

NORTHERN TELECOM

RELEASE 06.03
13 July 1998

PLN-8991-104

DMS-100* FAMILY

All Products Computing-Module Loads

Provisioning Manual - Active Detail

Volume 1 of 3

3Q1998

Standard 06.03

July 1998

* DMS-100 is a trademark of Northern Telecom Limited.

Volume Separator - Front Page

NORTHERN TELECOM

RELEASE 06.03
13 July 1998

PLN-8991-104

THIS PAGE IS INSERTED FOR PAGINATION.

RELEASE 06.03
13 July 1998

Provisioning Manual Table of Contents

Volume	1
Introduction.....	I-1
Chapter 1 Central Control Complex	1-1
Chapter 2 Switch Network	2-1
Chapter 3 Maintenance and Administration	3-1
Chapter 4 XPM Based Peripherals	4-1
Chapter 5 Line Peripherals	5-1
Chapter 6 Service and Maintenance Peripherals	6-1
 Volume	 2
Chapter 7 Service Circuits	7-1
Chapter 8 Link Peripheral Processor	8-1
Chapter 9 Application Processor Peripheral	9-1
Chapter 10 Remote Peripherals	10-1
Chapter 11 Common Channel Signalling Peripherals ..	11-1
Chapter 12 Telephone Operator Position Systems	12-1
Chapter 13 Terminals and Workstations	13-1
Chapter 14 Network Application Vehicle	14-1
Chapter 15 Power Equipment and Grounding	15-1
 Volume	 3
Chapter 16 Cabinets and Frames	16-1

NORTHERN TELECOM

PLN-8991-104

RELEASE 06.03
13 July 1998

Chapter 17	Miscellaneous Equipment	17-1
Chapter 18	Network Equipment	18-1
Chapter 19	Traffic Engineering	19-1
Chapter 20	Feature Engineering	20-1
Chapter 21	System Engineering	21-1
Chapter 22	Software	22-1

NORTHERN TELECOM

RELEASE 06.03
13 July 1998

PLN-8991-104

Introduction I

THIS PAGE IS INTENTIONALLY LEFT BLANK

RELEASE 06.03
13 July 1998

Section Contents

1.0	General	I-1
2.0	Practice Application	I-2
3.0	Manual Content Arrangement	I-3
3.1	Hardware Equipment Provisioning	I-3
3.2	Features and Systems Provisioning	I-7
3.3	Software Provisioning	I-8

THIS PAGE IS INTENTIONALLY LEFT BLANK

RELEASE 06.03
13 July 1998

1.0 General

This Provisioning Manual contains rules and guidelines for provisioning DMS-100 Family switching equipment.

The DMS-100 Family of digital multiplex switching systems consists of modular, software-controlled, digital central office and remote switches, providing local, toll and both local and toll service each with a variety of optional features. A complete telephone switching system, having the services, features and capacity, specified by the customer, is provided by an assemblage of equipment selected by type and quantity from the available range of DMS-100 Family hardware and software products. The following basic types of switches with their range of capacity are covered by the material provided in this Provisioning Manual.

- DMS-100
Local central office, having a capacity of 1500 to more than 100,000 subscriber lines.
- DMS-200
Toll central office, capable of handling from 400 to 60,000 trunks of various types.
- DMS-100/200
Local and toll central office, handling combinations of subscriber lines and trunks, within the ranges given for the DMS-100 and 200 above.

The content of this Manual is derived entirely from information sources which are continuously, maintained through the product development change control process. Provisioning information is extracted entirely from Engineering Change Memoranda (ECM) and software database sources. Previous Provisioning Manual content which was not extracted from ECMs has been removed. The suite of ECMs represent the most current provisioning information available. The ECMs and software database are updated on a daily basis as product changes are made and as new products are introduced.

Because this manual is prepared from extracts of routinely maintained information, its content represents the state of the DMS 100 family provisioning information at the time of issue.

In this issue, comprehensive software provisioning information is provided for software delivered in the PCL (Product Computing-module Load), PPL (Peripheral Product Load) and NCL (Non CM software Load) form. This information is extracted from Northern Telecom's PCA (Product Content Application) database.

2.0 Practice Application

The information contained in this Manual is subject to change with the progress of time, since Northern Telecom reserves the right, without notice, to make changes in equipment design or components as technology, design, engineering and manufacturing methods evolve. Such changes will be captured in future issues of this Manual.

RELEASE 06.03
13 July 1998

3.0 Manual Content Arrangement

The Provisioning Manual content is presented in the following general order of topics:

- Hardware equipment provisioning, e.g. Line Concentration Equipment, Switch Network, and Trunk Module Equipment provisioning.
- Features and systems provisioning, e.g. ADAS (Automated Directory Assistance System) and CLASS (Customer Local Area Signaling Service).
- Traffic based provisioning, i.e. determination of quantities based on traffic and grades of service requirements
- Software Provisioning

3.1 Hardware Equipment Provisioning

The arrangement of hardware equipment provisioning information follows the architectural pattern of a DMS-100 Family central office switch and its peripherals. This architecture is illustrated in Figure 1 on page I-4 , Figure 2 on page I-6 and Figure 3 on page I-7. Figure 1 is a high level block diagram showing the four major functional blocks comprising a DMS-100 Family switch.

- Central Control Complex
- Switch Network
- Peripheral Modules
- Maintenance and Administration

The Tops Positions block is included to illustrate the composition of TOPS equipped switches.

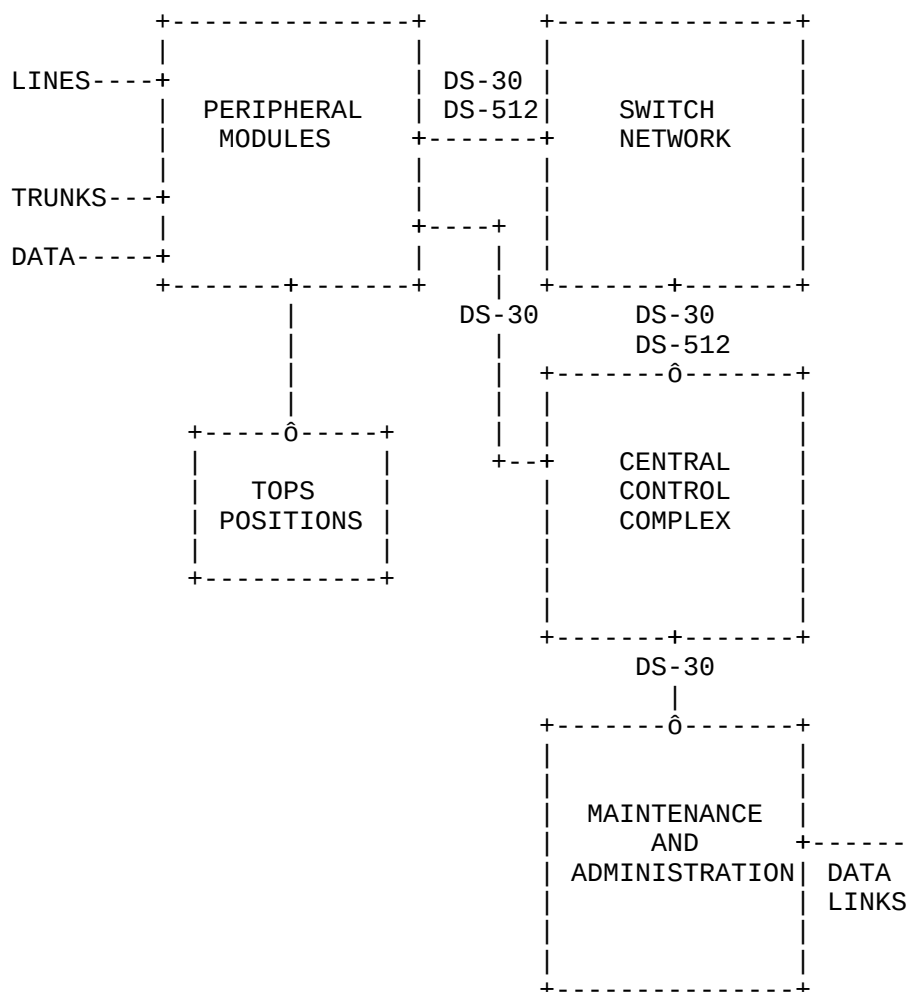


Figure 1. DMS 100/200 TOPS Block Diagram

Figure 2 on page I-6 shows in more detail the products which make up the DMS-100 Family Equipment, Peripheral Modules. From the Figure, the Peripheral Modules are broken down into two major groups:

- Host Peripherals
- Remote Peripherals

Host Peripherals are co-located with the Central Office Switch Network, Central Control Complex and Maintenance and Administration equipment. Remote Peripherals are installed in locations remote from the Central Office or Host Office which provides their control and maintenance functions. The blocks shown in Figure 2

RELEASE 06.03
13 July 1998

on page I-6 represent functional modules which may be housed in equipment frames or cabinets.

Peripheral modules include Line and trunk interfaces. They also include service circuits such as conference bridges, tone receivers circuits and digital announcement machines. Equipment providing condition scanning and alarms, and routine maintenance functions such as line testing are contained within the peripheral module equipment.

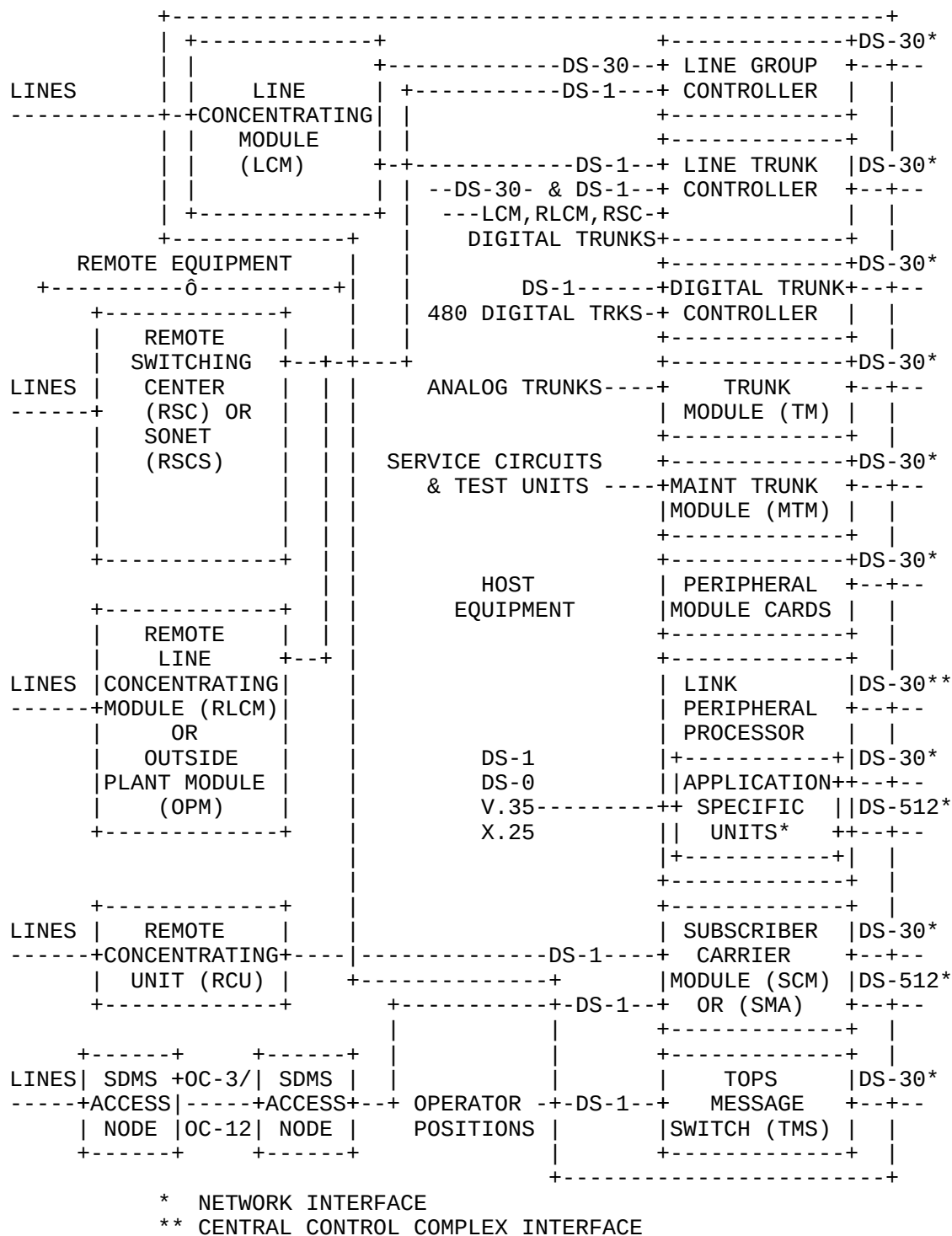


Figure 2. Peripheral Modules- Block Diagram

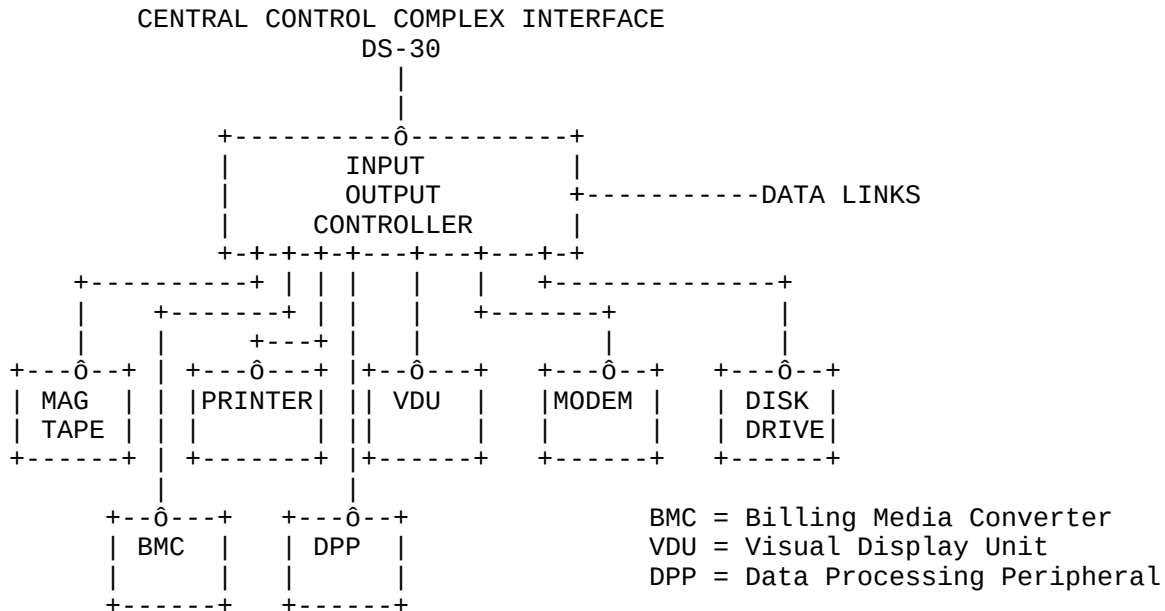


Figure 3. Maintenance and Administration Equipment - Block Diagram

A breakdown of the functional blocks within The Maintenance and Administration equipment for a DMS-100 Family Central Office (host) switch are shown in Figure 3

3.2 Features and Systems Provisioning

Provisioning of hardware and software is influenced by which of the available features and systems are incorporated in a DMS-100 Family switch. The Provisioning Manual provides a guide to provisioning of hardware and software for these features and systems. An example of a feature is CLASS (Customer Local Area Signaling Service). For this feature, the provisioning guide identifies which products and how many are required to provide CLASS features.

A system is loosely defined as a configuration of hardware and software required to provide a telephony or maintenance feature or service of variable functionality or size. The variability implies that 'engineering' is required to determine the correct equipment and quantities to provision. System provisioning information is based on the provisioning information outlined in "Hardware Equipment Provisioning" on page I-3 and "Software Provisioning" on page I-8

RELEASE 06.03
13 July 1998

3.3 Software Provisioning

The software provisioning information in this manual covers software delivered as either:

- PCL (Product Computing module Load)
- PPL (Peripheral Product Load)
- NCL (Non-CM Load)

the composition of PCLs, PPLs and NCLs is given in the Software Provisioning Chapter. That is, comprising DRUs, functional groups and functionalities are identified.

Some functionality is optional. Its selection is controlled by SOC (Software Optionality Control). These SOC functionalities are identified. Some SOCs and some software functionalities require special hardware provisioning. Where these are encountered, the required hardware is identified.

Order codes for orderable software products and SOCs are provided.

The software provisioning information provided in this manual is extracted directly from a Product Content Application database. This information is current at the date of publication of this manual.

NORTHERN TELECOM

RELEASE 06.03
13 July 1998

PLN-8991-104

Chapter 1

CENTRAL CONTROL COMPLEX

Central Control Complex
Chapter 1

THIS PAGE IS INTENTIONALLY LEFT BLANK

RELEASE 06.03
13 July 1998

CENTRAL CONTROL COMPLEX
Section Contents

1.0	ECM626 - DMS-SuperNode	1-1
1.1	Overview	1-1
1.1.1	Computing Module	1-2
1.1.2	Message Switch (MS)	1-4
1.1.3	System Load Module (SLM)	1-8
1.1.4	Circuit Pack Fills for NT9X01JB	1-9
1.1.5	Circuit Pack Fill Upgrades for NT9X01BA/JA	1-10
1.2	Hardware Provisioning	1-12
1.2.1	Hardware Usage Restrictions	1-12
1.2.1.1	Market Retired Optionality	1-13
1.2.2	Hardware Dependencies	1-14
1.2.2.1	P and C Side Port Requirements	1-14
1.2.2.2	DMS BUS Port Requirements	1-14
1.2.2.3	Circuits Per Card	1-14
1.2.2.4	Discrimination Numbering	1-14
1.2.2.5	NT40 Upgrade	1-14
1.2.2.6	BRISC	1-14
1.2.2.7	Power and Ground Cabling	1-15
1.2.3	Provisioning Considerations	1-15
1.2.3.1	MS Port Provisioning	1-15
1.2.3.2	Upgrade Table	1-18
1.2.4	MS Port Concentration Summary	1-21
1.2.5	Office Layout Information	1-41
1.2.6	Traffic Tables	1-43
1.2.7	XA-Core Retro Provisioning	1-43
1.2.7.1	Baseline Hardware for XA-Core	1-43
1.2.7.2	Unicore Fixed Configuration	1-44
1.2.7.3	Planning Considerations For Shelf Re- placement	1-46
1.3	Product/System Specification	1-48
1.3.1	Physical Characteristics	1-48
1.3.2	EMI/Earthquake Information	1-49
1.3.3	Sparing Information	1-49
1.3.4	Power Feed and Fusing Requirements	1-50
1.3.5	Current Drain Information	1-50
1.4	Software Provisioning	1-50
1.4.1	Required Software Packages and Interdependencies	1-51
1.4.1.1	Supernode 20 Product Component Packages and Features	1-51
1.4.1.2	Supernode Series 10 Product Component Packages	1-51
1.4.1.3	Supernode Series 30 Product Component Packages	1-52
1.4.1.4	Supernode Series 40 Product Component Packages	1-52
1.4.1.5	Supernode Synchronization Packages	1-52
1.4.1.6	System Load Module Software	1-53
1.4.1.7	BRISC	1-53
1.4.1.8	Affected Software Tables	1-53

RELEASE 06.03

13 July 1998

1.4.2	Software Usage Restrictions	1-54
1.4.3	Memory Provisioning	1-54
1.5	Real Time Impact	1-59
2.0	ECM632 - DMS SuperNode SE	1-60
2.1	Overview	1-60
2.1.1	SuperNode SE Applications	1-62
2.1.2	SuperNode SE Configurations	1-62
2.1.3	SuperNode/SuperNode SE Hardware Comparison	1-62
2.2	Hardware Provisioning	1-65
2.2.1	Hardware Usage Restrictions	1-65
2.2.1.1	Hardware Upgrades	1-66
2.2.2	Hardware Dependencies	1-67
2.2.2.1	P and C Side Port Requirements	1-68
2.2.2.2	DMS BUS Port Requirements	1-68
2.2.2.3	Circuits Per Card	1-71
2.2.2.4	Discrimination Numbering	1-71
2.2.2.5	SNSE to SuperNode Upgrades	1-71
2.2.3	Provisioning Considerations	1-74
2.2.3.1	Message Switch Provisioning	1-74
2.2.3.2	Link Interface Shelf (LIS) Provisioning	1-76
2.2.3.3	Enhanced Network Shelf (ENI) Provisioning	1-79
2.2.3.4	CM/SLM Shelf Provisioning	1-97
2.2.3.5	FBus Provisioning	1-101
2.2.3.6	Inter-MS Link Provisioning	1-102
2.2.3.7	LIU External Timing Source Generator Provisioning	1-103
2.2.3.8	C42(S/DMS) Cabinet Provisioning	1-104
2.2.4	Office Layout Information	1-104
2.2.5	Traffic Tables	1-105
2.3	Product/System Specification	1-105
2.3.1	Physical Characteristics	1-105
2.3.2	EMI/Earthquake Information	1-106
2.3.3	Sparing Information	1-106
2.3.4	Power Feed and Fusing Requirements	1-106
2.3.5	Current Drain Information	1-107
2.4	Software Provisioning	1-107
2.4.1	Required Software Packages and Interdependencies	1-107
2.4.2	Software Usage Restrictions	1-109
2.4.3	Memory Provisioning	1-110
2.5	Real Time Impact	1-110
3.0	ECM661 - International Cabinetized Message Switch 7, Model A	1-111
3.1	Overview	1-111
3.2	Hardware Provisioning	1-112
3.2.1	Hardware Usage Restrictions	1-112
3.2.2	Hardware Dependencies	1-112
3.2.2.1	P and C Side Port Requirements	1-112
3.2.2.2	DMS BUS Port Requirements	1-112

RELEASE 06.03
13 July 1998

3.2.2.3	Circuits Per Card	1-112
3.2.2.4	Discrimination Numbering	1-112
3.2.3	Provisioning Considerations	1-112
3.2.4	Office Layout Information	1-113
3.2.5	Traffic Tables	1-113
3.3	Product/System Specification	1-113
3.3.1	Physical Characteristics	1-113
3.3.2	EMI/Earthquake Information	1-113
3.3.3	Sparing Information	1-113
3.3.4	Power Feed and Fusing Requirements	1-113
3.3.5	Current Drain Information	1-113
3.4	Software Provisioning	1-113
3.4.1	Required Software Packages and Interdependen- cies	1-113
3.4.2	Software Usage Restrictions	1-113
3.4.3	Memory Provisioning	1-113
3.5	Real Time Impact	1-113
4.0	ECM806 - eXtended Architecture Core (XA-Core)	1-114
4.1	Overview	1-114
4.1.1	XA-CORE System Architecture	1-116
4.1.2	Supernode Conversions	1-117
4.2	Hardware Provisioning	1-118
4.2.1	Hardware Usage Restrictions	1-118
4.2.2	Hardware Dependencies	1-118
4.2.2.1	P and C Side Port Requirements	1-118
4.2.2.2	DMS BUS Port Requirements	1-118
4.2.2.3	Circuits Per Card	1-120
4.2.2.4	Discrimination Numbering	1-120
4.2.3	Provisioning Considerations	1-120
4.2.3.1	Processor Element (PE) Provisioning	1-120
4.2.3.2	Shared Memory(SM) Provisioning	1-120
4.2.3.3	IOP Provisioning	1-122
4.2.3.4	XA-Core Product Introduction Phases	1-123
4.2.3.5	XA-Core Product Structures	1-126
4.2.4	Office Layout Information	1-132
4.2.4.1	XA-Core Grounding	1-133
4.2.4.2	SWITCHBOARD CABLING RESTRICTIONS	1-133
4.2.5	Traffic Tables	1-134
4.3	Product/System Specification	1-134
4.3.1	Physical Characteristics	1-134
4.3.2	EMI/Earthquake Information	1-134
4.3.3	Sparing Information	1-134
4.3.4	Power Feed and Fusing Requirements	1-135
4.3.5	Current Drain Information	1-136
4.4	Software Provisioning	1-137
4.4.1	Required Software Packages and Interdependen- cies	1-138
4.4.2	Software Usage Restrictions	1-138
4.4.3	Memory Provisioning	1-138
4.5	Real Time Impact	1-138

THIS PAGE IS INTENTIONALLY LEFT BLANK

RELEASE 06.03
13 July 1998

1.0 ECM626 - DMS-SuperNode

1.1 Overview

The DMS-SuperNode is a technology upgrade for the DMS-100 family of digital switches. The DMS-SuperNode consists of DMS-Core and DMS-Bus subsystems. The Central Control Subsystem is superseded by these subsystems, designed to give enhanced performance and functionality.

The DMS-Core provides the call management and system control functions of the DMS-SuperNode. This is a duplicated device working in synchronous mode.

- It consists of a duplex Computing Module (CM) and a duplex System Load Module (SLM). SLM is a mass storage system which will be used to store office images and from which new loads, or stored images can be booted into the CM.

The DMS-Bus is a high speed transaction switch which supports messaging between the DMS-Core, Application processors, Peripheral processors and other elements of the DMS-SuperNode. The DMS-Bus is a duplicated device working in a loadsharing mode.

- It consists of a pair of Message Switches (MS) which provides an interface to all components.

In order to support the higher bandwidths and increased functional density of the DMS-Core components, optical fiber is utilized to carry messages between the subsystems. A new fiber based DMS internal link protocol, DS-512, is introduced to interconnect the DMS-Core CM and MS.

The DMS-SuperNode employs a new cabinet based packaging system. The C42 (S/DMS) SuperNode cabinet is a cost and functionally enhanced version of the existing SuperNode cabinet. The S/DMS cabinet is 42 inches wide compared with Cabinetized DMS's width of 28 inches. This new cabinet supports features, such as modified framework, based on Cabinetized DMS, "horizontal" (through line-up) cabling, and "hot slide" capability. "Horizontal" cabling meaning, cables running through a hole in the side of a cabinet and into the next cabinet(s) in the same lineup. "Hot slide" is the process of moving an operating cabinet into an existing lineup of equipment. The SuperNode incorporates a Frame Supervisory Panel (FSP), a Cooling Unit and accommodates four (4) equipment shelves. The following diagram gives a pictorial representation of this cabinet:

Figure 1. DMS-SuperNode in C42 Cabinet

RELEASE 06.03
13 July 1998

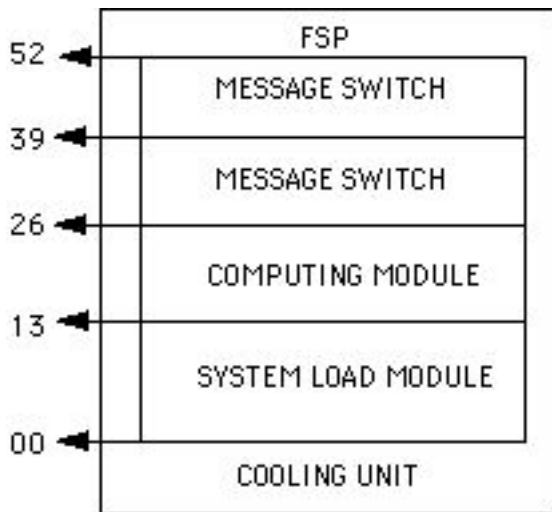


Figure 1. SUPERNODE IN C42 CABINET

1.1.1 Computing Module

A CM is a single shelf, fully duplicated, matched pair of processors and provisionable memory circuit packs. The two planes of the CM are interconnected by a mate exchange bus and CPU port crossover busses, which are used to checkpoint execution of the two processors.

Two RS-232-C ports are provided by each plane of the CM utilized for connection of reset terminals. Reset terminals replace the CP faceplate switches and indicators of the existing NT40 CPU with a more effective Man Machine Interface (MMI) that can be remoted. Via the MMI, individual processors of the CM and MS can be reset and their status displayed. One of the interfaces is designated for connection to a local terminal, the other for connection to a remote terminal via dataset equipment. Terminal equipment, furniture and datasets utilize MAP equipment.

The Enhanced Remote Terminal Interface (RTIF) CP (NT9X26AB), offers all the features of the existing NT9X26AA (ie. One RS-232-C terminal interface port and one RS-232-C / RS-422 interface port), plus:

- 2 mA current loop terminal interface port
- Status lamps indicating processor inactivity and sync

Approved VDU terminals, operating in current loop mode, can be connected directly to the NT9X26AB Enhanced RTIF CP at the cabinet bulkhead. In this mode, the back-to-back data units, modems or

RELEASE 06.03
13 July 1998

Rad current loop converters, which were needed for Isolated System Ground (ISG) compliance, are no longer required.

The SuperNode is evolving towards the provisioning of Central Processing Units (CPU). Capacity of the SuperNode is based upon the software feature package selected to the Computing Module CPU circuit pack provisioned.

The NT9X13JA is an optionally offered Central Processing Unit (CPU) circuit pack which provides from 1.2 to 1.4 times capacity of the Central Control Complex based on DMS100 at 75% Central Processor Occupancy (CPO). See "MS Port Group (Chain)" New offices should not be engineered using this processor. See "MS Port Group (Chain)" for processor upgrade for BCS35 and above loads.

The NT9X13BC is the baseline offered MC68020 based circuit pack, which provides 2.0-2.2 times capacity of the Central Control Complex based on DMS100 at 75% CPO. The NT9X13BC is MD replaced by NT9X10AA.

The NT9X13GA is an optionally offered Central Processing Unit (CPU) circuit pack which provides 1.4-1.5 times the real time capacity of the NT9X13BC CPU circuit pack based on DMS100 at 75% CPO.

The NT9X13HB is an optionally offered Central Processing Unit (CPU) providing 1.7-1.8 times the real time capacity of the current NT9X13BC. It is equipped with a Motorola 68030 microprocessor running at a clock speed of 40 MHz. The NT9X13HB is MD replaced by NT9X10BA.

The NT9X10AA 33 MHz 88000 BRISC CPU Circuit Pack will provide a real-time performance gain of 2.5 times over the NT9X13BC CPU. The NT9X10AA may replace existing 68020 and 68030 processor cards, provided the corresponding paddleboard is also replaced and a BRISC software load is utilized.

When NT9X10AA is equipped with 24 MBytes memory and it is operating in MEMbus protocol, the system is called BRISC Series 50. When NT9X10AA is equipped with 96 MBytes memory and it is operating in BURSTbus protocol the system is called BRISC Series 6 option. The Series 60 BRISC option for Supernode is projected to provide approximately 1.12 X Series 50 capacity based upon DMS100 at 75% CP Occ.

The NT9X10BA 60MHz 88110 BRISC CPU Circuit Pack is an optionally offered Central Processing Unit providing 1.85 times the real time capacity of the Series 50 processor and is equipped with 256 megabytes of on-board memory. Product is retired for North American applications.

RELEASE 06.03
13 July 1998

The NT9X10CA 60MHz 88110 BRISC CPU Circuit Pack is an optionally offered Central Processing Unit providing 1.85 times the real time capacity of the Series 50 processor and is equipped with 512 megabytes of on-board memory.

The NT9X26DA/DB/DC/EA/FA BRISC RTIF Paddleboards are functionally equivalent to the NT9X26AB RTIF paddleboard. The NT9X26DA/DB/DC is required with the NT9X10AA BRISC CPU when used as a Series 50 processor. The NT9X26DB/DC is required with the NT9X10AA BRISC CPU when used as a Series 60 processor.

The NT9X26EA RTIF paddleboard is required with the NT9X10BA BRISC CPU.

The NT9X26FA RTIF paddleboard is required with the NT9X10CA BRISC CPU.

In addition to its duplicated processors, communication ports and reset terminals interfaces, the CM Processor Shelf can accommodate up to 10 memory circuit packs per plane. The 96 Mbyte CP is the memory circuit pack generally available for all SuperNode offices.

It is the responsibility of the System and Equipment Application Engineering groups to reference equipment lists (i.e. URTS list or baseline reports) to determine product availability.

1.1.2 Message Switch (MS)

The Message Switch consists of a CPU and Memory Subsystem, Port Interface Subsystem, Mapper Subsystem, and the Clock Subsystem.

The DMS-Bus is built around two major internal buses. The Processing unit bus (P-Bus), is used to communicate with all other components of the DMS-Bus. The Transaction bus (T-Bus) on which messages are transmitted from port to port is a synchronous bus operating at 4.096 MHz.

MS is a high capacity communication facility that functions as the messaging hub of the DMS-Core. DMS-100 subsystems, I/O and Networks, are connected to ports on the MS. For redundancy purposes two (2) MS planes are utilized, each interfaces to both planes of the CM, Network Modules and IOC. Message route diversity is thus ensured to protect against equipment failure. Operationally the MS share the system messaging load, but are each capable of supporting the full load in the event of equipment failure.

Currently, the Supernode internally generates the office clock reference for the rest of the system in accordance with Stratum II, Stratum 2.5, or Stratum III standards. Furthermore; the DMS Bus External Clock Interface allows synchronization of Supernode to an external, highly stable clock source. This External Clock Interface allows synchronization of the internal clock reference

RELEASE 06.03
13 July 1998

to an external Stratum I (Cesium/Rubidium), Loran Composite Master (Loran-C), Composite Clock System (CCS - North America), or Digital Clock System (DCS - Japan) source. At the present time, cables to connect a Loran-C reference are not available, therefore this option is not yet supported.

Circuit packs which implement this feature are:

- NT9X53AD DMS-Bus System Clock CP
- NT9X53AC Combined Clock (MD status)
- NT9X53AB MS System Clock CP (MD status)
- NT9X54AC DMS Bus External Clock Interface PB
- NT9X54AD DMS Bus Ext Clock I/F PB (Japan)

For applications requiring external clock interface (i.e. Stratum I, Stratum II, Stratum III, and DMS Synch.), provision one (1) NT9X53AD DMS-Bus System Clock CP, one (1) NT9X53AC Combined Clock, or one (1) NT9X53AB MS System Clock CP per MS shelf. The NT9X53AD is a replacement for the NT9X53AC or NT9X53AB and is the preferred choice.

The NT9X53AD will not support Stratum 2 configurations until NA005. Provision the NT9X53AC for Stratum 2 configurations in software releases below NA005.

For all North American external clock reference applications, provision one (1) NT9X54AC DMS Bus External Clock Interface PB per MS shelf. For Japan applications, provide one (1) NT9X54AD DMS Bus External Clock Interface PB per MS shelf.

The NT9X53AD requires a minimum clock interface paddleboard of NT9X54AB, but the NT9X54AC/AD is recommended on the MS.

The clock card PEC in each MS must be the same.

There are no restrictions on the mix between clock cards in the MS and LMS as long as individual rules are not violated. Maximum robustness is obtained when both the MS and LMS use NT9X53AD clock cards.

The following table gives a summary of the supported office configurations for each vintage of NT9X53 on a per software release basis.

Clock Applications Table

RELEASE 06.03
13 July 1998

NT9X53						
S/W	Office	Stratum	AA	AB	AC	AD
BCS36UP 10	Master Int.	3 2.5 2	YES YES YES	YES YES YES	YES YES YES	N/A N/A N/A
BCS36UP 10	Slave	3 2.5 2	YES YES YES	YES YES YES	YES YES YES	N/A N/A N/A
BCS36UP 10	Master Int.	3 2.5 2	NO NO NO	YES YES YES	YES YES YES	N/A N/A N/A
NA001 to NA004	Master Int.	3 2.5 2	YES NO NO	YES NO NO	YES NO NO	YES NO NO
NA001 to NA004	Slave	3 2.5 2	YES YES YES	YES YES YES	YES YES YES	YES YES NO
NA001 to NA004	Master Ext.	3 2.5 2	NO NO NO	YES YES YES	YES YES YES	YES YES NO
NA005	Master Int.	3 2.5 2	YES NO NO	YES NO NO	YES NO NO	YES NO NO
NA005	Slave	3 2.5 2	YES YES YES	YES YES YES	YES YES YES	YES YES YES
NA005	Master Ext.		NO NO NO	YES YES YES	YES YES YES	YES YES YES

Provision Cable Assembly per Clock PB for each MS shelf as follows.

Clock Paddleboard for MS Shelf		
Qty	Cable PEC	Clock Types Supported
2	NT9X0192	Cesium/Rubidium
1	NT9X0175	Stratum II, Stratum 2.5, Stratum III, CCS, DCS

Cables running from the Supernode MS shelf bulkhead to a customer-provided external clock source, shall be provided by the customer.

RELEASE 06.03
13 July 1998

The external components can be either a non-synchronizable Master Reference or a synchronizable clock as follows:

- Stratum I requires the Master Reference Frequency frame
- Stratum II requires the Remote Oscillator shelf in an IOE frame equipped with the Stratum II circuit packs.

Supernode Offices installed in the U.S. must conform to Stratum (I/II/III) synchronization requirements. Stratum III capability has been built into the Supernode.

When the ATT/Bellcore Stratum standards are not a requirement, a non Stratum rated synchronizable clock has been used in offices requiring synchronization. This has been equipped on the CCC frame through the application of Synchronizable Master Clock Oscillator and Synchronizable Master Clock Counter. This pair of cards does not conform to the U.S. Stratum standards. Canadian installations of Supernode are required to conform to this existing synchronization level so this capability is being provided on an external oscillator shelf equipped on an IOE frame.

For Canadian offices only, DMS Synchronization to Stratum 2.5 reference is offered as follows:

The Clock for Supernode Stratum 2.5 synchronization is provided on the Remote Oscillator Shelf (ROS). The clock for Supernode Stratum II is provided on a Remote Oscillator Shelf (ROS). These two shelves are fully ISG compliant and consist of two separate backplanes. Backplane 'A' is located at slot positions 1-14 and backplane 'B' is located at positions 15-27.

When assigning either ROS shelf to the IOE frame, two sets of alarm and control signals and two power feeds are required at the FSP. Therefore, two (2) shelf positions on the IOE frame must be reserved. In particular, shelf position 18 must be reserved and one of either position 4 or 32. The ROS shelf may be mounted at either of positions 04 or 32.

To accommodate the alarm and power feeds for position 18, provision the second power control and alarm circuit pack, NT0X36AB on the IOE frame FSP, NT0X28AL.

'Hot' spares for the NT3X95BB shelf may be provided by equipping positions 09 and 23 with NT3X16BB Oscillator CP. 'Hot' spares for the NT3X95AB shelf may be provided by equipping positions 09 and 23 with NT3X16AB Oscillator CP. This would be done to overcome the initial aging of crystal oscillators. 'Hot' spares will be provided only on customer request. If they are equipped, the filler face plates always provided at positions 09 and 23 must be discarded.

The following Change Kits are available to upgrade existing ROS Shelves for ISG compliance with Supernode:

RELEASE 06.03
13 July 1998

1. NT0X43XB - Stratum II ROS ISG Upgrade Kit
2. NT0X43XC - Stratum 2.5 ROS ISG Upgrade Kit

Cabling

1. Provide local cabling for ROS shelf alarm and power connections as follows:
2. ROS Shelf Pos. Cables Required
3. 04 NT0X4301 & NT0X4302 for 'A' backplane
NT0X95BJ & NT0X95BK for 'B' backplane
4. 3 NT0X95BF & NT0X95CE for 'A' backplane
NT0X95BA & NT0X95BD for 'B' backplane
5. Each ROS shelf requires two (2) twenty amp fuses at the PDC frame one A and one B feed. Reference CA0X15 for Cabling details.
6. For NT0X43WC and NT0X43WD options see rules 28 and 29 in EMA5-01-000. (e.g. Interlocking Wiring NT0X43WC for Stratum II or 2.5 ROS when used with DMS Core for position 04. Similarly, NT0X43WD for position 32).

1.1.3 System Load Module (SLM)

The optional System Load Module (SLM) is a mass storage system which is used to store office images and from which new loads or stored images are booted into the CM. Originally, two (2) sizes of SLM units (called SLM I and SLM II) were available for use with SuperNode. SLM I is discontinued, leaving SLM II and SLM III.

SLM II is designed for larger DMS-Core loads that will exceed the 30 M-byte limit of the current MTD and because faster boot load and image dump rates are required. The SLM II is packaged into a single replaceable unit which consists of a 5 1/4" hard disk drive, a 1/4" streaming cartridge tape drive and controller CP.

The System Load Module II (SLM II) provides greatly increased non-volatile mass storage capacity compared to SLM I. This is needed to support the increasing number and size of system image files on the Supernode.

The SLM II is a hardware requirement for offices ordering NA001 or higher Product Layers. SLM II is now MD, all new offices will order SLM III.

The SLM II has the following architecture: A single replaceable package consisting of a 5-1/4" hard disk drive, 1/4" streaming cartridge tape drive, and controller CP.

RELEASE 06.03
13 July 1998

The SLM II hard disk has a capacity of 600 MBytes and the tape cartridge has a capacity of 250 MBytes.

The SLM III provides greater capacity than SLM II and may be used in offices at NA004 or greater. The SLM III provides a 3.5 inch disk drive with a maximum capacity of 1 GByte, a tape drive with a maximum capacity of 500 MBytes which requires a SLM III tape cartridge, and a controller card.

An upgrade from SLM II to SLM III is required when load image size exceeds 240 MBytes. The load image is not the same as CM load size. The formula for calculating load image is: $PS + .6 * DS + .72 * MS + FASTMEM$, where PS = Program Store, DS = Data Store, MS = Message Switch load size, and FASTMEM = 27.82M (28.00M in NA005 and higher) when the processor type is a Series 50 or 60. Fastmem is automatically calculated for NA005 and above software loads. The MS load size is 7M, 10M, or 16M depending on office configuration. 16M is the only MS load supported in NA004 and higher. The raw PS and DS values in KBytes can be obtained from FACET and converted to MBytes by dividing by 1024.

Tapes written by SLM III on the SLM III 500 MByte tape cartridge are not compatible with the SLM II or the SLM I. However, the SLM III can read 150 MByte and 250 MByte tape cartridges produced on SLM II or SLM I. SLM III can also write to 150 MByte and 250 MByte SLM II-or SLM I-compatible tape cartridges.

Note: The SLM III 500 MByte tape cartridge is labeled 525 MBytes, but software requirements limit the capacity to 500 MBytes.

SLM III hardware can be retrofitted without requiring an E1 condition. However, the CM is required to operate in simplex while the upgrade is performed, which creates an E2 situation. The Procedure used to upgrade a SLM II to a SLM III is the same as the procedure used to upgrade a SLM I to a SLM II.

SLM III functionality is essentially the same as the SLM II. The main difference is that the SLM III offers an increased maximum disk drive capacity of 1 GByte and an increased maximum tape drive capacity of 500 MByte.

1.1.4 Circuit Pack Fills for NT9X01JB

Circuit pack fills detail the always provided CP's at the shelf level which are associated with a unique function. Functional names are given to the circuit pack fills. The following fills are defined:

The pack fills NT9X04AL, NT9X06AF and NT9X07AC must be used with detail engineering.

- NT9X04AL Message Switch Circuit Packfill
- NT9X06AF Computing Module Processor Shelf CKT Packfill

RELEASE 06.03
13 July 1998

- NT9X07AC System Load Module Common Circuit Packfill

The circuit pack fills listed below MUST BE USED ONLY WITH NTZZ01RA.

- NT9X04AH Message Switch Processor Shelf
(NTZZ01RA uses release 03 (ref. SL9X04AH 01 03))
- NT9X06AD Computing Module Processor Shelf
- NT9X07AB System Load Module

Circuit pack fills and provisionable CPs are provisioned at the cabinet model level in the Modular Structure (MS) document.

1.1.5 Circuit Pack Fill Upgrades for NT9X01BA/JA

The following Product Change Kits (PC Kits) have been developed to field upgrade the CM & MS Common Circuit Pack fills.

PC Kits			
NOTE	PC Kit	Affected PEC	New PEC
	NT9X04AD	NT9X04AA	NT9X04AB
	NT9X04AF	NT9X04AB	NT9X04AE
1	NT9X04AZ	NT9X04AE	NT9X04AG
1	NT9X04AY	NT9X04AG	NT9X04AH
2	NT9X06CA	NT9X06AA	NT9X06AB
	NT9X06CC	NT9X06AA NT9X06AB	NT9X06AC
	NT9X06AZ	NT9X06AC	NT9X06AD
	NT9X06CC	NT9X07AA	NT9X07AB

NOTE 1: The NT9X04AE may be upgraded directly to NT9X04AH if the external clock interface is not required. The NT9X04AY is no longer required to update either the NT9X04AE to the NT9X04AH or the NT9X04AG to the NT9X04AH, and has been made MD.

NOTE 2: NT9X06AA/AB has been rated MD. Replaced by NT9X06AC.

The PC Kit NT9X04AD must be provisioned for all offices which specified the NT9X04AA MS. The '04AA' MS Common CP fill was ordered for early verification and pre-general release offices. The NT9X04AD PC Kit was developed in order to eliminate the manufacture discontinued NT9X14AA CP found in the NT9X04AA MS, and to bring the MS Common CP up to general availability status.

The PC Kit NT9X04AF must be provisioned for all offices which specified the NT9X04AB MS. The NT9X04AF PC Kit was developed in order to eliminate

RELEASE 06.03
13 July 1998

the manufacture discontinued NT9X13DA CP found in the NT9X04AB MS, to bring the MS Common CP up to BCS-26 gating hardware status, and to make the Subsystem Clock PB (NT9X54--) provisionable. The NT9X04AF PC Kit will convert the pack fill from an NT9X04AB to an NT9X04AE.

When external clock reference interface feature is required in an existing office, provision one (1) NT9X04AZ MS Clock Interface Upgrade Kit per cabinet. This kit upgrades the NT9X04AE to NT9X04AG MS Processor Shelf Common CP, modifies the MS bulkhead, and removes existing always-provided clock interface cables, CPs and PBs. It contains sufficient hardware to upgrade both MS shelves. Furthermore, provision NT9X53AB MS System Clock CP, NT9X53AC Combined Clock CP, or NT9X53AD DMS-Bus System Clock CP in slot 8F and NT9X54-- Clock Interface PB in slot 8R. The NT9X53AD is a replacement for the NT9X53AB or NT9X53AC and is the preferred choice.

Note that, the NT9X53AB requires BCS28 or higher, the NT9X53AC requires BCS31 or higher, and the NT9X53AD requires NA001 and higher. Hence NT9X53AB must be ordered for offices running with BCS28 to BCS30. The NT9X53AC is recommended for offices running with BCS31 to BCS36. The NT9X53AD is recommended for offices running with NA001 and higher. If the office is configured as a master external Stratum 2, the NT9X53AC should be provisioned instead of the NT9X53AD.

The PC Kit NT9X06CA must be provisioned for all offices which specified the NT9X06AA CM and are equipping the office with NT9X14DA 24 MByte Memory CP. The PC Kit will convert the pack fill from a NT9X06AA to an NT9X06AB. The NT9X13BB/BC CPU Processor CP is provisionable to the '06AB' CM and is required when providing 24 MByte Memory CP, thus the NT9X13BB/BC CP must be provisioned in addition to the NT9X06CA PC Kit for field upgrades.

Note: The NT9X13BB/BC is MD replaced by NT9X10AA/BA.

Note that the NT9X06AA/AB CM is rated Manufactured Discontinued and replaced by the NT9X06AC. Thus when upgrading the NT9X06AA, the NT9X06CC PC Kit must be specified converting the CM to the NT9X06AC level.

The PC Kit NT9X06CC must be provisioned for all offices which specify the NT9X06AA/AB CM and/or the NT9X07AA SLM when equipping the office with BCS 26. The PC Kit provides designation labels to convert the CM to the NT9X06AC and the SLM to the NT9X07AB level. At this level of modular packfill the NT9X12AB/AC/AD CPU Port CP is provisionable and must be ordered when field upgrading an office with BCS 26.

Note: The NT9X12AB is MD and replaced by the NT9X12AD.

When NT9X26AB Enhanced RTIF CP is required in an existing office for ISG compliance, provision one (1) NT9X06AZ CM Current Loop Upgrade Kit, one (1) NT9X04AZ PC Kit and two (2) NT9X26AB Enhanced Remote Terminal CP per cabinet. The NT9X06AZ kit upgrades the NT9X06AC to NT9X06AD CM Processor Shelf Common CP, modifies the CM bulkhead, and removes the

RELEASE 06.03
13 July 1998

existing always provided RTIF cable and NT9X26AA CP. When upgrading the CM with the Current Loop RTIF, the MS must be upgraded to avoid mixing the NT9X26AA and NT9X26AB in the same cabinet. There is no kit required when upgrading the NT9X26AA on the MS shelf.

For BRISC Series 50 Mixed Memory offices, provide the NT9X26DC RTIF. For BRISC 50/60 offices, provide NT9X26DA/DB/DC on the CM. For BRISC 70 offices, provide NT9X26EA on the CM. For BRISC 70EM offices, provide NT9X26FA on the CM. When upgrading to BRISC there is no requirement to upgrade the MS RTIFs unless current loop connection to the MS is required.

Also, for ISG requirements, if the office has 54AA paddleboard and 53AA clock, 54AA must be removed. The 54AB/AC provides a transformer for separation. The newer 9X54AC/AD cannot be used with 9X53AA clock. In this scenario, the clock must be upgraded to 9X53AC/53AD. The NT9X53AD is the recommended clock card.

Note that, the NT9X53AB requires BCS28 or higher, the NT9X53AC requires BCS31 or higher, and the NT9X53AD requires NA001 and higher. If the office is configured as a master external Stratum 2, the NT9X53AC should be provisioned instead of the NT9X53AD. The NT9X04AZ Kit upgrades the NT9X04AE to NT9X04AG MS Processor Shelf Common CP. Upon application of this kit the RTIF CPs are now considered to be provisionable CPs and must be ordered separately to be compatible with the contents of NT9X04AG Common CP.

1.2 Hardware Provisioning

1.2.1 Hardware Usage Restrictions

The DMS-SuperNode supports the same termination capacity as the CCC (i.e. up to 32 NM's per plane and up to 6 IOC's), and with its expanded capabilities can terminate a 128K ENET network and 13 IOCs for Public Carrier Networks or 20 IOCs for Wireless Networks.

The NT9X54AC or NT9X54AD Clock Interface PB is compatible with NT9X54AB but NOT NT9X54AA. If an existing MS shelf is equipped with NT9X54AA for an internal clock reference application, this must be removed and replaced with NT9X54AC/AD, if the mate MS shelf is being equipped with NT9X54AC/AD.

Cabinetized DMS has a port restriction of forty (40) connections per MS shelf (twenty (20) single port access per bulkhead). In other words, Cabinetized DMS is restricted to 40 Ports per MS shelf. Therefore the maximum number of NT9X17AA/ADs is 10 per MS Shelf for Cabinetized(streamline) DMS only.

The NT9X62BA will be available for Inter-MS-Link (IML) feature in BCS35.

RELEASE 06.03
13 July 1998

The NT9X10AA 33 MHz 88000 BRISC CPU Circuit Pack does not support the NT9X14BB 6MB Memory.

When NT9X10AA is equipped with 24 MBytes (NT9X14DB) the system is called BRISC Series 50. When the NT9X10AA is equipped with 96 MBytes (NT9X14EA) the system is called BRISC Series 60 (for BCS 36 and above loads). The RTIF NT9X26DB/DC must be provisioned with the Series 60 option and the NT9X26EA RTIF must be provisioned with the Series 70 option. Provision the NT9X26FA RTIF with the Series 70EM option. Use of NT9X14BB/DB is not permitted with BRISC Series 60 option. When the NT9X10AA is equipped with both 24 MByte (NT9X14DB) and 96 MByte (NT9X14EA) cards, the system is called BRISC Series 50 Mixed Memory (50MX). The NT9X26DC RTIF must be provisioned with 50MX.

Note: BRISC Series 50 Mixed Memory does not support the NT9X26DA or NT9X26DB RTIF. The NT9X26DA and NT9X26DB RTIF must be replaced by the NT9X26DC RTIF.

Upgrades to BRISC Series 50 Mixed Memory are restricted to offices containing BRISC Series 50 and the NT9X26DC RTIF.

BRISC Series 50 Mixed Memory requires NA004 or above.

Burst mode is not supported by BRISC Series 50 Mixed Memory.

SLM III can only be installed in offices with a base software load of NA004 or greater.

Tapes written by SLM III on the SLM III 500 MByte tape cartridge are not compatible with SLM II or SLM I. However, SLM III can read cartridges produced on SLM II or SLM I. SLM III can also write to SLM II- or SLM I-compatible tape cartridges.

1.2.1.1 Market Retired Optionality

The following products are no longer orderable in the NA100 market. These restrictions do not apply to STP or any other market.

- SuperNode Series 20 (NT9X13BC), 30 (NT9X13GA), and 40 (NT9X13HB). All new initials should order a minimum of Series 60. All processor upgrades should be to a minimum of Series 50 with mixed memory.
- 24M Memory Card (NT9X14DB). The 96M memory card (NT9X14EA) should be ordered on all new jobs. It is strongly recommended against ordering new 24M cards on extensions. Memory extensions can be filled by redeploying existing 24M cards freed up by Series 60 upgrades within the network.
- SLM II (NT9X44AB). The SLM III (NT9X44AD) should be ordered on all new SLM orders, the SLM II is now MD.
- BRISC 70 (NT9X10BA). The SR70EM (88110 BRISC) should be ordered for all NA offices.

RELEASE 06.03
13 July 1998

1.2.2 Hardware Dependencies

BRISC Series 50 Mixed Memory requires the NT9X26DC RTIF and does not support the NT9X26DA RTIF or the NT9X26DB RTIF.

1.2.2.1 P and C Side Port Requirements

Not applicable

1.2.2.2 DMS BUS Port Requirements

Not applicable

1.2.2.3 Circuits Per Card

Not applicable

1.2.2.4 Discrimination Numbering

Not applicable

1.2.2.5 NT40 Upgrade

Commissioning Engineering is to supply an IOE frame equipped with an MTD, IOC, Term-CP and Terminal, to be used when upgrading an NT40 office to DMS-SuperNode.

For U.S. offices, Isolated System Grounding (ISG) will be provided for all offices receiving a DMS-SuperNode. To be consistent with the evolving Industry Standards (TA-EOP-000295), it is recommended that all DMS-SuperNode office upgrades include ISG. See ECM-289 for provisioning rules on ISG for initial offices.

All DMS-SuperNode offices must be upgraded to BCS 26 S/W and BCS 26 Gating H/W (Reference ECM510 Gating H/W).

1.2.2.6 BRISC

The prerequisites for BRISC are as follows:

- NT9X12AD (NT9X12AB/AC on CM, SLM must be replaced)
- NT9X14DB (NT9X14BB on CM must be replaced)
- NT9X44AB (NT9X44AA must be replaced)
- For Series 50 provision NT9X26DA/DB/DC RTIF.
- For Series 50 Mixed Memory provision NT9X26DC RTIF.
- For Series 60 provision NT9X14EA memory and NT9X26DB/DC RTIF.
- For Series 70 provision NT9X14EA memory and NT9X26EA RTIF.

RELEASE 06.03
13 July 1998

- For Series 70EM provision NT9X14EA memory if required, and NT9X26FA RTIF. Since offices suffer a real time degradation when external memory cards are added to the 512 Megabyte on-board memory, those offices which will require extra memory should be migrated to XA-Core when those cabinets become available.
- 250MB tape (DC6250) for scratch purposes.
- 5 0MB tape (DC6525) for scratch purposes.

1.2.2.7 Power and Ground Cabling

The power and ground cabling of the S/DMS cabinet depends on the site configuration. Installations that do not utilize horizontal cabling, require the power cables entering the cabinet to be fed through EMC filters. On the other hand, use of S/DMS cabinet in a Cabinetized DMS lineup do not need the power filters.

1.2.3 Provisioning Considerations

DMS-SuperNode is provisioned to support the office configuration in four (4) major respects:

1. DS-30 message links required for NMs, IOCs and LIMs
2. CM memory required
3. processor required for the office configuration
4. SLM required to support storage capacity requirements

The Network frame must be modified for use with the DMS-SuperNode. See ECM 261 for provisioning rules on connection of Network Modules to the DMS-SuperNode.

The Input Output Controller (IOC) Modules must be modified for use with the DMS-SuperNode. See ECM 316 for IOC provisioning rules. Initial DMS-SuperNode offices must provision IOC shelves on IOE frames.

For office upgrades to the DMS-SuperNode that are currently utilizing the Message Device and Controller (MDC) module for I/O requirements, external (i.e. IOE/MTC) mounted IOC shelves must be provisioned.

1.2.3.1 MS Port Provisioning

The MS occupies two (2) planes and two (2) shelves on a DMS-SuperNode. Message port requirements are calculated as follows:

When provisioning ports on a Message Switch Shelf, a number of factors need to be considered. (Note that both MS Shelves must be equipped in exactly the same way.)

RELEASE 06.03
13 July 1998

There are 18 slots available for Network, IOC/EIOC, and LIM connections on each MS Shelf. Note during the upgrade, the Network slots must be shared between the existing NMs and the new ENET.

- Each NM requires two (2) ports (each must be on an adjacent card).
- Each IOC requires one (1) port.
- Each EIOC requires two (2) ports (each must be on a separate card).
- Each LIM requires four (4) ports (each pair must be on a separate card).

As an example, for an office that has 5 networks, 3 IOC and 2 LIMs:

EXAMPLE OFFICE			
The number of MS ports required per plane =			
No. NM's X Ports Per NM	Number of IOC's-	No. LIM's X Ports Per LIM	Total
(5 x 2) +	3 +	(2 x 4)	= 21 ports

Remember that port circuit packs are provisioned in pairs per MS plane (i.e. in multiples of four) as noted in "Message Switch (MS)" This allows Network Module links from the two planes to terminate on physically different port cards.

Each MS 4 Port CP (NT9X17AA/AD) can connect up to four (4) message ports.

The NT9X17AD is essentially the same circuit pack as NT9X17AA, and it provides full bandwidth capability and can be used in all present applications. The NT9X17AD requires BCS34 and higher. The NT9X17AD card is based on the existing NT9X17AA design and is used with the NT9X62BA, SR-512 interface paddleboard in FLIS, AP/FP and SDM-FT applications.

With the introduction of ENET, the requirement for MS ports greatly increases. Therefore, a 64 port CP (NT9X17DA) is introduced. The 4 port CP (NT9X17AA/AD) is retained for use with IOC, CM, NM and LIM. MS port assignments are first provisioned for IOCs. This will normally amount to two (2) NT9X17AA/AD and two (2) NT9X23AA per plane assigned to the highest numbered slots on the MS shelf. Unused ports from these cannot be used for ENET. However, the unused ports can be used for Inter-MS -Links.

The NT9X17CA, 128 port card is the continuous evolution of the SuperNode product that provides double the NT9X17DA (64 port card) capacity. This evolution increases the total number of ports that can be supported using the DMS-Bus shelf and allows a much greater fan-out from the DMS-Bus. The NT9X17CA is fully compatible with its predecessors in terms of functionality. They can be inter-changed and co-exist in the Message Switch with proper commissioning procedures.

RELEASE 06.03
13 July 1998

The NT9X17CA provides 128 independent ports on a single CP. Each port acts as an independent entity on the T-Bus, being able to transmit and receive messages identified by its own unique port address. Each port represents a bi-directional messaging path, with the T-Bus providing a routing mechanism.

The NT9X17CA can be used to support applications which require more than 64 messaging ports. In situations, where more than 64 ports but less than 128 ports are required, the NT9X17CA can be used in lieu of the NT9X17DA and therefore eliminate the requirement to chain two (2) 9X17DAs. This will reduce the requirement of the MS port Expander card and hence free up slots on the MS.

The NT9X62BB (4 Port SR128 Paddleboard) has been introduced to support a new application. The paddleboard along with a NT9X17AD requires two slots per MS and supports the Enhanced LPP.

The NT9X62BA (SR 512 Fiber Paddleboard), also supports a new application. The paddleboard along with a NT9X17AD requires two slots per MS and supports the Fiberized LPP.

ENET Interface

The following equipment is the minimum requirement in the Message Switch (MS) to interface with the ENET. The NT9X25AA and NT9X25BA are required, only if a chain of NT9X17DAs are required.

- NT9X13DC, MS CPU Processor CP (4 Megabytes)
- NT9X17DA, MS 64 Port CP
- NT9X20BB, ENET/MS Fiber Interface PB
- NT9X25AA, MS Port Expander PB
- NT9X25BA, MS Port Expander/Terminator PB
- NT9X49CB, MS P-Bus Terminator CP (Tracer Card)
- To interface with ENET, the MS requires 10 Megabytes of memory. This is achieved in the following ways:

ENET INTERFACE					
QTY	PEC	QTY	PEC	Applica- tion	NOTE
2	NT9X13DC (4 MB)	2	NT9X14BB (6 MB)	Canadian & U.S	
2	NT9X13DB (1 MB)	2	NT9X14DB (24 MB)	Richardson	1

RELEASE 06.03
13 July 1998

- Note 1: PM Note: New SN DPCCs should not be provided with the NT9X14BB MS memory for BCS-31 and above loads.

NOTE:

1. This configuration is non-standard and will not be supported by the formal design documentation. Earlier releases of NT9X13DB are not compatible with NT9X25AA/BA, later releases are. Release numbers are transparent to our documentation and process. Hence, Richardson will be responsible for keeping track of the proper type of NT9X13DB CPs for their offices.

Existing Offices With NT9X01BA/JA

The MS may be converted to the minimum level required to interface the ENET by removing the NT9X49CA and making slot 32F provisionable. The Product Change Kit (PC Kit) NT9X04AY is no longer needed for this upgrade and has been rated MD. Other existing PC Kits can be applied to existing MS Common CP Fills in order to bring them up to the necessary level.

1.2.3.2 Upgrade Table

UPGRADE TABLE			
	Existing Level	Required	New Common CP Level
MS	NT9X04AA	NT9X04AD	NT9X04AB
MS	NT9X04AB	NT9X04AF	NT9X04AE
MS	NT9X04AE	* NT9X04AZ	NT9X04AG
MS	NT9X04AG	* NT9X04AY	NT9X04AH

* NT9X04AE may be upgraded directly to NT9X04AH if the external clock interface is not required and the NT9X04AG may be upgraded to the NT9X04AH. The NT9X04AY is no longer required for these upgrades and is MD.

MS Port Group (Chain)

A MS Port Group is a set of one (1) or more adjacent MS Port cards, DS-512 Interface Paddleboards, and MS Port Expander/Terminator Paddleboards that are required to support the DS-512 link to an ENET shelf.

One MS Port Group is required per MS for each ENET shelf (per PLANE) because there are two (2) ENET planes. Therefore two port groups are associated with each ENET shelf. The port groups are located on both MS 0 and, on MS 1.

RELEASE 06.03
13 July 1998

Each MS port group is provisioned as a sum of the following:

- 1 port for the ENET Shelf Processor
- 1 port for each active message channel Processor associated with a speech link that terminates on the shelf (i.e. each Series I peripheral has one (1) Message Channel Processor, Each Series II peripheral has two (2) Message Channel Processors).

Each port group must be assigned a contiguous group of CP slots on the MS shelf. In order to size the MS Port Group, the distribution of peripheral types (i.e. Series I * II) over the ENET shelf pairs must be known.

NOTE: If the DMS office will require more than one (1) equipped ENET shelf (per plane), the assignment of the NT9X40BA, NT9X41BA, and the NT9X45BA Paddleboards (PBs) on the ENET shelves will directly affect the size of each MS Port Group. Hence, to optimize the size of the MS Port Group, it may be necessary to reassign the quantity of NT9X40BA, NT9X41BA and the NT9X45BA PBs from one ENET shelf to another in order to avoid crossing the boundary of message ports which would necessitate the addition of an MS 64 Port Card NT9X17DA and the associated paddleboards. (This card and the associated paddleboards are explained later in this section.) Note that any reassignments would only pertain to new equipment (i.e. initial offices or new equipment being added into an existing office). Existing paddleboards on an ENET shelf must not be reassigned during an extension.

For reasons previously discussed consideration should be given to making allowances for the future growth requirements of the last incomplete network shelf. Reserve slots on the MS for the projected future requirements of partially equipped ENET shelves.

An MS Port Group will consist of the following types of hardware:

- NT9X17DA MS 64 Port CP or NT9X17CA MS 128 Port Circuit Pack
- NT9X20BC ENET/MS Fiber Interface Paddleboard (NT9X20BB)
- NT9X25AA MS Port Expander Paddleboard
- NT9X25BA MS Port Expander/Terminator Paddleboard

ENET will utilize MS 64 Port CP or MS 128 Port CP for network and peripheral message port assignments.

NT9X17DA, MS 64 PORT CIRCUIT PACK

- One can connect up to 64 message ports.

NT9X17CA, MS 128 PORT CIRCUIT PACK

- One can connect up to 128 message ports

RELEASE 06.03
13 July 1998

The following paddleboards are required to complete each port group.
NT9X20BB, ENET/MS Fiber Interface PB

- One required per plane behind the first NT9X17DA circuit pack of each port group.
The NT9X20BB is being replaced with the NT9X20BC.
- Interfaces the message link from the Enhanced Network Shelf.

NT9X20BC, ENET/MS Fiber Interface Paddleboard

- One required per plane behind the first NT9X17CA/DA/BB of each port group.
- Interfaces the message link from the Enhanced Network Shelf.

NT9X25AA, MS PORT EXPANDER Paddleboard

- One required per plane behind the middle NT9X17DA CP of each port group if equipped.
- Expands the bus to accommodate a larger port group beyond 64 channels.

NT9X25BA, MS PORT EXPANDER/TERMINATOR Paddleboard

- One required per plane behind the last NT9X17DA CP or NT9X17CA of each port group if equipped.
- Terminates the bus.

Cable Length from MS Shelf to ENET Shelf

- All fiber optic cables from both MS Shelves (i.e. plane 0 and plane 1 to any ENET shelf (on either plane) must not deviate in length from each other by more than 25 feet.

The front card of each MS Port Group is always an NT9X17DA or NT9X17CA circuit pack. Behind the MS 64 Port CP (NT9X17DA) in each group, an NT9X20BB/NT9X20BC Paddleboard is provisioned, or behind the MS 128 Port circuit pack (NT9X17CA) in each group, an NT9X20BC paddleboard is provisioned.

The NT9X20BB/BC PB allow the physical connection of the fiber link from the MS Shelf to the ENET. For multiple card groups, an NT9X25BA PB (to terminate the port group) is located behind the last card, and an NT9X25AA PB (to extend the port group) behind any intervening MS 64 or MS 128 Port CPs in the group.

Note that a duplicate port group is provisioned for the other ENET plane.

RELEASE 06.03
13 July 1998

1.2.4 MS Port Concentration Summary

The following information was developed by E&IT for MS Port Concentration Clarification.

IOC

Assign new IOCs (for Initials and SNSE to SuperNode Upgrades) or re-assign existing IOCs (for ENET Upgrades) in descending physical slot number starting with physical slot number 29 :

IOC ASSIGNMENT		
IOC Number	MS Physical Slot Number	MS Port Number
0	29	0
1	28	0
2	29	1
3	28	1
4	29	2
5	28	2

LPP

Assign new LPPs (for Initials and SNSE to SuperNode Upgrades) or re-assign existing LPPs (for ENET Upgrades) to the next available physical slots after IOCs have been assigned. Refer to LPP assignment below :

LPP ASSIGNMENT		
LPP Number	MS Physical Slot Number	MS Port Number
0	27	0, 2
0	26	1, 3
1	27	1, 3
1	26	0, 2

SSLPP(FLIS)

| Special attention is required for SSLPP (FLIS) MS Port
| Concentration requiring relocation. The SSLPP should only be moved if
| there is no other alternative. This relocation will involve a service
| interruption to the SSLPP. The following must be considered:

- | 1. CCS7 links can be migrated while maintaining CCS7 service to the
| office since the links are redundant. This will require a special
| installation tool.

RELEASE 06.03
13 July 1998

2. All other ASU services will experience a service interruption for the duration of the relocation (estimated at 1.5 hours).
3. In order to minimize the service interruption both the two and from MS port cards shall exist in the MS for the move. This may require additional cards in the MS. After relocation, the cards that the SSLPP were on may be used. Therefore, temporary port cards are required. The engineer will determine the source of these temporary cards: office spares or job engineered. This shall be captured in the installation notes.

DS30 InterMS Links

Assign new DS30 InterMS Links (for Initials and SNSE to SuperNode Upgrades) or re-assign existing InterMS Links (for ENET Upgrades) to satisfy the following MS Port convention :

DS30 InterMS LINKS ASSIGNMENT		
IMSL Number	MS Physical Slot Number	MS Port Number
0	29	3
1	28	3

Fiber InterMS Links

If the Single Shelf LPP (SSLPP or FLIS) is used instead of the LPP, use the above LPP MS slots for the FLIS. In this case, the required InterMS Links are Fiber rather than DS30 and are assigned to the same NT9X62BA cards as the FLIS.

Billing Server

For a new Billing Server (for Initials and SNSE to SuperNode Upgrades) or to re-assign an existing Billing Server (for ENET Upgrades), refer to the physical slot assignment below :

BILLING SERVER		
Billing Sever Number	MS Physical Slot Number	MS Port Number
0	25	0, 1, 2, 3
0	24	0, 1, 2, 3

If additional devices are required, assign them to the highest number MS slot in descending order starting from slot 23 (or slot 25 if Billing Server is not used).

Do not configure IOCs and LPPs on MS Ports from the same MS Physical slot.

RELEASE 06.03
13 July 1998

For the above MS physical slots, the front card, back interface paddleboard, and device interfacing the paddleboard are described in the table below.

Front Card	Back Interface	Paddleboard Interface Device(s)
NT9X17AA NT9X17AD	NT9X23AA	IOCs, DS30 InterMS Modules Links, Network Modules
NT9X17AD	NT9X23BA	DS-30 LPPs Links
NT9X17AD	NT9X62BA	Billing Server, FLIS

Clear any network module ports to allow for relocation of any IOCs, LPPs, InterMS Links, and Billing Server and to make room for MS-ENET port chain cards as described in this summary. The cleared Network Module ports are reassigned or CONCENTRATED using installation tool NT9X69BA 16 Port paddleboard and NT9X17DA 64 port front card.

Assign ENET ports to the lowest numbered MS slots in ascending order (consecutive slots or as described in the chart below) starting from slot 12 etc. (easy to expand by moving chains out when cards are added).

ENET MS Port cards are separated into redefined logical groups called increments. Before a Circuit Pack can go into service, all members of that card's particular increment must be assigned and datafilled. Assign NT9X17CA ENET Port cards in the following manner:

RELEASE 06.03
13 July 1998

ENET INCREMENTS					
Increment	Logical Card	Physical Slot	Chain	Front PEC	Rear PEC
1	6	12	P0 Sh0	NT9X17CA NT9X17DA	NT9X20BB NT9X20BC
	7	13		NT9X17CA	NT9X25BA
	8	14	P1 Sh 0	NT9X17CA	NT9X20BC
	9	15		NT9X17CA	NT9X25BA
2	10	16	P0 Sh 1	NT9X17CA	NT9X20BC
	12	18	P1 Sh 1	NT9X17CA	NT9X20BC
3	11	17	P0 Sh 1	NT9X17CA	NT9X25BA
	13	19	P1 Sh 1	NT9X17CA	NT9X25BA
4	14	20	P0 Sh 2	NT9X17CA	NT9X20BC
	16	22	P1 Sh 2	NT9X17CA	NT9X20BC
5	15	21	P0 Sh 2	NT9X17CA	NT9X25BA
	17	23	P1 Sh 2	NT9X17CA	NT9X25BA
6	18	24	P0 Sh 3	NT9X17CA	NT9X20BC
	20	25	P1 Sh 3	NT9X17CA	NT9X20BC

Notes :

- Where it is known that only one NT9X17CA is required for a given chain, the next chain can be started in the adjacent/next slot.
- If an LPP exists in the Office, the LPP will use physical slots 26 and 27 (logical cards 20 and 21). In such case, Shelf 3 can only use one (1) chain card. The fourth chain for MS 0 will appear in physical slot 24 (logical card 18) and for MS 1 physical slot 25 (logical card 19)
- Use the NT9X17CA instead of the NT9X17DA.
- If extra growth is required in the office the LPP would have to use:
 - Increment 4 Logical Cards 14 and 16 Slots 20 and 21 or
 - Increment 6 Logical Cards 16 and 17 Slots 22 and 23.
 - Increments 3 and 5 are used for additions.

ENET Retrofit (Upgrade)

An ENET Retrofit (Upgrade) occurs when the Switching Network of an existing in-service DMS-SuperNode Office, changes from a Network Module

RELEASE 06.03
13 July 1998

(NM) or Junctored Network (JNET) to an Enhanced Network (ENET) implementation .

As described above, Network Modules are connected to the MS using NT9X17AA/NT9X17AD in the front and NT9X23AA in the rear. ENET is connected to the MS via the NT9X17CA/NT9X17DA in the front and associated NT9X20BB/NT9X20BC/NT9X25AA/9X25BA paddleboards in the rear.

During the ENET Retrofit Installation process, the MS MUST have a sufficient number of slots to support connectivity to both the ENET and Network Modules (JNET) at the same time.

During the ENET Retrofit Installation process, the ENET is installed, and connected to Peripherals on the P-side and to the MS on the C-side. Installation provides the "ENRETRO commissioning software" that allows the ENET and all its C-side and P-side equipment interfaces to be tested while the Office is fully in-service with the existing Network Modules.

In large DMS Offices, there may not be a sufficient number of empty slots in the MS to support both the MS-ENET port cards AND the Network Module port cards at the SAME time. In such cases, MS Port Concentration is required.

SuperNode MS Port Concentration

Each MS shelf (or DMS-Bus) must have a sufficient number of vacant slots to allow the addition of enough MS-ENET NT9X17CA/ NT9X17DA port cards to support both planes of the ENET and the existing Network Modules. If this is not the case, the existing Network Modules must be "concentrated" onto higher density port cards. This process will involve the relocation of the Network Module, IOC/EIOC, InterMS links, and LIM ports on the MS.

Addition of Sixteen Port Cards to the MS

To increase the number of MS slots and make room for the MS-ENET port cards, the Network Modules are moved from the existing 4-port NT9X17AA/NT9X17AD (front) and NT9X23AA/NT9X23BA (back) port card pair and CONCENTRATED onto the HIGHER port capacity NT9X17DA (front) and NT9X69BA (back) port card pair. The port capacity of each are summarized below :

PORT CAPACITY		
MS Port Card Pair Number	Ports Maximum Number	Network Modules per Card Pair
NT9X17AA/AD (Front)	4	4
NT9X23AA/BA (Back)	4	
NT9X17DA (Front)	64	16
NT9X69BA (Back)	16	

RELEASE 06.03
13 July 1998

Note that one (1) NT9X17DA/NT9X69BA front and back card pair can replace a maximum of four (4) NT9X17AA/ NT9X17AD/NT9X23AA/NT9X23BA front and back card pairs and thus increase the number of available MS slots by three (3).

If MS Port Concentration is required, the number of NT9X17DA/NT9X69BAs required will vary depending on the existing Office size and configuration. Typically, two or four NT9X17DA/NT9X69BA card pairs are required per MS. A quantity of five (5) NT9X17DAs and five (5) NT9X69BAs (with required bulkhead cabling) are provided in Installation Kit NTE7325B. This tool is ordered by Installation in preparation for the job as described in Installation Method 23-9903, "ENET Upgrade Phase 1 - Planning" The NT9X17DA/NT9X69BAs are Installation ENET Retrofit packs that are removed and returned to the Installation Toolroom after the cutover.

If MS Port concentration is required, Engineering must provide an INTERIM MS Configuration in the form of Engineering Notes. This will show the configuration of MS physical slots 12 through 29 inclusive during the Installation process when the Network Module port cards and MS-ENET ports cards are connected to the MS at the same time. Note that this INTERIM configuration will be described by two (2) Engineering Notes and will also include the location of the NT9X17DA/NT9X23BA Installation concentration cards. The information required in each of the two Engineering Notes are summarized below :

MS Pack Physical Slot Location and Terminating Device(s)		
Physical Slot Number	PEC	Device Terminating on Back PEC
12F 1 R	NT9X17CA NT9X20BC	ENET SHELF 0 PLANE 0
26F 26R	NT9X17DA NT9X69BA	LEAVE NET0 11-14; MOVE NET0 22-25 AND NET0 26-27
29F 29R	NT9X17AA NT9X23AA	LEAVE IOC 00 AND NET12 MOVE IOC 02 AND 04

RELEASE 06.03
13 July 1998

Port Assignments for NT9X69BA		
Logical Slot Number		
Port Number	20R	21R
0	NET0 0	NET1 0
1	NET0 1	NET1 1
2	NET0 2	NET1 2
3	NET0 3	NET1 3
4	NET0 4	NET1 4
5	NET0 5	NET1 5
--		
--		
--		
--		
15	NET0 15	NET1 15

Note: Port numbers 0-3 must be reserved for the LPP, if it needs to be moved.

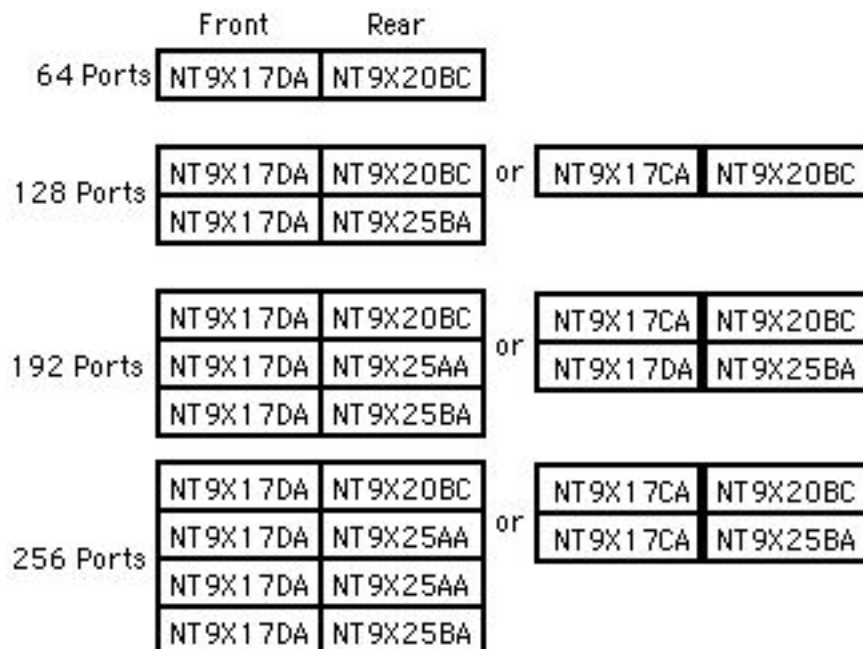


Figure 2. MS PORT CONCENTRATION SUMMARY

RELEASE 06.03
13 July 1998

If a MS Port Concentration is required, the SAE/EAE shall prepare D610 job drawings such that one will show the interim MS Port configuration and another drawing will show the final MS Port configuration for the DMS office. Notes should be added to the drawings distinguishing the interim and final configurations.

The EAE shall add a note to the 1001 Specification that will show the slot and port assignments of the NT9X17DA and NT9X69BA required for MS port concentration.

SNSE to SuperNode Upgrade

A SNSE upgrade can be undertaken when the utilization of the SNSE approaches its absolute limits.

A full section on how the SNSE to SuperNode upgrade occurs and the various major hardware that attaches to the SuperNode is described fully in the SuperNode SE document (ECM 632).

CM Provisioning

A CM consists of an NT9X0605 Computing Module Shelf Assembly, NT9X06AF CM Processor Shelf Circuit Packfill, memory circuit packs, and message links to the MS.

Memory provisioning is carried out in a similar fashion for CCC and DMS-Core. However separate memory is not defined for Program Store and Data Store. A single memory store expressed in Mega-bytes (M-bytes) is defined for the CM.

The FACET memory sizing tool is available for evaluating CM memory requirements.

In addition to the operational memory provisioned, one extra memory CP per circuit pack type (i.e. a spare 6 and a 24 Mbyte CP for mixed memory applications) must be provided per plane to be assigned as a reliability spare.

For retrofits and upgrades, refer to Change Application Procedure (CAP) 1351.

For all applications, provision one (1) NT9X6539 CM Bulkhead (Right) and one (1) NT9X6540 CM Bulkhead (Left).

When NT9X10AA is equipped with 24 MBytes memory and it is operating in MEMbus protocol, the system is called BRISC Series 50. When NT9X10AA is equipped with 96 MBytes memory and it is operating in BURSTbus protocol the system is called BRISC Series 6 option.

The Series 50 CPU will provide a real-time performance gain of 2.5 times over the NT9X13BC CPU. The Series 50 Mixed Memory CPU will provide a real-time performance gain of 2.25 times over the NT9X13BC CPU.

RELEASE 06.03
13 July 1998

The Series 60 BRISC option for Supernode will provide approximately 1.12 X Series 50 capacity.

The Series 70 CPU will provide approximately 1.85 times the Series 50 capacity.

The Series 70 EM CPU will provide approximately 1.66 times the Series 60 capacity.

The NT9X10AA/BA may replace existing 68020 and 68030 processor cards, provided the corresponding paddleboard is also replaced and a BRISC software load is utilized.

For Series 50 offices, provision two (2) NT9X10AA 33 MHz 88000 BRISC CPU Circuit Packs per SuperNode Computing Module (CM) in shelf position 13 in slots 19F and 20F (along with 24 MByte memory cards), and provision two (2) NT9X26DA/DB/DC BRISC RTIF Paddleboards per SuperNode Computing Module (CM) in shelf position 13 in slots 19R and 20R.

The BRISC Series 50 platform can support a mixed memory configuration which mixes NT9X14DB 24 MByte cards and NT9X14EA 96 MByte cards on a common CPU plane. This configuration requires the NT9X26DC RTIF.

The BRISC RTIF NT9X26DB/DC must be provisioned instead of the NT9X26DA for Series 60 applications.

For Series 60 offices, provision two (2) NT9X10AA 33 MHz 88000 BRISC CPU Circuit Packs per SuperNode Computing Module (CM) in shelf position 13 in slots 19F and 20F (along with 96 MByte memory cards), and provision two (2) NT9X26DB/DC BRISC RTIF Paddleboards per SuperNode Computing Module (CM) in shelf position 13 in slots 19R and 20R.

For BRISC 50/60 offices, provide NT9X26DA/DB/DC on the CM.

For Series 70 offices, provision two (2) NT9X10BA 60MHz 88110 BRISC CPU Circuit Packs per SuperNode Computing Module (CM) on shelf position 13, in slots 19F and 20F (along with 96 MByte memory cards), and provision (2) NT9X26EA BRISC RTIF paddleboards per SuperNode Computing Module (CM) on shelf position 13, in slots 19R and 20R. Product is retired for North American applications.

For Series 70EM offices, provision two (2) NT9X10CA 60MHz 88110 BRISC CPU Circuit Packs per SuperNode Computing Module (CM) on shelf position 13, in slots 19F and 20F (along with 96 MByte memory cards), and provision (2) NT9X26FA BRISC RTIF paddleboards per SuperNode Computing Module (CM) on shelf position 13, in slots 19R and 20R.

SLM Provisioning

SLM II units are a requirement of all offices whose image is expected to exceed 30 M-bytes during the engineered interval. Since provisioning SLM II units in an office would impact its IOC based mass storage needs,

RELEASE 06.03
13 July 1998

it is recommended that for new offices, the need for SLM II units be established based on image requirements forecasted out 5 years where possible. In smaller offices SLMs are considered to be a customer requested option.

The SLM II is a requirement for offices at NA001 and higher.

For U.S. applications, SEB 88-01-002 may be referenced. It contains a detailed formula for calculation of Supernode image size. The FACET tool also will calculate office image requirements.

SLM II is now at MD status, provision a SLM III for all new offices requiring this functionality.

When the SLM is required, provide two (2) NT9X44AB System Load Module II per NT9X01JA/JB Dual Plane Combined Core Cabinet (DPCC). Also provision the associated NT9X07AC SLM Common CP and NT9X12AB/AC/AD CPU Port CP. SLM II units are provisioned on a SLM shelf and interfaced to the CM via orderable CM bus extender paddleboards.

When SLM is not required, provide one (1) NT9X01FB Filler Packfill to satisfy cabinet cooling airflow requirements.

Nortel does not recommend AMA type records on the SLM units, the preference is to have AMA, CDR, SMDR etc. on the Disk Drive Units (or to use a BMC or DPP unit) associated with the IOC/IOM equipment. The following are the known applications using Device Independent Recording Package (DIRP) supported by software and the DDUs:

- AMA, CDR, SMDR, OM, JF, KT, TTRF, METBCKP, OOS, MS7, DLOG, CRS

For the disk storage provisioning for DMS-STP in support of data access by Signalling Engineering and Administration System (SEAS) IOC DDUs must be provisioned.

The engineering of data storage requirement for SLMs should include the dual (or single) image of the office, PM loads, a file for Patching, Polling files and any other Customer required OA&M file space.

In the case of parallel recording, the use of IOC DDUs are recommended over tape drives. This is for better performance in terms of throughput and storage capacity. Note that the overall throughput Performance using concurrent parallel recording will be limited to the IOC DDU throughput performance.

Provision a SLM III for offices at NA004 or greater that require a disk drive capacity of 1 GByte or a maximum tape drive capacity of 500 MByte.

CAUTION : Special considerations should be taken when provisioning a SLM III in conjunction with a CM Software Update.

RELEASE 06.03
13 July 1998

1. The SLM III should ONLY be treated as Load Gating Hardware when the load image size exceeds 240 Mbytes. Load Gating Hardware must be installed 10 working days prior to the CM Software Update. The SAE should indicate with a CI note if the SLM III is Load Gating so the EAE can load the material against the :R1 suborder" and "131 spec".
2. Always set the attribute of the CM load tape to SLM II format, as the SLM II drive cannot read the SLM III tape.

An upgrade from SLM II to SLM III is required when load image size exceeds 240 MBytes. The load image is not the same as CM load size. The formula for calculating load image is: $PS + .6 \cdot DS + .72 \cdot MS + FASTMEM$, where PS = Program Store, DS = Data Store, MS = Message Switch load size, and FASTMEM = 27.82M (28.00M in NA005 and higher). when the processor type is a Series 50 or 60. For NA005 and above software loads, Fastmem has already been added to the calculations for FACET, no additional value needs to be entered. The MS load size is 7M, 10M, or 16M depending on office configuration. 16M is the only MS load supported in NA004 and higher. The raw PS and DS values in KBytes can be obtained from FACET and converted to MBytes by dividing by 1024.

SLM III provisioning is almost identical to SLM II. When provisioning SLM III, provide two (2) NT9X44AD instead of two (2) NT9X44AB (SLM II) and also provide six (6) NT9X19AA filler face plates. The SLM III NT9X44ADs are mounted in shelf 00, position 8F and 24F. The six (6) NT9X19AA filler face plates are required in slots 13, 14, 15, 29, 30, and 31. All other provisioning considerations are the same as SLM II provisioning considerations.

SLM HANDLING CONSIDERATIONS

When SLM I is equipped in an office, the combined CM and MS software load (image) must be delivered to site in DC 600A compatible tape cartridges. This would also apply to any commissioning loads that are supplied.

When SLM II is equipped in an office, the combined CM and MS software load (image) must be delivered to site in a DC600XTD-compatible tape cartridge. The recommended cartridge is DC6250, however, the load can be delivered on a DC6150-compatible cartridge provided that the cartridge has sufficient capacity to store the total image size. This also applies to any commissioning loads that are supplied.

When SLM III is equipped in an office, it is recommended that the combined CM and MS software load (image) be delivered to site on a DC6525-compatible tape cartridge. However, the load can be delivered on a DC600XTD-, DC6150-, or a DC6250-compatible cartridge provided that the cartridge has sufficient capacity to store the total image size. This also applies to any commissioning loads that are supplied.

RELEASE 06.03
13 July 1998

Blank cartridges must also be provided for scratch purposes. The different CPC number, Manufacturing part number and the sizes are given below:

- CPC A0314597 Manufacturing Part # DC600A 60MB
- CPC A0369779 Manufacturing Part # DC6150 150MB
- CPC A0368760 Manufacturing Part # DC6250 250MB
- CPC A0609473 Manufacturing Part # DC6525 500MB

Field Commissioning Tapes, Non-Resident Software Tapes and Peripheral Processor Software tapes must be delivered on the usual 9 track magnetic tapes. The specification process will automatically call up the appropriate tape medium when the SLM software feature package is specified.

For Universal Software Load the SLM II is a must for offices running with BCS33 and later.

For non-Universal Software Load the SLM II is required for,

- offices running with BRISC Processor.
- offices running with NA001 or higher Product Layers.
- offices that exceed the SLM I tape capacity of 62Mb.
- offices with planned capacity upgrade, etc.

Since SLM I is MD'd, new offices will receive SLM II even if they do not have Universal Software Load. SLM II is now MD and replaced by SLM III.

Reset Terminal Provisioning

Two (2) compatible terminals must be provided in the maintenance area to serve as local reset terminals. These could be located close to MAP:00. Suitable furniture must be provided to accommodate these terminals. Terminals are powered from inverters which may be located on the MIS frame.

The Reset Terminal Interface (RTIF) (NT9X26AA) of the CM provides two terminal interfaces. One is a RS-232C and is intended for local applications while the other supports either RS-232C or RS-422 and is intended for interfacing to remotely located terminals. Local RTIF terminals connected to an initial DMS-Core must be connected through back-to-back modems (9600 Baud asynchronous modem), or approved Current Loop converters. These isolation methods are required to satisfy ISG requirements, provide power fault isolation and prevent cross-linking of terminal grounds with DMS equipment grounds.

RELEASE 06.03
13 July 1998

The Enhanced Remote Terminal Interface (RTIF) CP (NT9X26AB), offers all the features of the existing NT9X26AA (ie. One RS-232C terminal interface port and one RS-232C / RS-422 interface port), plus:

- 2 mA current loop terminal interface port
- Status lamps indicating processor inactivity and sync

Approved VDU terminals, operating in current loop mode, can be connected directly to the NT9X26AB Enhanced RTIF CP at the cabinet bulkhead. In this mode, the back-to-back data units, modems or Rad current loop converters, which were needed for Isolated System Ground (ISG) compliance, power fault isolation and prevention of cross-linking of terminal grounds with DMS equipment are no longer required.

- The NT9X26DA/DB/DC RTIF Paddleboard is required for BRISC Series 50.
- The NT9X26DC RTIF Paddleboard is required for BRISC Series 50 Mixed Memory.
- The NT9X26DB/DC RTIF Paddleboard is required for BRISC Series 60.
- The NT9X26EA RTIF Paddleboard is required for BRISC Series 70.
- The NT9X26FA RTIF Paddleboard is required for BRISC Series 70EM

An ISG compliant office may be using back to back modems connected to the RS232 connector on an NT9X26AA RTIF paddleboard. If the NT9X26AA is being changed to an NT9X26AB (or '26DA/DB/EA/FA), it is recommended to get rid of the back to back modems and provide a current loop cable for the RTIF Terminal being used in the office.

When upgrading from NT9X26AA to NT9X26DA/DB/DC/EA/FA the engineer will need to provision the following:

- () NT9X06AW (CM) Current Loop Upgrade Kit consisting of the following:
- () NT9X0196 RS232C & Current Loop Cable
- () A0336796 D Sub Filter Conn Cap
- (8) A0279319 D Sub Connector Assy Screw Retainer
- (8) A0317136 Screw Lock Female
- () Cables from DPCC Bulkhead to RTIF Term.
- The PEC for the cables depends on type of VDU as shown on CA0X15.

Option 1 (U.S. and Canadian Applications)

The Low Speed Data Unit with Elastomer Keypad (NT4X25AF) may be used in a non switched arrangement (back-to-back) with the RTIF. The NT4X25

RELEASE 06.03
13 July 1998

series has been MD with no replacement. All new jobs require the current loop option. Since the data unit connects directly to the RTIF in the CM, type D line cards are NOT required for this application. The following image depicts this arrangement:

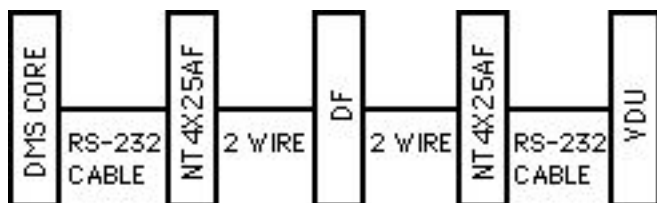


Figure 3. OPTION 1 CURRENT LOOP (U.S. AND CANADIAN APPLICATIONS)

Data Unit		Data Unit	
Settings	Baud	9600	9600
	Mode	Async	Async
Top	SW1	Slave	Slave
	SW2-1	Off	Off
	SW2-2	Off(slave)	(master)
	SW2-3	Off	Off
	SW2-4	Off	Off

Option 2 (U.S. Applications Only)

Current Loop converters from Rad Data Communication have been approved for compliance with ISG to interface from the SuperNode with the RTIF.

Note - A spare set of converters and power converters must be provisioned for each site.

A Passive RS-232 to Current Loop converter is plugged directly into the SuperNode bulkhead. This device is connected to an Active RS-232 to Current Loop converter by a two (2) pair 20 ma loop cable. The Active unit (located near the RTIF) is connected to the RTIF by a short connectorized (female on RAD end, female on RTIF end) RS-232 cable.

The Active unit is powered by a plug in Power Converter which converts 120V AC to 12V DC.

The following image depicts this arrangement:

RELEASE 06.03
13 July 1998

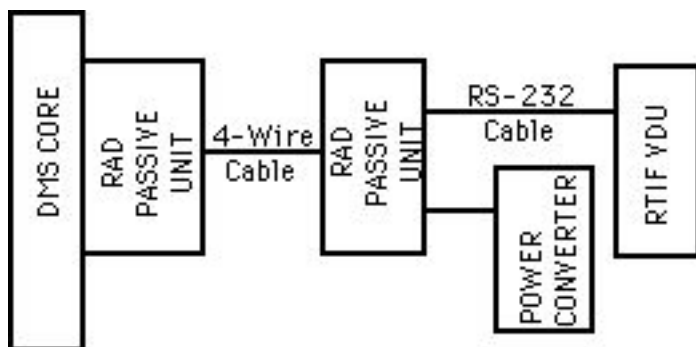


Figure 4. OPTION 2 CURRENT LOOP (U.S APPLICATIONS ONLY)

DESCRIPTION NT CPC RAD PART NO.
ACTIVE UNIT A0354166 MIC-24/CL/A-NF
PASSIVE UNIT A0354167 MIC-24/CL/P-NF
POWER CONVTR A0354168 MIC-P

See ECM-289 for Isolated System Grounding (ISG) provisioning guidelines.

When required, two additional reset terminals can be equipped at a remote location and interface to the RTIF via modems and secure dedicated lines. This equipment must be RS-232C compatible.

When required, the RTIF can interface to AT&T E2A equipment associated with a Switching Control Center System (SSC) (US applications only).

The Remote RTIF will be configured as 1200 baud RS232 to a modem or as 2400 baud RS422 connection to a Data Auxiliary Shelf (DAS) for E2A. The Baud rate is set at initial power up via instructions received from the NT9X26-- firmware to either 1200 baud if the E2A Software is not present or 2400 baud if the E2A Software is present. The Remote RTIF CANNOT be used for BOTH a remote modem connection, and a DAS connection.

Refer to the appropriate VDU ECM for approved RTIF terminals.

Inter-MS Link Provisioning

The two inter-MS links (IMLs) are provisioned if required to connect MS plane 0 to MS plane 1 and provide a path for messages in event of a failure. These links utilize DS-30 links and should be provisioned as follows:

For applications NOT using Cabinetized DMS cabinets, and where DS-30 inter-MS links are required, provision two (2) NTEX5022 Inter-MS DS-30 Cable Assemblies.(one NTEX5022 cable per IML)

RELEASE 06.03
13 July 1998

For Cabinetized DMS cabinet applications where DS-30 inter-MS links are required, provision two (2) NTEX5023 Inter-MS DS-30 Cable Assemblies. (one NTEX5023 cable per IML) For fiber inter-MS links, provision two (2) A0352268 Inter-MS

For applications requiring Inter-MS links, each DS-30 IML can be provisioned on any un-used DS-30 port on either an NT9X23AA or an NT9X23BA or an NT9X69BA paddleboard subject to the following restrictions:

The DS-30 ports selected for the two links must be on different paddleboards. That is, if the only free DS-30 ports are on the same paddleboard they cannot both be used for the IMLs; another port must be freed up on another paddleboard in order to equip the second link.

The paddleboards and ports selected must be the same on each MS. For example, if port 3 on paddleboards in slots 16 and 17 are selected in MS 0, then port 3 on paddleboards in slots 16 and 17 in MS 1 must be used. The paddleboards and ports selected can be in any slot or port in which DS-30 paddleboards are allowed except port 0 on paddleboards in slots 28 and 29.

Provisioning of DS-30 IMLs is currently limited to the SuperNode in non-Cabinetized or Cabinetized DMS cabinets. No requirements have been identified for the support of IMLs on the SL100 products. Hence, this is not currently supported.

For Meridian Cabinet applications the IML requirements can be met with an NTN36AR cable to connector "A" and another to "B" on the NT9X6558 bulkhead if THOSE CONNECTORS ARE NOT BEING UTILIZED. If these connectors are in use, then use the first available "four port" connector on either the left or right bulkhead AND PROVIDE DS30 PADDLEBOARDS, PORT CARDS, AND CABLES AS REQUIRED. The other end of this cable is connected to the same connector designation on the other plane of the message switch. When using a four port bulkhead connector, only one NTN36AR cable is needed.

Note that, IMLs are not required as previously engineered when NIUs are provisioned on a LIM. There is already an existing path in the form of inter-LMS links. FLIS is the only application at this time that requires IML links on the SuperNode Message Switch.

C42(S/DMS) Cabinet Provisioning

The DMS-SuperNode in C42(S/DMS) cabinet is a cost and functionally enhanced version of the existing SuperNode type cabinet. The S/DMS cabinet is very similar to the existing cabinet, items such as packs, shelf assemblies, interconnect cables, and bulkhead packs do not change. The differences from the existing Supernode cabinet are listed below.

1. The Cabinet changes from NT9X0113 to NT9X9575.
2. The Kick plate is not required with the S/DMS cabinet.

RELEASE 06.03
13 July 1998

3. Power wiring is optional. If the cabinet is in a Stream-line lineup, the cables will be equipped to take advantage of "horizontal" cabling. If the cabinet is in a non-Cabinetized lineup, power cables will be similar to existing power cables, so filters will have to be provisioned.

The NT9X01JB has been approved for all applications. All new initial SuperNode offices will specify the NT9X01JB Cabinet.

The NT9X01BA or NT9X01JA require an NT9X0108 Series 60 EMI Kit when operating at Series 60 or higher. This is an air filter gasket that is required to meet EMI compliance. This is not required on the NT9X01JB cabinet, which already meets EMI compliance.

SuperNode Building Block Definition

The SuperNode building block concept deals with a higher level of Product Engineering Code (PEC) ordering. The memory quantities, processor series and Network Interface can be selected depending on the telco desired specifications.

1. NTZZ01RG (SuperNode in S/DMS Cabinet)
2. NTZZ01RG contains the SuperNode cabinet NT9X01JB, Frame Supervisory panel, Cooling Unit, Common Circuit Packfills, bulkheads, and miscellaneous items that are always provided for a SuperNode. The existing NTZZ01AA, NTZZ97BA, NTZZ01TA, NTZZ97CA, NTZZ01AM, NTZZ97BH, NTZZ01RB, NTZZ01RC, NTZZ01RD, NTZZ01RE, NTZZ01RF, NTZZ01RM, NTZZ01RN are MD (Manufacture Discontinued) and replaced by NTZZ01RG.
3. NTZZ01BC (System Load Module (SLM) common CP)
4. The NTZZ01BC contains all the circuit packs and miscellaneous items that are always provided to the SLM. NTZZ97BG, NTZZ01BA, and NTZZ01BB are MD (Manufacture Discontinued) and replaced by NTZZ01BC. The SLM II is required for offices when the office image is greater than 75 MB. The SLM III is required when the office image is greater than 240 MB. The SLM II is load gating for NA001 and higher.
5. SLM II is now MD and replaced by the SLM III.
6. NTZZ01TM (16M MS Processor and RTIF)
7. The NTZZ01TM contains all the circuit packs required to support up to 16M of memory on the Message Switch.
8. NTZZ01CB (4 Port Network and IOC interface)
9. The NTZZ01CB contains the circuit packs for the SuperNode interface to the network modules and the Input/Output Controller modules (IOC). These circuits will be used for DMS-100F applications. The NTZZ01CB contains 4 interface circuit packs.(i.e. 2 for each Mes-

RELEASE 06.03
13 July 1998

sage Switch). The NTZZ01CB is used in Supernode for non-Cabinetized application. NTZZ01CA is MD (Manufacture Discontinued) and replaced by NTZZ01CB. The NTZZ01CB has the new 9X17AD 4-Port CP and it must be provisioned on all initial jobs for BCS34 and above.

10. NTZZ01DB (STP Interface)

11. The NTZZ01DB contains the circuit packs for the SuperNode interface to the Link Interface Units (LIU). These circuits will be used for STP applications. The NTZZ01DB contains 4 interface circuit packs. (i.e. 2 for each Message Switch). The NTZZ01DB is used in Supernode for non-Cabinetized application. NTZZ01DA is MD (Manufacture Discontinued) and replaced by NTZZ01DB.

12. The NTZZ01DB has the new 9X17AD 4-Port CP and it must be provisioned on all initial jobs for BCS34 and above.

13. The NTZZ01DB contains the NT9X23BA which can not be used to interface to network modules and Input/Output Controller modules (IOC).

14. NTZZ01UB (Cabinetized DMS 4 Port & IOC Interface)

15. The NTZZ01UB contains the circuit packs for the SuperNode interface to the network modules and the Input/Output Controller modules (IOC). These circuits will be used for DMS-100F applications. The NTZZ01UB contains 4 interface circuit packs. (i.e. 2 for each Message Switch). The NTZZ01UB is used in SuperNode for Cabinetized DMS application. NTZZ01UA is MD (Manufacture Discontinued) and replaced by NTZZ01UB. The NTZZ01UB has the new 9X17AD 4-Port CP and it must be provisioned on all initial jobs for BCS34 and above.

16. NTZZ01VB (Cabinetized 4 Port LIM/LPP Interface)

17. The NTZZ01VB contains the circuit packs for the SuperNode interface to the Link Interface Units (LIU). These circuits will be used for STP applications. The NTZZ01VB contains 4 interface circuit packs. (i.e. 2 for each Message Switch). The NTZZ01VB is used in SuperNode for Cabinetized DMS application. NTZZ01VA is MD (Manufacture Discontinued) and replaced by NTZZ01VB. The NTZZ01VB has the new 9X17AD 4-Port CP and it must be provisioned on all initial jobs for BCS34 and above.

18. The NTZZ01VB contains the NT9X23BA which can not be used to interface to network modules and Input/Output Controller modules (IOC).

19. NTZZ01EA (Filler Face Plate)

20. The NTZZ01EA contains the filler face plates required for forced air cooling when the message port circuit packs are not required. Each NTZZ01EA contains two (2) filler face plates and two (2) MS Bus Loader PBs.

21. NTZZ01FA (Supernode Series 10 CPU)

RELEASE 06.03
13 July 1998

22. The NTZZ01FA contains the SuperNode series 10 processor CP. The SN10 provides approximately 1.4 capacity gain over the NT40. Selection of SuperNode processor is determined by the use of QUICKCALC or RTCALC programs. This processor has been Manufacture Discontinued. If an existing site is configured with a Series 10 processor, the customer is requested to contact the regional sales representative for details on how to upgrade to a Series 20 processor or higher for BCS-35 and above loads. See "MS Port Group (Chain)" of ECM body for software packaging.
23. NTZZ01GA (Supernode Series 20 CPU)
24. The NTZZ01GA contains the Supernode series 20 processor CP. the SN20 provides 2.0 to 2.2 capacity gain over the NT40. Selection of SuperNode processor is determined by the use of QUICKCALC or RTCALC programs. NTZZ01GA MD replaced by NTZZ01SC.
25. NTZZ01HA (Supernode Series 30 CPU)
26. The NTZZ01HA contains the SuperNode series 30 processor CP. The SN30 provides a 1.4 to 1.5 capacity gain over the SN20. Selection of SuperNode processor is determined by the use of QUICKCALC or RTCALC programs.
27. NTZZ01JA (Supernode Series 40 CPU)
28. The NTZZ01JA contains the SuperNode series 40 processor CP. The SN40 provides a 1.7 to 1.8 capacity gain over the SN20. Selection of SuperNode processor is determined by the use of QUICKCALC or RTCALC programs. NTZZ01JA MD replaced by NTZZ01SM.
29. NTZZ01SC (Supernode BRISC 50/50MX/60 CPU)
30. Note: The NTZZ01SC is intended to replace the NTZZ01SB. Due to an availability issue, use the NTZZ01SB until the NTZZ01SC becomes available.
31. The NTZZ01SC provides a real time performance gain of 2.5 times over the SN20 when operating as a series 50 processor. The NTZZ01SC provides a real time performance gain of 2.25 times over the SN20 when operating as a series 50 mixed memory processor. The NTZZ01SC provides a real time performance gain of 2.8 times over the SN20 when operating as a series 60 processor. Selection of SuperNode processor is determined by the use of QUICKCALC or RTCALC programs.
32. NTZZ01SM (Supernode BRISC 70 CPU)
33. The NTZZ01SM provides a real time performance gain of 1.85 times over the SN50. Selection of SuperNode processor is determined by the use of QUICKCALC or RTCALC programs.
34. NTZZ01KA (Six (6) MByte Memory)

RELEASE 06.03
13 July 1998

35. The NTZZ01KA contains two (2) Six (6) MByte memory circuit packs and designation labels for the STP application. Memory requirements are determined by use of FACET programs.
36. NTZZ01LA (24 MByte Memory)
37. The NTZZ01LA contains two (2) 24 MB memory circuit pack and designation labels for the DMS-100F application. Memory requirements are determined by use of Memquick or FACET programs.
38. NTZZ01MA (Filler Face Plate)
39. The NTZZ01MA contains two (2) Filler Face Plates and designation labels for the SuperNode Computing Module.
40. NTZZ01NB (Initial Enhanced Network Interface)
41. The NTZZ01NB contains the circuit packs for the initial interface of SuperNode to the Enhanced Network. Provide two (2) NTZZ01NB for each ENET shelf pair provisioned. The NTZZ01NB contains two (2) interface circuit packs (i.e. 1 for each Message Switch).
42. NTZZ01PA (Intermediate Enhanced Network Interface)
43. The NTZZ01PA contains the circuit packs for the intermediate interface of SuperNode to the Enhanced Network. Provision NTZZ01PA per the worksheets provided in the ENET Building Block documents. The NTZZ01PA contains two (2) interface circuit packs. (i.e. 1 for each Message Switch).
44. NTZZ01QA (Final Enhanced Network Interface)
45. The NTZZ01QA contains the circuit packs for the final interface of SuperNode to the Enhanced Network. Provide two (2) NTZZ01QA for each ENET shelf pair provisioned when the NTZZ01NB/NN do not support the required number of ports connected to the ENET shelf. The NTZZ01QA contains two (2) interface circuit packs. (i.e. 1 for each Message Switch).
46. NTZZ01NN (Initial Enhanced Network Interface - 128 Port)
47. The NTZZ01NN contains the circuit packs for the initial interface of SuperNode to the Enhanced Network for BCS35 and higher. Provide two (2) NTZZ01NN instead of (2) NTZZ01NB and (2) NTZZ01PA for each ENET shelf pair provisioned. The NTZZ01NN contains two (2) interface circuit packs (i.e. 1 for each Message Switch).
48. NTZZ01QM (Final Enhanced Network Interface - 128 Port)
49. The NTZZ01QM contains the circuit packs for the final interface of SuperNode to the Enhanced Network for BCS35 and higher. Provide two (2) NTZZ01QM instead of (2) NTZZ01QA and (2) NTZZ01PA for each ENET shelf pair provisioned. The NTZZ01QM contains two (2) interface circuit packs.(i.e. 1 for each Message Switch).

RELEASE 06.03
13 July 1998

50. NTZZ01ZA (Link Interface for FLIS/APC)

51. The NTZZ01ZA contains the circuit packs for the Supernode Cabinet that is used to Interface Message Switch (0 and 1) to the Single Shelf LPP(Fiberized LIS(FLIS)) or APC.

52. SuperNode Building Block Provisioning

53. NTZZ01CB/UB - 4 Port Network & IOC Interface

- If NTZZ01CB/UB is required, then provide as follows:
 $\#NTZZ01CB/UB = \{(\#NM/4) + (\#IOC/8)\}$ to be rounded up to the next integer.
- Each NM requires a total of two ports. Each port must be on an adjacent slot. (one port out of 4 ports from each slot)
- Each IOC requires one port out of four ports
- NTZZ01DB/VB - 4 Port LIM/LPP Interface
 - If NTZZ01DB/VB is required, then provide as follows:
 - $\# NTZZ01DB/VB = \{\# \text{ Link Interface Module Cabinets } / 2 \}$ to be rounded up to the next integer.
 - NTZZ01EA - Interface Filler Face Plate
 - Provide NTZZ01EA as follows:
 - $\# NTZZ01EA = 9 - (\# NTZZ01CA/CB + \# NTZZ01DA/DB +$
 - $\# NTZZ01UA/UB + \# NTZZ01VA/VB +$
 - $\# NTZZ01NA/NB + \# NTZZ01PA + \# NTZZ01QA$
 - $\# NTZZ01NM/NN + \# NTZZ01QM + \# NTZZ01ZA)$
 - NTZZ01ZA Link Interface for FLIS/APC
 - If FLIS or APC is provisioned, then provide (1) one NTZZ01ZA.
 - Also Provision the cables for the IML links

1.2.5 Office Layout Information

The S/DMS cabinet will be shipped with the doors, shelves, circuit packs, FSP, and cooling unit installed. The bus bar will be installed and appropriate connections will be made at the factory. The bulkheads form part of the Electromagnetic Compatibility(EMC) cage around the equipment and provide a place to mount filter PCBs and optional power filters. The rear of the cabinet is equipped with two removable bulkhead panels near the bottom of the cabinet. When these panels are removed, the cabinet can be installed in, or removed from, a lineup

RELEASE 06.03
13 July 1998

equipped with horizontal cabling. The cabinet may be slid "FORWARD" only.

FLOOR LAYOUT

1. Aisle dimensions are derived to meet the requirements of central office environment for floor loading and heat dissipation.
2. An installation which requires multiple cabinet line-ups has six foot maintenance aisles.
3. Maintenance aisles between a cabinet line-up and a frame line-up are 4.5 feet wide.
4. Installations requiring a cabinet to be integrated into a frame line-up:
5. Can only be applied to the front most or rear most line-up
6. Cabinets and frames are aligned to be flush at the rear
7. Note that a mixed frame/cabinet configuration is in violation of NEBS. The Telco should confer with the Building Studies and Installation departments to confirm that the building floor can sustain the weight differential and to insure there is sufficient cooling available to cool the DMS office.
8. Refer to ECM600 for office layout restrictions when this cabinet is applied in a Cabinetized DMS lineup.
9. Note that, Richardson market floor layout may be different.

10. SWITCHBOARD CABLING RESTRICTIONS

11. Cabling restrictions between the Message Switch and the IOC and Network frames remain unchanged at 200 feet maximum.

12. INITIAL OFFICES

13. Cabinets and frames will not be mixed in the same line-up. The cabinets will occupy the front line-up. The second line-up will contain the IOE frames (and others as convenient) and will have fronts facing the front of the office.
14. Aisle spacing between the first (cabinet) and second (frame) line-ups is 4.5 feet.
15. The reset terminals will be located in the equipment room to the front of the office with convenient visual and physical access to the IOE equipment.
16. SuperNode Retrofit(Upgrade)
17. There are three possible physical installations in decreasing order of convenience:

RELEASE 06.03
13 July 1998

- If possible, within the guidelines mentioned for initials, a new front line-up for the cabinet(s) should be started.
 - Alternatively the existing front line-up can be extended laterally with the cabinet.
 - The cabinet is temporarily located close to the CCC for installation and commissioning. Following a successful cutover the cabinet(s) are relocated into the space vacated by the CCC, MEX frames.
1. For mixed line-ups the cabinet and frames are aligned to be flush at the back of the front line-up and should utilize a single cabinet only (Combined Core Cabinet).
 2. For option (iii) care must be taken to ensure that the retrofitted frames vacate sufficient space for the DMS-Core cabinets. Note that MSS frames should be considered as relocatable along with the retrofitted CCC and MEX frames.

It is recommended that a per site survey of retrofit sites be carried out jointly by Building Studies and Installation groups to ensure a feasible configuration is engineered.

1.2.6 Traffic Tables

Not applicable

1.2.7 XA-Core Retro Provisioning

| There are two types of XA-core upgrades available to customers with
| supernode CM. One is the standard upgrade which involves adding a
| product change kit to the original supernode cabinet (it may be a
| NT9X01BA, NT9X01JA or NT9X01JB) to remove or fill the CM/SLM shelves
| and then ordering a new NTLX01CA XA-core extension cabinet to provide
| the XA-Core shelf. The second is the shelf replacement upgrade which
| requires a portable XA-core cutover tool and a product change kit to
| remove the CM/SLM shelves from the supernode cabinet and install an
| XA-core shelf. Details of XA-core modules and provisioning are provided
| in ECM806.

1.2.7.1 Baseline Hardware for XA-Core

| The message switch processors must be upgraded with the XA-core con-
| version. For message switches equipped with the NT9X13DA/DB process-
| ors, the NT9X13DG must be provided. NT9X14** cards are not used with
| the NT9X13DG. For message switches equipped with the NT9X13DC
| processor, the NT9X13DF must be provided. The NT9X14** memory card
| shall remain.

RELEASE 06.03
13 July 1998

| The CMIC links for XA-Core use NT9X63AA ATM/OC-3 interface cards in place of the original DS-512 links. The NT9X63AA cards only work with XA-core and are part of the cut-over process.

| The MS Clocks are not changed by XA-Core.

1.2.7.2 Unicore Fixed Configuration

| There are two fixed configurations that must be used for supernode CM conversion to XA-Core. There are NO OPTIONS on these fixed configurations, they must be provided exactly as described. The UNICORE will NOT work with any other configuration. These fixed configurations are called Unicore because two processing elements are used in serial processing style. These two configurations have identical PE and IOP modules and are different in the amount of shared memory provided. Both configurations use five shared memory cards. The smaller uses five 256 MB cards and the larger uses five 384 MB cards. The unused locations must be filled with terminating filler cards.

RELEASE 06.03
13 July 1998

Unicore provisioning quantity, configuration type 1, smaller memory . </SUB>		
_{ PEC}	_{ Common name}	_{ Quantity}
_{ NTLX03BA}	_{ Double slot IOP}	_{ 2}
_{ NTLX03AA}	_{ Single slot IOP}	_{ 2}
_{ NTLX06AA}	_{ Disk packet}	_{ 2}
_{ NTLX07AA}	_{ Digital Audio Tape packet}	_{ 2}
_{ NTLX08AA}	_{ RS232 Serial I/F packet (RTIF)}	_{ 2}
_{ NTLX05AA}	_{ 0C-3/ ATM packet (CMIC) }	_{ 2}
_{ NTLX12AA}	_{ Shelf Interface Module }	_{ 2}
_{ NTLX02AA}	_{ Processor Element with PPC}	_{ 2}
_{ NTLX14BA}	_{ 256 MB Shared Memory Module}	_{ 5}
Unicore provisioning, configuration type 2, more memory . </SUB>		
_{ PEC}	_{ Common name}	_{ Quantity}
_{ NTLX03BA}	_{ Double slot IOP}	_{ 2}

RELEASE 06.03
13 July 1998

_{ NTLX03AA}	_{ Single slot IOP}	_{ 2}
_{ NTLX06AA}	_{ Disk packet}	_{ 2}
_{ NTLX07AA}	_{ Digital Audio Tape packet}	_{ 2}
_{ NTLX08AA}	_{ RS232 Serial I/F packet (RTIF)}	_{ 2}
_{ NTLX05AA}	_{ 0C-3/ ATM packet (CMIC) }	_{ 2}
_{ NTLX12AA}	_{ Shelf Interface Module }	_{ 2}
_{ NTLX02AA}	_{ Processor Element with PPC}	_{ 2}
_{ NTLX14CA}	_{ 384 MB Shared Memory Module}	_{ 5}

1.2.7.3 Planning Considerations For Shelf Replacement

| The shelf replacement method of XA-Core upgrade uses a detailed installation process that requires extra engineering effort different from normal office extension processes.

| Extra XA-Core Cooling Unit air filters

| When using the Shelf replacement method of XA-Core retrofit and adding the XA-Core cooling unit (this is done when the NT9X01JB cabinet is converted to a NT9X01JF), provision at least one extra XA-Core Cooling Unit air filter, order code P0884002.

| Cutover Device Note

| Conversion from Supernode to XA-Core requires a Cut Over Device (COD). This is used because the Supernode uses DS-512 CMIC links and the XA-Core uses 0C-3/ ATM CMIC links. When the standard upgrade method

RELEASE 06.03
13 July 1998

| of XA-Core retrofit is chosen, an installation note should be placed
| in the "1001" specification reminding the installation supervisor that
| a COD tool must be requested from the tool room. The COD is part of
| the stocklist for the portable XA-Core cutover tool and no special
| action is needed by engineering when shelf replacement method of upgrade
| is chosen.

Portable XA-Core Cutover Tool

| The portable XA-core cutover tool must be identified on office floor
| plans to assist installation and cutover. The cutover tool has the same
| footprint as a C42 cabinet and requires front and rear access. The tool
| requires office battery power and temporary fuse positions for the
| portable XA-Core cutover tool must be located and identified. The
| temporary fuse positions must be identified on specifications that will
| allow installers to quickly locate them.

| The engineer will provide temporary cables for power, ABS and alarms
| according to cable aids documents and standard engineering procedures
| for the portable XA-Core cutover device, NTLX01DA. The engineer will
| also figure the length required for the Computing Module Interface Card
| (CMIC) links from the portable to the SuperNode cabinet. These lengths
| will be included in cable specifications with a note that specifies the
| length of the temporary CMIC links. The installation supervisor will
| use this information to select the correct fiber cable installation kit.

Return of CM and SLM Shelves

| Shelf replacement upgrade requires the removal of CM, SLM and in some
| cases a cooling unit, from the DMS office. The switch application en-
| gineer (SAE), or other person with customer contact, will find out where
| these removed shelves are to be sent according to our agreements with
| the customer. The SAE will communicate this information to the equip-
| ment application engineer (EAE) or other person writing the equipment
| specifications.

| The EAE will place this information along with the phone number:
| 1-800-473-7766 and instructions order return material from the menu,
| in an installation note in the "1001" specification. This specification
| is used to order the XA-core equipment and should be used on all XA-Core
| upgrades.

| The installer will order shipping material to return the shelves from
| the factory using this "RMR" process. The engineer must provide the
| following phone number, 1-800-473-7766 and instructions to pick an op-
| tion that is correct for your market to obtain return material.

Power and Fuse Considerations

| The CM and SLM will be removed from service in all XA-core upgrade
| processes. For the NT9X01JB only, the cooling unit will be removed.
| The fuses from all these shelves are removed and the positions become

RELEASE 06.03
13 July 1998

| available after the conversion is complete. Review the PDC FUSE engineering manual section to determine the exact number and type of fuses becoming available. This is located in chapter 16 of the active engineering manual.

| The XA-core shelf requires new fuse positions and appears in the NT9X01BC, NT9X01JD and NT9X01JF converted cabinets. The NT9X01JB also requires new fuses for the XA-cooling unit when it is converted to the NT9X01JF. Review the PDC FUSE engineering manual section to determine the exact number and type of new fuses needed.

1.3 Product/System Specification

| See ECM806 for details of the XA-core product.

1.3.1 Physical Characteristics

| See ECM806 for details of the XA-core product.

The following describes the characteristics of the NT9X01JB SuperNode S/DMS cabinet:

The -60V version of the unit features the same packaging and performance as the -48V unit. Presently Germany, is the only country that requires -60V units.

Input Voltage -48VDC

Power Consumption 3525 watts (+/- 10%) fully equipped

Current Drain 73.0Amps

The current drain for CM and MS shelves is 20 amps per shelf

Each SLM draws 12.9 amps while running, and 18.7 amps during spin-up to operating speed.

POWER/HEAT DISSIPATION

- The fully loaded cabinet heat dissipation is up to 3500 watts.

MECHANICAL DIMENSIONS

- Height 72in. Width 42in. Depth 28in.
- Weight 1400lbs. (Full)

RELEASE 06.03
13 July 1998

1.3.2 EMI/Earthquake Information

End panels are required to complete the EMC enclosure for cabinets located at the end of a lineup. In earthquake installations, the S/DMS cabinet must be bolted to the floor in four(4) places through anchor holes provided in the base of the cabinet. The cooling unit must be removed for access to the bolts. When the cabinet is bolted in place, the optional leveling feet must not be installed. Leveling will be accomplished through the use of non-conductive shims. The bolts must be tightened with a torque wrench to ensure adequate pretension.

For raised floor installations, a sub-structure support between the concrete sub-floor and the raised floor will be required. A qualified seismic engineer should be consulted regarding the required additional bracing.

1.3.3 Sparing Information

| See ECM806 for details of the XA-core product.

One Spare Storage Cabinet (SSC) NT9X01FA can hold up to four Spares Shelves. The spares cabinet has one (1) always provided Spares Shelf (NT0X25AY); thus three (3) shelves are provisionable. One Spares Shelf (NT0X25AY) can hold 26 CPs and 4 Power Modules, as well as 26 PaddleBoards. Note that NT9X01FA has been made MD. Use NTRX49AA for new offices.

1. For U.S. applications use standard sparing algorithms.
2. For Canadian and other applications the following may be used.
 - Version 2, C42 Cooling Unit:
 - Blowers 660,000 hrs MTBF in its useful life of 10 years. Note that the blower's useful life is about 10 years. Around that time, failures are to be expected. Good practice might dictate replacement of operating blowers around that time (analogous to replacing your car's engine belts before they break).
 - MTM cards 4,700,000 hrs MTBF
 - Relay 100,000,000 hrs MTBF
1. BRISC Series 50 Mixed Memory software requires one spare card for each card type.

RELEASE 06.03
13 July 1998

1.3.4 Power Feed and Fusing Requirements

Each shelf has four (4) power converters, two at either side of the shelf, mounted from the front.

Logic power distribution to the shelf electronics is from each power module to the corresponding half of the shelf.

Fuses are required as follows for NT9X01JB:

- For powering from a standard 7' PDC:
 - 8 - 20 Amp fuses (MS, CM and SLM shelves)
 - 2 - 10 Amp fuses (for C42 cooling blowers)
 - 1 - 10 Amp Fuse (Alarm Battery Supply (ABS))
- For powering from a CPDC
 - 8 - 30 Amp fuses (MS, CM and SLM shelves)
 - 2 - 10 Amp fuses (for C42 cooling blowers)
 - 1 - 10 Amp Fuse (Alarm Battery Supply (ABS))
 - Refer to CA0X04 issue 01 20 and later for power cable information.
 - PDC feeds are connected to the cabinet via EMI feed through capacitors at the top of the frame. Cable and Drop Length shall be job engineered.

1.3.5 Current Drain Information

See Section, Physical Characteristics.

| See ECM806 for details of the XA-core product.

1.4 Software Provisioning

For NTX software packages to PCL/SOC mappings for CSP02 and beyond refer to ECM552 - Mapping of NTX/NTG Package to PCL/NCL/Option.

The existing DMS-100 software is being 'ported' to run on the DMS-Core. The availability of system features (e.g. toll, tops, local, IBN etc.) is phased over several BCS releases. Each major system feature will have a DMS-Core Verification Office (V.O.).

RELEASE 06.03
13 July 1998

1.4.1 Required Software Packages and Interdependencies

1.4.1.1 Supernode 20 Product Component Packages and Features

1. NTX960AA - DMS SUPERNODE BASIC - Master Package rated MD BCS-28.
2. NTX960AB - DMS SUPERNODE BASIC - Master Package rated MD BCS-28.
3. NTX960AC - DMS SUPERNODE BASIC - Master Package which includes:
 - NTX940AA - COMPUTING MODULE BILGE
 - NTX941AA - COMPUTING MODULE COMMON BASIC
 - NTX942AA - SUPERNODE SYSTEM LOAD MODULE
 - NTX950AA - MESSAGE SWITCH BILGE
 - NTX951AA - MESSAGE SWITCH COMMON BASIC
 - NTXF70AA - SUPERNODE SN-20 PROCESSOR

NTX960AC is ordered in addition to all other master and feature packages that would be ordered for an equivalent NT-40. For example NTX003AB and NTX960AC are ordered for a Local Enhanced office equipped with DMS-Core.

1.4.1.2 Supernode Series 10 Product Component Packages

1. Offices provisioning the SuperNode Series 10 will require:
 - NTXD16AB - SuperNode (Series 10) Basic which contains the following packages:
 - NTXF96AA - Basic SuperNode (SN-10) Processor
 - NTX940AA - Computing Module Bilge
 - NTX941AA - Computing Module Basic
 - NTX950AA - Message Switch Bilge
 - NTX951AA - Message Switch Basic
 - Note: The NTXD16AB and NTXF96AA (SN-10) packages are to be "Napped" (e.g. cannot be ordered/delivered) in the BCS-35/36 loads.
 - If an existing site is configured with a Series 10 processor, the customer is requested to contact the regional sales representative for details on how to upgrade to a Series 20 processor or higher for BCS-35 and above loads.
 - Note - System Load Unit software must be ordered separately on SuperNode Series 10 Offices (SLM - NTX942AA).

RELEASE 06.03
13 July 1998

1.4.1.3 Supernode Series 30 Product Component Packages

1. Offices provisioning the SuperNode Series 30 will require:

- NTXD17AB - DMS Core MC68030-33 MHz (Series 30) Processor Basic which contains the following packages
 - NTXF15AA - SuperNode MC68030-33MHz (Series 30) Processor
 - NTX940AA - Computing Module Bilge
 - NTX941AA - Computing Module Basic
 - NTX942AA - SuperNode System Load Module
 - NTX950AA - Message Switch Bilge
 - NTX951AA - Message Switch Basic

1.4.1.4 Supernode Series 40 Product Component Packages

1. Offices provisioning the SuperNode Series 40 will require:

- NTXD18AB - Series 40 Supernode-Basic which contains packages:
 - NTXF16AA - DMS-Core MC68030 40MHz Processor
 - NTX940AA - Computing Module Bilge
 - NTX941AA - Computing Module Basic
 - NTX942AA - SuperNode System Load Module
 - NTX950AA - Message Switch Bilge
 - NTX951AA - Message Switch Basic
- Note: For U.S. applications the SuperNode Series 40 is limited for deployment and must have RTP Marketing approval prior to provisioning.

1.4.1.5 Supernode Synchronization Packages

1. For offices requiring external clock synchronization to CCS or DCS standard, provide:

- NTXF26AA - BITS Composite Master
- NTXF27AA - Cesium, Loran Composite Master
- For offices requiring external clock synchronization to Cesium/Rubidium Stratum I standard, provide the NTXF27AA package. Note that this package also supports Loran Composite Master clock source, but the necessary provisionable cable is not yet available for the latter application.

RELEASE 06.03
13 July 1998

1.4.1.6 System Load Module Software

1. SLM II requires software package NTXE54AA.
2. The Device Independent Recording Package(DIRP) on SLM is optional, and it is activated internally by the presence of package module DIRPSLM in NTXJ44AA - SLM File System.
3. SLM III requires NA004 or greater.

1.4.1.7 BRISC

1. The NT9X10AA 33 MHz 88000 BRISC CPU Circuit Pack is incompatible with the standard SuperNode BCS loads and requires a BCS load compiled for the BRISC card. The minimum software release that is required is BCS-BR33.
2. Software package NTXD25AA is required to support the NT9X10AA BRISC CPU when operating as a Series 50 processor.
3. BRISC Series 50 Mixed Memory requires software load NA004 and above.
4. Software package NTXD26AA is required to support the NT9X10AA BRISC CPU when operating as a Series 60 processor.
5. BRISC Series 60 requires BCS-36 and above load.
6. Order ID BASE0009 is required for Series 70 and requires NA004 or higher. When upgrading to Series 70 from processors which only support 24M cards, an interim step at Series 60 will be required if the CM memory requirement exceeds 212M at NA004. This is because the switch must be existing at NA004 before installing Series 70; however, the (10) ten 24M cards will not support the NA004 load if the memory requirements exceed 212M. Contact Network Service Solutions (NSS) regarding a loan program for 96M cards, RTIFs, and processors.

1.4.1.8 Affected Software Tables

1. In general, initial office datafill will be accomplished in the same way for the DMS-Core as for the CCC. There are new data tables associated with the CM and MS subsystems which are specific to the new hardware. Datafill of these tables will be detailed in the data schema associated with the CM and MS.
2. A dump and restore datatool will be available for core upgrades to transfer CCC data to a DMS-Core. Datatools will also be available to support DMS-Core to DMS-Core data transfer for BCS upgrades. Note that even with the CCC to DMS-Core datatools, some initial datafill of the new tables will be necessary.

RELEASE 06.03
13 July 1998

1.4.2 Software Usage Restrictions

1. BCS33 and BCS34 DO NOT support the stand-alone STP. That is, it is limited to BCS32, and it will be supported with BCS35.
2. BRISC Series 50 Mixed Memory cannot be used in offices with software loads less than NA004.
3. SLM III cannot be used in offices with software loads less than NA004.

1.4.3 Memory Provisioning

MS Memory Configuration and Software Loads.

Refer to the latest issue of API 325 for detailed MS memory configuration and software load information.

Memory Provisioning in CM

Provisioning of six (6) MByte memory cards in the Computing Module (CM) are only available to STP offices. The non-integrated STP can use NT9X14BB Memory CP on the CM if the S/W load fits.

Mixed 6 & 24 MByte systems require a minimum of BCS 25 and the NT9X13BB Processor CP.

Pure 24 MByte systems require a minimum of BCS 26, and NT9X13BC, Processor CP.

Note for Mixed memory offices, once a 24 Mbyte CP has been provisioned, no additional 6 Mbyte CP will be provided. In U.S., reference System Engineering Bulletin (S.E.B 88-01-002) "DMS-100F Memory Administration Document" for detailed memory provisioning.

All offices must equip Memory CP to the following algorithm. Starting with 24 MByte CP for mixed offices, 1st. Slots 16F and 23F, 2nd. 15F and 24F, 3rd. 14F and 25F, 4th. 13F and 26F, 5th. 12F and 27F, 6th. 11F and 28F, 7th. 10F and 29F, 8th. 9F and 30F, 9th. 8F and 31F, 10th. 7F and 32F.

BCS 26 offices (pure 24 Mbyte CP) Memory requirements are rounded as follows:

- Round up FACET values for Program Store (PS) to the nearest 8 Mbyte multiple.
- Add four (4) MBytes to the FACET DS for 68K processors.
- Round up FACET values for Data Store (DS) to the nearest 8 MByte multiple.

RELEASE 06.03
13 July 1998

- Add the rounded PS + the rounded DS, and then round up to the nearest 24 Mbyte multiple to determine number of circuit packs requirement.

Note the CP quantities should include a 15% administrative spare for PS and 10% administrative spare for DS additional to the unrounded FACET PS + DS figures. Be sure to include one (1) 24 Mbyte CP as a reliability spare.

The maximum addressable memory is 212 MBytes for 68K processors and 248 MBytes for offices utilizing the 32 MBytes of onboard memory on the NT9X10AA Series 50 processor.

BRISC

Use of the NT9X10AA/BA BRISC CPU will cause an increase in program store requirements of about 1.6 times the existing amount for 68020 and 68030 processors. Some of this increased requirement will be offset by the additional memory on the NT9X10AA/BA BRISC CPU CP.

The NT9X10AA/BA BRISC CPU does not support the NT9X14BB 6MB memory packs. Existing NT9X14BB memory packs must be replaced by an equivalent amount of memory using NT9X14DB 24MB memory packs for Series 50 option.

FACET for Series 40 should be used for BRISC offices with software loads less than BCS34. FACET for Series 50 should be used for BRISC offices with software loads BCS34 and greater.

Mixed memory for the BRISC Series 50 SuperNode platform (50MX) allows a mix of NT9X14EA 96 MByte cards on a common CPU plane with an existing base of NT9X14DB 24 MByte cards. Mixed memory is restricted to offices containing BRISC Series 50 and the NT9X26DC RTIF, and software loads of NA004 or above.

Upgrades from 50MX to BRISC Series 60 are also supported. However, 50MX must be upgraded to BRISC Series 60 before being upgraded to BRISC Series 70.

Memory Upgrade

The following table describes steps to upgrade BRISC Series 50 to BRISC Series 50 Mixed Memory, and BRISC Series 50 Mixed Memory to BRISC Series 60.

Upgrade BRISC Series 50 to BRISC Series 60

RELEASE 06.03
13 July 1998

BRISC Series 50 Upgrade				
FROM	TO	REMOVE	ADD	UPGRADE SCHEME
Series 50	5 MX	NT9X14DB	NT9X14EA	Memory Extension
		NT9X26DB	NT9X26DC	
5 MX	Series 60	NT9X14DB	NT9X14EA	Memory Extension

If two (2) NT9X14EA cards per side are required, mount the cards in slots 15 and 16 for plane 0 and slots 23 and 24 for plane 1. If three (3) NT9X14EA cards per side are required, mount the cards on shelf 13, slots 14, 15, and 16 for plane 0 and slots 23, 24, and 25 for plane 1.

There must be a minimum of two (2) NT9X14EA per side for sparing purposes.

With two (2) NT9X14EA per side, the minimum number of NT9X14DB per side is four (4) and the maximum number is eight (8).

With three (3) NT9X14EAs per side, the minimum number of NT9X14DBs per side is two (2) and the maximum number is five (5).

Only the following memory configurations for 50MX are valid:

RELEASE 06.03
13 July 1998

Valid Memory Configurations for 50MX

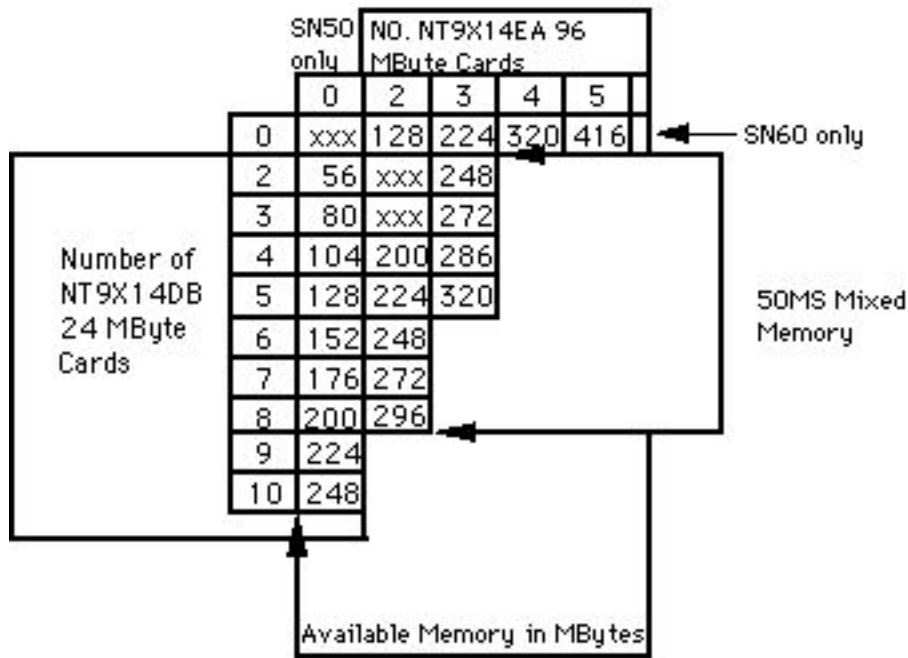


Figure 5. MEMORY CONFIGURATIONS FOR 40MX

Note: xxx in the preceding diagram represents an unsupported configuration.

The Series 60 and Series 70 option can work only with NT9X14EA (96 MBytes). Use of NT9X14BB/DB is not permitted with BRISC Series 60 or Series 70 option. See "Hardware Usage Restrictions" .

Calculated memory requirements for offices containing memory comprised of 6 MByte and 24 MByte cards are rounded up as follows:

- Step 1: round PS to the next 8 MByte multiple.
- Step 2: round the difference of (DS - 4 MByte) to the next 8 MByte multiple.
- Step 3: add Step 2 + 4 MByte
- Step 4: round the sum of (Step 1 result + Step 3 result) to the next 6 MByte multiple.

BCS 36 offices (pure 96 Mbyte CP) Memory requirements are rounded as follows:

- Round up FACET values for Program Store (PS) to the

RELEASE 06.03
13 July 1998

nearest 32 Mbyte multiple.

- Round up FACET values for Data Store (DS) to the nearest 32 Mbyte multiple.
- Add the rounded PS + the rounded DS, and then round up to the nearest 96 Mbyte multiple to determine number of circuit packs requirement.

Note the CP quantities should include a 15% administrative spare for PS and 10% administrative spare for DS additional to the unrounded FACET PS + DS figures. Be sure to include one (1) 96 Mbyte CP as a reliability spare.

The maximum addressable memory is 400M when the software load is less than NA005. In NA005, the limit was increased to 608M for Series 60 and 736M for Series 70.

Calculated memory requirements for offices containing BRISC Series 50 Mixed Memory are rounded up as follows:

- Step 1: round PS to the next 32 MByte multiple
- Step 2: round DS to the next 32 MByte multiple
- Step 3: round the sum of Step 1 + Step 2 to the next 96 MByte multiple.

CAUTION: For 9 or more memory blocks per side, provision N memory cards as required, plus one (1) spare memory card.

This rule applies (but not exclusive) to the following applications:

- NA100
- GL100
- EUR100
- APC
- DMS250
- DMS500
- GSM
- MTX

This rule does not apply to MSL and Austrian Telecom applications. Block sparing is not supported in the SuperNode.

RELEASE 06.03
13 July 1998

1.5 Real Time Impact

The NT9X13JA CPU 68020 20 MHz CP provides from 1.2 to 1.4 times the capacity of the NT-40 at introduction based upon DMS100 at 75% CP Occ.

The NT9X13BC is the baseline offered MC68020 based circuit pack, which provides 2.0-2.2 times capacity of the Central Control Complex (NT-40) based upon DMS100 at 75% CP Occ.

The NT9X13GA CPU 68030 33 MHz CP provides 1.4 - 1.5 times the real time capacity of the current NT9X13BC CPU circuit pack or 2.9 - 3.0 times the capacity of the NT-40 at introduction based upon DMS100 at 75% CP Occ.

The NT9X13HB CPU 68030 40 MHz CP provides 1.7 - 1.8 times the real time capacity of the current NT9X13BC CPU CP or 3.4 -3.8 times capacity of the NT-40 at introduction based upon DMS100 at 75% CP Occ.

BRISC

The NT9X10AA/BA BRISC CPU will provide a real-time performance gain of 2.5 times over the NT9X13BC CPU. The NT9X10AA may replace existing 68020 and 68030 processor cards, provided the corresponding paddleboard is also replaced and a BRISC software load is utilized.

The Series 50 Mixed Memory CPU will provide a real-time performance gain of 2.25 times over the NT9X13BC CPU.

Series 60 BRISC option for SN is projected to provide approximately 1.12 X Series 50 capacity.

Series 70 BRISC option for SN is projected to provide approximately 1.85 X Series 50 capacity.

RELEASE 06.03
13 July 1998

2.0 ECM632 - DMS SuperNode SE

2.1 Overview

The DMS SuperNode SE (SNSE) is an alternative provisioning option to the traditional SuperNode, Enhanced Network (ENET) and Link Peripheral Processor (LPP).

The selection of the DMS SuperNode SE is recommended where the application's projected growth will not exceed any of the following characteristics:

- ! 26 FXPM or 96 DS30 interfaces for Peripheral Modules.
- ! 3 Link Peripheral Processors (LPP).
- ! 2 Application / File Processors (AP/FP).

It is normally recommended that applications that exceed these parameters use the standard SuperNode.

The SNSE is intended for end-offices that require an initial capacity of up to 13,000 subscriber lines. The network can provide growth potential of 20,000 to 40,000 subscriber lines or 12,000 trunks, depending on the traffic and service mix of an application and the required peripheral configuration.

The SNSE platform is defined as containing the CM/SLM functionality, DMS-Bus functionality, LIS and Network functionality. In essence, SuperNode SE provides DMS-Core, DMS-Bus, ENET 16K Channels, and a Link Interface Shelf (LIS) in a single cabinet.

The ENET 16K channels provides an effective network switching capacity of up to 6,000 Erlang (216,000 CCS). The network can be configured to support a maximum of 27 DS-512 and 16 DS-30 interfaces through to 22 DS-512 and 96-DS30 interfaces. The use of an external SLC allows 21 DS-512 and 112 DS-30 interfaces. The 16K channel ENET is recommended for all initial SuperNode SE based offices. In NT-40 retrofit applications requiring JNET or DSN, the ENET portion of the SNSE is not required. In this case, the JNET or DSN is located in a separate frame or frames. Up to 7 Network Modules (NM) can normally be provisioned with SNSE. Note that, existing offices with JNETs are supported for NT40 to SuperNode SE retrofits.

The LIS provides capacity for twelve (12) Application Specific Units (ASUs) and the Enhanced Network and Interface Unit shelf (ENI) can support an additional two (2) LIU7s or EIUs only if ENET is provisioned. The SNSE MS will support an external SSLPP in addition to the internal LIS. With such a configuration, the number

RELEASE 06.03
13 July 1998

of CCS7 ASUs (LIU7) cannot exceed 24, regardless of the availability of the 2 LIU7 slots in the ENI shelf. Additional ASU capacity can be provided through the provisioning of Link Peripheral Processor cabinets (LPPs). A maximum of three (3) LPPs can be supported by the SuperNode SE.

The following diagram gives a pictorial representation of this cabinet using both ENET and LIS:

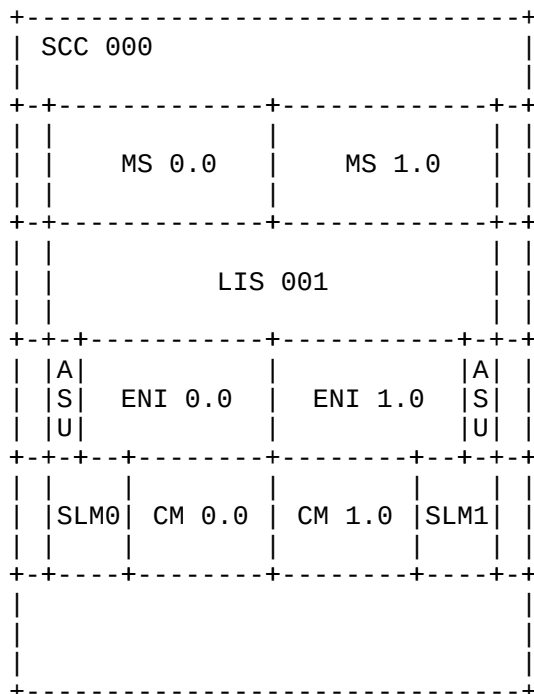


Figure 6. DMS SuperNode SE Cabinet

2.1.1 SuperNode SE Applications

The SuperNode SE can be utilized in the following type applications:

! Stand-alone	! International
! SSP	! IEC
! Toll	! PBX
! Cellular	! TOPS

2.1.2 SuperNode SE Configurations

When serving as a host office for a group of remote offices, the SuperNode SE supports the following remote peripherals:

! S/RSC	! DMS-1U
! RSC	! DMS-1R
! RLCM	! SLC-96
! OPM	! RSCI
! SRU	! RLM
! SMA	! ESMA

2.1.3 SuperNode/SuperNode SE Hardware Comparison

RELEASE 06.03
13 July 1998

Hardware Feature	SuperNode SE	SuperNode
PROCESSOR	68000 based (1) or BRISC based from BCS36	68000 based (2) or BRISC based from BCS35
Series 20 w. 24MB	100-108 MB (7)	200MB (7)
Series 20 w. 96MB	200MB	Not Available
Series 60 w. 96MB	400MB	400MB
Series 70 w. 96MB (NA004 onward)	400MB	400MB
Series 70EM w.96MB (NA007 onward)	400MB	400MB
IMLs	DS-30 and DS-512 (3)	DS-30 and DS-512 (3)
PROV'BLE PORT CPS	5 (3)	16
MS-BUS CAPACITY	128 Mbyte/sec	128 Mbyte/sec
FBUS CAPACITY	32 Mbyte/sec	32 Mbyte/sec
FIBER XPMs SUPPORT	YES	YES
JNETs SUPPORTED	7/10 NMs (4)	32 NMs
ENET SUPPORTED	16K	128K, 64K
IOCs SUPPORTED	6/10 (5)	6/10
SLM SUPPORTED	SLM1A (6) SLM III	SLM2 (6) SLM III

Figure 7. SuperNode/SuperNode SE Hardware Comparison

Notes:

1) SuperNode SE initially uses a 68020 processor. From BCS36 on the standard SNSE may have an optional Series 60 (BRISC) processor. From NA004 on the SNSE may have the optional Series 70 (BRISC) processor. There are no plans to introduce SN30, SN40 or SN50 on SNSE even with 24MB Memory card.

2) SuperNode processor was introduced with Series 20, but has evolved and is evolving to Series 30, 40, 50, 60 and 70. Series 20, 30, 40, are 68K CPU's. Series 50, 60 and 70 are 88K CPU's (BRISC).

RELEASE 06.03
13 July 1998

3) For SuperNode SE, two of the MS slots (slot 10 for plane 0 and slot 29 for plane 1) are reserved for IOC/DS-30 IMLs. If AP/FP is provisioned with SNSE, then DS-512 IML MUST BE USED from slot 13 on plane 0 and slot 26 on plane 1.

4) SuperNode SE supports seven NMs when configured for the LEC/IEC markets, and up to ten NMs in the MSL markets.

5) SuperNode SE supports up to six IOCs when configured for the LEC/IEC markets, and up to eight IOCs in the MTX markets.

6) System Load Module capacities:

- * SLM1A 340 Mbyte hard disk (unformatted)
150 Mbyte tape
- * SLM2 600 Mbyte hard disk (unformatted)
150 Mbyte tape
- * SLM3 1 Gbyte hard disk (unformatted)
500 Mbyte tape

7) Memory Availability:

SNSE memory capacity is based on the following:

- BCS34 - SuperNode SE Series 20 with 24 Meg memory only.
- BCS35 - SuperNode SE Series 20 with 96 Meg OR 24 Meg CPs,
but not mixed.
- BCS36 - SuperNode SE Series 60 with 96 Meg CPs only.
- NA004 - SuperNode SE Series 70 with 96 Meg CPs only.
- NA007 - SN/SNSE Series 70EM with 96 Meg CPs only.

Memory capacity is the Data Store plus Program Store capacity.

Memory capacity excludes:

- Block spare for SNSE and card spare for SuperNode
- first 4MB of data store for 68K processors.

Memory capacity includes:

- reserved memory for program store and data store patching
- data store fragmentation
- first 4MB of datastore for 68K processors.
- 32MB on-board for 88K Processors.

RELEASE 06.03
13 July 1998

2.2 Hardware Provisioning

2.2.1 Hardware Usage Restrictions

The SuperNode SE can support either ENET or JNET configurations. It cannot support mixed ENET and JNET configurations, because JNET cannot interwork with ENET.

Note that JNET is NOT supported with SNSE in streamline application.

On the SuperNode SE, IMLs can be provided using DS-30 links, fiber IMLs can be used to connect to the AP/FP cabinets.

JNET requires two (2) adjacent link interface cards per MS side.

LPP requires two (2) link interface cards per MS side.

IOC 0, IOC 1, and IMLs must always be on the MS physical card slot 10 for plane 0 & slot 29 for plane 1.

NT9X14DB and NT9X14EA WILL NOT be supported in a mixed configuration.

The memory load image (100% PS + typically 60% DS) CANNOT exceed 5 % of the SLM drive capacity (150MB for SLM1A). The memory load image stated above includes MS load memory also.

RELEASE 06.03
13 July 1998

2.2.1.1 Hardware Upgrades

SuperNode SE will support the following upgrades:

<u>FROM</u>	<u>TO</u>
NT40 Core	SuperNode SE (without ENET)
SuperNode SE/JNET	SuperNode SE/16K ENET
SuperNode SE/MSB7	SuperNode SE/LIU
NT40/DSN/MSB7	SuperNode SE/16K ENET/LIU

Upgrade procedures for the above configurations are very similar to established SuperNode upgrade procedures.

The following upgrade procedures will be documented and verified in the BCS35 timeframe.

<u>FROM</u>	<u>TO</u>
SuperNode SE with LIU/LIS	SuperNode SE with LIU/LIS+ external SSLPP
SuperNode SE with LIU/LIS/external SSLPP DMS-10 RSC	SuperNode SE with LIU/LIS/external SSLPP+LPP SNSE SNSE

The following upgrade procedures were documented and verified in 3rd Quarter 1996 timeframe.

<u>FROM</u>	<u>TO</u>
SuperNode SE	Full SuperNode

Processor	SE 20 NT9X13MA	SE 20 NT9X13MB	SE 60 NT9X10AA	SE 70 NT9X10BA
RTIF PB	NT9X26AB	NT9X26AB	NT9X26DC	NT9X26EA
Dual Port Msg	NT9X86AA	NT9X86AA	NT9X86AB	NT9X86AB
Memory	24 Meg. NT9X14DB	NT9X14DB OR NT9X14EA	96 Meg. NT9X14EA	96 Meg NT9X14EA
Port Card	NT9X12AC/ NT9X12AD	NT9X12AC/ NT9X12AD	NT9X12AD	NT9X12AD
Software Release	BCS 34	BCS 35	BCS 36	CSP004

Processor	SE 70 EM NT9X10CA
RTIF PB	NT9X26FA
Dual Port Msg	NT9X86AB
Memory	96 Meg NT9X14EA
Port Card	NT9X12AD
Software Release	CSP007

Figure 8. SNSE Processor, Associated Card and Software Requirements.

2.2.2 Hardware Dependencies

When using "Universal" Loads on the SNSE the Compute Module must be provisioned with the 96 Meg memory (NT9X14EA).

RELEASE 06.03
13 July 1998

2.2.2.1 P and C Side Port Requirements

Not applicable

2.2.2.2 DMS BUS Port Requirements

Message Switch Configurations

The range of port cards and paddle boards that are supported by the SuperNode SE allows it to be configured with up to 8 Input/Output Controllers (IOC), 2 mandatory Inter-Message-Links (IML), up to 3 Link Peripheral Processors (LPP), and either a fully equipped 16K channel Enhanced Network (ENET) or up to 7 junctored Network Modules (JNET/NMs). Note that MSL Cabinet packaged systems can support up to 10 NMs. Where ENET 16K is used, the message switch also provides two slots for interfaces to Application/File Processors (AP/FP) and or Single Shelf LPPs (SSLPP or FLIS) external to the SNSE cabinet.

		ENET	JNET	JNET
	MS SLOTS	MS P-side ports < than 256	1 - 4 Network Modules	5 - 7 Net. Mod. OR 10NMs for MSL appl.
2 IMLs	10 & 29	17AD/23AA	17AD/23AA	17AD/23AA
2 IOCs	11 & 28		17AD/23AA	17BB/69BA
&	12 & 27		17AD/23AA	17BB/69BA
0 LPP	13 & 26,,	17AD/62BA	17AD/62BA	17AD/62BA
& 1 FLIS				
2 IMLs	10 & 29	17BB/69BA	17BB/69BA	17BB/69BA
up to	11 & 28		17AD/23AA	17BB/69BA
8 IOcs	12 & 27		17AD/23AA	17BB/69BA
& 0 LPPs	13 & 26,,			
2 IMLs	10 & 29	17BB/69BA	17BB/69BA	17BB/69BA
up to	11 & 28	17BB/69BA	17BB/69BA	17BB/69BA
8 IOcs	12 & 27		17BB/69BA	17BB/69BA
& 3 LPPs	13 & 26,,			

Figure 9. Message Switch Configurations

RELEASE 06.03
13 July 1998

* See subrule 3 for provisioning of slots 13 & 26.

Note that the SuperNode SE can support either ENET or JNET configurations. It cannot support mixed ENET and JNET configurations, because JNET cannot interwork with ENET.

Note that JNET is NOT supported with SNSE in streamline application.

The ENET interface provisioning is determined by the number of peripheral message channels required per ENET plane and is shown below.

P-side ports/ MS Plane	P-Side Peripheral Msg channels per ENET Pl.	slot 15 & 24 Front Front	slot 14 & 25 Rear Rear
32	< or = 15	17BB 62CA	- -
64	< or = 31	17BB 62CA 17DA 62CA	17BB 62CA/25BA - -
96	< or = 47	17DA 62CA	17BB 62CA/25BA
128	< or = 63	17DA 62CA 17CA 62CA	17DA 62CA/25BA - -
256	< or = 127	17CA 62CA	17CA 62CA/25BA

Figure 10. ENET Interface Provisioning

NOTES:

CAUTION: The following notes are important to correctly implement the different circuit packs.

The NT9X17CA is a 128 port card that has attained General Availability (GA) in BCS36.

One high capacity port card CAN NOT be provisioned to replace two lower capacity port cards.

The NT9X25BA MS Port Expander with Terminations paddleboard has been used for Message Port growth on SuperNode SE extensions. All initial and JNET to ENET upgrades must now use the NT9X62CA paddleboard.

RELEASE 06.03
13 July 1998

Examples:

The 17DA/62CA combination can not be used to replace an existing 17BB/62CA and 17BB/25BA combination.

The 17DA/62CA combination can not be used to replace any existing four card combinations (17BB/25BA or 17DA/62CA and 17BB/25BA or 17DA/62CA and 17DA/25BA combination).

To Provision Message Switch for internal LIS interface, equip slots 8F and 31F with NT9X73BA (Rate Adapter CP) and 8R and 31R with NT9X79BA, F-Bus Extender Paddle Board.

To provision Message Switch for up to four (4) JNET modules, equip slots 11F, 12F, 28F, and 27F with NT9X17AD (4 Port MS Interface card) port cards and 11R, 12R, 28R, and 27R with NT9X23AA (4 Link DS-30 Paddle Boards).

To provision Message Switch for up to seven (7) JNET modules in DMS, and up to ten (10) JNET Modules in MSL applications, equip slots 11F, 12F, 28F, and 27F with NT9X17BB (32 Port MS Interface card) port cards and 11R, 12R, 28R, and 27R with NT9X69BA(16 Link DS-30 Paddle Boards).

To Provision Message Switch for up to two (2) AP/FP modules equip slots 12F,13F, on Plane 0 and 26F,27F on Plane 1 with NT9X17AD and slots 12R,13R, on Plane 0 and 26R,27R on Plane 1 with NT9X62BA PBs.

To Provision Message Switch for SSLPP (FLIS) without AP/FP equip slots 13F on plane 0 and 26F on plane 1 with NT9X17AD and slots 1 R on Plane 0 and 26R on Plane 1 with NT9X62BA. However, if SNSE is provisioned with SSLPP and AP/FP, then the unused ports from slots 13 and 26 can be used for SSLPP.

Synchronization

The DMS SuperNode SE supports the following clock configurations:

- Stratum III
- Stratum 2.5
- Stratum II

The DMS SuperNode SE supports external clock sources such as Stratum II and Stratum 2.5 with the use of a Remote Oscillator Shelf (ROS), in the identical manner to SuperNode. For software, cabling and other related information, refer to ECM-626 DMS SuperNode (section 1.1.2 - Message Switch).

The composite clock for LIS is terminated in the Message Switch and extended to the LIS via the FBus Cable.

RELEASE 06.03
13 July 1998

2.2.2.3 Circuits Per Card

Not applicable

2.2.2.4 Discrimination Numbering

Not applicable

2.2.2.5 SNSE to SuperNode Upgrades

When the SNSE exhausts the internal network, (DSNE or SNSE ENI) an upgrade to a SuperNode can be undertaken so that the office does not have to be split. An upgrade should be only undertaken when the office growth is dramatic and unforeseen.

There are many different procedures that may be implemented to upgrade the SNSE to the SuperNode, each will affect several departments within NT.

Following are the major hardware and software requirements for this upgrade that will guide the SAE to a proper solution for this office.

1. The new SuperNode along with all related hardware and software must be ordered and provisioned through normal process. Two RTIFs (terminals) must be included for the SuperNode processor. The new SuperNode will be engineered as an initial, in turn linking the current SNSE peripherals, IOCs and LPPs.

Major items in sequence for an office are shown as:

- Add LIM to SNSE if required
- Add DPCC and ENET to office.
- Add PDC to office if required.
- Convert over to DPCC/ENET
- Add new peripherals to office.

All items above can be done in one job with transition specs or alternatively, be done with multiple H-Numbers.

2. For CCS7 offices, an LPP must be ordered with the number of ASUs (links) equal to the number on the present SNSE LIS shelf, i.e.; the ASUs on the SNSE LIS shelf are now duplicated on the LPP. Since the LPP now coexists with the SNSE LIS, four (4) DS-30 ports per plane must be available on the SNSE ENI if NUIs are to be migrated from the SNSE LIS. A new LPP will also require cables and data translations.

The LPP will then be turned up on the SNSE and then migrated to the SN when the cutover occurs. The ASUs on the LPP should have the same PEC as the ASUs on the SNSE LIS. Note that cables for both the SNSE and SN will be required, along with additional SNSE-MS port cards

RELEASE 06.03
13 July 1998

if required. The LPP extension must be done first in the time line for this conversion.

ASU provisioning for the migration should be as follows;

If the SNSE LIS is equipped with NIU and channelized LIUs, then the NIU and the channelized LIUs must be located on LIS 03 of the LPP. This arrangement will ensure that the NIU numbering scheme is not duplicated. The channelized LIUs will follow the standard assignment sequence on LIS 03.

If the SNSE LIS or SNSE ENI is equipped with Non-channelized LIUs, then these LIUs will be spread across LIS 01-03 per the standard LIU assignment sequence. Additional ASU growth on the LPP will be preformed after the conversion using standard assignment rules.

3. SNSE MS port card provisioning must be carefully evaluated. Following are the basic steps: If there is an existing LPP on the SNSE with enough empty slots then the LIS ASU's will be moved there and no SNSE MS port cards are provisioned. If there is no existing LPP then an LPP will be provisioned with the SuperNode and ENET. If the above is not true, Operations Technology has a MS Port Concentration Kit that can be used on the SNSE. This kit will provide the MS port cards and therefore the necessary ports required during the installation phase. This kit NTE7325 (NTE7325B in Canada) contains:

- Quantity 5 NT9X17DA 64 Port CP
- Quantity 5 NT9X69BA 16 Port DS30 Paddleboard
- Quantity 5 NT9X0532 Cables

Installation will provide the NTEX7325 kit and the EAE will configure the cards via the null spec into the SNSE MS. This will facilitate accurate transistion drawings for the proper datafill and the Customer will not have the expense of cards used on the SNSE during the installation interval.

4. Software for the new SuperNode requires scheduling via the software delivery tools and is loaded in the office via the One Night Process (ONP)

5. The SuperNode PCL software release must be the same as the SNSE. The SNSE software must be NA0004 or later. Older vintage processors and memory cards are being retired (MD status), check for the correct processor and memory cards in the ordering tools. If a S/W upgrade is required, it must be performed either before or after the SNSE to SN cutover process.

6. NT will deliver a commissioning data load at H date to the site.

RELEASE 06.03
13 July 1998

7. At a minimum the SN CM memory cards must match the memory capacity to that of the existing SNSE.

8. During the upgrade, temporary power will be required for the LPP, Master switchboxes, and the Commissioning IOC itself. Detailed feeds from the office PDCs are:

1A and 1B feed required for the LPP switchbox.

1A and 1B feed required for the Master Switchbox.

1A and 2B feeds OR

2A and 1B feeds required for the CIOC.

9. No peripherals should be added to the office after Z date minus 35 days. While multiple extensions may be a Customer preference in an office, this short time period will minimize serious impact to the office. Additional growth for LCMs, LTCs, LGCs and DTCs can be done after Cutover (Z) date.

10. A SNSE office with FLIS cabinet can now be upgraded to a SN. Also offices with EIUS can now be converted.

11. Major hardware items not currently supported are:

SPMs (used in DMS 250 and DMS 500)

XA-Core (New product)

32K ENET (New product)

12. This procedure covers SNSE with an ENI shelf to a SN with ENET or SNSE with JNET to SN with JNET. The new SN can be upgraded from JNET to ENET if required.

RELEASE 06.03
13 July 1998

2.2.3 Provisioning Considerations

2.2.3.1 Message Switch Provisioning

See Figure 11 below for a Combined Message Switch Shelf in a typical configuration. NT9X0470 is the MS Shelf Assembly.

+-----+-----+-----+		
9X31AB -5V 20A Pwr Converter	1F	
9X30AB +5V 80A Pwr Converter	4F	
+-----+-----+-----+		
9X49CC TBus Terminator CP	7F	7R 9X19BA
9X19AA CP Filler Pack	8F	8R 9X19BA
9X15AA Mapper Circuit Pack	9F	9R 9X19BA
9X17AD or 9X17BB	10F	10R 9X23AA or 9X69BA
9X19AA CP Filler Pack	11F	11R 9X19BA
9X19AA CP Filler Pack	12F	12R 9X19BA
9X19AA CP Filler Pack	13F	13R 9X19BA
9X19AA CP Filler Pack	14F	14R 9X19BA
9X19AA CP Filler Pack	15F	15R 9X19BA
9X17AD 4 Port Circuit Pack	16F	16R 9X62CA
9X13NA MS Processor w 16M memory	17F	17R 9X26AB
9X53AD System Clock Circuit Pack	18F	18R 9X54AC
9X52AA T-Bus Access Circuit Pack	19F	19R 9X19BA
+-----+-----+-----+		
9X52AA T-Bus Access Circuit Pack	20F	20R 9X19BA
9X53AD System Clock Circuit Pack	21F	21R 9X54AC
9X13NA MS Processor w 16M memory	22F	22R 9X26AB
9X17AD 4 Port Circuit Pack	23F	23R 9X62CA
9X19AA CP Filler Pack	24F	24R 9X19BA
9X19AA CP Filler Pack	25F	25R 9X19BA
9X19AA CP Filler Pack	26F	26R 9X19BA
9X19AA CP Filler Pack	27F	27R 9X19BA
9X19AA CP Filler Pack	28F	28R 9X19BA
9X17AD or 9X17BB	29F	29R 9X23AA or 9X69BA
9X15AA Mapper Circuit Pack	30F	20R 9X19BA
9X19AA CP Filler Pack	31F	31R 9X19BA
9X49CC TBus Terminator CP	32F	32R 9X19BA
+-----+-----+-----+		
9X31AB -5V 20A Power Converter	33F	
9X30AB +5V 80A Power Converter	36F	
+-----+-----+-----+		

Figure 11. Combined Message Switch Shelf Typical Configuration

RELEASE 06.03
13 July 1998

DS30 link assignments are shown below when more than 2 IOCs or LPP capability is provided or mixed JNET/LPP is required.

LINK	Pos.10R/29R	Pos.11R/28R	Pos.12R/27R	NOTES
0	IOC 0	JNET 1,0	JNET 0,0	1,2
1	IOC 1	JNET 1,1	JNET 0,1	1,2
2	IML 0	JNET 1,2	JNET 0,2	2
3	IML 1	JNET 1,3	JNET 0,3	2
4	IOC 2	JNET 1,4	JNET 0,4	2
5	IOC 3	JNET 1,5	JNET 0,5	2
6	IOC 4	JNET 1,6	JNET 0,6	2
7	IOC 5	JNET 1,7	JNET 0,7	2
8	IOC 6	JNET 1,8	JNET 0,8	2,4
9	IOC 7	JNET 1,9	JNET 0,9	2,4
10	LPP 0,0	LPP 1,0		3
11	LPP 0,0	LPP 1,0		3
12	LPP 0,1	LPP 1,1		3
13	LPP 0,1	LPP 1,1		3
14	LPP 0,2	LPP 1,2		3
15	LPP 0,2	LPP 1,2		3

Figure 12. DS30 Link Assignments

Note 1:

IOC 0 and IOC 1 must always be in slot 10R, link 0 and link 1 respectively. Other IOCs can be in any links not occupied by LPP or JNET links.

Note 2:

JNET requires 2 card slots per MS side, in paired adjacent slots 1 -12. In the table above, JNET cannot reside in the same card as

RELEASE 06.03
13 July 1998

LPP. JNET plane 0 has to start in even MS slot. This is verified in BCS35.

JNET 0,0 implies Plane 0; Module 0

Note 3:

Each LPP requires total of four ports. Two ports out of 4 ports must be on each slot. Note that, Side 0 and Side 1 of the LPP are in 2 different slots.

Note 4:

IOC 6 and IOC 7 are not supported with SNSE in Cabinetized (Streamline) application. That is, links 8 and 9 are not wired. Also JNET is not supported with SNSE in Streamline application. For SDM-FT applications, provide two SR256 links on one NT9X17AD card per MS. In the rear of this card provide one NT9X62BA/CA rear paddleboard.

The SDM-FT requires one slot per Message switch plane and the cards should be provisioned in slots 12 and 27. The SDM-FT port card can only be used for SDM use, no other application (FLIS, APC etc.) can share any ports on the two slots. Only one SDM-FT is to be connected per SuperNode SE.

2.2.3.2 Link Interface Shelf (LIS) Provisioning

For all markets, the LIS shelf (NT9X7204) must be provided with the SuperNode SE cabinet because the LIS shelf cannot be retrofitted in a working SuperNode SE office. There are no exceptions to this rule. If not used, provision NT9X01FB.

See the figure below for the Link Interface Shelf that is equipped with 4 LIU7.

9X19EA Filler Power	1F		
9X30AB +5V 80A Pwr Converter	4F		
9X74DA FBus Repeater CP	7F	7R	9X79AA/BA
EX22BB ASU (LIU7) Processor CP	8F	8R	EX20BA
9X76AA ASU Interface CP	9F	9R	9X77AA/78AA/78BA
EX22BB ASU (LIU7) Processor CP	10F	10R	9X19BA
9X76AA ASU Interface CP	11F	11R	9X77AA/78AA/78BA
9X19AA CP Filler Pack	12F	12R	9X19BA
9X19AA CP Filler Pack	13F	13R	9X19BA
9X19AA CP Filler Pack	14F	14R	9X19BA
9X19AA CP Filler Pack	15F	15R	9X19BA
9X19AA CP Filler Pack	16F	16R	9X19BA
9X19AA CP Filler Pack	17F	17R	9X19BA
9X19AA CP Filler Pack	18F	18R	9X19BA
9X19AA CP Filler Pack	19F	19R	9X19BA
9X19AA CP Filler Pack	20F	20R	9X19BA
9X19AA CP Filler Pack	21F	21R	9X19BA
9X19AA CP Filler Pack	22F	22R	9X19BA
9X19AA CP Filler Pack	23F	23R	9X19BA
9X19AA CP Filler Pack	24F	24R	9X19BA
9X19AA CP Filler Pack	25F	25R	9X19BA
9X19AA CP Filler Pack	26F	26R	9X19BA
9X19AA CP Filler Pack	27F	27R	9X19BA
EX22BB ASU (LIU7) Processor CP	28F	28R	9X19BA
9X76AA ASU Interface CP	29F	29R	9X77AA/78AA/78BA
EX22BB ASU (LIU7) Processor CP	30F	30R	EX20AA
9X76AA ASU Interface CP	31F	31R	9X77AA/78AA/78BA
9X74DA FBus Repeater CP	32F	32R	9X79AA/BA
9X19EA Filler Power	33F		
9X30AB +5V 80A Power Converter	36F		

Figure 13. Link Interface Shelf Equipped w/4 LIU7

Provision NT9X79AAs in slots 7R and 32R in the LIS shelf, if ENI shelf is provided and equipped with the two LIU7s. Otherwise, provision with NT9X79BAs with two left FBUS cables NT9X7211 and with two right FBUS cables NT9X7213.

The LIS provides capacity for twelve (12) Application Specific Units (ASUs) and the Enhanced Network and Interface Unit shelf(ENI) can support an additional two (2) LIU7s or EIUs. The SNSE MS will support an external SSLPP in addition to the internal

RELEASE 06.03
13 July 1998

LIS. With such a configuration, the number of CCS7 ASUs (LIU7) cannot exceed 24, regardless of the availability of the 2 LIU7 slots in the ENI shelf. This scenario is for LIU applications only and any additional ASUs that are considered for mixing must be factored using the F-BUS, T-BUS and LINK load factor calculations.

For capacity beyond 24 LIUs, external LPP frames must be provided. A maximum of three (3) LPP frames can be supported by the SuperNode SE.

The only Application Specific Unit (ASU) supported in BCS34 is the LIU7. In 4Q95, the Ethernet Interface Unit (EIU) will be available for provisioning on the LIS and ENI shelves. The NIU will be available on SNSE's LIS from BCS36.

Each Link Interface Unit (LIU) is composed of two circuit packs and one paddleboard. The first circuit pack is the NTEX22BB IPF Processor and F-Bus Interface and is provisioned in an even-numbered slot from 8F to 30F. The second circuit pack is the NT9X76AA STP Signalling Terminal and is provisioned in the next highest (odd-numbered) slot (from 9F to 31F). The paddleboard is either an NT9X77AA V.35 Interface or an NT9X78AA/BA/CA Enhanced DS0A Interface and is provisioned behind the NT9X76AA (in an odd-numbered slot from 9R to 31R).

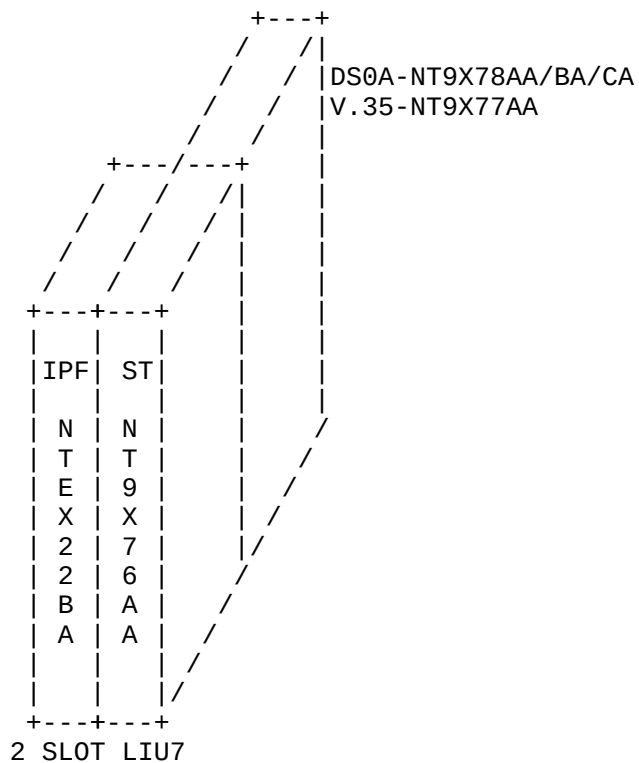
Up to twelve (12) LIUs may be provisioned per LIS shelf, with the left-most LIU occupying slots 8F, 9F and 9R, and the right-most LIU occupying slots 30F, 31F and 31R.

Provisioning of LIUs within LIS shelves should be done as follows:

LIUs forming a pair should be provisioned in different halves of the shelf with LIUs being assigned from the sides towards the middle.

These three cards make up a single Link Interface Unit.

Refer to Figure 14 on page 1-79

**Figure 14. LIU7 CONFIGURATION****2.2.3.3 Enhanced Network Shelf (ENI) Provisioning**

See Figure 15 on page 1-80 for a Enhanced Network Shelf(ENI) Shelf in a 4K ENET configuration without the ASU (LIU7 or EIU).

-----+-----+-----					
9X31AB	-5V 20A Pwr Converter	1F			
9X30AB	+5V 80A Pwr Converter	4F			

9X19AA	Filler Face Plate	7F	7R	9X19BA	OPTION
9X19AA	Filler Face Plate	8F	8R	9X19BA	LIU
9X19AA	Filler Face Plate	9F	9R	9X19BA	
9X13KA	ENET Processor CP	10F	10R	9X26AB	
9X36BA	ENET Clock & Message CP	11F	11R	9X40BB	--> to MS
9X35FA	4K x 8K Chan Xpt CP	12F	12R	9X19BA	
9X35FA	4K x 8K Chan Xpt CP	13F	13R	9X45BA	
9X19AA	Filler Face Plate	14F	14R	9X19BA	
9X19AA	Filler Face Plate	15F	15R	9X19BA	
9X19AA	Filler Face Plate	16F	16R	9X19BA	
9X19AA	Filler Face Plate	17F	17R	9X19BA	
9X19AA	Filler Face Plate	18F	18R	9X19BA	
9X19AA	Filler Face Plate	19F	19R	9X19BA	

9X13KA	ENET Processor CP	20F	20R	9X26AB	
9X36BA	ENET Clock & Message CP	21F	21R	9X40BB	--> to MS
9X35FA	4K x 8K Chan Xpt CP	22F	22R	9X19BA	
9X35FA	4K x 8K Chan Xpt CP	23F	23R	9X45BA	
9X19AA	Filler Face Plate	24F	24R	9X19BA	
9X19AA	Filler Face Plate	25F	25R	9X19BA	
9X19AA	Filler Face Plate	26F	26R	9X19BA	
9X19AA	Filler Face Plate	27F	27R	9X19BA	
9X19AA	Filler Face Plate	28F	28R	9X19BA	
9X19AA	Filler Face Plate	29F	29R	9X19BA	
9X19AA	Filler Face Plate	30F	30R	9X19BA	OPTION
9X19AA	Filler Face Plate	31F	31R	9X19BA	LIU
9X19AA	Filler Face Plate	32F	32R	9X19BA	

9X31AB	-5V 20A Power Converter	33F			
9X30AB	+5V 80A Power Converter	36F			
-----+-----+-----					

Figure 15. Enhanced Network Shelf(ENI) Shelf in a 4K ENET configuration w/o ASU (LIU7 or EIU).

For all markets, the ENI shelf (NT9X0810) must be provided with the SuperNode SE cabinet because the ENI shelf cannot be retrofitted in a working SuperNode SE office. If it is not currently used, it is to be engineered with filler circuit packs.

RELEASE 06.03
13 July 1998

The ENET is provisionable in 4K, 8K, 12K and 16K channel configurations. Note that 2K channels are reserved for peripheral and network control processor messaging in all configurations. Therefore, the number of channels available for subscriber traffic in all configurations is 2K, 6K, 10K and 14K channels respectively.

Peripheral Module Interfaces

Three basic types of paddleboard are available:

- „ DS-30 (NT9X41BA, copper links only)
- „ DS-512 (NT9X40BB, fiber links only)
- „ DS-30/DS-512 (NT9X45BA, both copper and fiber links).

The DS-512 PB has four (4) DS-512 inputs (i.e. 0.5K Channels per input) which are utilized on fiber XPMs.

The DS-30 PB combines 16 DS-30 copper speech links which are utilized on Series I Peripherals and non fiber XPMs. The NT9X41BA has 16-Ports numbered 0-15. All ports except port #1 may be used for Voice or Messaging Links. Port #1 is valid for Voice Links only. This is a S/W restriction on the hardware.

The DS-30/DS-512 PB is a new peripheral interface paddle board which can interface 3 DS-512 fiber links and 16 DS-30 copper links. It combines the functionality of two existing packs. The NT9X45BA has 16 DS-30 ports numbered 0-15 and 3 DS-512 ports. All DS-30 ports except port #1 may be used for Voice or Messaging Links. Port #1 is valid for Voice Links only. This is a S/W restriction on the hardware.

The NT9X40BB (4 DS-512) fully utilize the ENET's channel handling capacity. But, it does not provide copper links. On the other hand, the NT9X41BA (16 DS-30) pack does not fully utilize ENET's channel handling capacity(only 25% utilization of crosspoints). Using an NT9X45BA results in a 100% utilization of ENET crosspoints and providing both copper and fiber links.

RELEASE 06.03
13 July 1998

ENET Capacity

Series II Peripheral Modules (XPMs) MUST be fiberized to achieve full usage of the ENET capacity. Although up to 192 DS0 messaging is allocated to the ENET-PM ports per plane, the available card slots in the ENET 16K for the use of the PMs are limited to maximum of 7 paddle boards in each plane (i.e. 13R-19R in Plane 0 and 23R-29R in Plane 1). Refer table below.

+-----+ 16K ENET Maximum PM Port Capacities (per ENET plane) 								
+-----+-----+-----+-----+-----+-----+-----+-----+-----+								
DS512 ports	27	26	25	24	23	22	21	
+-----+-----+-----+-----+-----+-----+-----+-----+-----+								
DS30 ports	16	32	48	64	80	96	112	
+-----+-----+-----+-----+-----+-----+-----+-----+-----+								
NT9X45s	1	2	3	4	5	6	7	
+-----+-----+-----+-----+-----+-----+-----+-----+-----+								
NT9X40s	6	5	4	3	2	1	0	
+-----+-----+-----+-----+-----+-----+-----+-----+-----+								

NOTE:

The NT9X40BB is a must in slot 11R for Plane 0 and 21R for Plane 1, if ENI shelf is provisioned. This is not included in the above table.

RELEASE 06.03
13 July 1998

WORK SHEETS

+-----+
| WORKSHEET # 1 |

+-----+ Determine the Number of Cards required for Plane 0 for ENET Shelf +-----+				
Step	Procedure			Answer
1	Determine the total number of copper(DS30) speech links.			_____
	Column A	Column B	Column C	Column D
	Peripheral Type	Number of Peripherals	Speech Lks/ Peripheral	Total Links (Col C) x (Col B)
	LM (2 port)		2	
	LM (3 port)		3	
	LM (4 port)		4	
	DCM/DCMR		4	
	NIU **		4	
	SMS		____ (3-4)	
	SMR		____ (3-16)	
	DES *		3	
	MSB7		3	
	TM/MTM/DRAM		1	
	EDRAM/CTM		1	
	ISM		1	
	Spare:			
	Total of Column D			
	* Digital Echo Suppressor			
	** Unit 0 of NIU requires 4 ports on ENET plane 0 and unit 1 of NIU requires 4 ports on ENET plane 1.			

RELEASE 06.03
13 July 1998

-----+
| WORKSHEET # 1 Continued |
-----+

Step	Procedure				Answer
2	Determine the total number of copper(DS30) message channels				_____
	Column A	Column B	Column C	Column D	
	Peripheral Type	Number of Peripherals	Channels/Peripheral	Total Channels (Col C) x (Col B)	
	LM (2 port)		1		
	LM (3 port)		1		
	LM (4 port)		1		
	DCM		1		
	DCMR		1		
	DES		1		
	SMS		2		
	SMR		2		
	MSB7		2		
	TM/MTM/DRAM		1		
	EDRAM/CTM		1		
	ISM		1		
	Spare:		1 or 2		
	Total of Column D				_____

-----+
| WORKSHEET # 1 Continued |
-----+

Step	Procedure	Answer																																				
3	Determine the total number of fiber (DS512) speech links	_____																																				
	<table><tr><th>Column A</th><th>Column B</th><th>Column C</th><th>Column D</th></tr><tr><th>Peripheral Type</th><th>Number of Peripherals</th><th>Speech lks/ Peripheral</th><th>Total Links (Col C) x (Col B)</th></tr><tr><td>LGC/LGCI</td><td></td><td>1</td><td></td></tr><tr><td>LTC/LTCI</td><td></td><td>1</td><td></td></tr><tr><td>SMU/SMUI</td><td></td><td>1</td><td></td></tr><tr><td>DTC/DTCI</td><td></td><td>1</td><td></td></tr><tr><td>SMA/ESMA</td><td></td><td>1</td><td></td></tr><tr><td>Spare</td><td></td><td>1</td><td></td></tr><tr><td colspan="3">Total of Column D</td><td>_____</td></tr></table>	Column A	Column B	Column C	Column D	Peripheral Type	Number of Peripherals	Speech lks/ Peripheral	Total Links (Col C) x (Col B)	LGC/LGCI		1		LTC/LTCI		1		SMU/SMUI		1		DTC/DTCI		1		SMA/ESMA		1		Spare		1		Total of Column D			_____	
Column A	Column B	Column C	Column D																																			
Peripheral Type	Number of Peripherals	Speech lks/ Peripheral	Total Links (Col C) x (Col B)																																			
LGC/LGCI		1																																				
LTC/LTCI		1																																				
SMU/SMUI		1																																				
DTC/DTCI		1																																				
SMA/ESMA		1																																				
Spare		1																																				
Total of Column D			_____																																			

```

+-----+
| WORKSHEET # 1 Continued |
+-----+

```

Step	Procedure	Answer																																				
4	Determine the total number of fiber(DS512) message channels	_____																																				
	<table border="1"> <thead> <tr> <th>Column A</th> <th>Column B</th> <th>Column C</th> <th>Column D</th> </tr> <tr> <th>Peripheral Type</th> <th>Number of Peripherals</th> <th>Channels/Peripheral</th> <th>Total Channels (Col C) x (Col B)</th> </tr> </thead> <tbody> <tr> <td>LGC/LGCI</td> <td></td> <td>2</td> <td></td> </tr> <tr> <td>LTC/LTCI</td> <td></td> <td>2</td> <td></td> </tr> <tr> <td>SMU/SMUI</td> <td></td> <td>2</td> <td></td> </tr> <tr> <td>DTC/DTCI</td> <td></td> <td>2</td> <td></td> </tr> <tr> <td>SMA/ESMA</td> <td></td> <td>2</td> <td></td> </tr> <tr> <td>Spare</td> <td></td> <td>2</td> <td></td> </tr> <tr> <td colspan="3">Total of Column D</td> <td>_____</td> </tr> </tbody> </table>	Column A	Column B	Column C	Column D	Peripheral Type	Number of Peripherals	Channels/Peripheral	Total Channels (Col C) x (Col B)	LGC/LGCI		2		LTC/LTCI		2		SMU/SMUI		2		DTC/DTCI		2		SMA/ESMA		2		Spare		2		Total of Column D			_____	
Column A	Column B	Column C	Column D																																			
Peripheral Type	Number of Peripherals	Channels/Peripheral	Total Channels (Col C) x (Col B)																																			
LGC/LGCI		2																																				
LTC/LTCI		2																																				
SMU/SMUI		2																																				
DTC/DTCI		2																																				
SMA/ESMA		2																																				
Spare		2																																				
Total of Column D			_____																																			

For INITIAL ENET installations continue WORKSHEET #1 to end and skip WORKSHEET # 2.

For EXTENSIONS on ENET go to WORKSHEET # 2 after Step 4.

RELEASE 06.03
13 July 1998

+-----+
| WORKSHEET # 1 Continued |
+-----+

Step	Procedure	Answer																																							
5	Determine the number of DS-512/DS-30 I/F Assy's required for DS30's. (Round up to an integer) Take the greater of : <table> <tr> <td>+-----+</td><td></td><td>+-----+</td></tr> <tr> <td> Step 1 </td><td>OR</td><td> Step 2 </td></tr> <tr> <td> ----- = </td><td></td><td> ----- = </td></tr> <tr> <td> 16 </td><td></td><td> 15 </td></tr> <tr> <td>+-----+</td><td></td><td>+-----+</td></tr> </table>	+-----+		+-----+	Step 1	OR	Step 2	----- =		----- =	16		15	+-----+		+-----+	_____																								
+-----+		+-----+																																							
Step 1	OR	Step 2																																							
----- =		----- =																																							
16		15																																							
+-----+		+-----+																																							
6	Determine the number of DS-512/DS-30 I/F Assy's required. (Round up to an integer) Take the lesser of : <table> <tr> <td>+-----+</td><td></td><td>+-----+</td></tr> <tr> <td> Step 3/3" - 1 </td><td>OR</td><td> (Step 5) - 1 </td></tr> <tr> <td>+-----+</td><td></td><td>+-----+</td></tr> </table> Note that one NT9X45BA is always provided in slots 13R for Plane 0 and 23R for Plane 1.	+-----+		+-----+	Step 3/3" - 1	OR	(Step 5) - 1	+-----+		+-----+	_____																														
+-----+		+-----+																																							
Step 3/3" - 1	OR	(Step 5) - 1																																							
+-----+		+-----+																																							
7	Determine the number of Quad DS-512 Fiber I/F Assy's required. (Round up to an integer) Take the greater of : <table> <tr> <td>+-----+</td><td></td><td>+-----+</td></tr> <tr> <td> Zero (0) </td><td>OR</td><td> Step 3 - ((Step 6 +1) x 3) </td></tr> <tr> <td>+-----+</td><td></td><td> ----- </td></tr> <tr> <td></td><td></td><td> 4 </td></tr> <tr> <td>+-----+</td><td></td><td>+-----+</td></tr> </table>	+-----+		+-----+	Zero (0)	OR	Step 3 - ((Step 6 +1) x 3)	+-----+		-----			4	+-----+		+-----+	_____																								
+-----+		+-----+																																							
Zero (0)	OR	Step 3 - ((Step 6 +1) x 3)																																							
+-----+		-----																																							
		4																																							
+-----+		+-----+																																							
8	Determine the number of DS-30 Interface Asmbly's required. (Round up to an integer) Take the greater of : <table> <tr> <td>+-----+</td><td></td><td>+-----+</td></tr> <tr> <td> Zero (0) </td><td></td><td></td></tr> <tr> <td>+-----+</td><td></td><td></td></tr> <tr> <td>OR</td><td></td><td>+-----+</td></tr> <tr> <td></td><td></td><td> Step 2 - ((Step 6 +1) x 15) </td></tr> <tr> <td></td><td></td><td> ----- </td></tr> <tr> <td></td><td></td><td> 15 </td></tr> <tr> <td></td><td></td><td>+-----+</td></tr> <tr> <td>OR</td><td></td><td>+-----+</td></tr> <tr> <td></td><td></td><td> Step 1 - ((Step 6 +1) x 16) </td></tr> <tr> <td></td><td></td><td> ----- </td></tr> <tr> <td></td><td></td><td> 16 </td></tr> <tr> <td></td><td></td><td>+-----+</td></tr> </table>	+-----+		+-----+	Zero (0)			+-----+			OR		+-----+			Step 2 - ((Step 6 +1) x 15)			-----			15			+-----+	OR		+-----+			Step 1 - ((Step 6 +1) x 16)			-----			16			+-----+	_____
+-----+		+-----+																																							
Zero (0)																																									
+-----+																																									
OR		+-----+																																							
		Step 2 - ((Step 6 +1) x 15)																																							

		15																																							
		+-----+																																							
OR		+-----+																																							
		Step 1 - ((Step 6 +1) x 16)																																							

		16																																							
		+-----+																																							

RELEASE 06.03
13 July 1998

+-----+
| WORKSHEET # 1 End |
+-----+

Step	Procedure	Answer															
9	Determine the number of Crosspoint CP's (NT9X35FA) required: <table border="1"> <tr> <td>If</td><td>is equal to</td><td>Provide</td></tr> <tr> <td>Step 6 +</td><td>or</td><td></td></tr> <tr> <td>Step 7 +</td><td>less than</td><td></td></tr> <tr> <td>Step 8</td><td></td><td></td></tr> <tr> <td></td><td>6</td><td>0-6*</td></tr> </table> * These are provisioned in pairs, so if the total of Step 6+7+8 is an odd number, add 1 to it. Let that quantity be Y. The number of Crosspoint CP's to provide is equal to Y. The ENET is provisionable in 4K, 8K, 12K and 16K channel configurations. Note that 2K channels are reserved for peripheral and network control processor messaging in all configurations. Therefore, the number of channels available for subscriber traffic in all configurations is 2K, 6K, 10K and 14K channels respectively. NOTE: One Quad DS-512 interface assembly NT9X40BB is always required in card slot 11R for Plane 0 and card slot 21R for Plane 1 in ENI shelf.	If	is equal to	Provide	Step 6 +	or		Step 7 +	less than		Step 8				6	0-6*	_____
If	is equal to	Provide															
Step 6 +	or																
Step 7 +	less than																
Step 8																	
	6	0-6*															

RELEASE 06.03
13 July 1998

+-----+
| WORKSHEET # 2 |
+-----+

+-----+
| Determine the Number of Cards required for to Extend an Existing ENET |
+-----+

| Plane 0 |
+-----+

Step	Procedure	Answer																				
1	Determine the DS30 speech link capacity of the installed cards. <table border="1"> <thead> <tr> <th>Column A</th> <th>Column B</th> <th>Column C</th> <th>Column D</th> </tr> <tr> <th>Card Type</th> <th>Number of Cards</th> <th>Spch Lks/ Card</th> <th>Total Links (Col B)x(Col C)</th> </tr> </thead> <tbody> <tr> <td>DS512 DS30 I/F Assy</td> <td></td> <td>16</td> <td></td> </tr> <tr> <td>DS30 Interface Asmbly</td> <td></td> <td>16</td> <td></td> </tr> <tr> <td colspan="3">Total of Column D</td> <td></td> </tr> </tbody> </table>	Column A	Column B	Column C	Column D	Card Type	Number of Cards	Spch Lks/ Card	Total Links (Col B)x(Col C)	DS512 DS30 I/F Assy		16		DS30 Interface Asmbly		16		Total of Column D				
Column A	Column B	Column C	Column D																			
Card Type	Number of Cards	Spch Lks/ Card	Total Links (Col B)x(Col C)																			
DS512 DS30 I/F Assy		16																				
DS30 Interface Asmbly		16																				
Total of Column D																						
2	Determine the additional DS30 speech link capacity required. +-----+ Step 1 of WS1 - Step 1 of WS2 = +-----+																					
3	Determine the DS30 message channel capacity of the installed cards. <table border="1"> <thead> <tr> <th>Column A</th> <th>Column B</th> <th>Column C</th> <th>Column D</th> </tr> <tr> <th>Card Type</th> <th>Number of Cards</th> <th>Msg Chnl/ Card</th> <th>Total Links (Col B)x(Col C)</th> </tr> </thead> <tbody> <tr> <td>DS512 DS30 I/F Assy</td> <td></td> <td>15</td> <td></td> </tr> <tr> <td>DS30 Interface Asmbly</td> <td></td> <td>15</td> <td></td> </tr> <tr> <td colspan="3">Total of Column D</td> <td></td> </tr> </tbody> </table>	Column A	Column B	Column C	Column D	Card Type	Number of Cards	Msg Chnl/ Card	Total Links (Col B)x(Col C)	DS512 DS30 I/F Assy		15		DS30 Interface Asmbly		15		Total of Column D				
Column A	Column B	Column C	Column D																			
Card Type	Number of Cards	Msg Chnl/ Card	Total Links (Col B)x(Col C)																			
DS512 DS30 I/F Assy		15																				
DS30 Interface Asmbly		15																				
Total of Column D																						

RELEASE 06.03
13 July 1998

+-----+
| WORKSHEET # 2, Cont'd |
+-----+

Step	Procedure	Answer
4	Determine the additional DS30 message channel capacity required. +-----+ Step 2 of WS1 - Step 3 of WS2 = +-----+	_____
5	Determine the DS512 speech link capacity of the installed cards. +-----+ Column A Column B Column C Column D Card Number Spch Lks/ Total Links Type of Cards Card (Col B)x(Col C) +-----+ DS512 DS30 I/F Assy 3 +-----+ Quad DS512 Fiber I/F 4 +-----+ Total of Column D _____ +-----+	_____
6	Determine the additional DS512 speech link capacity required. +-----+ Step 3 of WS1 - Step 5 of WS2 = +-----+	_____

RELEASE 06.03
13 July 1998

+-----+
| WORKSHEET # 2, Cont'd |
+-----+

Step	Procedure	Answer															
7	Determine the additional number of DS-512 DS-30 I/F Assy's required for DS30's. (Round up to an integer) NOTE: complete this step only if step 2 or step 4 is 1 or more. If both step 2 & 4 are zero or negative, enter 0 in step 7. Take the greater of : <table> <tr> <td>+-----+</td><td></td><td>+-----+</td></tr> <tr> <td> Step 2 </td><td></td><td> Step 4 </td></tr> <tr> <td> ----- = </td><td>OR</td><td> ----- = </td></tr> <tr> <td> 16 </td><td></td><td> 15 </td></tr> <tr> <td>+-----+</td><td></td><td>+-----+</td></tr> </table>	+-----+		+-----+	Step 2		Step 4	----- =	OR	----- =	16		15	+-----+		+-----+	_____
+-----+		+-----+															
Step 2		Step 4															
----- =	OR	----- =															
16		15															
+-----+		+-----+															
8	Determine the additional number of DS-512 DS-30 I/F Assy's required. (Round up to an integer) Take the lesser of : <table> <tr> <td>+-----+</td><td></td><td>+-----+</td></tr> <tr> <td> Step 6 </td><td></td><td> Step 7 </td></tr> <tr> <td> ----- = </td><td>OR</td><td> Step 7 </td></tr> <tr> <td> 3 </td><td></td><td> </td></tr> <tr> <td>+-----+</td><td></td><td>+-----+</td></tr> </table>	+-----+		+-----+	Step 6		Step 7	----- =	OR	Step 7	3			+-----+		+-----+	_____
+-----+		+-----+															
Step 6		Step 7															
----- =	OR	Step 7															
3																	
+-----+		+-----+															
9	Determine the additional number of Quad DS-512 Fiber I/F's required. (Round up to an integer) Take the greater of : <table> <tr> <td>+-----+</td><td></td><td>+-----+</td></tr> <tr> <td> Zero (0) </td><td>OR</td><td> Step 6 - (Step 8 x3) </td></tr> <tr> <td> </td><td></td><td> ----- = </td></tr> <tr> <td>+-----+</td><td></td><td> 4 </td></tr> <tr> <td></td><td></td><td>+-----+</td></tr> </table>	+-----+		+-----+	Zero (0)	OR	Step 6 - (Step 8 x3)			----- =	+-----+		4			+-----+	_____
+-----+		+-----+															
Zero (0)	OR	Step 6 - (Step 8 x3)															
		----- =															
+-----+		4															
		+-----+															

RELEASE 06.03
13 July 1998

+-----+
| WORKSHEET # 2, Cont'd |
+-----+

Step	Procedure	Answer
10	Determine the additional number of DS-30 Interface Asmbly's required. (Round up to an integer) Take the greater of : +-----+ Zero (0) +-----+ OR Step 4 - (Step 8 x15) ----- = 15 OR Step 2 - (Step 8 x16) ----- = 16	_____
11	Determine the total number of DS512 DS30 I/F Assy's required. +-----+ Step 8 + exist DS512 DS30 I/F Assy's (see step 1) +-----+	_____
12	Determine the total number of Quad DS-512 Fiber I/F's required. +-----+ Step 9 + exist Quad DS512 Fiber I/F's (see step 5) +-----+	_____
13	Determine the total number of DS-30 Interface Asmbly's required. +-----+ Step 10 + exist DS30 Interface Asmbly's (see step 1) +-----+	_____

RELEASE 06.03
13 July 1998

+-----+
| WORKSHEET # 2 End |
+-----+

Step	Procedure	Answer																		
14	Determine the number of Crosspoint CP's (NT9X35FA) required:	_____																		
	<table border="1"> <tr> <td>If</td><td>is equal to</td><td>Provide</td></tr> <tr> <td>Step 6 +</td><td>or</td><td></td></tr> <tr> <td>Step 7 +</td><td>less than</td><td></td></tr> <tr> <td>Step 8</td><td></td><td></td></tr> <tr> <td></td><td></td><td></td></tr> <tr> <td></td><td>6</td><td>0-6*</td></tr> </table>	If	is equal to	Provide	Step 6 +	or		Step 7 +	less than		Step 8							6	0-6*	
If	is equal to	Provide																		
Step 6 +	or																			
Step 7 +	less than																			
Step 8																				
	6	0-6*																		
	* These are provisioned in pairs, so if the total of Step 6+7+8 is an odd number, add 1 to it. Let that quantity be Y. The number of Crosspoint CP's to provide is equal to Y-2. NOTE: One Quad DS-512 interface assembly NT9X40BB is always required in card slot 11R for Plane 0 and card slot 21R for Plane 1 in ENI shelf.																			

RELEASE 06.03
13 July 1998

Speech Link Assignment Rules

DS-30 Speech links (Series I Peripherals)

Distribute speech links with messaging from each peripheral type (i.e. MTM, LM, TM, DCM, DES) as evenly as possible over the available DS-30 PBs. Note that Series I peripherals require 1 messaging link per peripheral.

Distribute the remaining speech links by peripheral types as evenly as possible over PBs. Note that Series I peripherals require from 1 to 4 speech links.

DS-30 Speech links (Series II Peripherals)

Distribute speech links with messaging from each peripheral type as evenly as possible over the available DS-30 PBs. Distribute the remaining speech links by peripheral types as evenly as possible over PBs.

DS-512 Speech links

Distribute speech links with messaging from each peripheral type as evenly as possible over the available DS-512 PBs.

The telephone company may review and if necessary re-assign the emergency services to ensure that where possible, all essential services are not located on the same peripherals which are on the same Paddle Board. The peripherals with emergency services (police, hospital, fire, etc..) must be evenly distributed where possible in paddle boards.

ASU Provisioning on ENI Shelf.

Note that LIU or EIU can ONLY be provisioned on ENI Shelf, only if ENET is provisioned on SNSE.

Speech Link Connecting Frame Provisioning.

SuperNode SE can be used with existing external SLC if previously installed (i.e. NT-40 retrofit). When cabinetized SMSs are used with SNSE, then SLC is recommended.

Peripherals can be cabled directly to the ENET Shelf, only if fewer than seven (7) NT9X41BA and or NT9X45BA PBs are on the ENET Shelf.

If there are seven (7) NT9X41BA and or NT9X45BA PBs on the ENET Shelf, Peripheral Speech Link (PSL) panels and Network Speech Link (NSL) panels will be engineered as appropriate. In such a case, if there is room on an existing SLC frame, the new PSL and NSL panels can be assigned onto it. Otherwise, new SLC frames will have to be provided.

RELEASE 06.03
13 July 1998

Note that Streamline application may not require the SLC.

The NT9X6530 (i.e. left bulkhead panel provides access for 0 to 112 DS-30s) is required, if there are four (4) to seven (7) NT9X41BA and or NT9X45BA PBs per the corresponding left half of the shelf (i.e. between card slots 29R-21R). The NT9X6531 (i.e. right bulkhead panel provides access for 0 to 112 DS-30s) is required, if there are four (4) to seven (7) NT9X41BA and or NT9X45BA PBs per the corresponding right half of the shelf (i.e. between card slots 11R-19R). The DS-30 speech links terminating on the either half of the shelf will be cross connected at an SLC. For more information, refer to Bulkhead Provisioning Rules.

If any of the above bulkhead panel is used, the number of NSLs can be calculated using,

#of NSLs = {#of NT9X41BA & or 45BAs in one half of the shelf/4}
to be rounded to next higher integer.

RELEASE 06.03
13 July 1998

Bulkhead Provisioning Rules

Another factor influences, where NT9X41BA/45BA CPs are placed on the shelf. As with the DMS-SuperNode, all copper switchboard cables leaving the cabinet route via filter bulkheads. Fiber leads pass through holes in the bulkheads. Each bulkhead serves the nearest half shelf.

- 1) NT9X6520 Filter Bulkhead Panel Left 48 DS-30
NT9X6521 Filter Bulkhead Panel Right 48 DS-30

- Each provides filtering and connectivity for DS-30 speech links for up to 3 NT9X41BA/45BA (3 X 16 = 48 DS-30).
- Each provides 13 holes with grommet to access fiber connections
- Dedicated cabling to individual peripheral modules
- Intended for use in normal ENET applications

- 2) NT9X6553 CM/SLM Bulkhead Assemblies

- The NT9X6553 CM/SLM bulkheads have no DS30 connection capability.
- The Bulkhead NT9X6553 is the common CM/SLM bulkhead for non-cabinetized, Meridian and cabinetized (Streamline) applications.
- The NT9X6520/21 pair always require the NT9X6553 CM/SLM bulkhead for 1 to 48 DS30 links.

- 3) NT9X6552 CM/SLM Bulkhead Assemblies

- The NT9X6552 CM/SLM bulkheads have extra DS30 connection capability.
- The NT9X6520/21 pair always require the NT9X6552 CM/SLM bulkhead for 49 to 96 DS30 links.

- 4) NT9X6530 Filter Bulkhead Panel Left, 112 DS-30
NT9X6531 Filter Bulkhead Panel Right, 112 DS-30

- Each provides filtering and connectivity for DS-30 speech links for up to 7 NT9X41BA/45BA
- Each provides 13 holes with grommet to access fiber connections
- Group cabling to peripherals via SLC and normal speech link cable group facilities
- Intended for use where high concentrations of DS-30 result in more than six (6) NT9X41BA/45BA PBs per ENET shelf. (e.g. BOC offices with lots of SLC-96s or ENET retrofits involving significant quantities of Series I Peripherals).
- The NT9X6530/31 pair always require the NT9X6553 CM/SLM bulkhead assemblies.

RELEASE 06.03
13 July 1998

Selection of bulkhead types should be based on projected NT9X41BA/45BA requirement of fully equipped shelves. If the projected number of NT9X41BA/45BA per shelf exceeds six (6) then NT9X6530/31 are required else NT9X6520/21 are recommended. In the majority of new applications the average number of NT9X41BA and or NT9X45BA per fully equipped shelf is expected to range between two (2) and four (4).

2.2.3.4 CM/SLM Shelf Provisioning

See Figure 16 on page 1-98 for a Combined CM/SLM Shelf in a typical configuration. NT9X0610 is the CM/SLM Shelf Assembly.

9X91AC +5V/+12V Pwr Converter	1F		
DX15AB +5V/-5V Pwr Converter	4F		
	7F	7R	9X46AA
SLM III	8F	8R	9X19BA
NT9X44AD	9F	9R	9X19BA
	10F	10R	9X19BA
	11F	11R	9X19BA
9X14EA 96Meg Memory	12F	12R	9X21AB
9X14EA 96Meg Memory	13F	12R	9X19BA
9X14EA 96Meg Memory	14F	12R	9X19BA
9X14EA 96Meg Memory	15F	12R	9X19BA
9X14EA 96Meg Memory	16F	12R	9X19BA
9X12AD Message Interface	17F	17R	9X46AA
9X86AB Dual Port Msg Controller	18F	18R	9X62AA
9X10AA or 9X10CA Processor	19F	19R	9X26DC or 9X26FA
9X10AA or 9X10CA Processor	20F	20R	9X26DC or 9X26FA
9X86AB Dual Port Msg Controller	21F	21R	9X62AA
9X12AD Message Interface	22F	22R	9X46AA
9X14EA 96Meg Memory	23F	23R	9X19BA
9X14EA 96Meg Memory	24F	24R	9X19BA
9X14EA 96Meg Memory	25F	25R	9X19BA
9X14EA 96Meg Memory	26F	26R	9X19BA
9X14EA 96Meg Memory	27F	27R	9X21AB
	28F	28R	9X46AA
	29F	29R	9X19BA
SLM III	30F	20R	9X19BA
NT9X44AD	31F	31R	9X19BA
	32F	32R	9X19BA
DX15AB +5V/-5V Pwr Converter	33F		
9X91AC +5V/+12V Pwr Converter	36F		

Figure 16. Combined CM/SLM Shelf Typical Configuration

The CM/SLM functions are realized by integrating SuperNode type CM's and SLM's on a single shelf. The SLM provides the mass storage media for SNSE in terms of Hard Disk and Streaming tape. The original SLM used is the 5 slot SLM1A. This SLM1A is supplied with a 300 MByte formatted hard disk drive. The tape drive is the same as the SuperNode SLMII, having a capacity of 150MBytes.

RELEASE 06.03
13 July 1998

The SLM III system load module provides greater capacity than SLM II and may be used in offices at CSP04 or greater. The SLM III offers a 3.5 inch disk drive with a minimum capacity of 1 GByte, a tape drive with a minimum capacity of 500 MBytes which requires an SLM III tape cartridge, and a controller card.

Northern Telecom does not recommend AMA type records on the SLM units, preferring to have AMA, (CDR, SMDR etc) on the Disk Drive Units associated with the IOC/IOM equipment.

Sizing of the SLM should include the dual (or single) image requirement, PM loads, a file for Patching and any other Customer required QA&M file space.

Tapes written by SLM III on the SLM III 500 MByte tape cartridge are not compatible with SLM II or SLM 1A. However, SLM III can read 150 MByte and 250 MByte tape cartridges produced on SLM II or SLM 1A. SLM III can also write to 150 MByte and 250 MByte SLM II or SLM 1A compatible tape cartridges.

Note: The SLM III 500 MByte tape cartridge is labeled 525 MBytes, but software requirements limit the capacity to 500 MBytes.

The SLM III requires the same 12 volt power converter as the SLM 1A and SLM II.

The connections between the computing module and the SLM III, SLM II, and SLM 1A are the same.

The SLM III is designed to be physically interchangeable with the SLM 1A and will fit in the SLM II slot on the shelf.

The SLM III hardware can be retrofitted without requiring an E1 condition. However, the CM is required to operate in simplex while the upgrade is performed, which creates an E2 situation.

SLM III functionality is essentially the same as the SLM 1A. The main difference is that the SLM III offers an increased minimum disk drive capacity of 1 GByte and an increased minimum tape drive capacity of 500 MByte.

Provision an SLM III for offices at CSP04 or greater that require a minimum disk drive capacity of 1 GByte or a minimum tape drive capacity of 500 MByte.

SLM III provisioning is almost identical to SLM 1A. When provisioning SLM III, provide two (2) NT9X44AD instead of two (2) NT9X44AC (SLM 1A). The SLM III NT9X44ADs are mounted in shelf 0, position 7F and 28F.

RELEASE 06.03
13 July 1998

SLM III will be provided, instead of SLM 1A, when the load image size exceeds 145 Mbytes. The load image is not the same as CM load size. The formula for calculating load image is:

$$PS + FASTMEM + .6*DS + .72*MS$$
where FASTMEM equals 27.82 for SNSE 60,
PS is Program Store
DS is Data Store
MS is Message Switch load size.

FASTMEM is 27.82 for SNSE 60 for NA004 and below. Fastmem is automatically calculated for NA005 and above software loads. The MS load size is 16M for SNSE. The raw PS and DS values in KBytes can be obtained from MEMCALC and converted to MBytes by dividing by 1024.

The Computing Module consists of the CPU and the Memory CPs as used for SuperNode. Normally, the duplicated CPU's are running in the "sync match" mode of operation. The controlling CPU is called the "Active" and the mate is called the "Inactive". Each CM CPU connects to both MS's directly via fiber CMIC links. The memory size is specific to customer requirements.

Provision two NT9X13MA processors to support the CM section of the SuperNode SE. The NT9X13MA supports 24Mb memory only. The NT9X14DB 24Mb circuit boards are supported from BCS34. The 24Mb circuit boards do not function in burst mode. The NT9X13MA boards are manufacturer discontinued.

For new jobs at BCS35 and higher, provide the NT9X13MB processor circuit boards. The NT9X13MB Processor provides ability to function with either NT9X14EA (96 Meg memory) or NT9X14DB (24 Meg memory), but not both. That is NT9X14DB and NT9X14EA WILL NOT be supported in a mixed configuration.

The 96 Meg memory cards are the recommended option on SNSE initials from BCS35 onwards. The 24 Meg memory will only be available on SNSE extensions.

The NT9X14EA memory boards have the capability to function in burst mode. Burst mode memory is required to fully utilize the Series 60 BRISC processor. BRISC is available from BCS36 onward. The new RTIF NT9X26DC will have to be provisioned with this BRISC processor.

Provision memory circuit packs in pairs, in slots in the following order:

- 1) 16F and 23F;
- 2) 15F and 24F;
- 3) 14F and 25F;
- 4) 13F and 26F;

RELEASE 06.03
13 July 1998

5) 12F and 27F.

The number of pairs to be provisioned depends on the memory requirement for the office. For offices with BRISC 70 Processors, it is recommended that two (2) memory cards are provisioned per side.

The DMS SuperNode SE provides card sparing and block sparing capabilities for memory. Card sparing uses an entire memory circuit pack for backup; block sparing uses an 8M block, on a circuit pack for backup. Hence, with 24 Mb memory cards the maximum usable memory is 96 Mb with card sparing, and 112 Mb with block sparing.

The block sparing capability is recommended for SNSE.

The office must be equipped with two (2) RTIF terminals connected to the NT9X26AB paddleboards on the CM shelf. The RTIF paddleboards are also required for performing the out-of-band reset function between the CM/MS and ENET on the SuperNode SE.

2.2.3.5 FBus Provisioning

There are four possible F-Bus configurations available on the SuperNode SE:

- 1) MS to LIS to ENI (with ASU in ENI Shelf)
- 2) MS to LIS (with LIS only in SNSE)
- 3) MS to ENI (with ASU in ENI and no LIS in SNSE)
- 4) MS only (no ASU in ENI and LIS is not equipped in SNSE)

All possible configurations and associated paddleboards are shown in the following diagrams.

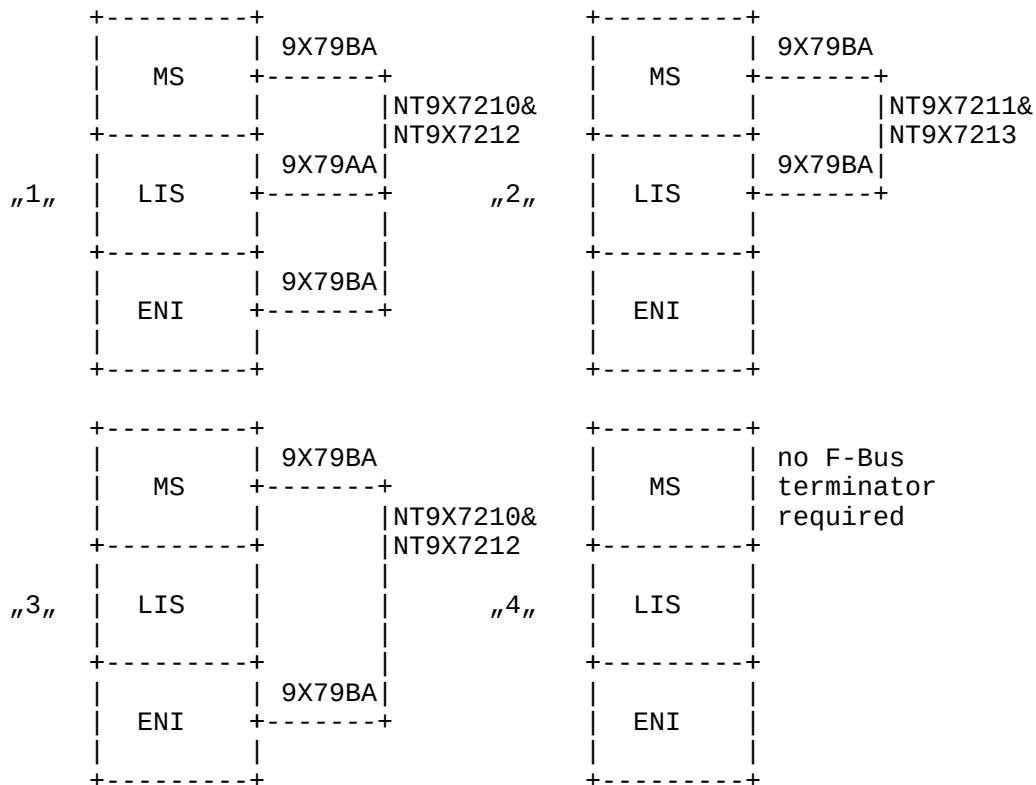


Figure 17. F-Bus configurations

There are two rules that must be adhered to when provisioning F-Bus paddleboards:

- 1) Both physical ends of the F-Bus must be terminated with a NT9X79BA F-Bus Ext with Terminations paddleboard.
- 2) Intermediate extensions require a NT9X79AA F-Bus Extender paddleboard.

2.2.3.6 Inter-MS Link Provisioning

To improve the reliability of the DMS-BUS (Message Switch), MS Inter-links are a basic provisioning requirement for SuperNode SE.

The Inter-links require the provisioning of two ports for each MS plane (MS0 and MS1) to be inter-connected to provide a path for re-routing of FTS (Frame Transport System) messages if normal messaging paths are blocked due to hardware failure.

The links may be setup as DS30 links for standard applications, or as fiber DS512 IML links to link to an Application Processor/

RELEASE 06.03
13 July 1998

File Processor. Note that when using the fiber links the DS30 links must be de-activated.

For an explanation of the datafill required and the functionality provided by this feature, refer to NTP-297-1001-451 Table MSILINV.

Two DS-30 IMLs are provided on SuperNode SE between MS0 and MS1 from slot 10 (MS0 card 10) to slot 29 (MS1 card 10). Note that, on the SuperNode SE, IMLs can only be provided using DS-30 links.

IML 0: (MS0 : card 10 port 2 -> MS1 : card 10 port 2)

IML 1: (MS0 : card 10 port 3 -> MS1 : card 10 port 3)

The SuperNode SE differs from the standard SuperNode in that the IMLs are in a fixed location. These ports are fixed in order to simplify the engineering of IMLs and also to fully utilize the ports on the provisioned NT9X23 or NT9X69 card in MS card slots 10 and 29.

2.2.3.7 LIU External Timing Source Generator Provisioning

When V.35 paddle boards (NT9X77AA) are used on LIUs, a Timing Source Generator (TSG) system is not required.

When DS-0 paddle boards (NT9X78AA/BA/CA) are used on LIUs, a Timing Source Generator (TSG) system is required.

The DS-0 paddleboards require a timing signal that is supplied by a Timing Source Generator (TSG). The TSG must be located in or near the channel bank frame. Each Timing Output Card provides ten (10) ports. The following TSG equipment is required:

Description	Part Number
-----	-----
DCD-400 Shelf Assembly	990-40000-01
Fuse & Alarm Card	990-40014-01
Clock Input Card	990-40010-01
Stratum 3 Clock	990-40013-01
Timing Output Card	990-40011-01
Timing Output Card (Hot Spare)	990-40011-01
Matrix Control Card	990-40015-01

This equipment is manufactured by Telecom Solutions.

For U.S. applications, the TSG is supplied by the operating company.

RELEASE 06.03
13 July 1998

2.2.3.8 C42(S/DMS) Cabinet Provisioning

The SNSE is housed in C42 (S/DMS) Cabinet. The S/DMS cabinet is very similar to the existing cabinet, items such as packs, shelf assemblies, interconnect cables, and bulkhead packs do not change. The differences from the previous Supernode type cabinet are listed below.

- 1) The Cabinet changes from NT9X0113 to NT9X9575.
- 2) The Kick plate is not required with the S/DMS cabinet.
- 3) Power wiring is optional. If the cabinet is in a Cabine-sized lineup, the cables will be equipped to take advantage of "horizontal" cabling. If the cabinet is in a non-Cabinetized lineup, power cables will be similar to existing power cables, so filters will have to be provisioned.

Provide one (1) NT9X9532 stand-alone Cabling Interface Kit when powering the NT9X01MB cabinet in a non-Cabinetized(non-streamline) lineup. This kit includes power cables, filters, and miscellaneous mounting hardware. Twenty-two (22) white boots are included in the NT9X9532 stand-alone Cabling Interface Kit.

Customers may require a spare EMI line filter (A0326932) per office, this filter is part of the stand-alone interface kit.

Provide one (1) NT9X9531 Horizontal Power Cabling Interface Kit when powering the NT9X01MB cabinet in a Cabinetized (streamline) lineup. This kit includes power cables, terminal blocks, and miscellaneous mounting hardware. Always provide two (2) EMI contact strips(P0714698) when providing the NT9X9531 Horizontal Power Cabling Interface Kit.

2.2.4 Office Layout Information

The S/DMS cabinet will be shipped with the doors, shelves, circuit packs, FSP, and cooling unit installed. The bus bar will be installed and appropriate connections will be made at the factory. The bulkheads form part of the Electromagnetic Compatibility(EMC) cage around the equipment and provide a place to mount filter PCBs and optional power filters. The rear of the cabinet is equipped with two removeable bulkhead panels near the bottom of the cabinet. When these panels are removed, the cabinet can be installed in, or removed from, a lineup equipped with horizontal cabling. The cabinet may be slid "FORWARD" only.

FLOOR LAYOUT

RELEASE 06.03
13 July 1998

Aisle dimensions are derived to meet the requirements of central office environment for floor loading and heat dissipation.

- An installation which requires multiple cabinet line-ups has six foot maintenance aisles.
- Maintenance aisles between a cabinet line-up and a frame line-up are 4.5 feet wide.

Installations requiring a cabinet to be integrated into a frame line-up:

- Can only be applied to the front most or rear most line-up
- Cabinets and frames are aligned to be flush at the rear

Note that a mixed frame/cabinet configuration is in violation of NEBS. The Telco should confer with the Building Studies and Installation departments to confirm that the building floor can sustain the weight differential and to insure there is sufficient cooling available to cool the DMS office.

Refer to ECM600 for office layout restrictions when this cabinet is applied in a Cabinetized DMS lineup.

Note that, Richardson and other markets floor layout may be different.

2.2.5 Traffic Tables

For detailed ASU capacity provisioning, refer to, SEB 92-02-001 LPP and SSLPP Mixed Application Provisioning Rules.

For Line and Trunk Traffic tables, refer to ECM 590.

2.3 Product/System Specification

2.3.1 Physical Characteristics

The dimensions of the SuperNode SE cabinet are as follows:

„ Footprint:	42 in (1067 mm) wide
	23 in (584 mm) deep (base)
	28 in (712 mm) deep (with doors)
„ Overall:	72 in (1829 mm) high
	42 in (1067 mm) wide
	28.5 in (724 mm) deep

RELEASE 06.03
13 July 1998

2.3.2 EMI/Earthquake Information

Earthquake framework for the SuperNode SE frame must always be provided for all MSL market jobs.

2.3.3 Sparing Information

One Spare Storage Cabinet (SSC) NTRX49AA can hold up to four Spares Shelves. The spares cabinet has one (1) always provided Spares Shelf (NT0X25AY); thus three (3) shelves are provisionable. One Spares Shelf (NT0X25AY) can hold 26 CPs and 4 Power Modules, as well as 26 Paddle Boards.

For ALL applications the following may be used.

a) Version 2, C42 Cooling Unit:

Blowers 660,000 hrs MTBF in its useful life of 10 years.
MTM cards 4,700,000 hrs MTBF
Relay 100,000,000 hrs MTBF

Note that the blower's useful life is about 10 years. Around that time, failures are to be expected. Good practice might dictate replacement of operating blowers around that time (analagous to replacing your car's engine belts before they break).

2.3.4 Power Feed and Fusing Requirements

The following fuses and feeds are required:

The SuperNode SE cabinet overall power dissipation does not exceed 4000 Watts total.

Grounding Requirements

The S/DMS cabinet must be grounded using Isolated System Grounding (ISG) standards. The framework ground and framework isolation techniques are described in Section 10 of the DMS100 Technical Specification.

Fusing Requirements

The SuperNode SE can be powered from a standard PDC or a Cabinetized PDC. The rules are as follows:

Standard PDC

Eight (8) - 20A fuses, two for each shelf (MS,LIS,ENI,CM/SLM)
Two (2) - 10A fuses, one for each power feed to the cooling unit.

Cabinetized PDC(CPDC)

Eight (8) - 30A fuses, two for each shelf (MS,LIS,ENI,CM/SLM)

RELEASE 06.03
13 July 1998

Two (2) - 10A fuses, one for each power feed to the cooling unit.

2.3.5 Current Drain Information

„ Full Size card slot:	0.5 Amps avg, 0.6 Amps max
„ Paddle board slot:	0.15 Watts avg, 0.20 Watts max
„ CM/SML1A Shelf:	14 Amps, A plus B feed maximum
„ MS Shelf:	20 Amps, A plus B feed maximum
„ LIS Shelf:	20 Amps, A plus B feed maximum
„ ENET/LIU Shelf:	20 Amps, A plus B feed maximum
„ Cooling Unit:	6 Amps, A plus B feed maximum

2.4 Software Provisioning

For NTX software packages to PLC/SOC mappings for CSP02 and beyond refer to ECM552 - Mapping of NTX/NTG Package to PCL/NCL/Option.

2.4.1 Required Software Packages and Interdependencies

The DMS SuperNode SE (SNSE) software packaging is as follows:

RELEASE 06.03
13 July 1998

SuperNode SE	Package No	Description	SuperNode Equivalent
SuperNode SE (Series 20)	NTXD88AA	DMS SuperNode SE (Series 20) Base	NTX960AD SuperNode Series 20
SuperNode SE (Series 60)	NTXC40AA	DMS SuperNode SE (Series 60) Base	NTXD26AA SuperNode Series 60
for ENET 16K	NTXC21AA	Enhanced Network '16K'	NTXE01AA Enhanced Network
for JNET	NTXP10AA	Network Modules	NTXP10AA Network Modules
for LIS in SuperNode SE Combined Core Cabinet	NTXQ53AA	MS Resident, LIS Controller	NONE
for SSLPP (alias FLIS)	NTXD87AA	MS Resident, LIS Controller	NTXD87AA Master Pkg. LIS Resident, LIS Controller is Available if used with SSLPP.
for external LPP	NTXD44AA	LPP on DMS	NTXD44AA LPP on DMS

Figure 18. DMS SuperNode SE (SNSE) Software Packages

All other feature and service packages are added in the same way as they are for DMS SuperNode.

Prior to BCS34, the JNET s/w is part of NTX001AA which is a Common Basic Software package. From BCS34 onwards, the JNET s/w has been separated into a new software package called NTPX10AA.

For all ENET UPGRADE jobs provision the software packages NTPX10AA and NTPX21AA effective BCS34 and higher BCSs. It is recommended that NTPX10AA be removed in the subsequent BCS upgrade following the network Upgrade.

Example: If an office running with pre BCS34 s/w, with JNET, For SNSE with 16K ENET UPGRADE, These steps must be done:

- 1) NTPX10AA must be ordered for JNET to work.
- 2) NTPX21AA must be ordered for 16K ENET.
- 3) NTPX71AB must be ordered for SuperNode Enhanced Messaging.

RELEASE 06.03
13 July 1998

Note that, NTP10AA can be removed in the subsequent BCS upgrade following the network Upgrade.

As an alternative to the selection of the individual software packages for the DMS SuperNode SE, the following "Universal" loads are available as an alternative option, with BCS35:

For the U.S., either of:

NTXC57AA DMS100 BCS35 S/W LOAD FOR SNSE ENET SERIES 20
NTXC58AA DMS100/200 BCS35 S/W LOAD FOR SNSE SERIES 20
NTXC59AA DMS200 BCS35 S/W LOAD FOR SNSE SERIES 20

For Canada, either of:

NTXC63BA - The status of NTP63BA is LIMITED.

NTXC63AA SMART MANAGEMENT SNSE SERIES 20 is MD'd and it is replaced by NTP63BA.

NTXC64AA UNIVERSAL S/W SNSE SERIES 20 FOR TOLL

Note that, when using "Universal" loads on the SuperNode SE, the Compute Module must be provisioned with NT9X14EA 96MByte memory cards.

The SNSE also require the following software package for the CCS7 jobs.

NTXN19AA - LIU7 for LPP Based CCS7 Applications (if supported)

NA100 Gating Software/Hardware

The gating hardware for NA001 and beyond includes the 96 Meg Memory CP (NT9X14EA) and the SN20 Processor (NT9X13MB). These are the minimum elements required for NA001.

The SLM III subsystem requires NA004 or greater software.

The SNSE can support a TOPS office, a minimum BRISC 60 processor is recommended. Real-Time and MEMCALC analysis should be done before the software is ordered.

When NT9X10BA (SE 70) is provisioned, the required Base Master package is Base0010.

The authoritative source for software provisioning for the SuperNode SE are the SOLID/SMS databases. As many of the software packages or loads are volatile, please consult these databases.

2.4.2 Software Usage Restrictions

Not applicable

RELEASE 06.03
13 July 1998

2.4.3 Memory Provisioning

Provision memory circuit packs in pairs, in slots in the following order:

- 1) 16F and 23F;
- 2) 15F and 24F;
- 3) 14F and 25F;
- 4) 13F and 26F;
- 5) 12F and 27F.

The number of pairs to be provisioned depends on the memory requirement for the office.

Refer to the System Engineering Bulletin titled DMS 100F Memory Administration Provisioning (SEB 88-01-002) for information on how to provision offices with memory cards using the MEMCALC program. Also reference the SEB along with the section titled SuperNode/SNSE Hardware Comparison to obtain the memory limits for a switch based on processor type.

The DMS SuperNode SE provides card sparing and block sparing capabilities for memory. Card sparing uses an entire memory circuit pack for backup; block sparing uses an 8M block, on a circuit pack for backup. Hence, with 24 Mb memory cards the maximum usable memory is 96 Mb with card sparing, and 112 Mb with block sparing.

The block sparing capability is recommended for SNSE.

When using "Universal" load on the SNSE the Compute Module must be provisioned with the 96 Meg memory (NT9X14EA). When using "Non-Universal" load the usage of NT9X14EA should be based on "MEMCALC" results.

2.5 Real Time Impact

Real time performance information is available from System Engineering, Product Performance group.

Series 60 BRISC for SNSE provides approximately 3.3 times the Series 20 Capacity based upon the DMS 100 at 75% CP

Series 70 BRISC for SNSE provides approximately 5.5 times the Series 20 Capacity based upon the DMS 100 at 75% CP Occupancy.

RELEASE 06.03
13 July 1998

3.0 ECM661 - International Cabinetized Message Switch 7, Model A

3.1 Overview

This document describes engineering and provisioning considerations for the NTRX48AA Model A International Cabinetized Message Switch 7 (CMS7), introduced for the European Community and Australian markets where the power supply is 48VDC, to meet safety and global electromagnetic radiation EN Class A requirements.

The Building Block for this product is NTZZ37HA. Refer to the Engineering Manual Section for NTZZ37HA for additional information.

The dimensions of the Model A CMS7 cabinet are shown in Figure 19.

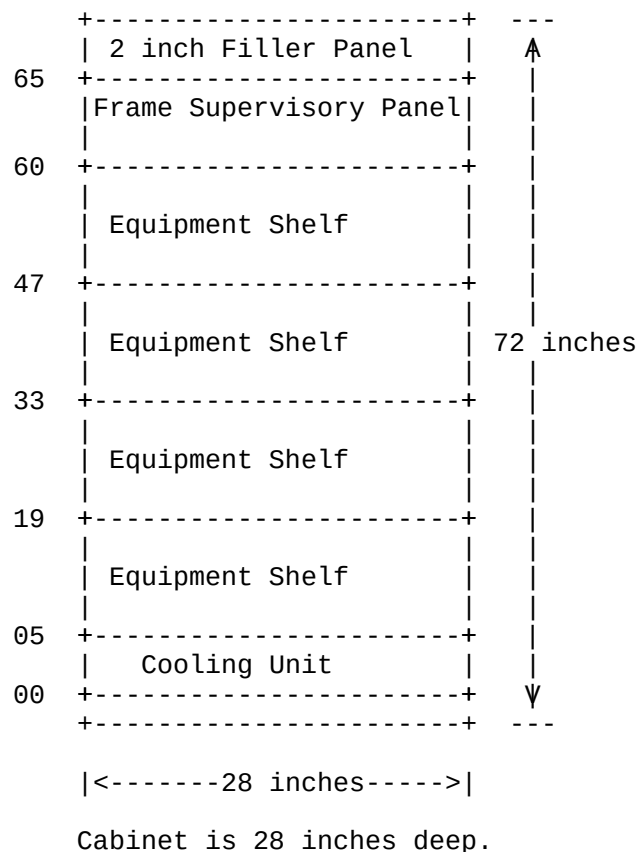


Figure 19. DMS-100 MODEL A CABINET LAYOUT

RELEASE 06.03
13 July 1998

3.2 Hardware Provisioning

3.2.1 Hardware Usage Restrictions

The international DMS-100 cabinetized equipment is intended to replace the existing international DMS-100 product lines including frames and Meridian cabinets.

3.2.2 Hardware Dependencies

To maintain the EMI integrity of the cabinetized system, DMS-100 cabinets should not be mixed with frames or Meridian cabinets.

3.2.2.1 P and C Side Port Requirements

Not applicable

3.2.2.2 DMS BUS Port Requirements

Not applicable

3.2.2.3 Circuits Per Card

Not applicable

3.2.2.4 Discrimination Numbering

Not applicable

3.2.3 Provisioning Considerations

The NTRX48AA cabinet houses a dual-shelf Message Switch Buffer 7 (MSB7) module and two STG7 shelves. The MSB7 shelves are connected to each plane of the CDSN Network through the CSLC via bulkhead DS30 cabling. Each of the MSB7 and STG7 shelves supports 4 and 16 NT6X66 Signaling Terminal (ST) circuit packs respectively, for a total of 40 STs per cabinet.

NT6X66AA and NT6X66CA STs are provisionable for CCS7 and DPNSS7 respectively.

In the top of the cabinet is the FSP which distributes power, control and alarms to the cabinet.

The cabinet is forced air cooled with a fan unit integrated into the base of the cabinet.

The NTRX48AA is always provided in building block NTZZ37HA International CMS7.

3.2.4 Office Layout Information

Not applicable.

3.2.5 Traffic Tables

Standard traffic provisioning algorithms apply.

3.3 Product/System Specification

3.3.1 Physical Characteristics

Not applicable.

3.3.2 EMI/Earthquake Information

Not applicable.

3.3.3 Sparing Information

Standard sparing algorithms apply.

3.3.4 Power Feed and Fusing Requirements

The following fuses and feeds are required:

3.3.5 Current Drain Information

Current Drain for the circuit packs are:

3.4 Software Provisioning

For NTX software packages to PLC/SOC mappings for CSP02 and beyond refer to ECM552 - Mapping of NTX/NTG Package to PCL/NCL/Option.

3.4.1 Required Software Packages and Interdependencies

Not applicable.

3.4.2 Software Usage Restrictions

Not applicable.

3.4.3 Memory Provisioning

Not applicable.

3.5 Real Time Impact

Not applicable.

4.0 ECM806 - eXtended Architecture Core (XA-Core)

4.1 Overview

Product/System Overview

The intent of XA-Core product is to eliminate the core processing power as a limiting factor in switch capacity. In other words, XA-Core is an entirely new architecture for achieving scalable computing power. This represents a fundamental paradigm shift in providing incremental capacity. XA-Core offers customers significant improvements in switching capacity through the use of a multi-processor architecture. With XA-Core, capacity growth is a function of both the speed of processors and the number of processors as shown in Figure 1 .

Figure 1. Scalable Computing Power

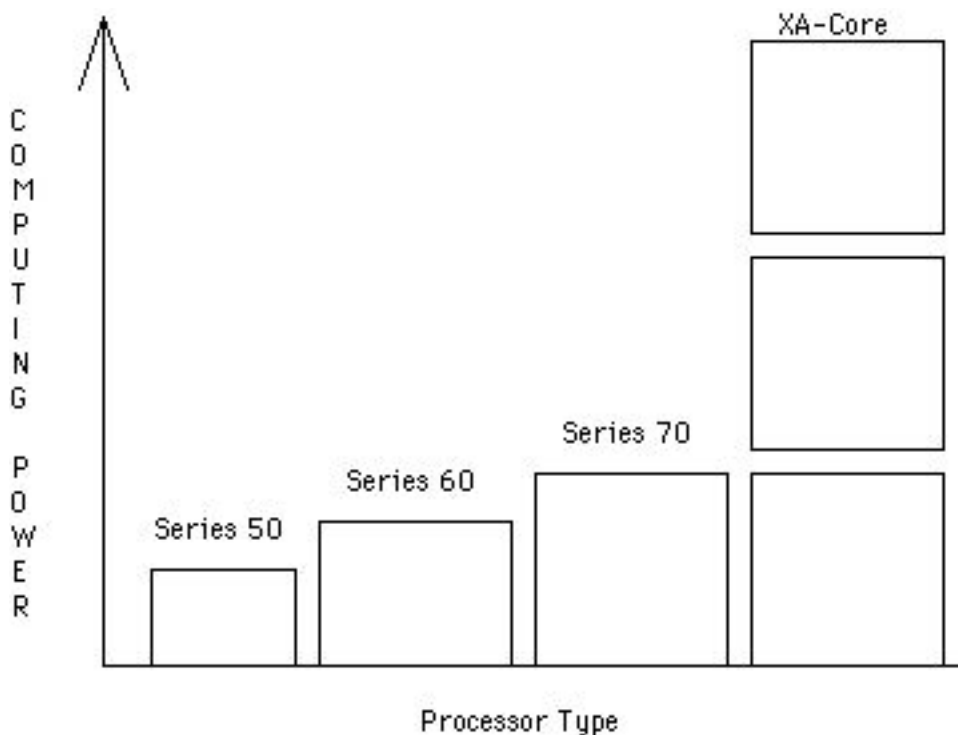


Figure 20. SCALABLE COMPUTING POWER FIGURE

XA-Core replaces the existing CM/SLM in the architecture as shown in Figure 2 .

Figure 2. CM vs. XA-Core Architecture

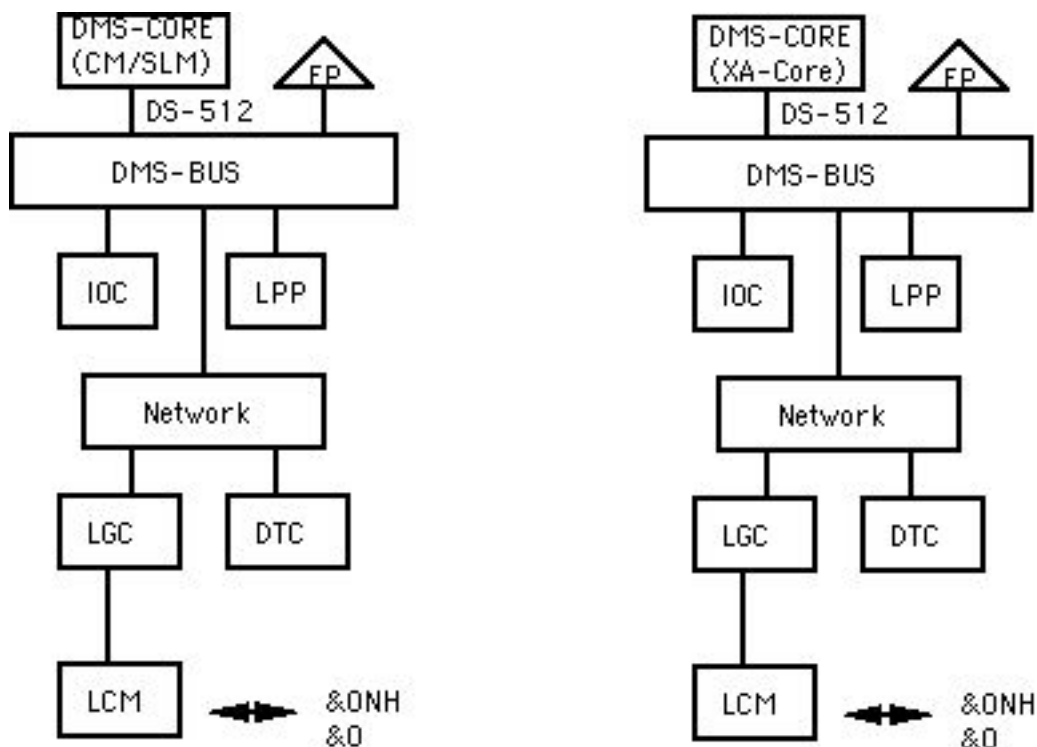


Figure 21. CM VS. XA-CORE ARCHITECTURE

The XA-Core comprises a new shelf provisioned with processor elements (PE), Shared Memory (SM) and Input-Output Processors (IOP) modules interconnected by multiple independent serial Busses. The IOP comprises a common module with insertable Packlets connected via a standard Peripheral Component Interconnect (PCI) BUS to provide desired communication and storage capabilities. Refer to Figure 3 .

Figure 3. High-level view of XA-Core

RELEASE 06.03
13 July 1998

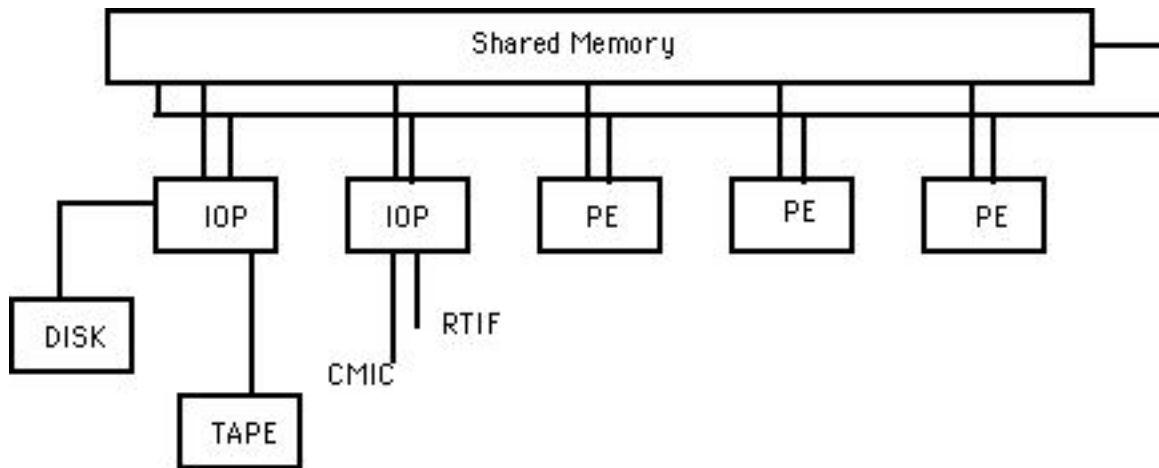


Figure 22. HIGH-LEVEL VIEW OF XA-CORE

4.1.1.1 XA-CORE System Architecture

XA-Core is implemented as a symmetric, tightly coupled multi-processor system. The symmetry in computing architecture refers to a system built up of identical Processor Elements (PEs) each running the same software load. In XA-Core, number of independent PEs access a single shared memory system.

The XA-Core relies on dynamic load distribution. When a processor has no work to do, it requests the next unit of work from the system. As a result of all the processors behaving this way, load is automatically and evenly distributed across the available processors. This dynamic load distribution provides the most efficient use of the XA-Core processing capacity.

XA-Core uses the Checkpoint and Rollback mechanisms to eliminate the transient effect of a processor failure and guarantee no impact on executing applications. Checkpoint creates a transient processing state which reserves sufficient information to restart the software process from that state. Any failure of the processor or any software interaction that terminates the process before completion causes the current execution to terminate and the software entity to return to the last checkpoint. This process of returning the software state back to the last checkpoint is called a rollback.

Shared memory stores the checkpoint information until the process has completed execution and established a new checkpoint, then the previous checkpoint is discarded. When one of the processor fails, the task which was executing on the processor at the time of the failure is rolled back to their last checkpoint state and is re-executed on a different processor.

RELEASE 06.03
13 July 1998

Scalable

The processing capacity, memory and I/O capacity are all scalable by inserting more cards.

The processing capacity is scalable from the capacity of two processors up to a maximum number of configured processors. The maximum number depends on capacity characteristics for each of the switch types such as DMS-250, GSM and DMS-100. The maximum number of processors have not been established yet but governed by the availability of slots applicable to PE cards. Refer to Provisioning Considerations section for more details.

Memory is expandable in two ways: by installing more cards and by installing cards with greater memory capacity. NTLX14BA (256MB) cards deployed in the field can be upgraded to 384MB via the addition of 128MB modules at an NT Customer Service facility. Such upgrades are not performed in the field.

The I/O is expandable by adding packlets of the appropriate type (eg. disks, tapes) and IOPs to accommodate the packlets. When a packlet is inserted into an IOP, the packlet Presence/Isolation circuitry enables event notification to the IOP and perform various controls such as packlet's LEDs and automatic tests.

4.1.2 Supernode Conversions

| Existing CM based SuperNode and SNSE cabinets can be converted to
| XA-Core using a standard or shelf replacement process. The
| standard process removes the cards from the CM and SLM shelves in
| the SuperNode and replaces them with filler packs. The XA-Core
| shelf is provided in an NTLX01CA extension cabinet. The shelf
| replacement process removes the cards and the CM and SLM shelves
| replaces them with an XA-Core shelf. The NT9X01JB is the only
| cabinet to receive the XA-Core cooling unit. The other cabinets
| will maintain exiting cooling unit and utilize a baffle to control
| air flow. The XA-Core shelf, baffle, shelf filler and/or
| XA-cooling unit are supplied using the correct product change kit
| for the original cabinet that is being converted.

| Engineering a shelf replacement XA-Core upgrade requires some
| unique deliverables in the engineering specifications. Refer
| ECM626 for more details on supernode to XA-Core conversions.

RELEASE 06.03
13 July 1998

Supernode to XA-Core Conversions				
Starting PEC	Change Kit	Resulting PEC	With PEC	Process Name
NT9X01BA	NT9X9020	NT9X01BB	NTLX01CA	Standard
NT9X01BA	NT9X9021	NT9X01BC	N/A	Shelf Re- placement
NT9X01JA	NT9X9022	NT9X01JC	NTLX01CA	Standard
NT9X01JA	NT9X9023	NT9X01JD	N/A	Shelf Re- placement
NT9X01JB	NT9X9024	NT9X01JE	NTLX01CA	Standard
NT9X01JB	NT9X9025	NT9X01JF	N/A	Shelf Re- placement

4.2 Hardware Provisioning

4.2.1 Hardware Usage Restrictions

The SLM disks and tape devices are not supported with the XA-Core. It is important to note that, if SLM disks are holding billing files, then these files must be moved to XA-Core or IOC disk during the upgrade from CM-SLM to XA-Core.

JNET is not supported with XA-Core.

4.2.2 Hardware Dependencies

ENET is required with XA-Core

4.2.2.1 P and C Side Port Requirements

Not Applicable.

4.2.2.2 DMS BUS Port Requirements

The DMS-Bus is a high speed transaction switch which supports messaging between the XA-Core, and other elements of the switch. The DMS-Bus is a duplicated device working in a loadsharing mode.

- It consists of a pair of Message Switches (MS) that provides an interface to all components.

The MS occupies two (2) planes and two (2) shelves on a DMS-SuperNode and two (2) planes and one (1) shelf on a SNSE respectively.

For the SuperNode,

RELEASE 06.03
13 July 1998

For initial meaning, the first time installation of the SuperNode with XA-Core shelf, the message switch must be equipped with the NT9X13DG MS processors. For upgrade meaning, upgrading the CM/SLM functionality to XA-Core, the NT9X13DD MS processors in the message switch MUST be upgraded to NT9X13DG. Similarly, the NT9X13DC message switch processors MUST be upgraded to NT9X13DF. Note that the NT9X13DB is not supported with the XA-Core platform and MUST be replaced with NT9X13DG.

For the SuperNode SE,

For initial meaning, the first time installation of the SuperNode SE with XA-Core shelf, the message switch must be equipped with the NT9X13NB MS processors.

For upgrade meaning, upgrading the CM/SLM functionality to XA-Core, the NT9X13NA MS processors in the message switch MUST be upgraded to NT9X13NB.

CMIC links

In order to be able to support the higher bandwidths in the future, an OC-3/ATM link is utilized to carry messages between the DMS-Bus and the XA-Core.

For the SuperNode,

- Each OC-3 packlet in the IOP has two (2) OC-3 ports.
- Each CMIC Link requires one (1) port and the switch requires four (4) CMIC links.
- Each NT9X63AA PB has two (2) ports and each CMIC link from the IOP OC-3 packlet must be on a separate PB.
- One port out of two in each PB is unused.
- Four NT9X63AA cards are required in total for the two Message switches.

For the SNSE,

- Each OC-3 packlet in the IOP has two (2) OC-3 ports.
- Each CMIC Link requires one (1) port and the switch requires four (4) CMIC links.
- Each NT9X63AA PB has two (2) ports and each CMIC link from the IOP OC-3 packlet must be on the same PB.
- There are no unused ports in the NT9X63AA for this configuration.
- Two NT9X63AA are required in total for this application.

RELEASE 06.03
13 July 1998

Note the NT9X63AA PB is a substitute for the NT9X20AA DS512 PB in SuperNode and the NT9X62CA DS-512 PB in the SuperNode SE for OC-3 CMIC Links.

The NT9X17AD is the baseline MS Port card in the Message Switch of the SuperNode or SNSE to support the CMIC links to XA-Core. When upgrading to XA-Core, the 4 NT9X17AA cards that are used for connecting the CM to the MS's are to be upgraded to NT9X17AD's.

4.2.2.3 Circuits Per Card

Not Applicable.

4.2.2.4 Discrimination Numbering

Not Available as of this issue of the ECM

4.2.3 Provisioning Considerations

This section provides guidelines on engineering the PEs, Shared Memory and IOPs to meet the capacity and reliability requirements.

4.2.3.1 Processor Element (PE) Provisioning

XA-Core processing capacity is scalable from the capacity of a pair of processors to a maximum number of configured processors. Two (2) PE are configured for release 1. The maximum number depends on new capacity characteristics for each of the switch types such as DMS-250, GSM and DMS-100. The maximum number of processors have not been established as of this issue of this ECM.

4.2.3.2 Shared Memory(SM) Provisioning

In XA-Core, Data Store (DS) plus a master copy of Program Store (PS) is contained in Shared Memory (SM). SM, like its CM memory counterpart, is duplicated and an extra card(s) (spare) provided to satisfy system reliability / availability objectives.

However, unlike the CM there are no physical planes nor paring of cards between planes. Instead duplication consists of randomly paring 32MB blocks of memory across various SM cards including the extra card(s). The only rule being that a mated pair cannot reside on the same card.

Memory provisioning involves:

1. determining the number of duplicated 32MB blocks required to contain PS and DS;
2. determining the number of cards required to contain those blocks, using either
256MB (NTLX14BA) or
384MB (NTLX14CA) cards.

RELEASE 06.03
13 July 1998

3. adding an extra card (spare) (or 2 extra cards if the customer requires it)

Note:-system availability objectives are fully met with one extra card which is the normal engineering option. However the customer may choose to add one more as an alternative to, or in addition to, "cold" spares, to increase time to repair. An added benefit is that the extra card is on-line and fully maintained by the system. A drawback is that it decreases by one the maximum number of cards available for engineered memory.

Detailed procedure is as follows:-

1. Determine number of 32MB blocks needed for PS.
2. Determine number of 32MB blocks needed for DS.
3. Add to get total PS + DS 32MB blocks.
4. Multiply by 2 for total duplex 32MB blocks.
5. Select card type for this customer (or market); either 256MB or 384MB.
6. Determine number of cards of the selected type required to accommodate the duplex 32MB blocks as follows:
if 256MB cards divide duplex blocks by 8
if 384MB cards divide duplex blocks by 12
Round up fractional results to next higher integer.
Note: result can be EITHER odd OR even number of cards.
7. add extra spare card (or cards) of the same type to complete.
8. configure this number of cards.

Limitations	
Minimum number of cards:	3
Max. number of cards including extra cards:	
SN Cabinet NS / SNSE Extension Cabinet	10
SNSE Cabinet:	7

RELEASE 06.03
13 July 1998

Shared Memory Summary			
Card Type	Provision- ing Granularity	Shelf Limit Supernode & Exten- sion Cab	Shelf Limit SNSE
256MB cards	128MB	1152MB	768MB
384MB cards	192MB	1728MB	1152MB

Mixed configurations

While 256MB - 384MB mixed configurations are supported on XA-Core, such arrangements are NOT RECOMMENDED. Engineering should start with one card type and continue to shelf exhaust with that type.

When a 256MB based configuration exhausts at 1152 (or 768MB for fully configured SNSE) cards may be upgraded to 384MB to increase the SM. Card upgrades are conducted at NT Customer Service facility. Each card converted to 384MB adds 64MB (duplicated) to shared memory.

In 256MB / 384MB mixed configurations the extra card(s) and cold spare, if provided, must both be equal in size to the larger card (i.e. 384MB). Hence a mixed configuration will have at least two 384MB cards on the shelf (assuming 1 extra card).

For example, a configuration having 8 x 256MB cards and 2 x 384MB cards will provide 1216MB of shared memory assuming one extra card (spare).

4.2.3.3 IOP Provisioning

Disks are provisioned to store the office image loads and other data. Minimum of two (2) disks are to be provisioned. The office image can also be loaded from DAT tapes. Minimum of two (2) DAT drives are to be provisioned for redundancy.

There are two (2) types of IOPs single slot width IOP and dual slots width IOP. Note that IOPs can be inserted into the front or rear of the XA-Core shelf. However, the IOP housing the first (2) two disks and two (2) tapes packlets MUST be configured at the front of the shelf. The single slot width IOP supports RTIF and OC-3 Packlets and they must always be inserted into the rear of the XA-Core shelf.

The application and location of storage devices to maintain redundancy are shown in the following example below:

RELEASE 06.03
13 July 1998

Minimum Disk/ tape configuration:		
IOP-2 slot		IOP-2 slot
Tape		Tape
SLM Disk		SLM Disk
2F		17F

Expanded for two (2) Billing Disks:		
IOP-2	IOP-2	IOP-2
Tape	Bill Disk	Tape
SLM Disk	SLM Disk	Bill Disk
2F	14F	17F

4.2.3.4 XA-Core Product Introduction Phases

XA-Core Product introduction is divided in two (2) phases:

Release 1

Release 1 is the initial product offering of

- Two hardware configuration (Fixed) for all applications. The full compliment of hardware elements is delivered in a fixed configuration of processor, memory and IOPs to specific customers only.
- Two (2) processor elements operating in "serialized" mode. Serialized meaning, the second PE will not undertake to execute any task until the first PE has completed a task. In case of any failure to one PE, the Scheduler will automatically schedule all tasks to the other PE. Note that multi-processing software is not activated.
- Capacity is forecast at 1.3 times of Series 70EM for MTX, 1.4 times Series 70EM for DMS250, and 1.5 times Series 70EM for GSM baselining against CSP10.
- The platform software will be delivered as part of CSP10.XA release instead of 7.XA release.
- 4 Input/Output Processors (IOPs): 2 IOPs incorporating 2 SCSI disks and 2 SCSI tapes plus 2 IOPs incorporating 4 CMIC links and 2 RTIFs.
- Shared memory cards running in duplex + hot spare mode. Two initial configurations are offered: 5 X 256MB =512MB and 5 X 384MB = 768MB
- third party storage devices; These are the 2 disks and 2 DAT drives as mentioned in "IOP Provisioning" .

RELEASE 06.03
13 July 1998

- The platform software will be delivered as part of a CSP010.4 release.

Note that PE, SM and IOPs extensions are not supported in the fixed configuration.

Release 2 and post Release 2

Release 2 is the product offering of

- PEs running in n+m configuration. Capacity is 'n' PEs to provide Engineered Capacity.
- The platform software will be delivered as part of a CSP11 and later releases. This release will allow full distribution of call processing to multiple PE's.

Refer to Figure 4 .

RELEASE 06.03
13 July 1998

Fig 4. Uni-Core Vs. Multi-Core		
	Release 1 (Uni-Core)	Release 2 (Multi-Core)
Products Supported	GSM, DMS-250/ACD/500 MTX	Unchanged from Release 1. NA100, EUR0100, APC100
Configurations	Two Fixed (5)	Various
PEs	$n+m = 1+1=2$ (2)	$n+m$ load shared
Operating Mode	Shared Memory Serial Processing (3)	Shared Memory Multi-Processing
PE Memory	256MB	256MB
Shared Memory	768MB (5*384MB CP) 5 2MB (5*256MB CP)	Max. 1728MB, 1 52MB for SNSE Single Cabinet
Memory Management	Duplex 32MB blocks + Spare card	Unchanged from Release 1.
Dual Packlet IOPs	4	As req. by Customer
Disks	2 * 4.0GB	$x * 4.0GB$; $x \geq 2$
Removable Media	2 DAT	$x * DAT$
Communications Lnk	OC-3/ATM CMIC links Only	OC-3/ATM CMIC links
RTIF	CSP10.4: Standard Capability.	Full support E2A Access added
Software	CSP10.4,	CSP12 and Later
SM, PE and IOP Extensions	Not Supported	Additions of PE, SM, I/O interfaces Not Service affecting SM growth in 128MB increments

Notes:

1. GSM Includes MSC, HLR, MSC/STP. Based on the current XA-Core Project Management Plan Issue 5.0.
2. 'n' is the number of PE required to deliver the engineered capacity. 'm' is the number of 'hot' spares required to meet system availability objectives. m will normally be one (1). Note that XA-Core houses a maximum of 16PEs + IOPs (12 for SNSE in a single cabinet configuration).

RELEASE 06.03
13 July 1998

3. Serialized meaning, the second PE will not undertake to execute any task until the first PE has completed a task.
4. Refer to Figure 10 and Figure 11 for Uni-Core fixed configuration.

4.2.3.5 XA-Core Product Structures

XA-Core can be packaged into three different configurations as shown in Figure 5 .

1. SuperNode-XA
2. SNSE-XA
3. XA-Standalone

Figure 5. XA-Core Configurations

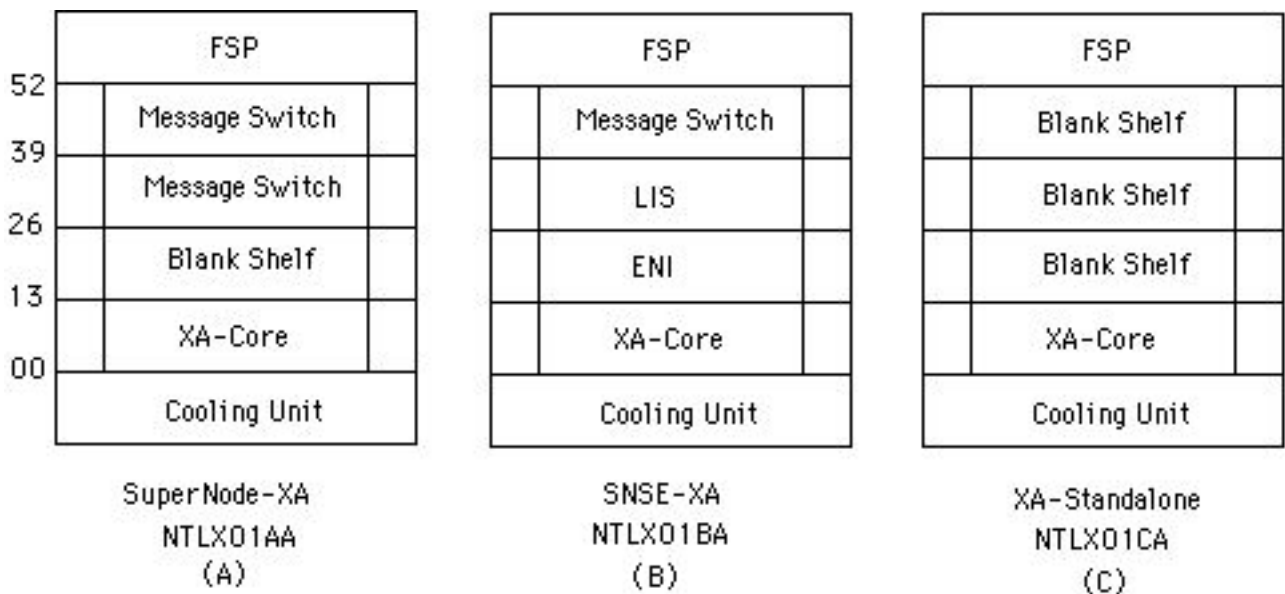


Figure 23. XA CORE CONFIGURATIONS

The term "Initial" and the term "Upgrade" used in this section refer to the following:

- Initial meaning, the first time installation of an entire switch.
- Upgrade meaning, upgrading the CM/SLM functionality to XA-Core functionality.

Customers can deploy XA-Core in its own C42 Cabinet as shown in Figure 5 (C) and this cabinet can be added to the existing front-end lineup. The front end line up is preferred but any suitable line-up will work.

RELEASE 06.03
13 July 1998

(refer to Figure 6 and Figure 7) This is called Dual cabinet configurations. In this method, the CM/SLM are decommissioned and the CM/SLM circuit packs and paddle boards are replaced with Filler cards (NT9X19AA) at the front and Filler Paddle Boards (NT9X19BA) at the rear. In Figure 6 , the CM/SLM functions of the existing SuperNode are cutover(transferred) to the new XA-Standalone. In Figure 7 , the CM/SLM functions of the existing SNSE are cutover(transferred) to the new XA-Standalone. More details on the standard replacement can be found in ECM626.

Customers requiring initial offices with XA-Core or requiring upgrade via shelf replacement method (replacing the CM, SLM and in some cases the cooling unit, with the XA-core shelf and cooling unit) can deploy XA-Core in either SuperNode-XA or in SNSE-XA cabinet configurations. (refer to Figure 5 (A) and (B).) This is called a single cabinet configuration.

Figure 6. SuperNode cabinet with XA-Core Standalone cabinet		
Shelf Position		
52	FSP	FSP
39	Message Switch	Blank shelf
26	Message Switch	Blank shelf
13	Filler Cards	Blank shelf
00	Filler Cards	XA-Core
	Cooling Unit	Cooling Unit
	Supernode Cabinet NT9X01AA/BA/JA/JB	XA-Standalone

Figure 7. SNSE cabinet with XA-Core Standalone cabinet		
Shelf Position		
52	FSP	FSP
39	Message Switch	Blank shelf
26	Link I/F Shelf	Blank shelf
13	ENI	Blank shelf
00	Filler Cards	XA-Core
	Cooling Unit	Cooling Unit
	SNSE NT9X01MA/MB	XA-Standalone

XA-Core Shelf Configurations

RELEASE 06.03
13 July 1998

The shelf configuration shown in Figure 8 ,is applicable to SuperNode-XA (refer to Figure 5 (A)) in a single cabinet configuration. The same configuration is also applicable to dual cabinet configuration as shown in Figure 6 and in Figure 7 .

In Figure 8 , shelf consists of 16 usable slots in front and rear to accommodate PE and IOP modules. Two of these slots (slot 02F and 17F) are assignable to IOP only. Note that the front slots 01, 03, 15, and 18 are not interconnected with the midplane and CANNOT be equipped with any of the PE, IOP or Shared Memory. However, the double width IOPs in adjacent card slots can overlap these slots(03F, 15F and 18F). Note that the double width IOPs are required for DISK and DAT drives. Also note there are ten (10) slot locations in the center portion of the shelf is reserved for Shared Memory provisioning.

The shelf configuration shown in Figure 9 ,is only applicable to SNSE-XA (refer to Figure 5 (B)) in a single cabinet configuration. Note that in Figure 9 , the front slots 01, 03, 15, and 18 are not interconnected with the midplane and CANNOT be equipped with any of the PE, IOP or Shared Memory. Also there are seven additional slots 06F,06R,09F,08R,12F,11R and 13R are unassignable and are not powered in this configuration. However, double slot width IOP in the adjacent left slots can overlap. Note this configuration is a MANDATORY in SNSE-XA cabinet to limit thermal dissipation within a cabinet.

In Figure 9 , shelf consists of 12 usable slots in front and rear to accommodate PE and IOP modules. Two of these slots (slot 02F and 17F) are assignable to IOP only. Note only seven slot locations in the center portion of the shelf is reserved for Shared Memory provisioning.

RELEASE 06.03
13 July 1998

Figure 8. Full capacity shelf configuration			
XXX NOT AVAILABLE FOR USE XXX	1F		
IOP	2F		
XXX NOT AVAILABLE FOR USE XXX	3F	SIM	3R
PE/IOP	4F	PE/IOP	4R
PE/IOP	5F	PE/IOP	5R
PE/IOP	6F	PE/IOP	6R
Shared Memory	7F	Shared Memory	7R
Shared Memory	8F	Shared Memory	8R
Shared Memory	9F	Shared Memory	9R
Shared Memory	1 F	Shared Memory	1 R
Shared Memory	1 F	Shared Memory	1 R
PE/IOP	1 F	PE/IOP	1 R
PE/IOP	1 F	PE/IOP	1 R
PE/IOP	14F	PE/IOP	14R
XXX NOT AVAILABLE FOR USE XXX	15F	PE/IOP	15R
PE/IOP	16F	SIM	16R
Double Slot IOP (Disk/Tape)	17F		
	18F		

RELEASE 06.03
13 July 1998

Figure 9. Reduced capacity shelf configuration			
XXX NOT AVAILABLE FOR USE XXX	1F		
NTLX03BA IOP	2F		
XXX NOT AVAILABLE FOR USE XXX	3F	SIM	3R
PE/IOP	4F	PE/IOP	4R
PE/IOP	5F	PE/IOP	5R
XXX NOT AVAILABLE FOR USE XXX	6F	NOT AVAILABLE	6R
Shared Memory	7F	Shared Memory	7R
Shared Memory	8F	NOT AVAILABLE	8R
XXX NOT AVAILABLE FOR USE XXX	9F	Shared Memory	9R
Shared Memory	1 F	Shared Memory	1 R
Shared Memory	1 F	NOT AVAILABLE	1 R
XXX NOT AVAILABLE FOR USE XXX	1 F	PE/IOP	1 R
PE/IOP	1 F	NOT AVAILABLE	1 R
PE/IOP	14F	PE/IOP	14R
XXX NOT AVAILABLE FOR USE XXX	15F	PE/IOP	15R
PE/IOP	16F	SIM	16R
Double Slot IOP (Disk/Tape)	17F		
	18F		

Uni-Core fixed configuration

The shelf configuration shown in Figure 10 ,is applicable to in cabinet configuration shown in Figure 5 , (A) ONLY for Release 1. Note that power feeds are denoted by A1 B1 and A2 B2 and that like cards MUST be placed on alternating feeds.

RELEASE 06.03
13 July 1998

Figure 10. Uni-Core fixed configuration for SuperNode			
Filler	1F		
Double Slot IOP (Disk/Tape), A2 B2	2F		
	3F	SIM	3R
Processor Element, A2 B2	4F	A1 B1, IOP (OC-3/RTIF)	4R
Terminating Filler	5F	Terminating Filler	5R
Terminating Filler	6F	Terminating Filler	6R
Shared Memory, A2 B2	7F	A1 B1, Shared Memory	7R
Shared Memory, A1 B1	8F	Terminating Filler	8R
Terminating Filler	9F	Terminating Filler	9R
Shared Memory, A2 B2	10F	Terminating Filler	10R
Shared Memory, A1 B1	11F	Terminating Filler	11R
Terminating Filler	12F	Terminating Filler	12R
Terminating Filler	13F	Terminating Filler	13R
Terminating Filler	14F	Terminating Filler	14R
Terminating Filler	15F	A2 B2, IOP (OC-3/RTIF)	15R
Processor Element, A2 B2	16F	SIM	16R
Double Slot IOP (Disk/Tape), A1 B1	17F		
	18F		

The shelf configuration shown in Figure 11 ,is applicable to in cabinet configuration shown in Figure 5 , (B). for Release 1. Note that power feeds are denoted by A1 B1 and A2 B2 and that like cards MUST be placed on alternating feeds. The location of these feeds is described in Figure 13.

RELEASE 06.03
13 July 1998

Figure 11. Uni-Core fixed configuration for SuperNode SE			
Filler	1F		
Double Slot IOP (Disk/Tape), A2 B2	2F		
	3F	SIM	3R
Processor Element A1 B2	4F	A1 B1, IOP (OC-3/RTIF)	4R
Filler	5F	Filler	5R
XXX Not Available for use XXX	6F	Not Available for use Filler	6R
Shared Memory P2	7F	A1 B1, Shared Memory	7R
Shared Memory, A1 B1	8F	Not Available for use Filler	8R
XXX Not Available for use XXX	9F	A2 B2, Filler	9R
Shared Memory, A2 B2	10F	A2 B2, Filler	10R
Shared Memory, A1 B1	11F	Filler	11R
XXX Not Available for use XXX	12F	Filler	12R
Filler	13F	Not Available for use Filler	13R
Filler, A1 B1,	14F	Filler	14R
XXX Not available for use XXX	15F	A2 B2, IOP (OC-3/RTIF)	15R
Processor Element, A2 B2	16F	SIM	16R
Double Slot IOP (Disk/Tape), A1 B1	17F		
	18F		

4.2.4 Office Layout Information

Refer to ECM600 for office layout restrictions when this cabinet is applied in a DMS-100 Cabinetized lineup.

RELEASE 06.03
13 July 1998

Refer to ECM626 for Floor Layout information section and note that Richardson market floor layout may be different than those mentioned in that section.

The NTLX01AA, NTLX01BA and NTLX01CA cabinets are shipped with the doors, shelves, modules, FSP, and cooling unit installed. The rear of any of these cabinets are equipped with two removable bulkhead panels near the bottom of the cabinet. When these panels are removed, the cabinet can be installed in, or removed from, a lineup equipped with horizontal cabling.

4.2.4.1 XA-Core Grounding

XA-Core is compatible with the Isolated System Grounding (ISG) specifications used for DMS-100 systems. The XA-Core is compatible with the grounding requirements of the following:

- TP01115 (U) (Telecom Australia)
- TR-EOP-000295 (Bellcore, Isolated Grounding Requirements)
- Section 810(REA)
- NFPA70 (US National Electrical Code), 1993
- CSA 22.1 (Canadian Electrical Code), 1990
- ETS 300 253 (ETSI), Oct. 1992
- CCITT K-27 (International Mesh and Isolated Grounding Standards)
- CS4122 (NT Corporate Standards), Apr. 1993
- NTP 297-1001-156 Power Distribution and Grounding Guide.

XA-Core grounding is compatible with the two major grounding topologies in the market; SPG/IBN and Mesh/CBN. Since all other grounding topologies are derivatives of these two main topologies, this approach allows XA-Core to be easily integrated into any grounding application.

The XA-Core shelf assembly grounding is through the shelf mounting screws to the C-42 framework. Star washers are required under the fastener heads to make this ground contact at the front of the shelf. At the rear of the shelf, the lower shelf extrusion requires a grounding surface, which is grounded to the horizontal cable management extrusion gasket. The horizontal cable management is then tied to the framework via a grounding strap. Note that all communication links leaving the shelf must be DC isolated.

4.2.4.2 SWITCHBOARD CABLING RESTRICTIONS

The optical transceiver used on the NT9X63AA supports distances up to 100m, however for CMIC applications the maximum distance of fiber optic cable between the XA-Core Packlet and MS paddle board is 100m in their

RELEASE 06.03
13 July 1998

final locations. During shelf replacement procedures with the portable XA-Core tool, round trip fiber optic cable lengths of 200m are allowed.

It is recommended that a per site survey of retrofit sites be carried out jointly by Building Studies and Installation groups to ensure a feasible configuration is engineered.

4.2.5 Traffic Tables

Not applicable.

4.3 Product/System Specification

4.3.1 Physical Characteristics

Cabinet(NTLX01AA/BA/CA) Mechanical Dimensions

Height 72in. Width 42in. Depth 28in.

XA-Core Shelf Mechanical Dimensions

Height 327.6mm Depth 567mm

Width of Primary side(Front) 918mm

Width of Secondary side(Rear) 688mm

Shelf Weight(without any modules) 34kg

XA-Core clear height for Modules

Height 287mm

4.3.2 EMI/Earthquake Information

Conforms fully.

4.3.3 Sparing Information

Standard sparing practices should be followed for XA-Core circuit packs. Normally, one spare of each circuit pack type should be available for an XA-core office. The cooling unit is different from standard SuperNode and a spare CU should be available.

The CU consists of three fan drawers and they are Field Replaceable Units. The fan drawer (NTLX11AA) consists of a sliding drawer, a backward curved impeller and dual speed power converter (NTLX1101). The fan drawers are identical and the CU is shipped with all fan drawers installed. However, customers may desire spares for the fan drawer (NTLX11AA). Power is connected to each fan drawer with blind mate connectors.

RELEASE 06.03
13 July 1998

4.3.4 Power Feed and Fusing Requirements

Power interconnect for A and B battery power feeds are provided into the shelf through cable reduction terminations and two Shelf Interface Modules (SIMs). One for A feeds, one for B feeds. Refer to Figure 12. The cable reduction termination point allows termination of up to #6AWG by the installers. The cabling from this point to the SIM will be #10AWG and wired in the shop. Each SIM is a replaceable module since it will contain power filtering, filter soft start, alarms etc.. SIMs are equipped with three (3) circuit breakers one per feed. SIM does not support live insertion.

Figure 12. Power Distribution for XA-Core Shelf

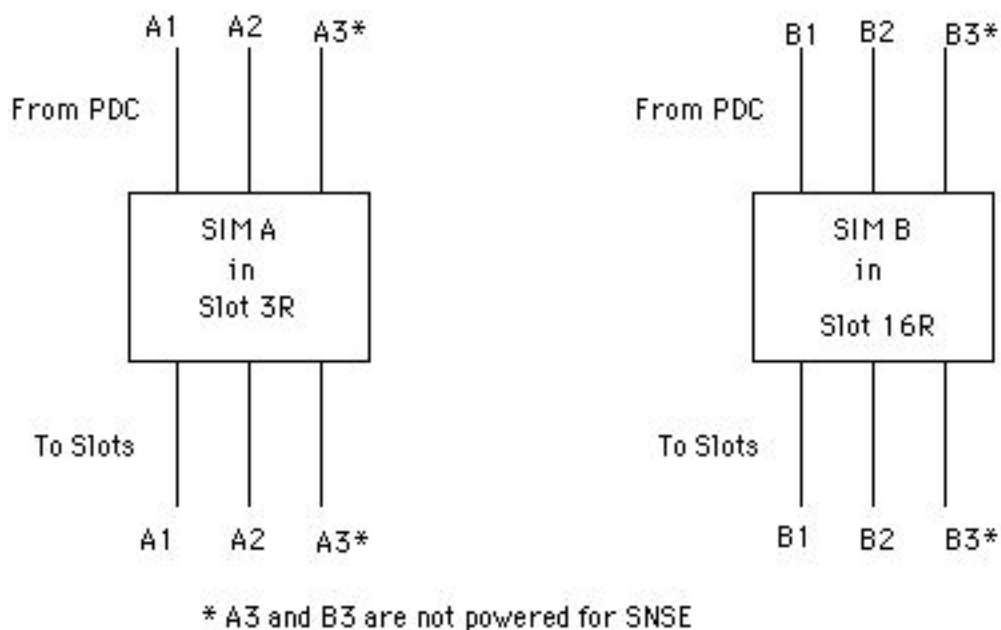


Figure 24. POWER DISTRIBUTION FOR XA-CORE SHELF

Figure 13. Power feed per slot.			
SLOT	PWR FEED	SLOT	PWR FEED
1F	A1 B1		
2F	A2 B2		
3F	-- --	3R	SIM (A PWR)
4F	A2 B2	4R	A1 B1
5F	A1 B1	5R	A2 B2
6F	A3 B3	6R	A3 B3
7F	A2 B2	7R	A1 B1
8F	A1 B1	8R	A3 B3
9F	A3 B3	9R	A2 B2
10F	A2 B2	10R	A2 B2
11F	A1 B1	11R	A3 B3
12F	A3 B3	12R	A1 B1
13F	A2 B2	13R	A3 B3
14F	A1 B1	14R	A1 B1
15F	-- --	15R	A2 B2
16F	A2 B2	16R	SIM (B PWR)
17F	A1 B1		
18F	-- --		
-- -- Denotes no power available			

4.3.5 Current Drain Information

Note the tables shown in Figure 13 and in Figure 14 , are preliminary and more accurate information will be available in the subsequent releases of this ECM. Also, note that the Current Drain for the XA-Core Modules such as PEs, SM, IOPs and SIMs will be entered in the EMA16-01-001 section at XA-Core GATE2 time frame.

Figure 13. Power Dissipation		
	SuperNode	SuperNode SE
XA-Core Shelf	2000 Watts	1475 Watts
Other Shelves	1000 W x 2	1000 W x 3
Cooling Unit	450 Watts	450 Watts
Total	4450 Watts	4925 Watts

Figure 14. Characteristics				
PEC	PARAMETER/Unit	NOMINAL	MIN/MAX	POWER (W)
NTLX0101	Supply Volt-age Volts	-48	-34/-75	2000 in SN 1475 in SNSE
NTLX1101 CU Con- verter	Supply Volt-age Volts	-50	-47.5/-55	450
NTLX02AA PE	Supply Volt-age Volts	-48	-36/-75	80
NTLX03AA IOP + 2 Disk Packlets	Supply Cur-rent AMPs	2.15	2.94/1.37	103
NTLX03AA IOP + 1 Disk + Tape	Supply Cur-rent AMPs	1.56	2.08/1.00	75
NTLX03AA IOP + RTIF + OC-3	Supply Cur-rent AMPs	1.09	1.46/0.70	52.5
NTLX06AA Disk Packlet	Supply cur-rent mA at -48V	390	-/860	41.5 occurs at spin-up
NTLX07AA Tape Packlet	Supply cur-rent mA at -48V	330	-/600	27.8
NTLX08AA RTIF Packlet	Supply cur-rent mA at -48V	146	-/230	11

4.4 Software Provisioning

Not Available as of this issue of the ECM

4.4.1 Required Software Packages and Interdependencies

Not Available as of this issue of the ECM

4.4.2 Software Usage Restrictions

Not Available as of this issue of the ECM

4.4.3 Memory Provisioning

Refer to "Shared Memory(SM) Provisioning" .

4.5 Real Time Impact

Not Available as of this issue of the ECM

NORTHERN TELECOM

RELEASE 06.03
13 July 1998

PLN-8991-104

Chapter 2

SWITCH NETWORK

THIS PAGE IS INTENTIONALLY LEFT BLANK

RELEASE 06.03
13 July 1998

SWITCH NETWORK
Section Contents

1.0	ECM108 - NETC FSP Changeover and Retrofit	2-1
1.1	Overview	2-1
1.2	Hardware Provisioning	2-1
1.2.1	Hardware Usage Restrictions	2-1
1.2.2	Hardware Dependencies	2-1
1.2.2.1	P and C Side Port Requirements	2-1
1.2.2.2	DMS BUS Port Requirements	2-1
1.2.2.3	Circuits Per Card	2-1
1.2.2.4	Discrimination Numbering	2-1
1.2.3	Provisioning Considerations	2-1
1.2.4	Office Layout Information	2-1
1.2.5	Traffic Tables	2-1
1.3	Product/System Specification	2-2
1.3.1	Physical Characteristics	2-2
1.3.2	EMI/Earthquake Information	2-2
1.3.3	Sparing Information	2-2
1.3.4	Power Feed and Fusing Requirements	2-2
1.3.5	Current Drain Information	2-2
1.4	Software Provisioning	2-2
1.4.1	Required Software Packages and Interdependencies	2-2
1.4.2	Software Usage Restrictions	2-2
1.4.3	Memory Provisioning	2-2
1.5	Real Time Impact	2-2
2.0	ECM143 - Network Junctor Pattern Update	2-3
2.1	Overview	2-3
2.2	Hardware Provisioning	2-3
2.2.1	Hardware Usage Restrictions	2-3
2.2.2	Hardware Dependencies	2-3
2.2.2.1	P and C Side Port Requirements	2-3
2.2.2.2	DMS BUS Port Requirements	2-3
2.2.2.3	Circuits Per Card	2-3
2.2.2.4	Discrimination Numbering	2-3
2.2.3	Provisioning Considerations	2-3
2.2.4	Office Layout Information	2-3
2.2.5	Traffic Tables	2-3
2.3	Product/System Specification	2-3
2.3.1	Physical Characteristics	2-3
2.3.2	EMI/Earthquake Information	2-4
2.3.3	Sparing Information	2-4
2.3.4	Power Feed and Fusing Requirements	2-4
2.3.5	Current Drain Information	2-4
2.4	Software Provisioning	2-4
2.4.1	Required Software Packages and Interdependencies	2-4
2.4.2	Software Usage Restrictions	2-4
2.4.3	Memory Provisioning	2-4
2.5	Real Time Impact	2-4
3.0	ECM191 - Double Shelf Network Equipment Frame (DSNE)	2-5

RELEASE 06.03
13 July 1998

3.1	Overview	2-5
3.1.1	Hardware Provisioning	2-7
3.1.2	Hardware Usage Restrictions	2-7
3.1.3	Hardware Dependencies	2-7
3.1.3.1	P and C Side Port Requirements	2-8
3.1.3.2	DMS BUS Port Requirements	2-8
3.1.3.3	Circuits Per Card	2-8
3.1.3.4	Discrimination Numbering	2-8
3.1.4	Provisioning Considerations	2-8
3.1.4.1	Refurbished DSN Provisioning	2-8
3.1.4.2	Power Converter Upgrade	2-8
3.1.4.3	Network Common Circuit Packs	2-8
3.1.4.4	DMS-Core and ISDN Applications	2-9
3.1.4.5	Network Port Circuit Pack, NT8X12AA	2-9
3.1.4.6	Standard JCT1N	2-11
3.1.4.7	Standard JCT2DSN	2-11
3.1.4.8	Standard JCT1N1D	2-11
3.1.4.9	Standard JCT101D	2-12
3.1.4.10	Standard JCT101N	2-12
3.1.5	Office Layout Information	2-12
3.2	Traffic Tables	2-12
3.3	Product/System Specification	2-14
3.3.1	Physical Characteristics	2-14
3.3.1.1	Power/Heat Dissipation	2-14
3.3.2	EMI/Earthquake Information	2-14
3.3.3	Sparing Information	2-14
3.3.4	Power Feed and Fusing Requirements	2-14
3.3.5	Current Drain Information	2-15
3.4	Software Provisioning	2-15
3.4.1	Required Software Packages and Interdependencies	2-15
3.4.2	Software Usage Restrictions	2-15
3.4.3	Memory Provisioning	2-15
3.5	Real Time Impact	2-15
4.0	ECM311 - Redistribution of Network Modules	2-16
4.1	Overview	2-16
4.2	Hardware Provisioning	2-16
4.2.1	Hardware Usage Restrictions	2-16
4.2.2	Hardware Dependencies	2-16
4.2.2.1	P and C Side Port Requirements	2-16
4.2.2.2	DMS BUS Port Requirements	2-16
4.2.2.3	Circuits Per Card	2-17
4.2.2.4	Discrimination Numbering	2-17
4.2.3	Provisioning Considerations	2-17
4.2.4	Office Layout Information	2-17
4.2.5	Traffic Tables	2-17
4.3	Product/System Specification	2-17
4.3.1	Physical Characteristics	2-17
4.3.2	EMI/Earthquake Information	2-17
4.3.3	Sparing Information	2-17
4.3.4	Power Feed and Fusing Requirements	2-17
4.3.5	Current Drain Information	2-17

RELEASE 06.03
13 July 1998

4.4	Software Provisioning	2-17
4.4.1	Required Software Packages and Interdependencies	2-17
4.4.2	Software Usage Restrictions	2-18
4.4.3	Memory Provisioning	2-18
4.5	Real Time Impact	2-18
5.0	ECM508 - Network Port Spread	2-19
5.1	Overview	2-19
5.2	Hardware Provisioning	2-19
5.2.1	Hardware Usage Restrictions	2-19
5.2.2	Hardware Dependencies	2-19
5.2.2.1	P and C Side Port Requirements	2-19
5.2.2.2	DMS BUS Port Requirements	2-19
5.2.2.3	Circuits Per Card	2-19
5.2.2.4	Discrimination Numbering	2-19
5.2.3	Provisioning Considerations	2-19
5.2.4	Office Layout Information	2-23
5.2.5	Traffic Tables	2-23
5.3	Product/System Specification	2-23
5.3.1	Physical Characteristics	2-23
5.3.2	EMI/Earthquake Information	2-23
5.3.3	Sparing Information	2-23
5.3.4	Power Feed and Fusing Requirements	2-23
5.3.5	Current Drain Information	2-23
5.4	Software Provisioning	2-23
5.4.1	Required Software Packages and Interdependencies	2-23
5.4.2	Software Usage Restrictions	2-23
5.4.3	Memory Provisioning	2-23
5.5	Real Time Impact	2-23
6.0	ECM604 - Building Block Engineering - DSNE	2-24
6.1	Overview	2-24
6.2	Hardware Provisioning	2-25
6.2.1	Hardware Usage Restrictions	2-25
6.2.2	Hardware Dependencies	2-25
6.2.2.1	P and C Side Port Requirements	2-26
6.2.2.2	DMS BUS Port Requirements	2-26
6.2.2.3	Circuits Per Card	2-26
6.2.2.4	Discrimination Numbering	2-26
6.2.3	Provisioning Considerations	2-27
6.2.4	Office Layout Information	2-29
6.2.5	Traffic Tables	2-29
6.3	Product/System Specification	2-29
6.3.1	Physical Characteristics	2-29
6.3.2	EMI/Earthquake Information	2-29
6.3.3	Sparing Information	2-30
6.3.4	Power Feed and Fusing Requirements	2-30
6.3.5	Current Drain Information	2-30
6.4	Software Provisioning	2-30
6.4.1	Required Software Packages and Interdependencies	2-30
6.4.2	Software Usage Restrictions	2-30
6.4.3	Memory Provisioning	2-30

RELEASE 06.03
13 July 1998

6.5	Real Time Impact	2-30
7.0	ECM627 - 128K Enhanced Network (Dual Cabinet ENET)	2-31
7.1	Overview	2-31
7.1.1	NETWORK ARCHITECTURE	2-33
7.2	Hardware Provisioning	2-35
7.2.1	Hardware Usage Restrictions	2-35
7.2.2	Hardware Dependencies	2-37
7.2.2.1	P and C Side Port Requirements	2-37
7.2.2.2	128K ENET Cabinet Worksheet 1	2-37
7.2.2.3	Message Switch Provisioning	2-43
7.2.2.4	Worksheet 2 Reference Manual	2-52
7.2.2.5	DMS BUS Port Requirements	2-55
7.2.2.6	Circuits Per Card	2-62
7.2.2.7	Discrimination Numbering	2-62
7.2.2.8	ENET RETROFIT (UPGRADE)	2-62
7.2.2.9	ENET RETROFIT - PERIPHERAL BASELINE	2-63
7.2.3	Provisioning Considerations	2-70
7.2.3.1	ENET in C42(S/DMS) Cabinet	2-70
7.2.3.2	ENHANCED NETWORK (ENET) SHELF PROVISIONING	2-73
7.2.3.3	SPEECH LINK ASSIGNMENT RULES	2-77
7.2.3.4	BULKHEAD PROVISIONING RULES	2-78
7.2.3.5	RESET TERMINALS	2-79
7.2.3.6	OFFICE ALARM UNIT PROVISIONING	2-80
7.2.3.7	CABINET CABLE TURNING SECTION (CCTS)	2-80
7.2.4	Office Layout Information	2-81
7.2.5	Traffic Tables	2-83
7.3	Product/System Specification	2-83
7.3.1	Physical Characteristics	2-83
7.3.2	EMI/Earthquake Information	2-83
7.3.3	Sparing Information	2-83
7.3.4	Power Feed and Fusing Requirements	2-85
7.3.5	Current Drain Information	2-86
7.4	Software Provisioning	2-86
7.4.1	Required Software Packages and Interdependencies	2-86
7.4.2	Software Usage Restrictions	2-87
7.4.3	Memory Provisioning	2-87
7.5	Real Time Impact	2-87
8.0	ECM635 - Single Cabinet Enhanced Network	2-88
8.1	Overview	2-88
8.2	Hardware Provisioning	2-89
8.2.1	Hardware Usage Restrictions	2-89
8.2.1.1	64K ENET To 128K ENET Upgrade	2-90
8.2.2	Hardware Dependencies	2-92
8.2.2.1	P and C Side Port Requirements	2-93
8.2.2.2	64K ENET Cabinet Worksheet 1	2-93
8.2.2.3	Message Switch Provisioning	2-99
8.2.2.4	Worksheet 2 Reference Manual	2-106
8.2.2.5	DMS BUS Port Requirements	2-109
8.2.2.6	Circuits Per Card	2-109

RELEASE 06.03

13 July 1998

8.2.2.7	Discrimination Numbering	2-109
8.2.2.8	ENET RETROFIT (UPGRADE)	2-109
8.2.3	Provisioning Considerations	2-111
8.2.3.1	Cabinet Model	2-111
8.2.3.2	Enhanced Network (ENET) Shelf Provi- sioning	2-112
8.2.3.3	Speech Link Assignment Rules	2-116
8.2.3.4	Cabinet Cable Turning Section	2-117
8.2.4	Office Layout Information	2-118
8.2.5	Traffic Tables	2-118
8.3	Product/System Specification	2-118
8.3.1	Physical Characteristics	2-118
8.3.1.1	Power/Heat Dissipation	2-118
8.3.2	EMI/Earthquake Information	2-118
8.3.3	Sparing Information	2-119
8.3.4	Power Feed and Fusing Requirements	2-119
8.3.5	Current Drain Information	2-120
8.4	Software Provisioning	2-120
8.4.1	Required Software Packages and Interdependen- cies	2-120
8.4.2	Software Usage Restrictions	2-120
8.4.3	Memory Provisioning	2-120
8.5	Real Time Impact	2-121
9.0	ECM671 - DMS Building Block - DNI Engineering	2-122
9.1	Overview	2-122
9.2	Hardware Provisioning	2-122
9.2.1	Hardware Usage Restrictions	2-122
9.2.2	Hardware Dependencies	2-122
9.2.2.1	P and C Side Port Requirements	2-122
9.2.2.2	DMS BUS Port Requirements	2-122
9.2.2.3	Circuits Per Card	2-122
9.2.2.4	Discrimination Numbering	2-122
9.2.3	Provisioning Considerations	2-122
9.2.4	Office Layout Information	2-123
9.2.5	Traffic Tables	2-123
9.3	Product/System Specification	2-123
9.3.1	Physical Characteristics	2-123
9.3.2	EMI/Earthquake Information	2-123
9.3.3	Sparing Information	2-123
9.3.4	Power Feed and Fusing Requirements	2-123
9.3.5	Current Drain Information	2-123
9.4	Software Provisioning	2-123
9.4.1	Required Software Packages and Interdependen- cies	2-123
9.4.2	Software Usage Restrictions	2-123
9.4.3	Memory Provisioning	2-123
9.5	Real Time Impact	2-123
10.0	ECM672 - DMS Building Block - SLC Engineering	2-124
10.1	Overview	2-124
10.2	Hardware Provisioning	2-124

RELEASE 06.03
13 July 1998

10.2.1	Hardware Usage Restrictions	2-124
10.2.2	Hardware Dependencies	2-124
10.2.2.1	P and C Side Port Requirements	2-124
10.2.2.2	DMS BUS Port Requirements	2-124
10.2.2.3	Circuits Per Card	2-124
10.2.2.4	Discrimination Numbering	2-124
10.2.3	Provisioning Considerations	2-124
10.2.4	Office Layout Information	2-125
10.2.5	Traffic Tables	2-125
10.3	Product/System Specification	2-125
10.3.1	Physical Characteristics	2-125
10.3.2	EMI/Earthquake Information	2-125
10.3.3	Sparing Information	2-125
10.3.4	Power Feed and Fusing Requirements	2-125
10.3.5	Current Drain Information	2-125
10.4	Software Provisioning	2-125
10.4.1	Required Software Packages and Interdependen- cies	2-125
10.4.2	Software Usage Restrictions	2-125
10.4.3	Memory Provisioning	2-125
10.5	Real Time Impact	2-126

1.0 ECM108 - NETC FSP Changeover and Retrofit

1.1 Overview

Change Control, Dept. S614, will apply the necessary changeover to the above FSP, via DCA028A34 and DCA091A10, in the shop and the retrofit in the field so that the possibility of losing power to both planes on the NETC frame is eliminated.

There will be no change in the FSP PEC code.

1.2 Hardware Provisioning

1.2.1 Hardware Usage Restrictions

Not applicable.

1.2.2 Hardware Dependencies

Not applicable.

1.2.2.1 P and C Side Port Requirements

Not applicable

1.2.2.2 DMS BUS Port Requirements

Not applicable

1.2.2.3 Circuits Per Card

Not applicable

1.2.2.4 Discrimination Numbering

Not applicable

1.2.3 Provisioning Considerations

1.2.4 Office Layout Information

Not applicable.

1.2.5 Traffic Tables

Not applicable.

RELEASE 06.03
13 July 1998

1.3 Product/System Specification

1.3.1 Physical Characteristics

Not applicable.

1.3.2 EMI/Earthquake Information

Not applicable.

1.3.3 Sparing Information

Change Control shall be supplying one spare NT0X91AE circuit pack for each office retrofitted in the field. For each affected office which has not shipped yet, Customer Engineering shall provide a spare NT0X91AE CP.

1.3.4 Power Feed and Fusing Requirements

Not applicable.

1.3.5 Current Drain Information

Not applicable.

1.4 Software Provisioning

For NTX software packages to PLC/SOC mappings for CSP02 and beyond refer to ECM552 - Mapping of NTX/NTG Package to PCL/NCL/Option.

1.4.1 Required Software Packages and Interdependencies

Not applicable.

1.4.2 Software Usage Restrictions

Not applicable.

1.4.3 Memory Provisioning

Not applicable.

1.5 Real Time Impact

Not applicable.

2.0 ECM143 - Network Junctor Pattern Update

2.1 Overview

2.2 Hardware Provisioning

2.2.1 Hardware Usage Restrictions

Not applicable.

2.2.2 Hardware Dependencies

Not applicable.

2.2.2.1 P and C Side Port Requirements

Not applicable

2.2.2.2 DMS BUS Port Requirements

Not applicable

2.2.2.3 Circuits Per Card

Not applicable

2.2.2.4 Discrimination Numbering

Not applicable

2.2.3 Provisioning Considerations

Not applicable

2.2.4 Office Layout Information

Not applicable.

2.2.5 Traffic Tables

Not applicable.

2.3 Product/System Specification

2.3.1 Physical Characteristics

Not applicable.

2.3.2 EMI/Earthquake Information

Not applicable.

2.3.3 Sparing Information

Not applicable.

2.3.4 Power Feed and Fusing Requirements

Not applicable

2.3.5 Current Drain Information

Not applicable

2.4 Software Provisioning

For NTX software packages to PLC/SOC mappings for CSP02 and beyond refer to ECM552 - Mapping of NTX/NTG Package to PCL/NCL/Option.

2.4.1 Required Software Packages and Interdependencies

Not applicable.

2.4.2 Software Usage Restrictions

Not applicable.

2.4.3 Memory Provisioning

Not applicable.

2.5 Real Time Impact

Not applicable.

RELEASE 06.03
13 July 1998

3.0 ECM191 - Double Shelf Network Equipment Frame (DSNE)

3.1 Overview

The DSNE frame packages one network plane (64 ports) on a single shelf rather than two shelves as per the existing NETC frame, and therefore, permits two complete networks per plane in a single bay, doubling the existing density.

Figure 1 on page 2-6 illustrates the nomenclature for the first version of the network, i.e. NT0X48 series. One network module (one network plane) requires one frame.

Figure 1 on page 2-6 also illustrates the current network (NETC NT5X13AA/BA) nomenclature. This network has both planes within one frame.

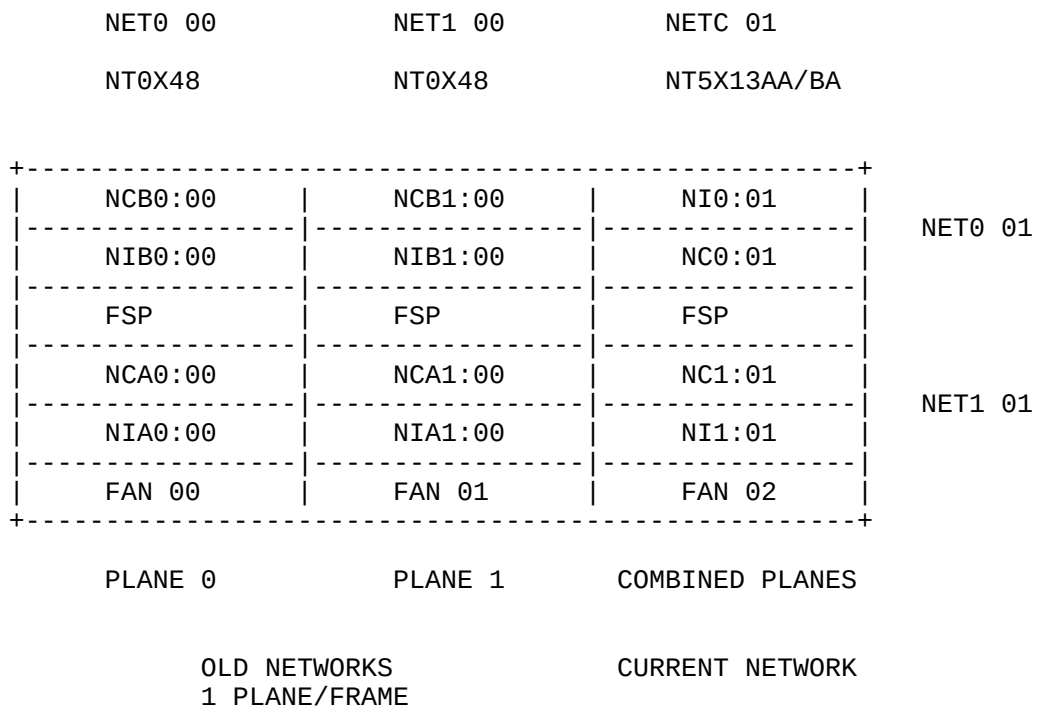
Figure 2 on page 2-7 illustrates the network nomenclature for the new network (DSNE NT8X10AA) having one network module (one network plane) in one shelf.

As can be seen on Figure 1 on page 2-6 and Figure 2 on page 2-7, NET0 XX and NET1 XX remain the network module (i.e. one network plane).

As shown on Figure 1 on page 2-6 and Figure 2 on page 2-7, in an office having new and old networks, the DSNE discrimination number is contiguous to the old network frames.

The Network Common Circuit Packs will provide for the network module on the DSNE frame as the DTC Common Circuit Packs provides for the DTC module.

The Power Converter (NT2X70AF) is now provisionable by the NT8X11AD and NT8X11BB Common Packfills.

**Figure 1. FUNCTIONAL NAMES FOR OLD & CURRENT NETWORK MODULES**FRAMES

NET0	NETWORK FRAME PLANE 0	FUNCTIONAL NAME FOR NETWORK MODULE
NET1	NETWORK FRAME PLANE 1	
NETC	NETWORK FRAME COMBINED PLANE 0 & 1 CONTAINS 1 NETWORK MODULE	

SHELVES

NCB0	NETWORK CROSSPOINT B PLANE 0
NCB1	NETWORK CROSSPOINT B PLANE 1
NC0	NETWORK CROSSPOINT A & B PLANE 0
NI0	NETWORK INTERFACE A & B PLANE 0

RELEASE 06.03
13 July 1998

DSNE 02

NT8X10AA

NET0 03	FRAME DSNE = Double Shelf Network Equipment
NET0 02	Shelf/Module NET0 = Network Plane 0
FSP	Shelf/Module NET1 = Network Plane 1
NET1 03	NETWORK COMMON CP
NET1 02	DSNE contains one or two network modules (both planes)
FAN 03	

NEW NETWORK

Figure 2. FUNCTIONAL NAMES FOR THE NEW NETWORK

The DSNE frame will replace the existing Network Equipment Frame Combined, NETC, NT5X13AA/BA.

3.1.1 Hardware Provisioning

3.1.2 Hardware Usage Restrictions

NOTE: Due to several base restrictions, DSNE should not be used for initial office configurations. For initial offices, ENET (either the 64K or 128K cabinets) should be the choice based on economics and greater throughput for data, resulting in a significant operations and capital savings for the operating company.

3.1.3 Hardware Dependencies

Provide two (2) Network Junctor Connecting Panels, NT0X18DD per network module (i.e. one per network plane) of DSNE version. The NJC Panel, NT0X18DD, mounts on the Digital Network Interconnecting (DNI) Frame, NT0X18CB.

Provide two (2) Network Speech Link (NSL) Panels, NT0X56BB, for each network module (i.e. one per network plane). On a fully equipped DSNE frame, provide four (4) NSL Panels.

RELEASE 06.03
13 July 1998

When adding DSNE frames to an existing office equipped with NT5X13 Network frames, be sure to update the NT5X13 network frames to include additional Network Serial Port I/F CPs (NT3X72) and NT3X73/86 CPs as required per Engineering Manual sections on the NT5X13AA and NT5X13BA.

3.1.3.1 P and C Side Port Requirements

Not Applicable

3.1.3.2 DMS BUS Port Requirements

Not Applicable

3.1.3.3 Circuits Per Card

Not Applicable

3.1.3.4 Discrimination Numbering

Not Applicable

3.1.4 Provisioning Considerations

3.1.4.1 Refurbished DSN Provisioning

| Three new hardware codes have been added to those already available
| for the DSN line. A refurbished DSNE which contains both planes
| of a single network can be ordered (NTZZ07AD).

| A Refurbished DSNE module can be added to this DSNE to fill the
| second provisionable plane (NTZZ07AG) or this module can be added
| to an existing DSNE that is in an office.

| A set of DSN faceplates which will replace the cards in a module
| completes the set, the order code is NTZZ07AH.

3.1.4.2 Power Converter Upgrade

The older power converters have been manufacturer discontinued, all applicable shelves should be provisioned with the NT2X70AF Power Converter.

3.1.4.3 Network Common Circuit Packs

For domestic applications, one Network Common Circuit Packs (Domestic), NT8X11AD, will contain the always provided circuit packs

RELEASE 06.03
13 July 1998

required by one network (i.e. both planes of the network on the DSNE frame).

For international applications, one Network Common Circuit Packs (International), NT8X11BB, will contain the always provided circuit packs required by one network (i.e. both planes of the network on the DSNE frame).

A maximum of two NT8X11AD/BB can be provided per DSNE frame.

3.1.4.4 DMS-Core and ISDN Applications

To accommodate future applications of DMS-Core and ISDN for both domestic and international offices, the following circuit packs have been made provisionable. They must be provided in addition to the Network Common Circuit Packs (i.e. NT8X11AD/BB).

- NT3X75BA - Non ISDN/ISDN Applications
- *NT3X74BA - Non DMS-Core Applications
- *NT3X74BB - DMS-Core Applications
- NT3X76AA - Non DMS-Core Applications (Manufacturer Discontinued)
- NT3X76AC - DMS-Core Applications

* Rating Change Pending; provision the NT3X74BB Circuit Pack for all new applications. Existing offices with the NT3X74BA CP provisioned do not have to retrofit to the "BB" CP unless interfacing a DMS-Core.

3.1.4.5 Network Port Circuit Pack, NT8X12AA

These provisionable NT8X12AA cards are over and above the NT8X12AA cards provided by Network Common Circuit Packs, NT8X11AD.

No NT8X12AA CPs are required on the DSNE frame when only one network module per plane is required and no DNI is required.

When the office is equipped with only two Network Modules per plane in a single DSNE frame and non junctored at the DNI (i.e. no DNI is required), then four NT8X12AA CPs are required per each network module (both planes).

When the office is equipped with only two Network Modules per plane in a single DSNE frame junctored at the DNI (i.e. DNI is required), then four NT8X12AA CPs are required per each network module (both planes).

When the office is equipped with three or more Network Modules junctored at the DNI (i.e. DNI is required), then eight NT8X12AA CPs are required per each network module (both planes).

For an office which has only two (2) network modules consisting of one network of NETC version (NT5X13__) and one network of DSNE

RELEASE 06.03
13 July 1998

version (NT8X10__), then a DNI is always required and four NT8X12AA CPs are required per network module (DSNE version).

Network Junctor Patterns

The network junctor patterns for the network module housed on the DSNE frame is the same as the network junctor patterns for the network module housed on the NETC frame in all cases except three.

One exception occurs when there are only two (2) network modules per plane in the office and these network modules are housed on the DSNE frame. The pattern for this exception is JCT2DSN. It does not matter whether the DNI frame is used or not. This network junctor pattern is shown as a file called Standard JCT2DSN and resides on the CADES production library.

The second exception occurs when one (1) NETC and one (1) DSN are in the office. The pattern for this exception is JCT1N1D. A DNI frame is always required. This network junctor pattern is shown as a file called Standard JCT1N1D and resides on the CADES production library.

The third exception occurs when one (1) NT0X48 network and one DSN are in the office. The pattern for this exception is JCT101D. A DNI frame is required. This pattern is shown as a file called Standard JCT101D on the CADES production library.

Network Junctor Patch Cords

When there are three (3) or more networks in the office, the DNIPC Patch Cord Program will provide patch cords for the DSN (NT8X10AA) in the same manner as for the NETC (NT5X13) with the following exception:

For NT5X13, when 3,4, or 5 networks are required in the office, patch cords are not required for PARALLEL INTRA network junctors. A DNI frame is always required for 3 or more networks.

However, for NT8X10AA, when 3,4, or 5 networks are required in the office, patch cords are required for all network junctors in the NT8X10AA (i.e. whether INTRA or INTER). A DNI frame is always required for 3 or more networks.

For any type of network (i.e. NT0X48, NT5X13, NT8X10AA), when six (6) or more networks are required in the office, patch cords are required for all network junctors (i.e. whether INTRA or INTER). A DNI frame is always required.

RELEASE 06.03
13 July 1998

3.1.4.6 Standard JCT1N

Network junctor pattern, Standard JCT1N, is the same pattern for both NT5X13 and NT8X10AA when there is only one network in the office.

For NT5X13, since there are only PARALLEL INTRA network junctors, patch cords are not required in this case.

However, for NT8X10AA, when only one Network Module per plane in a single DSNE frame is non-junctored at the DNI frame, although patch cords are not required, Cable Assembly, NT8X1104, must be provided as shown in Engineering Manual Section on the NT8X10AA Frame.

3.1.4.7 Standard JCT2DSN

Network junctor pattern, Standard JCT2DSN, is the pattern for only two (2) networks in the office and these networks are housed on the DSNE frame.

In the case where two (2) Network Modules per plane in a single DSNE frame are non-junctored at the DNI, although patch cords are not required, Cable Assemblies, NT8X1104, NT8X1001, and NT8X1002, must be provided as shown in Engineering Manual Section on the NT8X10AA Frame.

In the case where the two (2) Network Modules per plane in a single DSNE frame are junctored at the DNI, patch cords are required for INTER junctors (i.e. from network 0 to network 1). These patch cords will be provided by the DNIPC program. Also provide Cable Assembly NT8X1104 for INTRA junctor requirements (i.e. from Network 0 to 0 and from Network 1 to 1) as shown in Engineering Manual Section on the NT8X10AA Frame.

3.1.4.8 Standard JCT1N1D

Network junctor pattern, Standard JCT1N1D, is the pattern for one (1) NETC and one (1) DSN in the office. The NETC is the first network and the DSN is the second network in the office (i.e. NETC 00, DSNE 01).

A DNI frame is always required.

For NETC, patch cords are not required for INTRA network junctors.

For the DSN, although patch cords are not required for the INTRA network junctors, Cable Assembly, NT8X1104, must be provided as shown in Engineering Manual Section on the NT8X10AA Frame.

Patch cords are required for the SERIAL INTER network junctors (i.e. network junctors from NETC to DSN).

RELEASE 06.03
13 July 1998

3.1.4.9 Standard JCT101D

Network junctor pattern, Standard JCT101D, is the pattern for one () NT0X48 network and one (1) DSN in the office. The NT0X48 is the first network and the DSN is the second network (i.e. NET0 00 & NET1 00, DSNE 01).

A DNI frame is always required.

For the NT0X48 network, patch cords are always required for both INTRA and INTER network junctors.

For the DSN, although patch cords are not required for the INTRA network junctors, Cable Assembly, NT8X1104, must be provided as shown in Engineering Manual Section on the NT8X10AA Frame.

Patch cords are required for the SERIAL INTER network junctors (i.e. network junctors from NT0X48 to DSN).

3.1.4.10 Standard JCT101N

Network junctor pattern, Standard JCT101N, is the pattern for one (1) NT0X48 network and one (1) NETC in the office. The NT0X48 network is the first network and the NETC is the second network in the office.

A DNI frame is always required.

For the NT0X48 network, patch cords are always required for both INTRA and INTER network junctors.

For NETC, patch cords are not required for INTRA network junctors. They are required for INTER network junctors.

Patch cords are required for the INTER (SERIAL) network junctors (i.e. network junctors from NT0X48 to NETC).

3.1.5 Office Layout Information

Not Applicable

3.2 Traffic Tables

The traffic criteria and considerations which apply to the existing NETC frame, NT5X13AA, are also applicable to the DSNE frame, NT8X10AA.

Attached are the following tables:

1. Figure 3 on page 2-13 DMS-100 Local Network Capacities Two Way CCS per Network Module

RELEASE 06.03
13 July 1998

2. Figure 4 on page 2-14 DMS-200 & DMS-100/200, Toll & Local/Toll
Network Capacities Two Way CCS per Network Module

The above traffic figures apply to the network module of NETC
version (NT5X13__) as well as to the network module of DSNE version
(NT8X10__).

No. of NMs	BLOCKING		No. of NMs	BLOCKING	
	ABSBH 0.1% IML	HDBH 1% IML		ABSBH 0.1% IML	HDBH 1% IML
1	68000	68700	17	58500	64300
2	67400	68600	18	57100	63200
3	66400	68400	19	57700	62900
4	66100	68100	20	58900	63400
5	65100	67700	21	60400	64400
6	64200	67300	22	58700	64100
7	64300	67100	23	54500	62800
8	64300	67100	24	52200	61400
9	63500	66600	25	51900	60200
10	62100	65900	26	52400	59600
11	62000	66100	27	53200	59600
12	61300	65300	28	54300	60000
13	62000	65900	29	55400	60600
14	59600	64700	30	56600	61500
15	60300	64500	31	57700	62400
16	62100	65600	32	58900	63400

Figure 3. DMS-100 LOCAL NETWORK CAPACITIES TWO WAY CCS PER NETWORK MODULE
TABLE

RELEASE 06.03
13 July 1998

No. of NMs	BLOCKING		No. of NMs	BLOCKING	
	10HDBH	.5% OML		10HDBH	.5% OML
1	68400	68900	17	55800	63000
2	68200	68800	18	55000	61300
3	67200	68700	19	56100	61200
4	66900	68400	20	57800	62100
5	65800	67900	21	59700	63600
6	64800	67400	22	55700	62800
7	64800	67100	23	50000	60400
8	64900	67100	24	49000	58100
9	63800	66500	25	49300	56800
10	61900	65500	26	50100	56600
11	61500	65700	27	51100	57000
12	60800	64600	28	52300	57800
13	61700	65500	29	53600	58700
14	58200	63500	30	54900	59800
15	59500	63600	31	56200	61000
16	61900	65200	32	57600	62200

Figure 4. DMS-200 & DMS-100/200 TOLL & LOCAL/TOLL NETWORK CAPACITIES TWO WAY CCS PER NETWORK MODULE TABLE

3.3 Product/System Specification

3.3.1 Physical Characteristics

3.3.1.1 Power/Heat Dissipation

150 watts per shelf

300 watts per network module (both planes)

3.3.2 EMI/Earthquake Information

3.3.3 Sparing Information

Standard sparing algorithms shall apply

3.3.4 Power Feed and Fusing Requirements

Four 10 amp fuses are required at the PDC panel (i.e. two 10 amp fuses for A feed and two 10 amp fuses for B feed) for each DSNE frame.

3.3.5 Current Drain Information

3.50 AMPS per shelf

7.0 AMPS per network module (both planes)

3.4 Software Provisioning

For NTX software packages to PLC/SOC mappings for CSP02 and beyond refer to ECM552 - Mapping of NTX/NTG Package to PCL/NCL/Option.

3.4.1 Required Software Packages and Interdependencies

Not Applicable

3.4.2 Software Usage Restrictions

Not Applicable

3.4.3 Memory Provisioning

Not Applicable

3.5 Real Time Impact

Not Applicable

RELEASE 06.03
13 July 1998

4.0 ECM311 - Redistribution of Network Modules

4.1 Overview

The new vintage of network modules (NT5X13/NT8X10) have the capability of assigning transmission pads in software data tables. These pads allow the insertion of gain or loss onto a network connection. For old network modules (NT0X48) a set of fixed transmission pads were used for a network connection.

If Peripheral modules are redistributed from old networks to new networks the amount of loss insertion doubles resulting in poor transmission quality.

To avoid poor transmission on ID trunks, when network modules are redistributed, the following rules for redistribution should be adhered to:

- 1) Existing TM, DCM, DTC, LTC assigned to NT0X48 should only be redistributed over NT0X48 networks.
- 2) All other peripherals and additional TM, DCM, DTC, LTC should be distributed to any network module in the office.
- 3) Existing TM, DCM, DTC, LTC assigned to NT5X13/NT8X10 network can only be redistributed over NT5X13/NT8X10 networks.
- 4) The above rules should be adhered to, provided no more than one messaging link and 50% of speech links are on one network.

4.2 Hardware Provisioning

4.2.1 Hardware Usage Restrictions

Not applicable.

4.2.2 Hardware Dependencies

Not applicable.

4.2.2.1 P and C Side Port Requirements

Not applicable.

4.2.2.2 DMS BUS Port Requirements

Not applicable

4.2.2.3 Circuits Per Card

Not applicable.

4.2.2.4 Discrimination Numbering

Not applicable.

4.2.3 Provisioning Considerations

Not applicable.

4.2.4 Office Layout Information

Not applicable.

4.2.5 Traffic Tables

Not applicable.

4.3 Product/System Specification

4.3.1 Physical Characteristics

Not applicable.

4.3.2 EMI/Earthquake Information

Not applicable.

4.3.3 Sparing Information

Not applicable.

4.3.4 Power Feed and Fusing Requirements

Not applicable.

4.3.5 Current Drain Information

Not applicable.

4.4 Software Provisioning

For NTX software packages to PLC/SOC mappings for CSP02 and beyond refer to ECM552 - Mapping of NTX/NTG Package to PCL/NCL/Option.

4.4.1 Required Software Packages and Interdependencies

Not applicable.

4.4.2 Software Usage Restrictions

Not applicable.

4.4.3 Memory Provisioning

Not applicable.

4.5 Real Time Impact

Not applicable.

5.0 ECM508 - Network Port Spread

5.1 Overview

This document provides rules for balancing ports of peripheral modules across all non-ENET networks in both initial and extension offices.

The non-ENET networks are:

NT8X10AA Double Shelf Network Equipment Frame

NT5X13AA/BA Network Frame Planes Combined (retired)

NT0X48AA/AG Network Frame - Full (MD'd)

NT0X48AB/AH Network Frame - Half (MD'd)

NT0X48AC/AJ Network Frame - Quarter (MD'd)

5.2 Hardware Provisioning

5.2.1 Hardware Usage Restrictions

Not applicable.

5.2.2 Hardware Dependencies

Not applicable.

5.2.2.1 P and C Side Port Requirements

5.2.2.2 DMS BUS Port Requirements

5.2.2.3 Circuits Per Card

5.2.2.4 Discrimination Numbering

5.2.3 Provisioning Considerations

1. BALANCE the ports of each individual peripheral across all networks and network subgroups (NSGs).
2. BALANCE the total number of ports for each peripheral type across all networks and NSGs.
3. BALANCE the total number of MESSAGE PORTS across all networks and NSGs.
4. BALANCE the total number of MESSAGE PORTS for each peripheral type across all networks and NSGs.

RELEASE 06.03
13 July 1998

5. The two MESSAGE PORTS of an XPM must be on different networks in offices with more than one network, or on different NSGs in offices with only one network.
6. The MESSAGE PORTS of the two LM bays in the same LME must be on different networks in offices with more than one network, or on different NSGs in offices with only one network.
7. If the office has spare ports, spread the spare ports between the NSGs with DRA/EDRA MTMs, to a maximum of 2 spare ports per NSG with a DRA/EDRA. BALANCE the remaining spare ports across all networks and NSGs.

Note: DRAs (or any other circuit which employs Network Broadcast) can magnify the traffic on the C-side of the NM. See DRAM Network Deloading Table in NTP 297-1001-450.

8. BALANCE A and B powered ports across all networks and NSGs on initial jobs.

Consider the following additional rules for PM redistributions on extensions:

9. Minimize port moves on an extension.
10. If the links of an MSB7 (NT6X32) are already BALANCED, then its links must not be moved.

Note: Because of nailed up connections, MSB7 links are difficult to move without traffic interruption. Avoid moving them.

11. If the links of an MSB6 (NT6X07) are already BALANCED, then its links must not be moved.

Note: Because of nailed up connections, MSB6 links are difficult to move without traffic interruption. Avoid moving them.

12. When balancing MESSAGE PORTS, it is preferred to only move MESSAGE PORTS of XPMs. Avoid moving MESSAGE PORTS for the purpose of balancing other port types.

Note: Speech links on XPMs require much less installer effort to move.

13. Attempt to BALANCE A and B powered ports across all networks and NSGs, but do not move any port solely for the purpose of balancing A and B powers.

RELEASE 06.03
13 July 1998

Note: One plane of the network is A powered and the other is B powered. If one complete power feed fails, it doesn't matter what the spread of failed PMs is across the networks. A spread of powers is not a problem on initial offices, but on extensions it is not desirable to introduce extra moves to balance powers.

Note to software writer: This may be easier to implement using a balancing criterion of, for example, 10.

14. When all other rules have been followed, and an equal choice still exists between a number of links, then it is preferable to move a link on a PM which already has other links being moved, rather than moving a link on a PM that has not yet been involved in the PM redistribution.

15. Secondary to Rule 14, it is preferred to move an XPM speech link rather than other link types.

Note: In some cases a PM has to be "busied" to be worked on. Thus, it is best to minimize the number of PMs to be worked on.

16. The port spreading program provides a user interface which allows him to specify specific links which he prefers not to move. The port spreading program will then only relocate these links if it is absolutely necessary to reach BALANCE, subject to the above rules.

Note: Nailed up connections as specified in customer tables (IPML, Speccon etc.) are difficult to move without causing an interruption of service. This user interface will give the spec writer an opportunity to avoid such moves.

17. If the links of an ISDN Peripheral (residing in frame NT6X01AB) are already BALANCED, then its links must not be moved.

Note: ISDN links may ONLY be relocated with service interruption.

Note: The software written to implement Rules 17, 10, and 11 (restricting unnecessary moves for difficult-to-move links) should be flexible enough to accept new PECs as they are identified (i.e., Streamline may create some new PECs for repackaging of existing products).

RELEASE 06.03
13 July 1998

The word "BALANCED" as used in the above rules means the following:

(i) On Initials:

The network/NSG with the most number of ports minus the network/NSG with the least number of ports is less than or equal to one (1).

(ii) On Extensions:

The network/NSG with the most number of ports minus the network/NSG with the least number of ports is less than or equal to:

- two () for speech ports
- one () for MESSAGE PORTS
- one () for OAUs, MTMs (controlling and standby alarms)
- one () for DRA/EDRA (circuits which employ Network Broadcast)

Note: On initials there is no problem to balance an office within 1. However, on extensions, every port moved costs NT and the Customer in installation hours. The idea of reducing the balancing on extensions to within two ports is to significantly reduce the number of moves. This will not reduce the redundancy or operation of the office significantly because if there is a failure of an NSG or Network in one plane, the other plane is the main provision for redundancy.

The only case where balancing across NSGs has an effect on operation is when an NSG on an 0X48 is fully provisioned. Time switching is performed more effectively if the NSG is not full. However, even if they are full, operation is within design constraints of the network. Therefore this does not hinder us from using a balancing criterion of 2.

Series 1 or first generation peripherals have a single message channel on Port 0 Channel 0.

Series II or XPM or second generation peripherals have two messaging channels to the network for reliability; i.e., XPM message channels are Port 0 Channel 0 and Port 2 Channel 0.

5.2.4 Office Layout Information

Not applicable.

5.2.5 Traffic Tables

Not applicable.

5.3 Product/System Specification

5.3.1 Physical Characteristics

Not applicable.

5.3.2 EMI/Earthquake Information

Not applicable.

5.3.3 Sparing Information

Not applicable.

5.3.4 Power Feed and Fusing Requirements

5.3.5 Current Drain Information

5.4 Software Provisioning

For NTX software packages to PLC/SOC mappings for CSP02 and beyond refer to ECM552 - Mapping of NTX/NTG Package to PCL/NCL/Option.

5.4.1 Required Software Packages and Interdependencies

Not applicable.

5.4.2 Software Usage Restrictions

Not applicable.

5.4.3 Memory Provisioning

Not applicable.

5.5 Real Time Impact

Not applicable.

RELEASE 06.03
13 July 1998

6.0 ECM604 - Building Block Engineering - DSNE

6.1 Overview

The purpose of this ECM is to document the provisioning of the DSNE by the use of Building Block Engineering techniques.

The Double Shelf Network building block concept deals with a higher level of Product Engineering Code (PEC) ordering and simplifies the engineering process. The DSNE is the switching hub of the DMS-100F switching system and a network has 1920 ports or 64 DS-30 ports providing connections through the DMS-100. The DSNE frame contains up to two (2) Networks and comes equipped with the Frame Supervisory Panel, DC Cooling Unit, and Network module shelf assembly. The Network Common Circuit Packs (CP) and Double Shelf Network assembly will be provided on an as need basis.

NTZZ07AA (Double Shelf Network Equipment Frame)

The NTZZ07AA includes the frame and one (1) Network Module shelf assembly, Frame Supervisory Panel, and DC Cooling Unit. The frame is also ISG compliant and contains earthquake framework. Options to NTZZ07AA include an additional Network Shelf Assembly, up to two (2) Network Common CP, and interface circuit packs to either the NT-40 or SuperNode.

NTZZ07BA (Network Common Circuit Packs) The NTZZ07BA contains the common circuit packs required for a Network which is housed in the DSNE frame. Each NTZZ07BA contains Network Port CP's, Test Code cp's, Network Control Processor, Network P-side Message Processor, and Power Converter. This PEC provides a full complement of network ports circuit packs which allows junctoring at the DNI.

NTZZ07QA (Double Shelf Network W/O Network Ports) The NTZZ07QA contains the common circuit packs required for a Network which is housed in the DSNE frame. Each NTZZ07QA contains Test Code cp's, Network Control Processor, Network P-side Message Processor, and Power Converter. Network Port circuit packs are provisionable.

NTZZ41PA (International Double Shelf Network) The NTZZ41PA contains the common circuit packs required for a Network which is housed in the DSNE frame. Each NTZZ41PA contains Test Code cp's, Network Control Processor, Network P-side Message Processor, and Power Converter. This PEC provides a full complement of network port circuit packs which allows junctoring at the DNI.

NTZZ07CA NT-40 Network Clock Interface - MD - Retired

The NTZZ07CA contains the circuit pack to provide the interface from the DSNE to the NT-40. Each NTZZ07CA contains two (2) CP's (one (1) per Network Plane) and designation labels.

RELEASE 06.03
13 July 1998

NTZZ07DA SuperNode Network Clock Interface

The NTZZ07DA contains the circuit pack to provide the interface from the DSNE to the SuperNode. Each NTZZ07DA contains two (2) CP's (one (1) per Network Plane) and designation labels.

NTZZ07EA (Double Shelf Network Equipment Frame (US))

The NTZZ07EA includes the frame and one (1) Network Module shelf assembly, Frame Supervisory Panel, and DC Cooling Unit. The frame is also ISG compliant. Options to NTZZ07EA include an additional Network Shelf Assembly, up to two (2) Network Common CP, and interface circuit packs to either the NT-40 or Supernode. This frame is for US applications only.

NTZZ07MA (Network Port CP)

The NTZZ07MA includes a quantity of four network port circuit packs. This PEC is used to equip a NTZZ07NA DSN Common CP for a two DSN module only (non-DNI) office. This PEC is also used to extend an office with only one or two DSN modules not junctored at the DNI. Please note that offices with three or more network modules of the same vintage, or two or more network modules of different vintages must be junctored at the DNI.

NTZZ07NA (DSN Common CP)

The NTZZ07NA does not include any network port circuit packs. This PEC can be used to provide a single DSN module in a non-DNI office or two DSN modules in a non-DNI office when equipped with NTZZ07MA.

NTZZ07PA (Earthquake DSNE Frame (US))

The NTZZ07PA includes the frame and one (1) Network Module shelf assembly, Frame Supervisory Panel, and DC Cooling Unit. The frame is also ISG compliant. Options to NTZZ07EA include an additional Network Shelf Assembly, up to two (2) Network Common CP, and interface circuit packs to either the NT-40 or Supernode. This frame is for US earthquake applications only.

6.2 Hardware Provisioning

6.2.1 Hardware Usage Restrictions

Not Applicable.

6.2.2 Hardware Dependencies

Not Applicable.

6.2.2.1 P and C Side Port Requirements

Not applicable

6.2.2.2 DMS BUS Port Requirements

Not applicable

6.2.2.3 Circuits Per Card

Not applicable

6.2.2.4 Discrimination Numbering

Not applicable

RELEASE 06.03
13 July 1998

6.2.3 Provisioning Considerations

QUESTIONNAIRE

(A) Will the DSNE interface to SuperNode? (yes/no) _____

(B) REQUIRED NETWORK MODULES (Physical):

(The Customer is only required to fill in the total SPARE PORTS. All other quantities have been calculated in their respective documents.)

PERIPHERAL MODULE	QTY	PORTS/ UNIT	TOTAL PORTS	NOTES
16 PORT LGC - PERIPHERAL PORTS				
20 PORT LGC - PERIPHERAL PORTS				
SUBSCRIBER MODULE FOR SLC-96 (SMS)	x	4		
SMR (SP LINKS PER SMR _____ X 24)/ 30		XXXX		
SMU (SP LINKS PER SMU _____ X 24)/ 30		XXXX		
MESSAGE SWITCH & BUFFER FR (MS6E)				
TOPS MESSAGE SWITCH				
MESSAGE SIGNALLING 7 EQUIP (MS7E)	X	3		
DIGITAL CARRIER MODULE (DCM)	X	4		
DIGITAL TRUNK CARRIER (DTC)	X	16		
LTC - PERIPHERAL PORTS				
PAGE TOTALS		XXXX		XXXX

Figure 5. REQUIRED NETWORK MODULES (Physical)

RELEASE 06.03
13 July 1998

PERIPHERAL MODULE	QTY	PORTS/ UNIT	TOTAL PORTS	NOTES
TOTALS FROM PRECEEDING PAGE	XXX	XXXX		XXXX
MAINTENANCE TRUNK MODULE (MTM, DRA MTM)		X 1		
TRUNK MODULE (TM)		X 1		
20 PORT IAC - PRIMARY RATE ACCESS				
COMMON PERIPHERAL EQUIP. - ISDN				
20 PORT IAC - PERIPHERAL PORTS				
FIBER ISDN I/F - HLE				
SPARE PORTS	XXX	XXXX		XXXX
TOTAL PORTS FOR ALL MODULES		XXXX		XXXX

Figure 6. REQUIRED NETWORK MODULES (Physical)

NOTE: Include ports to support wired capacity if required.

** Calculate requirements for each controller, round up,
and sum for TOTAL PORTS. (minimum 3 ports per controller)

(C) For U.S. offices, is earthquake protection
required? _____

CALCULATIONS

(NETWORK MODULES PER PLANE (Physical))

() Quantity of Network Module Common CP = _____
{TOTAL PORTS / 64}
(NTZZ07BA/NTZZ41PA or NTZZ07NA)

NTZZ07NA may be selected for non-DNI offices
of one or two network modules.

- () Quantity of DSNE frames = _____
{Item (1) / 2} Round up
NTZZ07AA
- () Quantity of Double Shelf Network Assemblies = _____
(NT8X11AB)
If Item (1) is Even no., {Enter Item (2)}
If Item (1) is Odd no., {Enter Item (2) - 1}
- (For DSNE frames equipped with two (2)
Network Modules.)
- (5) Quantity of SuperNode Interface Circuit Packs = _____
{Item (1) if question A is answered yes}
(NTZZ07DA)
- (6) Quantity of Filler Panels = _____
{Item ((2) - (3)) x 2}
(P0575239)
- (7) Quantity of Network Port CP _____
{If Item 1 = Qty 1 of NTZZ07NA then
NTZZ07MA = 0 else if Item 1 = Qty 2
NTZZ07NA then NTZZ07MA = 2. If Item 1
= any Qty NTZZ07BA then NTZZ07MA = 0.

6.2.4 Office Layout Information

Not Applicable.

6.2.5 Traffic Tables

Not Applicable.

6.3 Product/System Specification

Not Applicable.

6.3.1 Physical Characteristics

Not Applicable.

6.3.2 EMI/Earthquake Information

Not Applicable.

6.3.3 Sparing Information

Not Applicable.

6.3.4 Power Feed and Fusing Requirements

The following fuses and feeds are required:

Each shelf of DSNE requires a 10 amp fuse. Each shelf is connected alternately to the A and B feeds.

6.3.5 Current Drain Information

Current Drain for each DSNE shelf is 3.5 amps.

6.4 Software Provisioning

For NTX software packages to PLC/SOC mappings for CSP02 and beyond refer to ECM552 - Mapping of NTX/NTG Package to PCL/NCL/Option.

Not Applicable.

6.4.1 Required Software Packages and Interdependencies

Not Applicable.

6.4.2 Software Usage Restrictions

Not Applicable.

6.4.3 Memory Provisioning

Not Applicable.

6.5 Real Time Impact

Not Applicable.

RELEASE 06.03
13 July 1998

7.0 ECM627 - 128K Enhanced Network (Dual Cabinet ENET)

7.1 Overview

In this document ENET refers to the 128K Enhanced Network.

In the Junctored Network (JNET) system, each network module (NM) interfaces up to 64 DS-30 speech links. This equates to 2K channels per NM. That is,

$$64 \text{ Ports per NM} \times 32 \text{ Channels per port} = 2048 \text{ Channels}$$

The total channel capacity of junctored network system is

$$2K \times 32 \text{ NM} = 64K \text{ Channels or 2 way Peripheral Module access paths.}$$

(Rule: Minimum junctors required between two NM is 2.)
(64 junctors (ports) Divided by 2 junctors per NM = 32NM)

Theoretically 32K simultaneous 2 way paths could be set up across the network. The network modules have to be interconnected to achieve the desired network size. The channel delay through the network is variable dependent on the path, and access between one port to another may be blocked due to congestion in the network or on the junctors.

The Enhanced Network (ENET) is a single-stage junctor-less switching matrix that replaces the junctored network system. By comparison, a 128K Enhanced Network Cabinet (ENC) with four (4) Enhanced Network (ENET) shelves (i.e. one plane per cabinet) provides 128K channel access. This is nominally equivalent to twice the existing capacity of Junctored Network System (32 NM max). In ENET constant delay between any two ports on the matrix. Moreover, any port is insured access to any free ports by its associated cross-point. This makes blocking impossible.

In the junctored network system, speech links (PM-NET) and message links (NET-CMC, MS) utilize the DMS DS-30 format. This format consists of 32 PCM channels each 10 bits wide and operate at 2.56 M-bits/sec. Each 10 bit channel includes 8 data (speech) bits, one channel supervision bit and one parity bit.

With the introduction of the ENET - ENET to MS and XPM to ENET will utilize fiber medium. Fiber transmission links were first used in the DMS-S/N to connect the CM and MS. Each fiber link is the transmission equivalent of 16 DS-30 copper links in that there is a total of 512 channels in each. Sixteen DS-30 is the speech link complement of one XPM.

RELEASE 06.03
13 July 1998

Also with the introduction of ENET, there is a significant change in the way that the Message Switch (MS) is provisioned. MS ports and message channels are dedicated to specific peripherals. Message links are nailed up over cross-points for direct access from the DMS-Bus to the PM.

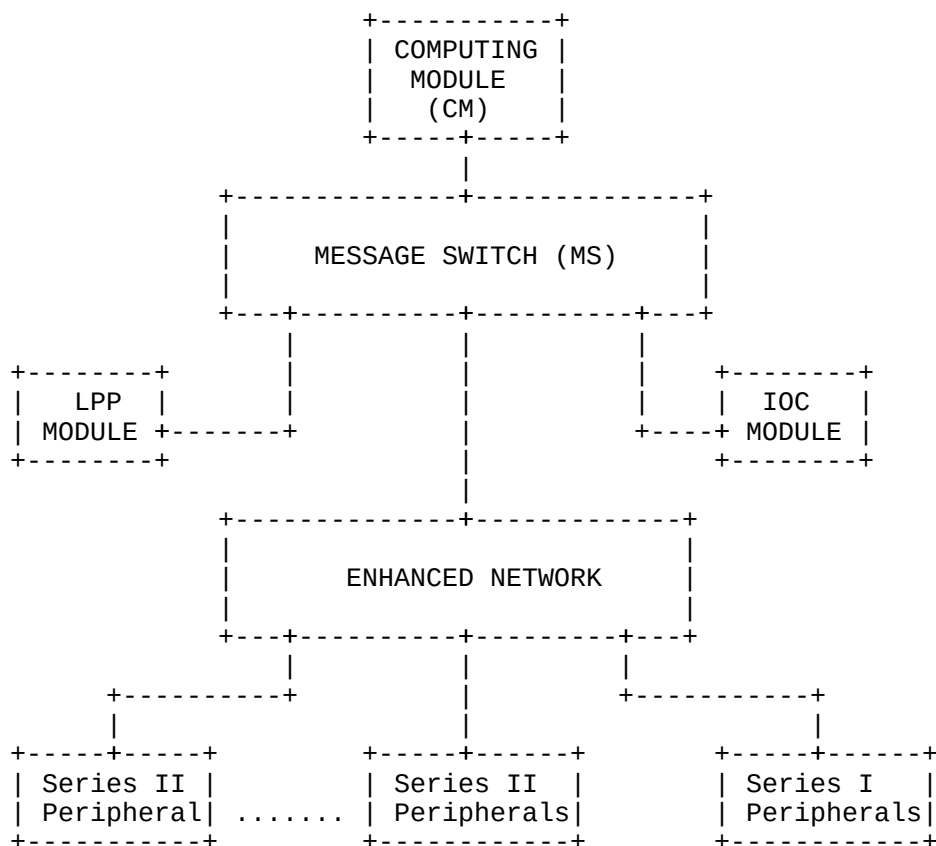


Figure 7. OVERVIEW OF THE ENHANCED NETWORK SYSTEM

Refer to Figure 7 for an overview for the ENET system.

The Series II Peripherals (or XPMs) are the following:

DOMESTIC: DTC, LGC, LTC, LCM, SMS, SMU, MSB7, DTCI, LGCI, LTCI

INTERNATIONAL:

The Series I Peripherals are the following:

DOMESTIC: DCM, DES, TM2/4/8, MTM, OAU, LM, DRA

RELEASE 06.03
13 July 1998

INTERNATIONAL: ITM2/4/8, IDRA

7.1.1.1 NETWORK ARCHITECTURE

Benefits derived from the non-blocking design of ENET is described in terms of Full Availability, Switched PCM, the Switching Matrix, Speech Link Interfaces, and Control Plus Messaging as follows:

- Full Availability
 - No traffic penalty for nailed up or wide-band connections.
 - No traffic balancing on speech links is necessary; port spreads are not required thus Speech Link Connector (SLC) Frames and Digital Network Interface (DNI) Frames are eliminated for this purpose.
 - No path search required since all possible paths are independent.
 - Dual plane redundancy is provided for improved reliability.
- SWITCHED PCM

Switching is performed on 2 K-channel PCM streams which are multiplexed from four converted DS-512 sources. Each DS-512 is derived either from a fiber speech link originating from a fiber XPM (FXPM) or from up to 16 copper speech links operating in the DS-30 format from conventional PMs.

- SWITCHING MATRIX
 - The basic building block of the switching element is a 16 K-channel (input) x 4 K-channel (output) matrix time switch. Four such units are combined on each Network Cross-Point CP to form a 16 K-channel x 16 K-channel time switch. These are one-way connections and two paths would be required for each two-way conversation.
 - The 16K PCM inputs to the time switch on each CP are derived as follows:

2K is multiplexed from four DS-512 streams then passed from the PB behind the cross point CP. This 2K PCM is also distributed to the cross point CP in the same slot on the other three shelves, when equipped, via the Vertical Bus (V-Bus).
 - 6K PCM are derived from the other three shelves when equipped via the upper and lower V-Bus.
 - 8K PCM are derived from the corresponding V-Bus array of the mate cross-point card in the same shelf.

RELEASE 06.03
13 July 1998

- The unswitched PCM distributed vertically between the shelves in the cabinet utilize the V-Bus (or Unswitched Bus). This bus is implemented via orderable local cables.
- Eight 2K switched outputs from 16 cross-point CP pairs on a shelf are combined in the backplane to form the Horizontal Bus (H-Bus) or (Switched Bus) and makes the shelf a 128K x 32K matrix. One switched PCM from the H-Bus is demultiplexed on each cross point CP into four DS-512 PCM streams and fed to the interface PB behind the CP.
- The four shelves on a single cabinet combine to form a 128K x 128K matrix. This configuration, contained in a single cabinet per plane, is nominally equivalent (terminations) to 64 NM per plane of the current design.
- Despite its 16K X 16K size, each new cross-point CP adds only one new 2K PCM input and output to the network.
- SPEECH LINK INTERFACES
 - Three basic types of paddleboard are available i.e. DS-30, DS-512. and DS-30/DS-512.
 - The DS-512 PB has four (4) DS-512 inputs (i.e. 0.5K Channels per input) which are utilized on fiber XPMs.
 - The DS-30 PB combines 16 DS-30 copper speech links which are utilized on Series I Peripherals and non fiber XPMs, but is now at MD status.
 - The DS-30/DS-512 PB is a newer peripheral interface paddle board to be used on the ENET shelves. This pack can interface 3 DS-512 fiber links and 16 DS-30 copper links. It combines the functionality of two existing packs. The NT9X40BA/40BB (4 DS-512) fully utilize the ENET's channel handling capacity. But, it does not provide copper links. On the other hand, the NT9X41BA (16 DS-30) pack does not fully utilize ENET's channel handling capacity (only 25% utilization of crosspoints). Using an NT9X45BA results in a 100% utilization of ENET crosspoints and providing both copper and fiber links. For example an ENET currently equipped with 4 NT9X41BAs and 3 NTX40BA/BBs requires 7 Crosspoints. This could be reconfigured with 4 NT9X45BAs and only 4 Crosspoints a savings of 3 Crosspoint cards.
- CONTROL & MESSAGING
 - Each ENET shelf is equipped with and controlled by a Motorola 68020 CPU. This processor, equipped with 4 M-bytes of memory, operates on downloaded SOS-based software. Control is directed by messages sent via the MS over fiber message links.

RELEASE 06.03
13 July 1998

- The ENET-to-MS message links now become multi-message channel facilities. The set of MS message port hardware associated with a given ENET shelf pair and the peripherals which it interfaces is referred to as a "MS Port Group". Each group consists of at least one (1) MS Port CP (NT9X17CA or DA) and associated PB. The cards of a port group occupy adjacent slots on the MS shelf.

One port group is required on each MS shelf to interface each ENET shelf. Thus, an office equipped with one pair (i.e. plane 0, 1) of ENET shelves would require four (4) port groups.

- A major deviation from the current NM practice is the method by which control messages are distributed to peripherals.
 - Peripherals connected to ENET shelves are assigned independent message ports on each MS, one (1) port for each message channel required.
 - The message channels are connected to the message ports via Nailed-Up connections in the interfacing ENET shelf and via the DS-512 message link extended between the ENET shelf and MS.
 - One (1) cross-point CP on each ENET shelf is reserved for message switching with 0.5K channels assigned to each MS link. The remaining 1K channels are not available for speech link access.
- The MS port requirements are greatly increased with the introduction of ENET making necessary the utilization of the MS 64 port CP (NT9X17DA), and the 128 Port CP (NT9X17CA). Both of these are used for ENET to MS connections. The MS 4 port CP (NT9X17AD) is still used for connection to the IOCs, NM, LPP, FLIS and CM.

7.2 Hardware Provisioning

7.2.1 Hardware Usage Restrictions

The following restriction apply to ENET H/W applications:

- The Enhanced Network must interface to a SuperNode (i.e. Message Switch & Computing Module). An NT-40 (i.e. Central Control Complex) will not support an Enhanced Network.
- The Enhanced Network will not interwork with any previous version of Network frames.
- The NT9X41BA has 16-Ports numbered 0-15. All ports except port #1 may be used for Voice or Messaging Links. Port #1 is valid

RELEASE 06.03
13 July 1998

for Voice Links only. This is a S/W restriction on the hardware.

- The NT9X45BA has 16 DS-30 ports numbered 0-15 and 3 DS-512 ports. All DS-30 ports except port #1 may be used for Voice or Messaging Links. Port #1 is valid for Voice Links only. This is a S/W restriction on the hardware.
- Application of the above restriction prohibits the assignments of the following Peripheral Module (PM) ports to Link #1 as follows:
 - Single link PMs (e.g. MTMs, TM8s, OAU's, etc.)
 - Port Zero of DCMs and LMs
 - Port Zero and Two of XPMs
- The MSB6, SMR, DTC6 are not ENET ready in that facilities to equip these units with enhanced messaging (NT6X69AC/MA) are not available. Therefore, offices equipped with these types of XPMs should not be considered for ENET interface.
- MS to ENET, ENET to FXPM Distance Restrictions are as follows:
 - MS-9X20BB To ENET-9X40BB
Length: 250ft (1,4), Variance: 25ft (3)
 - MS-9X20BC To ENET-9X40BB
Length: 250ft (1,4), Variance: 25ft (3)
 - MS-9X62BA To ENET-9X40BB
Length: 250ft (1,2), Variance: 25ft (3)
 - ENET-9X40BB To FXPM-6X40DA
Length: 1000m (4), Variance: 200ft
 - ENET-9X40BB To FXPM-6X40GA
Length: 1000m, Variance: 200ft
 - ENET-9X41BA to XPM/PM
Length: 750ft, Variance: 200ft
 - ENET-9X45BA to XPM/PM
Length: 600ft, Variance: 200ft
 - ENET-9X40DA to SPM
HCS Fiber Link
Length: 100ft.

NOTES:

1. Refer To ECM-626 For MS TO ENET Restrictions
2. Recommended length limit so that the received optical power is greater than -26dbm. This optical receive power is based on the jitter limit of the R94-Hybrid on the 9X20BB/BC and 9X40BB in loopback.

RELEASE 06.03
13 July 1998

3. The limits placed on the variation in cable length between either MS and any ENET shelf is required to maintain integrity of the ENET Vertical Busses.
4. This value is base on the link interface CPs having a R94-Hybrid on one end and a G64-Hybrid with a 5L78 Clock recovery hybrid on the other.

7.2.2 Hardware Dependencies

7.2.2.1 P and C Side Port Requirements

The ENET Worksheets calculates the Enhanced Network and all the major provisionable parts, including the MS Port requirements of the SuperNode.

Worksheet one calculates the cards and shelves on the ENET, while worksheet 2 calculates the MS port requirments on the SuperNode.

7.2.2.2 128K ENET Cabinet Worksheet 1

Section 1. Determine the copper peripheral ports:

		Ports times		Perphl. Qty.= Total
1.1	LM (2,3,4)	_____ x	_____	= _____
1.2	DCM/DCMR	4 x	_____	= _____
1.3	NIU	4 x	_____	= _____
1.4	SMS	_____ (3-16) x	_____	= _____
1.5	SMR	_____ (3-16) x	_____	= _____
1.6	Digital Echo Supp	3 x	_____	= _____
1.7	MSB7	3 x	_____	= _____
1.8	TM/MTM/DRAM	1 x	_____	= _____
1.9	EDRAM/CTM	1 x	_____	= _____
1.10	Copper spare ports needed		_____	
1.11	Subtotal of copper ports (Add Items 1.1 through 1.7 and 1.10)		_____	

RELEASE 06.03
13 July 1998

1.12 Open Copper Ports _____

1.13 Total Copper Ports: _____
Item 1.11 - Item 1.12)

Section 2. Determine the fiber peripheral ports:

2.1 LGC/LGCI _____

2.2 LTC/LTCI _____

2.3 SMU/SMUI _____

2.4 SMS _____

2.5 DTC/DTCI _____

2.6 SMA/SMA2 _____

| 2.7 SPM _____

2.8 Fiber spare ports required _____

2.9 Subtotal of fiber ports _____
Add Items 2.1 through 2.8

2.10 Open Fiber Ports _____

| 2.11 Total Fiber Ports: _____
(Item 2.9 - Item 2.10)

3. Interface Paddleboard Calculation

- 3.1 Multiport interface total _____
Divide the total copper ports by 16 if
multiport interfaces (SMS, SMR etc.)
are terminated.
(Item 1.13 / 16)
- 3.2 Single port interface total _____
Divide the single copper ports by 15 if using single
port cards such as MTM/EDRAM/DRAM/ISM
(Items 1.8 + 1.9) / 15 _____
(Result is qty required of NT9X45BA)
- 3.3 Quantity of Fiber Ports Available _____
Multiply items (3.1 + 3.2) x 3
- 3.4. Determine the number of Fiber Interface _____
Paddleboards required.:
| (Item 2.11 - (Item 3.1 + Item 3.2)) /4
(Result is qty required of NT9X40BB)
(Round up to next integer)
5. Type of Bulkhead required for the ENET shelves. _____
A. NT6506/6503 Fiber only
B. NT6520/6521 Up to 6 DS 30 type cards per shelf
C. NT6530/6531 Up to 14 DS 30 type cards per shelf
(Requires Speech Link Connector Bays)
D. NT8909 Not used in PCN.

RELEASE 06.03
13 July 1998

6. Quantity of ENET Shelves required

		Exist	Add	Total
6.1	Qty. of DS 512/DS30 PB placed on Shelf 0	_____	_____	_____
6.2	Qty. of DS 30 PB placed on Shelf 0	_____	_____	_____
6.3	Qty. of DS 512 PB placed on Shelf 0	_____	_____	_____
6.4	Qty of Paddleboards for this shelf Maximum of 15 PB per shelf for peripheral support.	_____		
6.5	Qty. of DS 512/DS30 PB placed on Shelf 1	_____	_____	_____
6.6	Qty. of DS DS 30 PB placed on Shelf 1	_____	_____	_____
6.7	Qty. of DS 512 PB placed on Shelf 1	_____	_____	_____
6.8	Qty of Paddleboards for this shelf. Maximum of 15 PB per shelf for peripheral support.	_____		
6.9	Qty. of DS 512/DS30 PB placed on Shelf 2	_____	_____	_____
6.10	Qty. of DS 30 PB placed on Shelf 2	_____	_____	_____
6.11	Qty. of DS 512 PB placed on Shelf 2	_____	_____	_____
6.12	Qty of Paddleboards for this shelf Maximum of 15 PB per shelf for peripheral support.	_____		
6.13	Qty. of DS 512/DS30 PB placed on Shelf 3	_____	_____	_____
6.14	Qty. of DS DS 30 PB placed on Shelf 3	_____	_____	_____
6.15	Qty. of DS 512 PB placed on Shelf 3	_____	_____	_____
6.16	Qty of Paddleboards for this shelf. Maximum of 15 PB per shelf for peripheral support.	_____		

7. Quantity of single plane ENET shelves required _____
Sum the number of shelves used by 6.1 thru 6.16
Min. number of shelves is 1, max is 4.
- 7.1 Quantity of dual plane ENET shelves required _____
Min. number of shelves is 2, max is 8.
(Item 7 x 2)
- 8 Quantity of ENET Support Cards required.
- 8.1 Quantity of +5Volt Power Supplies required. _____
(Item 7.1 x 2)
- 8.2 Quantity of -5Volt Power Supplies required. _____
(Item 7.1 x 2)
- 8.3 Quantity of CPU CP required. _____
(Item 7.1 x 1)
- 8.4 Quantity of Network Clock and Message CP required. _____
(Item 7.1 x 1)
- 8.5 Quantity of RTIF CP required. _____
(Item 7.1 x 1)
- 8.6 Quantity of Quad DS-512 Interface PB required. _____
(Item 7.1 x 1)

RELEASE 06.03
13 July 1998

- 9 Quantity of ENET I/F Paddleboard Cards required.
- 9.1 Quantity of DS 512/DS 30 PB required. _____
 (Item 3.3 x 2)
- 9.2 Quantity of DS 512 PB required. _____
 (Item 3.4 x 2)
- 1 Quantity of ENET Crosspoint Cards required.
- 1 .1 Quantity of Crosspoint CP required. _____
- 1 .2 Quantity of Crosspoint Termination CP required. _____
- 1 . Bulkhead Provisioning
- 1 .1 Quantity of Left Bulkheads required. _____
 (Item 7.1 x 1)
- 1 .2 Quantity of Right Bulkheads required. _____
 (Item 7.1 x 1)
- 1 . Auxilliary Cabinet Provisioning
- 1 .1 Quantity of CCTS cabinets required. _____
 Provide 2 cabinets for new offices.
- 1 .2 Quantity of SLC cabinets required. _____

RELEASE 06.03
13 July 1998

7.2.2.3 Message Switch Provisioning

The MS port requirements are determined by the quantity of ports required by the combination of all interface paddleboards on each ENET shelf. The MS port requirements are then duplicated because there are two MS shelves on the SuperNode. All calculations done on worksheet 2 will result in changes and additions to the MS shelves on the SuperNode.

Calculation of MS Port Card Requirements for Shelf 0

PPC x Qty PB equals PB Ports

- 1.1 Qty. DS30/DS512 I/F CP 22 X _____ = _____
- 1.2 Qty. DS30 I/F CP 22 X _____ = _____
- 1.3 Qty Quad Fiber I/F CP 8 X _____ = _____
- 1.4 Total quantity of ports required for Shelf 0 _____
- 1 5 Quantity of MS 128 Port CP required for Shelf 0 _____
From Table A in Reference manual (NT9X17CA)
- 1.6 Qty. of MS 64 Port CP required for Shelf 0 _____
From Table A (NT9X17DA)
- 1.7 Qty. of ENET MS Fiber I/F CP required for Shelf 0 _____
From Table A (NT9X20BC)
- 1.8 Quantity of MS Port Term. CP required for Shelf 0 _____
From Table A (NT9X25BA)

Calculation of MS Port Card Requirements for Shelf 1

PPC times Qty PB equals PB Ports

- 2.1 Qty. DS30/DS512 I/F CP 22 X _____ = _____
- 2.2 Qty. DS30 I/F CP 22 X _____ = _____
- 2.3 Qty Quad Fiber I/F CP 8 X _____ = _____
- 2.4 Total quantity of ports required for Shelf 1 _____
- 2.5 Quantity of MS 128 Port CP required for Shelf 1 _____
From Table A (NT9X17CA)
- 2.6 Quantity of MS 64 Port CP required for Shelf 1 _____
From Table A (NT9X17DA)
- 2.7 Qty. of ENET MS Fiber I/F CP required for Shelf 1 _____
From Table A (NT9X20BC)
- 2.8 Qty. of MS Port Term. CP required for Shelf 1 _____
From Table A (NT9X25BA)

Calculation of MS Port Card Requirements for Shelf 2

PPC times Qty PB equals PB Ports

2.9 Qty. DS30/DS512 I/F CP 22 X _____ = _____

2.10 Qty. DS30 I/F CP 22 X _____ = _____

2.11 Qty Quad Fiber I/F CP 8 X _____ = _____

2.12 Total quantity of ports required for Shelf 1 _____

2.13 Quantity of MS 128 Port CP required for Shelf 1 _____
From Table A (NT9X17CA)2.16 Quantity of MS 64 Port CP required for Shelf 1 _____
From Table A (NT9X17DA)2.15 Qty. of ENET MS Fiber I/F CP required for Shelf 1 _____
From Table A (NT9X20BC)2.16 Qty. of MS Port Term. CP required for Shelf 1 _____
From Table A (NT9X25BA)

Calculation of MS Port Card Requirements for Shelf 3

PPC times Qty PB equals PB Ports

2.17 Qty. DS30/DS512 I/F CP 22 X _____ = _____

2.18 Qty. DS30 I/F CP 22 X _____ = _____

2.19 Qty Quad Fiber I/F CP 8 X _____ = _____

2.20 Total quantity of ports required for Shelf 3 _____

2.21 Quantity of MS 128 Port CP required for Shelf 3 _____
From Table A (NT9X17CA)2.22 Quantity of MS 64 Port CP required for Shelf 3 _____
From Table A (NT9X17DA)2.23 Qty. of ENET MS Fiber I/F CP required for Shelf 3 _____
From Table A (NT9X20BC)2.24 Qty. of MS Port Term. CP required for Shelf 3 _____
From Table A (NT9X25BA)

RELEASE 06.03
13 July 1998

h id=EWRS635.ENET WORKSHEET REFERENCE SECTION

This section is intended to provide a short explanation for each entry in the ENET worksheets. The worksheets has been completely revised and rewritten to provide an easier interface to provisioning an ENET or to upgrading/adding port capacity to an existing ENET. h id=ermo635.Worksheet 1 Reference Manual

For initial offices enter the total or the sum of all of the peripherals in the office. For extension offices enter the delta or only the added peripherals that are being added at this time. Some of the peripherals as in the case of Line Modules, DCMs, MSB7s and SMRs will not be found in newer offices. Some of the peripherals are combined on one line but the total is the sum of all of these types in the office.

1. Section 1 defines all the copper based peripherals. Enter the peripheral quantity and multiply by the number of ports to determine the total copper port quantity.

1.1 Enter the quantity of Line Modules in this office. Line Modules used 2, 3 or 4 Ports to the network. If for some reason, an unusual office has a mixture of ports enter the entire port quantity in the total column. Note that LCMs terminate on LTCs or LGCs and therefore do not terminate on the network directly.

1.2 Enter the number of Digital Carrier Modules and Digital Carrier Modules Remote (DCM/DCMR) in this office.

1.3 Enter the quantity of Network Interface Units in this office.

1.4 Enter the quantity of Subscriber Module Systems in this office.

1.5 Enter the quantity of Subscriber Module Rural in this office.

1.6 Enter the quantity of Digital Echo Suppressors in this office.

1.7 Enter the quantity of MSB7s connected in this office.

1.8 Enter the total quantity of TMs, MTMs and DRAMs in this office. ISMs do not have a separate entry, they are classified as a TM or MTM.

1.9 Enter the quantity of EDRAMs and CTMs in this office.

1.10 Enter the number of spare copper ports requested for this office.

1.11 This calculation is a sub-total of all the copper ports required for this office.

1.12 Enter the number of open ports which are DS-30 and can be used to terminate copper links from peripherals. Paddle boards in an office

RELEASE 06.03
13 July 1998

may be shown in the office records as having spare ports. Use caution, and use the standard polling procedure to guarantee that the Telco has not already used these ports while adding a few frames/cabinets without notifying NT.

1.13 This calculation is is the total number of copper ports required for this office.

2. Section 2 defines all the fiber based peripherals, enter the peripheral quantity which determines the total fiber port quantity. ports:

2.1 Enter the quantity of Line Group Controllers (LGC) and Line Group Controllers ISDN (LGCI) in this office.

2.2 Enter the quantity of Line Trunk Controllers (LTC) and Line Trunk Controllers ISDN (LTCI) in this office.

2.3 Enter the quantity of Subscriber Module Unit (SMU) and Subscriber Module Unit ISDN (SMUI) in this office.

2.4 Enter the quantity of Subscriber Module SLC (SMS) in this office.

2.5 Enter the quantity of Digital Trunk Controller (DTC) and Digital Digital Trunk ISDN (DTCI) in this office.

2.6 Enter the quantity of Subscriber Module Access (SMA) and Subscriber Module Access Version 2 (SMA2) in this office.

| 2.7 Enter the quantity of Spectrum Peripheral Modules (SPM) in this
| office. Each SPM will require two (2) NT9X40DA HCS Fiber Link Interface
| Paddleboards placed on the rear of the ENET shelf.

2.8 Enter the number of reserved fiber ports requested for this office.

2.9 This calculation is a sub-total of all the fiber ports required for this office.

2.10 Enter the number of open ports which are DS-512 and can be used to terminate fiber links from peripherals. Paddle boards in an office may be shown in the office records as having spare ports. Use caution, and use the standard polling procedure to guarantee that the Telco has not already used these ports while adding a few frames/cabinets without notifying NT.

2.11 This calculation is is the total number of fiber ports required for this office.

3. Determine the number of interface paddleboards that contain copper links required for this office.

RELEASE 06.03
13 July 1998

3.1 The DS512/DS30 Interface Paddleboard contains 16 DS 30 interface links and 3 DS 512 fiber links. These DS512 links should be used first and then the 4link DS 512 Interface Paddleboard should be used. This calculation multiplies the number of DS512/DS30 I/F Paddleboard by three to show the total number of fiber ports available.

4. The DS512 Fiber Interface Paddleboard can be calculated by subtracting the number of available fiber ports on the DS512/DS30 Interface Paddleboard and then dividing the remainder by four to determine the number of Fiber Interface PB required.

5. Determine the type of bulkhead required for the ENET shelves. Some order systems may default to the 6530/30 but few offices want the SLC bays. The standard should be the 6520/21 bulkheads which can only handle up to 6 (16 link) copper interfaces per shelf.

Since many of the rules for card placement are based upon the DS-30 interface use on the shelves, provisioning is based on the particular type of bulkhead used. The same type of bulkhead is usually consistent throughout a given office.

A. The 6506/6503 bulkheads are used for fiber only. No DS-30 interfaces are included.

B. The 6520/6521 bulkheads can handle up to 6 DS-30 (16 link) interfaces. This includes a mix or non-mix of the DS-30 Interface cards (now at MD status) and/or the DS-512/DS30 Interface cards.

C. The 6530/6531 bulkheads can handle up to 14 DS-30 (16 link) interfaces. This includes a mix or non-mix of the DS-30 Interface cards (now at MD status) and/or the DS-512/DS30 Interface cards. These bulkheads require the use of Speech Link Connector (SLC) cabinets.

D. The 8909 bulkheads are used for extension offices that have Model A cabinets. These cabinets have been set to MD status in North America.

Since many of the rules for card placement are based upon the DS-30 interface used on the shelves, provisioning is based on the particular type of bulkhead used. The same type of bulkhead is usually consistent throughout a given office.

6. Quantity of ENET Shelves required:

The ENET shelf quantity can be based on two items;

One, the quantity of shelves based on interface card quantities on a particular shelf. When a shelf becomes filled with interface cards, another shelf will be required. A maximum of 15 PB can be added to a shelf.

Two, the quantity of copper interface cards on a shelf depend on the type of bulkheads chosen by the Customer/SAE. In many cases this limits

RELEASE 06.03
13 July 1998

the number of DS 30 interfaces per shelf, leading to the provisioning of another shelf, even though one shelf is normally filled before provisioning another.

6.1 thru 6.4 1st Shelf ENET Card Placement

Enter the number of copper interface cards that are existing in the Exist column. Enter the number of added copper interface cards in the Add column. The DS 30 PB is now MD, no added cards should be shown in this column. Based on the type of bulkhead determined in Item 5 above, the maximum number of DS 30 type interface cards are shown in the table:

NT9X6506/NT9X6503 Fiber only- no DS 30 type PB allowed

NT9X6520/NT9X6521 Up to 6 DS 30 PB per shelf

NT9X6530/NT9X6531 Up to 14 DS 30 PB per shelf

DS 30 type PB here means either the NT9X41 series of DS 30 Interface PB or the NT9X45 series of DS 512/DS 30 PB.

Also enter the number of fiber only paddleboards and the number of DS-5 2/DS-30 interface paddleboards for this office.

Present practice is to place the DS-30 interfaces at the outside of the ENET shelf, therefore the DS-512 Interfaces should occupy the inner slots of the shelf.

For Item 6.4, add the total number of interface PBs of all types as totaled in the last column. This total can not exceed 15.

6.5 thru 6.8 2nd Shelf ENET Card Placement

Enter the number of copper and fiber interface cards as was done in the shelf 0. Refer back to the restrictions on the placement of copper interface cards if required. Be certain to adhere to all the rules and notes for this ENET shelf that are detailed in the ENET shelf 0 text.

For Item 6.8, add the total number of interface PBs of all types as totaled in the last column. This total can not exceed 15.

7. If there are any of the three types of cards provisioned in the shelf, that shelf is being utilized and the shelf must be provisioned along with the support cards for that shelf. Note that crosspoint cards will also be provisioned as required. There can be instances in which there are crosspoint cards without the corresponding paddleboard (interface) circuit packs.

7.1 Provisioning of the cards and ports are originally done as a single plane, since the ENET is a duplicated (dual) plane cabinet, quantities of shelves are doubled to have the correct answer.

8. Determine the quantities of ENET Support Cards Required.

RELEASE 06.03
13 July 1998

8.1 The quantity of +5Volt Power supplies is equal to the number of ENET shelves times two.

8.2 The quantity of +5/-5Volt Power supplies is equal to the number of ENET shelves times two.

8.3 The quantity of CPU CPs is equal to the number of ENET shelves times one.

8.4 The quantity of Network Clock and Message CPs is equal to the number of ENET shelves times one.

8.5 The quantity of RTIF CPs is equal to the number of ENET shelves times one.

8.6 The quantity of Quad DS-512 I/F PB is equal to the number of ENET shelves times one.

9. Determine the number of ENET Interface PB required for both planes.

9.1 The quantity of DS 512/DS-30 I/F PB is equal to the number of ENET shelves times two.

9.2 The quantity of Quad DS-512 I/F PB is equal to the number of ENET shelves times two.

1 . Determine the number of ENET crosspoint cards required.

1 .1 The number of ENET crosspoint cards is shown in the table:

Number of crosspoint CPs required:

Number of interface is equal to Provide
cards shown: or less than

30	0-24 Note 1
44	36
60	48
74	60
90	72
104	84
120	96

NOTE 1: Crosspoint cards are provisioned in pairs for the first shelf. If the total number of interface cards is an odd number, add one (1)

RELEASE 06.03
13 July 1998

to the number. Let that quantity be called Y. The number of crosspoint cards to be provisioned is then equal to Y -4.

1 .2 The number of ENET Termination Crosspoint cards is shown in the table:

Number of Termination Crosspoint CPs required:

Number of interface is equal to Provide
cards shown: or less than

30	8
44	12
60	16
74	20
90	24
104	28
120	32

1 . Bulkhead Provisioning

1 .1 Determine the number of left bulkheads required by multiplying the number of sheves by one. Bulkhead types are shown in Item 5.

1 .2 Determine the number of right bulkheads required by multiplying the number of sheves by one. Bulkhead types are shown in Item 5.

1 . Auxilliary Cabinet Provisioning

1 .1 For new offices, provide two CCTS cabinets to contain all the cable from the office peripherals. For extension offices, two cabinets should already be in existence.

1 .2 Speech Link Cabinets do not easily fit into formulas. Reference SLC Provisioning - ECM 672

7.2.2.4 Worksheet 2 Reference Manual

1. Calculation of MS Port Card Requirements for Shelf 0

Calculations for each shelf should be done separately for two different reasons. One, the port chain depends upon the number of ports for that shelf, therefore each must be shown separately. Two, if the total number of Interface PBs is less than 15, a decision will need to be made

RELEASE 06.03
13 July 1998

to either compensate for the cards that will be added later, or the provisioning of MS port cards will need to be changed with a later extension.

Reference the MS Port Configuration rules in ECM626 for further information.

1.1 Multiply the number of DS512/DS30 Paddleboards placed on shelf 1 times the Ports per card (PPC) to determine the total number of ports used by this PB type. Use the answer from Worksheet 1 Item 6.1.

1.2 Multiply the number of DS30 Paddleboards placed on shelf 1 times the Ports per card (PPC) to determine the total number of ports used by this PB type. Use the answer from Worksheet 1 Item 6.2. Note that the port quantity for the DS30 I/F card is actually 16 but has been changed to 22 to allow for the changeout to the DS30/DS512 I/F CP.

1.3 Multiply the number of DS512 Paddleboards placed on shelf 1 times the Ports per card (PPC) to determine the total number of ports used by this PB type. Use the answer from Worksheet 1 Item 6.3.

1.4 The total quantity of ports is the sum of all three types of card|s total ports. Reference Table A below to find the card grouping for this shelf.

Table A

Use the following table to determine the port card requirement for each of the ENET shelves required.

Table A will need to be referenced twice, once for Shelf 0 and once for Shelf 1.

1.1. If ports are less than or equal to 64:

Preferred card grouping Secondary card grouping

Qty. Type Mtg. Qty. Type Mtg.

NT9X17DA Front None
NT9X20BC Rear

If the shelf contains an appreciable amount of copper links or if growth is anticipated, the minimum configuration should be that shown in 1.2 below.

1.2 If ports are more than 64 but less than 128:

Preferred card grouping Secondary card grouping

Qty. Type Mtg. Qty. Type Mtg.

RELEASE 06.03
13 July 1998

NT9X17CA Front 4 NT9X17DA Front
NT9X20BC Rear
2 NT9X20BC Rear
2 NT9X25BA Rear

1.3 If ports are more than 129 but less than 192:

Preferred card grouping Secondary card grouping

Qty.	Type	Mtg.	Qty.	Type	Mtg.
	NT9X17CA	Front	6	NT9X17DA	Front
	NT9X17DA	Front			
	NT9X20BC	Rear	2	NT9X20BC	Rear
	NT9X25BA	Rear	4	NT9X25BA	Rear

1.4 If ports are more than 193 but less than 256:

Preferred card grouping Secondary card grouping

Qty.	Type	Mtg.	Qty.	Type	Mtg.
	NT9X17CA	Front	8	NT9X17DA	Front
	NT9X17CA	Front			
	NT9X20BC	Rear	2	NT9X20BC	Rear
	NT9X25BA	Rear	6	NT9X25BA	Rear

Note 1: The maximum number of ports for a port group is 324. If this number is exceeded, an arithmetic error has occurred. Please check your calculations and enter the correct port group.

Note 2: Initial offices get large discounts. For at least the first MS to ENET interface, the use of CA cards should be encouraged. If the first shelf contains a large amount of copper interfaces, two CA cards should be provided. The MS shelf has finite slots, if the slots are used for 9X17DA card chains, it is possible to run out of slots on future growth jobs for the office.

Note 3: Maximize the Port Group wherever possible. In many cases the use of two NT9X17CA cards for the first ENET shelf is justified.

Note 4: The NT9X40s in existing offices shown in slot 8R should not be counted as Message Links. If using the D410 drawing, these cards are shown but do not interface to the peripherals.

2. Calculation of MS Port Card Requirements for Shelf 1

2.1 Multiply the number of DS512/DS30 Paddleboards placed on shelf 1 times the Ports per card (PPC) to determine the total number of ports used by this PB type. Use the answer from Worksheet 1 Item 6.5.

RELEASE 06.03
13 July 1998

2.2 Multiply the number of DS30 Paddleboards placed on shelf 1 times the Ports per card (PPC) to determine the total number of ports used by this PB type. Use the answer from Worksheet 1 Item 6.6. Note that the port quantity for the DS30 I/F card is actually 16 but has been changed to 22 to allow for the changeout to the DS30/DS512 I/F CP

2.3 Multiply the number of DS512 Paddleboards placed on shelf 1 times the Ports per card (PPC) to determine the total number of ports used by this PB type. Use the answer from Worksheet 1 Item 6.7.

2.4 The total quantity of ports is the sum of all three types of card's total ports. Reference Table A above to find the card grouping for this shelf.

7.2.2.5 DMS BUS Port Requirements

The following equipment is the minimum requirement in the Message Switch (MS) to interface with the ENET. The NT9X25AA and NT9X25BA are required, only if a chain of 17DAs is required.

- NT9X13DC, MS CPU Processor CP (4 Megabytes) (Now MD)
- NT9X13DD, MS CPU Processor CP (16 Megabytes)
(Replaces NT9X13DC)
- NT9X17DA, MS 64 Port CP
- NT9X20BB, ENET/MS Fiber Interface PB
or
- NT9X20BC, ENET/MS Fiber Interface PB
- NT9X25AA, MS Port Expander PB
- NT9X25BA, MS Port Expander/Terminator PB
- NT9X49CB, MS P-Bus Terminator CP (Tracer Card)

To interface with ENET, the MS requires 10 Megabytes of memory. This is achieved in the following ways:

QTY	PEC	QTY	PEC	Application	NOTE
	NT9X13DD (16 MB)	2	NT9X14DB (24 MB)	Canadian & U.S.	
	NT9X13DB (1 MB)	2	NT9X14DB (24 MB)	Richardson	1

NOTE 1: This configuration is non-standard and will not be supported by the formal design documentation. Earlier releases of NT9X13DB are not compatible with NT9X25AA/BA, later releases are. Release numbers are transparent to our documentation and process. Hence, Richardson will be responsible for keeping track of the proper type of NT9X13DB CPs for their offices.

Existing Offices With NT9X01BA/JA SuperNode Cabinet

Product Change Kit (PC Kit) NT9X04AY converts the MS to the minimum level required to interface the ENET. It removes NT9X49CA and makes slot position 32F provisionable. It can be applied to NT9X04AG in order to upgrade the MS to NT9X04AH which is the min-

RELEASE 06.03
13 July 1998

imum level required to interface the ENET. Other existing PC Kits can be applied to existing MS Common CP Fills in order to bring them up to the necessary level.

	Existing Level	PC Kit Required	New Common CP Level
MS -	NT9X04AA	NT9X04AD	NT9X04AB
MS -	NT9X04AB	NT9X04AF	NT9X04AE
MS -	NT9X04AE	* NT9X04AZ	NT9X04AG
MS -	NT9X04AG	* NT9X04AY	NT9X04AH

* NT9X04AE may be upgraded directly to NT9X04AH by applying NT9X04AY if the external clock interface is not required. The NT9X04AY kit has been rated MD.

The introduction of ENET has increased the number of MS ports required dramatically. Therefore, a 64 port CP (NT9X17DA) is introduced. The 4-Port CP (NT9X17AD) is retained for use with IOC, CM, NM, FLIS, and LPP.

MS Port Group (Chain)

A MS Port Group is a set of one (1) or more adjacent MS Port cards, DS-512 Interface Paddleboards, and MS Port Expander/Terminator Paddleboards that are required to support the DS-512 link to an ENET shelf.

One MS Port Group is required per MS for each ENET shelf (per plane). Because there are two (2) ENET planes, therefore two port groups are associated with each ENET shelf. Both port groups are located on MS 0 and, on MS 1.

Each MS port group is provisioned as a sum of the following:

- 1 port for the ENET Shelf Processor
- 1 port for each active message channel Processor associated with a speech link that terminates on the shelf (i.e. each Series I peripheral has one (1) Message Channel Processor, Each Series II peripheral has two (2) Message Channel Processors).

Each port group must be assigned a contiguous group of CP slots on the MS shelf. In order to size the MS Port Group, the distribution of peripheral types (i.e. Series I * II) over the ENET shelf pairs must be known.

NOTE: If the DMS office will require more than one (1) equipped ENET shelf (per plane), the assignment of the NT9X40BA/40BB, NT9X41BA, and the NT9X45BA Paddleboards (PBs) on the ENET shelves will directly affect the size of each MS Port Group. Hence, to optimize the size of the MS Port Group, it may be necessary to

RELEASE 06.03
13 July 1998

reassign the quantity of NT9X40BA/40BB, NT9X41BA and the NT9X45BA PBs from one ENET shelf to another in order to avoid crossing the boundary of message ports which would necessitate the addition of an MS 64 Port Card NT9X17DA and the associated paddleboards. (This card and the associated paddleboards are explained later in this section.) Note that any reassignments would only pertain to new equipment (i.e. initial offices or new equipment being added into an existing office). Existing paddleboards on an ENET shelf must not be reassigned during an extension.

For reasons previously discussed consideration should be given to making allowances for the future growth requirements of the last incomplete network shelf. RESERVE slots on the MS for the PROJECTED FUTURE REQUIREMENTS of partially equipped ENET shelves.

An MS Port Group will consist of the following types of hardware:

- NT9X17DA MS 64 Port CP paired with
NT9X20BB ENET/MS Fiber Interface PB
OR
- NT9X17CA MS 256 Port CP paired with
NT9X20BC ENET/MS Fiber Interface PB
- NT9X25AA MS Port Expander PB
- NT9X25BA MS Port Expander/Terminator PB

ENET will utilize only MS 64 Port CP for network and peripheral message port assignments.

NT9X17DA, MS 64 PORT CP

- One can connect up to 64 message ports.

The following PBs are required to complete each port group which is expected to consist of between 1 and 4 NT9X17DA cards:

NT9X20BB, ENET/MS Fiber Interface PB

- One required per plane behind the first NT9X17DA CP of each port group.
- Interfaces the message link from the Enhanced Network Shelf.

NT9X25AA, MS PORT EXPANDER PB

- One required per plane behind the middle NT9X17DA CP of each port group if equipped.
- Expands the bus to accommodate a larger port group beyond 64 channels.

RELEASE 06.03
13 July 1998

NT9X25BA, MS PORT EXPANDER/TERMINATOR PB

- One required per plane behind the last NT9X17DA CP of each port group if equipped.
- Terminates the bus.

Important rules.

1) Provide two (2) NT9X17DA MS 64-Port CP and two (2) NT9X20BB DS-512 ENET/MS Fiber interface PB to interface with an ENET shelf. An NT9X17DA/NT9X20BB pair is required per MS (per plane) for each link.

2) The NT9X17DA used only with ENET and it requires BCS31 or higher.

3) If the number of message ports required for interfacing with ENET is greater than 64, provide additional NT9X17DA MS 64-Port CP in successive higher numbered slots. For each additional NT9X17DA except the last, provide one (1) NT9X25AA MS Port Expander PB; for the last NT9X17DA, provide one (1) NT9X25BA MS Port Terminator PB. This is illustrated as follows:

The following figures represent examples of the physical circuit pack assignments to a MS shelf for ENET-MS port groups of the four possible capacities. Please note these are examples and the MS can contain a mixture of ENET-MS port groups of various capacities and circuit pack locations. The NT9X20 and NT9X25 circuit packs (if required) of an ENET-MS port group must occupy contiguous slots on the MS as shown in the examples. The circuit pack locations shall be the same on the second MS shelf of the Supernode.

For ENET Initial, assign IOCs, EIOCs and LPPs to the highest numbered MS slots in descending order starting from slot 29 (i.e. slots 29, 28, etc.). These slots will contain 4-port cards (NT9X17AD) in the front and 4-port DS-30 interface paddleboards (NT9X23AA for IOCs and EIOCs; NT9X23BA for LPPs) in the rear.

In MS Port Group, assign the ENET ports to the lowest numbered MS slots in ascending order starting from slot 12 (i.e. slots 12, 13, etc.). However, the SAEs and EAEs should anticipate and plan all future growth on each ENET shelf and provision the MS cards accordingly, by leaving a spare slot for future expansion if necessary, as shown below.

64 Port Requirement for 64 Port Cards

	Front	Rear	
	+-----+	+-----+	
n	NT9X17DA	NT9X20BB	to Plane 0 of ENET
	+-----+	+-----+	
n+1			reserve for future growth
	+-----0-----+		

	Front	Rear	
	+-----+	+-----+	
n+2	NT9X17DA	NT9X20BB	to Plane 1 of ENET
	+-----+	+-----+	
n+3			reserve for future growth
	+-----0-----+		

128 Port Requirement

	Front	Rear	
	+-----+	+-----+	
n	NT9X17DA	NT9X20BB	PL 0
	+-----+	+-----+	
n+1	NT9X17DA	NT9X25BA	OR
n+2			reserved
	+-----0-----+		

	Front	Rear	
	+-----+	+-----+	
n+3	NT9X17DA	NT9X20BB	to Plane 1 of ENET
	+-----+	+-----+	
n+4	NT9X17DA	NT9X25BA	
	+-----+	+-----+	
n+5			reserve for future growth
	+-----0-----+		

RELEASE 06.03
13 July 1998

192 Port Requirement

	Front	Rear	
	+-----+	+-----+	
12	NT9X17DA	NT9X20BB	to Plane 0 of ENET, 192 PORTS
	+-----+	+-----+	
13	NT9X17DA	NT9X25AA	
	+-----+	+-----+	
14	NT9X17DA	NT9X25BA	
	+-----+	+-----+	
15	NT9X17DA	NT9X20BB	to Plane 1 of ENET, 192 PORTS
	+-----+	+-----+	
16	NT9X17DA	NT9X25AA	
	+-----+	+-----+	
17	NT9X17DA	NT9X25BA	
	+-----0-----+		

256 Port Requirement

	Front	Rear	
	+-----+	+-----+	
12	NT9X17DA	NT9X20BB	to Plane 0 of ENET, 256 PORTS
	+-----+	+-----+	
13	NT9X17DA	NT9X25AA	
	+-----+	+-----+	
14	NT9X17DA	NT9X25AA	
	+-----+	+-----+	
15	NT9X17DA	NT9X25BA	
	+-----+	+-----+	
16	NT9X17DA	NT9X20BB	to Plane 1 of ENET, 256 PORTS
	+-----+	+-----+	
17	NT9X17DA	NT9X25AA	
	+-----+	+-----+	
18	NT9X17DA	NT9X25AA	
	+-----+	+-----+	
19	NT9X17DA	NT9X25BA	
	+-----0-----+		

0-128 Port Requirement for 128 Port Cards

128 Port Requirement

	Front	Rear
	+-----+	+-----+
	NT9X17CA	NT9X20BC
	+-----+	+-----+
	+-----0-----+	

129-192 Port Requirement for 128 Port Cards

Front	Rear
+-----+	+-----+
NT9X17CA	NT9X20BC
+-----+	+-----+
NT9X17DA	NT9X25BA
+-----+	+-----+
+-----0-----+	

193-256 Port Requirement for 128 Port Cards

Front	Rear
+-----+	+-----+
NT9X17CA	NT9X20BC
+-----+	+-----+
NT9X17CA	NT9X25BA
+-----+	+-----+
+-----0-----+	

4) Provide two (2) NT9X17CA MS 128 Port CP and two (2) NT9X20BC DS-512 ENET/MS Fiber interface PB to interface with an ENET shelf. An NT9X17CA/NT9X20BC pair is required per MS (per plane) for each link.

Refer to (ECM 626) DMS SuperNode for more detailed information.

Cable Length from MS Shelf to ENET Shelf

All fiber optic cables from both MS Shelves (i.e. plane 0 and 1) to any ENET shelf (on either plane) must not deviate in length from each other by more than 25 feet.

All fiber optic cables from an MS Shelf to any pair of ENET shelves in the same plane must not deviate in length from each other by more than 25 feet.

RELEASE 06.03
13 July 1998

7.2.2.6 Circuits Per Card

Not applicable

7.2.2.7 Discrimination Numbering

NAME ABBREVIATION <Plane> <Shelf, Cabinet> <Function>

Where NAME ABBREVIATION = ENC or ENET

Plane = 0 or 1
Shelf = 00 through 03
Cabinet = 00
Function = ABS, and B1 through B4

where ABS = Alarm Battery Supply
B = Blower Fan

eg. ENC 0 00 B1
ENET 0 00
ENC 0 00 ABS

7.2.2.8 ENET RETROFIT (UPGRADE)

An ENET retrofit (upgrade) occurs when the switching network of an existing inservice DMS-SuperNode office changes from a Junctored Network Module (JNET/NM) implementation to an Enhanced Network (ENET) implementation.

The objectives of ENET Retrofit are as follows:

1. Reconfigure the MS Shelf to support both JNETs and ENETs temporarily. Note, after the ENET Retrofit the JNETs shall be removed.
2. Determine if DS-30 Paddleboards are required to support MS Port Concentration. MS Port Concentration is required if:
 - a. a insufficient quantity of card slots are available on the MS to add NT9X17DAs required to Interface ENET, and/or
 - b. the total number of slots required in the MS is greater than 18.
3. The provisioning of the MS slots and ports is the responsibility of the SAE/EAE. The rules for the ENET Retrofits (Upgrades) with MS Port Concentration are found in ECM-626.
4. Document the MS shelf configuration Before, During, and After the ENET Retrofit via the CI and D610 job drawing.

RELEASE 06.03
13 July 1998

5. If MS Port Concentration is required define the quantity of NT9X69AAs required, and report this requirement to Installation via the CI.
6. Obtaining the H/W required for MS Port Concentration is the responsibility of the Installation Staff. Refer to the appropriate section of IM-925/926.
7. Reference 2.3.6 for the required peripheral module requirements when upgrading from a DSNE to an ENET office.
8. When an ENET Cabinet is installed next to SuperNode Cabinet of the earlier vintages, (NT9X01BA/JA) the NT9X04AX Message Switch BulkHead Interface kit must be provisioned. The part (P0674593) has circular openings while the replacement part (P0701264) contained in the interface kit has an oval opening and reduces the cable congestion. Check carefully that the DPCC is of the older vintage before ordering the kit. The NT9X04AX kit was rated MD but is now at standard status.

7.2.2.9 ENET RETROFIT - PERIPHERAL BASELINE

NOTICE:

The following information on peripherals shows the minimum configuration necessary to interface with the ENET. Many offices have been updated with newer packs. This information is shown as the minimum necessary to change from a Junctored Network to a ENET.

A. Peripherals verified in FAST/VO/Ramp site

Non-cabinetized peripherals which fall under this category include,

DCM	Digital Carrier Controller
* DRAM	Digital Recorded Answering Machine
LM	Line Module
MTM	Maintenance Trunk Module
* MTU	Metallic Test Unit
OAU	Office Alarm Unit
TM8	Trunk Module 8-Wire
DTC	Digital Trunk Controller
LGC	Line Group Controller
LTC	Line Trunk Controller
* RSC	Remote Switching Centre
SMU	Subscriber Carrier Module: DMS-1U
RCU/RCC	Remote Cluster Unit
LCM	Line Concentrating Module
* RMM	Remote Maintenance Module

RELEASE 06.03
13 July 1998

- * DPP Distributing Processing Peripheral
- * LCME Line Concentrating Module E
- * MPC Multi Protocol Controller
- * LCM I Line Concentrating Module ISDN
- LTCI ISDN Line Trunk Controller
- DTCI ISDN Digital Trunk Controller

B. Peripherals verified in FAST only

Non-cabinetized peripherals which fall under this category include,

- DES Digital Echo Suppressor
- * DTU Digital Test Unit
- * RLM Remote Line Module
- * RSM Remote Service Module
- SMR Subscriber Carrier Module: DMS-1R
- SMS Subscriber Carrier Module: SLC-96
- SMSR Subscriber Carrier Module Remote
- * OPM Outside Plant Module
- * RLCM Remote Line Concentrating Module

RELEASE 06.03
13 July 1998

C. Peripherals which have never been verified with ENET

Peripherals which fall under this category include,

TM2	Trunk Module 2-Wire
TM4	Trunk Module 4-Wire
T8A	Trunk Module 8-Wire with Metallic Test Access
MSB6	Message Switch Buffer #6
* TOPS	TOPS Interfaces

Note that the TM2, TM4 and T8A use the same processor as the TM8, which has been verified. Moreover, these peripherals do not require hardware changes for compatibility with ENET. The associated risks are therefore low. In addition, the MSB6 has been tested in BNR DMS-300 lab, and the risks are known be to low.

* These are not peripheral modules which are connected directly to the network.

Note if APIs/ECMs do not adequately address ENET interface requirements for the peripherals to be connected to the ENET, then the SAE is to flag the issue to PLM/Market primes (with a copy to Engineering Process Update).

RELEASE 06.03
13 July 1998

SERIES I PERIPHERALS

Series I peripherals (DCM, LM, DES, etc.) will interface the ENET using existing copper speech link cable group arrangements. However, the Messaging CP (NT2X33AA/AB) must be replaced with a NT2X33AE.

Modification For Existing Offices

Use Product Change Kit (PC Kit) NT2X31AS converts the PM to the minimum level required to interface the ENET.

	Existing Level	PC Kit Required
* DCM	- NT2X31AA	NT2X31AS
	NT2X31AB	NT2X31AS
	NT2X31AC	NT2X31AS
	NT2X31AH	NT2X31AS
	NT2X31AJ	NT2X31AS
	NT2X31AK	NT2X31AS
	NT2X31AL	NT2X31AS
LMC	- NT2X14AA	NT2X31AS
	NT2X14AC	NT2X31AS
	NT2X14AE	NT2X31AS
	NT2X14AG	NT2X31AS
DES	- NT2X12AA	NT2X31AS
	NT2X12AB	NT2X31AS
	NT2X12AD	NT2X31AS

For Canadian Applications, when required, the SAE/EAE shall inform CSO Change Application Dept.S895 BRW of this requirement using 160 SPEC. That is, SAE/EAE shall order this kit through the 160 SPEC.

* New applications for DCMs will provide the NT2X31AT which has a NT2X33AE circuit pack always provided.

RELEASE 06.03
13 July 1998

SERIES II PERIPHERALS

Series II peripherals (XPM: e.g. LGC) will interface the ENET using fiber speech links and require modification.

Copper Interface to ENET Only

Note that MSB7 will interface the ENET using copper speech links only.

Note that for ENET Retrofit (Upgrade) jobs, the following rules apply until BCS34 (These rules do not apply for initials or peripheral extensions). DTCs that do not have exactly 4,8,12 or 16 C-side links can not be fiberized. That is they will interface to ENET using copper speech links only. Also DO NOT fiberize peripherals appearing in table SPECCONN (including DTCs) which have fewer than 16 C-side links.

Fiber Interface

The following equipment is required to modify the XPM for fiber interface (i.e. FXPM) to the ENET:

PEC	Description	Quantity
NT6X02UF	- Fiber Interface Hardware Assembly	1
NT6X40CA	- DS-512 XPM Interface CP	2
NT6X40DA	- DS-512 Link Paddle Board	2
NT6X40FA	- DS-512 XPM Interface CP	2
NT6X40GA	- DS-512 Link Paddle Board	2
NT6X69AC	- Message Protocol & Tone CP	2
Note 1: The NT6X69AC CP performs the same functions as the NT6X69MA CP. The NT6X69AC is the ASIC version of NT6X69MA.		
Note 2: Upon general availability, the NT6X40FA will replace the NT6X40CA as the standard DS512 XPM Interface and the NT6X40GA will replace the NT6X40DA as the standard DS512 Link Paddle Board.		

While fiber conversion of the XPMs is not enforced by ENET design, it becomes the rule because DS-30 copper speech link interface to the ENET under utilizes Network port capacity by 75%.

The NT9X45BA card uses up the XPT card (9X35BA/CA) to its maximum capacity (ie. 2K Channels), whereas the 9X41BA only utilized 1/4 of the XPT capacity.

XPM NEW MESSAGING REQUIREMENT FOR ENET

RELEASE 06.03
13 July 1998

The messaging protocol in the Old Messaging card (i.e. NT6X43__) is not compatible with the Message Switch (MS) messaging protocol. Hence, XPMs using the NT6X43__ card cannot be supported by ENET.

Host XPMs in all ENET offices must have the New Messaging card NT6X69AC or later in order to interface ENET.

Currently, the SMR, DTC6, and MSB6 modules do not support New Messaging. Therefore, these modules cannot interface ENET.

MINIMUM XPM TO ENET CP FILLS

The following is a breakdown of the minimum XPM packfill level required to interface the ENET.

Initial Offices

DTC7 Common CP Fill = NT6X02IC
LGC Common CP Fill = NT6X02LC
LTC Common CP Fill = NT6X02MC
MSB7 Common CP Fill = NT6X32CC
SMS Common CP Fill = NT6X02DH
SMU Common CP Fill = NT6X02EG
DTCI Common CP Fill = * NT6X02NA
LGC I Common CP Fill = * NT6X02NA
LTC I Common CP Fill = * NT6X02NA

* NT6X69AC/MA is provisionable on the NT6X02NA CP Fill

Existing Offices

Use Product Change Kit (PC Kit) NT6X02BQ (NT6X02BR for NT6X02AA/AC modules only) to convert the XPM to the minimum level required to interface the ENET. The NT6X02BQ PC Kit contains two (2) NT6X69AC CPs. The NT6X02BR PC Kit makes CPs, which were previously always provided, provisionable.

	Existing Level	PC Kit Required	New Module Level
DTC	- NT6X02IA NT6X02AS	NT6X02BQ NT6X02BQ	NT6X02IC NT6X02IC
LGC	- NT6X02LA NT6X02AT	NT6X02BQ NT6X02BQ	NT6X02LC NT6X02LC
LTC	- NT6X02MA NT6X02AU	NT6X02BQ NT6X02BQ	NT6X02MC NT6X02MC
MSB7	- NT6X32AB NT6X32CA	NT6X02BQ NT6X02BQ	NT6X32CC NT6X32CC

RELEASE 06.03
13 July 1998

SMS	-	NT6X02DC	NT6X02DK	NT6X02DJ
		NT6X02DD	NT6X02DK	NT6X02DJ

SMU	-	NT6X02EB	NT6X02EH	NT6X02EF
		NT6X02AW	NT6X02EH	NT6X02EF

DTCI - Same As Initial Office

LGCI - Same As Initial Office

LTCI - Same As Initial Office

RELEASE 06.03
13 July 1998

7.2.3 Provisioning Considerations

7.2.3.1 ENET in C42(S/DMS) Cabinet

The ENET in C42(S/DMS) cabinet is a cost and functionally enhanced version of the existing ENET cabinet. The S/DMS cabinet is 42 inches wide compared with Streamline's width of 28 inches. This new cabinet supports features such as modified framework based on Streamline, "horizontal"(through line-up) cabling, and "hot slide" capability. "Horizontal" cabling meaning, cables running through a hole in the side of a cabinet and into the next cabinet(s) in the same lineup. "Hot slide" is the process of moving an operating cabinet into an existing lineup of equipment. Note that the S/DMS cabinet is very similar to the existing cabinet, items such as packs, shelf assemblies, interconnect cables, and bulkhead packs do not change. The differences from the existing ENET cabinet are listed below.

- 1) The Cabinet changes from NT9X0113 to NT9X9575.
- 2) The Kick plate is not required with the S/DMS cabinet.
- 3) Power wiring is optional. If the cabinet is in a Streamline lineup, the cables will be equipped to take advantage of "horizontal" cabling. If the cabinet is in a non-Cabinetized lineup, power cables will be similar to existing power cables, so filters will have to be provisioned.

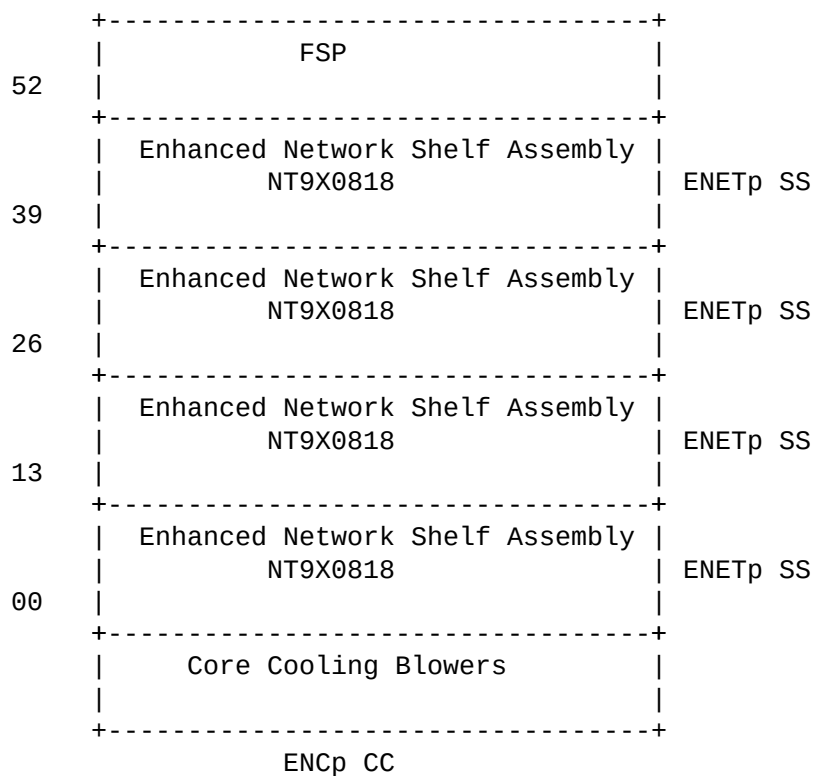
The NT9X05AC has been approved for all applications. All new initial offices with ENET will specify the NT9X05AC Cabinet. The NT9X05AB PEC is MD status and will remain for all existing offices.

RELEASE 06.03
13 July 1998

CABINET MODELS

NT9X05AB/AC Enhanced Network Cabinet (ENC).

The NT9X05AB/AC is a 128K Enhanced Network product which is a single cabinet model equipped with a minimum of one shelf and expandable to four shelves (see figure following).



Enhanced Network Cabinet

where p = the Plane number 0 or 1
CC = the Cabinet number 00
SS = the Shelf number 00-03
(assign from top down)

RELEASE 06.03
13 July 1998

New Designation Labels have been developed for the ENET Cabinet (ENC) and ENET Shelf (ENET) to be applied to the Cabinet and the PDC as follows:

The Exterior Cabinet Door Label will be as follows:

P0710504 - Exterior Door Label (Lime Green)
P0711199 - Exterior Door Label (Meridian Aqua)
P0734962 - Exterior Door Label (Streamline Blue)

The format of this label is as follows:

ENC<plane> <cabinet number> ENET, eg. ENC 0 00 ENET

Where plane = 0 or 1
cabinet number = 00

ENET Shelf Designation Label
P0734961 - ENET Shelf ID Label

Locate label beside the Frame Supervisory Panel(FSP).
The label format includes Cabinet Name, Plane, Number, Location, PEC, and Shelf Name is as follows:

-Cabinet Name (ENC) <plane> <cabinet number>
eg. ENC 0 0

where plane = 0 or 1
cabinet number = 0

-Location : aann eg. A03, BA34

where aa = one or two letters from A through Z,
excluding I and O, and AA through ZZ,
excluding II and OO.
nn = two digits from 01 through 49

-PEC Code : NT9X05AC

- Shelf Name : ENET <Plane> <Shelf>,
eg. ENET 0 00, ENET 1 00

where Plane = 0 or 1
Shelf = 00 through 03

RELEASE 06.03
13 July 1998

7.2.3.2 ENHANCED NETWORK (ENET) SHELF PROVISIONING

Network shelves are provisioned based on Speech Link PB needs. One shelf is required per plane for every 15 Speech Link PB. Each Enhanced Network Cabinet (ENC) can be equipped with up to four (4) Enhanced Network (ENET) Shelf assemblies NT9X0818, as required. One (1) shelf assembly is always provided on the ENC cabinet with the remaining three (3) shelf assemblies being provisionable.

The ENET Shelf assembly does not have a common circuit pack fill. All circuit packs are provisionable. ENET Shelf Provisioning is dependent on the quantity and types of peripherals to be interfaced. The assumption is made that peripherals and IOC are first provisioned according to existing engineering rules. ENET rules relate to one plane only. See worksheets provided.

ENET provisioning is not sensitive to traffic or real time and therefore is provisioned based on terminations only.

NT9X40BA/BB Quad DS-512 Fiber Interface Paddle Board

- one (1) required per ENET shelf assembly to interface MS links (i.e. card slot 8R of ENET shelf).
- one (1) required per four (4) DS-512 speech links. One (1) NT9X40BA/BB can accommodate four (4) fiber XPMs (FXPMs).

NT9X41BA DS-30 Interface Paddle Board

- one (1) required per 16 DS-30 links. No messaging ports can be assigned to link #1 (when counting from link #0 up). The DS-30 Interface Paddleboard is replaced by the DS-30/DS-512 Interface paddleboard.

NT9X45BA DS-30/DS-512 Interface Paddle Board

- Note, No messaging ports can be assigned to link #1 of 16DS-30 links (when counting from link #0 up).
- The DS-30/DS-512 PB is a new peripheral interface paddle board can be used on the Dual Cabinet Enhanced NETwork. This pack can interface 3 DS-512 fiber links and 16 DS-30 copper links. It combines the functionality of existing NT9X41BA and NT9X40BA/BB packs. The NT9X40BA/BB(4 DS-512) fully utilize the ENET's channel handling capacity. But, it does not provide copper links. On the other hand, the NT9X41BA (16 DS-30) pack does not fully utilize ENET's channel handling capacity(only 25% utilization of cross-points). Using an NT9X45BA results in a 100% utilization of ENET crosspoints and providing both copper and fiber links. For example an ENET currently equipped with 4 NT9X41BAs and 3 NT9X40BBs requires 7 Crosspoints. This could be reconfigured with 4 NT9X45BAs and only 4 Crosspoints a savings of 3 Crosspoints

NT9X35CA 16K x 16K Channel Terminating Cross-point CP

RELEASE 06.03
13 July 1998

- Used to terminate Horizontal bus (H-bus).
- Minimum 2 per Network Shelf. Maximum 4 per Network Shelf.
- The first Network Shelf always requires four (4) CP.
- One CP, slot 9F, required for MS to Network Shelf messaging. Slot 9R cannot be equipped with a PB and is therefore NOT available for speech links to peripherals.
- Other 3 CPs used for speech link interface to peripherals may be used with DS-30 or DS-512 or DS-30/DS512 PBs.

NT9X35BA 16K x 16K Channel Cross-point CP

- One required for each speech link interface PB.
- Maximum 12 per Network Shelf.
- Provisioned in pairs (4K-CH) for the first shelf per plane and in groups of six CP (12K-CH) for the three subsequent shelves.

NT9X13FA CPU CP - now an MD CP.

- One (1) required per shelf assembly.
- OR

NT9X13KA CPU CP

- One (1) required per shelf assembly.

NT9X30AB +5V 80A Power Converter

- Two (2) required per shelf assembly.

NT9X31AB -5V 20A Power Converter

- Two (2) required per shelf assembly.

NT9X26AA/AB Remote Terminal Interface

- One (1) required per shelf assembly.

NT9X36BA Network Clock & Message Interface Circuit Pack

- Used to interface peripheral Message Channel to the Message Switch. One (1) required per shelf assembly.

NT9X0530 V-Bus Cables

- 16 are required for each shelf assembly added to a cabinet starting with the second shelf (i.e. shelves 01, 02, 03 will require V-Bus cables).

NT9X0520 DS-30 Cable Assemblies

- One (1) is required for each NT9X41BA equipped to extend the DS-30 Speech links to the Bulkhead from the Paddle Board.

NT9X0524 DS-30 Cable Assemblies

- One (1) is required for each NT9X45BA equipped to extend the DS-30 Speech links to the Bulkhead from the Paddle Board.

NT9X19AA Filler Face Plate

- Eight (8) are required per shelf assembly.
- Provide as needed for other unequipped card slots.

NT9X19BA Filler Face Plate Paddle Board

- Nine (9) are required per shelf assembly.
- Provide as needed for other unequipped PB slots.

See the figure below for a depiction of a fully utilized ENET shelf.

9X31AB -5V 20A Pwr Converter	1F		
9X30AB +5V 80A Pwr Converter	4F		
9X13KA CPU CP	7F	7R	9X26AB
9X36BA Network Clock & MSG CP	8F	8R	9X40BA/40BB
9X35CA 16K x 16K Chan Term Xpt CP	9F	9R	9X19BA
9X35CA 16K x 16K Chan Term Xpt CP	10F	10R	9X40BB/41BA/45BA
9X35BA 16K x 16K Chan Xpt CP	11F	11R	9X40BB/41BA/45BA
9X35BA 16K x 16K Chan Xpt CP	12F	12R	9X40BB/41BA/45BA
9X35BA 16K x 16K Chan Xpt CP	13F	13R	9X40BB/41BA/45BA
9X35BA 16K x 16K Chan Xpt CP	14F	14R	9X40BB/41BA/45BA
9X35BA 16K x 16K Chan Xpt CP	15F	15R	9X40BB/41BA/45BA
9X35BA 16K x 16K Chan Xpt CP	16F	16R	9X40BB/41BA/45BA
9X19AA Filler Face Plate	17F	17R	9X19BA
9X19AA Filler Face Plate	18F	18R	9X19BA
9X19AA Filler Face Plate	19F	19R	9X19BA
9X19AA Filler Face Plate	20F	20R	9X19BA
9X19AA Filler Face Plate	21F	21R	9X19BA
9X19AA Filler Face Plate	22F	22R	9X19BA
9X19AA Filler Face Plate	23F	23R	9X19BA
9X19AA Filler Face Plate	24F	24R	9X19BA
9X35BA 16K x 16K Chan Xpt CP	25F	25R	9X40BB/41BA/45BA
9X35BA 16K x 16K Chan Xpt CP	26F	26R	9X40BB/41BA/45BA
9X35BA 16K x 16K Chan Xpt CP	27F	27R	9X40BB/41BA/45BA
9X35BA 16K x 16K Chan Xpt CP	28F	28R	9X40BB/41BA/45BA
9X35BA 16K x 16K Chan Xpt CP	29F	29R	9X40BB/41BA/45BA
9X35BA 16K x 16K Chan Xpt CP	30F	30R	9X40BB/41BA/45BA
9X35CA 16K x 16K Chan Term Xpt CP	31F	31R	9X40BB/41BA/45BA
9X35CA 16K x 16K Chan Term Xpt CP	32F	32R	9X40BB/41BA/45BA
9X31AB -5V 20A Power Converter	33F		
9X30AB +5V 80A Power Converter	36F		

RELEASE 06.03
13 July 1998

7.2.3.3 SPEECH LINK ASSIGNMENT RULES

Reallocation of normal grades of service across system components taking into account the new switching architecture, may result in improvements to stated capacities of other traffic sensitive components. This area requires further study.

In Initial offices, the peripheral modules must be assigned to the Enhanced Network in the following order of preference.

- 1) Different ENET shelves where possible or
- 2) Different halves of the ENET shelf or
- 3) Odd/Even slots (but not adjacent slots) or
- 4) Adjacent Slots.

DS-30 Speech links (Series I Peripherals)

Distribute speech links with messaging from each peripheral type (i.e. MTM, LM, TM, DCM, DES) as evenly as possible over the available shelves and DS-30 PBs. Note that Series I peripherals require 1 messaging link per peripheral.

Distribute the remaining speech links by peripheral types as evenly as possible over PBs. Note that Series I peripherals require from 1 to 4 speech links.

DS-30 Speech links (Series II Peripherals)

Distribute speech links with messaging from each peripheral type as evenly as possible over the available shelves and DS-30 PBs.

Distribute the remaining speech links by peripheral types as evenly as possible over PBs and shelves.

DS-512 Speech links

Distribute speech links with messaging from each peripheral type as evenly as possible over the available shelves and DS-512 PBs.

The telephone company may review and if necessary re-assign the emergency services to ensure that where possible, all essential services are not located on the same peripherals which are on the same ENET shelf, or on the same Paddle Board. The peripherals with emergency services (police, hospital, fire, etc..) must be evenly distributed where possible, over ENET shelves and paddle boards.

As previously stated, no rigorous port spreading rules apply to speech links and respreading is not carried out during exten-

RELEASE 06.03
13 July 1998

sions. Peripherals will be cabled directly to the ENET Shelf, only if fewer than seven (7) NT9X41BA and or NT9X45BA PBs are on the ENET Shelf.

If there are seven (7) or more NT9X41BA and or NT9X45BA PBs on the ENET Shelf, Speech Link Connector (SLC) frames, Peripheral Speech Link (PSL) panels, and Network Speech Link (NSL) panels will be engineered as appropriate. In such a case, if there is room on an existing SLC frame, the new PSL and NSL panels can be assigned onto it. Otherwise, new SLC frames will have to be provided.

When SLC Frames/Panels are required, provision PECs and quantities exactly as documented for JNETs.

The NT9X6530 (i.e. left bulkhead panel provides access for 0 to 112 DS-30s) is required, if there are four (4) to seven (7) NT9X41BA and or NT9X45BA PBs per the corresponding left half of the shelf (i.e. between card slots 32R-25R). The NT9X6531 (i.e. right bulkhead panel provides access for 0 to 112 DS-30s) is required, if there are four (4) to seven (7) NT9X41BA and or NT9X45BA PBs per the corresponding right half of the shelf (i.e. between card slots 10R-16R). The DS-30 speech links terminating on the either half of the shelf will be cross connected at an SLC. For more information, refer to Bulkhead Provisioning Rules.

If any of the above bulkhead panel is used, the number of NSLs can be calculated using,

#of NSLs = {#of NT9X41BA & or 45BAs in one half of the shelf/4}
to be rounded to next higher integer.

It is a requirement that each ENET Shelf be fully equipped with X-Point CPs before another is started. Each X-Point CP need not have a PB behind it.

7.2.3.4 BULKHEAD PROVISIONING RULES

Another factor influences where NT9X41BA/45BA CPs are placed on the shelf. As with the DMS-SuperNode, all copper switchboard cables leaving the cabinet route via filter bulkheads. Fiber leads pass through holes in the bulkheads. Each bulkhead serves the nearest half shelf. Three (3) different pairs can be provisioned;

- 1) NT9X6503 Interface Panel Right Fiber Assembly
NT9X6506 Interface Panel Left Fiber Assembly
 - No DS-30 filtering provided
 - Intended to be used only for fiber cables
 - Will not normally be used
- 2) NT9X6520 Filter Bulkhead Panel Left 48 DS-30
NT9X6521 Filter Bulkhead Panel Right 48 DS-30

RELEASE 06.03
13 July 1998

- Each provides filtering and connectivity for DS-30 speech links for up to 3 NT9X41BA/45BA (3 X 16 = 48 DS-30).
 - Each provides 13 holes with grommet to access fiber connections
 - Dedicated cabling to individual peripheral modules
 - Intended for use in normal ENET applications
- 3) NT9X6530 Filter Bulkhead Panel Left, 112 DS-30
NT9X6531 Filter Bulkhead Panel Right, 112 DS-30
- Each provides filtering and connectivity for DS-30 speech links for up to 7 NT9X41BA/45BA
 - Each provides 13 holes with grommet to access fiber connections
 - Group cabling to peripherals via SLC and normal speech link cable group facilities
- Intended for use where high concentrations of DS-30 result in more than six (6) NT9X41BA/45BA PBs per ENET shelf.
(e.g. BOC offices with many SLC-96s or ENET retrofits involving significant quantities of Series I Peripherals).

Selection of bulkhead types should be based on projected NT9X41BA/45BA requirement of fully equipped shelves. If the projected number of NT9X41BA/45BA per shelf exceeds six (6) then NT9X6530/31 are required else NT9X6520/21 are recommended. In the majority of new applications the average number of NT9X41BA per fully equipped shelf is expected to range between two (2) and four (4). NT9X6530/31 should not be used in preference to NT9X6520/21. Where fewer than four (4) NT9X41BA are required per shelf, one NT9X6506 or NT9X6503 can be used in preference to a NT9X6520 or NT9X6521 but for reasons of flexibility this is not recommended.

From the above discussion, it is assumed that NT9X41BA/45BA would be distributed evenly over all shelves and half shelves.

7.2.3.5 RESET TERMINALS

Although each network shelf is equipped with a RTIF PB, separate reset terminals are not required. Normal RTIF access is from the CM reset terminal via out-of-band signalling over the message links.

The only difference between NT9X26AA and 26AB is, 26AB has both RS-232 and current loop. It is NOT a requirement to have 26AB in MS in SuperNode if ENET has 26AB. Thus, MS can have 26AA and ENET can have NT9X26AB.

RELEASE 06.03
13 July 1998

7.2.3.6 OFFICE ALARM UNIT PROVISIONING

The Office Alarm Unit (OAU) is configured in two (2) MTM shelves. Messaging links from these shall be assigned to Cross-point CP's, NT9X35BA or NT9X35CA in the following order of preference:

- 1) Different ENET shelves where possible or
- 2) Odd/Even slots of different Cross-point pairs or
- 3) Adjacent Cross-point CPs of the same pair or
- 4) same Cross-point CP.

7.2.3.7 CABINET CABLE TURNING SECTION (CCTS)

The NT0X35CC (CCTS) mounts on the left and/or right side of a ENC or S/N cabinet. The CCTS provides a larger cabling area for cables connected between cabinets and frames. Cable is intended to run down (or up) this cabinet, and enter the large holes in the side of the SuperNode, ENC, etc. cabinet to reach the connector bulkheads.

The NT0X35CC MUST be provisioned for ALL 64K and 128K ENET installations. Richardson applications do not require the cabling cabinets on both 64K and 128K ENET installations.

If two ENET cabinets are in the same lineup, the number of NT0X35CC, CCTS cabinets provided is equal to the number of NT9X05AC ENC Cabinets plus one (1). In the same lineup, one CCTS Cabinet is located on each side of the ENC Cabinets and one CCTS Cabinet is located in between each ENC (See figure below). When two ENET cabinets are in two different lineups, four (4) cabling cabinets are required.

The number of cabling cabinets required for 64K ENET (NT9X05AD) must be 2(See figure below).

From 64K ENET to 128K ENET upgrades refer to the first figure.

If not initially installed with ENET, CCTS Cabinets cannot be added at a later date.

Rear

END PNL	CCTS	ENC	CCTS	ENC	CCTS	END PNL
Assy	Cabinet	PL. 0	Cabinet	PL. 1	Cabinet	Assy
	NT0X35CC	NT9X05AC	NT0X35CC	NT9X05AC	NT0X35CC	

RELEASE 06.03
13 July 1998

Front

Rear

END PNL	CCTS	ENC	CCTS	END PNL
Assy	Cabinet	PL.0 & 1	Cabinet	Assy
	NT0X35CC	NT9X05AD	NT0X35CC	

Front

7.2.4 Office Layout Information

The S/DMS cabinet will be shipped with the doors, shelves, circuit packs, FSP, and cooling unit installed. The bus bar will be installed and appropriate connections will be made at the factory. The bulkheads form part of the EMC cage around the equipment and provide a place to mount filter PCBs and optional power filters. The rear of the cabinet is equipped with two removeable bulkhead panels near the bottom of the cabinet. When these panels are removed, the cabinet can be installed in, or removed from, a lineup equipped with horizontal cabling. The cabinet may be slid "FORWARD" only.

Refer to ECM 600 for office layout restrictions when this cabinet is applied in a Streamline lineup.

Refer to the following Layout section when this cabinet is applied in a stand alone lineup.

FLOOR LAYOUT

A cross aisle trough must be placed from one of the ENC cabinets to all aisles in the office to accommodate the fiber cables terminating to the ENC.

Cabinets and frames should not be mixed in the same line-up. ENC, DMS-SuperNode and associated SSC and CCTS cabinets should be grouped in separate line-ups.

Aisle dimensions have been derived to meet central office environmental requirements for floor loading and heat dissipation. These dimensions are as follows:

maintenance or wiring aisles between adjacent line-ups of cabinets, 1.8 m (6'),

maintenance or wiring aisles between a cabinet and a frame line-up, 1.4 m (4' 6").

RELEASE 06.03
13 July 1998

INITIALS & UPGRADES

The above floor layout applies to all ENET only offices where all cabinets can be accommodated in separate line-ups. However, in certain upgrade situations this may not be possible due to floor layout constraints. In such cases cabinets may have to be separated and (or) included in line-ups with frames.

ENC cabinets should be deployed using one of the following methods (arranged in descending order of preference):

- 1) as an extension to an existing front line-up,
- 2) as an extension to an existing or planned line-up in the network growth area provided that aisle spacing requirements are met or can be met by the removal of existing NET, SLC or DNI frames.
- 3) as a new line-up at the growth end of the office,
- 4) as an extension to an existing line-up at the growth end of the office.

When Cabinets and frames are placed in the same line-up, the following rules apply:

frames and cabinets are not to be interspersed among each other

the backs of frames and cabinets are to be aligned,

if a frame and a cabinet are to adjoin each other, a gap of 6" must separate the two.

aisle spacing rules for cabinets must be observed

When ENET Cabinet is installed next to SuperNode Cabinet(NT9X01BA/JA) the NT9X04AX Message Switch Bulk Head Interface kit must be provisioned.

Close attention should be paid to the placement of cross-aisle ducts and cable racks to ensure that speech link and message link cables are afforded uncongested access to ENC cabinets. It should be noted that fiber cables which terminate in an ENC cabinet must route over the top of the same cabinet before entering the Cabinet Cable Turning Section (CCTS) Cabinet. These cables can only approach the CCTS Cabinet from one direction which may force looping in the cable trough. Also they cannot enter the CCTS Cabinet directly from a cable rack or cross-aisle duct.

The placement of air conditioning diffusers and return air vents in the vicinity of cabinets and their respective flow rates must take into consideration the increased dissipation of these cabinets and their increased air flow rates and different intake and exhaust positions and patterns.

RELEASE 06.03
13 July 1998

Local engineering support groups should be consulted if a raised floor application is proposed. However the following should be noted:

Stated earthquake performance may not be guaranteed for certain building floor and earthquake zone combinations.

7.2.5 Traffic Tables

Not applicable.

7.3 Product/System Specification

7.3.1 Physical Characteristics

The following describes the physical dimension of NT9X05AC ENET Cabinet.

MECHANICAL DIMENSIONS

Height 72in. Width 42in. Depth 28in.

Weight 1400lbs. (Full)

7.3.2 EMI/Earthquake Information

End panels are required to complete the EMC enclosure for cabinets located at the end of a lineup. In earthquake installations, the S/DMS cabinet must be bolted to the floor in four(4) places through anchor holes provided in the base of the cabinet. The cooling unit must be removed for access to the bolts. When the cabinet is bolted in place, the optional leveling feet must not be installed. Leveling will be accomplished through the use of non-conductive shims. The bolts must be tightened with a torque wrench to ensure adequate pretension.

For raised floor installations, a sub-structure support between the concrete sub-floor and the raised floor will be required. A qualified seismic engineer should be consulted regarding the required additional bracing.

7.3.3 Sparing Information

For U.S. applications use standard sparing algorithms.

For Canadian and other applications the following may be used.

a) Version 2, C42 Cooling Unit:

RELEASE 06.03
13 July 1998

Blowers 660,000 hrs MTBF in its useful life of 10 years.
MTM cards 4,700,000 hrs MTBF
Relay 100,000,000 hrs MTBF

Note that the blower's useful life is about 10 years. Around that time, failures are to be expected. Good practice might dictate replacement of operating blowers around that time (analogous to replacing your car's engine belts before they break).

Ordering information for Spare Storage Cabinets (SSC) is provided in ECM-626.

Mean Time Before Failure (MTBF) for the ENET Circuit Packs and related interface Circuit Packs are as follows,

PEC	Failures/ Millions of hours	MTBF (Years)
NT9X13FA (MD)	5.0	22
NT9X13KA	5.0	22
NT9X30AA	1.8	
NT9X31AA	1.5	
NT9X35BA	5.6	20
NT9X35CA	5.6	20
NT9X36BA	4.2	27
NT9X40BA	2.4	47
NT9X41BA (MD)	1.2	95
NT9X45BA	2.3	49

For U.S. applications use standard sparing algorithms.
For Canadian applications the following may be used until formal provisioning is available through the engineering process.

a) ENET & DMS- SuperNode Equipment:

PEC	NO. SPARES	(1) ENGINEERED INVENTORY
NT9X13FA (MD)	1	8
NT9X13KA	1	8
NT9X17DA	2	16
NT9X20BB	1	8
NT9X25AA	1	8
NT9X25BA	1	8
NT9X26AB	1	8
NT9X30AA	1	16
NT9X31AA	1	16
NT9X35BA	3	96
NT9X35CA	1	32

RELEASE 06.03
13 July 1998

NT9X36BA	1	8
NT9X40BA/BB	4	128
NT9X41BA (MD)	4	128
NT9X45BA	4	128

(1) Spares cover all engineered quantities if no entry.

(2) Spares quantity based upon MTBF and 720 Hrs turn around time unless otherwise noted..

b) FXPM Equipment:

NT6X40CA	MTBF(years) is 62
NT6X40DA	MTBF(years) is 127
NT6X40FA	MTBF(years) is 69
NT6X40GA	MTBF(years) is 245

PEC	Failures/Millions of hours
NT6X40CA	1.0
NT6X40DA	0.9
NT6X40FA	1.7
NT6X40GA	0.5

Note: Upon general availability, the NT6X40FA will replace the NT6X40CA as the standard DS512 XPM Interface and the NT6X40GA will replace the NT6X40DA as the standard DS512 Link Paddle Board.

All ENET offices must provide two (2) spare Quad Fiber cables for use on an emergency basis in the event of a failure of a job engineered fiber cable. The spares will be used on a temporary basis until a corrected length fiber cable can be obtained.

The spare fiber cables should be as long as the longest job specified cable, with a breakout length also equal to the longest length used in the office.
(eg. NT0X97AK, NT0X97AJ Fiber Cables)

7.3.4 Power Feed and Fusing Requirements

Each shelf has four (4) power converters, two at either side of the shelf, mounted from the front.

Logic power distribution to the shelf electronics is from each power module to the corresponding half of the shelf.

Fuses are required as follows for NT9X05AC.

For powering from a standard 7' PDC

RELEASE 06.03
13 July 1998

- 2 - 20 Amp fuses (for each ENET Shelf)
- 2 - 10 Amp fuses (for C42 cooling blowers)
- 1 - 10 Amp Fuse (Alarm Battery Supply (ABS))

For powering from a CPDC

-
- 2 - 30 Amp fuses (for each ENET Shelf)
 - 2 - 10 Amp fuses (for C42 cooling blowers)
 - 1 - 10 Amp Fuse (Alarm Battery Supply (ABS))

Plane 0 cabinets are powered from A feed while plane 1 cabinets are powered from B feed.

Refer to CA0X04 issue 01 20 and later for power cable information.

PDC feeds are connected to the cabinet via EMI feed through capacitors at the top of the frame. Cable and Drop Length shall be job engineered.

7.3.5 Current Drain Information

Input Voltage.....-48VDC
Power Consumption.....4432 watts (+/- 10%) fully equipped
Current Drain.....92.0Amps

7.4 Software Provisioning

For NTX software packages to PLC/SOC mappings for CSP02 and beyond refer to ECM552 - Mapping of NTX/NTG Package to PCL/NCL/Option.

7.4.1 Required Software Packages and Interdependencies

1) Initial jobs with 64K or 128K ENET require NTXE01AA package. In addition, offices equipped with 64K or 128K ENET must have

- NTXF71AB - SuperNode Enhanced Messaging.

2) The optional packages for ENET (64K or 128K) offices are,

- NTXP13AA - Switch Path Diagnostics (SPD).
- NTX738AC - Switch Performance Monitoring System (SPMS).

Prior to BCS34, the JNET s/w is part of NTX001AA which is a Common Basic Software package. From BCS34 onwards, the JNET s/w has been separated into a new software package called NTXP10AA.

For all ENET UPGRADE jobs provision the software packages NTXP10AA and NTXE01AA effective BCS34 and higher BCSs. It is recommended that NTXP10AA be removed in the subsequent BCS upgrade following the network Upgrade.

RELEASE 06.03
13 July 1998

Example: If an office running with pre BCS34 s/w, with JNET, For ENET UPGARDE, These steps must be done.

- 1) NTXP10AA must be ordered for JNET to work.
- 2) NTXE01AA must be ordered for ENET.
- 3) NTXF71AB must be ordered for SuperNode Enhanced Messaging.

Note that, NTXP10AA can be removed in the subsequent BCS upgrade following the network Upgrade.

7.4.2 Software Usage Restrictions

When ordered by the Customer, the Switch Path Diagnostics (SPD) software package is to be furnished as NTX885AB for non-ENET SuperNode and NT-40 offices and furnished as NTXP13AA for ENET SuperNode offices.

If software package SPD exists in a DMS office prior to an ENET upgrade, then both NTX885AB and NTXP13AA are to be provided in the retrofit software load to provide both Network Module (NM) and ENET coverage. NTX885AB is to be removed on the next BCS application following the upgrade.

The above rules are an example of unautomated rules which are stored in a document entitled "SW Package Ordering Rules - Not Automated" in the SMS Documentation Menu in CODA.

Offices equipped with NT9X45BA must have a BCS33 load or higher.

Offices equipped with NT9X40BB must have a BCS33 load or higher.

7.4.3 Memory Provisioning

CM Memory must be 6 to 8 megabytes.

MS-E(MS Load for ENET) requires 10 megabytes.

7.5 Real Time Impact

There is not a Real Time improvement or degradation on ENET over JNET applications (i.e. No impact on DMS-100 Call Processing Capacity due to JNET/ENET Variance.

RELEASE 06.03
13 July 1998

8.0 ECM635 - Single Cabinet Enhanced Network

8.1 Overview

In this document ENET refers to the 64K Enhanced Network.

Single Cabinet Enhanced Network is designed to allow a network size of 64K channels duplex with modular growth from 4K to 64K channels. Growth from 4K to 32K will be in 2K increments; 32K to 64K channels will be in 16K channels. Network Plane 0 and Plane 1 both will be in the single cabinet. The NT9X05AD is a 64K Enhanced Network Duplex Cabinet and the following diagram gives a pictorial representation of this cabinet:

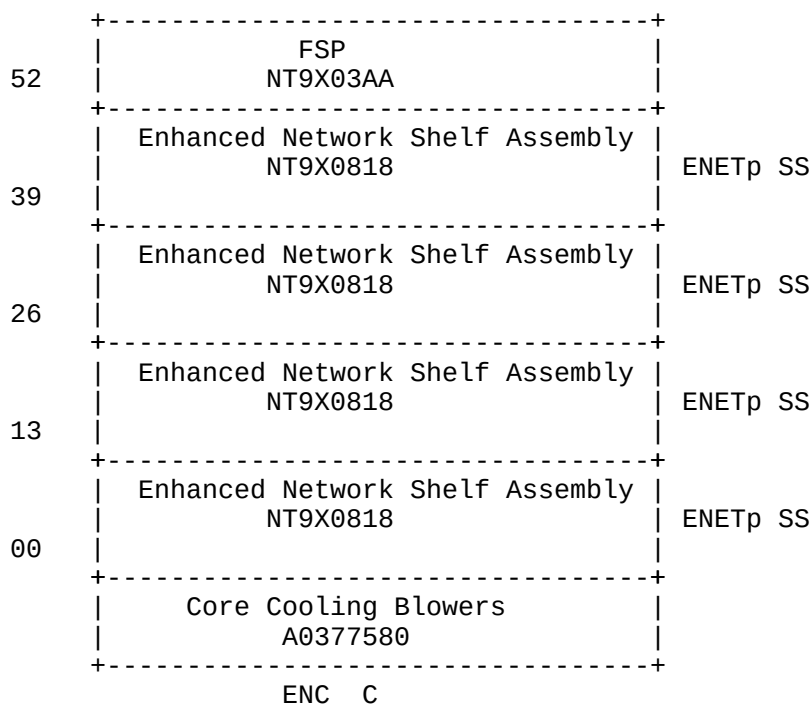


Figure 8. Single Cabinet Enhanced Network

where p = the Plane number 0 or 1
C = the Cabinet number 0
SS = the Shelf number 00-01
(assign from top down)
(Shelf 39 & 26 is Plane 0)
(Shelf 13 & 00 is Plane 1)

RELEASE 06.03
13 July 1998

8.2 Hardware Provisioning

8.2.1 Hardware Usage Restrictions

The following restriction apply to ENET H/W applications:

- The Enhanced Network must interface to a SuperNode (i.e. Message Switch & Computing Module). An NT-40 (i.e. Central Control Complex) will not support an Enhanced Network.
- The Enhanced Network will not interwork with any previous version of Network frames.
- The NT9X41BA has 16-Ports numbered 0-15. All ports except port #1 may be used for Voice or Messaging Links. Port #1 is valid for Voice Links only. This is a S/W restriction on the hardware.
- The NT9X45BA has 16 DS-30 ports numbered 0-15 and 3 DS-512 ports. All DS-30 ports except port #1 may be used for Voice or Messaging Links. Port #1 is valid for Voice Links only. This is a S/W restriction on the hardware.
- Application of the above restriction prohibits the assignments of the following Peripheral Module (PM) ports to Link #1 as follows:
 - Single link PMs (e.g. MTMs, TM8s, OAU's, etc.)
 - Port Zero of DCMs and LMs
 - Port Zero and Two of XPMs
 - The DTC6, MSB6 and SMR are not ENET ready since enhanced messaging (NT6X69AC/MA) are not available in those facilities. Therefore, offices equipped with this vintage XPMs should not be considered for ENET unless an agreement can be reached with the Telco to change these peripherals to a ENET ready type.
- MS to ENET, ENET to FXPM Distance Restrictions are as follows:
 - MS-9X20BB To ENET-9X40BB
Length: 250ft Variance: 25ft
 - MS-9X62BA To ENET-9X40BB
Length: 250ft Variance: 25ft
 - ENET-9X40BB To FXPM-6X40DA
Length: 1000m Variance: 200m
 - ENET-9X40BB To FXPM-6X40GA
Length: 1000m, Variance: 200m
 - ENET-9X41BA to XPM/PM

RELEASE 06.03
13 July 1998

16 port Copper Link
Length: 750ft, Variance: 200ft

- ENET-9X45BA to XPM/PM
16 port Copper Link
Length: 750ft, Variance: 200ft
3X Fiber link
Length: 1000m, Variance: 200m

- ENET-9X40DA to SPM
HCS Fiber Link
Length: 100ft.

- NT9X40BA/41BA/45BA Interchange Capability are as follows:
 - NT9X41 to NT9X40 is to fiberize copper XPMs in in-service ENET offices. This has been verified in FAST office and it is allowed.
 - NT9X41 to NT9X45 is for adding 3 more DS-512 ports without loss of DS-30 ports and without additional Cross point cards. This procedure has been verified in FAST office and in V.0 and it is allowed.
 - NT9X45 to NT9X40 has been verified in FAST office and in V.0, and it is allowed.
 - NT9X40 to NT9X45 is NOT ALLOWED, no requirement seen.
 - NT9X40 to NT9X41 is possible, but is of no value. Hence this is NOT ALLOWED. NT9X41 product is now MD.
 - NT9X45 to NT9X41 is of no value. Hence this is NOT ALLOWED.

NOTES:

1. Refer To ECM-626 For MS TO ENET Restrictions

8.2.1.1 64K ENET To 128K ENET Upgrade

When the network capacity of the existing 64K ENET cabinet exhausts, then an upgrade to 128K ENET Cabinets is required. NT has developed engineering and installation procedures in which the inservice 64K Cabinet (NT9X05AD) in the Customer's office is converted to a Plane 0 128K Cabinet (NT9X05AC), and a Plane 1 128K Cabinet will be ordered and engineered for the Customer. This will eliminate the necessity of ordering two new cabinets and having a 64K cabinet left over once the office has the new network in-service.

RELEASE 06.03
13 July 1998

In an initial office if the ports are near the 64K maximum and growth is anticipated, then the 128K ENET should be provisioned to avoid an unnecessary 64K ENET upgrade in the future.

Following are the major hardware and software requirements for this upgrade that will guide the SAE/EAE to a proper solution for this office:

1. Order a 64K to 128K ENET Upgrade Kit. This kit is detailed in the NT9X0560 EMS section and provides the necessary cables and labels required to convert the 64K cabinet to the 1 8K Cabinet. This kit includes the V-Bus cables required for Plane 0 plus some of the labels.

2. Order one 128K ENET Cabinet for Plane 1 using the standard process for the NT9X05AC Cabinet. Reference ECM 627 for the Dual ENET cabinet. Provision the cabinet (NT9X05AC) with both shelves 0 and 1 equipped with crosspoint cards and paddle boards. The crosspoint card and paddle board configurations on the new ENET cabinet shelf 0 and 1 must be identical to the shelf 0 and 1 configuration on the existing ENET 64K cabinet in the Customer's office. Note that the interface cards on the existing shelf may be updated based on item 3 below.

3. Preconditions for this upgrade include checking (or provisioning) that the 64K Cabinet is fully equipped with all crosspoint cards before the upgrade kit is applied. Also the DS 30 Interface cards (NT9X41BA) cards must be replaced with the DS-512/DS-30 Interface Cards (NT9X45BA) and the DS-30 cables must be replaced with the DS-512/DS-30 cable assemblies. Based on these parameters, the bulkheads for the shelves may need to be changed. The bulkheads in the Plane 1 cabinet (new 128K) must be the same as those on Plane 0.

4. The NT9X0818 shelves in a cabinet can co-exist with previously provided NT9X0801 shelves. The NT9X0801 shelf has been set to MD status.

5. Based on software requirements the ENET processor card may need to be upgraded to latest vintage. At CSP006 (NA0006) the NT9X13FA must be replaced by the NT9X13KA.

6. Two types of MS port cards are used for connecting the ENET to the MS, the NT9X17DA (64 ports) and the NT9X17CA (128 ports). These port cards can also be used by other applications for connection to the MS (per standard ENET rules). Although the NT9X17DA chain cards can be used, the number of slots in the MS shelf can be reduced by using the NT9X17CAs, which allows more peripherals to be connected with less MS slots. A MS port reconfiguration may be required for some offices before proceeding with the upgrade. For this upgrade, two (2) MS card chains per MS need to be provisioned for connection to the shelves in the new ENET cabinet.

RELEASE 06.03
13 July 1998

7. With this addition of the second cabinet, SLC and CCTS cabinets will need space planning and ordering if required.

8. In the existing 64K cabinet which is being changed to a 128K cabinet, the power cables from the PDC or CPDC will change from B powering to A powering (Shelves 00 and 13). Also the new 128K cabinet (Plane 1) will require B power. Check to see that fuse/breaker positions are available, if necessary a new PDC/CPDC must be ordered.

9. Since many of the shelf locations and also a large number of card changes/additions will be made, the EAE will need to check that the proper shelf labels and the proper card labels have been provisioned for the job. Many of these labels are office dependant and therefore can not be part of an upgrade kit.

8.2.2 Hardware Dependencies

RELEASE 06.03
13 July 1998

8.2.2.1 P and C Side Port Requirements

The ENET Worksheets calculates the Enhanced Network and all the major provisionable parts, including the MS Port requirements of the SuperNode.

Worksheet one calculates the cards and shelves on the ENET, while worksheet 2 calculates the MS port requirements on the SuperNode.

8.2.2.2 64K ENET Cabinet Worksheet 1

Section 1. Determine the copper peripheral ports:

		Ports times	Perphl. Qty.= Total
1.1	LM (2,3,4)	_____ x	_____ = _____
1.2	DCM/DCMR	4 x	_____ = _____
1.3	NIU	4 x	_____ = _____
1.4	SMS _____ (3-16)	x	_____ = _____
1.5	SMR _____ (3-16)	x	_____ = _____
1.6	Digital Echo Supp	3 x	_____ = _____
1.7	MSB7	3 x	_____ = _____
1.8	TM/MTM/DRAM	1 x	_____ = _____
1.9	EDRAM/CTM	1 x	_____ = _____
1.10	Copper spare ports needed		_____
1.11	Subtotal of copper ports (Add Items 1.1 through 1.7 and 1.10)		_____
1.12	Open Copper Ports		_____
1.13	Total Copper Ports: Item 1.11 - Item 1.12)		_____

Section 2. Determine the fiber peripheral ports:

2.1	LGC/LGCI	_____
2.2	LTC/LTCI	_____
2.3	SMU/SMUI	_____
2.4	SMS	_____
2.5	DTC/DTCI	_____
2.6	SMA/SMA2	_____
2.7	SMS	_____
2.8	Fiber spare ports required	_____
2.9	Subtotal of fiber ports	_____
	Add Items 2.1 through 2.8	
2.10	Open Fiber Ports	_____
2.11	Total Fiber Ports:	_____
	(Item 2.9 - Item 2.10)	

3. Interface Paddleboard Calculation

- 3.1 Multiport interface total _____
Divide the total copper ports by 16 if
multiport interfaces (SMS,SMR etc.)
are terminated.
(Item 1.13 / 16)
- 3.2 Single port interface total _____
Divide the total copper ports by 15 if using single
port cards such as MTM/EDRAM/DRAM/ISM
(Items 1.8 + 1.9) / 15 _____
- 3.3 Calculated qty. of DS30/DS512 IF CP _____
(Items 3.1 + 3.2)
(Result is qty required of NT9X45BA)
- 3.4 Quantity of Fiber Ports Available _____
(Items 3.3) x 3
- 3.5. Determine the number of Fiber Interface _____
Paddleboards required.:
| (Item 2.11 - Item 3.3) /4
(Result is qty required of NT9X40BB)
(Round up to next integer)
5. Type of Bulkhead required for the ENET shelves. _____
A. NT6506/6503 Fiber only
B. NT6520/6521 Up to 6 DS 30 type cards per shelf
C. NT6530/6531 Up to 14 DS 30 type cards per shelf
 (Requires Speech Link Connector Bays)
D. NT8909 Not used in PCN.

RELEASE 06.03
13 July 1998

6. Quantity of ENET Shelves required

		Exist	Add	Total
6.1	Qty. of DS 512/DS30 PB placed on Shelf 0	_____	_____	_____
6.2	Qty. of DS 30 PB placed on Shelf 0	_____	_____	_____
6.3	Qty. of DS 512 PB placed on Shelf 0	_____	_____	_____
6.4	Qty of Paddleboards for this shelf Maximum of 15 PB per shelf for peripheral support.	_____		
6.5	Qty. of DS 512/DS30 PB placed on Shelf 1	_____	_____	_____
6.6	Qty. of DS DS 30 PB placed on Shelf 1	_____	_____	_____
6.7	Qty. of DS 512 PB placed on Shelf 1	_____	_____	_____
6.8	Qty of Paddleboards for this shelf. Maximum of 15 PB per shelf for peripheral support. If the sum of Items 6.4 and 6.8 is close to or equals 30, the 128K ENET should be provisioned.	_____		

7. Quantity of single plane ENET shelves required _____
Sum the number of shelves used by 6.1 thru 6.8
Min. number of shelves is 1, max is 2.
- 7.1 Quantity of dual plane ENET shelves required _____
Min. number of shelves is 2, max is 4.
(Item 7 x 2)
- 8 Quantity of ENET Support Cards required.
- 8.1 Quantity of +5Volt Power Supplies required. _____
(Item 7.1 x 2)
- 8.2 Quantity of -5Volt Power Supplies required. _____
(Item 7.1 x 2)
- 8.3 Quantity of CPU CP required. _____
(Item 7.1 x 1)
- 8.4 Quantity of Network Clock and Message CP required. _____
(Item 7.1 x 1)
- 8.5 Quantity of RTIF CP required. _____
(Item 7.1 x 1)
- 8.6 Quantity of Quad DS-512 Interface PB required. _____
(Item 7.1 x 1)

- 9 Quantity of ENET I/F Paddleboard Cards required.
- 9.1 Quantity of DS 512/DS 30 PB required. _____
 (Item 3.3 x 2)
- 9.2 Quantity of DS 512 PB required. _____
 (Item 3.4 x 2)
- 1 Quantity of ENET Crosspoint Cards required.
- 1 .1 Quantity of Crosspoint CP required. _____
- 1 .2 Quantity of Crosspoint Termination CP required. _____
- 1 . Bulkhead Provisioning
- 1 .1 Quantity of Left Bulkheads required. _____
 (Item 7.1 x 1)
- 1 .2 Quantity of Right Bulkheads required. _____
 (Item 7.1 x 1)
- 1 . Auxilliary Cabinet Provisioning
- 1 .1 Quantity of CCTS cabinets required. _____
 Provide 2 cabinets for new offices.
- 1 .2 Quantity of SLC cabinets required. _____

RELEASE 06.03
13 July 1998

8.2.2.3 Message Switch Provisioning

The MS port requirements are determined by the quantity of ports required by the combination of all interface paddleboards on each ENET shelf. The MS port requirements are then duplicated because there are two MS shelves on the SuperNode. All calculations done on worksheet 2 will result in changes and additions to the MS shelves on the SuperNode.

Calculation of MS Port Card Requirements for Shelf 0

PPC x Qty PB equals PB Ports

- 1.1 Qty. DS30/DS512 I/F CP 22 X _____ = _____
- 1.2 Qty. DS30 I/F CP 22 X _____ = _____
- 1.3 Qty Quad Fiber I/F CP 8 X _____ = _____
- 1.4 Total quantity of ports required for Shelf 0 _____
- 1 5 Quantity of MS 128 Port CP required for Shelf 0 _____
From Table A in Reference manual (NT9X17CA)
- 1.6 Qty. of MS 64 Port CP required for Shelf 0 _____
From Table A (NT9X17DA)
- 1.7 Qty. of ENET MS Fiber I/F CP required for Shelf 0 _____
From Table A (NT9X20BC)
- 1.8 Quantity of MS Port Term. CP required for Shelf 0 _____
From Table A (NT9X25BA)

Calculation of MS Port Card Requirements for Shelf 1

PPC times Qty PB equals PB Ports

- 2.1 Qty. DS30/DS512 I/F CP 22 X _____ = _____
- 2.2 Qty. DS30 I/F CP 22 X _____ = _____
- 2.3 Qty Quad Fiber I/F CP 8 X _____ = _____
- 2.4 Total quantity of ports required for Shelf 1 _____
- 2.5 Quantity of MS 128 Port CP required for Shelf 1 _____
From Table A (NT9X17CA)
- 2.6 Quantity of MS 64 Port CP required for Shelf 1 _____
From Table A (NT9X17DA)
- 2.7 Qty. of ENET MS Fiber I/F CP required for Shelf 1 _____
From Table A (NT9X20BC)
- 2.8 Qty. of MS Port Term. CP required for Shelf 1 _____
From Table A (NT9X25BA)

RELEASE 06.03
13 July 1998

h id=EWRS635.ENET WORKSHEET REFERENCE SECTION

This section is intended to provide a short explanation for each entry in the ENET worksheets. The worksheets has been completely revised and rewritten to provide an easier interface to provisioning an ENET or to upgrading/adding port capacity to an existing ENET. h id=ermo635.Worksheet 1 Reference Manual

For initial offices enter the total or the sum of all of the peripherals in the office. For extension offices enter the delta or only the added peripherals that are being added at this time. Some of the peripherals as in the case of Line Modules, DCMs, MSB7s and SMRs will not be found in newer offices. Some of the peripherals are combined on one line but the total is the sum of all of these types in the office.

1. Section 1 defines all the copper based peripherals. Enter the peripheral quantity and multiply by the number of ports to determine the total copper port quantity.

1.1 Enter the quantity of Line Modules in this office. Line Modules used 2, 3 or 4 Ports to the network. If for some reason, an unusual office has a mixture of ports enter the entire port quantity in the total column. Note that LCMS terminate on LTCs or LGCs and therefore do not terminate on the network directly.

1.2 Enter the number of Digital Carrier Modules and Digital Carrier Modules Remote (DCM/DCMR) in this office.

1.3 Enter the quantity of Network Interface Units in this office.

1.4 Enter the quantity of Subscriber Module Systems in this office.

1.5 Enter the quantity of Subscriber Module Rural in this office.

1.6 Enter the quantity of Digital Echo Suppressors in this office.

1.7 Enter the quantity of MSB7s connected in this office.

1.8 Enter the total quantity of TMs, MTMs and DRAMs in this office. ISMs do not have a separate entry, they are classified as a TM or MTM.

1.9 Enter the quantity of EDRAMs and CTMs in this office.

1.10 Enter the number of spare copper ports requested for this office.

1.11 This calculation is a sub-total of all the copper ports required for this office.

RELEASE 06.03
13 July 1998

1.12 Enter the number of open ports which are DS-30 and can be used to terminate copper links from peripherals. Paddle boards in an office may be shown in the office records as having spare ports. Use caution, and use the standard polling procedure to guarantee that the Telco has not already used these ports while adding a few frames/cabinets without notifying NT.

1.13 This calculation is is the total number of copper ports required for this office.

2. Section 2 defines all the fiber based peripherals, enter the peripheral quantity which determines the total fiber port quantity. ports:

2.1 Enter the quantity of Line Group Controllers (LGC) and Line Group Controllers ISDN (LGCI) in this office.

2.2 Enter the quantity of Line Trunk Controllers (LTC) and Line Trunk Controllers ISDN (LTCI) in this office.

2.3 Enter the quantity of Subscriber Module Unit (SMU) and Subscriber Module Unit ISDN (SMUI) in this office.

2.4 Enter the quantity of Subscriber Module SLC (SMS) in this office.

2.5 Enter the quantity of Digital Trunk Controller (DTC) and Digital Digital Trunk ISDN (DTCI) in this office.

2.6 Enter the quantity of Subscriber Module Access (SMA) and Subscriber Module Access Version 2 (SMA2) in this office.

| 2.7 Enter the quantity of Spectrum Peripheral Modules (SPM) in this
| office. Each SPM will require two (2) NT9X40DA HCS Fiber Link Interface
| Paddleboards placed on the rear of the ENET shelf.

2.8 Enter the number of reserved fiber ports requested for this office.

2.9 This calculation is a sub-total of all the fiber ports required for this office.

2.10 Enter the number of open ports which are DS-512 and can be used to terminate fiber links from peripherals. Paddle boards in an office may be shown in the office records as having spare ports. Use caution, and use the standard polling procedure to guarantee that the Telco has not already used these ports while adding a few frames/cabinets without notifying NT.

2.11 This calculation is is the total number of fiber ports required for this office.

RELEASE 06.03
13 July 1998

3. Determine the number of interface paddleboards that contain copper links required for this office.

3.1 The DS512/DS30 Interface Paddleboard contains 16 DS 30 interface links and 3 DS 512 fiber links. These DS512 links should be used first and then the 4link DS 512 Interface Paddleboard should be used. This calculation multiplies the number of DS512/DS30 I/F Paddleboard by three to show the total number of fiber ports available.

4. The DS512 Fiber Interface Paddleboard can be calculated by subtracting the number of available fiber ports on the DS512/DS30 Interface Paddleboard and then dividing the remainder by four to determine the number of Fiber Interface PB required.

5. Determine the type of bulkhead required for the ENET shelves. Some order systems may default to the 6530/30 but few offices want the SLC bays. The standard should be the 6520/21 bulkheads which can only handle up to 6 (16 link) copper interfaces per shelf.

Since many of the rules for card placement are based upon the DS-30 interface use on the shelves, provisioning is based on the particular type of bulkhead used. The same type of bulkhead is usually consistent throughout a given office.

A. The 6506/6503 bulkheads are used for fiber only. No DS-30 interfaces are included.

B. The 6520/6521 bulkheads can handle up to 6 DS-30 (16 link) interfaces. This includes a mix or non-mix of the DS-30 Interface cards (now at MD status) and/or the DS-512/DS30 Interface cards.

C. The 6530/6531 bulkheads can handle up to 14 DS-30 (16 link) interfaces. This includes a mix or non-mix of the DS-30 Interface cards (now at MD status) and/or the DS-512/DS30 Interface cards. These bulkheads require the use of Speech Link Connector (SLC) cabinets.

D. The 8909 bulkheads are used for extension offices that have Model A cabinets. These cabinets have been set to MD status in North America.

Since many of the rules for card placement are based upon the DS-30 interface used on the shelves, provisioning is based on the particular type of bulkhead used. The same type of bulkhead is usually consistent throughout a given office.

6. Quantity of ENET Shelves required:

The ENET shelf quantity can be based on two items;

One, the quantity of shelves based on interface card quantities on a particular shelf. When a shelf becomes filled with interface cards, another shelf will be required. A maximum of 15 PB can be added to a shelf.

RELEASE 06.03
13 July 1998

Two, the quantity of copper interface cards on a shelf depend on the type of bulkheads chosen by the Customer/SAE. In many cases this limits the number of DS 30 interfaces per shelf, leading to the provisioning of another shelf, even though one shelf is normally filled before provisioning another.

6.1 thru 6.4 1st Shelf ENET Card Placement

Enter the number of copper interface cards that are existing in the Exist column. Enter the number of added copper interface cards in the Add column. The DS 30 PB is now MD, no added cards should be shown in this column. Based on the type of bulkhead determined in Item 5 above, the maximum number of DS 30 type interface cards are shown in the table:

NT9X6506/NT9X6503 Fiber only- no DS 30 type PB allowed

NT9X6520/NT9X6521 Up to 6 DS 30 PB per shelf

NT9X6530/NT9X6531 Up to 14 DS 30 PB per shelf

DS 30 type PB here means either the NT9X41 series of DS 30 Interface PB or the NT9X45 series of DS 512/DS 30 PB.

Also enter the number of fiber only paddleboards and the number of DS-5 2/DS-30 interface paddleboards for this office.

Present practice is to place the DS-30 interfaces at the outside of the ENET shelf, therefore the DS-512 Interfaces should occupy the inner slots of the shelf.

For Item 6.4, add the total number of interface PBs of all types as totaled in the last column. This total can not exceed 15.

6.5 thru 6.8 2nd Shelf ENET Card Placement

Enter the number of copper and fiber interface cards as was done in the shelf 0. Refer back to the restrictions on the placement of copper interface cards if required. Be certain to adhere to all the rules and notes for this ENET shelf that are detailed in the ENET shelf 0 text.

For Item 6.8, add the total number of interface PBs of all types as totaled in the last column. This total can not exceed 15.

7. If there are any of the three types of cards provisioned in the shelf, that shelf is being utilized and the shelf must be provisioned along with the support cards for that shelf. Note that crosspoint cards will also be provisioned as required. There can be instances in which there are crosspoint cards without the corresponding paddleboard (interface) circuit packs.

7.1 Provisioning of the cards and ports are originally done as a single plane, since the ENET is a duplicated (dual) plane cabinet, quantities of shelves are doubled to have the correct answer.

8. Determine the quantities of ENET Support Cards Required.

RELEASE 06.03
13 July 1998

8.1 The quantity of +5Volt Power supplies is equal to the number of ENET shelves times two.

8.2 The quantity of +5/-5Volt Power supplies is equal to the number of ENET shelves times two.

8.3 The quantity of CPU CPs is equal to the number of ENET shelves times one.

8.4 The quantity of Network Clock and Message CPs is equal to the number of ENET shelves times one.

8.5 The quantity of RTIF CPs is equal to the number of ENET shelves times one.

8.6 The quantity of Quad DS-512 I/F PB is equal to the number of ENET shelves times one.

9. Determine the number of ENET Interface PB required for both planes.

9.1 The quantity of DS 512/DS-30 I/F PB is equal to the number of ENET shelves times two.

9.2 The quantity of Quad DS-512 I/F PB is equal to the number of ENET shelves times two.

1 . Determine the number of ENET crosspoint cards required.

1 .1 The number of ENET crosspoint cards is shown in the table:
Number of crosspoint CPs required:

Number of interface is equal to Provide
cards shown: or less than

30	0-24 Note 1
44	36
60	48

NOTE 1: Crosspoint cards are provisioned in pairs for the first shelf. If the total number of interface cards is an odd number, add one (1) to the number. Let that quantity be called Y. The number of crosspoint cards to be provisioned is then equal to Y -4.

1 .2 The number of ENET Termination Crosspoint cards is shown in the table:

Number of Termination Crosspoint CPs required:

RELEASE 06.03
13 July 1998

Number of interface is equal to Provide
cards shown: or less than

30	8
44	12
60	16

1 . Bulkhead Provisioning

1 .1 Determine the number of left bulkheads required by multiplying the number of sheves by one. Bulkhead types are shown in Item 5.

1 .2 Determine the number of right bulkheads required by multiplying the number of sheves by one. Bulkhead types are shown in Item 5.

1 . Auxilliary Cabinet Provisioning

1 .1 For new offices, provide two CCTS cabinets to contain all the cable from the office peripherals. For extension offices, two cabinets should already be in existance.

1 .2 Speech Link Cabinets do not easily fit into formulas. Reference SLC Provisioning - ECM 672

8.2.2.4 Worksheet 2 Reference Manual

1. Calculation of MS Port Card Requirements for Shelf 0

Calculations for each shelf should be done separately for two different reasons. One, the port chain depends upon the number of ports for that shelf, therefore each must be shown separately. Two, if the total number of Interface PBs is less than 15, a decision will need to be made to either compensate for the cards that will be added later, or the provisioning of MS port cards will need to be changed with a later extension.

1.1 Multiply the number of DS512/DS30 Paddleboards placed on shelf 1 times the Ports per card (PPC) to determine the total number of ports used by this PB type. Use the answer from Worksheet 1 Item 6.1.

1.2 Multiply the number of DS30 Paddleboards placed on shelf 1 times the Ports per card (PPC) to determine the total number of ports used by this PB type. Use the answer from Worksheet 1 Item 6.2. Note that the port quantity for the DS30 I/F card is actually 16 but has been changed to 22 to allow for the changeout to the DS30/DS512 I/F CP

RELEASE 06.03
13 July 1998

1.3 Multiply the number of DS512 Paddleboards placed on shelf 1 times the Ports per card (PPC) to determine the total number of ports used by this PB type. Use the answer from Worksheet 1 Item 6.3.

1.4 The total quantity of ports is the sum of all three types of card|s total ports. Reference Table A below to find the card grouping for this shelf.

Table A

Use the following table to determine the port card requirement for each of the ENET shelves required.

Table A will need to be referenced twice, once for Shelf 0 and once for Shelf 1.

1.1. If ports are less than or equal to 64:

Preferred card grouping Secondary card grouping

Qty.	Type	Mtg.	Qty.	Type	Mtg.
	NT9X17DA	Front		None	
	NT9X20BC	Rear			

If the shelf contains an appreciable amount of copper links or if growth is anticipated, the minimum configuration should be that shown in 1.2 below.

1.2 If ports are more than 64 but less than 128:

Preferred card grouping Secondary card grouping

Qty.	Type	Mtg.	Qty.	Type	Mtg.
	NT9X17CA	Front	4	NT9X17DA	Front
	NT9X20BC	Rear			
			2	NT9X20BC	Rear
			2	NT9X25BA	Rear

1.3 If ports are more than 129 but less than 192:

Preferred card grouping Secondary card grouping

Qty.	Type	Mtg.	Qty.	Type	Mtg.
	NT9X17CA	Front	6	NT9X17DA	Front
	NT9X17DA	Front			
	NT9X20BC	Rear	2	NT9X20BC	Rear
	NT9X25BA	Rear	4	NT9X25BA	Rear

RELEASE 06.03
13 July 1998

1.4 If ports are more than 193 but less than 256:

Preferred card grouping Secondary card grouping

Qty. Type Mtg. Qty. Type Mtg.

NT9X17CA Front 8 NT9X17DA Front

NT9X17CA Front

NT9X20BC Rear 2 NT9X20BC Rear

NT9X25BA Rear 6 NT9X25BA Rear

Note 1: The maximum number of ports for a port group is 324. If this number is exceeded, an arithmetic error has occurred. Please check your calculations and enter the correct port group.

Note 2: Initial offices get large discounts. For at least the first MS to ENET interface, the use of CA cards should be encouraged. If the first shelf contains a large amount of copper interfaces, two CA cards should be provided. The MS shelf has finite slots, if the slots are used for 9X17DA card chains, it is possible to run out of slots on future growth jobs for the office.

Note 3: Maximize the Port Group wherever possible. In many cases the use of two NT9X17CA cards for the first ENET shelf is justified.

Note 4: The NT9X40s in existing offices shown in slot 8R should not be counted as Message Links. If using the D410 drawing, these cards are shown but do not interface to the peripherals.

2. Calculation of MS Port Card Requirements for Shelf 1

2.1 Multiply the number of DS512/DS30 Paddleboards placed on shelf 1 times the Ports per card (PPC) to determine the total number of ports used by this PB type. Use the answer from Worksheet 1 Item 6.5.

2.2 Multiply the number of DS30 Paddleboards placed on shelf 1 times the Ports per card (PPC) to determine the total number of ports used by this PB type. Use the answer from Worksheet 1 Item 6.6. Note that the port quantity for the DS30 I/F card is actually 16 but has been changed to 22 to allow for the changeout to the DS30/DS512 I/F CP

2.3 Multiply the number of DS512 Paddleboards placed on shelf 1 times the Ports per card (PPC) to determine the total number of ports used by this PB type. Use the answer from Worksheet 1 Item 6.7.

2.4 The total quantity of ports is the sum of all three types of card's total ports. Reference Table A above to find the card grouping for this shelf.

RELEASE 06.03
13 July 1998

8.2.2.5 DMS BUS Port Requirements

Important rules.

1) Provide two (2) NT9X17DA MS 64-Port CP and two (2) NT9X20BB DS-512 ENET/MS Fiber interface PB to interface with an ENET shelf. An NT9X17DA/NT9X20BB pair is required per MS (per plane) for each link.

2) The NT9X17DA used only with ENET and it requires BCS31 or higher.

3) If the number of message ports required for interfacing with ENET is greater than 64, provide additional NT9X17DA MS 64-Port CP in successive higher numbered slots. For each additional NT9X17DA except the last, provide one (1) NT9X25AA MS Port Expander PB; for the last NT9X17DA, provide one (1) NT9X25BA MS Port Terminator PB.

In MS Port Group, assign the ENET ports to the lowest numbered MS slots in ascending order starting from slot 12 (i.e. slots 12, 13, etc.). However, the SAEs and EAEs should anticipate and plan all future growth on each ENET shelf and provision the MS cards accordingly, by leaving a spare slot for future expansion if necessary.

4) Provide two (2) NT9X17CA MS 128 Port CP and two (2) NT9X20BC DS-512 ENET/MS Fiber interface PB to interface with an ENET shelf. An NT9X17CA/NT9X20BC pair is required per MS (per plane) for each link.

Also refer to (ECM 627) Dual ENET and (ECM 626) DMS SuperNode for more detailed information.

8.2.2.6 Circuits Per Card

Not applicable

8.2.2.7 Discrimination Numbering

Not applicable

8.2.2.8 ENET RETROFIT (UPGRADE)

| An ENET retrofit (upgrade) occurs when the switching network of
| an existing inservice DMS-SuperNode office changes from a
| Junctored Network Module (JNET/NM) implementation to an Enhanced
| Network (ENET) implementation.

| The objectives of ENET Retrofit are as follows:

RELEASE 06.03
13 July 1998

1. Reconfigure the MS Shelf to support both JNETs and ENETs temporarily. Note, after the ENET Retrofit the JNETs shall be removed.
2. Determine if DS-30 Paddleboards are required to support MS Port Concentration. MS Port Concentration is required if:
 - a. a insufficient quantity of card slots are available on the MS to add NT9X17DAs required to Interface ENET, and/or
 - b. the total number of slots required in the MS is greater than 18.
3. The provisioning of the MS slots and ports is the responsibility of the SAE/EAE. The rules for the ENET Retrofits (Upgrades) with MS Port Concentration are found in ECM-626.
4. Document the MS shelf configuration Before, During, and After the ENET Retrofit via the CI and D610 job drawing.
5. If MS Port Concentration is required define the quantity of NT9X69xxs required, and report this requirement to Installation via the CI.
6. Obtaining the H/W required for MS Port Concentration is the responsibility of the Installation Staff. Refer to the appropriate section of IM-925/926.
7. When an ENET Cabinet is installed next to SuperNode Cabinet of the earlier vintages, (NT9X01BA/AA/JA) the NT9X04AX Message Switch BulkHead Interface kit must be provisioned. The part (P0674593) has circular openings while the replacement part (P0701264) contained in the interface kit has an oval opening and reduces the cable congestion. Check carefully that the DPCC is of the older vintage before ordering the kit. The NT9X04AX kit was rated MD but is now at standard status.

RELEASE 06.03
13 July 1998

8.2.3 Provisioning Considerations

8.2.3.1 Cabinet Model

NT9X05AD Enhanced Network Cabinet (ENC)

The 64K ENET will be engineered and provisioned the same as the current 128K ENET, with the exception that the system can be configured with the single cabinet for both planes. The shelf position 39 and 26 are Plane 0 and the shelf position 13 and 00 are Plane 1.

New Designation Labels have been developed for the ENET Cabinet (ENC) and ENET Shelf (ENET) to be applied to the Cabinet and the PDC as follows: This is for the 64K Enhanced Network product.

The Exterior Cabinet Door Label will be as follows :

P0735379 - Exterior Door Label (ENET Brown)
P0735380 - Exterior Door Label (ENET Grey)
P0735381 - Exterior Door Label (ENET Blue)

The format of this label is as follows:

ENC <cabinet number> , eg. ENC 0
cabinet number = 0

ENET Shelf Designation Label
P0735382 - ENET Shelf ID Label

Locate label beside the Frame Supervisory Panel (FSP). The label format includes Cabinet Name, Plane, Number, Location, PEC, and Shelf Name is as follows:

- Cabinet Name (ENC) <cabinet number>
eg. ENC 0

where cabinet number = 0

- Location : aann eg. A03, BA34

where aa = one or two letters from A through Z,
excluding I and O, and AA through ZZ,
excluding II and 00.

nn = two digits from 01 through 49

- PEC Code : NT9X05AD

- Shelf Name : ENET <Plane> <Shelf>,
eg. ENET 0 00, ENET 1 01
where Plane = 0 or 1
Shelf = 00 through 01

RELEASE 06.03
13 July 1998

The Power Distribution Centre Labels will be as follows:

P0735383 - The Power Distribution Centre Label

- NAME ABBREVIATION <Plane> <Shelf, Cabinet> <Function>

Where NAME ABBREVIATION = ENC or ENET

Plane = 0 or 1
Shelf = 00 through 01
Cabinet = 0
Function = ABS, and B1 through B4

where ABS = Alarm Battery Supply
B = Blower Fan

eg. ENC 0 00 B1
ENET 0 00
ENC 0 00 ABS

8.2.3.2 Enhanced Network (ENET) Shelf Provisioning

Network shelves are provisioned based on Speech Link PB needs. One shelf is required per plane for every 15 Speech Link PB. Each Single Cabinet Enhanced Network can be equipped with up to four (4) Enhanced Network (ENET) Shelf assemblies NT9X0818, as required. The Single Cabinet Enhanced network is always equipped with two (2) NT9X0818 enhanced network assembly in position 39 and 13. The additional shelves are to be mounted on the cabinet in position 26 and 00 as required. A fully equipped Single Cabinet Enhanced Network has the capacity of up to 64K channels.

The ENET Shelf assembly does not have a common circuit pack fill. All circuit packs are provisionable.

ENET Shelf Provisioning is dependent on the quantity and types of peripherals to be interfaced. The assumption is made that peripherals and IOC are first provisioned according to existing engineering rules. ENET rules relate to one plane only.

ENET provisioning is not sensitive to traffic or real time and therefore is provisioned based on terminations only.

NT9X40BB Quad DS-512 Fiber Interface Paddle Board

- one (1) required per ENET shelf assembly to interface MS links (i.e. card slot 8R of ENET shelf).

- one (1) required per four (4) DS-512 speech links. One (1) NT9X40BB can accommodate four (4) fiber XPMs (FXPMs).

NT9X41BA DS-30 Interface Paddle Board

RELEASE 06.03
13 July 1998

- one (1) required per 16 DS-30 links. No messaging ports can be assigned to link #1 (when counting from link #0 up). This paddle board is now at MD status, use the NT9X40/45 paddle boards instead.

NT9X45BA 16DS-30/3DS-512 Interface Paddle Board

The DS-30/DS-512 PB is a newer peripheral interface paddle board which can be used on the Single Cabinet Enhanced NETwork. This pack can interface 3 DS-512 fiber links and 16 DS-30 copper links. It combines the functionality of existing NT9X41BA and NT9X40BB packs. The NT9X40BB (4 DS-512) fully utilize the ENET's channel handling capacity, but it does not provide copper links. On the other hand, the NT9X41BA (16 DS-30) pack does not fully utilize ENET's channel handling capacity (only 25% utilization of cross-points). Using an NT9X45BA results in a 100% utilization of ENET crosspoints and providing both copper and fiber links. For example an ENET currently equipped with 4 NT9X41BAs and 3 NT9X40BBs requires 7 Crosspoints. This could be reconfigured with 4 NT9X45BAs and only 4 Crosspoints a savings of 3 Crosspoints

NT9X35CA 16K x 16K Channel Terminating Cross-point CP

- Used to terminate Horizontal bus (H-bus).
- Minimum 2 per Network Shelf. Maximum 4 per Network Shelf.
- The first Network Shelf always requires four (4) CP.
- One CP, slot 9F, required for MS to Network Shelf messaging. Slot 9R cannot be equipped with a PB and is therefore not available for speech links to peripherals.
- Other 3 CPs used for speech link interface to peripherals may be used with DS-30 or DS-512 PB.

NT9X35BA 16K x 16K Channel Cross-point CP

- One required for each speech link interface PB.
- Maximum 12 per Network Shelf.
- Provisioned in pairs (4K-CH) for the first shelf per plane and in groups of six CP (12K-CH) for the second shelf.

NT9X13KA CPU CP

- One (1) required per shelf assembly.

NT9X30AB +5V 80A Power Converter

- Two (2) required per shelf assembly.

RELEASE 06.03
13 July 1998

NT9X31AB -5V 20A Power Converter

- Two (2) required per shelf assembly.

NT9X26AB Remote Terminal Interface

- One (1) required per shelf assembly.

NT9X36BA Network Clock & Message Interface Circuit Pack

- Used to interface peripheral Message Channel to the Message Switch
- One (1) required per shelf assembly.

NT9X0530 V-Bus Cables

- 16 V-Bus cables are required between shelf 0 and shelf 1 on Plane 0 (i.e. between shelf position 39 and 26).
- 16 V-Bus cables are required between shelf 0 and shelf 1 on Plane 1 (i.e. between shelf position 13 and 00).

It is not permissible to have V-Bus cables between shelf position 26 and shelf position 13.

NT9X0520 DS-30 Cable Assemblies

- One (1) is required for each NT9X41BA equipped to extend the DS-30 Speech links to the Bulkhead from the Paddle Board.

NT9X19AA Filler Face Plate

- Eight (8) are required per shelf assembly.
- Provide as needed for other unequipped card slots.

NT9X19BA Filler Face Plate Paddle Board

- Nine (9) are required per shelf assembly.
- Provide as needed for other unequipped PB slots.

RELEASE 06.03
13 July 1998

See the figure below for a depiction of a fully utilized ENET shelf.

9X31AB -5V 20A Pwr Converter	1F		
9X30AB +5V 80A Pwr Converter	4F		
9X13KA CPU CP	7F	7R	9X26AB
9X36BA Network Clock & MSG CP	8F	8R	9X40BB
9X35CA 16K x 16K Chan Term Xpt CP	9F	9R	9X19BA
9X35CA 16K x 16K Chan Term Xpt CP	10F	10R	9X40BB/41BA/45BA
9X35BA 16K x 16K Chan Xpt CP	11F	11R	9X40BB/41BA/45BA
9X35BA 16K x 16K Chan Xpt CP	12F	12R	9X40BB/41BA/45BA
9X35BA 16K x 16K Chan Xpt CP	13F	13R	9X40BB/41BA/45BA
9X35BA 16K x 16K Chan Xpt CP	14F	14R	9X40BB/41BA/45BA
9X35BA 16K x 16K Chan Xpt CP	15F	15R	9X40BB/41BA/45BA
9X35BA 16K x 16K Chan Xpt CP	16F	16R	9X40BB/41BA/45BA
9X19AA Filler Face Plate	17F	17R	9X19BA
9X19AA Filler Face Plate	18F	18R	9X19BA
9X19AA Filler Face Plate	19F	19R	9X19BA
9X19AA Filler Face Plate	20F	20R	9X19BA
9X19AA Filler Face Plate	21F	21R	9X19BA
9X19AA Filler Face Plate	22F	22R	9X19BA
9X19AA Filler Face Plate	23F	23R	9X19BA
9X19AA Filler Face Plate	24F	24R	9X19BA
9X35BA 16K x 16K Chan Xpt CP	25F	25R	9X40BB/41BA/45BA
9X35BA 16K x 16K Chan Xpt CP	26F	26R	9X40BB/41BA/45BA
9X35BA 16K x 16K Chan Xpt CP	27F	27R	9X40BB/41BA/45BA
9X35BA 16K x 16K Chan Xpt CP	28F	28R	9X40BB/41BA/45BA
9X35BA 16K x 16K Chan Xpt CP	29F	29R	9X40BB/41BA/45BA
9X35BA 16K x 16K Chan Xpt CP	30F	30R	9X40BB/41BA/45BA
9X35CA 16K x 16K Chan Term Xpt CP	31F	31R	9X40BB/41BA/45BA
9X35CA 16K x 16K Chan Term Xpt CP	32F	32R	9X40BB/41BA/45BA
9X31AB -5V 20A Power Converter	33F		
9X30AB +5V 80A Power Converter	36F		

Figure 9. Fully Utilized ENET Shelf

RELEASE 06.03
13 July 1998

8.2.3.3 Speech Link Assignment Rules

Reallocation of normal grades of service across system components taking into account the new switching architecture, may result in improvements to stated capacities of other traffic sensitive components. This area requires further study.

As previously stated, no rigorous port spreading rules apply to speech links and respreading is not carried out during extensions. Indeed in ENET offices, no SLC is provided to facilitate such activity. Peripherals will be cabled directly to the ENET Shelf only if fewer than seven (7) NT9X41BA/45BA PBs are on the ENET Shelf.

If there are seven (7) or more NT9X41BA/45BA PBs on the ENET Shelf, Speech Link Connector (SLC) frames, Peripheral Speech Link (PSL) panels, and Network Speech Link (NSL) panels will be engineered as appropriate. In such a case, if there is room on an existing SLC frame, the new PSL and NSL panels can be assigned onto it. Otherwise, new SLC frames will have to be provided.

When SLC Frames/Panels are required, provision PECs and quantities exactly as documented for JNETs.

The NT9X6530 (i.e. left bulkhead panel provides access for 0 to 112 DS-30s) is required, if there are four (4) to seven (7) NT9X41BA and or 45BA PBs per the corresponding left half of the shelf (i.e. between card slots 32R-25R). The NT9X6531 (i.e. right bulkhead panel provides access for 0 to 112 DS-30s) is required, if there are four (4) to seven (7) NT9X41BA and or 45BA PBs per the corresponding right half of the shelf (i.e. between card slots 10R-16R). The DS-30 speech links terminating on the either half of the shelf will be cross connected at an SLC.

If any of the above bulkhead panel is used, the number of NSLs can be calculated using,

$$\# \text{ of NSLs} = \{ \# \text{ of NT9X41BA/45BAs in one half of the shelf} / 4 \}$$

to be rounded to next higher integer.

It is a requirement that each ENET Shelf be fully equipped with X-Point CPs before another is started. Each X-Point CP need not have a PB behind it.

RELEASE 06.03
13 July 1998

8.2.3.4 Cabinet Cable Turning Section

The NT0X35CC (CCTS) mounts on the left and/or right side of a ENC or S/N cabinet. The CCTS provides a larger cabling area for cables connected between cabinets and frames. Cable is intended to run down (or up) this cabinet, and enter the large holes in the side of the SuperNode, ENC, etc. cabinet to reach the connector bulkheads.

The NT0X35CC MUST be provisioned for ALL 64K and 128K ENET installations. Richardson applications do not require the cabling cabinets on both 64K and 128K ENET installations.

The number of cabling cabinets required for 64K ENET (NT9X05AD) must be 2 (See Figure 10)

For 64K ENET to 128K ENET upgrade refer to ECM 627.

If not initially installed with ENET, CCTS Cabinets cannot be added at a later date.

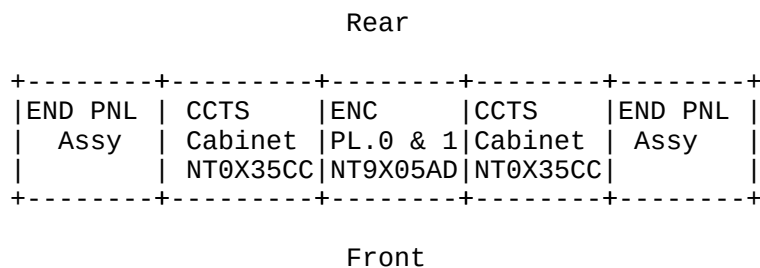


Figure 10. NT0X35CC (CCTS)

RELEASE 06.03
13 July 1998

8.2.4 Office Layout Information

The S/DMS cabinet will be shipped with the doors, shelves, circuit packs, FSP, and cooling unit installed. The bus bar will be installed and appropriate connections will be made at the factory. The bulkheads form part of the EMC cage around the equipment and provide a place to mount filter PCBs and optional power filters. The rear of the cabinet is equipped with two removeable bulkhead panels near the bottom of the cabinet. When these panels are removed, the cabinet can be installed in, or removed from, a lineup equipped with horizontal cabling. The cabinet may be slid "FORWARD" only.

Refer to ECM 627 for office layout restrictions when this cabinet is applied in a stand alone lineup.

Refer to ECM 600 for office layout restrictions when this cabinet is applied in a Streamline lineup.

8.2.5 Traffic Tables

Not applicable.

8.3 Product/System Specification

8.3.1 Physical Characteristics

8.3.1.1 Power/Heat Dissipation

The following describes the characteristics of the 64K ENET (NT9X05AD) cabinet:

The following values are the typical power dissipation figures for a fully equipped 64K ENET single cabinet:

One (1) ENET Shelf Dissipation	1073W
Four (4) ENET Shelves Dissipation (1073 X 4) .	4293W (approx.)
Fan Consumption	300W
ENC Cabinet Dissipation (4293 + 300)	4593W

Refer to CA0X04 issue 01 20 and later for power cable information.

PDC feeds are connected to the cabinet via EMI feed through capacitors at the top of the frame. Cable and Drop Length shall be job engineered.

8.3.2 EMI/Earthquake Information

End panels are required to complete the EMC enclosure for cabinets located at the end of a lineup. In earthquake installations, the

RELEASE 06.03
13 July 1998

S/DMS cabinet must be bolted to the floor in four(4) places through anchor holes provided in the base of the cabinet. The cooling unit must be removed for access to the bolts. When the cabinet is bolted in place, the optional leveling feet must not be installed. Leveling will be accomplished through the use of non-conductive shims. The bolts must be tightened with a torque wrench to ensure adequate pretension.

For raised floor installations, a sub-structure support between the concrete sub-floor and the raised floor will be required. A qualified seismic engineer should be consulted regarding the required additional bracing.

8.3.3 Sparing Information

For U.S. applications use standard sparing algorithms.

For Canadian and other applications the following may be used.

a) Version 2, C42 Cooling Unit:

Blowers	660,000 hrs MTBF in its useful life of 10 years.
MTM cards	4,700,000 hrs MTBF
Relay	100,000,000 hrs MTBF

Note that the blower's useful life is about 10 years. Around that time, failures are to be expected. Good practice might dictate replacement of operating blowers around that time (analogous to replacing your car's engine belts before they break).

The spare fiber cables should be as long as the longest job specified cable, with a breakout length also equal to the longest length used in the office.
(eg. NT0X97AK, NT0X97AJ Fiber Cables)

8.3.4 Power Feed and Fusing Requirements

Each shelf has four (4) power converters, two at either side of the shelf, mounted from the front.

Logic power distribution to the shelf electronics is from each power module to the corresponding half of the shelf.

Fuses are required as follows for NT9X05AC.

For powering from a standard 7' PDC

2 - 20 Amp fuses (for each ENET Shelf)

RELEASE 06.03
13 July 1998

- 2 - 10 Amp fuses (for C42 cooling blowers)
- 1 - 10 Amp Fuse (Alarm Battery Supply (ABS))

For powering from a CPDC

-
- 2 - 30 Amp fuses (for each ENET Shelf)
 - 2 - 10 Amp fuses (for C42 cooling blowers)
 - 1 - 10 Amp Fuse (Alarm Battery Supply (ABS))

Plane 0 cabinets are powered from A feed while plane 1 cabinets are powered from B feed.

Refer to CA0X04 issue 01 20 and later for power cable information.

PDC feeds are connected to the cabinet via EMI feed through capacitors at the top of the frame. Cable and Drop Length shall be job engineered.

8.3.5 Current Drain Information

Input Voltage.....-48VDC
Power Consumption.....4432 watts (+/- 10%) fully equipped
Current Drain.....92.0Amps

8.4 Software Provisioning

For NTX software packages to PLC/SOC mappings for CSP02 and beyond refer to ECM552 - Mapping of NTX/NTG Package to PCL/NCL/Option.

8.4.1 Required Software Packages and Interdependencies

The software developed for the 128K ENET and packaged in NTXE01AA will be utilized in 64K ENET. For further information refer to ECM 627.

8.4.2 Software Usage Restrictions

The 64K ENET requires software release BCS-33 or above.

Offices equipped with NT9X45BA requires a BCS33 Load or above.

Offices equipped with NT9X40BB requires a BCS33 Load or above.

8.4.3 Memory Provisioning

Not applicable.

8.5 Real Time Impact

Not applicable.

RELEASE 06.03
13 July 1998

9.0 ECM671 - DMS Building Block - DNI Engineering

9.1 Overview

This ECM provides references to the existing documentation for DNI equipment. Since this equipment has been orderable for many years, no effort to describe product function will be made.

9.2 Hardware Provisioning

9.2.1 Hardware Usage Restrictions

Not applicable.

9.2.2 Hardware Dependencies

Not applicable.

9.2.2.1 P and C Side Port Requirements

Not applicable.

9.2.2.2 DMS BUS Port Requirements

Not applicable.

9.2.2.3 Circuits Per Card

Not applicable.

9.2.2.4 Discrimination Numbering

Not applicable.

9.2.3 Provisioning Considerations

The following DNI Building Blocks are available:

NTZZ20AA: DNI Frame for U.S. and Canadian applications. This Building Block provides the DNI with the NT0X25AH Universal framework.

NTZZ20BA: Declared Manufacture Discontinued (MD). Refer to Engineering Manual section for Retired Building Blocks (EMC3-05-002) for reference information.

NTZZ20DA: Declared Manufacture Discontinued (MD). Refer to Engineering Manual section for Retired Building Blocks (EMC3-05-003) for reference information.

9.2.4 Office Layout Information

Not applicable.

9.2.5 Traffic Tables

Not applicable.

9.3 Product/System Specification

9.3.1 Physical Characteristics

Not applicable.

9.3.2 EMI/Earthquake Information

Not applicable.

9.3.3 Sparing Information

Not applicable.

9.3.4 Power Feed and Fusing Requirements

Not applicable.

9.3.5 Current Drain Information

Not applicable.

9.4 Software Provisioning

For NTX software packages to PLC/SOC mappings for CSP02 and beyond refer to ECM552 - Mapping of NTX/NTG Package to PCL/NCL/Option.

9.4.1 Required Software Packages and Interdependencies

Not applicable.

9.4.2 Software Usage Restrictions

Not applicable.

9.4.3 Memory Provisioning

Not applicable.

9.5 Real Time Impact

Not applicable.

RELEASE 06.03
13 July 1998

10.0 ECM672 - DMS Building Block - SLC Engineering

10.1 Overview

This ECM provides references to the existing documentation for SLC equipment. Since this equipment has been orderable for many years, no effort to describe product function will be made.

10.2 Hardware Provisioning

10.2.1 Hardware Usage Restrictions

Not applicable.

10.2.2 Hardware Dependencies

Not applicable.

10.2.2.1 P and C Side Port Requirements

Not applicable.

10.2.2.2 DMS BUS Port Requirements

Not applicable.

10.2.2.3 Circuits Per Card

Not applicable.

10.2.2.4 Discrimination Numbering

Not applicable.

10.2.3 Provisioning Considerations

The following SLC Building Blocks are available:

NTZZ21AA: SLC Frame for U.S. and Canadian applications. This Building Block provides the SLC with the NT0X25AH Universal framework.

NTZZ21BA: SLC Frame for U.S. applications. This Building Block has been declared Manufacture Discontinued due to the MD status of the NT0X25AA framework. NTZZ21BA is replaced by NTZZ21AA. Refer to section EMC3-05-004 of the Engineering Manual for reference information.

NTZZ21DA: EQ Frame SLC Building Block. This Building Block has been declared Manufacture Discontinued since it duplicates the NTZZ21AA

RELEASE 06.03
13 July 1998

Building Block. NTZZ21DA is replaced by NTZZ21AA. Refer to section EMC3-05-005 of the Engineering Manual for reference information.

The NT0X25AV framework is A&M and it is replaced by NT0X25AH.

10.2.4 Office Layout Information

Not applicable.

10.2.5 Traffic Tables

Not applicable.

10.3 Product/System Specification

10.3.1 Physical Characteristics

Not applicable.

10.3.2 EMI/Earthquake Information

Not applicable.

10.3.3 Sparing Information

Not applicable.

10.3.4 Power Feed and Fusing Requirements

Not applicable.

10.3.5 Current Drain Information

Not applicable.

10.4 Software Provisioning

For NTX software packages to PLC/SOC mappings for CSP02 and beyond refer to ECM552 - Mapping of NTX/NTG Package to PCL/NCL/Option.

10.4.1 Required Software Packages and Interdependencies

Not applicable.

10.4.2 Software Usage Restrictions

Not applicable.

10.4.3 Memory Provisioning

Not applicable.

10.5 Real Time Impact

Not applicable.

NORTHERN TELECOM

RELEASE 06.03
13 July 1998

PLN-8991-104

Chapter 3

MAINTENANCE AND ADMINISTRATION

THIS PAGE IS INTENTIONALLY LEFT BLANK

RELEASE 06.03
13 July 1998

MAINTENANCE AND ADMINISTRATION
Section Contents

1.0	ECM202 - Billing Media Converter II	3-1
1.1	Overview	3-1
1.2	Hardware Provisioning	3-7
1.2.1	Hardware Usage Restrictions	3-7
1.2.2	Hardware Dependencies	3-8
1.2.2.1	P and C Side Port Requirements	3-9
1.2.2.2	DMS BUS Port Requirements	3-9
1.2.2.3	Circuits Per Card	3-9
1.2.2.4	Discrimination Numbering	3-10
1.2.3	Provisioning Considerations	3-10
1.2.3.1	Redundant BMC Provisioning	3-10
1.2.3.2	Selecting The Correct BMC	3-10
1.2.3.3	BMCA Disk Drive Sizing	3-11
1.2.3.4	BMC PECs and Associations	3-12
1.2.3.5	Table F: Product Code Replacements	3-21
1.2.4	Office Layout Information	3-22
1.2.5	Traffic Tables	3-23
1.3	Product/System Specification	3-23
1.3.1	Physical Characteristics	3-23
1.3.1.1	BMC AMA (BMCA)	3-23
1.3.2	EMI/Earthquake Information	3-23
1.3.3	Sparing Information	3-23
1.3.4	Power Feed and Fusing Requirements	3-23
1.3.5	Current Drain Information	3-23
1.4	Software Provisioning	3-23
1.4.1	Required Software Packages and Interdependencies	3-24
1.4.2	Software Usage Restrictions	3-24
1.4.3	Memory Provisioning	3-24
1.5	Real Time Impact	3-24
2.0	ECM300 - Disk Drive Unit Provisioning	3-25
2.1	Overview	3-25
2.2	Hardware Provisioning	3-26
2.2.1	Hardware Usage Restrictions	3-26
2.2.2	Hardware Dependencies	3-26
2.2.3	P and C Side Port Requirements	3-26
2.2.4	DMS BUS Port Requirements	3-27
2.2.5	Circuits Per Card	3-27
2.2.6	Discrimination Numbering	3-27
2.2.7	Provisioning Considerations	3-27
2.2.8	Office Layout Information	3-38
2.2.9	Traffic Tables	3-38
2.3	Product/System Specification	3-38
2.3.1	Physical Characteristics	3-38
2.3.2	EMI/Earthquake Information	3-38
2.3.3	Sparing Information	3-38
2.3.4	Power Feed and Fusing Requirements	3-39
2.3.5	Current Drain Information	3-39
2.4	Software Provisioning	3-39

RELEASE 06.03

13 July 1998

2.4.1	Required Software Packages and Interdependencies	3-39
2.4.2	Software Usage Restrictions	3-39
2.4.3	Memory Provisioning	3-39
2.5	Real Time Impact	3-39
3.0	ECM306 - Distributed Processing Peripheral (DPP)	3-40
3.1	Overview	3-40
3.2	Hardware Provisioning	3-41
3.2.1	Hardware Usage Restrictions	3-41
3.2.2	Hardware Dependencies	3-41
3.2.2.1	P and C Side Port Requirements	3-42
3.2.2.2	DMS BUS Port Requirements	3-42
3.2.2.3	Circuits Per Card	3-42
3.2.2.4	Discrimination Numbering	3-42
3.2.3	Provisioning Considerations	3-43
3.2.3.1	DPP - SCSI DISK SUBSYSTEM WITH 3.5" DRIVES	3-43
3.2.3.2	DPP - 5.25" DRIVES	3-47
3.2.3.3	ENHANCED BELLCORE AMA FORMAT(EBAF)	3-52
3.2.4	Office Layout Information	3-53
3.2.5	Traffic Tables	3-53
3.3	Product/System Specification	3-53
3.3.1	Physical Characteristics	3-53
3.3.2	EMI/Earthquake Information	3-54
3.3.3	Sparing Information	3-54
3.3.3.1	DPP - SCSI DISK SUBSYSTEM WITH 3.5" DRIVES	3-54
3.3.3.2	DPP - 5.25" DRIVES	3-55
3.3.4	Power Feed and Fusing Requirements	3-57
3.3.5	Current Drain Information	3-57
3.4	Software Provisioning	3-58
3.4.1	Required Software Packages and Interdependencies	3-58
3.4.2	Software Usage Restrictions	3-59
3.4.3	Memory Provisioning	3-59
3.5	Real Time Impact	3-59
4.0	ECM316 - I/O Controller Module	3-60
4.1	Overview	3-60
4.1.1	EMPC	3-60
4.2	Hardware Provisioning	3-61
4.2.1	Hardware Usage Restrictions	3-61
4.2.1.1	EMPC	3-61
4.2.2	Hardware Dependencies	3-61
4.2.2.1	P and C Side Port Requirements	3-61
4.2.2.2	DMS BUS Port Requirements	3-61
4.2.2.3	Circuits Per Card	3-61
4.2.2.4	Discrimination Numbering	3-61
4.2.3	Provisioning Considerations	3-61
4.2.3.1	IOC	3-61
4.2.3.2	EMPC	3-62
4.2.4	Office Layout Information	3-62
4.2.5	Traffic Tables	3-63

RELEASE 06.03
13 July 1998

4.2.5.1	EMPC	3-63
4.3	Product/System Specification	3-63
4.3.1	Physical Characteristics	3-63
4.3.1.1	EMPC	3-63
4.3.2	EMI/Earthquake Information	3-64
4.3.3	Sparing Information	3-64
4.3.3.1	IOC	3-64
4.3.3.2	EMPC	3-64
4.3.4	Power Feed and Fusing Requirements	3-64
4.3.5	Current Drain Information	3-65
4.4	Software Provisioning	3-65
4.4.1	Required Software Packages and Interdependencies	3-65
4.4.1.1	EMPC	3-65
4.4.2	Software Usage Restrictions	3-66
4.4.3	Memory Provisioning	3-66
4.5	Real Time Impact	3-66
4.5.1	EMPC	3-66
5.0	ECM377 - Meridian Enhanced Input/Output Controller	3-67
5.1	Overview	3-67
5.2	Hardware Provisioning	3-69
5.2.1	Hardware Usage Restrictions	3-69
5.2.2	Hardware Dependencies	3-69
5.2.2.1	P and C Side Port Requirements	3-70
5.2.2.2	DMS BUS Port Requirements	3-70
5.2.2.3	Circuits Per Card	3-70
5.2.2.4	Discrimination Numbering	3-70
5.2.2.5	CC MIS PROVISIONING (Call Center MIS)	3-70
5.2.3	POWER/HEAT DISPENSATION	3-71
5.2.4	Provisioning Considerations	3-72
5.2.5	Office Layout Information	3-72
5.2.6	Traffic Tables	3-73
5.3	Product/System Specification	3-73
5.3.1	Physical Characteristics	3-73
5.3.2	EMI/Earthquake Information	3-73
5.3.3	Sparing Information	3-73
5.3.4	Power Feed and Fusing Requirements	3-73
5.3.5	Current Drain Information	3-73
5.4	Software Provisioning	3-73
5.4.1	Required Software Packages and Interdependencies	3-74
5.4.2	Software Usage Restrictions	3-74
5.4.3	Memory Provisioning	3-74
5.5	Real Time Impact	3-74
6.0	ECM388 - NT1X67 Baud Rate Summary	3-75
6.1	Overview	3-75
6.2	Hardware Provisioning	3-75
6.2.1	Hardware Usage Restrictions	3-75
6.2.2	Hardware Dependencies	3-75
6.2.2.1	P and C Side Port Requirements	3-75
6.2.2.2	DMS BUS Port Requirements	3-75
6.2.2.3	Circuits Per Card	3-75

RELEASE 06.03

13 July 1998

6.2.2.4	Discrimination Numbering	3-75
6.2.3	Provisioning Considerations	3-75
6.2.3.1	: Port Configurations for NT1X67AB and NT1X67CB	3-77
6.2.3.2	: Port Configurations for NT1X67BC and NT1X67BD	3-79
6.2.3.3	: Port Configurations for NT1X67BB and NT1X67DB	3-81
6.2.3.4	: Port Configurations for NT1X67EA	3-81
6.2.3.5	: Port Configurations for NT1X67FA	3-82
6.2.4	Office Layout Information	3-82
6.2.5	Traffic Tables	3-82
6.3	Product/System Specification	3-82
6.3.1	Physical Characteristics	3-82
6.3.2	EMI/Earthquake Information	3-82
6.3.3	Sparing Information	3-82
6.3.4	Power Feed and Fusing Requirements	3-82
6.3.5	Current Drain Information	3-83
6.4	Software Provisioning	3-83
6.4.1	Required Software Packages and Interdependencies	3-83
6.4.2	Software Usage Restrictions	3-83
6.4.3	Memory Provisioning	3-83
6.5	Real Time Impact	3-83
7.0	ECM472 - Norstar Key System Provisioning	3-84
7.1	Overview	3-84
7.2	Hardware Provisioning	3-85
7.2.1	Hardware Usage Restrictions	3-85
7.2.2	Hardware Dependencies	3-85
7.2.2.1	P and C Side Port Requirements	3-85
7.2.2.2	DMS BUS Port Requirements	3-86
7.2.2.3	Circuits Per Card	3-86
7.2.2.4	Discrimination Numbering	3-86
7.2.3	Provisioning Considerations	3-86
7.2.3.1	8 X 24 Main KSU Module	3-86
7.2.3.2	Norstar Trunk Module (NTM)	3-87
7.2.3.3	Norstar Station Module (NSM)	3-87
7.2.4	Office Layout Information	3-87
7.2.5	Traffic Tables	3-87
7.3	Product/System Specification	3-87
7.3.1	Physical Characteristics	3-87
7.3.1.1	NT5B20FC-93 - NorStar 8X24 KSU	3-87
7.3.2	EMI/Earthquake Information	3-88
7.3.3	Sparing Information	3-88
7.3.4	Power Feed and Fusing Requirements	3-88
7.3.5	Current Drain Information	3-88
7.4	Software Provisioning	3-88
7.4.1	Required Software Packages and Interdependencies	3-88
7.4.2	Software Usage Restrictions	3-88
7.4.3	Memory Provisioning	3-88
7.5	Real Time Impact	3-88

RELEASE 06.03

13 July 1998

8.0	ECM502 - Magnetic Tape Drive (MTD) Provisioning	3-89
8.1	Overview	3-89
8.2	Hardware Provisioning	3-89
8.2.1	Hardware Usage Restrictions	3-89
8.2.2	Hardware Dependencies	3-90
8.2.2.1	P and C Side Port Requirements	3-90
8.2.2.2	DMS BUS Port Requirements	3-90
8.2.2.3	Circuits Per Card	3-90
8.2.2.4	Discrimination Numbering	3-90
8.2.3	Provisioning Considerations	3-90
8.2.4	Office Layout Information	3-93
8.2.5	Traffic Tables	3-93
8.3	Product/System Specification	3-94
8.3.1	Physical Characteristics	3-94
8.3.1.1	8 Inch DDU	3-94
8.3.1.2	5.25 Inch DDU	3-94
8.3.2	EMI/Earthquake Information	3-94
8.3.3	Sparing Information	3-94
8.3.4	Power Feed and Fusing Requirements	3-94
8.3.5	Current Drain Information	3-94
8.4	Software Provisioning	3-94
8.4.1	Required Software Packages and Interdependencies	3-94
8.4.2	Software Usage Restrictions	3-94
8.4.3	Memory Provisioning	3-95
8.5	Real Time Impact	3-95
9.0	ECM561 - IOC Based SCSI Disk Drive Unit	3-96
9.1	Overview	3-96
9.2	Hardware Provisioning	3-97
9.2.1	Hardware Usage Restrictions	3-97
9.2.2	Hardware Dependencies	3-97
9.2.2.1	P and C Side Port Requirements	3-97
9.2.2.2	DMS BUS Port Requirements	3-97
9.2.2.3	Circuits Per Card	3-97
9.2.2.4	Discrimination Numbering	3-97
9.2.3	Provisioning Considerations	3-98
9.2.4	Office Layout Information	3-98
9.2.5	Traffic Tables	3-98
9.3	Product/System Specification	3-98
9.3.1	Physical Characteristics	3-98
9.3.2	EMI/Earthquake Information	3-98
9.3.3	Sparing Information	3-98
9.3.4	Power Feed and Fusing Requirements	3-99
9.3.5	Current Drain Information	3-99
9.4	Software Provisioning	3-99
9.4.1	Required Software Packages and Interdependencies	3-99
9.4.2	Software Usage Restrictions	3-99
9.4.3	Memory Provisioning	3-99
9.5	Real Time Impact	3-99
10.0	ECM563 - SuperNode Data Manager (SDM)	3-100
10.1	Overview	3-100

RELEASE 06.03
13 July 1998

10.2	Hardware Provisioning	3-104
10.2.1	Hardware Usage Restrictions	3-104
10.2.2	Hardware Dependencies	3-104
10.2.2.1	P and C Side Port Requirements	3-106
10.2.2.2	DMS BUS Port Requirements	3-106
10.2.2.3	Circuits Per Card	3-106
10.2.2.4	Discrimination Numbering	3-106
10.2.3	Provisioning Considerations	3-106
10.2.4	Office Layout Information	3-106
10.2.5	Traffic Tables	3-106
10.3	Product/System Specification	3-107
10.3.1	Physical Characteristics	3-107
10.3.2	EMI/Earthquake Information	3-107
10.3.3	Sparing Information	3-107
10.3.4	Power Feed and Fusing Requirements	3-107
10.3.5	Current Drain Information	3-108
10.4	Software Provisioning	3-108
10.4.1	Required Software Packages and Interdependen- cies	3-108
10.4.2	Software Usage Restrictions	3-108
10.4.3	Memory Provisioning	3-108
10.5	Real Time Impact	3-108
11.0	ECM588 - SuperNode Data Manager SDM06	3-109
11.1	Overview	3-109
11.2	Hardware Provisioning	3-114
11.2.1	Hardware Usage Restrictions	3-114
11.2.2	Hardware Dependencies	3-115
11.2.2.1	P and C Side Port Requirements	3-115
11.2.2.2	DMS BUS Port Requirements	3-116
11.2.2.3	Circuits Per Card	3-116
11.2.2.4	Discrimination Numbering	3-116
11.2.3	Provisioning Considerations	3-116
11.2.4	Office Layout Information	3-118
11.2.5	Traffic Tables	3-125
11.3	Product/System Specification	3-125
11.3.1	Physical Characteristics	3-125
11.3.2	EMI/Earthquake Information	3-125
11.3.3	Sparing Information	3-126
11.3.4	Power Feed and Fusing Requirements	3-126
11.3.5	Current Drain Information	3-126
11.4	Software Provisioning	3-126
11.4.1	Required Software Packages and Interdependen- cies	3-126
11.4.2	Software Usage Restrictions	3-127
11.4.3	Memory Provisioning	3-132
11.5	Real Time Impact	3-132
12.0	ECM607 - Building Block Engineering of MAP	3-133
12.1	Overview	3-133
12.2	Hardware Provisioning	3-133
12.2.1	Hardware Usage Restrictions	3-133

RELEASE 06.03

13 July 1998

12.2.2	Hardware Dependencies	3-133
12.2.2.1	P and C Side Port Requirements . . .	3-133
12.2.2.2	DMS BUS Port Requirements	3-133
12.2.2.3	Circuits Per Card	3-133
12.2.2.4	Discrimination Numbering	3-133
12.2.3	Provisioning Considerations	3-133
12.2.4	Office Layout Information	3-136
12.2.5	Traffic Tables	3-136
12.3	Product/System Specification	3-136
12.3.1	Physical Characteristics	3-136
12.3.2	EMI/Earthquake Information	3-136
12.3.3	Sparing Information	3-136
12.3.4	Power Feed and Fusing Requirements	3-136
12.3.5	Current Drain Information	3-136
12.4	Software Provisioning	3-136
12.4.1	Required Software Packages and Interdependen- cies	3-136
12.4.2	Software Usage Restrictions	3-136
12.4.3	Memory Provisioning	3-136
12.5	Real Time Impact	3-137
13.0	ECM613 - DMS Building Block - IOE Engineering	3-138
13.1	Overview	3-138
13.2	Hardware Provisioning	3-138
13.2.1	Hardware Usage Restrictions	3-138
13.2.2	Hardware Dependencies	3-138
13.2.2.1	P and C Side Port Requirements . . .	3-138
13.2.2.2	DMS BUS Port Requirements	3-138
13.2.2.3	Circuits Per Card	3-138
13.2.2.4	Discrimination Numbering	3-138
13.2.3	Provisioning Considerations	3-138
13.2.4	Input/Output Equipment Building Block Defi- nition	3-138
13.2.5	IOE Calculations	3-140
13.2.5.1	IOE Customer Questions	3-140
13.2.5.2	IOE Customer Calculations	3-147
13.2.6	IOE Rules for NCS Links (MCI Applications).	3-153
13.2.7	Office Layout Information	3-154
13.2.8	Traffic Tables	3-154
13.3	Product/System Specification	3-154
13.3.1	Physical Characteristics	3-154
13.3.2	EMI/Earthquake Information	3-154
13.3.3	Sparing Information	3-154
13.3.4	Power Feed and Fusing Requirements	3-154
13.3.5	Current Drain Information	3-154
13.4	Software Provisioning	3-154
13.4.1	Required Software Packages and Interdependen- cies	3-154
13.4.2	Software Usage Restrictions	3-154
13.4.3	Memory Provisioning	3-155
13.5	Real Time Impact	3-155

RELEASE 06.03
13 July 1998

14.0	ECM705 - Input Output Module - General Information	3-156
14.1	Overview	3-156
14.2	Hardware Provisioning	3-161
14.2.1	Hardware Usage Restrictions	3-161
14.2.2	Hardware Dependencies	3-163
14.2.2.1	P and C Side Port Requirements	3-164
14.2.2.2	DMS BUS Port Requirements	3-164
14.2.2.3	Circuits Per Card	3-164
14.2.2.4	Discrimination Numbering	3-164
14.2.2.5	Provisioning Considerations	3-165
14.2.3	Office Layout Information	3-172
14.2.4	Traffic Tables	3-175
14.3	Product/System Specification	3-176
14.3.1	Physical Characteristics	3-176
14.3.2	EMI/Earthquake Information	3-177
14.3.3	Sparing Information	3-177
14.3.4	Power Feed and Fusing Requirements	3-178
14.3.5	Current Drain Information	3-178
14.4	Software Provisioning	3-178
14.4.1	Required Software Packages and Interdependencies	3-178
14.4.2	Software Usage Restrictions	3-179
14.4.3	Memory Provisioning	3-179
14.5	Real Time Impact	3-179
15.0	ECM715 - SuperNode Data Manager	3-181
15.1	Overview	3-181
15.2	Hardware Provisioning	3-185
15.2.1	Hardware Usage Restrictions	3-185
15.2.2	Hardware Dependencies	3-186
15.2.2.1	P and C Side Port Requirements	3-187
15.2.2.2	DMS BUS Port Requirements	3-187
15.2.2.3	Circuits Per Card	3-187
15.2.2.4	Discrimination Numbering	3-187
15.2.3	Provisioning Considerations	3-187
15.2.4	Office Layout Information	3-188
15.2.5	Traffic Tables	3-190
15.3	Product/System Specification	3-190
15.3.1	Physical Characteristics	3-190
15.3.2	EMI/Earthquake Information	3-190
15.3.3	Sparing Information	3-190
15.3.4	Power Feed and Fusing Requirements	3-191
15.3.5	Current Drain Information	3-191
15.4	Software Provisioning	3-192
15.4.1	Required Software Packages and Interdependencies	3-192
15.4.2	Software Usage Restrictions	3-195
15.4.3	Memory Provisioning	3-199
15.5	Real Time Impact	3-199
16.0	ECM720 - SuperNode Billing Application	3-200
16.1	Overview	3-200

RELEASE 06.03
13 July 1998

16.2	Hardware Provisioning	3-201
16.2.1	Hardware Usage Restrictions	3-201
16.2.2	Hardware Dependencies	3-201
16.2.2.1	P and C Side Port Requirements	3-201
16.2.2.2	DMS BUS Port Requirements	3-201
16.2.2.3	Circuits Per Card	3-201
16.2.2.4	Discrimination Numbering	3-201
16.2.3	Provisioning Considerations	3-201
16.2.4	Office Layout Information	3-204
16.2.5	Traffic Tables	3-204
16.3	Product/System Specification	3-204
16.3.1	Physical Characteristics	3-204
16.3.2	EMI/Earthquake Information	3-204
16.3.3	Sparing Information	3-205
16.3.4	Power Feed and Fusing Requirements	3-205
16.3.5	Current Drain Information	3-205
16.4	Software Provisioning	3-205
16.4.1	Required Software Packages and Interdependen- cies	3-205
16.4.2	Software Usage Restrictions	3-205
16.4.3	Memory Provisioning	3-205
16.5	Real Time Impact	3-205

THIS PAGE IS INTENTIONALLY LEFT BLANK

RELEASE 06.03
13 July 1998

1.0 ECM202 - Billing Media Converter II

1.1 Overview

The Billing Media Converter (BMC) is available from Northern Telecom. The BMC provides for the acquisition, storage, and forwarding of data from the DMS100F. The BMC accepts billing data from the DMS100F, temporarily stores the collected data on hard disk, and when requested retrieves, reformats, and sends the stored data to the Host Office Collector (HOC). (NOTE: If the HOC is not a BMC 'POLLSTAR' device - then an I/F Analysis must be performed to ensure BMC to HOC compatibility).

The BMC is currently available in the BMCA configuration only, with option packages in which the variables include:

- the disk drive size,
- the number of users per system,
- the communications protocol used, and
- the maximum rate of data between the BMC & HOC

The BMC is available only in the BMCA configuration. The Billing Media Converter for Automatic Message Accounting (BMCA) is a redundant, single user, dual shelf BMC used for the collection, storage, retrieval, and forwarding of Automatic Message Accounting (AMA) data to a central collection point for one entire DMS100F office. The call record format from the DMS100F to the BMCA may be either LSSGR, or NT format.

RELEASE 06.03
13 July 1998

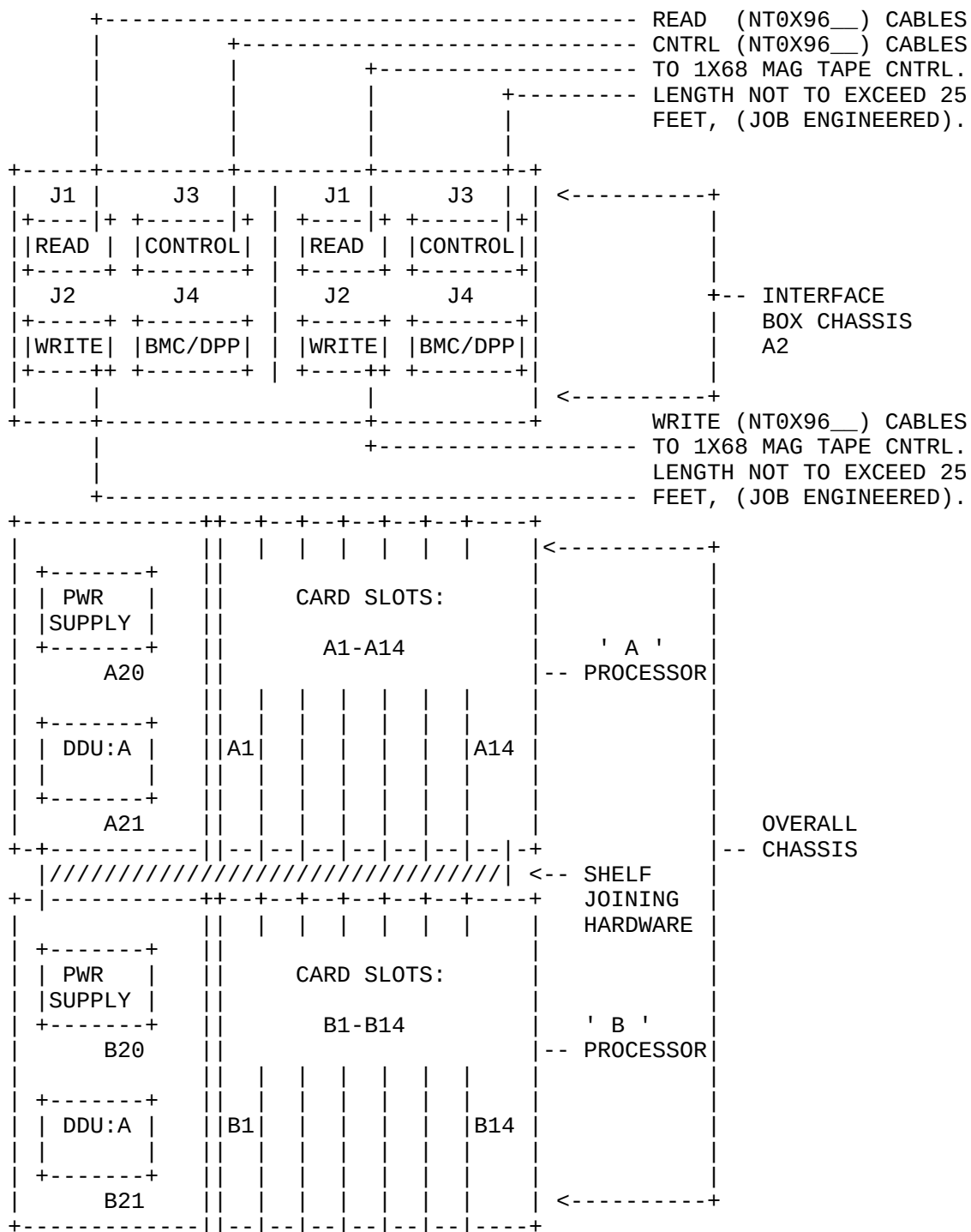


Figure 1. BMCA Physical Configuration

RELEASE 06.03
13 July 1998

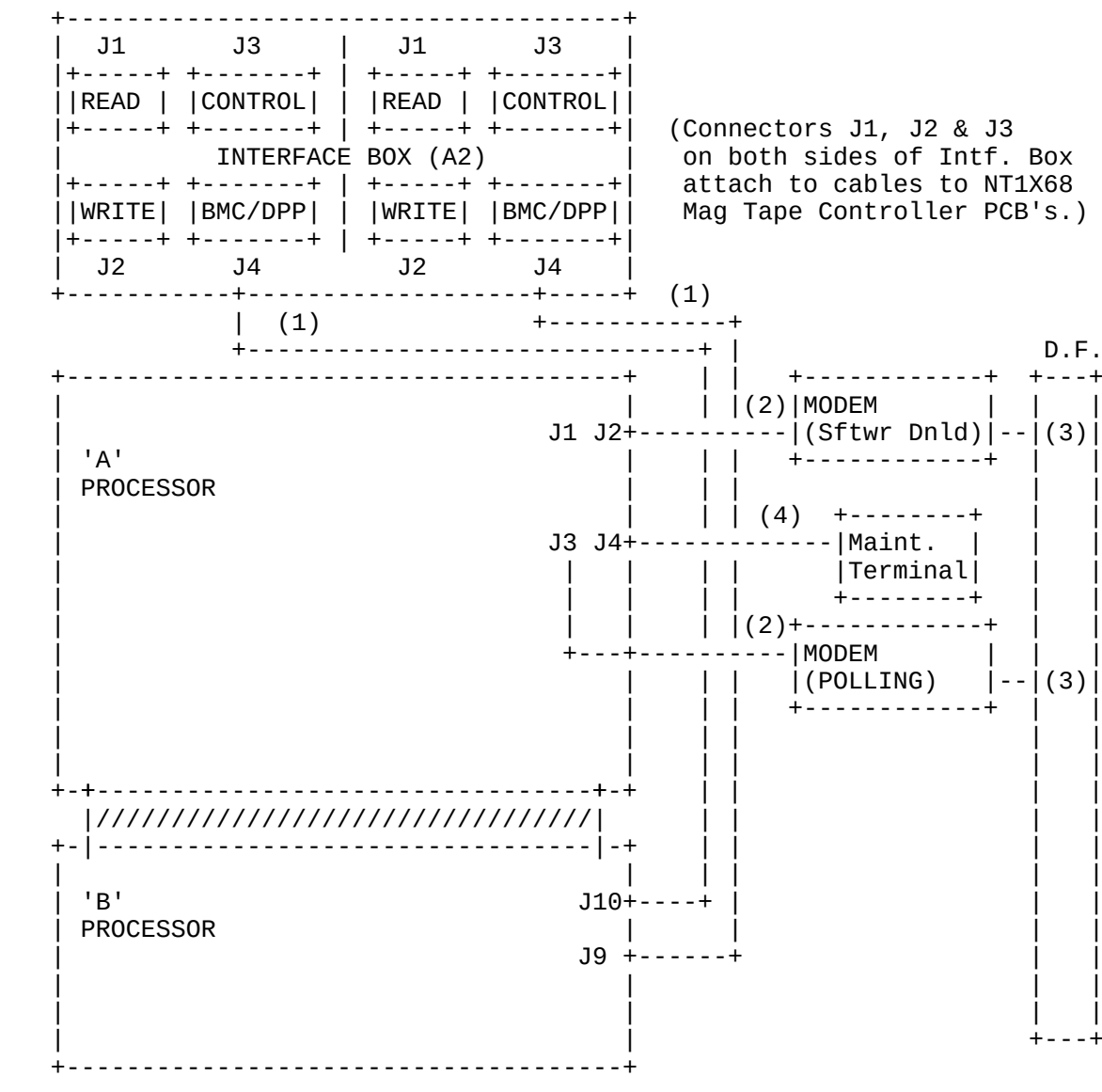


Figure 2. BMCA Connectivity Diagram For 'C' Feature Groups

1. These are 4' ribbon cables (Connector J10 = NT6M99AG & J9 = NT6M99AF) furnished by Nortel.
2. These are 50' RS-232-C Cables (NT8M99AG) furnished by Nortel.
3. The Modem-DF cables are engineered/furnished/installed by DMS100.
4. These are 25' RS-232-C cables (NT8M99AB) furnished by Nortel.

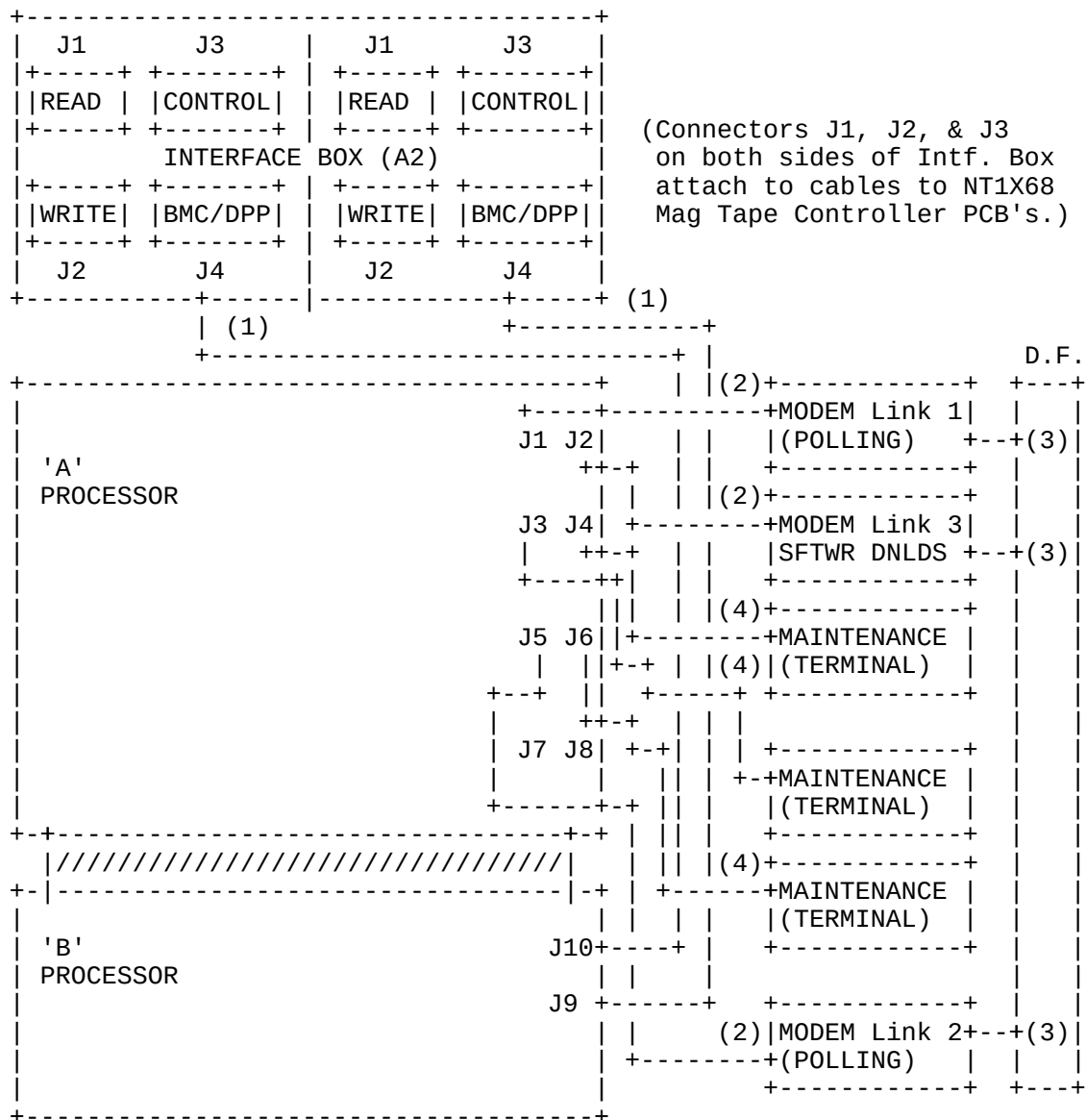
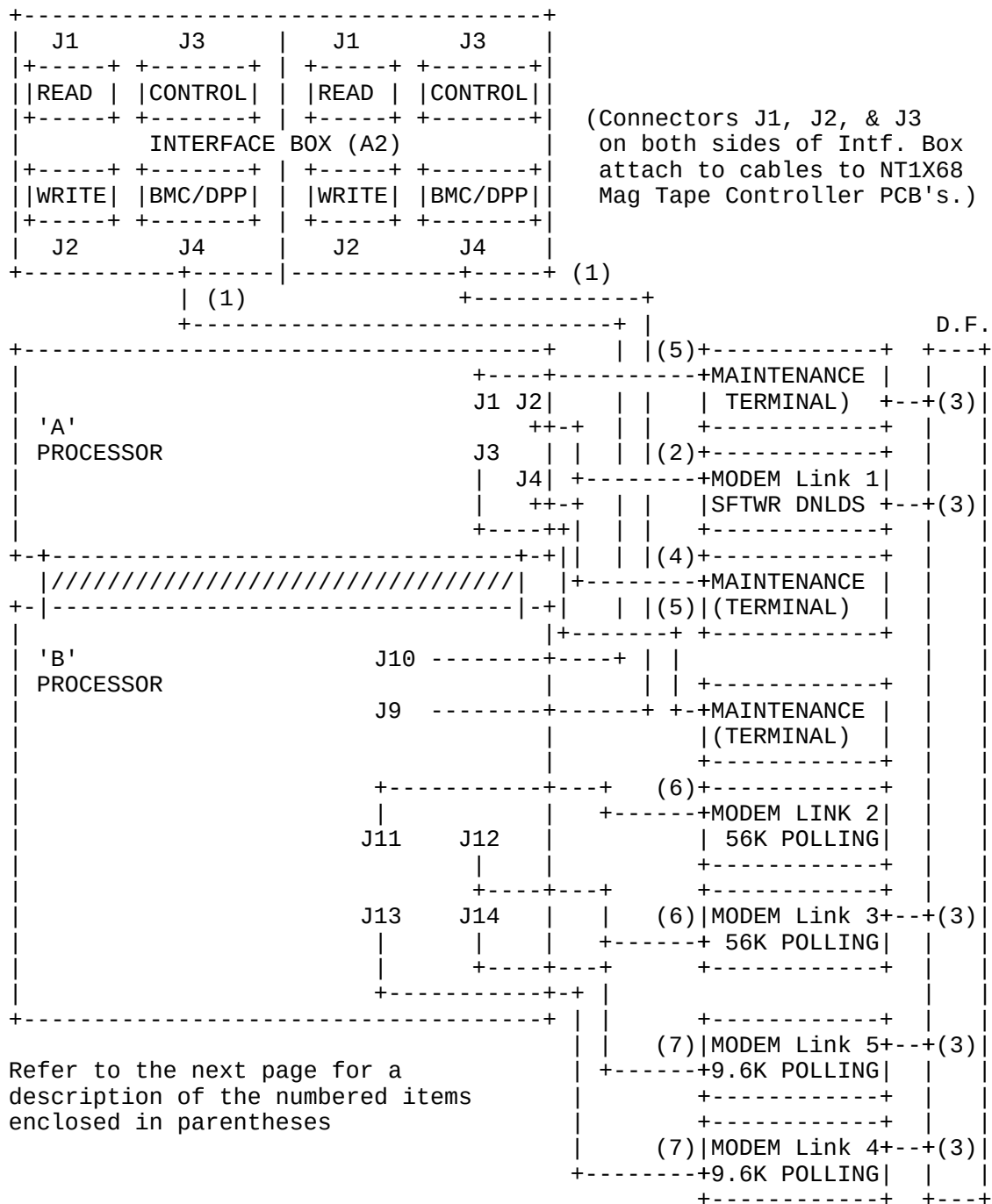


Figure 3. BMCA Connectivity Diagram For 'E' Feature Group W/O 56K Polling
MT8M04AE/BE/CE/DE

1. These are 4' ribbon cables (Connector J10 = NT6M99AG & J9 = NT6M99AF) furnished by Nortel.
2. These are 50' RS-232-C Cables (NT8M99AG) furnished by Nortel.
3. The Modem-DF cables are engineered/furnished/installed by DMS100.
4. These are 25' RS-232-C cables (NT8M99AB) furnished by Nortel.

5. Cables for connector J5 are engineered/furnished/installed by DMS100 Switching, however Nortel provides the appropriate connectors.



RELEASE 06.03
13 July 1998

1. These are 4' ribbon cables (Connector J10 = NT6M99AG & J9 = NT6M99AF) furnished by Nortel.
2. These are 50' RS-232-C Cables (NT8M99AG) furnished by Nortel.
3. The Modem-DF cables are engineered/furnished/installed by DMS100.
4. These are 25' RS-232-C cables (NT8M99AB) furnished by Nortel.
5. These are 25' RS-232-C cables which must be provisioned. Provide via the PEC NT8M99AB.
6. This cable must be provisioned based on the modem used as follows. Also, the length is job engineered to a maximum of 50 feet.
 - UDS 56K DSU: Use NTNX36BG or BZ cable
 - SYNT II DSU: Use NTNX69AA cable
 - AT&T 2600 Series, GDC, or MR1 DSUs: Use NTNX69AD Cable
7. This is a 50' RS-232C Cable (NT8M99AG) which must be provisioned.

1.2 Hardware Provisioning

1.2.1 Hardware Usage Restrictions

The following hardware usage restrictions apply to all version of Billing Media Converter (BMC):

- 60Hz AC Clock Option

The BMC contains a clock for time stamping BMC log messages. The clock originates from one of two sources:

1. A DC powered crystal oscillator internal to the BMC, or a
2. A commercial 110VAC (60Hz) signal through Nortel supplied AC transformers to the BMC.

In offices configured for Isolated System Grounding (ISG) do not connect the clock circuit AC transformer. This connection introduces an ISG violation.

The 60Hz AC clock is prime when wired. If it is not used, then the internal DC clock provides the signal for the clock which generates the log message time stamps.

Transformers and connectors for wiring the AC clock option are always provided with BMC's. The 110Vac 60Hz source must be commercial, NON-GENERATOR. The AC clock and internal DC clock circuits accuracy is approximately equal and accurate to +/- 4 seconds per day.

- Physical Location Limits

The distance between the MTD controller card (NT1X68) and the main BMC unit must not exceed 25 feet.

RELEASE 06.03
13 July 1998

- Modem Selection with Specific Options

Do Not Provide UDS modems for any BMC application that includes the Automatic Dial-Up (ADU) option. Until further notice the UDS modems do not work with the BMC ADU option. UDS modems do work with non-ADU applications.

- Host Collector Compatibility

In all applications where a BMC unit is not used as the Host Collector ('Pollstar'), then the SAE must initiate a Compatibility Analysis to be performed by:

- Department 3321 in conjunction with NT Peripheral TAS to insure Host-To-BMC compatibility for U.S. jobs, or
- Department S684 in conjunction with NT Peripheral TAS to insure Host-To-BMC compatibility for Canadian jobs.

1.2.2 Hardware Dependencies

The following DMS-100F supporting hardware is required for the BMCA as applicable:

- DMS To BMC Interface

Provide two NT1X68AC/BC IOC Cards per BMCA. Provide two each READ, WRITE, and CONTROL cables (NT8M96__) to interface the IOC cards to the BMC interface box for BMCA.

Refer to the Engineering Manual, Table A, for Trunk Module Provisionable Cards, for device controller card assignment rules.

- Transmission to Host Collector

The BMC utilizes at least one (1) modem interface for transmitting data to the processing center (Host). This requirement can be fulfilled by provisioning modems (Refer ECM-633 for detailed engineering information on modems). Nortel supplies one modem cable (NT8M99AG) with every BMC. Extra modem cables may be provisioned separately as required. These cables are designed for standard modems; 9600 max. baud.

The TURBO BMC's (PEC's NT8M04EE,FE,HE,IE) are capable of polling speeds up to 56K baud. Where this high speed polling is required, a dedicated link between the modem at the BMC and the modem at the Host is required. Also, the cable between the BMC and the 56K modem is dependent on the modem manufacturer:

56K Modem Type	Cable PEC
UDS	NTNX36BZ
Amdahl or SYNT II	NTNX69AA
GDC, AT&T, or MR1	NTNX69AD

RELEASE 06.03
13 July 1998

(The length of these 56K modem cables is job engineered, with a maximum length of 50').

If 56k Polling/TURBO is ordered, the 56K modem may be attached to B J11 and/or J12. If non-TURBO is ordered and the customer wishes to use V.35 modems, B J11 and/or J12 may be used and will operate at 9.6K baud or less.

Connectors B J13 and J14 are RS232C 2.4K to 9.6K baud.

- Hardcopy Output

The BMC utilizes a KSR printer for installation, testing, and maintenance purposes. This printer must be EIA RS-232-C and be located within 25 cable feet of the BMC. A remote KSR printer may also be used as a maintenance device utilizing a Rixon or UDS modem. The baud rate of this link must not exceed 1200 baud. A CRT may also be attached to this port, in which case baud rates to 9600 are acceptable. Nortel supplies a RS-232 terminal cable (NT8M99AB) with every BMC. This cable fits all standard RS-232-C terminal devices.

- Remoting DMS/BMC Alarms

The BMC offers the capability of monitoring several BMC alarm conditions through the DMS-100F alarm system. The BMC alarm signals may be implemented via the NT0X10AA, Miscellaneous Scan Detector Card. Nortel supplies a connector kit (NT6M96AD) for the BMC side of the cable. Local cable is used between the BMC to the MDF and the MDF to the Scan Detector Card. The BMC requires six (6) scan points.

For 3.5" BMCs NT8M04GE/HE/IE, provide the Enhanced Alarm Cable assy depending on the type of frame or cabinet the BMS is installed in. In the IOE frame, use NT8M99AN. For CIOE mod A cabinet use NT8M99AQ. For CIOE mod B cabinets, use NT8M99AR.

1.2.2.1 P and C Side Port Requirements

There are 3 C side ports (read, write, and control). There are zero or no P side ports.

1.2.2.2 DMS BUS Port Requirements

N/A

1.2.2.3 Circuits Per Card

N/A

RELEASE 06.03
13 July 1998

1.2.2.4 Discrimination Numbering

Discrimination Numbering is 0-n.

1.2.3 Provisioning Considerations

1.2.3.1 Redundant BMC Provisioning

The Redundant BMC is a dual shelf unit with cross-over circuitry to ensure continuous operation in the event of a BMC component failure. Interface to DMS-100F is limited to Tape Emulation Circuitry (TEC) only. Passive interface of the BMC to magnetic tape drives (ABC) is not supported.

All BMC units support various communication protocols to communicate with a Host Collector at speeds of 1200, 2400, 4800, or 9600 Bits Per Second (BPS). TURBO BMC units, (NT8M04EE, FE, HE, IE) support BX.25 protocol at speeds up to 56K BPS.

Available DDU sizes are 30, 72, 140, 380, 380 TURBO and 760 TURBO.

1GB DDU's are available for NT8M04GC. 1GB and 2GB TURBO DDU's are available only for NT8M04GE/HE/IE.

Automatic Message Accounting (AMA) Configuration referred to as the Billing Media Converter for AMA (BMCA). The BMCA configuration supports AMA data collection and spooling using the BiSync or BX.25 protocols.

1.2.3.2 Selecting The Correct BMC

The SAE must determine which of the many BMC CONFIGURATIONS BEST MATCHES THE TELCO's REQUIREMENTS. These requirements are determined as follows:

1. Determine the polling protocol required.
2. Determine the polling speed required for modem provisioning.
3. Determine the disk drive size required.
4. Refer to "Hardware Usage Restrictions" on page 3-7 and "Hardware Dependencies" on page 3-8 to provision BMC supporting/interface hardware as required.

The BMC provides the capability of polling DMS billing data from a remote location. The BMC receives the billing data through the NT1X68AC or NT1X68BC, Magnetic Tape Drive Controller Cards. The BMC provides total magnetic tape drive emulation, and accordingly, can reduce office requirements for magnetic tape drives. The BMCA units require two NT1X68 cards.

RELEASE 06.03
13 July 1998

Interface of each BMC unit to each NT1X68, Magnetic Tape Drive Controller Card, is via three cables to the Interface Box. The BMCA units require 2 each Read, Write, and Control cables (NT0X96___) which must be ordered separately, length is job engineered and must not exceed 25 feet. This must be accounted for when defining the location of the IOC shelf and the location of the BMC. The BMCA units and the Interface Box occupy the same amount of vertical rack space as one MagTape Drive unit, plus 2.5 inches. The Interface Box is used to convert from switch board cabling to ribbon cabling. The BMC unit is powered indirectly from the PDC via the FSP. Note: The Interface Box does not require AC or DC power.

1.2.3.3 BMCA Disk Drive Sizing

Raw data for these calculations is provided by the Telco.

Average Busy X Customer defined # Capacity Requirement
Day Volume of days of disk = (in Call Records)
(in Call Records) back-up

The Capacity Requirement translates to disk size via the following Table:

- Select average number of Call Records per block...

(If number of Call Records/block for this office is not shown use the next higher number.)

18 20 26
22 28
24 30

- Enter the Table at the left side. Find the appropriate number Records per block. Read to the right to find the Capacity Requirements next greater than or equal to the calculated value. Read down bottom of the Table to find the disk size.

CALL RECORDS PER BLOCK	70 % CAPACITY REQUIREMENTS (in number of Call Records)		
18	144,372	272,106	549,990
20	127,080	302,340	611,100
22	139,788	332,574	672,210
24	152,496	362,808	733,320
26	165,204	393,042	794,430
28	177,912	423,276	855,540
30	190,620	453,510	916,650
SELECT DISK-> SI%E	30MB	72MB	140MB

RELEASE 06.03
13 July 1998

NOTE: Use this table only for non BX.25 applications.

66.6 % CAPACITY FOR BX.25 APPLICATIONS ONLY (in number of Call Records)							
CALL RECORDS PER BLOCK							
18	650,664	1,802,304	2,313,360	4,386,600	6,912,748	13,825,496	
20	722,960	2,002,560	2,570,400	4,874,000	7,680,831	15,361,662	
22	795,256	2,202,816	2,827,440	5,361,400	8,448,914	16,897,828	
24	867,552	2,403,072	3,084,480	5,848,800	9,216,997	18,433,994	
26	939,848	2,603,328	3,341,520	6,336,200	9,985,080	19,970,160	
28	1,012,144	2,803,584	3,598,560	6,823,600	10,753,164	21,506,328	
30	1,084,440	3,003,840	3,855,600	7,311,000	11,521,247	23,042,494	
SELECT DISK --> SI%E	140MB	380MB w/o 56K Polling	380MB w/56K Polling	760MB w/56K Polling	1GB	2GB	

Capacity Requirements exceeding those shown in the Table are beyond the current capacity of the BMC.

1.2.3.4 BMC PECs and Associations

The BMC's are organized in Figure 5 on page 3-13 For ease of identification, use the last character of the PEC (NT____'x') as the 'Feature Set' Identifier.

- BMCA, BMCS, and BMCD product codes
- BMCA, BMCS, and BMCD Minimum Spares Kit product Codes
- BMCA, BMCS, and BMCD Maximum Spares Kit product Codes

NOTE: The BMCS and BMCD offerings have been MD'd.

RELEASE 06.03
13 July 1998

PRODUCT STATUS	PEC	CPC	TYPE DISK	FEATURE SET C/R FRMT	PROTOCOL
MD	NT8M04AA	A0333364	BMCS 72MB	SMDR/NT	Bisync
MD	NT8M04BA	A0333365	BMCS 140MB	SMDR/NT	Bisync
MD	NT8M04CA	A0333366	BMCS 30MB	SMDR/NT	Bisync
STD	NT8M04AC	A0338314	BMCA 72MB	LSSGR	Bisync
STD	NT8M04BC	A0338315	BMCA 140MB	LSSGR	Bisync
STD	NT8M04CC	A0338316	BMCA 30MB	LSSGR	Bisync
STD	NT8M04GC	A0627680	BMCA 1GB	LSSGR	Bisync
MD	NT8M04AD	A0337561	BMCA 72MB	LSSGR	HDLC-B
MD	NT8M04BD	A0337563	BMCA 140MB	LSSGR	HDLC-B
MD	NT8M04CD	A0337565	BMCA 30MB	LSSGR	HDLC-B
STD	NT8M04AE	A0339645	BMCA 72MB	LSSGR	BX.25
STD	NT8M04BE	A0339646	BMCA 140MB	LSSGR	BX.25
MD	NT8M04CE	A0339647	BMCA 30MB	LSSGR	BX.25
MD	NT8M04DE	A0350804	BMCA 380MB	LSSGR	BX.25
STD	NT8M04EE	A0365973	BMCA 380TURBO	LSSGR	BX.25
STD	NT8M04FE	A0365974	BMCA 760TURBO	LSSGR	BX.25
MD	NT8M04GE	A0627682	BMCA 1GB	LSSGR	BX.25
MD	NT8M04HE	A0627683	BMCA 1GBTURBO	LSSGR	BX.25
MD	NT8M04IE	A0627684	BMCA 2GBTURBO	LSSGR	BX.25
MD	NT8M04AF	A0338913	BMCA 72MB	LSSGR	HDLC ADU "
MD	NT8M04BF	A0338914	BMCA 140MB	LSSGR	HDLC ADU "
MD	NT8M04CF	A0338915	BMCA 30MB	LSSGR	HDLC ADU "
MD	NT8M04DF	A0371766	BMCA 380MB	LSSGR	HDLC ADU A
MD	NT8M04AG	A0341833	BMCD 72MB	SMDR	Bisync
MD	NT8M04BG	A0341834	BMCD 140MB	SMDR	Bisync
MD	NT8M04AJ	A0347087	BMCA 72MB	NT	HDLC ADU "
MD	NT8M04BJ	A0347088	BMCA 140MB	NT	HDLC ADU "
MD	NT8M04CJ	A0347089	BMCA 30MB	NT	HDLC ADU "
MD	NT8M04AL	A0389361	BMCD 72MB	SMDR	ASCII
MD	NT8M04BL	A0389362	BMCD 140MB	SMDR	ASCII
MD	NT8M04AM	A0389369	BMCS 72MB	SMDR	ASCII
MD	NT8M04BM	A0389370	BMCS 140MB	SMDR	ASCII
MD	NT8M04CM	A0389371	BMCS 30MB	SMDR	ASCII

„ ADU = AUTO DIALUP (Special feature of this BMC)

Figure 5. Table A: Product Engineering Codes For BMCA/S/D Units

RELEASE 06.03
13 July 1998

PRODUCT STATUS	PEC	CPC	TITLE	
MD	NT8M94AA	A0333367	MIN KIT W/72MB FEAT. A	
MD	NT8M94BA	A0333368	MIN KIT W/O DISK FEAT. A	
MD	NT8M94EA	A0333371	MIN KIT W/140MB FEAT. A	
MD	NT8M94GA	A0333373	MIN KIT W/30MB FEAT. A	
STD	NT8M94AC	A0338318	MIN KIT W/72MB FEAT. C	
STD	NT8M94BC	A0338319	MIN KIT W/O DISK FEAT. C	
STD	NT8M94EC	A0338322	MIN KIT W/140MB FEAT. C	
STD	NT8M94GC	A0338324	MIN KIT W/30MB FEAT. C	
MD	NT8M94AD	A0337568	MIN KIT W/72MB FEAT. D	
MD	NT8M94BD	A0337569	MIN KIT W/O DISK FEAT. D	
MD	NT8M94ED	A0337575	MIN KIT W/140MB FEAT. D	
MD	NT8M94GD	A0337577	MIN KIT W/30MB FEAT. D	
MD	NT8M94AE	A0339649	MIN KIT W/72MB FEAT. E	
MD	NT8M94BE	A0339650	MIN KIT W/O DISK FEAT. E	
MD	NT8M94EE	A0339653	MIN KIT W/140MB FEAT. E	
MD	NT8M94GE	A0339655	MIN KIT W/30MB FEAT. E	
MD	NT8M94JE	A0350805	MIN KIT W/380MB FEAT. E	380
MD	NT8M94LE	A0350807	MIN KIT W/O DISK FEAT. E	
STD	NT8M94NE	A0365611	MIN KIT W/380MB FEAT. E	
STD	NT8M94QE	A0365613	MIN KIT W/760MB FEAT. E	
STD	NT8M94WE	A0627703	MIN KIT AMAT TURBO FEAT. E	
MD	NT8M94AF	A0338921	MIN KIT W/72MB FEAT. F	
MD	NT8M94BF	A0338922	MIN KIT W/O DISK FEAT. F	
MD	NT8M94EF	A0338924	MIN KIT W/140MB FEAT. F	
MD	NT8M94GF	A0338927	MIN KIT W/30MB FEAT. F	
STD	NT8M94JF	A0371767	MIN KIT W/380MB FEAT. F	
STD	NT8M94LF	A0371769	MIN KIT W/O DISK FEAT. F	380
MD	NT8M94AG	A0341845	MIN KIT W/72MB FEAT. G	
MD	NT8M94BG	A0341846	MIN KIT W/O DISK FEAT. G	
MD	NT8M94EG	A0341849	MIN KIT W/140MB FEAT. G	
MD	NT8M94AJ	A0347091	MIN KIT W/72MB FEAT. J	
MD	NT8M94BJ	A0347097	MIN KIT W/140MB FEAT. J	
MD	NT8M94EJ	A0347093	MIN KIT W/O Disk FEAT. J	
MD	NT8M94GJ	A0347095	MIN KIT W/30MB FEAT. J	
STD	NT8M94AL	A0389363	MIN KIT W/72MB FEAT. L	
STD	NT8M94BL	A0389364	MIN KIT W/O DISK FEAT. L	
STD	NT8M94EL	A0389367	MIN KIT W/140MB FEAT. L	
STD	NT8M94AM	A0389380	MIN KIT W/72MB FEAT. M	
STD	NT8M94BM	A0389381	MIN KIT W/O DISK FEAT. M	
STD	NT8M94EM	A0389384	MIN KIT W/140MB FEAT. M	
STD	NT8M94GM	A0389386	MIN KIT W/30MB FEAT. M	

Figure 6. Table B: PEC Codes For BMCA/S/D Minimum Spares Kits

See Figure 8 on page 3-16 for the associated Stocklist of the Minimum Spares Kit.

RELEASE 06.03
13 July 1998

PRODUCT STATUS	PEC	CPC	TITLE	
MD	NT8M94CA	A0333369	MAX KIT W/72MB FEAT. A	
MD	NT8M94DA	A0333370	MAX KIT W/O DISK FEAT. A	
MD	NT8M94FA	A0333372	MAX KIT W/140MB FEAT. A	
MD	NT8M94HA	A0333374	MAX KIT W/30MB FEAT. A	
STD	NT8M94CC	A0338320	MAX KIT W/72MB FEAT. C	
STD	NT8M94DC	A0338321	MAX KIT W/O DISK FEAT. C	
STD	NT8M94FC	A0338323	MAX KIT W/140MB FEAT. C	
STD	NT8M94HC	A0338325	MAX KIT W/30MB FEAT. C	
MD	NT8M94CD	A0337571	MAX KIT W/72MB FEAT. D	
MD	NT8M94DD	A0337573	MAX KIT W/O DISK FEAT. D	
MD	NT8M94FD	A0337576	MAX KIT W/140MB FEAT. D	
MD	NT8M94HD	A0337578	MAX KIT W/30MB FEAT. D	
MD	NT8M94CE	A0339651	MAX KIT W/72MB FEAT. E	
MD	NT8M94DE	A0339652	MAX KIT W/O DISK FEAT. E	
MD	NT8M94FE	A0339654	MAX KIT W/140MB FEAT. E	
MD	NT8M94HE	A0339656	MAX KIT W/30MB FEAT. E	
MD	NT8M94KE	A0350806	MAX KIT W/380MB FEAT. E	
MD	NT8M94ME	A0350808	MAX KIT W/O DISK FEAT. E	380
STD	NT8M94PE	A0365612	MAX KIT W/380MB FEAT. E	
STD	NT8M94RE	A0365614	MAX KIT W/760MB FEAT. E	
STD	NT8M94TE	A0365616	MAX KIT W/O DISK FEAT. E	
STD	NT8M94XE	A0627704	MAX KIT AMAT TURBO FEAT. E	
MD	NT8M94CF	A0338923	MAX KIT W/72MB FEAT. F	
MD	NT8M94DF	A0338924	MAX KIT W/O DISK FEAT. F	
MD	NT8M94FF	A0338926	MAX KIT W/140MB FEAT. F	
MD	NT8M94HF	A0338928	MAX KIT W/30MB FEAT. F	
STD	NT8M94KF	A0371768	MAX KIT W/380MB FEAT. F	
STD	NT8M94MF	A0371770	MAX KIT W/O DISK FEAT. F	380
MD	NT8M94DG	A0341848	MAX KIT W/O DISK FEAT. G	
MD	NT8M94FG	A0341850	MAX KIT W/140MB FEAT. G	
MD	NT8M94CJ	A0347092	MAX KIT W/72MB FEAT. J	
MD	NT8M94DJ	A0347098	MAX KIT W/O DISK FEAT. J	
MD	NT8M94FJ	A0347094	MAX KIT W/140MB FEAT. J	
MD	NT8M94HJ	A0347096	MAX KIT W/30MB FEAT. J	
STD	NT8M94CL	A0389365	MAX KIT W/70MB FEAT. L	
STD	NT8M94DL	A0389366	MAX KIT W/O DISK FEAT. L	
STD	NT8M94FL	A0389368	MAX KIT W/140MB FEAT. L	
STD	NT8M94CM	A0389382	MAX KIT W/70MB FEAT. M	
STD	NT8M94DM	A0389383	MAX KIT W/O DISK FEAT. M	
STD	NT8M94FM	A0389385	MAX KIT W/140MB FEAT. M	
STD	NT8M94HM	A0389387	MAX KIT W/30MB FEAT. M	

Figure 7. Table C: PEC Codes For BMCA/S/D Maximum Spares Kits

See Figure 9 on page 3-19 for the Stocklist of the Maximum Spares Kit.

RELEASE 06.03
13 July 1998

Refer to the Table below for the contents of the Minimum Spares Kit's supercodes for all Billing Media Converters:

ITEM	PEC	CPC	DESCRIPTION	QTY	NOTE
1	NT6M84BA	A0333063	P/A Comm. PCB	1	1
2			Intent. Left Blank		
3	NT6M66AL	A0364996	Disk Interface PCB	1	6
4	NT6M66AH	A0339826	Disk Interface PCB	1	6
5	NT6M66BA	A0348752	Disk Interface PCB	1	6
6			(Intent. left blank)		
7	NT6M65AB	A0333057	Error Control II PCB	1	3
8			(Intent. left blank)		
9	NT6M65AG	A0335297	Error Control II PCB	1	3
10	NT6M72CA	A0333152	Disk Assy 30MBs	1	5
11	NT6M72AA	A0325853	Disk Assy 72MBs	1	5
12	NT6M72BA	A0328128	Disk Assy 140MBs	1	5
13	NT6M72DA	A0339828	Disk Assy 380MBs	1	5
14	NT6M72DD	A0367053	Disk Assy 380MB TURBO	1	5
15	NT6M72EA	A0350597	Disk Assy 760MB TURBO	1	5
16			(Intent. left blank)		
17			(Intent. left blank)		
18	NT6M96AA	A0325828	Spare Fuse Kit	1	1
19	NT6M48AA	A0348749	56K Crossover PCB	1	7
20	NT6M94AA	A0348748	56K Interface PCB	1	7
21	NT6M70AB	A0331042	Data Stream I/F PCB	1	8,9
22	NT6M70BD	A0393197	Data Stream I/F PCB	1	8
23			(Intent. left blank)		
24	NT6M66CA	A0615106	SCSI DISK INTF PCB	1	6

Figure 8. Table D: Minimum Spares Kit Stocklist

NOTES:

1. These PCB's and Spare Fuse Kit are provided with all BMC Minimum Spares Kits.
2. This Note is intentionally left blank.

RELEASE 06.03
13 July 1998

3. Error Control II PCB is provided with all BMC Minimum Spares Kits for all System Feature Groups. Selection of the PCB is as follows:

SYSTEM FEAT. GROUP	ERROR CTRL II ITEM NUMBER
=====	=====
NT8M04_C	7
NT8M04GC	9
NT8M04_E	9

4. (Intentionally left blank)

5. The DDU provided is indicated in the TITLE of Table B. The 380MB DDU is only available for System Feature Group E. The 380MB and 760MB TURBO DDU's are only available for System Feature Group E, PECs NT8M04EE and NT8M04FE.

6. Disk Interface PCB's provided with all BMC Minimum Spares Kits for all System Feature Groups. Selection of PCB is as follows:

SYSTEM PEC	DISK INTERFACE ITEM NUMBER
=====	=====
NT8M04_C	3
NT8M04GC	24
NT8M04(A-C)E	3
NT8M04DE	4
NT8M04(E-F)E	5
NT8M04(G-I)E	24

7. 56K Crossover and 56K Interface PCB's provided with BMC Minimum Spares Kits for Feature Group E, PEC's NT8M04EE, NT8M04FE, NT8M04GE, NT8M04HE and NT8M04IE.
8. The Data Stream I/F PCB is provided with all BMC Minimum Spares Kits for all System Feature Groups. Selection of PCB is as follows:

SYSTEM FEAT. GROUP	DATA STREAM I/F PCB ITEM NUMBER
=====	=====
NT8M04_C	21
NT8M04GC	22
NT8M04_E	21

9. When NT6M70AB is ordered individually, the PEC of the kit where originally provided or the DMS100F site name must be provided in order to receive the proper firmware EPROM.

Refer to Figure 9 on page 3-19 for the contents of the Maximum Spares Kit's supercodes for all Billing Media Converters:

RELEASE 06.03
13 July 1998

ITEM	PEC	CPC	DESCRIPTION	QTY	NOTE
1	NTM609AB	A0331691	Error Ctrl Jmpr PCB	1	1
2	NT6M62BA	A0327812	CPU Logic PCB	1	1
3	NT6M64AA	A0325131	Expanded Memory PCB	1	1
4	NT6M68AA	A0325134	Terminator PCB	1	1
5			Intent. Left Blank		
6	NT6M71AB	A0328027	Power Supply	1	1
7	NT6M72AE	A0347771	Disk Xovr PCB	1	9
8	NT6M93AA	A0348753	Disk Xovr PCB	1	9
9	NT6M84BA	A0333063	PA Comm. PCB	1	1
10	680-7830	A0287304	Fan	1	1
11	NT6M60BA	A0332012	Quad SIO PCB	1	1
12	NT6M66AL	A0364996	Disk Interface PCB	1	2
13			(Intent. left blank)		
14	NT6M66AH	A0339826	Disk Interface PCB	1	2
15	NT6M66BA	A0348752	Disk Interface PCB	1	2
16	NT6M65AB	A0333057	Error Control II PCB	1	3
17			(Intent. left blank)		
18	NT6M65AG	A0335297	Error Control II PCB	1	3
19	NT6M72AA	A0325853	Disk Assy 72MBs	1	5
20	NT6M72BA	A0328128	Disk Assy 140MBs	1	5
21	NT6M72CA	A0333152	Disk Assy 30MBs	1	5
22	NT6M72DA	A0339828	Disk Assy 380MBs	1	5
23	NT6M72DD	A0367053	Disk Assy 380MB Turbo	1	5
24	NT6M72EA	A0350597	Disk Assy 760MB Turbo	1	5
25	NT6M63DE	A0393205	EPROM PCB	1	6
26			(Intent. left blank)		
27			(Intent. left blank)		
28	NT6M63CM	A0365617	EPROM PCB	1	6
29	NT6M63DC	A0393203	EPROM PCB	1	6
30	NT6M63FL	A0627306	EPROM PCB	1	6
31	212744-107	A0347443	ADU Logic PCB	1	7
32	212934-101	A0337368	LED Status Alarm	1	8
33	212934-103	A0337369	LED Status Primary	1	8
34	212934-105	A0337370	LED Status Only	1	8
35	212934-107	A0337371	LED Status Major	1	8
36	212934-109	A0337372	LED Status Minor	1	8
37	212934-111	A0337373	LED Status Error	1	8
38			(Intent. left blank)		
				0-0-0	

Maximum Spares Kit Stocklist Table (Continued on next page...)

RELEASE 06.03
13 July 1998

...continued from previous page

ITEM	PEC	CPC	DESCRIPTION	QTY	NOTE
39	212934-115	A0347197	LED Stat Critical	1	8
40	NT6M96AA	A0331042	Spare Fuse Kit	1	1
41	NT6M70AB	A0325136	Data Stream I/F PCB	1	11,12
42	NT6M70BD	A0393197	Data Stream I/F PCB	1	11
43			(Intent. left blank)		
44	NT6M48AA	A0348749	56K Crossover PCB	1	10
45	NT6M94AA	A0348748	56K Interface PCB	1	10
46	NT6M66CA	A0615106	SCSI INTERFACE PCB	1	10
47	NT6M48AA	A0348749	56K DISK XOVR PCB	1	9
48	NT6M93BA	A0615108	SCSI Crossover PCA	1	13

Figure 9. Maximum Spares Kit Stocklist Table

NOTES:

1. These PCB's and other sub-assy's are provided with all BMC Maximum Spares Kits. (NTM609AB is not a typo.)
2. Disk Interface PCB is provided with all BMC Maximum Spares Kits for all System Feature Groups. Selection of PCB is as follows:

SYSTEM PEC	DISK INTERFACE ITEM NUMBER
=====	=====
NT8M04_C	12
NT8M04GC	46
NT8M04(A-C)E	12
NT8M04DE	14
NT8M04(E-F)E	15
NT8M04(G-I)E	46

3. Error Control II PCB is provided with all BMC Maximum Spares Kits for all System Feature Groups. Selection of PCB is as follows:

SYSTEM PEC	ERROR CNTL II ITEM NUMBER
=====	=====
NT8M04_C	16
NT8M04GC	18
NT8M04_E	18

4. (Intentionally left blank.)
5. The DDU provided is indicated in the TITLE of Table C. The 380MB DDU is available for System Feature Group E only. The 380 MB and 760MD TURBO DDU's are only available for System Feature Group 'E', PECs NT8M04EE and NT8M04FE.

RELEASE 06.03
13 July 1998

6. EPROM PCB is provided with all BMC Maximum Spares Kits for all System Feature Groups. Selection of PCB is as follows:

SYSTEM PEC	EPROM ITEM NUMBER
=====	=====
NT8M04_C	25
NT8M04GC	30
NT8M04(A-D)E	29
NT8M04(E-F)E	28
NT8M04(G-I)E	30

7. Automatic Dial-Up (ADU) is not a feature on currently provisionable BMC units.
8. BMC LEDs are supplied in BMC Maximum Spares Kits in accordance with the System Feature Group selected, as follows:

PEC	DESCRIPTION	SYSTEM FEATURE GROUPS	
		C	E
=====	=====	=====	=====
212934-101	LED Status Alarm	1	1
212934-103	LED Status Primary	1	1
212934-105	LED Status Only	1	1
212934-107	LED Status Major	1	1
212934-109	LED Status Minor	1	1
212934-111	LED Status Error	1	-
212934-113	LED Status Power	-	-
212934-115	LED Status Critical	-	1

9. Disk XOVR PCB is provided with all BMC Maximum Spares Kits for all System Feature Groups. Selection of PCB is as follows:

SYSTEM PEC	DISK XOVR ITEM NUMBER
NT8M04_C	7
NT8M04GC	47
NT8M04(A-D)E	7
NT8M04(E-F)E	8
NT8M04(H-I)E	47

0. 56K Crossover and 56K Interface PCB's provided with BMC Maximum Spares Kits for Feature Group E, PEC's NT8M04EE, NT8M04FE, NT8M04GE, NT8M04HE and NT8M04IE.

RELEASE 06.03
13 July 1998

1. The Data Stream I/F PCB is provided with all BMC Maximum Spares Kits for all System Feature Groups. Selection of PCB is as follows:

SYSTEM FEAT. GROUP	DATA STREAM I/F PCB ITEM NUMBER
=====	=====
NT8M04_C	41
NT8M04GC	42
NT8M04_E	42

2. When NT6M70AB is ordered individually, the PEC of the kit where originally provided or the DMS100F site name must be provided in order to receive the proper firmware EPROM.
3. The SCSI Crossover PCA is provided only in MAX kits for NT8M04GE, NT8M04HE and NT8M04IE.

1.2.3.5 Table F: Product Code Replacements

The following coding scheme may be employed to identify the appropriate replacement for the old 2129-WW-X-YY-Z-S Redundant BMC equipment ording codes:

RELEASE 06.03
13 July 1998

WW OPT.	Detailed Definition Of Option WW				Option YY						
FEATURE GROUP	CUSTOMER	PROTOCOL	CALL RECORD FORMAT	FORMAT TO HOST	USABLE DISK SIZE						REPLACEMENT CONFIGURATION
					1	3	7	1	2		
					3	7	4	8	6	G G	
					0	2	0	0	0	B B	
A2	ALLTELL	HDLC	NT	Common	x	x					Unavailable
CE/CC/CW	CONTELL	HDLC	NT	Pseudo	x	x					NT8M04-J (MD'd)
CL	INDEPEND	BISYNC	LSSGR	Pseudo	x	x	x		x		NT8M04-C
BP/BL	GTE BIP	HDLC Lap B	LSSGR	Pseudo	x	x	x				NT8M04-D (MD'd)
AM	BOC(AMAT)	BX.25	LSSGR	Cat B	x	x	x	x	x	x	NT8M04-E
CH	CENTREX	HDLC	SMDR	Pseudo	x	x	x				Discontinued
CX	CENTREX/ INDEPEND	BISYNC	SMDR/NT	Pseudo	x	x	x				NT8M04-A (MD'd)
LH or HL	ALLTELL/ CONTELL	HDLC	LSSGR	Pseudo	x	x	x	x			NT8M04-F (MD'd)

Figure 10. 2129-WW-X-YY-Z-S To NT8M04xx Replacement Chart

Options Not Reflected In The Above Chart:

X - All codes presented are for the DMS100F (X = 4)

Z - KSR printers are provided by the Telco or NTI

S - Refer to "EMI/Earthquake Information" on page 3-23 for sparing information.

The dash or hyphen (-) in the NT8M04 PECs are used as a variable for the various disk drive sizes. Replace the '-' with 'A' for 7, 'B' for 140, 'C' for 30, 'D' for 380, 'E' for 380 TURBO, or 'F' for 760 TURBO, 'G' for 1GB, 'H' for 1GB TURBO, 'I' for 2GB TURBO.

380 disk size is available with Feature Group E.

380 & 760MB TURBO disk size is available with Feature Group E only and cannot be equipped in old 2129-WW-X-YY-Z-S.

1.2.4 Office Layout Information

Not Applicable

RELEASE 06.03
13 July 1998

1.2.5 Traffic Tables

Not Applicable

1.3 Product/System Specification

1.3.1 Physical Characteristics

1.3.1.1 BMC AMA (BMCA)

Input Voltage -48VDC
Power Consumption 300 watts
Current Drain 10 Amps
Thermal Dissipation 1,024 BTU/hr
Fusing Requirements Two 10 Amp Fuses at PDC

MECHANICAL DIMENSIONS

Height 27"(685.8mm)
Width 19"(483mm)
Length 15"(381mm)

1.3.2 EMI/Earthquake Information

Not Applicable

1.3.3 Sparing Information

Provision one BMC Spares Kit as required for the BMC configuration (BMCA) per Telco specifications. See Figure 6 on page 3-14 and Figure 7 on page 3-15 for BMC Spares Kit PECs.

1.3.4 Power Feed and Fusing Requirements

Redundant BMCA requirements are as follows:

Two (2) 10 AMP fuses are required at PDC. One for each unit.

1.3.5 Current Drain Information

Redundant BMCA requirements are as follows:

4 Amps nominal
14 Amps maxium at intitial start up

1.4 Software Provisioning

For NTX software packages to PLC/SOC mappings for CSP02 and beyond refer to ECM552 - Mapping of NTX/NTG Package to PCL/NCL/Option.

1.4.1 Required Software Packages and Interdependencies

The DMS100F must be equipped with the NTX103AA (IBN - SMDR Enhanced) software package only if SMDR data is to be collected. This package is not required for AMA.

1.4.2 Software Usage Restrictions

Not Applicable

1.4.3 Memory Provisioning

Not Applicable

1.5 Real Time Impact

Not Applicable

RELEASE 06.03
13 July 1998

2.0 ECM300 - Disk Drive Unit Provisioning

2.1 Overview

Product/System Overview

Available disk capacity is that capacity remaining after power-up and formatting:

66 MByte Disk:	60,513,280 bytes available
154 MByte Disk:	144,615,424 bytes available
8" DDU:	240,020,000 bytes available
NT1X55FA SCSI-DDU:	250,000,000 bytes available

DDU's should be provisioned for a five year period by using five-year forecasted traffic figures. The DDU provisioning must be re-evaluated for another five year period with each office extension.

Data Recording Management

Data Recording Management involves functions relating to the Device Independent Recording Package (DIRP). DIRP controls the data flow from originating subsystems (i.e. OM,AMA,JF) to the devices (i.e. Tape or DDU) where the data is stored.

Disk Drive Unit sizing is divided into the following major areas:

- General Provisioning Information
- Subsystem volume sizes (which are as follows:)
 - Office Image
 - Auto Messaging Accounting (AMA)
 - Parallel AMA
 - Operational Measurements (OM)
 - Journal File (JF)
 - Peripheral Module (PM) Loads
 - Non-Resident Software
 - Batch Data Modification Orders (DMO)
 - Scan Log
 - Scratch Area

RELEASE 06.03
13 July 1998

- Killer Trunks (KT)

GENERAL PROVISIONING INFORMATION

A DDU is physically allocated in blocks. Each "DDU block" contains 1024 Bytes. Two (2) "DDU blocks" make up a "DIRP block" of 2048 Bytes. A "DIRP file segment" contains 256 DIRP blocks for a total of 524,288 Bytes.

A volume is an area of the DDU. Volumes are used for each area of Data Recording Management. An overhead of 2,148,352 Bytes are required per volume. The overhead consists of 51,200 Bytes (50 blocks) for volume and file control and 2,097,152 Bytes (048 blocks) for low space conditions. a DDU volume is physically defined by the multiple number "DIRP file segments" it contains plus the required overhead.

The following are volume summary guidelines:

- All DDU's and subsystems should be provisioned evenly across IOCs
- The minimum size of a volume is 2,672,640 Bytes (2610K blocks)
- The maximum size of a volume is 67,108,864 Bytes (64M blocks)
- One volume must be located in on DDU (i.e., a single volume cannot span 2 DDUs)
- The maximum number of volumes for each DIRP subsystem is 24
- Each ovolume for a DIRP subsystem must be the same size
- DIRP will use space evenly to all volumes allocated to a subsystem
- Volumes must be spread evenly over the DDUs provisioned
- There must be at least two (2) volumes per DDU

2.2 Hardware Provisioning

2.2.1 Hardware Usage Restrictions

N/A

2.2.2 Hardware Dependencies

N/A

2.2.3 P and C Side Port Requirements

N/A

RELEASE 06.03
13 July 1998

2.2.4 DMS BUS Port Requirements

N/A

2.2.5 Circuits Per Card

N/A

2.2.6 Discrimination Numbering

N/A

2.2.7 Provisioning Considerations

Office Image System Volume Size

The Office Image is formed by the total combined Program Store and Data Store requirements. It is recommended that a full 67,108,864 byte volume (maximum usable volume plus overhead) be reserved for the Office Image. A volume of this size provides adequate storage for an office containing 8 megawords of Program Store (PS) and 16 megawords of Data Store (DS) per side plus 50 percent spare for five-year growth.

Actual Office Image requirements may also be calculated using the following formula:

Office Image Volume Size = 2,148,352 Bytes + (.75 * (Program Store (bytes) + Data Store (bytes)))

Where 2,148,352 bytes is for Disk volume maintenance

This formula takes into account 50 percent spare for five-year growth and the prediction that only half of the provisionable PS and DS memory is Office Image.

This formula is valid for NT40 offices and SuperNode offices without a System Load Module (SLM). The SLM contains SuperNode office images and thus would not require redundant images to reside on disk.

Each DDU can contain only one Office Image volume. The maximum number of DDU's containing an Office Image volume is three.

Automatic Message Accounting (AMA)

AMA records should be stored on DDU:00 and DDU:01 equipped with power interlock. AMA entries for the total retention period are recorded over DDU:00 and DDU:01 (half on DDU:00 and half on DDU:01).

The required period of AMA record retention is specified in the number of days. Valid entries are 0 days to 499 days. An example of four days retention is as follows:

RELEASE 06.03
13 July 1998

First Day:	Recorded on DDU:00
Second Day:	Recorded on DDU:01
Third Day:	Recorded on DDU:00
Fourth Day:	Recorded on DDU:01

The AMA subsystem on DDU:00 and DDU:01 should be set up for a minimum of two volumes each. AMA/Local Call Detail Recording (LCDR) and Station Message Detail Recording (SMDR) data may be contained in the same volume if NT format is utilized. This data may also be recorded in separate volumes. The factor 1.3 included in calculations throughout this document consists of a dedicated area for volume and file control.

If a Distributive Processing Peripheral (DPP) or Billing Media Converter (BMC) is used, primary AMA is not stored on the disk.

NT Format AMA

The following calculations are used to determine storage requirements for AMA in the NT format. Entries should be answered calls unless the Telco is recording unanswered attempts, in which case entries should be call attempts.

A	=	AMA DDD High Day Entries	*	22 bytes
B	=	LCDR High Day Entries	*	22 bytes
C	=	AMA IDDD High Day Entries	*	25 bytes
D	=	Tops High Day Entries	*	45 bytes
E	=	Optional Trunk ID extension High Day Entry	*	9 bytes

F = Subtotal NT AMA = A+B+C+D+E

Total NT AMA = (F * 1.3 factor * number of days retention)
(rounded up to the nearest multiple of 524,288)

Number of AMA Volumes = (Total NT AMA) / (volume size in bytes)
(rounded up to the nearest even integer)

RELEASE 06.03
13 July 1998

$\text{AMA/Volume} = (\text{Total NT AMA (bytes)}) / (\text{number of AMA volumes}) + (2,148,352 \text{ bytes (overhead)})$

The minimum volume size for AMA is 2,672,640 Bytes. The maximum volume size for AMA is 67,108,864 Bytes. The recommended minimum of AMA volumes is four. The maximum number of volumes is 24.

SMDR (IBN Lines)

The following calculations are used to determine storage requirements for SMDR records:

S	=	SMDR (dialed digits less than 12)	*	High Day entries	*	33 bytes
T	=	SMDR (dialed digits 12 or greater)	*	High Day entries	*	39 bytes
H	=	Additive for High Day entries	*	13 bytes		

(for calls if the dialed digits are different than the outputted digits and the option is activated to record outputted digits.)

$J = \text{Subtotal SMDR} = (S+T+H)$

$\text{Total SMDR} = (J * 1.3 \text{ factor} * \text{number of days retention})$

(round up to the nearest multiple of 524,288)

$\text{Number of SMDR Volumes} = (\text{Total SMDR}) / (\text{volume size in bytes})$

(round up to the nearest even integer)

$\text{SMDR/volume} = (\text{Total SMDR in bytes}) / (\text{no. of SMDR volumes}) + (2,148,352 \text{ bytes (overhead)})$

The minimum volume size for SMDR is 2,672,640 Bytes. The maximum volume size for SMDR is 67,108,864 Bytes. The recommended minimum of SMDR volumes is four. The maximum number of volumes is 24.

Combined AMA and SMDR Volumes (NT Format Only)

(Do not calculate here if calculated separately.)

$\text{AMA/volume} = (\text{Total NT AMA}) + (\text{Total SMDR}) / (\text{no. of AMA volumes}) + (2,148,352 \text{ bytes})$

Bellcore AMA Format

The following calculations are used to determine storage requirements for AMA in the Bellcore record format.

$\text{Basic Average High Day entries} * 55 \text{ bytes} + \text{See notes} = K$

RELEASE 06.03
13 July 1998

Note 1: If the office is optionally equipped with software for Equal Access (Equal Access End Office NT1X86AA or Access Tandem NTX386AA), then add 10 bytes to the multiple 55 bytes above. Ensure that High Day entries contain both originating and terminating calls if recorded. Additive for Switch Supervisory Unit (SSU) for line and trunk if feature NTX076AA AMA Enhanced is turned on:

L = High Day Entries * 8 bytes

Additive for IBN customer dialed account number(package NTX102AA)

M = High Day entries * 10 bytes

Reduction due to compression (high runner call types: message rate, flat rate, station paid calls are compressed by 10 bytes.)

N = High Day entries * 10 bytes

P = Subtotal Bell Core AMA Format = (K+L+M) - N

Total Bell Core AMA Format = (P * factor 1.2 * number of days retention * 1.3)

(round up to the nearest multiple of 524,288)

Number of AMA volumes = (total Bell Core AMA) / (volume size in bytes)
(round up to the nearest even integer)

AMA/Volume = (total Bell Core AMA format) / (no. of AMA volumes)" +
(2,148,352 bytes (overhead))

(Factor 1.2 estimates variable structure code information per call code.)

The minimum volume size for AMA is 2,672,640 Bytes. The maximum volume size for AMA is 67,108,864 Bytes. The recommended minimum of AMA volumes is four. The maximum number of volumes is 24.

Expanded Bellcore AMA Format (EBAF)

EBAF uses new base structure codes and appended modules to record AMA information. Refer to SEB: 89-12-002 for a cross reference of record sizes.

Example: A 0+ call originating on a TOPS trunk group with the calling party requesting person-to-person. The call is then billed and completed. Record size for pre-EBAF = 69 bytes, with EBAF = 84 bytes.

Parallel Volumes

Parallel recording is optional for any subsystem on Mag Tape or disk. If parallel recording is done on disk it should be done on one that does not have regular AMA volumes (i.e. active/stand-by). It is recommended that parallel volumes should be sized at a full 67,108,864 Bytes.

Operational Measurement Volume

The number of Common Language Location Identifiers (CLLI) includes pseudo maintenance CLLI, spares, interoffice CLLI, and growth CLLI. The minimum number of CLLI is 120.

Basic OM on Trunk Groups (Single Precision)

RELEASE 06.03
13 July 1998

Q = Number of CLLI's * 18 bytes * number of dumps/day (max.48)
Repeat for all classes used. The maximum number of classes is 30.
Basic OM's on Trunk Groups (Double Precision)
R = Number of CLLI's * 36 bytes * number of dumps/day (max. 48)
Repeat for all classes used.
IBN OM's (Single Precision)
S = Number of Customer Groups * 175 bytes * no. of dumps/day (max.48)
Repeat for all classes used. The maximum number of classes is 30.
IBN OM's (Double Precision)
T = Number of Customer Groups * 350 bytes * no. of dumps/day (max.48)
"
Repeat for all classes used.
V = Subtotal OM = (Q+S) or (R+T)
Total OM = (V * factor 1.3 * number of days retention)
(round up to the nearest multiple of 524,288)

Number of OM Volumes = (Total OM) / (Volume size in Bytes)
(round up to the nearest even integer)

OM/Volume = (Total OM) / (No. of OM Volumes)" + (2,148,352 bytes
(overhead))

The minimum volume size for OM is 2,672,640 Bytes. The maximum volume size for OM is 67,108,864 Bytes. The recommended minimum of OM volumes is two. The maximum number of volumes is 24.

Journal File Volume

The Journal File (JF) subsystem provides a means of recording Data modification Orders (DMO's) allowing their addition to the office image on respective disk drives after an office reload.

In a two DDU office, the expected worst case number of days retention for DDU:00 is seven days. DDU:01 has the image taken at the time the office was last booted in. If the image is older then 61 days, the following options are possible.

- DMO's that are older than 61 days are only stored on magnetic tape, not disk. The number of days retention is 61 days for DDU:01.
- The DMO's that are older than 61 days are stored on DDU. The number of days retention is optional up to as much as 6 months to one year.

In a three DDU Office, the expected worst case number of days retention for DDU:00 & 01 is 14 days. For DDU:02 the number of days retention is the same as for DDU:01 in a two DDU office (see above.)

JF Volume

Total JF = No. of DMO's * 512 bytes * factor 1.3 * No. of days retention "
(round up to the nearest multiple of 524,288)

RELEASE 06.03
13 July 1998

Number of days retention equals the age of the office image in days.

$$\text{JF/Volume} = \text{Total JF} + 2,148,352 \text{ bytes (Overhead) (minimum 2,672,640 bytes) "}$$

Repeat for each DDU.

Peripheral Module Load Volume
BCS 30 Peripheral Loads

RELEASE 06.03
13 July 1998

PM Load	Description	LRec	Re-cords	Bytes
RDCMPA02	DCM, DES	76	523	39748
DPPA9A	DPP	2048	66	135168
SDC30B	DTC (CCIS6)	1024	768	786432
DC730B0	DTC (CCS7)	1024	2432	2490368
NDT30B0	DTC (new mem & msg)	1024	2004	2052096
SDT30B	DTC (old mem & msg)	1024	770	788480
DTI30B01	DTCI	1024	3276	3354624
LCMI30F	LCMI	55	1076	59180
SLCMI27A	LCMI	76	1148	87248
NLG30B0	LGC	1024	2266	2320384
BLMRA01	LM	76	1426	108376
LTI30B01	LTCI	1024	4468	4575232
PM Load	Description	LRec	Re-cords	Bytes
MPC03001	MPC0 (CCITT)	2048	149	305152
MPCA30B0	MPCA (asynch)	2048	141	288768
MPCX30B0	MPCX (enh MPC)	2048	195	399360
SMC30B	MSB6	1024	578	591872
MC730B0	MSB7	1024	1492	1527808
MTMKA02	MTM, TAN, OAU	76	302	22952
PAC30B0	PRA, IAC	1024	1906	1951744
NRC30B01	RCC	1024	2768	2834432
RCI30B01	RCCI	1024	4430	4536320
PM Load	Description	LRec	Re-cords	Bytes
DLM27A1	RDLM	76	1097	83372
LCM30H	RLCM	55	726	39930
ESA30B0	RLCM (ESA)	1024	1478	1513472
XLCM30G	RLCM (super-charging)	55	877	48235
ERLMQA01	RLM (bay 0)	76	2527	192052

BRLMQA01	RLM (bay 1)	76	1863	141588
RMMDA02	RMM	76	690	52440
SM30B0	SMR	1024	1838	1882112
NSS30B01	SMS	1024	2030	2078720
SU30B0	SMU	1024	2180	2232320
MCIHA02	ST (CCIS)	76	890	67640
M7COA04	ST (CCS7)	76	1002	76152
BTMKA02	TM2, TM4, TM8	76	275	20900
FSTMDA02	TM8 (feature load)	76	311	23636
TSTMKA02	TM8 (traffic load)	76	283	21508
TMS30B01	TMS	1024	4400	4505600

Duplicate the PM loads on two DDU's on separate IOC's.
Minimum PM volume size is 2,672,640 bytes.

Peripheral Module Load Volume

BCS 32 Peripheral Loads

PM Load	Description	LRec	Re- cords	Bytes
CMRAH04	CMR	1024	170	174080
DCH32CD2	DCH	1024	672	688128
RDCMDA02	DCM, DES	76	523	39748
ADCMPA01	DES	76	441	33516
DPP004	DPP	2048	67	137216
DPT021	DPP (turbo)	2048	113	231424
SDC32B	DTC (CCIS6)	1024	768	786432
DC732CD1	DTC (CCS7)	1024	2848	2916352
NDT32CD	DTC (new mem & msg)	1024	2234	2287616
SDT32B	DTC (old mem & msg)	1024	772	790528
DTI32CD2	DTCI	1024	4058	4155392
DTUBAA01	DTU	60	755	45300
MRC32CD	EIU	1020	2343	2389860
ENC32CD	ENET	1020	2538	2588760
FRC32CD	FRIU	1020	2538	2588760
IPE32BZ	IPE	1024	139	142336
LCME32N	LCM (2B1Q)	55	1197	65835
LCMI32F	LCMI	55	1017	55935
NLG32CD	LGC	1024	2730	2795520
LRC32CD	LIU7 (2 slot)	1020	2603	2655060
LCC32CD	LIU7 (3 slot)	1020	2668	2721360
BLMTA03	LM	76	1426	108376
PM Load	Description	LRec	Re- cords	Bytes
LPC32CD	LPP (LIM)	1020	4488	4577760
NLT32CD	LTC (4 meg mem)	1024	2902	2971648
LTi32CD2	LTCI	1024	4058	4155392
MPCA32CD	MPC (async)	2048	144	294912
MPCX32CD	MPC (BX.25)	2048	196	401408
MPC432CD	MPC (V.32)	2048	157	321536

RELEASE 06.03
13 July 1998

MPC032CD	MPC0 (CCITT 1980)	2048	157	321536
SMC32B	MSB6	1024	580	593920
MC732CD	MSB7	1024	1564	1601536
RMTMKA01	MTM (receivers)	76	302	22952
MTMKA02	MTM, TAN, OAU	76	302	22952
MTULF01	MTU	80	1871	149680
OAM32CA	OAM	128	7814	1000192
NRC32CD	RCC	1024	3182	3258368
RCI32CD2	RCCI	1024	4664	4775936
DLM32A	RDLM	76	1089	82764
LCM32H	RLCM	55	727	39985
ESA32CD	RLCM (ESA)	1024	1604	1642496
XLCM32K	RLCM (super-charging)	55	1021	56155
PM Load	Description	LRec	Re-cords	Bytes
ERLMTA02	RLM (bay 0)	76	2527	192052
BRLMTA02	RLM (bay 1)	76	1863	141588
RMM31C	RMM	1024	27	27648
SM32CD	SMR	1024	1996	2043904
NSM32CD	SMR (enhanced)	1024	2186	2238464
NSS32CD	SMS	1024	2284	2338816
SU32CD	SMU	1024	2452	2510848
MCIHA02	ST (CCIS)	76	890	67640
M7CQA01	ST (CCS7)	76	962	73112
FSTMDA02	TM8 (feature load)	76	311	23636
TSTMKA02	TM8 (traffic load)	76	283	21508
TMS32CD2	TMS	1024	4568	4677632
XCH32CD2	TMS	1024	630	645120

Duplicate the PM loads on two DDU's on separate IOC's.
Minimum PM volume size is 2,672,640 bytes.

Non-Resident Software Volume

RELEASE 06.03
13 July 1998

All Non-Resident Software is supplied to the Telco on a tape. Thus volume space on a DDU is not required.

Batch Data Modification Order Volume

Externally created Data Modification Orders (DMOs) may be bulk loaded into the system. DMOs can be written to DDUs either from magnetic tape or through a communication link with remote batch input terminal.

Batch DMO Volume = Number of DMOs _____ x 128 x 1.3

The suggested minimum is 250 DMOs. The Maximum number of DMO's is 4096. If this feature is used, then the recommended volume size is 2,672,640 bytes.

Scan Log Volume Size (Log Analyzer)

Scan Log is a tool that can be used to analyze log messages. A recommended low value is 5,242,880 bytes. At the operating company's option this can be increased. (Maximum volume size is 67,108,864 Bytes)

Scratch Area Volume Size

Allocate the unused area on each DDU as a scratch area. Size the scratch area on each DDU into approximately 2,097,152 or 3,145,728 byte volumes.

Note: A scratch area volume name must be between one to four characters in order to be usable by DIRP in an emergency situation.

Killer Trunk Reports To DIRP

Determine the required DDU storage requirements for Killer Trunk (KT) Reports using the following formula:

$KT\ Storage = N * (36\ bytes + (12\ bytes * M)) + 20\ bytes$

Where: N = Number of reports generated per day.

M = Number of IBN trunk members to test

Multiply the total bytes required by the number of days retention.

$Total\ KT = (KT\ Storage * 1.3 * number\ of\ days\ retention)$

(round up to the nearest multiple of 524,288)

$Number\ of\ KT\ volumes = (Total\ KT) / (Volume\ Size\ in\ Bytes)$

(round up to the nearest even integer)

$KT\ per\ volume = (Total\ KT) / (No.\ of\ KT\ Volumes) + 2,672,640\ bytes$

The minimum KT per volume is 2,672,640 records or bytes.

|* For a definition of Killer Trunks, refer to NTP-297-1001-451

| Customer Data Schema: table TRKGRP.

Automatic Trunk Testing Reports to DIRP

RELEASE 06.03
13 July 1998

Determine the required DDU storage for Automatic Trunk Test reports using the following formula.

$$\text{ATT Storage} = 240 \text{ bytes} + (P * 70 \text{ bytes}) * Q + 20 \text{ bytes} + (R * 10 \text{ bytes})$$

Where:

P = Number of IBN trunk group members per trunk group.

Q = Number of IBN trunk groups.

R = Number of restarts

Multiply total bytes required by the number of days retention.

$$\text{Total ATT} = (\text{Storage ATT} * 1.3 * \text{number of days retention})$$

(round up to the nearest multiple of 524,288)

$$\text{Number of ATT volumes} = (\text{Total ATT}) / (\text{volume size in Bytes})$$

(round up to the nearest even integer)

$$\text{ATT per volume} = (\text{Total ATT}) / (\text{No. of ATT Volumes}) + (2,672,640 \text{ Bytes})$$

The minimum ATT per volume is 2,672,640 bytes
ATT and KT reports should be separate volumes.

The minimum volume size for ATT and KT is 2,672,640 Bytes. The maximum volume size for OM is 67,108,864 Bytes. The recommended minimum of ATT and KT volumes is two. The maximum number of volumes is 24.

Summary

Total all DDU requirements and divide by total usable volume space to determine required number of DDU's.

2.2.8 Office Layout Information

N/A

2.2.9 Traffic Tables

N/A

2.3 Product/System Specification

2.3.1 Physical Characteristics

N/A

2.3.2 EMI/Earthquake Information

N/A

2.3.3 Sparing Information

N/A

2.3.4 Power Feed and Fusing Requirements

N/A

2.3.5 Current Drain Information

N/A

2.4 Software Provisioning

For NTX software packages to PLC/SOC mappings for CSP02 and beyond refer to ECM552 - Mapping of NTX/NTG Package to PCL/NCL/Option.

2.4.1 Required Software Packages and Interdependencies

N/A

2.4.2 Software Usage Restrictions

N/A

2.4.3 Memory Provisioning

N/A

2.5 Real Time Impact

N/A

RELEASE 06.03
13 July 1998

3.0 ECM306 - Distributed Processing Peripheral (DPP)

3.1 Overview

The Distributed Processor Peripheral (DPP) allows remote polling of AMA data information as specified by Automatic Message Accounting Teleprocessing System (AMATPS) requirements. AMA data is collected and stored on the DPPs internal Disk Drive Units for forwarding, upon request, to a host collector. Currently, AMATPS is the only application of the DPP, with only one DPP unit being provisioned per office.

Polling options available for the DPP include ≥ 9600 baud, 56K high speed polling, and 56K/Compression. The 56K/Compression DPP introduces the implementation of Firmware Data Compression Feature (FDCF) for Automatic Message Accounting Transmitter (AMAT). FDCF is added to the Communications Processor (CP) and is not a part of the BCS software release. The 56K/Compression feature implements the AT&T LZW algorithm to achieve a nominal compression ratio of 2.8:1. This is equivalent to polling non-compressed data at 27K baud over dial up phone lines. The host collector must be capable of receiving compressed data and expanding that data. The data is stored at the DPP disk and collector end in a non-compressed form.

The DPP is provided in a redundant configuration. The redundant DPP is composed of 2 processor units equipped with cross-over circuitry to ensure continuous operation in the event of a component failure. Interface to the DMS-100F is via IOC Mag Tape Controller cards for AMA records, IOC I/O cards for connection to the MAP, and MTM scan cards for alarm indications. The serial I/O ports handle maintenance commands to the DPP, maintenance responses from the DPP, log messages from the DPP, and software download capabilities. Communications between the DPP and the MAP utilizes the DMS MMI protocol. A second serial I/O port is required to provide redundant capabilities. The configuration of the controllers is such that each controller is located on a different IOC for reliability.

The DPP utilizes a modem interface for transmission of data to the host collector at speeds up to 56K bits per second. The 56K/Compression option is polled at a maximum rate of 9.6K baud via RS-232 interface from DPP to Modem. DPPs equipped with compression hardware may be polled at higher speeds (56K) when compression feature is turned off. The 56K feature requires a V.35 interface from DPP to the modem. AMA data transmission is performed using the Bellcore BX.25 protocol.

The DPP with Small Computer System Interface (SCSI) disk subsystem is introduced to replace the existing DPP which has 5.25 inch drive technology. The disk subsystem is the set of hard drives, Disk Crossover packs, SCSI Interface packs EPROM packs, and intercon-

RELEASE 06.03
13 July 1998

nects that combine to perform the function of program and data store for the DPP system. The new disk subsystem has 3.5 inch drive technology and is offered in customer-usable storage capacities of 1GB or 2GB with redundant architecture.

Storage/polling dependencies for the DPP are as follows:

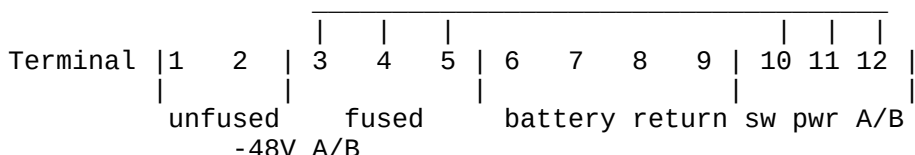
- 1 GB disk - <=9600 baud, 56K, or 56K/Compression
- 2 GB disk - Either 56K or 56K/Compression

3.2 Hardware Provisioning

3.2.1 Hardware Usage Restrictions

The 56K/Compression option is available on the 1 GB and 2 GB DPP units. This data compression feature is designed to run at a polling rate of 9.6K baud. Significantly faster data cannot be maintained and still achieve the desired compression rate.

A DPP unit may be equipped in the same frame that has an 8" DDU Unit provided, or a Remote Oscillator Shelf provided, or any equipment provisioned on an IOE Frame when no more than four (4) Battery Return (BR) connections are required on FSP TB1 terminal block.



TB1 Terminal Block

3.2.2 Hardware Dependencies

NT1X68AC/BC Cook Mag Tape Controller CP - Provide two per each DPP. These two cards should be located on separate IOC modules.

NT1X67BC/BD I/O Terminal Controller CP - Provide two PORTS per each DPP. These two ports should be located on separate IOC modules. Refer to Figure 14 on page 3-47 for provisioning of these CPs including power interlock requirements for the IOCs.

NT0X36AB Power Control and Alarm CP - Provide one for each IOE frame with a DPP. In cabinetized offices with an MSP the alarm module is standard, therefore, no additional CPs need to be ordered.

RELEASE 06.03
13 July 1998

NT0X10AA Scan Detector Circuit - One dedicated scan card must be provided for each DPP. The first three channels only are always used with the remaining channels remaining not used and unavailable. In addition, the 3.5" disk DPP requires three additional scan circuits on a non-dedicated scan card for enhanced alarm capability.

Modem Provide 2400, 4800, 9600 or 56K Baud Rate modem as required for polling. The near and far end modems must be compatible. Specify cable pec code NT8M99AG for 2400-9600 Baud Case modems, NTNX36BZ for 56K UDS modems, NTNX69AA SYNT II, or NTNX69AD for AT&T 2600 series 56K modems or GDC modems.

NOTE: The Customer is responsible for modem compatibility with any automatic callback unit that they provide for DPP polling. NT does not provide an automatic call back unit for DPP polling.

The 56Kbps polling option requires modem/data unit capable of the same speed transmission.

The 56K/Compression option requires a modem capable of up to 9.6K and RS-232 must be used to interface the DPP and the modem.

Compression DPPs are able to work properly with non compression type collectors. Non-compression type collectors are able to poll data in non-compressed mode only. To be able to poll in compressed mode, the collector must conform to the AT&T LZW data compression specifications.

3.2.2.1 P and C Side Port Requirements

Not Applicable

3.2.2.2 DMS BUS Port Requirements

Not Applicable

3.2.2.3 Circuits Per Card

Not Applicable

3.2.2.4 Discrimination Numbering

Not Applicable

RELEASE 06.03
13 July 1998

3.2.3 Provisioning Considerations

3.2.3.1 DPP - SCSI DISK SUBSYSTEM WITH 3.5" DRIVES

This section details the provisioning guidelines for the DPP with the SCSI disk subsystem including how to calculate disk size requirements. In addition, upgrade kits are shown to bring any 5.25" DPP to any 3.5" DPP as well as to update any 3.5" DPP to one with a larger disk or different polling option.

DISK SIZE CALCULATION AND SYSTEM ALARMS

The DPP disk size is determined by the number of blocks required. To get the number of blocks required, use the following calculations:

Variables:

ABDV = Average Busy Day Volume expressed as call records/day
BYT = customer defined average bytes per call record
CRB = Call Records per Block
DAY = customer defined number of days of disk back-up + 1
(current day)
TC = Total Capacity requirement in call records
B = number of Blocks required

First calculate the number of call records per block. Different types of call records are different record lengths. The customer's traffic department will have established an average call record length for the office. Each block is 1,531 bytes long, so the number of call records per block is simply 1,531 divided by the number of bytes per call record. Typical values are from 18 to 30 call records per block (CRB).

$$CRB = (1,531 \text{ bytes/block}) / (BYT)$$

Next calculate the number of call records which must fit on the disk drives (Total Capacity Req., or TC). This is done by multiplying the Average Busy Day Volume (ABDV) by the Number of Days Back-Up (DAY) required by the customer.

$$TC = ABDV \times DAY$$

Next calculate the number of blocks by dividing the Total Capacity Required (TC) by the number of Call Records per Block (CRB). This will give the total number of blocks (B) required.

$$B = (TC) / (CRB)$$

RELEASE 06.03
13 July 1998

Finally, the number of blocks (B) required translates to the DPP disk size requirement per the following Table. As defined in the table, if the number of blocks required is less than or equal to 576,639 then the 1GB disk is recommended. If the number of blocks required is greater than 576,639 but less than or equal to 1,153,278 then the 2GB disk is recommended. If the number of blocks required is greater than 1,153,278 then the number of days of backup will have to be reduced.

Disk Size	Number of Blocks
1 GB	576,639
2 GB	1,153,278

Figure 11. DPP disk size requirement

The following is an example using the calculations in Figure 11

ABDV = 2,880,000 call records/day

BYT = 63 bytes/call record

DAY = 5 days back-up + 1 = 6 days

CRB = (1,531 bytes/block) / (63 bytes/call record) = 24.3 rounds up
25 call records/block

TC = 2,880,000 call records/day x 6 days = 17,280,000 call records

B = 17,280,000 call records / 25 call records/block = 691,200 blocks

Therefore, refer to Figure 11 to determine the DPP disk size. Since the 1 GB disk only offers up to 576,639 blocks, the 2 GB disk is required.

The following method illustrates the capacity usage of the DPP disks and associated alarms:

- As a threshold of 70% total capacity is reached, a minor alarm indicating the fill level is generated.
- The disk subsystem continues to fill with primary and secondary data beyond 70% to a maximum of 90%.
- At 90% total capacity a major alarm is generated indicating the fill level reached. The disk subsystem begins to overwrite the oldest secondary (polled) data with new primary (unpolled) AMA data. This operation continues until all the secondary data has been overwritten.

RELEASE 06.03
13 July 1998

- Finally, at 100% capacity, one disk is put off-line and the other disk is cleared of data, in preparation for storing data in a non-redundant mode.

This would be an unusual situation since large traffic generating offices are assumed to be polled every hour, thus preventing data from being overwritten.

Following is an example of the DPP storage capacity (assuming 24 call records per block):

DPP MODEL	Total storage(bytes)	Total storage (call records)
1 GB	617,984,004 at 70%	9,687,535
	794,550,916 at 90%	12,455,403
	882,834,309 at 100%	13,839,336
2 GB	1,235,968,071 at 70%	19,375,071
	1,589,101,769 at 90%	24,910,805
	1,765,668,618 at 100%	27,678,672

The average bytes per call record is determined after removing the 12 byte expansion field (containing the recording office type and ID) which is not stored on disk.

The above chart assumes the average call record equals 63 bytes. The storage capacity increases with a corresponding reduction in the number of bytes per record.

DPP UPGRADE KITS

There are two types of field upgrades that can be performed on the DPP. First, an existing 5.25" disk DPP can be field upgraded to the 3.5" disk DPP with required disk size and polling option. Refer to section 4 SOFTWARE PROVISIONING for any required software for this upgrade. Also, an existing 3.5" disk DPP can be upgraded to a larger disk size or different polling option.

The field upgrade kits shown below can be applied to the DPP EMC, which has shielded D-type AC/DC power and alarm connectors, as well as the DPP non-EMC, which has Terminal Block AC/DC power connectors and 1 -pin external alarm connectors. The DPP EMC and DPP non-EMC both use 5.25" disk architecture.

The following table demonstrates how to upgrade any 5.25" DPP to any 3.5" DPP:

RELEASE 06.03
13 July 1998

Existing 5.25 inch DPP	Required 3.5 inch DPP	Apply Kit
72-380MB non-TURBO	1 GB TURBO	NT6M97FB
72-380MB non-TURBO	1 GB COMPRESSION	NT6M97FC
72-380MB non-TURBO	2 GB TURBO	NT6M97FD
72-380MB non-TURBO	2 GB COMPRESSION	NT6M97FE
380-760MB TURBO	1 GB TURBO	NT6M97FF
380-760MB TURBO	2 GB TURBO	NT6M97FG
380-760MB TURBO	1 GB COMPRESSION	NT6M97FH
380-760MB TURBO	2 GB COMPRESSION	NT6M97FI
380-760MB COMPRESSION	1 GB COMPRESSION	NT6M97FF
380-760MB COMPRESSION	2 GB COMPRESSION	NT6M97FG

Figure 12. 5.25" disk DPP upgrade to 3.5" disk DPP

Refer to Figure 12 upgrade kit EMS's for further information.

The following table demonstrates how to upgrade an existing 3.5" disk DPP to one with a different polling option or disk size:

Existing 3.5 inch DPP	Required 3.5 inch DPP	Apply Kit
1 GB TURBO	2 GB TURBO	NT6M97GE
1 GB TURBO	1 GB COMPRESSION	NT6M97GF
1 GB TURBO	2 GB COMPRESSION	NT6M97GG
1 GB COMPRESSION	2 GB COMPRESSION	NT6M97GE
2 GB TURBO	2 GB COMPRESSION	NT6M97GF

Figure 13. 3.5" disk DPP upgrade to different disk size or polling option

3.2.3.2 DPP - 5.25" DRIVES

Figure 14 on page 3-47 and Figure 15 on page 3-48 outline the Product Engineering Code versus the quantity per DPP application.

+-----+INITIAL+UPGRADE+INITIAL+INITIAL+INITIAL+						
DPP APPL.			760MB	380MB	140MB	
+-----+ 760MB 760MB 56Kbps 56Kbps 56Kbps						
PEC 56Kbps 56Kbps cmprsn cmprsn cmprsn						
+-----+						
NT8X48AD	1		1	1	1	
+-----+						
NT6M63CJ	2	2	2	2	2	
+-----+						
NT6M72EA	2	2	2			
+-----+						
NT6M72DD				2		
+-----+						
NT6M72DE					2	
+-----+						
NT6M66BA	2	2	2	2		
+-----+						
NT6M66BC					2	
+-----+						
NT6M93AA	2	2	2	2	2	
+-----+						
NT6M94AA	2	2				
+-----+						
NT6M94BA			2	2	2	
+-----+						
NT6M48AA	1	1	1	1	1	
+-----+						
NT6M54AL	1	1	1	1	1	
+-----+						
NT6M73AJ	1	1	1	1	1	
+-----+						
NT6M73AK	1	1	1	1	1	
+-----+						
NT6M85CA	1	1	1	1	1	
+-----+						

Figure 14. Product Engineering Code versus the quantity per DPP application

Note: Refer to Figure 16 on page 3-50 for upgrade information to Compression

RELEASE 06.03
13 July 1998

DPP APPL.	INITIAL		UPGRADES		INITIAL	UPGRADE
PEC	380MB	380MB	380MB	380MB	140 MB	140 MB
	56Kbps		56Kbps			
NT8X48AC,,			*	*		*
NT8X48AD	1	1			1	
NT6M63CL		2		2	2	2
NT6M63CJ	2		2			
NT6M72BA					2	2
NT6M72DA		2		2		
NT6M72DD	2		2			
NT6M66BA	2		2			
NT6M66AH		2		2		
NT6M66AL					2	2
NT6M93AA	2		2			
NT6M72AE		2		2	2	2
NT6M94AA	2		2			
NT6M48AA	1		1			
NT6M54AL	1		1			
NT6M73AJ	1		1			
NT6M73AK	1		1			
NT6M85CA	1		1			

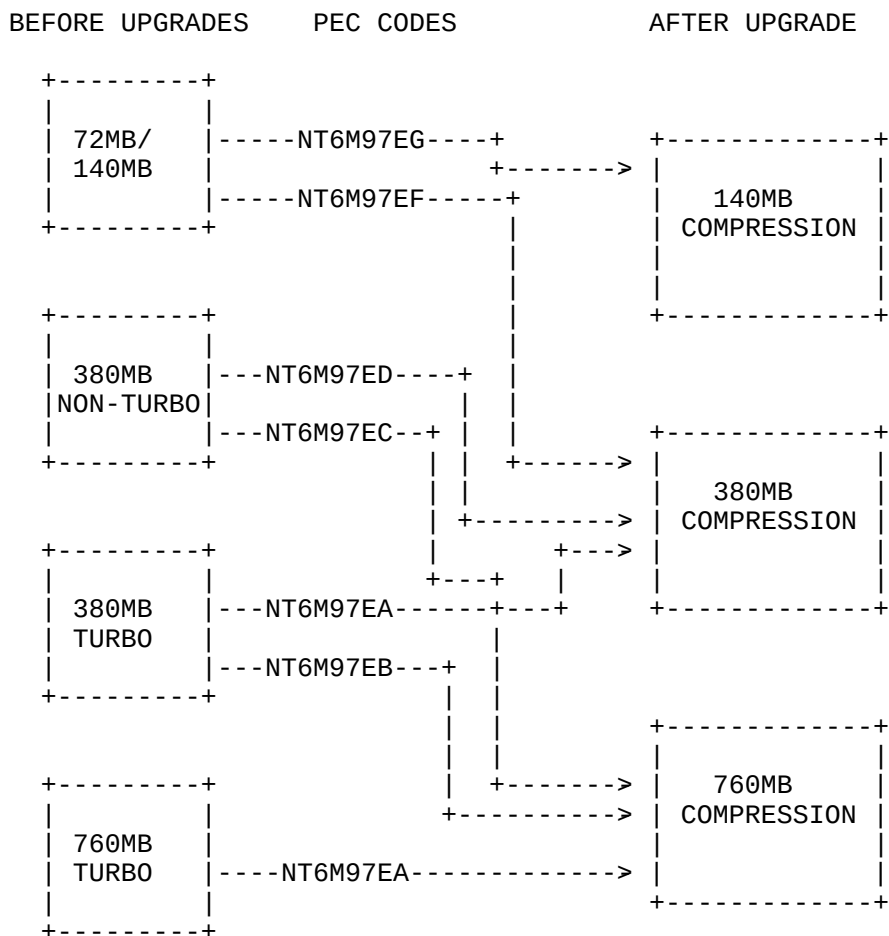
Figure 15. Product Engineering Code versus the quantity per DPP application

Note - Existing NT6M72AC and NT6M72AD CP work with the 140 MByte Disk, but do not work with the 380 MByte Disk.
- Existing 72 MByte Disk offices which are upgrading to a 140 MByte Disk, remove the existing NT6M66AC CP and replace

RELEASE 06.03
13 July 1998

- with NT6M66AL or latest vintage CP.
- Refer to Figure 16 on page 3-50 for upgrade information to Compression.
- As of 6/24/93, it is not necessary to provision 2 NT6M72DD disks when upgrading a 380 DPP to a 380 DPP with 56K high speed polling. The existing NT6M72DA disk drives are used and installation will upgrade them to NT6M72DD.

The following table outlines the Product Engineering Code of PC Kits required to upgrade an existing DPP to 56K/Compression polling. Each PC kit stocklist contains all the hardware required to upgrade DPP as shown.



Note - Turbo refers to 56 Kbps polling option.

Figure 16. DPP UPGRADE TO COMPRESSION CONFIGURATIONS

RELEASE 06.03
13 July 1998

DPP ALARMS

Refer to "DISK SIZE CALCULATION AND SYSTEM ALARMS" on page 3-43 for DPP system alarm information

56 KBPS LINK TRANSFER RATE

The 56 Kbps link that is associated with AMATPS has maximum baud rate of 25,200,000 bytes per hour (7000 bytes per sec X 600 seconds). An associated overhead of 20% is attributed to X.25 link protocol for the communications between the HOC (Host Office Collector) and the DMS office being polled. The effective polling rate of the 56 Kbps link is then reduced to 20,000,000 bytes per hour or expressed in terms of call records would equate to 268,800 call records per hour. (rated at 75 bytes per call)

For comparison of various link speeds the following chart presents the effective throughput utilizing X.25 protocol:

LINK SPEED	RECORDS PER HOUR
9600 bps w/o compression	46,000
9600 bps w/ compression	129,000
19,200 bps	92,000
56,000 bps	268,800

Retention period

The following example office illustrates the retention period of the 760 Mbyte DPP:

Office Data	Retention Period	
	One disk	Two disk
Polled data (70% level)	5.85 days*	N.A.
Unpolled data (100% level)	8.37 days	16.74 days

*Includes up to one day of unpolled data

Given :

- 100,000 HDBH (High Day Busy Hour) records
- 75 (average) bytes for all call records
- HDBH is considered 12% of the days activity

RELEASE 06.03
13 July 1998

$$\text{MBytes per day} = \frac{(100,000 \times 75)}{(1,000,000 \times 12\%)} = 62.5 \text{ MBytes/day}$$

For a 760 MByte Disk DPP,

at 70% AMA capacity

$$\begin{aligned} \text{Retention period} &= 366 \text{ MBytes} / 62.5 \text{ MBytes per day} \\ &= 5.85 \text{ days} \end{aligned}$$

at 100% AMA capacity

$$\begin{aligned} \text{Retention period} &= 523 \text{ MBytes} / 62.5 \text{ MBytes per day} \\ &= 8.37 \text{ days} \end{aligned}$$

The two disk figure is shown only for illustration purposes. The recommendation would be to utilize the DPP in a redundant mode in order for duplicate records to be maintained.

The average Bytes per call record is determined after removing the 12 Byte expansion field (containing the recording office type and ID) which is not stored on disk.

3.2.3.3 ENHANCED BELLCORE AMA FORMAT(EBAF)

While EBAF provides for new structure codes and call type codes, the other impact is in the increased size of AMA records that are utilized. The following examples provide for a comparison of the existing and proposed changes:

Example 1 is a 0-minus call originating on a TOPS trunk group. The call is marked for station paid.

Example 2 is an MCCS call that originated on a TOPS trunk. A LIDB query is performed.

Example 3 is a 1+ coin call originating on a TOPS trunk group, rated by the on-line rating service and all monies collected.

Example 4 is a 0+ call originating on a TOPS trunk group with the calling party requesting person-to-person. The call is then billed and completed.

Example 5 is a 0+ call originating on a TOPS trunk group that is requesting bill to third party. A query to the Billing Validation Authority (BVA) is sent and received with the call successfully completed.

RELEASE 06.03
13 July 1998

Example 6 is a 411 that employs the use of a database and is billed as a Station Paid.

Example 7 is a 0+ carrier call billed to Third Party. BVA is employed for verification and the operator completes the call with the aid of TOPS InterLATA Carrier Service (TICS).

Example 8 is a Remote Operator Number Identification (RONI) call.

Example 9 is a 1+ CAMA call that is completed without operator intervention.

Example 10 is a 1+ CAMA call that is completed by the operator. ANI failure brought the call to position.

CROSS REFERENCE OF RECORD SIZES

EXAMPLE	PRE-EBAF	w/EBAF
Ex. 1	69 bytes	84 bytes
Ex. 2	82 bytes	113 bytes
Ex. 3	75 bytes	94 bytes
Ex. 4	69 bytes	89 bytes
Ex. 5	82 bytes	103 bytes
Ex. 6	69 bytes	107 bytes
Ex. 7	105 bytes	129 bytes
Ex. 8	60 bytes	77 bytes
Ex. 9	69 bytes	60 bytes
Ex. 10	69 bytes	84 bytes

3.2.4 Office Layout Information

The DPP and interface box mount together as one unit using 26" mounting brackets provided with the DPP. It is designed to mount in an IOE/MTC frame position 18 or 51, or can mount in a CIOE cabinet in position 33 or 47 using 28" of vertical space.

3.2.5 Traffic Tables

Not applicable.

3.3 Product/System Specification

3.3.1 Physical Characteristics

DPP Unit:

Height - 24.5 inches (62.2 cm) (without interface box)
Height - 1.5 inches (3.81 cm) (interface box)
Height - 26.5 inches (67.3 cm) (total DPP unit)
Width - 19 inches (48.3 cm)
Depth - 15 inches (38.1 cm)

RELEASE 06.03
13 July 1998

Weight - approximately 80 lbs. (approximately 36.3 k)
Heat dissipation - 150 Watts
Operating conditions of the DPP require that the ambient temperature of the office not exceed 100 degrees F.

3.3.2 EMI/Earthquake Information

The following information is given for the DPP with the SCSI 3.5 inch disk drive subsystem.

For non-operating conditions, the following shock and vibration conditions apply to the DPP. These limits are governed by the ratings supplied by the disk drive manufacturers since the disk drives are the most sensitive components:

Shock: Intermittent shock not exceeding 75 g's at a maximum duration of 11 mS (half-sinewave). Shock can be applied in any axis.

Vibration: Continuous vibration not exceeding 0.081 inch displacement in any axis from 5-22 Hz or 2.00 g's in any axis from 22-400 Hz.

For active (operating) systems, the system will operate error-free under the following shock and vibration conditions:

Shock: Intermittent shock not exceeding 10 g's at a maximum duration of 11 mS (half-sinewave). Shock can be applied in any axis.

Vibration: Continuous vibration not exceeding 0.040 inch displacement in any axis from 5-22 Hz or 2.00 g's in any axis from 22-400 Hz.

The DPP system with the new SCSI disk subsystem and EMC chassis meets FCC 47CFR15B Class A requirements.

3.3.3 Sparing Information

3.3.3.1 DPP - SCSI DISK SUBSYSTEM WITH 3.5" DRIVES

Spares for the 3.5" disk DPP are ordered via a minimum or maximum spares kit and additional circuit packs based on polling option and disk size required. Figure 17 on page 3-55 shows DPP sparing:

RELEASE 06.03
13 July 1998

DPP Configuration	Min. Spares Kit NT6M95AK plus...	Max. Spares Kit NT6M95AL plus...	Spare Disk
1 GB NT	NT6M66CA	NT6M66CA, NT6M93FE NT6M93BA	NT6M72GA
1 GB T	NT6M66CA, NT6M94AA NT6M48AA	NT6M66CA, NT6M94AA NT6M48AA, NT6M63FE NT6M93BA	NT6M72GA
1 GB T/C	NT6M66CA, NT6M94BA NT6M48AA	NT6M66CA, NT6M94BA NT6M48AA, NT6M63FE NT6M93BA	NT6M72GA
2 GB T	NT6M66CA, NT6M94AA NT6M48AA	NT6M66CA, NT6M94AA NT6M48AA, NT6M63FE NT6M93BA	NT6M72HA
2 GB T/C	NT6M66CA, NT6M94BA NT6M48AA	NT6M66CA, NT6M94BA NT6M48AA, NT6M63FE NT6M93BA	NT6M72HA

Figure 17. DPP Sparing

3.3.3.2 DPP - 5.25" DRIVES

Spares for the DPP are ordered in Kits and Circuit Packs based on size of Disk equipped, 56K/Compression features and BCS level of the office.

NT6M95AK - Spares Kit Minimum (does not include Disk Drive)

NT6M95AL - Spares Kit Maximum (does not include Disk Drive)

Individual Circuit Packs must be ordered in addition to the Spares Kits. These individual circuit packs are provisioned per standard algorithms.

Stocklists for the spares kits are as follows:

NT6M95AK (QTY 1 each)

NT6M96AA Fuse Kit

NT6M65AA Error Control II CP

NT6M70AC Data Stream Interface CP

NT6M84BA Power/Alarm Communication CP

NT6M95AL (QTY 1 each)

NT6M95AK Minimum Spare Parts Kit
NT6M60BA Quad SIO CP (4 MHZ)
NT6M62BA CPU CP
NTM609AB Error Control Jumper II CP
NT6M64AA Expanded Memory CP (128K DRAM)
NT6M68AA Bus Terminator CP
NT6M71AB Power Supply ASSY
- Also includes a spare 48V fan and
assorted LEDs.

RELEASE 06.03
13 July 1998

The following shows the Minimum and Maximum spare parts kits plus the individual circuit packs that are needed when ordering a DPP with a certain size disk and polling features.

MINIMUM (NT6M95AK)

```

-----
7 /140 MB                = NT6M95AK + NT6M66AL
-----
140 Compression          = NT6M95AK + NT6M66BC + NT6M48AA + NT6M94BA
-----
380 MB                   = NT6M95AK + NT6M66AH
-----
380/760 MB Turbo         = NT6M95AK + NT6M66BA + NT6M48AA + NT6M94AA
-----
380/760 MB Compression = NT6M95AK + NT6M66BA + NT6M48AA + NT6M94BA
-----

```

MAXIMUM (NT6M95AL)

```

-----
7 /140 MB                = NT6M95AL + NT6M66AL + NT6M63CL + NT6M72AE
-----
140 Compression          = NT6M95AL + NT6M66BC + NT6M63CJ + NT6M93AA
                          + NT6M48AA + NT6M94BA
-----
380 MB                   = NT6M95AL + NT6M66AH + NT6M63CL + NT6M72AE
-----
380/760 MB Turbo         = NT6M95AL + NT6M66BA + NT6M63CJ + NT6M93AA
                          + NT6M48AA + NT6M94AA
-----
380/760 MB Compression = NT6M95AL + NT6M66BA + NT6M63CJ + NT6M93AA
                          + NT6M48AA + NT6M94BA
-----

```

3.3.4 Power Feed and Fusing Requirements

The DPP has a heat dissipation of 150 Watts.

The DPP requires one 10 Amp fuse for each power feed for a total of two. The power feeds are fused at the FSP/MSP in the same frame/cabinet as the DPP.

3.3.5 Current Drain Information

The DPP has a nominal current drain of four (4) Amps (i.e. two (2) Amps per chassis). The start up current drain is a maximum of seven (7) Amps per chassis.

RELEASE 06.03
13 July 1998

3.4 Software Provisioning

For NTX software packages to PLC/SOC mappings for CSP02 and beyond refer to ECM552 - Mapping of NTX/NTG Package to PCL/NCL/Option.

3.4.1 Required Software Packages and Interdependencies

The DPP with 3.5" SCSI Disk Subsystem is available for offices at BCS 36 and above. For an initial 3.5" DPP order or an upgrade to a 3.5" DPP, an associated DPP load needs to be either provisioned or the office checked for its availability. The following DPP loads are provisioned in SOLID via the PM load tape:

DPP Configuration	Download this file
-----	-----
1GB w/o 56K/Compression	D1P0nn*
1GB with 56K/Compression	D1T0nn*
2GB with 56K/Compression	D2T0nn*

* nn = two digit numeric release level of DPP software. Refer to PM Load Release document for current release level.

In addition to one of the above loads, the DMS-100 must contain specific software to function with the DPP. The DMS-100 requires package NTX243AA for all DPP applications.

Also required is one (1) or both of the following packages:

NTX098AA AT&T CAMA Format
NTX159AA AT&T LAMA Format

For PCL; refer to ECM 552 for cross reference.

RELEASE 06.03
13 July 1998

For Canadian applications, order the following software packages:

Office Type	Software Package	Description	Optional ?
LAMA	NTXD07AA	AMAMOD - LAMA Master Package	N
	NTX243AA	AMA Teleprocessing System AMATPS	N
	NTXF14AA	High Capacity DPP	N
	NTXN81AA	Two Digit ANI ID - End Office	Y
CAMA	NTXD08AA	AMAMOD - CAMA Master Package	N
	NTX243AA	AMA Teleprocessing System AMATPS	N
	NTXF14AA	High Capacity DPP	N
	NTXP56AA	Two Digit ANI - CAMA	Y
TOPS	NTXD09AA	AMAMOD - TOPS Master Package	N
	NTX243AA	AMA Teleprocessing System AMATPS	N
	NTXF14AA	High Capacity DPP	N
	NTXE18AA	TOPS AMA Enhancements	Y*
	NTXD37AA	TOPS MPX - Host	Y
	NTXN52AA	IS-PCS/Millennium	Y
OOC	NTXD08AA	AMAMOD - CAMA Master Package	N
	NTXD09AA	AMAMOD - TOPS Master Package	N
	NTX243AA	AMA Teleprocessing System AMATPS	N
	NTX631AB	OOC Call Processing	N
	NTXF14AA	High Capacity DPP	N
	NTXE18AA	TOPS AMA Enhancements	Y*

Note: * - NTXE18AA is mandatory for Bell Canada offices

3.4.2 Software Usage Restrictions

Not applicable.

3.4.3 Memory Provisioning

Not applicable.

3.5 Real Time Impact

Not applicable.

RELEASE 06.03
13 July 1998

4.0 ECM316 - I/O Controller Module

4.1 Overview

The Input/Output Controller (IOC) provides an interface between the NT40 (CCC) or SuperNode and up to nine device controller Circuit Packs.

Each IOC performs serial to parallel and parallel to serial conversions to the Data to and from Device Controllers on two (2) 2.56Mb/s serial ports to a pair of Message Device Controllers (on NT40) or Message Switches (on SuperNode).

The IOC consists of the following card types:

- I/O Message Processor - Contains a microprocessor, associated memory serial link I/F logic, parallel bus I/F logic.
- Device Controllers - Contains a microprocessor and associated memory for the I/O device (i.e. MTD, DDU, VDU, etc.)
- IOC Terminator - Contains terminating resistors for the IOC's parallel bus.
- Power Converter - Supplies Voltages required for the IOC message controller and other IOC Circuit Packs.

The I/O Controller Module is made up of an I/O Shelf Assembly and a Common Circuit Pack Fill. A new IOC module is currently available for the IOE frame and will eventually replace the old IOC modules in all cabinets.

4.1.1 EMPC

configurable Input/Output Controller capable of supporting a variety of data communications protocols. Typical of these is the CCITT X.25 (1980) protocol. In addition the EMPC will provide 64, 56, and 19.2 Kbps data transmission rates. This is an enhancement over the 19.2 Kbps maximum data rate limit of the Multi-Protocol Controller (MPC).

The MPC is now MD'd and replaced by the EMPC. The EMPC is designed to co-exist with all currently provisioned I/O-device controllers. Also the EMPC is backwards compatible to the MPC, with the exception of the RS-366 port which was not used on the MPC.

RELEASE 06.03
13 July 1998

4.2 Hardware Provisioning

4.2.1 Hardware Usage Restrictions

4.2.1.1 EMPC

Ports 1 & 3 on the EMPC are mutually exclusive - meaning you may use one or the other but not both on the same card.

Port Zero is used for Debug purposes only by the current software loads. Future applications are planned which may permit this port to be used to transmit and receive customer data.

4.2.2 Hardware Dependencies

Not Applicable

4.2.2.1 P and C Side Port Requirements

Not applicable.

4.2.2.2 DMS BUS Port Requirements

Not applicable.

4.2.2.3 Circuits Per Card

The EMPC has 4 circuits per card. Refer to "Physical Characteristics" on page 3-63 for more information.

4.2.2.4 Discrimination Numbering

Not applicable.

4.2.3 Provisioning Considerations

4.2.3.1 IOC

From BCS26 onwards, a DMS office can have maximum of thirteen (13) IOC's except for DMS-MTX offices which may allow up to twenty (20) IOC's. For each office, the maximum number of IOC's depends on how a system is configured (for example, the number of network modules and the number of CMC/MS interface circuit packs provisioned) and the limitation for software to support maintenance functions for IOCs and connected devices without impacting System's performance.

A minimum of two I/O Controller Modules (IOC:00, IOC:01) are required per system. These may be provisioned either as functional modules within the Central Message I/O Controller shelf (MDC) for NT40 applications only or as independent shelves. Note that for

RELEASE 06.03
13 July 1998

SuperNode applications two independent shelves must be provisioned.

Each shelf accommodates up to nine I/O device controller cards.

The IOC shelf and the devices (MTD, DDU, MAP etc.) it interfaces should be cabled to the same power feed on the Power Distribution Center (PDC).

Provide one (1) PC Kit NT1X61AX when converting an existing IOC Module (NT1X61AA or AB) for DMS-Core applications.

4.2.3.2 EMPC

The EMPC may be defined as a conduit which enables computer to computer communications via the DMS100F products. The quantities required and the performance of the CP is dependent on the application being used. Therefore, look to the application document (document which defines a Software Package which will utilize the EMPC) for the full ramifications of using the EMPC.

The EMPC is an intelligent I/O Device Controller which is software configurable for the required protocol and speed up to 64KBPS.

In general, if more than one EMPC is required for a particular application it is recommended that they be distributed across the available IOCs as IOCs and their power supply are not redundant.

It is possible to provision up to nine (9) EMPCs on a single IOC shelf if required. Software will allow the assignment of multiple applications to a single EMPC, but the practice is not recommended. The supported provisioning guideline is " One or more EMPCs per application " some applications may specifically require more than one EMPC.

The EMPC is housed on the IOC and MDC shelves in the following card slots:

<i>IOC SHELF</i>	<i>MDC SHELF</i>
04, 06, 08,	15, 17, 19,
10, 12, 14,	21
16, 18, 20	

4.2.4 Office Layout Information

Not applicable.

RELEASE 06.03
13 July 1998

4.2.5 Traffic Tables

4.2.5.1 EMPC

Traffic related provisioning aspects of the EMPC is application dependent. Therefore, the messaging and memory requirements are defined by the application using the EMPC hardware.

4.3 Product/System Specification

4.3.1 Physical Characteristics

4.3.1.1 EMPC

Each EMPC has four interfaces for connection to I/O devices. The following ports correspond to the four connectors provided for each IOC slot at the rear of the IOC shelf. The four connectors are arranged such that Port Zero is the bottom connector and Port Three is top connector. However, these four physical connectors map to three data links, Ports One and Three use the same data link. These ports are:

1. Port 0: Asynchronous Only with an RS-232 Interface
2. Port 1: Synchronous CCITT V.35 Interface
3. Port 2: Synchronous/Asynchronous with an RS-232 Interface
4. Port 3: Synchronous/Asynchronous with an RS-232 Interface

The above ports are used as follows:

Port 0

- Port zero is arranged for Async-Only RS-232 transmissions. This port provides the following modem controls signals (this is an enhancement over the MPC):
 - Ring Indicator (RI)
 - Data Terminal Ready (DTR)
 - Data Set Ready (DSR)
 - Request To Send (RTS)
 - Clear To Send (CTS)
 - Receive Line Signal Detect (RLSD)

However, Port Zero is used for Debug purposes only by the current software loads.

Port 1

- Port one is a CCITT V.35 Synchronous communication port. This port shares a common data stream circuit with Port 3 and is thus datafilled in s/w tables as port/link 3. Port one supports 56-64Kbps data transmissions with external clocking only.

RELEASE 06.03
13 July 1998

Port 2

- Port Two is arranged for Asynchronous or Synchronous transmission with a RS-232 interface. This port facilitates Synchronous data transmissions from:

NT1X89BA - 300bps to 2400bps with internal or external clocking.

NT1X89BB - 300bps to 19.2Kbps with internal or external clocking.

Port 3

- Port Three is arranged for Asynchronous or Synchronous transmission with a RS-232 interface. This port facilitates Synchronous data transmissions from:

NT1X89BA - 300bps to 2400bps with internal or external clocking.

NT1X89BB - 300bps to 19.2Kbps with internal or external clocking.

4.3.2 EMI/Earthquake Information

Not applicable.

4.3.3 Sparing Information

4.3.3.1 IOC

Standard sparing criteria will be maintained for the IOC.

4.3.3.2 EMPC

Spare EMPC CPs are provided per telco requests.

4.3.4 Power Feed and Fusing Requirements

Each IOC will have dissipation based on its contents. The following is an outline of the major IOC component dissipations.

NT1X61 - 24.0 Watts
NT1X67 - 12.6 Watts
NT1X89AA - 12.6 Watts
NT1X89BA - 11.2 watts
NT1X89BB - 11.2 watts
NT1X55 - 12.6 Watts

The IOC Shelf requires one (1) 20 Amp fuse.

RELEASE 06.03
13 July 1998

4.3.5 Current Drain Information

An empty IOC shelf without any provisionable I/O Device control card will have a current drain of 0.5 Amps.

The following information is for the EMPC:

Input Voltage

+5V at 2.00A = 10.0W

-12V at 0.05A = 00.6W

+12V at 0.05A = 00.6W

4.4 Software Provisioning

For NTX software packages to PLC/SOC mappings for CSP02 and beyond refer to ECM552 - Mapping of NTX/NTG Package to PCL/NCL/Option.

4.4.1 Required Software Packages and Interdependencies

4.4.1.1 EMPC

The following s/w packages are always required:

NTX000AA - BILGE

NTX001AA - Common Basic

For BCS34 and below the following are the requirements:

1. Low Speed (19.2 and below)
 - a. NTXE98AA - High Speed MPC
 - b. NTX273AA - Multi-Protocol Controller BX.25
2. High Speed (above 19.2)
 - a. NTXE98AA - High Speed MPC
 - b. NTX273AA - Multi-Protocol Controller BX.25
 - c. NTXE65AA - MPC X.25 Interface

For BCS35 and above the following are the s/w requirements:

1. Low Speed
 - a. NTX273AA - Multi-Protocol Controller BX.25
2. High Speed
 - a. NTXE98AA - High Speed MPC
 - b. NTX273AA - Multi-Protocol Controller BX.25

c. NTXE65AA - MPC X.25 Interface

4.4.2 Software Usage Restrictions

Not applicable.

4.4.3 Memory Provisioning

Not applicable.

4.5 Real Time Impact

4.5.1 EMPC

The EMPC hardware in itself does not have a Real Time impact, however the application being run on the EMPC may. Therefore, look to application document for the Real Time impact.

RELEASE 06.03
13 July 1998

5.0 ECM377 - Meridian Enhanced Input/Output Controller

5.1 Overview

The basic EIOC configuration has been replaced by the APC cabinet NT9X80CA.

The basic EIOC configuration is a 3-bay line-up expandable to 7 bays. The addition of DVS equipment in the lineup can extend the total to 10 bays in a single aisle.

The MCEM and MCEP (2) bays are always required in the system, and occupy the first three locations in a contiguous line-up. Up to 4 MCEX bays may be added additional to this basic layout.

It is also possible to interface DVS cabinets (MCAA &MCAP) to the extent that CMC ports are available to connect to these bay types.

MCEM Frame:

MCEM Frame has been Manufactured Discontinued (EC002-15973).

This cabinet module provides power to the EIOC line-up. It is capable of providing power for up to seven EIOC bays, and can be used to provide power to Meridian Cabinet DVS equipment in the same line-up as the EIOC. This cabinet is equipped with an MTD and a DDU which are dedicated for system initialization. Room is allowed to equip one additional DDU for system storage.

Immediately above the PDP is the Dual 8-inch Disk Drive Module. It contains up to Two Priam or NT-Mercury 8-inch Disk Drive units (DDU). The DDUs provide 227 Mbytes of formatted storage for system utilization.

The upper two shelves of the cabinet are occupied by a Magnetic Tape Drive (MTD). This drive provides for system initialization and transportable storage.

Located in the top of the cabinet is the Frame Supervisory Panel (FSP) which distributes and controls power and alarms in the cabinet.

This cabinet does not contain forced air cooling because the total power dissipation is low enough for convection cooling.

MCEP Frame (2 Cabinets):

MCEP Frame has been Manufactured Discontinued (EC002-15973).

This cabinet module contains the intelligence of the system, the Central Control. It is fully duplicated to provide high reli-

RELEASE 06.03
13 July 1998

ability service. It is composed of two identical cabinets permanently bolted together. Contained in each cabinet are the CPU, PS, CMC, DIO, System Clock, and up to two DDUs. These units are hardwired together and fully tested at the factory.

The bottom mounting position contains a Dual 8-inch Disk Drive Module. This module contains up to two Priam or NT-Mercury 8-inch Disk Drive units (DDU). Each DDU provides 227 Mbytes of formatted storage for system utilization.

Above the DDU shelf is a Dual Input/Output Controller (DIO). This shelf contains two half-shelf IOCs each of which may be equipped with a variety of application I/O controller circuit packs.

Above the DIO is mounted the MDM shelf. This shelf contains Data Store, Clocking, Interface from the EIOC system to the host CCC, Internal EIOC ports; and MAP, boot, and ETAS I/O controllers.

Above the MDM is located the CPM shelf. This shelf contains Program Store and the CCC.

Located at the top of the cabinet is the Frame Supervisory Panel (FSP) which distributes and controls power and alarms in the cabinet.

Both Cabinets are forced-air cooled with a two-speed fan module integrated into the base of the cabinet.

MCEX Frame:

| MCEX Frame has been Manufactured Discontinued (EC002-16572).

This cabinet module provides I/O and mass storage for the MSL100 & MTXD primary core group lineup.

This cabinet module also provides additional I/O and mass storage for the EIOC system. Up to four MCEX bays may be configured with each EIOC extending the total system storage capacity to about 3 Gbytes for Call Detail Recording. Each MCEX bay also contains a Dual I/O shelf capable of supporting approximately ten application specific controller circuit packs.

Shelf position 19 has a Dual Input/Output Controller (DIO). This shelf contains two half-shelf IOCs each of which may be equipped with a variety of application I/O controller circuit packs.

The upper two shelves of the cabinet are occupied by a Magnetic Tape Drive (MTD). This drive provides for system initialization and transportable storage.

RELEASE 06.03
13 July 1998

Located at the top of the cabinet is the Frame Supervisory Panel (FSP) which distributes and controls power and alarms in the cabinet.

5.2 Hardware Provisioning

5.2.1 Hardware Usage Restrictions

Not Applicable

5.2.2 Hardware Dependencies

Cabling Considerations:

This section describes the cables that are provisioned when the EIOC is engineered. All internal cabling is provided with the type cabinet ordered. This results in a greatly simplified cabling specification requirement.

Internal Cabling:

The following cables are used to connect the MCEP cabinet to the MCEX cabinets (or to MCAP bays in a DVS application).

NTNX36AR - Qty. 2 (one per plane)

Interconnection To Host:

The following cables are used to connect the MCEP cabinet EIOC system messaging links to the Host (either NT-40 or E-CORE) MDC:

NTNX36BP - Qty. 4 (two per plane)

Interconnection To Alarms (MDF):

The following cables are used to connect the MCEM cabinet EIOC alarm to the Host MDF for cross-connect to the alarm scanner:

NTNX36AT - Qty. 1

MCEX Interconnection To I/O Devices:

The following cables are used to connect the I/O application circuit packs to their respective I/O terminal devices:

NTNX36AQ - Qty. 1 per EIA device (excluding MODEMS)
NTNX36AU - Qty. 1 per CL device (VDU/PRT/EMAP)
NTNX36GC - Qty. 1 per MODEM Async
NTNX36PW - Qty. 1 per V.35 link (CCMIS)
NTNX36EM - Qty. 1 per SMDI link (MSM)

RELEASE 06.03
13 July 1998

Additional Equipment Requirements:

MAP Equipment (Always Provided):

QTY	PEC	CPC	DESCRIPTION
---	---	---	-----
1	VT220-B2	A0320895	DEC VT220 VDU
1	VT-22K-AA	A0324082	DEC VT220 Keyboard
1	LA120-DA	A0288136	LA120 Teleprinter
1	LAXX-KC	A0379021	Workshelf for LA120
1	LAXX-NC	A0379022	LA120 Paper Basket
1	LA12X-AL	C0056454	LA120 Current Loop Option
1	LAXXR-12	C0055531	LA120 Ribbons
1	NT0X87AA	B0206512	Inverter
2	905-5055-216	A0288173	Rixon Dedicated MODEM (Sprint)
2	905-5084-264	A0345971	Dual Speed Full Duplex Modem

Misc. Equipment (Always Provided):

QTY	PEC	CPC	DESCRIPTION
---	---	---	-----
1	CP501	A0292903	CP501 Static Mat
1	NTNX2540	B0226930	Anchor Kit (1 per bay)
1	P0588065	P0588065	Aisle Designation Labels
1	P0695393	P0695393	FS/PS Label Kit
1	P0695425	P0695425	NT Logo
1	P0695874	P0695874	MSL250 Logo (250 System)
1	P0695392	P0695392	MSL100 Logo (100 System)

5.2.2.1 P and C Side Port Requirements

Not Applicable

5.2.2.2 DMS BUS Port Requirements

MCEX: Each IOC requires one MS port per MS plane.

5.2.2.3 Circuits Per Card

Circuits per card has not changed on the I/O cards.

5.2.2.4 Discrimination Numbering

Standard numbering applies to DIO's and DDU's.

5.2.2.5 CC MIS PROVISIONING (Call Center MIS)

For provisioning the CC MIS switch link either RS232 or V.35 interface can be utilized for the required X.25 protocol. The type of interface utilized is transparent to the CC MIS. It is a customer option whether to utilize either RS232 or V.35 physical interface.

RELEASE 06.03
13 July 1998

The NT1X89BB EMPC is the required I/O card for the Switch to CC MIS connection.

Redundant X.25 links are a customer option feature. The intent of this feature is to make the link from the CC MIS to the switch redundant such that there will be minimum loss of data in the case of any link failure. Redundancy will involve the addition of another NT1X89 EMPC card. Only one X.25 link will be active at a time. In order for the Switch to support the link redundancy feature the following software packages must be used:

- * NTXE65AA MPC X.25 Interface
- * NTXE98AA High Speed MPC
- * NTX273AA Multi-Protocol Controller X.25
- * NTXN85AA MPC Enhancements required for 1984 X.25 Protocol

The cabling interfaces, cables, and associated shelf and slots for the NT1X89 on the MCEX (NTNX32AA) are:

- * NTNX36PW: Sync. V.35 SHELF 19 SLOTS 12,13,21,23
- * NTNX36AQ: Async. RS232(EIA) SHELF 19 SLOTS 8,11,12,13,19,21,22,23
- * NTNX36PV: Sync. RS232(EIA) SHELF 19 SLOTS 8,11,12,13,19,21,22,23

Other possible interfaces to other DMS equipment are as follows:

CUSTOM NON-EMI IOE

- * NT0X26LY: RS232(EIA) CUSTOM NON-EMI
- * NT0X96EF: V.35

5.2.3 POWER/HEAT DISPENSATION

The lineup is powered from a Power Distribution Panel (PDP) located on shelf pos 00 of the MCEM bay.

The Power Distribution Panel (PDP) which can supply up to nine additional cabinets in this lineup, is located in the bottom (first) mounting position of the cabinet.

- DC power from Power Room/Battery back-up.
- Protected AC from Power Board via a 500VA Inverter providing service for one set of Man I/O Devices and ETAS MODEMS.
- All Power cables between the PDP and the cabinets in the line-up are equipped with the cabinets in the line-up.
- The Meridian Cabinet EIOC will operate over the range 42V-56V.

RELEASE 06.03
13 July 1998

- Power requirements of the cabinetized modules are estimated as follows:

MODULE	CURRENT AT 48V DC
MCEM	08 AMPS
MCEP	40 AMPS
MCEX	12 AMPS

5.2.4 Provisioning Considerations

See EngMan inserts.

5.2.5 Office Layout Information

The Meridian Cabinet is a unified steel structure which replaces the open rack DMS frame for housing switch equipment. It has been designed to mount four standard "4" wide DMS equipment shelves plus a FSP. When required, the integral cooling unit is located in the base of the cabinet and does not reduce the equipment mounting space.

Size and style of the cabinet were designed to permit easy movement through doorways and elevators. The cabinet has a height of 6.0 feet, a depth of 28 inches and a width of 28.5 inches.

The cabinet has two center open doors on both the front and rear. A lockable latch is built into the top cap of each door. The lock and catch assembly retain the essential EMI seal and provide ease of access for servicing.

In order to accommodate raised computer floor applications, the base of the cabinet is recessed at the front to give the base a depth of 23.5 inches.

An opening in the base of the cabinet below the rear bulkhead permits cables to be routed under the floor without being visible. With this arrangement the EMI shield is not broken eliminating the need for locating the inter line-up cables in a shielded duct.

For applications where raised floor is not used, cables are routed through the rear bulkhead opening in the top of the cabinet. Open racks can be used to route between line-ups and to the DF.

The color of the Meridian Cabinet, the doors, and screw-on end covers is DMS Brown or Meridian Gray.

MCEM - Occupies the first position in the EIOC line-up. Contains PDP to power EIOC and DVS equipment in the same line-up.

MCEP - Occupies the second and third position in the EIOC line-up. This consists of a double-bay cabinet providing duplicated

RELEASE 06.03
13 July 1998

plane NT-40 processors located within 200 cable feet of the host DMS NT-40.

MCEX - Contains additional mass storage for the EIOC system. Up to 4 MCEX cabinets may exist within the EIOC lineup starting at the fourth position in the line-up.

5.2.6 Traffic Tables

Not Applicable

5.3 Product/System Specification

not Applicable

5.3.1 Physical Characteristics

Not Applicable

5.3.2 EMI/Earthquake Information

Resistance to damage by earthquake vibrations is achieved throughout the two single-piece, formed side members which are joined to a specially reinforced base. A single Meridian Cabinet is not damaged by forces up to 150% of the NEBS spec when fully provisioned in any configuration.

Connecting two or more cabinets together improves its resistance to earthquake damage, hence an Meridian Cabinet EIOC will be impervious to earthquake damage for all levels which do not destroy the building in which it resides.

The Meridian Cabinet also exceeds the NEBS tipping specification and therefore does not require bolting to the floor except for earthquake applications.

5.3.3 Sparing Information

Standard sparing algorithms will apply.

5.3.4 Power Feed and Fusing Requirements

See sec. 2.4

5.3.5 Current Drain Information

See sec. 2.4

5.4 Software Provisioning

For NTX software packages to PCL/SOC mappings for CSP02 and beyond refer to ECM552 - Mapping of NTX/NTG Package to PCL/NCL/Option.

5.4.1 Required Software Packages and Interdependencies

Not Applicable

5.4.2 Software Usage Restrictions

Not Applicable

5.4.3 Memory Provisioning

Not Applicable

5.5 Real Time Impact

Not Applicable

RELEASE 06.03
13 July 1998

6.0 ECM388 - NT1X67 Baud Rate Summary

6.1 Overview

Product/System Overview

This Engineering Change Memo (ECM) is issued to clarify the baud rate capabilities of the various versions of the NT1X67 Input/Output controller pack.

6.2 Hardware Provisioning

6.2.1 Hardware Usage Restrictions

Not applicable.

6.2.2 Hardware Dependencies

Not applicable.

6.2.2.1 P and C Side Port Requirements

Not applicable

6.2.2.2 DMS BUS Port Requirements

Not applicable

6.2.2.3 Circuits Per Card

Not applicable

6.2.2.4 Discrimination Numbering

Not applicable

6.2.3 Provisioning Considerations

This section details the provisioning guidelines for this product.

The following is a summary of the baud rate capabilities of the various versions of the NT1X67 I/O controller pack. Each pack, or group of packs with the same baud rate capability, is (text deleted) discussed separately.

BAUD RATE SUMMARY

NT1X67AB and NT1X67CB (status of these cards is A&M)

These cards have four separate ports used for peripheral terminal devices such as VDUs, printers, modems, etc. These ports can support

RELEASE 06.03
13 July 1998

one device per port at variable baud rates using either the EIA or 20mA current loop mode of operation. The current Northern Telecom specifications dictate that no single port on these cards will exceed 1200 baud. However, it is possible in special applications for these cards to support a baud rate of up to 4800 baud on a single port if the following conditions are met:

- The terminal must be able to support the higher baud rates.
- The sum of the baud rates for all ports on a single card must not exceed 4800 baud.

Refer to Figure 1 for examples of port configurations. Even though these capabilities exist, any configuration that specifies a single port supporting a baud rate greater than 1200 baud will be at the customer's discretion and/or risk. Northern Telecom will not guarantee data integrity.

As a separate issue, terminals used for the operator position must be configured for a maximum baud rate of 1200 baud due to potential communication problems that may be created during emergency situations if higher baud rates are used.

NT1X67BC and NT1X67BD

These cards succeed the previous cards and also have four separate ports for peripheral terminal devices. However, these cards have had firmware modifications that allow terminals to communicate at higher speeds on all ports. The previous Northern Telecom specification for these cards dictates that no single port shall exceed 2400 baud. Cards ordered after May 1993 can support up to 9600 baud rate for EIA operation and 4800 baud rate for current loop operation. The maximum baud rate that can be supported by a single port in a special application is 4800 baud (9600 baud after 5/93). When any single port on a card exceeds 2400 baud the following conditions must be met:

1. The terminal must be able to support the higher baud rates.
2. The sum of the baud rates for all ports on a single card must not exceed 4800 baud (9600 baud after 5/93).
 - a. For EIA, the sum of ALL baud rates must not exceed 9600.
 - b. For Current Loop, the sum of ALL baud rates must not exceed 4800.
 - c. IOC powered by NT2X70AA/AB/AC may not work reliably with applications running at 9600 Baud (on one port or all four ports combined).
3. Any configuration that exceeds these maximums is at the customer's discretion and/or risk. NORTEL will not guarantee data integrity.

RELEASE 06.03
13 July 1998

Refer to Figure 2 for examples of port configurations. As an added issue, terminals used for operator positions should still be configured for 1200 baud. The NT1X67BD card should be used in all Auto Dial Back applications and for special Line Editing functions. The NT1X67BC card has been Manufacture Discontinued and the NT1X67BD replaces it as the standard I/O Terminal Controller.

NT1X67BB and NT1X67DB

The NT1X67BB and NT1X67DB are special cards designed for special applications. They are not functionally similar to the other NT1X67 cards and cannot be used as a substitute. Each card has a single port that will support a baud rate of up to 9600 baud and communicates using EIA only. These cards are not currently used for U.S. applications but were applied to early offices using the DNC-500. This application now uses the NT1X89AA Multiprotocol Converter. Refer to Figure 3

NT1X67EA

The NT1X67EA is a single port, high speed, output-only, asynchronous terminal controller. This circuit pack is a single channel, high capacity 9600 baud version that was introduced to meet customer requirements for realtime tracking of call distribution reports. Currently for Richardson application only. Refer to Figure 4

NT1X67FA

The NT1X67FA card is for Simplified Message Desk Interface (SMDI) applications only. It is not functionally similar to the other NT1X67 cards and cannot be used as a substitute. Each card has a single port that will support a baud rate of up to 1200 full duplex. Refer to Figure 5

6.2.3.1 : Port Configurations for NT1X67AB and NT1X67CB

Example A**Port**

0	1200 Baud Maximum
1	1200 Baud Maximum
2	1200 Baud Maximum
3	1200 Baud Maximum

Example B**Port**

0	600 Baud
1	600 Baud
2	2400 Baud
3	1200 Baud

Example C**Port**

0	300 Baud
1	600 Baud
2	1200 Baud
3	2400 Baud

Example D**Port**

0	No Connection
1	2400 Baud
2	No Connection
3	2400 Baud

Example E**Port**

0	No Connection
1	No Connection
2	No Connection
3	4800 Baud

Notes

1. These are examples only and not set configurations.
2. The sum of the Baud rates for each card must not exceed 4800 Baud.
3. Example A illustrates the normal operating condition. All others are for special applications.

Figure 18. GPRTABCB.GIF

6.2.3.2 : Port Configurations for NT1X67BC and NT1X67BD

Example A**Port**

0	2400 Baud Maximum
1	2400 Baud Maximum
2	2400 Baud Maximum
3	2400 Baud Maximum

Example B**Port**

0	No Connection
1	1200 Baud (4800 Baud - Note 2)
2	3600 Baud (4800 Baud - Note 2)
3	No Connection

Example C**Port**

0	No Connection
1	No Connection
2	No Connection
3	4800 Baud (9600 Baud - Note 2)

Example D**Port**

0	600 Baud
1	600 Baud
2	3600 Baud
3	No Connection

Example E**Port**

0	No Connection
1	No Connection
2	No Connection
3	4800 Baud

Notes

1. These are examples only and not set configurations.
2. For a card that has a port exceeding 2400 Baud, the sum of the Baud rates for all ports must not exceed 4800 Baud (9600 Baud for EIA or 4800 Baud for C L after 5/93).
3. Example A illustrates the normal operating condition. All others are for special applications.

Figure 19. GPRTBCBD.GIF

6.2.3.3 : Port Configurations for NT1X67BB and NT1X67DB

Example A**Port**

0	9600 Baud Maximum
1	
2	
3	

Notes

1. Only one port available
2. EIA Communication only
3. Used for HDLC X.25 Protocol only

Figure 20. GPRTBDB.GIF

6.2.3.4 : Port Configurations for NT1X67EA

Example A**Port**

0	9600 Baud Maximum
1	
2	
3	

Notes

1. Only one port available
2. EIA Communication only
3. Output only

Figure 21. GPRT67EA.GIF

6.2.3.5 : Port Configurations for NT1X67FA

Example A**Port**

0	1200 Baud Maximum
1	
2	
3	

Notes

1. Only one port available
2. 1200 Baud Full Duplex
3. SMDI applications only

Figure 22. GPRTFA.GIF

6.2.4 Office Layout Information

Not applicable.

6.2.5 Traffic Tables

Not applicable.

6.3 Product/System Specification6.3.1 Physical Characteristics

Not applicable.

6.3.2 EMI/Earthquake Information

Not applicable.

6.3.3 Sparing Information

Not applicable.

6.3.4 Power Feed and Fusing Requirements

Not applicable.

6.3.5 Current Drain Information

Not applicable.

6.4 Software Provisioning

For NTX software packages to PCL/SOC mappings for CSP02 and beyond refer to ECM552 - Mapping of NTX/NTG Package to PCL/NCL/Option.

6.4.1 Required Software Packages and Interdependencies

Not applicable.

6.4.2 Software Usage Restrictions

Not applicable.

6.4.3 Memory Provisioning

Not applicable.

6.5 Real Time Impact

Not applicable.

RELEASE 06.03
13 July 1998

7.0 ECM472 - Norstar Key System Provisioning

7.1 Overview

The Norstar Key System Unit (NKSU) is a digital key system which replaces the analog MAP Communication Module. The NKSU is not backwards compatible with the 1A2 Key System or the Logic 10/20 or ITT/Comdial 30 button phones. The purpose of this system is to provide a method of communications between the MAP positions as well as to the outside world via lines from this switch or another switch.

The Norstar Key System Unit will be provided on initial offices instead of the Logic 20 unit.

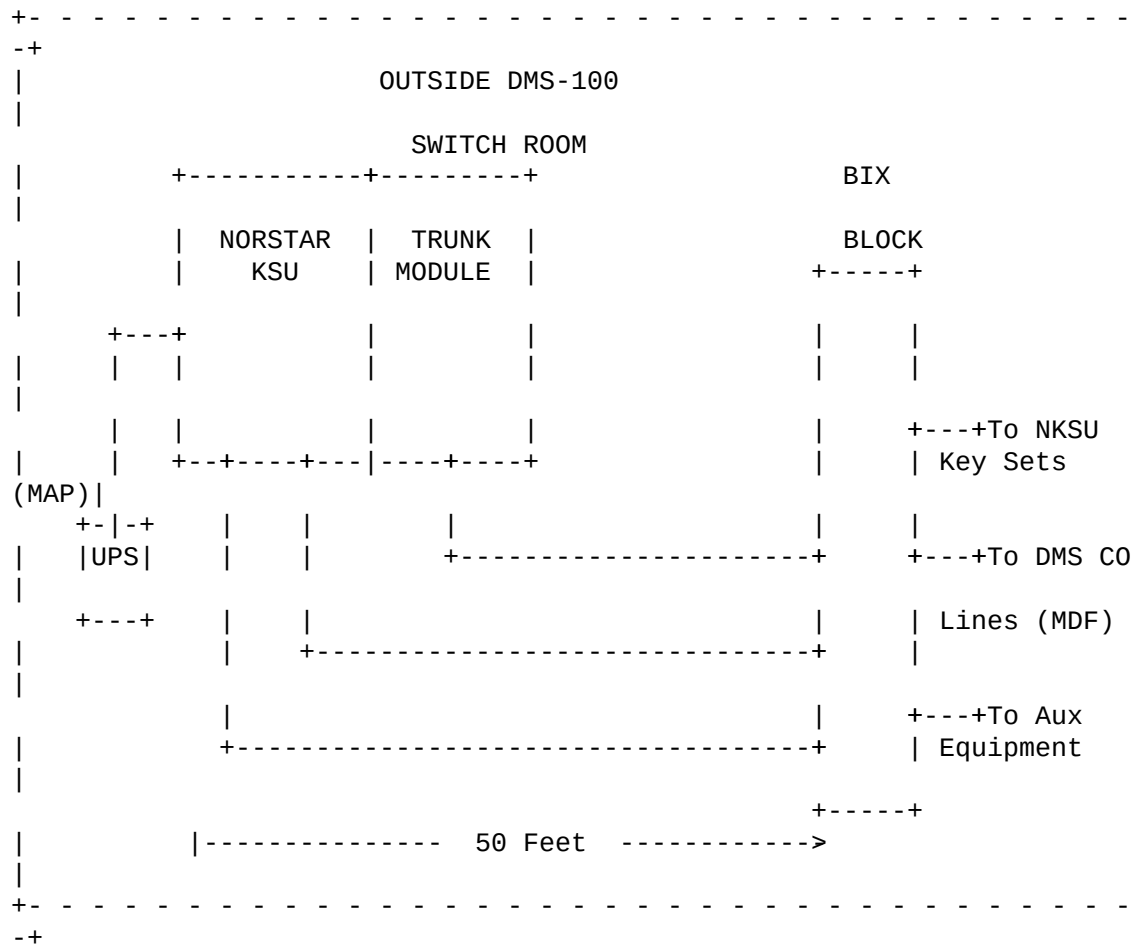
The Norstar is designed on a modular concept which offers plug-in modules to provide a number of features. However, only those approved by DMS-100 Marketing for the MAP application are listed below:

- 2 or 6-Port Expansion Cartridge which allows the addition of two or six modules (either trunk or station modules).
- Trunk Module which allows the addition of three Trunk Cartridges (2 CO Lines).
- Station Module which increases the number of Norstar telephone sets that can be connected to the Norstar by a factor of 16.
- Telephone Set (M7324)
- Norstar Trunk Module
- Norstar Station Module
- Technical Manual
- Headset

Other miscellaneous items are defined herein.

RELEASE 06.03
13 July 1998

A conceptual block diagram of a NKSU is as follows:



UPS = Uninterruptable Power Supply (Telco Provided)

7.2 Hardware Provisioning

7.2.1 Hardware Usage Restrictions

See "Office Layout Information" on page 3-87

7.2.2 Hardware Dependencies

See "Provisioning Considerations" on page 3-86

7.2.2.1 P and C Side Port Requirements

Not Applicable.

RELEASE 06.03
13 July 1998

7.2.2.2 DMS BUS Port Requirements

Not Applicable.

7.2.2.3 Circuits Per Card

Not Applicable.

7.2.2.4 Discrimination Numbering

Not Applicable

7.2.3 Provisioning Considerations

The Norstar KSU may be provisioned in two ways:

1. Provide the base unit PEC and accessories (See Engineering Manual Section for details) or
2. Providing all components of the Norstar KSU individually.

The Norstar Key Service Unit (KSU) consists of three provisionable modules, which are:

- 8 X 24 Main KSU Module
- Norstar Trunk Module (NTM)
- Norstar Station Module (NSM)

The Norstar KSU requires an Uninterruptable Power Supply (UPS) to be provided by the customer. The A.C. outlet must be located within 4.9 feet of the NKSU.

The Norstar KSU also requires provisionable software that must be provided based on the type of feature set required. Refer to the Engineering Manual Section for the list/rules of the available software feature sets.

7.2.3.1 8 X 24 Main KSU Module

Provide one (1) 8x24 Main KSU Module to terminate up to eight (8) CO-lines and twenty-four (24) Norstar Telsets. Also provide either:

- one 2-Port expansion unit to facilitate adding up to two (2) add on modules (NTM or NSM) in any combination, or
- one 6-Port expansion unit to facilitate adding up to six (6) add on modules (NTM or NSM) in any combination.

RELEASE 06.03
13 July 1998

7.2.3.2 Norstar Trunk Module (NTM)

Provide the NTM to enable the Norstar KSU to terminate more CO-Lines, as the Base Unit terminates eight CO-Lines. A maximum of six add on modules may be provided per base KSU in any combination of NTMs and NSMs.

The NTM may be thought of as a card cage which requires circuit packs to enable the desired functions. Provide up to three (3) Trunk Cartridges per NTM.

One Trunk Cartridge increases the CO-Line termination capability of the base KSU by a factor of four (4). Provisioning a NTM with a full complement of Trunk Cartridges increases the base Norstar KSU CO-Line terminating capability by a factor of 12, enabling the KSU to terminate a total of 2 CO-Lines.

Trunk Cartridges to connect various types of trunks are also available. Refer to the Engineering Manual Section for the list/rules of all available trunk cartridges.

7.2.3.3 Norstar Station Module (NSM)

The NSM is used to expand the number of telsets that can be connected to the base unit by a factor of 16-Telsets. The base unit can accommodate 24-Telset without the addition of a NSM.

7.2.4 Office Layout Information

The Norstar KSU cannot be mounted in the DMS-100 Switch Room due to inflammability issues. It may be mounted on a wall outside the Switch Room but still convenient to MAP location. NKSU should be located at least 4m (13.1 ft.) from equipment such as copiers, electrical motors, and other equipment that can produce electromagnetic, radio frequency and electrostatic interference.

7.2.5 Traffic Tables

Not Applicable.

7.3 Product/System Specification

7.3.1 Physical Characteristics

7.3.1.1 NT5B20FC-93 - NorStar 8X24 KSU

RELEASE 06.03
13 July 1998

Input Voltage Vrms.....115V at 57-63(50-60) Hz
Power Consumption.....NKSU = 50Watts
 NTM = 24Watts
 NSM = 24Watts
Current Draw (power bar).....15 Amps
Thermal Dissipation.....126 BTU
Fusing Requirements.....N/A

Note: A.C. outlet should be provided by the customer.

7.3.2 EMI/Earthquake Information

Not Applicable.

7.3.3 Sparing Information

Not Applicable.

7.3.4 Power Feed and Fusing Requirements

Not Applicable.

7.3.5 Current Drain Information

Not Applicable.

7.4 Software Provisioning

For NTX software packages to PLC/SOC mappings for CSP02 and beyond refer to ECM552 - Mapping of NTX/NTG Package to PCL/NCL/Option.

7.4.1 Required Software Packages and Interdependencies

The Norstar KSU also requires provisionable software that must be provided based on the type of feature set required. Refer to the Engineering Manual Section for the list/rules of the available software feature sets.

7.4.2 Software Usage Restrictions

Not Applicable.

7.4.3 Memory Provisioning

Not Applicable.

7.5 Real Time Impact

Not Applicable.

RELEASE 06.03
13 July 1998

8.0 ECM502 - Magnetic Tape Drive (MTD) Provisioning

8.1 Overview

Magnetic Tape Drives

Magnetic tapes are used in DMS as external storage devices and as a media for transferring bulk data and operation software into and out of the system. The read-write device for magnetic tapes is the MTD. Magnetic tapes are used for the following functions:

- 1) Office Image (system software backup)
- 2) Trouble Diagnostics and Reports
- 3) Automatic Message Accounting (AMA)
- 4) Operational Measurements (OM) if required
- 5) Data Modification Orders (DMO) bulk
- 6) Service Analysis (SA) if required
- 7) Call Detail Recording (DMS-300 only)
- 8) Peripheral Loads (to re-load peripherals)

Disk Drive Units

NT's Disk Drive Unit (DDU) is included in the Input/Output Device (IOD) subsystem of the DMS-100 Family of switches. Its application is similar to MTDs when used for storage or retrieval of information. The following are some of the types of information that can be stored on a disk:

- The office image
- Non-resident software commands
- Automatic Message Accounting (AMA), Operational Measurements (OMs), and Journal File (JF) data.

Refer to ECM 300 for calculation of DDU volume size.

8.2 Hardware Provisioning

8.2.1 Hardware Usage Restrictions

| Engineering Change Document 018-45271 MD'ed the NT1X55DA 5.25 inch
| disk drive controller and its associated disk drive. This results
| in the MD'ing of the NT4X00AF shelf and all related PECs as well.
| The NT1X55FA 3.5 inch SCSI disk drive is the replacement. See ECM
| 561 for provisioning SCSI DDUs.

When mounted in the NT4X00AF shelf, the 5.25" and 8" DDUs can only be provisioned in the IOE shelf position 04 with shelf position 18 left vacant. This is due to heating restrictions with the DDUs and a fusing limitation on the IOE's FSP. 8" DDUs are no longer available.

RELEASE 06.03
13 July 1998

A NT4X00AZ DDU Enhancement Kit must be provided with a 5.25" DDU when the 5.25" DDU is provided to replace a 14" DDU on a NT4X00AA, NT4X00AB or NT4X00AC DDU shelf.

A NTZZ99AG Univ 5.25" DDU Upgrade Kit must be provided with a 5.25" DDU when the 5.25" DDU is provided to replace an 8" Priam or Mercury DDU on a NT4X00AA, NT4X00AB, NT4X00AC or NT4X00AF DDU shelf.

8.2.2 Hardware Dependencies

Provide one additional NT0X36AB in the IOE Frame Supervisory Panel (FSP) when the NT4X00AF Shelf is provisioned.

8.2.2.1 P and C Side Port Requirements

Not applicable

8.2.2.2 DMS BUS Port Requirements

Not applicable

8.2.2.3 Circuits Per Card

Not applicable

8.2.2.4 Discrimination Numbering

Not applicable

8.2.3 Provisioning Considerations

This section details the provisioning guidelines for this product.

Magnetic Tape Drives

For an office which will have MTDs only, Magnetic Tape Drive Units are provisioned as follows:

- A minimum of two (2) is required per system, one for maintenance and one for back-up or image/spare.
- An additional two (2) may be required for LAMA/CAMA. This function can be provided on a Distributed Processor Peripheral (DPP).
- An extra MTD may be provided for separate Operational Measurement (OM) support.
- Provide a maximum of ten (10) MTD per system.

RELEASE 06.03
13 July 1998

In a disk office one MTD is retained primarily to enable physical transportation of data to and from the office and secondarily as a back up to the DDU.

The standard DMS MTD is the Cook Electric drive, 209800-153 or NT0X44AB. If the MTD is to be drop-shipped, separately order the drive (209800-153) and its mounting hardware (NT0X44AD) on the appropriate specs. If MTD is not to be drop-shipped, the combined drive and hardware is ordered using NT0X44AB. The Hewlett Packard 7970E-151-048 MTD has been rated MD and can no longer be ordered by Northern Telecom. Provide one (1) NT0X44AC MTD Mounting Hardware to mount a customer-provided HP drive (formerly provided if 7970E-151-048 MTD was drop-shipped by NT). Customers may provide their own MTD and mounting hardware if the Cook Electric drive is not suitable. In offices where the HP MTD is retrofitted with DDU, provide one (1) R0107733 HP MTD Packing Box for shipping and storing purposes.

Disk Drive Units

Engineering Change Document 018-45271 MD'ed the NT1X55DA 5.25 inch disk drive controller and its associated disk drive. This results in the MD'ing of the NT4X00AF shelf and all related PECs as well. The NT1X55FA 3.5 inch SCSI disk drive is the replacement. See ECM 561 for provisioning SCSI DDUs.

The 5.25" DDU has been developed to replace the 8" DDU which replaced the 14" DDU. In new offices, one or two 5.25" DDU are to be provisioned on a NT4X00AF shelf. In existing offices, when replacement is necessary, the 5.25" DDU should be provided. To replace a 14" DDU, a NT4X00AZ DDU Enhancement Kit shall be provided along with a 5.25" DDU on the NT4X00AA, NT4X00AB or NT4X00AC DDU shelf to provide the proper cabling and mounting equipment. To replace an existing 8" DDU, one 5.25" DDU should be ordered for the NT4X00AA, NT4X00AB or NT4X00AC shelf and one or two DDUs should be ordered for the NT4X00AF shelf. A NTZZ99AG Univ 5.25" DDU Upgrade Kit must be provided with each 5.25" DDU provided to replace an 8" DDU.

The 8" DDU is no longer available for ordering. Provide the 5.25" DDU for all offices.

The following hardware is required for 5.25" DDU assignment in a new DMS-100F office. (The 8" DDU is no longer available)

PEC

CPC

NT4X00AG	B0232823 - 5.25" DDU - (228.7 Mbytes formatted) - Maximum 2 per NT4X00AF shelf.

RELEASE 06.03
13 July 1998

NT4X0038	B0227231 - Mercury Disk Hardware Kit - Provide one (1) per 5.25" or 8" DDU.
NT4X00AF	B0225620 - Dual Disk Drive Shelf Assembly - supports two (2) 5.25" or two (2) 8" DDUs.
NT1X55DA	B0226492 - Disk Drive Controller CP. Provide one (1) per DDU.

- Notes:
- 1) For all offices, provide the 5.25" DDUs. The 8" DDU is no longer available.
 - 2) The 1st DDU shall be located on the left side (slot 10) of the NT4X00AF Dual Disk Drive shelf (located in shelf Position 04). If a 2nd DDU is required on the same shelf, it shall be located on the right side (slot 18).
 - 3) DDUs can only be provisioned in the IOE on shelf pos. 04 with shelf pos. 18 left vacant. This is due to heating restrictions with the DDU and a fusing limitation on the IOE's FSP.
 - 4) Provide one additional NT0X36AB in the IOE Frame Supervisory Panel (FSP) when the NT4X00AF Shelf is provisioned.

The following hardware is required to replace an existing 14" DDU on a NT4X00AA, NT4X00AB or NT4X00AC shelf with a 5.25" DDU. The 8" DDU is no longer available.

PEC	CPC

NT4X00AG	B0232823 - 5.25" DDU - Maximum one (1) per NT4X00AA, NT4X00AB or NT4X00AC shelf.
NT4X00AZ	B0234738 - DDU Enhancement Kit

- Notes:
- 1) For all offices, provide the 5.25" DDU. The 8" DDU is no longer available.
 - 2) The NT4X00AZ Enhancement Kit provides appropriate cabling and mounting equipment to allow the replacement of a 14" DDU on a NT4X00AA, NT4X00AB or NT4X00AC DDU shelf with a 5.25" DDU. The 8" DDU is no longer available and the NT4X00AY Enhancement Kit is no longer available.

RELEASE 06.03
13 July 1998

The following hardware is required to replace existing 8" DDU(s) on an NT4X00AA, NT4X00AB, NT4X00AC or NT4X00AF shelf with 5.25" DDU(s).

PEC	CPC
NT4X00AG	B0232823 - 5.25" DDU - Maximum one (1) per NT4X00AA, NT4X00AB or NT4X00AC shelf. Maximum two (2) per NT4X00AF shelf.
NTZZ99AG	B0235777 - Univ 5.25" DDU Upgrade Kit (One per 5.25" DDU is required)

- Notes:
- 1) Existing shelf cabling used for the 8" DDU(s) will be used for the 5.25" DDU(s).
 - 2) On the NT4X00AF shelf, where two 8" DDUs are existing, it is possible to replace only one of the 8" DDUs with the 5.25" DDU, resulting in one (1) 5.25" DDU and one (1) 8" DDU on the shelf together.

Per Customer request, the NT4X0046 Cable Assembly supplied in the NT4X00AY 14 Inch DDU Enhancement Kit during a 14" DDU replacement by an 8" DDU or the two NT4X0039 Cable Assemblies of an existing NT4X00AF can be replaced with the NT4X0048 cable assembly. For all new 14" DDU to 5.25" DDU replacements provide the NT4X00AZ DDU Enhancement Kit. The NT4X00AY DDU Enhancement Kit is no longer available.

8.2.4 Office Layout Information

5.25" DDUs can only be provisioned in the IOE on shelf position 04 and shelf position 18 must be left vacant. This is due to heating restrictions with the DDUs and a fusing limitation on the IOE's FSP. When replacing 14" DDU's with 5.25" DDUs, they can be replaced on a one to one basis with the existing shelves remaining in place. The 8" DDUs are no longer available.

8.2.5 Traffic Tables

Not applicable.

8.3 Product/System Specification

8.3.1 Physical Characteristics

8.3.1.1 8 Inch DDU

Power Consumption - 100 watts
Current Drain - 7 Amps
Fusing Requirements - One (1) 20A Fuse per DDU

8.3.1.2 5.25 Inch DDU

Input Voltage - 5V and 24V
Power Consumption - 93 watts
Current Drain - 8 Amps
Fusing Requirements - One (1) 20A Fuse per DDU

8.3.2 EMI/Earthquake Information

Not applicable.

8.3.3 Sparing Information

Standard sparing rules will apply.

8.3.4 Power Feed and Fusing Requirements

The following fuses and feeds are required:

8.3.5 Current Drain Information

Current Drain for the circuit packs are:

8.4 Software Provisioning

For NTX software packages to PLC/SOC mappings for CSP02 and beyond refer to ECM552 - Mapping of NTX/NTG Package to PCL/NCL/Option.

8.4.1 Required Software Packages and Interdependencies

To support DDUs: package NTX074AA - Data Disk Storage is needed.

8.4.2 Software Usage Restrictions

Not applicable.

8.4.3 Memory Provisioning

Not applicable.

8.5 Real Time Impact

Not applicable.

RELEASE 06.03
13 July 1998

9.0 ECM561 - IOC Based SCSI Disk Drive Unit

9.1 Overview

The SCSI-based Disk Drive Unit (SCSI-DDU) is a single circuit pack that replaces the ESDI-based 5.25" Disk Drive Unit (ESDI-DDU) and its controller circuit pack currently used in the DMS-100 system. The SCSI-DDU circuit pack includes the control circuits, IOC interface and a 2.5" disk drive, and it occupies a single slot in the Input/Output Controller (IOC) shelf of the Input/Output Equipment (IOE) frame/cabinet. As a comparison, the ESDI-DDU is mounted in a dual DDU shelf, and its Controller circuit pack is mounted on a separate IOC shelf. The SCSI-DDU controller performs the same function as the current ESDI-DDU controller. It interfaces with the DMS through the IOC controller which relays messages to the Computing Module (CM) of the SuperNode via the Message Switch (MS) or to the Central Control (CC) of NT40 via the Central Message Controller (CMC).

The SCSI-DDU is based on the industry standard interface SCSI which is also used by the disk drives on SuperNode and other NT products. The ESDI standard used by the current ESDI-based DDUs are already obsolete. The SCSI-DDU can emulate the ESDI-DDU controller and provide full backward compatibility.

The SCSI-DDU uses a 2.5" disk drive which requires a single source of power (5V) supply which is available on the IOC shelf, and no separate power converter is required. With the 2.5" disk drive, the 220 MByte capacity limitation imposed on the ESDI-DDU is eliminated, and, hence, much higher capacity disk drives can be used. Currently, 2.5" drives are at 250 MByte capacity, and higher capacity is expected in the near future.

The SCSI-DDU also brings the following side benefits:

-) Reduced power consumption compared with ESDI-DDU.)
-) Significant simplification in installation and maintenance.
-) Higher reliability (due to reduced component count and higher MTBF for the disk drive).
- 4) Providing a migration path to Fault Tolerant File System (FTFS) for all DDU applications.

RELEASE 06.03
13 July 1998

9.2 Hardware Provisioning

9.2.1 Hardware Usage Restrictions

The SCSI-DDU is fully backward compatible. It eliminates the capacity limitation of 220 MByte imposed on existing ESDI-DDU, thereby offering flexibility for future enhancements.

One IOC(all versions), however, should contain a maximum combination of 3 EMPC/MPC and/or DDU controller cards or SCSI-DDUs. For example:

- a) 1-NT1X55FA and 2-NT1X89BB
- b) 3-NT1X89BA
- c) 2-NT1X55DA and 1-NT1X89BB

Any combination of these exceeding 3 will adversely affect the real-time processing on the Message Switch. Also, a maximum of 1 SCSI-DDUs can exist in an office.

The SCSI-DDU card in an IOC shelf is powered by the IOC shelf power supply. The compatible power supply for the SCSI-based DDU in an IOC shelf is NT2X70AF. If the SCSI-DDU is used in an existing shelf with any power supply other than NT2X70AF then the power supply needs to be changed to the AF. For upgrading the power converter to NT2X70AF on existing shelves (NT1X61AB,AD, and NT1X61AG) refer to power converter kit NT2X70AY.

9.2.2 Hardware Dependencies

9.2.2.1 P and C Side Port Requirements

Not applicable

9.2.2.2 DMS BUS Port Requirements

Not applicable

9.2.2.3 Circuits Per Card

Not applicable

9.2.2.4 Discrimination Numbering

Discrimination numbering for the SCSI-DDU starts at 00 and ends at 05.

RELEASE 06.03
13 July 1998

9.2.3 Provisioning Considerations

The SCSI-DDU contains both the disk drive and the controller on the same circuit pack. For initial jobs, the SCSI-DDU can be mounted in any one of the nine (9) slots on an IOC shelf, and the DDU shelf on the IOE/CIOE is eliminated. Provide a maximum number of 10 SCSI-DDUs per office. When providing SCSI-DDUs, they must be distributed across a minimum of 2 IOC shelves.

For field upgrades, since the SCSI-DDU circuit pack uses a double size faceplate as opposed to the single size faceplate used by the DDU Controller CP, remove the DDU Controller CP and the neighboring filler face plate and mount the SCSI-DDU in the slot from where the DDU Controller CP was removed. The cables connected to the associated ESDI-DDU should also be removed.

The elimination of the separate DDU shelf frees up space that can be used to accommodate another IOC shelf on the IOE FRAME if needed. For example, a typical IOE frame can have one MTD, which occupies two shelf positions, and three IOC shelves.

The ESDI-DDU and SCSI-DDU can be used together in an existing office. The SCSI-DDU can exist in the same IOC as the DDU Controller for an existing ESDI-DDU.

9.2.4 Office Layout Information

Not applicable.

9.2.5 Traffic Tables

Not applicable.

9.3 Product/System Specification

9.3.1 Physical Characteristics

The SCSI-DDU NT1X55FA is packaged as a standard size (10.0" X 12.5") circuit pack. The 2.5" disk drive is mounted directly on the board with four (4) screws. The faceplate is double size with a dual color LED at the standard location.

9.3.2 EMI/Earthquake Information

The SCSI-DDU is equal or better than the ESDI-DDU and its controller NT1X55DA combination in radiated Electromagnetic Interference.

9.3.3 Sparing Information

The MTBF for the SCSI-DDU is 200,000 hours.

RELEASE 06.03
13 July 1998

9.3.4 Power Feed and Fusing Requirements

Not Applicable

9.3.5 Current Drain Information

The SCSI-DDU requires approximately 2.5 Amp current at 5 volts, and its 12 V power requirement is less than 2 watts. Hence the total power consumption is less than 20 watts which is approximately the same power requirement for the DDU controller NT1X55DA. The minimum version of power supply required for the SCSI-DDU is NT2X70AF. Refer to section 2.2 HARDWARE USAGE RESTRICTIONS concerning earlier versions of the NT2X70.

9.4 Software Provisioning

For NTX software packages to PLC/SOC mappings for CSP02 and beyond refer to ECM552 - Mapping of NTX/NTG Package to PCL/NCL/Option.

9.4.1 Required Software Packages and Interdependencies

Not applicable.

9.4.2 Software Usage Restrictions

The SCSI-DDU software support (circuit pack code change) is available in BCS36 via NTX074AA-Data Disk Storage. After BCS36 the software for the DDU is provided with the order of every PCL (Product Computing-Module Load).

9.4.3 Memory Provisioning

Not applicable.

9.5 Real Time Impact

Not applicable.

10.0 ECM563 - SuperNode Data Manager (SDM)

10.1 Overview

The SuperNode Data Manager is a high-performance UNIX computing platform and software applications package. The platform is integrated with the DMS SuperNode for support of operations, maintenance and administration. Initially, two versions of the SuperNode Data Manager are available:

- 1) A fully Central Office (CO)-compliant cabinetized simplex system
- 2) A low-cost standalone simplex system

In a later release, a CO-compliant cabinetized duplex system will be offered with load sharing and switchover capability.

The initial provisioning application for SDM is the Streamlined Translations application. It provides a service view of translation datafill that replaces the existing DMS table view. This reduces the number of operations required to perform provisioning tasks. The SDM will also provide streamlined translations for Equal Access provisioning.

CABINETIZED SIMPLEX SYSTEM (NTRX50BA)

The cabinetized model of SuperNode Data Manager is powered by -48V and can be installed in a Central Office environment. This product will offer a smooth migration path to the future Cabinetized Multi-Computing model.

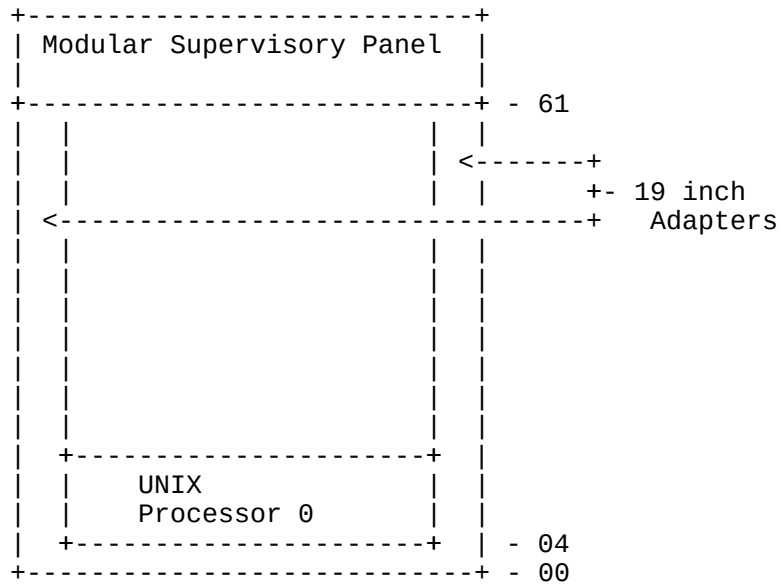


Figure 23. Cabinetized SDM

RELEASE 06.03
13 July 1998

STANDALONE SDM (NTRX50CA)

The standalone version of SuperNode Data Manager is essentially only the computing hardware and requires the customer to be responsible for resolution of several issues. These are:

- o The model is not compliant with CO requirements.
- o 10BaseT connectivity between the SDM and its EtherNet Interface Unit (EIU) is limited to 100 meters. This limitation may be overcome by use of LAN repeater equipment (for example, HUBs).
- o The model is A.C. powered and an uninterruptible power supply is highly recommended.
- o The configuration of the Multiplex Distribution Panel (MDP) and associated modems must be managed by the customer.
- o The customer must provide compatible modems for remote dial-up access to the cabinetized or the standalone version of the SDM.
- o The standalone model has no interface to the DMS external alarm system so a power failure to the processor will not be detected at the SuperNode MAP.

CABINETIZED MULTI-COMPUTING (FUTURE)

It is currently planned to introduce a cabinetized multi-computing model to provide a highly-available, high-performance computing platform. Dual UNIX processors will not only provide a high degree of hardware reliability but will also share the processing load, thus increasing the available computing capacity. It is planned to make the cabinetized simplex SDM upgradable to the cabinetized multi-computing configuration.

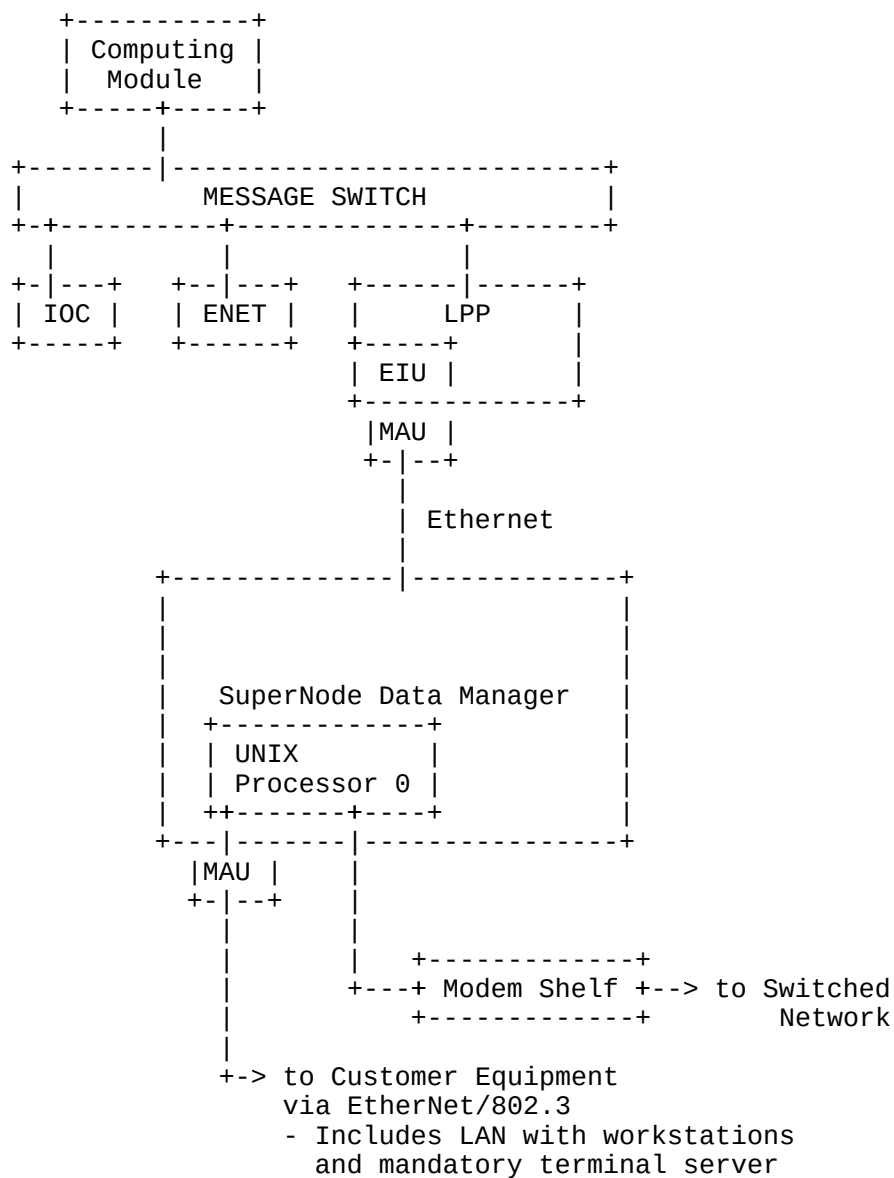


Figure 24. SuperNode Data Manager System Configuration

RELEASE 06.03
13 July 1998

10.2 Hardware Provisioning

10.2.1 Hardware Usage Restrictions

The initial release of the SDM is available for either CO-compliant applications or as a standalone model. No other versions are currently available.

X Terminals are not supported on the SuperNode Data Manager due to their deployment limitations and the excessive amount of TCP/IP traffic that they introduce on a LAN.

In the SDM02 release, User Interface clients will only be supported on PA-RISC based processors (from Hewlett Packard) running the HPUX 9.05 Operating System (or higher) with the appropriate DCE client software (version 1.2 or higher.)

CD-ROM capabilities are not provided as part of the SDM02 release.

10.2.2 Hardware Dependencies

The SuperNode Data Manager processing engine is an HP9000-series E25 Business Server, equipped with:

- HP PA-RISC 48MHz processor with 64K internal cache
- Precision Bus with four single height HP-PB slots
- 32 Mbytes of RAM, upgradable to 64 Mbytes
- 1.0 GByte integrated disk drive
- 2.0 GByte DDS embedded cartridge tape drive
- One Ethernet/802.3 LAN interface (on processor board)
- Multi-function I/O card (interface to MDP)
- LAN Interface which uses a MAU.
- Failure Indicator Lamps

The SDM is upgradable to have two 1.0 GByte disk drives for use with the Disk Mirroring option or to augment existing data storage. An optional X.25 circuit pack is available for field upgrades of both versions of the SDM.

Modem Requirements

Modems are required to provide ground isolation between the RS232 ports from the Multiplex Distribution Panel (MDP) and the craft interface. A maximum of six modems are currently supported for the SDM, one of which must be a dial up modem for remote support. The Multiplex Distribution Panel (MDP) is required to convert the internal proprietary HP data stream into multiple RS232 ports.

Modems must be located in any of the following miscellaneous cabinets or frames;
NT0X43BA MOE (Modem) Frame
NT0X02AA MIS Frame

RELEASE 06.03
13 July 1998

NTRX34AB MIS Cabinet (CMIS)
NTRX56AA MIS Cabinet (CMIS)

EtherNet Interface Unit Requirement

An EtherNet Interface Unit (EIU) provides a gateway between the DMS Bus and an EtherNet LAN. The EIU may be mounted in an LPP cabinet, a Fiberized Link Interface Shelf (FLIS) or a SuperNode SE. The EIU hosts the Telnet Server application and acts as a router between the Computing Module and the SDM.

For SDM02, an EIU residing in the LPP cabinet is supported.

MAU Requirement

The internal LAN (EIU to SDM) requires 10BaseT with MAUs to provide electrical ground isolation between the EIU and the SDM cabinet. One MAU is required at the EIU. The processor houses on-board MAU functionality. The MAU of choice is the HP mini-MAU, HP model # HP28685B EtherTwist Transceiver. The maximum distance between the EIU and the processor is 10 meters (330 feet).

DAT

A 2.0 GByte DDS embedded cartridge tape drive is included as part of the processor unit and is accessible from the front. The DAT will be used for software delivery and SDM file backup and restore operations.

TERMINAL SERVERS

Terminal servers are supported in SDM02 and are mandatory. The terminal server converts a TCP/IP logical channel into a physical asynchronous port and vice versa. A terminal server cannot be used for remote maintenance port access. This access must be provided via the modem port 7 that is on the RS232 Multiplex Distribution Panel on the processing unit.

WORKSTATIONS

In order to off-load the SDM processor from Graphical User Interface processing, a workstation is used to run the GUI software. This software will run on a remote UNIX workstation. The software runs on the following platform:

- HP 700-series color workstation running HP-UX 9.05 or later

One workstation can be used to access multiple SDMs simultaneously.

RELEASE 06.03
13 July 1998

10.2.2.1 P and C Side Port Requirements

The SuperNode Data Manager interfaces to the DMS via an EtherNet interface and neither consumes nor provides either C- or P-side ports.

10.2.2.2 DMS BUS Port Requirements

Not applicable

10.2.2.3 Circuits Per Card

Not applicable.

10.2.2.4 Discrimination Numbering

Not applicable

10.2.3 Provisioning Considerations

The customer is responsible for the assignment of all IP addresses on the internal and external LANs.

Neither routers, bridges nor hubs are mandatory in the SDM02 release. Printers are also not required in SDM02 but printing may be provided by using the remote printing capability of UNIX and spooling printer output to a printer controlled by a workstation in the Telco LAN.

10.2.4 Office Layout Information

The processor must be within 100 meters (330 feet) of the EIU when using the 10BaseT transceiver. This limitation may be eliminated by use of telco-provided LAN repeater equipment (for example, hubs).

A SuperNode Data Manager which uses modems in a CMIS must be located in the same lineup as the CMIS. The RS-232 modem cable can be no more than 50 feet long.

A standalone SDM (AC powered) must be separated from the DMS Integrated Bonding Network (the DMS lineup) by at least 2 meters (7 feet).

10.2.5 Traffic Tables

Not Applicable.

RELEASE 06.03
13 July 1998

10.3 Product/System Specification

10.3.1 Physical Characteristics

The cabinetized SDM is packaged in a Model B C28 cabinet and has the following physical characteristics:

Height: 72"

Width : 28.5"

Depth : 28.7"

Weight: Approximately 810 pounds

Color : Grey, with the exception of the MSP which is brown

10.3.2 EMI/Earthquake Information

The SDM complies with FCC and EN Class A EMI requirements. The NTRX2564 Earthquake Anchor kit shall be provided for each cabinetized SDM in earthquake applications (refer to NTRX25AA for details).

10.3.3 Sparing Information

Standard sparing algorithms apply.

In the entry level systems, the replacement of any field replaceable units will require the entire system to be powered down, thus resulting in a complete system outage.

10.3.4 Power Feed and Fusing Requirements

The following fuses and feeds are required for each SDM cabinet:

- (1) 30 Amp "A" Feed
- (1) 30 Amp "B" Feed
- (2) Returns

The cabinet is currently only offered with one server. Therefore the "A" feed is all that is needed, and the label at the power bay shall read as follows;

SDM 000
SERVER 0

The future offering of two servers per cabinet will use "A" and "B" feeds, with the second server label shown below;

SDM 000
SERVER 1

RELEASE 06.03
13 July 1998

The server number will not increment, with 0 and 1 shown on each cabinet.

10.3.5 Current Drain Information

The -48V powered SuperNode Data Manager requires -40 VDC to -60 VDC, with a nominal current requirement of 7 Amps (10 Amps at turn on).

10.4 Software Provisioning

For NTX software packages to PLC/SOC mappings for CSP02 and beyond refer to ECM552 - Mapping of NTX/NTG Package to PCL/NCL/Option.

The customer is responsible for the assignment of all IP addresses on the internal and external LANs.

10.4.1 Required Software Packages and Interdependencies

Mandatory Software

All applications of SuperNode Data Manager will require NCL Order Code SDML0002. SDML0002 includes:

SDM00002 SDM Base Unix
SDM00003 SDM Service Layer.

Optional Software

Two additional packages are available but optional, based on customer requirements. These are:

SDM00004 SDM Simple Provisioning
SDM00005 SDM High Speed Log Interface

10.4.2 Software Usage Restrictions

Not applicable.

10.4.3 Memory Provisioning

Not applicable.

10.5 Real Time Impact

No RealTime engineering for SDM is currently required. The requirements for each application have been included in the hardware specified for that application. As more applications are introduced, the RealTime requirements will be revised accordingly.

RELEASE 06.03
13 July 1998

11.0 ECM588 - SuperNode Data Manager SDM06

11.1 Overview

The SuperNode Data Manager product is a UNIX-based computing platform on which a variety of services and applications can be delivered.

In this document, the term 'computing platform' includes the following components:

- all SDM-related hardware
- base software, including the operating system (O/S), the System Software Resources, and OAM and System Administration (SA) tools required to administer the computing platform.

For SDM06, the SDM employs Motorola-supplied VME computing hardware based on the PowerPC family of processors. The SDM06 platform is a shelf-mounted simplex VME system, is fully compliant with all CO equipment standards and is installed into the DMS-100 Miscellaneous (MIS) Frame. The standard SDM06 has four serial ports. One port can be configured synchronous for X.25 access. One asynchronous port is reserved for console access. Standard access from customer equipment to the SDM is achieved via serial port (modem) access. As an option the SDM can connect via a separate Ethernet link to the Telco LAN via an optional plug-in Ethernet card.

The SDM is qualified for CSP05 in the NT0X02AB MIS Frame. Some World Trade models use frames with special cosmetic doors that have ventilation holes at the bottom. See Section 2.2 for more MIS Frame information.

SDM hardware is based on a 3-slot VME chassis housing the following components:

- up to three VME cards (horizontal card cage, front mount)
- six transition cards (horizontal card cage, rear mount)
- two 3.5" SCSI devices
- one -48V DC Power Supply Unit (PSU)
- one fan unit

The SCSI devices can consist of a 1 or 2 GB hard drive and one DAT drive for software install, file backup and restore.

The VME Simplex configuration makes use of a Single Board Computer (SBC). This unit occupies slot 1 in the card cage and contains all circuitry necessary for basic I/O and computing.

RELEASE 06.03
13 July 1998

A microprocessor, the PowerPC 603 clocked at 66 Mhz, forms part of a separate computing module that is mounted on the SBC. The SBC motherboard is offered in four different configurations, each distinguished by the physical memory on each one: 32Mb, 64Mb, 96Mb, and 128Mb.

The processor card provides four serial ports through the Processor Transition card in slot 0. These ports can be configured as modems (DCE) for connecting to terminals or as terminals (DTE) for connection to modems. The SDM is shipped with these ports configured for DTE operation.

For SDML006, connectivity between CM and SDM employs a 10BaseT Ethernet link between the SDM and an EIU on the Link Peripheral Processor (LPP), Fiberized Link Interface Shelf (FLIS), or SuperNode System Enhanced (SNSE). The link terminates at the SDM on a built-in Ethernet interface (the processor card Ethernet port).

The optional Ethernet Controller card available in CSP05 is for connecting SDM to Telco LAN and mounts in VME slot 2. The Ethernet port on the processor card can then be used to connect SDM to the Telco LAN.

The following summarizes the connectivity options that are available for SDM to Telco equipment communications:

SDM to Telco Connectivity

	BASE CONFIGURATION	UPGRADE
Ethernet	No	Yes, with the addition of the Ethernet I/F Card
Asynchronous Access	3 port (1 reserved for console access)	Yes, via the terminal server and Ethernet Card
X.25/Synchronous Access	1 port (if X.25 is not required, this port can be configured as additional asynchronous port)	No. Only one port can be configured to synchronous X.25.

A backplane extends to the entire height of the VME shelf and provides connectors for the VME cards, transition cards, PSU, disk and tape modules and the fan unit.

An SDM Fault Tolerant configuration is planned for a future release. It features dual sync-matched processors and fault tolerant dual I/O busses. These features assure that interruptions to service due to system hardware and software failure are in line with Telco availability requirements.

A complete set of Northern Telecom Practices (NTPs) are available for the SDM that describe SDM base hardware and software, engineering, provisioning, operation, administration, and maintenance of the system.

Figure 25 on page 3-112 shows an example of a MIS Frame with an SDM06 shelf installed on the lowest shelf position.

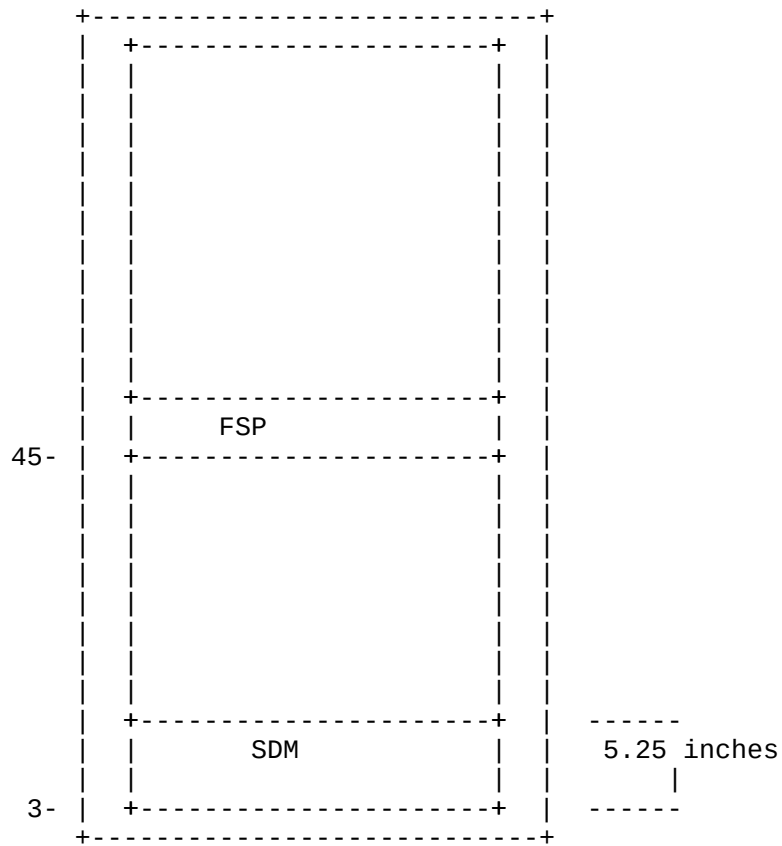


Figure 25. Physical view of SDM in MIS Frame

RELEASE 06.03
13 July 1998

Figure 26 shows an SDM06 shelf front view (not to any scale).

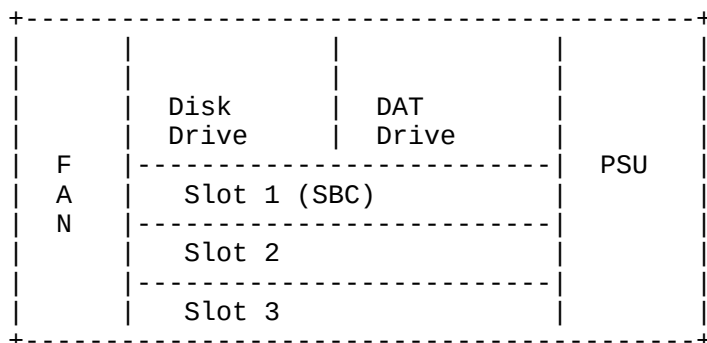


Figure 26. Three-slot VME Chassis w/front panel removed

Figure 27 shows an SDM06 shelf side view (not to any scale).

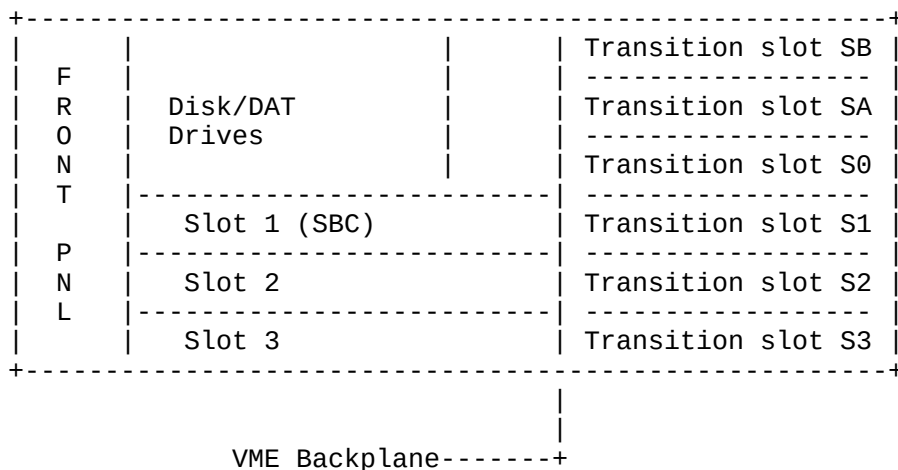


Figure 27. Side View - Internal SRM Chassis, PSU not shown

RELEASE 06.03
13 July 1998

11.2 Hardware Provisioning

11.2.1 Hardware Usage Restrictions

The SDM product is a UNIX-based computing platform on which a variety of services and applications can be delivered. The computing platform uses commercially available UNIX hardware and software products in order to speed product development and create a more open UNIX computing environment. The computing platform includes the following components:

- all SDM-related hardware
- base software, including the operating system (O/S)
- System Software Resources
- OAM and System Administration (SA) tools

The VME Simplex configuration is based on a fully integrated three-slot VME-based chassis. While the shelf-based chassis can be mounted in either a cabinet or a frame, only mounting in a MIS Frame is supported for SDML006 (CSP05). Some World Trade models use frames with special cosmetic doors that have ventilation holes at the bottom.

Where the doors are NOT used on the MIS Frame, the SDM should be mounted in shelf position 3, and no baffle should be used. If this space is not available, the SDM can be mounted in any available space, with a 4 inch baffle (NT6X1402) placed directly beneath the SDM from position 8 and up.

Where the doors are used, these are recommended mounting positions:

- 68, with 4 inch baffle below SDM (fills 64-74)
- 52, with 4 inch baffle below SDM (fills 48-58)
- 34, with 4 inch baffle below SDM (fills 30-40)
- 17 down to 4, using no baffle below 8.
- 17 would fill 13-23, 16 would fill 12-22, etc.

Refer to the Engineering Manual Section NTRX50DA for more information about mounting and provisioning rules.

The direct physical X-Terminal connection to the SDM is not supported due to deployment limitations and excessive amounts of TCP/IP traffic that the terminals introduce on a LAN. Customers wishing to deploy GUIs in their network must use UNIX workstations or PCs connected through a Remote UI interface. X-Terminals can be used if acting as clients to a networked UNIX workstation.

In SDML006, the current plan is that UI Clients are only supported on PA-RISC based processors (from Hewlett Packard) running HP-UX 9.05 Operating System (or higher) with the appropriate DCE client software (version 1.2 or higher).

RELEASE 06.03
13 July 1998

Hubs are required whenever 10BaseT or Unshielded Twisted Pair LANs are deployed. Deployment of 10BaseT technology is strongly recommended because of its industry wide support and ease of installation.

Routers may be deployed in conjunction with the SDM to perform the following functions:

- WAN Networking for SDM GUIs
- Access to X.25 Network
- Gateway or Protocol Translator functions

Terminal Servers are supported for the SDM06 release.

Printing capabilities may be provided by using the remote printing capabilities offered by UNIX and spooling printer output to a printer controlled by a workstation in the Telco LAN. Printer types supported are postscript and ASCII-based line printers (Async RS232).

11.2.2 Hardware Dependencies

Modems are required by the SDM product to provide asynchronous TTY and X.25 dialup access to the SDM. To remain CO compliant, the only way to provide this access to the SDM is via modems located in a MOE or MIS Frame, or a CMIS cabinet. Alternatively, a protected 1 0V AC powered standalone modem can be used for this access. Since the SDM is fully ground isolated this does not pose an electrical threat to the SDM.

The modems used to connect to the SDM must be located in the same MIS Frame or in the same frame line-up as the SDM. This is needed for grounding. The SDM is connected to the frame ground and the modem ports on the SDM use this ground for reference.

An interface to the external (Telco) LAN is provided as an option to the base offering for the SDM platform. It offers:

- high speed (10Mbps) communication channel over Ethernet or 802.3
- reliable end-to-end transmission of data
- industry standard interfaces (TCP/IP, Telenet, FTP, DCE, etc.)

The customer is responsible for the engineering, administration, and maintenance of all equipment on the external (Telco) LAN. The customer is also responsible for the assignment of all IP addresses on the internal and external LAN. As an option, the customer can employ NORTEL to configure and install the external LAN.

11.2.2.1 P and C Side Port Requirements

Not Applicable

11.2.2.2 DMS BUS Port Requirements

Not Applicable

11.2.2.3 Circuits Per Card

Not Applicable

11.2.2.4 Discrimination Numbering

Not Applicable

11.2.3 Provisioning Considerations

The base SDM hardware configuration consists of the following items. This configuration requires the selection of a processor card and disk drive to complete the unit.

- 2 processor transition cards
- 1 SCSI transition card w/ext. active termination
- 1 alarm interface transition card
- 1 4Gb 4MM DAT drive w/SCSI-II single ended i/f (3.5")
- 1 power supply unit (PSU)
- 1 fan unit

The following options are available to complete the SDM configuration:

- 1 processor card w/32,64,96 or 128 MBs DRAM
- 1 one or two GBs single ended SCSI-II disk drive (3.5")
- 1 Ethernet controller card w/Ethernet transition card for a second Ethernet port

The slot positions of the VME and transition cards are fixed for SDM configuration. See the following for details.

SDM Chassis VME Configuration

Slot ----	Description -----	Interfaces -----	Connector Type -----
	PowerPC603 CPU Card	RS232(4), Ethernet, SCSI, Printer	P2 i/f for transition card
	Ethernet Controller Card	Ethernet	P2 i/f for transition card
	N/A	N/A	N/A

SDM Chassis Transition Configuration

Slot ----	Description -----	Interfaces -----
SB	Alarm card	RJ-45(2), DB9(1)
SA	SCSI card	SCSI(in and out)
S0	Processor 2 card	Ethernet, SCSI, Printer
S1	Processor 1 card	RS232(4)
S2	Ethernet card	Ethernet
S3	N/A	N/A

RELEASE 06.03
13 July 1998

All NA005.1 V0 sites will be engineered with this SDM06 product.
At CI, provision the following items with the NTRX50DA VME Super-node Data Manager:

NTRX50JQ qty 1
NTRX50JU qty 1
NTRX50JV qty 1
NTRX50JW qty 1
other associated HW and SW order code SDMN0006.

If the CI has been captured equipment changes will be added via a Class D JIM.

At V0 sites currently equiped with the NTRX50DA, a CI update to remove the NTRX50JP and add NTRX50JQ should be made.

See the Engineering Manual Section NTRX50DA for more details and engineering rules.

11.2.4 Office Layout Information

The SDM does not exceed the maximum floor load of 115 lbs./sq. ft. averaged over the equipment footprint and allowable aisle area in accordance with NEBS TR-NWT-000063.

Within the SDM there are a number of separate LANs:

- Internal LAN (EIU to SDM connectivity)
- Optional External LAN (SDM to Telco LAN connectivity)

The interface requirements for each of these can be described as follows:

	Internal LAN	External LAN	Notes
LINK LEVEL			
- Ethernet	Yes	Yes	
- IEEE 802.3	No	Yes	
PHYSICAL LEVEL			
- 0BaseT	Yes	Yes	1, 2

RELEASE 06.03
13 July 1998

Note 1

MAU functionality is required at the far ends of the Internal and External LAN. Where the LAN leaves the switching lineup or the office, MAU functionality is required for isolation grounding. Both within and when leaving the lineup, the MAUs are required for 10BaseT transceiver functions.

The SDM provides on-board MAU functionality on transition cards connected to the SDM SBC and the optional Ethernet Controller Card. This means that only an EIU-side MAU is required for the internal LAN. For the External LAN, customers must provide MAU functionality for connection to the Telco LAN.

Note 2

The MAU of choice is the HP mini-MAU, HP model HP28685B EtherTwist Transceiver. The maximum reach is 330 feet (100 M).

- MODELS -

Refer to Figure 28 on page 3-120 for the SDM06 NA005.1 Model #1.

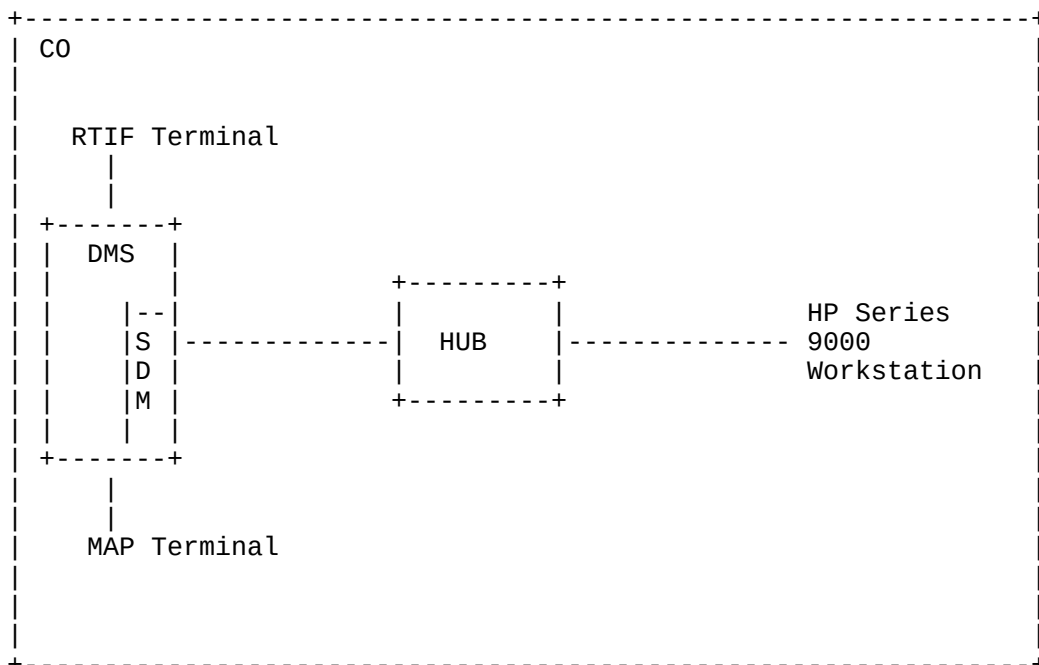


Figure 28. SDM06 NA005.1 Model #1

Refer to Figure 29 on page 3-121 for the SDM06 NA005.1 Model #2.

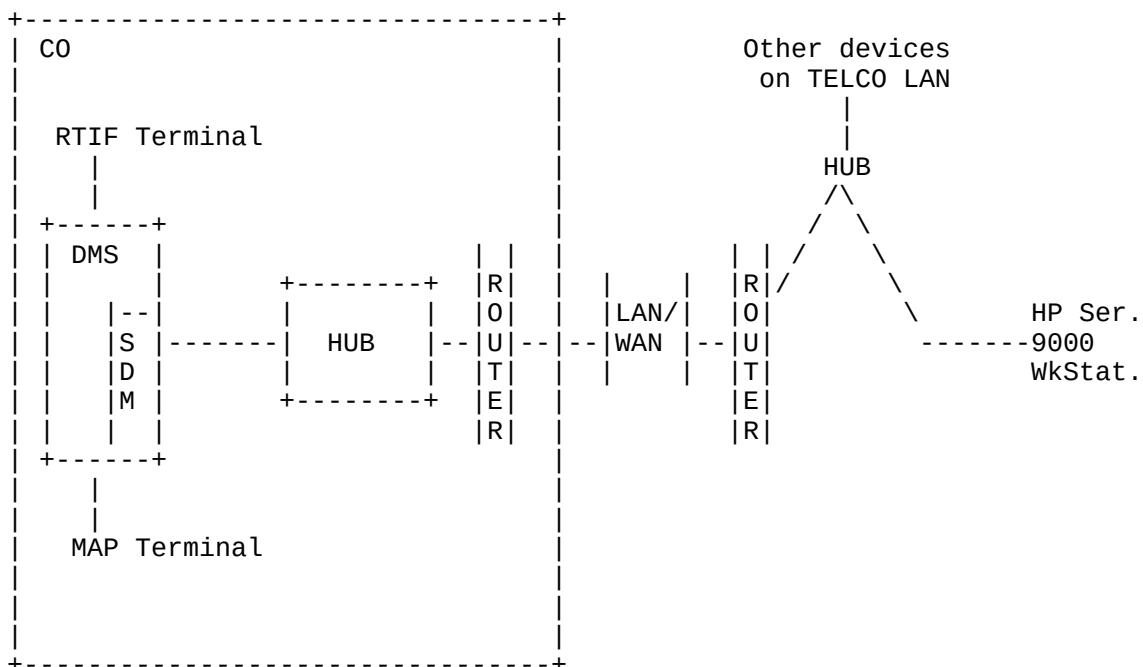


Figure 29. SDM06 NA005.1 Model #2

Refer to Figure 30 on page 3-122 for the SDM06 NA005.1 Model #3.

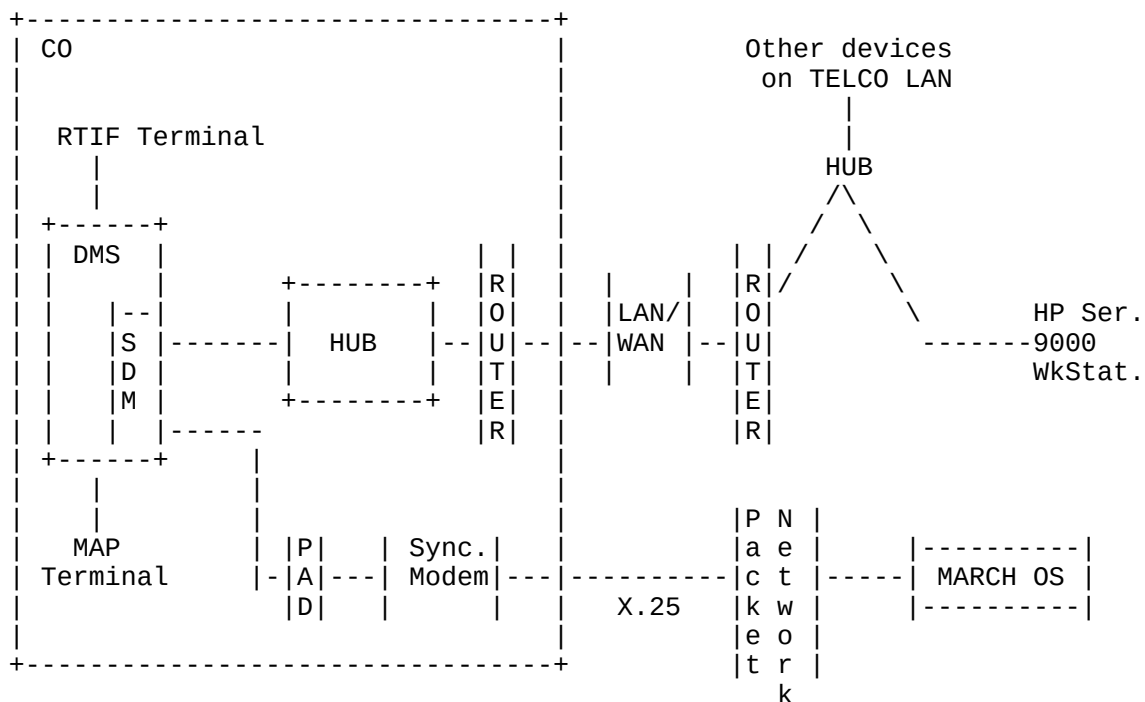


Figure 30. SDM06 NA005.1 Model #3

Refer to Figure 31 on page 3-123 for the SDM06 NA005.1 Model #4 Log Delivery

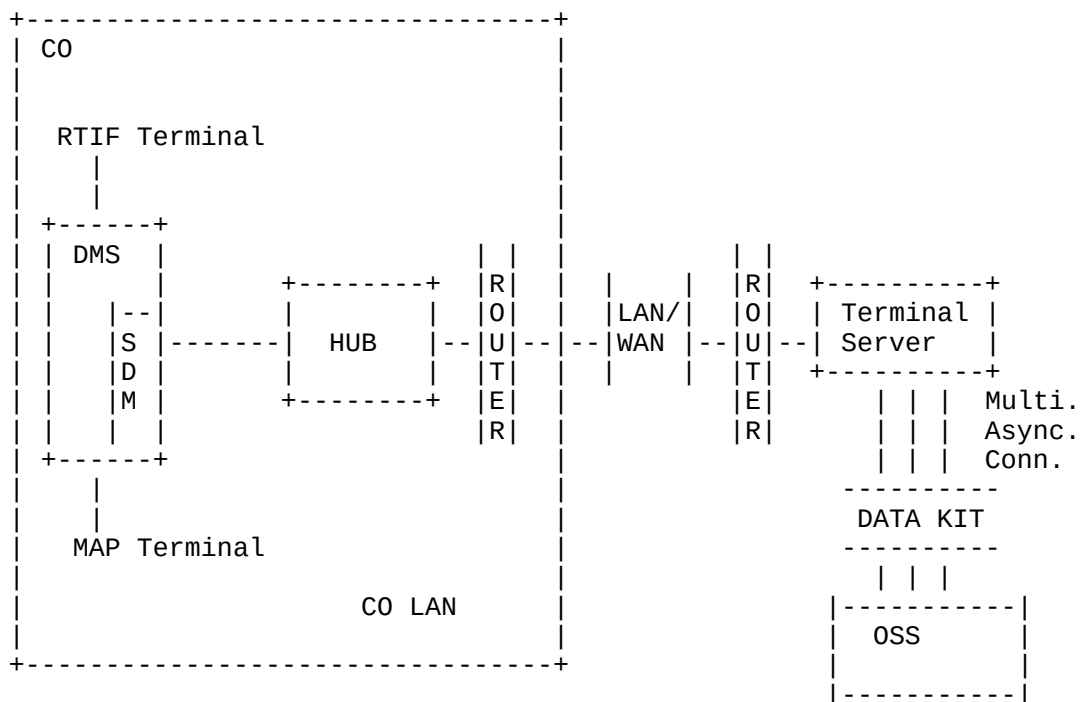


Figure 31. SDM06 NA005.1 Model #4 Log Delivery

Refer to Figure 32 on page 3-124 for the SDM06 NA006 Model #5 (Multiple DMS).

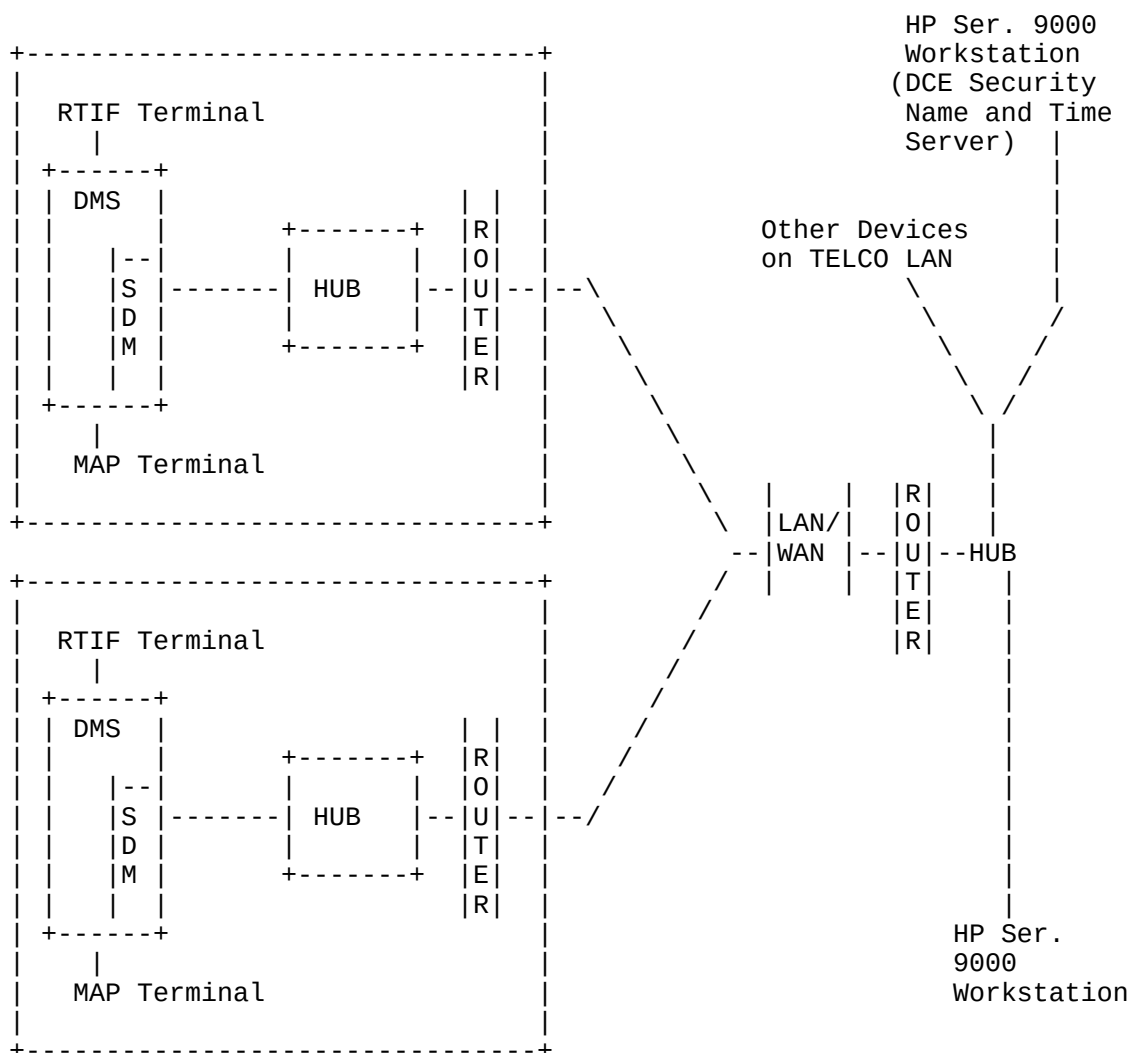


Figure 32. SDM06 NA006 Model #5 (Multiple DMS)

SDM GUI/Security and Name Server

HARDWARE

- HP-9000 Series Workstation
- PA-RISC based processor
 - IEEE 802.3 Ethernet 10BaseT Interface

RELEASE 06.03
13 July 1998

- 64M bytes of RAM (GUI server application only)
- 1G disk drive (100M swap space)
- 1 DAT drive
- 17" color monitor

SOFTWARE

- Operating System License HPUX version 9.05 or higher
- DCE Client License version 1.2 or higher

In NA005.1, the only workstation supported for running SDM applications is the HP700/800 (the 9000 series) with HP-UX 9. Two exceptions are - Exception Reporting in 1Q97 will be on a SUN workstation, and SUN workstations with Solaris not before NA007.

11.2.5 Traffic Tables

Not Applicable

11.3 Product/System Specification

11.3.1 Physical Characteristics

The Motorola Small Rack Mount (SRM) VME chassis chosen for the SDM has three VME slots and six transition slots, a -48V DC power supply unit, a fan unit and dual 3.5" disk bays. It mounts on a 19" standard rack and occupies 5.25" vertical rack space and 14.5" depth. The plastic front panel requires 2.25" of clearance in front of the rack mount flanges. A metal blank faceplate is required for cooling and provides RFI shielding for each unused VME or transition slot.

11.3.2 EMI/Earthquake Information

The SDM chassis is fully enclosed for EMI purposes. Any unused VME or transition slot should have a blank faceplate installed.

The SDM chassis is connected internally to its logic ground. The SDM is isolated from the frame by use of an isolating mounting kit. The SDM chassis is connected to logic return ground.

The SDM units comply with TR-NWT-001089 for electromagnetic compatibility.

The SDM will recover after earthquake testing when subjected to earthquake floor response spectra criteria stated in NEBS TR-NWT-000063 (up to and including Zone 4).

RELEASE 06.03
13 July 1998

11.3.3 Sparing Information

Due to the highly configurable nature of the SDM, no spares kit will be offered. Spares should be ordered for each of the following:

- Processor Card
- Hard Drive
- DAT Drive
- Power Supply
- Fan
- Ethernet Card (if part of configuration)

All spares should match the customers chosen configuration.

11.3.4 Power Feed and Fusing Requirements

The SMR VME chassis is powered by a single A or B feed (-48V DC). Power to the chassis is supplied through a breaker in the FSP and is controlled by a rotary keylock switch mounted on the Power Supply Unit. This switch is left in the on position and keys will not be supplied with the SDM.

Both NT0X88AB and NT0X88AF FSPs are supported on the MIS Frame. If both breakers in the MIS Frame FSP are in use, an additional FSP must be provisioned for SDM mounting.

Power for the MIS Frame must originate from the PDC or CPDC.

11.3.5 Current Drain Information

The Power Supply Unit (PSU) is rated at 170W continuous (all outputs combined) and its single feed input can range from -36V DC to -72V DC. The PSU supplies +5.1V, +12.12V, and -12.12V to the chassis.

11.4 Software Provisioning

For NTX software packages to PLC/SOC mappings for CSP02 and beyond refer to ECM552 - Mapping of NTX/NTG Package to PCL/NCL/Option.

11.4.1 Required Software Packages and Interdependencies

The SDM software architecture is a three-layer architecture composed of separate base, services, and application layers. This organization permits parallel development in each stream, allowing new services and applications to be delivered independently. Each application will be delivered to the customer via DAT tape, complete with installation instructions. All SDM services are accessed using standard UNIX application program interfaces at the Service layer boundary.

RELEASE 06.03
13 July 1998

The SDM platform comes complete with full base software services. These include AIX 4.1 IBM operating system, full maintenance and administration services, and nodal and process control services.

The following shows the Development Release Unit (DRU) and CSP releases required with SDM release stream SDML006.

DRUs - SRV04, UTL05, SDMB03
CSP - CSP05/NA05/GL02

The SDM NCL code software for NA005.1 is SDMN0006 and if fully defined in PCA. Order this for NA005.1 VO sites.

11.4.2 Software Usage Restrictions

COMMISSIONING

The SDM is a UNIX-based machine that connects to (and is part of) the DMS. It connects to the DMS using Internet Protocol over ethernet or DS-512 links. The SDM also has external connections. It connects to an external environment using Internet Protocol, X.25, and asynchronous connections.

Because of all of these connections (both internal and external), several pieces of information about those connections are required and must be captured and input into the SDM and into the DMS. Also, this information is unique to each site and cannot be input into the SDM or DMS until the time of installation or commissioning. However, it is imperative that this information be captured prior to the time of install or commissioning. The information that must be input into the DMS and into the SDM must be provided by the customer while the customer is answering questions during the NTACCESS session.

The following descriptions help form the questions that NTACCESS must ask of the customer.

For the internal connections (from the SDM to the DMS), the customer needs the datafill in the appropriate tables in the DMS. For the external connections, the customer needs the commissioning values (at time of install) entered correctly on the SDM.

-DATAFILL-

Datafill for the DMS captures information about the EIU, DS-512 connections, CM IP Address, etc.

It is agreed that the SDE will provide the datafill for the following tables. But, in order to do this, the SDE must have all of the questions (that follow) answered correctly.

--DMS Datafill

RELEASE 06.03
13 July 1998

LIUINV	- EIU location, load, and MAC address (note 1)
IPNETWRK	- CM IP address and CM subnet mask
IPHOST	- EIU IP addresses and CM and EIU resources
IPTHRON	- IP throttling numbers
IPROUTER	- EIU network information as a router
ENSITES	- location of external node
ENTYPE	- type of external node
EXNDINV	- SDM information including IP address, name, location

-COMMISSIONING VALUES-

The SDM commissioning values capture information about the SDM IP address, X.25 address, LAN type, LAN subnet size, etc.

--SDM Commissioning Values (put on SDM)

Login Greeting
SDM Hostname
CM IP Address
EIU IP Address (CM side)
SDM IP Address (CM side)
SDM IP Address (external LAN side)
CM CLLI
LAN type
Subnet Mask (external LAN side)
X.25 Port Address
Known Node on external LAN - IP Address (up to 4 nodes)
Known Node on external LAN - Hostname (up to 4 nodes)

QUESTIONS that must be ASKED and ANSWERED

1. What is the CM IP Address?

The IP Address of the CM must be a unique, real address. It must exist on its own subnet. The only other nodes allowed on the subnet would be nodes known to the DMS such as EIUs or APUs. The address must be in the format of X.X.X.X, where X is a number with the value of 1 to 254, inclusive.

This information is used in SDM commissioning and in DMS datafill (Table IPNETWK).

2. What is the size of the CM subnet?

This question is asking what is the total number of bits that are set to 1 for the subnet mask. This number will vary with the way each LAN is engineered and with the class of the subnet and its addresses. This number must be an integer ranging from 1 to 22.

RELEASE 06.03
13 July 1998

This information is used in DMS datafill (Table IPNETWK).

3. What are the IP Addresses of the EIU?

The EIU has two IP addresses because it acts as a router from the CM to the SDM. So, the first IP address has to be on the same subnet as the CM. And, the second IP Address has to be on the same subnet as the SDM, which is a different subnet from CM. This second subnet must be isolated. No other nodes except the SDM and the EIU can exist on this second subnet. The format of the EIU IP Address is X.X.X.X, where X is a number with the value of 1 to 254. The two EIU IP Addresses must be on separate subnets.

This information is used in SDM commissioning and in DMS datafill (Table IPHOST and IPRouter).

More information is added per the SDM Team on issue 05 of this ECM concerning the EIU IP Addresses. The IP address of the EIU on the SDM side and the IP address of the SDM on the EIU side need to be defined in a special manner. This is the subnet between the EIU and the SDM, and it only has two nodes. The SDM base design group has preset the subnet mask to be limited and set to 255.255.255.252. This limits the number of nodes to that subnet to 4. This makes it difficult because the first (of the four) is the ID address of the subnet and can't be used. The last (of the four) is the broadcast address of the subnet and can't be used. So, the remaining two addresses have to be used for the EIU and the SDM. When assigning addresses at random the ID or the broadcast addresses may be done in error. To determine if the assigned address is valid, take the last number of the IP address and divide by 4. If it is divisible by 4 with no remainder or divisible by 4 with a remainder of 3, then the address is NOT valid. (For example, IP address = w.x.y.z. If z=123, 123 divided by 4 equals 30 with a remainder of 3. This value for z is not valid.) This works because of the following:

	1	2	3
4	5	6	7
8	9	10	11
1	13	14	15
16	17	18	19
2	21	22	23
24	25	26	27
'''			
'''			
'''			
248	249	250	251
252	253	254	255

The first column is the number of the subnet ID (0,4,8...). The fourth column is the number of the broadcast address (3,7,11...).

RELEASE 06.03
13 July 1998

The other two columns are the addresses of the EIU (on the SDM side) and the SDM (on the EIU side). When assigning the address, the EIU and the SDM addresses must come from the same row. The EIU and SDM must be 1 and 2, or 13 and 14, or 249 and 250, etc. They cannot be 9 and 22, or 5 and 150, etc. This makes sure that the EIU and the SDM are assigned addresses in the same subnet.

4. Will FTP Service be enabled or disabled?

FTP is an abbreviation of file transfer protocol and is a method in which files are transferred from one node on the network to/from another node on the network. FTP is not very secure and some customers may wish to have this ability on the SDM disabled. However, if FTP is disabled on the SDM there will be no method of transferring files (such as GUI clients, log files, etc.) from the network to the SDM. Anytime a file would be transferred, a craftsperson would have to re-configure the SDM to allow for FTP.

5. Will TELNET Service be enabled or disabled?

TELNET is a method for different users to log on to a machine on the network via a different machine on the same network. TELNET is not very secure and some customers may wish to have this ability on the SDM disabled. However, if TELNET is disabled, no one would be able to use the X.25 link or any of the 16 Asynchronous links of the SDM. Anytime someone needed to log onto the SDM via the network, a craftsperson would have to log on the SDM (via async link) to re-configure the SDM.

6. What is the Console Login Prompt for the SDM?

The greeting for the SDM is given to anyone logging onto the SDM. The information normally found here would be a warning of being logged into a private database machine, the location of the SDM, or whatever the customer would like to put here. This is very similar to the MOTD (message of the day) on the DMS. The format of the greeting is limited to 220 alpha-numeric characters.

7. What is the SDM Telco LAN side Hostname?

This is a unique name that is associated with the SDM. Usually this name would have some reference to the CLLI that the SDM is used for plus the letters SDM as well, or it may need to follow the rules for naming LAN nodes that the customer already has existing. The format of this name must be from 3-16 alpha-numeric characters.

8. What are the IP Addresses of the SDM?

The SDM has two IP Addresses, working similarly to the EIU. The first IP address should be on the same subnet as the secondary EIU IP address (discussed previously). The second IP address on the SDM should be on yet another subnet, separate from the CM or the

RELEASE 06.03
13 July 1998

EIU subnets. This can be an existing subnet already installed at the customer's site. The subnet between the EIU and the SDM must be isolated. No other nodes may exist on that subnet except the EIU and the SDM. However, the subnet that the SDM shares with the external connections to the customer's LAN may share multiple nodes on the LAN. The format of the IP Addresses on the SDM is X.X.X.X, where X is a number with a value from 1 to 254. The two addresses for the SDM must be on separate subnets.

This information is used in SDM commissioning and in DMS datafill (Table EXNDINV).

9. What is the subnet mask of the external LAN (or customer's LAN) to which the SDM is connected (SDM Telco LAN Netmask)?

This question asks what the actual mask of the subnet is, not the size of the subnet. So, the format of the mask should be 255.Y.Y.Y, where Y is a number with the value of 0 to 255.

10. What type of LAN will be used - Ethernet or IEEE?

This determines the Network protocol format of the TCP/IP messages. Ethernet is the most common and is usually the type used.

11. What is the DNA (Data Network Address) for the X.25 connection to the SDM?

This is the DTE address of the SDM for the X.25 port to uniquely identify it to the data packet network for communication purposes. This should be a unique number assigned by someone in charge of the customer's data packet network (DPN). The format of this address should be a number with a maximum length of 15 digits. Usually this number resembles a phone number (10 digits).

12. What are some known and active nodes on the customer's LAN to which the SDM is connecting (Telco LAN node IP address)?

The SDM will be verifying that it can communicate with the customer's LAN. In order to do this it needs to know the IP address and Hostname of some node (or machine) on that LAN. If the SDM cannot communicate with the LAN, then it will raise an alarm on the SDM, and the SDM will raise a minor alarm on the MAP screen of the DMS. There can be up to 4 different nodes given. As long as the SDM can communicate with one of these 4 nodes, then no alarm will be raised. The answer to this question should contain an IP address and a hostname of the node(s) or machine(s). There must be a minimum of one node's information provided and a maximum of 4 node's information provided. The IP address of the nodes should have the format of X.X.X.X, where X is a number with the value of 1 to 254. The hostname should be less than or equal to 8 alphanumeric characters. These nodes can reside anywhere on the customer's LAN on any subnet, as long as the proper routing has been

RELEASE 06.03
13 July 1998

defined on the network to allow the SDM to communicate to these nodes. Usually the nodes that are given are the GUI client machines and the DCE security/name server machine.

NOTE 1

The MAC Address (Machine Address Code Address) is a unique number that must be provided by NORTEL, not the customer. In order for the SDE to obtain a MAC Address, he/she must submit a COCOS to the user "MAC Address", along with the customer name, site name, site address, site CLLI, and site/NORTEL contact. This is NOT an option; the MAC Address must be obtained prior to datafill of the EIU on the switch. Please refer to ECM 620 for more detail about EIU provisioning and MAC Addresses.

11.4.3 Memory Provisioning

Not Applicable

11.5 Real Time Impact

Not Applicable

RELEASE 06.03
13 July 1998

12.0 ECM607 - Building Block Engineering of MAP

12.1 Overview

The Maintenance Administration Position (MAP) is for the DMS-100 Family of switching equipment. Described in the MAP is furniture, jacks, logic phone, connector blocks, Keyboard Send and Receive (KSR) Printer, and Video Display Unit (VDU). Optional equipment provisioned in support of the MAP includes Key Systems and Alarm Panels.

12.2 Hardware Provisioning

12.2.1 Hardware Usage Restrictions

Not applicable

12.2.2 Hardware Dependencies

Not applicable

12.2.2.1 P and C Side Port Requirements

Not applicable.

12.2.2.2 DMS BUS Port Requirements

Not Applicable

12.2.2.3 Circuits Per Card

Not Applicable

12.2.2.4 Discrimination Numbering

Not Applicable

12.2.3 Provisioning Considerations

Maintenance Administration Position (MAP)

The Maintenance Administration Position building block concept deals with a higher level of Product Engineering Code (PEC) ordering and simplifies the engineering ordering process. The MAP provides the man to machine interface for the DMS-100F switching systems. Each MAP includes the center, shelf, and counter sections. Optionally a VDU, KSR, Key System, and Lamarche Inverter can be selected.

TPC Administration and Maintenance Interface (TAMI)

RELEASE 06.03
13 July 1998

The TAMI position equipment may be customer supplied. The recommended VDU is a VT100 compatible terminal. The VT100 compatible terminals available from NT are the DEC VT-420, DEC VT-340, and the HP 700/44. The HP 700/44 VDUs have been MD'd and until further notice use the DEC VT-420 VDU. The DEC VT-340 should be the DEC VT525.

The printer for the TAMI position may also be required. The printers which are available from NT (and compatible with the VT-340_525 and the VT-420) are the DEC LA75S and the DEC LA424. The DEC LA75S is suited to desktop printing and the DEC LA424 is suited for tasks requiring larger buffer size such as capturing MAP activities. The DEC LA75S has been MD'd and replaced by DEC LA30. Also the DEC LA424 is MD'd and replaced by the DEC LA400.

DATAPHON (Data Phones / Telephone Sets)

Data Phones are used in various Data Phone applications such as in ETAS. With the introduction of modems with auto-dialers, the requirement for data phones for use with modems has decreased, but are still in wide use.

NTZZ14BA (MAP Furniture with Jacks)

The NTZZ14BA includes the MAP furniture center section with the test trunk jack assembly, counter section, and shelf section. Optionally available to NTZZ14BA is the Camel colored MAP Chair.

VT-420 (Video Display Unit)

The VT-420 (Video Display Unit) has been MD and replaced with the VT-520.

HP C1007 (HP 700/44) Amber/Green/White (Video Display Unit)

The HP C1007 (HP 700/44) has been MD and replaced with the VT-520.

VT340 (Video Display Unit)

The VT340 (Video Display Unit) has been MD and replaced with the VT-525.

VT520 Series (Video Display Unit)

The VT520 Video Display Unit is a multi-session color video display unit equipped with keyboard. This VDU is provisionable for the primary MAP VDU or the portable MAP VDU functions. The VT520JA has an amber screen and the VT520GA has a white screen.

VT525 (Video Display Unit)

RELEASE 06.03
13 July 1998

| The VT525 Video Display Unit is a multi-session color video display
| unit equipped with keyboard and logic box. This VDU is
| provisionable for the primary MAP VDU or the portable MAP VDU
| functions.

NTZZ14EB LA75+ (MAP Printer (Read-Only))

The DEC LA75+ has been MD'd an replaced with the DEC LA30.

NTZZ14ED LA30 (MAP Printer (Read-Only))

The DEC LA30N-CA is a complete printer configured for EIA operation. The DEC LA30N-CA is suited for tasks requiring less Buffer size such as desktop printing. Options available are a Printer Stand/Paper Catcher, Ribbon Cartridge, an RS-232 Connection Adapter, a 20MA current loop adapter, and slave cables.

The NTZZ14ED (DEC LA30) has the following options always provided: Printer, Printer Stand/Paper Catcher, RS232 Connection adapter, Dec Ribbon Cartridge, and the 20MA current loop adapter. The only option that is provisionable are the slave cables.

NTZZ14EC LA424 (MAP Printer (Read-Only))

The DEC LA424 has been MD'd an replaced with the DEC LA400.

NTZZ14EE LA400 (MAP Printer (Read-Only))

The DEC LA400-CA is a complete printer configured for EIA operation. DEC LA400-CA is suited for tasks requiring larger Buffer size such as capturing MAP activities. Options available are a Printer Stand/Paper Catcher, Ribbon Cartridge, an RS-232 Connection Adapter, a 20MA current loop adapter, and slave cables.

The NTZZ14EE (DEC LA400-CA) has the following options always provided: Printer, Printer Stand / Paper Catcher, RS232 Connection adapter, Dec Ribbon Cartridge, and the 20MA current loop adapter. The only option that is provisionable are the slave cables.

NTZX18AB (Norstar Digital Key Service Module)

The NTZX18AB includes the Ash colored Norstar digital Key Service Module configured to access up to 20 central office lines. Included is the technical reference set, power supplies, ring generators and associated required equipment to make a fully functional key system. The M7234 ash telset and headset are provided plus one Unity I telset for use as an emergency telephone (ET). Also, additional Norstar telsets may be provisioned via

RELEASE 06.03
13 July 1998

conventional methods. The Norstar unit can be provided for initial jobs as well as extensions.

12.2.4 Office Layout Information

Not applicable

12.2.5 Traffic Tables

Not applicable

12.3 Product/System Specification

12.3.1 Physical Characteristics

Not applicable

12.3.2 EMI/Earthquake Information

Reference ECM-125

12.3.3 Sparing Information

Per Telco specifications

12.3.4 Power Feed and Fusing Requirements

Not applicable

12.3.5 Current Drain Information

Not applicable.

12.4 Software Provisioning

For NTX software packages to PCL/SOC mappings for CSP02 and beyond refer to ECM552 - Mapping of NTX/NTG Package to PCL/NCL/Option.

12.4.1 Required Software Packages and Interdependencies

Not applicable

12.4.2 Software Usage Restrictions

Not applicable

12.4.3 Memory Provisioning

Reference MEMCALC

12.5 Real Time Impact

Reference Real Quick or PRTCalc

RELEASE 06.03
13 July 1998

13.0 ECM613 - DMS Building Block - IOE Engineering

13.1 Overview

The purpose of this ECM is to document the DMS Building Block approach for capturing the provisioning of the IOE.

There are two (2) components to this ECM,
IOE Customer Questions
IOE Calculations

IOE Customer Questions - Worksheet of Telco inputs derived at the time of order capture.

IOE Calculations - Worksheet of provisioning algorithms driven from the results of IOE Customer Questions.

13.2 Hardware Provisioning

13.2.1 Hardware Usage Restrictions

Not applicable.

13.2.2 Hardware Dependencies

Not applicable.

13.2.2.1 P and C Side Port Requirements

Not applicable.

13.2.2.2 DMS BUS Port Requirements

Not applicable.

13.2.2.3 Circuits Per Card

Not applicable.

13.2.2.4 Discrimination Numbering

Not applicable.

13.2.3 Provisioning Considerations

13.2.4 Input/Output Equipment Building Block Definition

The Input/Output Equipment (IOE) building block method deals with a higher level of Product Engineering Code (PEC) ordering and simplifies the engineering process. The IOE provides the man to

RELEASE 06.03
13 July 1998

machine interface with the DMS-100F switch. The IOE essentially provides the working interface between the DMS office personnel and the DMS machine. This equipment includes the MAP, Magnetic Tape drive units, Disk Drive Units, miscellaneous I/O terminals and modems, and the I/O Controller modules which interface these with the Central Control subsystem. The I/O Controller cards are the provisionable interfaces which mount on the IOC.

NTZZ09AA (Input/Output Equipment Frame)

The NTZZ09AA contains the frame which will house all the Input/Output devices. The frame contains universal framework and is ISG compliant. The frame is equipped with the frame supervisory panel and cover. Optional equipment to the IOE will be derived from questions used to provide the required equipment. Existing rules for assignments to the IOE are still applicable.

NTZZ09CA/CB/CC (Input/Output Controller Module)

The NTZZ09CA/CB/CC contains the Input/Output Module used to house the controller cards. A maximum of 9 provisionable circuit packs can mount on the module. Each NTZZ09CA/CB/CC includes the shelf assembly, Common Circuit Packs, Designation Labels, Power Converters, and other associated equipment. This IOC is compatible with both the SuperNode and NT40 core.

NTZZ09EA (I/O Terminal Controller CP w/Automatic Dial-Back)

The NTZZ09EA contains one (1) NT1X67BD I/O controller circuit Pack and designation label. The controller card provides up to four ports. Each port can operate at baud rates up to 2400 baud. All four ports can be assigned as 2400 baud ports. For special applications, a single port can exceed 2400 baud up to a maximum of 4800 baud. If a single port exceeds 2400 baud, then the total assigned baud rate for all four ports cannot exceed 4800 baud. This controller card must be used for applications requiring the automatic dial back feature. This controller can also be used for all standard applications in the place of NTZZ09DA. A maximum of 9 of these controller cards can mount in an IOC (NTZZ09CA/CB/CC or NTZZ09VA/VB).

NTZZ09GA (I/O Multi-Protocol Controller)

The NTZZ09GA contains one (1) I/O Controller Circuit Pack and designation label. This circuit pack is provided to serve the Multi-Protocol feature. A maximum of 9 of these circuit packs can be assigned to an IOC Building Block.

RELEASE 06.03
13 July 1998

NTZZ09HA (9 Track Tape Controller CP (COOK MTD))

The NTZZ09HA contains one 9 track controller circuit pack and designation label. This circuit pack is provided to serve the Cook Magnetic Tape drives equipped in the office. One of these circuits is required for each Magnetic Tape drive. A maximum of nine (9) of these circuit packs can be assigned to an IOC Building Block.

NT1X89BB (Enhanced I/O Multi-Protocol Controller)

The NT1X89BB circuit pack is provided to serve the Enhanced Multi-Protocol feature. A maximum of 9 of these circuit packs can be assigned to an IOC Building Block.

NT8X48BD (DPP Shelf 3.5" drives)

The NT8X48BD is the PEC for the Distributed Processing Peripheral that contains 3.5" disk drives. Disk capacities that are available for order are 1 GB and 2 GB disk. Polling options include a high speed 56 Kbps polling or 56K/Compression polling for 1 GB and 2 GB DPPs. Also, the 1 GB DPP can be polled at rates ranging from 2400 baud to 9600 baud. The NT8X48BD replaces all 5 1/4" DPP building blocks.

13.2.5 IOE Calculations

13.2.5.1 IOE Customer Questions

(A) Distributed Processing Peripheral (DPP) Requirements

- . Is DPP remote polling of AMA required (Y/N)? _____
(If no, go to section (B) Automatic Dial-Back Provisioning)
- . Which of the following is a required polling option:
 - .1 Compression _____
 - .2 56 Kbps _____
 - .3 neither _____
- . Is DPP disk drive size to be specified or calculated?
 - .1 Specified _____
 - .2 Calculated _____
- 4. If DPP disk drive size is to be specified, specify the size.
 - 4.1 1 GB (valid w/56K, 56K/Comp, <=9600 baud) _____
 - 4.2 2 GB (valid w/56 Kbps or 56K/Compression) _____

5. If DPP disk drive size is to be calculated :
Refer to ECM 306
6. How many modems will NT supply for DPP application?
- 6.1 One (only near-end) _____
- 6.2 Two (near and far-end) _____
- 6.3 None _____
(If none, go to question 9)
7. Select polling speed:
- 7.1 1200 baud (valid for 1 GB disk drives) _____
- 7.2 2400 baud (valid for 1 GB disk drives) _____
- 7.3 4800 baud (valid for 1 GB disk drives) _____
- 7.4 9600 baud (valid for 1 GB disk drives and
either disk with 56K/Comp) _____
- 7.5 56,000 baud (valid for 1 & 2 GB disk drives) _____
8. Which of the following is required:
- 8.1 Dial-up (valid for 1.2 to 4.8 K) _____
- 8.2 Private line (valid for 9.6 K to 56 K) _____
9. Select DPP spare CP's option required:
- 9.1 Minimum _____
- 9.2 Maximum _____
- 9.3 None _____
- 1 . Is a spare DPP disk drive required? _____
- 1 . Select one:
- 1 .1 Keyed status panel _____
- 1 .2 Keyless status panel _____
- 1 . Is a connector jack that is compatible with
a 20 ma loop rover maintenance terminal needed
on the DPP filler panel? (Y/N) _____

(B) Automatic Dial-back Provisioning

. Answer Modem Pool

.1 Number of originating busy hour attempts. _____
(Users attempts to answer only modem pool)

.2 Login Holding Time in seconds. _____
(Maximum holding time for users)

. Autodial Modem Pool

.1 Number of busy hour users. _____
(Users logged into system)

.2 User holding time in seconds. _____
(Average holding time for users)

(...continued from previous page)

[illegible]

. Total standard I/O ports required.
(Total line entries of sheets 1 & 2 above)

Figure 33. I/O Provisioning Worksheet

(D) ISDN OAM Processor Workstation

- . Is an ISDN OAM Processor workstation required ? _____

(E) Disk Drive Unit Requirements

- . Quantity required for daily operations. _____
- . Total quantity of DDU required _____
- . Total quantity of 14" DDU to be replaced with 5.25" DDU. _____
- 4. Total quantity of 8" DDU to be replaced with 5.25" DDU. _____

(F) Magnetic Tape Drive Requirements (Cook)

- . Quantity required for DDU support. _____
- . Quantity for other functions. _____
- . Total MTDs required. _____

(G) Stratum II Synchronization

- . Is Stratum II synchronization required ? _____
- . Are "Hot" spare oscillators required ? _____

(H) EADAS Interface

- . Is EADAS Operational Support System required ? _____
- . Is on-line redundancy required ? _____

(J) Service Evaluation System Interface

- . Is a SES - DMS interface required ? _____

(K) ACD Management Information System

Local ACD Management Information System

- . Is a ACD - Management Information System required. _____
- . Quantity of ACD MIS links required. _____

Network ACD Management Information System

- . Is a Network ACD - Management Information System required. _____
- 4. Quantity of NACD MIS call attempts. _____
- 5. NACD MIS link baud rate.
 - 5.1 9600 _____
 - 5.2 4800 _____
 - 5.3 2400 _____
- (L) SMDI Interface
 - . Quantity of SMDI links required ? _____
- (M) TOPS Interface
 - . TOPS MP DA
 - .1 Quantity of busy hour calls for DMS to DASC. _____
 - . TOPS MPX DA
 - .1 Quantity of busy hour calls for DMS to IBM-DAS/C. _____
 - . Automated Alternate Billing Services
 - .1 Is AABS required ? _____
- (N) Stratum 2.5 Synchronization
 - . Is Stratum 2.5 synchronization required ?
(Canadian offices only) _____
 - . Are "Hot" spares required ? _____
- (P) Earthquake U.S.
 - . Does this office require earthquake frames ? _____
- (Q) IOM Interface

RELEASE 06.03
13 July 1998

- . Quantity of new DPP/BMC to be controlled by an IOM (as opposed to an IOC). _____
 - . Quantity of new MTD to be controlled by an IOM. _____
- (R) IOM Upgrades (Cabinetized IOE Only)
- . Quantity of existing DPP/BMC that will now be controlled by an IOM. _____
 - . Quantity of existing MTD that will now be controlled by an IOM. _____

13.2.5.2 IOE Customer Calculations

- NTZZ09AA - IOE Frame

The required quantity of IOE frames is calculated from the required number of shelves. IOE frames is provided through the NTZZ09AA for all applications.

If P1 = Yes, US jobs shall be provisioned with NTZZ09AA and equipped with NT0X25AH Universal framework. Refer to the IOE frame Engineering Manual sections for valid combinations.

The following table lists all available shelves and their required mounting positions on an IOE frame. The IOE contains five (5) available 14" mounting positions. Filler panels shall occupy all unused 14" mounting positions.

RELEASE 06.03
13 July 1998

MODULE	NUMBER OF 14 INCH SHELVES	NUMBER OF 14 INCH FILLERS
NTZZ09BB	1	1
NTZZ09CA	1	0
NTZZ09CB	1	0
NTZZ09CC	1	0
NTZZ09VA	1	0
NTZZ09VB	1	0
DPP	2	0
MTD	2	0
NTZZ09MA	2	0
NT3X95AB	2	0
NTZZ09NA	2	0
NT3X95BB	2	0
NT8M04GE	2	0
NT8M04HE	2	0
NT8M04IE	2	0
NT8M04GC	2	0

• NTZZ09CA/CB/CC - Input/Output Controller Shelf

Provide a quantity of NTZZ09CA/CB/CC equal to NTZZ09DA + NTZZ09EA + NT1X67FA + NTZZ09GA + NT1X68BC + NTZZ09JA + NT1X89BB divided by nine and rounded up. (Use NTZZ09CA/CB/CC for both SuperNode and NT40 offices). (A minimum of two NTZZ09CA/CB/CC are required per office).

• NT0X50AA - Filler Face Plate

Provide a quantity of NT0X50AA equal to number of empty slots in the IOC (NTZZ09CA/CB/CC) whether odd or even numbered slots.

• NTZZ09DA or NTZZ09EA - I/O Terminal Controller CP

Provide a quantity of NTZZ09DA or NTZZ09EA equal to $(C1 + 2(\text{If question A} = \text{yes}))/4$ and rounded up. (A minimum of two NTZZ09DA or NTZZ09EA are required per office for standard applications).

RELEASE 06.03
13 July 1998

• NTZZ09EA - I/O Terminal Controller CP

Provide a quantity of NTZZ09EA for the automatic dial back feature per the calculations that follow:

$(B1.1 \times B1.2)/100 = CCS$. Refer to Figure 34 on page 3-153 with CCS to determine the quantity of ports required. (PORTS1)

$(B2.1 \times B2.2)/100 = CCS$. Refer to Figure 34 on page 3-153 with CCS to determine the quantity of ports required. (PORTS2)

$(PORTS1 + PORTS2)/4$ (rounded up) = Quantity of NTZZ09EA required.

• NT1X89BB - Multi-protocol Controller and SMDI Interface

Provide a quantity of NT1X89BB per the following calculation:

If D1 is equal to yes, aa = 1; if D1 is equal to no aa = 0.

If H1 is equal to yes, bb = 1; if H1 is equal to no bb = 0.

If H2 is equal to yes, cc = 1; if H2 is equal to no cc = 0.

If J1 is equal to yes, dd = 1; if J1 is equal to no dd = 0.

K = ee

If L1 is equal to yes, kk = 1; if L1 is equal to no kk = 0.

$K4/n$, (where n = 15600 for K5.1, 11400 for K5.2, or 7200 for K5.3) = ff

$M .1 \times 0.0001$ rounded up = gg

$M .1 \times 0.00011$ rounded up = hh

$L / 2 = jj$

If M3.1 is equal to yes, ll = 2; if M3.1 is equal to no ll = 0.

Provide a quantity of NT1X89BB = aa + bb + cc + dd + ee + ff + gg + hh + jj + kk + ll

RELEASE 06.03
13 July 1998

• NT1X68BC - 9 Track Tape Controller CP

Provide a quantity of NT1X68BC equal to F3 + 2(If A1 = yes).

• NT1X55FA - MSB DDU Controller CP

Provide a quantity of NT1X55FA equal to E2.

• NT8X48BD - 3.5" disk DPP

If disk size is to be calculated, refer to ECM 306 (Provisioning Considerations) for calculation information to determine disk size.

• Modems for DPP application

For modem provisioning, refer to ECM 633 and provide correct modem based on polling speed, number required, and whether dial-up or private line is selected.

• DPP Spares kit

If minimum spare option (9.1) is selected, provide one NT6M95AK and additional CPs as listed in ECM 306.
If maximum spare option (9.2) is selected, provide one NT6M95AL and additional CPs as listed in ECM 306.

• DPP spare disk drive

If A10 equals yes, provide quantity of one of disk drive based on answer to A4 or A5.

• Status Panel

If keyed status panel (11.1) is selected, provide one (1) NT6M59AA.
if keyless status panel (11.2) is selected, provide one (1) NT6M59AB.

• Filler Panel

If A12 equals yes, provide 1 NT6M59BB filler panel with connector jack.
If A12 equals no, provide 1 NT8M59BB filler panel.

RELEASE 06.03
13 July 1998

- MTD - Magnetic Tape Drive (Cook)

Provide a quantity of NT0X44AB equal to F3.
- NT3X95AB - Stratum II Shelf

Provide one NT3X95AB if G1 is equal to yes.

Provide two NT3X16AB if G2 is equal to yes.
- NT3X95BB - Stratum 2.5 Shelf

Provide one NT3X95BB if N1 is equal to yes.

Provide two NT3X16BB if N2 is equal to yes.
- NTFX36AA - IOM Pertec Smart Connector Assembly

For each new DPP/BMC to be controlled by IOM, provide a quantity of NTFX36AA = Q1 x 2.

For each new MTD to be controlled by IOM, provide a quantity of NTFX36AA = Q2.
- NTRX33DW - IOM - DPP/BMC Interface Kit (CIOE applications only)

For each existing (currently controlled by an IOC) DPP/BMC to be controlled by an IOM, provide a quantity of NTRX33DW = R1.
- NTRX33DX - CIOE Retrofit Kit for IOM (CIOE applications only)

For each existing (currently controlled by an IOC) MTD to be controlled by an IOM, provide a quantity of NTRX33DX = R2.

RELEASE 06.03
13 July 1998

CCS Per Port At GOS Of P .001									
Ports	CCS	Ports	CCS	Ports	CCS	Ports	CCS	Ports	CCS
1	.1	31	597	61	1428	91	2317		
2	1.6	32	624	62	1457	92	2346		
3	6.9	33	650	63	1486	93	2377		
4	15.4	34	676	64	1516	94	2407		
5	26.6	35	703	65	1544	95	2437		
6	40.0	36	729	66	1574	96	2468		
7	54.7	37	756	67	1603	97	2498		
8	70.9	38	783	68	1632	98	2528		
9	88.2	39	810	69	1661	99	2559		
10	107	40	837	70	1691	100	2589		
11	126	41	865	71	1720	101	2620		
12	145	42	892	72	1750	102	2650		
13	166	43	919	73	1779	103	2681		
14	187	44	947	74	1809	104	2711		
15	208	45	975	75	1838	105	2742		
16	231	46	1003	76	1868	106	2772		
17	253	47	1030	77	1898	107	2803		
18	276	48	1058	78	1927	108	2834		
19	299	49	1086	79	1957	109	2864		
20	323	50	1115	80	1986	110	2895		

Modem Pooling Traffic Requirements Table (continued next page..)

RELEASE 06.03
13 July 1998

(..continued from previous page)

CCS Per Port At GOS Of P .001								
21	346	51	1143	81	2016	111	2926	
22	370	52	1171	82	2046	112	2956	
23	395	53	1200	83	2076	113	2987	
24	419	54	1228	84	2106	114	3018	
25	444	55	1256	85	2136	115	3049	
26	469	56	1285	86	2166	116	3080	
27	495	57	1313	87	2196	117	3110	
28	520	58	1342	88	2226	118	3141	
29	545	59	1371	89	2256	119	3172	
30	571	60	1400	90	2286	120	3203	

Figure 34. Modem Pooling Traffic Requirements Table

13.2.6 IOE Rules for NCS Links (MCI Applications).

IOE Configuration for NCS Links.

The following assumptions are made with respect to these recommendations:

1. NCS Traffic is evenly distributed across all NCS EMPC cards.
2. 8 IOCs are configured.
3. These recommendations do NOT take into account the existing or future physical layout of the IOC frames or wiring issues. They are specifically oriented towards optimizing the IOC DS-30 Link bandwidth and NCS Traffic issues.

There are some basic rules to follow when modifying the IOC Configuration:

1. No more than 2 Billing DDUs per IOC.
2. No more than 2 call processing EMPCs per IOC.
3. Maximum of 3 Billing DDUs or Call processing EMPCs per IOC (i.e. if there are 2 Billing DDUs, then configure only one call

RELEASE 06.03
13 July 1998

processing EMPC, or 2 Call Processing EMPCs + 1 Billing DDU)
when possible.

4. No more than 1 Tape drive per IOC.

13.2.7 Office Layout Information

Not applicable.

13.2.8 Traffic Tables

Not applicable.

13.3 Product/System Specification

13.3.1 Physical Characteristics

Not applicable.

13.3.2 EMI/Earthquake Information

Not applicable.

13.3.3 Sparing Information

Not applicable.

13.3.4 Power Feed and Fusing Requirements

Not applicable.

13.3.5 Current Drain Information

The NTRX31DH Inverter and the MD'd LaMarche Inverter (A0367433) both provide AC socket outlets for four (4) circuits (two dual outlets). The maximum total consumption of units connected to the inverter is not to exceed 500 Watts (120VAC nominal 4.15 Amps output).

13.4 Software Provisioning

For NTX software packages to PCL/SOC mappings for CSP02 and beyond refer to ECM552 - Mapping of NTX/NTG Package to PCL/NCL/Option.

13.4.1 Required Software Packages and Interdependencies

Not applicable.

13.4.2 Software Usage Restrictions

Not applicable.

13.4.3 Memory Provisioning

Not applicable.

13.5 Real Time Impact

Not applicable.

RELEASE 06.03
13 July 1998

14.0 ECM705 - Input Output Module - General Information

14.1 Overview

Product/System Overview

IOC cards provide a variety of input/output functions. These include RS-232C serial connection for VDU, printers and some modems, X.25 connection for data communication equipment, disk drive and magnetic tape drive controls. These services require different specialized cards on the current IOC. The Input Output Module (IOM) takes one to three slots of the ISM Shelf and emulates most of the same functionality (excluding the HDLC controller NT6X91, the SMDI Controller NT1X67FA, and DPAC /DLC controllers NT1X67DA/B) as the IOC. The IOM Phase One product resides in an ISM Shelf in CISM, or MCAM cabinets or in ISME frame. Phase Two of the IOM introduction program targets elimination of the IOE and CIOE product lines.

The IOM provides the functionality currently provided by the following CPs:

- NT0X67AA - IOC Bus Terminator
- NT1X62CB - Message Controller
- NT1X55FA - DDU Controllers and DDU
- NT1X67BD - Terminal Controller
- NT1X67EA - Printer Controller
- NT1X68BC - MTD Controller (Cook Devices or DPP only)
- NT1X89BB - Multi_Protocol Controller

The IOM is a direct replacement for the existing IOC Shelf. The IOM is a multi-link multi-protocol communication board with disks and/or tape drives on a separate board.

The IOM is for SuperNode (SN and SNSE -- CSP06 offices or higher, various patches may be required) offices only.

The IOM Main Controller Card NTFX30AA is provisionable to and mounts in the ISM Shelf, NTFX4101, in one of two universal slots (03F or 04F). One ISM Shelf can accommodate two IOM Controller Cards or one IOM card and one Storage Media Card (SMC). The SMCNTFX32AA is provisionable to and mounts in the ISM Shelf, occupying two slots (04F and 05F). Each IOM Controller Card has an associated Paddleboard NTFX31AA mounted on the rear side of the backplane directly opposite the corresponding IOM card. SMCs do

RELEASE 06.03
13 July 1998

| not need a Paddleboard, but will need cableNTFX40HB to connect the
| SMC to the IOM controller paddleboard.

| The IOM introduces a new approach for user interface. This is the
| concept of Smart Connectors (or SC) where the user end of the
| cable terminates with a connector size box containing logic de-
| vices. RS-232C, Current Loop, or V.35 links are connected to the
| end equipment via protocol conversion circuitry embedded in the
| connector. The PERTEC SC is mounted on the Cook Drive (text de-
| leted) or the DPP (or BMC) frame upright with cables from the SC
| connected to the MTD, DPP, or BMC. A label on the SC identifies
| its protocol conversion type. The SC provides ISG compliance,
| farther reach than conventional RS-232C(from 50 to 750 ft) and
| reduces cable congestion. Each port of the IOM can be configured
| under firmware control as RS-232C, V.35,Current Loop, or PERTEC
| interface to a MTD, DPP, or BMC. Two DS-30connections are used
| to communicate to the Message Switch (MS).

| An additional optional SC addresses (text deleted) specific re-
| quirements for 512Kbps Synchronous Communications support on IOM.
| The 512Kbps interface capability requires a different firmware
| load for the IOM than the previously mentioned SCs . This con-
| figuration allows the IOM to support X.25 links at 512Kbps syn-
| chronous speed for up to a maximum of 2 links per IOM. No other
| ports on the IOM can be activated if two are used for 512Kbps
| interface. An SMC is also not supported if the 512Kbps interface
| is used.

| Refer to Figure 1 for a rear view of the Paddleboard assembly
| NTFX31AA showing how the compliant pins and the plastic shrouds
| for cable connections to SCs are arranged.

Figure 1. Paddleboard Assembly NTFX31AAPinout

RELEASE 06.03
13 July 1998

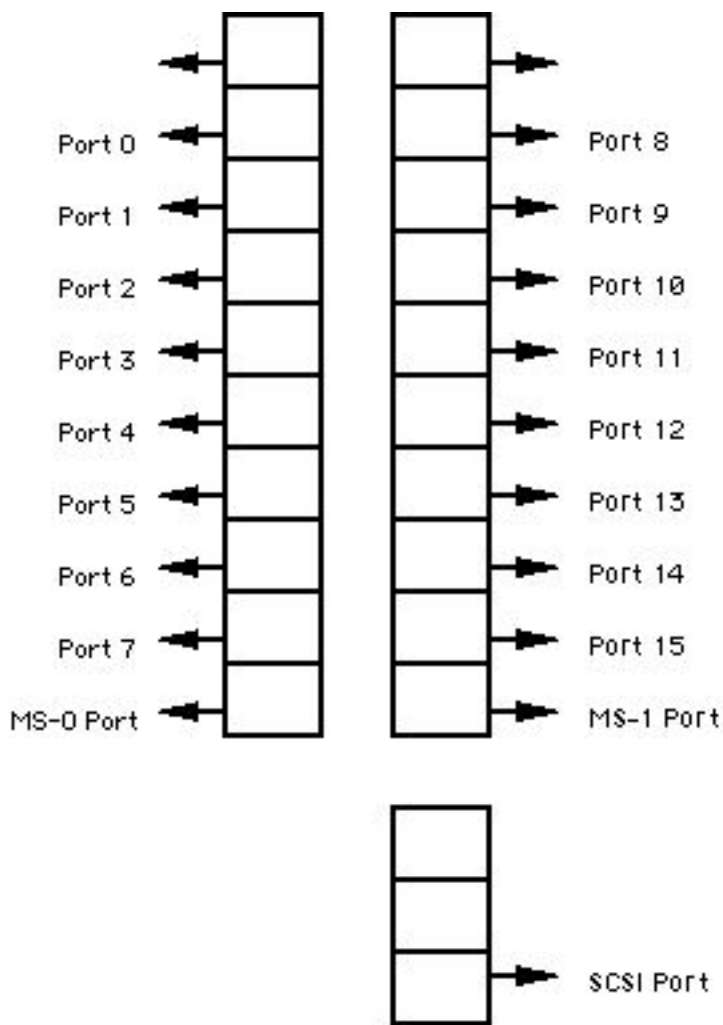


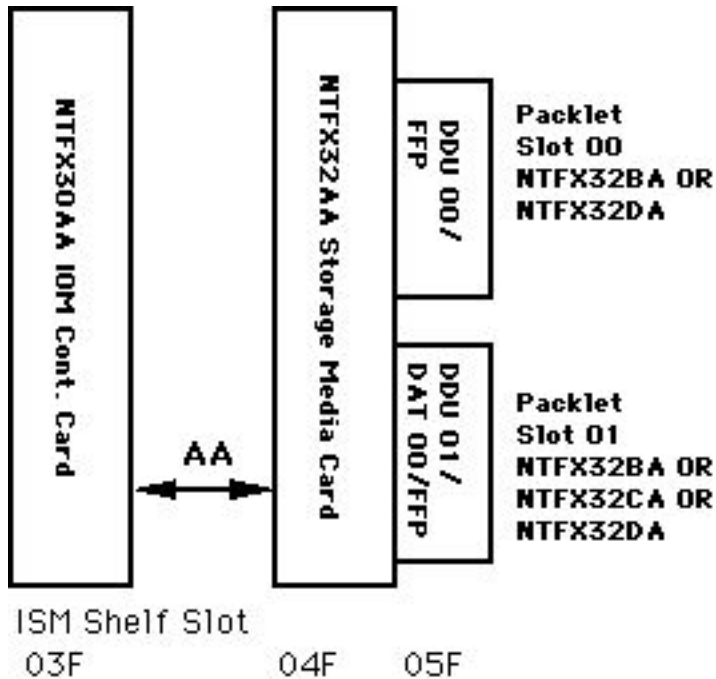
Figure 35. PDBD ASSY NTFX31AA PINOUT

The IOM has several different configurations depending on the customer provisioning requirements. The IOM Controller Card has all the communication ports and Storage Media Card controller circuitry. The IOM Controller Card together with the Storage Media Card provides all communications and storage functions as the existing IOC, DDU, and MTD. The IOM Controller Card resides in slot 03F or 04F of the ISM Shelf. The Storage Media Card occupies 2 slots (04F and 05F) and has provisionable plug-in units (DDU and DAT plug-in modules or blank Filler Faceplate). This arrangement gives the customer maximum flexibility and does not require circuit pack replacement for upgrades and repairs.

RELEASE 06.03
13 July 1998

Refer to Figure 2 for a front view of the IOM Controller Card and the Storage Media Card, which shows the DDU and DAT plug-in module mounting positions. This is an example of an IOM Controller Card in slot 03F with a Storage Media Card in slots 04F-05F in an ISM Shelf, and showing DDUs, DAT, or Filler Faceplate placement, and NTFX40HB SCSI Cable.

Figure 2. IOM Controller Card and Storage Media Card



AA = NTFX40HB SCSI Cable

Figure 36. IOM CONT. CD AND SMC

There are three IOM configurations in the ISM Shelf. These are:

- 1 IOM Controller Card in slot 03F
- 2 IOM Cards occupying two slots 03F and 04F (without storage)
- 1 IOM Card and 1 Storage Media Card occupying slots 03F, 04F and 05F.

The IOM provides 20 communication ports. All ports on the IOM are electrically DS-30 ports but use a proprietary protocol at the higher levels. These ports and the protocol is identified as 'IOM'. Sixteen of the ports are general purpose input/output ports

RELEASE 06.03
13 July 1998

| providing RS-232C, V.35, current loop, or PERTEC interfaces with a SC at the user end of the cable to do the protocol conversion. Two IOM ports are used for communication with the Message Switch and are true DS-30 ports. The remaining two are unused. General purpose ports can be configured to provide any previously specified existing IOC functionalities as required.

| A Paddleboard assembly which contains power feed circuitry to 16 SCs and circuitry to implement local loopback for diagnostic purposes is required with each IOM Main Controller Card. It is mounted on the rear side of the backplane with two standoffs. The assembly has 20 connectors to distribute 20 ports to the bulkhead if in a CISM or directly to their destinations if in an ISME.

| Some benefits of the IOM design are PEC reduction, enhanced communication functionality (19.2K for TC , 8.8K mpc async, 64K sync), and state-of-the-art technology replacing obsolete components. Simplified cabling reduces redundancy, and the disk drive capacity is easily upgradable as higher capacity drives become available.

| Refer to Figure 3 for a side view of the IOM Controller Card, backplane, Paddleboard, and SCs . This example also shows the SCSI I/F to the Storage Media Card connection.

| Figure 3. IOM Card, Backplane, Paddleboard, SCs , SMC

RELEASE 06.03
13 July 1998

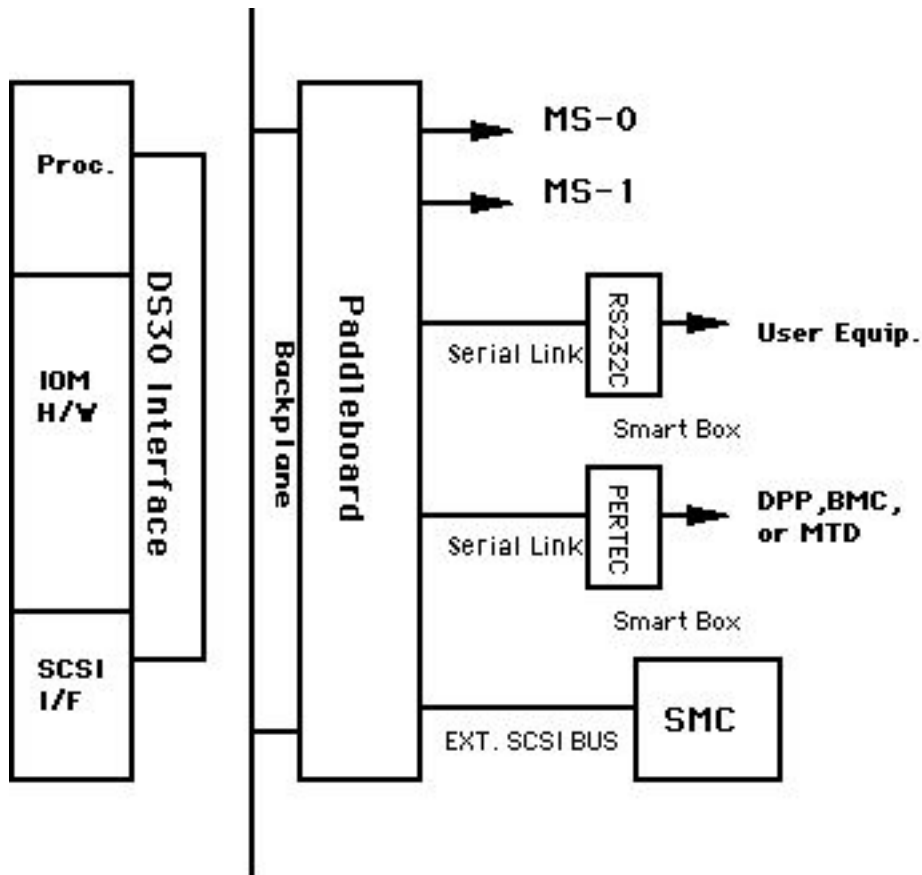


Figure 37. IOM CD, BKPL, BDPD, SM BOX, SMC

14.2 Hardware Provisioning

14.2.1 Hardware Usage Restrictions

Introduction of the IOM results in engineering rule changes for IOE, CIOE, ISM, ISME, and CISM equipment.

Existing ISM Shelves in the field can accommodate IOMs after modification. Modifications include bulkhead cabling, changing compliant pins (applies to new builds only), replacement of backplane shrouds in slots 03F and 04F, new provisionable key slot brackets and updated provisioning rules.

The (text deleted) IOM (text deleted) has 16 configurable ports but usage is limited by the provisioning rules . (text deleted) Each of the 16 ports (text deleted) can be programmed to operate at any of the following Baud rates: Synchronous or asynchronous at 300, 600, 1200, 2400, 4800, 14400, 19200, 28800 and synchronous

RELEASE 06.03
13 July 1998

| at 56000, 64000, and 512K (subject to the application configura-
| tion limits) . (text deleted)

| The IOM can coexist with an existing IOC in an office. The minimum
system requirement in an office with no IOCs (i.e., an initial
office) is two IOM Controller Cards and two Storage Media Cards
with at least one DDU located in each Storage Media Card. The
first two IOMs {IOC 0(iom) and IOC 1(iom)} are to be in two sepa-
| rate ISM Shelves for redundancy and both must have one RS-232C SC
in each IOM for the Operator and MAP terminals. On an initial of-
| fice, Port 0 on each of the first two IOMs must be assigned to the
| default MAP terminal port, and table IOC must be datafilled with
| an NTFX30 prior to the CM load being delivered to the site . If
there are pre-existing IOCs, the requirement for two IOM Cards or
two Storage Media Cards may not apply.

When provisioning IOM into an existing office with IOCs, use the
standard IOC provisioning rules for MS port provisioning. Make
sure MS ports are available for the new IOMs. If the existing IOCs
are to be removed, the new IOMs will move back onto the fixed MS
port positions (IOC 00 = port 0 and IOC 01 = port 1) for IOC0/1.

| The IOM supports all types of peripheral equipment (i.e. printers,
VDU, MODEMSs, DPP,MTD, etc.) that work with the current IOC. Its
connectivity with the CM is through the MS using DS-30 links.
| (text deleted)

| NOTE --The supported IOM OEM devices are limited to those in
MSFX4101, NOTE 27. (text deleted) (text deleted) . Refer to this
| document for more information .

The only currently available qualified terminal for MAP usage is
the DEC VT520.

| Since manufacturers of terminals/printers/etc. no longer provide
current loop interfaces, and that IOM functionality allows for ISG
and increased loop length, the product plan is that NTFX38AACL SC
are only provisioned for DMS Alarm subsystem Portable VDUs. The
| NTFX34AA SC requires the NTFX40UD Gender Adapter Cable to connect
| to Modems equipped with a 25pin male connector. (text deleted)
| TheNTFX34AA SC requires the NTFX40UF to connect to a VDU.

| Maximum number of IOC for a SuperNode office (IOC or IOC(iom))is
13 and for an MTX switch is 20. Maximum number of DDU per switch
is 10. Maximum number of MTD per switch is 16. In the case of IOM,
| this includes both 9-track MTD and SCSI DAT. Furthermore, the
| maximum number of TCs is 04, the maximum number of MPCs is256.

| An IOM can be used for just storage (a DAT and/or DDU) (text de-
| leted) if required. (text deleted)

RELEASE 06.03
13 July 1998

| The current disk capacity on an IOM is 1Gb. With up to 10 DDUs, this
| equates to a total of 10Gbs per office. With the IOC, the total
| capacity per office is 2.2Gbytes .

The DAT is used as a replacement for the 9 track MTD. It has identical functionality. The DAT can co-exist with a MTD even on the same IOM.

| When the customer does not require DAT but needs a 9 track tape, one of the general purpose ports of the IOM can provide the interface and controls for the 9 track. The IOM port terminates at a PERTEC SC mounted close to the tape drive (within 2 feet) in the IOE or CIOE. The IOM also provides PERTEC and RS-232C interfaces to the DPP or the BMC as currently handled by the IOC.

| Additional I/O devices cannot be deployed on an IOM with 512Kbps interface (NTFX35BA) . A maximum of two 512Kbps interfaces are supported on an IOM, with one used as a traffic bearing mode and the second one acting as a standby. A different firmware load is required for an IOM supporting 512Kbps links. The IOM Controller Card is delivered with regular Base Load pre-programmed in the Flash memory. For 512Kbps application, the Base Load portion is reprogrammed.

When the AXU is provisioned in either a CISM or ISME, IOM must not be provisioned in the shelves which are used for alarms. IOM may only be provisioned in the lowest shelf, in shelf position 05 in CISM, or in shelf position 07 in ISME.

14.2.2 Hardware Dependencies

The IOM is compatible with the current (non-MD'ed) IOC circuit packs.

The following shows possible IOM configurations in an ISM Shelf. This applies for both ISME and CISM. V1 refers to IOM Controller Card plus Paddleboard Assy. V2 refers to the Storage Media Card.

IOM Configurations

- Configuration ISM Slot 3 ISM Slot 4 Comments
- 1 V1 - Up to 16 ports
- 2 V1 V1 Up to 32 ports
- 3 V1 V2 Up to 16 ports+1 DDU
- 4 V1 V2 Up to 16 ports+2 DDUs
- 5 V1 V2 Up to 16 ports+DDU+DAT

RELEASE 06.03
13 July 1998

- 6 V1 V2 Up to 16 ports+DAT

In each of these configurations a MTD, DPP or BMC can be provisioned to be connected to any of the 16 IOM ports. However, as with IOCs, the BMC/DPP Unit 0 and 1 connections must be on separate IOMs for redundancy purposes.

Eighteen ports appear on the MAP corresponding to each IOM. A new map display for the IOM shows IOC level, and all 18 ports are visible with each port type identified with a three letter acronym. These are MPC (multiprotocol controller), MTD (for 9track or DPP), (text deleted) CON , (text deleted) and SCS for the SCSI (text deleted) interface to the DAT or DDU . Functions performed on each port is very similar to those on the current IOC. Sixteen are communication ports, and the other two indicate SCSI devices on the Storage Media Card. A MTD, DPP, and/or BMC continue to be supported through any one of the sixteen communication ports.

DDU (if required) is always assigned to SCSI port 1 which is represented as port 16 on the MAP display and slot 00 on the SMC (top position on NTFX32AA faceplate).

DAT (if required) is always assigned to SCSI port 2 which is represented as port 17 on the MAP display and slot 01 on the SMC (bottom position on NTFX32AA faceplate).

A second DDU (if required) is always assigned to SCSI port 2 which is represented as port 17 on the MAP display and slot 01 on the SMC. For any unused module slot on the Storage Media CP provide one Storage Media Blank Plug-in Unit. Spread the DDUs evenly across all IOMs.

14.2.2.1 P and C Side Port Requirements

Not applicable

14.2.2.2 DMS BUS Port Requirements

Not applicable

14.2.2.3 Circuits Per Card

Not applicable

14.2.2.4 Discrimination Numbering

Each IOM is given an IOC number but is identified as an IOM at the MAP IOC level--i.e. IOCxx(iom).

The IOM can co-exist with the IOC in an office. With most extensions the new IOM gets the next available IOC number and its addition does not affect the existing IOC. However, if the new IOM

RELEASE 06.03
13 July 1998

| is replacing the existing IOC, the (text deleted) IOC datafill must
| be removed. The old IOC hardware can also be removed after the
IOM is brought into service.

Labels

| The ports on the Paddleboard and the ports on the bulkhead are
labeled from 0 to 15 for the SC connections. MS-0 and MS-1 for the
Message Switch, and SCSI for the Storage Media Card connections
are also identified. The port numbers correspond to the port
numbers that appear on the MAP screen when an IOM is posted. In
addition, the four 1-to-9 cable splitters on the bulkhead identify
"IOM slot 3" and "IOM slot 4". Paddleboard connectors have identi-
cal port labels.

IOM Cards are identified by small labels (IOC 00, IOC 01, etc.) on
the shelf designation label strip. Shelf designation strip labels
are required for each IOM Controller Card and Storage Media Card.
The plug-in units for DDU, DAT, and Filler Face Plate for each
Storage Media Card are identified by their PEC on their faceplates.
| Each SC has a label to identify the type of protocol conversion
it represents.

14.2.2.5 Provisioning Considerations

The following is a list of components of an IOM subsystem. Quan-
tities depend on the office requirements.

NTFX30AA - IOM Main Controller Card - contains hardware and
firmware to support 16 general purpose ports (RS-232C,
V.35, Current Loop, and PERTEC), 2 DS-30 links to the Message
Switch, and 2 optional external SCSI devices on the Storage Media
Card. The card occupies one slot (slot 03F or 04F) on the ISM
Shelf. If an NTFX30AA is provided in slot 03F of an ISM Shelf with
slot 04F open, then slot 04F is reserved for a future NTFX30AA or
NTFX32AA Storage Media Card.

| NTFX31AA - Paddleboard Assembly - Contains the power feed circui-
| try to 16 SCs and circuitry to implement local loopback for diag-
| nostic purposes. It is mounted on the rear side of the backplane.
| The Paddleboard Assy. has 20 connectors (text deleted) of which 10
| ports are distributed (text deleted) to the bulkhead if in CISM
| or directly to their destinations if in ISME. 16 of the ports
| provide power along with the signal to the SC at the end of the
cable. Four ports do not have power associated with them. Two
of these ports are for connection to the MS and the last two are
unused. The Paddleboard Assembly contains an additional connector
to link the IOM Controller Card to the Storage Media Card in slot
4 through a SCSI bus. The DC current on each link is limited to
| maximum 100 mA. A plastic shroud (text deleted) is also engineered
with each paddleboard to align the paddleboard with the correct

RELEASE 06.03
13 July 1998

| backpanel pins. The NTFX31AA is always needed with the NTFX30AA ,
| and must be installed before the NTFX30AA, and removed after the
| NTFX30AA is pulled out..

NTZZ40AK - IOM Main Controller Card Kit - this building block contains one NTFX30AA IOM Main Controller Card, one NTFX31AAPaddleboard Assy., one P0749586 Insertion Guide, and one P0831731Designation Label IOC 00-19. Use this building block when ordering an IOM Main Controller Card to avoid missing other provisionable items.

NTFX32AA - Storage Media Card - an optional unit for the IOM. It can hold maximum of two DDUs in slots 00 and 01 and/or one DAT Plug-in Module unit in slot 01. Slot 00 is located at the top of the SMC and slot 01 is at the bottom. Functionally, with these two units installed, the card is the equivalent to the DDU and/or 9 track MTD. It is used for all applications that require a DDU and/or 9 track MTD. The card can only be inserted in slot 04F for the ISM Shelf, filling two slots 04F-05F with a double faceplate. The Storage Media Card is connected to the IOM Controller Card in slot 03F with a SCSI Cable. The SCSI Cable (NTFX40HB), a Connector Key Bracket (P0832228), and a Designation Label (P0831733) are always needed when the NTFX32AA is ordered.

NTFX32BA - DDU Plug-in Module - This is a 1 Gbyte 3.5"SCSI disk drive. It is inserted into a housing on the Storage Media Card. A maximum of two DDUs can be mounted on the SMC as unit 0 and/or 1.

| NTFX32CA - DAT Plug-in Module - This is a 1.3 Gbyte 3.5"SCSI 4mm DAT drive. It plugs into a housing on the Storage Media Card. It is only provisionable in the unit 1 position. This unit uses a 4mm cassette tape and provides the same functionality as the 9 track MTD. (text deleted)

The recommended DAT tapes to be used with NTFX32CA are A0648771 (Sony DG-60M) for data tapes, and A0627875 (Sony DG5CLAA) for cleaning cartridges.

NTFX32DA - Storage Media Filler Card - used on the SMC when an open plug-in module slot exists.

NTZZ40AJ - IOM Storage Media Card Kit - this building block contains one NTFX32AA SMC, one NTFX40HB Cable Assy., one P0831733Des. Label and one P0832228 Connector Key Bracket. Use this building block when ordering the Storage Media Card to avoid missing other provisionable items.

NTFX34AA - RS-232C Smart Connector Assembly containing IOM to RS-232C message protocol conversion circuit.

| NTFX35AA - V.35 Smart Connector Assembly containing IOM to V.35 message protocol conversion circuit. (text deleted)

RELEASE 06.03
13 July 1998

| NTFX3505 - Passive Adapter for 25 pin V.35 connector to 34 pin V.35
| connector. The V.35 SC connector is 25 pin and this adapter may
| be needed to connect to devices that have V.35 34 pin connectors.

| NTFX35BA - 512Kbps Compatible Smart Connector for use in (text
| deleted) specific requirements for 512Kbps Synchronous Communi-
| cations support on IOM. Supports X.25 links at 512Kbps synchronous
| speed for up to a maximum of 2 links per IOM.

| NTFX3506 - Passive Adapter for 25 pin 512Kbps connector to 34
| pin V.35 connector. The 512Kbps Smart Connector is 25 pins and this
| adapter may be needed to connect to devices that have V.35 34 pin
| connectors.

| NTFX38AA - Current Loop Smart Connector (text deleted) providing
| 20 mA current loop to the FSP portable VDU jacks on each FSP or
| MSP. Contains IOM to Current Loop protocol conversion circuitry.

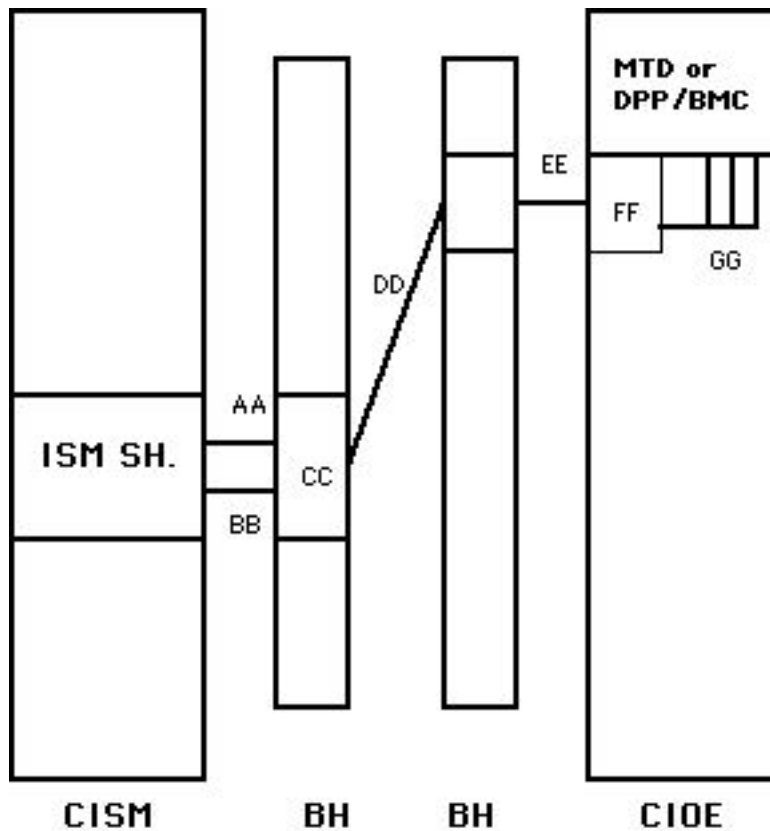
NTFX36AA - PERTEC Smart Connector Assembly containing IOM to
PERTEC protocol conversion circuit for 9 track MTD support.

| If the PERTEC device is cabinetized the PERTEC Smart Connector is
| mounted inside the cabinet, on the right hand side upright, looking
| from the rear. The PERTEC SC to bulkhead (CIOE) connection is made
| using the cable NT0X4321 (length=2.5 feet). Both the NT0X4320 and
| the NT0X4321 cables are included in the NTRX33DX and NTRX33DW
| Retrofit Kits.

Refer to Figure 4 for an example of the connections needed for CISM
mounted ISM Shelf to a MTD or DPP/BMC.

Figure 4. CISM to CIOE connections

RELEASE 06.03
13 July 1998



AA = NTFX40HC cable in new CISM
 BB = NTFX40HA - one cable with four connectors
 in upgrade kit NTFX40UA.
 CC = NTFX39AA BH 1-9 Cable Splitter Assy.
 DD = Job Length Engineered Cable
 EE = NTOX4321 CIOE BH-FX36AA Smartbox cable
 assy.
 FF = NTFX36AA PERTEC Smart Box mounted on CIOE
 GG = NTOX4320 PERTEC I/F cable assy. - has 3
 connectors labeled Read, Write, and Control
 which plug into MTD/DPP/BMC.

Figure 38. CISM TO CIOE CONNS

- | Refer to Figure 5 for the mounting positions of the PERTEC SC on the IOE/CIOE.
- | Figure 5. PERTEC SC mounting positions on IOE/CIOE.

RELEASE 06.03
13 July 1998

		PERTEC BOX 1	PERTEC BOX 2
IOE	DPP Pos. 18	41	32
	DPP Pos. 51	74	65
	MTD Pos. 51	67	
CIOE	DPP Pos. 05	28	19
	DPP Pos. 33	56	47
	DPP Pos. 33	21	
	MTD Pos. 33	49	

Figure 39. PERTEC SM BOX ON IOE/CIOE

NTFX39AA - CISM Bulkhead One-to-Nine Cable Splitter Unit-This connection unit is mounted on CISM bulkhead, and connects with one NTFX40HA (1 cable split into 4 cables with 4 connectors) to IOM Paddleboards on the ISM Shelf. This units printed circuit board includes the EMI filtering elements and eliminates the current bulkhead filter adapters for those bulkhead positions that are used for IOM connections. The NTFX39AA converts connectors 5,6,7,8 on the existing bulkhead to 4 groups of 9 connectors, 1 connector for MS and 8 for IOM ports.

Refer to Figure 6 for a view of the 4.245 inch by 4.245 inch 1X9 NTFX39AA Connector Assembly.

Figure 6. 1X9 NTFX39AA Connector Assembly

RELEASE 06.03
13 July 1998

P00	P08	P00	P08
P01	P09	P01	P09
P02	P10	P02	P10
P03	P11	P03	P11
P04	P12	P04	P12
P05	P13	P05	P13
P06	P14	P06	P14
P07	P15	P07	P15
MS0	MS1	MS0	MS1

S04	S03

Figure 40. 1X9 NTFX39AA CONN ASSY

NTFX40UC - SC Extension Cable- This cable is required from the RS232 SC to location J16 on the DS6 modem shelf in MIS or CMIS because of spacing requirements.

NTFX40UD - Smart Connector (text deleted) DB25FGender Adapter Cable - This cable is used with NTFX34AA SC to connect to Modems equipped with 25 pin male connector. Also used to connect IOM to older printer types. Refer to EMS NTFX4101 for accepted printer types.

NTFX40HD - Current Loop Power Cable Assembly. Connects the current loop SC to the AXU bulkhead. The current loop feeds the portable VDU jacks on the MSPs. This cable is used on CISM's, and runs from the CISM bulkhead Port 0(if first two IOMs in an initial office) and the AXU bulkhead connector xx.

NTFX40UE - Smart Connector Female to Male RS-232 Roll Over Cable - required to connect the IOM Smart Connectors to the MAP Terminals or printers. Provide this cable if a male (plug) end is required.

NTFX40UF - Smart Connector Female to Female RS-232 Roll Over Cable - required to connect the IOM Smart Connectors to the MAP Terminals

RELEASE 06.03
13 July 1998

or printers. Provide this cable if a female (receptacle) end is required.

NTFX40UA - ISM Retrofit Kit for IOM (Cabinet) - for field upgrades to CISM, allows for IOM provisioning on ISM Shelves. The NTFX40UA contains one NTFX40HA Cable Assembly and miscellaneous hardware. The NTFX40HA Modified ISM Harness is used to connect two IOM Paddleboards to the bulkhead to modify existing CISM's to accommodate one or two IOMs.

NTFX40UB - ISM Retrofit Kit for IOM (Frame) - for field upgrades to ISME, allows for IOM provisioning on ISM Shelves. The NTFX40UB contains miscellaneous hardware.

NTRX33DX - CIOE MTD to IOM Retrofit Kit, provides the necessary PERTEC SCs, interface cabling, and CIOE personality plate. The NTRX33DX stocklist contains one (1) NTFX36AA, one (1) NT0X4320, one (1) NT0X4321, and one (1) P0835229BH connector plate.

NTRX33DW - CIOE DPP/BMC to IOM Retrofit Kit, provides the necessary PERTEC SCs, interface cabling, and CIOE personality plate. The NTRX33DW stocklist contains two (2) NTFX36AA, two (2) NT0X4320, two (2) NT0X4321, one (1) P0831302BH connector plate and misc. hardware items.

NTFX40HC - Cable Harness for CISM to connect two IOM Paddleboards to the bulkhead, included on newly manufactured CISM's.

The following are provisioning guidelines.

The IOM Controller Card is always provisioned with an associated IOM Paddleboard.

The minimum system requirement in an office with no IOC's is two IOM Controller Cards and Storage Media Cards, with at least one DDU each. The first IOMs -IOC 0(iom) and IOC 1(iom)-should be in two separate ISM Shelves. Both must have Port 00 used for the Operator and MAP terminals.

As a provisioning rule, consideration should be made at the time of initial provisioning of a CISM that the bottom row of the bulkhead connectors will be used for IOM connectivity. The corresponding slots 5,6,7, and 8 in the ISM Shelf shall be used by circuit packs that need only network connections and do not require external MDF connections if planning to provision IOMs in the future. At the moment, the only cards mountable in slots 5-8 of a CISM mounted ISM Shelf are: EDRAM (NT1X80AA), CTM (NT1X81AA), TTU (NT2X47xx), TTT (NT1X90xx/2X96xx), DT/MF Receivers (NT2X48xx), Conference Circuits (NT1X31AA/3X67xx), DMODEMs (NT3X02/03xx combination) are the circuit packs that fit this purpose. This rule does not apply to ISME mounted ISM Shelf since slots 3,4,5,6,7 and 8 all have their external connectivity on the backplane.

RELEASE 06.03
13 July 1998

DSU products that are currently approved, qualified, and rated as standard include the Motorola UDS RM16M, RM4200, and the GDCDS6. These products are currently provisionable in the MIS (NT0X02AB) and CMIS Model B (NTRX56AA) products for connections to IOM. CMIS applications for these DSU shelves are only valid for open (non-EMI) cabinets. Refer to NTFX4101 for specific information on what else is supported.

The NTFX40UC cable is required to connect from the RS232 SC to location J16 on the DS6 Shelf because of spacing requirements. The NTFX40UC cable is 9 inches.

14.2.3 Office Layout Information

Cable lengths to the SCs are job engineered. Any device connected to the IOM can be limited to a 750 feet cable length distance. The MS connection to the current IOC is limited to 160 feet. This is also the limit on the IOM.

Cabling for the IOM in ISME

Cables for all the required ports for slots 03F and slot 04F should be provisioned for their pre-determined lengths according to the office requirements. The SC for any port shall be provisioned according to the office setup. Each cable is terminated on the IOM Paddleboard at the back of slot03F or 04F in an ISME.

If slot 03F is occupied by an IOM Controller Card and slot 04F is occupied with a Storage Media Card, then a provisionable SCSI cable, NTFX40HB, connects the IOM Paddleboard to the backplane pins of slot 04F. The NTFX40HB Cable is a part of the NTZZ40AJ building block.

Refer to Figure 7 for an example of IOM cabling for ISME.

Figure 7. IOM Cabling for ISME

RELEASE 06.03
13 July 1998

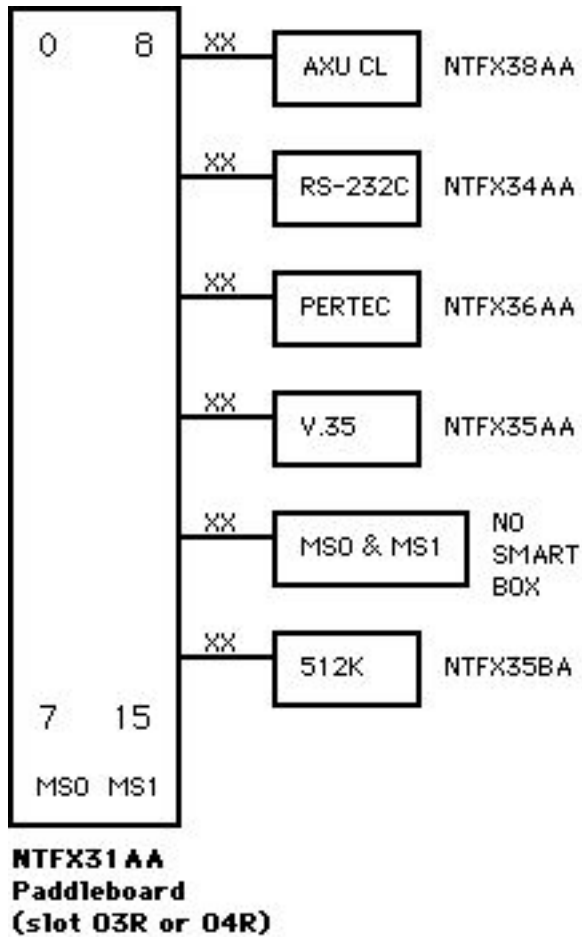


Figure 41. IOM CABLING FOR ISME

Cabling for the IOM in CISM

The backplane to bulkhead harness for an ISM Shelf is modified using the (text deleted) 1-to-9 Cable Splitter. The new harness code for this is NTFX40HC. To upgrade an existing ISM Shelf in a CISM, an NTFX40HA cable is added to the existing harness in the field along with the NTFX39AA. Connections for slot 03F and 04F are brought out to the bulkhead on the bottom four connectors using the new ISM harness. The bottom four connectors on the bulkhead are dedicated to the IOM and cannot be used for other ISM packs requiring external connections. ILTACPs no longer may be provisioned in slot 06F of the ISM Shelf because of this restriction. The switchboard cables from the bulkhead, the cable lengths and the SC for each port are provisioned according to office requirements.

RELEASE 06.03
13 July 1998

To support the cabinetized MTD, DPP, and BMC in a CIOE, the SC cable assembly connects to the bulkhead of the CIOE and the PERTEC SC (part of SLRX33DX and DW) is mounted inside the cabinet, on the right side upright. The bulkhead to PERTEC SC connection is made using the provisionable NT0X4321 cable which is a part of the stocklist of NTRX33DX and NTRX33DW. The PERTEC SC is connected to the MTD using the provisionable NT0X4320 cable which splits into 3 connectors, Read, Write, and Control. The NT0X4320 is part of the stocklist of NTRX33DX and NTRX33DW CIOE upgrade kits. Refer to the figure 'CISM to CIOE Connections' in this document.

Refer to Figure 8 for an example of IOM cabling for CISM.

Figure 8. IOM Cabling for CISM

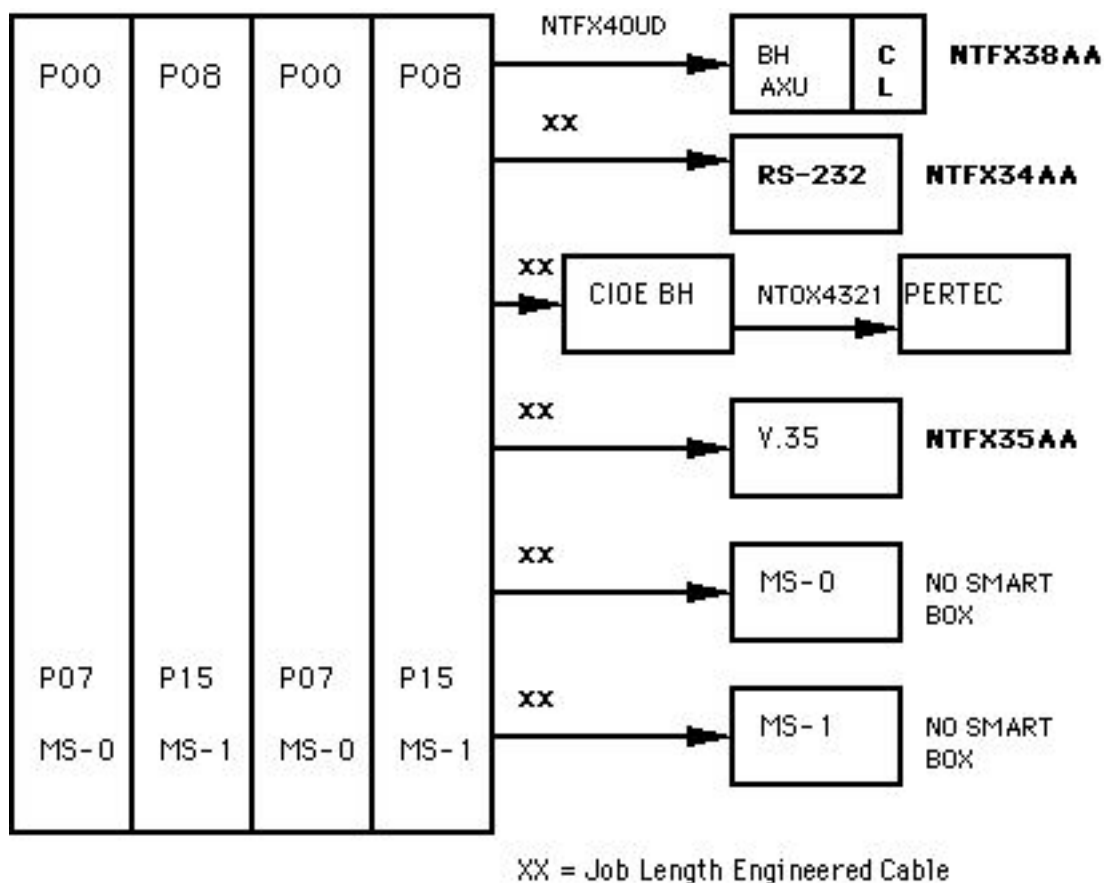


Figure 42. IOM CABLING FOR CISM

For extensions in CISM, an upgrade kit that includes harness cable and the bulkhead unit is provided. If slot 03F or 04F of the ISM Shelf is occupied, the ISM card is moved to another slot if one

RELEASE 06.03
13 July 1998

is available. Note that re-cabling may be required if the cards are cabled externally to the cabinet. This is true for ISME also. If no other ISM Shelf slot is available, the ISM Shelf cannot be upgraded for IOM. The addition of a new IOM requires datafill and configuration on the MAP terminal.

14.2.4 Traffic Tables

A comparison of IOC Message Controller and IOM messaging mechanism between CM and IOC together with IOM throughput testing results have led to similar conclusion on the data rate of about 100KBytes per second in each direction being sustained on the CM-MS-IOM link. Furthermore, 50% overhead is observed on protocol and messaging handshakes between CM and IOC/IOM firmware, bringing the effective throughput to 50Kbytes per second. Note that the babbling threshold of the MS (currently 15msg/30mSec on SN) not be exceeded ..

In general, the input/output devices traffic are proportional to the data rate. In case of MPC, traffic related provisioning aspects are application dependent due to the bursty nature of various applications. Therefore, the messaging and memory requirements are defined by the application using the IOM hardware. Further generalization for ease of provisioning can be established with the data rate that is running on each port with a weighted index for applications. To summarize, the following rules apply:

- Total IOM available capacity = 50KBytesper second
- Reserve at least 1 port spare to increase MTTR. Maximum communication ports to be provisioned = 15.
- IO device capacity = weighted index *data rate (text deleted)
-
- DDU throughput (text deleted) is dependent on record size (text deleted) , file size, and CPU occupancy . The average throughput measurement is 25KBytesper second and this value is used as the assumed data rate on DDU. With two DDUs, the average drops to about 20Kbytes per second.

The following summarizes (text deleted) our configuration recommendations.

IOM Traffic Index

RELEASE 06.03
13 July 1998

<u>IO Devices</u>	<u>Weighted Index</u>	<u>Assumed Data rate (KBps)</u>
TC	1	Baud Rate Used
1 DDU	1	2 5
2 DDUs		2
DAT	1	1
MTD	1	1
MPC Sync	Application dependent- Loopback = 1.5	Baud Rate Used
MPC Async	1.3	Baud Rate Used

There are also H/W limits that must be observed:
 2 DDUs maximum
 #MPC sync ports + #MTD ports <=10
 1 DAT maximum
 No port should be left in service if the SC is removed.

The provisioning on a regular IOM will be:

Sum (port datarate * weighted index) <50KBytes per second .

Note that unless a port is OFFL, it needs to be included in the above calculation. Nortel (Northern Telecom) does not guarantee the behavior of the system if configured above the limits.

The above traffic calculation does not apply to High Speed application using IOMHxxyy firmware load. For 512kbps application, maximum of 2 ports can be datafilled (CM limit). It is assumed that one link is active and the other is standby.

14.3 Product/System Specification

14.3.1 Physical Characteristics

Standard ISM Shelf board sizes are used for the IOM Controller Card and the Storage Media Card. The Paddleboard is approx. 10.5"x 3.5".

The approximate dimensions of the SCs are 2.7" x 3.5" x 0.75". The RS-232C, V.35 and Current Loop SCs have a 6 pin teledapt connector on the IOM side (or C side) and a 25 pin D-type connector on the user side (or P side). Each type of SC is identified by labels on the SC . The standard V.35 connector is a 34 pin connector and larger than the 25 pin D-type connector. For equipment that uses the standard V.35 connector, a passive 25 pin to 34 pin adapter ((text deleted)) NTFX3505 is available to connect to the V.35 25 pin SC . The PERTEC SC has the same dimensions. The IOM, or C side, has a 6 pin teledapt connector. The

RELEASE 06.03
13 July 1998

PERTEC side , or P side, has a 50 pin connector. A 2.5 feet three way split cable with a 50 pin connector at one end and three separate connectors at the other will provide connectivity to the MTD or DPP.

14.3.2 EMI/Earthquake Information

Not applicable

14.3.3 Sparing Information

Sparing strategy for each office is suggested as follows.

- NTFX30AA IOM Controller Card - 1 spare
- NTFX32BA DDU Plug-in Module - 1 spare if provisioned
- NTFX32CA DAT Plug-in Module - 1 spare if provisioned
- NTFX31AA Paddleboard - 1 spare
- NTFX32AA Storage Media Card - 1 spare if provisioned
- | • NTFX40HB SCSI Cable - 1 spare if NTFX32is provisioned
- | • NTFX34AA RS-232 SC - 1 spare per20
- | • NTFX35AA V.35 SC - 1 spare per20
- | • NTFX36AA PERTEC SC - 1 spare per20
- | • NTFX38AA Current Loop SC - 1 spare per 20

In the event of a hardware related port failure on the IOM Controller Card, the port can be physically moved to another connector on the Paddleboard (or on the bulkhead in the case of CISM) designated as a spare port until a scheduled IOM replacement. Spare ports should be left on the IOM Card for this purpose. For a port failure on the Paddleboard, the procedure is the same as for the IOM Controller Card. A spare port can be used until the scheduled replacement of the Paddleboard. If a Paddleboard failure occurs that affects the entire IOM Card, the Paddleboard must be changed. If a bulkhead or harness failure occurs, a spare port should be used and the failed component replaced.

The IOM has several components, therefore its MTBF has to be expressed in terms of MTBFs of its components. The Main IOM board has an MBTF of approximately 40 years. DAT MTBF is approximately 150,000hours with 20% 'on' time. DDU MTBF value is estimated at 20 years, or 300,000 hours.

RELEASE 06.03
13 July 1998

14.3.4 Power Feed and Fusing Requirements

-48V DC power on the ISM backplane is used directly for the IOM cards. Conversion to required voltages (5V, 3.3V, and 12V) is done on the card.

There is no change of the existing fusing arrangement for the ISM. The ISM backplane provides both A and B battery feeds to slots 03F and 04F. (text deleted) . (text deleted) . The SMC should be installed when both A and B battery feeds are provided by the ISM backplane. When there is only one feed available, DDU/DAT cannot be brought into service from the offline state. However, the IOM mainboard (NTFX30AA) and the paddleboard (NTFX31AA) can be installed and brought into service when only one feed is available. Once DDU/DAT is in service, failure of either A or B feed does not affect operation, and this condition is indicated by the turning off of both LEDs on the SMC (NTFX32AA). A and B feeds are protected from any failures on the IOM Card or the Paddleboard by frame/cabinet fusing. Power Interlocking is not required on IOM.

14.3.5 Current Drain Information

The IOM power requirements are as follows

IOM Controller Card - Approx. 0.3A at -48 Volts

Storage Media Card - Approx. 0.15A at -48 Volts

Paddleboard - 5V for on board logic is provided by IOM Controller card. Power for each Smart Connector is approx. 1.5W provided from the -48V on the backplane. For a fully loaded Paddleboard the power requirement is approx. 0.5A at -48V or at -60V.

The total power requirement for a fully loaded IOM with 16 ports, a DDU and a DAT is approx. 50W from the -48V rail.

14.4 Software Provisioning

For NTX software packages to PLC/SOC mappings for CSP02 and beyond refer to ECM552 - Mapping of NTX/NTG Package to PCL/NCL/Option.

14.4.1 Required Software Packages and Interdependencies

All CM software is provided with every office. IOM is introduced in CSP06.

Two new features are introduced in CSP06 to support 512Kbps application; AG4882(BAS07) IOM 512Kbps link usage control and AG4883(TL06) IOM 512Kbps link support. These two features are intro-

RELEASE 06.03
13 July 1998

duced to provide proper datafill control and support for 5 Kbps link connections.

14.4.2 Software Usage Restrictions

| The IOM is for SuperNode (SN and SNSE -- CSP06 offices or higher, various patches may be required) Offices only.

| The software portion of the IOM project is defined as consisting of CM software and local IOM software. The scope of the software is limited to duplicating the functionality of the existing hardware on the new hardware, while maintaining backward compatibility with the existing hardware. Additional functionality such as support for up to 28.8 Kbps async (9.2Kbps for TC) and 1GByte disk drive is provided.

The CM software is modified to support the new hardware (IOM card and smart cables). The local IOM software, referred to as firmware, provides functionality of the existing I/O controller, Terminal Controller, Multi-Protocol Controller, Disk Drive Controller, and Magnetic Tape Drive Controller.

Minimum CSP06 is required for IOM.

The software MAP port assignments are as follows:

- Ports 0-15 CON, MPC, MTD
- Port 16 DDU (scsi)
- Port 17 DDU (scsi) or DAT (scsi)

MTD and DDU port restrictions are not applicable in IOM as MTDs and DDUs in NT40 Core office required specific provisioning to allow for thumbwheel settings on the NT40 Processor shelf for system down-and-up-loading purposes. SN offices have dedicated SLM Tape and disk drives for these purposes.

14.4.3 Memory Provisioning

Not applicable

14.5 Real Time Impact

The following is existing provisioning guidelines for mixed applications on IOC (real time limits on IOC).

- No more than 2 DDU cards per IOC.
- No more than 2 EMPC cards per IOC.

- | • # DDU (text deleted) +# EMPCs per IOC.
- No more than 1 Tape Drive per IOC.

RELEASE 06.03
13 July 1998

15.0 ECM715 - SuperNode Data Manager

15.1 Overview

Product/System Overview

The SDM-FT computing platform is housed in a C28 Model B Cabinet within a Main Chassis (SDMM) and an Input/Output (I/O) Expansion Chassis (SDME). The SDM-FT runs redundant hardware components in full synchronization, with one unit as master and the other in standby. There is no loss of service during a switch of activity. The SDM-FT is designed to prevent any loss of instructions or data during a switch between master and standby components.

The SDM-FT has a fault tolerant redundant computing core. Data is stored in redundant mirrored disks. Input/Output is conducted over redundant I/O Buses that communicate to redundant external I/O Interfaces. The SDM-FT is based on a Motorola PowerPC two CPU set system.

The Main Chassis has 16 one-inch wide controller (or front) module slots and 16 one-inch wide personality (or rear) module slots. The mid-mounted backplane allows mounting of modules from front and rear. The I/O Expansion Chassis is physically the same as the Main Chassis, except for backplane, with all slots housing I/O Modules only. 'I/O Module' (or MFIO) refers to the front mounted I/O card and its rear mounted personality card.

The Main Chassis houses CPs referred to as CPUsets, MFIO (Multi-Function Input Output cards), and LANPM (LAN Personality Modules). CPUsets (a processor and memory subsystem) access MFIOs by way of the I/O Buses. This allows the system to form redundant pairs of devices that do not share an I/O path to the processor. A MFIO is a module that plugs into an I/O slot in the front of the chassis. A MFIO connects to the outside world by way of a LANPM with connectors at the rear of the chassis. All external I/O connections to the system are made at the rear of the chassis. A MFIO refers to a combined I/O Controller and its personality module. The I/O Domain consists of several I/O slots that are connected to a single I/O Bus, power and maintenance bus. The SDM-FT has two I/O Domains (0 and 1) housed in the Main Chassis.

The I/O Expansion Chassis increases the number of I/O slots on the Main Chassis. All slots are dedicated to I/O Modules and are divided into I/O Domains. The I/O Expansion Chassis is connected to the Main Chassis backplane by dual flex cables which extend the Main Chassis backplane buses to the I/O Expansion Chassis.

Both the Main Chassis and I/O Expansion Chassis have two Interconnect Modules (ICM) located at the top rear of the chassis. Minus 48V dc power input to the chassis is found here, along with

RELEASE 06.03
13 July 1998

central office system alarm connections. The ICMs distribute the -48V dc and other output voltages to the modules via the backplane.

Throughout this document, the SDM base software and SDM hardware that is delivered during the CSP07/08 / 9 timeframe is described as the SDM07/08 / 9 product.

The term "computing platform" includes the following components:

1. SDM computing hardware
2. SDM communications hardware
3. SDM base software, including the operating system (O/S), the system software resources, and OAM and System Administration (SA)
tools required to administer the computing platform.

Communication between SDM and the Computing Module (CM) is conducted over redundant direct DS512 links to both sides of the Message Switch (MS). For communications between the SDM-FT and the Telco OSS/LAN, customers can make use of the built-in Ethernet interface. Asynch communication can be conducted via a terminal server and router respectively off the Telco LAN. The SDM-FT hardware platform is fully compliant with the regulations and safety standards required by CO equipment.

The hardware for the SDM-FT comprises an OEM Main Chassis and I/O Expansion Chassis designed and manufactured by Motorola. Duplicated processor and I/O Domains for required reliability are housed in a single chassis. The SDM-FT chassis are installed in a dedicated C28 Model B cabinet with solid doors. Adapter brackets mount the 19 inch chassis directly on the 28 inch cabinet. In addition to the Motorola hardware a DS512 interface is required to interface into the DMS-100. This is achieved with the development of a Nortel Technology designed DS512 interface pack which is configured in the Main Chassis. Fan Trays provide cooling in the Main and I/O Expansion Chassis.

Refer to Figure 1 for layout of the SDM-FT cabinet NTRX50FA. See individual cabinet Engineering Manual Section for specifics of CP slot assignments.

Figure 1. Front View of Cabinetized SDM-FT (NTRX50FA) - CSDM

RELEASE 06.03
13 July 1998

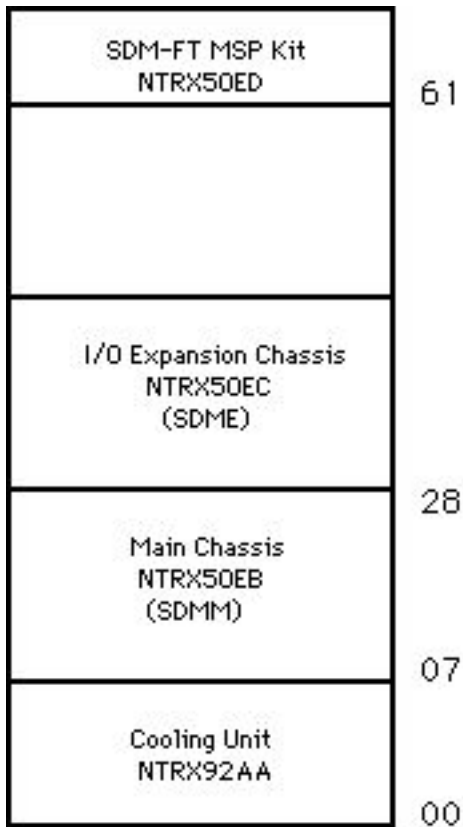


Figure 43. CSDM CAB

The software for the SDM is developed and managed in accordance with the DMS Evolution model with a SDM Platform DRU, Common Application DRU, and Product/Market Specific Application DRU(s). The SDM S/W is released and maintained per the DMS approved Non-CM Software standard process. Product Line owners have the option of utilizing the SDM platform for their own OAM&P application development.

The SDM-FT is connected to the MS using four fiber DS512 links. The SDM-side interface to these DS512 links is comprised of two DS512 interface CPs. Each CP is equipped with two ports that are connected using separate links to each of the MS planes. The DS512 interface provides the following benefits for the SDM-FT program:

1. Fault Tolerant link connectivity provided by four DS512 links to the MS
2. Reduced recovery time, providing higher SDM availability over critical faults
3. Integration of the SDM with the DMS messaging and maintenance

RELEASE 06.03
13 July 1998

systems

4. Low messaging latency between the CM and the SDM

The SDM platform includes the following Base software services:

1. AIX operating system with extensions to support fault tolerance
2. Nodal maintenance and administration services
3. Nodal process and control services

The SDM07 uses IBMs UNIX AIX4.1.4 as the basis for its operating system.

The SDM platform provides full-featured CM-based maintenance. This interface allows customer monitoring of the health of the SDM hardware, connectivity, system software and application software from a SuperNode MAP terminal. It also provides a real-time display of the state of the SDM and its links to the MS.

The SDM provides process control services that monitor the health of registered processes and the hardware, and that start and stop processes as required. It also monitors the integrity of the SDM to CM connection.

Refer to Figure 2 for how the SDM-FT fits into the DMS SuperNode Switch as well as Telco LAN.

Figure 2. SDM-FT in DMS SuperNode Switch and Telco LAN

RELEASE 06.03
13 July 1998

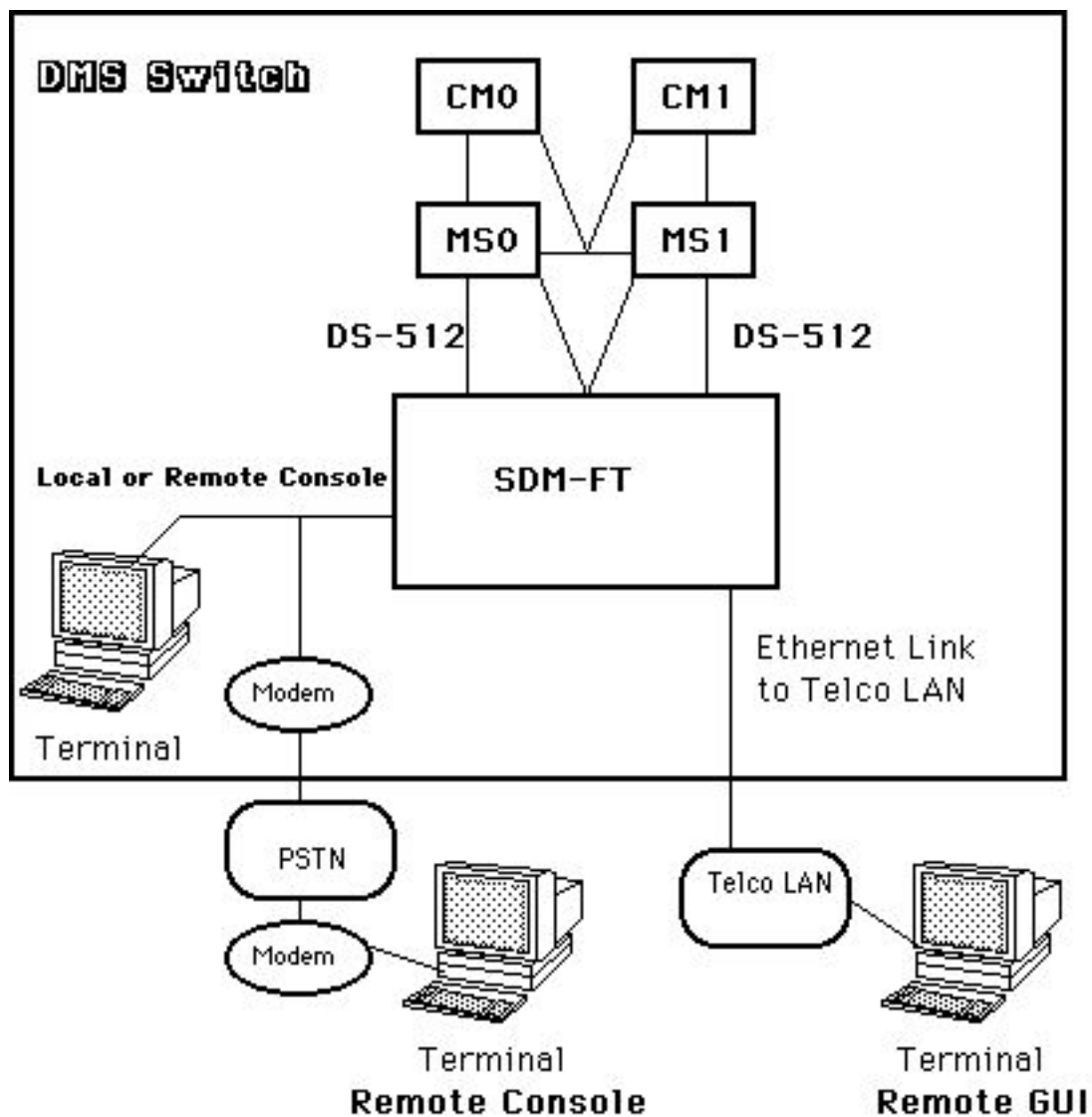


Figure 44. CSDM IN SN W/TELCO LAN

15.2 Hardware Provisioning

15.2.1 Hardware Usage Restrictions

A typical MS CP configuration would include two NT9X17AD 4 Port CPs and two NT9X62BA/CA 4 Link Paddleboards for connectivity of both DS512 CPs in the SDM.

RS232 Ports on NTRX50FD

RELEASE 06.03
13 July 1998

Only port 0 will be used for remote and local console access. Port 0 will normally be connected by NTRX5093 cable to a modem for remote access. If a local console is required, disconnect the NTRX5093 cable from port 0 and use NTRX5094 cable to connect a terminal to this port. Port 1 is not used. Note: The NTRX50FD is an always provided (ape) item on the main chassis.

Increased disk storage per MFIO is provided in SDM08 with the introduction of the MFIO CPs NTRX50GN and NTRX50GP. These CPs provide maximum mirrored system storage capacity of up to 4GB root volume group and 16GB for the data volume group. In addition, future data volume group expansion (post SDM08) to up to 40GBytes using the expansion chassis will be allowed. See the SDM-FT Product Specification (issue ac01, Appendix A, SDM08) for more details on root volume and data volume group MFIO upgrades.

Issue 07 introduces the new CPs for SDM10. Issue 09 shows the DEV status PECS in EMS NTRX50FA for V0 purposes. The EMS NTRX50FA will be updated prior to the Gate 2 of the SDM10 program with these new pecs shown as STD status, via a design EC. CADES NOTE --For modeling purposes and/or V0 assignments, use the mounting locations given in the EMS NTRX50FA for similar CPs.

15.2.2 Hardware Dependencies

See the Engineering Manual Section NTRX50FA for more details on provisioning.

Two new versions of MFIOs providing 4 GByte disk are introduced in the CSP08/SDM08 timeframe. These product enhancements are driven by the SuperNode Billing Application (SBA) and DMS Data Management System (DDMS) application requirements.

A modem is required with every SDM-FT product to provide external access. Provision one DS-6 Modem Shelf if required and always provision one Modem Card. See the EMS NTRX50FA for details on modem provisioning.

The Telco must have an Ethernet LAN with at least one workstation before the SDM-FT can be installed. The pre-CI letter to the Telco customer from the SAE should state that the Telco Information Systems (IS) craftsperson should be available during the CI session to ensure the LAN will be ready for installation.

Message Switch Requirements

Needed equipment on the MS for SDM-FT - NT9X17AD MS Port Card, NT9X62BA/CA MS Port Card Paddle Board, NT0X97AE Fiber SDM-MS Port Card Paddle Board Cable.

The SDM uses two SR256 links on one NT9X17AD slot per MS to be provisioned by datafill. The SDM NT9X17AD can be provisioned in

RELEASE 06.03
13 July 1998

slots 12 to 27 only. The SDM NT9X17AD port card can only be used for SDM. No other application can be provisioned on any port in the SDM port slot.

SDM in SNSE Offices

The SDM requires a dedicated port card on each plane of the message switch. Because of limited port capacity of SNSE, there could be situations where spare MS ports are not available because they are used by LPP, IOC, ENET, File Processors and Application Processors. Therefore planning of initial office must consider all future uses of MS ports.

Refer to ECM 632 for typical MS port assignment in SNSE.

15.2.2.1 P and C Side Port Requirements

The SDM-FT is connected to the MS using four DS512 optical fiber links. The four link configuration is supported in a fully redundant configuration. This allows for more provisioning options in those offices where MS link or slot availability is at a premium. The SDM-side interface to these DS512 links is comprised of two DS512 interface cards. Each card is equipped with two ports that are connected over separate links to each of the MS planes (link 0 port side 0 to MS plane 0, link 1 port side 1 to MS plane 1).

15.2.2.2 DMS BUS Port Requirements

Not applicable

15.2.2.3 Circuits Per Card

Not applicable

15.2.2.4 Discrimination Numbering

In an office, the first CSDM is 00, with shelves numbered as SDMM 00 and SDME 00. Each additional CSDM increments these numbers by one.

15.2.3 Provisioning Considerations

The following cables are job length engineered. Refer to CA drawings for more details concerning usage of these cables.

NTRX5104 SDM to Telco LAN cable - maximum length 100m.
NTRX5093 SDM to Modem cable - maximum length 15.3m

NOTE - All four cables are shielded and the shield grounded only at the SDM end. For proper installation, the SDM side of the cable is identified by a label.

RELEASE 06.03
13 July 1998

FUNCTIONAL BLOCKS

Issue 05 of this ECM introduces two Functional Blocks to simplify ordering. The specs are as follows:

NTZZ01EK CSDM Main Chassis w/128MB CPUset
NTZZ01EJ CSDM Main Chassis w/256MB CPUset

The Main Chassis NTRX50EB is no longer APE with the CSDM NTRX50FA. To provide the Main Chassis and the required CPUset use one of the Functional Blocks instead of detail provisioning. This is a requirement of manufacturing for ordering and stocking.

Addition of I/O Expansion chassis to an in-service Main Chassis is supported in SDM07 release and upwards.

15.2.4 Office Layout Information

The SDM-FT Cabinet is fully integrated into the SuperNode line-up in a Central Office.

Refer to Figure 7 for the SDM network configuration.

Figure 7. SDM-FT Network Configuration

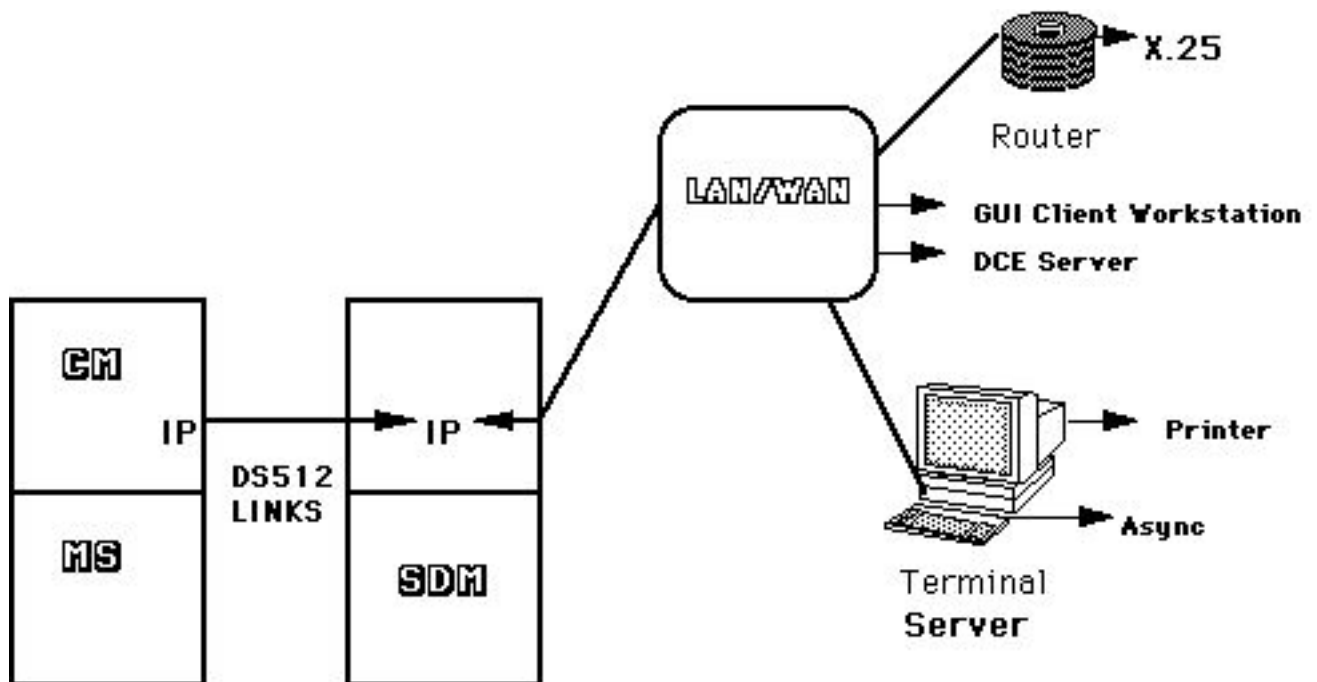


Figure 45. CSDM NETWK CONFIG

RELEASE 06.03
13 July 1998

Refer to Figure 8 for the SDM-FT (Multiple DMS).

Figure 8. SDM-FT (Multiple DMS)

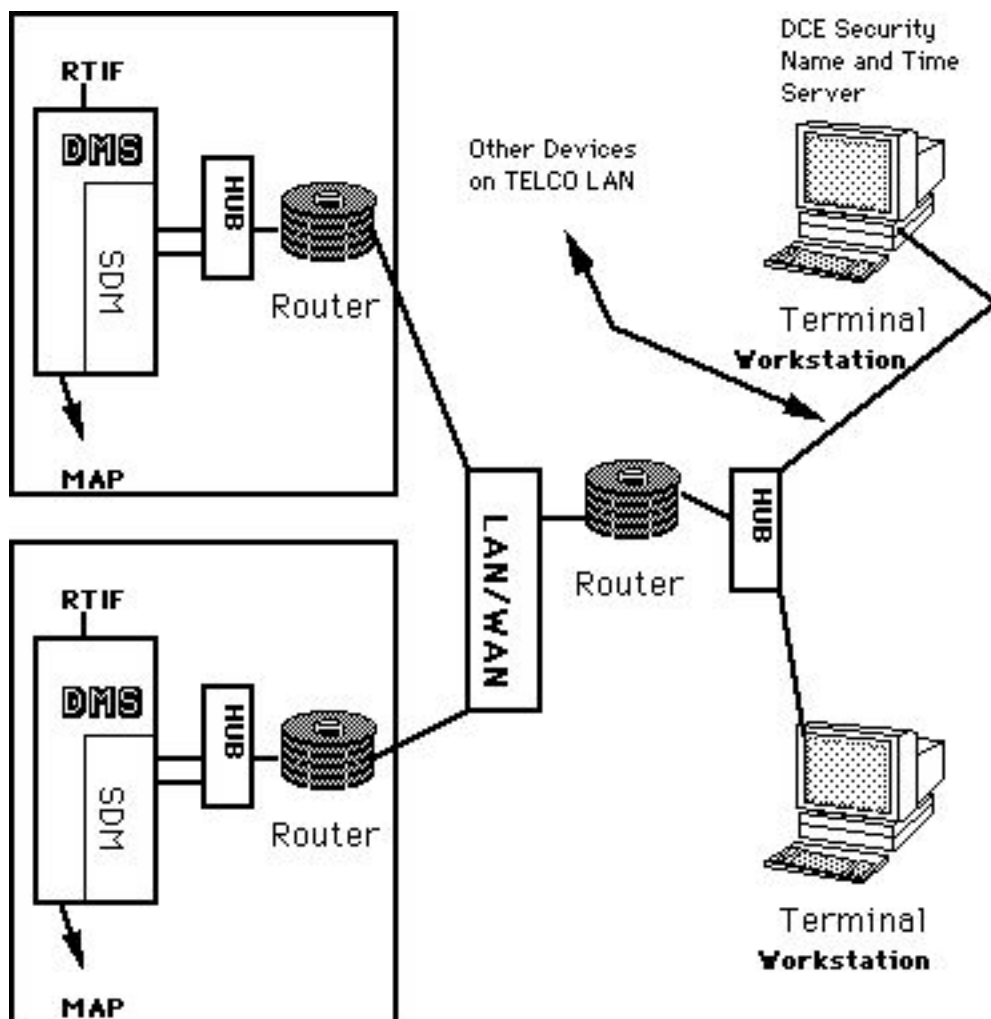


Figure 46. CSDM W/MULTI DMS

SDM GUI/Security and Name Server

HARDWARE

- HP700/800 (9000 Series) with HP-UX10 or
- SUN Sparc with SUN OS or Solaris 2.4
- PA-RISC based processor

- IEEE 802.3 Ethernet 10BaseT Interface
- 64M bytes of Memory
- 1G Disk Drive
- 1 DAT drive
- 17" color monitor

SOFTWARE

- Operating System License
- DCE Client License version
- DCE Security Server License
- DCE Directory Server License

NOTE-The Security server and backup should be in locked/secure rooms with no network login access.

15.2.5 Traffic Tables

Not applicable

15.3 Product/System Specification

15.3.1 Physical Characteristics

Not applicable

15.3.2 EMI/Earthquake Information

Not applicable

15.3.3 Sparing Information

Due to the configurable nature of the SDM-FT, no spares kit is available. Base spares should be ordered as follows:

- Qty 1 per Main Chassis - Fan Tray 0 (Upper Module) NTRX50FE
- Qty 1 per Main Chassis - Fan Tray 1 (Lower Module) NTRX50FF
- Qty 1 per Main Chassis - Interconnect Module 0 NTRX50FG
- Qty 1 per Main Chassis - Interconnect Module 1 NTRX50FH
- Qty 1 per pair provisioned - DS512 I/F Module NTRX50GA
- Qty 1 per pair provisioned - DS512 Person. Module NTRX50GH

RELEASE 06.03
13 July 1998

If the Expansion Chassis NTRX50EC is provisioned the NTRX50KD Fan Tray 0 (Upper Module) should be ordered as a base spare.

Additionally, depending on configuration, additional spares should be ordered as follows to match the customer configuration:

- Qty 1 per quantity of provisioned - CPUset NTRX50FK
- Qty 1 per quantity of provisioned - CPUset NTRX50FL
- Qty 1 per quantity of provisioned - CPUset NTRX50FM
- Qty 1 per quantity of provisioned - MFIO NTRX50FQ
- Qty 1 per quantity of provisioned - MFIO NTRX50FU
- Qty 1 per quantity of provisioned - MFIO NTRX50GN
- Qty 1 per quantity of provisioned - MFIO NTRX50GP
- Cabinet Cooling Unit - NTRX92AA (most customer's will have this in Model B spares and will not need as additional unit)

15.3.4 Power Feed and Fusing Requirements

One 'A' and one 'B' feed is brought into the SDM-FT Cabinet from the PDC, CPDC, or MPDC. The 'A' and 'B' feeds power the Main and I/O Expansion Chassis. Each feed is fused at 30A. The MSP in the cabinet has two 15A breakers which supply the 'A' and 'B' feeds to the Main and I/O Expansion Chassis.

The MSP is equipped with four 3/4A fuses for the alarm supply.

Each SDM-FT module (which runs off the -48V dc at the backplane) is equipped with a 3A (48V) fuse. This fuse is not field replaceable. The Interconnect Module (ICM) where the power enters the SDM-FT chassis is equipped with 12A (48V) fuse. The Main Chassis ICM supplies 5 I/O slots and 3 CPU slots. The I/O Expansion Chassis ICM supplies 8 I/O slots. The ICM fuse is not field replaceable.

The async console external grounding connection is through the modem. The modem port on the SDM-FT chassis is opto isolated and referenced to a separate ground.

15.3.5 Current Drain Information

Current Drain for this product is contained in DSRX50FA.

| Battery Voltage
| Min. = -38 VDC
| Nominal = -48 VDC
| Max. = -72 VDC

RELEASE 06.03
13 July 1998

Battery Current
Min. = 5 Amps per ICM
Nominal = 8 Amps per ICM
Max. = 12 Amps per ICM

15.4 Software Provisioning

For NTX software packages to PLC/SOC mappings for CSP02 and beyond refer to ECM552 - Mapping of NTX/NTG Package to PCL/NCL/Option.

15.4.1 Required Software Packages and Interdependencies

The SDM NCL is developed and managed in accordance with the DMS Evolution model. The Product and Program Management of the SDM NCL is coupled with the SDM-FT platform. The following is the NCL order code for NA007 under NCL Title SDMF00NA007.

SDMN0003

The NCL contains the following always provided functional groups order codes under DRU SDMPLF07. The functionality of each is shown in “.

- LCSE0007 - LCSE AOS FaultTolerant0/S
- --- LCSE AOS FT 0/S S/W“
- PLAT0005 - PLAT SDM STD FT Platform
- --- PLAT SDM STD S/W“
- PLAT HiSpeed Log i/f“
- --- PLAT SDM DS512 I/F“

The NCL has options. The following is the optional functional group order codes under DRU SDMCom07. The functionality (FN) of each is shown in “.

- ENTA0001 - ENTA Enhanced Term Access
- --- ENTA Enhanced Term-Access“
- SURV0003 - SURV DMSSurveillance
- --- SURV Excptn Rptng“
- LCSE0005 - LCSE RT Works Sys
- --- SURV RT Works“

NOTE - Functional Group SURV0003 requires Functional Group LCSE0005 as dependency.

The engineering provisioning number for LCSE0005 is one (1).

RELEASE 06.03
13 July 1998

NOTE - The functional groups under DRU SDMPLE07 are non- optional. In NA100 Market, Enhanced Terminal Access application is included in the non-optional package.

NOTE - SMMN0003 is only compatible with NA007 PCL and must be upgraded when going to a higher PCL level as documented in this ECM.

The following is the NCL order code for NA008 under NCL Title SDMF00NA008.

SDMN0004

The NCL contains the following always provided functional groups order codes under DRU SDMPLE08. The functionality of each is shown in ".

- LCSE0007 - LCSE AOS FaultTolerantO/S
- --- LCSE AOS FT O/S S/W"
- PLAT0005 - PLAT SDM STD FT Platform
- --- PLAT SDM STD S/W"
- --- PLAT HiSpeed Log i/f"

The NCL has options. The following is the optional functional group order codes under DRU SDMCom08. The functionality (FN) of each is shown in ".

- ENTA0001 - ENTA Enhanced Term Access
- --- ENTA Enhanced Term-Access"
- SURV0003 - SURV DMSSurveillance
- --- SURV Excptn Rptng"
- LCSE0005 - LCSE RT Works Sys
- --- SURV RT Works"
- SBM00001 - SBM Billing Appl Base
- --- SBM Billing Appl-Base"
- SBM00003 - SBM AMADNS DDI I/F
- --- SBM AMADNS DDI-I/F"

NOTE - Functional Group SURV0003 requires Functional Group LCSE0005 as dependency.

NOTE - Functional Group SBM00003 requires Functional Group SBM00001 as dependency.

RELEASE 06.03
13 July 1998

The engineering provisioning number for LCSE0005 is one (1).

NOTE - The functional groups under DRU SDMPLF08 are non- optional. In NA100 Market, Enhanced Terminal Access application is included in the non-optional package.

NOTE - SDMN0004 is compatible with NA007 and NA008 PCL loads. NA007 is the minimum PCL level that must be in-service to support SDMN0004.

When provisioning via NTACCESS, the software media type is as follows:

ATTRIBUTE NAME -- "TAPE"
ATTRIBUTE VALUE -- "DAT"

The following is the NCL order code for NA009 under NCL Title SDMF00NA009.

SDMN0009

This order code is compatible with NA007-NA009 loads. All the order codes listed below are supported in the NA007-NA009 loads except DDMS0001. This feature requires NA009 for support. (If the SAE orders this feature then SOLID will check for the NA009 PCL dependency in the office.)

The NCL contains the following always provided (Y#) functional groups order codes under DRU SDMPLF09. The functionality of each is shown in ".

- PLAT0005 - PLAT SDM STD FT Platform
- --- PLAT SDM STD S/W"
- --- PLAT HiSpeed Log i/f"
- LCSE0009 - LCSE Obj Store DB
- --- LCSE Obj Store DB"

The NCL has options. The following is the optional functional group (orderable by SAE) order codes under DRU SDMComF09. The functionality (FN) of each is shown in ".

- ENTA0001 - ENTA Enhanced Term Access
- --- ENTA Enhanced Term-Access"
- SURV0003 - SURV DMSSurveillance

RELEASE 06.03
13 July 1998

- --- SURV Excptn Rptng"
- LCSE0005 - LCSE RT Works Sys
- --- SURV RT Works"
- SBM00001 - SBM Billing Appl Base
- --- SBM Billing Appl-Base"
- SBM00003 - SBM AMADNS DDI I/F
- --- SBM AMADNS DDI-I/F"
- SFT00001 - SFT Secure File Transfer
- --- SFT Secure File-Transfer"
- DDMS0001 - DDMS System Phase 1
- --- DDMS Platform Ph 1"
- --- DDMS OSS Data i/f"
- --- DDMS Basic GUIDE HMI"

NOTE - Functional Group SURV0003 requires Functional Group LCSE0005 as dependency.

NOTE - Functional Group SBM00003 requires Functional Group SBM00001 as dependency.

The engineering provisioning number for LCSE0005 is one (1).

NOTE - The functional groups under DRU SDMPLF09 are non- optional. In NA100 Market, Enhanced Terminal Access application is included in the non-optional package.

15.4.2 Software Usage Restrictions

COMMISSIONING

---DISCLAIMER---The following information is NOT considered official documentation for the SDM product. This information is provided to the authors and owners of the API/ECM and NTACCESS documents and processes. Through review of the documents and process, this information will be verified, approved, and released, and only at that time will it be considered official.

The SDM is a UNIX-based machine that connects to (and is part of) the DMS. It connects to the DMS using Internet Protocol over DS512 links. The SDM also has external connections. It connects to an external environment using Internet Protocol and asynchronous connections.

RELEASE 06.03
13 July 1998

Because of all of these connections (both internal and external), several pieces of information about those connections are required and must be captured and input into the SDM and into the DMS. Also, this information is unique to each site and cannot be input into the SDM or DMS until the time of installation or commissioning. However, it is imperative that this information be captured prior to the time of install or commissioning. The information that must be input into the DMS and into the SDM must be provided by the customer while the customer is answering questions during the NTACCESS session.

The following descriptions help form the questions that NTACCESS must ask of the customer.

For the internal connections (from the SDM to the DMS), the customer needs the datafill in the appropriate tables in the DMS. For the external connections, the customer needs the commissioning values (at time of install) entered correctly on the SDM.

-DATAFILL-

Datafill for the DMS captures information about the DS512 connections, CM IP Address, etc.

It is agreed that the SDE will provide the datafill for the following tables. But, in order to do this, the SDE must have all of the questions (that follow) answered correctly.

--DMS Datafill

- MSCDINV - MS port cards location and load
- IPNETWRK - CM IP address and CM subnet mask
- IPHOST - CM resources
- SDMINV - SDM IP address, MS ports used, location

-COMMISSIONING VALUES

The SDM commissioning values capture information about the SDM IP address, LAN type, LAN subnet size, etc.

--SDM Commissioning Values (put on SDM)

- Login Greeting
- SDM Hostname
- CM IP Address
- SDM IP Address
- DS512 Subrate

RELEASE 06.03
13 July 1998

- DS512 Throttling Rate
- DS512 Link Count
- CM CLLI
- LAN type
- Subnet Mask of external LAN
- Known Node on external LAN - IP Address (up to 4 nodes)
- Known Node on external LAN - Hostname (up to 4 nodes)

QUESTIONS that must be ASKED and ANSWERED

1. What is the IP Address of the CM?
The IP Address of the CM must be a unique, real address. It must exist on its own subnet. The only other nodes allowed on the subnet would be nodes known to the DMS such as APUs. The address is in the format of X.X.X.X, where X is a number with the value of 1 to 254, inclusive. The IP Address must be pre-planned. The Installation Manuals for SDM-FT describe this process.
2. What is the size of the CM subnet?
This question is asking what is the total number of bits that are set to 1 for the subnet mask. This number will vary with the way each LAN is engineered and with the class of the subnet and its addresses. This number should be an integer ranging from 1 to 22. The commissioning tool will check/reject IP and subnet mask settings that don't make sense within the scope of the SDM itself.
3. Deleted - What are the IP Addresses of the EIU? The EIU has two IP addresses because it acts as a router from
4. Will FTP be enabled or disabled?
FTP is an abbreviation of file transfer protocol and is a method in which files are transferred from one node on the network to/from another node on the network. FTP is not very secure and some customers may wish to have this ability on the SDM disabled. FTP, when disabled, prevents FTP requests from another node TO the SDM; users logged into the SDM via the console port, telnet (if enabled), or ETA can still initiate OUTBOUND FTP sessions. Root users can send/receive any file in this manner; maint users can only send files and are restricted to files under /data/logs only.
5. Will TELNET be enabled or disabled?
TELNET is a method for different users to log on to a machine on the network via a different machine on the same network. TELNET is not very secure and some customers may wish to have this ability on the SDM disabled. When TELNET is disabled,

RELEASE 06.03
13 July 1998

the access to SDM is only possible via ETA, the console port, or via SDMRLOGIN from the CM.

6. What is the Login Greeting for the SDM?
The greeting for the SDM is given to anyone logging onto the SDM. The information normally found here would be a warning of being logged into a private database machine, the location of the SDM, or whatever the customer would like to put here. This is very similar to the MOTD (message of the day) on the DMS. The format of the greeting is limited to 220 alpha-numeric characters.
7. What is the SDM Hostname?
This a unique name that is associated with the SDM. Usually this name would have some reference to the CLLI that the SDM is used for plus the letters SDM as well, or it may need to follow the rules for naming LAN nodes that the customer already has existing. The format of this name should be less than or equal to 8 alpha-numeric characters.
8. What is the IP Address of the SDM?
The SDM uses the CM IP Address.
9. What is the subnet mask of the external LAN (or customer's LAN) to which the SDM is connected?
This question asks what the actual mask of the subnet is, not the size of the subnet. So, the format of the mask should be 255.Y.Y.Y, where Y is a number with the value of 0 to 255.
10. What type of LAN will be used?
Ethernet is the most common and is usually the type used.
11. Deleted - What is the DNA (Data Network Address) for the X.25
This is an address for the X.25 port on the SDM to uniquely
12. What are some known and active nodes on the customer's LAN to which the SDM is connecting?
The SDM will be verifying that it can communicate with the customer's LAN. In order to do this it needs to know the IP address and Hostname of some node (or machine) on that LAN. If the SDM cannot communicate with the LAN, then it will raise an alarm on the SDM, and the SDM will raise a minor alarm on the MAP screen of the DMS. There can be up to 4 different nodes given. As long as the SDM can communicate with one of these 4 nodes, then no alarm will be raised. The answer to this question should contain an IP address and a hostname of the node(s) or machine(s). There must be a minimum of one node's information provided and a maximum of 4 node's information provided. The IP address of the nodes should have the format of X.X.X.X, where X is a number with the value of 1 to 254. The hostname should be less than or equal to 8 alpha-numeric characters. These nodes can reside anywhere on the customer's LAN on any subnet, as long as the proper routing

RELEASE 06.03
13 July 1998

has been defined on the network to allow the SDM to communicate to these nodes. Usually the nodes that are given are the GUI client machines and the DCE security/name server machine. QUESTIONS that must be ASKED and ANSWERED To be detailed at a later date. NOTE 1 The MAC Address (Machine Address Code Address) is a unique the MAC Address and must be obtained prior to datafill of the SDM-FT.

15.4.3 Memory Provisioning

The various CPUsets available are for provisioning memory to match the application software requirements.

15.5 Real Time Impact

Refer to SEB-96-02-001.02.01 for capacity information.

RELEASE 06.03
13 July 1998

16.0 ECM720 - SuperNode Billing Application

16.1 Overview

Nortel (Northern Telecom) is developing the SuperNode Billing Application (SBA) to support the AMADNS (AMA Data Networking System) teleprocessing standard introduced by Bellcore. This enables Nortel to provide operating companies with a robust billing platform that is architected for consistency with Bellcore's requirements.

The SBA is positioned as part of the OAM&P evolution of the DMS switch. It offers new billing and telecommunications capabilities that operating companies clearly require. The SBA is consistent with the operating company efforts to modernize billing facilities through redistribution and upgrading of downstream applications.

The SBA has software components running under two hardware units in the DMS100 - the CM and the SDM. The primary purpose of the SBA is to receive BAF billing records from the CM, move them to the SDM, perform any user-specified processing, then make the records available as billing files to the operating company's downstream processor(s).

The SBA features

- o Open-systems-interface teleprocessing which facilitates higher data transmission rates that support larger volumes of data.
- o Near-real-time BAF record delivery. Records are available on the SDM within 5 minutes of call completion.
- o Enhanced switch capacity, which results of the off-loading of billing related processing from the CM to the SDM.

The SBA runs within the SDM Base Software Platform. The SDM, in addition to handling billing data with SBA, also provides a central repository for OAM data that requires storage redundancy and high speed delivery. The prime objective of the SDM is to off-load the CM of its non-call processing functions. The SBA is designed to further this objective. The SBA significantly increases the billing capacity of the SuperNode and provides a flexible architecture consistent with the AMADNS standard.

Refer to Engineering Manual Section NTRX50FA and ECM 715 for more information on the SDM-FT.

RELEASE 06.03
13 July 1998

16.2 Hardware Provisioning

16.2.1 Hardware Usage Restrictions

In situations where the LAN/WAN communication link to the downstream processor is inoperative for extended periods of time and where an alarm at the RMI indicates a critical shortage of disk space on the SDM, the craftsperson may elect to move files from the SDM to the DAT drive. Files of billing data residing on the SDM disk are backed up by the SDM's DAT drive hardware. (The RMI is the Remote Maintenance Interface, or user interface, provided in the SDM platform.)

16.2.2 Hardware Dependencies

The SBA is dependent on the projected availability and robustness of the SDM-FT platform. For the first few releases of the SDM-FT platform, an expansion chassis that houses additional disk drives may be required to support the AMA data retention requirements.

The SBA is optional software for the SDM. It requires its own installation and control functionality within the SDM environment.

16.2.2.1 P and C Side Port Requirements

Not applicable

16.2.2.2 DMS BUS Port Requirements

Not applicable

16.2.2.3 Circuits Per Card

Not applicable

16.2.2.4 Discrimination Numbering

Not applicable

16.2.3 Provisioning Considerations

| The following is a list of questions which are required for con-
| figuration of the SBA. Contact Sandeep Mathur, Project Manager
| for SBA, with additional questions/comments at (919)992-0522.
| Questions to be input to NTACCESS, and reviewed during CI process
| with the customer. The main intent of these questions is to ensure
| the customer has this data available. Nortel does not require
| answers to these questions, especially when passwords are in-
| volved.

| Downstream Processing Management System (DPMS) Configuration

RELEASE 06.03
13 July 1998

| 1. What type of system is the downstream DPMS? Unix or VMS

| The next 5 questions pertain to the downstream collector. Current
| implementation of SBA requires this information if the billing
| files are to be sent from the SDM to the downstream collector via
| push technology.

| 2. What is the IP address of primary DPMS?

| 3. What is the IP address of secondary DPMS?

| 4. What is the login ID of the DPMS (used for both primary and
| secondary DPMSs)?

| 5. What is the Password for the login ID above?

| 6. What is the path to the directory for storing the standard AMA
| files on DPMS (both primary and secondary)?

RELEASE 06.03
13 July 1998

Transmission Time Settings

1. How often is needed for the automatic transmissions to the DPMS to occur? NOTE-If entering the value using the installation script, then the value will be in minutes. Is there a block of time that the transmissions should occur withing? For example, only transmit the files between 8 PM and 12 Midnight. If yes, then,

2. Start time of transmissions?

3. Stop time of transmissions?

File Size Configurations

The default settings are provided in parenthesis. The first of these settings that is reached triggers the closing of the file.

1. What is the maximum size in BYTES of the files (20M)?

2. What is the maximum size in RECORDS of the files (500,000)?

3. Do you want the files to be closed after a defined elapse time (no)? If yes, answer question 4.

4. The maximum time in minutes that a file can be open (0080 = 1 week)?

Storage Occupancy

The default settings are provided in parenthesis.

1. The maximum occupancy level threshold for the primary billing files (90%)?

2. What is the disk utilization max. percentage before secondary files are removed (60%)?

3. What is the variance within which the disk utilization percentage is kept (5%)? For example, for the default values, SBA attempts to keep the disk utilization within 55% to 65%.

Source and Destination Identifiers

These parameters represent the source (DMS) and the downstream collector respectively. Each of these parameters are to be used in the naming of the billing files as they are stored in the SDM. They conform to the AMADNS specification as defined in the Bellcore GR-1343. The first two digits of the parameter represent the component type. This subfield must be within 01 and 15 inclusive. The last four digits of the parameter represent the component ID. This subfield must be within 0001 and 4096 inclusive.

RELEASE 06.03
13 July 1998

1. The identification code for the source?

2. The identification code for the destination?

Total Storage

The following formulas are dependent on the BBHCA (Billable Busy Hour Call Attempts), number of busy hours in a day and number of days retention for the office receiving SBA.

1. How much disk space on the SDM is needed to store billing files? (On the SDM, space can be added to the logical volume to be created with this size, but cannot be shrunk. The space can always be increased.)

$$\text{BBHCA} * \text{average record length in bytes} * \# \text{ of busy hours} * \# \text{ of days retention} = ?$$
 (for example, assuming one record per Busy Hour Call Attempt, 200,000 recs per hour * 100 bytes * 10 hours * 1 days = 2 Gigabyte (2,000,000,000 bytes).

2. On the DMS, two volumes should be configured as backup. These volumes must be allocated with adequate space to store at least 1 days worth of AMA data. The volume names can be a total of eight characters or less. Below is the recommended formula to calculate a days worth of AMA.

$$\text{BBHCA} * \text{average record length in bytes} * \# \text{ of busy hours} = ?$$
 (for example, 100,000 recs per hour * 100 bytes * 10 hours = 10 Megabytes (100,000,000 bytes). So each volume can be configured for 50 Megabytes.

16.2.4 Office Layout Information

Not applicable

16.2.5 Traffic Tables

Not applicable

16.3 Product/System Specification

16.3.1 Physical Characteristics

Not applicable

16.3.2 EMI/Earthquake Information

Not applicable

16.3.3 Sparing Information

Not applicable

16.3.4 Power Feed and Fusing Requirements

Not applicable

16.3.5 Current Drain Information

Not applicable

16.4 Software Provisioning

For NTX software packages to PLC/SOC mappings for CSP02 and beyond refer to ECM552 - Mapping of NTX/NTG Package to PCL/NCL/Option.

16.4.1 Required Software Packages and Interdependencies

Not applicable

16.4.2 Software Usage Restrictions

The features developed to support the first release of the SBA are being deployed in the NA007 and NA008 PCS's and the SDMN008 NCL.

16.4.3 Memory Provisioning

Not applicable

16.5 Real Time Impact

The SBA has the following CM storage requirements:

Buffers, 1.2M-bytes
Program Store, 15K-bytes
Miscellaneous, 300K-bytes

CPU real-time is TBD.

Real-time impact to the SDM is TBD.

Memory usage on the SDM is TBD.

NORTHERN TELECOM

RELEASE 06.03
13 July 1998

PLN-8991-104

Chapter 4

XPM BASED PERIPHERALS

THIS PAGE IS INTENTIONALLY LEFT BLANK

RELEASE 06.03
13 July 1998

XPM BASED PERIPHERALS
Section Contents

1.0	ECM383 - China Project	4-1
1.1	Overview	4-1
1.2	Hardware Provisioning	4-1
1.2.1	Hardware Usage Restrictions	4-1
1.2.2	Hardware Dependencies	4-1
1.2.2.1	P and C Side Port Requirements	4-1
1.2.2.2	DMS BUS Port Requirements	4-1
1.2.2.3	Circuits Per Card	4-1
1.2.2.4	Discrimination Numbering	4-1
1.2.3	Provisioning Considerations	4-1
1.2.4	Office Layout Information	4-5
1.2.5	Traffic Tables	4-5
1.3	Product/System Specification	4-5
1.3.1	Physical Characteristics	4-5
1.3.2	EMI/Earthquake Information	4-6
1.3.3	Sparing Information	4-6
1.3.4	Power Feed and Fusing Requirements	4-6
1.3.5	Current Drain Information	4-6
1.4	Software Provisioning	4-6
1.4.1	Required Software Packages and Interdependencies	4-6
1.4.2	Software Usage Restrictions	4-6
1.4.3	Memory Provisioning	4-6
1.5	Real Time Impact	4-6
2.0	ECM412 - DMS Digital Cross Connect	4-7
2.1	Overview	4-7
2.2	Hardware Provisioning	4-7
2.2.1	Hardware Usage Restrictions	4-7
2.2.2	Hardware Dependencies	4-8
2.2.2.1	P and C Side Port Requirements	4-8
2.2.2.2	DMS BUS Port Requirements	4-8
2.2.2.3	Circuits Per Card	4-8
2.2.2.4	Discrimination Numbering	4-8
2.2.3	Provisioning Considerations	4-8
2.2.4	Office Layout Information	4-8
2.2.5	Traffic Tables	4-8
2.3	Product/System Specification	4-8
2.3.1	Physical Characteristics	4-8
2.3.2	EMI/Earthquake Information	4-8
2.3.3	Sparing Information	4-8
2.3.4	Power Feed and Fusing Requirements	4-8
2.3.5	Current Drain Information	4-8
2.4	Software Provisioning	4-8
2.4.1	Required Software Packages and Interdependencies	4-8
2.4.2	Software Usage Restrictions	4-9
2.4.3	Memory Provisioning	4-9
2.5	Real Time Impact	4-9
3.0	ECM441 - XPM Power Provisioning	4-10

RELEASE 06.03
13 July 1998

3.1	Overview	4-10
3.2	Hardware Provisioning	4-10
3.2.1	Hardware Usage Restrictions	4-10
3.2.2	Hardware Dependencies	4-10
3.2.2.1	P and C Side Port Requirements	4-10
3.2.2.2	DMS BUS Port Requirements	4-10
3.2.2.3	Circuits Per Card	4-10
3.2.2.4	Discrimination Numbering	4-10
3.2.3	Provisioning Considerations	4-10
3.2.4	Office Layout Information	4-78
3.2.5	Traffic Tables	4-78
3.3	Product/System Specification	4-78
3.3.1	Physical Characteristics	4-78
3.3.2	EMI/Earthquake Information	4-78
3.3.3	Sparing Information	4-78
3.3.4	Power Feed and Fusing Requirements	4-78
3.3.5	Current Drain Information	4-78
3.4	Software Provisioning	4-79
3.4.1	Required Software Packages and Interdependencies	4-79
3.4.2	Software Usage Restrictions	4-79
3.4.3	Memory Provisioning	4-79
3.5	Real Time Impact	4-79
4.0	ECM507 - HPR (High Performance Routing) Provisioning	4-80
4.1	Overview	4-80
4.2	Hardware Provisioning	4-80
4.2.1	Hardware Usage Restrictions	4-80
4.2.2	Hardware Dependencies	4-80
4.2.2.1	P and C Side Port Requirements	4-80
4.2.2.2	DMS BUS Port Requirements	4-80
4.2.2.3	Circuits Per Card	4-80
4.2.2.4	Discrimination Numbering	4-80
4.2.3	Provisioning Considerations	4-80
4.2.4	Office Layout Information	4-81
4.2.5	Traffic Tables	4-81
4.3	Product/System Specification	4-81
4.3.1	Physical Characteristics	4-81
4.3.2	EMI/Earthquake Information	4-82
4.3.3	Sparing Information	4-82
4.3.4	Power Feed and Fusing Requirements	4-83
4.3.5	Current Drain Information	4-83
4.4	Software Provisioning	4-83
4.4.1	Required Software Packages and Interdependencies	4-83
4.4.2	Software Usage Restrictions	4-83
4.4.3	Memory Provisioning	4-83
4.5	Real Time Impact	4-83
5.0	ECM568 - Cabinetized Global Peripheral Platform (CGPP)	4-84
5.1	Overview	4-84
5.2	Hardware Provisioning	4-85
5.2.1	Hardware Usage Restrictions	4-85
5.2.2	Hardware Dependencies	4-86

RELEASE 06.03
13 July 1998

5.2.2.1	P and C Side Port Requirements	4-86
5.2.2.2	DMS BUS Port Requirements	4-87
5.2.2.3	Circuits Per Card	4-87
5.2.2.4	Discrimination Numbering	4-87
5.2.3	Provisioning Considerations	4-87
5.2.4	Office Layout Information	4-87
5.2.5	Traffic Tables	4-87
5.3	Product/System Specification	4-88
5.3.1	Physical Characteristics	4-88
5.3.2	EMI/Earthquake Information	4-89
5.3.3	Sparing Information	4-89
5.3.4	Power Feed and Fusing Requirements	4-89
5.3.5	Current Drain Information	4-89
5.4	Software Provisioning	4-90
5.4.1	Required Software Packages and Interdependencies	4-90
5.4.2	Software Usage Restrictions	4-91
5.4.3	Memory Provisioning	4-91
5.5	Real Time Impact	4-91
6.0	ECM597 - SPM OC-3	4-92
6.1	Overview	4-92
6.2	Hardware Provisioning	4-95
6.2.1	Hardware Usage Restrictions	4-95
6.2.2	Hardware Dependencies	4-95
6.2.2.1	P and C Side Port Requirements	4-96
6.2.2.2	DMS BUS Port Requirements	4-96
6.2.2.3	Circuits Per Card	4-96
6.2.2.4	Discrimination Numbering	4-97
6.2.3	Provisioning Considerations	4-97
6.2.3.1	DSP Provisioning Tables	4-98
6.2.3.2	VSP Provisioning Tables	4-99
6.2.4	Office Layout Information	4-100
6.2.5	Traffic Tables	4-100
6.3	Product/System Specification	4-103
6.3.1	Physical Characteristics	4-103
6.3.2	EMI/Earthquake Information	4-103
6.3.3	Sparing Information	4-103
6.3.4	Power Feed and Fusing Requirements	4-104
6.3.5	Current Drain Information	4-104
6.4	Software Provisioning	4-104
6.4.1	Required Software Packages and Interdependen- cies	4-104
6.4.2	Software Usage Restrictions	4-105
6.4.3	Memory Provisioning	4-105
6.5	Real Time Impact	4-105
7.0	ECM615 - DMS - Service Control Point (DMS-SCP) II	4-106
7.1	Overview	4-106
7.1.1	DMS-SCP II Hardware Description	4-107
7.2	Hardware Provisioning	4-110
7.2.1	Hardware Usage Restrictions	4-110
7.2.2	Hardware Dependencies	4-110

RELEASE 06.03
13 July 1998

7.2.2.1	P and C Side Port Requirements	4-110
7.2.2.2	DMS BUS Port Requirements	4-110
7.2.2.3	Circuits Per Card	4-110
7.2.2.4	Discrimination Numbering	4-110
7.2.3	Provisioning Considerations	4-110
7.2.3.1	LPP Prpvvisioning Guidelines	4-110
7.2.3.2	Service Management System (SMS)	4-114
7.2.3.3	DMS SuperNode Equipment	4-116
7.2.3.4	Trunk Module Equipment (TME)	4-116
7.2.3.5	Double Shelf Network	4-117
7.2.3.6	Input/Output Equipment	4-117
7.2.3.7	Power Distribution Center	4-117
7.2.3.8	Miscellaneous Equipment Frame	4-117
7.2.3.9	Maintenance Spares Storage	4-117
7.2.3.10	Application Processor Cabinet	4-117
7.2.3.11	Enhanced 800 + Services Provisioning	4-120
7.2.4	Office Layout Information	4-129
7.2.5	Traffic Tables	4-130
7.3	Product/System Specification	4-130
7.3.1	Physical Characteristics	4-130
7.3.2	EMI/Earthquake Information	4-130
7.3.3	Sparing Information	4-130
7.3.4	Power Feed and Fusing Requirements	4-130
7.3.5	Current Drain Information	4-130
7.4	Software Provisioning	4-130
7.4.1	Required Software Packages and Interdependen- cies	4-130
7.4.2	Software Usage Restrictions	4-131
7.4.3	Memory Provisioning	4-131
7.5	Real Time Impact	4-131
8.0	ECM643 - International Common Peripheral Equipment Frame	4-132
8.1	Overview	4-132
8.2	Hardware Provisioning	4-132
8.2.1	Hardware Usage Restrictions	4-132
8.2.2	Hardware Dependencies	4-133
8.2.2.1	P and C Side Port Requirements	4-133
8.2.2.2	DMS BUS Port Requirements	4-133
8.2.2.3	Circuits Per Card	4-133
8.2.2.4	Discrimination Numbering	4-134
8.2.3	Provisioning Considerations	4-134
8.2.4	Office Layout Information	4-143
8.2.5	Traffic Tables	4-143
8.3	Product/System Specification	4-143
8.3.1	Physical Characteristics	4-143
8.3.2	EMI/Earthquake Information	4-144
8.3.3	Sparing Information	4-144
8.3.4	Power Feed and Fusing Requirements	4-144
8.3.5	Current Drain Information	4-144
8.4	Software Provisioning	4-144
8.4.1	Required Software Packages and Interdependen- cies	4-144

RELEASE 06.03

13 July 1998

8.4.2	Software Usage Restrictions	4-146
8.4.3	Memory Provisioning	4-146
8.5	Real Time Impact	4-146
9.0	ECM669 - Cabinetized International Peripheral Equipment Fiber ISDN,	4-147
9.1	Overview	4-147
9.2	Hardware Provisioning	4-148
9.2.1	Hardware Usage Restrictions	4-148
9.2.2	Hardware Dependencies	4-148
9.2.2.1	P and C Side Port Requirements	4-148
9.2.2.2	DMS BUS Port Requirements	4-148
9.2.2.3	Circuits Per Card	4-149
9.2.2.4	Discrimination Numbering	4-149
9.2.3	Provisioning Considerations	4-149
9.2.4	Office Layout Information	4-149
9.2.5	Traffic Tables	4-149
9.3	Product/System Specification	4-149
9.3.1	Physical Characteristics	4-149
9.3.2	EMI/Earthquake Information	4-149
9.3.3	Sparing Information	4-149
9.3.4	Power Feed and Fusing Requirements	4-149
9.3.5	Current Drain Information	4-149
9.4	Software Provisioning	4-149
9.4.1	Required Software Packages and Interdependencies	4-149
9.4.2	Software Usage Restrictions	4-149
9.4.3	Memory Provisioning	4-150
9.5	Real Time Impact	4-150
10.0	ECM704 - International EXTended Peripheral Modules - XPM	4-151
10.1	Overview	4-151
10.1.1	NTFX33AA Meridian Cabinet Trunk Module (MCTM)	4-151
10.1.2	NTFX33CA Line Trunk Equipment Module (LTEM)	4-152
10.1.3	NTNX33FA (MD) Meridian Cab. Trunk Module (MCTM)	4-153
10.1.4	NTNX33GA (MD) Fiber Cab. Trunk Module (FCTM-ISDN)	4-153
10.1.5	NTRX46AA (MD) Cab. Intern. Peripheral Equip. (CIPE)	4-154
10.1.6	NTRX46CA Cabinitized International Peripheral	4-155
10.1.7	NTRX47AA (MD) Int.Cabinet Digital Cont. (CIDC)	4-156
10.1.8	NT6X01AC Frame Common Peripheral Equip. (ICPE)	4-157
10.1.9	NT6X01BA Intern. Common Peripheral Eq. (ICPE)	4-157
10.2	Hardware Provisioning	4-158
10.2.1	Hardware Usage Restrictions	4-158
10.2.2	Hardware Dependencies	4-159
10.2.2.1	P and C Side Port Requirements	4-160
10.2.2.2	DMS BUS Port Requirements	4-160
10.2.2.3	Circuits Per Card	4-160
10.2.2.4	Discrimination Numbering	4-160
10.2.3	Provisioning Considerations	4-161
10.2.4	Office Layout Information	4-161

RELEASE 06.03

13 July 1998

10.2.5	Traffic Tables	4-161
10.3	Product/System Specification	4-162
10.3.1	Physical Characteristics	4-162
10.3.2	EMI/Earthquake Information	4-162
10.3.3	Sparing Information	4-163
10.3.4	Power Feed and Fusing Requirements	4-163
10.3.5	Current Drain Information	4-163
10.4	Software Provisioning	4-163
10.4.1	Required Software Packages and Interdependencies	4-164
10.4.2	Software Usage Restrictions	4-164
10.4.3	Memory Provisioning	4-164
10.5	Real Time Impact	4-164
11.0	ECM712 - PM Purchase Requirements	4-165
11.1	Overview	4-165
11.2	Hardware Provisioning	4-166
11.2.1	Hardware Usage Restrictions	4-166
11.2.2	Hardware Dependencies	4-166
11.2.2.1	P and C Side Port Requirements	4-166
11.2.2.2	DMS BUS Port Requirements	4-166
11.2.2.3	Circuits Per Card	4-167
11.2.2.4	Discrimination Numbering	4-167
11.2.3	Provisioning Considerations	4-167
11.2.3.1	ECM References	4-167
11.2.4	Office Layout Information	4-172
11.2.5	Traffic Tables	4-172
11.3	Product/System Specification	4-172
11.3.1	Physical Characteristics	4-172
11.3.2	EMI/Earthquake Information	4-172
11.3.3	Sparing Information	4-172
11.3.4	Power Feed and Fusing Requirements	4-172
11.3.5	Current Drain Information	4-172
11.4	Software Provisioning	4-172
11.4.1	Required Software Packages and Interdependencies	4-172
11.4.2	Software Usage Restrictions	4-173
11.4.3	Required Software Packages and Interdependencies	4-173
11.4.4	Memory Provisioning	4-173
11.5	Real Time Impact	4-173
12.0	ECM714 - Domestic XPMs and Subscriber Carrier Modules	4-174
12.1	Overview	4-174
12.1.1	Subscriber Carrier Modules	4-175
12.1.1.1	SMS	4-176
12.1.1.2	SMS-R	4-177
12.1.1.3	SMU	4-178
12.1.2	Peripheral Packfills	4-187
12.2	Hardware Provisioning	4-190
12.2.1	Hardware Usage Restrictions	4-190
12.2.2	Hardware Dependencies	4-196

RELEASE 06.03
13 July 1998

12.2.2.1	P and C Side Port Requirements . . .	4-197
12.2.2.2	DMS BUS Port Requirements	4-199
12.2.2.3	Circuits Per Card	4-199
12.2.2.4	Discrimination Numbering	4-199
12.2.3	Provisioning Considerations	4-200
12.2.3.1	DTC/LGC/LTC Peripheral Controller Modules	4-200
12.2.3.2	SMS/SMU/SMS-R Line Test	4-200
12.2.3.3	SMS Considerations	4-200
12.2.3.4	SMU Considerations	4-201
12.2.3.5	SMS-R Considerations	4-201
12.2.4	Office Layout Information	4-202
12.2.5	Traffic Tables	4-203
12.3	Product/System Specification	4-208
12.3.1	Physical Characteristics	4-208
12.3.2	EMI/Earthquake Information	4-208
12.3.3	Sparing Information	4-209
12.3.4	Power Feed and Fusing Requirements	4-209
12.3.5	Current Drain Information	4-210
12.4	Software Provisioning	4-211
12.4.1	Required Software Packages and Interdependen- cies	4-211
12.4.2	Software Usage Restrictions	4-218
12.4.3	Memory Provisioning	4-220
12.5	Real Time Impact	4-220
12.5.1	Real Time Engineering (BRI)	4-221
12.5.2	Real Time Engineering (PRI)	4-223
12.5.3	Unified Processor (XPM+)	4-223

THIS PAGE IS INTENTIONALLY LEFT BLANK

1.0 ECM383 - China Project

1.1 Overview

N/A

1.2 Hardware Provisioning

1.2.1 Hardware Usage Restrictions

UTR and GTR cannot exist in the same module. For an upgrade situation, the existing UTRs need to be removed and replaced by GTRs in addition to the GTRs being provisioned.

1.2.2 Hardware Dependencies

N/A

1.2.2.1 P and C Side Port Requirements

N/A

1.2.2.2 DMS BUS Port Requirements

N/A

1.2.2.3 Circuits Per Card

N/A

1.2.2.4 Discrimination Numbering

N/A

1.2.3 Provisioning Considerations

Network

Provide the International A-Law Double Shelf Network NT8X10AA.

Provide one (1) NT8X11BA to equip each network.

Reference ECM-191 for further provisioning details.

Line Cards

The following line cards are available for the China market:

- Provide one (1) NT6X93CA China Type 'A' Line Card for each POTS line.

RELEASE 06.03
13 July 1998

- Provide one (1) NT6X93FA China Type 'A' Extended Ran Card for each POTS line with a loop length longer than the standard loop length.
- Provide one (1) NT6X94CA China Type 'B' Line Card for each line requiring meter pulsing control or for reversals for coin or PBX lines.
- Provide one (1) NT6X95AB Metering Tone Generator per line drawer equipped with type 'B' line cards that are used for meter pulsing control.

Line Card Module

Provide one (1) NT6X03AA Line Card Equipment Frame to accommodate up to two ILCM modules. Provide two (2) NT6X30DA Ringing Generators to support analog ringing.

To equip the ILCM, provide one (1) NT6X04BA ILCM Common CP fill.

Provide up to ten (10) NT6X05BA Line Drawers per each ILCM. Each line drawer will accommodate up to sixty-four (64) line cards.

Common Peripheral Controllers

Provision one (1) NT6X01BA International Common Peripheral Controller Equipment Frame to accommodate up to two (2) ILGC or IDTC modules. To equip the IDTC provide one (1) NT6X02KE IDTC Common CP fill. To equip the ILGC provide one (1) NT6X02KF ILGC Common CP fill.

The following circuit packs are provisionable on the Peripheral Controller Module:

IDTC

Provide up to eight (8) NT6X27AA PCM-30 Interface Circuit Packs per IDTC module. Each NT6X27AA circuit pack has two (2) PCM-30 circuits.

Provide two NT6X27AB PCM-30 Interface Circuit Packs per IDTC when inter-office synchronization is required. The NT6X27AB circuit packs are assigned to slot 4 of the IDTA shelf in place of a NT6X27AA circuit pack.

If inter-office synchronization is to be provided, two IDTC modules in the office should be equipped with NT6X27AB circuit packs.

RELEASE 06.03
13 July 1998

Provide zero (0), two (2) or four (4) Universal Tone Receivers NT6X92CA or NT6X92EA Global Tone Receivers as required per IDTC module. One pair of GTR CP's contains the equivalent of thirty receivers.

Provide two (2) NT6X28AA PCM-30 Signalling CP per IDTC if TS 16 signalling is used on the PCM link.

ILGC

Provide four (4) NT6X48AA DS-30A Interface Circuit Packs. Each pair of NT6X48AA circuit packs provides ten DS-30 ports for a total of twenty DS-30A ports.

Provide zero (0), two (2) or four (4) Universal Tone Receivers NT6X92CA or NT6X92EA Global Tone Receivers as required. One pair of GTR CP's contains the equivalent of thirty receivers.

Provide two (2) NT6X28AA PCM-30 Signalling CP if the ILGC supports ILCM modules equipped with Metering Tone Generator NT6X95AB.

Service Circuits

The service circuits are equipped on the International MTM Shelf NT2X58AT. Provide one (1) NT2X58AS MTM Common CP fill to equip the MTM shelf.

For DRA provide one (1) NT2X58AU International MTM DRA Shelf. Equip it with NT2X58AS Common CP fill.

The only new service circuit for China is the NT1X00KA 102 Test Trunk. Provision the service circuits according to provisioning rules in the Engineering Manual (Section EMA14-01-000). In general provision the International (A-Law) version of the service circuit if it exists.

Remotes

Provide one (1) NT6X14AA Remote Line Concentrating Module to accommodate up to 640 lines.

Provide one (1) NT6X04BA ILCM Common CP to equip the ILCM.

Provide up to ten (10) NT6X05BA Line Drawers per each ILCM. Each line drawer will accommodate up to sixty-four (64) line cards.

RELEASE 06.03
13 July 1998

Provide one (1) NT6X13BA International RMM Common CP to equip the Remote Maintenance Module.

Provide one (1) NT6X11KA International HIE Common CP to equip the Host Interface Equipment shelf.

Provision the following circuit packs as required:

Provide two (2) NT6X60DA Ringing Generators to support analog ringing.

Two (2) NT6X27AB PCM-30 Interface Circuit Packs are always provided allowing up to four (4) PCM-30 links to the host.

A third PCM-30 Interface Circuit Pack NT6X27AB may be provisioned to provide up to six (6) PCM-30 links to the host.

ESA Option

For emergency stand alone, provision the following circuit packs:

- One (1) NT6X47AB Master Process Memory CP
- One (1) NT6X45AF LGC/DTC Processor CP
- One (1) NT6X75KA ESA Tone & Clock CP (China)

For ESA, provision A-Law DTMF Receiver CP NT2X48CC on the RMM shelf as per traffic requirements.

Refer to ECM 381, IRLCM-ESA, for more information on the provisioning of IRLCM-ESA.

ITOPS

Please refer to ECM 361 for provisioning information on ITOPS.

MODEMS

GDC 212A/L shall be used for all China modem applications. The part numbers are as follows:

071A001-002 Standalone, 220VAC

071P001-002 Rackmount, DC-powered - MD'ed on Issue 10 of this document and replaced by...

049P038-001 GDC DC596 Rackmount Modem
(Mounts on NT5X09AA GDC DS-5 Modem Shelf)

RELEASE 06.03
13 July 1998

| # = MD'ed

The various China applications are as follows:

ETAS modems using IOC interface
1 00 Baud, Dial-Up, 2-Wire, Full-Duplex

Modems for Remote VDU/PRT using IOC interface
1 00 Baud, Dedicated, 2-Wire, Full-Duplex

Modems for ITOPS PRT using NT3X02AA/3X03AA Digital Modem interface
3 0 Baud, Dedicated, 2-Wire, Full-Duplex

Modems for Service Hall printer using NT3X02AA/03AA Digital Modem I/F
3 0 Baud, Dedicated, 2-Wire, Full-Duplex

PRINTERS

Order the DEC LA75-AZ 240VAC R/O Printer (LA75-AZ) for Service Hall applications. Order one 25 PIN H8571-D ADAPTER CABLE, (H8571-D) for each LA75-AZ R/O Printer.

Despite its 240VAC rating, the LA75-AZ will operate in a 220VAC environment.

Included in the PEC for the LA75-AZ printer are one Table Top Stand (DEC Part No. LAXXS-AA) one Box of 6 Ink Ribbons (LA50R-06) and one box 9 1/2" x 11" 1 part paper (H9850-PH).

1.2.4 Office Layout Information

N/A

1.2.5 Traffic Tables

N/A

1.3 Product/System Specification

1.3.1 Physical Characteristics

N/A

1.3.2 EMI/Earthquake Information

N/A

1.3.3 Sparing Information

N/A

1.3.4 Power Feed and Fusing Requirements

N/A

1.3.5 Current Drain Information

N/A

1.4 Software Provisioning

For NTX software packages to PLC/SOC mappings for CSP02 and beyond refer to ECM552 - Mapping of NTX/NTG Package to PCL/NCL/Option.

1.4.1 Required Software Packages and Interdependencies

N/A

1.4.2 Software Usage Restrictions

N/A

1.4.3 Memory Provisioning

N/A

1.5 Real Time Impact

RELEASE 06.03
13 July 1998

2.0 ECM412 - DMS Digital Cross Connect

2.1 Overview

Special Connections are permanent or "nailed up" connections between "end points". The connections provide for two way, 64kbits/sec PCM data communication between the endpoints and are made in the XPM. This feature allows Special Connections between endpoints that terminate on different XPMs and allows Special Connections that terminate on DTCs, LTCs and LGCs. This is accomplished by removing the restriction that prohibited inter-node connections and adding DTCs, LTCs and LGCs to the list of allowed endpoints.

In order to lift the restriction that Special Connections can only be made on endpoints that have a common XPM, CC network connections become a requirement and will be added as part of this feature. It should be noted that Special Connections involving paths through Network Modules will decrease the number of channels available to Call Processing.

Special Connections involving a connection through a Network Module are established by adding the connection to Table SPECCONN and are disconnected by deleting the connection from the same Table.

2.2 Hardware Provisioning

2.2.1 Hardware Usage Restrictions

The following restrictions apply to the use of Special Connections:

- It is the responsibility of the user to handle recovery from Special Connection failures.
- Endpoints may not terminate on LCMs.
- SMUs cannot handle Special Connections involving paths through Network Modules.
- This feature will not do any checking to ensure that endpoints are compatible.
- A loop around connection consists of 2 P-side to C-side connections which are looped back to back (via a formatter card) through the time switch of an XPM. IAC, LTC, LGC, DTC and SMU are the only valid XPMs to support a loop around connection.
- A common node is an XPM that can support a loop around connection of a Special Connection. ISLMs and RCUs cannot support loop around connections and therefore cannot be the common node.

- This feature assumes that ISDN terminals are connected to the IAC through permanent connections in the ISLM.

2.2.2 Hardware Dependencies

2.2.2.1 P and C Side Port Requirements

2.2.2.2 DMS BUS Port Requirements

Not applicable

2.2.2.3 Circuits Per Card

2.2.2.4 Discrimination Numbering

2.2.3 Provisioning Considerations

2.2.4 Office Layout Information

Not applicable.

2.2.5 Traffic Tables

Not applicable.

2.3 Product/System Specification

2.3.1 Physical Characteristics

2.3.2 EMI/Earthquake Information

2.3.3 Sparing Information

Not applicable.

2.3.4 Power Feed and Fusing Requirements

2.3.5 Current Drain Information

2.4 Software Provisioning

For NTX software packages to PLC/SOC mappings for CSP02 and beyond refer to ECM552 - Mapping of NTX/NTG Package to PCL/NCL/Option.

2.4.1 Required Software Packages and Interdependencies

The Special Connections Enhancements feature is provided in feature package NTXA69AA. Refer to the appropriate BCS packaging API/ECM and other availability reports to identify the valid or-

RELEASE 06.03
13 July 1998

dering date for the software. Package NTXA69AA needs the following:

NTX000AA	Bilge
NTX001AA	Common Basic
NTX270AA	New Peripheral Maintenance Package
NTX901AA	Local Features I

2.4.2 Software Usage Restrictions

2.4.3 Memory Provisioning

The DMS Digital Cross Connect feature requires the following memory:

Program Store Overhead	: 14091 bytes
Data Store Overhead	: 5876 words

Note that the overhead values are based upon the sum total of all software modules within each software package. Any redundant modules within the software load will not be counted in memory requirements and may result in a lesser memory impact for this feature. Refer to the latest MEMCALC for a more precise value.

2.5 Real Time Impact

This feature does not impact either CC or XPM Real Time engineering rules. Existing traffic engineering guidelines do not require change as a result of this feature.

RELEASE 06.03
13 July 1998

3.0 ECM441 - XPM Power Provisioning

3.1 Overview

The XMS-based Peripheral Modules (XPM) were introduced into the DMS-100 Family as the Series II Peripheral Modules. An XMS-based Peripheral Module (XPM) is any one of the following modules: DTC, LGC, LTC, SMU, SMS, SMR. Since their introduction, the XPMs have evolved into peripherals that offer a wide variety of features and options.

Some of these features and options have related hardware that must be located in certain XPMs. However, each XPM has a maximum allowable power limit that must be taken into consideration when provisioning XPMs. This document provides the engineering information and power worksheets needed to calculate the power consumption of an XPM.

The XPM is part of the DMS-100 Family line of products.

3.2 Hardware Provisioning

3.2.1 Hardware Usage Restrictions

Not applicable

3.2.2 Hardware Dependencies

Not applicable

3.2.2.1 P and C Side Port Requirements

Not applicable

3.2.2.2 DMS BUS Port Requirements

Not applicable

3.2.2.3 Circuits Per Card

Not applicable

3.2.2.4 Discrimination Numbering

Not applicable

3.2.3 Provisioning Considerations

The power worksheets in this section shall be used to determine the power consumption of an XPM. Only one (1) worksheet for each type of module is included in this document. The power consumption

RELEASE 06.03
13 July 1998

of each XPM in a DMS office must be calculated to ensure that no module is over the maximum allowable power limit. The power consumption of each module must be taken into consideration when provisioning XMS-based Peripheral Modules (XPM).

The following sections are included in this document:

- 10.1 DTC Power Worksheets
- 10.2 LGC Power Worksheets
- 10.3 LTC Power Worksheets
- 10.4 SMU Power Worksheets
- 10.5 SMS Power Worksheets
- 10.6 SMR Power Worksheets
- 10.7 SMS-R Power Worksheets

The following guidelines may be applied to XPMs at BCS 31-32 only:

- . DTC, SMU, SMS, SMR, and SMS-R modules at BCS 31 or 32 will not exceed the maximum allowable power limit. Therefore, power worksheets do not need to be utilized for these modules.
- . Power worksheets are not required for LGC and LTC modules at BCS 31 or 32 in the following situations:
 - a. LGC/LTC equipped with NT6X02LC/MC circuit pack fill (whether new or upgraded via NT6X02EQ or NT6X02BQ PC Kit).
 - b. LGC/LTC equipped with only one pair NT6X92BB Universal Tone Receivers.
 - c. LGC/LTC configured with two NT6X47AC Master Processor Memory circuit packs.
 - d. LGC/LTC configured with two NT6X69AB Message Protocol and Tone circuit packs, but not equipped with NT6X78AA Class Modem Resource circuit packs.

If any of these conditions exist in an LGC/LTC, then the power consumption for that module is under the maximum allowable power limit. However, if an LGC/LTC is not configured per any of these situations, a power worksheet should be utilized to ensure power consumption does not exceed the maximum allowable limit.

10.1 DTC Power Worksheets

RELEASE 06.03
13 July 1998

This section includes the power worksheets for the following DTC modules:

NT6X02AA
NT6X02AC
NT6X02AQ
NT6X02AS
NT6X02IA
NT6X02IC

***** PLEASE NOTE *****

The power consumption rating of each DTC module is based on the 2X70 Power Converter supporting the following DTC card slots:

Slots 01-24 of one (1) array/shelf in a module
Slots 01-05 of mate array/shelf in a module

Therefore, only the above card slots need to be looked at when completing the DTC power worksheets. However, if the module does not have an equal number of 6X50 cards in both top and bottom arrays, then a power worksheet MUST be completed for EACH array. This is because the 6X50 DS1 Interface CPs are not redundant, and the configuration of these cards depends on the port assignment.

RELEASE 06.03
13 July 1998

Designation = DTC:____

Power Used = _____ AMPS

Packfill = NT6X02AA

(Maximum is 45 AMPS)

DESCRIPTION	PEC	QTY	POWER USED PER PACK (AMPS)	TOTAL POWER USED (AMPS)
Base Packfill (packs included) (in stocklist)	NT6X02AA	N/A	N/A	29.56
DS1 Interface (select PEC)	NT6X50AA	(0 - 10)	1.10	
	NT6X50AB	(0 - 10)	0.87	
TOTAL (AMPS)				

RELEASE 06.03
13 July 1998

Designation = DTC:____ (Normal Operation: Max. = 50 AMPS)

Packfill = NT6X02AC (Power Share Mode: Max. = 55 AMPS)

DESCRIPTION	PEC	QTY	POWER USED PER PACK (AMPS)	TOTAL POWER USED (AMPS)
Base Packfill (packs included) (in stocklist)	NT6X02AC	N/A	N/A	29.56
DS1 Interface	NT6X50AA	(0 - 5)	1.10	
(select PEC)	NT6X50AB	(0 - 5)	0.87	
TOTAL (Normal Operation)				
DS1 Interface of Mate Array/Shelf	NT6X50AA	(0 - 5)	1.10	
(select PEC)	NT6X50AB	(0 - 5)	0.87	
TOTAL (Power Share Mode)				

RELEASE 06.03
13 July 1998

Designation = DTC:____ (Normal Operation: Max. = 50 AMPS)

Packfill = NT6X02AQ (Power Share Mode: Max. = 55 AMPS)

DESCRIPTION	PEC	QTY	POWER USED PER PACK (AMPS)	TOTAL POWER USED (AMPS)
Base Packfill (packs included) (in stocklist)	NT6X02AQ	N/A	N/A	31.16
DS1 Interface	NT6X50AA	(0 - 5)	1.10	
(select PEC)	NT6X50AB	(0 - 5)	0.87	
Continuity Tone Detector	NT6X70AA	(0 or 1)	1.43	
Universal Tone Receiver or	NT6X92BB	(0 - 2)	3.91	
Global Tone Receiver	NT6X92EA	(0 - 2)	1.20	
TOTAL (Normal Operation)				
DS1 Interface of Mate Array/Shelf	NT6X50AA	(0 - 5)	1.10	
(select PEC)	NT6X50AB	(0 - 5)	0.87	
TOTAL (Power Share Mode)				

RELEASE 06.03
13 July 1998

Designation = DTC:____ (Normal Operation: Max. = 50 AMPS)

Packfill = NT6X02AS (Power Share Mode: Max. = 55 AMPS)

DESCRIPTION	PEC	QTY	POWER USED PER PACK (AMPS)	TOTAL POWER USED (AMPS)
Base Packfill (packs included) (in stocklist)	NT6X02AS	N/A	N/A	21.95
DS30 Network I/F	NT6X40AA	2	1.96	3.92
XPM Processor (select PEC)	NT6X45AC NT6X45BA or NT6X45BB	(0 or 2) (0 or 2)	2.75 2.75	
MP Memory Plus (card slot 09)	NT6X47AB	(0 or 1)	2.31	
DS1 Interface (select PEC)	NT6X50AA NT6X50AB	(0 - 5) (0 - 5)	1.10 0.87	
Continuity Tone Detector	NT6X70AA	(0 or 1)	1.43	

(Continued on next page)

Universal Tone Receiver or	NT6X92BB	(0 - 2)	3.91	
Global Tone Receiver	NT6X92EA	(0 - 2)	1.20	
TOTAL (Normal Operation)				
DS1 Interface of Mate Array/Shelf	NT6X50AA	(0 - 5)	1.10	
(select PEC)	NT6X50AB	(0 - 5)	0.87	
TOTAL (Power Share Mode)				

RELEASE 06.03
13 July 1998

Designation = DTC:____ (Normal Operation: Max. = 50 AMPS)

Packfill = NT6X02IA (Power Share Mode: Max. = 55 AMPS)

DESCRIPTION	PEC	QTY	POWER USED PER PACK (AMPS)	TOTAL POWER USED (AMPS)
Base Packfill (packs included) (in stocklist)	NT6X02IA	N/A	N/A	20.39
DS30 Network I/F	NT6X40AC	1	0.82	0.82
XPM Processor	NT6X45AF	(0 or 2)	2.75	
(select PEC)	NT6X45BA or NT6X45BB	(0 or 2)	2.75	
MP Memory Plus	NT6X47AB		2.31	
(card slot 09)		(0 or 1)		
DS1 Interface	NT6X50AA	(0 - 5)	1.10	
(select PEC)	NT6X50AB	(0 - 5)	0.87	
Continuity Tone Detector	NT6X70AA		1.43	
		(0 or 1)		

(Continued on next page)

Universal Tone Receiver or	NT6X92BB	(0 - 2)	3.91	
Global Tone Receiver	NT6X92EA	(0 - 2)	1.20	
TOTAL (Normal Operation)				
DS1 Interface of Mate Array/Shelf	NT6X50AA	(0 - 5)	1.10	
(select PEC)	NT6X50AB	(0 - 5)	0.87	
TOTAL (Power Share Mode)				

RELEASE 06.03
13 July 1998

Designation = DTC:____ (Normal Operation: Max. = 50 AMPS)

Packfill = NT6X02IC (Power Share Mode: Max. = 55 AMPS)

DESCRIPTION	PEC	QTY	POWER USED PER PACK (AMPS)	TOTAL POWER USED (AMPS)
Base Packfill (packs included) (in stocklist)	NT6X02IC	N/A	N/A	6.78
DS30 Network I/F (select PEC)	NT6X40AA	(0 or 2)	1.96	
	NT6X40AC	(0 or 1)	0.82	
	NT6X40CA and NT6X40DA	(0 or 1)	3.45	
XPM Processor (select PEC)	NT6X45AF	(0 or 2)	2.75	
	NT6X45BA or NT6X45BB	(0 or 2)	2.75	
MP Memory Plus (select PEC)	NT6X47AB	(0 or 1 or 2)	2.31	
	NT6X47AC	(0 or 1)	1.01	
SP Memory Plus (select Pec)	NT6X46BA	(0 or 1)	2.96	

(Continued on next page)

RELEASE 06.03
13 July 1998

(select PEC)	NT6X46AC and NT6X1205	(0 or 1)	2.94	
DS1 Interface	NT6X50AA	(0 - 5)	1.10	
(select PEC)	NT6X50AB	(0 - 5)	0.87	
Msg Prot & Tone	NT6X69AA and NT6X79AA	(0 or 1)	5.80	
(select PEC)	NT6X69AB	(0 or 1)	4.22	
	NT6X69AC	(0 or 1)	1.02	
Continuity Tone Detector	NT6X70AA	(0 or 1)	1.43	
Universal Tone Receiver or	NT6X92BB	(0 - 2)	3.91	
Global Tone Receiver	NT6X92EA	(0 - 2)	1.20	
TOTAL (Normal Operation)				
DS1 Interface of Mate Array/Shelf	NT6X50AA	(0 - 5)	1.10	
(select PEC)	NT6X50AB	(0 - 5)	0.87	
TOTAL (Power Share Mode)				

1 .2 LGC Power Worksheets

RELEASE 06.03
13 July 1998

This section includes the power worksheets for the following LGC modules:

NT6X02AA
NT6X02AC
NT6X02AE
NT6X02AH
NT6X02AT
NT6X02LA
NT6X02LC

***** PLEASE NOTE *****

The power consumption rating of each LGC module is based on the 2X70 Power Converter supporting the following LGC card slots:

Slots 01-24 of one (1) array/shelf in a module
Slots 01-05 of mate array/shelf in a module

Therefore, only the above card slots need to be looked at when completing the LGC power worksheets. However, if the module does not have an equal number of 6X50 cards in both top and bottom arrays, then a power worksheet MUST be completed for EACH array. This is because the 6X50 DS1 Interface CPs are not redundant, and the configuration of these cards depends on the port assignment.

RELEASE 06.03
13 July 1998

Designation = LGC:____

Power Used = _____ AMPS

Packfill = NT6X02AA

(Maximum is 45 AMPS)

DESCRIPTION	PEC	QTY	POWER USED PER PACK (AMPS)	TOTAL POWER USED (AMPS)
Base Packfill (packs included) (in stocklist)	NT6X02AA	N/A	N/A	29.56
DS30A LCM I/F	NT6X48AA	(0 - 2)	1.32	
DS1 Interface	NT6X50AA	(0 - 5)	1.10	
(select PEC)	NT6X50AB	(0 - 5)	0.87	
TOTAL (AMPS)				

RELEASE 06.03
13 July 1998

Designation = LGC:____ (Normal Operation: Max. = 50 AMPS)

Packfill = NT6X02AC (Power Share Mode: Max. = 55 AMPS)

DESCRIPTION	PEC	QTY	POWER USED PER PACK (AMPS)	TOTAL POWER USED (AMPS)
Base Packfill (packs included) (in stocklist)	NT6X02AC	N/A	N/A	29.56
DS30A LCM I/F	NT6X48AA	(0 - 2)	1.32	
DS1 Interface	NT6X50AA	(0 - 5)	1.10	
(select PEC)	NT6X50AB	(0 - 5)	0.87	
TOTAL (Normal Operation)				
DS1 Interface of Mate Array/Shelf	NT6X50AA	(0 - 5)	1.10	
(select PEC)	NT6X50AB	(0 - 5)	0.87	
TOTAL (Power Share Mode)				

RELEASE 06.03
13 July 1998

Designation = LGC:____ (Normal Operation: Max. = 50 AMPS)

Packfill = NT6X02AE (Power Share Mode: Max. = 55 AMPS)

DESCRIPTION	PEC	QTY	POWER USED PER PACK (AMPS)	TOTAL POWER USED (AMPS)
Base Packfill (packs included) (in stocklist)	NT6X02AE	N/A	N/A	28.17
DS30A LCM I/F	NT6X48AA	(0 - 2)	1.32	
DS1 Interface	NT6X50AA	(0 - 5)	1.10	
(select PEC)	NT6X50AB	(0 - 5)	0.87	
TOTAL (Normal Operation)				
DS1 Interface of Mate Array/Shelf	NT6X50AA	(0 - 5)	1.10	
(select PEC)	NT6X50AB	(0 - 5)	0.87	
TOTAL (Power Share Mode)				

RELEASE 06.03
13 July 1998

Designation = LGC:____ (Normal Operation: Max. = 50 AMPS)

Packfill = NT6X02AH (Power Share Mode: Max. = 55 AMPS)

DESCRIPTION	PEC	QTY	POWER USED PER PACK (AMPS)	TOTAL POWER USED (AMPS)
Base Packfill (packs included) (in stocklist)	NT6X02AH	N/A	N/A	31.16
DS30A LCM I/F	NT6X48AA	(0 - 2)	1.32	
DS1 Interface	NT6X50AA	(0 - 5)	1.10	
(select PEC)	NT6X50AB	(0 - 5)	0.87	
Universal Tone Receiver or	NT6X92BB	(0 - 2)	3.91	
Global Tone Receiver	NT6X92EA	(0 - 2)	1.20	
TOTAL (Normal Operation)				
DS1 Interface of Mate Array/Shelf	NT6X50AA	(0 - 5)	1.10	
(select PEC)	NT6X50AB	(0 - 5)	0.87	
TOTAL (Power Share Mode)				

RELEASE 06.03
13 July 1998

Designation = LGC:____ (Normal Operation: Max. = 50 AMPS)

Packfill = NT6X02AT (Power Share Mode: Max. = 55 AMPS)

DESCRIPTION	PEC	QTY	POWER USED PER PACK (AMPS)	TOTAL POWER USED (AMPS)
Base Packfill (packs included) (in stocklist)	NT6X02AT	N/A	N/A	21.95
DS30 Network I/F	NT6X40AA	2	1.96	3.92
XPM Processor	NT6X45AC	(0 or 2)	2.75	
(select PEC)	NT6X45BA or NT6X45BB	(0 or 2)	2.75	
MP Memory Plus (card slot 09)	NT6X47AB	(0 or 1)	2.31	
DS30A LCM I/F	NT6X48AA	(0 - 2)	1.32	
DS1 Interface	NT6X50AA	(0 - 5)	1.10	
(select PEC)	NT6X50AB	(0 - 5)	0.87	
CLASS Modem Resource	NT6X78AA	(0 or 1)	2.78	

(Continued on next page)

Universal Tone Receiver or	NT6X92BB	(0 - 2)	3.91	
Global Tone Receiver	NT6X92EA	(0 - 2)	1.20	
TOTAL (Normal Operation)				
DS1 Interface of Mate Array/Shelf	NT6X50AA	(0 - 5)	1.10	
(select PEC)	NT6X50AB	(0 - 5)	0.87	
TOTAL (Power Share Mode)				

RELEASE 06.03
13 July 1998

Designation = LGC:____ (Normal Operation: Max. = 50 AMPS)

Packfill = NT6X02LA (Power Share Mode: Max. = 55 AMPS)

DESCRIPTION	PEC	QTY	POWER USED PER PACK (AMPS)	TOTAL POWER USED (AMPS)
Base Packfill (packs included) (in stocklist)	NT6X02LA	N/A	N/A	20.39
DS30 Network I/F	NT6X40AC	1	0.82	0.82
XPM Processor	NT6X45AF	(0 or 2)	2.75	
(select PEC)	NT6X45BA or NT6X45BB	(0 or 2)	2.75	
MP Memory Plus	NT6X47AB		2.31	
(card slot 09)		(0 or 1)		
DS30A LCM I/F	NT6X48AA		1.32	
		(0 - 2)		
DS1 Interface	NT6X50AA	(0 - 5)	1.10	
(select PEC)	NT6X50AB	(0 - 5)	0.87	
CLASS Modem Resource	NT6X78AA		2.78	
		(0 or 1)		

(Continued on next page)

Universal Tone Receiver or	NT6X92BB	(0 - 2)	3.91	
Global Tone Receiver	NT6X92EA	(0 - 2)	1.20	
TOTAL (Normal Operation)				
DS1 Interface of Mate Array/Shelf	NT6X50AA	(0 - 5)	1.10	
(select PEC)	NT6X50AB	(0 - 5)	0.87	
TOTAL (Power Share Mode)				

RELEASE 06.03
13 July 1998

Designation = LGC:____ (Normal Operation: Max. = 50 AMPS)

Packfill = NT6X02LC (Power Share Mode: Max. = 55 AMPS)

DESCRIPTION	PEC	QTY	POWER USED PER PACK (AMPS)	TOTAL POWER USED (AMPS)
Base Packfill (packs included) (in stocklist)	NT6X02LC	N/A	N/A	6.78
DS30 Network I/F (select PEC)	NT6X40AA	(0 or 2)	1.96	
	NT6X40AC		0.82	
		(0 or 1)		
	NT6X40CA or NT6X40DA	(0 or 1)	3.45	
XPM Processor (select PEC)	NT6X45AF	(0 or 2)	2.75	
	NT6X45BA or NT6X45BB	(0 or 2)	2.75	
MP Memory Plus (select PEC)	NT6X47AB	(0 or 1 or 2)	2.31	
	NT6X47AC	(0 or 1)	1.01	

(Continued on next page)

RELEASE 06.03
13 July 1998

SP Memory Plus	NT6X46BA	(0 or 1)	2.96	
(select PEC)	NT6X46AC and NT6X1205	(0 or 1)	2.94	
DS30A LCM I/F	NT6X48AA	(0 - 2)	1.32	
DS1 Interface	NT6X50AA	(0 - 5)	1.10	
(select PEC)	NT6X50AB	(0 - 5)	0.87	
Msg Prot & Tone	NT6X69AA and NT6X79AA	(0 or 1)	5.80	
(select PEC)	NT6X69AB	(0 or 1)	4.22	
	NT6X69AC	(0 or 1)	1.02	
CLASS Modem Resource	NT6X78AA	(0 or 1)	2.78	
Universal Tone Receiver or	NT6X92BB	(0 - 2)	3.91	
Global Tone Receiver	NT6X92EA	(0 - 2)	1.20	
TOTAL (Normal Operation)				

(Continued on next page)

RELEASE 06.03
13 July 1998

DS1 Interface of Mate Array/Shelf (select PEC)	NT6X50AA	(0 - 5)	1.10	
	NT6X50AB	(0 - 5)	0.87	
TOTAL (Power Share Mode)				

1 .3 LTC Power Worksheets

This section includes the power worksheets for the following LTC modules:

NT6X02AA
NT6X02AC
NT6X02AD
NT6X02AG
NT6X02AU
NT6X02MA
NT6X02MC

***** PLEASE NOTE *****

The power consumption rating of each LTC module is based on the 2X70 Power Converter supporting the following LTC card slots:

Slots 01-24 of one (1) array/shelf in a module
Slots 01-05 of mate array/shelf in a module

Therefore, only the above card slots need to be looked at when completing the LTC power worksheets. However, if the module does not have an equal number of 6X50 cards in both top and bottom arrays, then a power worksheet MUST be completed for EACH array. This is because the 6X50 DS1 Interface CPs are not redundant, and the configuration of these cards depends on the port assignment.

RELEASE 06.03
13 July 1998

Designation = LTC:____

Power Used = _____ AMPS

Packfill = NT6X02AA

(Maximum is 45 AMPS)

DESCRIPTION	PEC	QTY	POWER USED PER PACK (AMPS)	TOTAL POWER USED (AMPS)
Base Packfill (packs included) (in stocklist)	NT6X02AA	N/A	N/A	29.56
DS30A LCM I/F	NT6X48AA	(0 - 2)	1.32	
DS1 Interface	NT6X50AA	(0 - 10)	1.10	
(select PEC)	NT6X50AB	(0 - 10)	0.87	
TOTAL (AMPS)				

RELEASE 06.03
13 July 1998

Designation = LTC:____ (Normal Operation: Max. = 50 AMPS)

Packfill = NT6X02AC (Power Share Mode: Max. = 55 AMPS)

DESCRIPTION	PEC	QTY	POWER USED PER PACK (AMPS)	TOTAL POWER USED (AMPS)
Base Packfill (packs included) (in stocklist)	NT6X02AC	N/A	N/A	29.56
DS30A LCM I/F	NT6X48AA	(0 - 2)	1.32	
DS1 Interface	NT6X50AA	(0 - 5)	1.10	
(select PEC)	NT6X50AB	(0 - 5)	0.87	
TOTAL (Normal Operation)				
DS1 Interface of Mate Array/Shelf	NT6X50AA	(0 - 5)	1.10	
(select PEC)	NT6X50AB	(0 - 5)	0.87	
TOTAL (Power Share Mode)				

RELEASE 06.03
13 July 1998

Designation = LTC:____ (Normal Operation: Max. = 50 AMPS)

Packfill = NT6X02AD (Power Share Mode: Max. = 55 AMPS)

DESCRIPTION	PEC	QTY	POWER USED PER PACK (AMPS)	TOTAL POWER USED (AMPS)
Base Packfill (packs included) (in stocklist)	NT6X02AD	N/A	N/A	28.17
DS30A LCM I/F	NT6X48AA	(0 - 2)	1.32	
DS1 Interface	NT6X50AA	(0 - 5)	1.10	
(select PEC)	NT6X50AB	(0 - 5)	0.87	
TOTAL (Normal Operation)				
DS1 Interface of Mate Array/Shelf	NT6X50AA	(0 - 5)	1.10	
(select PEC)	NT6X50AB	(0 - 5)	0.87	
TOTAL (Power Share Mode)				

RELEASE 06.03
13 July 1998

Designation = LTC:____ (Normal Operation: Max. = 50 AMPS)

Packfill = NT6X02AG (Power Share Mode: Max. = 55 AMPS)

DESCRIPTION	PEC	QTY	POWER USED PER PACK (AMPS)	TOTAL POWER USED (AMPS)
Base Packfill (packs included) (in stocklist)	NT6X02AG	N/A	N/A	31.16
DS30A LCM I/F	NT6X48AA	(0 - 2)	1.32	
DS1 Interface	NT6X50AA	(0 - 5)	1.10	
(select PEC)	NT6X50AB	(0 - 5)	0.87	
Universal Tone Receiver or	NT6X92BB	(0 - 2)	3.91	
Global Tone Receiver	NT6X92EA	(0 - 2)	1.20	
TOTAL (Normal Operation)				
DS1 Interface of Mate Array/Shelf	NT6X50AA	(0 - 5)	1.10	
(select PEC)	NT6X50AB	(0 - 5)	0.87	
TOTAL (Power Share Mode)				

RELEASE 06.03
13 July 1998

Designation = LTC:____ (Normal Operation: Max. = 50 AMPS)

Packfill = NT6X02AU (Power Share Mode: Max. = 55 AMPS)

DESCRIPTION	PEC	QTY	POWER USED PER PACK (AMPS)	TOTAL POWER USED (AMPS)
Base Packfill (packs included) (in stocklist)	NT6X02AU	N/A	N/A	21.95
DS30 Network I/F	NT6X40AA	2	1.96	3.92
XPM Processor	NT6X45AC	(0 or 2)	2.75	
(select PEC)	NT6X45BA or NT6X45BB	(0 or 2)	2.75	
MP Memory Plus (card slot 09)	NT6X47AB	(0 or 1)	2.31	
DS30A LCM I/F	NT6X48AA	(0 - 2)	1.32	
DS1 Interface	NT6X50AA	(0 - 5)	1.10	
(select PEC)	NT6X50AB	(0 - 5)	0.87	
CLASS Modem Resource	NT6X78AA	(0 or 1)	2.78	

(Continued on next page)

Universal Tone Receiver or	NT6X92BB	(0 - 2)	3.91	
Global Tone Receiver	NT6X92EA	(0 - 2)	1.20	
TOTAL (Normal Operation)				
DS1 Interface of Mate Array/Shelf	NT6X50AA	(0 - 5)	1.10	
(select PEC)	NT6X50AB	(0 - 5)	0.87	
TOTAL (Power Share Mode)				

RELEASE 06.03
13 July 1998

Designation = LTC:____ (Normal Operation: Max. = 50 AMPS)

Packfill = NT6X02MA (Power Share Mode: Max. = 55 AMPS)

DESCRIPTION	PEC	QTY	POWER USED PER PACK (AMPS)	TOTAL POWER USED (AMPS)
Base Packfill (packs included) (in stocklist)	NT6X02MA	N/A	N/A	20.39
DS30 Network I/F	NT6X40AC	1	0.82	0.82
XPM Processor (select PEC)	NT6X45AF NT6X45BA or NT6X45BB	(0 or 2) (0 or 2)	2.75 2.75	
MP Memory Plus (card slot 09)	NT6X47AB	(0 or 1)	2.31	
DS30A LCM I/F	NT6X48AA	(0 - 2)	1.32	
DS1 Interface (select PEC)	NT6X50AA NT6X50AB	(0 - 5) (0 - 5)	1.10 0.87	
CLASS Modem Resource	NT6X78AA	(0 or 1)	2.78	

(Continued on next page)

Universal Tone Receiver or	NT6X92BB	(0 - 2)	3.91	
Global Tone Receiver	NT6X92EA	(0 - 2)	1.20	
TOTAL (Normal Operation)				
DS1 Interface of Mate Array/Shelf	NT6X50AA	(0 - 5)	1.10	
(select PEC)	NT6X50AB	(0 - 5)	0.87	
TOTAL (Power Share Mode)				

RELEASE 06.03
13 July 1998

Designation = LTC:____ (Normal Operation: Max. = 50 AMPS)

Packfill = NT6X02MC (Power Share Mode: Max. = 55 AMPS)

DESCRIPTION	PEC	QTY	POWER USED PER PACK (AMPS)	TOTAL POWER USED (AMPS)
Base Packfill (packs included) (in stocklist)	NT6X02MC	N/A	N/A	6.78
DS30 Network I/F (select PEC)	NT6X40AA	(0 or 2)	1.96	
	NT6X40AC	(0 or 1)	0.82	
	NT6X40CA and NT6X40DA	(0 or 1)	3.45	
XPM Processor (select PEC)	NT6X45AF	(0 or 2)	2.75	
	NT6X45BA or NT6X45BB	(0 or 2)	2.75	
MP Memory Plus (select PEC)	NT6X47AB	(0 or 1 or 2)	2.31	
	NT6X47AC	(0 or 1)	1.01	

(Continued on next page)

RELEASE 06.03
13 July 1998

SP Memory Plus	NT6X46BA	(0 or 1)	2.96	
(select PEC)	NT6X46AC and NT6X1205	(0 or 1)	2.94	
DS30A LCM I/F	NT6X48AA	(0 - 2)	1.32	
DS1 Interface	NT6X50AA	(0 - 5)	1.10	
(select PEC)	NT6X50AB	(0 - 5)	0.87	
Msg Prot & Tone	NT6X69AA and NT6X79AA	(0 or 1)	5.80	
(select PEC)	NT6X69AB	(0 or 1)	4.22	
	NT6X69AC	(0 or 1)	1.02	
CLASS Modem Resource	NT6X78AA	(0 or 1)	2.78	
Universal Tone Receiver or	NT6X92BB	(0 - 2)	3.91	
Global Tone Receiver	NT6X92EA	(0 - 2)	1.20	
TOTAL (Normal Operation)				

(Continued on next page)

RELEASE 06.03
13 July 1998

DS1 Interface of Mate Array/Shelf (select PEC)	NT6X50AA	(0 - 5)	1.10	
	NT6X50AB	(0 - 5)	0.87	
TOTAL (Power Share Mode)				

1 .4 SMU Power Worksheets

This section includes the power worksheets for the following SMU modules:

NT6X02EA
NT6X02AW
NT6X02EB
NT6X02EF
NT6X02EG
NT6X02EK

***** PLEASE NOTE *****

The power consumption rating of each SMU module is based on the 2X70 Power Converter supporting the following SMU card slots:

Slots 01-24 of one (1) array/shelf in a module
Slots 01-05 of mate array/shelf in a module

Therefore, only the above card slots need to be looked at when completing the SMU power worksheets. However, if the module does not have an equal number of 6X85 cards in both top and bottom arrays, then a power worksheet MUST be completed for EACH array. This is because the 6X85 DS1 Interface CPs are not redundant, and the configuration of these cards depends on the port assignment.

RELEASE 06.03
13 July 1998

Designation = SMU:____ (Normal Operation: Max. = 50 AMPS)

Packfill = NT6X02EA (Power Share Mode: Max. = 55 AMPS)

DESCRIPTION	PEC	QTY	POWER USED PER PACK (AMPS)	TOTAL POWER USED (AMPS)
Base Packfill (packs included) (in stocklist)	NT6X02EA	N/A	N/A	31.20
SCM DS1 Interface (select PEC)	NT6X85AA	(0 - 5)	1.52	
	NT6X85AB	(0 - 5)	1.31	
TOTAL (Normal Operation)				
SCM DS1 Interface of Mate Array/Shelf (select PEC)	NT6X85AA	(0 - 5)	1.52	
	NT6X85AB	(0 - 5)	1.31	
TOTAL (Power Share Mode)				

RELEASE 06.03
13 July 1998

Designation = SMU:____ (Normal Operation: Max. = 50 AMPS)

Packfill = NT6X02AW (Power Share Mode: Max. = 55 AMPS)

DESCRIPTION	PEC	QTY	POWER USED PER PACK (AMPS)	TOTAL POWER USED (AMPS)
Base Packfill (packs included) (in stocklist)	NT6X02AW	N/A	N/A	21.99
DS30 Network I/F	NT6X40AA	2	1.96	3.92
XPM Processor (select PEC)	NT6X45AC	(0 or 2)	2.75	
	NT6X45BA or NT6X45BB	(0 or 2)	2.75	
MP Memory Plus (2nd NT6X47AB)	NT6X47AB	(0 or 1)	2.31	
SCM DS1 Interface (select PEC)	NT6X85AA	(0 - 5)	1.52	
	NT6X85AB	(0 - 5)	1.31	
TOTAL (Normal Operation)				

(Continued on next page)

SCM	NT6X85AA		1.52	
DS1 Interface of		(0 - 5)		
Mate Array/Shelf	NT6X85AB		1.31	
(select PEC)		(0 - 5)		
TOTAL (Power Share Mode)				

RELEASE 06.03
13 July 1998

Designation = SMU:____ (Normal Operation: Max. = 50 AMPS)

Packfill = NT6X02EB (Power Share Mode: Max. = 55 AMPS)

DESCRIPTION	PEC	QTY	POWER USED PER PACK (AMPS)	TOTAL POWER USED (AMPS)
Base Packfill (packs included) (in stocklist)	NT6X02EB	N/A	N/A	22.01
DS30 Network I/F	NT6X40AC	1	0.82	0.82
XPM Processor	NT6X45AF	(0 or 2)	2.75	
(select PEC)	NT6X45BA or NT6X45BB	(0 or 2)	2.75	
MP Memory Plus (2nd NT6X47AB)	NT6X47AB	(0 or 1)	2.31	
SCM DS1 Interface	NT6X85AA	(0 - 5)	1.52	
(select PEC)	NT6X85AB	(0 - 5)	1.31	
TOTAL (Normal Operation)				

(Continued on next page)

SCM	NT6X85AA		1.52	
DS1 Interface of		(0 - 5)		
Mate Array/Shelf	NT6X85AB		1.31	
(select PEC)		(0 - 5)		
TOTAL (Power Share Mode)				

RELEASE 06.03
13 July 1998

Designation = SMU:____ (Normal Operation: Max. = 50 AMPS)

Packfill = NT6X02EF (Power Share Mode: Max. = 55 AMPS)

DESCRIPTION	PEC	QTY	POWER USED PER PACK (AMPS)	TOTAL POWER USED (AMPS)
Base Packfill (packs included) (in stocklist)	NT6X02EF	N/A	N/A	12.52
Network I/F (select PEC)	NT6X40AA	(0 or 2)	1.96	
	NT6X40AC	(0 or 1)	0.82	
	NT6X40CA and NT6X40DA	(0 or 1)	3.45	
XPM Processor (select PEC)	NT6X45AF or NT6X45AC	(0 or 2)	2.75	
	NT6X45BA or NT6X45BB	(0 or 2)	2.75	
MP Memory Plus (select pec)	NT6X47AB	(0 or 1 or 2)	2.31	
	NT6X47AC	(0 or 1)	1.01	

(Continued on next page)

RELEASE 06.03
13 July 1998

SP Memory Plus	NT6X46AC and NT6X1205	(0 or 1)	2.94	
(select pec)	NT6X46BA	(0 or 1)	2.96	
SCM DS1 Interface	NT6X85AA	(0 - 5)	1.52	
(select PEC)	NT6X85AB	(0 - 5)	1.31	
Msg Prot & Tone	NT6X69AB	(0 or 1)	4.22	
(select PEC)	NT6X69AC	(0 or 1)	1.02	
CLASS Modem Resource	NT6X78AA	(0 or 1)	2.78	
TOTAL (Normal Operation)				
SCM DS1 Interface of Mate Array/Shelf	NT6X85AA	(0 - 5)	1.52	
(select PEC)	NT6X85AB	(0 - 5)	1.31	
TOTAL (Power Share Mode)				

RELEASE 06.03
13 July 1998

Designation = SMU:____ (Normal Operation: Max. = 50 AMPS)

Packfill = NT6X02EG (Power Share Mode: Max. = 55 AMPS)

DESCRIPTION	PEC	QTY	POWER USED PER PACK (AMPS)	TOTAL POWER USED (AMPS)
Base Packfill (packs included) (in stocklist)	NT6X02EG	N/A	N/A	17.94
Network I/F (select PEC)	NT6X40AC	(0 or 1)	0.82	
	NT6X40CA and NT6X40DA	(0 or 1)	3.45	
SCM DS1 Interface (select PEC)	NT6X85AA	(0 - 5)	1.52	
	NT6X85AB	(0 - 5)	1.31	
Msg Prot & Tone (select PEC)	NT6X69AB	(0 or 1)	4.22	
	NT6X69AC	(0 or 1)	1.02	
CLASS Modem Resource	NT6X78AA	(0 or 1)	2.78	
TOTAL (Normal Operation)				

(Continued on next page)

SCM	NT6X85AA		1.52	
DS1 Interface of		(0 - 5)		
Mate Array/Shelf	NT6X85AB		1.31	
(select PEC)		(0 - 5)		
TOTAL (Power Share Mode)				

RELEASE 06.03
13 July 1998

Designation = SMU:____ (Normal Operation: Max. = 50 AMPS)

Packfill = NT6X02EK (Power Share Mode: Max. = 55 AMPS)

DESCRIPTION	PEC	QTY	POWER USED PER PACK (AMPS)	TOTAL POWER USED (AMPS)
Base Packfill (packs included) (in stocklist)	NT6X02EK	N/A	N/A	19.24
Network I/F	NT6X40AC	(0 or 1)	0.82	
(select PEC)	NT6X40CA and NT6X40DA	(0 or 1)	3.45	
SCM DS1 Interface	NT6X85AA	(0 - 5)	1.52	
(select PEC)	NT6X85AB	(0 - 5)	1.31	
Msg Prot & Tone	NT6X69AB	(0 or 1)	4.22	
(select PEC)	NT6X69AC	(0 or 1)	1.02	
CLASS Modem Resource	NT6X78AA	(0 or 1)	2.78	
TOTAL (Normal Operation)				

(Continued on next page)

RELEASE 06.03
13 July 1998

SCM	NT6X85AA		1.52	
DS1 Interface of		(0 - 5)		
Mate Array/Shelf	NT6X85AB		1.31	
(select PEC)		(0 - 5)		
TOTAL (Power Share Mode)				

1 .5 SMS Power Worksheets

This section includes the power worksheets for the following SMS modules:

NT6X02DA
NT6X02DB
NT6X02DC
NT6X02DD
NT6X02DH
NT6X02DJ
NT6X02DM

***** PLEASE NOTE *****

The power consumption rating of each SMS module is based on the 2X70 Power Converter supporting the following SMS card slots:

Slots 01-24 of one (1) array/shelf in a module
Slots 01-05 of mate array/shelf in a module

Therefore, only the above card slots need to be looked at when completing the SMS power worksheets. However, if the module does not have an equal number of 6X85 cards in both top and bottom arrays, then a power worksheet MUST be completed for EACH array. This is because the 6X85 DS1 Interface CPs are not redundant, and the configuration of these cards depends on the port assignment.

RELEASE 06.03
13 July 1998

Designation = SMS:____ (Normal Operation: Max. = 50 AMPS)

Packfill = NT6X02DA (Power Share Mode: Max. = 55 AMPS)

DESCRIPTION	PEC	QTY	POWER USED PER PACK (AMPS)	TOTAL POWER USED (AMPS)
Base Packfill (packs included) (in stocklist)	NT6X02DA	N/A	N/A	34.50
SCM DS1 Interface	NT6X85AA	(0 - 5)	1.52	
(select PEC)	NT6X85AB	(0 - 5)	1.31	
TOTAL (Normal Operation)				
SCM DS1 Interface of Mate Array/Shelf	NT6X85AA	(0 - 5)	1.52	
(select PEC)	NT6X85AB	(0 - 5)	1.31	
TOTAL (Power Share Mode)				

RELEASE 06.03
13 July 1998

Designation = SMS:____ (Normal Operation: Max. = 50 AMPS)

Packfill = NT6X02DB (Power Share Mode: Max. = 55 AMPS)

DESCRIPTION	PEC	QTY	POWER USED PER PACK (AMPS)	TOTAL POWER USED (AMPS)
Base Packfill (packs included) (in stocklist)	NT6X02DB	N/A	N/A	33.49
SCM DS1 Interface	NT6X85AA	(0 - 5)	1.52	
(select PEC)	NT6X85AB	(0 - 5)	1.31	
TOTAL (Normal Operation)				
SCM DS1 Interface of Mate Array/Shelf	NT6X85AA	(0 - 5)	1.52	
(select PEC)	NT6X85AB	(0 - 5)	1.31	
TOTAL (Power Share Mode)				

RELEASE 06.03
13 July 1998

Designation = SMS:____ (Normal Operation: Max. = 50 AMPS)

Packfill = NT6X02DC (Power Share Mode: Max. = 55 AMPS)

DESCRIPTION	PEC	QTY	POWER USED PER PACK (AMPS)	TOTAL POWER USED (AMPS)
Base Packfill (packs included) (in stocklist)	NT6X02DC	N/A	N/A	21.60
DS30 Network I/F	NT6X40BA	1	1.46	1.46
XPM Processor	NT6X45CA	(0 or 2)	2.75	
(select PEC)	NT6X45BA or NT6X45BB	(0 or 2)	2.75	
MP Memory Plus (2nd NT6X47AB)	NT6X47AB	(0 or 1)	2.31	
Message & Tone	NT6X69AB	(0 or 1)	4.22	
(select PEC)	NT6X69AC	(0 or 1)	1.02	
SCM DS1 Interface	NT6X85AA	(0 - 5)	1.52	
(select PEC)	NT6X85AB	(0 - 5)	1.31	

(Continued on next page)

CLASS Modem Resource	NT6X78AA	(0 or 1)	2.78	
TOTAL (Normal Operation)				
SCM DS1 Interface of Mate Array/Shelf	NT6X85AA	(0 - 5)	1.52	
(select PEC)	NT6X85AB	(0 - 5)	1.31	
TOTAL (Power Share Mode)				

RELEASE 06.03
13 July 1998

Designation = SMS:____ (Normal Operation: Max. = 50 AMPS)

Packfill = NT6X02DD (Power Share Mode: Max. = 55 AMPS)

DESCRIPTION	PEC	QTY	POWER USED PER PACK (AMPS)	TOTAL POWER USED (AMPS)
Base Packfill (packs included) (in stocklist)	NT6X02DD	N/A	N/A	21.62
DS30 Network I/F	NT6X40BA	1	1.46	1.46
XPM Processor	NT6X45CA	(0 or 2)	2.75	
(select PEC)	NT6X45BA or NT6X45BB	(0 or 2)	2.75	
MP Memory Plus (2nd NT6X47AB)	NT6X47AB	(0 or 1)	2.31	
Message & Tone	NT6X69AB	(0 or 1)	4.22	
(select PEC)	NT6X69AC	(0 or 1)	1.02	
SCM DS1 Interface	NT6X85AA	(0 - 5)	1.52	
(select PEC)	NT6X85AB	(0 - 5)	1.31	

(Continued on next page)

CLASS Modem Resource	NT6X78AA	(0 or 1)	2.78	
TOTAL (Normal Operation)				
SCM DS1 Interface of Mate Array/Shelf	NT6X85AA	(0 - 5)	1.52	
(select PEC)	NT6X85AB	(0 - 5)	1.31	
TOTAL (Power Share Mode)				

RELEASE 06.03
13 July 1998

Designation = SMS:____ (Normal Operation: Max. = 50 AMPS)

Packfill = NT6X02DH (Power Share Mode: Max. = 55 AMPS)

DESCRIPTION	PEC	QTY	POWER USED PER PACK (AMPS)	TOTAL POWER USED (AMPS)
Base Packfill (packs included) (in stocklist)	NT6X02DH	N/A	N/A	24.71
DS30 Network I/F	NT6X40BA	1	1.46	1.46
Msg Prot & Tone (select PEC)	NT6X69AB	(0 or 1)	4.22	
	NT6X69AC	(0 or 1)	1.02	
SCM DS1 Interface (select PEC)	NT6X85AA	(0 - 5)	1.52	
	NT6X85AB	(0 - 5)	1.31	
CLASS Modem Resource	NT6X78AA	(0 or 1)	2.78	
TOTAL (Normal Operation)				

(Continued on next page)

SCM	NT6X85AA		1.52	
DS1 Interface of		(0 - 5)		
Mate Array/Shelf	NT6X85AB		1.31	
(select PEC)		(0 - 5)		
TOTAL (Power Share Mode)				

RELEASE 06.03
13 July 1998

Designation = SMS:____ (Normal Operation: Max. = 50 AMPS)

Packfill = NT6X02DJ (Power Share Mode: Max. = 55 AMPS)

DESCRIPTION	PEC	QTY	POWER USED PER PACK (AMPS)	TOTAL POWER USED (AMPS)
Base Packfill (packs included) (in stocklist)	NT6X02DJ	N/A	N/A	17.36
DS30 Network I/F	NT6X40BA	1	1.46	1.46
XPM Processor	NT6X45CA	(0 or 2)	2.75	
(select PEC)	NT6X45BA or NT6X45BB	(0 or 2)	2.75	
SP Memory Plus	NT6X46AC and NT6X1205	(0 or 1)	2.94	
(select PEC)	NT6X46BA	(0 or 1)	2.96	
Message & Tone	NT6X69AB	(0 or 1)	4.22	
(select PEC)	NT6X69AC	(0 or 1)	1.02	

(Continued on next page)

SCM DS1 Interface (select PEC)	NT6X85AA	(0 - 5)	1.52	
	NT6X85AB	(0 - 5)	1.31	
CLASS Modem Resource	NT6X78AA	(0 or 1)	2.78	
TOTAL (Normal Operation)				
SCM DS1 Interface of Mate Array/Shelf (select PEC)	NT6X85AA	(0 - 5)	1.52	
	NT6X85AB	(0 - 5)	1.31	
TOTAL (Power Share Mode)				

RELEASE 06.03
13 July 1998

Designation = SMS:____ (Normal Operation: Max. = 50 AMPS)

Packfill = NT6X02DM (Power Share Mode: Max. = 55 AMPS)

DESCRIPTION	PEC	QTY	POWER USED PER PACK (AMPS)	TOTAL POWER USED (AMPS)
Base Packfill (packs included) (in stocklist)	NT6X02DM	N/A	N/A	23.07
DS30 Network I/F	NT6X40BA	1	1.46	1.46
Msg Prot & Tone (select PEC)	NT6X69AB	(0 or 1)	4.22	
	NT6X69AC	(0 or 1)	1.02	
SCM DS1 Interface (select PEC)	NT6X85AA	(0 - 5)	1.52	
	NT6X85AB	(0 - 5)	1.31	
CLASS Modem Resource	NT6X78AA	(0 or 1)	2.78	
TOTAL (Normal Operation)				

(Continued on next page)

RELEASE 06.03
13 July 1998

SCM	NT6X85AA		1.52	
DS1 Interface of		(0 - 5)		
Mate Array/Shelf	NT6X85AB		1.31	
(select PEC)		(0 - 5)		
TOTAL (Power Share Mode)				

1 .6 SMR Power Worksheets

This section includes the power worksheets for the following SMR modules:

NT6X02CA
NT6X02CC
NT6X02CQ
NT6X02CP
NT6X02CS

***** PLEASE NOTE *****

The power consumption rating of each SMR module is based on the 2X70 Power Converter supporting the following SMR card slots:

Slots 01-24 of one (1) array/shelf in a module
Slots 01-05 of mate array/shelf in a module

Therefore, only the above card slots need to be looked at when completing the SMR power worksheets. However, if the module does not have an equal number of 6X50 cards in both top and bottom arrays, then a power worksheet MUST be completed for EACH array. This is because the 6X50 DS1 Interface CPs are not redundant, and the configuration of these cards depends on the port assignment.

RELEASE 06.03
13 July 1998

Designation = SMR:____ (Normal Operation: Max. = 50 AMPS)

Packfill = NT6X02CA (Power Share Mode: Max. = 55 AMPS)

DESCRIPTION	PEC	QTY	POWER USED PER PACK (AMPS)	TOTAL POWER USED (AMPS)
Base Packfill (packs included) (in stocklist)	NT6X02CA	N/A	N/A	31.68
DS1 Interface	NT6X50AA	(0 - 5)	1.10	
(select PEC)	NT6X50AB	(0 - 5)	0.87	
TOTAL (Normal Operation)				
DS1 Interface of Mate Array/Shelf	NT6X50AA	(0 - 5)	1.10	
(select PEC)	NT6X50AB	(0 - 5)	0.87	
TOTAL (Power Share Mode)				

RELEASE 06.03
13 July 1998

Designation = SMR:____ (Normal Operation: Max. = 50 AMPS)

Packfill = NT6X02CC (Power Share Mode: Max. = 55 AMPS)

DESCRIPTION	PEC	QTY	POWER USED PER PACK (AMPS)	TOTAL POWER USED (AMPS)
Base Packfill (packs included) (in stocklist)	NT6X02CC	N/A	N/A	29.72
Network I/F	NT6X40AC	(0 or 1)	0.82	0.82
XPM Processor	NT6X45AF	(0 or 2)	2.75	
(select PEC)	NT6X45BA	(0 or 2)	2.75	
MP Memory Plus (2nd NT6X47AB)	NT6X47AB	(0 or 1)	2.31	
DS1 Interface	NT6X50AA	(0 - 5)	1.10	
(select PEC)	NT6X50AB	(0 - 5)	0.87	
TOTAL (Normal Operation)				

(Continued on next page)

DS1 Interface of Mate Array/Shelf (select PEC)	NT6X50AA	(0 - 5)	1.10	
	NT6X50AB	(0 - 5)	0.87	
TOTAL (Power Share Mode)				

RELEASE 06.03
13 July 1998

Designation = SMR:____ (Normal Operation: Max. = 50 AMPS)

Packfill = NT6X02CQ (Power Share Mode: Max. = 55 AMPS)

DESCRIPTION	PEC	QTY	POWER USED PER PACK (AMPS)	TOTAL POWER USED (AMPS)
Base Packfill (packs included) (in stocklist)	NT6X02CQ	N/A	N/A	29.93
DS30 Network I/F	NT6X40AA	2	1.96	3.92
MP Memory Plus (2nd NT6X47AB)	NT6X47AB	(0 or 1)	2.31	
DS1 Interface	NT6X50AA	(0 - 5)	1.10	
(select PEC)	NT6X50AB	(0 - 5)	0.87	
TOTAL (Normal Operation)				
DS1 Interface of Mate Array/Shelf	NT6X50AA	(0 - 5)	1.10	
(select PEC)	NT6X50AB	(0 - 5)	0.87	
TOTAL (Power Share Mode)				

RELEASE 06.03
13 July 1998

Designation = SMR:____ (Normal Operation: Max. = 50 AMPS)

Packfill = NT6X02CP (Power Share Mode: Max. = 55 AMPS)

DESCRIPTION	PEC	QTY	POWER USED PER PACK (AMPS)	TOTAL POWER USED (AMPS)
Base Packfill (packs included) (in stocklist)	NT6X02CP	N/A	N/A	27.85
Network I/F	NT6X40AC	(0 or 1)	0.82	0.82
DS1 Interface (select PEC)	NT6X50AA	(0 - 5)	1.10	
	NT6X50AB	(0 - 5)	0.87	
TOTAL (Normal Operation)				
DS1 Interface of Mate Array/Shelf (select PEC)	NT6X50AA	(0 - 5)	1.10	
	NT6X50AB	(0 - 5)	0.87	
TOTAL (Power Share Mode)				

RELEASE 06.03
13 July 1998

Designation = SMR:____ (Normal Operation: Max. = 50 AMPS)

Packfill = NT6X02CS (Power Share Mode: Max. = 55 AMPS)

DESCRIPTION	PEC	QTY	POWER USED PER PACK (AMPS)	TOTAL POWER USED (AMPS)
Base Packfill (packs included) (in stocklist)	NT6X02CS	N/A	N/A	26.21
Network I/F	NT6X40AC	(0 or 1)	0.82	0.82
DS1 Interface	NT6X50AA	(0 - 5)	1.10	
(select PEC)	NT6X50AB	(0 - 5)	0.87	
TOTAL (Normal Operation)				
DS1 Interface of Mate Array/Shelf	NT6X50AA	(0 - 5)	1.10	
(select PEC)	NT6X50AB	(0 - 5)	0.87	
TOTAL (Power Share Mode)				

1 .7 SMS-R Power Worksheets

This section includes the power worksheets for the following SMS-R modules:

NT6X02PB
NT6X02PD

RELEASE 06.03
13 July 1998

***** PLEASE NOTE *****

The power consumption rating of each SMS-R module is based on the 2X70 Power Converter supporting the following SMS-R card slots:

Slots 01-24 of one (1) array/shelf in a module
Slots 01-05 of mate array/shelf in a module

Therefore, only the above card slots need to be looked at when completing the SMS-R power worksheets. However, if the module does not have an equal number of 6X85 cards in both top and bottom arrays, then a power worksheet MUST be completed for EACH array. This is because the 6X85 DS1 Interface CPs are not redundant, and the configuration of these cards depends on the port assignment.

RELEASE 06.03
13 July 1998

Designation = SMS-R:____ (Normal Operation: Max. = 50 AMPS)

Packfill = NT6X02PB (Power Share Mode: Max. = 55 AMPS)

DESCRIPTION	PEC	QTY	POWER USED PER PACK (AMPS)	TOTAL POWER USED (AMPS)
Base Packfill (packs included) (in stocklist)	NT6X02PB	N/A	N/A	18.72
XPM Processor	NT6X45BA	2	2.75	2.75
SP Memory Plus	NT6X46BA	1	2.96	2.96
Message & Tone	NT6X69AB	(0 or 1)	4.22	
(select PEC)	NT6X69AC	(0 or 1)	1.02	
SCM DS1 Interface	NT6X85AA	(0 - 5)	1.52	
(select PEC)	NT6X85AB	(0 - 5)	1.31	
TOTAL (Normal Operation)				

(Continued on next page)

SCM	NT6X85AA		1.52	
DS1 Interface of		(0 - 5)		
Mate Array/Shelf	NT6X85AB		1.31	
(select PEC)		(0 - 5)		
TOTAL (Power Share Mode)				

RELEASE 06.03
13 July 1998

Designation = SMS-R:____ (Normal Operation: Max. = 50 AMPS)

Packfill = NT6X02PD (Power Share Mode: Max. = 55 AMPS)

DESCRIPTION	PEC	QTY	POWER USED PER PACK (AMPS)	TOTAL POWER USED (AMPS)
Base Packfill (packs included) (in stocklist)	NT6X02PD	N/A	N/A	21.77
Message & Tone	NT6X69AB	(0 or 1)	4.22	
(select PEC)	NT6X69AC	(0 or 1)	1.02	
SMS-R DS-30A Interface	NT8X18BA	1	1.36	1.36
SCM DS1 Interface	NT6X85AA	(0 - 5)	1.52	
(select PEC)	NT6X85AB	(0 - 5)	1.31	
TOTAL (Normal Operation)				

(Continued on next page)

RELEASE 06.03
13 July 1998

SCM	NT6X85AA		1.52	
DS1 Interface of		(0 - 5)		
Mate Array/Shelf	NT6X85AB		1.31	
(select PEC)		(0 - 5)		
TOTAL (Power Share Mode)				

3.2.4 Office Layout Information

Not applicable

3.2.5 Traffic Tables

Not applicable

3.3 Product/System Specification

3.3.1 Physical Characteristics

Not applicable

3.3.2 EMI/Earthquake Information

Not applicable

3.3.3 Sparing Information

Not applicable

3.3.4 Power Feed and Fusing Requirements

Not applicable

3.3.5 Current Drain Information

The power consumption of an XPM module depends on the amount and type of circuit packs provisioned in the module. However, the maximum allowable power consumptions are listed below:

XPM MODULE EQUIPPED WITH		MAXIMUM POWER CONSUMPTION	
NT2X70AA	Power Converter	40	Amps
NT2X70AB	Power Converter	45	Amps
NT2X70AC	Power Converter	46	Amps
NT2X70AD	Power Converter	50	Amps
NT2X70AE	Power Converter	50	Amps
NT2X70AF	Power Converter	50	Amps

3.4 Software Provisioning

For NTX software packages to PLC/SOC mappings for CSP02 and beyond refer to ECM552 - Mapping of NTX/NTG Package to PCL/NCL/Option.

3.4.1 Required Software Packages and Interdependencies

Not applicable.

3.4.2 Software Usage Restrictions

Not applicable.

3.4.3 Memory Provisioning

Not applicable.

3.5 Real Time Impact

Not applicable.

RELEASE 06.03
13 July 1998

4.0 ECM507 - HPR (High Performance Routing) Provisioning

4.1 Overview

The High Performance Routing (HPR) network is an application by Telecom Canada of Dynamically Controlled Routing.

Dynamically Controlled Routing (DCR) is a software application based on a Hewlett Packard computing engine. Its centralized adaptive routing system provides real-time routing updates to manage the overflow of traffic between switches and also support tools for trunk group forecasting and servicing.

In the High Performance Routing (HPR) network, there are two major types of hardware component. One is the DMS-200 toll switch and the other is the Network Processor (NP).

4.2 Hardware Provisioning

4.2.1 Hardware Usage Restrictions

The DCR Network Processor (NP) communicates with DMS via a dedicated line. This link is exclusively used by DCR and cannot be shared by another application. The MPC card has more than one port. DCR will use one port exclusively and the others can be used for other applications. However it is recommended to use MPC card exclusively by DCR.

4.2.2 Hardware Dependencies

Not Applicable

4.2.2.1 P and C Side Port Requirements

4.2.2.2 DMS BUS Port Requirements

4.2.2.3 Circuits Per Card

4.2.2.4 Discrimination Numbering

4.2.3 Provisioning Considerations

DMS-200 TOLL OFFICE PROVISIONING CONSIDERATIONS

Provision one NT1X89AA MPC card per DMS/NP DATAROUTE link.

Two types of MPC card are available, NT1X89AA or NT1X89BA. Both will support a full duplex RS232C synchronous 9600 bps interface required for HPR communications. The NT1X89BA is an enhanced version of the NT1X89AA with higher CPU processing speed capabilities and it also supports a V.35 56/64 kb link.

RELEASE 06.03
13 July 1998

The NT1X89AA is assignable to the IOC NT1X61 shelf.

Each NT1X89AA has four interfaces for connection to I/O devices. The first two, ports 2 and 3, are independent full duplex RS232C data communications interfaces. The HPR connections must be provisioned on either port 2 or 3. Cabling to these interfaces is done as per CA0X15.

NETWORK PROCESSOR PROVISIONING CONSIDERATIONS

For detailed provisioning information on the network processor portion, please contact Prism Systems.

4.2.4 Office Layout Information

Contact Prism Systems

4.2.5 Traffic Tables

Not Applicable

4.3 Product/System Specification

4.3.1 Physical Characteristics

DMS-200 TOLL OFFICE PHYSICAL CHARACTERISTICS

Total power consumption for NT1X89AA is 13.28 watts.

NETWORK PROCESSOR PHYSICAL CHARACTERISTICS

PART 1 - Network Processor System (@115VAC, 60Hz)

ITEM	MODEL	QTY	RECEPTACLE	POWER CONSUMPTION (WATTS)	
				UNIT	SUB-TOTAL
-1A	HP-A1040A	2	5-15R-IG	900	1800
-1B	HP-7937H	2	5-15R-IG	440	880
-1C	HP-9144A	2	5-15R-IG	125	250
-1D	HP-C1001A	1	5-15R-IG	90	90
-1E	HP-2139BA	2	5-15R-IG	700	1400

PART 2 - Peripherals (@115VAC, 60Hz)

ITEM	MODEL	QTY	RECEPTACLE	POWER CONSUMPTION (WATTS)	
				UNIT	SUB-TOTAL

RELEASE 06.03
13 July 1998

-1A	HP-360	2	5-15R-IG	420	840	
-1B	HP-9144A	2	5-15R-IG	125	250	
-1C	HP-7958B	2	5-15R-IG	100	200	
-2A	HP-340	1	5-15R-IG	420	420	
-2B	HP-9144A	1	5-15R-IG	125	125	
-2C	HP-7958B	1	5-15R-IG	100	100	
-3	HP-C1001A	1	5-15R-IG	90	90	
+-----+-----+-----+-----+-----+-----+						

PART 3 - Modems for Communications Facilities (@115VAC, 60Hz)

ITEM	MODEL	QTY	RECEPTACLE	POWER CONSUMPTION		
				(WATTS)		
+-----+-----+-----+-----+-----+-----+						
				UNIT	SUB-TOTAL	
+-----+-----+-----+-----+-----+-----+						
-1	MODEM	80		20	1600	
+-----+-----+-----+-----+-----+-----+						

PART 4 - LIGHT FIXTURES

Over the Main System Line-up (@115VAC, 60Hz)

ITEM	MODEL	QTY	RECEPTACLE	POWER CONSUMPTION		
				(WATTS)		
+-----+-----+-----+-----+-----+-----+						
				UNIT	SUB-TOTAL	
+-----+-----+-----+-----+-----+-----+						
4-1	Light Fxt	4		100	400	
+-----+-----+-----+-----+-----+-----+						

NOTES:

- A minimum of 20% should be allocated for future expansion when providing UPS (uninterrupted power source). This 20% figure is not accounted for in the tables above
- Items 2-1A, 2-1B and 2-1C are the components required for the two 'bundled' 360 workstations.
- Items 2-2A, 2-2B and 2-2C are the components required for the two 340 workstations.

4.3.2 EMI/Earthquake Information

Contact Prism Systems

4.3.3 Sparing Information

Contact Prism Systems

RELEASE 06.03
13 July 1998

4.3.4 Power Feed and Fusing Requirements

4.3.5 Current Drain Information

4.4 Software Provisioning

For NTX software packages to PLC/SOC mappings for CSP02 and beyond refer to ECM552 - Mapping of NTX/NTG Package to PCL/NCL/Option.

4.4.1 Required Software Packages and Interdependencies

DMS-200 TOLL OFFICE SOFTWARE PACKAGES AND INTERDEPENDENCIES

Provide the following software packages

NTD57AA - Telecom Canada HPR Master Packages
which includes the following packages:

- NTX022AB - Dynamically Controlled Routing (DCR/HPR)
- NTXE65AA - MPC X.25 Interface
- NTX059AB - Polling OM & AMA Data via Datapac.
- NTX273AA - Multi-protocol controller BX.25
- NTX560AB - NOP - Generic R0 Service

NETWORK PROCESSOR SOFTWARE PACKAGES AND INTERDEPENDENCIES

Provide the following HPR software packages

NTG408AA - HPR network processor basic s/w
NTG420AA - HPR servicing system interface & support
NTG418AA - HPR CUSCO interface and support
NTG417AA - HPR messaging system software
NTG422AA - HPR workstation software

4.4.2 Software Usage Restrictions

DMS-200 TOLL OFFICE SOFTWARE USAGE RESTRICTIONS

None

NETWORK PROCESSOR SOFTWARE USAGE RESTRICTIONS

Contact Prism Systems

4.4.3 Memory Provisioning

Contact Prism Systems

4.5 Real Time Impact

Contact Prism Systems

RELEASE 06.03
13 July 1998

5.0 ECM568 - Cabinetized Global Peripheral Platform (CGPP)

5.1 Overview

The Cabinetized Global Peripheral Platform (CGPP) is a host peripheral based on the Compact Peripheral Module (CPM) shelf. The CGPP can mount a maximum of four GPP shelves. The CGPP is currently deployed in the UK to interface with multiplexers via a PCM30 CAS interface.

The CGPP product is introduced in the Australian market by OPTUS with the CAS interface (non-concentrating).

Each GPP Shelf connects to either a JNET (with up to sixteen DS30 links) or to an ENET with one DS512 link. The CGPP utilizes the redundant configuration of the GPP, with one unit active and the other in a hot standby mode. The GPP Main Shelf can support up to twenty-four (24) PCM30 links on its P-side. The GPP with an Extension (half shelf) can support up to forty-eight (48) PCM30 links.

The host CGPP can contain up to four GPP shelves and may contain one or two Extension shelves, as well as the MSP and cooling unit. The number of GPP shelves is dependent on the protocol (MEL CAS or V5.2). Refer to the EMS NTMX90AB for provisioning rules. The CGPP utilizes the Model B C28 cabinet, which is available with either brown or gray hardware.

RELEASE 06.03
13 July 1998

Modular Supervisory Panel	-----> Provisionable
GPP Main Shelf/Extension (Optional)	- 61 -----> Provisionable Shelf
GPP Main Shelf/Extension (Optional)	- 47 -----> Provisionable Shelf
GPP Main Shelf (Optional)	- 33 -----> Provisionable Shelf
GPP Main Shelf (Always Provided)	- 19 -----> Always Provided Shelf
Cooling Unit	- 05 -----> Provisionable
	- 00

Figure 1. Model B CGPP

5.2 Hardware Provisioning

5.2.1 Hardware Usage Restrictions

The initial release of the CGPP is designed for the cable television market in the United Kingdom and uses PCM30 interfaces. A later level of CGPP product is available in the Australian market using CAS interface and now, the V5.2 protocol, which will complement the CAS protocol.

In the first level of the V5.2 development, only 2048 lines will be available for each V5.2 interface. This limit will increase to 4800 in the future. The GPP Shelf must be located such that the length of the DS-30 links between the CGPP and the Network Module is less than 228M for JNET switches, and 1000M for ENET switches. The maximum distance between the Main and the EXT shelf is limited to 6M. The maximum of c-channels that can be declared per V5.2 interface is 4(2 active and 2 backup). The total POTS lines supported on a single GPP shelf will be 6400 assuming traffic allows this number. Each CGPP can have similar sized ANs - either 8 small ANs (up to 672 lines), or 5 medium or small ANs (up to 1344 lines), or 3 large, medium or small ANs (up to 2048 lines). The Peripheral Recovery Loader CP is not available for level 1 of the V5.2 product.

The V5.2 interface to the AN will be via a 120 Ohm twisted pair connection, or a 75 Ohm COAX connection.

RELEASE 06.03
13 July 1998

5.2.2 Hardware Dependencies

The CGPP requires the following equipment:

GPP Shelf

(2) NTMX77AA - Unified Processor
(2) NTMX76CA - Message , Tone and CSM pack. (NOTE: The NTMX76BA is available but NOT preferred for use and should only be used if there is a shortage of NTMX76CAs).
(2) NTMX73AB - Signaling Processor
(2) NT6X92CA - Universal Tone Receiver
(2) NTMX75AA - Matrix pack
(2) NTMX72AA - Power Supply
(2) NTB01BA - EISP, for V5.2 Access Protocol Feature
(A/R) NT0X50AA - Filler Face Plate

C-side Interface

EITHER (2) NT6X40AC or (2)NT6X40AD- DS30 pack (JNET Interface)

(NOTE is not recommended to mix NT6X40ACs and NT6X40ADs in the same module.)

OR (2) NT6X40FB - DS512 pack (ENET Interface)
(2) NT6X40GA - Fiber paddleboard

P-side Interface

(max 3) NTMX87AA Quad Carrier pack
up to (4) NTMX82AA PCM30 packlets per NTMX87AA

For all CGPP requiring V5.2 interface, the NTB01BA EISP CP is mandatory.

5.2.2.1 P and C Side Port Requirements

Each GPP Shelf uses either one DS-512 (for ENET) or up to sixteen DS-30 links (for JNET) for its C-side network connection. These links are fully redundant.

The GPP Main Shelf alone can support up to 24 PCM30 links. The GPP and an Extension half shelf can support up to 48 PCM30 links. The CGPP with three GPP shelves and one Extension Shelf provides two CPM/EXT combinations and one other GPP Main Shelf for a maximum of 120 PCM30 links or 3600 lines (120 PCM30s X 30 channels each = 3600).

Under normal traffic conditions, it is advisable to limit the number of P-side links used for V5.2 to 16. The 16 limit is not a hardware/software restriction but is based on an assumption concerning a traffic profile.

RELEASE 06.03
13 July 1998

5.2.2.2 DMS BUS Port Requirements

Not applicable

5.2.2.3 Circuits Per Card

Each Dual PCM-30 packet provides two (2) PCM-30 interfaces.

5.2.2.4 Discrimination Numbering

Not applicable

5.2.3 Provisioning Considerations

MEL CAS PROTOCOL Information

The GPP Shelf can be provisioned and is considered a fully-equipped shelf with twenty-four (24) PCM-30 interfaces. Such a shelf supports 720 channels/lines. The EXT Shelf Kit provides only the shelf mechanicals and must be provided with one EXT Shelf CP Kit in order to be fully-configured. An equipped EXT Shelf adds twenty-four (24) PCM-30 interfaces for the GPP Shelf it extends. Therefore, one GPP and EXT combination will support 1440 channels/lines. A fully-loaded CGPP can mount two GPP/EXT Shelf combinations and one GPP Shelf without extension for a maximum of 3600 channels/lines ($2 \times 1440 + 720 = 3600$).

Two versions of the CGPP are available, these being the three GPP shelves plus two EXT half-shelves cabinet which supports 120 PCM30 links, and the two GPP shelves plus four EXT half-shelves cabinet, which supports 144 PCM30 links. With a three cabinet arrangement, two of the first type and one of the second type can be used, for a total of 384 PCM30 links. This gives an average of 128 PCM30 links per cabinet for an average of 3840 lines per cabinet.

V5.2 ACCESS PROTOCOL Information

The V5.2 version of the CGPP consists of a GPP Shelf in position 05 as always provided equipment. Cabinet expansion is to progress with GPP shelves provisionable is shelf 47, then shelf position 19, then position 33.

5.2.4 Office Layout Information

Not applicable.

5.2.5 Traffic Tables

The following table reflects the current view of traffic capacity for the GPP Shelf in the CGPP application:

RELEASE 06.03
13 July 1998

„ Ports to NET	„ Channels to NET	Traffic in ERLANGS
2	58	46.4
3	88	74.1
4	118	102.4
5	148	130.9
6	178	159.6
7	208	188.5
8	238	217.6
9	268	246.7
10	298	275.8
11	328	305.1
12	358	334.4
13	388	363.7
14	418	393.1
15	448	422.5
16	478	451.9

Figure 2. Traffic Capacity Table for CGPP

Note: Table based on High Day Busy Hour (HDBH) carried traffic, at 0.03 HDBH blocking, using a mixed loss delay model with 55% originations.

5.3 Product/System Specification

5.3.1 Physical Characteristics

The CGPP is packaged in a Model B C28 cabinet and has the following physical characteristics:

Height: 72"
Width : 28.5"
Depth : 28.7"
Weight: Approximately 810 pounds

RELEASE 06.03
13 July 1998

5.3.2 EMI/Earthquake Information

The CGPP complies with FCC and EN Class A EMI requirements. The NTRX2564 Earthquake Anchor kit shall be provided for each CGPP in earthquake applications (refer to NTRX25AA for details).

5.3.3 Sparing Information

Standard sparing algorithms apply.

The NTRX92AA 10" Cooling Unit kit includes the NTRX91AA Cooling Unit which uses the A0346832 air filter medium. This air filter may be required for sparing.

5.3.4 Power Feed and Fusing Requirements

The CGPP is powered by an external -48V power supply which conforms to the following:

Voltage level within -42V to -56V (-48V nominal)
Ripple voltage shall be less than 0.02V.
Max current of 5A for each unit (0 & 1) in the GPP Shelf

The following circuit breakers are required for each CGPP:

- (2) 30 Amp "A" Feeds
- (2) 30 Amp "B" Feeds
- (4) Returns

5.3.5 Current Drain Information

The following is the -5V current drain, in Amps, of each cp that can mount on the GPP Shelf;

PEC	DRAIN	QTY	CPS	TOTAL DRAIN	COMMENTS
NTMX72AA	0	2		0	Power supply (40 Amp)
NTMX77AA	4.00	2		8.00	
NT6X92CA	2.00	4		8.00	
NTBX01BA	4.57	2		9.14	
NT6X78AB	2.78	2		5.56	
NTMX76CA/BA	2.80	2		5.60	
NT6X40AC	2.35	2		4.70	
NTMX75AA	1.40	2		2.80	
NTMX73AB	2.60	2		5.20	
NTMX87AA	0	3		0	PCM30 Quad Frame
NTMX82AA	0.36	12		4.32	Dual PCM30 Packlet

TOTAL Worst Case CURRENT DRAIN				= 53.32 Amps	

RELEASE 06.03
13 July 1998

The following is the -5V current drain, in Amps, of each cp that can mount on the EXT Shelf;

PEC	DRAIN	QTY CPS	TOTAL DRAIN	COMMENTS
NTMX79AA	0.80	4	3.20	Power supply (7 Amp)
NTMX87AA	0	6	0	PCM30 Qual Frame
NTMX82AA	0.36	24	8.64	Dual PCM30 Packlet

TOTAL Worst Case CURRENT DRAIN			= 11.84 Amps	

The worst case dissipation for a fully configured CGPP is 1066.4 Watts (213.28 Amps output = 1066.4 Watts output). This figure considers four GPP shelves.

Assuming that the NTMX72 power supply takes about 20 percent converting the -48V to 5V, and that the -12V requirements are minimal, the total power requirement of a fully populated CGPP from the PDC is 1333 Watts (input) or approximately 28 Amps assuming a -48V power supply.

Testing has shown that at the specified air delivery of 200CFM and maximum operating ambient of 40 degrees C, the CGPP poses no thermal problems (without V5.2 added equipment).

Since no hardware is being developed for the V5.2 program, thermal analysis will be performed at a later date and be available via the Product Spec. for a CGPP using V5.2 protocol equipment.

5.4 Software Provisioning

For NTX software packages to PLC/SOC mappings for CSP02 and beyond refer to ECM552 - Mapping of NTX/NTG Package to PCL/NCL/Option.

5.4.1 Required Software Packages and Interdependencies

The CGPP software is part of the DMS-100C DRU and its Functional Group name is GPP Generic. The Functional Group SOC number is P0749554Y and includes the following:

- GPP Data and MMI
- GPP Static Data and P-side Extensions
- GPP Call Process
- GPP Line Maintenance

There is also CGPP software in the DMS100E European Layer Product Definition. The DRU is DMSCEU02 and it is interdependent on DMS100C02. The PCL is UK0002 (cpc P0723268) and the PCL order code is UK002, UK000002. The Functional Group is SUBA Subscriber Ac-

RELEASE 06.03
13 July 1998

cess, the Functional Group SOC is P0721256N and the Functional Group Order Code is SUBA0001N. The Functionality is SUBA GPP, the Functionality SOC is P0723267Y in SOC release CSP03 and the Functionality Order Code is SUBA0002Y. The PXL load is UK00AF1.

5.4.2 Software Usage Restrictions

CGPP SW in APC0 Loads

CGPP will not support APC03, but will support APC04. Australia plans to trial CGPP with APC03 load made from the UK load (non-supported).

The Level 1 of the V5.2 development is planned for the CSP05/APC05/CCM05 streams, and a CGPP offstream load based on XPM06.

5.4.3 Memory Provisioning

Not applicable.

5.5 Real Time Impact

Not applicable.

RELEASE 06.03
13 July 1998

6.0 ECM597 - SPM OC-3

6.1 Overview

The SPM OC-3 is a trunking peripheral hosting ISUP and PTS speech trunks on a GR-253 compliant OC-3 carrier connected to the DMS switch. See Figure 3 on page 4-93 for an illustration of how the SPM connects to the DMS in relation to other peripherals. In the initial release the SPM replaces the functions of a Digital Trunk Controller (DTC) for inter-switch trunks between tandem offices and access trunks.

The SPM architecture is based around duplicated Common Equipment (CEM) modules, providing control and traffic switching functions, and half of the redundant DS512 links to the network. One CEM is active, i.e. actually performing call processing functions, while the other is inactive, ready to take over if the active unit fails. See Figure 4 on page 4-94.

Each CEM receives a copy of the PCM traffic from every source (i.e. from each resource module via S-link and each DS512 link). Outgoing PCM traffic is always sourced from the active CEM. Access to the DS512 links on the mate CEM is provided via the DS512 crossover signals. The two CEMs can communicate with each other via the "Inter Machine Communication" (IMC) messaging links, in order to synchronize call processing and maintenance states.

The CEM have dedicated slots in the SPM shelves, and both are always provisioned.

Up to 26 Resource Modules (RMs) can be equipped to provide the SPM with functionality required for a particular application. The RMs are connected to the CEMs via serial links (S-Links), as shown in Figure 4 on page 4-94. This results in a point-to-point architecture, which (when compared to bused architectures) provides superior fault containment and isolation properties. Within the peripheral, all traffic is treated as DS0s (or sets of DS0s); any notion of an external carrier format (e.g. DS1) is terminated at an interface RM.

In addition to payload (PCM) channels, the S-Links transport messaging channels and overhead control and status bits between the CEMs and RMs. Each S-Link provides 256 timeslots. RM slots have access to 3 S-Links, or 768 timeslots. With allowances for overhead, each slot is capable of servicing one STS-1 or DS-3's worth of bandwidth. Two RM slots are provided with 6 extra links each. These slots are therefore capable of terminating the full payload bandwidth from an OC-3.

All RM slots have a similar physical and logical interface. This simplifies engineering and enhances flexibility. Since all slots

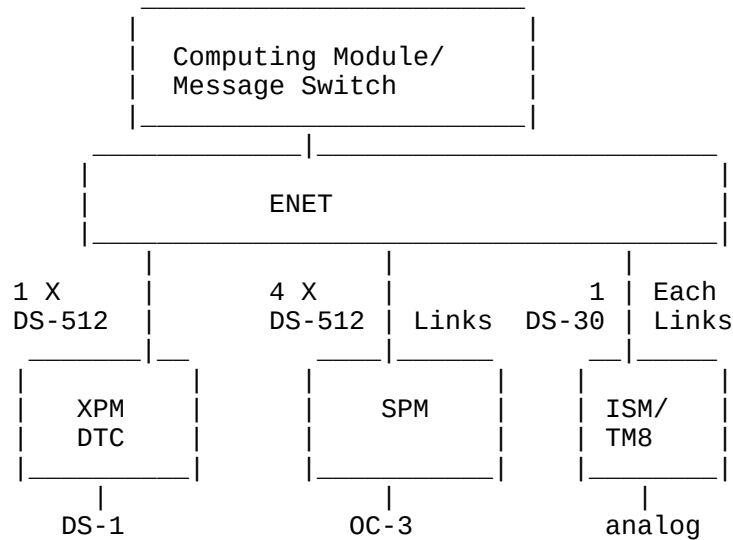


Figure 3. SPM in relation to other DMS peripherals

have the same characteristics, RMs can be mixed and matched until the slots provided are exhausted. There are no special "services" and "I/O" slots to exhaust before the shelf is fully equipped.

Resource Modules come in three basic types:

- Interfaces to carriers and other switch components (e.g. OC-3)
- PCM Services (e.g. tone generation and detection) provided by Digital Signal Processing Resource modules (DSP).
- Voice Processing services (e.g. echo cancellation) provided by Voice Services Processor modules (VSP).

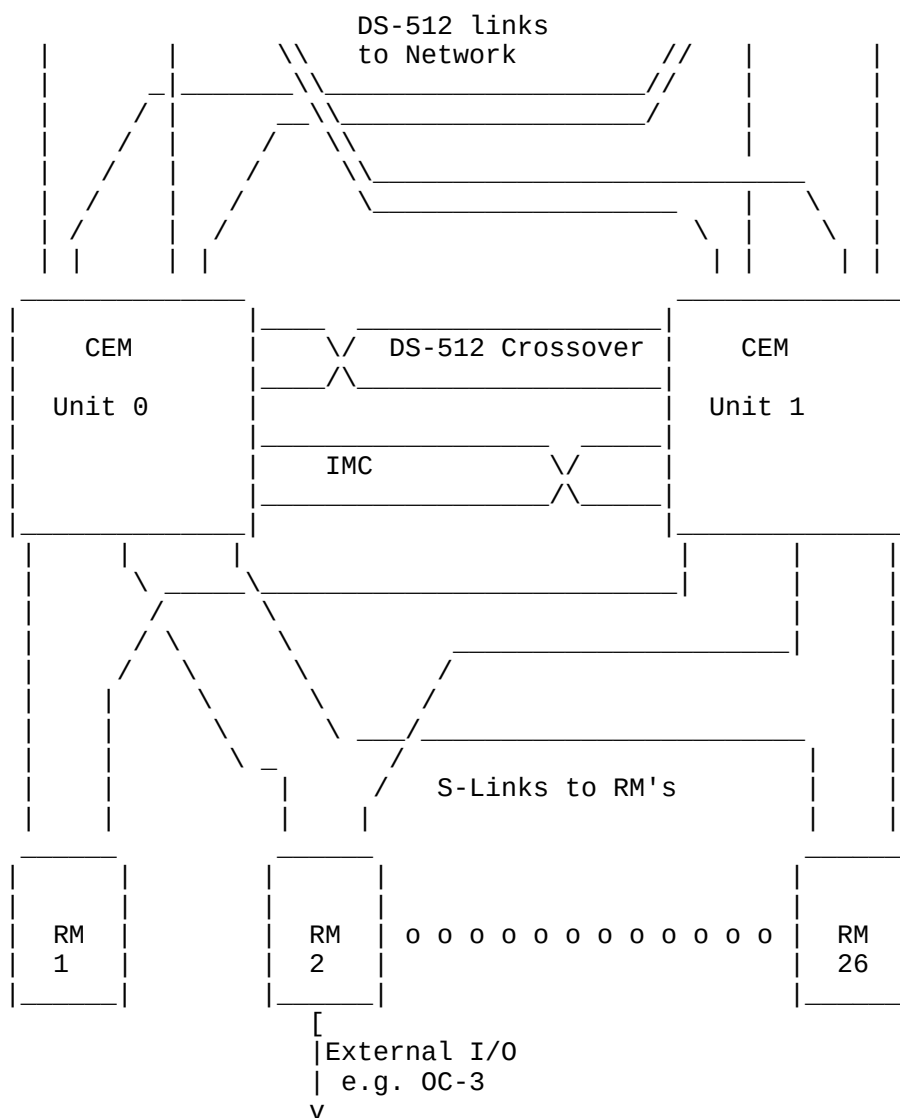


Figure 4. SPM hardware top level view

RELEASE 06.03
13 July 1998

OC3 Resource Module The OC3 module provides the following features:

Single OC-3 Interface (2 Resource Modules are required for 1:1 Protection Switching)

Support For Protection Switching

TR-NWT-000253 Short/ Intermediate Reach Optical interface

Dedicated Processing Complex Performs:

- Low Level Maintenance Functions
- Performance Monitoring data collection
- Extraction and Insertion
- SONET Overhead Termination
- Overhead may be routed to other SPM Resource Modules for further processing. (e.g. Datacom Channels)

System Interface Modules (SIMs)

There are two System Interface Modules, which provide power supply conditioning and connection points for the power feeds and alarm signals. The SIMs provide an alarm interface from the CEM to PCIU and cooling unit.

The required service circuit and interface provisioning is:

Duplicated OC3 ByteSync/ Async VT1.5 Interface with Protection Switching (016 Trunks)

| Required minimum applications for DSP modules is:

COT tone generation and detection on DSP RMs

Miscellaneous tone generation (e.g. dialtone) on DSP RMs

STA Service Test Access on DSP RMs, provisionable as required.

| Optional applications for DSP modules are:

Up to 100% DTMF tone detection, for re-originated calls on DSP RMs

MF Multi-Frequency receivers DSP RMs, provisionable as required.

ABH AB bit handling on DSP RMs, provisionable as required.

| Optional applications for VSP modules are:

Echo Cancelling (provisionable up to 100% of the 2016 trunks) on VSP RMs

6.2 Hardware Provisioning

6.2.1 Hardware Usage Restrictions

The SPM will not work with the JNET network or with the Message Switch Buffer number 7 (MSB7). DS1 circuits are not terminated on the SPM in the first release. Existing DS-512 ENET paddleboards cannot be used with SPM.

6.2.2 Hardware Dependencies

The SPM requires ENET with new ENET fiber paddle boards (NT9X40DA) designed to accommodate the SPM.

RELEASE 06.03
13 July 1998

The SPM requires the Link Peripheral Processor (LPP) for CCS7 signalling.

6.2.2.1 P and C Side Port Requirements

Each CEM uses four (4) DS-512 interfaces to the ENET. These interfaces use a new fiber cable and a new ENET paddle card. A single SPM which has two CEM's will require two (2) NT9X40DA ENET paddle cards to be provisioned and installed. One will be installed in each plane of the ENET shelf the SPM is connected to. A full SPME frame with two SPM's will require four (4) NT9X40DA cards for connection to the ENET.

The following connections will be made between the SPM CEM and the ENET paddle boards:

CEM 0 shelf 0, slot 7

connector 4 to ENET Plane 1 connector 4
connector 3 to ENET Plane 0 connector 3
connector 2 to ENET Plane 1 connector 2
connector 1 to ENET Plane 0 connector 1

CEM 1 shelf 0, slot 8

connector 4 to ENET Plane 0 connector 4
connector 3 to ENET Plane 1 connector 3
connector 2 to ENET Plane 0 connector 2
connector 1 to ENET Plane 1 connector 1

The Peripheral side uses an OC-3 optical interface that is compliant to applicable sections of Bellcore GR253. Short/Intermediate reach optics using single mode fiber are used. A full fill of OC-3 optics (2016 circuits) is available for traffic. Asynchronous VT, byte synchronous VT, DS3 and STS-1 mappings are supported. One for one redundancy is supported.

6.2.2.2 DMS BUS Port Requirements

Not applicable

6.2.2.3 Circuits Per Card

The number of circuits per DSP and VSP card is variable depending on the application and mix of applications operating on the individual card. Cards having the same PEC may be loaded with different applications and would have different numbers of services or circuits because of this.

RELEASE 06.03
13 July 1998

Inactive SPM shelves must be provisioned with 2 SIM cards and enough filler modules to cover all 28 available slots. These 28 slots represent 26 provisionable resource modules and two common equipment modules.

6.2.3.1 DSP Provisioning Tables

The DSP services are distributed amongst the DSP RMs as shown in Table X and Table y. For initial IEC applications, seven (7) DSP resource modules are provisioned to provide 100% ISUP and PTS capacity as indicated below. This provisioning includes extra STA resources to allow periodic testing of echo canceller resources. For initial NA100 applications, four (4) DSP resource modules are provisioned to provide 100% ISUP and PTS capacity as indicated below.

The ABH resource may only be provisioned for 28 resources per DSP module due to internal module messaging restrictions.

SPM01 software release will support up to 7 working DSP resource modules and 1 spare. (8 total)

The following tables list examples of acceptable provisioning for different DMS family products.

Table X : NA100 DSP Provisioning

DSP #	TONESYN	COT	DTMF+DT	STA	ABH	MF
1	255	0	0	0	28	80
2	0	80	0	0	28	40
3	0	0	0	0	28	40
4	Warm Spare for all functions					

RELEASE 06.03
13 July 1998

Table Y : IEC DSP Provisioning

DSP #	TONESYN	COT	DTMF+DT	STA	ABH	MF
1	255	0	448	0	14	0
2	0	80	448	0	14	0
3	0	0	384	0	28	40
4	0	0	384	0	28	40
5	255	0	384	1	0	40
6	0	0	0	9	0	0
7	Warm Spare for all functions					

6.2.3.2 VSP Provisioning Tables

Echo canceller provisioning

Echo cancellers are provisionable from 0% to 100%. The echo canceller function is provided by equipping NTLX66AA VSP modules or third party modules. One type of third party resource module is the NTLX85AA Coherent 64 millisecond ECRM and the NTLX86AA Coherent 128 millisecond ECRM. Both the NTLX85AA and the NTLX86AA provide 336 channels of half echo canceller per resource module. Seven levels of echo canceller provisioning are available by providing the number of VSP resource modules listed below. Each VSP provides 288 channels of half echo canceller per resource module. SPM01 software release will support up to 7 working VSP resource modules and 1 spare. (8 total)

The following table shows the possible VSP provisioning levels. In the table, the sparing ratio is shown in brackets.

Table Z : NTLX66AA VSP Provisioning

#VSP's	Max #ECAN	% 2016
2 (1:1)	288	14.3%
3 (2:1)	576	28.6%
4 (3:1)	864	42.9%
5 (4:1)	1152	57.1%
6 (5:1)	1440	71.4%
7 (6:1)	1728	85.7%
8 (7:1)	2016	100.0%

RELEASE 06.03
13 July 1998

The following table shows possible Ecan provisioning levels.
In the table, the sparing ratio is shown in brackets.

Table ZZ: NTLX85AA/NTLX86AA ECAN Provisioning

#VSP's	Max #ECAN	% 2016
2 (1:1)	336	16.7%
3 (2:1)	672	33.3%
4 (3:1)	1008	50.0%
5 (4:1)	1344	66.7%
6 (5:1)	1680	83.3%
7 (6:1)	2016	100.0%

6.2.4 Office Layout Information

The SPM is available in seven foot frames and can be placed anywhere within the 100 meter reach of the DS-512 cable to ENET. This length restriction is new with the Hard Clad Silica (HCS) cable. The SPM shelf doors and SPM tray covers are gray. Two SPMs are provisioned in one frame. The SPM OC-3 is designed to be compliant with "front access only" rules. The SPM OC-3 can be integrated into existing DMS line-ups.

The optical fibers for the OC-3 interface connect on the front faceplate of the OC-3 module. The customer must provide OC-3 patch cable from the OC-3 modules of the SPM to the customer connection point. NORTEL (Northern Telecom) will provide a cable adapter kit for SC to SC, SC to ST and SC to FC connections. There is no support in Cable Aids (CA) documents for connections to customer equipment. Fiber patch cables for standard OC-3 connections are available in a variety of fixed lengths and connector types from vendors.

6.2.5 Traffic Tables

The following information applies to the SPM in NA100 applications.
DSP Traffic Inputs

Complete the following inputs to calculate the number of each DSP application based on traffic requirements.

NumMfTrunks = Number of MF trunks on SPM MF, ABH, DTMF, ToneSyn'

NumIsupTrunks = Number of ISUP trunks on SPM COT, DTMF, ToneSyn'

NumCallsPerTrunk = Avg. number of trunk call attempts per hour
(ABSBH) MF, COT, DTMF, ToneSyn'

RELEASE 06.03
13 July 1998

PercentIncoming = % incoming call attempts {range 0 - 1}
MF, COT, DTMF, ToneSyn'

PercentCot = % of calls to test for Continuity Tone (CoT)
{range 0 - 1} COT'

PercentReorig = % of incoming calls that reoriginate {range 0 - 1}
ToneSyn'

HtPerTrunk = Avg. holding time (secs) per trunk call DTMF'

HtPerMfr = Weighted avg. MF receiver holding time (secs) MF'
(Reference Table 6 in ECM590)

NumEcanTest = Number of echo canceller tests per day STA'

EcanTestInterval = Echo canceller test interval (hours) per day STA'

MF Calculations

The Multi-Frequency (MF) receiver application collects the digits for incoming MF trunk calls. These calls use Per Trunk Signaling (PTS) instead of Common Channel Signaling #7 (CCS7) used for ISUP trunks.

NumMfrAttempts = NumMfTrunks * NumCallsPerTrunk * PercentIncoming

MfrCcs = (NumMfrAttempts * HtPerMfr) / 100

NumMfrCircuits = P.01 (MfrCcs) (Reference Table 5 in ECM590)

NumMfrIslands = NumMfrCircuits / 40 {round up}

CoT Calculations

The Continuity Tone (CoT) application tests the continuity of an ISUP trunk before setting up an incoming call over the facility. This does not apply to MF trunks because the trunk is assumed OK if the signaling wink was received. The test is usually only performed on a portion of the calls because the test could take up to 3 seconds. The calculations below assume an average test time of 1 sec. The application can be configured to test outgoing instead of incoming trunk calls, as assumed in these calculations.

NumCotAttempts = NumIsupTrunks * NumCallsPerTrunk
* PercentIncoming * PercentCot

CotCcs = (NumCotAttempts * 1) / 100

NumCotCircuits = P.01 (CotCcs) (Reference Table 5 in ECM590)

RELEASE 06.03
13 July 1998

NumCotIslands = NumCotCircuits / 80 {round up}

ABH Calculations

The A/B Bit Handler (ABH) application performs scanning on MF trunks. The number of ABH Islands does not vary based on the number of call attempts.

NumAbhIslands = NumMfTrunks / (14 * 24) {round up}

Note: Only 2 ABH Islands should be provided per DSP Resource Module.

ToneSyn Calculations

The Tone Synthesizer (ToneSyn) application is required for generating audible tones (e.g. dialtone for reoriginations) or outgoing tone-based signaling (e.g. MF). The average dialtone holding time is assumed to be 3 seconds.

MfToneAttempts = NumMfTrunks * NumCallsPerTrunk
* (1 - PercentIncoming)

MfToneCcs = (MfToneAttempts * HtPerMfr) / 100

NumReorigs = (NumMfTrunks + NumIsupTrunks) * NumCallsPerTrunk
* PercentIncoming * PercentReorig

DialtoneCcs = (NumReorigs * 3) / 100

ToneSynCcs = MfToneCcs + DialtoneCcs

NumToneSynCircuits = P.01 (ToneSynCcs) (Reference Table 5 in ECM590)

NumToneSynIslands = NumToneSynCircuits / 255 {round up}

DSP Calculations

The DSP Resource Module currently supports the MF receiver, COT, ABH, ToneSyn, DTMF receiver, and STA applications. There are 9 islands per DSP that are configured via software to perform a specific application. Only 2 ABH islands should be provided per DSP because it tends to be very messaging intensive, and puts a heavy load on the Resource Module host processor. A warm spare DSP should always be provided. The numbers "NumDtmfIslands and NumStaIslands" is zero (0) for NA100.

NumDsp = Maximum (((NumMfrIslands + NumCotIslands + NumAbhIslands
+ NumToneSynIslands + NumDtmfIslands
+ NumStaIslands) / 9), (NumAbhIslands / 2)) + 1

RELEASE 06.03
13 July 1998

6.3 Product/System Specification

6.3.1 Physical Characteristics

Provisionable circuits packs in the SPM are enclosed in modules for protection and improved Electro Magnetic Interference (EMI) performance. SPM resource modules may be considered like circuit packs for purposes of shelf mounting position and slot identification.

The SPM modules are fiberworld gray and are mounted on gray DMS frames. A fully equipped SPM frame weighs approximately 900 pounds.

6.3.2 EMI/Earthquake Information

The SPM uses an EMI design strategy with several levels of protection. The circuit packs are completely enclosed in metal modules that slide into the shelf assembly. The backplane of the shelf assembly is shielded. Each module is powered by a Point of Use Power Supply (PUPS) that allows containment of noise produced by DC to DC power conversion. The shelf power is further isolated and filtered from system battery power by a Shelf Interface Module (SIM).

No additional hardware is needed to meet NEBS Zone 4 earthquake compliance.

6.3.3 Sparing Information

At least one extra circuit pack of each provisionable type (i.e. DSP or VSP are two types) must be provided to allow the SPM to provide warm spares. These spares are provisioned by software and simply require that extra circuit packs be available and operating in the SPM.

Provision one extra filler module with the spares kit. This is required because when a module is removed from the shelf the cooling airflow is reduced. Filling the empty slot with a filler module is required unless the failed module is immediately replaced.

The circuit packs used in the SPM are a different size than other DMS circuit packs. An additional spares shelf or cabinet should be provided to store these circuit packs. The NTLX5107 Spectrum Storage shelf assembly can be provided in a NTRX49BA Cabinetized Miscellaneous Spare Storage cabinet.

The fans are removable and can be replaced from the front of the shelf. Each fan can be individually disconnected and removed.

RELEASE 06.03
13 July 1998

6.3.4 Power Feed and Fusing Requirements

Two thirty (30) amp feeds from the PDC with 30 ampere fuses, one each from A and B, will be required for each SPM. There is no main feed fusing on the SPM OC-3 frame. Each SPM OC-3 frame can support up to 2 SPM Modules, therefore a frame can terminate up to four 30 AMP feeds and Alarm Battery Supply (ABS). Each module is supplied with both A and B power feeds and a Point of Use Power Supply (PUPS) that allows reliable production of the voltages it needs. Shelf level power converters are not required because of this.

6.3.5 Current Drain Information

Current Drain for the circuit packs are:

Module Nominal Maximum amperes from 48 volts

NTLX63AA		Not known for CEM
NTLX65AA	0.30	0.42
NTLX66AA	0.39	0.52
NTLX71AA	0.7	1.0

The total power consumption for a SPM frame will not be more than 2000 watts.

6.4 Software Provisioning

The initial release of SPM software will be on the MCI and UCS software streams.

MCI software can be ordered with the MCI00014 order code.

UCS software can be ordered with the UCS00008 order code.

MCI software contains the SPM peripheral software in PMCI0014.

UCS software contains the SPM peripheral software in PUCS0004.

6.4.1 Required Software Packages and Interdependencies

For NA100 applications, The following software ordering information applies:

ORDER CODE	PCID	NAME
DMSSPM10	00013886	DMSSPM10

Order codes unique to the NA100 market for the SPM10 generic are:

SPM00009	00011527	SPM DSP
		- 00011531 DSP (Functionality)
SPM00006	00011543	SPM OC3
		- 00011544 OC3 (Functionality)

SPM00001 00011300 SPM CEM

6.4.2 Software Usage Restrictions

Not applicable.

6.4.3 Memory Provisioning

Not applicable.

6.5 Real Time Impact

Not applicable.

RELEASE 06.03
13 July 1998

7.0 ECM615 - DMS - Service Control Point (DMS-SCP) II

7.1 Overview

The Service Control Point (SCP) is a node in an SS7 network which is responsible for providing access to one or more transaction-based services as defined by SS7. (In this document, the term SS7 (Signaling System #7) is synonymous with CCS7 (Common Channel Signaling #7)). Associated with each SCP service is a database containing information, possibly for several telephone operating companies, required to provide that service.

The SS7 Network can be configured in two ways; the FULLY ASSOCIATED NETWORK and the QUASI ASSOCIATED NETWORK. The Fully Associated Network has every Service Switching Point (SSP - End Office) connected directly to the SCP(s). The Quasi Associated Network has every SSP connected to the SCP through a Signaling Transfer Point (STP).

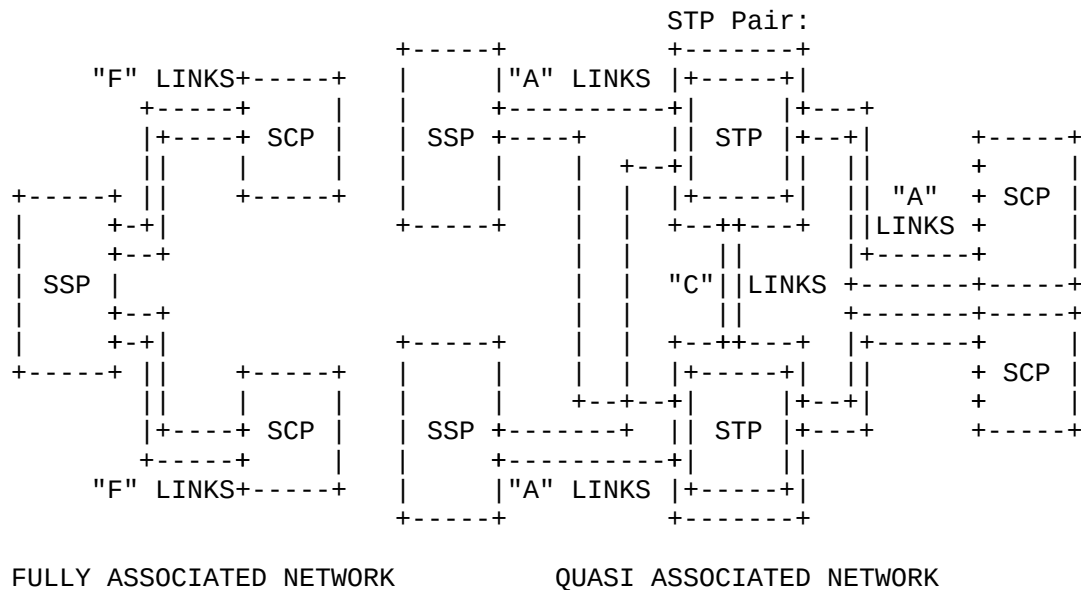


Figure 5. SS7 Network Configuration

There is at least one provisionable SS7 'F' Link Set from each SSP to each SCP node in the Fully Associated Network. In the Quasi Associated Network, SS7 'A' link pairs connect each Toll SSP to the corresponding regional STPs, 'A' link pairs connect each SCP to corresponding regional STP pairs, and 'C' link pairs connect the two members of the STP pair.

RELEASE 06.03
13 July 1998

The first generation DMS-SCP is based on the Data Voice System (DVS) hardware platform, and is documented in ECM-426. This ECM describes provisioning of the second generation DMS-SCP II, which is based on the SuperNode Multicomputing Base (SMB) platform. Physical hardware configuration is detailed in ECM-512 and API-202.

The DMS-SCP II is comprised of DMS SuperNode equipment, including one or more Application Processor Cabinets. It performs the actual query processing and real time functions by responding to incoming database queries from the network. OAM functions such as database administration will be handled by terminals connected to the Input/Output Equipment in BCS-34. Beginning in BCS-34 the telco will interface their Service Management System (SMS) to the DMS-SCP II via Ethernet links and routers.

7.1.1 DMS-SCP II Hardware Description

The DMS-SCP II architecture is illustrated in figure 1 and is made up of the following components:

- Link Interface Module (LIM)/Link Peripheral Processor (LPP)
- Application Processor Cabinet (APC)
- DMS-Core (Dual Plane Combined Core Cabinet)
- Trunk Module Equipment (TME)
- Double Shelf Network (DSN)
- Input/Output Equipment (IOE)
- Power Distribution Center (PDC)
- Miscellaneous Equipment (MIS)
- Maintenance Spares Storage (MSS)

The LIM, which interfaces directly with the DMS SuperNode Message Switch, is responsible for distributing messages between the DMS-SCP II components and the SS7 network (Message Transfer Part (MTP) signaling message handling and Signaling Connection Control Part (SCCP)). It is provisioned with Link Interface Units (LIU7s) which interface the SS7 links, and Ethernet Interface Units (EIUs) which interface the Service Management System.

The Application Processor Cabinets house File Processors (FPs) and Storage Devices (SDs). Each FP is linked to one or more SDs through Small Computer Standard Interface (SCSI) links. The SDs are equipped with disks to store the SCP application databases, and the FPs implement the query processing functions and provide access for database update and administration functions. In addition, SDs can be equipped with Digital Audio Tape (DAT) drives to allow backing up the application databases to tape. Refer to ECM-512 for more information on Application Processor Cabinet hardware.

RELEASE 06.03
13 July 1998

The DMS SuperNode equipment consists of the DMS-CORE and the DMS-BUS housed in a single cabinet:

The DMS-CORE consists of a Computing Module (contains duplicated DMS SuperNode CPUs) and System Load Module (SLM). It is responsible for centralized SCP and SS7 maintenance, but does not participate in query processing or database updates.

The DMS-BUS consists of a Message Switch, which performs the routing of messages within the DMS-SCP II.

The TME houses the MTMs which support service circuits, test facilities and office alarm circuits. The latter facility provides visual and audible indication of trouble conditions in the DMS equipment. The TME also houses the Alarm Cross-connect Unit (AXU).

The DSN is used to interface the MTM. In a normal DMS-100 office, a Speech Link Connection (SLC) frame is used to cross-connect speech links from the MTM to the peripheral side of the DSN. In the SCP application, however, the MTM may be cabled directly to the DSN.

The IOE supports various devices including disk, tape and MAP terminals required to load and operate the DMS SuperNode.

The PDC distributes fused -48V power to individual equipment frames, cabinets, shelves, etc..

The MIS frame provides rack space for housing modems, power inverters and other equipment.

The MSS cabinet offers storage space for DMS SuperNode spare circuit packs.

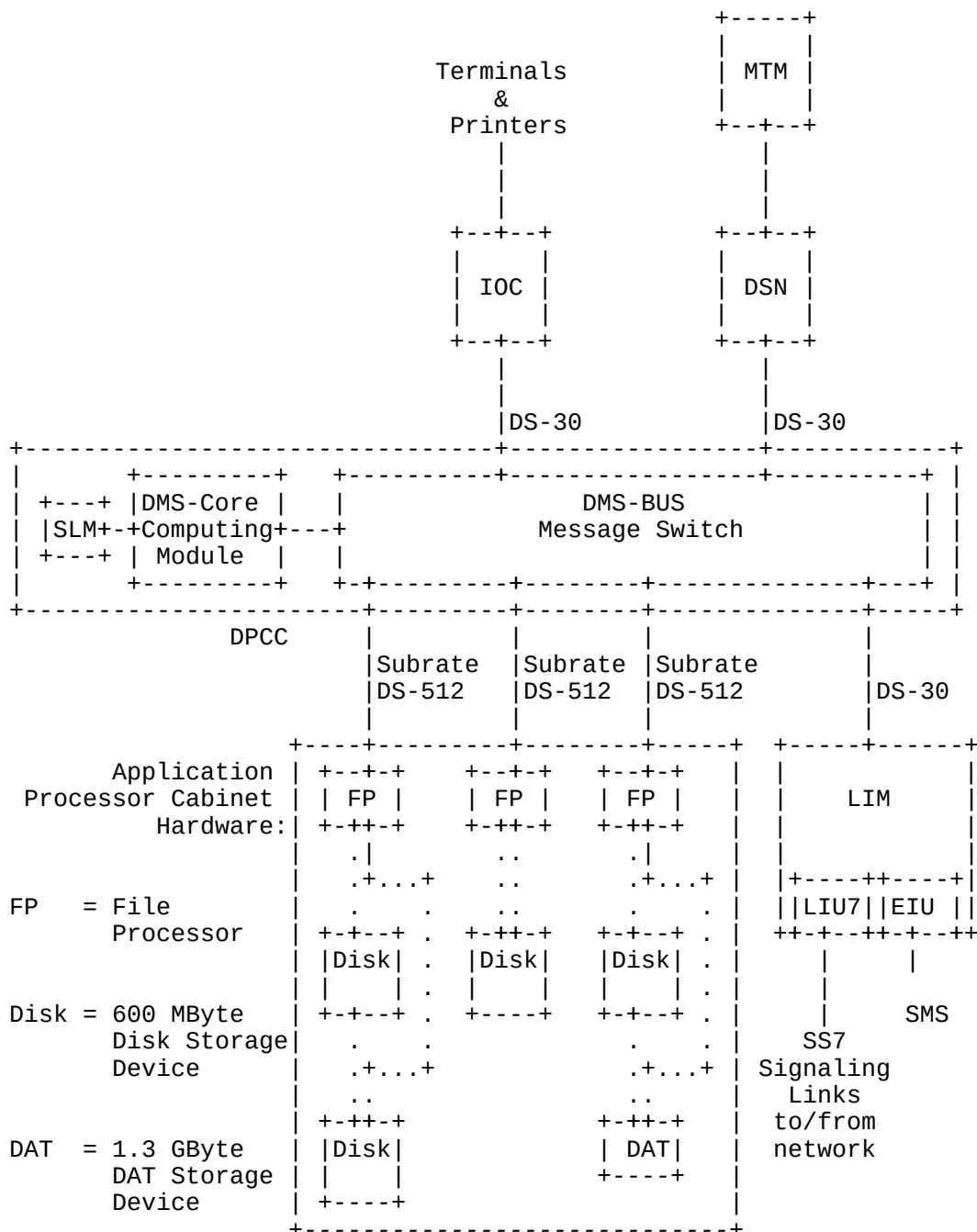


Figure 6. DMS - Service Control Point (DMS-SCP) II

RELEASE 06.03
13 July 1998

7.2 Hardware Provisioning

7.2.1 Hardware Usage Restrictions

Refer to ECM512 for restrictions in Application Processor Cabinet (APC) configuration.

7.2.2 Hardware Dependencies

None.

7.2.2.1 P and C Side Port Requirements

None.

7.2.2.2 DMS BUS Port Requirements

None.

7.2.2.3 Circuits Per Card

None.

7.2.2.4 Discrimination Numbering

None.

7.2.3 Provisioning Considerations

7.2.3.1 LPP Prpvisioning Guidelines

Each LPP physically supports 36 Interface units. For the DMS-SCPII these can be the LIU7 or EIU Interfaces.

The NT9X70BA LIM can be equipped with up to 36 LIU7s or EIUs in any combination. It replaces the NT9X70AA LIM which can hold 24 LIU7s or EIUs in any combination. Both the NT9X70AA and the NT9X70BA have been changed to MD status. They are replaced by the NT9X70BB.

Due to the nature of this predominantly software driven project, there are no hardware modifications required. As a result this document will provide the user the means to determine the required quantities of hardware necessary for DMS-SCP II. To avoid redundancy reference will be made to the respective APIs and ECMs.

EIU Provisioning

The EIU is required on the DMS-SCPII to provide the communications interface to the SMS. Two (2) EIUs provide sufficient bandwidth and redundancy for the DMS-SCPII to SMS Interface requirements.

RELEASE 06.03
13 July 1998

Provision two (2) EIU on the LPP. Refer also to ECM505 for EIU Provisioning information.

LIU7 Provisioning

LIU7s are required on the DMS-SCPII to provide the communications interface to the CCS7 Network. The number of LIU7 required depends on a number of factors such as:

- CCS7 Network Signalling Configuration (Associated or Quasi-Assoc)
- CCS7 Network Traffic
- LIU7 Capacity
- Query and Response Messages Length
- Number of Messages Per Query
- CCS7 Link Speed

LINK PROVISIONING

a.) Associated CCS7 Network

In an Associated CCS7 Network, all SSP's communicate with SCP's via direct CCS7 links (F-Links).

For Associated CCS7 Network, F-Links need to be provisioned from each SSP to all the SCPs in the CCS7 Network.

In normal mode of operation each F-Link should not exceed 40% occupancy or 0.4 Erlangs.

Thus the number of F-Links required at the SSP end is:

Number of F-LINKS=	Total SSP HDBH TRAFFIC	
at SSP	-----	(round up
	F-Link Capacity at 0.4 Erlangs	to next integer)

Where :

F-Link Capacity =	0.4 Erlang x Link Speed x 2 Directions

	# Bits per Octet x Msgs Length x Msgs per Query

At the DMS-SCP II end, the number of F-Links required is:

Number of F-Links at SCP = Sum of total number of F-Links being directed to the SCP from each SSP in the Network.

For LPPs each F-Link represents a LIU7 Card

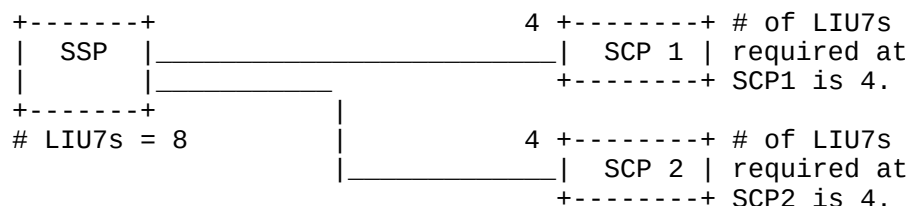
Therefore:

RELEASE 06.03
13 July 1998

Total Number of LPP's = Total number of LIU7 Cards (round up to
----- next integer)
36

If the number LIU7s calculated from the above formula is 8 then:

For a Fully Associated Network



Note: On the first LPP only 34 LIU7 Interfaces are available due to
2 Interface slots required for the EIU Interface.

b.) Quasi-Associated CCS7 Network

In a Quasi-Associated CCS7 Network, all SSP's communicate with SCP's via regional STP's. Thus each SCP type will assume to have A-Links to its regional STP pairs. For Quasi-Associated CCS7 Network, A-Links need to be provisioned from STP pair to all SCPs in the CCS7 Network. In normal mode of operation each A-Link should not exceed 40% occupancy or 0.4 Erlangs.

For an application type, we will assume that the STP backbone of a Quasi-Associated CCS7 Network can evenly distribute the Application Traffic over all the SCP for that Application when operating normally.

CCS7 defines a single and mated NODE configurations for STPs and SCP. For reliability purposes, both SCPs and STPs are typically deployed in the mated pair configuration so that, in the event of a complete CCS7 Node Outage, the mate can take over and handle the entire CCS7 traffic load without impacting service.

For provisioning purposes, each A-link should be provisioned so that it is operating at 80% occupancy(0.8 Erlang) when 1 SCP Node is down. Thus for an DMS-SCPII Node, the number of A-Links required is:

RELEASE 06.03
13 July 1998

Total Number of A-Links = $\frac{\text{Total Network HDBH Traffic}}{\text{A-Link Capacity at 80\% Occupancy}}$ (round up to next even integer)

Where :

LIU7 A-Link Capacity at 80 % = $\frac{0.8 \text{ Erlang} \times \text{Link Speed} \times 2 \text{ Directions}}{\# \text{ Bits per Octet} \times \text{Msgs Length} \times \text{Msgs per Query}}$

For LPPs each A-Link represents a LIU7 Card

Therefore:

Total Number of LPP's = $\frac{\text{Total number of LIU7 Cards}}{36}$

Note: On the first LPP only 34 LIU7 Interfaces are available due to 2 Interface slots required for the EIU Interface.

STP LINKS

All the links on the DMS-SCPII are directed to a regional STP pair. Therefore each STP Node receives only half the number of A-Links from each DMS-SCP II Node.

Thus for an STP Node, the number of A-Links required is:

Total Number of A-Links at STP Node = $2 \times \text{A-Links from each SCP Node}$
= Total of A-Links at each SCP Node

Therefore:

Total Number of LPP's at STP = $\frac{\text{Total number of LIU7 Cards}}{36}$

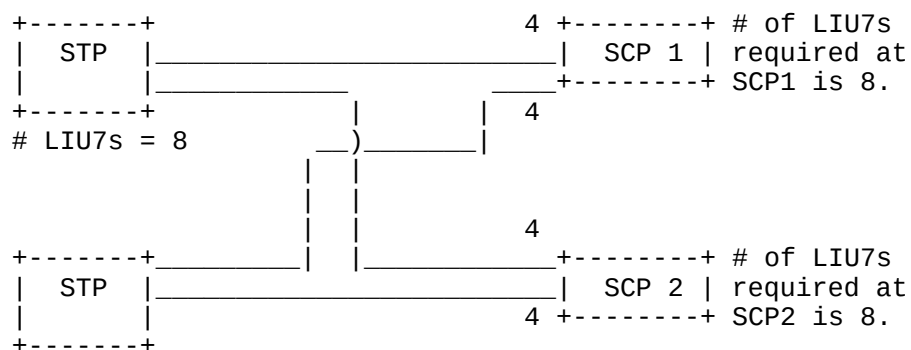
EXAMPLE:

The following chart illustrates the LIU7 Capacity with some variable parameters.

RELEASE 06.03
13 July 1998

LINK SPEED	LINK USAGE	MESSAGE LENGTH in BYTES			
		50	100	150	279
56 KBit/S	0.4 Erlang	56 Q/sec	28 Q/sec	18 Q/sec	10 Q/sec
56 KBit/S	0.8 Erlang	112 Q/sec	56 Q/sec	37 Q/sec	20 Q/sec
64 KBit/S	0.4 Erlang	64 Q/sec	32 Q/sec	21 Q/sec	11 Q/sec
64 KBit/S	0.8 Erlang	128 Q/sec	64 Q/sec	42 Q/sec	22 Q/sec

For a Quasi Associated Network



7.2.3.2 Service Management System (SMS)

The telco is to provide the SMS and related Ethernet hardware. This section describes the general requirements for the interface.

The Ethernet Local Area Network (LAN) can be implemented using either 10Base5 (Thick Coax) or IEEE 802.3 10BaseT (Unshielded Twisted Pair/UTP) standard. The latter is preferred.

When using IEEE 802.3 10BaseT standard, a Medium Access Unit (MAU) and Hub are required. The MAU provides a connection between the EIU and the UTP, while the Hub is a multi-port repeater unit permitting attachment of multiple LAN devices. MAUs and Hubs from various vendors may be used provided that they conform to the IEEE 802.3 10BaseT standard. The Hewlett Packard EtherTwist Hub and MAU set have been tested to operate with the EIU.

To connect a distant LAN to the EIU (Wide Area Network or WAN application), a synchronous serial link can be used. A router should be used in the connection to provide range extension over standard communication facilities and to provide fault isolation between the LAN segments. Routers from various vendors may be used provided that they support TCP/IP (Transmission Control Protocol/Internet Protocol) and provide link speeds within the 56 kbit/s to 1.544 Mbit/s range. The Cisco AGS router, equipped with the Multi-port Communication Interface (MCI) card, has been tested to connect a distant 10BaseT LAN to the EIU.

RELEASE 06.03
13 July 1998

Refer to Figure 7 on page 4-115 for a diagram of these configurations.

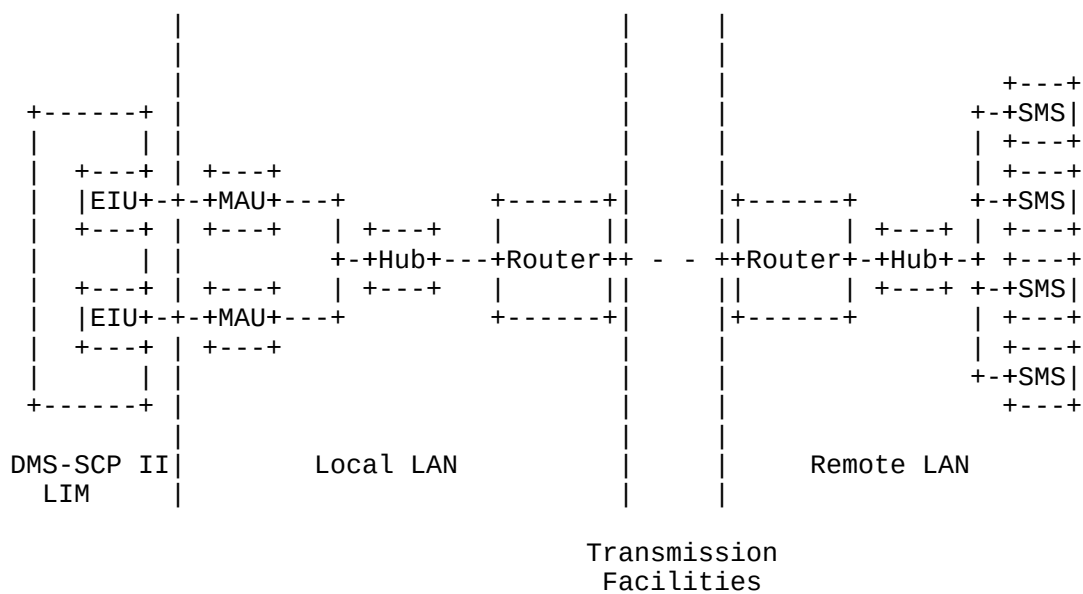


Figure 7. Example Connection From DMS-SCP II To LAN/WAN

RELEASE 06.03
13 July 1998

7.2.3.3 DMS SuperNode Equipment

DMS-SCP will use a dedicated Dual Plane Combined Core Cabinet (DPCC) NT9X01JB. This cabinet contains two MS shelves and one CM shelf. One (1) DPCC is required per DMS-SCP II.

PER UNIT COMPONENT CAPACITY:

Each MS: 9,000 Q/S
Each CM: 225 Q/S (800+ service)

The MS is provisioned with NT9X17AC Port cards and associated paddleboards. There are three types of paddleboards, selected based on the type of equipment to be interfaced to the MS:

PEC	Description	Used to Interface:
NT9X23AA	4-port DS-30 PB	IOC, DSN
NT9X23BA	4-port DS-30 PB	LIM
NT9X62BA	4-port Subrate DS-512 PB	File Processors in Application Processor Cabinet

On the Message Switch of the SuperNode Core you MUST have Inter MS Links. (refer to ECM 626 for provisioning details)

The number of NT9X17AA 4-port CPs is equivalent to the total number of NT9X23__ paddleboards. Refer to ECM-512 for NT9X17AD Port CP provisioning with the NT9X62BA paddleboard,(for BCS36) and NT9X17DA with the NT9X62BA for BCS 36 and below. Refer to ECM-626, ECM-386, and ECM-512 for port provisioning and assignment considerations for each type of paddleboard.

If the DMS Synchronizable Clock / Stratum is employed in the DMS-SCP system, related equipment must be provisioned on the IOE (see IOE section below).

System Load Module Provisioning

Provision two (2) SLM II units.

Refer to ECM-626 for more details on DMS SuperNode Provisioning.

7.2.3.4 Trunk Module Equipment (TME)

In each DMS-SCP provide one TME equipped with at least two MTM shelves. Refer to Engineering Manual Section EMA2-01-000 for engineering information for the MTM/AXU. Refer also to ECM-386 Signal Transfer Point "Office Alarm System" section for recommended provisioning of MTM cards in a dedicated SS7 node.

RELEASE 06.03
13 July 1998

7.2.3.5 Double Shelf Network

Provide minimum one (1) Double Shelf Network (DSN) to interface the MTMs.

Refer to ECM604 for provisioning rules for the DSN. Depending on the number of network modules provided, a Digital Network Interconnect (DNI) frame may also be required.

7.2.3.6 Input/Output Equipment

Provide Input/Output Equipment (IOE) as required. Refer to the Engineering Manual section EMA5-01-000 for provisioning information for the IOE. Two IOCs per DMS-SCP are required along with their associated disk, tape and terminal requirements. If Stratum clock synchronization (Stratum II or Stratum 2.5) is required for the DMS-SCP, a Remote Oscillator Shelf and associated circuit packs are required. Refer to ECM-317 Synchronization for DMS-Core Offices for further information.

7.2.3.7 Power Distribution Center

Refer to ECM631 for provisioning rules for the PDC to power the DMS equipment.

7.2.3.8 Miscellaneous Equipment Frame

Provide MIS frames as required for housing modems, power inverters, and other miscellaneous equipment as required. Refer to Engineering Manual section EMA13-01-000 for more details on the MIS frame.

7.2.3.9 Maintenance Spares Storage

Provide as required for storage of spare DMS SuperNode circuit packs. Refer to ECM-614 for provisioning information.

7.2.3.10 Application Processor Cabinet

Application Processor Cabinets (APCs) are to be provisioned with File Processors (FPs) and associated Storage Devices (SDs) connected via a SCSI bus. All FPs are to be provisioned with a full complement of Memory CPs. Enhanced 800+ Service supports up to a eleven (11) File Processors on the DMS-SCPII Platform.

There are two functions performed by the File Processors in a DMS-SCP II system. One or more FPs are designated as Query Processors (QPs); these FPs support the SCP query processing services. The other FPs are designated as Update Processors (UPs). The UP validates database updates, distributes them to the Query Processors, and supports database maintenance functions such as backup and restore from disk or tape.

RELEASE 06.03
13 July 1998

Query Processor (QP) Provisioning

The QP performs the SCP database query transaction processing.

Provisioning Update Processors(UPs)

1. Provisioning Update Processors(UPs)

Each UP maintains a local master copy of one SCP application database. Provision one UP per application. The following are examples of different applications: 800+, Automated Calling Card Service (ACCS), and Billing Number Screening (BNS). Services within these applications (for example, 800+ Variable Call Routing) are not considered to be different applications.

Provision one (1) File Processor per UP.

of Update Processors = _____

2. Provisioning of Storage Devices.

The quantity of Disk Storage Devices in each UP depends on the size of the application database each supports. Each UP is always equipped with an online copy of the master database. Optionally, a backup copy of the master database can be equipped by providing a second equivalent set of Storage Devices. Although the online database copy employs duplicated ("shadowed") disk devices for reliability, the backup copy allows fast recovery in the event of serious database corruption and failure of the online copy. In addition, one shadowed Disk SD is configured as a support disk to store update batch files, update response files, and transaction logs. Database records are not stored on this disk, to ensure data reliability.

Use the following to calculate the number of 600 MByte Disk Storage Devices per UP:

$$\# \text{ Online Disks} = \frac{((\text{Application Database Size in MBytes}))}{(\frac{\text{-----}}{600})}$$

(Round UP to next higher integer)

Where : Application Database Size = Service Database Storage +
Update File Storage +
Response File

Figure 8. Number of 600 MByte Disk Storage Devices per UP

RELEASE 06.03
13 July 1998

DAT drives are provided to support database backup and restore functions. Use the following to calculate the number of 1.3 GByte DAT Storage Devices per UP:

$$\# \text{ DAT Storage Devices} = \frac{(\text{Application Database Size in MBytes})}{1300}$$

(Round UP to next higher integer)

Total # of Storage Devices = TOTAL DISKS + # DAT Storage Devices

Refer to ECM512 for provisioning of the circuit packs.

Figure 9. Number of 1.3 GByte Disk Storage Devices per UP

Provisioning Query Processors(QPs)

The Number of Query Processors Required is:

$$\text{Query Processors Required} = \frac{\text{Total Service HDBH Query Capacity}}{\text{Query Capacity}}$$

(Round UP)

Where : Total Service HDBH(High Day Busy Hour) Query Capacity.
(maximum traffic of the CCS7 Network Interconnected to
DMS-SCP II Nodes)

Number of Storage Devices.

Use the following to calculate the number of 600 MByte Disk Storage Devices per QP:

$$\# \text{ Online Disks} = \frac{((\text{Application Database Size in MBytes}))}{600}$$

(Round UP to next higher integer)

Figure 10. Number of 600 MByte Disk Storage Devices per QP

To provide optional shadow (duplicate) disks for added reliability, double the above quantity.

If Shadowing is required then

Total # of Disks = 2 * #Online Disks

7.2.3.11 Enhanced 800 + Services Provisioning
Service Provisioning Steps.

RELEASE 06.03
13 July 1998

TELCO Required Information

1. Network Configuration and Link Speed.
2. Maximum Network Query Traffic = T1
3. Total Number of E800+ Service Records = R1
4. Records Update Traffic = U1
5. Individual E800+ Services Query Traffic

SERVICE TYPE	% Usage of T1	% Usage Y of R1
Domestic Basic Service	A1	B1
Domestic Single Number	A2	B2
Domestic Flexroute	A3	B3
Domestic Exchange Route	A4	B4
Domestic Overflow Call Routing	A5	B5
Northbound Single Number	A6	B6
Northbound Flexroute	A7	B7
Northbound Overflow Call Routing	A8	B8
Southbound		

RELEASE 06.03
13 July 1998

Query Capacity Multipliers

The Query Capacity Multipliers provide a workload factor (relative to STD QRY) on the Query processor for a specific Service type.

SERVICE TYPE	Query Capacity	Reference
Domestic Basic Service	1.00	M1
Domestic Single Number	1.00	M2
Domestic Flexroute	3.13	M3
Domestic Exchange Route	1.39	M4
Domestic Overflow Call Routing	1.12	M5
Northbound Single Number	1.06	M6
Northbound Flexroute	3.70	M7
Northbound Overflow Call Routing	1.16	M8
Southbound (6 Digit)	1.85	M9
Southbound (10 Digit)	1.54	M10

RELEASE 06.03
13 July 1998

Update Processor Provisioning

1. Provision one (1) UP per service application.
2. Determine Total Number of Record Storage Blocks
(complete the table below)

SERVICE TYPE	Number of Storage Blocks
Domestic Basic Service	$(R1 * B1) / 81$
Domestic Single Number	$(R1 * B2) / 61$
Domestic Flexroute	$(R1 * B3) / 48$
Domestic Exchange Route	$(R1 * B4) / 38$
Domestic Overflow Call Routing	$(R1 * B5) / 65$
Northbound Single Number	$(R1 * B6) / 11$
Northbound Flexroute	$(R1 * B7) / 10$
Northbound Overflow Call Routing	$(R1 * B8) / 11$
Southbound	$(R1 * B9) / 130$
Total Number of Storage Blocks	SB1

RELEASE 06.03
13 July 1998

3. Determine Total Database Size

Total Database Size = Supporting Data + (800 Data & Overhead)

$$\begin{aligned} TS1 &= 12000000 + (U1 * 1536) \\ &+ (\text{round to integer}(SB1/4096 + 0.05) * 33554432) \\ &+ (\text{round to integer}(SB1/5120 + 0.5) * 65536) \\ &+ (\text{round to integer}(R1/207336 + 0.5) * 4194304) \end{aligned}$$

4. Determine Number of UP Disks

Number of Online = Total Database Size / Disk Size

Number of Online = TS1 600 MByte (Round Up)

Where Disk Size = 600 MByte.

For each online Disk on the UP, provision a Shadow Disk.

Query Processor Provisioning

1. Determine Maximum Query Processing Traffic

Maximum Query Processing Traffic = $T2 = T1 * (A1*M1 + A2*M2 + A3*M3 + \dots + An*Mn)$

where n = number of services

An = % of usage on T1 for a given service(n)

Mn = Query Capacity Multiplier for a given service(n)

T1 = Maximum Network Query Traffic

2. Calculate Query processing Capacity of each QP at the appropriate CHR.(cache hit ratio)

CHR = Maximum CACHE Size / Total Record Storage Size

where Maximum Cache Size = 24 Mbytes

Total Record Storage Size = SB1 * 8192

$$CHR = C1 = (24 * 1048576) / (SB1 * 8192)$$

$$QP \text{ capacity at } C1 = 20 + (25 * C1)$$

Query Processor Traffic Capacity

The table below depicts QP Query handling Capacity based on a single Database access (Cache or Disk).

RELEASE 06.03
13 July 1998

Cache Hit RATIO CHR	Query Capacity (queries/sec.)	QP Query Response TIME

0%	20 Q/Sec	250 msec
15%	24 Q/Sec	250 msec
40%	30 Q/Sec	250 msec
60%	35 Q/Sec	250 msec
100%	45 Q/Sec	250 msec

3. Calculate number of QPS required to handle traffic at the appropriate CHR(C1)

$$\begin{aligned}\text{Number of QPs} &= \text{Maximum Query Processing Traffic} / \text{QP Capacity} \\ &= T2 / (20 + (25 * C1)) \quad \text{Round UP}\end{aligned}$$

where T2 = Maximum Query Processing Traffic

EIU and LIU7 Provisioning

See "LPP Prpvisioning Guidelines" on page 4-110

Enhanced 800+ Service Example

TELCO Required Network Information

RELEASE 06.03
13 July 1998

1. Network Configuration and Link Speed.
= Quasi-Associated Network with STP and SCP pairs for redundancy
= Link Speed = 56Kb/s
2. Maximum Network Query Traffic = T1 = 250 Q/s
3. Total Number of E800+ Service Records = R1 = 300000
4. Records Update Traffic = U1 = 1000 Updates/day
5. Average Query and Response message size = 100 Bytes
6. Individual E800+ Services Query Traffic

SERVICE TYPE	% Usage of T1	% Usage Y of R1
Domestic Basic Service	36.0	24.0
Domestic Single Number	4.0	4.0
Domestic Flexroute	0.5	0.25
Domestic Exchange Route	0.5	0.25
Domestic Overflow Call Routing	1.0	0.50
Northbound Single Number	1.5	0.50
Northbound Flexroute	0.5	0.25
Northbound Overflow Call Routing	1.0	0.25
Southbound	55.0	70.0

RELEASE 06.03
13 July 1998

Update Processor Provisioning

1. Provision one (1) UP per service application.
= 1 UP.
2. Determine Total Number of Record Storage Blocks
(complete the table below)

SERVICE TYPE	Number of Storage Blocks
Domestic Basic Service	$(300000 * 0.24) / 81$
Domestic Single Number	$(300000 * 0.04) / 61$
Domestic Flexroute	$(300000 * 0.0025) / 48$
Domestic Exchange Route	$(300000 * 0.0025) / 38$
Domestic Overflow Call Routing	$(300000 * 0.005) / 65$
Northbound Single Number	$(300000 * 0.005) / 11$
Northbound Flexroute	$(300000 * 0.0025) / 10$
Northbound Overflow Call Routing	$(300000 * 0.0025) / 11$
Southbound	$(300000 * 0.70) / 130$
Total Number of Storage Blocks	SB1 = 3044

3. Determine Total Database Size

Total Database Size = Supporting Data + (800 Data & Overhead)

$$TS1 = 12000000 + (U1 * 1536) + (\text{round to integer}(SB1/4096 + 0.05) * 33554432)$$

RELEASE 06.03
13 July 1998

$$+ (\text{round to integer}(\text{SB1}/5120 + 0.5) * 65536 \\ + (\text{round to integer}(\text{R1}/207336 + 0.5) * 4194304$$

$$\text{TS1} = 12000000 + (1000 * 1536) \\ + (\text{round to integer}(3044/4096 + 0.05) * 33554432 \\ + (\text{round to integer}(3044/5120 + 0.5) * 65536 \\ + (\text{round to integer}(300000/207336 + 0.5) * 4194304$$

$$\text{TS1} = 55544576$$

4. Determine Number of UP Disks

Number of Online = Total Database Size / Disk Size

Where Disk Size = 600 MByte.

$$\text{Number of Online} = 55544576 / 600 \text{ MByte} / 1048576 \text{ (Round Up)}$$

$$\text{Number of Online} = 1$$

For each online Disk on the UP, provision a Shadow Disk.

Query Processor Provisioning

1. Determine Maximum Query Processing Traffic

$$\text{Maximum Query Processing Traffic} = \text{T2} = \text{T1} * (\text{A1} * \text{M1} + \text{A2} * \text{M2} + \text{A3} * \text{M3} \dots \text{An} * \text{Mn})$$

where n = number of services

An = % of usage on T1 for a given service(n)

Mn = Query Capacity Multiplier for a given service(n)

T1 = Maximum Network Query Traffic

$$\text{Maximum Query Processing Traffic} = \text{T2} = 250 * ((0.36 * 1.00) + (0.04 * 1.0) + \\ (0.005 * 3.13) + (0.005 * 1.39) + (0.01 * 1.12) \\ + (0.015 * 1.06) + (0.005 * 3.70) + (0.01 * 1.16) \\ + (0.55 * 1.54))$$

$$\text{Maximum Query Processing Traffic} = \text{T2} = 328.61 \text{ STD QRY/sec}$$

2. Calculate Query processing Capacity of each QP at the appropriate CHR.(cache hit ratio)

$$\text{CHR} = \text{Maximum CACHE Size} / \text{Total Record Storage Size}$$

where Maximum Cache Size = 24 Mbytes

$$\text{Total Record Storage Size} = \text{SB1} * 8192$$

RELEASE 06.03
13 July 1998

$$\begin{aligned}\text{CHR} = \text{C1} &= (24 * 1048576) / (3044 * 8192) \\ &= 1.01 = 100 \% \text{ CHR}\end{aligned}$$

$$\begin{aligned}\text{QP capacity at C1} &= 20 + (25 * 1.00) \\ &= 45 \text{ STD QRY/sec}\end{aligned}$$

3. Calculate number of QPs required to handle traffic at the appropriate CHR(C1)

$$\begin{aligned}\text{Number of QPs} &= \text{Maximum Query Processing Traffic/QP Capacity} \\ &= \text{T2} / (20 + (25 * \text{C1})) \quad \text{Round UP}\end{aligned}$$

where T2 = Maximum Query Processing Traffic

$$\begin{aligned}&= 328.61 / (20 + (25 * 1.00)) \quad \text{Round UP} \\ &= 7.3 \text{ (round up)} \\ &= 8 \text{ QPs}\end{aligned}$$

EIU and LIU7 Provisioning

Number of EIUs = 2

For Quasi Associated Network Configuration:

$$\begin{array}{lcl}\text{Total Number of A-Links} &= \text{Total Network HDBH Traffic} & \\ &\text{-----} & \text{(round up)} \\ &\text{A-Link Capacity at 80\% Occupancy} & \end{array}$$

A-Link Capacity at 80% occupancy = 56 Q/sec. with 100 MByte message length.

Therefore:

$$\text{Total Number of A-Links} = 250/56 = 4.46 = 6 \text{ Links}$$

$$\text{Total Number of LIU7s required} = 6$$

$$\text{Total Interfaces required at each DMS-SCPII LPP} = 8 \text{ (2 EIU, 6 LIU7)}$$

$$\text{Number of LPPs required at each DMS-SCPII} = 1$$

$$\text{Total A-Links required at each STP} = 6 \text{ (3 from each SCP)}$$

7.2.4 Office Layout Information

There are no unique equipment layout restrictions in a DMS-SCP II office.

7.2.5 Traffic Tables

Not applicable

7.3 Product/System Specification

7.3.1 Physical Characteristics

Not applicable

7.3.2 EMI/Earthquake Information

Not applicable.

7.3.3 Sparing Information

Not applicable.

7.3.4 Power Feed and Fusing Requirements

None.

7.3.5 Current Drain Information

None.

ECM-604 Double Shelf Network

7.4 Software Provisioning

For NTX software packages to PLC/SOC mappings for CSP02 and beyond refer to ECM552 - Mapping of NTX/NTG Package to PCL/NCL/Option.

7.4.1 Required Software Packages and Interdependencies

SCP BASE

Required Packages:

Package	Title
-----	-----
NTXN21AA	SCP BASE MASTER PACKAGE
NTXQ47AA	SCP GENERIC BASE INTERFACE
NTXQ46AA	SCP DATA MANAGEMENT

SSP 800+ SERVICES

Required Packages:

RELEASE 06.03
13 July 1998

Package	Title
NTNX24AA	SCP BASIC 800 SERVICE - MD
NTNX37AB	MCAM Meridian Cabinet Aux Mod - Replaces NTNX24AA
NTXQ36AA	SCP 800 ENHANCED

7.4.2 Software Usage Restrictions

None.

7.4.3 Memory Provisioning

To determine the amount of memory required for the DMS-Core, use the MEMCALC program.

7.5 Real Time Impact

Not applicable. The DMS-SCP II DMS-Core is dedicated to the SCP node, so there is no call processing activity.

RELEASE 06.03
13 July 1998

8.0 ECM643 - International Common Peripheral Equipment Frame

8.1 Overview

The NT6X01AC International Common Peripheral Equipment Frame is based on the domestic NT6X01AB, adapted for international applications. It supports PCM30 links, ISDN services, and Common Channel Signaling 7 (CCS7) features on two independent peripheral modules. Additionally, it accommodates the ILGC+ and IDTC+ (Unified Processor) applications for DMS100i applications (non-ISDN).

In DMS100 International, an IDTC supports channel associated signalling (CAS) only (eg R1/R2/DP). An IDTC does not support CCS7 (eg CTUP, ISUP). For CCS7 offices, a separate PDTC peripheral must be provisioned. However, one IDTC and one PDTC can co-exist on the same frame.

8.2 Hardware Provisioning

8.2.1 Hardware Usage Restrictions

NT6X01AC International Peripheral Controller Equipment Frame

The NT6X01AC International Peripheral Controller Equipment Frame supports five peripheral module types: PCM-30 LGC, DTC, TMS, ILGC+, and IDTC+.

PCM-30 LGC - Supports ISDN, Centrex, EBS, IBN and POTS services on standard Line Concentrating Module types

- Has PCM-30 P-side links for PRLCM and International Remote Switching Center interface
- Operation as a non-ISDN peripheral is not yet implemented in software, meaning that the ISDN Pre-Preprocessor CP is required even if no ISDN features are used
- Supports AMI interface to the NT1. 2B1Q is not supported for this interface

PCM-30 DTC - Supports CCS7 and R1 signaling in International applications, using PCM-30 links.

- ISDN services like Primary Rate Interface are not supported

PCM-30 TMS - Supports the TPC interface for TOPS MP applications as well as interfacing TOPS MPX positions to the DMS.

RELEASE 06.03
13 July 1998

- TMS does not support a fiber interface to the network (DS512).
- ILGC - Supports the Unified Processor only on the International Line Group Controller (LGC) with the 2P backplane. Note: The ILGC applies only to the DMS-100i, and does not support ISDN.
- IDTC - Supports the Unified Processor only on the International Digital Trunk Controller (DTC) with the 2P backplane. Note: The IDTC applies only to the DMS-100i, and does not support ISDN. An IDTC does not support CCS7 signalling links.

Modules of different types may be mixed on the frame if required.

D-Channel Handler CP are not required for PCM-30 DTC applications, nor where the PCM-30 LGC supports only non-ISDN LCMs.

ISDN Pre-Processor CPs are always required on PCM-30 LGC (until such time as software supports purely non-ISDN operation). This CP is not required on PCM-30 DTC.

For DMS100i supports purely non-ISDN operation, therefore an ISDN pre-processor CP is NOT required, nor supported.

UTR and GTR cannot exist in the same module. For an upgrade situation, the existing UTRs need to be removed and replaced by GTRs in addition to the GTRs being provisioned.

8.2.2 Hardware Dependencies

All PCM-30 links from a PRCC must terminate on the same host PCM-30 LGC. Only the PCM-30 LGC peripheral type can terminate PRCC host links.

Unified Processor (XPM+) applications are only supported on the 2P backplane.

8.2.2.1 P and C Side Port Requirements

Not applicable

8.2.2.2 DMS BUS Port Requirements

Not applicable

8.2.2.3 Circuits Per Card

Not applicable

RELEASE 06.03
13 July 1998

8.2.2.4 Discrimination Numbering

Not applicable

8.2.3 Provisioning Considerations

NT6X01AC International Frame

Common Circuit Packfill:

NT6X01AC is a general purpose Common Peripheral Controller Equipment Frame for applications outside North America ("International"). It houses two dual shelf peripheral modules which support PCM30 links, ISDN services, and Common Channel Signaling 7 (CCS7) features. Additionally, the NT6X01AC supports the IDTC and ILGC Unified Processor applications on the dual processor (2P) backplane shelf. (DMS100i) Each peripheral module is housed on two adjacent shelves (ie. a pair of shelves on positions 65 and 51 and a pair of shelves on positions 32 and 18).

Each of the two modules in the frame may be configured as:

- ILGC International Line Group Controller Non-ISDN
- PLGC PCM-30 Line Group Controller
- LGCO Line Group Controller Offshore
- LGCI Line Group Controller ISDN
- IDTC International Digital Trunk Controller Non-ISDN
- PDTC PCM-30 Digital Group Controller
- DTCO Digital Trunk Controller Offshore
- DTCI Digital Trunk Controller ISDN
- TMS TOPS Message Switch,

Cooling Inverter Unit:

Provide for each frame,

- one (1) NT3X90AC Cooling Inverter Unit.

Isolated System Grounding:

When extending existing offices not equipped with Isolated System Grounding (ISG), provide:

- one (1) NT0X0009 Logic Return Cable Assembly.

Common Circuit Packfill:

Provide per customer requirements:

- maximum two (2) NT6X02UB LGC/DTC Common CPs (International).

Filler Faceplates for Unequipped Modules:

When shelves 18-32 or 51-65 are not equipped with any circuit packs, provide for each module:

- one (1) NT6X02AB CPC Filler Faceplates.

Filler Faceplates for Unequipped CP Slots:

For each unequipped circuit pack position on the module, provide:

- one (1) NT0X50AA filler faceplate.

ISDN Applications:

When ISDN BRA functions are required (ISDN functions on subscriber lines) for each equipped LGC module, provide:

- up to nine (9) D Channel Handler CPs

In BCS-28 or later, provide for use as a hot spare:

- one (1) additional D Channel Handler CP.

Note that ISDN Pre-Processor and Enhanced ISDN Pre-Processor CPs and the DCH CP may not be provisioned on a DTC which is provisioned with NT6X70AAs to handle CCIS/CCS7 voice trunking.

DCH CP are not required on a PCM-30 DTC module nor where a PCM-30 LGC module supports only non-ISDN LCMs.

For TMS (TOPS Message Switch) applications, provide:

- four (4) D Channel Handler CPs.

Each DCH CP supports up to 124 BRI D-Channels. The spare DCH CP should not be counted when determining the number of DCH CPs required to support D-channel traffic.

Each DCH CP, including the spare, requires one (1) peripheral port on the PCM-30 LGC module. Assign DCH cards to shelf and slot positions in the following order. The spare DCH should be assigned last:

DCH PACK PROVISIONED				SHELF POSITION	CP POSITION	ASSIGN TO LOGICAL PORT NUMBER
1st	DCH	CP	Provisioned:	X+14	1	19
2nd	DCH	CP	Provisioned:	X	1	17
3rd	DCH	CP	Provisioned:	X+14	2	15
4th	DCH	CP	Provisioned:	X	2	13
5th	DCH	CP	Provisioned:	X+14	3	11

RELEASE 06.03
13 July 1998

6th	DCH CP Provisioned:	X		3		09	
7th	DCH CP Provisioned:	X+14		4		07	
8th	DCH CP Provisioned:	X		4		05	
9th	DCH CP Provisioned:	X+14		5		03	
10th	DCH CP Provisioned:	X		5		01	
+-----+-----+-----+-----+							

Where:

For the lower module in the frame
shelf position X=18, X+14=32

For the upper module in the frame
shelf position X=51, X+14=65

PCM-30 Interface CPs:

Provide for each equipped LGC or DTC module, as per customer requirements:

- maximum eight (8) PCM-30 Interface CPs.

For each TMS module,

- For TPC (TOPS Position Controller) interface,
 - for up to 64 operators, provide:
 - two (2) PCM-30 Interface CPs
in CP slots 5 of both shelves, and
 - for more than 64 operators and up to 96 operators, provide an additional:
 - one (1) PCM-30 Interface CP
in CP slot 4 of shelf 0,
- For data base access, provide:
 - two (2) PCM-30 Interface CPs
in CP slot 4 of shelf 1 and
in CP slot 3 of shelf 0, and
- For inter DCH ORDB, provide:
 - one (1) PCM-30 Interface CP
in CP slot 3 of shelf 1.

Otherwise provide for each unequipped CP slot:

- one (1) NT0X50AA Filler Faceplate.

Provide one (1) PCM-30 Interface CP for every two PCM 30 ports required.

Peripheral port/pack location relationship is as follows:

+-----+-----+-----+-----+									
CP POS		5		4		3		2	
+-----+-----+-----+-----+									

RELEASE 06.03
13 July 1998

SHELF POS	PORTS	PORTS	PORTS	PORTS
X+14	2,3	6,7	10,11	14,15
-----	-----	-----	-----	-----
SHELF POS	PORTS	PORTS	PORTS	PORTS
X	0,1	4,5	8,9	12,13
-----	-----	-----	-----	-----

Where:

For the lower module in the frame

shelf position X=18, X+14=32

For the upper module in the frame

shelf position X=51, X+14=65

Assign PCM-30 CP to module starting at port 0 and continue in sequential order to port 15.

Each D Channel Handler CP already assigned to CP pos 2 to 5 physically makes the two PCM 30 ports shown above unavailable for assignment to PCM 30.

LCM Interface CPs:

For PCM-30 LGC applications, to interface links from LCMI and/or LCM, provide:

- four (4) NT6X48AA DS30A LCM Interface CPs.
- four (4) P0745307 Connector Key Brackets.

The NT6X48AA CP are assigned in pairs for reliability. One member of the pair interfaces the same DS30A ports as the other member. Each member of the pair occupies the same CP position, with one CP assigned to LGAI/LTAI 0 (lower shelf of the module) and the other assigned to LGAI/LTAI 1 (upper shelf of the module).

The two pairs of NT6X48AA provide interfaces for up to twenty (20) DS30A ports (links) from LCMs, LCMI, and/or LCMs.

The following is a listing of DS30A ports per DS30A LCM Interface CP, NT6X48AA location:

-----	-----	-----	-----
	CP POS 6	CP POS 7	
-----	-----	-----	-----
PORT	2	0	
-----	-----	-----	-----
PORT	3	1	
-----	-----	-----	-----
PORT	6	4	
-----	-----	-----	-----
PORT	7	5	
-----	-----	-----	-----

RELEASE 06.03
13 July 1998

PORT	10		8	
+-----+		+-----+		+-----+
PORT	11		9	
+-----+		+-----+		+-----+
PORT	14		12	
+-----+		+-----+		+-----+
PORT	15		13	
+-----+		+-----+		+-----+
PORT	18		16	
+-----+		+-----+		+-----+
PORT	19		17	
+-----+		+-----+		+-----+

The ports for DS30A must be selected from the those ports that remain after assignment of port circuits.

Assign ports to DS30A in the following sequence: 19, 17, 18, 16, 15, 13, 14, 12, 11, 9, 10, 8, 7, 5, 6, 4, 3, 1, 2 and 0 (if unused by DCH or DS-1). In an extension job, when adding new DCH ports, the DS30A ports may have to be reconfigured in accordance with this rule.

Two Processor XPM (MP/SP) or XPM Plus (UP):

For offices with the

XPM (MP/SP) feature, provide for each equipped LGC or DTC module:

- four (4) NT6X45BA LGC/DTC Processor CPs,
- two (2) NT6X47AC 4MB MP Memory CPs,
- two (2) NT0X50AA Filler Faceplates in slot 10, and
- two (2) NT6X46BA/BB Signal Processor Memory Plus CPs.

Alternatively, for offices with the XPM Plus (UP) feature, provide for each equipped LGC or DTC module:

- two (2) NTMX77AA XPM Plus Processor CPs,
- two (2) NTMX71AA XPM Plus Paddleboards,
- eight (8) NT0X50AA Filler Faceplates in slots 8, 9, 10, and 11.
- THE NT6X01WE Wiring (XPM Plus) is always provided with the frame and documented in LW6X01AC.

In offices with the XPM (MP/SP) feature, provide:

- for each equipped LGC module:
 - two (2) NTBX01AA ISDN Sig. Preproc. CPs.
(Note that NTBX01AAs must be provisioned for LGC even when ISDN services are not required).
 - DMS100i does not support XPM (MP/SP).

RELEASE 06.03
13 July 1998

- for each equipped DTC module:
 - when ISDN services are required,
 - two (2) NTB01AA ISDN Sig. Preproc. CPs, or
 - when ISDN services are not required,
 - two (2) NT0X50AA Filler Faceplates.

Note that NTB01AA ISDN CPs may not be provisioned on a DTC which is provisioned with NT6X70AAs to handle CCIS/CCS7 voice trunking.

In offices with the XPM Plus (UP) feature with ISDN, provide:

- for each equipped LGC module:
 - two (2) NTB01AB ISDN Sig. Preproc. CPs.
(Note that NTB01ABs must be provisioned for LGC even when ISDN services are not required. In contrary, NTB01AB's must NOT be provided for ILGC's in DMS100i offices where ISDN service are neither supported nor required.)
- for each equipped DTC module:
 - when ISDN services are required,
 - two (2) NTB01AB ISDN Sig. Preproc. CPs, or
 - when ISDN services are not required,
 - two (2) NT0X50AA Filler Faceplates.

Note that NTB01AB ISDN CPs may not be provisioned on a DTC which is provisioned with NT6X70AAs to handle CCIS/CCS7 voice trunking.

For ISDN XPM's with MS/SP processor configuration, the NTB01AC is preferred and it should be used for all new offices with this configuration.

For ISDN XPM+ applications with the NTMX77 processor, the NTB01AC or NTB01BA may be used and the NTB01BA is preferred for all new offices.

For existing modules being converted from XPM to XPM Plus provide:

- when no parts are already stocked on site,
 - one (1) NT6X02XG XPM Plus Upgrade Kit, or
- when the office already has the NTMX77AA CPs and the NTMX71AA Paddlecards stocked on site,
 - one (1) NTMX70AB XPM Plus Paddlecard Kit.

The NTMX70AB does not contain NTMX77AA, NTMX71AA, nor P 735417 Designation Labels for NTMX77AA.

When either the NT6X02XG or the NTMX70AB Kit is installed, remove all the NT6X45, NT6X46, and NT6X47 CPs in the module and provide NT0X50AA Filler Face Plates as required to occupy the vacant CP positions.

RELEASE 06.03
13 July 1998

When NTB01AA ISDN Signalling Pre-processor CPs are present in a module being upgraded to XPM PLUS, provide two (2) NTB01AB CPs, with two (2) P0735418 Designation Labels, and use them to replace the NTB01AA CPs.

The formerly provided NT6X02XF XPM Plus Upgrade Kit has been changed to A&M status and replaced by the NT6X02XG.

Wiring Option for Non-ISDN:

Provide one (1) NT6X01WD Wiring Option when ISDN features are not required on the frame. The option adds a wire strap to the back-panel NT6X0103 Slot XX-12 between pins 7A and 8A to allow for non-ISDN operation.

Continuity Tone Detector CPs:

When this module is handling CCIS/CCS7 voice trunking, provision for each PCM-30 DTC module:

- two (2) NT6X70AA Continuity Tone Detector CPs.

Note that NT6X70AAs for CCIS/CCS7 voice trunking, may not be provisioned on a DTC which is provisioned with NTB01AA/AB ISDN CPs.

This CP supports a Continuity Test (COT), and is recommended whenever analog facilities are employed in part or all of the transmission path.

When the facility is end-to-end digital, this CP is not required since digital facilities employ other means of fault detection.

An LGC may not be provisioned with NT6X70AA CPs.

Calling Number Display Feature CPs:

When the module is handling CMS Calling Number Display feature, provide for each PCM-30 LGC module:

- two (2) CLASS Modem Resource CPs (NT6X78AB)

Universal Time Switch CPs:

Provide for each PCM-30 LGC/DTC module:

- two (2) NT6X44EA Universal Time Switch (UK) CPs.

Tone Receiver CPs:

When analog (POTS) lines are to be supported, or when non-ISDN trunks (A/B bit signalling) are interfaced to a PCM-30 DTC module, provide the following Tone Receiver CP for each PCM-30 DTC module:

RELEASE 06.03
13 July 1998

- maximum of four (4) NT6X92CA UTR CPs.
(OR)
- maximum of four (4) NT6X92EA Global Tone Receiver GTR CPs.

In DMS100 International, an IDTC supports channel associated signalling (CAS) only (eg R1/R2/DP). An IDTC does not support CCS7 (eg CTUP, ISUP). For CCS7 offices, a separate PDTC peripheral must be provisioned. However, one IDTC and one PDTC can co-exist on the same frame.

For each PDTC+ utilized for CCS7 applications for the DMS100i product in BCS37i (or later releases), 0 (ZERO) UTRs are required to be provisioned. DMS100i supports PDTC+, and not PDTC.

Network Interface CPs:

When DS30 copper network interface is required in a non-ENET office, provide for each PCM-30 LGC/DTC module:

- two (2) NT6X40AC/AD DS30 Network Interface CPs, (See note)
- two (2) NT6X69LB Msg Protcl & Downldbl Tone CPs, and
- in existing frames when this module was not previously equipped with NT6X02UF,
- one (1) NT6X02UF UFXPM Kit
(EC 024-96554 NT6X02UF always provided for new production)

Provide 2 (two) NT6X40AD's per module for JNET (non-fiber) network interface. The NT6X40AD is backwards compatible with the NT6X40AC. However, the NT6X40AD has an enhanced c-side loop-around feature available with XPM05+ software loads. If a NT6X40AC and NT6X40AD are mixed in a module, they must be datafilled as NT6X40AC in order for the diagnostics to pass. Use NT6X40AD for new production.=

The NT6X69LB is recommended for use in all applications in place of the NT6X69LA. The NT6X69LA is manufacture discontinued.

Otherwise, when fiber network interface is required in an ENET office, provide for each PCM-30 LGC/DTC module:

- two (2) NT6X40FA/FB DS512 Network Interface CPs, (See note)
- two (2) NT6X40GA DS512 Paddle Boards,
- two (2) NT6X69LB Msg Protcl & Downldbl Tone CPs,
- one (1) NT6X0251 Fiber Cable Conversion Kit, and
- in existing frames when this module was not previously equipped with NT6X02UF,
- one (1) NT6X02UF UFXPM Kit
(EC 024-96554 NT6X02UF always provided for new production)

Provide 2 (two) NT6X40FB's per module for ENET (fiber) Interface. The NT6X40FB is backwards compatible with the NT6X40FA. However, the NT6X40FB has an enhanced C-side Loop-around diagnostic feature

RELEASE 06.03
13 July 1998

available with XPM05+ software loads. If the NT6X40FA and NT6X40FB are mixed in a module, they must be datafilled as a NT6X40FA in-order for the diagnostics to pass.

For fiber network interface the NT6X69LB must be used (the NT6X69LA has been changed to MD status).

Power Conversion CPs:

Provide for each PCM-30 LGC/DTC module:

- two (2) NT2X70AF Power Conv +/-5V & 12V CPs.

The formerly provided NT2X70AE Power Converter has been changed to MD status and replaced by the NT2X70AF. NT2X70AF is the preferred power converter for all new production.

Universal Network Interface Kit:

The NT6X02UF Bracket kit will be always provided (in both fiber and non-fiber applications) as part of the frame stocklist per EC 0 4-96554. Provide only if not part of the frame.

- two (2) NT6X02UF UFXPM Kits.

Universal Ground Point:

For each cabinet, provide for equipment maintenance at rear of cabinet:

- one (1) NT6X0250 Universal Ground Point.

Provide one (1) NT6X0250 Universal Ground Point per new frame for Initials and Extensions. Provision one (1) NT6X0250 per frame when NT6X02UF UFXPM mechanicals are provisioned for field upgrades to fiber or when XPM+ upgrade kits are provisioned. Only one (1) NT6X0250 is ever required per frame. If the frame was upgraded to FIBER then it should have received an NT6X0250 upgrade. When XPM+ upgrades are required, No additional NT6X0250's are needed.

Designation Labels for CPs:

Provide the appropriate designation label for each CP provided.

PCM-30 Signaling CPs:

For each equipped LGC/DTC which supports PCM30 links (NT6X27 PCM-30 Interface CPs), or for each equipped LGC module which supports links to an LCM (NT6X48 DS30A LCM Interface CPs provided), and the LCM is equipped with a PCM30 line drawer such as the NT6X05CA, provide:

RELEASE 06.03
13 July 1998

- two (2) NT6X28AA PCM-30 Signaling CPs.

CPC Coax Panel:

When PCM30 feature is required, provide for each PCM-30 LGC/DTC module:

- one (1) NT6X01ZA CPC Coax Panel OR
- one (1) NT6X01ZD CPC Coax Panel.

When PCM30 Transmission is required, per CHINA and International Standards provide for each PCM-30 LGC/DTC module:

- one (1) NT6X01ZF CPC Coax Panel.

Each of the NT6X01ZD/ZF Coaxial panel may be provisioned with the NTCX50AB paddle board, when the latter is required in pos 19R. The NT6X01ZA Coaxial panel however, can not accomodate the NTCX50AB in pos 19R, because of space limitations.

When this feature is to be field installed, then the NT6X01ZA/ZD/ZF CPC Coax Panel will require the following supporting documents: PC6X01ZB and SRJ6X01AC.

Echo Cancelling:

For Echo Cancelling, in XPM+ applications provide for each equipped module:

- one (1) NT6X01XK XPM+ ECHO Canceller Upgrade Kit

NT7X05AA Product Change Kit:

For NT7X05AA Product Change Kit provide:

- one (1) NT6X02WF NT7X05AA Product Change Kit

8.2.4 Office Layout Information

Not applicable.

8.2.5 Traffic Tables

Standard traffic provisioning algorithms apply.

8.3 Product/System Specification

8.3.1 Physical Characteristics

Not applicable.

RELEASE 06.03
13 July 1998

8.3.2 EMI/Earthquake Information

Not applicable.

8.3.3 Sparing Information

Standard sparing algorithms apply.

8.3.4 Power Feed and Fusing Requirements

8.3.5 Current Drain Information

8.4 Software Provisioning

For NTX software packages to PLC/SOC mappings for CSP02 and beyond refer to ECM552 - Mapping of NTX/NTG Package to PCL/NCL/Option.

8.4.1 Required Software Packages and Interdependencies

Software feature package NTXH10AA, NTX274AA, or NTX478AA is required for NT6X27BB Enhanced PCM-30 Interface Circuit Pack. These packages are contained in master packages. Check SOLID to order appropriate master package.

XPM Software Planned Introduction:

XPM software XPM01 is planned to be introduced in BCS35 time frame.

XPM software XPM02 is planned to be introduced in CSP01 (BCS36) time frame.

XPM software XPM03 is planned to be introduced in CSP02 (BCS37) time frame.

XPM TWO PROCESSOR (MP/SP) LOAD PHASE-OUT:

DTCO (Digital Trunk Controller Offshore Non-ISDN):

Current Two Processor (MP/SP) UDT load supporting DTCO will be:

- Frozen in BCS34 software, and
- Become unavailable in XPM02 software.

DTCI (Digital Trunk Controller ISDN):

Current Two Processor (MP/SP) UDI load supporting DTCI will be:

- Frozen in XPM01 software, and
- Become unavailable in XPM02 software.

RELEASE 06.03
13 July 1998

LGCI (Line Group Controller ISDN):

Current Two Processor (MP/SP) OLG load supporting LGCI will be:

- Frozen in BCS34 software, and
- Become unavailable in XPM01 software.

XPM PLUS (UP) LOAD PHASE-IN:

DTCO (Digital Trunk Controller Offshore Non-ISDN):

XPM Plus (UP) ODT load supporting DTCO will be:

- Introduced in Verification Office BCS34 software (Feature Packages NTXK79AA and NTR34AA), and
- Become Generally Available in XPM01 software.

DTCI (Digital Trunk Controller ISDN):

XPM Plus (UP) ODI load supporting DTCI will be:

- Introduced in Verification Office XPM02 software (Feature Packages NTXK79AC and NTR34AB), and
- Become Generally Available in XPM03 software.

ILGO (Line Group Controller Offshore Non-ISDN):

XPM Plus (UP) OLG load supporting LGCO will be:

- Introduced in Verification Office XPM02 software (Feature Packages NTXK79AC and NTR34AB), and
- Become Generally Available in XPM03 software.

LGCI (Line Group Controller ISDN):

XPM Plus (UP) OGI load supporting LGCI will be:

- Introduced in Verification Office BCS34 software (Feature Packages NTXK79AA and NTR34AA), and
- Become Generally Available in XPM01 software.

ILGC+ (International Line Group Controller IXPM+):

IXPM Plus (UP) load supporting ILGC+ will:

- Be introduced for Verification in BCS38i (Feature Package NTXK79AD)

- Utilize the EIL firmware load

IDTC+ (International Digital Trunk Controller IXPM+):

IXPM Plus (UP) load supporting IDTC+ will:

- Be introduced for Verification in BCS38i (Feature Package NTKK79AD)
- Utilize the EID firmware load

8.4.2 Software Usage Restrictions

TWO PROCESSOR (MP/SP) SOFTWARE				XPM PLUS (UP) SOFTWARE			
XPM TYPE	LOAD NAME	LOAD FROZEN	LOAD NOT AVAILABLE	LOAD NAME	VERIF. OFFICE	GENERALLY AVAILABLE	
DTCO	UDT	BCS34	XPM02	ODT	BCS34	XPM01	
DTCI	UDI	XPM02	XPM03	ODI	XPM02	XPM03	
LGC0	N/A	N/A	N/A	OLG	XPM02	XPM03	
LGCI	OLG	BCS34	XPM01	OGI	BCS34	XPM01	

8.4.3 Memory Provisioning

There is no program store or data store impact as a result of hardware described in this ECM.

8.5 Real Time Impact

None.

RELEASE 06.03
13 July 1998

9.0 ECM669 - Cabinetized International Peripheral Equipment Fiber ISDN,

9.1 Overview

The NTRX46BA Cabinetized International Peripheral Equipment (CIPE) was developed in the DMS-100 Global Cabinetization project Phase 4, Germany Intelligent Network and EN Class B.

The CIPE contains two dual shelf XPM modules configured as either LGCs (Line Group Controllers) or DTCs (Digital Trunk Controllers).

CIPE connects to the network through either DS-30 trunks (twisted pairs) or DS-512 trunks (fiberoptic cables).

CIPE connects to the LCMS (Line Card Modules) via DS-30A trunks (twisted pairs).

CIPE may also interface directly to external PCM-30 trunks (either twisted pairs or coaxial cables).

All connections to the network, line card modules or PCM-30 trunks pass through the bulkhead for EMI protection.

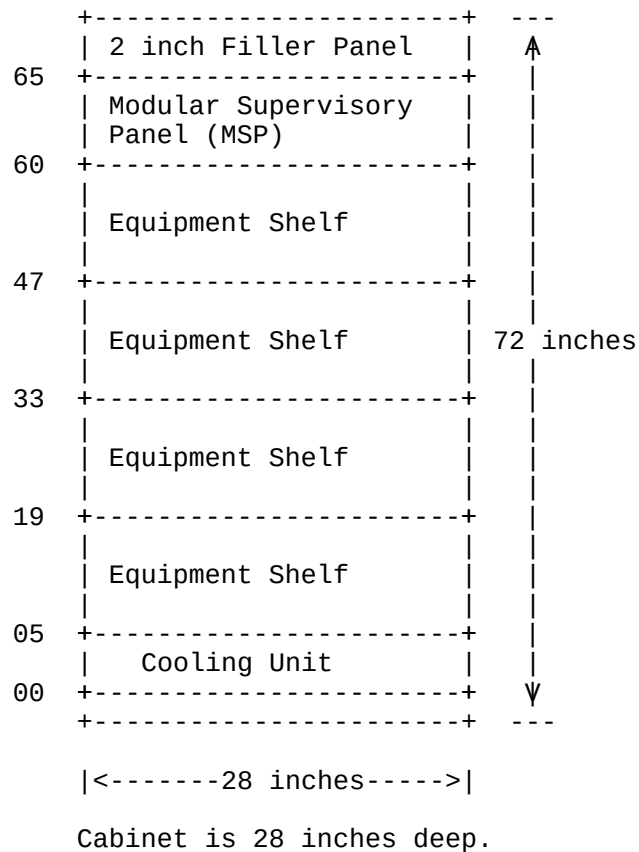
The Modular Supervisory Panel (MSP) that distributes -48VDC or -60VDC to shelves and contains the cabinet alarms is located at the top of the cabinet.

CIPE is forced air cooled with a -48VDC or -60VDC fan unit integrated into the base of the cabinet.

The following features and options of the NTRX46BA apply to the Germany Intelligent Network:

- MSP: -60VDC option,
- Fan Unit: -60VDC option,
- Labels: German Language option for some labels,
- EN Class B requirements:
 - Molded, shielded inter cabinet cables,
 - Molded bulkhead-to-backplane signal cables

The Dimensions of the Model A CIPE cabinet are shown in Figure 11 on page 4-148 .

**Figure 11. CIPE MODEL A CABINET LAYOUT**

9.2 Hardware Provisioning

9.2.1 Hardware Usage Restrictions

Not applicable.

9.2.2 Hardware Dependencies

To maintain EMI integrity of the cabinetized system, DMS-100 cabinets should not be mixed with frames or Meridian cabinets.

9.2.2.1 P and C Side Port Requirements

Not applicable

9.2.2.2 DMS BUS Port Requirements

Not applicable

9.2.2.3 Circuits Per Card

Not applicable

9.2.2.4 Discrimination Numbering

Not applicable

9.2.3 Provisioning Considerations

Please refer to the Engineering Manual Section for NTRX46BA.

9.2.4 Office Layout Information

Please refer to ECM-600, DMS-100 Cabinetized.

9.2.5 Traffic Tables

Not applicable.

9.3 Product/System Specification

9.3.1 Physical Characteristics

Please refer to ECM-600, DMS-100 Cabinetized.

9.3.2 EMI/Earthquake Information

Please refer to ECM-600, DMS-100 Cabinetized.

9.3.3 Sparing Information

Use existing practices.

9.3.4 Power Feed and Fusing Requirements

9.3.5 Current Drain Information

9.4 Software Provisioning

For NTX software packages to PLC/SOC mappings for CSP02 and beyond refer to ECM552 - Mapping of NTX/NTG Package to PCL/NCL/Option.

9.4.1 Required Software Packages and Interdependencies

Software feature AE0777 is required for NT6X27BB Enhanced PCM-30 Interface Circuit Pack.

9.4.2 Software Usage Restrictions

Not applicable.

9.4.3 Memory Provisioning

Not applicable.

9.5 Real Time Impact

Not applicable.

RELEASE 06.03
13 July 1998

10.0 ECM704 - International EXTENDED Peripheral Modules - XPM

10.1 Overview

Product/System Overview

The purpose of this sub-section is to provide general comments about the international products and individual module options.

All products are housed in dual shelf Peripheral Controller modules. A frame may contain either 1 or 2 modules. (i.e. for frames: a pair of shelves on positions 18 and 32 and a pair of shelves on position 51 and 65; for cabinets: a pair of shelves on positions 05 and 19 and a pair of shelves on position 33 and 47).

The modules may be provisioned and mixed inside a frame or cabinet. When modules are mixed the Equipment is labeled according to the bottom module.

Offshore Designation

Note: Module type with an |0| (offshore) suffix, i.e. LGC0, LTC0, etc., signify a (2P) Two-Processor Shelf (6X0216 or 6X0241 for NTRX46CA Cabinet) used for international applications.

DMS100i Software

Configurations with DMS100i software use the (I) International before the type. (i.e. IDTC and ILGC) DMS100i software does not support ISDN services.

China Project

Note: The DMS-100 Family switch being introduced into China is a standard international A-Law switch. There will be several new PECs introduced, however, these are generally PROM changes to existing circuit packs to meet the China tone requirements. The hardware that is equipped for is based on the DMS-100 Family switch for Turkey with the differences described in the HARDWARE PROVISIONING Section. Also see ECM 383 for the China Project.

International products are marketed outside North America. These include seven cabinet and two frame types. International XPMs may utilize either the 2P or 3P backplane as noted.

10.1.1 NTFX33AA Meridian Cabinet Trunk Module (MCTM)

BACKPLANE: 3P-NT6X0211 PROVISIONING SECTION: NTFX33AA

RELEASE 06.03
13 July 1998

The NTFX33AA is a general purpose, Meridian style Common Peripheral Controller Equipment Cabinet for international Non-ISDN applications.

Configurations Available:

- PLGC - PCM-30 Line Group Controller
- PDTC - PCM-30 Digital Trunk Controllers
- IDTC) - International Digital Trunk Controller (DMS100i Software)
- ILGC - International Line Group Controller (DMS100i Software)

The MCTM may support the following

Copper (DS-30) network interface
Fiber (DS-512) network interface
PCM-30 links to RLCM, RSC or OPM
DS30A interface to LCM
DS0 interface (with PCM-30) 64 Bit Access
Common Channel Signalling 7 (CCS7) (IDTC/PDTC)
Echo Canceller Controller (ECC)
Unified Processor (XPM+)
Class Modem Resource (CMR)
Digital Test Access (DTA)
N5 Signalling

10.1.2 NTFX33CA Line Trunk Equipment Module (LTEM)

BACKPLANE: 2P-NT6X0216 PROVISIONING SECTION: NTFX33CA

The LTEM was introduced for the Austrian International gateway switch. The Australian DMS-300 International Gateway Switch is based on the DMS-300 supplied to Turkey with the following enhancements:

- Signalling systems necessary to introduce the product into the Australian National Network
- Enhancements to the Call Detail Recording, Operational Measurements and Call Progression tone systems.

The shelves within the LTEM cabinet are provisioned in the same way as the domestic ISDN frame NT6X01AB, except that PCM-30 interfaces are used instead of DS-1 and some circuit pack vintages top different for the Offshore market.

Configurations Available:

- PLGC - PCM-30 Line Group Controller
- PDTC - PCM-30 Digital Trunk Controller

RELEASE 06.03
13 July 1998

- PLTC - PCM-30 Line Trunk Controller
- LGCI - Line Group Controller ISDN
- DTCI Digital Trunk Controller ISDN
- LTCI - Line Trunk Controller ISDN

The LTEM may support the following:

Copper (DS-30) network interface
Fiber (DS-512) network interface
PCM-30 links
DS30A interface to LCM
DS1 interface
Unified Processor (XPM+)
Class Modem Resource (CMR)

10.1.3 NTNX33FA (MD) Meridian Cab. Trunk Module (MCTM)

BACKPLANE: 3P-NT6X0211 PROVISIONING SECTION: NTNX33FA

The NTNX33FA is a general purpose Non-ISDN Meridian Common Peripheral Controller Equipment Cabinet. Discontinued.

Configurations Available

- PDTC - PCM-30 Digital Trunk Controller
- IDTC - International Digital Trunk Controller (DMS100i Software)

The IDTC/PDTC may support:

Copper interface (DS30)
Fiber interface (DS-3512)
PCM-30 links to other offices
Common Channel Signalling 7 (CCS7)
Unified Processor (XPM+)

10.1.4 NTNX33GA (MD) Fiber Cab. Trunk Module (FCTM-ISDN)

BACKPLANE: 2P-NT6X0216 PROVISIONING SECTION: NTNX33GA

The NTNX33GA is a general purpose ISDN Meridian type Common Peripheral Equipment Cabinet. Discontinued.

The Australian DMS-300 International Gateway Switch is based on the DMS-300 supplied to Turkey with the following enhancements:

- Signalling systems necessary to introduce the product into the Australian National Network

RELEASE 06.03
13 July 1998

- Enhancements to the Call Detail Recording, Operational Measurements and Call Progression tone systems

Similarly, the DMS-300 Gateway Switch for Madley-B Digital International Switching Centre (DISC) in the United Kingdom is based on existing technology, adapted for that market.

The shelves within the FCTM-ISDN cabinet are provisioned the same as the domestic ISDN frame (NT6X01AB), except that PCM-30 interfaces are used instead of DS-1, and some circuit pack vintages are different for the International market.

An interface is available for connection to an external Echo Canceller for the PCM-30 links.

Configurations :

- LGCO - Line Group Controller Offshore
- DTCO - Digital Trunk Controller Offshore

The FCTM-ISDN may support:

Copper interface (DS30)
Fiber interface (DS-3512)
DSI interface
DS30A Interface
ISDN Services
Unified Processor (XPM+)
Class Modem Resource (CMR)

10.1.5 NTRX46AA (MD) Cab. Intern. Peripheral Equip. (CIPE)

BACKPLANE: 2P NT6X0216 PROVISIONING SECTION: NTZZ37AA

The Cabinetized International Peripheral Equipment (CIPE) is a Model A, ISDN, Peripheral Module.

The TMS/ETMS/OC-ETMS will not be Detailed in this ECM (see 468).

The NTRX46AA is manufacture discontinued and replaced by NTRX46CA Model B CIPE.

Configurations Available:

- LGCO - Line Group Controller Offshore
- DTCO - Digital Trunk Controller Offshore
- TMS - Tops Message Switch
- ETMS - Enhanced Tops Message Switch

The LGCO/DTCO may be provisioned to support:

Copper interface (DS30A)

RELEASE 06.03
13 July 1998

Copper interface (DS30)
Fiber interface (DS-512)
Unified Processor (XPM+)
ISDN Services

10.1.6 NTRX46CA Cabinitized International Peripheral

Equipment (CIPE)

BACKPLANE: 2P-4 layer PROVISIONING SECTION: NTZZ37AC NT6X0223 / NT6X0241 starting at REL11 of cabinet

This Cabinetized International Peripheral Equipment (CIPE) Model B may be configured as either a LINE Group Controller (LGC) or Digital Trunk Controllers (DTC). A new Shelf assembly is introduced on the CIPE at REL11 in order to provide compliant pins. Otherwise, REL10 CIPE is identical to the REL11.

7 Pins added to support the NT6X55JA CMI Interface (slots 1-5).
2 Pins added to support the N5 Signalling (slot 17 and 20).
8 Pins added for future Flexibility to support NT6X55BA (slots 2-5).
Total 82 pins per shelf added per EC 024-98050.

Configurations Available:

- CIPE - Cabinetized International Peripheral Equipment

The CIPE Modules:

- TMS - TOPS Message Switch
- PLGC - PCM-30 Line Group Controller
- PDTC - PCM-30 Digital Trunk Controller
- DTC - Digital Trunk Controller (Japan)
- DTCI- Digital Trunk Controller ISDN (Japan)
- PDTC - PCM-30 Digital Trunk Controller (Japan)

NOTE: *A&M added to configurations (Module Names) that are not valid with current software loads. These labels may be used in existing offices where the customer request like cabinet labeling. For new offices the 1 cabinet name and 6 Module types are acceptable. (3 configurations specific to Japan.)

Cabinetized PCM-30 Digital Trunk (CPDT) *A&M

Cabinetized PCM-30 Line Group (CPLG) *A&M

Cabinetized International Line Group (CILG) *A&M

Cabinetized International Digital Trunk (CIDT) *A&M

Cabinetized Digital Trunk Offshore (CDTO) *A&M

Cabinetized Line Group Offshore (CLGO) *A&M

RELEASE 06.03
13 July 1998

Digital Trunk Controller Offshore (DTCO) *A&M
Line Group Controller Offshore (LGCO) *A&M
Enhanced TOPS Message Switch (ETMS) *A&M
Line Group Controller ISDN (LGCI) *A&M
International Digital Trunk Controller (IDTC) *A&M
International Line Group Controller (ILGC) *A&M
The CIPE may be provisioned to support:

Copper interface (DS30A)
Copper interface (DS30)
Fiber interface (DS-512)
M 0 Interface for Japan
CII/CMI Interface for Japan
DS1 Interface
ISDN Interface
Unified Processor (XPM+)
N5 Signalling
Echo Cancellor Controller (ECC)
Class Modem Resource (CMR)

10.1.7 NTRX47AA (MD) Int.Cabinet Digital Cont. (CIDC)

BACKPLANE: 3P-NT6X0211 PROVISIONING SECTION: NTZZ37EA

The Cabinetized International Digital Controller (CIDC) Fiber (Non-ISDN) was introduced for European and Australian markets, where the power supply is 48VDC, to meet safety and global electromagnetic radiation EN Class A requirements.

This cabinet has been changed to MD status and replaced by the NTRX46CA Model B CIPE.

Configurations:

- CPLG - Cabinetized PCM-30 Line Group Controller
- CPDT - Cabinetized PCM-30 Digital Trunk Controller
- CILG - Cabinetized International Line Group
- CIDT - Cabinetized International Digital Trunk

The CIDC may be provisioned to support:

Copper interface (DS30A)
Copper interface (DS30)
Fiber Interface (DS-512)
Echo Cancellor Controller (ECC)
Unified Processor (XPM+)

RELEASE 06.03
13 July 1998

10.1.8 NT6X01AC Frame Common Peripheral Equip. (ICPE)

BACKPLANE: 2P-NT6X0216 PROVISIONING SECTION: NT6X01AC

The International Common Peripheral Equipment Frame is based on the NT6X01AB Domestic Frame, adapted for international applications. The IDTC supports Channel Associated Signalling (CAS) only. IDTC does not support CCS7. For CCS7 offices, a separate PDTC peripheral must be provisioned. However, a IDTC and a PDTC can co-exist in the same frame.

Configurations Available:

- PDTC - PCM-30 Digital Trunk Controller
- PLGC - PCM-30 Line Group Controller
- LGCI - Line Group Controller ISDN
- LGCO - Line Group Controller Offshore
- LGCI - Line Group Controller ISDN
- DTCI - Digital Trunk Controller ISDN
- DTCO - Digital Trunk Controller Offshore
- TMS - TOPS Message Switch
Enhanced TOPS Message Switch (ETMS)
Operator Centralization-Enhanced Tops Message Switch
- ILGC - International Line Group Controller (DMS100i Software)
- IDTC - International Digital Trunk Controller (DMS100i Software)

This frame supports:

PCM-30 Links
ISDN Services
Common Channel Signaling 7 (CCS7)
Channel Associated Signalling (CAS)
Copper Interface (DS-30)
Fiber Interface (DS-512)
DS30A Interface
Echo Cancellation Controller (ECC)
Unified Processor (XPM+)
Class Modem Resource (CMR)

10.1.9 NT6X01BA Intern. Common Peripheral Eq. (ICPE)

BACKPLANE: 3P-NT6X0211 PROVISIONING SECTION: NT6X01BA

RELEASE 06.03
13 July 1998

This frame is a general purpose Non-ISDN, Common Peripheral Controller Equipment Frame.

Configurations Available:

- PLGC - PCM-30 Line Group Controller
- PDTC -PCM-30 Digital Trunk Controller
- ILGC - International Line Group Controller (DMS100i software)
- IDTC - International Digital Trunk Controller (DMS100i software)

This frame supports:

PCM-30 Links
Copper Interface (DS-30)
Fiber Interface (DS-512)
DS30A Interface
Echo Canceller Controller (ECC)
Unified Processor (XPM+)
Class Modem Resource (CMR)
N5 Signalling

10.2 Hardware Provisioning

10.2.1 Hardware Usage Restrictions

- Slots 1 thru 5 provisioning
If ANY circuit packs are required in slots 1 through 5 of either shelf of an equipped module, then a total of at least two circuit packs must be provisioned in slots 1 through 5 on that shelf.
- Network Interface Circuit Packs
If NT6X40FA and NT6X40FB are mixed in a module, they must be datafilled as NT6X40FA. If NT6X40AC and NT6X40AD are mixed in a module, they must be datafilled as NT6X40AC. The NT6X40AC is MD'ed replaced by NT6X40AD.
- XPM+ Modules
XPM+ modules are the standard offering for all new jobs. MP/SP-equipped XPM modules are still available for special orders on new jobs, otherwise they should be considered for additions and maintenance only.
Only XPM+ modules will be supported in NA005 and beyond.
- UTR and GTR Restrictions
UTR (LSSGR/CCITT compliant Global Tone Receiver) and GTR (Global Tone Receiver) cannot exist in the same module. For an upgrade, existing UTRs need to be removed and replaced by GTRs and the GTRs must be provisioned.

RELEASE 06.03
13 July 1998

10.2.2 Hardware Dependencies

Fiber Bracket Upgrade Kit NT6X02UF

The Fiber Bracket support kit is used for both fiber DS512 and copper DS30 applications. The Kit has been moved to the frame and cabinet level as always provided. The NT6X02UF may be provided during field upgrades if not previously provided. The NT6X02UF has Not been added to the MD'ed Products upper level stocklist. In these cases the NT6X02UF is provisionable for fiber and non-fiber field upgrades.

Echo Canceller Control

Interface to an external Echo Canceller for the PCM-30 links requires the Unified Processor (XPM+), the NTCX50AB Echo Canceller Control Paddlecard, and the NT6X28AC PCM-30 Signalling Interface CP.

The NT6X28AC must be introduced for all applications because of obsolescence of the NT6X28AA

The NT6X28AC circuit pack may be provisioned for all applications on NT6X01AC, NT6X01BA and NTRX46CA products. To support the NT6X28AC provisioning, two Echo Canceller Controller upgrade kits are introduced: NT6X03DF (based on the NT6X01XG) for cabinets | and NT6X03DG (based on the NT6X01XK) for frames. In applications | other than ECC, the NT6X28AA is used. The existing NT6X01XG and | NT6X01XK kits must be provided for field upgrades when the customer | already has NT6X28AA.and require ECC The new kits will be used for | new production and for field upgrades when the customer already | has NT6X28AC.

N5 Signalling Kit

The NT6X42CA and NT6X62DA should only be provided as part of the NTRX4653 N5 Signalling Kit. DO NOT specify them alone.

EMI Integrity

To maintain the EMI integrity of the cabinetized system, DMS-100 cabinets should not be mixed with frames or Meridian cabinets.

NT6X40AD

NT6X40AD requires an XPM connected to a JNET. NT6X40AD enhanced test features are available with XPM05+.

NT6X40FB

NT6X40FB requires a DMS-100 Fiberized XPM connected to an ENET and the fiber paddle card NT6X40GA. NT6X40FB enhanced test features are available with XPM05+.

RELEASE 06.03
13 July 1998

NT6X92xx UTR/GTR

Do not mix any versions of NT6X92 UTR's with NT6X92EA GTR in the same module. If on an extension two additional tone receivers are required and two UTRs are present, the UTRs need to be removed and replaced with GTRs in addition to the required GTRs.

NT7X05AA Peripheral/Remote Loader CP

The Peripheral Remote Loader NT7X05AA will not be introduced into the international Market per 024-98050 and 024-99131

PCM-30 Links

All PCM-30 links from a PCM-30 Remote Cluster Controller must terminate on the same host PCM-30 LGC. Only the PCM-30 LGC peripheral type can terminate PRCC host links.

Specific hardware dependencies can be found under the appropriate hardware type below.

10.2.2.1 P and C Side Port Requirements

Unified Processor (XPM+)

There are no P and C side ports associated with the Unified Processor.

EDCH/DCH CP's

One (1) P-Side port is required per EDCH/DCH CP assigned and One (1) additional port is made unavailable by the EDCH/DCH CP, therefore, 2 Ports are consumed per DCH/EDCH CP.

10.2.2.2 DMS BUS Port Requirements

Unified Processor (XPM+)

There are no DMS Bus ports associated with the Unified Processor.

10.2.2.3 Circuits Per Card

Unified Processor (XPM+)

There is one Unified Processor per circuit pack.

10.2.2.4 Discrimination Numbering

Frame level naming and numbering is determined by the bottom module in the frame/cabinet.

RELEASE 06.03
13 July 1998

Unified Processor (XPM+) There is no discrimination numbering associated with XPM+.

10.2.3 Provisioning Considerations

See Individual Engineering Sections for Provisioning

XPM+ modules are the standard offering for all new jobs. MP/SP-equipped XPM modules are still available for special orders on new jobs, otherwise they should be considered for additions and maintenance only.

Only XPM+ modules will be supported in NA005 and beyond.

The ISDN Peripheral Controller modules mount in Common Peripheral Controller Equipment Frames and Cabinets. See the Engineering Manual Sections for detailed provisioning rules.

The name will be derived from the bottom module within the frame (i.e. first one assigned). Although a PLGC OR ILGC module PDTC or IDTC respectively may be combined in the same frame or cabinet, it is expected that some telcos will want the product dedicated to line functions and separate products dedicated to digital trunking functions.

With mixed frames it is harder to enforce the maximum 50 ft. cabling limit between ILCM and associated ILGC. With frames having non specialized function it is harder to rationalize cabling. For example IDTE with IDTC only will have cables to the ORB or DSX but no cabling to the ILCM (i.e. less cables, less cable congestion, which may be critical in an office with low ceiling height where there is no room for auxiliary cable rack).

Each ILGC, IDTC, PLGC, or PDTC module requires four cables per plane to the Speech Link Connecting Panel. The four Speech Link Cable Groups from one module are to be adjacent in one PSL panel. One ILGC, IDTC, PLGC, or PDTC module uses up one quarter of a PSL panel on SLC frame.

10.2.4 Office Layout Information

Please refer to Northern Telecom Practice 555-4001-103 Integrated Services Network Meridian SL-100 Cabinetized General Description for NTFX33AA, NTFX33CA

10.2.5 Traffic Tables

Unless otherwise indicated, standard traffic provisioning algorithms apply.

RELEASE 06.03
13 July 1998

10.3 Product/System Specification

The purpose of this section is to provide comments about various aspect of the specifications for specific XPMs.

10.3.1 Physical Characteristics

Future issues of this ECM will include physical details of each of the international products.

Cabinet Color

Refer to the appropriate EMS for provisioning details related to color selection.

CP Designation Labels

Provide the appropriate designation label for each CP.

Supervisory Panel

The Modular Supervisory Panel (MSP) that distributes - 48VDC to shelves and contains the cabinet alarms is located at the top of the cabinet.

The CIPE may interface directly to external PCM-30 trunks either twisted pair or coax).

The CIPE connects to the LCM's (Line Card Modules) via DS-30A trunks (twisted pairs).

All connections from cabinetized Equipment to the networks, Line Card Modules or PCM-30 trunks pass through the bulkhead for EMI protection. par;The CIPE is forced air cooled with a -48VDC fan unit integrated into the base of the cabinet.

The FSP (Frame Supervisory Panel), located at the top of the cabinet, distributes -48 VDC power to shelves and contains the cabinet alarms.

Unequipped CP Slots

For each unequipped CP slot provide one filler face plate.

10.3.2 EMI/Earthquake Information

The EMS Rules generally provide for anchor kits for resistance to earthquake damage. When cabinet is installed in seismic (earthquake) zones:

ATC Zones 6 & 7,
NEBS Zone 4, and

RELEASE 06.03
13 July 1998

UBC Zone 4

For Earthquake Zones Provision for each cabinet :

- For slab-type flooring , one (1) NTNX2540 Earthquake Anchor Kit, OR
- For computer-type flooring , one (1) NTNX2578 Earthquake Anchor Kit

For Non-Earthquake Zones , a cabinet/frame mounting kit is sufficient. Non-Earthquake Frame Mounting Kits:

- For slab-type flooring , provide one (1) NTNX2579 Frame Mounting Kit, OR
- For computer-type flooring , provide one (1) NTNX2580 Frame Mounting Kit

10.3.3 Sparing Information

Sparing is a safeguard against service breakdown or degradation. Sparing needs are calculated based on MTBF and MTTR figures and the number of cards present in the configuration.

Unless otherwise indicated under this heading, standard sparing algorithms apply.

10.3.4 Power Feed and Fusing Requirements

For power distribution information, refer to ECM-631.

For XPM Power Provisioning, refer to ECM-441.

Fusing information for the four Meridian cabinets introduced specifically for Australia is not available at this time.

The CIPE can accommodate either Vertical (external) or Horizontal power arrangements. For details refer to ECM 683.

10.3.5 Current Drain Information

Current Drain information for the four Meridian cabinets introduced specifically for Australia is not available at this time.

10.4 Software Provisioning

For NTX software packages to PLC/SOC mappings for CSP02 and beyond refer to ECM 552 - Mapping of NTX/NTG Package to PCL/NCL/Option.

RELEASE 06.03
13 July 1998

10.4.1 Required Software Packages and Interdependencies

Software feature AE0777 is required for NT6X27BB Enhanced PCM-30 Interface Circuit Pack.

Software feature NTXK79AC, Echo Canceller for XPM Plus, is required to support the NTCX50AB Echo Canceller Control Paddlecard for interface to an external Echo Canceller. The Echo Canceller interface feature also requires NTXR34AB, XPM+ Base Package, and NTXR42AA, Firmware Downloading Capability.

10.4.2 Software Usage Restrictions

Software support for the MP/SP (non-XPM+) versions of the XPM modules is being phased out. By NA005 and TOPS05 only the UP (XPM+) versions of the peripheral controller modules will be supported.

For DTC, LGC and LTC with XPM+ (MX77) and ISDN: TOPS0004, TOPS0005, TOPS0006 and TOPS0007 are not supported. For these peripheral types use LETB004 Load. For additional information refer to NTP 297-8981-599 Peripheral Module Software Release Document.

Also see API-325, Load Gating Hardware by Release Name.

Software feature AE0777 is required for NT6X27BB Enhanced PCM-30 Interface Circuit Pack.

10.4.3 Memory Provisioning

Refer to MEMCALC for provisioning.

10.5 Real Time Impact

In the U.S., refer to PRTCALC.

In CANADA, for a detailed calculation of Peripheral Processor (PP) realtime, use the XPRT program. Refer to the latest issue of the Systems Engineering Letter (SEL) for details and operational instructions.

The Unified Processor provides an improvement in Real Time capacity by a factor of approximately 1.6X compared to the previously provided MP/SP processor combination.

RELEASE 06.03
13 July 1998

11.0 ECM712 - PM Purchase Requirements

11.1 Overview

The purpose of this document is to provide the framework around which the PM Purchase Process is to be implemented. This ECM is to be used to ensure that the minimum required hardware is in place when PM Purchase is used.

This document contains upgrade paths and limitations on the distance forward and backward that a product may use PM Purchase. The NA100 release level and its corresponding XPM DRU is provided in this ECM (ie. NA006/XPM07).

The primary purposes of this ECM is to ensure that hardware requirements for PM only purchases are defined for use by Installation, Engineering, and SAEs.

This document contains Load Gating Hardware, Upgrade Paths and Peripheral hardware platforms.

Load Gating Hardware is identified because it is required to be shipped and installed before the loading of a Software Release (such as a XPM06) is attempted in the target DMS. Software is now ordered via PCLs. Each Software Release Stream contains several different PCLs. The Load Gating Hardware is common to all PCLs in a particular Software Release Stream.

If loading of the PCL is attempted before the Load Gating Hardware has been installed, a load abort will occur.

RELEASE 06.03
13 July 1998

LOAD GATING HARDWARE
Load Gating Hardware is, for a specific Software Release Stream (such as XPM06), the hardware that is deemed to be necessary to load and run the specific Software Release.
FUNCTIONALITY REQUIRED HARDWARE
Functionality Required Hardware (aka Service Activation Hardware) - is the hardware, incremental to the Load Gating Hardware, which is needed to enable a software functionality to function correctly. The software load may be inserted without this hardware but the Function may not be placed in service without it. Not all functionalities require additional hardware.

Figure 12. DEFINITIONS.

Load Gating Hardware for SW releases can be found in API 325.

11.2 Hardware Provisioning

11.2.1 Hardware Usage Restrictions

Not applicable.

The NT40 is not supported in DMSE offices.

11.2.2 Hardware Dependencies

Not applicable.

11.2.2.1 P and C Side Port Requirements

Not applicable

11.2.2.2 DMS BUS Port Requirements

Not applicable

RELEASE 06.03
13 July 1998

11.2.2.3 Circuits Per Card

Not applicable

11.2.2.4 Discrimination Numbering

Not applicable

11.2.3 Provisioning Considerations

This section details the provisioning guidelines for this product.

The hardware listed is the minimum required for the SuperNode or SNSE switching platform to load the software and perform basic functions. The NT40 is not supported in DMSE offices.

11.2.3.1 ECM References

The Load Gating Hardware PECs shown in the Load Gating Hardware table are intended to highlight the minimum hardware required. For provisioning details, refer to the appropriate product API/ECM and Engineering Manual Sections (EMS). Some of the most relevant API/ECMs are listed below. API/ECM references are also indicated in the Load Gating Hardware table.

PRODUCT	ECM	ECM NAME
DTC/LGC/LTC	373	Detail/Building Block Engineering
DTCI/LGCI/LTCI	616	ISDN Common Peripheral Equipment (CPEI)
RSC-S	691	Model B Remote Switching Center - SONET
XPM+	678	XPM Plus For Base Non-ISDN XPM

Figure 13. ECM REFERENCES.

XPM/XPM+/PM Load Gating Hardware

Load Gating Hardware is identified because it is required to be shipped and installed before the loading of a Software Release (such as a XPM06) is attempted in the target DMS. Software is now ordered via PCLs. Each Software Release Stream contains several different PCLs. The Load Gating Hardware is common to all PCLs in a particular Software Release Stream.

If loading of the PCL is attempted before the Load Gating Hardware has been installed, a load abort will occur.

The PECs shown below are the minimum functional level required. Higher levels may be used unless specifically prohibited in this

RELEASE 06.03
13 July 1998

document. In instances where the PEC shown is no longer orderable, new orders will be shipped with the current manufacturing baseline version.

RELEASE	PRODUCT	LOAD GATING HARDWARE		ECM
XPM04 (NA003)	LGCI	XPM+	(NT6X45/46 MP/SP Processors must be upgraded to MX77 Unified Proc)	616
	LTCI	XPM+	(NT6X45/46 MP/SP Processors must be upgraded to MX77 Unified Proc)	616
XPM05 (NA004)	DTC7	XPM+	(NT6X45/46 MP/SP Processors must be upgraded to MX77 Unified Proc)	373
	DTCI	XPM+	(NT6X45/46 MP/SP Processors must be upgraded to MX77 Unified Proc)	616
	LGC	XPM+	(NT6X45/46 MP/SP Processors must be upgraded to MX77 Unified Proc)	373
	LTC	XPM+	(NT6X45/46 MP/SP Processors must be upgraded to MX77 Unified Proc)	373
	RSC	XPM+	(NT6X45/46 MP/SP Processors must be upgraded to MX77 Unified Proc)	618
	SMU	XPM+	(NT6X45/46 MP/SP Processors must be upgraded to MX77 Unified Proc)	314
0	0			0

Continued.....

RELEASE 06.03
13 July 1998

RELEASE	PRODUCT	LOAD GATING HARDWARE	ECM
XPM06 (NA005)	DTC	XPM+ (NT6X45/46 MP/SP Processors must be upgraded to MX77 Unified Proc)	612 373
	DTCI	BX02BA EDCH (see NOTE 1)	616
	LGCI	BX02BA EDCH (see NOTE 1)	616
	LTCI	BX02BA EDCH (see NOTE 1)	616
NOTE 1: The NTB02BA circuit pack is ISDN feature gating. However, beginning in NA005 to update the ISDN peripheral software, this circuit pack is required prior to the insertion of the peripheral load.			
	SMS	XPM+ (NT6X45/46 MP/SP Processors must be upgraded to MX77 Unified Proc)	328
	SMSR	XPM+ (NT6X45/46 MP/SP Processors must be upgraded to MX77 Unified Proc)	454
	TMS/ ETMS	XPM+ (NT6X45/46 MP/SP Processors must be upgraded to MX77 Unified Proc) BX01AB EISP & BX02BA EDCH Once the TMS is upgraded with XPM+ it is called an ETMS.	468
0	0		0

Continued.....

RELEASE 06.03
13 July 1998

... Continued

RELEASE	PRODUCT	LOAD GATING HARDWARE	ECM
XPM07 (NA006)	ESMA	AX74AA 16 MB Processor BX01AC or BX01AB EISP	576
	SMA	AX74AA 16 MB Processor BX01AC or BX01AB EISP	676
PM08 (NA007)	DTCI	Same as XPM07	616
	LGCI	Same as XPM07	616
	LTCI	Same as XPM07	616
PM09 (NA008)	RSC-S	AX74AA 16 MB Processor & BX01AC or BX01BA EISP	691

Figure 14. XPM/XPM+/PM LOAD GATING HARDWARE.

XPM/XPM+/PM Requirements

The following table shows the XPM types and descriptions for NA100 releases.

RELEASE 06.03
13 July 1998

RELEASE	PM LOAD	XPM Type	DESCRIPTION
NA003	XPM03	DTCOI PDTC PLGC LGCI LTCI ICP ESMU	DTC - Overseas ISDN PCM30 DTC PCM30 LGC ISDN Line Group Controller ISDN Line Trunk Controller Intelligent Cellular Processor Enhance SCM - Urban
none	XPM04	DTC7 LGC LTC RSC	CCS7 Digital Trunk Controller Line Group Controller Line Trunk Controller Remote Switching Center
NA004	XPM05	DTCI SMU	ISDN DTC SCM - Urban
NA005	XPM06	DTC ETMS SMS SMSR	Digital Trunk Controller Enhanced TOPS Message Switch SCM for SLC-96 SCM-100S Remote
0	0	0	0

Figure 15. XPM Descriptions.

NOTE: AS OF NA005/XPM06 THE MP/SP PROCESSORS (6X45/6X46) ARE NO LONGER SUPPORTED. ANY HOST SITE WHICH HAS MP/SP PROCESSORS AND REQUIRING XPM06 OR ABOVE MUST BE UPGRADED TO THE MX77 UNIFIED PROCESSOR. MP/SP PROCESSORS ARE STILL SUPPORTED IN OPAC AND RLCM IN XPM06 AND BEYOND. (THE AX74 WILL BE REQUIRED IN FUTURE NA100 RELEASES FOR SOME PRODUCTS.)

This information was obtained from the North American DMS-100/200 Three Year Hardware Plan, Rel 6-96, authored by Jim Miller. This Power Point file is updated on a bi-monthly basis. The latest version can be obtained at the following AppleShare location:

RTP.CA4 / NA-100 H/W Mac (Moore Mac) / Public Folder / Baseline Hardware

Guest access is permitted.

XPM Functionality Required Hardware Not Applicable

RELEASE	PRODUCT	FUNCTIONALITY REQUIRED HARDWARE	ECM
		Not Applicable	
0	0		0

Figure 16. XPM/XPM+/PM FUNCTIONALITY REQUIRED HARDWARE.11.2.4 Office Layout Information

Not applicable.

11.2.5 Traffic Tables

Not applicable.

11.3 Product/System Specification11.3.1 Physical Characteristics

Not applicable.

11.3.2 EMI/Earthquake Information

Not applicable.

11.3.3 Sparing Information

Not applicable.

11.3.4 Power Feed and Fusing Requirements

Not applicable.

11.3.5 Current Drain Information

Not applicable.

11.4 Software Provisioning

For NTX software packages to PLC/SOC mappings for CSP02 and beyond refer to ECM552 - Mapping of NTX/NTG Package to PCL/NCL/Option.

11.4.1 Required Software Packages and Interdependencies

Not applicable.

RELEASE 06.03
13 July 1998

11.4.2 Software Usage Restrictions

11.4.3 Required Software Packages and Interdependencies

Software is now ordered via PCLs. Each Software Release Stream contains several different PCLs/PPLs.

RELEASE	PCL CODE	DESCRIPTION
		TBD
0	0	

Figure 17. XPM PCL/PPL LISTING.

This information was obtained from Product Content Application (PCA).

11.4.4 Memory Provisioning

11.5 Real Time Impact

RELEASE 06.03
13 July 1998

12.0 ECM714 - Domestic XPMs and Subscriber Carrier Modules

12.1 Overview

Product/System Overview

This ECM provides an overview of domestic XPM architecture and provisioning considerations. Domestic products are those marketed in Canada, the United States, and CALA.

Extended peripheral modules (XPMs) are access vehicles to the DMS-100 switch. They interface to analog and digital transmission facilities on the DMS-100 peripheral side (P-side). The extended peripheral modules adapt various characteristics of transmission facilities to 32-channel 2.56 megabits per second (mb/s) time division multiplex format used by the DMS-100 switch. By off-loading both non-speech data (messaging) and speech data (call processing) previously handled by the Central Control Complex (CCC), Series II extended peripheral modules free up the Central Control Complex for other tasks.

Originally the acronym 'PM' was used to refer to peripheral modules. Now both Series I and Series II modules are referred to as XPMs. Figure 1 shows Series I extended peripheral modules.

Figure 1. Series I Extended Peripheral Modules

Series I Extended Peripheral Modules	
PM	<u>Acronym Extension</u>
DCM	Digital Carrier Module
LM	Line Module
MTM	Maintenance Trunk Module
TM	Trunk Module

A growing demand for features and capacity generated additional need for real time processing and memory and was the impetus for development of the Series II peripherals. Demands placed on the Series I Line Module, in particular, led to a system architectural change to distributed processing and greater memory. The extended peripheral modules which evolved out of this design change are known as Series II peripherals. Series I extended peripheral modules are gradually being replaced with Series II modules. Figure 2 shows Series II extended peripheral modules.

Figure 2. Series II Extended Peripheral Modules

RELEASE 06.03
13 July 1998

Series II Extended Peripheral Modules	
PM	Acronym Extension
DTC	Digital Trunk Controller
LGC	Line Group Controller
LTC	Line Trunk Controller

The abbreviations for the peripheral modules listed above may include a "+" sign (denoting use of the Unified Processor for "XPM+") and/or an "I" (denoting ISDN capability).

Each peripheral module (XPM/SCM) consists of two adjacent shelves (in a frame or cabinet; for frames: a pair of shelves on positions 18 and 32 and a pair of shelves on position 51 and 65; for cabinets: a pair of shelves on positions 05 and 19 and a pair of shelves on position 33 and 47).

Two cabinets and three frame types were designed to meet the requirements of the domestic market. The cabinet types are:

- NTRX36AB (MD) Cabinetized Common Peripheral Equipment Model A
- NTRX36BA Cabinetized Common Peripheral Equipment Model B

to as CPCI (Cabinetized Peripheral Controller ISDN).

The frame types are:

- NT6X01AA (MD) Common Peripheral Controller Equipment Frame (CPCE)
- NT6X01AB (MD) Common Peripheral ISDN Equipment Frame (CPEI)
- NT6X01AD ISDN Ready XPM (CPEI)

ISDN modules only, and the NT6X01AD supports both module types.

12.1.1.1 Subscriber Carrier Modules

The Subscriber Carrier Module was designed for use in various environments including:

- SMS, which provides direct digital interface between SLC-96 terminals and the DMS-100F.
- SMU, which provides direct digital interface between the DMS-10U Remote Concentrator Terminal (RCU) and the DMS-100F. The SMU is also used to provide E911 service.
- SMA (MD), which provides an interface between the DMS-100 and the S/DMS AccessNode at BCS-35 (followed by the ESMA). AccessNode as

RELEASE 06.03
13 July 1998

well as TR-303 compliant Remote Digital Terminals by other manufacturers at BCS-36 and above.

- SMSR, which provides direct digital interface between a Remote Switching Center (RSC) or RSC-Sonet, and SLC-96 Remote Terminals.
- ESMA, which provides interface between Remote Digital Terminals (of other manufactures) and the DMS-100F in compliance with TR-303. The ESMA is the "second generation" SMA.

Figure 3. Series II Subscriber Carrier Modules

Series II Subscriber Carrier Modules	
Peripheral Module	Acronym Extension
SMR (MD)	Subscriber Carrier Module-100 Rural
SMS	Subscriber Carrier Module-100 SLC-96
SMSR	Subscriber Carrier Module-100 SLC-96
SMU	Subscriber Carrier Module-100 Urban
SMUI	Subscriber Carrier Module-100 Urban ISDN
SMA (MD)	Subscriber Carrier Module-100 Access
ESMA	Subscriber Carrier Module-100 Expanded

NOTES: "SMUI" is also referred to as "ESMU". The ESMA (SMA2) is not covered in this ECM, refer to ECM 576.

12.1.1.1 SMS

The Subscriber Carrier Module-100S (SMS) was introduced to provide a direct digital interface between the DMS and SLC-96 Remote Terminals (RT). The SMS replaced the Central Office Terminal (COT), thus eliminating individual analog line circuits in the DMS-100 to communicate on a line-by-line basis with the SLC-96.

The SMS is an Extended Peripheral Module (XPM) peripheral controller. Each SMS module consists of two shelves of equipment with duplicated processors and power converters. The SMS module is mounted in a Common Peripheral Controller Equip (CPCE) frame or cabinet.

RELEASE 06.03
13 July 1998

The SMS module is connected to the DMS via DS-30 links. The SMS connects directly to the SLC-96 via DS-1 links. The number of DS-1 links used depends upon the SLC-96 mode of operation. There are three (3) operating modes for the SLC-96: Mode I, II, and III.

MODE I - Non-concentrated Line Mode

Used primarily for single and multiparty lines. Mode I supports up to 96 subscriber lines (2 shelf groups). The 96 subscribers are connected to the SMS through 4 DS-1 links, plus one protection line (total of (5) DS-1 lines).

MODE II - Concentrated Line Mode

Used for subscriber lines, special service and coin lines. Mode II supports up to 96 subscriber lines and connects to the SMS through up to three (3) DS-1 lines. One of these lines is used for a protection line. Each shelf group of 48 subscribers (two shelf groups total) at the SLC-96 must compete for 24 channels on the DS-1 line.

MODE III - Non-concentrated Single Shelf Group

Used for special service and coin circuits. MODE III supports up to 48 lines and connects to the SMS through up to three (3) DS-1 lines. One of these lines is used for a protection line.

The SMS is capable of serving a mixture of SLC-96s in different modes. For example, one SLC-96 with all shelves in Mode I could be served along with a SLC-96 with all its shelves in Mode II. The SMS is not capable of serving Split Mode SLC-96s (for example, a SLC-96 with two shelves in Mode I and two shelves in Mode III).

12.1.1.2 SMS-R

The RSC is widely used as a Central Office (CO) replacement in areas where the existing office is serving SLC-96 systems. The SMS-R fulfills the requirement for direct digital interface between the RSC or RSC-S and the SLC-96 Remote Terminals.

The SMS-R is connected to the RSC/RSC-S via DS-30A links. The SMS-R connects directly to the SLC-96 via DS-1 links. The number of DS-1 links used depends upon the SLC-96 mode of operation

- In a standard Mode I configuration, each SMS-R serves four (4) Mode I SLC-96's. Thus, in Mode I operation, up to 384 subscriber lines are served by each SMS-R. It is possible for the SMS-R to serve five (5) Mode I SLC-96's by eliminating the protection links.
- In a standard Mode II configuration, each SMS-R serves Six (6) mode II SLC-96's. Thus, in Mode II operation, up to 576 subscriber lines are served by each SMS-R.

RELEASE 06.03
13 July 1998

- In Mode III, the SLC-96 shelves are equipped only with coin and D4 Single Circuit Channel Units. Thus, in Mode III operation, up to 288 subscriber lines are served by each SMS-R.
- The SMS-R is capable of serving a mixture of SLC-96s in different modes. For example, one SLC-96 with all shelves in Mode I could be served along with a SLC-96 with all its shelves in Mode II. However, the SMS-R is not capable of serving Split Mode SLC-96s (for example, a SLC-96 with two shelves in Mode I and two shelves in Mode III).

SMS-R DIAGRAM								
SLC-96	TO	SMS-R	TO	RCC RCC2 DRCC	TO	LGC or LTC	TO	NET
	MODE I 5 DS-1 LINKS or MODE II-III 3 DS-1 LINKS		2-4 DS-30A Links		DS-1		DS-1 LINKS	

12.1.1.3 SMU

The SMU was designed to replace the Central Control Terminal (CCT) previously required when the RCU is connected to a DMS-100 Family Switch. This eliminates the need for duplicated line circuits and reduces floor space required at the DMS-100 host office.

The following table Figure 4 lists the features supported by each type of subscriber carrier module (except the SMA):

RELEASE 06.03
13 July 1998

Figure 4. Features Supported by Subscriber Carrier Modules				
FEATURE	SMS	SMSR	SMU	SMUI
POTS				
single party	X	X	X	X
multi party				
2 party ANI and ONI	X	X		
4 or 8 party ONI	X	X		
2 or 4 party FSR with				
2 party ANI			X	X
4 party ONI			X	X
2, 4, or 8 party coded ringing w/:				
2 party ANI			X	X
2, 4, or 8 party ONI			X	X
2 party divided ringing with ANI			X	X
COIN				
coin first (CCF)	X	X	X	X
dial tone first (CDF)	X	X	X	X
coin semi-post pay (CSP)		X	X	X
ground start			X	X
loop start			X	X
PBX Line				
loop start	X	X		
ground start		X		
Ringing				

RELEASE 06.03
13 July 1998

superimposed ringing				
single party (bridged)	X	X		
multi-party				
4-party, fully selective	X	X		
8-party, semi selective coded ringing	X	X		
coded ringing				
cadencing		X		
multi-party				
4-party, semi selective	X			
8-party, divided code	X			
frequency selective ringing		X		
Dialing				
dial pulse	X	X	X	X
digitone		X	X	X
dual tone multi-frequency	X			
Tones				
dial tone	X	X	X	X
audible ringback	X	X	X	X
reorder	X	X	X	X
busy	X	X	X	X
Custom Calling				

RELEASE 06.03
13 July 1998

speed calling	X	X	X	X
3-way calling		X	X	X
call waiting	X	X	X	X
call forwarding	X	X	X	X
all current IBN features with the exception of: distinctive ringing, datapath, and EBS	X		X	X
Additional Features				
analog display services interface	X	X		
spontaneous call waiting ID (SCWID)	X	X		
automatic loss pad switching		X		
CLASS		X		
call management services (CM-Canada)		X		
ISDN				X
Meridian business services				X
Feature	SMS	SMSR	SMU	SMUI
Maintenance				
automatic board to board test			X	X

RELEASE 06.03
13 July 1998

test desk (e.g., MLT, LRS, or +14 LTD)			X	X
automatic line testing (ALT)			X	X
line card testing			X	X
subscriber loop testing			X	X

SMA

SMAThe SMA product has been MD'd, and replaced through product evolution by the ESMA product. The following information on the SMA will be removed in a future release of this document.

The SMA module provides a Digital Loop Carrier (DLC) interface between the DMS-100 and Northern Telecom's Fiberworld S/DMS AccessNode, as well as TR-303 compliant Remote Digital Terminals by other manufacturers.

The AccessNode is a combination of a Remote Fiber Terminal (RFT), which supports up to 672 lines and 42 DS-1s, and a Fiber Central Office Terminal (FCOT). The primary function of the FCOT is to convert between the SONET transmission facilities used by the RFT and the DS-1 transmission facilities used by the SMA.

The SMA system supports a base set of signaling and operations features which provide certain functions common to all access vehicles. There is also an AccessNode application feature set within the SMA system which includes the extensions needed when connecting the DMS-100 to AccessNode. This feature set includes support for various NT proprietary services and capabilities such as EBS, Meridian Digital Centrex (MDC) and multi-hosting.

SMA BCS-36 Provisioning

The initial release (BCS-35 version) of the SMA supports only the interface to AccessNode using proprietary NTI protocols. This version does NOT support ISDN capability. Enhancements included in BCS-36 provide support for ISDN. The provisioning information herein describes the hardware configuration required for this support.

SMA TR-303 Multivendor Interface on XPM

The Bellcore TR-303 standard defines protocols which will allow equipment from various manufacturers to interface correctly. Compliance with this standard will be achieved in stages as the different capa-

RELEASE 06.03
13 July 1998

bilities are added. The initial SMA product, the BCS-36 version and the early TR-303 compliant SMA are based on the XPM platform. Compliance with the 28 P-side DS-1 requirement of TR-303 will require the application of a different platform. This ECM describes the first version of the TR-303 Multivendor Interface (MVI), which is implemented on the XPM hardware platform.

The Facility Data Link (FDL) processor has been removed as a requirement for MVI and should not be ordered.

AccessNode Multihosting

Features added in BCS-36 allow the AccessNode to connect to several DMS switches at once. Provisioning at each DMS host is identical to applications with an AccessNode connected to a single host (i.e. SMA is provisioned at each host as though the AccessNode was connected only to that switch). The multihosting capability is controlled via datafill.

AccessNodes may be connected to different switches in order to distribute load, to offer different services on different switches or for a form of protection.

The SMA hardware and feature deliverables were introduced in three phases starting with BCS-35. The development plan was partitioned into BCS-35, BCS-36 and NA003 deliverables. Provisioning rules are given in this ECM through NA0004.

The following table provides the SMA hardware introduction schedule. Only the new circuit packs and the circuit packs that change from one BCS to another are listed in the table. Refer to the Engineering Manual for a complete listing of circuit packs used in the SMA module.

RELEASE 06.03
13 July 1998

Hardware	BCS	Notes
NTMX77AA Universal Processor NTBX01AC Enh ISDN Pre-Proc NT6X44AA Time Switch NT6X92BB UTR (No DCH or EDCH) or NT6X92EA GTR	BCS-35	Initial Platform for SMA. ISDN not supported
NT6X44CA Time Switch NTAX78AB Enhanced Time Switch NT6X92BC UTR or NT6X92EA GTR NTBX02BA EDCH (for ISDN)	BCS-36	When available, the NTAX78AB will replace NT6X44CA.
No new hardware identified	NA003	Digital Test Access Feature is supported by the NTAX78AB.
NTAX74AA Enhanced Processor	NA004 and XPM06	The NTAX74AA is available in XPM06 and required in XPM07 for SMA.

The SMA module will be required to support a phased introduction of services as follows:

RELEASE 06.03
13 July 1998

Service	BCS-35	BCS-36	NA002/3 and above
POTS Single Party	X		
800 Service Trunk	X		
800 Service Line	X		
WATS Trunk Out	X		
WATS Line Out	X		
WATS Trunk (2-Way)	X		
WATS Line (2-Way)	X		
Attendant Console	X		
MDC Line (500, 2500 Sets)	X		
MDC Line (EBS)	X		
MADN	X		
Direct Outward Dial	X		
Service	BCS-35	BCS-36	NA002/3 and above
PBX CO Trunks	X		
Off Premise Extension	X		
Secretarial Line	X		
Toll Diversion	X		
Coin (CDF, CSP, CCF)	X		
CLASS/CMS CND	X		
Teen Service	X		
ISDN Related Svcs (not MFT)		X	
DATAPATH Line			X
Direct Inward Dial			X
Message Waiting Lamp Ind.			X
PBX-Centrex Tie Trunk			X
POTS Multiparty			X
Remote Meter/Register			X

RELEASE 06.03
13 July 1998

Residential Fiber Access			X
Nationwide ISDN			X

Additionally, a maintenance feature, Digital Test Access for ISDN, was introduced in NA003. Digital Test Access requires the NTAX78AB Enhanced Time Switch Circuit Pack.

The SMA system physically consists of the SMA module as well as additional DMS components.

The following diagram provides a high level view of the SMA System physical architecture.

SMA System Architecture					
NTAI/S	FCOT --->	SMA --->	NM --->	MS --->	IOC
	and		MTM	DMS-CORE	LSCI (MAP) or LOGS
	RFT		No Test Trunk OR Scan/SD		

The SMA itself consists of an XPM+ peripheral module based on the ISDN LTC.

The SMA connects to the DMS-100 Switching Network on its C-Side. The Switching Network can consist of ENET or Junctored Network Module (NM).

SuperNode technology is used to support SMA. The SMA will not operate in the NT-40 environment due to memory constraints. The SuperNode hardware for SMA consists of the DMS-Core and the Message Switch (MS) (also referred to as DMS-Bus), and the Input/Output Controller (IOC).

The Input/Output Controller (IOC) supports the LSCI interface.

The Maintenance Trunk Module (MTM) will provide the Scan/SD point interfaces and the NTT interface.

The FCOT consists of a SONET multiplexer and will not be considered part of the DMS-100. The FCOT will attach to one or more SMAs using DS-1 links. The FCOT will also terminate SONET transmission facilities from the RFT access vehicle, and will provide the optical to electrical conversion necessary for interfacing to SMA.

RELEASE 06.03
13 July 1998

The Remote Fiber Terminal (RFT) is, in Bellcore TR-303 terminology, the Northern Telecom version of the Remote Digital Terminal (RDT). This equipment connects to the subscriber lines, and provides multiplexing, signaling and operations capabilities.

Note that the RFT and FCOT combined is referred to as "S/DMS AccessNode" or "AccessNode" for short.

System Interfaces

The important interfaces between the SMA system and the outside world are listed and defined below:

Northern Telecom Access Interface/Sonet (NTAI/S)

This interface allows DMS-100 to connect to Northern Telecom access products that employ SONET transmission facilities such as AccessNode. The NTAI/S is based on TR-303, but contains a number of NT proprietary extensions.

Local Switch Craft Interface (LSCI)

The LSCI consists of a MAP terminal that allows switching personnel to perform provisioning, maintenance and testing functions associated with the DMS-100.

RDT Log Interface

This interface allows RDT event reports to be directed to an external log device such as a printer.

" No Test" Trunk (NTT)

This interface permits connection to external loop testing systems such as the AT&T Mechanized Loop Testing (MLT) system and Local Test Desks (LTDs). Its function is to allow these test systems to access subscriber loops which connect to RDTs. Scan/SD Points

This interface consists of a set of relay drivers and contacts that enable the SMA System to connect to E2A telemetry remotes. Such remotes are used to monitor RDT alarm conditions.

12.1.1.2 Peripheral Packfills

| Following are the peripheral packfills and associated Building Blocks
| to be ordered for all new extended peripheral modules, initials, or
| extensions Created as a result of the NT6X41AA being replaced by the
| NT6X41AC

RELEASE 06.03
13 July 1998

Peripheral Module/Subscriber Carrier Module Packfills and Associated Building Block Sections)			
NTRX36BA Cabi- net NT6X01AD Frame Packfill De- scription	New-Order Packfill PEC	Replaces PEC	Applications
LTCI Common Packfill	NT6X02LL AP in BB's	NT6X02NA part of BB	LGCI, LTCI, DTCI (ISDN)
	New-order BB PEC	Replaces BB PEC	NOTES
	NTZZ17SN	NTZZ17SM	ISDN XPM+ DTC BB
	NTZZ17RN	NTZZ17RM	ISDN XPM+ LGC BB
	NTZZ17QN	NTZZ17QM	ISDN XPM+LTC BB
	NTZZ17TP	NTZZ17TM	ISDN CPCE W/XPM+ and DWS BB
	NTZZ17GR	NTZZ17GJ	ISDN COMMON PERIHERAL CON- TROLLER BB
	NTZZ17QT	NTZZ17QS	ISDN LTC COMMON BB
	NTZZ17RT	NTZZ17RS	ISDN LGC COMMON BB
	NTZZ17SW	NTZZ17ST	ISDN XPM+ DTC BB
	NTZZ17TW	NTZZ17TT	ISDN CPCEW/XPM+ AND DWS BB
	NTZZ17SZ	NTZZ17SU	ENHANCED DTC ISDN DTCI (AX74AA /6X69AC) BB
	NTZZ17SY	NTZZ17SV	ENHANCED DTC ISDN (DTCI) AX74AA /6X69AD) BB
	NTZZ17GN	NTZZ17GM	TMS/ETMS LTCI+ BB
LGC Common Packfill	NT6X02LJ AP in BB's	NT6X02LC	LGC
	New-order BB PEC	Replaces BB PEC	NOTES
	NTZZ02BB	NTZZ02BA	LGC BB

RELEASE 06.03
13 July 1998

	NTZZ02QB	NTZZ02QA	LGC XPM+BB
	NTZZ02QP	NTZZ02QM	LGC+ MODULE W/EDC
	NTZZ02QR	NTZZ02QJ	LGC COMMON BB
	NTZZ02QS	NTZZ02QN	LGC+ MODULE W/EDC AND
LTC Common Packfill	NT6X02LK AP in BB's	NT6X02MC	LTC
	New-order BB PEC	Replaces BB PEC	NOTES
	NTZZ02CB	NTZZ02CA	LTC BB
	NTZZ02PB	NTZZ02PA	LTC+
	NTZZ02PQ	NTZZ02PM	LTC+ with EDC
	NTZZ02PK	NTZZ02PJ	LTC BB
	NTZZ02PR	NTZZ02PN	LTC+ with EDC and ADSI/SCWID
DMS-250 Fiber Packfill	NT6X02LG	NT6X02LF	DMS-250 Fiber XPM EDTC
DTC Common Packfill	NT6X02LM	NT6X02RF	DMS-250 ISDN XPM
SMUI Common Packfill	NT6X02LN	NT6X02FJ	DMS-250 Jnet EDTC
DTC Common Packfill	NT6X02LQ AP in BB's	NT6X02CZ	EDTC
	New-order BB PEC	Replaces BB PEC	NOTES
	NTZZ04BD	NTZZ04BA	DTC BB
	NTZZ04BC	NTZZ04BB	DTC for DWS
	NTZZ04HC	NTZZ04HB	DTC W/ XPM+ and NT6X69AC
	NTZZ04HE	NTZZ04HD	DTC W/ XPM+ and NT6X69AD
	NTZZ04KE	NTZZ04KD	DTC+ w/NT6X69AD for DWS
SMS Common Packfill	NT6X02LRAP in BB's	NT6X02DV	SMS
	New-order BB PEC	Replaces BB PEC	NOTES
	NTZZ03BT	NTZZ03BS	SLC-96 w/NT6X69AD

RELEASE 06.03
13 July 1998

	NTZZ03BJ	NTZZ03BG	SLC-96 w/ NT6X69AC
SMU Common Packfill	NT6X02LH AP in BB's	NT6X02EU	SMU
	New-order BB PEC	Replaces BB PEC	NOTES
	NTZZ03DG	NTZZ03DE	SMU for DMS-1U with XPM+ and NT6X69AC
	NTZZ03DQ	NTZZ03DK	SMU for DMS-1U with XPM+ and NT6X69AD
	NTZZ03DN	NTZZ03DM	SM for DMS-1U with XPM and NT6X69AC
SMS-R Common Packfill	NT6X02LP AP in BB's	NT6X02PL	SMS-R
	New-order BB PEC	Replaces BB PEC	NOTES
	NTZZ03EH	NTZZ03ED	SMS-R with XPM+ and NT6X69AC
	NTZZ03EJ	NTZZ03EF	SMS-R with XPM and NT6X69AC
SMUI Common Packfill	NT6X02LS AP in BB's	NT6X02CX	ESMU-ISDN
	NTZZ03RD	NTZZ03RC	XPM+ and NT6X69AC
	NTZZ03RM	NTZZ03RL	XPM+ and NT6X69AD
The New Packfills are part of the New-Order Building block listed and do not have associated Engineering Manual sections. These packfills and BB's have been created as a result of the NT6X41AC replacing the NT6X41AA. Refer to the NTZZ47GD (NTRX36BA) or the NTZZ17AT (NT6X01AD) for Always provided items.			

12.2 Hardware Provisioning

12.2.1 Hardware Usage Restrictions

- The following restriction applies to the NT6X01AD frame, the NTRX36AB cabinet, and the NTRX36BA cabinet:
 - If ANY circuit packs are required in slots 1 through 5 of either shelf of an equipped module, then a total of at least two cir-

RELEASE 06.03
13 July 1998

- cuit packs must be provisioned in slots 1 through 5 on that shelf. This applies to Building Blocks which contain one circuit pack as well as individually provisioned circuit packs.
- Provide one additional circuit pack, per shelf, if necessary to meet this requirement.
 - If NO circuit packs are required in slots 1 through 5 in order for the module to function, then the above restriction has no effect.
 - The following applies to provisioning of RSC/RSC-S:
As a rule, RSCs should be evenly distributed over all LGC/LTCs at the host office. However, a maximum of two RSCs can be assigned to the same LGC/LTC if all the following conditions are met:
 - Real time and traffic are within LGC/LTC parameters.
 - Two RCCs from separate mono RSC configurations.
 - One RCC from a dual configuration and one RCC from a single configuration. Both RCCs from a dual configuration cannot mount on the same LGC/LTC, and two RCCs from separate dual configurations cannot mount on the same LGC/LTC.
 - The LGC/LTC does not directly or indirectly support more than 64 elements that require identification for translation purposes. For this calculation, such elements include: RLCM, OPM, SMS-R, RCC, RMM, LCM, ESA Processor, subtending TR-008 DLC, or any "dummy" elements or elements datafilled, but unassigned to hardware.
 - LTC is required when CDO/PBX trunking is required.
 - The following restrictions apply to the NTAX74AA Enhanced Processor:
 - The NTAX74AA is for use in DTCI in MCI-ACD applications ONLY. It is not available for any other DTCI application, or any LGC/LGCI/LTC/LTCI applications.
 - The NTAX74AA is a new upgraded processor used in place of the NTMX77. It provides enhanced features such as TR303 in SMA, expanded memory for future load growth and improved real-time call processing capabilities.
 - The NTAX74AA requires an "XPM+ ready" cabinet baseline (which includes the NTMX71AA paddlecard).
 - The NTAX74AA is initially supported in XLI (ISDN) XPM07 and requires the NTB01AC/BA or later.
 - The NTAX74AA is incompatible with the NT7X05AA Peripheral/ Remote Loader. The customer must remove the NT7X05AA prior to adding the NTAX74AA.

RELEASE 06.03
13 July 1998

- The enhanced features of the NT6X50AB will not be available on SMRs. The NT6X50AB will not replace the NT6X85AB interface on SMS or SMU.
- If NT6X40FA and NT6X40FB are mixed in a module, they must be datafilled as NT6X40FA. If NT6X40AC and NT6X40AD are mixed in a module, they must be datafilled as NT6X40AC.
- The following restrictions apply to the NT6X55AB:
 - The DTC supporting the NT6X55AB must be equipped with Extended Memory (NT6X46) and Enhanced Messaging (NT6X69).
 - The NT6X55AB is not applicable in an LTC.
 - The DS0A link must not exceed 1500 feet.
 - Can be provisioned in any slot that a NT6X50 is allowed in a DTC. One NT6X55AB consumes two DS-1 links on a DTC. One channel of the first DS-1 link is used for the DS0A channel. The remaining 47 channels are not used. Therefore, the NT6X55ABs should be distributed evenly across all DTCs to minimize the port impact.
- DMS datafill does not support mixing the vintages of the NT6X40 circuit pack, see EMS for provisioning details.
- The NT6X69AD cannot be used in DMS-10 applications, SMSR applications, SMS with MP/SP (non-XMP+) with XPM03 or lower s/w loads, or with DTC's configured in a DMS250 or DMS200 LAT load application (including large tandem).
- The NT6X69AD is NOT required in host offices supporting RSC or RSC-S which have the NT6X69AD. The NT6X69AC is acceptable at the host in these configurations.
- SMUs supporting LDTPSAPS (Line Appear on Digital Trunks, Public Service Answering Point) (E911 service) must remain dedicated only to LDTPSAPS to ensure priority service to E911. Due to this consideration, SMUs with LDTs will NOT allow NT6X92BB/BC/EA (UTR/GTR) to be datafilled.
- SMUs can support E911 PSAP or DMS-1U, but E911 PSAP and DMS-1U cannot (simultaneously) be assigned to the same SMU.
- SMUIs do not support E911 PSAP.
- Do not mix any versions of NT6X92 UTR's with NT6X92EA GTR in the same module. If on an extension two additional tone receivers are required and two UTRs are present, the UTRs need to be removed and replaced with GTRs in addition to the required GTRs.
- The NT6X62AA/AB cannot be used in DTCI or LTCI modules for DMS-250 applications (the NTB01BA EISP card utilizes the same slot as the NT6X62AA/AB card).

RELEASE 06.03
13 July 1998

- Multi-Point Embedded Operations Channel (MP-EOC) and 3-DS0 Time Division Multiplex (TDM) Services are not supported on SMUI modules.
- All DS-1 links from a particular DMS-1U must terminate on the same SMUI.
- The following restrictions apply to SMS:
 - One "Channel Test" can be performed per SLC-96 to verify line assignments at a time. Multiple ABBT units cannot be used to test a single Remote Terminal or group of RT's which share the same MTA vertical.
 - ABBT of SLC-96 lines is limited to the verification of software assignment vs. hardware location. ABBT units cannot check for party assignment or ground start.
 - Support for more than four c-side ports requires use of the NT6X40AC (or greater) DS-30 interface packs on the SMS.
 - The NT6X86AB A-Bit Message CP, rather than the NT6X86AA, is required with the Unified Processor (XPM+) in the SMS module.
- The following restrictions apply to SMA:

NOTE: The SMA product has been MD'd, the following information will be removed from this document in a future release.

 - The SMA will be limited to no more than 20 DS-1 connections with no ISDN BRI lines and 16 DS-1 connections with ISDN BRI lines.
 - A single SMA will be permitted to connect to no more than eight AccessNodes when no ISDN BRI lines are supported by the SMA, and seven AccessNodes if there are any ISDN BRI lines on that SMA.
 - The SMA will be capable of supporting no more than 672 lines and 42 DS-1s per AccessNode.
 - A maximum of four Enhanced D-Channel Handlers (3 active plus 1 spare) will be allowed in a single SMA (requires BCS-36).
 - The SMA will not be capable of supporting connections to existing access vehicles such as the LCM, RLCM, DMS-1U, or SLC-96.
 - Currently, the SMA can not be remotely located as in the case of a Remote Switching Center (RSC).
 - Currently, the SMA does not support Primary Rate Interface (PRI).
 - The SMA will be constrained to the traffic limits given in ECM-497.
 - As of NA006 a maximum of two hundred forty (240) AccessNodes may connect to a single DMS.

RELEASE 06.03
13 July 1998

- The BCS-35 SMA provides an interface between the DMS and Northern Telecom's AccessNode using a Northern Telecom proprietary protocol. ISDN is NOT supported.
- The following restrictions apply to SMU:
 - The RCU may be located outside the central office up to a maximum distance of 100 miles.
 - The SMU will only interface RCUs (DMS-1Us). The SMU does not offer interface support to any other remote system (e.g. DMS-1R, SLC-96, RSC, RLCM, OPM, etc.) nor host equipment (e.g. LCM).
 - The SMU does not support DS-1 protection switching as it will not be offered in the RCU product.
 - The SMU requires office repeaters located in a separate Span Rack.
 - Support for Universal Tone Receivers on SMU modules was introduced in BCS-36 (Feature AF3410) and is included in software package NTX387AC. Refer to the Engineering Manual section for provisioning and mounting details.
 - The NT6X80BB is required for all initials and extensions on SMU and SMUI (to reduce crosstalk).
 - Support for the Analog Display Services Interface/Spontaneous Call Waiting I.D. (ADSI/SCWID) feature on RCUs requires the SMU module to be equipped with the Unified Processor (XPM+), CLASS Modem Resource (CMR) CPs, UTRs and NT6X69AD Messaging packs. Refer to the Engineering Manual section for provisioning and mounting details.
- The following restrictions apply to SMS-R:
 - The SMS-R is dedicated to supporting SLC-96 RT's. It does not support LCM's, RLCM's or switched digital trunk services.
 - ISDN lines are not supported.
 - The SMS-R must reside in the host RSC or host RSC-Sonet. See ECM 618 for RSC details, and ECM 691 for RSD-Sonet details. No provision is made to facilitate future enhancement to enable the SMS-R to be located remotely from the RSC/RSC-S.
 - The SMS-R does not support P-phones.
 - Do not mount NT6X78 CLASS Modem Resource (CMR) circuit packs in the SMS-R module. If Custom Local Area Signaling Services (CLASS), Call Management Services (CMS), Analog Display Services Interface (ADSI), or Spontaneous Call Waiting ID (SCWID) are required for the lines subtending an SMS-R module, the

RELEASE 06.03
13 July 1998

necessary NT6X78 CMR circuit packs must reside in the host RSC. See ECM-618 for additional details.

- The RSC/RSC-S does not support hairpins on lines to and from an SMS-R.
- NT6X01AA Usage Restrictions
 - Upgrading an existing XPM module on an NT6X01AA frame, or equipping a vacant module position on an existing NT6X01AA frame with a new XPM+ module, requires that wiring modifications be installed on the module backplane. One NTMX70AB Kit is included, along with two each of the NTMX77AA Unified Processor and its associated NTMX71AA Terminator Paddleboard, in the NT6X02XG XPM+ Upgrade Kit.
 - Minimum packfill levels are required before upgrading to XPM+, as follows:
Base XPMs :

DTC Modules - NT6X02AS, NT6X02IA or NT6X02IC
LGC Modules - NT6X02AT, NT6X02LA or NT6X02LC
LTC Modules - NT6X02AU, NT6X02MA or NT6X02MC
- XPM+ Provisioning and Upgrades
 - XPM+ (Unified Processor equipped) modules are the standard offering for all new jobs. MP/SP-equipped XPM modules are still available for special orders on new jobs, otherwise they should be considered for additions and maintenance only.
 - Only XPM+ modules will be supported in NA005 and beyond. Refer to "Required Software Packages and Interdependencies" for information regarding the phase-out of MP/SP-equipped XPM modules.
 - The NT7X03AA XPM+ Power Manager card will only be implemented in Existing North America (Domestic) Frames and Cabinets UNDER These Conditions and Configurations:
DTC - NT6X02LC Packfill
LTC - NT6X02MC Packfill
LGC - NT6X02CZ Packfill
On the Following Frames and Cabinets:
NT6X01AA (MD'ed)
NT6X01AD (Current)
NTRX36AB (MD'ed)
NTRX36BA (Current)
The NT7X03AA Power Manager Card is required (one per shelf in slot 9) IF 8 or more NT6X50AB (release AA through BY) are installed in an XPM+ module (NTMX77AA processor), and NO NT6X48AA/AB packs are present.
The NT7X03 Card is a "Merchandise Order Only" item.
The NT7X03AA is backwards compatible with any software baseline

RELEASE 06.03
13 July 1998

The NT7X03AA circuit pack will be provided upon customer request at no charge to the customer.

The circuit pack will be installed by the customer

The use of the NT7X03AA eliminates the need for the power converter forming procedure upon power converter replacement, as detailed in DMS-100 Warning 960088.

The NT7X03AA must be installed before power converter failure, or "power sharing" condition.

The use of the NT7X03AA also supplements the NT2X70AF. as detailed in DMS-100 Warning 960106

Please reference to the NT7X03AA circuit pack replacement Procedure in:

NTP 297-8991-805 Hardware Description Manual

NTP 297-8001-547 Call Replacement Procedure North America

NTP 297-8041-547 Call Replacement Procedure Europe

12.2.2 Hardware Dependencies

- NT6X40FB requires a DMS-100 Fiberized XPM connected to an ENET and the fiber paddle card NT6X40GA. NT6X40FB enhanced test features are available with XPM05+.

The NT6X55AB DS0A Signaling Interface CPs require a timing signal is a Telco-provided Time Source Generator (TSG). Each Timing Output Card provides ten (10) ports. The following TSG equipment is recommended:

TSG Equipment	
Description	Part Number
DCD-400 Shelf Assembly	990-40000-01
Fuse & Alarm Card	990-40014-01
Clock Input Card	990-40010-01
Stratum 3 Clock	990-40013-01
Timing Output Card	990-40011-01
(Hot Spare)	990-40011-01
Matrix Control Card	990-40015-01
Equipment manufactured by Telecom Solutions	

- The NT7X05AA Peripheral/Remote Loader Circuit Pack can only be installed in extended peripheral modules which are equipped with the

RELEASE 06.03
13 July 1998

NTMX77AA Unified Processor (XPM+). Do not use the Peripheral/Remote Loader CP on SMA modules.

- Necessary CPs to support the ADSI/SCWID feature must be provided in the Remote Switching Center (RSC) which is hosting the SMS-R, rather than in the SMS-R module itself.
- The following apply to SMS:
 - The Central Office Terminals (COT) must be reconfigured using external C.O. repeaters and a DSX patch panel. Jacks on the DSX will provide a monitor path for the transmitted PCM signal from COT to SLC-96. Along this path the regenerated PCM signals from the repeaters will be transmitted to the appropriate SMS port.
 - ABBT on a Mode I system will require five (5) bridging repeaters. Mode II systems will require three (3) bridging repeaters.
 - The reconfigured cabling must appear at the same DSX bay to facilitate patching from the COT DS-1 link monitor jacks to the bridging repeater input jacks, and from the bridging output jacks to the SMS port input jacks.
 - SMS board-to-board testing will require the provisioning of an applique unit (ES-10233-RTP) in addition to the regularly ordered equipment. The SMS applique unit contains miscellaneous hardware required to adapt the ABBT unit (NT5X73AB) to recognize the SMS lines. One (1) SMS applique unit is required for each ABBT unit that will be testing the SMS lines.

12.2.2.1 P and C Side Port Requirements

- LGC/LGCI
 - P-side ports:
 - 2-6 DS-30A to LCM
 - 2-18 DS-30A to LCME
 - 2-6 DS-1 to RLCM, OPM, OPAC
 - 2-16 DS-1 to RSC, RSC-S
 - C-side ports:
 - 3-16 DS-30
 - 1 DS-512
- LTC/LTCI
 - P-side ports:

- 2-6 DS-30A to LCM
- 2-6 DS-1 to RLCM, OPM
- 2-16 DS-1 to RSC, RSC-S
- C-side ports:
 - 4-16 DS-30
 - 1 DS-512
- DTC/DTCI
 - P-side ports:
 - 1-20 DS-1 to digital network
 - C-side ports:
 - 4-16 DS-30
 - 1 DS-512
- SMS/SMS-R
 - P-side ports:
 - 5 DS-1s to SLC-96 (4 DS1s + 1 protect)
 - C-side ports:
 - 3-16 DS-30
 - 1 DS-512
- SMU/SMUI
 - P-side ports:
 - 2-6 DS-1s to DMS-1U
 - C-side ports:
 - 3-16 DS-30
 - 1 DS-512
- SMA
 - P-side ports:
 - 2-20 DS-1s to AccessNode
 - C-side ports:
 - 3-16 DS-30
 - 1 DS-512

RELEASE 06.03
13 July 1998

12.2.2.2 DMS BUS Port Requirements

Not Applicable.

12.2.2.3 Circuits Per Card

- Unified Processor (XPM+)
 - There is one Unified Processor per circuit pack.

12.2.2.4 Discrimination Numbering

ISDN Applications

- Prior to BCS-31, in an office equipped with both ISDN and non-ISDN peripheral controllers, the CPCI modules could be assigned the same discrimination numbers as existing non-ISDN modules. For example, LGC 01 and LGCI 01 could co-exist in an office. The same is not true for LCME/LCMI versus LCM bays.
- For BCS-31 and above, discrimination numbering of ISDN peripherals has been changed, requiring them to be consecutive with non-ISDN modules.
- Frame level naming and numbering is unchanged and the frame type is still determined by the bottom module in the frame.
- At the MAP, ISDN modules are no longer called LGCI/LTCI. Instead, only LGC/LTC are allowed.
- (Note that DTCI has not been changed to DTC at the MAP).
- As a result of this change, at BCS-31, existing ISDN peripheral controllers (LGCI/LTCI) will need to be renumbered to be consecutive with non-ISDN controllers.
- For example, an office with existing LGC 00-05 and LGCI 00-01 will require renumbering the ISDN modules to LGC 06-07 at BCS-31.
- New labels for the ISDN controllers will be required.
- DTC and DTCI numbering will not be changed due to the complexity of changing in-service trunks and the lack of a software tool for this activity.
- Numbering for DTC/DTCI modules will be unchanged from pre-BCS-31 practices.
- At the MAP, modules can still be identified as ISDN or non-ISDN by referring to the ISP16 table.

RELEASE 06.03
13 July 1998

12.2.3 Provisioning Considerations

12.2.3.1 DTC/LGC/LTC Peripheral Controller Modules

DTC/LGC/LTC Customer Questions

The customer question section has been removed from this document.

12.2.3.2 SMS/SMU/SMS-R Line Test

Mechanized line testing refers to testing subscriber loops and line cards using non-DMS equipment located at a remote site (e.g. #14 Local Test Desk (LTD), #3 Local Test Cabinet (LTC), Mechanized Loop Testing (MLT), etc.). The remote test site works with the DMS system to gain metallic access to the subscriber loops. The mechanized line test equipment executes tests on the loop such as measuring foreign AC and DC voltage, resistance, etc.

Remote loop testing devices will be interfaced to the DMS by a modified test trunk. A NT2X90AD test trunk will provide all functions currently supported by previous vintages of the NT2X90 CP and additionally will support the Subscriber Carrier module loop testing requirements.

An applique circuit must be provisioned to support line testing by the Mechanized Loop Testing system (MLT). The applique will provide DC signals required to report channel test results to the MLT system.

Only the MLT requires the NT3J00BB applique. Offices containing SMS, SMR and SMU peripherals may share NT3J00BB and NT3J00BA facilities. A summary of the provisioning rules for the NT3J00BA & BB equipment follows:

- An applique circuit pack (NT3J00BB) contains two (2) circuits. Each circuit will interface one NT2X90AD cp provisioned for line testing to the RCS for loop testing. An applique CP is required for each NT2X90AD test trunk connecting to a MLT.
- The NT3J00BA card cage will house ten (10) NT3J00BB applique cp.
- A Signal Distribution (SD) circuit pack (NT2X57AA) is required for each NT3J00BB circuit provisioned to operate relays on the applique CP.

12.2.3.3 SMS Considerations

- SMS Auto-Board/Board Test
The Automatic Board to Board Test (ABBT) is used when transferring service from an old switch to a new DMS-100. When testing subscriber loops attached to a SLC-96 Remote Terminal (RT) there are prerequisites/limitations which must be met to complete the ABBT.

RELEASE 06.03
13 July 1998

12.2.3.4 SMU Considerations

SMU MAINTENANCE

Loop testing is provided for RCU subscriber lines. Tests may be performed through the MAP or from remote test desks (e.g. MLT 1 or 2, LTC, LTD, (CALRS for Canadian offices), etc.).

When a SMU is provisioned in a DMS-100F office, the following maintenance trunk circuit pack derivations have been updated to include the Subscriber Carrier Modules. Refer to ECM276 for Metallic Test Access (MTA) provisioning criteria.

NT2X10AB - Line Test Unit (ODD) (LTU)
NT2X11AA - Line Test Unit (EVEN)
NT2X46AB - METALLIC TEST ACCESS (MTA)
NT3X09BA - 8 X 8 METALLIC TEST ACCESS

SMU PROVISIONING FORMULA

Provisioning of Line Test Unit (LTU) utilizing NT2X46AB MTA.

$$\text{LTU} = (\text{No. SMS s/w sites})/20'' + (\text{No. SMU s/w sites})/20'' + (\text{No. LCM})/10'' + (\text{No. LM})/10'' + 1$$

Provisioning of Line Test Unit (LTU) utilizing NT3X09BA 8 X 8 Metallic Test Access CP.

$$\text{LTU} = (\text{No. SMS s/w sites})/16'' + (\text{No. SMU s/w sites})/16'' + (\text{No. LCM})/8'' + (\text{No. LM})/8'' + 1$$

Provisioning a NT2X46AB MTA.

$$\text{MTA} = (\text{No. SMS s/w sites})/20'' + (\text{No. SMU s/w sites})/20'' + (\text{No. LCM})/10'' + (\text{No. LM})/10''$$

Provisioning a NT3X09BA 8 X 8 Metallic Test Access.

$$\text{MTA} = (\text{No. SMS s/w sites})/8'' + (\text{No. SMU s/w sites})/8'' + (\text{No. LCM})/4'' + (\text{No. LM})/4''$$

Note : The above formulas have been updated to reflect the Subscriber Carrier additions.

12.2.3.5 SMS-R Considerations

Note that there is a distance limit of 100 miles from the host Central Office (CO) to the SLC-96 with repeaters located approximately every 6,000 ft. One (1) repeater is required to be co-located with the SMS-R module.

SMS-R MAINTENANCE

RELEASE 06.03
13 July 1998

Automatic node and link maintenance of SMS-R and SLC-96 RTs is integrated with the host RSC maintenance which is in turn integrated with the host central office maintenance functions.

Loop testing is provided for SLC-96 subscriber lines. Tests may be performed through the MAP at the Host Office, or from Remote Test Desks, e.g., MLT 1 or 2, Local Test Cabinet, LTD, CALRS, etc.

Refer to ECM-618 for RSC provisioning information. Refer to ECM- 276 for MTA provisioning information and to NTP 297-2101-516 for more information on line testing.

SMS-R BYPASS TESTING

Bypass Testing refers to the use of the Metallic Test Pair connecting the DMS-100 Test Equipment to either SLC-96 line card or the subscriber loop. This connection is established through the Channel Test Unit. There are two (2) Bypass Test configurations for the SMS-R SLC-96 sub-system:

1. Termination to the Metallic Test Access (MTA) in the DMS-100 or DMS-100/200 central office from the SLC-96 at the Maintenance Trunk Module (MTM).
2. Termination to the MTA in the RCC-RMM (Remote Maintenance Module) from the SLC-96.

Bypass testing can be performed from the MAP position or from Remote Test Desks.

SMS-R and the Digital Remote Test Unit (DRTU)

The DRTU is a new measurement device located at the carrier remote terminal and functions as a slave measurement device controlled by a Local Test Cabinet. A spare carrier channel is used as a two way communication path linking the DRTU and the central office test unit. All measurement results are displayed at the repair service center. Only metallic line test and communications circuit pack modules are included in the DRTU. Refer to ECM-152 for additional information concerning the DRTU.

12.2.4 Office Layout Information

(Refer to NT Practice 555-4001-103 Integrated Services Network Meridian SL-100 Cabinetized General Description.)

If the NT6X55AB is mounted in an existing DTC slot, then the connection between the existing DTC slot and the DSX slot must be removed.

ISDN LCME

RELEASE 06.03
13 July 1998

The 2B1Q product has been designed to fully meet ANSI and BELLCORE Loop Requirements (number 1 to 15). In terms of loop loss at 40 kHz, the U-loop length restrictions as follows:

Figure 7. U-Loop Length Restrictions

U-Loop Length Restrictions	
26 gauge loop length (in kilo-feet)	Description
16.5	Operational Loss - Loop reached with 49 disturbers in cable
14.5	Application Loss - Loop reached with 49 disturbers in cable plus 6 db margin

The loop length restriction for the ISDN S/T loop is 3 kilo-feet (point-to-point).

SMS-R

The SMS-R must be co-located with its host RCC in the RSC. The maximum permissible length of the DS-30A Links between the RCC and the SMS-R is 50 ft.

The SMA must be physically located such that the length of the DS-30 links between the SMA and the Network Module does not exceed 1000 feet.

12.2.5 Traffic Tables

Unless otherwise indicated, standard traffic provisioning algorithms apply.

ISDN LCME

The traffic engineering rules for the ISDN LCME will be based on the provisioning of the DS-30A links to the LGCI/LTCI. Refer to ECM-497, Simplified Traffic Provisioning.

Refer to ECM-413 ISDN Traffic Provisioning. This ECM contains worksheets and tables for engineering the required quantity of DMS-100 peripherals and DPN packet handler equipment based on carried traffic and Grade of Service considerations.

SMS

The SMS will be capable of supporting four (4) Mode I (five (5) DS-1 links) or six (6) Mode II/III (three (3) DS-1 links) SLC-96 units. Mix

RELEASE 06.03
13 July 1998

of Mode I, II or III operations will be supported in a SMS. All DS-1 links from a SLC-96 must terminate on the same SMS (via a DSX or ORB).

Effective with BCS-22 the minimum number DS-30 ports to the Network Module from a SMS will be three (3) and a maximum will be four (4). Effective BCS-35 the maximum number DS-30 ports to the Network Module was increased to sixteen (16). To avoid using more network ports than necessary, the traffic requirement should be determined and ports provided based on this requirement. Refer to the Engineering Manual Section for provisioning details.

The quantity of DS-30 ports should be engineered based on Mode type of SLC-96 and grade of service requested by the telco.

Mode I and III	No concentration at the SLC-96 end or at the DS-1 side of the SMS. The quantity of network ports will thus introduce the required grade of service.
Mode II	A 2:1 concentration ratio is automatically introduced by DS-1 allocation. The quantity of network ports will introduce a second concentration point which can be adjusted per a telco's desired grade of service.

SMU

The SMU is presently capable of supporting 20 RCU DS-1 ports (each RCU may have up to eight (8) DS-1 links). The total number of DS-1 ports from the RCUs must be less than or equal to 20. All DS-1 links from a RCU must terminate on the same SMU.

The SMU will be connected to the Network Module of the DMS-100F via three (3) to 16 provisionable DS-30 ports or one DS-512 fiber connection. Connections are duplicated to provide connections to each plane of the network. The SMU should be configured as non-blocking, that is configure DS-30 ports per a channel in/channel out ratio to the DS-1 channels provisioned to the RCUs.

SMU CAPACITY

The SMU should be configured as non-blocking. That is, the number of DS-30 channels to the Network should be equal to the number of DS-1 channels to the RCUs.

The following table represents the CCS capacity of the SMU per DS-30 port to the Network.

RELEASE 06.03
13 July 1998

Capacity of SMU at 4% TML (ccs)							
Net- work Ports	3 2780	4 3806	5 4841	6 5883	7 6929	8 7979	9 9 32 (ccs)
Net- work Ports	10 1 087	11 1 144	12 1 203	13 1 264	14 14325	15 15388	16 16451 (ccs)

Refer to ECM-497 for SMUI Traffic provisioning rules.

In ECM-350, it is stated that a maximum of 62 software nodes can be datafilled on an LGC/LTC P-side in BCS-23 and onwards. The term "software nodes" is defined fully in the ECM.

However, there is an additional restriction due to the limited number of direct messaging channels to the LGC/LTC P-side. A maximum of thirty (30) channels is available for this purpose. Each of the following nodes consumes two (2) direct messaging channels:

- LCM
- RCC
- RLCM/OPM
- Each RMM shelf on the RLCM/OPMs
- Each ESA Processor (NT6X75AA CP) on the RLCM/OPMs

The total number of nodes provisioned on the LGC/LTC P- side cannot exceed the maximum (30) available.

Nodes that do NOT require a direct messaging channel comprise those interfaced to the LGC/LTC via a Remote Switching Center (RSC), i.e., any LCMs, RLCM/OPMs, RMM shelves, and ESA Processors off the P-side of the RCC. The TOTAL of these nodes plus those above which require direct messaging channels cannot exceed 62. Refer to Figure 8 for illustration.

Figure 8

RELEASE 06.03
13 July 1998

6 Maximum Nodes (Direct and Indirect)						
LGC/LTC						
DIRECT --> NODES 3 MAX per LGC/LTC	LCM	RLCM/OPM-	RCC	RMM	ESA	
			-			
INDIRECT --> NODES 3 MAX per LGC/LTC			LCM RLCM OPM RMM ESA			
Note: Each element constitutes two nodes.						

SMS-R

The SMS-R is connected to the RCC/RCC2 P-Side via 2 to 4 DS-30A links. Each SMS-R shelf has one (1) dedicated channel for messaging per DS-30A link, leaving a minimum of 60 voice channels to interface with the RCC/RCC2. Up to 120 voice channels are available when the SMS-R is provisioned with four DS-30A links. Provision links based on the following traffic tables.

All traffic tables are based on the following:

1. 5 CCS per loop
2. Maximum 4% blocking (HD G.O.S.)
3. CCS per SLC-96 line assumes 100% fill
4. Mode I (384 Subscriber lines)
Mode II (576 Subscriber lines)
Mode III(288 Special Subscriber lines)
5. Based on infinite sources (SLC Lines)(Loops)
to SMS-R DS-30 Channels.

RELEASE 06.03
13 July 1998

Estimated Carried Traffic Capacity (Mode I)			
No. of DS-30A Loops (No. of channels)	Carried Load in CCS HD Capacity per SMS-R	CCS Per Channel	CCS Per SLC-96 Line
2 (60)	1607	26.78	4.18
3 (90)	2591	28.79	6.75
4 (20)	3603	3 .03	9.38

Estimated Carried Traffic Capacity (Mode II)			
No. of DS-30A Loops (No. of channels)	Carried Load in CCS HD Capacity per SMS-R	CCS Per Channel	CCS Per SLC-96 Line
2 (60)	1607	26.78	2.79
3 (90)	2591	28.79	4.50
4 (20)	3603	3 .03	6.26

Estimated Carried Traffic Capacity (Mode III)			
No. of DS-30A Loops (No. of channels)	Carried Load in CCS HD Capacity per SMS-R	CCS Per Channel	CCS Per SLC-96 Line
2 (60)	1607	26.78	5.58
3 (90)	2591	28.79	9.00
4 (20)	3603	3 .03	1 .51

CONCENTRATION RATIOS

The SMS-R has concentration capabilities, which are determined by the provisioning of DS-30A ports. The concentration ratio may be calculated using the following formulae:

FOR MODE I & II

RELEASE 06.03
13 July 1998

Concentration ratio = (No. of SLC-96s per SMS-R) * 96 " / (No. of DS-30A links) * 30"

FOR MODE III

Concentration ratio = (No. of SLC-96s per SMS-R) * 48" / (No. of DS-30A links) * 30"

A physical maximum of 9 SMS-R's can be connected to an RCC/RCC2 assuming that the minimum number of C-Side Links are used on each SMS-R and that 2 RCC/RCC2 P-Side Links are dedicated to RMM interface. The practical maximum number of SMS-R may be less than 9. However, there is a possibility that the consumption of RCC/RCC2 and Line Trunk Controller or LGC Real-Time by high traffic SMS-R's may impose a practical limit of less than 9 SMS-R's off a RCC.

The RCC is capable of satisfying a maximum call attempt rate of 5.5 calls/sec. Each SMS-R is capable of satisfying a maximum call rate of 0.8 calls/sec, which for 9 SMS-R's is 7.2 calls/sec.

12.3 Product/System Specification

12.3.1 Physical Characteristics

Supervisory Panel

The Modular Supervisory Panel (MSP) that distributes - 48VDC to shelves and contains the cabinet alarms is located at the top of the cabinet.

The CIPE is forced air cooled with a -48VDC fan unit integrated into the base of the cabinet.

Unequipped CP Slots

For each unequipped CP slot provide one filler face plate.

SMS-R

Input Voltage -48V at 60Hz
Power Consumption 960 Watts

12.3.2 EMI/Earthquake Information

The EMS Rules generally provide for anchor kits (for resistance to earthquake damage), when installing cabinets in an ATC Zone 6 or 7, NEBS Zone 4, or UBC Zone R. For non-earthquake zones, a cabinet frame or mounting kit is sufficient.

The SMS-R is designed to meet earthquake zone 4 seismic specifications.

RELEASE 06.03
13 July 1998

12.3.3 Sparing Information

Sparing is a safeguard against service breakdown or degradation. Sparing needs are calculated based on MTBF and MTTR figures and the number of cards present in the configuration.

Unless otherwise indicated under this heading, standard sparing algorithms apply. MTBF > 20 years. Sparing calculations is 89.9 years. DPN equipment sparing is based on such factors as turn-As a rule of thumb, provision as spare a minimum of one Provide one (1) NT3J00BB Applique CP and one (1) NT3J00BC The MTBF (Mean Time Between Failures) for each circuit pack in

12.3.4 Power Feed and Fusing Requirements

For power distribution information, refer to ECM-631.

For XPM Power Provisioning, refer to ECM-441.

- DIU
 - Each DIU requires one (1) 20 Amp fuse NT0X42AV.
 - These fuses are mounted on a special fuse panel on the PDC frame NT0X42AU. This panel is 8 inches high and may be mounted at positions 21 and 29.
 - The fuses may be assigned to positions 0-2 on the fuse panel. Positions 0-2, A feed and positions 0-2, B feed are to be used.
 - Each Network module (NM) requires two 30 Amp fuses NT0X42AS. These are assigned to the conventional fuse panels.
 - Prior to software Generic G24, each DIU requires one (1) 20 Amp fuse NT0X42AK, assigned to a conventional fuse panel.
 - When assigning 'A' and 'B' power feeds, the following should be considered:
 - The Packet Handler Resource Modules/Network Modules should be divided evenly between 'A' powered and 'B' powered.
 - The Access Module is to be powered off of the same feed ('A' or 'B') as the Resource Module/Network Module to which its primary Network Link is connected.
 - The DIU is to be powered off of the same feed ('A' or 'B') as the Access Module to which its links or the majority of its links are connected.
 - For an office with only one (1) Resource Module/Network Module, the DIUs and Access Modules (if more than one) may be assigned to different power feeds ('A' or 'B') if required to balance the 'A' and 'B' power requirements.

RELEASE 06.03
13 July 1998

- All XPM and SCM modules mounted in frames require the following fusing and feeds:
 - Qty. (2) 20 Amp |A| Feeds
 - Qty. (2) 20 Amp |B| Feeds
 - (4) Returns
- All XPM and SCM modules mounted in cabinets require the following fusing and feeds:
 - For fusing to Model A CPDC:
 - Qty. (2) 30 Amp |A| Feeds
 - Qty. (2) 30 Amp |B| Feeds
 - (4) Returns
 - For fusing to Model B CPDC:
 - Qty. (3) 30 Amp |A| Feeds
 - Qty. (3) 30 Amp |B| Feeds
 - (6) Returns
- ISDN Packet Handler
 - The following gives the necessary provisioning for powering the Packet Handler (PH) equipment and the DIU from the office PDC.
 - Each Access Module (AM) of the packet handler uses one (1) 35 amp fuse NT0X42AV.
 - Each Resource Module (RM) of the packet handler uses one (1) 35 amp fuse NT0X42AV.

12.3.5 Current Drain Information

- NT6X50AB Extended Frame Format Card
- Power consumption is 4.5 Watts.
- NT6X55AB DS0A Signaling Interface
- The NT6X55AB CP has the following power characteristics:

Volt-ages:	+5V	+12V	-12V
Cur-rent:	1.0A	0.13A	0.03A

- Unified Processor (XPM+)

RELEASE 06.03
13 July 1998

- The NTMX77AA Unified Processor requires a maximum of 3.80 Amps and the NTMX71AA Terminator Paddleboard requires a maximum of 0.68 Amps.
- DTC/LGC/LTC Peripheral Controller Modules
- Current drain for a DTE/LGE/LTE Module is specified as: 8.5 Amps.
- SMS
 - The SMS has a current drain of 13.32 Amps.
 - The maximum current consumption for a SMS, including provisionable packs, should be limited to 50 Amps. A module can handle 55 Amps but will only function for up to 8 hours in power sharing mode.
 - The SMS heat dissipation is 592 Watts.
- SMA
 - The worst case power consumption for SMA in power sharing mode at BCS-35 is 30.89 Amps, which is well within the 55 Amp rating of the NT2X70AE/AF power converter.
 - Current drain for the NT6X44CA is 2.40 Amps.
 - Current drain for the NTAX74AA is 0.3 Amps at 48 volts.
- SMU

The SMU has a current drain of 13.32 Amps. Maximum current consumption per SMU, including all provisionable packs, should be limited to 50 Amps. A module can handle 55 Amps but will only function for 8 hours in power sharing mode.
The SMU heat dissipation is 592 Watts.
- SMS-R

Current Drain 20 Amps
Maximum current consumption per SMS-R, including all provisionable packs, should be limited to 50 Amps. A module can handle 55 Amps but will only function for 8 hours in power sharing mode.

12.4 Software Provisioning

(For NTX software packages to PCL/SOC mappings for CSP02 and beyond refer to ECM-552, Mapping of NTX/NTG Package to PCL/NCL/Option.)

12.4.1 Required Software Packages and Interdependencies

- Software package NTXR34-- is required to support the Unified Processor and will be needed for all XPM+ upgrades.
- Software package NTXR42-- is required to utilize the downloadable firmware feature and is required with NTXR34-- . In BCS-35, NTXR34AB

RELEASE 06.03
13 July 1998

replaces NTXR34AA and NTXR34AA is declared Manufacture Discontinued.

- Refer to SMS/SOLID for software requirements and interdependencies.
- Software package NTXS05-- is required in the host office to support RSC offices which have the Unified Processor. NTXS05-- is available at BCS-35 and later.
- SCM Software
 - The capability of supporting the Unified Processor on Subscriber Carrier Modules is introduced in BCS-36. Configurations using XPM+ will require the BCS-36 software load or higher.
 - The following feature packages are required for support of XPM+ on Subscriber Carrier Modules:
For SMU : NTX387AD - SMU and ISDN/MBS SMU
For SMS : NTXT16AA
For SMS-R: NTXT17AA
- SMS
 - The SMS software feature package is NTX398AB. Refer to SMS/SOLID for interdependencies.
 - SMS Special Services software feature package is NTX299AB with a prerequisite of software package NTX398AB.
 - Software support for the MP/SP (non-XPM+) version of the SMS module is planned to be discontinued effective with NA005. In NA005 and later, only the UP (XPM+) version of the SMS module will be supported.
- When CLASS features are required the following software package must be ordered:
 - NTXE38AA CLASS Display on SCM-S
- Refer to ECM-332 for additional CLASS software feature package requirements.
- The Analog Display Services Interface (ADSI) and the Spontaneous Call Waiting ID (SCWID) features of BCS-36+ require that the supporting SMS modules be equipped with the NT6X69AD Message Protocol CPs, rather than the NT6X69AC or older Message Protocol CPs. Support for these features also require that the SMS module be equipped with NT6X78AB Class Modem Resource CPs, and UTR/GTR CPs.
- SMA
 - SMA software will operate on top of the existing XPM base software.
 - Both the Base and Generic software capabilities are packaged on a peripheral module basis

RELEASE 06.03
13 July 1998

- Base/AccessNode Interface Software
 - The Feature Package Code for SMA System Interface to AccessNode is NTXF46AA. This capability is packaged in the functional group BAS00003.
- TR-303 Generic Interface Software
 - The TR-303 generic software, introduced in the NA004 stream, provides multi-vendor connectivity for remote terminals complying with the TR-303 requirements. The capability is packaged within the functional group SMA00001 or the package code NTXT23AA. The functional group BAS00003 or package code NTXF46AA is a prerequisite for this interface capability.
- AccessNode/SMA Multihosting
 - The software package for Multihosting is included in the NT4K90 family. Selection of a software package for Multihosting is dependent upon the AccessNode software release level.
- Enhanced Processor
 - The Enhanced Processor is available for SMA starting in NA004 with XPM06 (not NA004 with XPM05).
- Refer to the SMSQUERY/SOLID for software interdependencies and latest vintage of SMA feature package.

Compatibility between AccessNode software and the DMS-100 SW Load must be verified while planning and before publishing a schedule for a DMS-100 software upgrade. (This applies to any system with subtending AccessNodes) Refer to the following table.

RELEASE 06.03
13 July 1998

Access Node s/w and DMS-100 S/W Load Compatibility							
S/W	BCS35	BCS36	NA002	NA003	NA004	NA005	NA006
AN 06	P	S	N	N	N	N	N
AN06.1	S	P	N	N	N	N	N
AN 07	S	P	S	S	N	N	N
AN 08	S	S	P	S	S	S	N
AN 10	N	S	S	P	S	S	N
AN 12	N	S	S	S	P	S	S
AN 14	N	N	N	S	S	S	P
P - indicates combinations that provide full AccessNode functionality. (Primary AccessNode Product Configuration) S - indicates combinations that provide partial AccessNode functionality. (Secondary AccessNode Product Configuration) N - indicates compatibility is not a program objective.							

- SMU
 - SMU basic software feature package is NTX387AC. Refer to SOLID for interdependency information.
 - SMU Special Services software feature package is NTX621__.
 - SMU Bridged Services software feature package is NTX297__.
 - For Pre-BCS-34 offices, the Enhanced Office Recovery software feature is NTXA66AA.
 - Effective with BCS 34, the Enhanced Office Recovery feature is included in the NTX001AA (Common Basic) software package. The NTXA66AA package is not to be ordered for offices at BCS 34 and above.
 - Extended XPM Diagnostics software feature is NTXA67AA.
 - Refer to ECM-332 for CLASS software feature package.
- SMS-R
 - Provision Software packages NTXA85-- (SMS-R) and NTXA86-- (SMS-R: Special Services) for each DMS 100 or DMS 100/200 Host office that has RSC remotes requiring a SMS-R module.
 - Refer to SOLID for interdependency information.
 - The Analog Display Services Interface (ADSI) and the Spontaneous Call Waiting ID (SCWID) features of BCS-36+ require that the RSC hosting the SMS-R module be equipped with the NT6X69AD

RELEASE 06.03
13 July 1998

Message Protocol CPs, rather than the NT6X69AC or older Message Protocol CPs. Support for these features also requires that the hosting RSC be equipped with NT6X78AB Class Modem Resource CPs, and NT6X92 UTR/GTR CPs.

- Effective with BCS-34, when CLASS features are required for an SMS-R, provide the Software Package NTXE38AB (CLASS - CND on SMS/SMS-R). Refer to ECM-332 for additional CLASS software feature package requirements.
- The capability of supporting the Unified Processor on Subscriber Carrier Modules is introduced in BCS-36. Configurations using XPM+ hardware require the BCS-36 software load or higher.
- Software support for the MP/SP (non-XPM+) version of the SMS-R module is planned to be discontinued effective with NA005. In NA005 and later, only the UP (XPM+) version of the SMS-R module will be supported.
- SMS-R+ Software
 - The following feature package is required for support of XPM+ on SMS-R Modules:
 - NTXA85AC - Subscriber Mod. SLC-96/Remote
 - The following software is required for the 64 kb/s clear channel capability based on B8ZS: NTX142AA 64 kb/s Clear Channel
 - The following software is required for ESF format: NTX143AA Extended Super Frame
 - When either of the above software packages is required, the following software should also be provided: NTX270AA New Peripheral Maintenance Package
 - The NT6X55AB CP requires NTX712AA Common Channel Signaling No. 7 Dataport software.
 - NTX270AA New Peripheral Maintenance software is a prerequisite for NTX712AA software.
 - DTC/LGC/LTC Peripheral Controller Modules
 - Jobs that are ordering XPM+ (UP Processor) at BCS-34 need the BCS-35 PM load and the NTRX42AA CC package.
- Non-XPM+ Modules
 - Software support for the MP/SP (non-XPM+) versions of the XPM modules is being phased out. By NA005 and TOPS05 only the UP (XPM+) versions of the peripheral controller modules will be supported.

Last Support of MP/SP-Equipped Modules		
<u>Module Type</u>	<u>Release</u>	<u>PM Load</u>
RCCI	BCS-33	
LGCI	BCS-36	XPM02
LTCI	BCS-36	XPM02
SMUI	BCS-36	XPM02
ICP	BCS-36	XPM02
LGC	NA002/3	XPM03/03B
LTC	NA002/3	XPM03/03B
RSC	NA002/3	XPM03/03B
TMS	TOPS04	XPM05
DTC7	NA002/3	XPM03/03B
DTCI	NA003	XPM04
SMU	NA003	XPM04
DTC	NA004	XPM05
SMS	NA004	XPM05
SMS-R	NA004	XPM05

- ISDN
 - The software development for 2B1Q was done in two phases. In Phase I (BCS-31): The LCME will support only ISDN lines. In Phase II (BCS-32): The LCME will support ISDN lines POTS, EBS, and DATAPATH lines. Provision ISDN software packages as follows:

	34	35	36	37	38
NTX750AB	GA	MD	MD	MD	-
NTX750AC	LTD	GA	A/M	MD	-
NTX750AD	-	LTD	GA	GA	GA
NTXS36AA	-	GA	GA	GA	GA

- The necessary packages to support XPM+ on DTCI modules are:
 - NTXR34AA (allow XPM+)
 - NTX750AC (allow XPM+ on ISDN)
 - NTXS36AA (for DMS100 DTCI only)

RELEASE 06.03
13 July 1998

- NTXL79AA (for DMS250 DTCI only)
- For Basic Rate Interface (BRI):
 - NTX750 - ISDN BASIC ACCESS
 - NTX753AA - ISDN ADVANCED SIGNALING
- For BRI Functional Signaling :
 - NTX754AA - ISDN ELECTRONIC KEY TELEPHONE SERVICE
 - NTX755AA - ISDN SUPPLEMENTARY SERVICES COMPLIANCE
- For Primary Rate Interface (PRI) :
 - NTX790AA/AB - ISDN Primary Rate Interface Base
 - NTX791AA - ISDN Primary Rate Interface Networking
 - Note: If a DTCI is used for MF Trunks only, the NTX790AA/AB ISDN Primary Rate Interface Base software package must still be provided in order to datafill the module as DTCI.
 - Package NTX790AA is MD as of BCS-30 and replaced by NTX790AB. Two (2) new software packages have been created. These are:
 - NTX793AA - PRI Integrated Services Access
 - NTX794AA - PRI CCS7 Interworking
- Any offices ordering NTX790AA in BCS-29 or earlier is to be upgraded to NTX790AB, NTX793AA, and NTX794AA in conjunction with their next scheduled BCS-30 or higher load.
- 2B1Q capabilities will be provided under the standard ISDN NTX750AB feature package.
- BCS-31 will enable the LCME to support only ISDN lines. BCS-32 will enable the LCME to support in addition to ISDN lines POTS, EBS, and DATAPATH lines.
- The software feature package needed to provide ISDN and MBS services for SMUI is NTX387AC.
- Check the appropriate SMS (Software Management System) report for availability and to confirm required supporting packages.
- For XPM+ the following packages are required in addition to other ISDN packages:
 - NTXR34AB XPM+ Basic (DMS 100)
 - NTXL79AA XPM+ for DTCI (DMS 250)
- Software support for the NT6X44CA Time Switch Circuit Pack provided in SMA modules will eventually be discontinued. The NT6X44CA will

RELEASE 06.03
13 July 1998

be replaced at that time by the NTAX78AB Enhanced Time Switch CP for all SMA applications. (The NT6X44AA was never used in SMA applications.) The NTAX78AB is required for TR303 feature and is used for new production.

- The NTAX78BA is being introduced into LGCI and LTCI (ISDN) North America Domestic frames and cabinets. for VO applications only . The Products affected are:
 - NT6X01AD (Current production version of domestic frame)
 - NT6X01AB (Manufactured Discontinued Domestic Frame)
 - NTRX36AB (Manufactured Discontinued Domestic Cabinet)
 - The NTAX78BA provides "Enhanced Capacity" with it's flexible Software selectable P-side port assignment. All 40 ports can be assigned to DS30A or DS-1. The NTAX78BA is fully backwards compatible with NT6X44AA, NT6X44AB, NT6X44CA, NT6X44EA and NTAX78AB timeswitch Circuit Packs.
 - The NTAX78BA requires specific SW loads to utilize the enhanced capacity features. For LGCI and LTCI, the minimum S/W load is NA10.

12.4.2 Software Usage Restrictions

- DTC/LGC/LTC
 - Peripheral Controller Modules SMS supports NT6X69AD with XPM+ with BCS36 and later. The NT6X40FB enhanced diagnostic functionality is available starting with XPM05+ software loads. NT6X40AD enhanced diagnostic functionality is available starting with XPM05+ software loads. Both CPs are backwards compatible with their previous versions, NT6X40FA and NT6X40AC, and can be used with earlier software releases, however, the enhanced diagnostic functionality would not be available.
- ISDN
 - The software development for 2B1Q will be done in two phases. In the first phase (BCS-31), the LCME will support only ISDN lines. In the second phase (BCS-32), the LCME will support in addition to ISDN lines POTS, EBS, and DATAPATH lines.
 - Software Packages NTX793AA and NTX794AA are provisioned based on customer requirements. For example, if an ISDN office does not support CCS7, the NTX794AA software package need not be ordered when the offices is being upgraded to BCS-30.
 - NOTE: Package NTX550AA - CCS7 - TRANSACTION SERVICE SUPPORT is needed in an ISDN office if CCS7 Interworking is to be available in that office.

RELEASE 06.03
13 July 1998

- BCS-31 MTU software load must be installed for a MTU to work with 2B1Q lines. If ALT (Automatic Loop Testing) is required, a dedicated MTU must have the ALTUSE field in MTAHORIZ table selected as YES. Any LTUs that have access to the LCMes on the MTA verticals must have the ALTUSE field selected as NO.
- The SMUI will not support E911 PSAP calls. An enhanced SMU may be distinguished from a non-ISDN/MBS SMU by the fact that it has a EISP provisioned on it in table LTCINV. The DMS-100 software will not allow a Public Safety Answering Point (PSAP) which is used for terminating E911 calls, to be provisioned on a SMU with a EISP provisioned on it. Also, a EISP will not be allowed to be provisioned on a SMU that has one or more PSAPs provisioned on it.
- The Analog Display Services Interface (ADSI) and the Spontaneous Call Waiting ID (SCWID) features of BCS-36+ require supporting modules to be equipped with Class Modem Resource Cps, Universal Tone Receiver Cps or Global Tone Receiver Cps, and the new NT6X69AD Protocol and Tone Cps. The NT6X69AD cannot be used in DMS-10 applications, or SMSR applications, or SMS with MP/SP with XPM03 or lower. SMS will support NT6X69AD with XPM+ with BCS-36 and later. XPM+ is NOT a requirement to support ADSI or SCWID in the frame or cabinet-mounted XPM modules.
- SMS
 - A maximum of six SLC-96 systems may be homed off a single SMS module due to a limitation in software. Variable "max_rt" in Table SMSTYPES is set at six, limiting the number of SLC-96s, regardless of the number of links per SLC-96 or the number of SMS ports available.
- SMA
 - A Maximum of two hundred forty (240) AccessNodes may be connected to a single DMS.
 - The DMS-100 TR-303 MVI will support Timeslot Management Channel (TMC) signaling protocol only. Common Signaling Channel (CSC) protocol is NOT supported.
 - For SMA MVI, there is a fundamental change in the use of the Line Equipment Number (LEN) in LNINV. With the introduction of third party RDTs, physical configuration of lines is no longer uniform and the LEN cannot directly represent the line card physical location. Therefore, the LEN represents the Call Reference Value (CRV) for a line.
- SMS-R
 - The NTXE38-- software package requires the NT6X78 CMR Circuit Pack to be provisioned in the RSC hosting the SMS-R. Refer to

RELEASE 06.03
13 July 1998

ECM-618 for rules covering the provisioning of the CMR Circuit Pack in the RSC.

- TMS/ETMS
 - When ordering DTC/LGC/LTC with XPM Plus and ISDN, TOPS0004 is not supported.
 - When ordering these peripherals LETB004 load must be ordered (for TOPS applications).

12.4.3 Memory Provisioning

| (Refer to FACET for provisioning.)
ISDN

- Memory provisioning for the DTCI, LGCI, LTCI, LCME is as follows:

Module	Data Store Datafill Words Required
DTCI	7 7
LGCI	1428
LTCI	1428

- Memory provisioning for the SMUI is as follows:
 - PS - 23KB
 - DS - 1.5 kwords
 - Datafill DS - 1.5 kwords

12.5 Real Time Impact

- In the U.S., refer to PRTCALC.
- In CANADA, for a detailed calculation of Peripheral Processor (PP) realtime, use the XPRT program. Refer to the latest issue of the Systems Engineering Letter (SEL) for details and operational instructions.
- SMU
 - The Master Processor (MP) will support 2.38 Call Attempts (CA) per second and the Signal Processor (SP) will support 2.20 CA per second. When 2.8 CA per second is reached, the processors are operating above the engineerable capacity level and using buffer space. This

RELEASE 06.03
13 July 1998

buffer space is non-engineerable and provides room for peakedness.

Calculation

$(CPOCC/100) \times 1000 = \text{ms per second of call processing available}$
 $CA \text{ per second} = (\text{ms per sec of call processing}) / \text{ms per CA}$

- CPOCC for both the MP and the SP are known factors as is the ms per CA. Reference SEB 88-01-001 "BCS 24 New Peripheral Processor Occupancy and per Call Timing Tables", January 5, 1988.
- Results
 - Master Processor (MP)
 - CPOCC = 67%
 - ms per call attempt: Orig = 189, Term = 92
 - Total ms per call attempt = 281
 - $(67/100) \times 1000 = 670$
 - $670/281 = 2.38 \text{ CA per sec}$
 - Signal Processor (SP)
 - CPOCC = 41%
 - ms per call attempt: Orig = 107, Term = 79
 - Total ms per call attempt = 186
 - $(41/100) \times 1000 = 410$
 - $410/186 = 2.208 \text{ CA per sec}$

12.5.1 Real Time Engineering (BRI)

- LGCI/LTCI Real Time Engineering (BRI)
- The following chart illustrates the call types which impact Real Time Engineering of the Master Processor in the LGCI provisioned with Basic Rate Interface (BRI). Currently, the Master Processor is the only processor which requires Real Time Engineering.

RELEASE 06.03
13 July 1998

Call Type	BCS 27	BCS 28+
ISDN Circuit Switched	Y	Y
B Channel Packet Switched	N	N
D Channel Packet Switched	N	N
Electronic Business Set	Y	Y
Datapath	Y	Y
Other (POTS and MDC)	N	Y

- Refer to System Engineering Bulletin (SEB) 90-05-002 for BCS Abbreviated Real Time Engineering Guidelines for the LGCI/LTCI.
- SMS
 - Figure 9 shows BCS-27 Processor Occupancies for Subscriber Module Carrier (SMS). The measurements in this table reflect SMSs with one (1) in-service Remote Terminal (RT). Adjustments must be made for every additional RT after the first.

Figure 9. BCS-27 Processor Occupancies / SMS

BCS-27 Processor Occupancies / SMS				
Master Processor	Percent Overhead	Percent Maint	Percent Buffer	Percent available for Call Processing
SMS	14	5	15	66 (2,376,000 ms/hr)
Signal Processor	Percent Overhead	Percent Maint	Percent Buffer	Percent available for Call Processing
SMS	7	3	7	18 (648,000 ms/hr)

- Refer to SEB: 88-11-003 for further information on Real Time.
- SMUI Real Time Call Attempt Capacity
 - The table below shows the maximum Calls Per Hour (CPH) that the SMUI can handle at the HDBH engineered maximum for each

RELEASE 06.03
13 July 1998

processor. The Master Processor is engineered to 80% and the Signal Processor is engineered to 90%. The processor that is limiting can vary with the call mix that is used by each particular site. Again, the CPH numbers represent Originations + Terminations. Each call mix assumes a 50/50 split of Originating/Terminating traffic.

	Master	Signal
POTS DT	15,100	14,900*
ISDN	7,100*	1 ,700
MBS	9,750*	1 ,976
* = Limiting Processor		

- Refer to System Engineering .*Bulletin (SEB) 92-05-002 Enhanced SMU Performance Guidelines for more detailed information on the SMUI.
- SMS-R
 - Real Time Engineering of the SMS-R entails doing Capacity Calculation of the SMS-R itself and the RSC which hosts the SMS-R. Manual calculation can be accomplished by using the calculation methodology detailed in SEB 86 10 003, "New Peripheral Manual Method for Capacity Determination/Verification" and the Processor Occupancies and Per Call Timings included in SEB 91 11 001, "BCS-33 Peripheral Processor Occupancy Allocations and Call Timing Tables." The manual calculation method has been mechanized in the Peripheral Real Time Calculation Tool "PRTCALC" Version 2F.

12.5.2 Real Time Engineering (PRI)

Refer to System Engineering Bulletin (SEB) 89-10-001 for PRI/BRI CC Real Time.

12.5.3 Unified Processor (XPM+)

The Unified Processor provides an improvement in RealTime capacity by a factor of approximately 1.6X compared to the previously provided MP/SP processor combination.

NORTHERN TELECOM

RELEASE 06.03
13 July 1998

PLN-8991-104

NORTHERN TELECOM

RELEASE 06.03
13 July 1998

PLN-8991-104

Chapter 5

LINE PERIPHERALS

THIS PAGE IS INTENTIONALLY LEFT BLANK

RELEASE 06.03
13 July 1998

LINE PERIPHERALS
Section Contents

1.0	ECM256 - LCM to LGC/LTC Link Assignments	5-1
1.1	Overview	5-1
1.2	Hardware Provisioning	5-1
1.2.1	Hardware Usage Restrictions	5-1
1.2.2	Hardware Dependencies	5-1
1.2.2.1	P and C Side Port Requirements	5-1
1.2.2.2	DMS BUS Port Requirements	5-1
1.2.2.3	Circuits Per Card	5-1
1.2.2.4	Discrimination Numbering	5-1
1.2.3	Provisioning Considerations	5-1
1.2.3.1	Current Assignment Rules For NT6X48AA in the LGC/LTC	5-1
1.2.3.2	New Assignment Rules for NT6X48AA in the LGC/LTC	5-3
1.2.4	Office Layout Information	5-4
1.2.5	Traffic Tables	5-4
1.3	Product/System Specification	5-4
1.3.1	Physical Characteristics	5-4
1.3.2	EMI/Earthquake Information	5-4
1.3.3	Sparing Information	5-4
1.3.4	Power Feed and Fusing Requirements	5-4
1.3.5	Current Drain Information	5-4
1.4	Software Provisioning	5-4
1.4.1	Required Software Packages and Interdependencies	5-4
1.4.2	Software Usage Restrictions	5-5
1.4.3	Memory Provisioning	5-5
1.5	Real Time Impact	5-5
2.0	ECM307 - International Type B Line Card, NT6X94AB	5-6
2.1	Overview	5-6
2.2	Hardware Provisioning	5-6
2.2.1	Hardware Usage Restrictions	5-6
2.2.2	Hardware Dependencies	5-6
2.2.2.1	P and C Side Port Requirements	5-6
2.2.2.2	DMS BUS Port Requirements	5-6
2.2.2.3	Circuits Per Card	5-6
2.2.2.4	Discrimination Numbering	5-7
2.2.3	Provisioning Considerations	5-7
2.2.4	Office Layout Information	5-7
2.2.5	Traffic Tables	5-7
2.3	Product/System Specification	5-7
2.3.1	Physical Characteristics	5-7
2.3.2	EMI/Earthquake Information	5-7
2.3.3	Sparing Information	5-7
2.3.4	Power Feed and Fusing Requirements	5-7
2.3.5	Current Drain Information	5-7
2.4	Software Provisioning	5-7
2.4.1	Required Software Packages and Interdependencies	5-7
2.4.2	Software Usage Restrictions	5-7

RELEASE 06.03

13 July 1998

2.4.3	Memory Provisioning	5-8
2.5	Real Time Impact	5-8
3.0	ECM461 - Meridian Cabinet Line Module - ISDN	5-9
3.1	Overview	5-9
3.2	Hardware Provisioning	5-9
3.2.1	Hardware Usage Restrictions	5-9
3.2.2	Hardware Dependencies	5-9
3.2.2.1	P and C Side Port Requirements	5-9
3.2.2.2	DMS BUS Port Requirements	5-9
3.2.2.3	Circuits Per Card	5-9
3.2.2.4	Discrimination Numbering	5-9
3.2.3	Provisioning Considerations	5-9
3.2.4	Office Layout Information	5-10
3.2.5	Traffic Tables	5-10
3.3	Product/System Specification	5-10
3.3.1	Physical Characteristics	5-10
3.3.2	EMI/Earthquake Information	5-10
3.3.3	Sparing Information	5-10
3.3.4	Power Feed and Fusing Requirements	5-10
3.3.5	Current Drain Information	5-11
3.4	Software Provisioning	5-11
3.4.1	Required Software Packages and Interdependencies	5-11
3.4.2	Software Usage Restrictions	5-11
3.4.3	Memory Provisioning	5-11
3.5	Real Time Impact	5-11
4.0	ECM489 - NTNX38CA MCLM-ENHANCED 2B1Q ISDN	5-12
4.1	Overview	5-12
4.1.1	EXTENDING A LCME WITH FIBER: (FLI)	5-12
4.1.2	EXTENDING A CUSTOM EMI REMOTE WITH MCLME	5-13
4.2	Hardware Provisioning	5-13
4.2.1	Hardware Usage Restrictions	5-13
4.2.2	Hardware Dependencies	5-13
4.2.2.1	P and C Side Port Requirements	5-13
4.2.2.2	DMS BUS Port Requirements	5-13
4.2.2.3	Circuits Per Card	5-14
4.2.2.4	Discrimination Numbering	5-14
4.2.3	Provisioning Considerations	5-14
4.2.3.1	ISDN 2B1Q Line Drawer	5-14
4.2.3.2	MERIDIAN CABINET LINE MODULE - ENHANCED ISDN (2B1Q)	5-14
4.2.3.3	EXTENDED FIBER INTERFACE FOR LCME	5-14
4.2.4	Office Layout Information	5-15
4.2.5	Traffic Tables	5-15
4.3	Product/System Specification	5-16
4.3.1	Physical Characteristics	5-16
4.3.2	EMI/Earthquake Information	5-16
4.3.3	Sparing Information	5-16
4.3.4	Power Feed and Fusing Requirements	5-16
4.3.5	Current Drain Information	5-17
4.4	Software Provisioning	5-17

RELEASE 06.03

13 July 1998

4.4.1	Required Software Packages and Interdependencies	5-17
4.4.2	Software Usage Restrictions	5-17
4.4.3	Memory Provisioning	5-17
4.5	Real Time Impact	5-17
5.0	ECM500 - PCM-30 Line Drawer (PLD)	5-18
5.1	Overview	5-18
5.2	Hardware Provisioning	5-18
5.2.1	Hardware Usage Restrictions	5-18
5.2.2	Hardware Dependencies	5-18
5.2.2.1	P and C Side Port Requirements	5-18
5.2.2.2	DMS BUS Port Requirements	5-18
5.2.2.3	Circuits Per Card	5-18
5.2.2.4	Discrimination Numbering	5-19
5.2.3	Provisioning Considerations	5-19
5.2.4	Office Layout Information	5-21
5.2.5	Traffic Tables	5-21
5.3	Product/System Specification	5-21
5.3.1	Physical Characteristics	5-21
5.3.2	EMI/Earthquake Information	5-21
5.3.3	Sparing Information	5-21
5.3.4	Power Feed and Fusing Requirements	5-21
5.3.5	Current Drain Information	5-21
5.4	Software Provisioning	5-21
5.4.1	Required Software Packages and Interdependencies	5-22
5.4.2	Software Usage Restrictions	5-22
5.4.3	Memory Provisioning	5-22
5.5	Real Time Impact	5-22
6.0	ECM536 - World Line Card Type B	5-23
6.1	Overview	5-23
6.2	Hardware Provisioning	5-23
6.2.1	Hardware Usage Restrictions	5-23
6.2.2	Hardware Dependencies	5-24
6.2.2.1	P and C Side Port Requirements	5-24
6.2.2.2	DMS BUS Port Requirements	5-24
6.2.2.3	Circuits Per Card	5-24
6.2.2.4	Discrimination Numbering	5-24
6.2.3	Provisioning Considerations	5-24
6.2.4	Office Layout Information	5-24
6.2.5	Traffic Tables	5-24
6.3	Product/System Specification	5-24
6.3.1	Physical Characteristics	5-24
6.3.2	Power Dissipation	5-24
6.3.3	EMI/Earthquake Information	5-25
6.3.4	Sparing Information	5-25
6.3.5	Power Feed and Fusing Requirements	5-25
6.3.6	Current Drain Information	5-25
6.4	Software Provisioning	5-25
6.4.1	Required Software Packages and Interdependencies	5-25
6.4.2	Software Usage Restrictions	5-26
6.4.3	Memory Provisioning	5-26

RELEASE 06.03

13 July 1998

	6.5	Real Time Impact	5-26
	7.0	ECM550 - Meridian Cabinet Line Module	5-27
	7.1	Overview	5-27
	7.1.1	EXTENDING A LCM WITH FIBER: (FLI)	5-27
	7.1.2	EXTENDING A CUSTOM EMI REMOTE WITH MCLM	5-27
	7.1.3	BROADBAND INTERNET ACCESS FROM AN MCLM CABINET	5-28
	7.2	Hardware Provisioning	5-28
	7.2.1	Hardware Usage Restrictions	5-28
	7.2.2	Hardware Dependencies	5-28
	7.2.2.1	P and C Side Port Requirements	5-29
	7.2.2.2	DMS BUS Port Requirements	5-29
	7.2.2.3	Circuits Per Card	5-29
	7.2.2.4	Discrimination Numbering	5-29
	7.2.3	Provisioning Considerations	5-29
	7.2.3.1	ISDN LINE DRAWER FOR REMOTES - ILDR (NT6X05DA)	5-29
	7.2.3.2	1 MEG MODEM SERVICE (1-MMS)	5-31
	7.2.3.3	MCLM Provisionable Line Cards	5-31
	7.2.3.4	EXTENDED FIBER INTERFACE FOR LCM	5-32
	7.2.4	Office Layout Information	5-33
	7.2.5	Traffic Tables	5-33
	7.3	Product/System Specification	5-33
	7.3.1	Physical Characteristics	5-33
	7.3.2	EMI/Earthquake Information	5-34
	7.3.3	Sparing Information	5-34
	7.3.4	Power Feed and Fusing Requirements	5-34
	7.3.5	Current Drain Information	5-34
	7.4	Software Provisioning	5-34
	7.4.1	Required Software Packages and Interdependencies	5-34
	7.4.2	Software Usage Restrictions	5-34
	7.4.3	Memory Provisioning	5-34
	7.5	Real Time Impact	5-34
	8.0	ECM619 - Building Block Engineering - LCE	5-35
	8.1	Overview	5-35
	8.1.1	NT6X03AA (Line Concentrating Equipment Frame)	5-35
	8.1.2	NTZZ41JA (Line Concentrating Equipment Frame)	5-35
	8.1.3	NTZZ08BD (Line Concentrating Module N. America)	5-35
	8.1.4	NTZZ43MB (Line Concentration Module Interna- tional)	5-36
	8.1.5	NTZZ41WT/XT/YT/ZT (Ringing Generators - Frames)	5-36
	8.1.6	NTZZ08EC (Cabinetized Line Concentrating Equip- ment)	5-36
	8.1.7	NTZZ08BC (Line Concentrating Module North Amer- ica)	5-36
	8.1.8	NTZZ08MB (Line Concentrating Module Interna- tional)	5-36
	8.1.9	NTZZ08FT/GT/HT/JT (Ringing Generators - Cabinet Sys)	5-37
	8.1.10	NT6X05DA (ISDN Line Drawer Remotes)	5-37
	8.2	Hardware Provisioning	5-38

RELEASE 06.03
13 July 1998

8.2.1	Hardware Usage Restrictions	5-38
8.2.2	Hardware Dependencies	5-39
8.2.2.1	P and C Side Port Requirements	5-39
8.2.2.2	DMS BUS Port Requirements	5-39
8.2.2.3	Circuits Per Card	5-39
8.2.2.4	Discrimination Numbering	5-39
8.2.3	Provisioning Considerations	5-39
8.2.3.1	Customer Questions	5-40
8.2.3.2	Calculations	5-40
8.2.4	Office Layout Information	5-40
8.2.5	Traffic Tables	5-40
8.3	Product/System Specification	5-40
8.3.1	Physical Characteristics	5-40
8.3.2	EMI/Earthquake Information	5-40
8.3.3	Sparing Information	5-41
8.3.4	Power Feed and Fusing Requirements	5-41
8.3.5	Current Drain Information	5-41
8.4	Software Provisioning	5-41
8.4.1	Required Software Packages and Interdependencies	5-41
8.4.2	Software Usage Restrictions	5-41
8.4.3	Memory Provisioning	5-42
8.5	Real Time Impact	5-42
9.0	ECM629 - NT6X17BA - World Line Card (WLC) Type A	5-43
9.1	Overview	5-43
9.2	Hardware Provisioning	5-44
9.2.1	Hardware Usage Restrictions	5-44
9.2.2	Hardware Dependencies	5-44
9.2.3	P and C Side Port Requirements	5-44
9.2.4	DMS BUS Port Requirements	5-44
9.2.5	Circuits Per Card	5-44
9.2.6	Discrimination Numbering	5-44
9.2.7	Provisioning Considerations	5-44
9.2.8	Office Layout Information	5-44
9.2.9	Traffic Tables	5-45
9.3	Product/System Specification	5-45
9.3.1	Physical Characteristics	5-45
9.3.2	POWER DISSIPATION	5-45
9.3.3	EMI/Earthquake Information	5-45
9.3.4	Sparing Information	5-45
9.3.5	Power Feed and Fusing Requirements	5-45
9.3.6	Current Drain Information	5-45
9.4	Software Provisioning	5-45
9.4.1	Required Software Packages and Interdependencies	5-46
9.4.2	Software Usage Restrictions	5-46
9.4.3	Memory Provisioning	5-46
9.5	Real Time Impact	5-46
10.0	ECM685 - Detailed/Bldg Block Engineering - ISDN LCE	5-47
10.1	Overview	5-47
10.2	Hardware Provisioning	5-55
10.2.1	Hardware Usage Restrictions	5-55

RELEASE 06.03
13 July 1998

10.2.2	Hardware Dependencies	5-55
10.2.2.1	P and C Side Port Requirements	5-55
10.2.2.2	DMS BUS Port Requirements	5-56
10.2.2.3	Circuits Per Card	5-56
10.2.2.4	Discrimination Numbering	5-56
10.2.3	Provisioning Considerations	5-56
10.2.3.1	LCEI Frames/Cabinets	5-56
10.2.3.2	LCEI Modules (LCME)	5-57
10.2.3.3	LCME Provisionable Line Cards	5-60
10.2.3.4	Terminal Provisioning	5-62
10.2.3.5	MTU for 2B1Q Lines on a LCME.	5-62
10.2.3.6	ISDN Line Concentrating Equipment Building Blocks	5-62
10.2.4	Office Layout Information	5-63
10.2.5	Traffic Tables	5-63
10.3	Product/System Specification	5-63
10.3.1	Physical Characteristics	5-63
10.3.1.1	Power Requirements	5-63
10.3.2	EMI/Earthquake Information	5-64
10.3.3	Sparing Information	5-64
10.3.4	Power Feed and Fusing Requirements	5-64
10.3.4.1	NTBX30AB - LCEI Frame Power Feed And Fusing Chart	5-64
10.3.4.2	NTRX30BA - Power Feed And Fusing Chart	5-65
10.3.5	Current Drain Information	5-66
10.4	Software Provisioning	5-67
10.4.1	Required Software Packages and Interdependen- cies	5-67
10.4.2	Software Usage Restrictions	5-67
10.4.3	Memory Provisioning	5-67
10.5	Real Time Impact	5-67
10.5.1.1	LCMI Real-Time Engineering	5-67
11.0	ECM722 - 1-Meg Modem Service (1-MMS)	5-69
11.1	Overview	5-69
11.1.1	System Architecture	5-70
11.1.2	1-Meg Modem	5-70
11.1.3	xLC and DBIC	5-71
11.1.4	x Element Manager System (xEMS)	5-71
11.1.5	Access Network	5-73
11.2	Hardware Provisioning	5-73
11.2.1	Hardware Usage Restrictions	5-73
11.2.1.1	Drawer Fill Restrictions	5-74
11.2.1.2	Ethernet Interface	5-75
11.2.1.3	1-Meg Modem	5-75
11.2.1.4	Access Network	5-75
11.2.2	Hardware Dependencies	5-75
11.2.2.1	P and C Side Port Requirements	5-76
11.2.2.2	DMS BUS Port Requirements	5-76
11.2.2.3	Circuits Per Card	5-76
11.2.2.4	Discrimination Numbering	5-76
11.2.3	Provisioning Considerations	5-76

RELEASE 06.03

13 July 1998

11.2.3.1	Customer Responsibility For Access	
	Network	5-77
11.2.4	Office Layout Information	5-78
11.2.5	Traffic Tables	5-78
11.3	Product/System Specification	5-78
11.3.1	Physical Characteristics	5-78
11.3.2	EMI/Earthquake Information	5-79
	11.3.2.1 EMC/EMI Conditions	5-79
	11.3.2.2 Seismic Conditions	5-80
	11.3.2.3 Environmental Conditions	5-80
	11.3.2.4 ESD/RF Immunity	5-80
11.3.3	Sparing Information	5-81
11.3.4	Power Feed and Fusing Requirements	5-81
11.3.5	Current Drain Information	5-82
11.4	Software Provisioning	5-82
11.4.1	Required Software Packages and Interdependen-	
	cies	5-82
11.4.2	Software Usage Restrictions	5-83
11.4.3	Memory Provisioning	5-83
11.5	Real Time Impact	5-83

THIS PAGE IS INTENTIONALLY LEFT BLANK

1.0 ECM256 - LCM to LGC/LTC Link Assignments

1.1 Overview

1.2 Hardware Provisioning

1.2.1 Hardware Usage Restrictions

Not applicable.

1.2.2 Hardware Dependencies

Not applicable.

1.2.2.1 P and C Side Port Requirements

Not applicable.

1.2.2.2 DMS BUS Port Requirements

Not applicable

1.2.2.3 Circuits Per Card

Not applicable.

1.2.2.4 Discrimination Numbering

Not applicable.

1.2.3 Provisioning Considerations

1.2.3.1 Current Assignment Rules For NT6X48AA in the LGC/LTC

The current assignment rules are such that when there are up to ten (10) DS-30A ports (links) from LCM's, then one pair of NT6X48AA cards, DS-30A LCM Interface CP, is required to be mounted on an LGC/LTC module. One (1) NT6X48AA card is assigned to slot position six (6) of LGA/LTA 0 (lower shelf within the module) and the other NT6X48AA is assigned to slot position six (6) of LGA/LTA 1 (upper shelf within the module).

When more than ten (10) and up to twenty (20) DS-30A links from LCM's will be terminating onto an LGC/LTC, then two pairs of NT6X48AA cards are required to be mounted on the LGC/LTC. The first pair of NT6X48AA cards is assigned as outlined above. The second pair of NT6X48AA cards is assigned to slot position seven (7) in a manner similar to the first pair.

The following table illustrates how the DS-30A ports are laid out on the DS-30A LCM Interface CP, NT6X48AA:

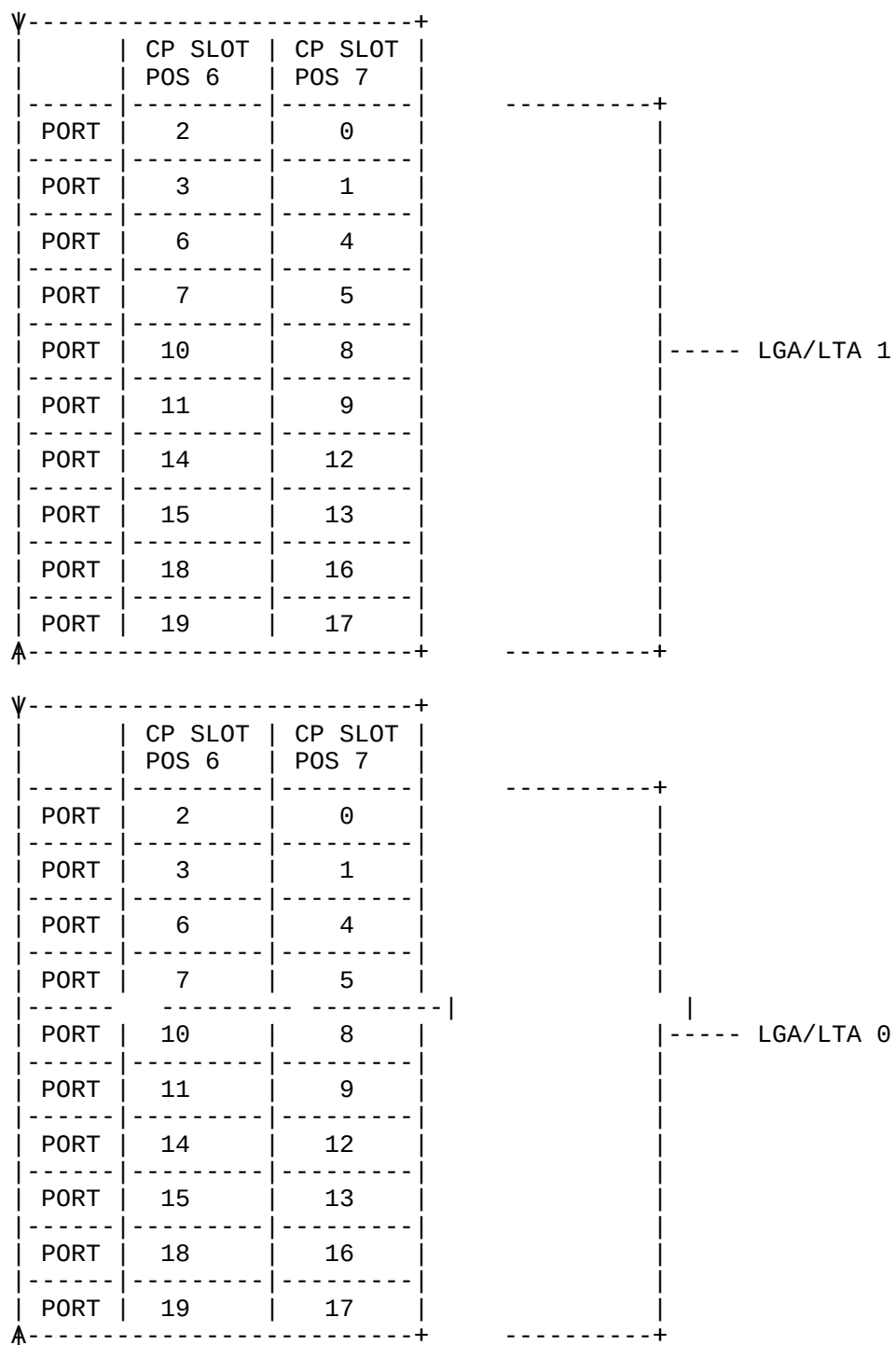


Figure 1. DS-30A Ports on the DS-30A Interface CP.

RELEASE 06.03
13 July 1998

The ports from each LCM are assigned to the NT6X48AA cards in slot six (6) in the existing prescribed manner. The assignment of DS-30A ports starts with port 19 and follows the sequence 19, 18, 15, 14, 11, 10, 7, 6, 3, and 2.

Once all ten (10) DS-30A ports are assigned, the additional DS-30A ports from LCM's are assigned to the second pair of NT6X48AA cards in slot seven (7) in the existing prescribed manner. The assignment of DS-30A ports starts with port 17 and follows the sequence 17, 16, 13, 12, 9, 8, 5, 4, 1, and 0.

1.2.3.2 New Assignment Rules for NT6X48AA in the LGC/LTC

| For LGC/LTC's equipped with one (1) pair of DS-30A LCM Interface CP in
| the module (i.e. in card slot 06 only) the port/circuits must start
| and follow the sequence 19, 18, 15, 14, 11, 1, 7, 6, 3, and 2.

| In the event of a later installation of a second pair of DS30A LCM
| Interface CP, the port/circuits must be reconfigured to spread the
| port/circuits across both pairs of CP.

| For LGC/LTC, equipped with two (2) pairs of DS-30A LCM Interface
| CP in the module (i.e. in card slots 06 and 07) the port/circuits
| must start and follow the sequence 19, 17, 18, 16, 15, 13, 14, 12,
| 11, 9, 1, 8, 7, 5, 6, 4, 3, 1, 2 and 0. LGC/LTC DS30A ports that
| are assigned to LCM are to be picked from this block of ports
| (circuits). Then assign the DS-1 interface CP in the module.

| This rule is critical in LGC/LTC that have fewer than 16 network
| ports and in addition one of the following applies:

- | - 18 or less than 18 DS-1 ports (circuits) are used for
| digital trunking
- | - 18 or less than 18 DS-1 ports (circuits) are used for RSC
- | - 18 or less than 18 DS-1 ports (circuits) are used for RSC
| and for digital trunking.

| For initial offices, always provide two (2) pairs of NT6X48AA cards
| and perform the assignment sequence as noted above where two (2)
| pairs of NT6X48AA cards are required.

RELEASE 06.03
13 July 1998

| When an existing office already has one (1) pair of NT6X48AA cards
| and an additional pair is required as part of an extension job,
| perform the assignment sequence as detailed above for LGC/LTC
| equipped with two () pairs of DS-30A LCM Interface CP.

| The above new assignment rules for the NT6X48AA card in the LGC/LTC
| module shall be applied to new jobs immediately and to existing
| jobs on a next time in basis.

| 1.2.4 Office Layout Information

| Not applicable.

| 1.2.5 Traffic Tables

| Not applicable.

| 1.3 Product/System Specification

| 1.3.1 Physical Characteristics

| Not applicable.

| 1.3.2 EMI/Earthquake Information

| Not applicable.

| 1.3.3 Sparing Information

| Not applicable.

| 1.3.4 Power Feed and Fusing Requirements

| Not applicable.

| 1.3.5 Current Drain Information

| Not applicable.

| 1.4 Software Provisioning

| For NTX software packages to PLC/SOC mappings for CSP02 and
| beyond refer to ECM552 - Mapping of NTX/NTG Package to
| PCL/NCL/Option.

| 1.4.1 Required Software Packages and Interdependencies

| Not applicable.

| 1.4.2 Software Usage Restrictions

| Not applicable.

| 1.4.3 Memory Provisioning

| Not applicable.

| 1.5 Real Time Impact

| Not applicable.

RELEASE 06.03
13 July 1998

2.0 ECM307 - International Type B Line Card, NT6X94AB

2.1 Overview

The NT6X94AA Type B Line Card is being replaced by the NT6X94AB Type B Line Card. The NT6X94AB line card has an RTS date of wk 30/87. All jobs that 'D' after this date should order NT6X94AB instead of NT6X94AA.

There are two major improvements incorporated into the NT6X94AB Type B Line Card.

1. The NT6X94AB line card provides loop isolation for metering tests. Therefore, this line card will not increment the subscriber premise meter while diagnostics are being performed.
2. The heat dissipation of the NT6X94AB line card has been reduced. The current restriction of maximum 10% type B line cards per line drawer is no longer in effect for the NT6X94AB Type B Line Card. However, it is still strongly recommended that the type B line cards be spread evenly across the office to a maximum of 20% population per line drawer. This will result in increased reliability.

2.2 Hardware Provisioning

2.2.1 Hardware Usage Restrictions

Not applicable.

2.2.2 Hardware Dependencies

Not applicable.

2.2.2.1 P and C Side Port Requirements

Not applicable.

2.2.2.2 DMS BUS Port Requirements

Not applicable

2.2.2.3 Circuits Per Card

Not applicable.

RELEASE 06.03
13 July 1998

- | 2.2.2.4 Discrimination Numbering
- | Not applicable.
- | 2.2.3 Provisioning Considerations
- | Not applicable.
- | 2.2.4 Office Layout Information
- | Not applicable.
- | 2.2.5 Traffic Tables
- | Not applicable.
- | 2.3 Product/System Specification
- | 2.3.1 Physical Characteristics
- | Not applicable.
- | 2.3.2 EMI/Earthquake Information
- | Not applicable.
- | 2.3.3 Sparing Information
- | Not applicable.
- | 2.3.4 Power Feed and Fusing Requirements
- | Not applicable.
- | 2.3.5 Current Drain Information
- | Not applicable.
- | 2.4 Software Provisioning
- | For NTX software packages to PLC/SOC mappings for CSP02 and beyond
| refer to ECM552 - Mapping of NTX/NTG Package to PCL/NCL/Option.
- | 2.4.1 Required Software Packages and Interdependencies
- | The NT6X94AB requires BCS22 software to support it.
- | 2.4.2 Software Usage Restrictions
- | Not applicable.

| 2.4.3 Memory Provisioning

| Not applicable.

| 2.5 Real Time Impact

| Not applicable.

RELEASE 06.03
13 July 1998

3.0 ECM461 - Meridian Cabinet Line Module - ISDN

3.1 Overview

The Meridian Cabinet Line Module (MCLM-ISDN) is the latest in the series of cabinet products in the MSL100 product line.

The MCLM-ISDN is a cabinet which houses two (2) dual shelf LCMI modules. Each module houses eight line drawers each of which can support forty-eight line cards with 384 slots per LCMI and 768 slots per MCLM-ISDN. The primary function of the MCLM-ISDN is to support ISDN line cards, however, standard line cards are also supported.

The Verification Office URT0/URTS date is week 40/89 at BCS29 using the "AMI" (Alternate Marking Inversion coding) ISDN line drawer. The 2B1Q line drawer is projected to be available at BCS31.

3.2 Hardware Provisioning

3.2.1 Hardware Usage Restrictions

Refer to ECM 418 Integrated Services Digital Network (ISDN).

3.2.2 Hardware Dependencies

The MCLM-ISDN houses two (2) LCMI modules. Each module can have 2 - 18 DS30A links to a Common Peripheral Controller-ISDN. Also, refer to ECM 418 Integrated Services Digital Network (ISDN).

3.2.2.1 P and C Side Port Requirements

Not applicable

3.2.2.2 DMS BUS Port Requirements

Not applicable

3.2.2.3 Circuits Per Card

Not applicable

3.2.2.4 Discrimination Numbering

Not applicable

3.2.3 Provisioning Considerations

Refer to ECM 418 Integrated Services Digital Network (ISDN).

RELEASE 06.03
13 July 1998

3.2.4 Office Layout Information

Refer to NTP 555-4001-103 Meridian SL100 Cabinetized

3.2.5 Traffic Tables

Refer to ECM 413 ISDN Traffic Provisioning

3.3 Product/System Specification

3.3.1 Physical Characteristics

Not applicable.

3.3.2 EMI/Earthquake Information

NTP 555-4001-103 Meridian SL100 Cabinetized
Section 2-1 EARTHQUAKE CONSIDERATIONS

3.3.3 Sparing Information

ISDN circuit pack sparing is based on such factors as turn-around time, geographic location of depot and ISDN cabinets, and the amount of equipment concentrated at a single location.

As a rule of thumb, provision as spare a minimum of one of each ISDN circuit pack, up to a maximum of 10% of the total count of that item.

3.3.4 Power Feed and Fusing Requirements

VOLTAGE LIMITS:

POTENTIAL: -48V RANGE: -42.5V TO -55.8V

FUSING REQUIREMENTS

FSP:

DESIG	AMP	POTENTIAL	ONE PER
-----	---	-----	-----
CB1	20	-48V(A)	SHELF 05
CB2	20	-48V(A)	SHELF 19
CB3	20	-48V(B)	SHELF 33
CB4	20	-48V(B)	SHELF 47
CB5	10	-48V(A)	RG-0
CB6	10	-48V(B)	RG-1
F01	2.0	-48V(A)	UPPER CU
F02	2.0	-48V(B)	UPPER CU
F03	3.0	-48V(A)	LOWER CU
F04	3.0	-48V(B)	LOWER CU
F05		-48V(A)	SPARE
F06		-48V(B)	SPARE

RELEASE 06.03
13 July 1998

F07		-48V(A)	NOT USED
F08		-48V(B)	NOT USED
F09	1 1/3	-48V	FRAME FAIL, UPPER FAIL L
F10	1 1/3	-48V	ALARM CARDS
F11	1 1/3	-48V	FAN ALARM
F12	1 1/3	-48V ABS	ABS JACKS
F13	1 1/3	-48V ABS	FAN FAIL
F14		-48V ABS	SPARE
F15		-48V ABS	SPARE
F16	1 1/3	-48V ABS	FRAME FAIL LAMP

3.3.5 Current Drain Information

The current drain per cabinet is as follows:

MCLM-ISDN NTNX38BA 30.0 AMPS

3.4 Software Provisioning

For NTX software packages to PLC/SOC mappings for CSP02 and beyond refer to ECM552 - Mapping of NTX/NTG Package to PCL/NCL/Option.

3.4.1 Required Software Packages and Interdependencies

Refer to ECM 418 Integrated Services Digital Network (ISDN)

3.4.2 Software Usage Restrictions

Refer to ECM 418 Integrated Services Digital Network (ISDN)

3.4.3 Memory Provisioning

Refer to ECM 418 Integrated Services Digital Network (ISDN)

3.5 Real Time Impact

Refer to ECM 418 Integrated Services Digital Network (ISDN)

RELEASE 06.03
13 July 1998

4.0 ECM489 - NTN38CA MCLM-ENHANCED 2B1Q ISDN

4.1 Overview

This ECM details provisioning rules and configuration assignments for the ISDN 2B1Q LCME hardware on the NTN38CA MCLM Enhanced cabinet.

The ISDN 2B1Q Access Subsystem supports the American National Standards Institute (ANSI) standard ISDN 2B1Q (Two Binary, One Quaternary) U-Loop Interface. The 2B1Q Access Subsystem, LCME, will be subtended from a MSL100 LTCI/LGCI OR MCRM-I/RCCI peripheral. It will provide access for most existing LCM line types plus ISDN 2B1Q U and S/T line types.

The ISDN 2B1Q Access Subsystem will offer the North American Standardized 2B1Q U-Loop ISDN Basic Rate Access (BRA) from an enhanced capacity ISDN LCM (LCME). It will continue to offer EBS (P-Phones), Datapath, S/T ISDN and POTS services. The 2B1Q (2 Binary, 1 Quaternary) Access Subsystem will not support the AMI line card.

The ISDN 2B1Q line equipment will be used in both host and remote locations.

4.1.1 EXTENDING A LCME WITH FIBER: (FLI)

The LCME can be extended from the Host switch and/or Remote Switching Center with OEM units.

The FLI components typically will be provided to the customer by Nortel's Distributor channels & will NOT be engineered by Nortel. It is imperative to provide this information assuring the engineering cabling considerations of this equipment integrated in the MSL-100 configuration.

The Fiber LCME Interface (FLI) components allows the LCME module(s) to be located 6 miles from the host or remote switch controller. Special low loss cable & high quality splices extend the distance as far as 15 Miles. The FLI units have drivers that regenerate the signal and are transparent to the functionality of the MSL-100.

The FLI system consist of a host side FLI (OEM unit) and an LCME side FLI (OEM unit).

* The Host side FLI unit converts the DS30A links from a single controller (LTC/LGC/RCC) into a fiber optic link.

* The LCME remote side FLI unit converts the fiber optic link into the normal DS30A links from the MSL-100 controller.

RELEASE 06.03
13 July 1998

The standard cabling (45 ft DS30A cable) normally provisioned for an MSL-100 controller to the LCME still applies. However, the amount of DS30A cabling normally provided is DOUBLED; (1) set of cables for the host FLI & () set for the LCME remote side.

4.1.2 EXTENDING A CUSTOM EMI REMOTE WITH MCLME

The MSL-100 Remote Migration Strategy is aimed at moving our customer installed base to a new applications platform made up of the MSL Cabinetized hardware and CSP based software.

Current feature requests have driven the current SL-100 Remote platforms beyond the point of supporting the myriad of product types and configurations existing on installed base customers. The MSL-100 Remote Migration Strategy enables extension growth paths utilizing the SONET technology portfolio. This strategy minimizes hardware requirements, thereby reducing support cost and hardware sustaining cost.

The MSL-100 installed base of remote Custom EMI hardware platforms can migrate to the SONET MSL-100 Cabinetized technology when new features are required with this strategy.

This strategy also enables line extension activities on the customer installed base to utilize the MSL-100 Cabinetized portfolio.

4.2 Hardware Provisioning

4.2.1 Hardware Usage Restrictions

The ISDN 2B1Q line drawer will not support AMI line cards.

No mixing of NTB32BA and NTB32AA line drawers allowed within an ISDN LCME module.

4.2.2 Hardware Dependencies

The software development for 2B1Q will be done in two phases. In the first phase (BCS31), the LCME will support only ISDN lines. In the second phase (BCS32), the LCME will support ISDN lines in addition to POTS, EBS and Datapath lines.

4.2.2.1 P and C Side Port Requirements

Not applicable.

4.2.2.2 DMS BUS Port Requirements

Not applicable.

RELEASE 06.03
13 July 1998

4.2.2.3 Circuits Per Card

Not applicable.

4.2.2.4 Discrimination Numbering

Not applicable.

4.2.3 Provisioning Considerations

4.2.3.1 ISDN 2B1Q Line Drawer

Refer to ECM 418 Integrated Services Digital Network (ISDN).

4.2.3.2 MERIDIAN CABINET LINE MODULE - ENHANCED ISDN (2B1Q)

The new MCLM-Enhanced ISDN cabinet houses two dual-shelf LCME modules using 2B1Q ISDN technology. The number assigned to each LCME must be unique. The individual modules in a cabinet are numbered from the bottom up.

There are eight (8) line drawers per LCME with a maximum of eighteen (18) DS30A links per LCME.

Each line drawer is divided into two (2) logical drawers or subgroups. The individual logical subgroup in a line drawer will number from the bottom up; starting at subgroup 0 at the first line drawer (Line Drawer 0) and continuing, in sequential order, up to subgroup 15 (at the top of Line Drawer 7).

4.2.3.3 EXTENDED FIBER INTERFACE FOR LCME

The cabling currently documented for the LCME will provide the FLI connectivity. The FLI cable diagram is illustrated in Figure 2 on page 5-15. Refer to the diagram to see how the connections are made for the FLI. The DS30A cables will be provisioned in the same manner, adhering to the same distance restriction as if co-located at the host, (i.e. 45 ft. on either side of the FLI unit). The FLI has signal drivers that boost the signal. The FLI system supports two external alarm contacts. Individual scan point connections on the local FLI pack notify the MSL-100 system of failures in remote LCMEs, power supplies, or fiber link equipment. An external closure is provided at the remote end.

All the stated switch interfaces to the FLI unit remain the same regardless of the type of FLI configuration, i.e. single-mode, multi-mode, single or double density.



Refer to NTP 555-4001-103 Meridian SL100 Cabinetized

The traffic engineering rules for the ISDN LCME will be based on the provisioning of the DS-30A links to the LTCI/LGCI/RCCI. These rules are under investigation by Northern Telecom System Engineers.

Page 5-15

RELEASE 06.03
13 July 1998

4.3 Product/System Specification

4.3.1 Physical Characteristics

Refer to ECM 418 for LCME module and 2B1Q line drawer information.

Refer to NTP 555-4001-103 Meridian SL100 Cabinetized for mechanical dimensions of cabinet.

4.3.2 EMI/Earthquake Information

Refer to NTP 555-4001-103.

The MSL-100 Remote Migration Strategy provides a migration plan for existing Custom EMI hardware platforms to the MSL-100 Cabinetized technology. This strategy provides EMI components between the MSL cabinet(s) to Custom EMI frames.

4.3.3 Sparing Information

Refer to 418 Integrated Services Digital Network (ISDN)

The following circuit packs are always provided (AP) with higher level PECs, but should be considered for spares list.

AP with NTB32BA 2B1Q Line Drawer:
NTB36BA LCME Bus I/F Card (BIC)
NTB71AA Drawer Power Supply Card (PUPS)

AP with NTN26LA FSP:
NT636AA FSP Alarm CP
NT636AB FSP Alarm CP

4.3.4 Power Feed and Fusing Requirements

Desig		AMP	Potential	One	Per
CB1	20	-48V(A)	Shelf 05		
CB2	20	-48V(A)	Shelf 19		
CB3	20	-48V(B)	Shelf 33		
CB4	20	-48V(B)	Shelf 47		
CB5	10	-48V(A)	RG-0		
CB6	10	-48V(B)	RG-1f 05		
F01	2.0	-48V(A)	UPPER C.U.		
F02	2.0	-48V(B)	UPPER C.U.		
F03	3.0	-48V(A)	LOWER C.U.		
F04	3.0	-48V(B)	LOWER C.U.		
F05		-48V(A)	SPARE		
F06		-48V(B)	SPARE		
F07		-48V(A)	NOT USED		
F08		-48V(B)	NOT USED		

RELEASE 06.03
13 July 1998

F09	1-1/3	-48V	FRAME FAIL UPPER FAN FAIL LAMP
F10	1-1/3	-48V	ALM CARDS
F11	1-1/3	-48V	FAN ALARM
F12	1-1/3	-48V ABS	ABS JACKS
F13	1-1/3	-48V ABS	CD01 ALM CARD
F14		-48V ABS	SPARE
F15		-48V ABS	SPARE
F16	1-1/3	-48V ABS	FRAME FAIL LAMP

VOLTAGE LIMITS

POTENTIAL -48V
RANGE -42.5V TO -55.8V

4.3.5 Current Drain Information

Not applicable.

4.4 Software Provisioning

For NTX software packages to PLC/SOC mappings for CSP02 and beyond refer to ECM552 - Mapping of NTX/NTG Package to PCL/NCL/Option.

4.4.1 Required Software Packages and Interdependencies

Refer to ECM 418 Integrated Services Digital Network (ISDN).

BCS31 will enable the LCME to support only ISDN lines. BCS32 will enable the LCME to support POTS, EBS and Datapath, in addition to ISDN lines.

4.4.2 Software Usage Restrictions

None

4.4.3 Memory Provisioning

No new rules.

4.5 Real Time Impact

Refer to ECM 418 Integrated Services Digital Network (ISDN).

RELEASE 06.03
13 July 1998

5.0 ECM500 - PCM-30 Line Drawer (PLD)

5.1 Overview

In the United Kingdom (UK), Mercury Communications Limited (MCL) has defined a standard for POTS line interface multiplexors which is supported on the trunk side of the DMS-250 switch. This configuration is limited to small applications because each customer must be assigned a dedicated trunk group for billing purposes, and there is a maximum of 2048 trunk groups per DMS.

An alternative configuration is provided by the PCM-30 Line Drawer, which offers two PCM-30 2.048 Mbit/sec interfaces for connecting Type 1 Mercury Exchange Line Multiplexor (MEL MUX) equipment. This equipment is used by Mercury Communications Limited in the UK to interface POTS subscribers. A total of 6 digital lines per drawer can be connected via the two PCM-30 links. MEL Loop Calling and MEL Earth Calling signaling protocols are supported. Since the subscribers are treated as normal line appearances, the trunk group limitation does not apply.

The configuration consists of an NT6X05CA PCM-30 Line Drawer (PLD) with one always provided NT6X54AC PLD Bus Interface Card (BIC) and one always provided NT6X27CA PCM-30 Interface Card (PIC). The PIC provides two ports for direct termination of the PCM-30 links.

PCM-30 Line Drawers may be assigned to the PRLCM or host ILCM in any combination with standard line drawers.

5.2 Hardware Provisioning

5.2.1 Hardware Usage Restrictions

Not applicable.

5.2.2 Hardware Dependencies

Not applicable.

5.2.2.1 P and C Side Port Requirements

Not applicable.

5.2.2.2 DMS BUS Port Requirements

Not applicable

5.2.2.3 Circuits Per Card

Not applicable.

RELEASE 06.03
13 July 1998

5.2.2.4 Discrimination Numbering

5.2.3 Provisioning Considerations

When the PCM-30 Line Drawer (PLD) is used by Mercury in the UK in the NT6X03AA ILCE frame:

- The North American NT6X04AB Common CP is to be used (and not the International NT6X04BB Common CP), and
- Two (2) Ringing Generators per ILCE frame must be provided even when the ILCE frame is equipped only with PLDs.

The PLD employs the ILCM to effect economic concentration of line traffic. If the level of traffic per line is sufficiently high, it is more economical to connect the PCM-30 links directly to an IDTC, which does not employ any concentration. The total number of lines allowed in this configuration is limited by the fact that one trunk group is required per line for billing purposes, and a maximum of 2048 trunk groups are allowed in the DMS switch. The initial estimate based on economic considerations is as follows: If total traffic from the MEL MUX exceeds 270 CCS per PCM-30 link, assign the PCM-30 links to IDTC, subject to the total line quantity restriction (048). Otherwise, assign the links to PCM-30 Line Drawers.

Further, it is assumed that individual MEL MUX sites will be relatively small and therefore it will not be feasible to forecast line growth and traffic levels with accuracy. On the basis of this assumption, each PCM-30 link shall be treated as 3 traffic sources each offering busy hour traffic at the maximum economic level mentioned above; that is, 9 CCS per line.

Provision one (1) PCM-30 link per thirty (30) subscribers homing on a MEL MUX. Provision one (1) NT6X05CA PCM-30 Line Drawer for every two (2) PCM-30 links; the NT6X27CA PCM-30 Interface Card and NT6X54CA PLD Bus Interface Card are always provided with the line drawer. Assign the line drawer to the PRLCM or host ILCM as required.

Telcos often fully equip the ILCMs with line drawers. Where there are two types of line drawer (regular and PCM-30) to choose from, it is recommended to maintain the same ratio of drawer types across all ILCMs, while maximizing the traffic on each ILCM. To determine the optimum configuration and calculate the ILCM links, use the following method:

A = Total number of non-PCM-30 line drawers

To calculate this value use standard methods based on line card slot width and 64 slots per drawer. If using the Credit

RELEASE 06.03

13 July 1998

| System (ECM350), this value is computed by dividing step A3.2
| by 64 and rounding up.

| B = Total number of line drawers

| = A + Number of PLD

| C = Total number of ILCM

| = B / 10 (round up)

| D = Number of non-PCM-30 line drawers per ILCM

| = A / C (do NOT round up or down yet)

| E = Average line traffic (not including MEL MUXs)

| Using standard methods, calculate this value by summing the
| components of local line traffic (POTS, MDC, Datapath,
| DIALAN, etc.) and dividing by the number of lines. If using
| the Credit System (ECM350), this value is calculated in step
| A6.1.

| F = Average line drawer traffic (non-PCM-30)

| = E * 64

| G = Actual number of non-PCM-30 line drawers per ILCM

| If F is greater than or equal to 540, round up the value
| calculated in step D (maximum 9); otherwise, round it down
| (minimum 1). Call the rounded value "G".

| Note that the number 540 represents the economic level of
| traffic assumed for MEL MUX lines; that is, 9 CCS per line *
| 30 lines per PCM-30 link * 2 links per drawer. This step
| maximizes the traffic carried per ILCM.

| H = Number of PCM-30 line drawers per ILCM

| = 10 - G

| J = Traffic carried per ILCM

| = (F * G) + (540 * H)

| K = Number of links per ILCM

| This is computed using standard ILCM Carried Traffic Capacity
| tables, using the value in step J and the required Grade of
| Service. The value in step E is to be used when selecting

RELEASE 06.03
13 July 1998

from multiple tables partitioned based on CCS/line. If using the Credit System (ECM350), see step A7.1.

5.2.4 Office Layout Information

Not applicable.

5.2.5 Traffic Tables

Standard LCM Carried Traffic Capacity tables are used. Refer to ECM350.

5.3 Product/System Specification

5.3.1 Physical Characteristics

The line drawer equipped with NT6X27CA and NT6X54CA cards requires 0.5 Amps from the +5 VDC supply and 0.5 Amps from the +15 VDC supply (maximum); that is, a total of 10 watts maximum. Maximum power dissipation is 34.1 BTU/hr.

The NT6X27CA and NT6X54CA are each equivalent in size to a four (4) slot line card.

5.3.2 EMI/Earthquake Information

Not applicable.

5.3.3 Sparing Information

Minimum Mean Time Between Failure (MTBF) figures are as follows:

NT6X27CA - 40 years

NT6X54CA - 60 years

5.3.4 Power Feed and Fusing Requirements

Not applicable.

5.3.5 Current Drain Information

Not applicable.

5.4 Software Provisioning

For NTX software packages to PLC/SOC mappings for CSP02 and beyond refer to ECM552 - Mapping of NTX/NTG Package to PCL/NCL/Option.

Provide the following software package when the PCM-30 Line Drawer is equipped:

RELEASE 06.03
13 July 1998

| NTXK00AA PCM30 LINE DRAWER

| 5.4.1 Required Software Packages and Interdependencies

| Not applicable

| 5.4.2 Software Usage Restrictions

| None.

| 5.4.3 Memory Provisioning

| The PCM-30 Line Drawer feature does not impact memory re-
| quirements.

| 5.5 Real Time Impact

| There is no call processing impact resulting from the PCM30
| Line Drawer feature.

RELEASE 06.03
13 July 1998

6.0 ECM536 - World Line Card Type B

6.1 Overview

The World Line Card (WLC) is a universal type B line card introduced to replace domestic and international type B line cards. The cards it replaces are:

- NT6X33AA - Japan Type A
- NT6X94AB - Turkey, Belize and Guyana
- NT6X94BB - Carribean
- NT6X94CA - China
- NT6X93DA - Morocco
- NT6X18AA - North America

The World Line Card (WLC) Type B simplifies engineering by replaces many line card types. This is accomplished by combining the characteristics of many line cards in one card type.

The WLC has software selectable loop current limit characteristics and software selectable automatic loss equalization. The card is capable of adjusting to a wide variety of input and balance impedances. This capability gives the WLC type B the capability of being used in many market areas having diverse line characteristics throughout the world.

The WLC is designed to work in the LCM, LCME, LCMI, ILCM, RLCM, OPM, SRU, RSC, RSCI, SRSC, XLCM and LCM peripherals.

The WLC works with both DTMF and DP units. It is compatible with CLASS/CMS signalling and MTU equipment. It also has electronic overvoltage protection to improve its robustness in hostile environments.

Compared with the the line cards it replaces, the WLC has increased reliability due to reduced component count and lower operating temperature and lower power consumption.

6.2 Hardware Provisioning

6.2.1 Hardware Usage Restrictions

Not applicable.

| 6.2.2 Hardware Dependencies

| Not applicable.

| 6.2.2.1 P and C Side Port Requirements

| Not applicable.

| 6.2.2.2 DMS BUS Port Requirements

| Not applicable.

| 6.2.2.3 Circuits Per Card

| Not applicable.

| 6.2.2.4 Discrimination Numbering

| Not applicable.

| 6.2.3 Provisioning Considerations

| The World Line Card Type B may be accommodated by any of the fol-
| lowing line drawers:

- | • Line Drawer (Domestic)
- | • ISDN Line Drawer
- | • ISDN Enhanced Line Drawer
- | • Line Drawer (International)

| 6.2.4 Office Layout Information

| Not applicable.

| 6.2.5 Traffic Tables

| Not applicable.

| 6.3 Product/System Specification

| 6.3.1 Physical Characteristics

| 6.3.2 Power Dissipation

RELEASE 06.03
13 July 1998

The power dissipation of a fully loaded LCM frame (1280 lines) with WLC Type B given below:

Power Dissipation (W)		
No of Active	40 mA CL	75 mA CL
0	210	210
107 (3 CCS)	430	541
284 (8 CCS)	790	1087

Figure 3. LCM Power Dissipation w/WLC Type B

The estimated temperature rise of a fully loaded LCM will not exceed 17.5 degrees Celsius with 40 mA current limit and 21.5 degrees Celsius with 75 mA current limit selected.

6.3.3 EMI/Earthquake Information

Not applicable.

6.3.4 Sparing Information

World line Card Type B has a Mean Time Between Failure (MTBF) of 1,300 years at an operating temperature of 40 degrees Celsius.

6.3.5 Power Feed and Fusing Requirements

6.3.6 Current Drain Information

6.4 Software Provisioning

For NTX software packages to PLC/SOC mappings for CSP02 and beyond refer to ECM552 - Mapping of NTX/NTG Package to PCL/NCL/Option.

6.4.1 Required Software Packages and Interdependencies

Software selectable parameters enable the WLC to replace existing domestic and international line cards. These parametric variants are held in templates which can be applied from the MAP.

Software features required for the WLC are:

- AE0905 - World Line Card Software Support (BCS33)
- AE0896 - World Line Card in the LCM (BCS33)
- AE0945 - WLC in the SRU and LCME (BCS34)

RELEASE 06.03
13 July 1998

- | • AE0946 - WLC Enhancements - Type A and B (BCS34)
- | • AE0956 - Cutover by DN (BCS 34)
- | • AE1013 - WLC Overvoltage Reporting
- | • TBD - Register Recall Earth and Earth Left (British Telecom)
- | (BCS TBD).

| Software packages for the above features that are required by the
| WLC are not available at the time of issue of this NTP.

| 6.4.2 Software Usage Restrictions

| Offices equipped with WLC must have at least BCS33 load.

| 6.4.3 Memory Provisioning

| Not applicable.

| 6.5 Real Time Impact

| Not applicable.

RELEASE 06.03
13 July 1998

7.0 ECM550 - Meridian Cabinet Line Module

7.1 Overview

The MCLM cabinet houses two dual shelf-ELMs (enhanced Line Modules). Each ELM has eight (8) line drawers. Each Line Drawer has two (2) line subgroups of thirty-two (32) line card slots each. The maximum capacity of each ELM is 512 line card slots and a total of 1024 line card slots per MCLM.

7.1.1 EXTENDING A LCM WITH FIBER: (FLI)

The LCM can be extended from the Host switch and/or Remote Switching Center with OEM units.

The FLI components typically will be provided to the customer by Nortel's distributor channels & will NOT be engineered by Nortel. It is imperative to provide this information, assuring the engineering cabling considerations of this equipment is integrated in the MSL-100 configuration.

The Fiber LCM Interface (FLI) components allow the LCM module(s) to be located 6 miles from the host or remote switch controller. Special low-loss cable & high quality splices extend the distance as far as 15 miles. The FLI units have drivers that regenerate the signal and are transparent to the functionality of the MSL-100.

The FLI system consists of a host-side FLI (OEM unit) and an LCM-side FLI (OEM unit).

* The Host-side FLI unit converts the DS30A links from a single controller (LTC/LGC/RCC) into a fiber optic link.

* The LCM remote-side FLI unit converts the fiber optic link into the normal DS30A links from the MSL-100 controller.

The standard cabling (45 ft DS30A cable) normally provisioned for an MSL-100 controller to the LCM still applies. However, the amount of DS30A cabling normally provided is DOUBLED; (1) one set of cables for the host FLI & (1) one set for the LCM remote side.

7.1.2 EXTENDING A CUSTOM EMI REMOTE WITH MCLM

The MSL-100 Remote Migration Strategy is aimed at moving our customer installed base to a new applications platform made up of the MSL cabinetized hardware and CSP-based software.

Current feature requests have driven the current SL-100 Remote platforms beyond the point of supporting the myriad of product types and configurations existing on installed base customers. The MSL-100 Remote Migration Strategy enables extension growth paths

RELEASE 06.03
13 July 1998

| utilizing the SONET technology portfolio. This strategy minimizes
| hardware requirements, thereby reducing support cost and hardware
| sustaining cost.

| The MSL-100 installed base of remote Custom EMI hardware platforms
| can migrate to the SONET MSL-100 Cabinetized technology when new
| features are required with this strategy.

| This strategy also enables line extension activities on the cus-
| tomer- installed base to utilize the MSL-100 cabinetized portfo-
| lio.

| 7.1.3 BROADBAND INTERNET ACCESS FROM AN MCLM CABINET

| 1 Meg Modem Service (1-MMS) is provisionable in an MCLM cabinet.
| 1-MMS uses DSL-like technology over standard two-wire lines for
| high- speed access to the Internet. The MCLM interfaces to a data
| network via the bulkhead for connection to a 10BaseT patch panel.

7.2 Hardware Provisioning

7.2.1 Hardware Usage Restrictions

When provisioning the NT6X60BA Japan Ringing Generator, remove ringing generator cables from FSP TB02-9 and TB02-10. Grounded Tip and Ring are not required on the Japan Card and will in fact blow the fuse on the card. The cables in question will be removed during installation.

When provisioning the North American Ringing Generator, NT6X60CA, the circuit pack must always be provisioned in both modules regardless of whether line drawers are provisioned in a module or not. Example: If provisioning one ELM (ELM 00-lower module), an NT6X60CA will be provisioned in both shelves 05, 33 at slot 17. (SHELF 33 is the lower shelf of the upper module (ELM 01). The two NT6X60CA'S have a load-sharing and back-up responsibility, and therefore must both be provisioned.

7.2.2 Hardware Dependencies

All new frames and field upgrades must be provisioned with the NT6X51AC, which replaces the NT6X51AA & NT6X51AB and eliminates the need for the Capacitor Upgrade Kit (NTNX38LM).

| When provisioning xLC line cards for 1 Meg Modem Service (1-MMS)
| the cabinet must be equipped with the 1-MMS Hardware Kit (NTNX37MM)
| on the ELM Module and a Data Bus Interface Card (DBIC) in each line
| drawer equipped with an xLC Line Card.

RELEASE 06.03
13 July 1998

7.2.2.1 P and C Side Port Requirements

Not applicable

7.2.2.2 DMS BUS Port Requirements

Not applicable

7.2.2.3 Circuits Per Card

Not applicable

7.2.2.4 Discrimination Numbering

Not applicable

7.2.3 Provisioning Considerations

7.2.3.1 ISDN LINE DRAWER FOR REMOTES - ILDR (NT6X05DA)

The ISDN Line Drawer for Remotes is a new LCM drawer type that will support ISDN line cards and contain the D-channel handler. The ISDN line drawer will co-exist with current POTS line drawers in a standard ELM. A maximum of two NT6X05DA Line Drawers can be provisioned per ELM. Only one ISDN line drawer per ELM shelf is allowable.

The ISDN line drawer is intended to be made available in all the Remote DMS-100F frame and cabinet types provisionable with the RSC, RSC-S, MCRMS, MCRM, MCRU, MCLM and RLCM remote products.

RSC SONET cannot be supported by LTCI or LGCI equipment at the host, when configured for ISDN Line Drawer. Also, remotes that subtends RSC SONET cannot be supported by LTCI or LGCI equipment at the host, when configured for ISDN Line Drawer.

ISDN Line Drawer for Remotes is for the North American Market Only.

During ESA (Emergency Stand Alone) of the RSC or RSC-S, the ISDN Line Drawer will not be supported. If an RSC or RSC-S enters ESA, the ILDR call might survive the entry but no commitment is made to supporting any service within ESA.

ONLY (1) ILDR can be defined in each LCA (Line Concentrating Array). ISDN Line Drawer can not be applied to positions 0 or 10. Preferred positions for locating the ISDN Line Drawer is 2 or 12. This means that if the ILDR drawer number of the first ILDR is within the range 2 - 6, the next ILDR to be defined in this ELM will have its drawer number within the range 12 - 16. This limitation exists in order to permit an optimal heat dispersion in the ELM.

RELEASE 06.03
13 July 1998

A maximum of seven (7) ISDN Line Drawers (NT6X05DA) per remote site can be applied to a single RSC SONET.

A maximum of fourteen (14) ISDN Line Drawers (NT6X05DA) per remote site can be applied to a dual RSC SONET.

If the RSC-S requires Extended Distance Capability, it may be equipped with the NTMX76AA or NTMX76AB circuit packs. The host XPM for a RSC-S with EDC must also be equipped for HDLC messaging (NTMX76AA or NTMX76AB instead of NT6X69) and must utilize the Unified Processor (XPM PLUS). Refer to ECM-445 for details of provisioning XPM PLUS. The Host DS1 interfaces must be 64Kb clear channel (NT6X50AB) to support ISDN and to ensure a protocol match with the NTMX81AA packs in the RCC2 shelf (NTMX81AA is electrically the same as NT6X50AB).

Implement the ISDN Line Drawer for Remotes (ILDR) in the MCLM & MCRU. Maximum of 2 line drawers per ELM is allowed. The number of ILDR drawers that can be provisioned on an XPM is dependent on equipment that subtends that XPM. The basic limitation is the number of available message channels on that equipment.

The following table shows the equipment that can be subtended off a peripheral and the number of message channels that are allocated for that equipment. The bottom line shows the maximum resources available per XPM. Therefore, for example, if an RCC2 already has 4 RLCMs, 4 LCMs and an RMM subtending it, that would use up a total of 33 message channels ($4 \times 6 + 4 \times 2 + 1$), and leave a total of 12 message channels for ILDRs. Since each ILDR uses 2 message channels, a total of 6 ILDRs would be able to be provisioned on this RCC2.

It should be noted that the RCC2 already has software to check that these limits are not exceeded, and the ILDR will be included in this check. However, other peripherals (RCC+ and LTC+) do not have this capability and therefore would have to be done manually. If this limitation is exceeded, functionality will be affected.

CPP MESSAGE PORT USAGE TABLE

NODE	# MESSAGE CHANNELS	RELEVANT TO:		
		RCC2	RCC+	LTC+
LCM	2	Y	Y	Y
RLCM WITH ESA & RMM	6	Y	Y	Y
LCME	2	Y	N	N
SMS-R	2	Y	N	N
RMM ON RCC2 OR RCC+	1	Y	Y	N

RELEASE 06.03
13 July 1998

ILDR	2	Y	Y	Y	
+-----+	+-----+	+-----+			+-----+
DUAL CONFIGURATION	2	Y	Y	N	
+-----+	+-----+	+-----+			+-----+
RCC2/RCC+	2	N	N	Y	
+-----+	+-----+	+-----+			+-----+
TOTAL # OF CHANNELS AVAILABLE:		45	39	47	

The limitations in the above table define the number of ILDRs that can be provisioned per host shelf. The limitation of 480 ISDN lines per host shelf defines the total quantity of ISDN lines that can be configured. As a general rule, the ILDR message channels will limit the configuration, assuming that no LCME is provisioned on the same host. If an LCME is provisioned on the same host, the number of ISDN lines would probably be the limiting factor.

7.2.3.2 1 MEG MODEM SERVICE (1-MMS)

When 1-MMS is provisioned in the field the line drawers must be upgraded with a change kit to NT6X05EA's. On new cabinets order the NT6X05EA initially for all line drawers in an ELM 2-shelf module equipped for 1-MMS.

LINE CARDS:

Initially only (16) sixteen 2-slot xLC Line Cards will be provisionable in each NT6X05EA Line Drawer (LD) per standard provisioning rules for the NT6X05EA LD. This is due to heat dissipation requirements.

7.2.3.3 MCLM Provisionable Line Cards

The following line card circuit packs are provisionable on the MCLM:

PEC	DESCRIPTION	TYPE	SLOTS REQ'D

NT6X17BA	World Line Card	A	1
NTEX17AA	XDSL Line Card	A	2
NT6X18BA	World Line Card	B	1
NT6X21AD	P-Phone Line Card	C	1
NT6X71BA	Single-Slot Data Line Card	D	1
NT6X19AA	Interface for Telephone set with message waiting lamp	E	1

RELEASE 06.03
13 July 1998

NT6X20AA	Message Waiting Converter	2
NT6X87AA	Data above voice POTS	4
NT6X76AA	Async. I/F Line Card	2
NT6X99AA	IBERT Test Card	2
NT6X33AA	Japan General Use LC	1
NTBX27AA	ISDN 2B1Q Line Card	1

The NT6X23AA Power Converter which was used with the NT6X18AA/AB for enhancing the prevention of coin fraud is no longer needed with the introduction of the NT6X18BA WLC Type B.

7.2.3.4 EXTENDED FIBER INTERFACE FOR LCM

The cabling currently documented for the LCM will provide the FLI connectivity. The FLI cable diagram is illustrated in Figure 4 on page 5-33. Refer to the diagram to see how the connections are made for the FLI. The DS30A cables will be provisioned in the same manner, adhering to the same distance restriction as if co-located at the host (i.e. - 45 ft. on either side of the FLI unit). The FLI has signal drivers that boost the signal. The FLI system supports two external alarm contacts. Individual scan point connections on the local FLI pack notify the MSL-100 system of failures in remote LCMEs, power supplies, or fiber link equipment. An external closure is provided at the remote end.

All the stated switch interfaces to the FLI unit remain the same regardless of the type of FLI configuration (i.e. - single-mode, multi-mode, single or double density).

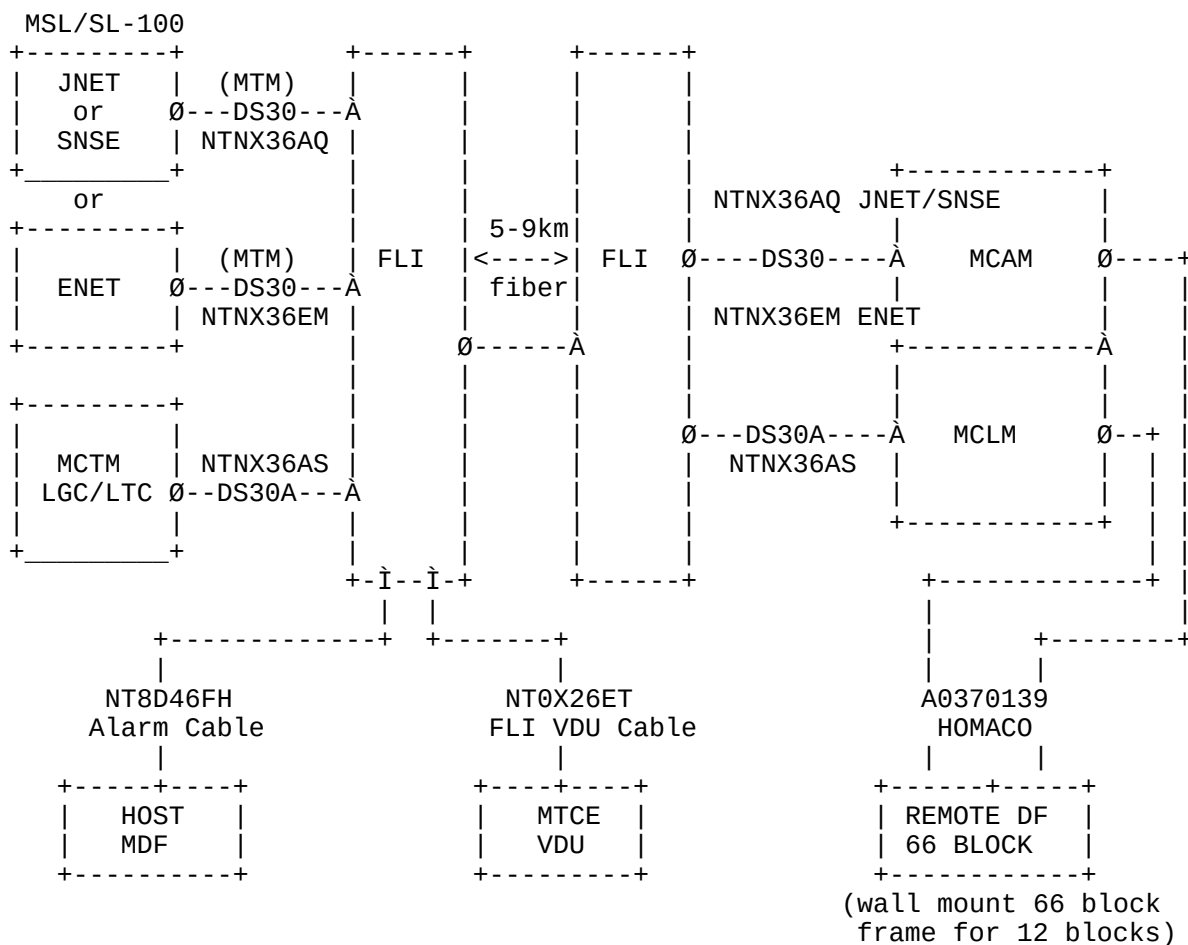


Figure 4. Extending LCM with FLI from HOST.

7.2.4 Office Layout Information

Not applicable.

7.2.5 Traffic Tables

Not applicable.

7.3 Product/System Specification

7.3.1 Physical Characteristics

Not applicable.

RELEASE 06.03
13 July 1998

7.3.2 EMI/Earthquake Information

Refer to NTP 555-4001-103

The MSL-100 Remote Migration Strategy provides a migration plan for existing Custom EMI hardware platforms to the MSL-100 Cabinetized technology. This strategy provides EMI components between the MSL cabinet(s) to Custom EMI frames.

7.3.3 Sparing Information

Not applicable.

7.3.4 Power Feed and Fusing Requirements

The following fuses and feeds are required:

7.3.5 Current Drain Information

For cabinet current drain refer to EMA16-01-001 for the CLCE.

7.4 Software Provisioning

For NTX software packages to PCL/SOC mappings for CSP02 and beyond refer to ECM552 - Mapping of NTX/NTG Package to PCL/NCL/Option.

7.4.1 Required Software Packages and Interdependencies

Not applicable.

7.4.2 Software Usage Restrictions

Not applicable.

7.4.3 Memory Provisioning

Not applicable.

7.5 Real Time Impact

Not applicable.

RELEASE 06.03
13 July 1998

8.0 ECM619 - Building Block Engineering - LCE

8.1 Overview

The Line Concentrating Equipment Frame (LCE) and Cabinet (CLCE) building block concept deals with a higher level of Product Engineering Code (PEC) ordering and simplifies the engineering order process. Line cards will be ordered per usual methods.

The ISDN Line Drawer for Remotes is a product which has been developed for the DMS-100 system enabling existing Remote sites to upgrade to ISDN without the expense of having to add an LCME, and upgrade host peripherals. It is also being developed to provide new job initials with the ability to provide low line size BRI features. The introduction strategy is thus targeted at providing the new capability to new job shipments as well as for upgrading the installed base of Nortel Remotes. The ISDN Line Drawer Remotes is only available for North America (U.S. and Canada) Remote applications.

8.1.1 NT6X03AA (Line Concentrating Equipment Frame)

The NT6X03AA Line Concentrating Equipment Frame is a standard DMS frame which houses two dual shelf LCM modules. A fully equipped LCE frame supports 1280 line cards, and can be provisioned for North America or International requirements. The NT6X03AA Line Concentrating Equipment Frame is engineered in 'detail'. It is used in instances where the LCE Building Blocks described herein do not satisfy the specification of the site being considered. The following requirements are met using 'detail' engineering with the NT6X03AA LCE:

- Non-earthquake EMI compliant
- Earthquake and EMI compliant.

8.1.2 NTZZ41JA (Line Concentrating Equipment Frame)

The NTZZ41JA contains the LCE frame which houses up to two () Line Concentrating Modules (LCM), North America or International. Each NTZZ41JA contains a frame Supervisory Panel and Universal Framework. The calculation used for frame provisioning is based on the number of analog wired lines the office requires.

8.1.3 NTZZ08BD (Line Concentrating Module N. America)

The NTZZ08BD contains the Line Concentrating Module used to house a maximum of 640 wired analog lines in 10 line drawers. Each NTZZ08BD contains 10 Line Drawers, Power Converters, Processors, and all required functional equipment. The quantity of links to the LGC or LTC is determined by traffic analysis of the CCS in each

RELEASE 06.03
13 July 1998

LCM. The functional equipment that is provided in the LCM has the capacity to serve a two link through a six link configuration. The NTZZ08BD is based on on the NT0X25AH Universal Frame, and is to be applied to the NTZZ41JA 'Line Concentrating Equipment'.

8.1.4 NTZZ43MB (Line Concentration Module International)

The NTZZ43MB provides the line shelves and drawers for the upper or lower LCMs. Ten (10) line drawers are always provided with the NTZZ43MB. This is to be applied to the NTZZ41JA 'Line Concentrating Equipment'.

8.1.5 NTZZ41WT/XT/YT/ZT (Ringing Generators - Frames)

The NTZZ41WT contains two (2) Ringing Generators for the North America Market.

The NTZZ41XT contains two (2) Ringing Generators for the UK Market.

The NTZZ41YT contains two (2) Ringing Generators for the China Market.

The NTZZ41ZT contains two (2) Ringing Generators for the Australia Market.

8.1.6 NTZZ08EC (Cabinetized Line Concentrating Equipment

Model B)

The NTZZ08EC is a single bay LCE cabinet which can be provisioned with up to two dual shelf LCM modules that may support a total of 1 80 line cards. The cabinet color can be either grey or brown. The power arrangement can be either external or horizontal. Ringing generators are provisionable in order to accomodate North America or International ringing standards. NTZZ08EC is a C28 Model B cabinet.

8.1.7 NTZZ08BC (Line Concentrating Module North America)

The NTZZ08BC Line Concentrating Module (CLCM) is a subsidiary peripheral module designed for use in the CLCE Model B cabinets. It provides an interface between 640 analog subscriber lines on its P-side and the switch network, via line (LGC) or trunk controllers (LTC), on its C-side. The NTZZ08BC contains common circuits and ten line drawers capable of housing up to 640 line cards. The NTZZ08BC is for use in the North America market.

8.1.8 NTZZ08MB (Line Concentrating Module International)

The NTZZ08MB Line Concentrating Module (CLCM) is designed for International use in the CLCE Model B cabinet. It contains the common circuits suitable for line circuits operating in a tele-

RELEASE 06.03
13 July 1998

phonic standards environment which is not equivalent to North American standards as far as the subscriber line interface is concerned. It also contains ten (10) Line Drawers and is capable of serving up to 640 subscriber lines.

8.1.9 NTZZ08FT/GT/HT/JT (Ringing Generators - Cabinet Sys)

The NTZZ08FT contains two (2) Ringing Generators for the North America Market.

The NTZZ08GT contains two (2) Ringing Generators for the UK Market.

The NTZZ08HT contains two (2) Ringing Generators for the China/Australia Market.

The NTZZ08JT contains two (2) Ringing Generators for the Japan Market.

8.1.10 NT6X05DA (ISDN Line Drawer Remotes)

The ISDN Line Drawer is a new LCM drawer type that will support ISDN line cards and contain the D-channel handler. The ISDN line drawer will co-exist with current POTS line drawers in a standard LCM. A maximum of two NT6X05DA Line Drawers can be provisioned per LCM. Only one line drawer per LCM shelf is allowable. It is recommended that the ISDN Line Drawer be provisioned in the right hand drawer position of each shelf in physical position 4 and 9 (logical drawers 8 and 18) in order to permit an optimal heat dispersion in the LCM. However, ISDN Line Drawers can be provisioned in any drawer position on the LCM shelf except physical position 0 and 5 (logical position 0 and 10). This is because BIC Relay Test diagnostics require those positions for systems use.

The ILD-R line drawer is intended to be made available in all the DMS-100 frame and cabinet types provisionable with the RSC, RSC-S, OPM, OPAC, and RLCM remote products. It is intended to be designed and engineerable in the following vehicles: CLCE, CRSC, RLCM, RLCC, OPM, OPAC and LCE.

The new line drawer type will support up to 28 BRI ISDN line cards (BX27), and a new interface card called the ISDN Drawer Controller (IDC). The IDC will replace the BIC for providing an interface between the line cards and the rest of the LCM and DMS-100 system. Since the BX27 line card can be used as it currently exists, no new line card development is required. However, the IDC is a new design that will provide D-channel handler and maintenance functions for each line card in the drawer.

The IDC, and therefore the drawer as a whole, is integrated into the LCM in the same way as a POTS line drawer, with 1 diloop to each Digroup Control Card (DCC). The interface to the LCM processor is also identical to a POTS line drawer. This approach reduces the

RELEASE 06.03
13 July 1998

impact to LCM loadware and existing high-level software that communicates with the LCM and drawer.

The ISDN Line Drawer Remotes is only available for North America (U.S. and Canada) Remote applications.

8.2 Hardware Provisioning

8.2.1 Hardware Usage Restrictions

The ILD-R cannot be equipped as drawer 0 or 5 (as not to prevent the ability to perform BIC Relay Test for the LCM).

Only 1 ILD-R can be defined in each LCA (Line Concentrating Array). This means that if the ILD-R drawer number of the first ILD is within the range 1-4, the next ILD-R to be defined in this LCM will have its drawer number within the range 6-9. This limitation exists in order to permit an optimal heat dispersion in the LCM. It is recommended that the ILD-R drawers be provisioned as drawers 8 and 18 due to heat dissipation issues, but this decision is left to the customer to decide.

The ILD-R physical drawer has two Line Subgroups (LSGs). When a physical drawer is datafilled as ILD-R, the drawer type of its two LSGs is also changed to ILD-R. The physical drawer number that appears in the LCMDRINV table is the number of the even LSG of this drawer.

The ILD-R will require an XLCM based load (256K memory).

Only North American shelves are supported (Not PLGC). LGCI and LTCI are not supported.

D-channel sparing is not supported by the ILD-R.

A maximum of 2 ISDN Drawers can be configured per LCM, RLCM, OPM or OPAC. Non-BX27 ISDN Line Cards are not supported.

Each ILD-R line drawer supports 28 NTBX27AA U-Loop ISDN line cards. The ISDN line drawer has built in D-channel handlers which allow the drawer to be independent of external ISDN hardware. For this reason, the host peripherals do not require EISP or EDCH packs added to them.

Non-BX27 ISDN Line Cards are not supported.

The ILD-R can be used together with the LCME to provide ISDN services, but the ILD-R cannot be installed in the LCME.

Upgrading an existing RLCM, OPM, OPAC, RSC (LCE), RSC-S (CLCE) line drawer to an ILD-R drawer will involve deleting all lines from that drawer, removing that drawer from service, physically replacing

RELEASE 06.03
13 July 1998

the drawer and then declaring and RTSing the new ILD-R line drawer. This procedure will not cause other drawers to be removed from service.

The RMM requires an MTU pack instead of the LTU that is used for POTS line cards in order to allow ISDN line maintenance.

During ESA of the RLCM, OPM, OPAC, RSC or RSC-S, the ISDN Line drawer will not be supported. If an RSC or RSC-S enters ESA, the ILD-R call might survive the entry, but no commitment is made to supporting any service within ESA.

8.2.2 Hardware Dependencies

Since the ILD-R requires ISDN line maintenance, the RMM that is connected to the LCM (LCE or CLCE) containing the ISDN Line drawer should be provisioned with an MTU pack (NT2X10BA/BB and NT2X11BA circuit packs). For RMMs without ISDN capability, this might require an upgrade from the standard LTU pack (NT2X11AD/NT2X10AB).

8.2.2.1 P and C Side Port Requirements

8.2.2.2 DMS BUS Port Requirements

8.2.2.3 Circuits Per Card

8.2.2.4 Discrimination Numbering

8.2.3 Provisioning Considerations

1. Utilization higher than 80% requires a detailed capacity study using Real::Time.
2. When MADN penetration is higher than 40%, then a detailed capacity study is required using Real::Time.
3. Deviation from NTI assignment rules requires that detailed capacity study be performed.
4. Meridian Digital Centrex (MDC) call timings include Electronic Business Set without display and Data Path.

ASSUMPTIONS:

1. 5 /50 Orig/Term split provides a worse case scenario.
2. 4 secondary members per MADN group.
3. 4 percent Custom Calling Feature assignment to POTS lines.
4. 10 percent Custom Calling Feature assignment to MDC lines.
5. 10 percent UTR provisioning.

RELEASE 06.03
13 July 1998

6. 5 percent secondary member answer.

7. 10 percent of Dialan lines will have voice and data.

8.2.3.1 Customer Questions

8.2.3.2 Calculations

1. Total LCMs:

Calculate the quantity of LCMs required according to method given in ECM-497, Simplified Traffic Provisioning and enter the result

—

2. Total LCDs

Total LCMs (Calc. 1.)/2 (round up to next integer)

—

8.2.4 Office Layout Information

Not applicable

8.2.5 Traffic Tables

Not applicable

8.3 Product/System Specification

The ISDN Line Drawer hardware development is limited to development inside the LCM product itself. The ISDN line drawer will be deployed in a line drawer position of the existing LCM product family (OPAC, OPM, RLCM, RSC/LCE and RSC-S/CLCE).

8.3.1 Physical Characteristics

The ISDN Line Drawer is a modified version of the standard DMS POTS Line Drawer. It consists of a Backplane Assembly and a structural foam integral shroud or Drawer. The shroud provides a matrix of 4 by 10 card positions and accepts single and double size cards.

The Drawer Assembly is fully connectorized, and, when installed in a DMS Line Shelf, mates with a flexible loop cable harness that allows full withdrawal of the module for access to the plug-in circuit packs.

The Line Drawer accommodates up to 28 ISDN Line Cards, one ISDN Drawer Controller (IDC) Card, one Loop Tester Card (future option), and one Point-of-use Power Supply (PUPS).

8.3.2 EMI/Earthquake Information

The ISDN Line Drawer shall satisfy Bellcore Technical Reference TR-EOP-001089, Sections 3.3.1 through 3.3.5 and TR-EOP-0063. The presence of the ISDN Line Drawer within a DMS-100 system shall not prevent the system with complying with the same.

RELEASE 06.03
13 July 1998

8.3.3 Sparing Information

Use standard sparing algorithm.

8.3.4 Power Feed and Fusing Requirements

Each LCE frame requires either four (4) or eight (8) power feeds.

For LCE frames having four power feeds, two are A-Feeds and two are B-Feeds.

For frames having eight power feeds, four are A-feeds and four are B-feeds.

For the four feed frames, two 30A fuses and two 20A fuses (TALKBAT) are needed at the PDC, one of each for protecting the A-feeds and one of each for the B-feeds.

For LCE frames having eight power feeds, eight 20A fuses are required at the PDC, four of these protect the A-feeds and four the B-feeds.

For power feed and fusing arrangements for cabinetized LCE refer to ECM 600 for Cabinetization Model A (MD) and ECM 683 for Model B.

For PDC/LGE/LCE clustering requirements for ISG offices, refer to ECM 289, Isolated System Grounding.

8.3.5 Current Drain Information

For LCE current drain information, refer to Engineering Manual Section EMA16-01-001.

8.4 Software Provisioning

For NTX software packages to PLC/SOC mappings for CSP02 and beyond refer to ECM552 - Mapping of NTX/NTG Package to PCL/NCL/Option.

Not applicable

8.4.1 Required Software Packages and Interdependencies

| The baseline software load for ISDN Line Drawer for Remotes is NA007
| for the Host office, and XPM08 for the RSC and RSC-S Remotes. The OPM,
| OPAC and RLCM Remotes and the ESA module, if so equipped, require an
| XPM81 software load.

8.4.2 Software Usage Restrictions

Not applicable

8.4.3 Memory Provisioning

Not applicable

8.5 Real Time Impact

Not applicable

RELEASE 06.03
13 July 1998

9.0 ECM629 - NT6X17BA - World Line Card (WLC) Type A

9.1 Overview

NT6X17BA World Line Card (WLC) is a universal type A line card introduced to replace domestic and international type A line cards.

The cards it replaces are:

NT6X17AC	-	North America
NT6X93AA	-	Turkey, Belize
NT6X93BA	-	Carribean
NT6X93CA	-	China
NT6X93DA	-	Morocco
NT6X93EA	-	Australia
NT6X98AA	-	UK Special Applications
NTMX29AA	-	British Telecom

The WLC has software selectable loop current limit characteristics and software selectable automatic loss equalization. The card has the flexibility to generate a wide variety of input and balance impedances that may allow it to be used in potential new markets.

The WLC is designed to work in the LCM, LCME, LCMI, ILCM, RLCM, OPM, SRU, RSC, RSCI, SRSC, XLCM, XRLCM and SMBR/NSM peripherals.

The WLC functions with both DTMF and DP units. It is compatible with CLASS/CMS signalling and MTU equipment. It also has electronic overvoltage protection to improve its robustness in hostile environments.

RELEASE 06.03
13 July 1998

Note:

For North American markets, the NT2X10/NT2X11 MTU combination is to be provisioned. The NT4X97/NT4X98 MTU combination is the equipment to be provisioned for International markets.

The WLC has increased reliability due to reduced component count and lower operating temperatures because of lower power consumption.

9.2 Hardware Provisioning

9.2.1 Hardware Usage Restrictions

For jobs being provisioned by RNS in Richardson, the NT6X17AC is still the type 'A' line card of choice. Until the NT6X17BA becomes fully compliant with RNS market requirements, the NT6X17AC is to be provisioned for all RNS jobs.

BCS33 software and XLCM hardware are required for all international applications for the type 'A' WLC.

In North American markets, the WLC defaults to NT6X17AC configuration and therefore can be used with BCS30 and newer software with the application of the appropriate software patches.

9.2.2 Hardware Dependencies

XLCM hardware running BCS33 software is required for international DMS offices in order to use the type 'A' WLC.

9.2.3 P and C Side Port Requirements

9.2.4 DMS BUS Port Requirements

9.2.5 Circuits Per Card

9.2.6 Discrimination Numbering

9.2.7 Provisioning Considerations

Currently, 2FR and 4FR multiparty applications are not supported by the NT6X17BA. For 2FR and 4FR multi-party applications, provide the the type 'B' World Line Card, NT6X18BA.

9.2.8 Office Layout Information

Not applicable.

9.2.9 Traffic Tables

Not Applicable.

9.3 Product/System Specification

9.3.1 Physical Characteristics

9.3.2 POWER DISSIPATION

The power dissipation of a fully loaded LCM frame (1280 lines) with NT6X17BA is given below:

+-----+ Power Dissipation (W) +-----+			
+-----+			
No of Active	40 mA CL	75 mA CL	
+-----+			
0	210	210	
+-----+			
107 (3 CCS)	430	541	
+-----+			
284 (8 CCS)	790	1087	
+-----+			

The estimated temperature rise of a fully loaded LCM will not exceed 17.5 C with 40 mA current limit and 21.5 C with 75 mA current limit selected.

9.3.3 EMI/Earthquake Information

Not applicable.

9.3.4 Sparing Information

World line Card NT6X17BA has a Mean Time Between Failure (MTBF) of 1427 years at an operating temperature of 40 C. Therefore, standard type 'A' line card sparing algorithms are to be applied when using the NT6X17BA WLC.

9.3.5 Power Feed and Fusing Requirements

9.3.6 Current Drain Information

9.4 Software Provisioning

For NTX software packages to PLC/SOC mappings for CSP02 and beyond refer to ECM552 - Mapping of NTX/NTG Package to PCL/NCL/Option.

RELEASE 06.03
13 July 1998

9.4.1 Required Software Packages and Interdependencies

Software selectable parameters enable the NT6X17BA to replace existing domestic and international line cards. These parametric variants are held in templates which can be applied from the MAP. An NT6X17BA with no template allocated will behave as an NT6X17AC.

Software packages required for the WLC are:

```
// NTXW00AA World Line Card Base (BCS33)
// NTXW02AA World Line Card Cutover by DN (BCS34)
// NTXW03AA World Line Card Over Voltage Report (BCS34)
// NTXW20AA World Line Card 900 +2 (BCS33)
// NTXW22AA World Line Card, UK (BCS33)
```

For Type 'B' only:

```
// NTXW01AA World Line Card Type 'B' (BCS34)
// NTXW21AA (BCS34)
```

9.4.2 Software Usage Restrictions

Offices equipped with the WLC must have a minimum of BCS33 release software for international applications.

North American offices can utilize the World Line Card with BCS30 software plus applicable software patches. The North American operation at BCS30 is possible due to the fact that the World Line Card Type 'A' defaults to NT6X17AC operation when no template overlays are in use in the software.

9.4.3 Memory Provisioning

Not Applicable.

9.5 Real Time Impact

Not applicable.

RELEASE 06.03
13 July 1998

10.0 ECM685 - Detailed/Bldg Block Engineering - ISDN LCE

10.1 Overview

The ISDN 2B1Q Access Subsystem represents Northern Telecom's first product offering that supports the American National Standards Institute (ANSI) standard ISDN 2B1Q (Two Binary One Quarternary) U-loop interface. The 2B1Q Access Subsystem is subtended from a DMS-100/MSL-100 LTCI/LGCI, RCCI, or RCC2 peripheral module. It provides access for most existing LCM line types and ISDN 2B1Q-U and ISDN S/T.

The ISDN 2B1Q Access Subsystem offers the North American Standard 2B1Q U Loop ISDN Basic Rate Interface (BRI) from an enhanced capacity ISDN LCM (LCME). The LCME is basically a LCMI that has been used for 2B1Q interface. It offers S/T ISDN services starting in BCS-31 and EBS (P-Phone), Datapath, S/T ISDN and POTS services starting in BCS- 3 . The 2B1Q (2 Binary, 1 Quarternary) Access Subsystem does not support the AMI line card.

The ISDN 2B1Q Access Subsystem adds the following components to the LCME:

- A single slot 2B1Q U-Loop ISDN line card (U-ISLC).
- A new high capacity line drawer.
- A new Enhanced Bus Interface Card.
- New ISDN LCM power packs.

The 2B1Q line card is not used in both host and remote locations.

The 2B1Q line drawer accomodates 60 single slot line cards, with eight (8) line drawers per LCME. Thus the LCME supports 480 single slot 2B1Q lines.

The diagram below depicts the ISDN Line Drawer physical layout:

SLOT	01	05	09	13	17	19	20	21	22	25
POSTIONS	N T B X 3 2	N T B X 3 2	N T B X 3 2	N T B X 3 2	N T B X 3 1 1 2	N T B X 3 5	N T B X 3 5	N T B X 3 4	N T B X 3 5	N T B X 7 2
	LD 0	LD 1	LD 2	LD 3	F U S E P N L	D C C 1	D C C 0	P R O C	C O N V E R T E R	R I N G R O U T E R
	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-
	LINE DRAWERS					LCAI				

Figure 5. ISDN 2B1Q Line Drawer Layout.

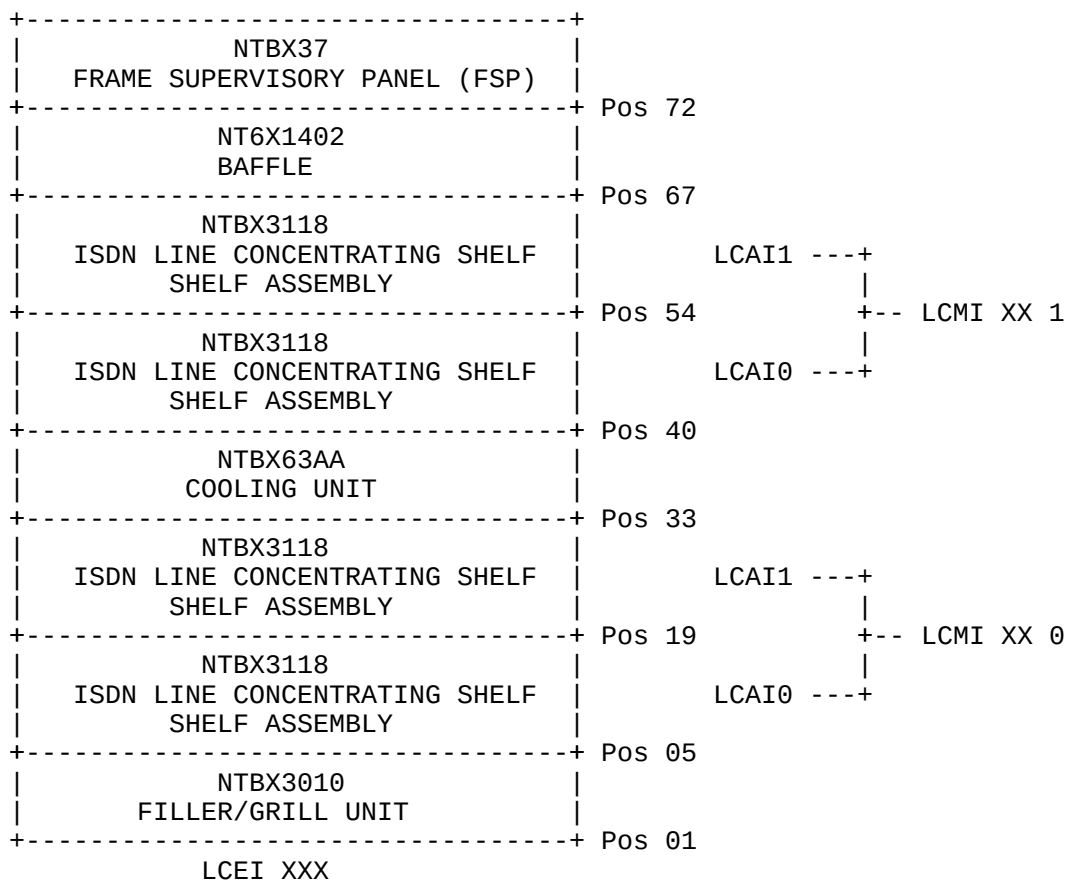


Figure 6. ISDN 2B1Q Frame NTBX30AB Layout

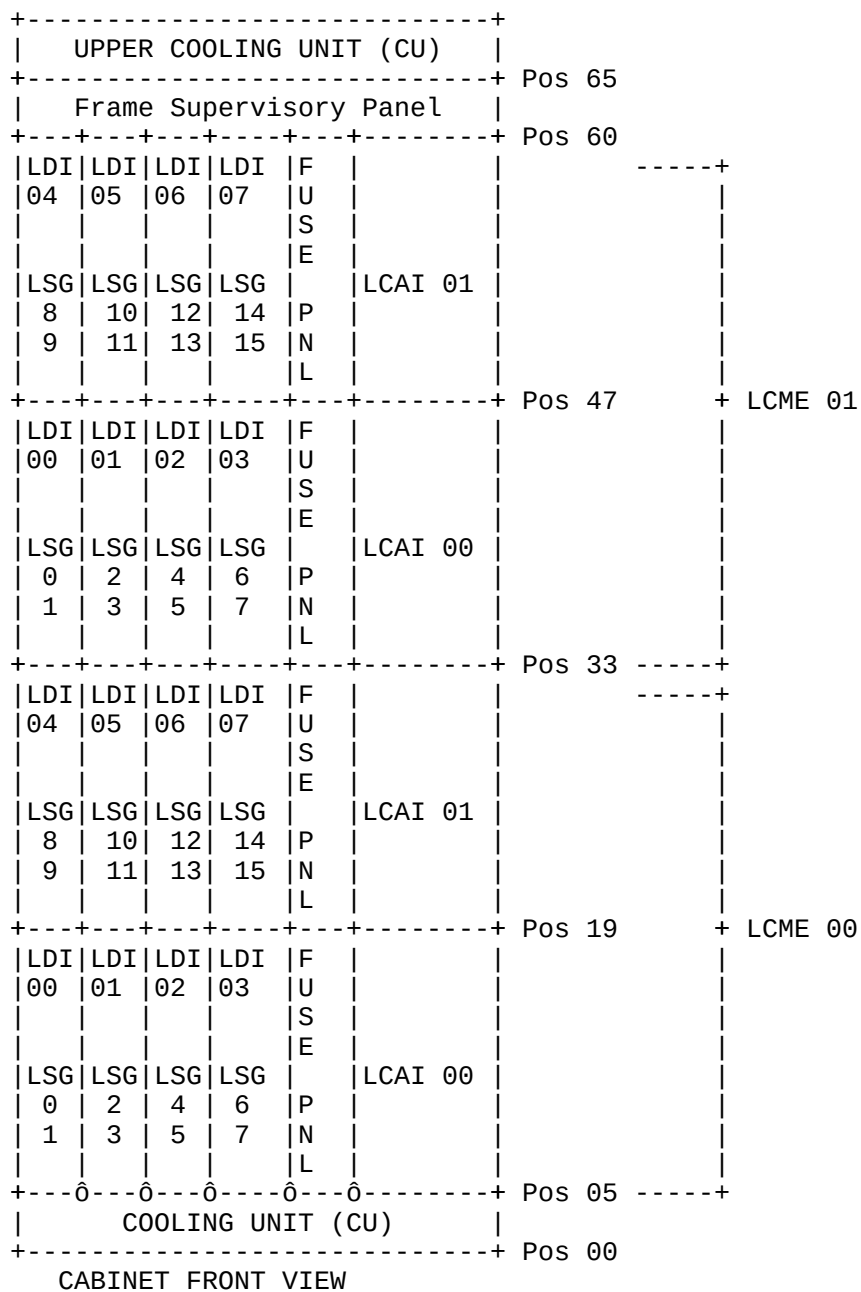


Figure 7. ISDN 2B1Q Cabinet Model A NTRX30BA Physical Layout.

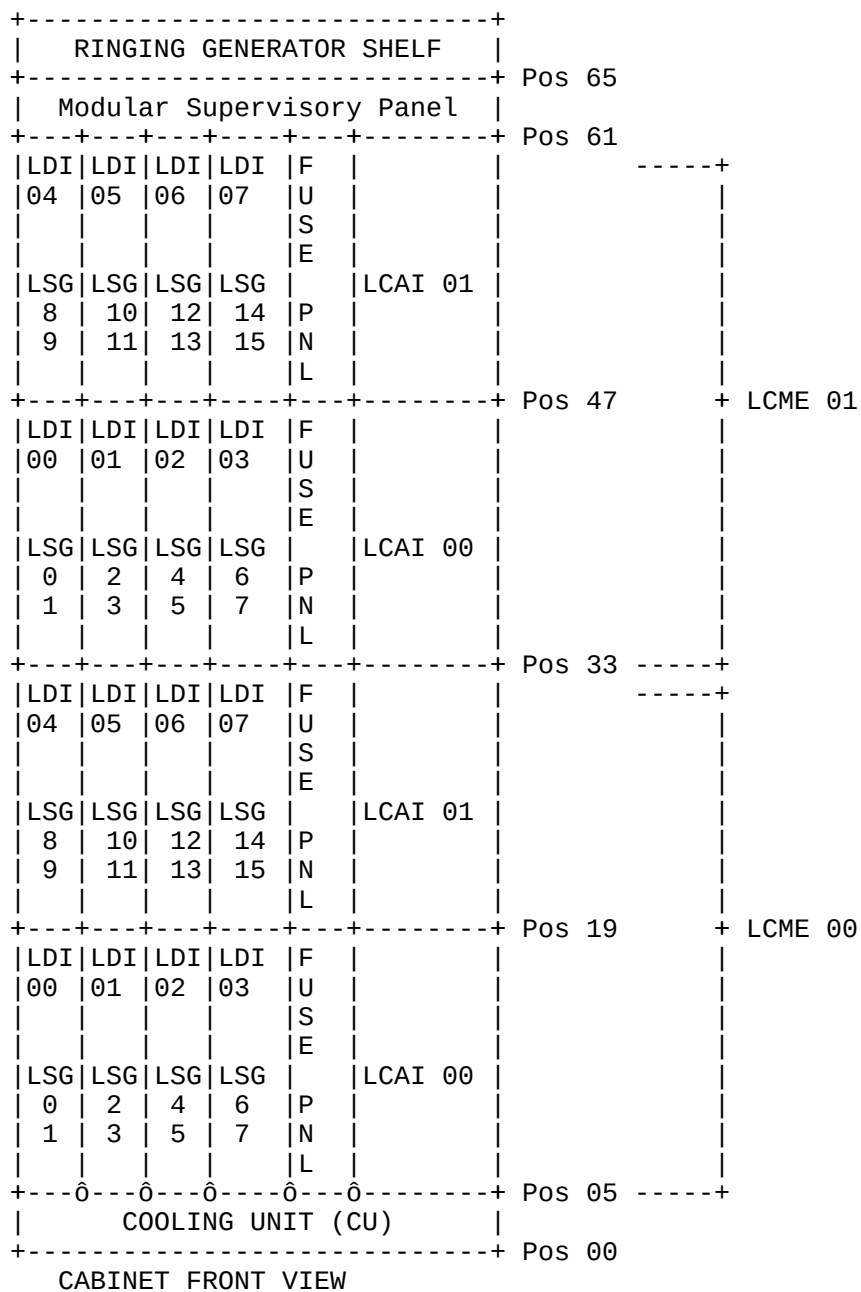


Figure 8. ISDN 2B1Q Cabinet Model B NTRX30DA Physical Layout

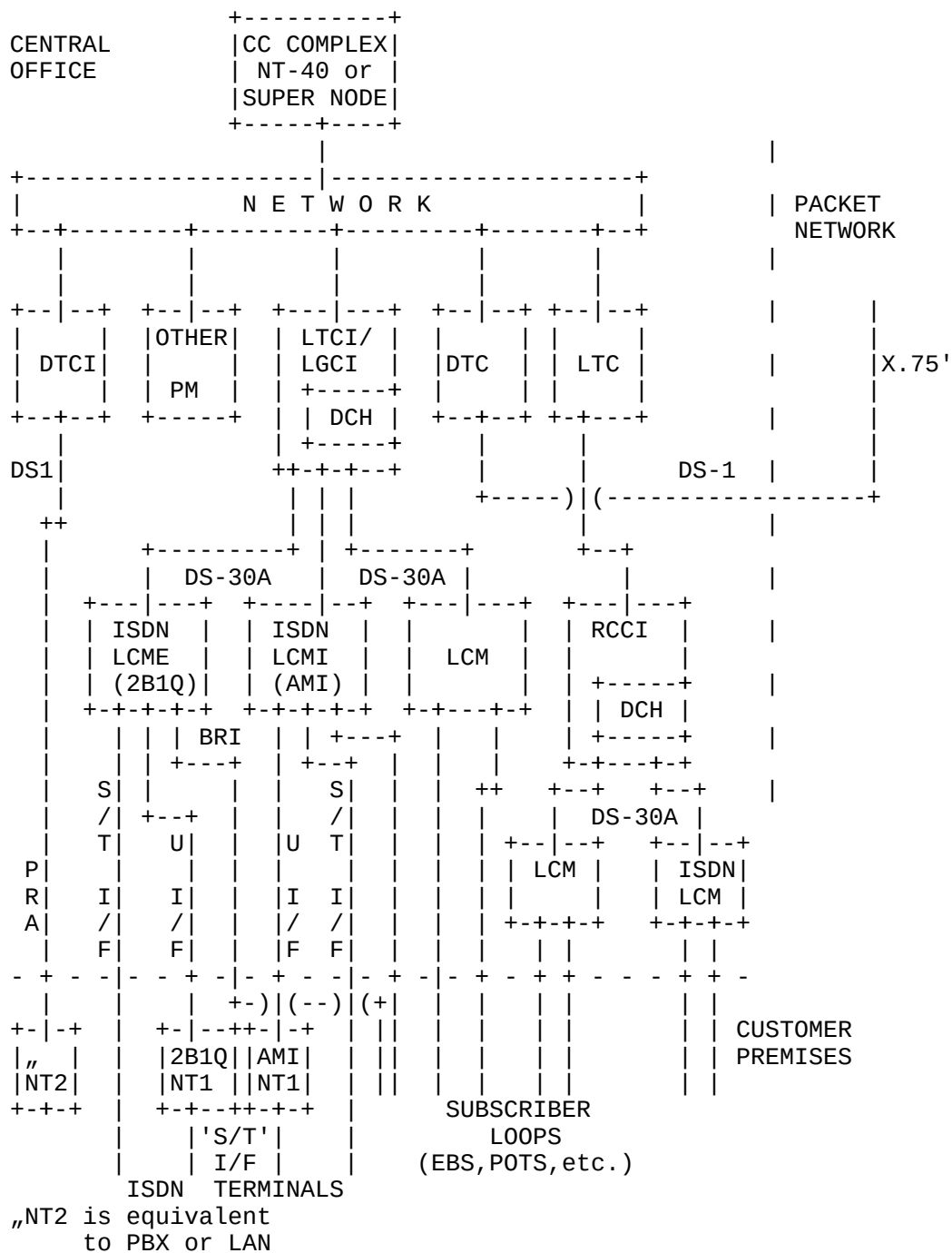


Figure 9. Preferred ISDN System Configuration For Packet DATA

RELEASE 06.03
13 July 1998

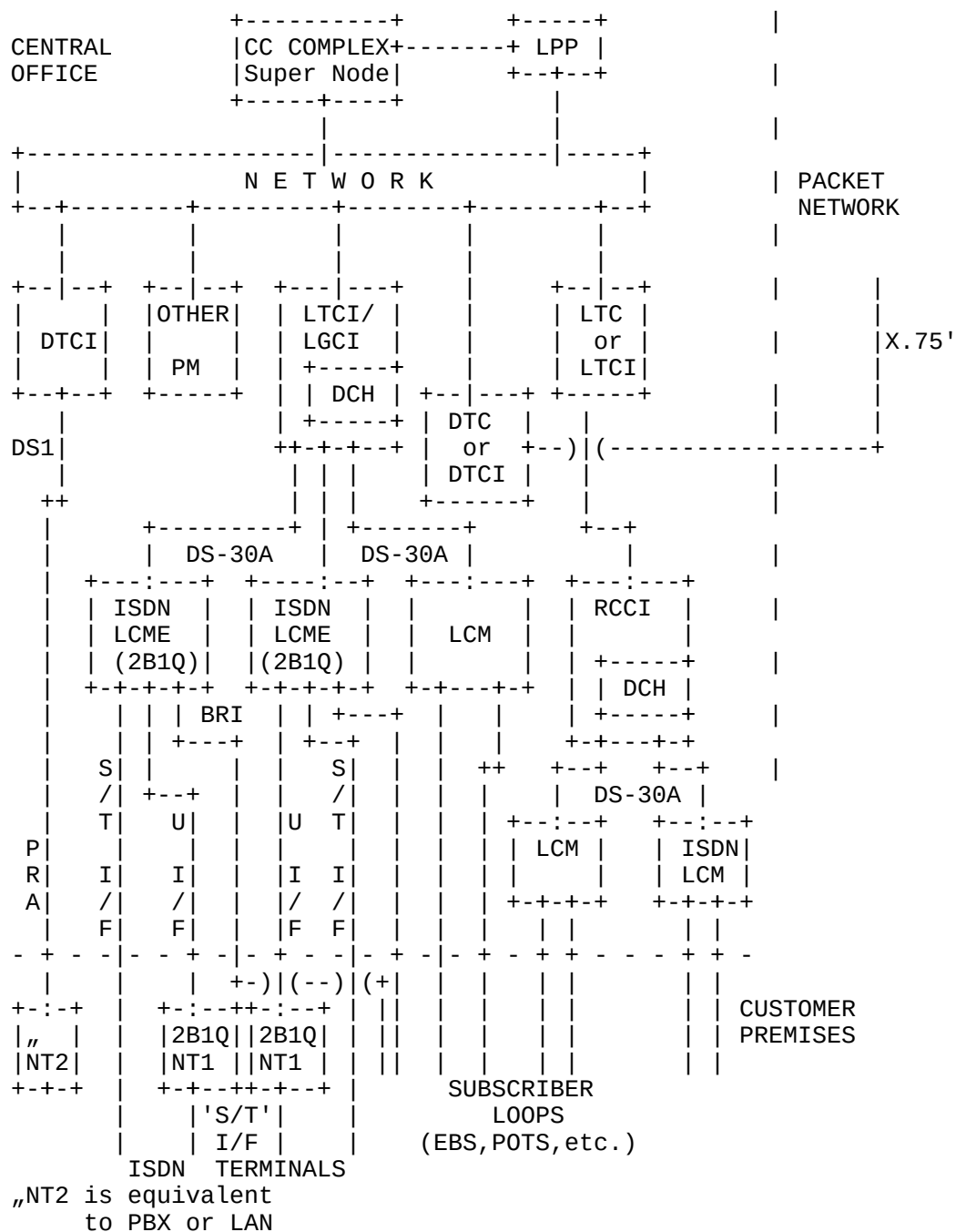


Figure 10. ISDN System Configuration w/DMS-PH

RELEASE 06.03
13 July 1998

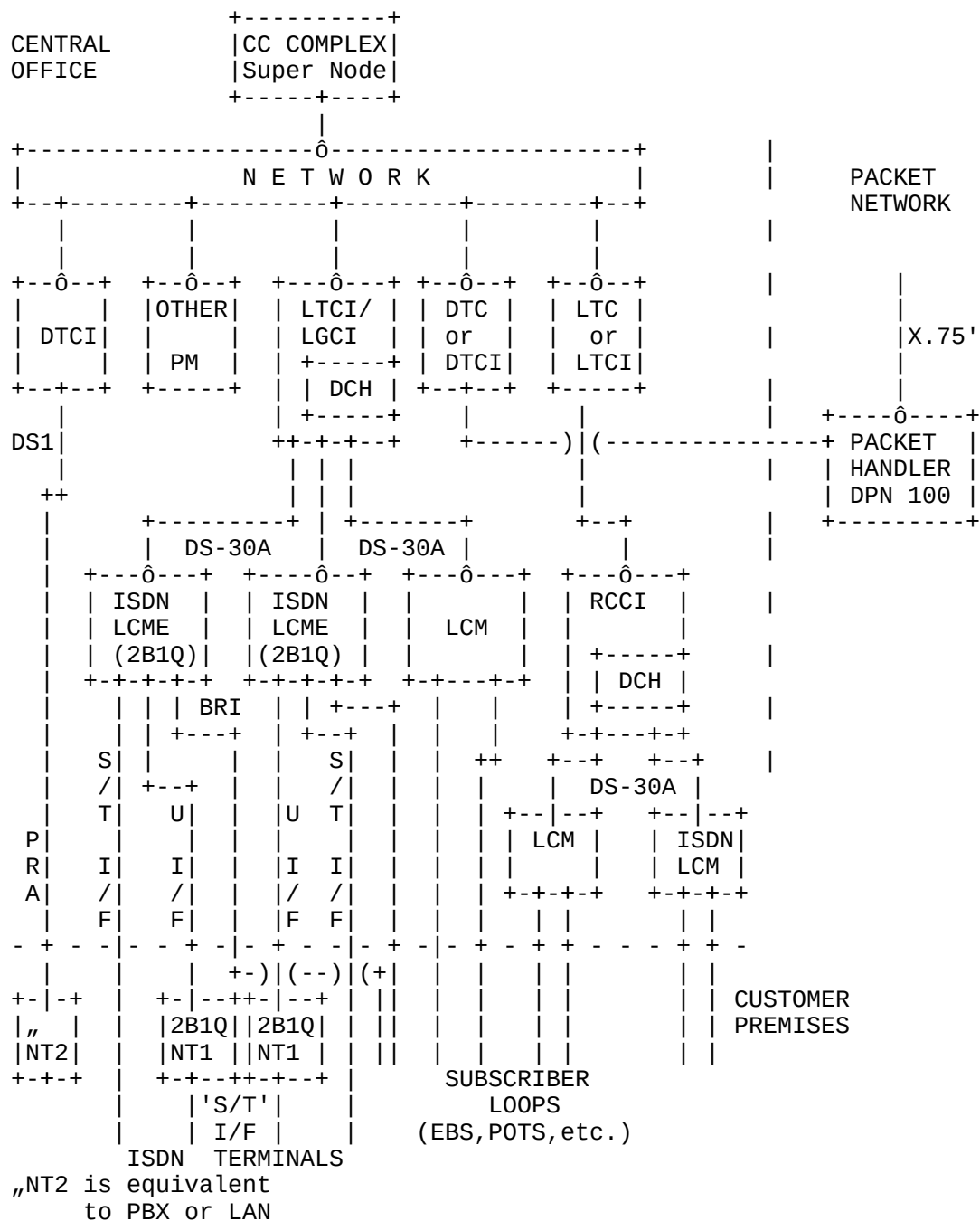


Figure 11. Preferred ISDN System Configuration w/DMS-PH

RELEASE 06.03
13 July 1998

10.2 Hardware Provisioning

10.2.1 Hardware Usage Restrictions

The ISDN 2B1Q Line Drawer NTB32BA will not support AMI line cards. The ISDN AMI Line Drawer NTB32AA (MD) will not support 2B1Q line cards.

There is no mixing of NTB32BA and NTB32AA (MD) line drawers allowed within an ISDN LCM module.

An AMI LCMI and a 2B1Q LCME can coexist on the same LCEI frame for field retrofit only. No mixed frames will be built from scratch. The LCMI to LCME Upgrade Kit (NTB30BC) is used to change an existing LCMI (AMI) to a LCME (2B1Q) on an existing LCEI frame or to add a new LCME module to an existing LCEI frame with only one LCMI module already equipped on it.

Line sub-groups 0-7 (physical line drawers 1-4) are served by the DS30A links to Unit 0 only. These are the even DS30A's (Link 0, 2, 4, Line sub-groups 8-15 (physical line drawers 5-8) are served by the DS30A links to Unit 1 only. These are the odd DS30A's (Link 1, 3, 5, ..., 17). If ISDN line cards are placed sequentially in the LSG's (starting with LSG 0 or 8 and working up), there is a high likelihood of overpopulating the links running to one unit, causing blocked originations and/or terminations. To prevent this, distribute ISDN line cards evenly throughout both units of the LCME.

10.2.2 Hardware Dependencies

The software development for 2B1Q had two phases. In Phase I (BCS31): The LCME supports only ISDN lines. In Phase II (BCS32): The LCME can support ISDN lines POTS, EBS, and DATAPATH lines.

10.2.2.1 P and C Side Port Requirements

The Line Concentrating Equipment frame for ISDN is an evolution of the standard LCE frame. The ISDN LCM will allow from 2-18 DS-30A links to the serving CPEI.

The maximum of 18 DS30A links provides non-limiting channel bandwidth for up to 239 ISDN Lines, even during takeover configurations.

Each LCME may have from two to eighteen DS-30A links to the supporting CPEI (i.e. either an LGCI, LTCI, RCCI, or RCC2). The total number of DS-30A links plus the number of DCHs (including the spare) cannot exceed twenty (20). That is the number of available ports on the LGCI/LTCI. Refer to the Traffic Engineering section for detailed link provisioning worksheets based on traffic loading calculations in ECM-497.

RELEASE 06.03
13 July 1998

10.2.2.2 DMS BUS Port Requirements

Not applicable

10.2.2.3 Circuits Per Card

Not applicable

10.2.2.4 Discrimination Numbering

ISDN LCE Frames and/or Cabinets must be numbered consecutively, starting from LCEI 000 to completion or starting from the next available Line Module number. For example:

- If no Line Modules exist and five (5) LCEIs are provisioned. The LCEIs or CLMIs shall be numbered as 000 to 004, or
- If LMEs exist from 00 0 to 03 1, and five (5) ISDN LCEs are added start number LCEs as 004 to 009.

10.2.3 Provisioning Considerations

When provisioning ISDN Line Concentrating Equipment (LCEI) the following must be considered:

- Module Housing (Frame or Cabinet)

When provisioning a cabinet based system refer to ECM-683 for additional equipment which may be required in support of the cabinet itself as opposed to the ISDN Line Function housed therein.

- LCME Module 2 per frame or cabinet
 - Line Drawers 8 Per Module
 - Line Card provisioning 60/LD, 480/LCME
- Line Cards
 - Type of cards provisionable
 - Ringing Generators
 - Line Card Spread
- Other Supporting Equipment
 - MTU Requirement
 - Peripheral Controller

10.2.3.1 LCEI Frames/Cabinets

The ISDN Line Concentrating Equipment (LCEI) is a single-bay equipment frame or cabinet containing two ISDN Line Concentrating Modules Enhanced (LCME). Provisioning this equipment in either

RELEASE 06.03
13 July 1998

the frame or cabinet configuration is based on customer preference.

However, the LCEI cabinet based system offers EMI/RFI shielding inherent in its design as opposed to the frame based system which requires add-on devices to facilitate EMI/RFI shielding.

When provisioning a frame based system refer to ECM-125 for additional equipment which may be required in support of the frame itself as opposed to the ISDN line function housed therein.

10.2.3.2 LCEI Modules (LCME)

The ISDN Line Concentrating Module (LCME) is a dual unit peripheral module which terminates ISDN lines. Each shelf in the module is referred to as a ISDN Line Concentrating Array (LCAI). The LCME consists of two Line Concentrating Arrays, which operate in a load sharing mode with mutual takeover capability.

Each shelf (LCAI) in the ISDN Line Concentrating Module contains four physical Line Drawers.

ISDN 2B1Q Line Drawers

There are eight (8) drawers per LCME with a maximum of 18 DS30A links per LCME. Refer to Figure 7 on page 5-50 and Figure 8 on page 5-51 for a layout of the LCME and the numbering of line drawers existing in it.

NTBX32BA ISDN Enhanced Line Drawer has been introduced for 2B1Q Access Subsystem. The NTBX32BA is a high capacity line drawer replacing NTBX32AA. It increases the ISDN LCM capacity from 48 slots to 60 slots. This provides a physical capacity of 480 single slot lines per LCME.

Each drawer can support up to 60 single slot line cards. The "D" channel of each line is statistically multiplexed at a 4 to 1 ratio at the LCME and sent to the D Channel Handler for processing. Refer to ECM-497 for calculations to determine provisioning based on traffic levels.

The ISDN 2B1Q line drawer consists of the following:

- One Bus Interface Card (BIC)
- Sixty line card slots
- One Point of Use Power Supply (PUPS).

The PUPS converts the common equipment -48V BATTERY to +5V. This +5V is routed to the line card slots.

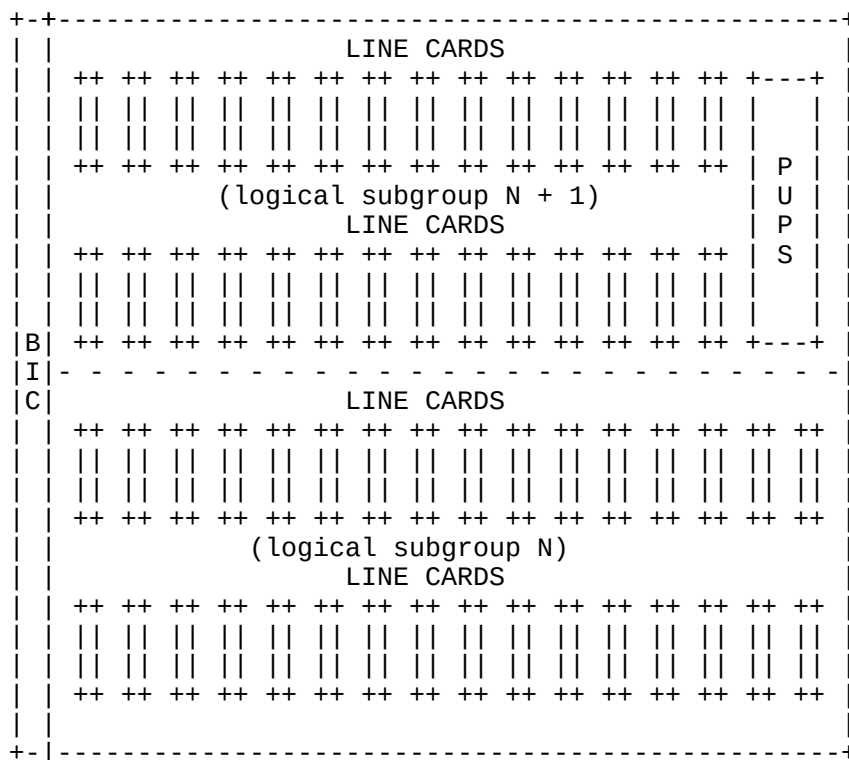
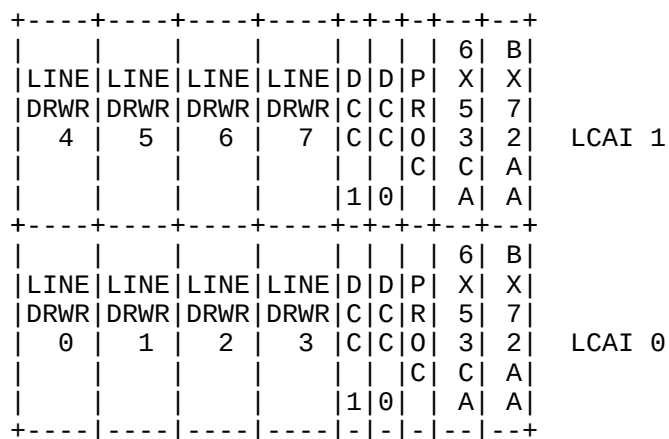


Figure 12. 2B1Q Enhanced Line Drawer Layout

Each drawer is divided into two (2) logical drawers or subgroups. This differs from the LCMI which has three (3) logical subgroups per each physical drawer.

RELEASE 06.03
13 July 1998

The individual logical subgroups in a line drawer will be numbered from the bottom up; starting as subgroup 0 at the first line drawer (Line Drawer 0) and continuing, in sequential order, up to subgroup 15 (at the top of Line Drawer 7). Refer to the figure below:



LINE DRWR - ISDN Enhanced Line Drawer NTB32BA
 DCC 0/DCC 1 - ISDN LCM Digroup Controller NTB35AA
 PROC - ISDN Enhanced LCM Processor NTB34CB
 6X53CA - ISDN LCME Power Converter NT6X53CA
 BX72AA - ISDN LCME Battery & Ring Router NTB72AA

Figure 13. LCME Module

NTBX72AA ISDN Enhanced LCM Battery & Ringing Router

The NTB72AA CP replaces the NT6X53BA power converter CP in each LCME unit. It distributes -48V BATTERY and BATTERY RETURN to the line drawers residing in its own shelf and will provide battery power to its mate shelf as well in the case of power takeover. The ring relay function multiplexes the ring bus from the two ISDN LCM frame ring generators to the line drawers.

NT6X53CA ISDN Enhanced LCM Power Converter +5V/+15V

The NT6X53CA CP replaces the NT6X53EA power converter in the LCME module. It will provide +5V to the common equipment control CPs and + 5V to the line drawers. The +15V is power shared to the line drawers.

RELEASE 06.03
13 July 1998

10.2.3.3 LCME Provisionable Line Cards

The 'U' line card interfaces to standard 2-wire outside plant for connection to the NT1 at customer premises. NTB27AA is the ISDN 2B1Q U Line Card which replaces the AMI U Line Card NTB25AB. The 2B1Q U-interface will be supported through the use of the NTB27AA. The 2B1Q line card NTB27AA is used in the high capacity 2B1Q line drawer for host and remote locations.

In BCS-28, an 'S/T' line card will be introduced which does not require an NT1. It will interface directly to the 4-wire S/T interface, with a restricted loop range. The S/T line card is only intended for applications where a remote system or Private Branch Exchange (PBX) is located in the customer premise. If the S/T line card is to be engineered in a C.O. environment where it will interface to outside plant wiring, overvoltage protection that meets the requirements of LSSGR Bell Communications Research (Bellcore) Spec TR-TSY-000057 First Level Surge Tests must be used.

'U' and 'S/T' line card types can be mixed within a line sub-group.

LCME Line Card Service Mix

The 2B1Q Access Subsystem will support many line card types. The list below summarizes which are not supported.

The 2B1Q Access Subsystem will support the following line card types:

1. POTS - Type-A Line Cards (NT6X17AA/AB/AC/BA).
2. POTS - Type-B Line Cards (NT6X18AA/AB/BA) (Non-coin/ANI only)
3. Datapath-Data line cards (NT6X71AA/AB/BA).
4. Datapath-Asynchronous Interface line card (NT6X76AA/AC/AD).
5. Datapath-IBERT line card (NT6X99AA).
6. EBS-P-Phone line card (NT6X21AC).
7. Message Waiting POTS type line card (NT6X19AA). This card requires a power converter line card (NT6X20AA) to function.
8. ISDN-S/T-Interface line card (NTB26AA). This card offers a digital 4-wire ISDN S/T Interface for ISDN services.
9. ISDN-U-Interface (2B1Q) line card (NTB27AA). This card offers a digital 2-wire ISDN U Interface for ISDN services.

The 2B1Q Access Subsystem will not support the following line card types:

1. POTS Type B line cards (NT6X18AA/AB)(Coin/ANI function)

Ringling Generator CPs are required in the ISDN Line Module Frame and or cabinet when POTS Line Cards are provisioned.

RELEASE 06.03
13 July 1998

2. ISDN AMI U-Interface line cards (NTBX25AA/AB).

LCME Line Capacity

Line Card Type	AMI LCMI	2B1Q LCME
ISDN 2B1Q U-I/F	0	480
ISDN AMI U-I/F	160	0
ISDN S/T I/F	192	240
POTS Type A	384	480
POTS Type B (ANI/COIN)	0	0
POTS Message Waiting	376	472
EBS (P-Phone)	384	480
Datapath Data Line Card	192	240
Datapath AILC Line Card	192	208
Datapath IBERT Line Card	1	1

Figure 14. Table 1: Line Capacities for the 2B1Q ISDN LCME

Powering for a full frame of 2B1Q U ISDN Line Cards, EBS Line Cards, POTS Line Cards, Data Line Cards, or S/T ISDN Line Cards is provided.

Power limits the NT6X76AA Asynchronous Interface Line Card to 26 per drawer. The NT6X76AC AILC has no greater current limit than a regular 2-slot line card; therefore, there is no limit to the provisioning of the NT6X76AC (maximum 30 per drawer).

LCME Line Card Distribution

In BCS-31, the LCME will support only ISDN lines.

In BCS-32 (and beyond), any of the line cards supported can be mixed with any other line card at the drawer or logical subgroup level. However, if there are more than eight (8) S/T-Interface line cards in the same row as POTS line cards, then the POTS line cards will NOT stay in-service on PUPS failure. The Data Line Cards cannot be mounted in the five line card position (slots 18 to 26) in the top LSG next to the PUPS line card. It is permitted to mount the Data Line Card in the lower LSG directly under the PUPS. Refer to the Engineering Manual, section EMA14-03-000, for more information on the non-ISDN line cards and their provisioning rules.

The LCME provides flexible Time Division Multiplexing (TDM) groups. This enables an ISDN line to be placed anywhere in a

RELEASE 06.03
13 July 1998

drawer. Any four ISDN lines from the same physical drawer can belong to the same TDM group subject to rule that lines in a particular TDM group must come from the same physical drawer.

D-channels from line cards within one physical drawer will be multiplexed together in any manner. D-channels from line cards in different physical drawers will not be multiplexed together.

Refer to ECM-497 for more information on how to engineer LCMEs that support ISDN lines only or mixed lines.

10.2.3.4 Terminal Provisioning

An LTID number is required for each terminal on the switch. The current limit for LTIDs is 32,000 per switch. The limit for packet data devices will remain at 16000 for the packet handler equipment.

Up to eight terminals may be assigned to each loop. A maximum of 2 B channel devices (voice, circuit switched data or 64K packet data) + 6 D channel devices (16K packet data), 1B + 7D or 8D may be assigned to each loop.

10.2.3.5 MTU for 2B1Q Lines on a LCME.

For every MTA that has a LCME on the vertical there must be at least one MTU on a horizontal of that MTA. Each MTU (NT2X10BA and NT2X11BA card set) has two test access ports; that is two () sets of tip and ring. Thus it can test two 2B1Q lines at the same time. A LTU that has access to an MTA that has a LCME on the vertical will NOT be used to perform any metallic testing on the 2B1Q lines. Any rover test units (ones shared across MTAs) that has access to the MTA that has a LCME on it must be a MTU for it to be used on the LCME.

The physical installation of MTUs in MTMs is no different for 2B1Q than for POTS. For more information on MTUs, refer to ECM-389.

10.2.3.6 ISDN Line Concentrating Equipment Building Blocks

A total of two ISDN LCE building blocks are maintained, one of these is based on equipment frames, and one is housed in a Model B cabinet. They have the following characteristics:

- Frame Based ISDN LCE: NTZZ17EB
 - ISDN LCE in Universal Frame with Ringing Generators and LCMEs provisionable
- Cabinet Based ISDN LCE: NTZZ47BC
 - ISDN LCE in Model B Cabinet, LCMEs and Ringing Generators are Provisionable

RELEASE 06.03
13 July 1998

In addition, an ISDN LCE frame can be engineered in 'detail' when the ISDN LCE building block does not satisfy the specification of the site being considered. The NTB30AB ISDN LCE frame is engineered in 'detail'.

10.2.4 Office Layout Information

Manual.

The maximum cable length for the DS-30A connections between CLMI Model A cabinet and its associated CPEI/IAC Controller shall not exceed 5 feet.

10.2.5 Traffic Tables

Manual.

The Traffic Engineering Rules for the ISDN LCME will be based on the provisioning of the DS-30A Links to the LGCI and or the LTCI, refer to ECM-497 (Simplified Traffic Provisioning).

Refer to ECM-413 (ISDN Traffic Provisioning). This ECM contains worksheets and tables for engineering the required quantity of DMS100 ISDN peripherals and DPN-PH equipment based on Carried Traffic and Grade Of Service (GOS) considerations.

10.3 Product/System Specification

10.3.1 Physical Characteristics

Manual.

10.3.1.1 Power Requirements

2B1Q Enhanced Line Drawer

MECHANICAL DIMENSIONS

Height	12.68"
Width	3.83"
Depth	17.87" - measured from faceplate
	18.50" - including handle

2B1Q Enhanced Line Drawer CPs

The NTB71AA ISDN Enhanced Line Drawer PUPS is a two slot line card.

The NTB27AA ISDN 2B1Q Line Card is a one slot line card.

RELEASE 06.03
13 July 1998

10.3.2 EMI/Earthquake Information

Manual.

Not applicable.

10.3.3 Sparing Information

The Mean Time Between Failure (MTBF) of the various CP are as follows:

NTBX27AA ISDN 2B1Q U Line Card.....75 years at 40 deg. C.
NTBX36BA ISDN LCME Processor BIC.....70 years at 40 deg. C.
NTBX71AA ISDN 2B1Q Enh. Line Drawer..80 years at 40 deg. C.

10.3.4 Power Feed and Fusing Requirements

10.3.4.1 NTBX30AB - LCEI Frame Power Feed And Fusing Chart

Refer to the chart below Power and Fusing requirements for the NTBX30AB frame are as follows:

NTBX30AB - FUSING REQUIREMENTS CHART				
DESIG	AMP	POTENTIAL	ONE PER	NOTE
CB1	10	-48V(A)	RING 0	Prov.
CB2	10	-48V(A)	SHELF 05	Prov.
CB3	20	-48V(A)	SHELF 05	Prov.
CB4	10	-48V(A)	SHELF 40	Prov.
CB5	20	-48V(A)	SHELF 40	Prov.
CB6	10	-48V(B)	SHELF 19	Prov.
CB7	20	-48V(B)	SHELF 19	Prov.
CB8	10	-48V(B)	SHELF 54	Prov.
CB9	20	-48V(B)	SHELF 54	Prov.
CB10	10	-48V(B)	RING 1	Prov.
F01	1 1/3	-48V	FRAMEFAIL	AP
			FANFAIL	
F02	1 1/3	-48V	ALM CARD	AP
F03	1 1/3	-48V	AISLE ALM	AP
F04	1 1/3	-48V	ABS JACK	AP
VOLTAGE LIMITS				
POTENTIAL		RANGE		
-48V		-42.5V TO -55.8V		
REF: ISBX30AB 00 08				

Figure 15. NTBX30AB Fusing Requirements Chart

RELEASE 06.03
13 July 1998

Fusing:

The NTB30AB is fused at the PDC with 4 x 20 Amp feeds for the LCEI (2A and 2B). These fuses are used as follows:

- 2 are required for the talk battery
(1A and 1B)

- 2 are required for the ringing generators*
(1A and 1B)

Provide two (2) 5 Amp feeds for the first DC Fan unit. Up to five (5) additional DC Fan units may subsequently be fed off the same LCEI frame.

Reference CA0X04 for further details on power cabling.

In addition multiple ABS 48V from preceding to succeeding frame and multiple Ringing Returns between frames in a line up. Reference CA0X04.

* The two feeds for the ringing generators are not required since ringing generators are not provisioned. However, generally they should be provided for future applications.

10.3.4.2 NTRX30BA - Power Feed And Fusing Chart

The following fuses and feeds are required:

Fusing:

The NTRX30BA is fused at the PDC with 4 x 30 Amp feeds for the each LCEI (2A and 2B). All existing LCEI jobs, equipped with 20 Amp fusing, will be upgraded to 30 Amp fusing.

In existing offices, it is possible that the cables between LCEI and PDC will not support a 30 Amp rating based on their length and gauge. In this case, it will be necessary to provide a larger gauge cable, or re-route the cable to reduce the length, or move the LCEI closer to the PDC.

NTRX30BA - FUSING REQUIREMENTS CHART				
DESIG	AMP	POTENTIAL	ONE PER	NOTE
CB1	20	-48V(A)	SHELF 05	Prov.
CB2	20	-48V(B)	SHELF 19	Prov.
CB3	20	-48V(A)	SHELF 33	Prov.
CB4	20	-48V(B)	SHELF 47	Prov.
CB5	10	-48V(A)	RG-0	Prov.
CB6	10	-48V(B)	RG-1	Prov.
F01	2.0	-48V(A)	UPPER CU	AP
F02	2.0	-48V(B)	UPPER CU	AP
F03	3.0	-48V(A)	LOWER CU	AP
F04	3.0	-48V(B)	LOWER CU	AP
F05		-48V(A)	SPARE	
F06		-48V(B)	SPARE	
F07		-48V(A)	NOT USED	
F08		-48V(B)	NOT USED	
F09	1 1/3	-48V	FRAMEFAIL Upper FAN Fail Lamp	AP
F10	1 1/3	-48V	ALM Cards	AP
F11	1 1/3	-48V	FAN ALARM	AP
F12	1 1/3	-48V ABS	ABS JACKS	AP
F13	1 1/3	-48V ABS	CD01 ALM CARD	AP
F14		-48V ABS	SPARE	
F15		-48V ABS	SPARE	
F16	1 1/3	-48V ABS	FRAME Fail Lamp	AP
VOLTAGE LIMITS				
POTENTIAL		RANGE		
-48V		-42.5V TO -55.8V		
REF: ISRX30BA 00 06				

Figure 16. NTRX30BA Fusing Requirements Chart

10.3.5 Current Drain Information

Manual.

LCEI Frame/Cabinet Current Drain is as follows:

Current Drain - 33 Amps
Heat Dissipation - 1610 Watts

RELEASE 06.03
13 July 1998

10.4 Software Provisioning

For NTX software packages to PLC/SOC mappings for CSP02 and beyond refer to ECM552 - Mapping of NTX/NTG Package to PCL/NCL/Option.

10.4.1 Required Software Packages and Interdependencies

Manual.

Not applicable.

10.4.2 Software Usage Restrictions

Manual.

Not applicable.

10.4.3 Memory Provisioning

Manual.

Not applicable.

10.5 Real Time Impact

LCME Real-Time Engineering for BRI is as follows:

The following chart illustrates the call types which impact Real Time Engineering of the LCME.

CALL TYPE	31	32+
-----	--	---
ISDN Circuit Switched	Y	Y
ISDN Packet Switched	N	N
Non-ISDN Circuit Switched (POTS, MDC,...)	N/A	Y

Refer to System Engineering Bulletin (SEB) 90-05-002 for Real Time Engineering Guidelines for the LCME.

10.5.1.1 LCMI Real-Time Engineering

The following chart illustrates the call types which impact Real Time Engineering of the LCMI.

CALL TYPE	BCS			
	25	26	27	28
-----	--	--	--	--
ISDN Circuit Switched	Y	Y	Y	Y
B Channel Packet Switched	N	N	N	N
D Channel Packet Switched	N	N	N	N
Electronic Business Set	N	N	Y	Y
Datapath	N	N	Y	Y
Other (POTS and MDC)	N	N	N	Y

RELEASE 06.03
13 July 1998

Refer to System Engineering Bulletin (SEB) 88-10-001 for BCS 25-27
Abbreviated Real Time Engineering Guidelines for the LCMI.

RELEASE 06.03
13 July 1998

11.0 ECM722 - 1-Meg Modem Service (1-MMS)

11.1 Overview

Product/System Overview

1-Meg Modem Service (1-MMS) High Speed Data Service is a NORTEL initiative to deploy an "ADSL-like" technology which provides users a 960 Kb/s downstream data rate and 128 Kb/s upstream data rate in addition to a simultaneous voice capability all over existing copper subscriber loops. Currently, approximately 58 million of the 175 million residential subscriber loops in North America are off of DMS-100F hosts. The goal of 1-MMS is to leverage the integrated nature of the solution as well as the installed base of existing copper loops and DMS-100F CO hardware to address the rapidly expanding home office and internet access markets.

The project includes modifications to the existing Line Concentrating Module (LCM) to implement the 1-Meg Modem Service functionality in addition to the introduction of a new piece of CPE equipment which will support the ADSL-like digital subscriber loop protocols. The modification to the LCM consists of a new data line interface card (xLC) to support simultaneous POTS and data service and a new Data Bus Interface Card (DBIC) to separate the data traffic from the voice traffic going to the DMS. These changes require the addition of a cable trough and assembly and a PEC change to the existing POTS LD to allow provisioning and connectivity of the new DBIC. Data will be routed to a cross connect panel in a DMS MIS frame for an ATM network connection and will bypass the DMS switching fabric; thereby, off-loading the DMS core from the processing and other associated resource requirements of handling a normally switched data call. A new CPE data set (1-Meg Modem), with provisions for simultaneous connection and activation of incoming/outgoing calls over a standard phone set, has been developed by NORTEL and is offered through the telephone company to interface the customer's incoming line with an Ethernet 10Base-T card. The Ethernet card will be inserted in the customer's personal computer (both customer-provided). NORTEL has developed phone filters that will be offered by telephone companies to their customers to provide isolation for all additional phone sets on their premises. The phone filters prevent ADSL signals from reaching the telephone set and ensure performance of the voice frequency (VF) at the phone set.

The NTEX38AA and NTEX39AA Phone Filters are OEM equipment items, and should be ordered in the 996 specification only for Telco Central Office test requirements. Telcos will have to order phone filters for their end users from NT-Nashville.

The 1-Meg Modem is an OEM equipment item, and should be ordered in the 996 specification only for Telco Central Office test re-

RELEASE 06.03
13 July 1998

quirements. Telcos will have to order 1-Meg Modems for their end users from NT-Nashville.

11.1.1 System Architecture

There are three main components to the 1-Meg Modem Service System:

1-Meg Modem: A CPE device that connects to the telephone line, extension telephone and personal computer. To the user, this device looks and acts like a regular voice band modem with the exception of providing a 10Base-T interface instead of a serial RS232 interface.

xLC: 1-Meg Modem Service linecard that is installed at the Central Office within a Line Concentrating Module (LCM) to terminate the customer's telephone line. This card provides high-speed data communication with a user's 1-Meg Modem while in parallel providing full voice service.

DBIC: 1-MMS Bus Interface Card which provides a concentrating function for the voice and data connections within a single LCM drawer. This card also separates the voice and data traffic for routing within a packet switched network (data) or circuit switched network (voice).

Other components necessary for providing a service using the 1-Meg Modem System are:

x Element Manager System (xEMS): This device is a workstation that provides operator control for operation, administration, maintenance and provisioning (OAM&P) functions. xEMS is also used to load DBIC software and configure the DBIC as well as for OA&M.

Access Network: The access network is a LAN or WAN which provides the connection to Internet or Corporate LANs. The primary interface of the 1-Meg Modem Serve access portion is through the ethernet port of a Magellan Passport or ethernet switch.

11.1.2 1-Meg Modem

The 1-Meg Modem, a CPE device, provides data access for 10Base-T Ethernet connection to the customer's computer. The architecture is designed to be plug and play making installation simple enough for the end customer to install their own 1-Meg Modem. The 1-Meg Modem provides the customer with a 10Base-T Ethernet interface to the Access Network. The customer may connect any Ethernet device such as a Personal Computer, Workstation, Router or Ethernet Switch. It is important to note that hubs are not allowed.

The 1-Meg Modem is an OEM equipment item, and should be ordered in the 996 specification only for Telco Central Office test re-

RELEASE 06.03
13 July 1998

quirements. Telcos will have to order 1-Meg Modems for their end users from NT-Nashville.

11.1.3 xLC and DBIC

The xLC and DBIC are installed within a line drawer of an LCM. One LCM can accommodate a total of 10 drawers, each of which can hold one DBIC and multiple linecards. The linecards can be a mix of xLCs and voice linecards with limitations as defined in Engineering Manual Section NT6X05EA, Rule 8. The xLC card contains the necessary interface circuitry for voice and high-speed data communication with the 1-Meg Modem and customer telephone sets. xLC linecards are installed for each customer that requires high-speed data service while the DBIC is only installed in line drawers that have xLC linecards. Each DBIC provides a 10Base-T Ethernet connection to the Access Network for all users within one line drawer. The DBIC multiplexes xLC data channels on one 10Base-T Ethernet. A 10Base-T interface typically operates at 10Mbps. However as designed on the DBIC, the 10Base-T interface can operate in full duplex mode providing 20Mbps aggregate throughput. As described earlier, any drawer with xLC cards must have a DBIC card to provide data service to that drawer. The XLBUS (eXtended LBUS) is a new protocol defined for communication between the DBIC and xLCs which uses the existing point-to-point lines used in the present system. It is thus backward compatible with the LBUS interface allowing the DBIC to replace an existing BIC and maintain compatibility with existing linecards.

11.1.4 x Element Manager System (xEMS)

The x Element Manager System (xEMS) is the OAM&P station which manages all the 3 main components of the 1-Meg Modem Service system (DBIC, xLC and 1-Meg Modem) and also provides an integrated management with other data components. The x Element Manager System is the responsibility of the Customer. NORTEL recommends the workstation equipment as indicated in "workstation requirements" at the end of this section.

Some of the functions of the xEMS are as follows:

- 1) DBIC Provisioning (datafill MAC address and physical location information).
- 2) DBIC, xLC and 1-Meg Modem fault and state management (data portions only).
- 3) DBIC, xLC and 1-Meg Modem performance management (Operational measurements).
- 4) DBIC IP address configuration (BOOTP server).

RELEASE 06.03
13 July 1998

5) Gateway router/switch configuration for ISP access by the 1-MMS subscribers. Static configuration on the switch allows the subscribers to access different ISPs. No multihoming support is provided for the VO trials. ISP access for Phase 1 is static, with only one connection to an ISP. Phase 2 will have dynamic access to different ISPs.

6) Management of other Network Elements such as Magellan Passport and Ethernet Switches.

Since no communication exists between the DMS Core and the xEMS, the following steps need to be performed:

A) The DMS needs to be datafilled to provision the DBICs, MAC Addresses, and xLCs via the DMS MAP.

B) The craftsperson must record the DBIC MAC address and location and communicate the information to 1-MMS Network Administrator to update the xEMS manually.

C) If a DBIC is deleted from the table and physically removed then it would still show up as a node with status red on the Openview MAP. Openview can be configured to remove the node if it remains red for more than a certain amount of time. In case of EIU and/or terminal server the removal of the DBIC from the Openview MAP would be almost instantaneous. The Openview Map is in the xEMS.

Note that as long as the xEMS is connected to the customer's local network which is accessible by NORTEL, NORTEL support can be provided through standard Telnet sessions. Access can be provided through regular dial-up modems connected to a Terminal Server which is itself connected to the customer's data network.

Workstation requirements: The xEMS runs on a workstation with the following minimum requirements:

Hewlett Packard 9000/712/100

Color Graphics 1024x768

1 8 MB RAM minimum

3 0 MB free disk space minimum

1.2GB hard drive minimum

LAN/Link for HP9000

ARPA services/9000

CD-ROM Drive or DAT

RELEASE 06.03
13 July 1998

A workstation configured as above allows interfacing to 500-2000 DBICs.

11.1.5 Access Network

The Access Network is maintained and provisioned by a Network Management station. It keeps track of all 1-MMS components in the network including the DBICs, xLCs and 1-Meg Modems. The general architecture is based on the use of the user's MAC (ethernet) address for switching data between users and their service providers. A device which uses the MAC address for routing between ports is generally referred to as an ethernet switch. The Magellan Passport switch can function in several modes. It can use ATM, IP or MAC addresses and is not considered an ethernet switch although it can operate as one in certain cases. Such a switch can connect the DBICs to the ISPs for Internet access and to corporations for work-at-home applications (in the following, "service provider" refers to "either"). This switch allows the internal data paths to be configured so that subscriber traffic is routed to the respective service provider.

11.2 Hardware Provisioning

11.2.1 Hardware Usage Restrictions

The hardware required for upgrading to 1-Meg Modem Service at the central office has been designed for North American DMS-100 Host office (LCE frame only) LCM applications, and is not currently applicable to International LCMs, Cabinetized LCEs (CLCE) or remotes such as RLCM, OPM, RSC, RSCS, and others.

Per customer requirements, NORTEL will engineer, install, and commission a new NT6X05EA Line Drawer equipped with a provisionable NTEX3710 Data Cable Trough Assembly, a provisionable NTEX54AA DBIC card, and provisionable NTEX17AA xLC cards (up to 16 per design rules), or a combination of xLC cards and new service POTS cards (per design rules).

Per Telco request, NORTEL will engineer the upgrade of existing NT6X05AA Line Drawers to be Xnet capable (NT6X05EA), by engineering, installing, and commissioning the NTEX37AA Product Change Kit, the NTEX54AA DBIC Card, the NTEX17AA xLC Line Cards (up to 16 per design rules) and any new POTS cards. The existing line drawer must have no active subscribers or line cards in place. Prior to delivery, it is the Telco's responsibility to remove all subscribers and line cards from any existing line drawer being upgraded to an NT6X05EA LCM Line Drawer, Provisionable BIC.

The Telco may add existing subscriber line cards to the new, or upgraded, NT6X05EA LCM Line Drawer after K-Date of the job schedule. New subscriber line cards can be added prior to the K-Date of the job.

RELEASE 06.03
13 July 1998

On any additional orders, when new NTEX54AA DBIC Cards are added, the commissioning of the DBICs will be a requirement for the Customer and NORTEL PCN Installation to jointly perform.

11.2.1.1 Drawer Fill Restrictions

Due to thermal constraints and power distribution within the LCM line card drawer, restrictions exist both in terms of the quantity and distribution of 1-MMS cards. These guidelines are intended to apply only to the first release of the 2-slot xLC, and, as more aggressive power management strategies are employed, it is expected that allowable card densities will increase. Failure to adhere to these guidelines may result in physical damage to cards.

The engineering guidelines for the deployment of the 2-slot xLC are as follows:

- 1) If only xLCs are deployed within a drawer, a maximum of sixteen may be installed. The xLCs are to be populated in the Even Line Subgroups (LSG) only (two lower rows of drawer), and the Odd Line Subgroup (top two rows of drawer) must be left completely unpopulated.
- 2) If xLCs and regular line cards are to be mixed, the above rules remain as stated for the 1-MMS cards. Line cards are not allowed in slots vertically above xLCs. Furthermore, line cards are not allowed in slots closer to the DBIC than the furthest xLC. For example, if an xLC occupies slots 07/23 of the Even LSG, no line cards are allowed in slots 00-07 and 16-23 of the Odd LSG.
- 3) An additional rule exists due to the height of the RJ-45 connector on the DBIC which extends beyond the 0.70 inches allowed. No cards are allowed in the slot adjacent to the top of the DBIC (slot 16, Odd Line Subgroup). Note that since the NT6X20AA (Message Waiting Converter Card) and NT6X23AA (Power Converter +48V Card) can only be used in slot 16 of the Odd LSG (with slot 0 remaining unassigned), these could never be used in an 1-MMS Line Drawer. Line Cards NT6X18AB and NT6X19AA also cannot be used in an 1-MMS Line Drawer.

Following these guidelines will ensure the total power dissipated within the line drawer remains below the 50W level. Furthermore, thermal simulations based on these guidelines have shown that these configurations minimize the temperature surrounding the DBIC. This is crucial since the DBIC has the tightest thermal constraints.

Note 1: Although the xLC occupies two slots, only the "bottom" Xlbus' are used. For example, if an xLC occupies slots 00 and 16, the Xlbus associated with slot 00 is used for voice and data while the Xlbus for slot 16 remains completely unused.

RELEASE 06.03
13 July 1998

Note 2: There is no limit to the number of 1-MMS line drawers in an LCM or LCE, other than the standard physical capacities of 10 per LCM and 20 per LCE, as is with a POTS line drawer.

11.2.1.2 Ethernet Interface

The maximum distance between the Line Drawer and the Data Equipment is limited by the 10Base-T protocol to be 100 meters. The same holds for the 10Base-T interface at the 1-Meg Modem. At the central office, the 100 meters is divided into two sections of 50 meters. The first 50 meters is reserved for the cable connecting drawers in an LCM to the cross-connect panel and the second 50 meters is reserved for the connection between the cross-connect panel and the data equipment.

11.2.1.3 1-Meg Modem

Only one ethernet host can be connected to the 1-Meg Modem. The connection must be direct and must not involve any hubs or bridges. An ethernet host is either a computer with an ethernet card or another device, such as a router, which presents only one MAC address to the 1-Meg Modem.

The modem technology in the 1MM and xLC is not designed to pass traffic during telephone ringing. Although data may get through between rings, this is not guaranteed. However, testing has shown that ringing will not cause the modems to lose synchronization in an unrecoverable way.

11.2.1.4 Access Network

The access network consists of Magellan Passport switches or third party ethernet switches with VLAN capability. The number of VLANs or "virtual channels" is generally limited. For example, the Passport switch has a limit of 180 "virtual channels" which limits the number of users that can be connected to it to 179 (1 channel is required to communicate to the xEMS) unless users are grouped in drawers such that all users within a drawer belong to one ISP allowing 1 VLAN to be used per drawer. Note that this has security implications so this should be done only under special circumstances.

11.2.2 Hardware Dependencies

Since the 1-MMS product is based on the DMS line drawer infrastructure, it is clearly dependent on the DMS-100 Host office product (LCE frame/LCM module) being installed. It is not possible at this time to provision a stand-alone LCE with data service only.

RELEASE 06.03
13 July 1998

11.2.2.1 P and C Side Port Requirements

Not applicable

11.2.2.2 DMS BUS Port Requirements

Not applicable

11.2.2.3 Circuits Per Card

The "Phase 1" xLC line card (NTEX17AA) will be a 2-slot line card with one subscriber line per card. The "Phase 2" xLC line card will be a single-slot line card with one subscriber line per card.

11.2.2.4 Discrimination Numbering

The 1-Meg Modem Service LCM Line Drawer, Provisionable BIC will use the same LSG and Line Card slot numbering patterns as the existing NT6X05AA POTS Line Drawer.

11.2.3 Provisioning Considerations

This section details the provisioning guidelines for this product.

1-Meg Modem Service is only available for North America DMS-100 Host Office frame applications.

Provide the NT6X05EA LCM Line Drawer, Provisionable BIC for applications requiring 1-MMS Ethernet Service. Up to sixteen (16) xLCs may be provisioned per NT6X05EA. Up to twenty (20) NT6X05EA LCM Line Drawers may be provisioned per LCE (NT6X03AA or NTZZ41JA). Refer to NT6X05EA Engineering Manual Section for provisionable DBIC and xLCs, and the associated application rules. Also see the NT6X05EA Engineering Manual Section for provisioning the NTEX3710 Data Cable Trough Assembly for cabling the DBIC if the NTEX54AA DBIC is provided.

Refer to NT6X03AA or NTZZ41JA Engineering Manual Sections for LCE frame provisioning information.

An existing NT6X05AA POTS Line Drawer may be upgraded to a NT6X05EA LCM Line Drawer by applying one (1) NTEX37AA PC Kit. Refer to NT6X05AA and NTEX37AA Engineering Manual Sections.

Provide NTEX17AA xLC line cards for 1-MMS voice and data service on the xLC. If only xLCs are deployed within a drawer, a maximum of 16 may be installed. The xLCs are to be populated in the even LSG only (two lower rows of drawer). The odd LSG (two 2" upper rows of drawer) must be left completely unpopulated. Note that xLCs are mountable in LSG 0 slots 0-15, physically occupying slots 0-31, and that LSG 1 slots 0-31 are unavailable when xLCs are mounted in LSG 0 slots 0-15. Line cards are not allowed in slots

RELEASE 06.03
13 July 1998

vertically above xLCs. Furthermore, line cards are not allowed in slots closer to the DBIC than the farthest xLC. For example, if an xLC occupies slots 07/23 of the even LSG, no line cards are allowed in slots 00-07 and 16-23 of the odd LSG.

The following Line Cards may not be provisioned in the NT6X05EA LCM Line Drawer, Provisionable BIC, although they are provisionable in the NT6X05AA Line Drawer: NT6X18AB, NT6X19AA, NT6X20AA, NT6X23AA. The NT6X18AB and NT6X23AA Line Cards are now rated MD.

Refer to NT0X02AB Engineering Manual Section for the provisioning of termination equipment (1-MMS Plug "N" Play Patch Panel NTEX46AA).

Provide quantity of NTEX46AA 1-MMS Patch Panels as required. At least one (1) NTEX46AA Patch Panel must be provisioned for any office equipped with 1-Meg Modem service. Up to 2 DBICs (NTEX54AA) may be connected to each NTEX46AA Patch Panel. All DBICs connected to the patch panel must be within 50 cable meters of the patch panel.

The total vertical space occupied by one (1) NTEX46AA Patch Panel is four (4) inches. Allow an additional minimum one (1) inch above the Patch Panel for cables from the front to route to the back of the unit.

11.2.3.1 Customer Responsibility For Access Network

The 1-Meg Modem Service product is comprised of three distinct groups of hardware/systems: the DMS, Access Network (LAN/WAN), and an xEMS Workstation. Because these three pieces of hardware are, in part, the responsibility of both the Customer and NORTEL, specific terms need to be identified prior to installation of 1-Meg Modem Service.

Datafill must occur both on the DMS and the xEMS Workstation. Both pieces of equipment contain the same subscriber line information, however the xEMS Workstation will contain data network information. This datafill will be completed by NORTEL for testing purposes only. The Customer will be responsible for all network administration pertaining to the subscriber/ISP connectivity.

The Customer has certain responsibilities that must be completed before installation of 1-Meg Modem Service can take place.

The following descriptions help form the questions that NTACCESS must ask of the customer:

The customer must have their Access Network installed and tested prior to installation. The Ports going to the patch panel must be tested prior to connectivity. The Customer will also perform

RELEASE 06.03
13 July 1998

all Network Administration (IP Addresses, Subnets, etc.) on the Access Node.

QUESTION: Will the Access Network be installed, tested and ready by the "H" Date of the project: (Y or N)

The xEMS (Element Management System) and all commercial software must be installed prior to installing the NCL (Non-Computing Load) Software onto the workstation.

QUESTION: Will the HP Workstation be available and commercial software installed and ready by the "H" Date of the project: (Y or N)

QUESTION: Will The RJ45 Cabling from the Access Network to the patch panel be ready for connectivity by the "H" Date of the project: (Y or N)

11.2.4 Office Layout Information

Office layout requirements generally follow accepted central office guidelines since much of the product consists of card upgrades. However, the need to connect the upgraded LCMs to a data network imposes some office layout constraints. As previously described in "Ethernet Interface", section 2.2.2, a miscellaneous bay is required within 50m of an upgraded LCE since the cross-connect panel is found there. Furthermore, the data equipment (routers, hubs, etc.) must be found no further than 50m from the miscellaneous bay in which the cross-connect panel is provisioned.

11.2.5 Traffic Tables

See ECM 497 for Traffic Rules and ECM 590 for Traffic Tables related to the 1-Meg Modem Service product.

With respect to 1-Meg Modem Service and voice traffic, the data and voice paths are separate with the data being channeled through an ethernet pipe directly from the DBIC while the voice portion is transmitted over a DS30a with the support of the Digroup Controller Card, (NT6X52) and the LCM Processor Card (NT6X51). The data associated with the 1-Meg Modem Service therefore does not affect voice traffic in any way.

11.3 Product/System Specification

11.3.1 Physical Characteristics

LCE: The frame and shelf layout remains unchanged from the existing LCE.

1-Meg Modem System: The 1-MMS hardware consists of replacement cards for existing LCEs so all 1-MMS cards (DBIC and xLC) must fit

RELEASE 06.03
13 July 1998

into LCM drawers (NT6X05AA) that are upgraded to 1-MMS. Additional wiring which is required for 10Base-T connectivity must also be compatible with existing LCMs and LCEs. A 1-MMS upgraded LCM drawer (NT6X05EA) configuration includes the provisionable DBIC (NTEX54AA), the provisionable data cable/trough assembly required to extend the DBIC's 10Base-T interface (NTEX3710) to the back of the drawer, the provisionable 2-slot xLCs (NTEX17AA), and regular voice line cards.

DBIC: The DBIC has the same dimensions as the existing domestic BIC (NT6X54AA). The clearance for the voice only BIC is generally 0.70 inches. This rule must be followed for the DBIC in the three bottom slot positions. The RJ-45 connector is allowed to break the 0.70 inch rule since other suitable connectors could not be found. This issue is solved by not allowing the placement of any cards in the slot adjacent to the DBIC on the top row (slot 16).

xLC: The xLC is a 2-slot line card. All dimensions, except for the height, is the same as the existing voice line cards such as the NT6X17BA.

1-Meg Modem: The 1-Meg Modem is designed for either horizontal or vertical installation. The size of this modem is 9.15 in. long, 6.50 in. wide, and 1.82 in. high.

| Plug "N" Play Patch Panel : The NORTEL provided patch panel is
| mounted in the Miscellaneous Frame . The size of the patch panel
| assembly is 4 inches high X 26 inches wide. This height does not
include any potential space required to allow air flow to other
equipment mounted above or below the patch panel. Allow an additional one (1) inch space above for cables from the front to route to the back of the unit.

Deskmount Phone Filter: The size of the outside package of the deskmount phone filter is 2.81 inches long, 1.50 inches wide, and 1.13 inches high.

Wallmount Phone Filter: The size of the outside package of the wallmount phone filter is 5.98 inches long, 3.50 inches wide, and 1.38 inches high.

11.3.2 EMI/Earthquake Information

11.3.2.1 EMC/EMI Conditions

The 1-MMS upgrade design shall include design features to ensure continued operation of the line cards with no performance degradation due to reduced susceptibility performance.

The 1-Meg Modem shall comply with the FCC Declaration of Conformity rules for a Class B computer peripheral that may be used in residential and commercial locations.

RELEASE 06.03
13 July 1998

11.3.2.2 Seismic Conditions

The LCE/LCM shall continue to operate and sustain operation without replacement of components, manual rebooting, or human intervention when subjected to Office Vibration levels per section 5.4.2 of Bellcore GR-CORE-63. The product shall be constructed to sustain the Zone 4 waveform testing of section 5.4.1 of Bellcore GR-CORE-63 without permanent structural or mechanical damage. The product shall sustain operation without replacement of components, manual rebooting, or human intervention.

11.3.2.3 Environmental Conditions

The LCE/LCM shall meet all of its performance requirements when installed at altitudes ranging from 197 feet below sea level to 5,905 feet above sea level. The product should be functional when installed at altitudes between 5,005 feet and 13,123 feet above sea level.

The 1-Meg Modem Service and LCM must operate normally within the following temperature & Humidity ranges as specified in Bellcore GR-63-CORE, Issue 1.0, section 4.1.2:

Operating Temperature: +5 degrees C to +40 degrees C.

Short-term Operating Temperature: -5 degrees C to +50 degrees C.

Operating Relative Humidity: 5% to 85%.

Short-term Relative Humidity: 5% to 90%.

Short-term refers to a period of not more than 96 consecutive hours and a total of not more than 15 days in 1 year.

The 1-Meg Modem must operate normally within the following temperature and humidity ranges as specified in Bellcore GR-63-CORE, Issue 1., section 4.1.2:

Operating Temperature: 0 degrees C to +40 degrees C.

Short-term Operating Temperature: -5 degrees C to +50 degrees C.

Storage Temperature: -40 degrees C to +70 degrees C.

Relative Humidity 95% non-condensing.

11.3.2.4 ESD/RF Immunity

The LCE/LCM, when installed in an EMC enhanced cabinet, should meet the requirements of Bellcore GR-1089-CORE, Issue 1.0 1994, Section 2.2 (System Level Electrostatic Discharge (ESD)).

The LCE/LCM, when installed in an EMC enhanced cabinet should meet error free performance in a minimum 5 V/m, 80% amplitude modulated E - field from 0.01 to 200 MHz and a minimum of 2 V/m from 200 to 1000 MHz for compliance to Bell Canada TAD 8465, Section NI1, Table 8 and Bellcore GR-1089-CORE.

The 1-Meg Modem should meet the requirements of Bellcore GR-1089-CORE, Issue 1.0 1994, Section 2.2 and Canadian Bell Canada TAD 8465, Section BI4 (System Level Electrostatic Discharge (ESD)).

RELEASE 06.03
13 July 1998

The 1-Meg Modem shall be designed to provide continued performance at ESD stress levels of up to +/- 15 kv as required by Bellcore GR-1089-CORE and Bell Canada TAD 8465.

The 1-Meg Modem should be designed to ensure error free performance in a minimum 5 V/m, 80% amplitude modulated E-field from 0.01 to 200 MHz and a minimum of 2 V/m from 200 to 1000 MHz for compliance to Bell Canada TAD 8465, Section NI1, Table 8 and Bellcore GR-1089-CORE.

Note: This will ensure the future compliance with the now evolving future FCC immunity requirements.

11.3.3 Sparing Information

DBIC: The predicted steady state MTBF (Mean Time Between Failures) in a C0 environment is 275 years which corresponds to a return rate of 0.36% per year.

xLC: The predicted steady state MTBF (Mean Time Between Failures) in a C0 environment is 231 years which corresponds to a return rate of 0.43% per year.

1-Meg Modem: The return rate objective for the 1-Meg Modem is less than 0.5% per year.

Phone Filters: The return rate objective for the Phone Filters is less than 0.5% per year.

11.3.4 Power Feed and Fusing Requirements

The following fuses and feeds are required:

LCE: Power in an LCE is provided from the -48V A & B feeds. This voltage is cleaned-up using filters in the Frame Supervisory Panel (FSP) and is distributed to the line cards to power the loop. The xLCs also uses this "talk battery" voltage to convert to +3.3V, +5V and +16.5V required by the new data specific circuitry. The -48V A & B feeds are also used by the existing NT6X53 power converter cards to provide +15V and +5V to the DBIC and xLC. These converters are protected, that is, if one NT6X53 fails, the other supplies both LCAs (10 drawers). This implies twice the current requirements on the NT6X53 due to this protection scheme. The NT6X53s are thus designed to supply 15A at 15V and 15.5A at 5.1V.

DBIC: Point of Use Power Supplies (PUPS) are used to convert the +15V provided over the backplane to the +3.3v and +5v required by the new data circuits. The voice circuits (X24 and drivers) continue to use the +5v from the backplane to ensure the reliability of the voice path.

RELEASE 06.03
13 July 1998

xLC: The xLC uses the -48V talk battery to power the loop and also uses the +15V to power some of the voice circuitry such as the B11 CODEC and relays. The supply consists of one PUPS which operates on the -48V battery feed as an input, to produce the +3.3V used by the MIX ASIC, the 16.5V used by the Analog Front End and the +5V used by the ADC and DAC. This PUPS is designed directly onto the xLC. It was designed to work on the battery feed range of -42.75V -> -56.7V with surges up to -75V. The PUPS is implemented as a switching supply with efficiency of 85%. It uses a switching frequency of 320 KHz and is synchronized to the drawer 2.56MHz provided by the DBIC.

1-Meg Modem: A standard external transformer must be used to provide power to the 1MM. This supply consists of a 120Vac to 16Vac (375mA max.) transformer and connector. The modem is expected to draw approximately 300mA. The 16Vac is converted to + 5Vdc via a linear regulator which is then converted to +5V and finally +3.3V. Note that an ON/OFF switch is included to turn the power off to the modem.

11.3.5 Current Drain Information

Current Drain for the circuit packs is as follows:

xLC (NTEX17AA): TBD

DBIC (NTEX54AA): TBD

For LCE current drain information, refer to Engineering Manual Section EMA16-01-001.

11.4 Software Provisioning

For NTX software packages to PCL/SOC mappings for CSP02 and beyond refer to ECM552 - Mapping of NTX/NTG Package to PCL/NCL/Option.

11.4.1 Required Software Packages and Interdependencies

The 1-MMS functionality will be fully supported in software release NA007. DMS order code HSTP0002 is required.

1-MMS Element Manager System requires two new Non-CM packages:

XDSL0001 DBIC Software (see Note)

XEMS0001 xEMS (Element Manager) Application Software (see Note)

NOTE: For the above two software packages, the Systems Application Engineer must ask the Customer at the CI meeting whether CD-ROM or DAT is their 'Media' choice

1-Meg Modem Service Element Manager System requires four Customer-provided commercial software packages:

HP-UX 10.10 UNIX Operating System

HP Openview (NNM version 5.0) xEMS platform

RELEASE 06.03
13 July 1998

B00TP (Access Provider Network Server)
TFTP (Access Provider Network Server)

11.4.2 Software Usage Restrictions

The Element Manager s/w is not suitable to work on HP-UX9.05 and/or with HP Openview NNM 3.3 and 4.0 releases. It is also not expected to work on any other OS platforms like Solaris 2.3/2.4 or Windows NT. Additional work is involved to port to those platforms. Software upgrades are maintained in PCA (Product Content Administration).

11.4.3 Memory Provisioning

No replaceable memory components exist in the 1-MMS system so memory provisioning is not a consideration.

11.5 Real Time Impact

No impact on software real-time performance (refer to HSTP0002, NA007).

NORTHERN TELECOM

RELEASE 06.03
13 July 1998

PLN-8991-104

NORTHERN TELECOM

RELEASE 06.03
13 July 1998

PLN-8991-104

Chapter 6

SERVICE AND MAINTENANCE PERIPHERALS

THIS PAGE IS INTENTIONALLY LEFT BLANK

RELEASE 06.03
13 July 1998

SERVICE AND MAINTENANCE PERIPHERALS
Section Contents

1.0	ECM111 - TRANSMISSION TEST UNIT (TTU)	6-1
1.1	Overview	6-1
1.2	Hardware Provisioning	6-1
1.2.1	Hardware Usage Restrictions	6-1
1.2.2	Hardware Dependencies	6-1
1.2.2.1	P and C Side Port Requirements	6-1
1.2.2.2	DMS BUS Port Requirements	6-1
1.2.2.3	Circuits Per Card	6-1
1.2.2.4	Discrimination Numbering	6-2
1.2.3	Provisioning Considerations	6-2
1.2.4	Office Layout Information	6-4
1.2.5	Traffic Tables	6-4
1.3	Product/System Specification	6-4
1.3.1	Physical Characteristics	6-4
1.3.2	EMI/Earthquake Information	6-4
1.3.3	Sparing Information	6-4
1.3.4	Power Feed and Fusing Requirements	6-4
1.3.5	Current Drain Information	6-4
1.4	Software Provisioning	6-5
1.4.1	Required Software Packages and Interdependencies	6-5
1.4.2	Software Usage Restrictions	6-5
1.4.3	Memory Provisioning	6-5
1.5	Real Time Impact	6-5
2.0	ECM152 - NSSD Local Test Cabinet	6-6
2.1	Overview	6-6
2.2	Hardware Provisioning	6-11
2.2.1	Hardware Usage Restrictions	6-11
2.2.2	Hardware Dependencies	6-11
2.2.2.1	P and C Side Port Requirements	6-11
2.2.2.2	DMS BUS Port Requirements	6-11
2.2.2.3	Circuits Per Card	6-11
2.2.2.4	Discrimination Numbering	6-11
2.2.3	Provisioning Considerations	6-11
2.2.3.1	LTC Model 3703-00/01 Upgrade Kit	6-12
2.2.3.2	LTC Provisioning	6-12
2.2.4	Office Layout Information	6-13
2.2.5	Traffic Tables	6-13
2.3	Product/System Specification	6-14
2.3.1	Physical Characteristics	6-14
2.3.1.1	Local Test Cabinet	6-14
2.3.1.2	DRTU	6-14
2.3.2	EMI/Earthquake Information	6-14
2.3.3	Sparing Information	6-14
2.3.4	Power Feed and Fusing Requirements	6-14
2.3.4.1	Local Test Cabinet	6-14
2.3.4.2	DRTU	6-14
2.3.5	Current Drain Information	6-15
2.3.5.1	Local Test Cabinet	6-15

RELEASE 06.03

13 July 1998

2.3.5.2	DRTU	6-15
2.4	Software Provisioning	6-15
2.4.1	Required Software Packages and Interdependencies	6-15
2.4.2	Software Usage Restrictions	6-15
2.4.3	Memory Provisioning	6-15
2.5	Real Time Impact	6-16
3.0	ECM170 - Test Access Network (TAN) NT5X00AC and NT5X00AD	6-17
3.1	Overview	6-17
3.2	Hardware Provisioning	6-17
3.2.1	Hardware Usage Restrictions	6-17
3.2.2	Hardware Dependencies	6-17
3.2.2.1	P and C Side Port Requirements	6-17
3.2.2.2	DMS BUS Port Requirements	6-17
3.2.2.3	Circuits Per Card	6-17
3.2.2.4	Discrimination Numbering	6-17
3.2.3	Provisioning Considerations	6-17
3.2.4	Office Layout Information	6-18
3.2.5	Traffic Tables	6-18
3.3	Product/System Specification	6-18
3.3.1	Physical Characteristics	6-18
3.3.2	EMI/Earthquake Information	6-18
3.3.3	Sparing Information	6-18
3.3.4	Power Feed and Fusing Requirements	6-18
3.3.5	Current Drain Information	6-18
3.4	Software Provisioning	6-18
3.4.1	Required Software Packages and Interdependencies	6-18
3.4.2	Software Usage Restrictions	6-19
3.4.3	Memory Provisioning	6-19
3.5	Real Time Impact	6-19
4.0	ECM266 - Maintenance Trunk Module / Remote Service Module	
Prov.		6-20
4.1	Overview	6-20
4.2	Hardware Provisioning	6-20
4.2.1	Hardware Usage Restrictions	6-20
4.2.2	Hardware Dependencies	6-20
4.2.2.1	P and C Side Port Requirements	6-20
4.2.2.2	DMS BUS Port Requirements	6-20
4.2.2.3	Circuits Per Card	6-20
4.2.2.4	Discrimination Numbering	6-20
4.2.3	Provisioning Considerations	6-20
4.2.3.1	MTM Shelves	6-20
4.2.3.2	Multi-Circuit Cards	6-22
4.2.3.3	RSM Shelves	6-23
4.2.4	Office Layout Information	6-23
4.2.5	Traffic Tables	6-23
4.3	Product/System Specification	6-23
4.3.1	Physical Characteristics	6-23
4.3.2	EMI/Earthquake Information	6-23
4.3.3	Sparing Information	6-23
4.3.4	Power Feed and Fusing Requirements	6-23

RELEASE 06.03

13 July 1998

4.3.5	Current Drain Information	6-23
4.4	Software Provisioning	6-24
4.4.1	Required Software Packages and Interdependencies	6-24
4.4.2	Software Usage Restrictions	6-24
4.4.3	Memory Provisioning	6-24
4.5	Real Time Impact	6-24
5.0	ECM352 - Digital Test Unit CP, NT4X23AA (DTU)	6-25
5.1	Overview	6-25
5.1.1	Product Features	6-26
5.1.2	Product Description	6-27
5.1.3	DTU CP Configuration for T1 Carrier Testing	6-28
5.2	Hardware Provisioning	6-29
5.2.1	Hardware Usage Restrictions	6-29
5.2.2	Hardware Dependencies	6-29
5.2.2.1	P and C Side Port Requirements	6-30
5.2.2.2	DMS BUS Port Requirements	6-30
5.2.2.3	Circuits Per Card	6-30
5.2.2.4	Discrimination Numbering	6-30
5.2.3	Provisioning Considerations	6-30
5.2.4	Office Layout Information	6-32
5.2.5	Traffic Tables	6-32
5.3	Product/System Specification	6-32
5.3.1	Physical Characteristics	6-32
5.3.2	EMI/Earthquake Information	6-32
5.3.3	Sparing Information	6-32
5.3.4	Power Feed and Fusing Requirements	6-32
5.3.5	Current Drain Information	6-32
5.4	Software Provisioning	6-32
5.4.1	Required Software Packages and Interdependencies	6-32
5.4.2	Software Usage Restrictions	6-33
5.4.3	Memory Provisioning	6-33
5.5	Real Time Impact	6-33
6.0	ECM409 - Cancelled: International Metallic Test Unit	6-34
6.1	Overview	6-34
6.2	Hardware Provisioning	6-34
6.2.1	Hardware Usage Restrictions	6-34
6.2.2	Hardware Dependencies	6-34
6.2.2.1	P and C Side Port Requirements	6-34
6.2.2.2	DMS BUS Port Requirements	6-34
6.2.2.3	Circuits Per Card	6-34
6.2.2.4	Discrimination Numbering	6-34
6.2.3	Provisioning Considerations	6-34
6.2.4	Office Layout Information	6-35
6.2.5	Traffic Tables	6-35
6.3	Product/System Specification	6-36
6.3.1	Physical Characteristics	6-36
6.3.2	EMI/Earthquake Information	6-36
6.3.3	Sparing Information	6-36
6.3.4	Power Feed and Fusing Requirements	6-36
6.3.5	Current Drain Information	6-36

RELEASE 06.03
13 July 1998

6.4	Software Provisioning	6-36
6.4.1	Required Software Packages and Interdependencies	6-36
6.4.2	Software Usage Restrictions	6-36
6.4.3	Memory Provisioning	6-37
6.5	Real Time Impact	6-37
7.0	ECM430 - Trunk Module E/W TM Controller CP, NT4X65AB . . .	6-38
7.1	Overview	6-38
7.2	Hardware Provisioning	6-38
7.2.1	Hardware Usage Restrictions	6-38
7.2.2	Hardware Dependencies	6-38
7.2.2.1	P and C Side Port Requirements . . .	6-38
7.2.2.2	DMS BUS Port Requirements	6-38
7.2.2.3	Circuits Per Card	6-38
7.2.2.4	Discrimination Numbering	6-38
7.2.3	Provisioning Considerations	6-38
7.2.4	Office Layout Information	6-39
7.2.5	Traffic Tables	6-39
7.3	Product/System Specification	6-39
7.3.1	Physical Characteristics	6-39
7.3.2	EMI/Earthquake Information	6-39
7.3.3	Sparing Information	6-39
7.3.4	Power Feed and Fusing Requirements	6-39
7.3.5	Current Drain Information	6-40
7.4	Software Provisioning	6-40
7.4.1	Required Software Packages and Interdependencies	6-40
7.4.2	Software Usage Restrictions	6-40
7.4.3	Memory Provisioning	6-40
7.5	Real Time Impact	6-40
8.0	ECM445 - MCTM-ISDN NTN33CA and MCTM NTN33AA	6-41
8.1	Overview	6-41
8.2	Hardware Provisioning	6-41
8.2.1	Hardware Usage Restrictions	6-41
8.2.2	Hardware Dependencies	6-42
8.2.2.1	P and C Side Port Requirements . . .	6-43
8.2.2.2	DMS BUS Port Requirements	6-44
8.2.2.3	Circuits Per Card	6-44
8.2.2.4	Discrimination Numbering	6-44
8.2.3	Provisioning Considerations	6-44
8.2.4	Office Layout Information	6-45
8.2.5	Traffic Tables	6-45
8.3	Product/System Specification	6-45
8.3.1	Physical Characteristics	6-45
8.3.2	EMI/Earthquake Information	6-45
8.3.3	Sparing Information	6-46
8.3.4	Power Feed and Fusing Requirements	6-46
8.3.4.1	POWER/HEAT DISIPATION	6-46
8.3.5	Current Drain Information	6-46
8.4	Software Provisioning	6-47
8.4.1	Required Software Packages and Interdependencies	6-47
8.4.2	Software Usage Restrictions	6-47

RELEASE 06.03
13 July 1998

8.4.3	Memory Provisioning	6-47
8.5	Real Time Impact	6-47
9.0	ECM523 - Meridian Cabinet Auxiliary Module, NTN37AB.	6-48
9.1	Overview	6-48
9.2	Hardware Provisioning	6-48
9.2.1	Hardware Usage Restrictions	6-48
9.2.2	Hardware Dependencies	6-48
9.2.2.1	P and C Side Port Requirements	6-48
9.2.2.2	DMS BUS Port Requirements	6-48
9.2.2.3	Circuits Per Card	6-48
9.2.2.4	Discrimination Numbering	6-49
9.2.3	Provisioning Considerations	6-49
9.2.4	Office Layout Information	6-49
9.2.5	Traffic Tables	6-49
9.3	Product/System Specification	6-49
9.3.1	Physical Characteristics	6-49
9.3.2	EMI/Earthquake Information	6-49
9.3.3	Sparing Information	6-49
9.3.4	Power Feed and Fusing Requirements	6-49
9.3.5	Current Drain Information	6-50
9.4	Software Provisioning	6-50
9.4.1	Required Software Packages and Interdependencies	6-50
9.4.2	Software Usage Restrictions	6-50
9.4.3	Memory Provisioning	6-50
9.5	Real Time Impact	6-50
10.0	ECM557 - Integrated Services Module	6-51
10.1	Overview	6-51
10.1.1	The ISM Shelf	6-52
10.1.2	The Cabinetized ISM Equipment (CISM)	6-53
10.1.2.1	Metallic Test Access - External Loop Test	6-53
10.1.3	The Frame ISM Equipment (ISME)	6-53
10.1.4	Circuit Packs Developed for ISM Application	6-53
10.1.4.1	ISM Processor (NTFX42AA)	6-53
10.1.4.2	ISM DC Converter (NTFX43AA).	6-53
10.1.4.3	Improved Loop Test Accessory (ILTA) - NTFX44AA.	6-54
10.1.4.4	Enhanced Digital Test Unit (EDTU) - NT4X45AA	6-54
10.1.4.5	Circuit Pack Modifications	6-55
10.2	Hardware Provisioning	6-55
10.2.1	Hardware Usage Restrictions	6-55
10.2.2	Hardware Dependencies	6-57
10.2.2.1	P and C Side Port Requirements	6-59
10.2.2.2	DMS BUS Port Requirements	6-59
10.2.2.3	Circuits Per Card	6-59
10.2.2.4	Discrimination Numbering	6-59
10.2.3	Provisioning Considerations	6-59
10.2.3.1	Provisioning Circuit Packs on the ISM Shelf	6-59

RELEASE 06.03

13 July 1998

10.2.3.2	Provisioning ISM Shelves on the Cabinetized ISM Equipment	6-60
10.2.3.3	Provisioning ISM Shelves on the ISM Equipment Frame	6-60
10.2.4	Office Layout Information	6-60
10.2.5	Traffic Tables	6-61
10.3	Product/System Specification	6-61
10.3.1	Physical Characteristics	6-61
10.3.2	EMI/Earthquake Information	6-61
10.3.3	Sparing Information	6-61
10.3.4	Power Feed and Fusing Requirements	6-61
10.3.5	Current Drain Information	6-62
10.4	Software Provisioning	6-63
10.4.1	Required Software Packages and Interdependencies	6-63
10.4.2	Software Usage Restrictions	6-63
10.4.3	Memory Provisioning	6-64
10.5	Real Time Impact	6-64
11.0	ECM560 - ISDN Integrated Testing Provisioning	6-65
11.1	Overview	6-65
11.2	Hardware Provisioning	6-72
11.2.1	Hardware Usage Restrictions	6-72
11.2.2	Hardware Dependencies	6-72
11.2.2.1	P and C Side Port Requirements	6-75
11.2.2.2	DMS BUS Port Requirements	6-75
11.2.2.3	Circuits Per Card	6-75
11.2.2.4	Discrimination Numbering	6-75
11.2.3	Provisioning Considerations	6-75
11.2.4	Office Layout Information	6-76
11.2.5	Traffic Tables	6-76
11.3	Product/System Specification	6-78
11.3.1	Physical Characteristics	6-78
11.3.1.1	Physical Characteristics - NT0J42BA	6-78
11.3.1.2	Physical Characteristics - NT0J43AA	6-78
11.3.2	EMI/Earthquake Information	6-78
11.3.3	Sparing Information	6-78
11.3.4	Power Feed and Fusing Requirements	6-79
11.3.4.1	NT0J42BA	6-79
11.3.4.2	NT0J43AA	6-79
11.3.5	Current Drain Information	6-79
11.3.5.1	NT0J42BA	6-79
11.3.5.2	NT0J43AA	6-79
11.4	Software Provisioning	6-79
11.4.1	Required Software Packages and Interdependencies	6-79
11.4.2	Software Usage Restrictions	6-80
11.4.3	Memory Provisioning	6-80
11.5	Real Time Impact	6-80
12.0	ECM601 - DMS Building Block Engineering - TME	6-81
12.1	Overview	6-81

RELEASE 06.03
13 July 1998

12.2	Hardware Provisioning	6-81
12.2.1	Hardware Usage Restrictions	6-81
12.2.2	Hardware Dependencies	6-81
12.2.2.1	P and C Side Port Requirements	6-81
12.2.2.2	DMS BUS Port Requirements	6-81
12.2.2.3	Circuits Per Card	6-81
12.2.2.4	Discrimination Numbering	6-81
12.2.3	Provisioning Considerations	6-81
12.2.4	Office Layout Information	6-100
12.2.5	Traffic Tables	6-100
12.3	Product/System Specification	6-100
12.3.1	Physical Characteristics	6-100
12.3.2	EMI/Earthquake Information	6-100
12.3.3	Sparing Information	6-100
12.3.4	Power Feed and Fusing Requirements	6-100
12.3.5	Current Drain Information	6-100
12.4	Software Provisioning	6-101
12.4.1	Required Software Packages and Interdependen- cies	6-101
12.4.2	Software Usage Restrictions	6-101
12.4.3	Memory Provisioning	6-101
12.5	Real Time Impact	6-101

THIS PAGE IS INTENTIONALLY LEFT BLANK

RELEASE 06.03
13 July 1998

1.0 ECM111 - TRANSMISSION TEST UNIT (TTU)

1.1 Overview

The NT2X47-- & NT2X56-- Circuit Pack (CP), which are assigned to a Maintenance Trunk Module (MTM), form the Transmission Test Unit (TTU). The NT2X47 CP interfaces to the Central Control (CC) which specifies the type of testing procedure required of the TTU. Once specified by the CC, the NT2X47 will control the generation and reception of tones necessary for the test and pass them on to the digital filter CP (NT2X56). The NT2X56 will filter, process and execute the instructions and generated tones received from the NT2X47.

The addition of Echo Return Loss (ERL) and Singing Return Loss (SRL) tests to the 105 Test Line has prompted the introduction of the Transmission Test Unit Control Processor (NT2X47AD). The ERL & SRL involve measuring the return loss of a bandlimited white noise signal over a trunk circuit.

1.2 Hardware Provisioning

1.2.1 Hardware Usage Restrictions

All three pairs of TTU CP can co-exist in the same office. However, the NT2X47AA must be paired with NT2X56AA, the NT2X47AC must be paired with the NT2X56AB, and the NT2X47AD must be paired with NT2X56AB.

The NT2X47AD & NT2X56AB CP can functionally replace all previous versions of existing NT2X47-- & NT2X56-- CP. All initial and extension offices will provision the NT2X47AD & NT2X56AB for TTU requirements.

1.2.2 Hardware Dependencies

Not applicable

1.2.2.1 P and C Side Port Requirements

Not applicable

1.2.2.2 DMS BUS Port Requirements

Not applicable

1.2.2.3 Circuits Per Card

Not applicable

RELEASE 06.03
13 July 1998

1.2.2.4 Discrimination Numbering

Not applicable

1.2.3 Provisioning Considerations

Provisioning of Transmission Test Unit (TTU) circuit packs is done on a two (2) step basis.

Step 1: provisioning TTU CP(s) for Automatic Line Testing (ALT).

The ALT has two (2) versions of diagnostics. Short and extended. In order to check the Pulse Coded Modulation (PCM) path to and from the line cards, as well as the analog path of the Voice Frequency (VF) transformer the short diagnostic routine performs the following tests

- o Trans-hybrid loss test
- o Attenuation 7DB pad test
- o Noise (notch & weighted) test
- o Ring Supervision (ring relay) test

It is suggested to provision the maximum of:

1 TTU per LTU, for both Host and Remote LTU's, OR

$$\begin{array}{lcl} \text{TTU for ALT} & = & \text{Total No. of Lines X Holding Time/Test} \\ \text{(short diag test)} & \text{-----} & = A \\ & & 3600 \text{ X Test Interval} \end{array}$$

where:

Total No. of lines includes all Local, Remote and Subscriber Carrier lines to be tested by the short diagnostic routine.

Holding Time/Test is seven (7) seconds for a short diagnostic test.

Test interval is in hours (6 hours are recommended).

The Extended diagnostic routine will check all of the line circuit for correct operation while performing the following tests.

- o Trans-hybrid loss test
- o Attenuation 7DB pad test
- o Noise (notch & weighted) test
- o Ring Supervision (ring relay) test
- o Cutoff relay test
- o Battery feed resistor test
- o Loop detector test
- o Reversal relay test

RELEASE 06.03
13 July 1998

- o Ground start relay test
- o Ground start detector test
- o Flux cancellation circuitry test
- o +48V relay test
- o Test access relay test
- o Subscriber loop test
- o Loop signalling at line card
- o Loop signalling at key set
- o LCM buffer full flag high test
- o LCM buffer full flag low test

The holding time to execute an extended diagnostic test is 25 seconds.

$$\begin{array}{lcl} \text{TTU for ALT} & = \text{Total No. of Lines X Holding Time/Test} & \\ \text{(extended diag test)} & \text{-----} & = B \\ & 3600 \text{ X Test Interval} & \end{array}$$

where:

Total No. of lines includes all Local, Remote and Subscriber Carrier lines to be tested by the extended diagnostic routine.

Holding Time/Test is 25 seconds for a extended diagnostic test.

Test interval is in hours.

Step 2: provisioning TTU CP(s) for Automatic Transmission Measurement System (ATMS) (i.e. 105 Test Line).

ATMS provides 2 way transmission loss and noise measurements on an outgoing or an outgoing portion of a 2 way trunk to the distant 105 terminating test line.

$$\begin{array}{lcl} \text{TTU for ATMS} = \text{Total No. Forecast Outgoing Trunks} & & \\ \text{(05 test)} & \text{-----} & \text{X Holding Time/Test} \\ & 5 & \\ & \text{-----} & = C \\ & 3600 \text{ X Test Interval} & \end{array}$$

where:

Total No. of outgoing or outgoing portion of 2 way trunks. This quantity is divided by five (5) so that one fifth of the trunks will be tested per day.

Holding Time/Test is 20 seconds for an ATMS test.

Test interval is in hours.

ATMS will measure the following;

- o Transmission loss
- o Noise
- o Echo return loss
- o Singing point return loss
- o High and low frequency loss

1.2.4 Office Layout Information

Not applicable

1.2.5 Traffic Tables

Not applicable

1.3 Product/System Specification

1.3.1 Physical Characteristics

Not applicable

1.3.2 EMI/Earthquake Information

Not applicable

1.3.3 Sparing Information

Not applicable

1.3.4 Power Feed and Fusing Requirements

| Not applicable

1.3.5 Current Drain Information

NT2X47 CIRCUIT PACK POWER REQUIREMENT

Input Voltage.....	+5 VOLTS	-12V	-15V
Power Consumption.....	8.35 watts		
Current Drain.....	1.65AMPS	7 MA	0.05MA
Thermal Dissipation.....	28.5 BTU/hr		
Fusing Requirements.....	Not Applicable		

MECHANICAL DIMENSIONS: See Section 3.1.2 below

NT2X56 CIRCUIT PACK POWER REQUIREMENT

Input Voltage.....	+5 VOLTS	-12VOLTS

RELEASE 06.03
13 July 1998

Power Consumption..... 12.9 watts
Current Drain.....1.45AMPS 0.47AMPS
Thermal Dissipation..... 44.0 BTU/hr
Fusing Requirements..... Not Applicable

MECHANICAL DIMENSIONS

Height	13.9"	Width	1.1"
Weight	1.5LB	Depth	10.9"

1.4 Software Provisioning

For NTX software packages to PLC/SOC mappings for CSP02 and beyond refer to ECM552 - Mapping of NTX/NTG Package to PCL/NCL/Option.

1.4.1 Required Software Packages and Interdependencies

ATMS or 105 test line software is optionally available in the following packages;

- NTX136AA - Automatic Transmission Measurement System
- NTX903AA - Transmission Measurements
- NTX052AB - Remote Office Test Line

The ALT software feature is contained as part of package NTX054AA - Line Test Position (LTP). For U.S. offices, the LTP software is contained in all DMS-100 & DMS-100/200 Master Package Selections.

1.4.2 Software Usage Restrictions

Not applicable

1.4.3 Memory Provisioning

Not applicable

1.5 Real Time Impact

Not applicable

RELEASE 06.03
13 July 1998

2.0 ECM152 - NSSD Local Test Cabinet

2.1 Overview

The NSSD LTC is a microprocessor controlled Local Test Cabinet (hereafter referred to as LTC) designed to test subscriber line circuits and trunk circuits. The LTC generates all test tones and test voltages without the aid of external devices. The LTC can access from one to sixteen test trunks and one MDF test trunk.

The LTC has the capability to test lines and trunks in DMS100F remote offices and other pair gain devices such as the AT&T SLC-96. This functionality is achieved via the Digital Remote Test Unit (DRTU).

The DRTU is a remote slave of the LTC. It is mounted in an equipment frame/Cabinet at the Remote Site. The DRTU to LTC communication is via Dial-up or Dedicated data lines. Refer to Figure 1 on page 6-10 for a pictorial representation of LTC to DRTU configuration.

The Local Test Cabinet works into any DMS100F test trunk and trunks from major switch manufacturers including AT&T/Western Electric, Automatic Electric, ITT/North, Stromberg Carlson, and TRW Vidar types. When properly calibrated, the LTC eliminates the effects of test trunk resistance and capacitance from the measured values displayed to the user. Busy lead sensing permits trunk sharing with other test equipment that may be installed in the office, (e.g., an LRS Loop Test Unit), and thus avoids the need for additional test trunks.

The LTC is designed to provide automated tests and measurements in a wall/desk/frame/MDF mounted configuration. The NSSD LTC offers an automatic measurement and diagnosis sequence plus a host of specialized loop test functions. The diagnosis sequence consists of the following:

- Measurements of AC volts, DC volts, resistance, and capacitance between all combinations of tip, ring, and ground
- Ringer presence check between all combinations of tip, ring and ground (shows where ringers are connected)
- Microprocessor analysis of the above tests to determine the condition of the line, which includes automatic recognition of pair gain and intercept arrangements.
- Measurement of the lines physical length.

Additional, individually-selectable test functions include:

RELEASE 06.03
13 July 1998

- Talk/monitor on subscriber's line via built-in handset or call-back path in remote applications.
- Draw dial tone and dial on subscriber's line
- Ring subscriber
- Check DP or DTMF digits dialed from subscriber's station set
- Apply howler (receiver off-hook) tone
- Permanent signal release
- Coin collect/return
- Control/interrogate AT&T Pair Gain Test Controller in SLC-96, DMS-1/DMS-1 Urban, and certain other subscriber carrier arrangements
- Activate remote device, pair gain metallic bypass path, or optional Digital Remote Test Unit (DRTU) slave measurement unit
- Condition loop.
- LINE ACCESS TEST FUNCTIONS
 - Automatic test trunk selection based on NNX code.
 - Supports both normal directory number access and line equipment number (LEN) access with automatic dialing of prefix digits.
 - Handles up to 16 test trunks, (up to four trunks on the standard unit), and supports any mixture of dial or MDF shoe trunks.
 - A special MDF trunk interface provides a full in/out bridge capability for any type of shoe.
 - The standard four trunk LTC provides one such interface while four are available on the 16-trunk unit.
- AUTOMATIC MEASUREMENT AND DIAGNOSIS SEQUENCE

The Automatic Measurement and Diagnostic Sequence provides a single-button multi-test sequence that includes:

 - Measurement of AC volts, DC volts, resistance and capacitance between all combinations of tip, ring, and ground;
 - ringer presence check;
 - measurement of line length;

RELEASE 06.03
13 July 1998

- Analysis via fault algorithm including recognition of pair gain and intercept arrangements.

Note: CRT display shows full discrete results plus line status message. Site dependent ringer data contained in nonvolatile memory "fine tunes" algorithm for high accuracy.

- DRAW DIAL TONE. The LTC applies off hook supervision on subscriber line to draw dial tone from central office. Operator can select either loop start or ground start supervision as appropriate.
- DIAL ON SUBSCRIBER LINE. Checks CO's ability to receive subscriber dialed digits and complete a call. DP, MF, or DTMF dialing mode may be selected.
- TALK AND MONITOR. Supplies talk battery when talking toward the station end of the loop. A high impedance, monitor-only mode is also selectable for situations where desired.
- CHECK SUBSCRIBER DIGITS. Permits analysis of DP or DTMF digits sent by the subscriber's dial.
- RING SUBSCRIBER. Connects the appropriate ringing signal to the accessed line.
- CONDITION LOOP. Places one or more of the following loop conditions on the line for applications where required:
 - reversed tip and ring,
 - shorted tip and ring,
 - ground on tip and ring,
- COIN COLLECT/RETURN. Applies coin collect/return voltage to line. Display indicates whether on not pay station relay operates, if test is successful, and the operating current.
- PERMANENT SIGNAL RELEASE (PSR). Frees office line equipment tied up by a permanent line busy fault condition such as Receiver Off Hook (ROH). Permanent signal release is applicable only where supported by the central office test trunk.
- APPLY HOWLER. Places howler tone on a subscriber line to signal a permanent receiver off hook (ROH) condition.
- ACTIVATE/DEACTIVATE DRTU OR OTHER REMOTE DEVICE. Sets up 3704 Digital Remote Test Unit (DRTU) communication path in certain common subscriber carrier systems and remote line concentrators.
- INTERROGATE PAIR GAIN TEST CONTROLLER. In SLC96 and DMS-1 arrangements equipped with the AT&T Pair Gain Test Controller

RELEASE 06.03
13 July 1998

(PGTC), collects and displays the results of digital carrier channel tests.

- CONNECT EXTERNAL JACK. Terminates the accessed line in a type 310 panel jack for connection of external test equipment. Provides a convenient access point for measuring level, noise, and other transmission parameters. The external jack function also enables the Pair ID Buzzer accessory described in the following paragraph.
- PAIR IDENTIFICATION. A Pair ID Buzzer accessory NT0J04DE provides audible and visual indications when the accessed tip/ring pair has been located at the wiring frame.
- TEST TRUNK CALIBRATION. Stores in nonvolatile memory the resistance and capacitance characteristics of each individual test trunk connected to the LTC. Eliminates the effects of test trunk length on the measurement results displayed to the user. A Trunk Calibrator accessory NT0J04DA reduces the number of steps required to obtain calibration values.
- REMOTE ACCESS/CONTROL PORTS. Permit LTC control from a remote or local data terminal, or intelligent controller via dial-up or dedicated operation. Also features call-back capability for talk/monitor functions, high level ASCII protocol, built-in 300/1200 baud modem, and user transparent log-in security feature.
- SELF TEST. Checks and displays the operational status of each CP within the NSSD LTC.

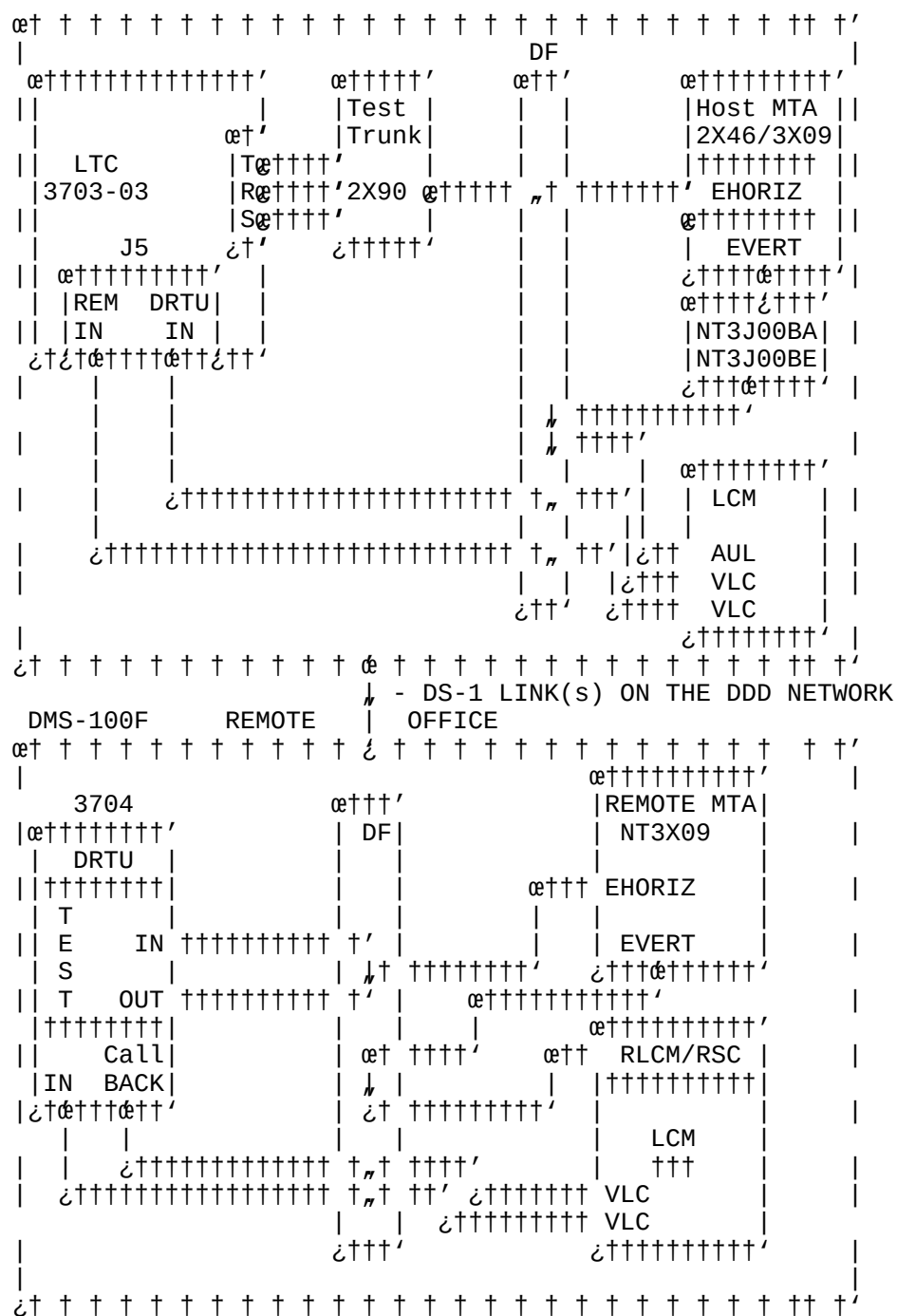


Figure 1. HOST LTC TO DRTU CONCEPTUAL DIAGRAM

RELEASE 06.03
13 July 1998

2.2 Hardware Provisioning

2.2.1 Hardware Usage Restrictions

The 4trunk 3Wire access card (NT0J62BA) is required to access up to four trunks on all other switching system. This is due to the fact that these switching systems utilize the 3-wire (Tip, Ring, Sleeve & Gnd) trunk accessing methodologies.

The 4trunk 4Wire access card (NT0J63BA) is required to access up to four trunks on the DMS-100 Product Families and the Western Electric/Bell Technology Product Families. This is due to the fact that these switching systems utilize the 3-wire (Tip, Ring, & Sleeve) trunk accessing methodologies.

The 16trunk 4Wire access card (NT0J64BA) is required to access up to sixteen trunks on the DMS-100 Product Families. This is due to the fact that these switching systems utilize the 4-wire (Tip, Ring, Sleeve & Gnd) trunk accessing methodologies.

2.2.2 Hardware Dependencies

When the Digital Remote Test Unit (DRTU) is used at a Remote Office a MLT Applique Shelf (NT3J00BA) card slot is required at the host to mount the DRTU Signature Card (NT3J00BE).

2.2.2.1 P and C Side Port Requirements

Not Applicable

2.2.2.2 DMS BUS Port Requirements

Not Applicable

2.2.2.3 Circuits Per Card

Not Applicable

2.2.2.4 Discrimination Numbering

Not Applicable

2.2.3 Provisioning Considerations

Several configurations of the NSSD Local Test Cabinet exist, which are Model 3703-00, 3703-01, and 3703-03. The Model 3703-03 is the current version provisioned, and upgrade kits exist for the earlier vintages. The NSSD LTC Models 3703-00 & 01 were ordered with a single PEC which provided all available options. The NSSD LTC Model provides increased functionality which is facilitated by ordering multiple PECs to provide the unit (See -- Heading id 'LTPC152' unknown --)

RELEASE 06.03
13 July 1998

The NSSD LTC is available as a Local or Remote configuration in Brown. Mounting options available are Equipment Rack/Wall/Desk/MDF mounting. Options allow for 4 or 16 test trunk access.

Please note that in Canada, our customers will be ordering the LTC directly from the Network Systems Support Division (NSSD). In the U.S. (NTI), our customers will be ordering it from NTI. For Canadian jobs, note that we must still provide the appropriate cables, jack boxes, and test jacks. Refer to CAX04 cable drawing for cabling information.

2.2.3.1 LTC Model 3703-00/01 Upgrade Kit

The LTC Model 3703-00 & 01 Upgrade Kit provides the hardware necessary to upgrade an existing unit to the LTC Model 3703-03 standards.

Telcos having a NSSD Model 3703-00 or 3703-01 LTC must upgrade the unit to the Model 3703-03 standards in order to take advantage of the majority of the LTC features as defined in the General Section.

The earlier vintage LTCs may be upgraded using the NT0J60AA System Upgrade Kit. When provisioning the Upgrade Kit the following information must be included with the order:

- The serial number of the existing Model
- The color of the existing Model

This information is required because the LTC card cage will be replaced and the existing serial number used on the new card cage.

The NT0J60AA System Upgrade Kit provides a new LTC card cage which provides the following features:

- Trunk Control Keys
- A Boost Key
- Four (4) More Ports:
 - Local EIA RS-232-C
 - Two (2) Dial-In Ports
 - Call-Back
- Four (4) Trunk Connectors Instead Of One (1)

2.2.3.2 LTC Provisioning

The NSSD LTC is an independent-operable unit that supports a full range of loop testing for existing and recently installed circuits. A typical Local Test Cabinet (LTC) consists of a pushbutton (key) control panel, a 5-inch video display (VDU), a telephone handset, and a 310-type connector for connecting additional test equipment.

The LTC is provisioned via several PECs which include:

- Minimum Components for LTC operation
 - LTC Mainframe (includes front panel and test trunk access option)
 - Mounting Brackets
- Optional Components for enhanced LTC operation
 - Buzzer Pair Identifier
 - Spares Kit
 - Digital Remote Test Unit (DRTU) Model 3704
 - DRTU Access Card
 - MLT Applique Shelf
 - Signature Accessory Card

Refer to the NSSD LTC Engineering Manual Insert attached

2.2.4 Office Layout Information

Not applicable

2.2.5 Traffic Tables

Not applicable

2.3 Product/System Specification

2.3.1 Physical Characteristics

2.3.1.1 Local Test Cabinet

Dimensions (WxHxD).....17" x 19.25" x 12"
.....(43.2 cm x 48.9 cm x 30.5 cm)
Weight.....50lbs w/o Brackets
.....(22.7 kg w/o Brackets)

2.3.1.2 DRTU

Dimensions (WxHxD).....17" x 3.5" x 11.25"
.....(43.2 cm x 8.9 cm x 28.6 cm)

2.3.2 EMI/Earthquake Information

Not applicable

2.3.3 Sparing Information

Standard sparing algorithms shall apply.

2.3.4 Power Feed and Fusing Requirements

2.3.4.1 Local Test Cabinet

Input Voltage.....-42 to -56Vdc -48Vdc Nominal
Power Consumption.....192 Watts
Fusing Requirements.....8amps

2.3.4.2 DRTU

RELEASE 06.03
13 July 1998

Input Voltage.....-42 to -56Vdc -48Vdc Nominal
Power Consumption.....72 Watts
Fusing Requirements.....1 1/3 Amps

NOTE: The unit(s) described in this section must be powered in accordance with ISG Specifications. (Refer to the Engineering Manual Active Equipment, chapter EMA17, Grounding Requirements.)

2.3.5 Current Drain Information

2.3.5.1 Local Test Cabinet

.....Current Drain 3 to 4 Amps

2.3.5.2 DRTU

Current Drain.....1.5 Amps

2.4 Software Provisioning

For NTX software packages to PLC/SOC mappings for CSP02 and beyond refer to ECM552 - Mapping of NTX/NTG Package to PCL/NCL/Option.

2.4.1 Required Software Packages and Interdependencies

The following software package is required for the Local Test Cabinet:

NTX064AA - Automatic Line Insulation Testing (ALIT)

Prerequisite:

NTX000AA - BILGE
NTX001AA - Common Basic
NTX901AA - Local Features

| After BCS36 the software is always provided in the load for a PCL
| (Product Content Load) and no additional functional groups need
| to be ordered.

2.4.2 Software Usage Restrictions

Not applicable

2.4.3 Memory Provisioning

Not applicable

2.5 Real Time Impact

Not applicable

RELEASE 06.03
13 July 1998

3.0 ECM170 - Test Access Network (TAN) NT5X00AC and NT5X00AD

3.1 Overview

The Test Access Network (TAN) provides a four wire metallic access from a jack on each Trunk Test Position (TTP) to all R , R2 and No. 5 and No. 6 trunk circuits in the office.

3.2 Hardware Provisioning

3.2.1 Hardware Usage Restrictions

Not applicable.

3.2.2 Hardware Dependencies

Not applicable.

3.2.2.1 P and C Side Port Requirements

Not applicable

3.2.2.2 DMS BUS Port Requirements

Not applicable

3.2.2.3 Circuits Per Card

Not applicable

3.2.2.4 Discrimination Numbering

Not applicable

3.2.3 Provisioning Considerations

The Test Access Network (TAN) Module provides 4-wire metallic access to trunks in DMS-300 machines from Test trunks and/or jacks on maintenance positions for purposes of testing.

The NT5X00AC and NT5X00AD TAN are functionally identical; however, NT5X00AC is not equipped with trunk appearance connectorization and therefore cannot be cabled directly to the TME.

Provide one (1) NT5X00AD TAN with TM Connections module for every 3 TME frames requiring access. These modules will provide access to the TME frames by the first three maintenance positions.

For each NT5X00AD, provide one (1) NT5X00AC TAN module as required for every three additional maintenance positions to be given access.

RELEASE 06.03
13 July 1998

NT5X00AA is rated MD and is replaced by NT5X00AC. NT5X00AB is rated MD and is replaced by NT5X00AD.

3.2.4 Office Layout Information

Both types of TAN modules mount on the Test Access Equipment frame (TAE, NT5X12AA or NT5X12AB) with the following restrictions:

- 1) The NT5X00AB/AD will mount only in positions 65 and 51 on the TAE frame.
- 2) The NT5X00AA/AC will mount in any position on the TAE frame (65, 51, 32, 18, 04) but yields positional preference to the NT5X00AB/AD.

3.2.5 Traffic Tables

Not applicable.

3.3 Product/System Specification

3.3.1 Physical Characteristics

Not applicable.

3.3.2 EMI/Earthquake Information

Not applicable.

3.3.3 Sparing Information

Standard sparing algorithms apply.

3.3.4 Power Feed and Fusing Requirements

Not applicable.

3.3.5 Current Drain Information

Not applicable.

3.4 Software Provisioning

For NTX software packages to PLC/SOC mappings for CSP02 and beyond refer to ECM552 - Mapping of NTX/NTG Package to PCL/NCL/Option.

3.4.1 Required Software Packages and Interdependencies

Not applicable.

3.4.2 Software Usage Restrictions

Not applicable.

3.4.3 Memory Provisioning

Not applicable.

3.5 Real Time Impact

Not applicable.

RELEASE 06.03
13 July 1998

4.0 ECM266 - Maintenance Trunk Module / Remote Service Module Prov.

4.1 Overview

The MTM and RSM are part of the DMS-100 Family line of products.

4.2 Hardware Provisioning

4.2.1 Hardware Usage Restrictions

This document introduces several MTM/DRA Common CP fills. In Canada, the shelves to which these fills are assigned have been superseded by shelves which support the TM Control CP, NT4X65AB. Refer to ECM430 for details regarding the latest MTM/DRA shelves and Common CP fills for new Canadian applications.

In the U.S. and International markets, the NT4X65AB TM Control CP is not used. The MTM/DRA Common CP fills in this ECM thus still apply to the U.S. and International markets.

The Remote Service Module (RSM) shelf and Common CP fill introduced by this ECM apply to both the Canadian and U.S. markets.

4.2.2 Hardware Dependencies

4.2.2.1 P and C Side Port Requirements

Not Applicable

4.2.2.2 DMS BUS Port Requirements

Not Applicable

4.2.2.3 Circuits Per Card

Not Applicable

4.2.2.4 Discrimination Numbering

Not Applicable

4.2.3 Provisioning Considerations

4.2.3.1 MTM Shelves

Provisioning rules for new MTM, IMTM and RSM shelves remain the same. Refer to the attached Engineering Manual sections for details.

RELEASE 06.03
13 July 1998

The NT2X70AF CP shall be the standard Power Converter for all new MTM/DRA shelves. Per Telco request, existing MTM/DRA shelves can be upgraded to the NT2X70AF CP via the NT2X70AY Power Converter Kit.

When an Audio Tone Detector CP, NT5X29AC, is mounted on an MTM equipped with a TM Processor CP NT0X70AA, then NT2X58CH, Product Change Kit to Provide NT0X70AC, must be provided to replace NT0X70AA with an NT0X70AC.

RELEASE 06.03
13 July 1998

4.2.3.2 Multi-Circuit Cards

The MTM backplane is designed to access up to 30 enable signals (circuits). Each provisionable MTM slot has access to these 30 enable signals per the following chart.

SLOT	ENABLE/CIRCUIT	ENABLE/CIRCUIT ACCESS	TOTAL ENABLES
05	00	00-29	30
06	02	02-29	28
07	04	04-29	26
08	06	06-13	8
09	08	08-15	8
10	10	10-17	8
11	12	12-19	8
12	14	14-21	8
13	16	16-23	8
14	18	18-25	8
15	20	20-27	8
16	22	22-29	8

o The ENABLE/CIRCUIT column represents the initial circuit the slot has access to.

o The ENABLE/CIRCUIT ACCESS column represents the entire range of enable/circuits the slot has access to.

o The TOTAL ENABLES column represents the total number of enable/circuits the slot has access to.

The enable signals on the backplane are arranged to allow 2-circuit cards to be placed in adjacent slots, 4-circuit cards to be placed in alternating slots, and 8-circuit cards to be placed in every fourth slot, etc. Circuit packs that use less than the available enables for that slot will access the lowest available enables.

Slots 05,06 and 07 are the only slots that have access to more than eight (8) enable signals. Therefore, cards such as the NT5X29 that utilize 16 circuits may only be assigned to slots 05,06 or 07. If the NT5X29 is assigned to slot 05, the next available slot is 13. If the NT5X29 is assigned to slot 06, the next available slot is 14. The NT5X29 can not be provisioned to use less than 16 circuits when it is located in slots 05-07 because it will always use the 16 enables if it has access to them. It is possible, however, to assign the NT5X29 to a card slot that accesses 8 enable signals allowing only 8 circuits on the NT5X29 to be accessed. This would allow more of the MTM to be used for other cards. When an 8 slot 16 circuit card is located in slot 05 then slots 13-16 are still available for other cards if enough enables are available. Remember that the MTM PM load should be verified prior to mixing NT5X29's with any other CP.

RELEASE 06.03
13 July 1998

4.2.3.3 RSM Shelves

Provide the following items per customer and office requirements (one RSM CP Fill is required for each RSM shelf ordered):

NT2X58CF	Remote Service Module.....MD Replaces	NT2X58AE
NT2X58CM	RSM Common CP.....MD. No replacement.	

Provisioning rules remain the same. Refer to the attached Engineering Manual sections for details.

The NT2X70AF CP shall be the standard Power Converter for all new RSM shelves. Per Telco request, existing RSM shelves can be upgraded to the NT2X70AF CP via the NT2X70AY Power Converter Kit.

4.2.4 Office Layout Information

Not applicable

4.2.5 Traffic Tables

Not applicable

4.3 Product/System Specification

4.3.1 Physical Characteristics

Not Applicable

4.3.2 EMI/Earthquake Information

N/A

4.3.3 Sparing Information

Standard sparing criteria will be maintained for the MTM/RSM.

4.3.4 Power Feed and Fusing Requirements

The heat dissipation of each MTM or RSM will be based on its contents. For information on the heat dissipation of each card in a MTM or RSM shelf, refer to Engineering Manual Section EMA14-01-000. The maximum allowable dissipation for the provisionable packs in a MTM or RSM shelf is 110 watts.

4.3.5 Current Drain Information

The current drain of a fully-equipped MTM shelf is as follows:

1.4 amps	(-48V nominal, unfiltered)
5.0 amps	(-48V nominal, filtered)

4.4 Software Provisioning

For NTX software packages to PLC/SOC mappings for CSP02 and beyond refer to ECM552 - Mapping of NTX/NTG Package to PCL/NCL/Option.

4.4.1 Required Software Packages and Interdependencies

Not Applicable

4.4.2 Software Usage Restrictions

Not Applicable

4.4.3 Memory Provisioning

Not Applicable

4.5 Real Time Impact

N/A

RELEASE 06.03
13 July 1998

5.0 ECM352 - Digital Test Unit CP, NT4X23AA (DTU)

5.1 Overview

A digital switch provides digital connectivity of customer voice and data traffic. Speech path maintenance is based on parity, integrity and supervision error detection within the switch, frame pulse error and bipolar violation detection on host-to-remote and inter-exchange T1 carrier facilities, and the IBERT Line Card, NT6X99AA, tests on datapath and digital trunk facilities.

The Digital Test Unit (DTU) Unit CP, NT4X23AA, is an optional maintenance feature which can be ordered for the measurement of bit error ratio (BER) and error-free interval of pseudo random test data.

A Bit Error Ratio Test (BERT) is a test used to measure the transmission quality of a loop. The basic idea of a BERT is to send a known stream of data over a given loop, and to have this data reflected back to the sender. The received data is then compared with the sent data thereby giving a measure of the transmission quality. By looping back data at different points in the loop and measuring the quality of transmission at each point, faults which may exist on the loop can be isolated.

There are available commercial stand alone external semi- automated BERT instruments, requiring some manual configuration and operation but this is too unwieldy an approach for long term switch maintenance. Also, since these are not integrated within DMS, there is no facility for automated path control or fault sectionalization.

The DTU CP is an integrated or resident piece of equipment in the DMS. Access to this unit will be by means of a single command located at the TTP level of the MAP. The benefit of this will be a simpler method of testing loops as well as dropping the need for any external test equipment.

The DTU Based BERT will be capable of performing some BERT functions available on the IBERT Line Card, NT6X99AA, including Data Unit (DU) interface via T-link protocol, but not the DPX feature. It is recommended that the NT6X99AA be used for DMS-100 and DMS-100/200 offices (local and local/toll applications).

It is recommended that the DTU CP be used for DMS-200 offices (toll applications). This MAP controllable BERT device will ensure data integrity within and between toll exchanges.

RELEASE 06.03
13 July 1998

5.1.1 Product Features

The DTU BERT will perform the following functions:

1) transmit standard 511, 2047 or 32767 bit data test pattern at 50 bits per second to 19.2 Kbit/s asynchronous or 1.2 Kbit/s to 64 Kbit/s synchronous using T-link.

2) transmit standard 511, 2047 or 32767 data test pattern at 64 Kbit/s without T-link handshaking.

3) transmit standard 511, 2047 or 32767 bit test data pattern at 64 Kbits with a 1's density suitable for T-carrier, without T-link handshaking.

4) transmit standard 511, 2047 or 32767 bit test data pattern at 56 Kbit/s in 56 Kbit/s data mode (LSB held marking) without T-link handshaking.

5) receive data in any of the above formats and detect bit errors, block errors, sync losses and errored and error-free seconds.

6) when in T-link mode, derive data timing from the 64 Kbit/s channel rate with the option to derive clocking from the received data stream if the far end uses external clocking (indicated in T-link handshake).

7) when in T-link mode, the data transmission and reception rate are adaptable to the far end equipment.

8) the following MAP commands are available:

- a. BSY
- b. LOADFW to NT4X23AA DTU H/W circuit pack.
- c. TST DTU
- d. RTS DTU
- e. activate a loopback at a Datapath DLC or DU.
- f. start a BERT in one of the following modes:
 - 1) 64 Kbit/s (no T-link handshake).
 - 2) 56 Kbit/s (no T-link handshake).
 - 3) T-link adaptive data rate.
 - 4) default to any of the above according to type of loopback selected.
- g. stop a BERT.
- h. display test results:
 - . bit error ratio
 - . errored bit count
 - . errored block count
 - . errored second count
 - . error-free second count
 - . elapsed test time
 - . sync loss count
- i. display the operating characteristics of the test.

RELEASE 06.03
13 July 1998

5.1.2 Product Description

DTU CP Configuration for Datapath Bit Error Rate Testing (Future Application).

A pictorial representation of a DTU CP Configuration for Datapath BER Testing is as follows:

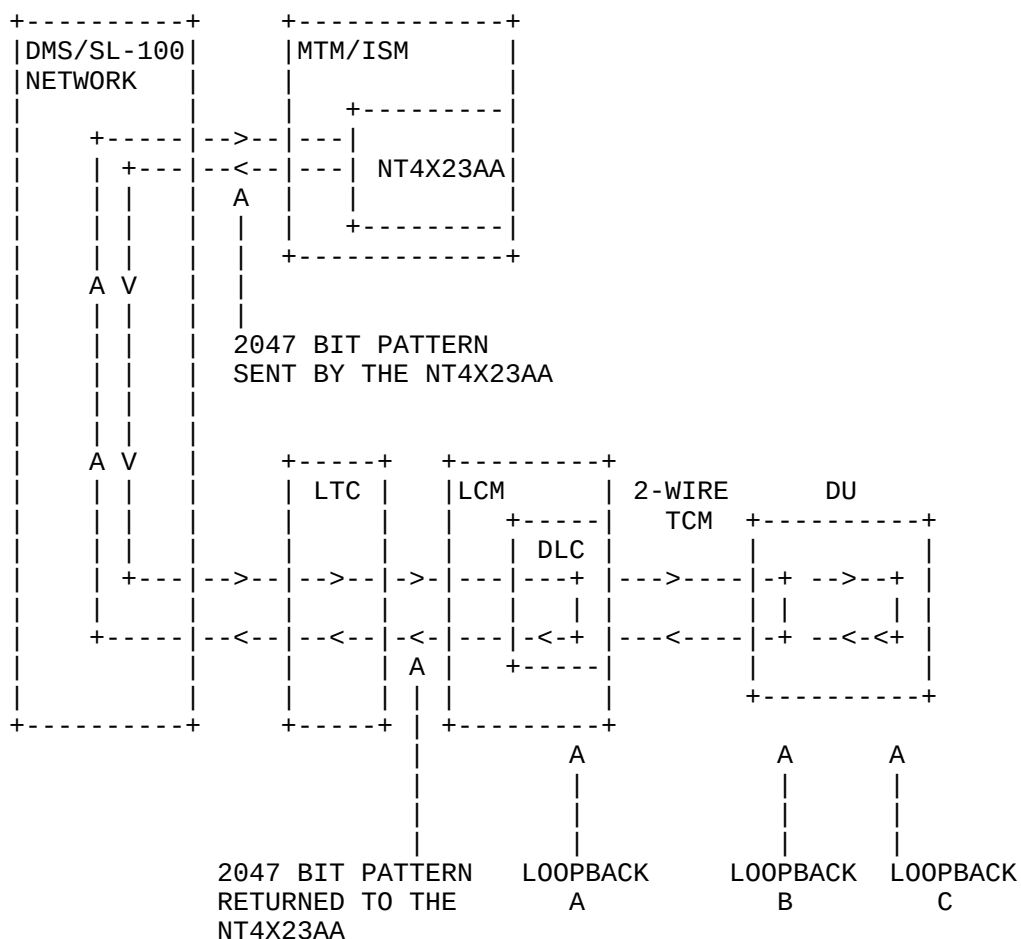


Figure 2. TYPICAL DATAPATH BIT ERROR RATE TEST SETUP

The loopbacks labelled A, B, and C are respectively a 64 Kilo-bit loopback at the Data Line Card (DLC), a 64 Kilo-bit loopback at the Data Unit (DU), and a loopback at the RS-232C interface of the Data Unit.

As can be seen from the diagram, the 2047 bit pattern is sent from the DTU CP through the network, out to the line in ques-

RELEASE 06.03
13 July 1998

tion, and is looped back from wherever the loopback is set (either A, B, or C) through the network to the DTU CP where it is compared with the pattern that was sent.

Optionally, no loopback may be set. This is referred to as a straight away test. In this case, an external BERT is connected to the Data Unit being tested. An external BERT takes care of receiving the bit pattern sent by the DTU CP and sending its own bit pattern back. This scenario is generally used for verifying the accuracy of the DTU CP. The external BERT would be used in this case to inject errors into the pattern sent back to the DTU CP so that it can be verified that in fact the DTU CP detected the error and reported it. Note that in this case the external BERT used must conform to CCITT standards so that it will generate the same 2047 bit pattern used by the DTU CP.

5.1.3 DTU CP Configuration for T1 Carrier Testing

A pictorial representation of a DTU CP Configuration for T1 Carrier Testing is as follows:

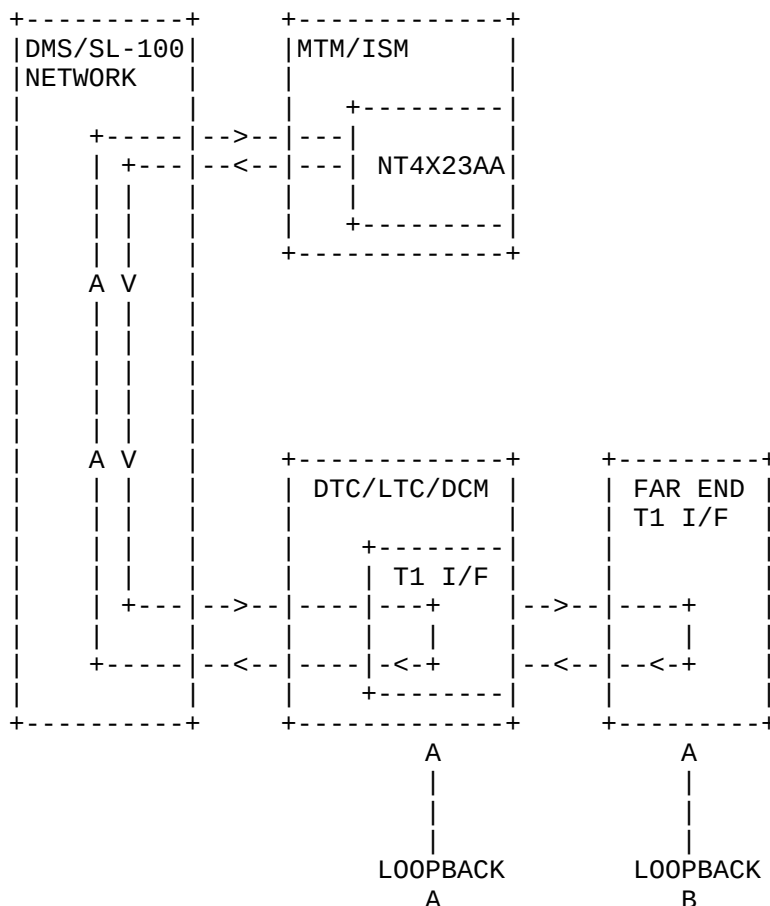


Figure 3. TYPICAL T1 CARRIER BIT ERROR RATE TEST SETUP

The loopbacks labelled A and B are respectively a loopback at the DTC/LTC/DCM T1 interface card and a loopback at the far end T1 interface card. Or alternatively, at each of the respective locations, a manually configured jacked loopback can be performed at the DSX.

5.2 Hardware Provisioning

5.2.1 Hardware Usage Restrictions

Not applicable

5.2.2 Hardware Dependencies

Not applicable

RELEASE 06.03
13 July 1998

5.2.2.1 P and C Side Port Requirements

Not applicable

5.2.2.2 DMS BUS Port Requirements

Not applicable

5.2.2.3 Circuits Per Card

Not applicable

5.2.2.4 Discrimination Numbering

Not applicable

5.2.3 Provisioning Considerations

The NT4X23AA is a provisionable single slot service CP which can reside in MTM, DRA, or ISM.

MTM	DRA	ISM
NT2X58CA	NT2X58CB	NTFX4101
NT2X58AC	NT2X58AK	
NT2X58AN	NT2X58AG	
NT2X58AA		

The NT4X23AA has the following characteristics:

- 2 circuits/card
- 2 amperes/card
- 10 watts/card
- 1 slot/card

An MTM and ISM may be fully provisioned with NT4X23AA CPs.

Up until BCS-24, the maximum number of NT6X99AA CPs and and NT4X23AA CPs (i.e. two circuits per card) allowed in an office (host plus all associated remotes) is 64.

For more information on IBERT Line Card NT6X99AA, see Table C Line Drawer Provisionable Cards.

As of BCS-25, the maximum number of NT6X99AA and NT4X23AA circuits allowed in an office is 128.

Other than the above restrictions, there are no restrictions to the number of DTU cards provisioned in a DMS switch for data integrity testing.

Simultaneous calls/tests may be made by any number of DTU BERT circuits.

RELEASE 06.03
13 July 1998

While BER testing can be performed by either the NT6X99AA CP, which mounts in an LCM, or by the NT4X23AA CP, which mounts in an MTM or ISM, there is a software problem that prevents the NT4X23AA from successfully testing Datapath Extension trunks. Therefore, it is recommended that the NT6X99AA be used for DMS-100 and DMS-100/200 offices (local and local/toll applications) and the NT4X23AA be used for DMS-200 offices (toll applications).

Determining The Number of DTU BERT Cards

The assumption placed on office testing shall be that an entire office should be tested within 12 hours.

12 hours = 720 minutes

1 call or test requires 10 minutes.

Hence $720/10 = 72$ calls or tests can be performed within a twelve hour period by one DTU BERT circuit.

One DTC or LTC can accommodate up to ten NT6X50AA cards.

1 DTC or LTC = 10 NT6X50AA cards
 = 20 DS-1 or T1 spans
 = 20 calls or tests

Hence $72/20 = 3.6$ DTC or LTC can be tested within a twelve hour period by one DTU BERT circuit.

1 DTU BERT circuit = 3.6 DTC or LTC

2 DTU BERT circuits = 1 DTU BERT card
 = 7.2; approximately 7 DTC or LTC

Hence one DTU BERT card can test up to seven DTC or LTC within a twelve hour period. One DCM can accommodate up to five NT2X35AA/AB cards.

1 DCM = 5 NT2X35AA/AB cards
 = 5 DS-1 or T1 spans
 = 5 calls or tests

Hence $72/5 = 14.4$; approximately 14 DCM can be tested within a twelve hour period by one DTU BERT circuit.

1 DTU BERT circuit = 14 DCM

2 DTU BERT circuits = 1 DTU BERT card
 = 28 DCM

RELEASE 06.03
13 July 1998

Hence one DTU BERT card can test up to 28 DCM within a twelve hour period.

A minimum of twelve (12) NT4X23AA CPs should be provisioned for DMS-200 (toll) offices.

5.2.4 Office Layout Information

Not applicable

5.2.5 Traffic Tables

Not applicable

5.3 Product/System Specification

5.3.1 Physical Characteristics

Not applicable

5.3.2 EMI/Earthquake Information

Not applicable

5.3.3 Sparing Information

Not applicable

5.3.4 Power Feed and Fusing Requirements

Not applicable

5.3.5 Current Drain Information

Not applicable

5.4 Software Provisioning

For NTX software packages to PLC/SOC mappings for CSP02 and beyond refer to ECM552 - Mapping of NTX/NTG Package to PCL/NCL/Option.

5.4.1 Required Software Packages and Interdependencies

DMS Toll Office

The applicable software is in the following software packages:

NTX882AA Bit Error Ratio Indicator for Toll Switches

Interdependencies for NTX882AA:

RELEASE 06.03
13 July 1998

NTX000AA Bilge
NTX001AA Common Basic
NTX270AA New Peripheral Maintenance Package
NTX801AA Toll Features 1 DMS Local, Local/Toll Offices

The applicable software is in the following software packages:

* NTX881AC Switch Bit Error Rate Maintenance
(Upgrade of NTX881AB)

* NTX885AB Switch Path Diagnostics
(Upgrade of NTX885AA)

* When ordering software package NTX881AC, it is recommended that NTX885AB be ordered as well.

Interdependencies for NTX881AC:

NTX000AA Bilge
NTX001AA Common Basic
NTX901AA Local Features 1
NTX270AA New Peripheral Maintenance Package

Interdependencies for NTX885AB:

NTX000AA Bilge
NTX001AA Common Basic
NTX270AA New Peripheral Maintenance Package

To determine/verify software package interdependency or master package content, the SMS89 document or SMSQUERY should be used.

5.4.2 Software Usage Restrictions

Not applicable

5.4.3 Memory Provisioning

Not applicable

5.5 Real Time Impact

Not applicable

6.0 ECM409 - Cancelled: International Metallic Test Unit

6.1 Overview

This product provides

6.2 Hardware Provisioning6.2.1 Hardware Usage Restrictions

Not applicable.

6.2.2 Hardware Dependencies

Not applicable.

6.2.2.1 P and C Side Port Requirements

Not applicable

6.2.2.2 DMS BUS Port Requirements

Not applicable

6.2.2.3 Circuits Per Card

Not applicable

6.2.2.4 Discrimination Numbering

Not applicable

6.2.3 Provisioning Considerations

The IMTU is assignable as follows:

DESCRIPTION	SIDE	SLOT	#CKTS/CD	PWR DIS
IMTU Analog (NT4X98)	Left	Odd	0	15
IMTU Controller (NT4X97)	Right	Even	2	9

There are presently slot restrictions in effect on the IRMM and the IMTM for NT4X97AA/NT4X98BB pair:

IRMM : Slots 9, 10

IMTM : Slots 11, 12

Do not assign it to these slots as it is not functional in them.

RELEASE 06.03
13 July 1998

To determine the number of IMTUs required in an office, use the provisioning formulae below.

It is recommended that one (1) IMTU circuit be assigned as a dedicated IMTU for two NT3X09BA Metallic Test Access cards. This will serve up to eight (8) LCMS. In addition, provision one (1) non-dedicated (rover) IMTU circuit per office.

For IRLCM offices provision a minimum of one (1) MTU pair per site. A non-dedicated MTU (rover) is not required for single IRLCM configurations. For multiple IRLCM configurations, provision the number of MTUs (including a rover circuit) based on the following methods:

Method 1

$$\begin{aligned} \text{No. of IMTU Circuits} &= \frac{\text{\# of LCMS}}{8} + 1 \\ \text{No. of NT4X97/NT4X98 Pairs} &= \frac{\text{\# of IMTU Circuits}}{2} \end{aligned}$$

Method 2

Telco requirements may dictate that all of the lines in an office be testable in a given time for test. This will require provisioning enough IMTU circuits to meet this requirement based on the following formula. Be sure to ensure that method 1 (above) has been observed.

$$\begin{aligned} \text{No. IMTU Circuits} &= \frac{\text{\# of Lines} \times \text{Test Hold Time (Secs)}}{3600 * \text{Time-For-Test (Hrs)}} + 1 \\ \text{No. of NT4X97/NT4X98 Pairs} &= \frac{\text{\# IMTU Circuits}}{2} \end{aligned}$$

6.2.4 Office Layout Information

Not applicable.

6.2.5 Traffic Tables

Not applicable.

RELEASE 06.03
13 July 1998

6.3 Product/System Specification

6.3.1 Physical Characteristics

Not applicable.

6.3.2 EMI/Earthquake Information

Not applicable.

6.3.3 Sparing Information

Not applicable.

6.3.4 Power Feed and Fusing Requirements

The IMTU circuit packs require -48V SP power.

- a. When the IMTU is assigned to an IMTM shelf, the -48V SP connection must be supplied by a provisionable local cable to the TME frame FSP. Currently the -48V SP connection is only available to shelves in positions 51 and 65. Provision the local cable as follows:

MTM In Shelf Position	PEC	QTY
51	NT0X95CR	1
65	NT0X95BU	1

The IMTU cards may not be assigned to shelves in positions 18 or 32. This will be changed in the near future.

- b. When the IMTU is assigned to an RMM shelf, provision one () NT6X1435 cable.

6.3.5 Current Drain Information

Current Drain for the circuit packs are:

6.4 Software Provisioning

For NTX software packages to PLC/SOC mappings for CSP02 and beyond refer to ECM552 - Mapping of NTX/NTG Package to PCL/NCL/Option.

6.4.1 Required Software Packages and Interdependencies

Not applicable.

6.4.2 Software Usage Restrictions

Not applicable.

6.4.3 Memory Provisioning

Not applicable.

6.5 Real Time Impact

Typical Test Hold Times

	Long Diagnostic Test	LIT Test
Type 'A' Line Card	26 secs	6-8 secs
Type 'B' Line Card	32 secs	6-8 secs
EBS Line Card	106 secs	6-8 secs

RELEASE 06.03
13 July 1998

7.0 ECM430 - Trunk Module E/W TM Controller CP, NT4X65AB

7.1 Overview

Circuit pack NT4X65AB TM Controller is introduced which performs the combined functions of circuit packs NT0X70AA, NT2X45AB, and NT2X53AA. It replaces the latter three CPs in the NT2X52__ TM and NT2X58__ MTM shelves. The NT4X65AB controls signaling and supervision functions, messaging to the host switch, and processing of PCM data. It is equipped with 48 kilobytes of random access memory.

Modified versions of existing TM and MTM shelves and Common CP are required for use with the NT4X65AB. These new shelves can be used in the same applications as the existing shelves.

7.2 Hardware Provisioning

7.2.1 Hardware Usage Restrictions

Not applicable

7.2.2 Hardware Dependencies

Not applicable

7.2.2.1 P and C Side Port Requirements

Not applicable

7.2.2.2 DMS BUS Port Requirements

Not applicable

7.2.2.3 Circuits Per Card

Not applicable

7.2.2.4 Discrimination Numbering

Not available

7.2.3 Provisioning Considerations

Provision one (1) associated Common CP, which contains the NT4X65AB as an always provided item, into the new TM/MTM shelves. The new shelves, the new Common CP fills, and the existing shelves which they replace are detailed in the following table. All shelves are applicable to TME frame NT0X46AB.

RELEASE 06.03
13 July 1998

Description	New TM/MTM Shelf PEC	Associated Common CP	Replaces Existing TM/MTM Shelf PEC
TM2	NT2X52AM	NT2X52AK	NT2X52AE
TM4	NT2X52AN	NT2X52AK	NT2X52AF
TM8	NT2X52AV	NT2X52AK	NT2X52AG/AP
DMS-300 TM	NT2X52AR	NT2X52AL	NT2X52AD
MTM	NT2X58AL	NT2X58AP	NT2X58CA NT2X58AC
DRA	NT2X58AM	NT2X58AP	NT2X58CB NT2X58AK

The provisioning rules for the 15 provisionable card slots of the new TM shelves, and the 12 provisionable card slots of the new MTM/DRA shelves, are the same as the provisioning rules of the shelves they are replacing.

7.2.4 Office Layout Information

Not applicable

7.2.5 Traffic Tables

Not applicable

7.3 Product/System Specification

7.3.1 Physical Characteristics

Not applicable

7.3.2 EMI/Earthquake Information

Not applicable

7.3.3 Sparing Information

Standard sparing algorithms apply.

7.3.4 Power Feed and Fusing Requirements

Not applicable

7.3.5 Current Drain Information

Not applicable

7.4 Software Provisioning

For NTX software packages to PLC/SOC mappings for CSP02 and beyond refer to ECM552 - Mapping of NTX/NTG Package to PCL/NCL/Option.

7.4.1 Required Software Packages and Interdependencies

Not applicable

7.4.2 Software Usage Restrictions

Minimum BCS-27 software is required to support the NT4X65AB CP.

7.4.3 Memory Provisioning

Not applicable

7.5 Real Time Impact

None.

RELEASE 06.03
13 July 1998

8.0 ECM445 - MCTM-ISDN NTN33CA and MCTM NTN33AA

8.1 Overview

The Meridian Cabinet Trunk Module (MCTM-ISDN) is the latest in the series of cabinet products in the MSL100 product line. MCTM-ISDN has replaced both the basic MCTM and the MCIM (IAC). The MCTM-ISDN contains two fully duplicated peripheral controllers and can be provisioned for ISDN and NON-ISDN functionalities. Also, all previous functionality of the basic MCTM is retained and equipment layout in the cabinet is identical.

The XPM PLUS (Product Life Upgrade Strategy) Phase II program addresses the need for memory and processing enhancements by replacing the separate MP and SP circuit packs in DTC/LGC/LTC/RCC modules with the Unified Processor (UP). The UP increases available memory to 8MB and provides an improvement in Realtime capacity by a factor of approximately 1.6x compared to the MP/SP processor. All existing functions, interfaces and tools continues to be supported.

8.2 Hardware Provisioning

8.2.1 Hardware Usage Restrictions

Refer to ECM 714 Domestic XPMS & Subscriber Carrier Modules.

The following usage restrictions apply to the XPM+ Phase II product:

- o RLCM and MSB7 are not to be upgraded to XPM PLUS with the Unified Processor.
- o In order to use the new software that is available in BCS-34 and above, XPMs currently equipped with enhanced messaging will require upgrade from MP/SP processors to the XPM PLUS processor.

LAST SUPPORT OF MP/SP-EQUIPPED MODULES

Module Type	Release	PM Load
RCCI	BCS-33	
LGC-I	BCS-34	
LTC-I	BCS-34	
SMU-I	BCS-34	
LGC	NA002/3	XPM03/03B
LTC	NA002/3	XPM03/03B

RELEASE 06.03
13 July 1998

! RSC	!	NA002/3	!	XPM03/03B	!
! DTC7	!	NA002/3	!	XPM03/03B	!
!	!		!		!
! DTCI	!	NA003	!	XPM04	!
! SMU	!	NA003	!	XPM04	!
!	!		!		!
! DTC	!	NA004	!	XPM05	!
!	!		!		!
!	!		!		!

=====

o As of BCS 35 the MP/SP processor will no longer be shipped for new orders of the LGC/LTC/DTC/RCC. The Unified processor (XPM Plus) will be shipped for all new LGC/DTC/LTC/ RCC modules ordered.

The following restrictions apply to the SMA Module:

o SMA is no longer available. Provide ESMA for all new jobs. ESMA is housed in the CMVI cabinet.

o The SMA will be limited to no more than 20 DS-1 connections if the AccessNode has no ISDN BRA lines or to 16 DS-1 connections with ISDN BRA lines.

o The SMA is capable of supporting no more than 672 lines and 42 DS-1s per AccessNode.

o A maximum of 4 Enhanced D-Channel Handlers (3 active + 1 spare) will be allowed in a single SMA module (require BCS-36).

o No more than 324 ISDN loops will be allowed in a single SMA module.

o A maximum of forty (40) AccessNodes may be connected to a single DMS.

8.2.2 Hardware Dependencies

For non-ISDN function of controllers on MCTM-ISDN cabinet, a strap must be added to each shelf of the 2-shelf controller between pins 7A & 8A of slot 12 (LTC/DTC Processor CP). The basic packfill is the same for ISDN/Non-ISDN function, however, presence or absence of strap just described, plus appropriate provisionable ckt packs and load/exec will determine the ISDN or Non-ISDN functionality of the controller.

Also refer to ECM 714 Domestic XPMS & Subscriber Carrier Modules.

The hardware required to implement XPM PLUS capability is the Unified Processor, the terminator card (which mounts in a rear side

RELEASE 06.03
13 July 1998

slot) and backplane strapping. These changes are applied to the existing non-ISDN XPM equipment as described in the Product Change Kit documents.

NTBX01AA/AB/AC/BA/CA circuit packs:

=====

The NTBX01AA is the original design ISDN Signal Pre-processor and is still present in some existing MP/SP equipped peripheral modules. NTBX01AB/AC only works with XPM PLUS modules. The NTBX01BA pack will be provisioned with new ISDN/SMA controller. NTBX01BA cps do not work with MP/SP processor. DO NOT REPLACE NTBX01AA/AB IN A MP/SP EQUIPPED MODULE W/NTBX01BA EXCEPT when NTBX01BA is part of the XPM PLUS upgrade.

The NTBX01BA pack is physically and functionally interchangeable with the NTBX01AB ONLY when used in an XPM PLUS module. NTBX01BA must only be used in an XPM PLUS module; therefore, the NTBX01BA pack can not be used to replace NTBX01AA IN A MP/SP equipped module. NTBX01BA pack can be used to upgrade MP/SP equipped module to an XPM PLUS module.

The NTBX01BA pack is physically and functionally interchangeable with the NTBX01AC in a SMA controller. The NTBX01CA pack replaces the NTBX01BA pack in the ICP & ICP-0 applications.

8.2.2.1 P and C Side Port Requirements

C-side: Each LGC/LTC/DTC/DTCI controller requires sixteen DS30 for Junctor Network (JNET) OR one DS512 for Enhanced Network. (ENET)

P-Side: Each LGC/LTC/DTC/DTCI has twenty (20) physical connectors on the P-Side. Depending on the applications, each of these twenty connectors (or port) can be used either as DS-1 or DS-30A. Usage of P-Side port is based on the 480 channels available per controller and it should be calculated per job basis. The following shows the maximum DS-1 or DS-30A port per controller:

```
*****
! Controller ! DS-1 ! DS-30A !
! *****!
! DTC/DTCI   ! 20   ! 0     !
! LGC        ! 0    ! 16    !
!            !     !      !
!            !     !      !
*****
```

For LTC controller, there will be a mixture of DS-1 and DS-30A; therefore; engineering will have to calculate for the maximum number of DS-1 and DS-30A per controller.

RELEASE 06.03
13 July 1998

8.2.2.2 DMS BUS Port Requirements

Not applicable

8.2.2.3 Circuits Per Card

Not applicable

8.2.2.4 Discrimination Numbering

For BCS-31 and above, discrimination numbering of ISDN peripherals has been changed, requiring them to be consecutive with NON-ISDN peripherals. At the map, ISDN modules will display as LGC/LTC instead of LGCI/LTCI. ISDN or Non-ISDN modules can still be identified by referring to the field 'ISP16' in table LTCINV.

the DTCI controller will remain the same due to the complexity of changing in-service trunk and the lack of software tool for this activity.

8.2.3 Provisioning Considerations

Refer to ECM 714 Domestic XPMS & Subscriber Carrier Modules.

Use product change kit NTNX33ZA to field upgrade NTNX33CA MCTMI products.

Use DS-512 Fiber Interface kit NTNX33SD to field upgrade NTNX33AA (MCTM) cabinets for use with ENET and ENI on SNSE.

Order one NT6X02UF, fiber bracket kit, per module on the MCTM/I when fiber interace is required. The NT6X02UF replaces the NT6X02BU.

The following circuit packs are required for provisioning a shelf of an SMA (2 shelves per module) in the MCTMI cabinet for Access Node interface:

PEC	DESCRIPTION	SLOT	RULE

NT6X50AB	DS-1 I/F	01-05	Qty as required
NTBX02BA	EDCH I/F	01-05	Qty as required
NTMX77AA	Unified Processor	12	Always provision
NT6X44CA	Time Switch	14	Does not support
NTAX78AB	Enhanced Time Switch	14	Digital Test Access
NT6X92BC	Univ. Tone Rcvr(UTR)	15	Does support Digital
			Test Access
NTBX01BA	ISDN Proc.	16	Always provision
			"

RELEASE 06.03
13 July 1998

NT6X78AB	CLASS Modem Resource	17	Req'd only for CLASS
NT6X69AC	Msg Protocol Tone Gen.	18	Provisionable
NTMX76AB	Msg & HDLC Signal Proc	18	Provisionable
NT6X80BB	SMU Pad Ringing Card	19	"
NTMX71AA	Terminater	19R	"
NT6X42AA	Channel Supp. Message	20	"
NT6X41AA	Speech Bus Formatter	21	"
NT6X40AD	DS-30 I/F	22	" (JNET)
NT6X40FB	DS-512 I/F	22	" (ENET)
NT6X40GA	DS-512 Paddle Board	22R	" (ENET)
NT0X50AA	Filler Face Plate	6,7,8,9,10 11,12,13,23,24 & 1-5 as required	
NT2X70AF	Power Supply	25	always provision

8.2.4 Office Layout Information

Refer to NTP 555-4001-103 Meridian SL100 Cabinetized General Description.

Refer to NTP 555-4001-120 Meridian SL100 Compact.

8.2.5 Traffic Tables

Refer to ECM 714 Domestic XPMS & Subscriber Carrier Modules.
ECM 497 Simplified Traffic Provisioning
SEA 92-09-003 CM Real Time Engineering Adjustments
Associated with S\DMS AccessNode.
SEB 92-09-003 BCS 36 Peripheral Processor Real Time
Occupancy Allocations and Call Timing Tables.

8.3 Product/System Specification

8.3.1 Physical Characteristics

8.3.2 EMI/Earthquake Information

Refer to NTP 555-4001-103 Meridian SL100 Cabinetized General Description.

Refer to NTP 555-4001-120 Meridian SL100 Compact.

RELEASE 06.03
13 July 1998

8.3.3 Sparing Information

ISDN circuit pack sparing is based on such factors as turn-around time, geographic location of depot and ISDN cabinets, and the amount of equipment concentrated at a single location.

As a rule of thumb, provision as spare a minimum of one each ISDN circuit pack, up to a maximum of 10% of the total count of that item.

8.3.4 Power Feed and Fusing Requirements

Desig	AMP	Potential	One Per
-----	-----	-----	-----
CB1	10A	-48V(B)	SH 47
CB2	10A	-48V(B)	SH 19
CB4	10A	-48V(A)	SH 33
CB5	10A	-48V(A)	SH 05
F01	1 1/3A	-48V ABS	Pwr & Alm PCB
F02	1 1/3A	-48V ABS	Fan Fail Lamps
F03	1 1/3A	-48V ABS	Test Equip Backs
F04	1 1/3A	-48V(B)	Cooling Unit
F05		-48V(B)	Spare
F06		-48V(B)	Spare
F07	1 1/3A	-48V(A)	Cooling Unit
F07	1 1/3A	-48V(A)	Cooling Unit
F07	1 1/3A	-48V(A)	Cooling Unit
F07	1 1/3A	-48V(A)	Cooling Unit
F07	1 1/3A	-48V(A)	Cooling Unit
F07	1 1/3A	-48V(A)	Cooling Unit
F07	1 1/3A	-48V(A)	Cooling Unit
F07	1 1/3A	-48V(A)	Cooling Unit
F07	1 1/3A	-48V(A)	Cooling Unit
F07	1 1/3A	-48V(A)	Cooling Unit
F07	1 1/3A	-48V(A)	Cooling Unit
F07	1 1/3A	-48V(A)	Cooling Unit
F07	1 1/3A	-48V(A)	Cooling Unit
F07	1 1/3A	-48V(A)	Cooling Unit
F07	1 1/3A	-48V(A)	Cooling Unit
F08	1 1/3A	-48V(B)	Cooling Unit

8.3.4.1 POWER/HEAT DISIPATION

Voltage Limits: Potential = -45V
Range = -42.5V to -55.8V

8.3.5 Current Drain Information

The current drain per cabinet is as follows:

MCTM-ISDN NTNX33CA 30.0 AMPS

RELEASE 06.03
13 July 1998

8.4 Software Provisioning

For NTX software packages to PLC/SOC mappings for CSP02 and beyond refer to ECM552 - Mapping of NTX/NTG Package to PCL/NCL/Option.

8.4.1 Required Software Packages and Interdependencies

Refer to ECM 714 Domestic XPMS & Subscriber Carrier Modules.

Software package NTXR34-- is required to support the Unified Processor and will be needed for all XPM PLUS upgrades. Software package NTXR42-- is required to utilize the downloadable firmware feature and is required with NTXR34--. In BCS-35, NTXR34AA is replaced by NTXR34AB (status of NTXR34AA is changed to Manufacture Discontinued). Refer to SMS/ SOLID for software requirements and interdependencies.

SMA software operates on top of existing XPM base software. The feature package for SMA System Interface to AccessNode is NTXF46AA and for SMA Multivendor Interface (MVI) is NTXS02AA.

8.4.2 Software Usage Restrictions

Refer to ECM 714 Domestic XPMS & Subscriber Carrier Modules

BRA/PRA software availability is projected for BCS29 (RTM) and BCS30 (IS). Verify availability with BNR or PLM.

8.4.3 Memory Provisioning

Refer to ECM 714 Domestic XPMS & Subscriber Carrier Modules.

8.5 Real Time Impact

Refer to ECM 714 Domestic XPMS & Subscriber Carrier Modules.

The Unified Processor provides an improvement in RealTime capacity by a factor of approximately 1.6X compared to the existing MP/SP.

RELEASE 06.03
13 July 1998

9.0 ECM523 - Meridian Cabinet Auxiliary Module, NTNX37AB.

9.1 Overview

Description.

The MCAMII NTNX37AB cabinet provides service circuits and fusing for a Meridian Cabinet line-up.

Product	PEC	CPC	Title
Status			
MD	NTNX37AB	B0230013	Meridian Cabinetized Auxiliary Module II Replaced by NTNX37AD

9.2 Hardware Provisioning

9.2.1 Hardware Usage Restrictions

This ECM 523-1 will introduce two (2) new wiring kits as part of MCAMII upgrade as follows:

- 1) NTNX37WA MTM wiring option kit to be provided with any PTM (SHF POS 33 OR 47) when NT4X65AB MTM control cp is provisioned as with the (3) new packfills also described in this ECM (COMMON CPs NTNX37NF/ NG & NH).
- 2) NTNX37WB MTU wiring option kit to be provided with the new MTU (Multiline Test Unit) pair NT2X10BA/NT2X11BA.

9.2.2 Hardware Dependencies

Not applicable.

9.2.2.1 P and C Side Port Requirements

C-side: In general each MCAM cabinet requires 4 DS-30 links to the network. Additional DS-30 links can be provisioned for single PM service circuit pack like EDRAM, CTM.

9.2.2.2 DMS BUS Port Requirements

Not applicable

9.2.2.3 Circuits Per Card

Not applicable

RELEASE 06.03
13 July 1998

9.2.2.4 Discrimination Numbering

Not applicable

9.2.3 Provisioning Considerations

This section details the provisioning guidelines for this product.

9.2.4 Office Layout Information

MCAM cabinet must always be the first cabinet in any cabinet line up.

9.2.5 Traffic Tables

Not applicable.

9.3 Product/System Specification

9.3.1 Physical Characteristics

Refer to NTP 555-4001-103 Meridian SL100 Cabinetized General Description.

9.3.2 EMI/Earthquake Information

Refer to NTP 555-4001-103 Meridian SL100 Cabinetized General Description.

9.3.3 Sparing Information

Standard methods apply.

9.3.4 Power Feed and Fusing Requirements

The following fuses and feeds are required:

! DESIG. !	! AMP !	! POTENTIAL !	! ONE PER !	! NOTE !
! F01 !	! 10 !	! -48V(A) !	! PTM !	! SH. 47 !
! F02 !	! 10 !	! -48V(B) !	! PTM !	! SH. 33 !
! F03 !	! 10 !	! -48V(A) !	! STM !	! SH. 19 !
! F04 !	! !	! !	! SPARE !	! !
! F05 !	! 1-1/3 !	! ABS !	! PWR & ALM !	! !
! !	! !	! !	! PCB !	! !
! F06 !	! 1-1/3 !	! ABS !	! FAN FAIL !	! !
! !	! !	! !	! LAMP !	! !
! F07 !	! 1-1/3 !	! ABS !	! TEST EQUPT !	! !
! !	! !	! !	! JACKS !	! !
! F08-F12 !	! !	! !	! SPARES !	! !

RELEASE 06.03
13 July 1998

! VOLTAGE LIMITS	!
! POTENTIALS:	RANGE:
! -48V	-42.5V TO 55.8V

9.3.5 Current Drain Information

Current drain for MCAM cabinet is 14 AMPS.

9.4 Software Provisioning

For NTX software packages to PCL/SOC mappings for CSP02 and beyond refer to ECM552 - Mapping of NTX/NTG Package to PCL/NCL/Option.

9.4.1 Required Software Packages and Interdependencies

Not applicable.

9.4.2 Software Usage Restrictions

Not applicable.

9.4.3 Memory Provisioning

Not applicable.

9.5 Real Time Impact

Not applicable.

RELEASE 06.03
13 July 1998

10.0 ECM557 - Integrated Services Module

10.1 Overview

Product/System Overview

The Integrated Services Module (ISM) is a single shelf unit that replaces the MD'ed Trunk Module (TM) Shelf or the Maintenance Trunk Module (MTM) Shelf. The ISM Shelf NTFX4101 mounts on either the Cabinetized ISM equipment (CISM) or the ISM Equipment frame (ISME), both housing a maximum of four ISM Shelves.

ISM is not supported on NT40. ISM for SuperNode offices only.

The ISM Shelf houses an ISM Processor, an ISM DC-DC Power Converter, and up to a maximum of eighteen (18) provisionable CPs. It connects with the DMS in the same manner as the existing TM and MTM shelves. The ISM processor has a DS-30 link interface with the network (one link to each plane of the network) and BUS connections with service CPs using the back panel. The P-side interface on the ISM Shelf is determined by the service circuits. The ISM can co-exist with TM/MTM and other peripheral modules (PM) within a DMS switch. Figure 1 shows the ISM connection within the DMS.

Figure 1. ISM connection within DMS.

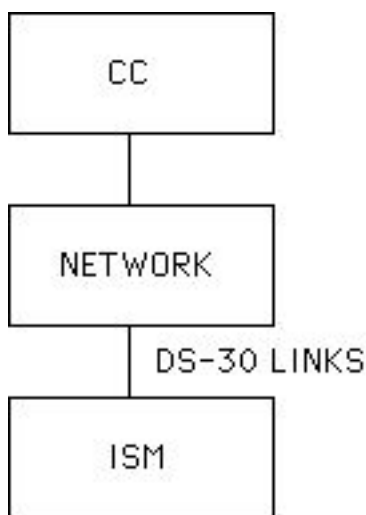


Figure 4. ISM CONN WITHIN DMS

RELEASE 06.03
13 July 1998

10.1.1 The ISM Shelf

The ISM Shelf (NTFX4101) is a standard DMS size shelf with a new ISM backpanel. It provides twenty one (21) slots interconnecting a single-slot ISM processor (NTFX42), a two-slot ISM DC Power Converter (NTFX43), and a maximum of eighteen (18) provisionable slots. The shelf layout is shown in Engineering Manual Section NTFX4101, ISM Shelf Assembly.

The ISM processor (NTFX42) is designed to be functionally compatible with the existing TM/MTM service circuit cards. It provides a combined functionality of 0X70, 2X45, 2X53 and 2X59 controller cards.

The ISM DC Power Converter (NTFX43) provides +5V, +12V, +25V and -15V DC voltages required by the ISM Shelf from an input battery feed.

The ISM Shelf provides eighteen (18) slots (slots 03-20) for provisionable CPs. Two slots (03-04) are now available for IOM CPs. Sixteen (16) slots (slots 05-20) are backwards compatible with the service CPs in the existing TM/MTM shelves and can be used for non-PM types of service circuits. Slot 05 may be used for non-PM service circuits for limited applications. Refer to "Provisioning Considerations" for detailed provisioning information.

DS-30 link interfaces are provided for PM (Peripheral Module) Service Circuits. These links provide interfaces with the network ports for slots 05 thru 17. PM Service Circuits which do not need power supply voltage levels other than -48V, and which are referred to as 'Stand Alone' PM Service Circuits, e.g. CTM (Conference Trunk Module), may be inserted in slot positions 03 thru 17 and IOM CPs may be inserted in slots 03 and 04. PM Service Circuits which do not contain dc power converters, e.g. EDRAM (Enhanced Digital Recorded Announcement Module) can be inserted in slots 05 thru 17.

In the ISM Shelf, the CPs which work adjacently in pairs are configured with the main card on the right and its companion card on the left, which is opposite to the configuration in the TM/MTM. This is true except for the TTT, for which the companion card is located on the right of the main card. Slots 03 and 04 are designed exclusively for single CPs having power supply requirements of -48V only, e.g. IOM CPs. Slots 03 and 04 provide direct battery feed of (-48V) for this purpose. The ISM Shelf appears at the MAP as either a TM or an MTM depending upon the software load applied. Also, the ISM designation label identifies an ISM Shelf as either a TM or MTM according to the ISM function.

RELEASE 06.03
13 July 1998

10.1.2 The Cabinetized ISM Equipment (CISM)

The Cabinetized ISM equipment (NTFX40AA) is a standard DMS C28 Model B cabinet that houses a maximum of four (4) ISM Shelves, an MSP Shelf and a cooling unit.

Cabinetized ISM Equipment Building Block NTZZ47XA is available for ordering CISM.

10.1.2.1 Metallic Test Access - External Loop Test

The CISM supports the provisioning of external loop test access for use with the Cabinetized Metallic Test Access (CMTA) system. One CISM can accommodate equipment for accessing a maximum of 20 test trunks, i.e. 20 horizontal connections to the metallic test access matrix provided by the CMTA system. Additional CISM can be used to increase the system total external loop test trunks to greater than 20.

10.1.3 The Frame ISM Equipment (ISME)

The ISM Equipment frame (NTFX40BA) is a standard DMS size open frame that houses a maximum of four ISM Shelves and an MSP Shelf.

The ISM Equipment frame building block NTZZ40AA is now MD'ed. The new building block for the frame is NTZZ40AB. Additional building blocks are now available for the MTM or TM Shelf (NTZZ40AD), and the Alarm Shelves (NTZZ40AF). Refer to the Engineering Manual Sections for more information.

10.1.4 Circuit Packs Developed for ISM Application

10.1.4.1 ISM Processor (NTFX42AA)

The ISM Processor NTFX42AA provides, for the ISM, the same function as the four CPs, NT0X70, NT2X45, NT2X53 and NT2X59, used in the TM/MTM shelves of the TME. The ISM processor also provides the combined functionality of NT2X59 and NT4X65 CPs. The NT4X65 CP is used in place of NT0X70, NT2X45, and NT2X53 in the Canadian market.

10.1.4.2 ISM DC Converter (NTFX43AA).

The ISM DC converters provide functionality similar to that provided by NT2X70 & NT2X09 used in the MTM/TM shelves of the TME. However, -5v and -12v are not provided by the ISM DC converter, because these voltages are not required by the service circuits used in the ISM shelf.

RELEASE 06.03
13 July 1998

10.1.4.3 Improved Loop Test Accessory (ILTA) - NTFX44AA.

The ILTA design combines the functionality of one NT2X57AA-Signal Distribution Card 1, two NT3J00BB-Loop Test Accessory CPs and one NT3J00BC-75 Volt Converter. The ILTA was introduced for the CMTA/MTAE application of ISM. The ILTA interfaces with up to four dedicated NT2X90AD CP to form a test access group. The ILTA is used with external Test Heads like VER-90, MLT2 and LTC testing of remote such as SLC-96, DMS1U etc., subscriber loops.

10.1.4.4 Enhanced Digital Test Unit (EDTU) - NT4X45AA

The NT4X45AA EDTU CP design provides a new platform to house the DTU (BERT and OHBT), TTT, and TTU functionality. The EDTU CP has four (4) circuit enables and is provisionable in the ISM Shelf (MTM) NTFX4101. When available, the EDTU CP is the preferred CP for DTU, TTT, and TTU applications. Check URTS date for availability before ordering.

A single EDTU CP can replace any of the following service CPs: (Domestic and International Mkt.)

replaces two (2) NT4X23AA Digital Test Unit (DTU) or
replaces four (4) NT1X90AA Test Signal Gen (domestic TTT) and
replaces four (4) NT2X96AA PCM Level Meter (domestic TTT) or
replaces four (4) NT2X47AC/AD Trans. Test Unit (domestic TTU) and
replaces four (4) NT2X56AB TTU Digital Filter (domestic TTU) or
replaces four (4) NT1X90BA Test Signal Gen (international TTT) and
replaces four (4) NT2X96BA PCM Level Meter (international TTT) or
replaces four (4) NT2X47AC/AD Trans. Test Unit (international TTU)
and
replaces four (4) NT2X56BA TTU Digital Filter (international
TTU) or
some combination of the above CPs.

The CC S/W associated with the EDTU provides mechanisms for static selection of any combination of DTU, TTT, and TTU applications.

To achieve robustness, all offices deploying EDTUs must provision at least two (2) separate EDTU CPs, and these should be installed on at least two (2) separate ISM (MTM) Shelves.

The total number of EDTUs required is based on the equivalent number of DTUs, TTTs, and TTUs that would otherwise be required in the office.

--Add up the total number of TTTs, TTUs, and DTU circuits needed for BERT/BERP, and the total number of DTU circuits needed for OHBT in the office.

--If this total is not a multiple of 4, increase it to the next larger multiple of 4. If the result is less than 8, use 8.

RELEASE 06.03
13 July 1998

--Divide this value by 4 to obtain the number of EDTU CPs required for the office. This is at least 2.

--Install these CPs on at least two separate ISM (MTM) Shelves.

--For robustness, distribute the circuits of each type needed across as many EDTU CPs as possible. For example, if there are to be three EDTU CPs, and 6 TTT trunk members are required in the office, provision two TTT trunk members on each of the three EDTU CPs.

See the Engineering Manual Sections for more information on CP location in the specific shelf types. See EMS NTFX4101 for ISM Shelf information, and EMS Table A or BB-TAB-A for MTM Shelf information.

10.1.4.5 Circuit Pack Modifications

The edge connector pins of the ISM have functional incompatibilities with some service circuits used in the TM and MTM shelves of the TME. These service circuits are modified for ISM use. The modified CPs are backward compatible with the MTM and TM shelves of the TME. They are identified with PECs as follows:

NT2X10BA modified to NT2X10BB
NT4X98BB modified to NT4X98BC.
NT3X82AC, AD, AE changed to NT3X82AH, AJ & AK respectively.
NT3X83AA, AB modified to NT3X83AC & AD respectively.
NT3X84AA modified to NT3X84AB.
NT3X85AA modified to NT3X85AB.

10.2 Hardware Provisioning

10.2.1 Hardware Usage Restrictions

ISM is intended as a replacement for TME frames and cabinets. It should be used instead of the TME except in the RMM (Remote Maintenance Module).

STP (Signal Transfer Point) applications are supported by ISM beginning with STP03.

Software support for ISM is available from BCS-36 and above. ISM shall not be applied in systems operating with BCS-35 and below software. Although the ISM supports most service circuits currently used in TM/MTM shelves, it does not support those CPs listed in Figure 2. The table also shows the new CPs that replace those CPs in the ISM.

Figure 2. CPs NOT Supported by ISM and the REPLACEMENTS

CP PEC NOT SUPPORTED BY ISM	REPLACED BY
NT1X31AA	NT1X81AA
NT1X75AA	NT1X80AA
NT1X76AA	NT1X80AA
NT1X77AA	NT1X80AA
NT1X79AA	NT1X80AA
NT2X10AA	NONE
NT2X10AB	NONE
NT2X10AC	NONE
NT2X10BA	NT2X10BB
NT2X11AA	NONE
NT2X11AC	NONE
NT2X11AD	NONE
NT2X43AB	NONE
NT2X47AA	NONE
NT2X47AB	NT2X47AD
NT2X47AC	NT2X47AD
NT2X48AA	NONE
NT2X48AB	NONE
NT2X50AB	NT3X09BA
NT2X55AA	NONE
NT2X56AA	NT2X56AB
NT3X05AA	NONE
NT3X05AB	NONE
NT3X05AC	NONE
NT3X08AA	NT3X08AB
NT3X09AA	NT3X09BA
NT3X67AA	NT1X81AA
NT3X67BA	NT1X81AA
NT3X67AB	NT1X81AA
NT3X82AA	NT3X82AF

RELEASE 06.03
13 July 1998

NT3X82AB	NT3X82AG
NT3X82AC	NT3X82AH
NT3X82AE	NT3X82AK
NT3X82AD	NT3X82AJ
NT3X83AA	NT3X83AC
NT3X83AB	NT3X83AD
NT3X84AA	NT3X84AB
NT3X85AA	NT3X85AB
NT4X98BA	NT4X98BC
NT4X98BB	NT4X98BC
NT2X90AA	NT2X90AD
NT2X90AB	NT2X90AD
NT2X90AC	NT2X90AD

For service circuits supported by ISM, refer to Engineering Manual Section EMA14-01-000.

10.2.2 Hardware Dependencies

The ISM is successfully introduced and is Generally Available for mounting in CISM or ISME. The following TM/MTM equipment should only be ordered for extensions where there is unused capacity in existing TME cabinets or frames. Although no longer manufactured some stock remains. Check availability before ordering the following TM and MTM equipment.

Figure 3. TM/MTM Modules for Extensions w/UNUSED capacity ONLY

MODULE TYPE	PEC
T8A	NT2X5201, NT2X52AD
TM2	NT2X5202, NT2X52AE
TM4	NT2X5208, NT2X52AF
TM2	NT2X5219, NT2X52AM
TM4	NT2X5220, NT2X52AN
TM8/T8A	NT2X5221, NT2X52AG
TM8 DMS300	NT2X5222, NT2X52CC
TM8/T8A	NT2X5224, NT2X52AP
T8A	NT2X5226, NT2X52AR
ITM8	NT2X5228, NT2X52BB
TM8	NT2X5229,
IT8A	NT2X5231,
ITM8	NT2X5232,
T8A	NT2X5233,
TM Packfill	NT2X52CA, NT2X52AK, NT2X52AL
IT8A Packfill	NT2X52CB
OAU	NT2X5809, NT2X58AF
MTM	NT2X5808, NT2X5828, NT2X5830
MTM	NT2X5839, NT2X5841, NT2X58CA
MTM	NT2X58CB, NT2X58AL, NT2X58AM,
MTM	NT2X58AP, NT2X58AX, NT2X58AZ
IMTM	NT2X5824, NT2X5825
IMTM	NT2X58AT, NT2X58AU,
IMTM Packfill	NT2X58BB, NT2X58CL
IMTM Packfill	NT2X58DB, NT2X58AY
MTM Packfill	NT2X58CN, NT2X58CP

RELEASE 06.03
13 July 1998

10.2.2.1 P and C Side Port Requirements

The ISM has the same interfaces as those available on the TM/MTM. The C-Side and P-Side interfaces are described as follows:

C-Side

The ISM has a DMS proprietary DS-30 interface on its C-Side. This interface has the biphase electrical format and consists of four-wire conductors for connection with each network plane. The connections are made at slot 21 on the ISM Shelf (i.e. connect to ISM processor).

Each PM type CP residing at slots 05-17 of the ISM Shelf each have one DS-30 link to the network as does the ISM processor at slot 21.

The ISM processor and the ISM backpanel(slot 21) has a certain number of pins reserved for future use for DS-30A interface.

P-Side

The P-Side interface on the ISM Shelf is determined by the service circuits.

10.2.2.2 DMS BUS Port Requirements

Not applicable

10.2.2.3 Circuits Per Card

Refer to EMA14-01-000 for the number of circuits supported by each service CP that is provisionable on the ISM Shelf.

10.2.2.4 Discrimination Numbering

The ISME and CISM discrimination number sequence begins at zero. This is true even in offices in which TME or CTME are present. TME or CTME discrimination number sequence is independent of ISME or CISM discrimination numbering sequence.

10.2.3 Provisioning Considerations

10.2.3.1 Provisioning Circuit Packs on the ISM Shelf

The ISM Shelf (NTFX4101) houses an ISM processor, an ISM DC Converter and service CPs. The following are the rules for provisioning CPs on the ISM Shelf:

ISM Processor CP

The ISM processor (NTFX42AA) occupies a single slot and is provisionable in slot 21. It is provided only when one or more non-PM type service circuits are allocated to the shelf. The Independent PM service cir-

RELEASE 06.03
13 July 1998

cuits, e.g. CTM, EDRAM, have DS-30 interfaces with the network and, therefore, do not require the ISM processor.

ISM DC Converter CP

The ISM DC Converter (NTFX43AA) occupies two (2) slot positions and is provisionable at slot 01-02. It is provided only when one or more service circuits, installed in the shelf, require +5v, +12v and -15v power supplies.

PM Service CP

PM Service CPs are PM CPs that require DC converter to provide 5V, 12V, 25V and -15V supplies. The PM service CPs, e.g. EDRAM, can be provisioned at any slot from slot 05 through slot 17 provided a DS-30 link is connected

Independent PM Service CP

Independent PM Service CPs are PM CPs that do not require a separate DC converter. Power is supplied directly from -48V battery. The Independent PM service CPs, e.g. CTM, can be provisioned at any slot from slot 03 through slot 17 provided a DS-30 link is connected at the slot.

Non-PM Service CP

The Non-PM service CPs can be provisioned at slot positions 05-20. Slot 05 can be used for a service CP that must work in pairs with another service CP in limited applications. In these instances, the CP pair can be provisioned at slots 05-06.

10.2.3.2 Provisioning ISM Shelves on the Cabinetized ISM Equipment

The Cabinetized ISM Equipment (NTFX40AA) houses a maximum of four ISM Shelves. For each new office, the first CISM must have an Alarm Cross-connect Unit (NT3X89CA) mounted on shelf position 47, a Primary Alarm ISM Unit (NTFX4101) mounted on shelf position 33 and a Secondary Alarm ISM Unit (NTFX4101) mounted on shelf position 19.

10.2.3.3 Provisioning ISM Shelves on the ISM Equipment Frame

The ISM Equipment frame (NTFX40BA) houses a maximum of four ISM Shelves. For each new office, the first ISME must have an Alarm Cross-connect Unit (NT3X89CA) mounted on shelf position 53, a Primary Alarm ISM Unit (NTFX4101) mounted on shelf position 39 and a Secondary Alarm ISM Unit (NTFX4101) mounted on shelf position 21.

10.2.4 Office Layout Information

Not applicable

RELEASE 06.03
13 July 1998

10.2.5 Traffic Tables

Not applicable

10.3 Product/System Specification

10.3.1 Physical Characteristics

The following table lists the physical dimensions of the ISM hardware:

Figure 4. Physical Dimensions of ISM Hardware

HARDWARE	STANDARD	DIMENSIONS (inch)
NTFX4101	DMS Shelf	19.9 (h), 12.0 (d), 24.0 (w)
NTFX42AA	DMS CP	12.5 (h), 10.4 (d), 1.125 (w)
NTFX43AA	DMS CP	12.5 (h), 10.4 (d), 2.25 (w)

The weight of the fully configured CISM or ISME is approximately 565 pounds.

The CISM/ISME meets the NORTEL specs of not causing a heat dispersment of more than 20 degrees C.

10.3.2 EMI/Earthquake Information

When mounted in the shelf and inside a closed cabinet, the ISM CPs meet the FCC Part 15J Class A limits. For European market, EN55022 Class B emission and conducted requirement is met as well as EN551101 for susceptibility. In addition, EN 50081/82 may be considered. These requirements are met only with CISM, not with ISME.

The ISM CPs are designed to meet the radiated, conducted and susceptibility requirements per CISPR 22 Class B when they are mounted inside a closed cabinet. However, no commitment is made or implied to meet this requirement as there is no market requirement stated.

10.3.3 Sparing Information

Not applicable

10.3.4 Power Feed and Fusing Requirements

The ISM Shelf requires the following power connections:

PC Battery: This input is required to power the ISM DC Converter and is fused in the MSP via a 10 Amp circuit breaker.

RELEASE 06.03
13 July 1998

Filter Battery: This input is required for service circuits (slot 05-20) that use a filtered battery feed and is fused in the MSP via a 3 Amp fuse.

Spare Battery (1): This input is required to power service circuits (slot 03-20) that continue to operate external equipment and alarms and is fused in the MSP via a 5 Amp fuse.

Spare Battery (2): This input is required to power PM service circuits (slot 03-20) that require input power redundancy. It is fused in the MSP via a 5 Amp fuse.

The ISM provides both the A & B battery feeds and results in three (3) A-feed and three (3) B-feed per ISM frame/cabinet. The battery feeds are fused at the PDC as follows:

Figure 5. Battery Fusing for PDC

PRODUCT	FEED	FUSE (AMP)	PRODUCT	FEED	FUSE (AMP)
CISM	A1	30	ISME	A1	30
	A2	10		A2	10
	A3	30		A3	30
	B1	30		B1	30
	B2	10		B2	10
	B3	30		B3	30

For offices requiring EAS, the first ISM equipped frame/cabinet is powered via independent power feeds and ABS from the power board instead of from the PDC/CPDC. The first ISM equipped frame/cabinet houses the primary and secondary alarm shelves. See ECM 690 for more details on EAS.

10.3.5 Current Drain Information

ISM Processor (NTFX42AA): Maximal power consumption = 15 watts;

ISM DC Converter (NTFX43AA): Maximal current drain = 8.5 Amp.

The ISM back panel provides connections for 5V, 12V, 25V and -15V for service circuits on slot 05-20. The maximum current available per slot is listed as follows:

Figure 6. MAX Current vs. Slot

RELEASE 06.03
13 July 1998

VOLTAGE (V)	CURRENT (A)	PINS
+5	1.8	78A/B
+12	0.1	76A/B
+25	0.5	35A/B
-15	0.1	74A/B

Refer to EMA14-01-000 for service circuit power consumption information.

The combined power of all CPs in an ISM Shelf shall not exceed 150 watts.

Per Design, the current drain for a fully configured CISM/ISME is 16 Amps.

10.4 Software Provisioning

For NTX software packages to PLC/SOC mappings for CSP02 and beyond refer to ECM552 - Mapping of NTX/NTG Package to PCL/NCL/Option.

10.4.1 Required Software Packages and Interdependencies

The ISM features are included in the superset SW package NTX001AA starting in BCS-36. which includes the feature AQ1097 - CC Support for the Integrated Services Module. The ISM SW support will be patched in BCS-36 with full support in BCS-37. The following patches are required in BCS 36:

- TOM01
- TOM02
- ETT03
- ETT12

The required software baseline for the following CPs is added with issue 33 of this document.

- NT1X80BA APC06 (CSP06)
- NT1X81BA TBD

10.4.2 Software Usage Restrictions

The ISM is introduced for application in systems operating with BCS 36 and above. ISM is not supported by BCS 35 and below.

10.4.3 Memory Provisioning

Not applicable

10.5 Real Time Impact

There is no Real Time impact with respect to TM/MTM once the ISM is In_Service state. However, the loading sequence is slower by 1-2 seconds due to the memory test feature being introduced in the ISM processor.

RELEASE 06.03
13 July 1998

11.0 ECM560 - ISDN Integrated Testing Provisioning

11.1 Overview

The Integrated Service Digital Network (ISDN) 2B1Q lines Subscriber line loop maintenance is performed by the Digital Multiplex System (DMS) 1 0. It consists of software packages and the Enhanced Services Test Unit (ESTU) test equipment. The equipment is as follows:

- An X.25 Interface.

The X.25 interface is provided upon Telco request to enable remote control of the ESTU from an Operation System (OS) capable of supporting the high level ASCII programming language (Transaction Query Language 1 (TL-1)). The EMPC H/W & S/W is required to support this interface to the ESTU.

- Features: Cold Start Verification, Performance Monitoring Detection, Threshold Crossing Verification Testing

The following hardware is required to provide the above test functions:

- The ISDN Test Module (ITM).

Testing of ISDN lines is controlled from a Line Testing Operations System (OS) over a data link and/or from the Line Test Position (LTPISDN) Maintenance and Administration Position (MAP) level.

The maintenance actions are controlled from an OS or from the LTPISDN MAP level. The OS is located in the remote maintenance center and it is not part of the DMS system. The communication channel between the OS and the DMS is the X.25 data link using Transaction Language One (TL-1) as the application protocol.

The DMS software controls the communication with the OS, performs the requested function, and reports the results back to the OS. There are three types of requests:

- Information
- Action and
- Test

The information request commands, requests the DMS system to gather various line data information and report it back to the OS.

The action commands requests actions to be performed on the lines such as removing line from service or returning it to service. The result of the action is reported back to the OS.

RELEASE 06.03
13 July 1998

The test commands request tests to be performed on the ISDN line loop. The tests are performed using the DMS test equipment. The test results are reported back to the OS.

The office ISDN line maintenance is enhanced with the tests provided for the OS from the LTPISDN MAP levels.

This NTP describes the tests and functions that are provided for the ISDN line loop maintenance. The tests provide complete line loop maintenance testing requirements for the ISDN 2B1Q lines.

The implementation of the tests and the functions are done in three phases:

- Phase 1

Implements the first 15 ISDN Integrated Testing TL-1 commands. The command function execution is implemented in the DMS software and the tests are performed by the DMS test equipment. This involves:

- providing communication with the OS system
- controlling the requests (commands) from the OS
- performing the requested function(s)
- reporting the results back to the OS

The NT1 and Loop Simulator are provisionable as test equipment (Test NT1) for the Cold Start Verification test. The MTU is modified to perform the sealing current and NT1 signature test.

- Phase 2

Implements the next 8 ISDN Integrated Testing commands and enhances the office line maintenance with the new tests from LTPISDN MAP level. The new test equipment, Enhanced Service Test Unit (ESTU), is introduced to perform the Wideband Tests.

- Phase 3

Modifies 3 ISDN TL-1 commands by introducing the replacement of test NT1 and Loop Simulator with the ITM. This phase also introduces the ESTU High Speed Modem (HSM) interface through which the DMS100 can access and download ESTU Master Module software to the ESTU. Phase 3 is the product for General Availability.

Phases which are to be implemented at a later date are listed below for reference purposes only. These phases will not be discussed beyond this section.

- Future development.

RELEASE 06.03
13 July 1998

Implement the remaining four ISDN Integrated Testing TL-1 commands. Transfer all of the line maintenance test functions from the existing test equipment to the ESTU. Enhance the Electronic Business Set (EBS) and the Plain Ordinary Telephone Set (POTS) line maintenance with the new test functions provided by the ESTU. Define tests for DATAPATH and the Custom Local Area Signalling System (CLASS) services.

ISDN Integrated Testing equipment may be installed in a Host or Remote office, refer to Figure 5 on page 6-68 and Figure 6 on page 6-71 for a functional block diagram of the Host and remote configurations.

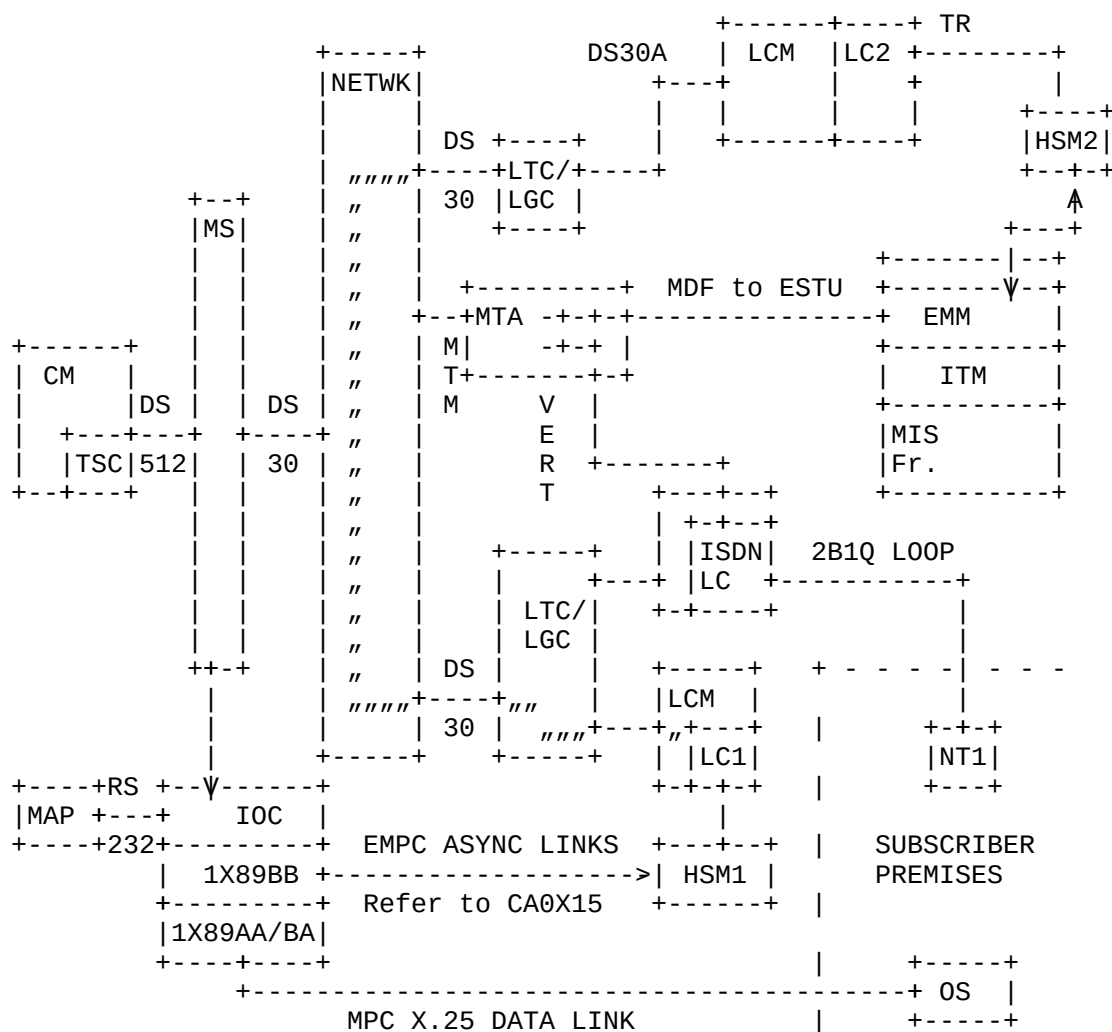


Figure 5. ISDN INTEGRATED TESTING ESTU Host Office Configuration for Phase 3.

The following acronyms are used in Figure 5 above.

DS30	30 Channel link for DMS-100
DS30A	30 Channel link, has longer range than DS30
ESTU	Enhanced Service Test Unit
IOC	Input/Output Controller
ITM	ISDN Test Module
HSM1	High speed modem on EMPC side
HSM2	High speed modem on ESTU side
LCM	Line Concentrating Module

RELEASE 06.03
13 July 1998

LC1 The LC which is used to communicate with the ESTU through HSM1
LC2 The LC which is used to communicate with ESTU through HSM2
ISDN LC The ISDN Line card under test
Line Access Supports both normal directory number and Line Equipment Number (LEN) access with automatic dialing of prefix digits; handles up to 16 test trunks; supports any mixture of dial or MDF shoe trunks; and provides a full in/out/bridge capability for any type of shoe with a special MDF tru trunk interface.

Note:

Automatic test trunk selection is based on NNX code.

Line Card Tests Draw dial tone; break dial tone, send dial pulse; and send DTMF.
LGC Line Group Controller
Line Test Test voice detection, ringer presence, receiver off-hook and cable fault location (one pair and two pair); and monitor/talk using callback path, load coil detection and spacing.
LTC Line Trunk Controller
Loop Tests Test resistance, capacitance, AC/DC Voltages, and line insulation; generate tones on to 200 KHz for -40 to +36dbm; and measure longitudinal balance.
M Modem on the ESTU
MAP Maintenance and Administration Position
NT1 Customer owned NT1
OS Operation System
TA Test Access
TR Tip and Ring
Transmission Tests Transmission tests for ISDN, MBS, CLASS, and Datapath Line. The test suite includes: measure insertion loss, noise, frequency response, signal-to-noise ratio, intermodulation distortion, and crosstalk.
TSC Test System Controller

The following illustrates a typical test scenario:

1. A test request arrives at the CM.
2. The CM examines the test request and determines that an ESTU can be used to perform the test.
3. The CM selects an ESTU which can service the loop under test and seizes the ESTU.
4. The CM sets up the metallic access to the loop, and sends test commands to the ESTU through the modem control link.

RELEASE 06.03
13 July 1998

5. The ESTU carries out the test request and sends the test results via the same modem control link to the CM.
6. The CM reformats the test results and sends them to the test request originator.
7. The CM releases the ESTU.

RELEASE 06.03
13 July 1998

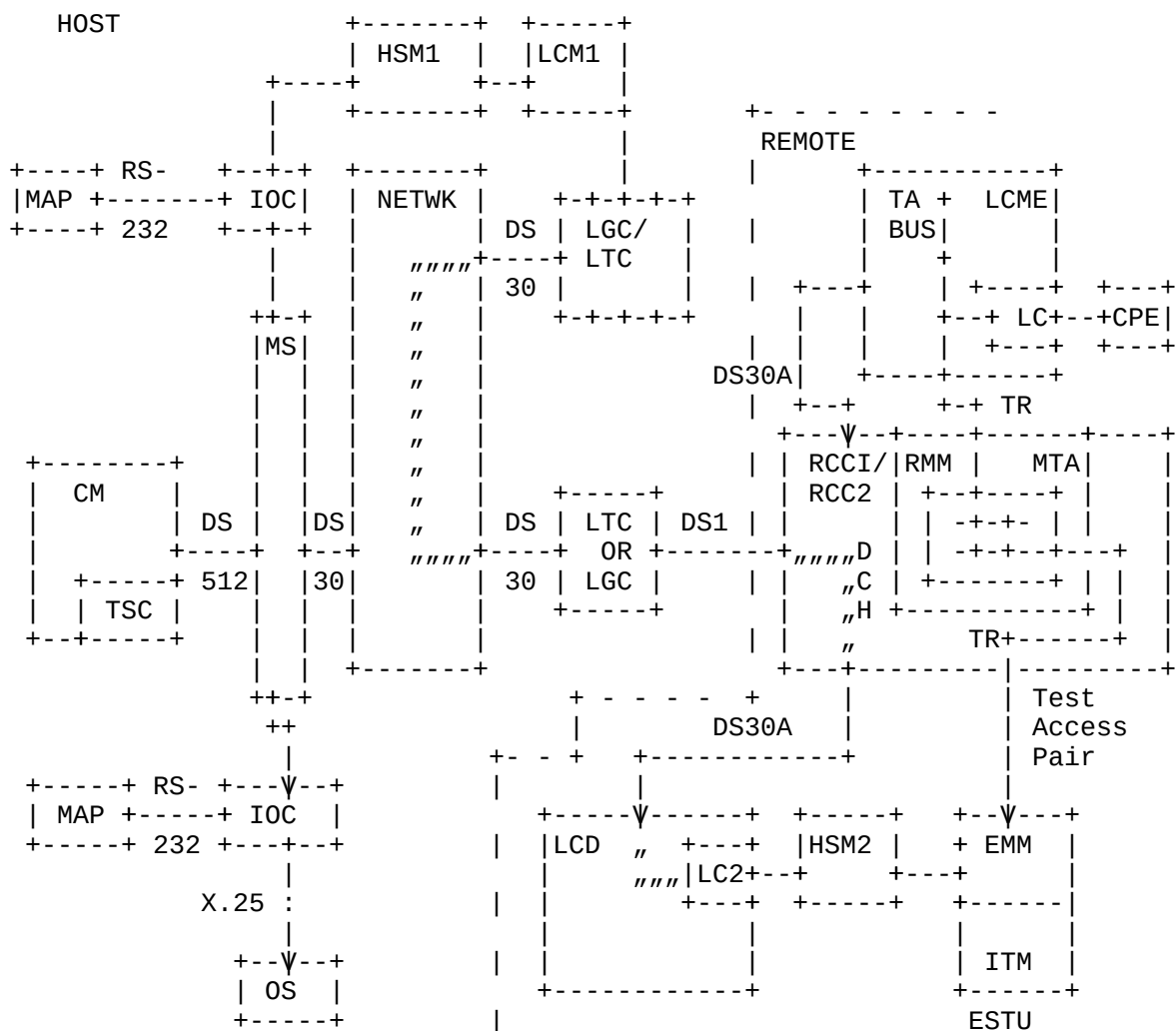


Figure 6. ESTU Remote Office Configuration

The following new acronyms are used in Figure 6 above.

CPE	Customer Premise Equipment
DCH	D-channel Handler
DS1	T1 span, 24 PCM channels (North America)
RCCI	Remote Cluster Controller ISDN
RMM	Remote Maintenance Module

All of the above ESTU configurations share two common characteristics:

RELEASE 06.03
13 July 1998

1. The CM always communicates with the ESTU. This characteristic enables the CM to control a remote ESTU easily.
2. The ESTU test access pair is always connected to a MTA horizontal.

11.2 Hardware Provisioning

11.2.1 Hardware Usage Restrictions

The following restrictions apply:

- One MPC or EMPC card can accommodate 16 SVCs.
- The maximum number of simultaneous sessions from all OSs is 60.

Note: ISDN line loop maintenance software is accessible from the Remote Maintenance Center OS (Operating System) and the LTPISDN MAP level.

- The X.25 Data Links must be assigned to dedicated EMPC/MPC Cards.
- The EMPC/MPC data links must be datafilled using the 1980 and 1984 versions of the X.25 Protocol.
- The EMPC/MPC can support one type of protocol at a time.
- The Unified Processor NTMX77AA is required to support ISDN services.

11.2.2 Hardware Dependencies

1. NA004

- The following hardware is required in order for the ISDN Integrated Testing Feature to function. This list represents the GA product:

One NT0J42BA (EMM) per 2000 ISDN Lines

Two NT6X18AB ground start line cards. The first card is connected through the HSM to the EMM high speed port and is used as a high speed communication port between the DMS and ESTU.

The second card is connected to the EMPC card, NT1X89BB, via HSM and is used as the communication port between the DMS and ESTU.

Two GDC 596 High Speed Modems (HSM). These HSM's are used to provide test access and download capability at higher speed. The HSM data transmission rate used is 9600 BPS.

RELEASE 06.03
13 July 1998

One NT1X89BB EMPC per two ESTU's. This card provides the ASYNC link to interface between the DMS and ESTU. The EMPC supports two ASYNC links. Refer to ECM 316 for provisioning of the EMPC.

One EMPC ASYNC cable per ESTU. This cable provides the connection between the NT1X89BB EMPC and the HSM on the EMPC side. This cable is provided through cable drawing CA0X15.

One EMM High Speed Download cable per ESTU. This cable provides the connection between the EMM and the HSM and is provided through CA0X15.

One EMM to MDF cable. This cable provides the MTA connection for the EMM.

- Optional Hardware

Optional hardware TBD.

- The following hardware must be provisioned for TL-1:

X.25 interface

One NT0J43AA, ITM, per EMM. The ITM replaces the NT1 and Loop Simulator in Phase 3. The ITM is required when the Telco requests the following ESTU tests/functions:

Cold Start Verification,
Performance Monitoring Detection, and
Threshold Crossing Verification Testing

One NT1X89AA/BA per 16 SVCs to be connected. Required when remote control of the ESTU is required from a TL-1 capable OS. The X.25 link is the data link that connects the OS to the DMS through the NT1X89AA/BA.

Each OS requires one SVC, however for backup purposes, provision two data links per OS on different MPC/EMPC cards.

Please provision 1 MTU per 2000 ISDN lines.

- The following hardware is required to perform a field upgrade of a phase 2 to phase 3 configuration:

EMM 26" mounting kit : NT0J42FA*

ESTU ISDN Test Module: NT0J43AA

HSM dataset : A0351816 (2 per ESTU)

EMPC HSM card : NT1X89BB

Gnd start line card : NT6X18AB/BA (2 per ESTU)

RELEASE 06.03
13 July 1998

Misc shelf : NT3X25AA* (1 host, 2 remote)
EMM firmware kit : NT7F8105

RELEASE 06.03
13 July 1998

*: or equivalent.

Directions for replacing the EMM firmware were documented in an Installation document labelled ESTUEPROM MOP.

11.2.2.1 P and C Side Port Requirements

There are no C-side or P-side ports in the traditional sense, however, there are I/O ports.

Output - Port 1 on the NT1X89AA/BA MPC/EMPC card provides the X.25 link between the OS and DMS-100. Provide two NT1X89 MPC/EMPC cards each with an X.25 data link for redundancy.

Output - Ports 2 and 3 on the NT1X89BB EMPC provide the EMPC ASYNC link.

11.2.2.2 DMS BUS Port Requirements

Not Applicable

11.2.2.3 Circuits Per Card

Not Applicable

11.2.2.4 Discrimination Numbering

Numbering begins at 00 to 254 in increments of 1.

11.2.3 Provisioning Considerations

Provision ISDN Integrated Testing in NA004 and later offices to enable the DMS to support National ISDN-1. However, when provisioning the ISDN Integrated Testing function via ESTU and associated optional hardware consider the following:

1. The ESTU is provisioned on a one per 2000 ISDN Lines basis.

Note:

a. ESTU Environmental Requirements

The EMM has slots on the side of the unit and emergency exhaust fans on the rear of the unit. Clearance must be maintained on the sides of the unit and behind the fans to allow the fans to draw air in from the sides of the unit and out the rear. The minimum clearance for the fans is two (2) inches and one (1) inch for the slots on the sides. There are no additional restrictions on the position of the EMM and ISDN with respect to other equipment in the frame.

11.2.4 Office Layout Information

Not applicable.

11.2.5 Traffic Tables

- Capacity Modelling

No capacity modeling provided

- Messaging Requirements

The messaging requirements remain the same as it is for the line maintenance. The messaging between the OS and MPC will not cause overload condition.

- Call Timings

Not applicable.

- ISDN Integrated Testing Command Test Times

The following chart lists the approximated times for all Phase 1 ISDN Integrated Testing commands. The tests were done on a NT40 switch under three levels of CP occupancy - 3%, 59% and 82%. The measurements are in units of (min).sec.

RELEASE 06.03
13 July 1998

ISDN TL-1 TESTS	3%	59%	82%
CONN_DTAC_ISDN	11.3	11.7	1:25.7
CONN_MTAC_ISDN	11.2	10.8	2:46.3
DISC_TACC	2.4	6.0	1:61.7
MEAS_SCUR_DSL	16.5	18.6	5:06.3
REPT_STAT	0.1	.3	7.2
RMV_TOTS	1.9	8.5	3:01.5
RST_TOTS	1.5	3.4	1:57.8
RTRV_COND_ISDN	3.5	4.5	1:10.9
RTRV_DNCT	0.4	2.4	1:04.9
RTRV_TRNSL	0.3	1.5	0:46.6
TST_CLDSTR	41.6	45.8	3:22.9
TST_LPBK_ISDN //	30.7	39.4	5:33.1
TST_QISDN	9.7	15.3	3:11.2
The above times represent elapsed time within CC only. The start time was taken from CC interrupt handler and the end time was taken at the point of sending the data from the I/O transactor to the MPC. In these measurements are not included the message propagation delays through the %.25 Packet Network. These should be estimated separately. // The TST-LPBK-ISDN test time is dependent on the time it is requested to do the test. The call timings for the other commands and the Super-Node switch will be added when they become available.			

Figure 7. Approximated Times for all Phase 1 ISDN Integrated Testing Cmds.

- Processor Interdependency
No processor interdependency requirements specified
- Overload
No overload requirements specified
- Load Service Curves
No load service curves provided

RELEASE 06.03
13 July 1998

11.3 Product/System Specification

11.3.1 Physical Characteristics

11.3.1.1 Physical Characteristics - NT0J42BA

Information Not Available as of this writing.

Input Voltage.....-48 Vdc
Power Consumption.....50 Watts
Current Drain.....0.75 Amps
Thermal Dissipation.....40 Watts
Fusing Requirements.....1 1/3 Amp Fuse

MECHANICAL DIMENSIONS

Height	1.75"	Width	17"	Depth	14"
Weight	_____				

11.3.1.2 Physical Characteristics - NT0J43AA

Information Not Available as of this writing.

Input Voltage.....-48 Vdc
Power Consumption.....40 Watts
Current Drain.....0.5 Amps
Thermal Dissipation.....30 Watts
Fusing Requirements.....1 1/3 Amp Fuse

MECHANICAL DIMENSIONS

Height	1.75"	Width	17"	Depth	12"
Weight	_____				

11.3.2 EMI/Earthquake Information

Not applicable.

11.3.3 Sparing Information

Sparing for the ISDN Integrate Testing components are as follows:

- ESTU Master Module

Sparing shall be based on a MTBF value of 16.6 years. If spares are required provision on a n+1 basis.

- ISDN Test Module

Sparing shall be based on a MTBF value of 30.0 years. If spares are required, provision on an n+1 basis.

RELEASE 06.03
13 July 1998

11.3.4 Power Feed and Fusing Requirements

11.3.4.1 NT0J42BA

Fusing Requirements.....1 1/3 Amp Fuse
The input termination points for the NT0J42BA are
battery (-48) and battery return (-48R).

11.3.4.2 NT0J43AA

Fusing Requirements.....1 1/3 Amp Fuse
The input termination points for the NT0J43AA are
battery (-48) and battery return (-48R).

11.3.5 Current Drain Information

11.3.5.1 NT0J42BA

Current Drain.....0.75 Amps

11.3.5.2 NT0J43AA

Current Drain.....0.5 Amps

11.4 Software Provisioning

For NTX software packages to PLC/SOC mappings for NA004 and beyond
refer to ECM552 - Mapping of NTX/NTG Package to PCL/NCL/Option.

11.4.1 Required Software Packages and Interdependencies

The following software packages are Limited availability with the GA
date listed out beside it with the exception of Common Basic:

- Required S/W Packages for ISDN Testing Services:
 - NTX001AA - Common Basic
 - NTXN87AB - Integrated Testing Base (GA BCS-36)
 - NTXN89AA - Testing ISDN Services (GA BCS-36)
- Required S/W Packages for TL-1:
 - NTXN91AA - TL-1 IOC MPC X.25 Data Link Control (GA BCS-36)
 - NTXN93AA - TL-1 ISDN Testing (GA BCS-36)
 - NTXR55AA - OSS TL-1 Testing Interface (GA BCS-36)
- Required S/W Package for ESTU testing:
 - NTXN94AA - ESTU Test Enable (GA NA004)---Required for ESTU
- MD'd Package
 - NTXN87AA - Integrated Testing Base---MD'd in BCS-36 and re-
placed by NTXN87AB.

RELEASE 06.03
13 July 1998

Customers receiving NTXN87AA in BCS35 must receive NTXN87AB and NTXN94AA in BCS36 in order to not lose feature functionality.

After BCS-36, the above software packages are organized into a functional group (FG) for the DMS Evolution program. Additionally, there are 3 new sections added for the ESTU Download, ESTU ITM support, and ESTU high speed I/F. The FG is NI000009 (NIO NI-1 BRI Enhanced Mtc.) which resides in the DMS100 Common layer. Please provision the ISDN TL-1 test features per this FG. From NA005, TL-1 software is moved to CNA (North American) DRU, and ESTU software remains in the CCM DRU.

In addition to all the phase 1 and 2 software, the product includes the following features.

Feat. AR0506	ESTU download	AR0507	ESTU ITM support
AR0596	ESTU HSM interface	AR1003	MP-EOC support phase 1

11.4.2 Software Usage Restrictions

This information is unavailable at this time.

11.4.3 Memory Provisioning

The following Memory Provisioning Requirements are included for introduction purposes only. Refer to MemCalc for the actual Memory requirements as they may differ from those listed below. The following information shall be removed from this NTP at Gate 2.

- Data store

min: 61 KBytes (10 OS Sessions)
max. 164 KBytes (60 OS Sessions)

In Phase 2, an increment of 10 KBytes from phase 1 is required.
In Phase 3, an increment of 10 KBytes from phase 2 is required.
From NA005, only the maximum 60 OS sessions will be available.

- Program store

Phase 1 = 41 KBytes
Phase 2 = (Est.)25 KBytes increment from phase 1
Phase 3 = (Est.)25 KBytes increment from phase 2

11.5 Real Time Impact

Not applicable.

RELEASE 06.03
13 July 1998

12.0 ECM601 - DMS Building Block Engineering - TME

12.1 Overview

Product/System Overview

Not Applicable

12.2 Hardware Provisioning

12.2.1 Hardware Usage Restrictions

With issue 36 of this ECM, NT2X48AA is MD'ed, replaced with NT2X48BA, and NT2X48AB is MD'ed, and replaced with NT2X48BB. Done per EC018-49399. Also see EMSs TABLE A and BB-TAB-A.

With issue 37 of this ECM, NT2X48AB is UN-MD'ed per EC018- 50459.

12.2.2 Hardware Dependencies

Not Applicable

12.2.2.1 P and C Side Port Requirements

Not Applicable

12.2.2.2 DMS BUS Port Requirements

Not Applicable

12.2.2.3 Circuits Per Card

Not Applicable

12.2.2.4 Discrimination Numbering

Not Applicable

12.2.3 Provisioning Considerations

Trunk Module Equipment Questions

TME Customer Questions - Worksheet of Telco inputs derived at the time of order capture.

TME Calculations - Worksheet of provisioning algorithms driven from the results of TME Customer Questions.

Engineering Manual Section - Detailed description of the provisioning guidelines adjusted for DMS Building Block Engineering

RELEASE 06.03
13 July 1998

1. Scan Distribution Circuits
 - 1.1 Scan points for DMS alarms ? _____
 - 1.2 Scan points for Telco alarms ? _____
 - 1.3 Scan points for 1066 ROTL/52A ? (14 minimum) _____
 - 1.4 Scan points for hunting function ? _____
 - 1.5 Scan points for network management function ? _____
 - 1.6 Scan points for automatic board to board testing ? _____
 - 1.7 Scan points for tone and scrambler function ? _____
 - 1.8 Scan points for DPP ? _____
 - 1.9 Scan points for BMC ? _____
 - 1.10 Scan points for VMX function ? _____
 - 1.11 Scan points for modem shelf power failure function ? _____
 - 1.12 Scan points for AC fail function ? _____
 - 1.13 Scan points for span protection alarm function ? _____
 - 1.14 Scan points for other functions not listed above ? _____
2. Signal Distribution Circuits
 - 2.1 Signal dist. points for DMS alarms ? _____
 - 2.2 Signal dist. points for Telco alarms ? _____
 - 2.3 Signal dist. points for 1066 ROTL/52A ? _____
 - 2.4 Signal dist. points for hunting function ? _____
 - 2.5 Signal dist. points for network management function ? _____
 - 2.6 Signal dist. points for automatic board to board testing ? _____
 - 2.7 Signal dist. points for carrier line testing applique ? _____
 - 2.8 Signal dist. points for remote surveillance and control ? _____
 - 2.9 Signal dist. points for conference and alerting systems ? _____
 - 2.10 Signal dist. points for other functions not listed above ? _____
3. Milliwatt Test Line Circuits.
 - 3.1 Quantity of 102 Milliwatt test lines required ? _____
4. Receiver Off Hook Tone Circuits.
 - 4.1 ABSBH originating ccs/line for all office lines including remotes. _____
 - 4.2 ABSBH holding time in seconds for originating attempts for all office lines ? _____
 - 4.3 Total office line quantity including remote lines ? _____
 - 4.4 Percentage of originating attempts that require receiver off hook tone ? _____
5. Transmission Test Trunk Circuits.
 - 5.1 Quantity of outgoing interoffice trunks ? _____
6. Automatic Identified Outward Dial Circuits.
 - 6.1 Quantity of C25 type signaling channels from PBX for AIOD reception ? _____

RELEASE 06.03
13 July 1998

- 6.2 Redundancy of above links required ? _____
- 6.3 Quantity of work sharing mode C25 links from
PBX for AIOD reception ? _____
- 6.4 Redundancy of above links required ? _____
- 7. MF Receiver Circuits.
- 7.1 Quantity of CAMA position signaling circuits ? _____
- 7.2 Quantity of blue box fraud detection MF
receiver circuits ? (1 to 3 per CAMA office) _____
- 7.3 Average MF receiver holding time in seconds.
(If not known, 3 seconds is recommended) _____
- 7.4 MF incoming trunk quantity ? (Does not include
DP or SS7 trunks. Does not include trunks on
DTC equipped with UTR) _____
- 8. Digitone Receiver Circuits.
- 8.1 Digitone receiver holding time in seconds ?
(if not known, 7 seconds is recommended) _____
- 8.2 Digitone line originating HDBH ccs/line ? _____
- 8.3 Digitone line average holding time in seconds ? _____
- 8.4 Number of digitone host and remote lines not
served by an LGC equipped with UTR ? _____
- 8.5 Quantity of digitone receivers for the
unauthorized fraud detection feature ? _____
- 9. Transmission Test Unit Circuits
- 9.1 Length of line diagnostic test.
- 9.1.1 Short ? (7 seconds) _____
- 9.1.2 Long ? (25 seconds) _____
- 10. Transmission Test Termination Circuits.
- 10.1 Quantity for open and short circuit tests ?
(Two recommended per office) _____
- 11. Loop Around Test Circuits.
- 11.1 Quantity for trunk transmission loss tests ?
(Two recommended per office) _____
- 12. Digital Modems
- 12.1. Quantity of TOPS positions ? _____
- 12.2. Quantity of MDC attendant consoles ? _____
- 12.3. Quantity of TOPS printers (excluding SNAC) ? _____
- 13. TOPS Autoquote Digital Modems.
- 13.1 Quantity of TOPS dial-up autoquote circuits ? _____
- 14. Six Port Conference Circuits
- 14.1 Quantity of Service Analysis Positions ? (SAP) _____
- 14.2 Quantity of Trunk Test Positions ? (TTP) _____
- 14.3 Quantity of Attendant Consoles ? (BSAC) _____
- 14.4 Quantity of TOPS positions or TOPS voice links
served by this office ? _____
- 14.5 Quantity of Service Analysis Evaluation System
interfaces ? _____
- 14.6 ACTS recall/overtime ABSBH attempts ? _____
- 14.7 ACTS recall/overtime holding time in seconds ?
(Amount of time to deposit coins for overtime.) _____
- 14.8 What is the total CCS for conference calls or
is this quantity to be calculated ? If calc
answer 15.8.1 through 15.8.3, if not enter total _____

RELEASE 06.03
13 July 1998

- CCS and skip to 15.10.
- 14.8.1 Total number of POTS lines with call conference feature ? _____
 - 14.8.2 POTS conference line ABSBH 2-way CCS per line _____
 - 14.8.3 Probability of conference feature activation for calls ? (If unknown, 5% recommended) _____
 - 14.9 ABSBH CCS for call transfer, consult-hold and add-on for MDC lines ? (If unknown, recommend 1% or 2% of total MDC line CCS. _____
 - 14.10 For 3 way call chaining, are circuit quantities to be specified or calculated ? _____
 - 14.10.1 For specify, what is the quantity of 3 way conference circuits required ? _____
 - 14.10.2 For calculated: _____
 - 14.10.2.1 Number of MDC lines with 3-way call feature ? _____
 - 14.10.2.2 Percentage of 3 way call chaining feature penetration ? _____
 - 14.10.2.3 Percentage of 3 way call chaining feature activation ? _____
 - 14.10.2.4 Average number of conferees in 3 way call chaining group ? _____
 - 14.11.3 Number of simultaneous 4 to 6 conferee conferences ? _____
 - 14.12.4 Number of 6 port conference circuits for large conferences ? _____
(For 7 to 10 conferee conferences provide 2 6 port circuits per simultaneous conference. For 11 - 30 conferee conferences, subtract 10 from the conference size and divide by 4 and round up to a whole number. Add 2 to this number to obtain the required number of 6 port circuits per simultaneous conferences of that size.)
 - 14.12.5 Number of Collect calls handled by the AABS feature ? _____
 - 14.12.6 Number of Third Party Billed calls handled by the AABS feature ? _____
 - 14.12.7 Average holding time in seconds for Collect calls handled by the AABS feature ? _____
 - 14.12.8 Average holding time in seconds for Third Party Billed calls handled by the AABS feature. _____
 - 15. Tone Generator Circuits _____
 - 15.1 MDC Preset Conference required ? (NTX260AA) _____
 - 15.2 Quantity of tone generator circuits for non-civilian applications? _____
 - 16. Digitone Sender Circuits _____
 - 16.1 Quantity of Tie Trunk outgoing ABSBH CCS ? _____
 - 16.2 Average holding time of Tie Trunk outgoing call in seconds ? (If unknown, 180 seconds recommended). _____
 - 16.3 Average holding time of digitone sender in _____

RELEASE 06.03
13 July 1998

- seconds ? (If unknown, 3 seconds recommended.) _____
17. Alarm Circuits
- 17.1 Alarm transfer or alarm sending (Choose only one).
- 17.1.1 Alarm transfer to a remote office receiving _____
circuit required ?
- 17.1.2 Alarm sending to a distant operator position _____
required ?
- 17.2 Alarm grouping required ? _____
18. DTU BERT Circuits
- 18.1 Is digital test unit bit error ratio testing _____
required ?
19. Tone Detector Circuits
- 19.1 RONI or non-civilian application required? _____
20. CAMA Circuits
- 20.1 Quantity of CAMA position signaling circuits _____
required ? (Equal to the number of RONI
circuits)
- 20.2 Quantity Of CAMA suspension and call waiting _____
circuits required ? (1 per office).
21. Analog Trunk Interface Circuits
- 21.1.1 Question deleted (Issue 02). _____
- 21.1.2 Quantity of analog recorded announcement _____
interfaces required ?
- 21.1.3 Quantity of TOPS position interfaces ? _____
- 21.1.4 Quantity of TOPS printer interfaces ? _____
- 21.1.5 Question Deleted (Issue 02). _____
- 21.1.6 Quantity of VMX voice message interfaces ? _____
- 21.1.7 Analog echo suppression required on the _____
above interfaces ?
- 21.1.8 Echo suppression w/o external pad sources _____
required for above interfaces ?
- 21.2 Quantity of NCIS system interface circuits _____
required ?
- 21.3 Quantity of 600 ohm 2 wire circuits required ? _____
- 21.4 Quantity of dial-up autoqoute interface _____
circuits required ?
- 21.5 Quantity of automatic board to board test _____
interface circuits required ?
- 21.6 Quantity of tone and scrambler and/or ACD _____
music on hold interface circuits required ?
22. Incoming/Outgoing Test Trunk Circuits
- 22.1 Quantity of No. 3 local test cabinet trunks _____
required ?
- 22.2 Quantity of No. 14 local test cabinet trunks _____
required ?
- 22.3 Quantity of operator verification trunks _____
required ?
- 22.4 Quantity of coin line test interface trunks _____
required ?
- 22.5 Quantity of mechanized loop test trunks _____
required ?
- 22.6 Quantity of dialable tone locator circuits _____

RELEASE 06.03
13 July 1998

- required ? (NTX277AA feature package)
- 22.7 Quantity of Pair Gain Test Controllers (PGTC) ? _____
- 22.8 Quantity of other test circuits required ? _____
23. DID/DOD Trunk Circuits
- 23.1 Quantity of 2 way DID/DOD PBX trunk circuits required ? _____
24. ROTL Trunk Circuits
- 24.1 ROTL test unit required ? _____
- 24.2 Quantity of additional 105 test trunks required ? _____
25. PBX Trunk Circuits
- 25.1 Quantity of 1 way PBX trunk circuits required ? _____
26. 101 Test Line Trunk Circuits
- 26.1 Quantity of 101 originating test line circuits required ? _____
- 26.2 Quantity of 101 terminating test line circuits required ? _____
27. Headset Monitor Interface
- 27.1 Quantity of headset monitor interface trunk circuits required ? _____
28. Call Waiting Tone Generator
- 28.1 Teen Service Required ? _____
29. Mechanized Calling Card Service
- 29.1 Total ABSBH MCCC attempts ? _____
- 29.2 Percentage of non-operator handled MCCC calls ? _____
30. Coin Detection Circuits
- 30.1 Total ABSBH toll coin attempts ? _____
31. Rover Line Test Units (LTU's).
- (Note: MTU's are preferred. See question 32)
- 31.1 Quantity of Rover LTU's required ? _____
- (Note: MTU's are preferred. See question 32.1)
32. Rover Metallic Test Units (MTU's)
- 32.1 Quantity of Rover MTU's required ? _____
- (Note: one MTU replaces two LTU's)
33. Enhanced Services Test Units (ESTU's)
- 33.1 Quantity of ESTU's required ? _____
- Trunk Module Equipment Calculations
- A. Scan Circuits
- A.1 Add 1.1 through 1.14 = aa (Total Scan Points)
- aa/14 (round up) = NT0X10AA
- B. Signal Distributor Circuits
- B.1 Add 2.1 through 2.10 = aa (Total SD points)
- aa/14 (round up) = NT2X57AA
- C. Milliwatt Test Line Circuits
- C.1 Provide the 3.1 quantity of NT1X00AB
- D. Receiver Off Hook Tone Circuits
- D.1 $(4.1)/(4.2/100) = aa$ (attempts per line)
- 4.3 x aa = bb (total attempts)
- bb x 4.4 = cc (ROH attempts)
- cc x .6 = (ROHCCS) (.6 = default ROH holding time/100)
- Refer to Fig. 2 with ROHCCS, result will be
- dd (quantity of ROH circuits required).

RELEASE 06.03
13 July 1998

- dd/2 = NT1X00AC
- E. Transmission Test Trunks
- E.1 $(5.1 \times 20)/21600$ = quantity of NTZZ06GA
- F. Automatic Identified Outward Dial Circuits
- F.1 $(6.1) + (6.3) = aa$ (total AIOD Circuits)
or if 6.2 or 6.4 = yes,
 $(2 \times 6.1) + (2 \times 6.3) = aa$ (total AIOD circuits)
aa/4 (round up) = NT2X01AA
- G. MF Receiver Circuits
- G.1 HDBH call attempts per trunk (DTC REAL:QUICK input) = aa
aa $\times (7.3/100) = bb$ (CCS per circuit)
bb $\times (7.4/2) = CCS$
Refer to Table Z with CCS and 8.4 to obtain quantity
of MF receiver circuits required = cc
cc + 7.1 + 7.2 = dd (MF receiver circuits required)
dd/4 = NT2X48BA
- H. Digitone Receiver Circuits
- H.1 $(29.2 \times 37 \text{ seconds}) = aa$
 $(1 - 29.2) \times 6 \text{ seconds} = bb$
aa + bb = cc (weighted average holding time MCCS)
 $29.1 \times (cc/100) = CCS$ (digitone receiver CCS MCCS)
Reference Table Z with CCS for dd (number of digitone
receiver circuits for MCCS)
 $(8.2)/(8.3/100) = ee$ (HD attempts per line)
 $(ee \times (8.1/100)) \times 8.4 = CCS$ (digitone receiver CCS lines)
Reference Table Z with CCS for ff (number of digitone
receiver circuits for lines).
dd + ff + 8.5 = gg (digitone receiver circuits required)
gg/4 = NT2X48BB
- J. Transmission Test Unit
- J.1 (No. LCM lines + No. LM lines + No. SMR lines +
No. SMS lines + No. SMU lines) $\times (n) / 21600$
(rounded up) = aa
(n) = 9.1.1 or 9.1.2.
(No. outgoing trunks $\times 4$)/21600 (rounded up) = bb
aa + bb = NTZZ06FA
- K. Transmission Test Termination
- K.1 10.1 = NT2X71AA (minimum of two)
- L. Loop Around Test
- L.1 $(11.1 / 2) = NT2X75AA$ (minimum of one)
- M. Digital Modems
- M.1 $(12.1 + 12.2 + 12.3) / 4$ (rounded up) = NTZZ06HA
- N. TOPS Autoquote Digital Modem
- O.1 $(13.1) / 4$ (rounded up) = NT3X02BA
- P. Coin Detect
- P.1 $(30.1 \times .38) = CCS$
Reference Fig.2 CCS = aa (coin detect circuits
required)
aa/8 = NT3X08AA
- Q. Six Port Conference
- Q.1 $(14.6) \times (14.7/100) = CCS$ (ACTS recall/overtime CCS)
Reference Fig.2

RELEASE 06.03
13 July 1998

- with CCS = (three port conf circuit
for ACTS recall/overtime)
- Q.2.1 If 14.8 = total CCS, reference Fig. 2.
for required
number of three port conference circuits.
- Q.2.2 If 14.8 = calc, $(14.8.1 \times 14.8.2 \times 14.8.3) + 14.9 =$
CCS
Reference Fig. 2
with CCS for the number of three
port conference circuits required.
- Q.2.3 (Calculation deleted)
- Q.2.4 If 14.10 = specify, 14.10.1 = 3 port conference
circuits required.
- Q.2.5 If 14.10 = calc, $((14.8.1 + 14.10.2.1) \times 14.10.2.2$
 $\times 14.10.2.3) / 14.10.2.4 = aa$
 $(14.10.2.4 - 2) \times aa$ (rounded up) = (three port
conference circuits for three way call chaining)
- Q.2.6 $((14.12.5 \times 14.12.7 / 100) \times .7) +$
 $((14.12.6 \times 14.12.8 / 100) \times .7) = CCS$
Reference Fig. 2.
with CCS = three port conf ckt
required for AABS feature.
- Q.2.7 14.11.3 = quantity of six port conference circuits
- Q.2.8 14.11.4 = quantity of six port conference circuits
- Q.2.9 $(14.1 + 14.2 + 14.3 + 14.4 + 14.5 + Q.1 + Q.2.1 \text{ or}$
 $Q.2.2 + Q.2.4 \text{ or } Q.2.5 + Q.2.6) / 2) + Q.2.7 +$
 $Q.2.8 = NT3X67AA.$
- R. Tone Generator
- R.1 If 15.1 = yes, provide 8 circuits = aa
 $aa + 15.2 = bb$ (tone generator circuits required)
 $bb / 4$ (rounded up) = NT3X68AA
- S. Digitone Senders
- S.1 $(16.1) / (16.2 / 100) \times (16.3 / 100) = CCS$ (digitone
sender CCS)
Reference Fig. 2.
with CCS = aa (digitone sender
circuits required)
 $aa / 4$ (rounded up) = NT3X68AB
- T. Alarm
- T.1 If 17.1.1 = yes, provide one NT3X83AA
If 17.1.2 = yes, provide one NT3X84AA
If 17.1.3 = yes, provide one NT3X85AA
For an initial office, always provide two NT3X82AA
- U. DTU BERT
- U.1 If 18.1 = yes, $(DTC + LTC) / 3.6 + (DCM / 14) = aa$
(128 - aa must be less than or equal to the quantity of
NT6X99AA IBERT line cards in this office and any remote
offices associated with this office.)
 $aa / 2 = NT4X23AA$
- V. Tone Detector
- V.1 If 19.1 = yes, provide 32 circuits = aa
 $aa / 16 = NT5X29AC$

RELEASE 06.03
13 July 1998

W. CAMA

W.1 (20.1) = NT2X65AA and NT2X77AB

(20.2) = NT2X66AA (MD'ed with issue 39 of ECM 601)

X. Analog Trunk Interface

X.1 (21.1.2) + (21.1.3) + (21.1.4) + 21.1.6 = aa

aa/2 = NT2X72AA

(If CCIS(MS6E) exists in the office, add 12 to aa.)

If 21.1.7 = yes, provide NT2X72AB instead of NT2X72AA

If 21.1.8 = yes, provide NT2X72AC instead of NT2X72AA

X.2 (21.2) = bb bb/2 = cc

Provide NT2X81AA = cc and NT2X77AA = 2 x cc

X.3 (21.3) = dd dd/2 = ee

Provide NT2X81AB = ee and NT2X77AB = 2 x ee

X.4 (21.4) = ff ff/2 = gg

Provide NT2X82AA = gg and NT2X77AA = 2 x gg

X.5 (21.5) = hh hh/2 = ii

Provide NT2X83AA = ii and NT2X77AA = 2 x ii

X.6 (21.6) = jj jj/2 = NT2X88AA

Y. Incoming/outgoing Test Trunks

Y.1 (22.1) + (22.2) + (22.3) + (22.4) + (22.5) + (22.6) +
(22.7) + (22.8) + (31.1) + 2 x (32.1) + (HH.1) +
2 x (II.1) = NT2X90AD and NT2X77AA(Note: The terms (31.1), 2 x (32.1), (HH.1) and
2 x (II.1) reflect the fact that each LTU requires
one NT2X90AD, and each MTU requires two
NT2X90AD's for the MONTALK function)

Z. DID/DOD Trunks

Z.1 (23.1) = NT2X95AA and NT2X77AA

AA. ROTL Trunks

AA.1 If 24.1 = yes, provide two circuits = aa

AA.2 (24.2) = bb (minimum of one)

AA.3 (aa + bb)/2 = NT3X91AA

BB. PBX Trunks

BB.1 (24.1) = aa aa/2 = NT5X25AA

CC. 101 Test Line

CC.1 (26.1) + (26.2) = NT5X30AA and NT2X77AA

DD. Head Set Monitor Interface (Local Office)

DD.1 (27.1) = NT5X30AA and NT2X77AA

EE. Call Waiting Tone Generator

EE.1 For Non-MDC office provide 8 circuits

For MDC office provide 12 circuits

If 28.1 = yes, provide 4 circuits

8 + 4 = 12/4 = 3 NT3X68AC for non-MDC office

12 + 4 = 16/4 = 4 NT3X68AC for MDC office

FF. MAP Jack Ended Trunk Interface

FF.1 Quantity of MAP w/jacks + quantity of LTP w/jacks +
TTP w/jacks = aa

(aa x 3)/2 = NT1X54AA

GG. Metallic Test Access

GG.1 aa = (No. of LCM)/4 + (No. of LCMI)/4 + (No. RCS)/8 +
(No. SMU)/8 + (No. SMR)/8
(rounded up to the nearest larger integer)

RELEASE 06.03

13 July 1998

$$bb = (Y.1 - HH.1 - 2 \times II.1 + (33.1) + 1) / 8$$

(rounded up to the nearest larger integer)
(Note: The term '1' represents the horizontal "0",
which is shared by all the Dedicated MTU/LTU's.)

$$aa \times bb = NT3X09BA$$

(Note:

- 'aa' is the number of MTA cards, NT3X09BA, necessary to accommodate all the verticals in the switch. One NT3X09BA can handle eight (8) verticals. 'aa' is rounded up to the nearest largest integer.
- 'bb' is the number of MTA cards, NT3X09BA, necessary to accommodate all the horizontals in the switch. One NT3X09BA can handle eight (8) horizontals. 'bb' is rounded up to the nearest largest integer.
- 'RCS' stands for Remote Concentrator S/W Site. A Remote SLC 96 Software Site is a group of SLC 96 Remote Terminals tested via the same vertical. One vertical may be used for testing up to ten (10) co-located SLC 96 Remote Terminals.
- 'SMU' stands for Subscriber Multiplexer - Urban. It represents the number of Remote DMS-1U Software Sites. A Remote DMS-1U Software Site is a group of DMS-1U terminals (maximum 2) tested via the same vertical.
- 'SMR' stands for Subscriber Multiplexer - Rural. It represents the number of Remote DMS-1R Software Sites. A Remote DMS-1R Software Site is a group of Remote DMS-1R terminals (maximum 4) tested via the same vertical.)

HH. Dedicated Line Test Unit (LTU)

$$HH.1 ((\text{No. of LCM}/8) + (\text{No. of LCMI}/8) + (\text{No. of RCS}/16) + (\text{No. of SMR}/16) + (\text{No. of SMU}/16)) (\text{rounded up}) + 1 = aa$$

II. Dedicated Metallic Test Unit (MTU)

$$II.1 = HH.1/2$$

(Note: One MTU replaces two LTU's. MTU's are preferred.)

JJ. TME Shelves

JJ.1 MTM shelves

RELEASE 06.03
13 July 1998

NTI PEC	From Sect	Cards Req'd	Slots/card	Slot Total	Dis/Card	Dis Total
NT0X10AA	B	a	1	aa	2.0	ba
NT1X00AB	D	b	1	ab	4.0	bb
NT1X00AC	E	c	1	ac	4.0	bc
NTZZ06GA	F	d	2	ad	19.0	bd
NT2X01AA	G	e	2	ae	19.0	be
NTZZ06EA	JJ	f	2	af	17.5	bf
NTZZ06FA	K	g	2	ag	24.0	bg
NT2X48AA	H	h	2	ah	12.0	bh
NT2X48AB	J	j	2	aj	12.0	bj
NT2X48BA	H	h	2	ah	12.0	bh
NT2X48BB	J	j	2	aj	12.0	bj
NT2X57AA	C	k	1	ak	4.5	bk
NT2X71AA	L	l	1	al	1.0	bl
NT2X75AA	M	m	1	am	4.0	bm
NTZZ06HA	N	n	2	an	13.0	bn
NT3X02BA	P	p	1	ap		bp
NT3X08AA	Q	q	4	aq	15.0	bq
NT3X09BA	HH	r	1	ar	11.5	br
NT3X67AA	R	s	3	as	7.5	bs
NT3X68AA	S	t	2	at	3.0	bt
NT3X68AB	T	u	2	au	3.0	bu
NT3X68AC	FF	v	2	av	3.0	bv
NT3X82AA	U	w	2	aw	9.0	bw
NT3X83AA	U	y	1	ax	13.0	bx
NT3X84AA	U	z	1	ay	2.0	by
NT3X85AA	U	a1	1	az	5.0	bz
NT4X23AA	V	b1	1	aa1	10.0	ba1

To calculate MTM shelves:

Cards Req'd x Slots/card = Slot total

Example: a x 1 = aa

Total of aa through aa1 = MTMSLOTA

MTMSLOTA/12 (round up) = MTMSHELFA

For s (NT3X67AA) greater than or equal to MTMSHELFA:

MTMSHELFA x 2 = MTMSLOTZ

RELEASE 06.03
13 July 1998

MTMSLOTA - MTMSLOTZ = MTMSLOTB
MTMSLOTB/12 (round up) = MTMSHELFB
MTMSHELF A - MTMSHELF B = MTMSHELFZ
(MTMSLOTB + (MTMSHELFZ x 2)) x 1.1 (round up) =
MTMTOT

For s (NT3X67AA) less than MTMSHELF A:
(MTMSLOTA - (s x 2)) x 1.1 (round up) = MTMTOT
(1.1 factor is for 10% administrative spare)
MTMTOT/12 (round up) = NTZZ06BA

Quantity of NT5X29AC = Quantity of NTZZ06AM

JJ.2 TM8 shelves

NTI PEC	From Sect	Cards Req'd	Slots/card	Slot Total
NT1X54AA	GG	a	1	aa
NT2X65AA	X	b	1	ab
NT2X66AA	X	c	1	ac
NT2X72AA	Y	d	1	ad
NT2X72AB	Y	e	1	ae
NT2X72AC	Y	f	1	af
NT2X81AA	Y	g	1	ag
NT2X81AB	Y	h	1	ah
NT2X82AA	Y	j	1	aj
NT2X83AA	Y	k	1	ak
NT2X88AA	Y	l	1	al
NT2X90AD	Z	m	1	am
NT2X95AA	AA	n	1	an
NT3X91AA	BB	p	1	ap
NT5X25AA	CC	q	1	aq
NT5X30AA	DD	r	1	ar

To calculate TM8 shelves:
Cards Req'd x Slots/card = Slot total
Example: a x 1 = aa
Total of aa through ar = TM8TOT
TM8TOT/15 = TM8 (NT2X52AG)

KK. AXU Shelf

KK.1 If COE0 is an initial order, provide one 1 AXU shelf (NT3X89AA)

If COE0 is an extension order, provide 0 AXU shelf

LL. TME Frames

LL.1 NTZZ06BA + TM8 + NTZZ06CA + NTZZ06AM = TMETOT

TMETOT/4 = TME (TME Frames) (NTZZ06AA), (NTZZ06YA),

RELEASE 06.03
13 July 1998

(NTZZ06ZA).

Please note that if an AXU was provided in KK.1, it shall be mounted on TME 0, Shelf Position 65. This shelf space is not included in the TME frame calculation as this shelf can mount in the TME frame with four TM8 or MTM shelves.

LL.3 (TME x 5) - TME TOT - AXU = Filler Panels (P0575239)

Figure 1. TABLE Y - Capacity Table Continued Next Page

Table Y CCS Per Port At GOS Of P .001							
Ports	CCS	Ports	CCS	Ports	CCS	Ports	CCS
1	.1	31	597	61	1428	91	2317
2	1.6	32	624	62	1457	92	2346
3	6.9	33	650	63	1486	93	2377
4	15.4	34	676	64	1516	94	2407
5	26.6	35	703	65	1544	95	2437
6	40.0	36	729	66	1574	96	2468
7	54.7	37	756	67	1603	97	2498
8	70.9	38	783	68	1632	98	2528
9	88.2	39	810	69	1661	99	2559
10	107	40	837	70	1691	100	2589
11	126	41	865	71	1720	101	2620
12	145	42	892	72	1750	102	2650
13	166	43	919	73	1779	103	2681
14	187	44	947	74	1809	104	2711
15	208	45	975	75	1838	105	2742
16	231	46	1003	76	1868	106	2772
17	253	47	1030	77	1898	107	2803
18	276	48	1058	78	1927	108	2834

Figure 2. TABLE Y - Capacity Table

RELEASE 06.03
13 July 1998

Table Y CCS Per Port At GOS Of P .001							
Ports	CCS	Ports	CCS	Ports	CCS	Ports	CCS
19	299	49	1086	79	1957	109	2864
20	323	50	1115	80	1986	110	2895
21	346	51	1143	81	2016	111	2926
22	370	52	1171	82	2046	112	2956
23	395	53	1200	83	2076	113	2987
24	419	54	1228	84	2106	114	3018
25	444	55	1256	85	2136	115	3049
26	469	56	1285	86	2166	116	3080
27	495	57	1313	87	2196	117	3110
28	520	58	1342	88	2226	118	3141
29	545	59	1371	89	2256	119	3172
30	571	60	1400	90	2286	120	3203

RELEASE 06.03
13 July 1998

Table Z - Receiver Capacity Table							
Mean Holding Time In Seconds							
No of Rec	1	2	3	4	5	6	7
2	17	7	4	3	3	3	2
3	47	24	17	14	12	11	10
4	79	48	36	30	26	24	23
5	113	77	59	50	45	41	39
6	147	107	85	73	66	61	58
7	182	138	113	99	89	83	79
8	216	171	143	126	115	107	102
9	243	204	173	154	141	132	126
10	270	237	204	183	169	158	151
11	297	271	236	213	197	186	177
12	324	306	269	244	226	214	204
13	351	340	302	275	256	242	232
14	378	375	335	306	286	271	260
15	405	405	368	339	317	301	289
16	432	432	402	371	348	331	318
17	459	459	436	404	380	362	348
18	486	486	470	436	412	393	378
19	513	513	504	470	444	424	409
20	540	540	538	503	476	456	439
21	567	567	567	536	509	487	470
22	594	594	594	570	542	519	502
23	621	621	621	604	575	551	533
24	648	648	648	638	608	584	565
25	675	675	675	672	641	616	597
26	702	702	702	702	674	649	629
27	729	729	729	729	708	682	661
28	756	756	756	756	742	715	694
29	783	783	783	783	775	748	726
30	810	810	810	810	809	781	759

RELEASE 06.03
13 July 1998

31	837	837	837	837	837	815	792
32	864	864	864	864	864	848	825
33	891	891	891	891	891	882	858
34	918	918	918	918	918	916	891
35	945	945	945	945	945	945	924
36	972	972	972	972	972	972	957
37	999	999	999	999	999	999	991
38	1026	1026	1026	1026	1026	1026	1024
39	1053	1053	1053	1053	1053	1053	1053
Table Z - Receiver Capacity Table cont.							
Mean Holding Time In Seconds							
No of Rec	1	2	3	4	5	6	7
40	1080	1080	1080	1080	1080	1080	1080
41	1107	1107	1107	1107	1107	1107	1107
42	1134	1134	1134	1134	1134	1134	1134
43	1161	1161	1161	1161	1161	1161	1161
44	1188	1188	1188	1188	1188	1188	1188
45	1215	1215	1215	1215	1215	1215	1215
46	1242	1242	1242	1242	1242	1242	1242
47	1269	1269	1269	1269	1269	1269	1269
48	1296	1296	1296	1296	1296	1296	1296
49	1323	1323	1323	1323	1323	1323	1323
50	1350	1350	1350	1350	1350	1350	1350
51	1377	1377	1377	1377	1377	1377	1377
52	1404	1404	1404	1404	1404	1404	1404
53	1431	1431	1431	1431	1431	1431	1431
54	1458	1458	1458	1458	1458	1458	1458
55	1485	1485	1485	1485	1485	1485	1485
56	1512	1512	1512	1512	1512	1512	1512
57	1539	1539	1539	1539	1539	1539	1539
58	1566	1566	1566	1566	1566	1566	1566
59	1593	1593	1593	1593	1593	1593	1593

RELEASE 06.03
13 July 1998

60	1620	1620	1620	1620	1620	1620	1620
61	1647	1647	1647	1647	1647	1657	1647
62	1674	1674	1674	1674	1674	1674	1674
63	1701	1701	1701	1701	1701	1701	1701
64	1728	1728	1728	1728	1728	1728	1728
65	1755	1755	1755	1755	1755	1755	1755
66	1782	1782	1782	1782	1782	1782	1782
67	1809	1809	1809	1809	1809	1809	1809
68	1836	1836	1836	1836	1836	1836	1836
69	1863	1863	1863	1863	1863	1863	1863
70	1890	1890	1890	1890	1890	1890	1890
71	1917	1917	1917	1917	1917	1917	1917
72	1944	1944	1944	1944	1944	1944	1944
73	1971	1971	1971	1971	1917	1971	1971
74	1998	1998	1998	1998	1998	1998	1998
75	2025	2025	2025	2025	2025	2025	2025
76	2052	2052	2052	2052	2052	2052	2052
77	2079	2079	2079	2079	2079	2079	2079
78	2106	2106	2106	2106	2106	2106	2106
79	2133	2133	2133	2133	2133	2133	2133
80	2160	2160	2160	2160	2160	2160	2160

Table Z - Receiver Capacity Table cont.

Mean Holding Time In Seconds

No of Rec	8	9	1	1	1	1	14
2	2	2	2	2	2	2	2
3	10	9	9	9	9	9	9
4	22	21	20	20	19	19	19
5	37	36	35	34	33	33	32
6	55	54	52	51	50	49	48
7	76	73	71	70	68	67	66
8	98	94	92	90	88	87	86
9	121	117	114	112	110	108	106

RELEASE 06.03
13 July 1998

10	145	141	137	134	132	130	128
11	171	166	162	158	155	153	151
12	197	191	187	183	180	177	175
13	224	217	212	208	205	201	199
14	251	244	239	234	230	227	224
15	279	272	266	261	256	252	249
16	308	300	293	288	283	279	275
17	337	328	321	315	310	306	302
18	367	357	349	343	338	333	329
19	396	386	378	371	365	360	356
20	426	416	407	400	394	388	384
21	457	446	436	429	422	417	412
22	487	476	466	458	451	445	440
23	518	506	496	488	480	474	469
24	549	537	526	517	510	503	497
25	581	568	557	547	539	532	526
26	612	599	587	577	569	562	556
27	644	630	618	608	599	592	585
28	676	661	649	638	629	622	615
29	708	693	680	669	660	652	645
30	740	724	711	700	691	682	675
31	772	756	743	731	721	713	705
32	805	788	774	763	752	743	735
33	837	820	806	794	783	774	766
34	870	853	838	826	815	805	797
35	903	885	870	857	846	836	827
36	936	918	902	889	877	867	858
37	969	950	934	921	909	899	890
38	1002	983	967	953	941	930	921
39	1035	1016	999	985	973	962	952
Table Z - Receiver Capacity Table cont.							
Mean Holding Time In Seconds							

RELEASE 06.03
13 July 1998

No of Rec	8	9	1	1	1	1	14
40	1068	1049	1032	1017	1004	993	983
41	1102	1082	1064	1049	1036	1025	1015
42	1134	1115	1097	1082	1069	1057	1046
43	1161	1148	1130	1114	1101	1089	1078
44	1188	1181	1163	1147	1133	1121	1110
45	1215	1214	1196	1179	1165	1153	1142
46	1242	1242	1229	1212	1198	1185	1174
47	1269	1269	1262	1245	1230	1218	1206
48	1296	1296	1295	1278	1263	1250	1238
49	1323	1323	1323	1311	1296	1282	1270
50	1350	1350	1350	1344	1328	1315	1303
51	1377	1377	1377	1377	1361	1347	1335
52	1404	1404	1404	1404	1394	1380	1367
53	1431	1431	1431	1431	1427	1413	1400
54	1458	1458	1458	1458	1458	1445	1432
55	1485	1485	1485	1485	1485	1478	1465
56	1512	1512	1512	1512	1512	1511	1498
57	1539	1539	1539	1539	1539	1539	1530
58	1566	1566	1566	1566	1566	1566	1563
59	1593	1593	1593	1593	1593	1593	1593
60	1620	1620	1620	1620	1620	1620	1620
61	1647	1647	1647	1647	1647	1647	1647
62	1674	1674	1674	1674	1674	1674	1674
63	1701	1701	1701	1701	1701	1701	1701
64	1728	1728	1728	1728	1728	1728	1728
65	1755	1755	1755	1755	1755	1755	1755
66	1782	1782	1782	1782	1782	1782	1782
67	1809	1809	1809	1809	1809	1809	1809
68	1836	1836	1836	1836	1836	1836	1836
69	1863	1863	1863	1863	1863	1863	1863
70	1890	1890	1890	1890	1890	1890	1890

RELEASE 06.03
13 July 1998

71	1917	1917	1917	1917	1917	1917	1917
72	1944	1944	1944	1944	1944	1944	1944
73	1971	1971	1971	1971	1917	1971	1971
74	1998	1998	1998	1998	1998	1998	1998
75	2025	2025	2025	2025	2025	2025	2025
76	2052	2052	2052	2052	2052	2052	2052
77	2079	2079	2079	2079	2079	2079	2079
78	2106	2106	2106	2106	2106	2106	2106
79	2133	2133	2133	2133	2133	2133	2133
80	2160	2160	2160	2160	2160	2160	2160

12.2.4 Office Layout Information

Not Applicable

12.2.5 Traffic Tables

Not Applicable

12.3 Product/System Specification

Not Applicable

12.3.1 Physical Characteristics

Not Applicable

12.3.2 EMI/Earthquake Information

Not Applicable

12.3.3 Sparing Information

Not Applicable

12.3.4 Power Feed and Fusing Requirements

Not Applicable

12.3.5 Current Drain Information

Not Applicable

RELEASE 06.03
13 July 1998

12.4 Software Provisioning

For NTX software packages to PLC/SOC mappings for CSP02 and beyond refer to ECM552 - Mapping of NTX/NTG Package to PCL/NCL/Option.

Not Applicable

12.4.1 Required Software Packages and Interdependencies

Not Applicable

12.4.2 Software Usage Restrictions

A datafill problem has been identified concerning NT2X48BB. This CP is not a valid PEC in the SW tables. The base SW will be updated to include this PEC per PRS#BY46633, with NA008 correcting the problem. Until then, the NT2X48BB should be datafilled as NT2X48AB and the NT2X48BA datafilled as NT2X48AA. When the PRS corrects the datafill problem in NA008, the SW structure will be corrected to match the hardware. See also Engineering Bulletin 771 for SW datafill information.

12.4.3 Memory Provisioning

Not Applicable

12.5 Real Time Impact

Not Applicable

NORTHERN TELECOM

RELEASE 06.03
13 July 1998

PLN-8991-104

NORTHERN TELECOM

RELEASE 06.03
13 July 1998

PLN-8991-104

DMS-100 FAMILY
NORTH AMERICAN DMS-100
Provisioning Guide Volume 1 of 3

CR 1994, 1995 Northern Telecom
All rights reserved

NORTHERN TELECOM CONFIDENTIAL: The information contained in this document is the property of Northern Telecom. Except as specifically authorized in writing by Northern Telecom, the holder of this document shall keep the information contained herein confidential and shall protect same in whole or in part from disclosure and dissemination to third parties and use same for evaluation, operation, and maintenance purposes only.

Information is subject to change without notice. Northern Telecom reserves the right to make changes in design or components as progress in engineering and manufacturing may warrant.

DMS, DMS SuperNode, MAP, and NT are trademarks of Northern Telecom.

Publication number: PLN-8991-104

Product release: LEC and up

Document release: 06.03

Date: 13 July 1998

Printed in the United States of America