

# ISOETEC<sup>®</sup> System/108

Technical Manual

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ISOMETRIC SYSTEMS

Technical Manual

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# Section 1

## Introduction

### 1.1 GENERAL

This manual provides a detailed technical description of the ISOETEC® System/108 Telephone System and step-by-step procedures for installation, programming, operation, and maintenance. The procedures and methods in this manual have been prepared to assist the installer and technician in the planning and installation of the system.

### 1.2 DESCRIPTION

The ISOETEC System/108 is a fully featured digital Telephone System with a capacity of 108 ports. The ports may be configured for either stations (voice and/or data) or trunk lines (loop start, ground start, or DID) in increments of 12. These ports can be either voice ports, (Digital telephones, CO lines, tie lines, etc.), voice/data ports (digital display telephones), or data ports (digital data interfaces). A combination card provides connection to E&M type II tie lines.

#### 1.2.1 System Description

The system architecture is based on the 16 bit 68000 microprocessor, and presently addresses 512 kilobytes of EPROM memory, 256 kilobytes of battery backed static RAM, and a real time clock. System software is provided in EPROM memory which is installed on the CPU circuit board.

The system utilizes time division switching techniques, and pulse code modulation. The voice/data bus is divided into 256 time slots: 16 time slots are used for CPU functions, 12 time slots are reserved for paging and conferences, 108 are available for voice connections, and 108 are available for data connections. This arrangement of time slots provides a telephone system which is non-blocking between ports. Each port is provided a time slot, thus a conversation between two ports uses two time slots.

Four input/output ports are provided for communications to the system. These 4 ports are used for the operator terminals, programming terminals, and the SMDR output. Two of these ports are configured for an RS-232-C connection. The remaining two are configured for an RS-422 connection. These connections are made via a single cable connected to the system backplane and then divided on the Main Distribution Frame (MDF).

A system self-test is incorporated in the design to aid in trouble shooting the system.

The system is equipped with a built in 300/1200 baud MODEM. This MODEM can be used for remote programming, and remote diagnostics.

### 1.2.2 Telephone sets

The ISOETEC System/108 may be used with a variety of telephone sets. ISOETEC digital telephone sets are provided in the following sizes:

A digital display telephone with 20 programmable keys and 3 'soft keys' and a 64 character liquid crystal display.

28-key digital telephone with 22 programmable keys.

17-key digital telephone with 11 programmable keys.

6-key digital telephone.

All digital telephone sets have 6 fixed function keys. These keys are the HOLD key, TR/CON (TTransfer/CONFERENCE) key, VOLUME UP and DOWN keys, PROGRAM key, HF (Hands Free) key on the 28-key and 29-key display telephones, VA (Voice Announce) key on the 17-key telephone, and an OUT key on the 6-key telephone.

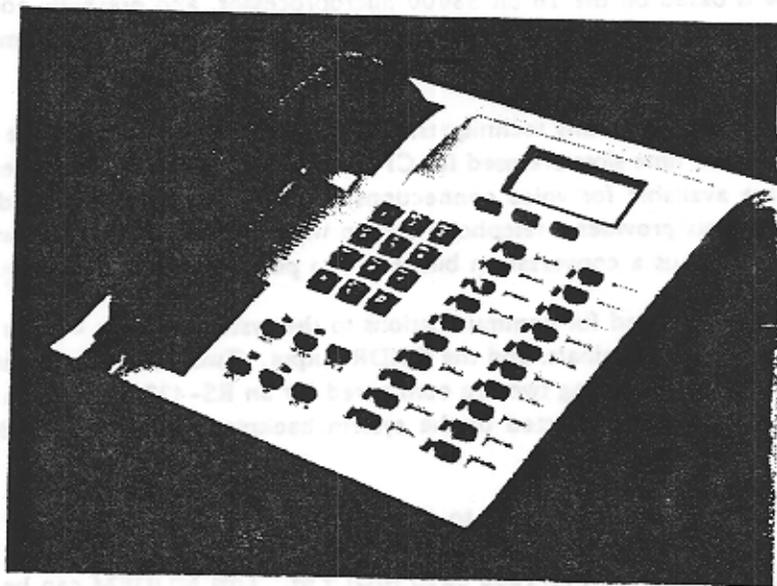


Figure 1-1 Digital Display Telephone

The ISOETEC System/108 multiple-key stations access CO lines and system features through the use of the programmable feature keys. Light Emitting Diodes (LEDs) indicate the status of all calls and features in use. The 29-key digital display telephone, and the 28-key digital telephone are fully featured, hands free telephone sets. The 17-key digital telephone is a voice announce telephone. The station may be used hands free for internal calls only. The digital single line telephone does not have hands free or voice announce capability.

ISOETEC's EZ-1 electronic 26-key and 14-key telephones may also be used with the System/108 through the use of the ISOETEC Electronic Phone Interface (IEPI).

A standard DTMF dial, single line telephone set may also be used with the ISOETEC System/108 with the use of an OPX (off premise extension) Interface connected to one of the station ports.

The stations are connected to station ports by means of randomly twisted 2 pair cable. Both pair are required for the telephone to function. One pair transmits digitized voice information and control signals from the system to the telephone. The other pair receives digitized voice information and control signals from the telephone. It is recommended that 4 pair cable be used to allow for future use. Each station has two digital channels to the station port card. The primary channel is used for voice communications. The secondary channel is used with Display Phones for either an off-hook second voice path, or for data communications.

### 1.2.3 Operator Station

The operator station is a CRT terminal which is connected to one of the four input/output ports. The operator station also requires a connection to a station port.

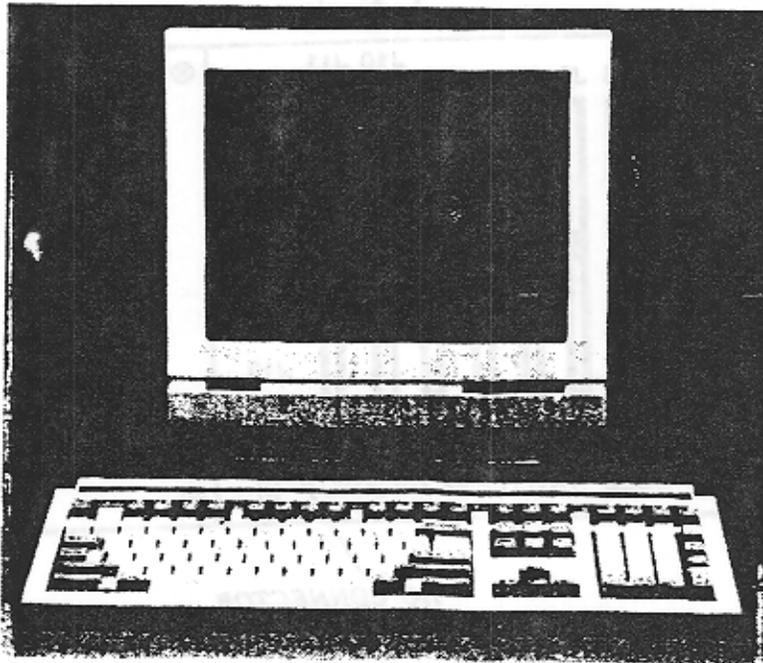


Figure 1-2 Integrated Operator Terminal

### 1.2.4 Trunks

The ISOETEC System/108 uses either loop start or ground start trunks. These lines may be either DTMF signal or pulse signal. The system can also be used with Direct Inward Dial service. The E&M Tie Line Combination port card allows the connection of 2-wire, E&M type II signal, tie lines to the system.

## 1.3 CIRCUIT CARD DESCRIPTION

The ISOETEC System/108 contains the following circuit cards:

### 1.3.1 Backplane

The backplane is the mounting card into which all the other circuit boards are installed. The backplane contains connectors for 11 circuit cards. There are 9 connectors for port cards (station or CO lines), one for the CPU, and one for the Voice Control Module/Data Control Module. The connectors are labeled J1 through J11 and are numbered from left to right. The connectors are offset for the different types of circuit cards to avoid improper installation.

The backplane has the connector for the input/output ports, and connections for background music and music on hold.

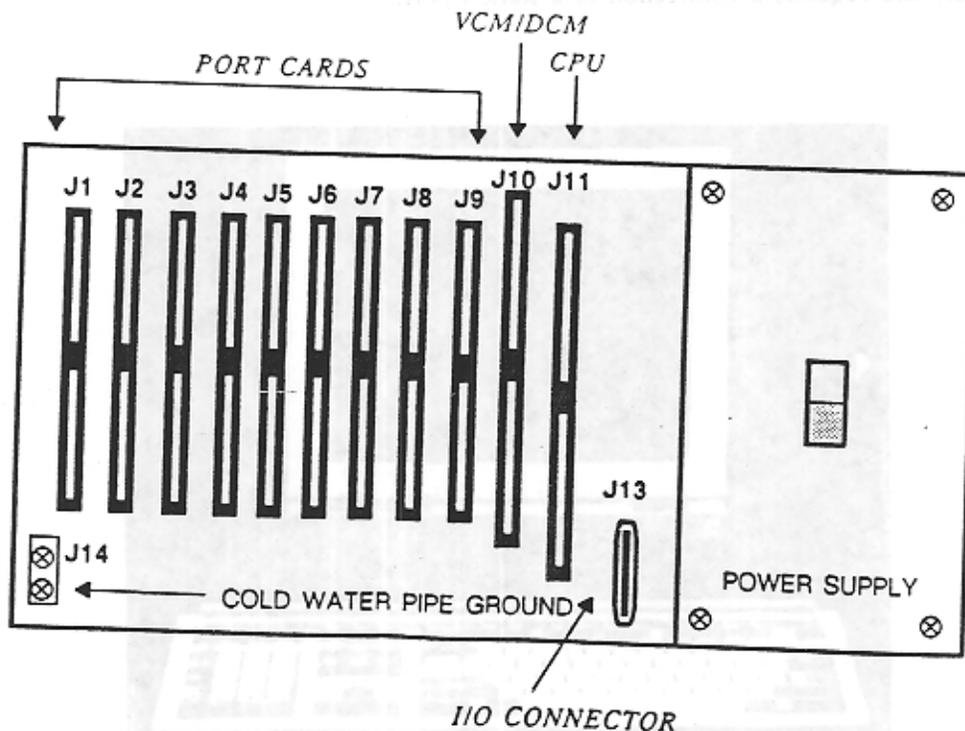


Figure 1-3 Backplane

### 1.3.2 CPU

The CPU (p/n 19300) is responsible for all control functions, execution of all logic operations, and control of system modules. The CPU contains a 16 bit microprocessor (the 68000), and is capable of addressing 512 kilobytes of EPROM memory, 256 kilobytes of battery backed static RAM, and a real time clock. The circuitry for the input/output ports is mounted on the CPU. The system reset switch is located on the CPU. System software, which is provided in EPROM memory, is installed on the CPU. The CPU is installed in slot J11, which is the right-most card slot on the backplane.

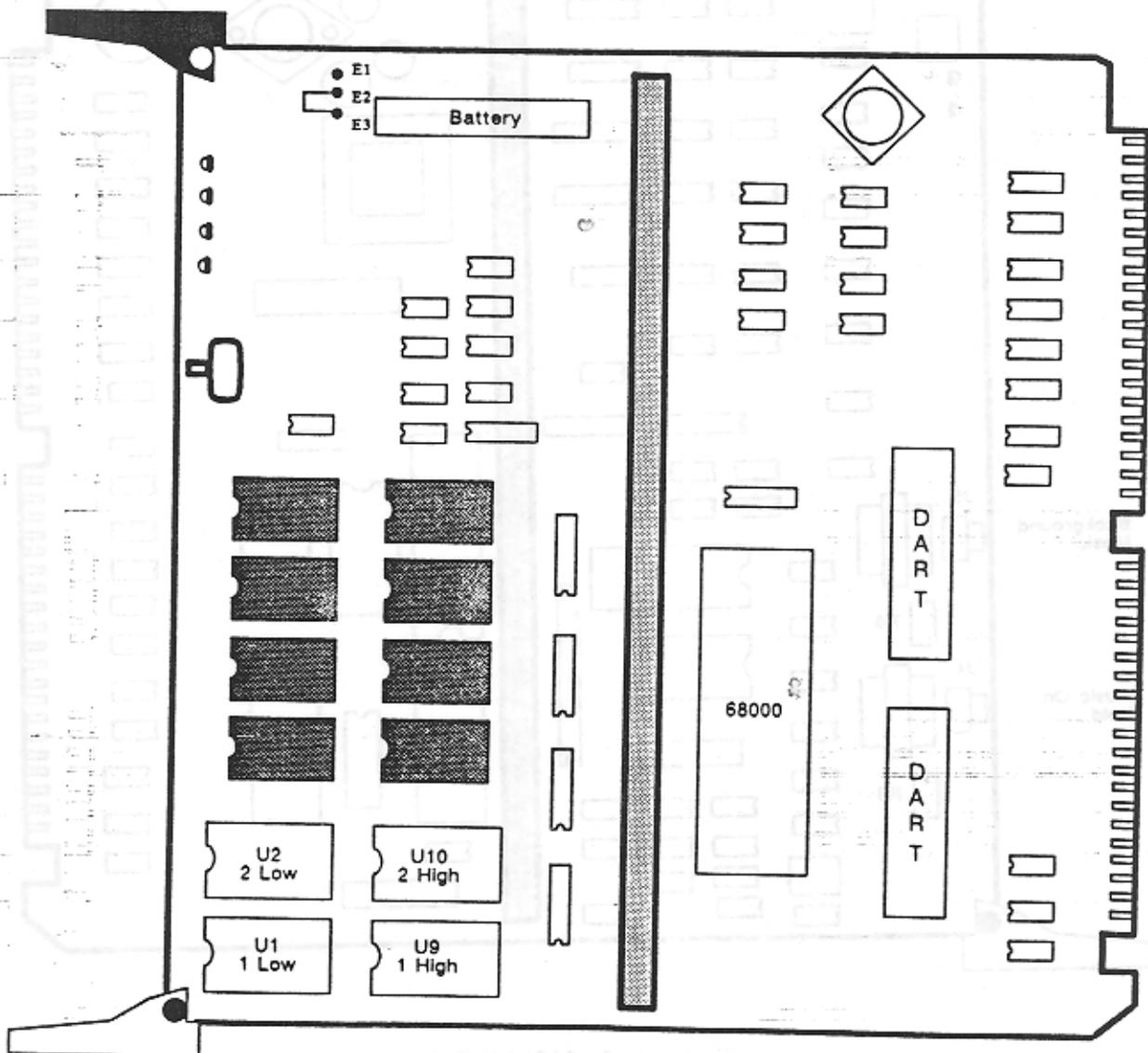


Figure 1-4 CPU

### 1.3 Voice Control/Data Control Module

The Voice Control/Data Control Module (p/n 15460) contains the circuitry necessary for voice switching and conference connections. It also contains the circuitry necessary to establish data connections. The VCM/DCM is responsible for all system tones, system timing, and station status control. The VCM/DCM contains the DTMF tone generators, a DTMF tone receiver, the circuitry and connections (two RCA type jacks) for background music and music on hold, and the system MODEM. One Voice Control /Data Control Module is required per system. The VCM/DCM is installed in slot J10 on the backplane.

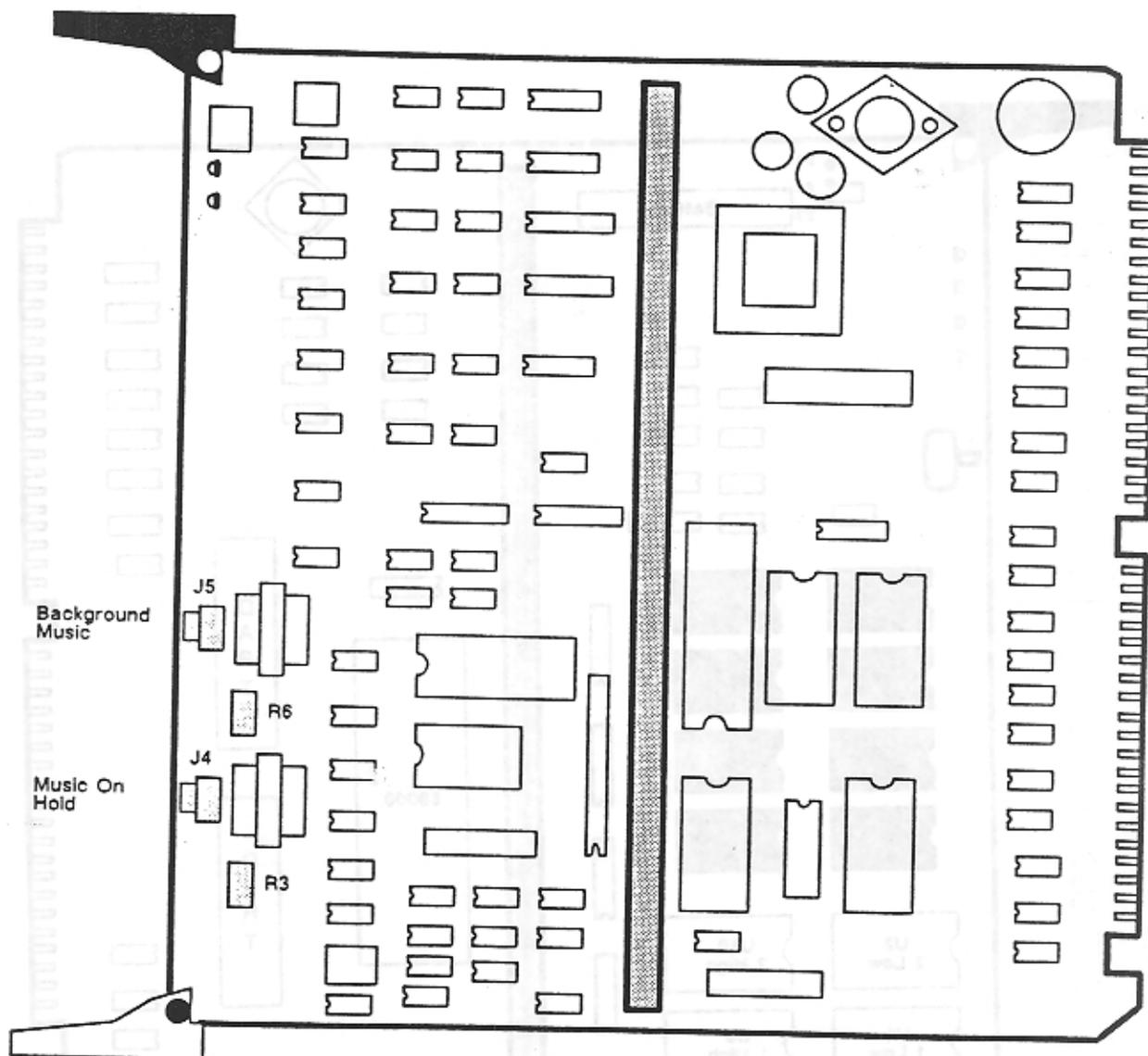


Figure 1-5 VCM/DCM

### 1.3.4 Station Port Card

The station port card (p/n 15640) contains the circuitry necessary to connect the ISOETEC digital telephone to the System/108. Each station port card contains 12 station ports. This card also has the circuitry necessary to support an external page. The external paging system is connected to the station port card via the main distribution frame. The screw connector terminals on the outside edge of the card are not used at this time. There should be no connection made to this terminal. A station port card may be plugged into any port position in the system. The board may be installed with the power on. A station port card is installed in any slot from J1 through J9.

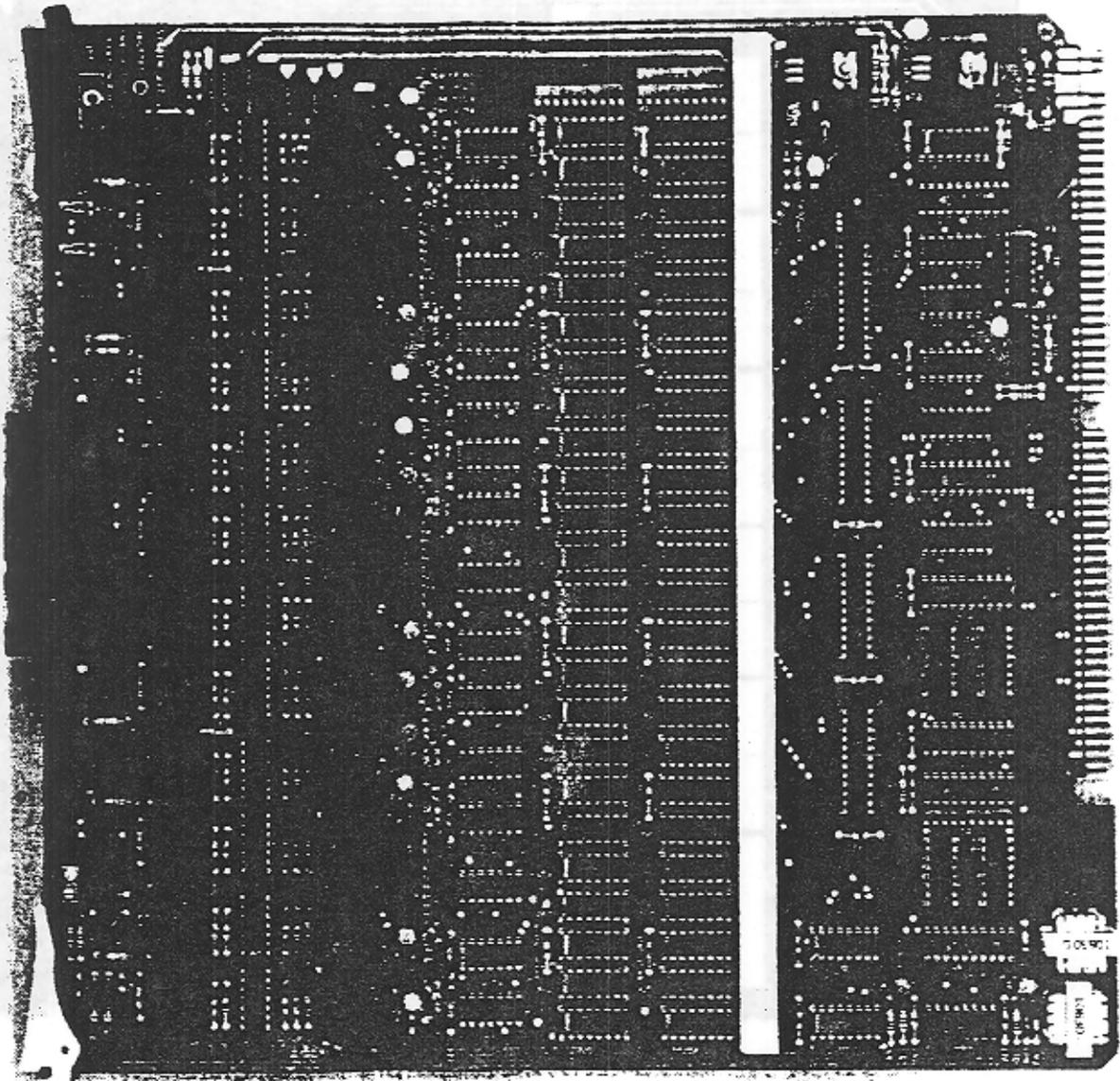


Figure 1-6 Station Port Card

### 1.3.5 CO Port Card

The CO port card (p/n 15600) provides connections for 12 loop start CO lines to the ISOMETEC System/108, and contains the circuitry for ring detection, pulse dialing, line seizure, and the analog/digital converters. It can accommodate either polarity of tip and ring on loop start lines, and provides high voltage protection for the tip and ring inputs. A CO port card may be plugged into any port position in the system. The board may be installed with the power on. A CO port card is installed in any slot from J1 through J9.

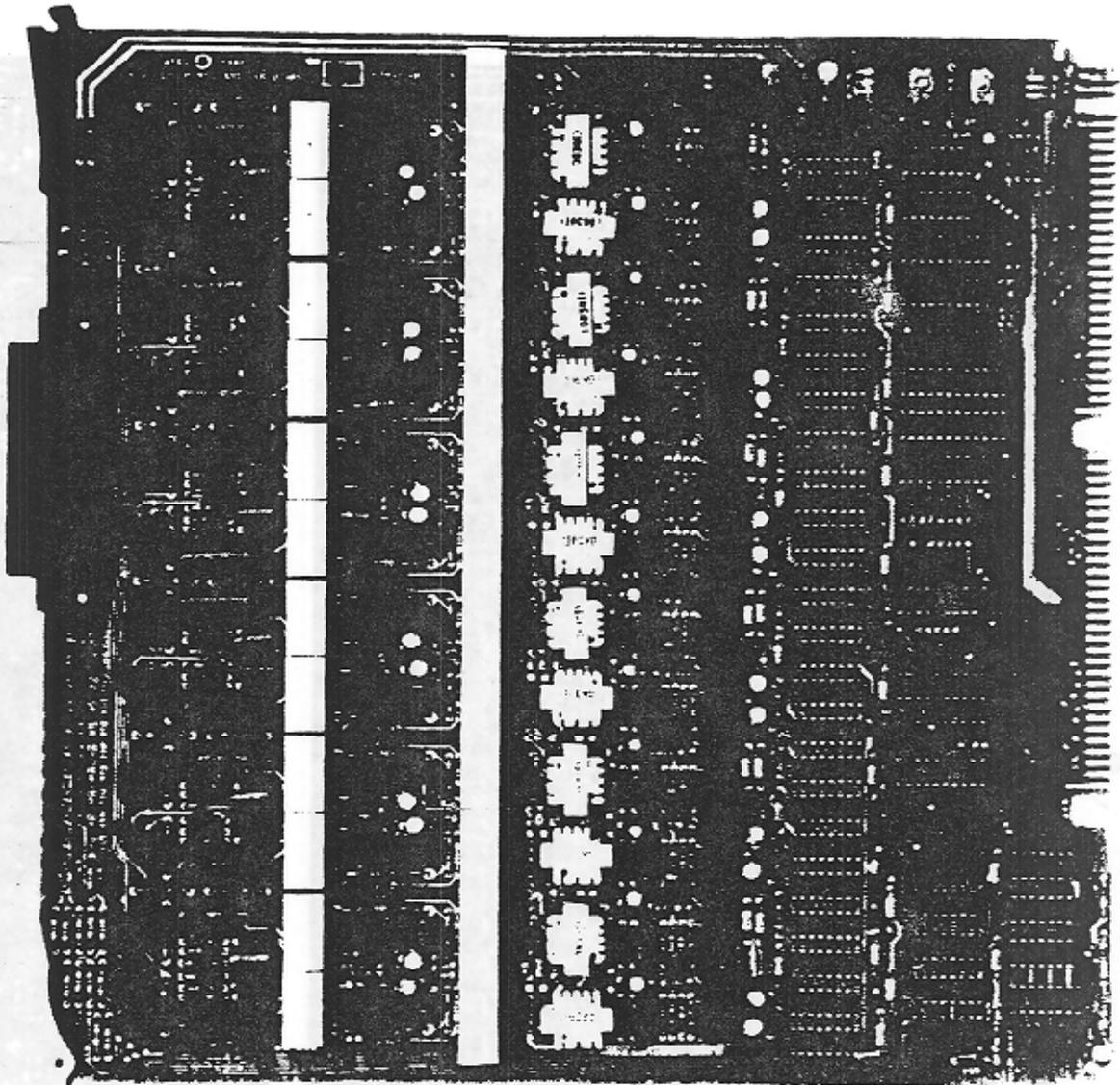


Figure 1-7 CO Port Card

### 1.3.6 Loop/Ground Start Port Card

The Loop/Ground Start port card (p/n 15620) provides connections for 12 loop start or ground start trunks to the ISOETEC System/108, and contains the circuitry for ring detection, pulse dialing, line seizure, and the analog/digital converters. A Loop/Ground Start port card may be plugged into any port position in the system. The board may be installed with the power on. A Loop/Ground Start port card is installed in any slot from J1 through J9.

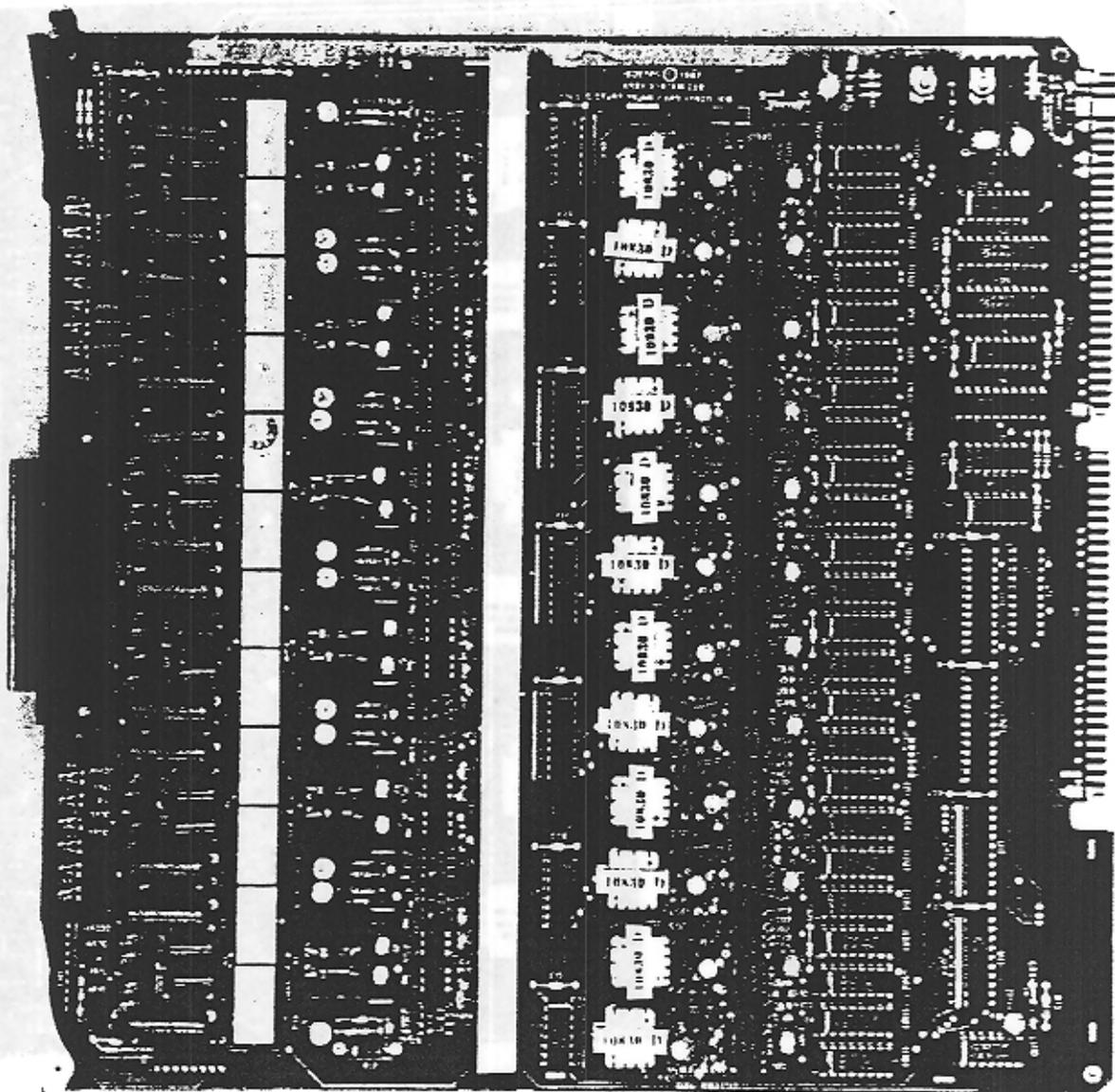


Figure 1-8 Loop/Ground Start Port Card

### 1.3.7 Direct Inward Dial Port Card

The Direct Inward Dial port card (p/n 15610) provides connections for 12 DID lines to the ISOETEC System/108. A DID port card may be plugged into any port position in the system. The board may be installed with the power on. A DID port card is installed in any slot from J1 though J9.

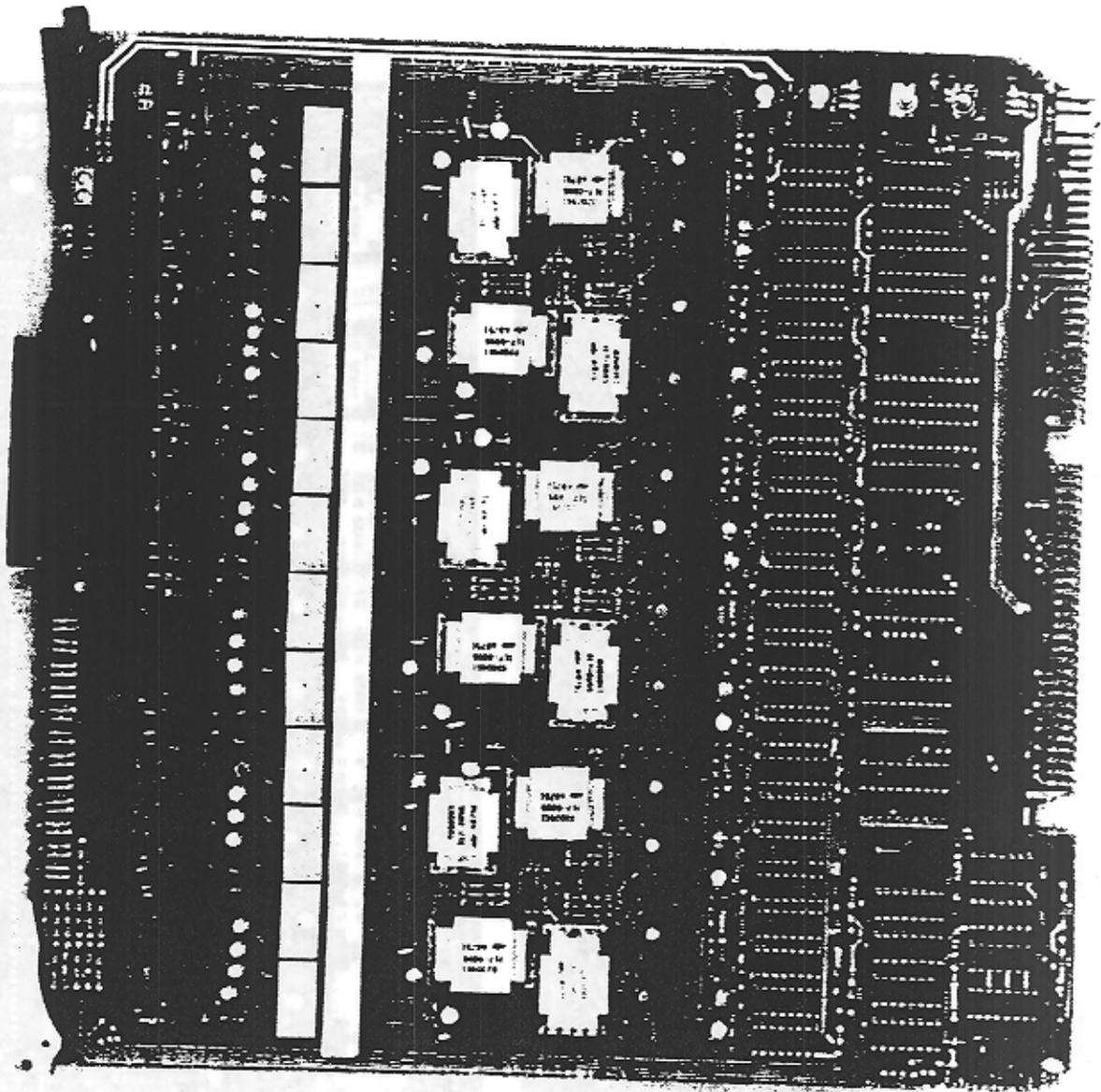


Figure 1-9 DID Card

### 1.3.8 E&M Tie Line Combination Port Card

The E&M tie line combination port card (p/n 15680) provides the connection for 4 two-wire, E&M type II signal tie lines and can be installed in any slot from J1 through J9. The card supports 6 digital voice paths and 4 E&M Tie Lines. Data and second voice path is not available for the digital voice stations connected to this combination card. The board may be installed with the power on.

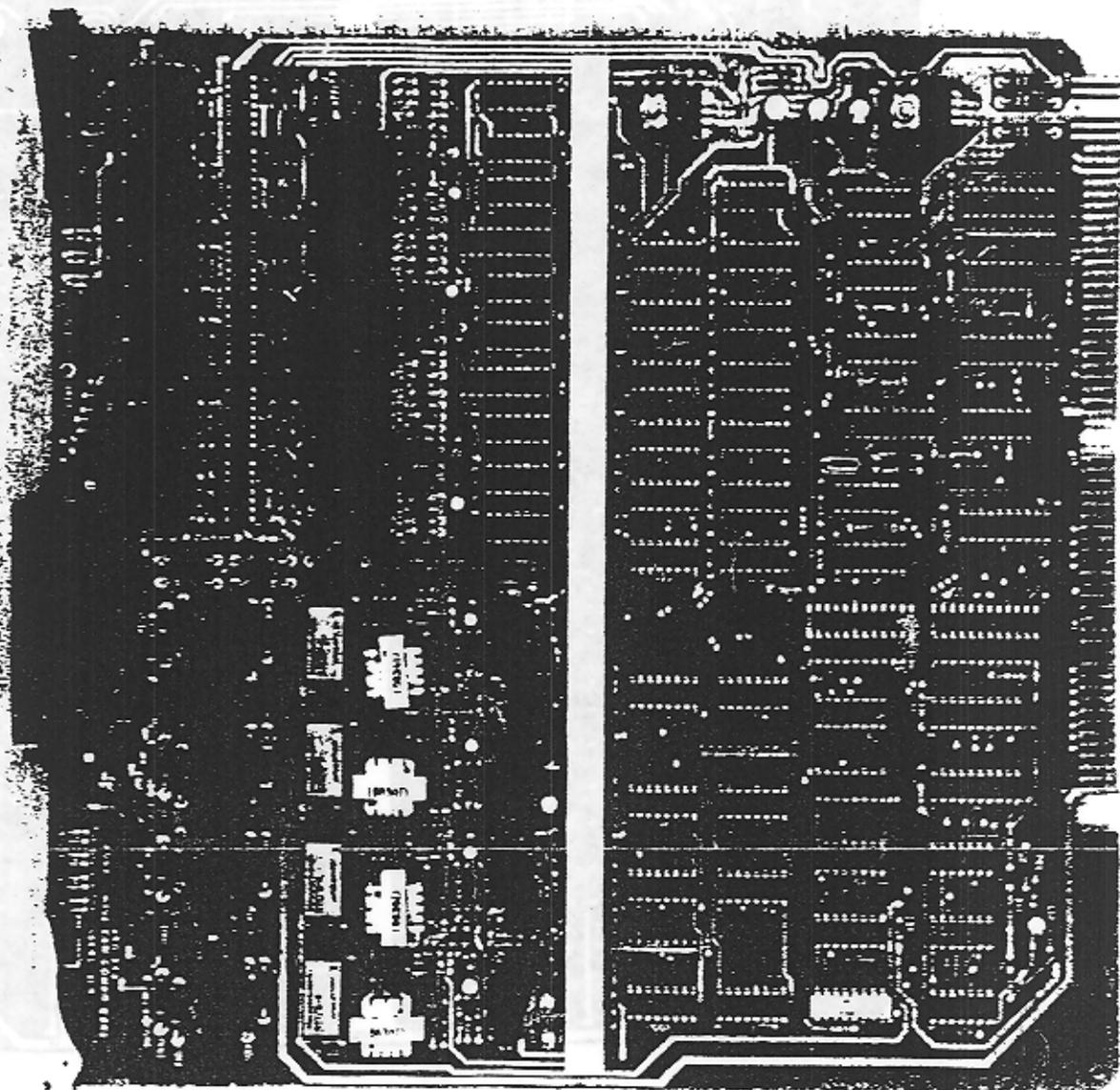


Figure 1-10 E&M Tie Line Combination Card

### 1.3.9 DTMF Receiver Combination Port Card

The DTMF Receiver Combo port card (p/n 15650) is used with the system's built-in Automated Attendant feature. This card provides six digital station ports, and six DTMF receiver ports. The DTMF Receiver port card may be plugged into any port position in the system. The board may be installed with the power on. A DTMF Receiver port card is installed in any slot from J1 through J9.

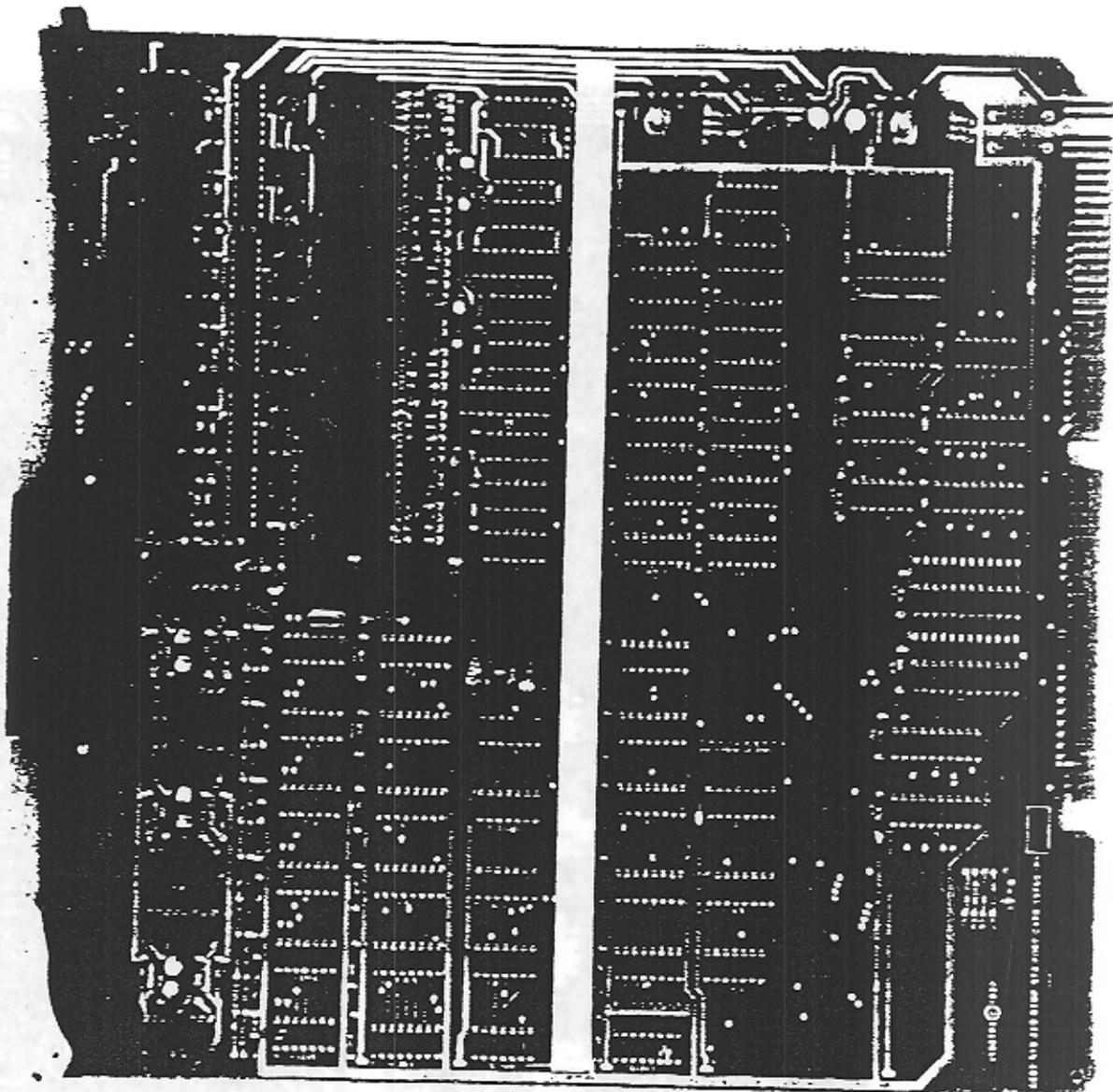


Figure 1-11 DTMF Receiver Combination Card

## 1.4 POWER SUPPLY

The System/108 power supply is installed inside the cabinet in the first slot on the right (J12). The power supply is designed to be an integral part of the System/108. When ordering the system cabinet (part number 19200) the power supply is included and already installed.

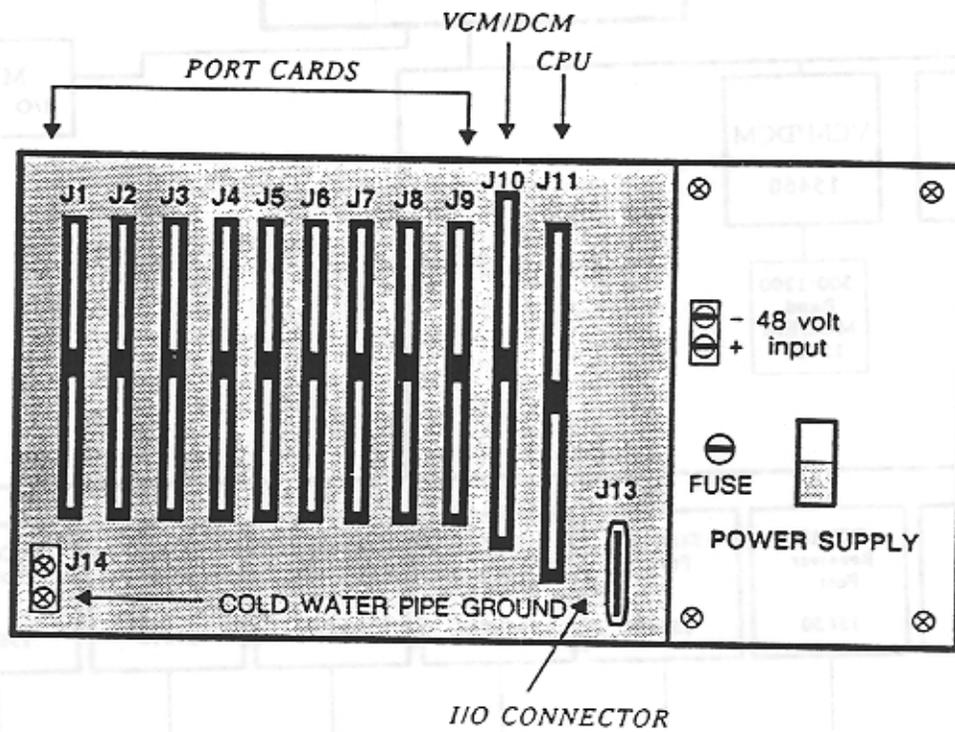


Figure 1-12 System Power Supply

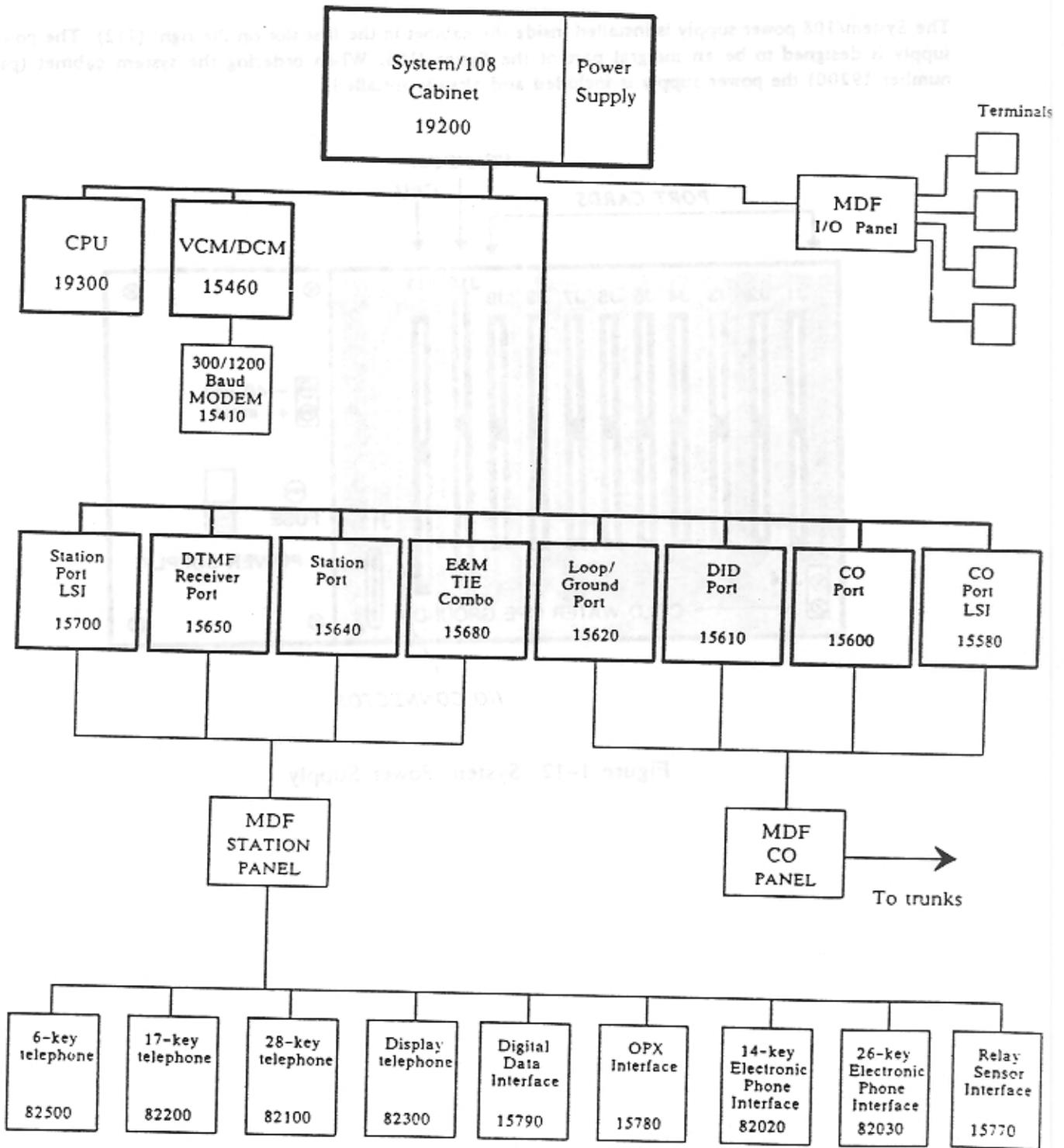


Figure 1-13 System/108 Block Diagram

## 1.5 SYSTEM TONES

- Dial Tone** Dial tone is a continuous tone received when a station is taken off-hook. This is an indication that dialing may begin.
- LCR Dial Tone** LCR dial tone is a continuous dual frequency tone received when accessing Least Cost Routing. (350 Hz and 440 Hz)
- Outside Line Dial Tone** Outside line dial tone is a continuous dual frequency tone received when accessing a Central Office line.
- Ring** The audible signal a station makes when it is being signaled.
- Ring-back tone** The audible tone received by a caller which indicates that the called station is ringing.
- Busy Tone** The tone received by a caller when the called station is busy.
- Reorder Tone** A fast busy tone indicating a miss dial, time out, or some other improper operation.
- Confirmation Tone** A tone consisting of four short beeps received to indicate the successful completion of a feature.
- Camp-on Tone** The tone received by a called station to indicate that a call is waiting.

## 1.6 FEATURES DESCRIPTION

<b>Account Codes</b>	An account (or client) code of up to ten digits can be added to the SMDR call record for both incoming and outgoing calls.
<b>Add On Conference</b>	An Add On conference allows an internal station user to converse with up to 9 other parties on the same call. Two of these other parties may be outside line calls.
<b>Auto Answer</b>	A ringing CO line may be answered by lifting the handset without having to press the Outside Line key.
<b>Automated Attendant</b>	The ISOETEC System/108 has an optional built-in Automated Attendant which can answer outside line calls, provide the caller with a greeting message and instructions on how to dial the party they desire. The Auto Attendant can route calls to individual extensions, hunt groups, the INFOSTAR/VX, or the system attendant. The system provides six different answering groups. Each group can be assigned one of four different dialing plans.
<b>Auto Pickup</b>	This is a system feature which optionally allows Direct Station Selection keys to be used to answer calls ringing on stations monitored by DSS keys. This feature is enabled on a system wide basis.
<b>Auto Second Path</b>	Second path is a feature of a display telephone which allows internal callers to reach the display phone when it is busy with another call. An extension with auto second path will receive second path calls whenever their extension is busy on the handset. Without auto second path, a caller must dial a code to activate the called station's second path.
<b>Auto Transfer</b>	If a station has a DSS (Direct Station Selection) key programmed for the extension to which a call is to be transferred, and the station has auto transfer active, an incoming call can be transferred by pressing the programmed DSS key.
<b>Background Music</b>	If music is connected to the system, it is available at all stations through the station's hands free speaker.
<b>Bad Line Key</b>	A feature key which is used to identify a bad facility or a bad line within a facility.
<b>Barge In</b>	This feature allows an authorized station user to enter into an existing conversation.
<b>Barge Tone Inhibit</b>	When an existing conversation is entered using the Barge In feature, a tone alerts the persons in the conversation that someone has entered their conversation. This tone can be prevented on a per station basis.
<b>Call Accounting Reports Option</b>	This is an optional feature available for the ISOETEC System/108 which stores Station Message Detail Recording information in system memory. This information can then be sorted and summarized by extension or account code.

**Call Back (station)**

A station user calling a busy extension may use call back to complete the call when the called station becomes free. A queued call remains in the system until both the called party and calling party are available. The system then calls the station which placed the call back using a distinctive ring.

**Call Coverage Key**

These keys provide a means of answering incoming calls on a station other than the station the call is ringing on. Call Coverage keys can be programmed to ring whenever the primary extension rings, only when it is busy, or to start ringing after an amount of time has lapsed.

**Call Diversion**

The system can be programmed to answer an incoming call, select an outgoing line and dial the telephone number contained in a system speed dial number. The two lines are then connected together. The system can be programmed to perform this action between certain hours during the week, on Saturday, and on Sunday.

**Call Forward**

Allows calls to an extension to be automatically rerouted to another extension.

**Call Forward to VX**

Allows calls to an extension to be automatically routed to the system's Voice Exchange (voice message system).

**Call Transfer**

A call (internal or outside line) can be routed to any extension by any other extension without the assistance of the operator.

**Camp-On**

When a busy signal is encountered on an internal call or when transferring an outside line call, a tone can be given to the called party to indicate that a call is waiting.

**Conference**

A conference allows an internal station user to converse with two other parties on the same call. The two parties may be two outside line parties, or one outside line party and one internal party.

**Cost Limit**

This feature can be used with Least Cost Routing to control the cost of outside line calls made by an extension. This limit can be assigned on a per extension basis.

**Data Feature**

This is a feature which provides the ISOETEC System/108 with the ability to transmit data from point to point within the system simultaneously with voice transmission. The system is capable of transmitting serial data at Baud rates of up to 38.4 kilobits/sec asynchronously and 56 kilobits/sec synchronously.

**Data Hot Line**

This key gives the capability to call a data port by pressing a single key, rather than dialing a data port extension number.

**Directory**

Part of system programming consists of assigning a station user's name to each of the extensions in the system. The extensions can also be grouped together by departments (up to 10 departments). The Operator's station uses this programming to process calls by a person's name as well as extension number.

<b>Diagnostics</b>	The system is equipped with self-test routines that can be run whenever a technician desires. The tests can be run while the system is still processing calls.
<b>Directed Call Pickup</b>	A station user may connect to a call ringing at another station if the extension number of the ringing station is known.
<b>Direct Inward Dial</b>	The ISOETEC System/108 can support the use of Direct Inward Dial lines. These lines allow an outside caller to directly dial the telephone number of an extension within the system without the need of the call being handled by the attendant. The System/108 uses rotary dial DID lines, and can accept from 2 to 7 digits from the Central Office.
<b>DISA</b>	Direct Inward System Access - The ISOETEC® System/108 can be accessed remotely. This allows a customer to use the system's CO lines from a distant location. The customer can also use DISA to call stations within the system.
<b>Discriminating Ring</b>	A station rings with two short rings when called by another station, and one long ring when an outside line call is ringing.
<b>DSS/BLF Key</b>	Direct Station Selection/Busy Lamp Field Keys - Feature keys may be programmed by the user to enable internal station rapid access. The lamps associated with such keys can be used to provide a visual indication of the status of the extension the key is programmed for.
<b>Do Not Disturb</b>	A station can block all ringing, pages, background music, and barge-in by activating the DND mode.
<b>Exclusive Hold</b>	A call placed on exclusive hold will flash only on the station that placed it on hold, it will light steady on all other stations. Only the station that placed the line on hold can remove the call from hold.
<b>External Page</b>	Each station port card has a page audio path which can be connected to an external paging system. This page path can be used for voice paging, to provide background music, or to provide CO ringing to areas without nearby telephone stations.
<b>Flash Operation</b>	The system can be programmed to imitate the action of flashing the switch-hook (momentary disconnection) on a CO/PBX Line. A flash timer is provided in system programming to adjust the length of the flash.
<b>Flexible Ringing</b>	Any outside line can be programmed to ring at any extension. A separate ring assignment may be made per station for day and night mode operation.
<b>Follow Me Class of Service</b>	When using Verified Forced Account codes, the account code can be used to change an extension's toll restriction class of service. Thus, someone with an appropriate account code can use any telephone to place calls regardless of that telephone extension's class of service.
<b>Forced Account Codes</b>	An extension can be programmed to force the entry of an account code (up to 10 digits) before any outside line call is made. The system can also be programmed to verify the entered account code (up to 8 digits) against a table of valid codes.

- Ground Start Trunks** The ISOETEC System/108 can support the use of ground start trunks with the Loop/Ground Start Trunk Port card.
- Group Pick Up** Stations can be arranged into groups such that a call ringing any station in the group can be answered by any other station using a single key. The advantage of the pickup group is that it is not necessary to know which extension in the group is ringing. There are a total of 36 pickup groups with no limit to the amount of stations assigned to a group. However, a station can only be part of one pickup group.
- Hands-Free CO** This option can be used to disable the hands free microphone when a station originates an outside line call. The option is assigned on a per station basis.
- Hands-Free Ext** This option can be used to disable the hands free microphone when a station originates an internal call. The option is assigned on a per station basis.
- Hands-Free Receive** An option that is used to prevent a station from receiving a call hands free when called internally. The called extension will ring when called.
- Hunt Group** Stations can be arranged in groups to allow an outside line to be transferred to groups of stations rather than an individual extension. Calls entering the hunt group are routed to the first available station in a circular fashion.
- In/Out** This feature key allows a station to indicate to the operator and internal callers that the user is not at the station.
- INFOSTAR™/VX** The INFOSTAR Voice Exchange is an optional feature which provides the ISOETEC System/108 with an integrated voice message system. Stations can be forwarded such that VX will take messages when the user is away from their extension.
- Last Number Re-dial** Each time a number is dialed on an outside line, the telephone number is retained in system memory for that extension until the next outside line call is dialed. The last number that was dialed can then be re-dialed by pressing # digit on the dial pad.
- Least Cost Routing** LCR provides the system with a means of routing outside line calls over the least costly route available to the system.
- Line Maintenance** Trunks can be removed from service and returned to service through the programming terminal, or the Remote Programming feature.
- Meet Me Page** This feature enables a station user to page a person and stay on the line waiting for the paged person to dial the meet me page code from any other station. The two parties will then be connected.
- Message Waiting** The message waiting key is used to leave a lamp indication at a called station when an internal caller receives a busy signal or no answer. The called station can use the message waiting key to call back the station that left the indication.

### **Mute Key**

A feature key which allows the microphone and the transmitter in the handset of a station to be attenuated. An outside party will not be able to hear a normal conversation carried out in the room while this feature is active.

### **Music On Hold**

If music is connected to the system, when an outside call is placed on Hold, music is connected to the outside line.

### **Night Answer**

A key can be provided for stations which do not ring when the system is in the night mode, to enable the station to answer incoming outside line calls.

### **Night Mode**

Stations can be programmed for different ring assignments when the system is in the day mode, and when the system is in the night mode. Access to outside lines and toll restriction can also be programmed differently for day mode, and night mode. The system is placed in night mode by the operator, or automatically by system programming.

### **Off Premise Extension Interface**

A System/108 extension can be converted for used with a standard 2500 type telephone set through the use of an Off Premise Extension Interface (OPXI).

### **On Hook Dialing**

Pressing any digit on a telephone's dial pad places the station in the hands free mode. A station can dial another station hands free, by dialing the extension number without lifting the handset.

### **Operator Station**

The Operator station is equipped with a CRT terminal which gives a visual display of office calling activity. The accompanying keyboard and handset are used to process calls.

### **Orbit**

An individual outside line call may be transferred to a waiting zone while an attempt is made to locate the called party via the paging system. The called party may retrieve the call in the waiting zone from any extension.

### **Outside Line Access**

Any extension can be prevented from accessing any particular outside line. Outside line access is programmed on a per extension basis.

### **Paging**

All paging is under control of the user. Paging may be for individual zones, all areas, or external page zones. There are 9 individual page zones and a page all zones.

### **Password Protection**

Access to system programming is protected by up to eight levels of passwords. Each level of password progressively allows more access to programming. Thus an operator may be provided with a password to access programming of the directory information, but is prevented from making any changes to system programming.

### **Patch Key**

This feature key is used when a station establishes a two outside line conference, and wishes to leave the conference and keep the two outside lines connected to each other. Without the use of this key, when the station that made the conference disconnects, the two outside lines are disconnected.

<b>Power Failure Transfer</b>	Systems equipped with OPX Interfaces can have the interfaces wired such that if the system loses electrical power, trunk lines are connected to the OPX Interfaces.
<b>Prime Line</b>	An extension may be programmed to automatically access a particular trunk or Trunk Group as soon as the phone is taken off-hook.
<b>Print Scheduler</b>	The System Reports can be programmed to print (via a printer connected to one of the I/O ports) at predetermined times.
<b>PBX Feature Keys</b>	Up to 40 programmable features can be assigned to the feature keys for single key dialing of PBX features.
<b>Public</b>	Trunk lines can be programmed as public to allow any number of stations to access a trunk at the same time. The trunk line must appear as a direct line if it is to be programmed public.
<b>Release Key</b>	Used in conjunction with headset operation in place of the switch-hook.
<b>Remote Programming and Maintenance</b>	The ISOETEC System/108 is equipped with a built-in 300/1200 Baud MODEM which allows a technician to access the system, and carry out any programming or maintenance that could be accomplished from an on site programming terminal.
<b>Reports</b>	The ISOETEC System/108 provides management reports for use in evaluating the call handling performance of the telephone system. There are 13 management reports to help control cost through better utilization of outside lines. The Reports also provide information necessary to make line configuration, Least Cost Routing package, and incoming call handling as efficient as possible. Peak traffic periods and extensive telephone users can also be detected.
<b>Ring Type</b>	This feature allows a station to be programmed for one of 10 different tones for station ringing.
<b>Save/Repeat</b>	A number dialed on an outside line can be saved for later re-dialing.
<b>Second Path</b>	When used with a digital display phone, each station has a secondary channel which can be used for off-hook announcing.
<b>Serial Call</b>	The serial call key is provided so that a station user can press the key prior to transferring a call. When the party the call was transferred to is finished talking, the call will ring back the station that pressed the serial key.
<b>Silent Monitor</b>	This feature is used to enable an extension's outside line calls to be monitored by an authorized person. This feature is similar to the Barge In feature, except that once it is activated that station is monitored until the feature is deactivated. Barge In must be activated for each call to be monitored.
<b>SMDR</b>	Station Message Detail Recording - Provides a record of incoming and/or outgoing outside line calls.

<b>Split Key</b>	The split key allows a station user to place a call on hold, and switch to a waiting call. The user may then switch back and forth between the two calls with the use of one key.
<b>Station Speed Dial</b>	Station speed dial allows a station to dial an outside number (which is stored in memory by the system) by pressing a single key, or dialing a code. A station user can program and store up to 30 speed dial numbers with up to 30 digits each.
<b>Status Monitor</b>	The programming terminal can be used to provide a real time indication of system status including which stations are in use and what trunk or station they are connected to.
<b>System Backup</b>	Through the use of the Remote Programming feature and a microcomputer with some type of disk storage, the system configuration, LCR routing information, and Call Accounting Reports information can be saved and later restored.
<b>System Configure</b>	The ISOETEC System/108 is a ported system. Any port can be assigned any extension number within the range of the system.
<b>System Forward</b>	A station can be programmed such that unanswered calls to the station are rerouted to another (already assigned) station without using Call Forward. A timer is provided on a per station basis that determines how long a call should ring the station before being rerouted. Calls to a station that is busy are not affected by System Forward.
<b>System Speed Dial</b>	System Speed Dial allows a station to dial an outside number (which is stored in memory by the system) by pressing a single key, or dialing a code. System Speed Dial numbers can be used by any station in the system. System Speed Dial is programmed only by the operator to provide up to 200 speed dial numbers with a maximum of 30 digits each.
<b>Tie Lines</b>	A tie line combination port card is available as an option which provides 6 digital telephone ports and 4 E&M 2 wire, Type II signal tie line ports.
<b>Toll Restriction</b>	The system is capable of providing toll restriction on outgoing outside line calls based on the first 8 digits of the dialed number.
<b>Trunk Access</b>	Any station can be prevented from using any trunk in the system.
<b>Trunk Group</b>	Outside lines can be arranged into groups for access by stations. Trunk group keys are programmed on stations to allow access to the groups.
<b>Trunk Queuing</b>	When all outside lines in a particular Trunk Group are busy, a station user can activate this feature which will ring the station back when a line becomes available.
<b>UNI Key</b>	This feature key can be programmed on an extension to allow incoming calls to reach the extension on lines that do not appear at that extension.
<b>Verified Forced Account Codes</b>	An extension can be programmed to force the entry of an account code (up to 8 digits) before any outside line call is made. The system can also be programmed to verify the entered account code against a table of valid codes.

## Section 2

# Installation

### 2.1 FCC REQUIREMENTS

#### 2.1.1 FCC Regulations Part 15

**WARNING:** This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference in which case the user, at his own expense, will be required to take whatever measures may be required to correct the interference.

The ISOETEC® System/108, and any additional port cards are shipped with shielded cables. These cables must be used to install the system, and connected in accordance with the instructions provided in this manual to insure compliance with the Class A limits.

#### 2.1.2 FCC Regulations Part 68

Before starting system installation, there are established FCC rules and regulations which must be observed. These rules permit this system to be directly connected to the telephone network. Standardized jacks are used for these connections. This equipment should not be used on party lines or coin operated lines.

FCC rulings state that the owner of the system to be installed give the local telephone company sufficient advance notice of intention to use privately owned telephone equipment. The owner must also furnish information as to the identification of the particular lines to be connected to the system and the affected telephone numbers. FCC registration information on the model name, FCC-assigned registration number and ringer equivalence information must also be furnished. The ringer equivalence (REN) is used to determine how many devices can be connected to a telephone line. In most areas, the sum of RENs of all devices on one line should not exceed five. If too many devices are attached, they may not ring properly.

Should there be any question that the customer-provided equipment may cause harm to the telephone network, the local operating company is required to notify the customer of an impending temporary interruption of service. The customer must be given the opportunity to correct the existing problem, if possible. The telephone company must also advise the customer of their rights for filing complaints before the FCC.

The telephone company may make changes in its technical operations and procedures. If such changes affect the compatibility or use of this system, the telephone company is required to give adequate notice of the changes.

Under no circumstances is the equipment to be altered or modified without written approval of the manufacturer. Failure to gain permission for any modification will void the warranty. If a system malfunction is suspected, the connectors terminating the equipment to the CO lines should be disconnected.

### 2.1.3 Service Requirements

In the event of equipment malfunction, all repairs should be performed by an ISOETEC authorized agent. It is the responsibility of users requiring service to report the need for service to an ISOETEC authorized agent.

## 2.2 TRUNK ORDERING INFORMATION

### Public Network:

Interface Port Card	Facility Interface	Ringer Equivalence	Network Jack
CO Port (p/n 15600)	02LS2	1.9 B	RJ21X
Loop/Ground used Loop (p/n 15620)	02LS2	1.9 B	RJ21X
Loop/Ground used Ground (p/n 15620)	02GS2	1.9 B	RJ21X
Direct Inward Dial (p/n 15610)	02RV2-T	0.0 B	RJ21X

### Private Leased Lines:

Interface	Facility Interface	Service Code	Network Jack
E&M Tie Line Combo (p/n 15680)	TL12M	9.0 Y	RJ2FX
OPXI (p/n 15780)	OL13C	9.0 Y	RJ21X or RJ11C

## 2.3 FCC REGISTRATION NUMBERS

The ISOETEC® System/108 is registered with the Federal Communications Commission three ways. The registration number used depends on which features are being provided to the customer.

Key System: DHF-7AS-10270-KF-E  
 Hybrid System: DHF-7AS-10268-MF-E  
 PBX System: DHF-7AS-10267-PF-E

In order to be used as a key system and use the registration number DHF-7AS-10270-KF must not use the following features:

- Group Keys
- Least Cost Routing
- OPX Outgoing trunk access
- Prime line access by group
- Six key telephones
- Automatic Call Distribution
- Ground Start Trunks
- Direct Inward Dial

If any of these features are used, the system MUST be used as a Hybrid with registration number DHF-7AS-10268-MF-E, or a PBX with registration number DHF-7AS-10267-PF-

## 2.4 SUPPLEMENT FOR CANADIAN EQUIPMENT

**NOTICE:** The Canadian Department of Communications label identifies certified equipment means that the equipment meets certain telecommunications network protective safety requirements. The Department does not guarantee the equipment will operate in all situations.

Before installing this equipment, users should ensure that it is permissible to be connected to the local telecommunications company. The equipment must also be installed in accordance with the method of connection. In some cases, the company's inside wiring associated with a service may be extended by means of a certified connector assembly (telephone extension). The customer should be aware that compliance with the above conditions may not provide protection in some situations.

Repairs to certified equipment should be made by an authorized Canadian maintenance person or by the supplier. Any repairs or alterations made by the user to this equipment, or to the wiring, may give the telecommunications company cause to request the user to disconnect the equipment.

Users should ensure, for their own protection, that the electrical ground connection for the telephone lines and internal metallic water pipe system, if present, are connected to ground. This connection may be particularly important in rural areas.

**CAUTION:** Users should not attempt to make such connections themselves but should contact the appropriate electric inspection authority, or a qualified electrician, as appropriate.

The Load Number assigned to each terminal device denotes the percentage of the telephone loop which is used by the device, to prevent overloading the telephone loop. The Load Number may consist of any combination of devices subject only to the requirement that the sum of the Load Numbers does not exceed 100. An alphabetic suffix is also specified in the Load Number to indicate the appropriate ringing type (A or B), if applicable. The Load Number for the accessory equipment must be added to the Load Number for the terminal device. As a consequence, no additional equipment may be connected to any telephone loop if the sum of the Load Numbers is being connected.

CONNECTING ARRANGEMENT CODE: CA11A

## 2.5 SITE REQUIREMENTS

Selection of a suitable location is the most basic, yet most critical consideration in the installation of a telephone system. The following factors should be considered when choosing an appropriate location for equipment installation:

1. Ample space must be allowed to remove the cabinet cover, to access assemblies and cards within the cabinet and allow space for the MDF (Main Distribution Frame).
2. Location of CO/PBX line terminations must be considered when selecting a location for the ISOETEC System/108 cabinet. In the case of telephone company lines, RJ-21X FCC approved connectors supplied by the telephone company, should be within 5 feet (1.5 meters) of the main distribution frame.
3. To minimize the length of cable runs between the stations and the system cabinet, the location of the majority of the telephone sets (stations) should be taken into consideration when selecting a location for the cabinet.
4. A well ventilated, and well lighted area having an optimum temperature range of 60 to 80 degrees F and a relative humidity range of 5 to 90% (non-condensing) must be provided.
5. Area lighting should be adequate for installation and maintenance of the system. Hazardous or flammable materials should be removed from the vicinity. The immediate area must not be subject to flooding or excess moisture. The cabinet should be isolated from areas of moving machinery or equipment. It is also recommended that static electricity-producing carpets not be installed in this area.
6. A separately fused, dedicated 117 Volts AC,  $\pm 10\%$ , 15 Amp., 60 Hz, single phase, 3-wire (parallel blade with ground) power outlet should be located within 5 feet (1.5 meters) of the primary power supply.
7. A good earth ground must be provided using 16 AWG or larger insulated copper wire. A cold water pipe (not interrupted by insulated joints) will provide an adequate ground. Any interruptions in the cold water pipe must be bypassed with 14 AWG or larger straps. If a reliable ground cannot be provided, the system may be grounded to the casing of an ISOBLOC surge suppressor (ISOETEC p/n 440129).
8. The ISOETEC System/108 cabinet and main distribution frame should be placed in an electrically noise free environment, isolated and shielded from equipment that causes electro-magnetic interference (EMI) or radio frequency interference (RFI). Examples of electrical noise are rotating electrical machinery and arc welding equipment. Floor coverings that generate static electricity should be avoided.
9. The system cabinet should not be installed close to any equipment which may produce RFI (Radio Frequency Interference) such as a radio frequency transmitter.
10. If the system is to be installed in a location prone to lightning strikes, thought should be given to providing lightning protection on the power line, any station cable runs outside the building, and trunks.

## 2.6 INSTALLATION PLANNING

Prior planning of the installation will aid in a smooth cut-over and a satisfied customer. Select a suitable location for the system using the site requirements listed above as a guide.

Determine the number of telephones of each type, the number of station port cards, and the number of CO line port cards from the sales contract and discussions with the customer.

*NOTE: Only one station set is allowed per extension number. It is not possible to bridge station ports so that an extension number may appear in more than one location.*

Each station port card and CO line port card will support 12 ports. For systems with tie lines to be installed, the tie line combination port card supports 6 digital stations, and 4 tie line ports.

*NOTE: Stations using the data feature, or the second voice path of a digital display telephone MUST be connected to a Station Port card. The E&M Tie Line Combination Port card does not support the data feature, or the second voice path.*

Programming information should also be gathered from the customer at this time so that the system may be programmed either before, or while the system is being installed.

Determine the location and type of each telephone, and mark floor plans accordingly.

Determine the location for the operator stations, and mark the floor plans.

Arrange for power cabling (if necessary) and station cabling of the site.

Take note of the optional features the customer has ordered, and make certain the proper modules or circuit boards have been ordered.

If the system is to be installed in an area subject to frequent lightning storms, consideration should be given to providing lightning protection on the CO lines.

## 2.7 UNPACKING AND INSPECTION

The following inspection procedures should be performed prior to start of installation. Carefully inspect packages for evidence of external damage indicating possible damage to the contents. Check each package against the shipping list and job order. Report damaged or missing items immediately to your supplier representative.

### 2.7.1 ISOETEC System/108 Cabinet

Locate and open the carton containing the cabinet and remove the unit from the carton. Carefully remove covering and check all parts against the enclosed packing list. Check each item for damage and check part numbers of each part against those listed on your order form.

*NOTE: Be sure the system power supply is installed and secured properly in the cabinet before proceeding with installation.*

### 2.7.2 Stations

Locate packages containing the digital telephone sets and remove individual cartons from the packages. Carefully open cartons and remove the telephones. Check that the total number received agrees with those on the stock list. Place the telephones in locations where they are to be installed.

### 2.7.3 Miscellaneous Items

Open packages containing miscellaneous items and check each item against the packing list. Be sure that the MDF is included in the packages. Report any discrepancies.

## 2.8 CABINET INSTALLATION

### 2.8.1 Preparation

The ISOETEC System/108 may be wall-mounted. If the cabinet is to be wall-mounted, mount the cabinet so that the top is approximately three feet (1 meter) from the ceiling, and bottom is four feet (1.2 meters) from the floor.

Make certain before mounting the cabinet that circuit cards slide easily in and out of their respective card slots.

*NOTE: A fully loaded ISOETEC System/108 cabinet can weigh approximately 64 lbs. Make certain proper mounting procedures are followed if the system is wall-mounted.*

If the system is to be wall-mounted, select a suitable location for the cabinet and use the mounting template supplied with the cabinet to locate the mounting holes (Figure 2-1). Drill the holes and mount the cabinet.

*NOTE: This manual does not attempt to define construction techniques for mounting to concrete, plasterboard, or wooden surfaces. Proper mounting is the responsibility of the installer.*

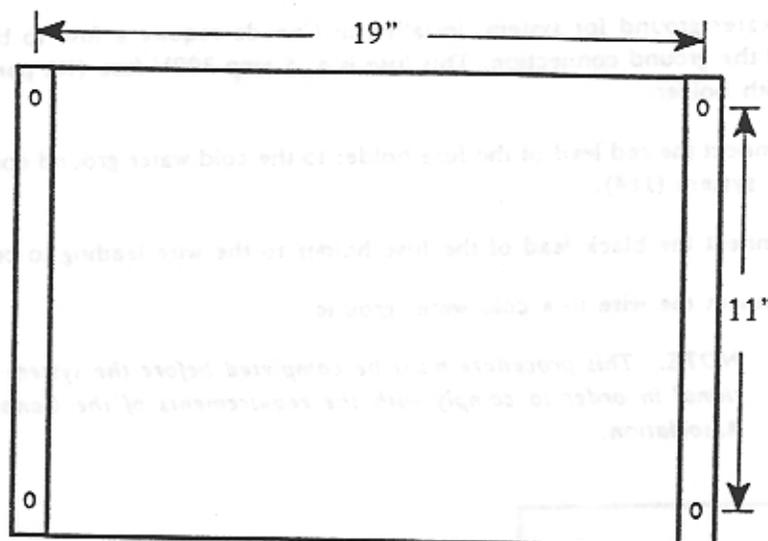


Figure 2-1 Mounting Holes For The Cabinet

### 2.8.2 Grounding

Immediately after the system cabinet is mounted, the system must be properly grounded. To ensure proper system operation, a good earth ground must be provided. In most cases, this can be provided by a metallic (unpainted) cold water pipe. The installer should verify that there are no insulated joints such as non-metallic pipe sections which will isolate the earth ground. If the cold water pipe is found to be an inadequate earth ground, or a cold water pipe is not available, the system may be grounded to the casing of an ISOBLOC surge suppressor (ISOETEC p/n 440129).

Earth ground must be provided using 16 AWG or larger insulated wire kept as short as possible.

The earth ground is connected to the backplane on the lower right corner to connector J14. The earth ground should be connected to the backplane prior to installation of any circuit boards.

The AC connection to the power supply requires a parallel blade with a ground receptacle. A three wire to two wire isolation adapter should not be used. The use of an ISOBLOC surge suppressor (ISOETEC p/n 440129) is required.

The ISOETEC System/108 is shipped with a Transient suppressor which is to be connected between the system cabinet and the MDF on the Input/Output cable. Locate the suppressor and connect an earth ground (grounded to the same point as the system cabinet) to it at this time. The ground must be connected to the unit before mounting it to the wall.

Any installed lightning protection should be provided with its own earth ground separate from the earth ground provided for the system.

### 2.8.3 Grounding Requirements For Systems Installed In Canada

The cold water ground for systems installed in Canada require a fuse to be placed in line between the system and the ground connection. This fuse is a .5 amp 300V fuse (Kit part number 440006). To install the fuse with holder:

1. Connect the red lead of the fuse holder to the cold water ground connection on the backplane of the system (J14).
2. Connect the black lead of the fuse holder to the wire leading to cold water ground.
3. Connect the wire to a cold water ground.

*NOTE: This procedure must be completed before the system is made operational in order to comply with the requirements of the Canadian Standards Association.*

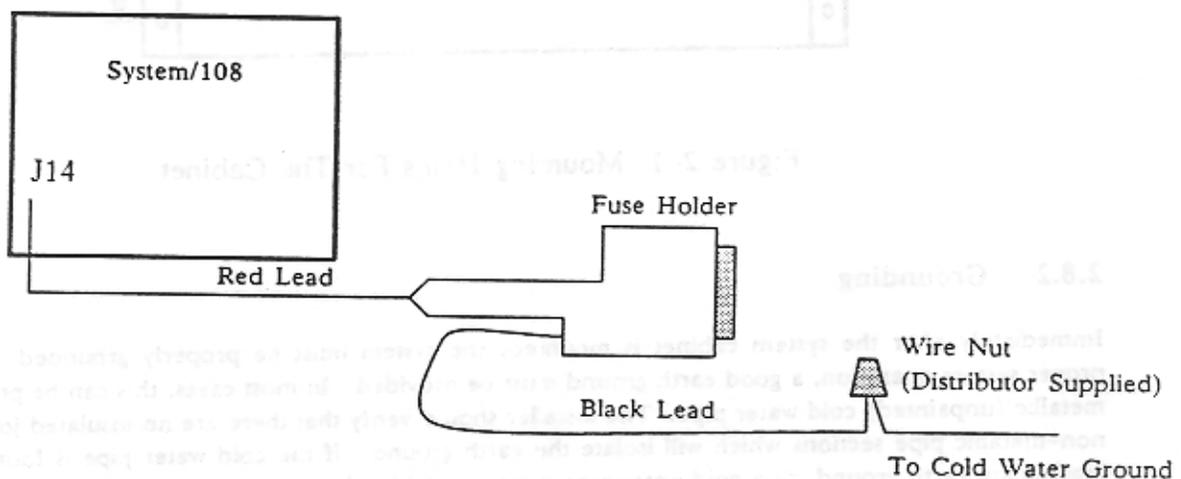


Figure 2-2 Grounding For Canadian Installations

## 2.9 OTHER BACKPLANE CONNECTIONS

The cable to bring the Input/Output ports to the main distribution frame is also connected to the backplane. Connect the I/O distribution cable to connector J13 in the lower right corner of the backplane. When connecting (tie wrap) the braiding of the I/O cable to the metal flange provided, be sure the tape used to mask the flange during manufacturing is removed. This will insure proper contact between the I/O cable braid and the cabinet.

## 2.10 POWER SUPPLY

The power supply is mounted inside of the cabinet. The power supply cord plugs into an isolated, dedicated, and dedicated ground 117 Volt AC outlet for power. This outlet should be located within 5 feet (1.5 meters) of the power supply.

The System/108 power supply is installed inside the system cabinet, on the right side of the cabinet, in the first card slot (J12). The power supply is designed to be an integral, structural part of the System/108. Do not attempt to install the system, or interface cards unless the power supply is installed with all four screws securely in place. The System/108 cabinet, part number 19200, includes the power supply already installed. The power supply is recognized under the Component Program of Underwriters Laboratories Inc.

The System/108 power supply is unique in that the power supply transformer is not present on the power supply card and its enclosure. The transformer is mounted inside the cabinet next to the bottom right of the backplane. When the power supply card is installed, the transformer is totally enclosed by the power supply card's "L" shaped enclosure, and the right side of the cabinet. This creates a totally enclosed, operational, power supply. Since the transformer is installed in the cabinet, and the power supply card is removable from the cabinet, the AC connections are made directly to the system backplane.

***WARNING:** Since hazardous voltages are always present on the backplane while the system AC power cord is plugged in, AT NO TIME SHOULD THE POWER SUPPLY CARD BE REMOVED WHILE THE SYSTEM AC POWER CORD IS PLUGGED IN. THE POWER SUPPLY BOARD AND ITS "L" SHAPED METAL ENCLOSURE PROVIDE THE ONLY PROTECTION FROM SHOCK HAZARD WHILE THE AC POWER CORD IS PLUGGED IN. There are very few instances when the power supply card should be removed. If an instance arises where it must be removed, ALWAYS unplug the system AC power cord FIRST.*

The power supply cord plugs into an isolated, dedicated, and dedicated ground 117 volt AC outlet for power. This is necessary to prevent possible voltage spikes and transients that may be caused by equipment sharing the same AC circuit.

The spring connectors on the front panel of the power supply are used to connect a 48 volt power supply to the system. This supplies 48 volts to the backplane for use with the Loop/Ground Start Trunk port card and the E&M Tie Line Combination card.

***NOTE:** The DID port card does not receive 48 volts DC from the backplane. Each DID port card must be wired to a 48 volt DC power source.*

If the system is to be installed with E&M Tie Line Combination or Loop/Ground Start Trunk port cards, a separate 48 volt DC regulated power supply is required. The power output for the power supply depends on how many of each type card is to be installed. Each of these port cards draws approximately 60 milliamps per card. The power supply is wired to the connector on the left side of the system power supply (see Figure 2-3).

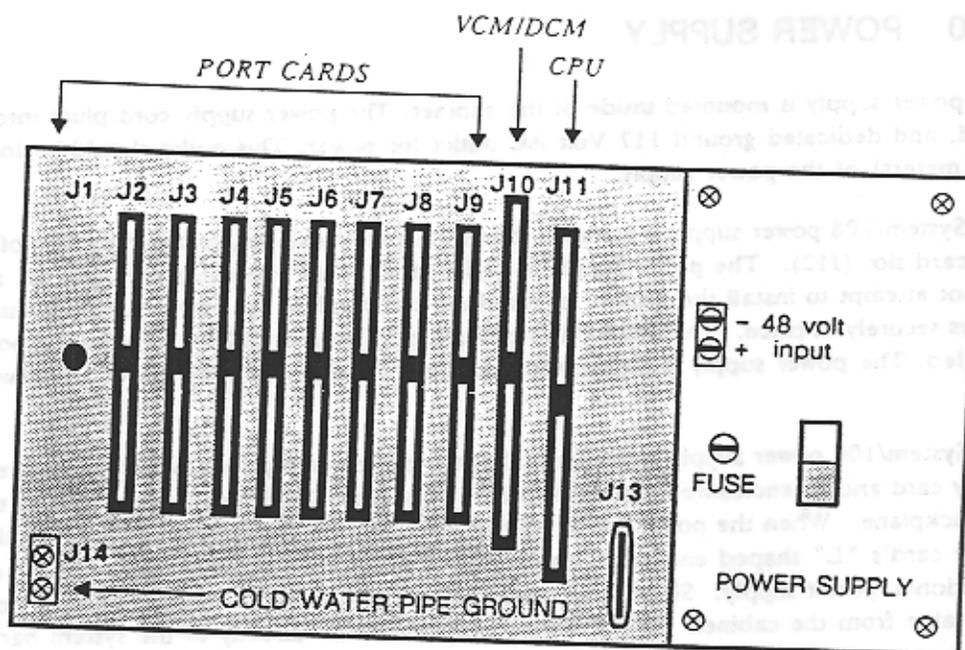


Figure 2-3 System/108 Power Supply

## 2.11 PRINTED CIRCUIT BOARDS

### 2.11.1 Port Card Requirements

The number of telephones and lines required determine how many port cards are needed. In addition, a CPU card and VCM/DCM card will be required.

### 2.11.2 CPU

The Central Processor Unit (CPU) is installed in the next to right-most slot of the ISOETEC System/108 backplane in slot J11. Make certain that the connections for the cold water ground, and terminal input/output cable have been made before installing the CPU card into its slot. The CPU board is inserted into the slot with components on the card facing the right. This board must NOT be installed with the power on. The edge connector on the CPU is offset to prevent it from being installed in an incorrect slot. Do not force the card into another slot. One CPU is required per system. Activate the battery backup switches on the CPU (see Figure 2-4).

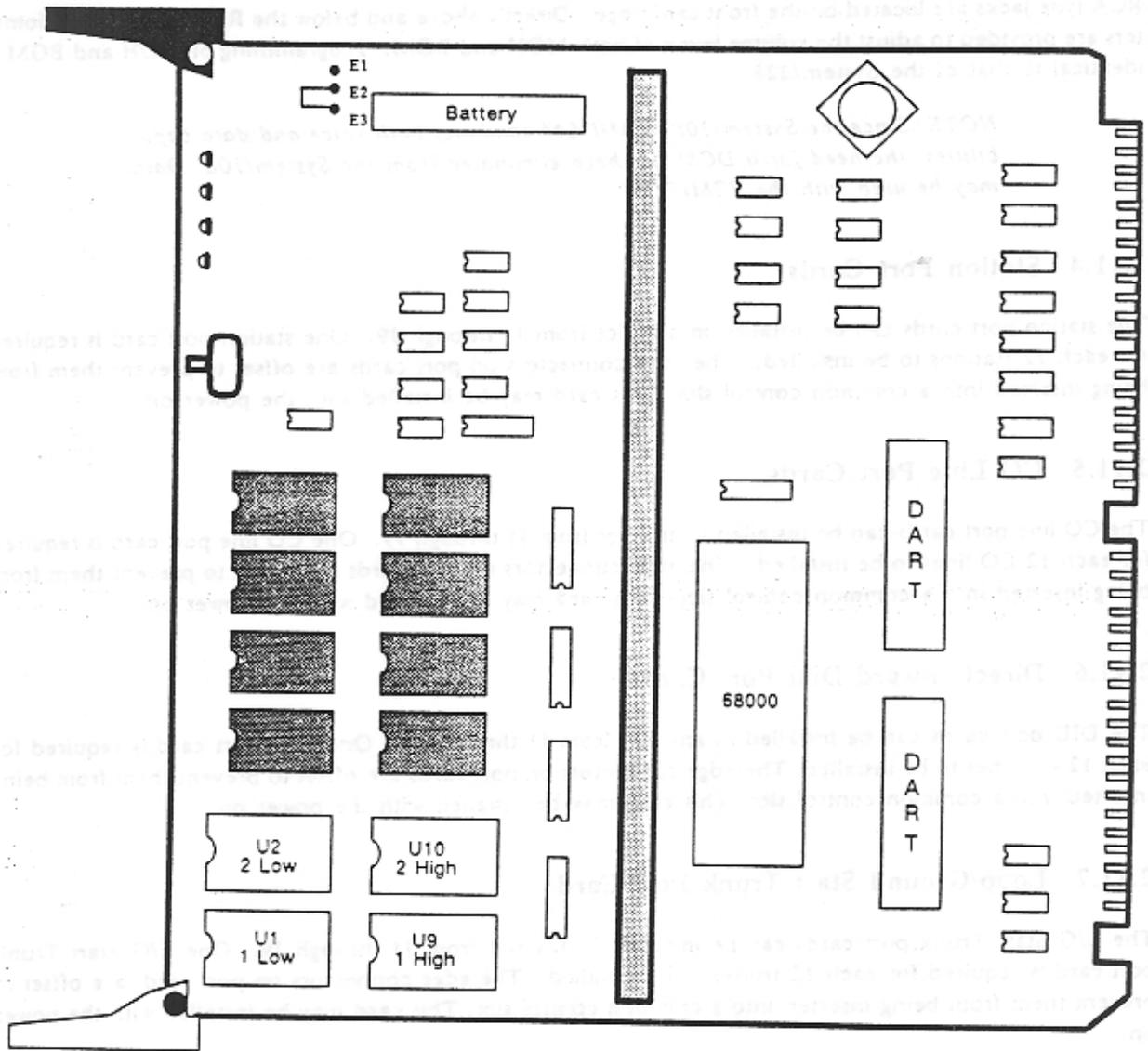


Figure 2-4 CPU Showing EPROM Placement

### 2.11.3 VCM/DCM

The Voice and Data Control Module (VCM/DCM) is installed in slot J10 of the backplane. This board must NOT be installed with the power on. The edge connector on the VCM/DCM is offset to prevent it from being installed in an incorrect slot. Do not force the card into another slot. One VCM/DCM is required per system.

Connections for Music On Hold (MOH) and Background Music (BGM) are found on this card. Two RCA type jacks are located on the front card edge. Directly above and below the RCA jacks, potentiometers are provided to adjust the volume levels of both MOH and BGM. Programming of MOH and BGM is identical to that of the System/228.

*NOTE: Since the System/108 VCM/DCM combines both voice and data capabilities, the need for a DCM has been eliminated from the System/108. Data may be used with the VCM/DCM.*

### 2.11.4 Station Port Cards

The station port cards can be installed in any slot from J1 through J9. One station port card is required for each 12 stations to be installed. The edge connectors on port cards are offset to prevent them from being inserted into a common control slot. This card may be installed with the power on.

### 2.11.5 CO Line Port Cards

The CO line port cards can be installed in any slot from J1 through J9. One CO line port card is required for each 12 CO lines to be installed. The edge connectors on port cards are offset to prevent them from being inserted into a common control slot. This card may be installed with the power on.

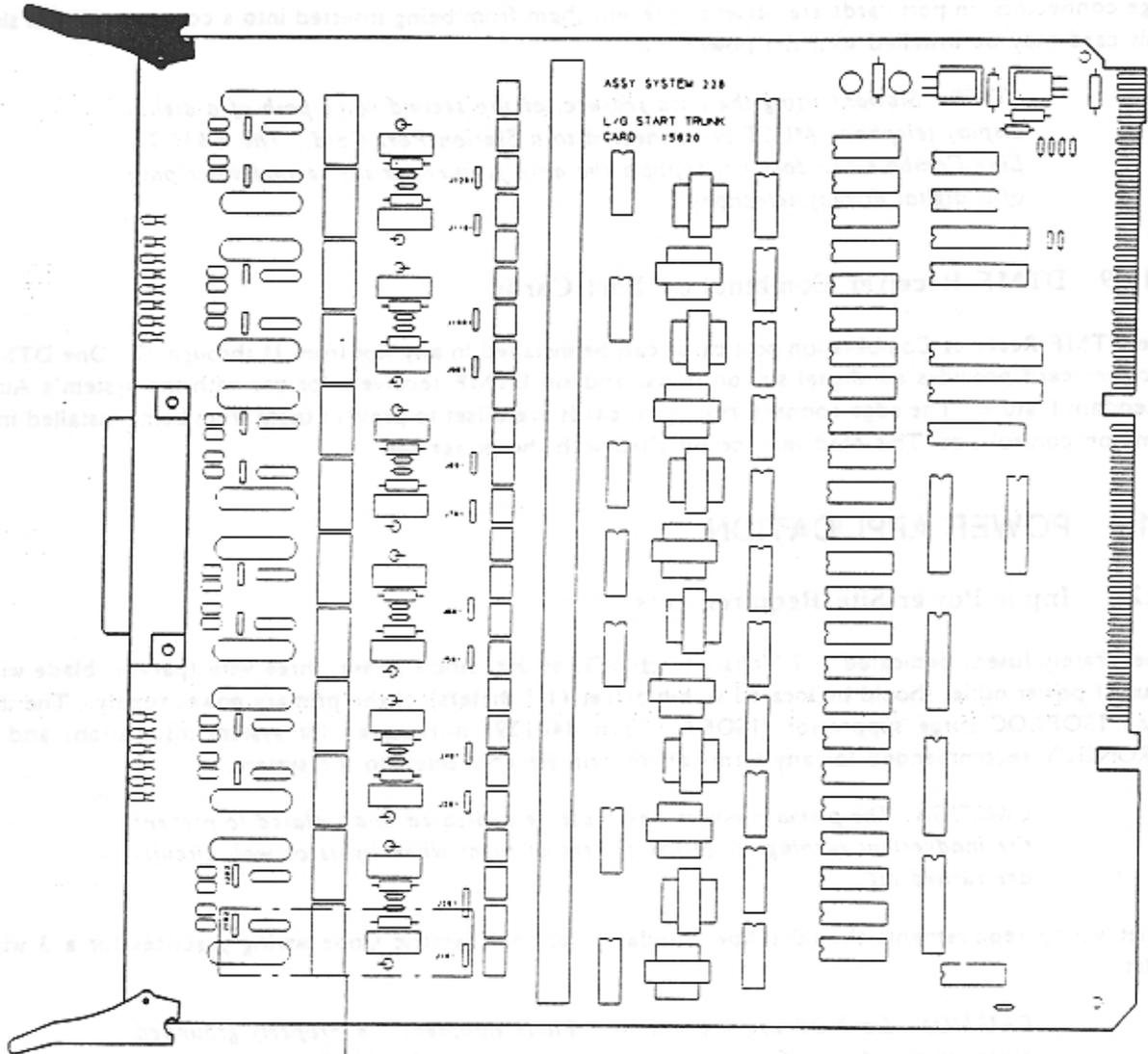
### 2.11.6 Direct Inward Dial Port Cards

The DID port cards can be installed in any slot from J1 through J9. One DID port card is required for each 12 CO lines to be installed. The edge connectors on port cards are offset to prevent them from being inserted into a common control slot. This card may be installed with the power on.

### 2.11.7 Loop/Ground Start Trunk Port Card

The L/G Start Trunk port cards can be installed in any slot from J1 through J9. One L/G Start Trunk port card is required for each 12 trunks to be installed. The edge connectors on port cards are offset to prevent them from being inserted into a common control slot. This card may be installed with the power on.

Before installing the card, 2 jumpers per circuit must be installed (for ground start) or removed (for loop start). The jumpers are installed for ground start from the factory. The jumpers are labeled J101 and J102 for circuit 1, J201 and J202 for circuit 2, etc. See Figure 2-5.



OPTION STRAPS FOR CIRCUIT 1 J101 AND J102

Figure 2-5 Loop/Ground Start Trunk Card

### 2.11.8 E&M Tie Line Combination Port Card

The E&M tie line combination port cards can be installed in any slot from J1 through J9. One tie line combination port card supports 6 digital stations and 4 E&M two wire, type II interface tie lines. The edge connectors on port cards are offset to prevent them from being inserted into a common control slot. This card may be installed with the power on.

*NOTE: Stations using the data feature, or the second voice path of a digital display telephone MUST be connected to a Station Port Card. The E&M Tie Line Combo Card does not support the data feature, or the second voice path of a digital display telephone.*

### 2.11.9 DTMF Receiver Combination Port Cards

The DTMF Receiver Combination port cards can be installed in any slot from J1 through J9. One DTMF Receiver card provides six digital station ports, and six DTMF receivers for use with the system's Auto Attendant feature. The edge connectors on port cards are offset to prevent them from being installed in a common control slot. This card may be installed with the power on.

## 2.12 POWER APPLICATION

### 2.12.1 Input Power Site Requirements

A separately fused, dedicated 117 Volts AC,  $\pm 10\%$ , 60 Hz, single phase, three wire (parallel blade with ground) power outlet should be located within 5 feet (1.5 meters) of the primary power supply. The use of an ISOBLOC surge suppressor (ISOETEC p/n 440129) is required for system installation, and is STRONGLY recommended for any terminals or printers connected to the system.

*CAUTION: The primary power line must be dedicated and isolated to prevent the inadvertent turning off of the system at night when lights or wall circuits are turned off.*

Outlet wiring requirements should follow standard National Electric Code wiring practices for a 3 wire outlet.

*CAUTION: Do NOT use 3 blade to 2 blade adapters. A properly grounded outlet is mandatory for proper system operation. Do NOT cut the ground blade from the system electrical plug.*

### 2.12.2 Power Up

After all circuit cards are installed, make certain that they are seated firmly in their connectors. Turn on the power supply with the red switch located on the power supply housing.

Refer to the *Cabling and Cross Connection* section to connect the ISOETEC System/108 to the trunk lines and stations.

## 2.13 INTEGRATED OPERATOR TERMINAL ASSEMBLY

The ISOETEC System/108 Integrated Operator Terminal consolidates a telephone set, and CRT terminal into one package. See Figure 2-6.

Before installing the terminal, inspect the shipping carton for any signs of damage. Have the delivery person note any damage found on the shipping document.

### 2.13.1 Parts List

The ISOETEC System/108 Integrated Operator Terminal consists of 3 packages containing the following pieces:

1. CRT terminal (p/n 440017):

- 1 ISOETEC CRT Display Module
- 1 Integrated Keyboard (keyboard is labeled for use as operator)
- 1 AC Power Cord
- 1 Operator Guide

2. Integration kit (p/n 09004):

- 1 ISOETEC Phone Box
- 1 6 foot - 6 conductor modular to modular line cord
- 1 1 foot (extended) coiled - 4 conductor gray jumper cord
- 1 6 foot (extended) coiled - 8 conductor black "Y" cable
- 1 Handset
- 1 Coiled handset cord
- 1 Handset cradle kit that contains the following:
  - 1 Black metal bracket with two handset rests.
  - 1 Handset cord jack holder
  - 1 1 Allen Key
  - 2 Machine screws
  - 1 Instruction Sheet

3. Terminal Cable (p/n 330006):

The DB-25 to modular plug connecting cable is ordered separately.

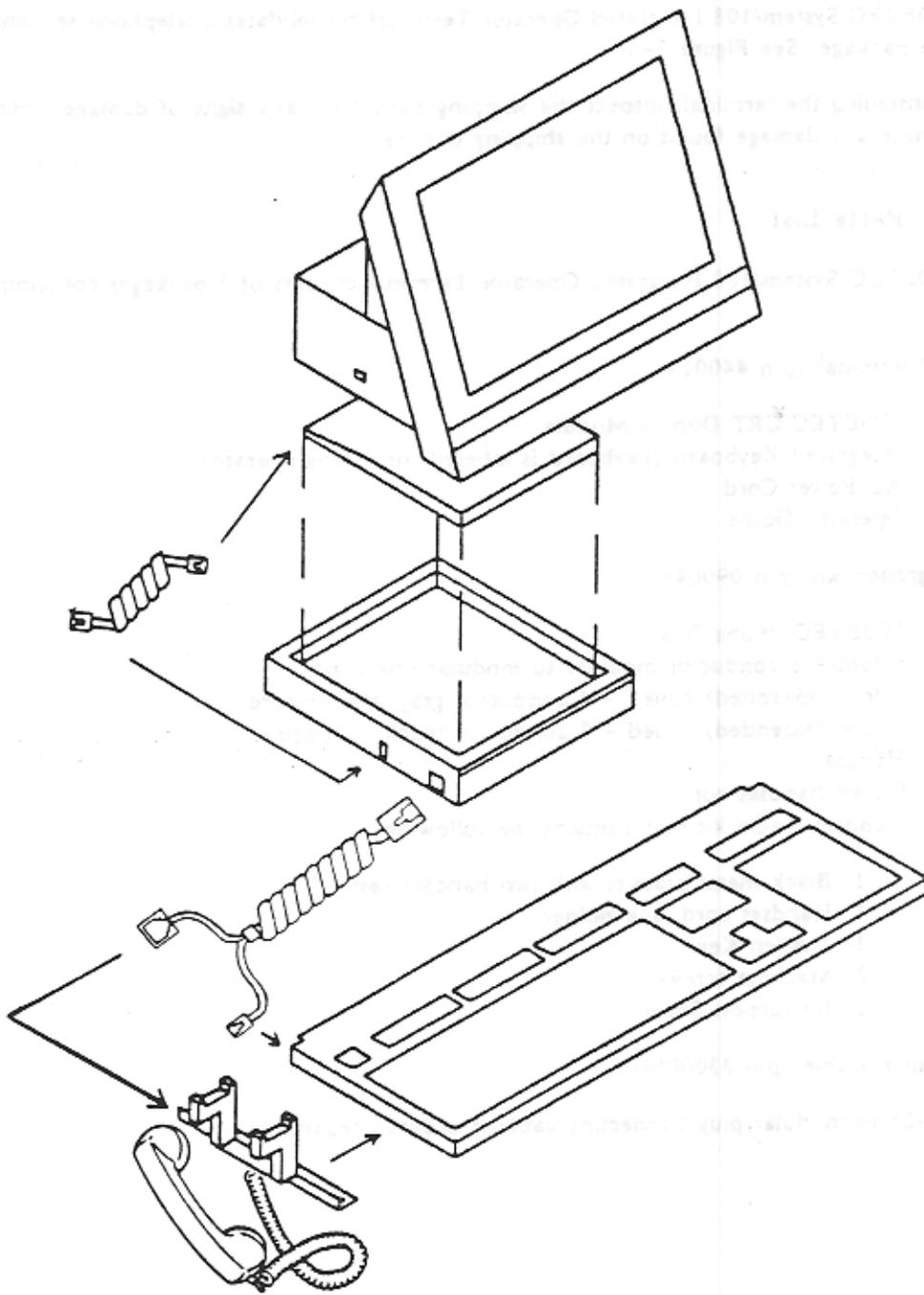


Figure 2-6 Assembly Of The Integrated Operator Terminal

### 2.13.2 Assembly Instructions

Be sure to check each package to insure that you have received all the parts. Once you have located and identified all the parts provided in the ISOETEC System/108 Integrated Operator Terminal Kit, you can proceed with the following instructions to assemble the terminal.

1. Place the phone box at the location chosen for the operator position with the 6 conductor jack facing toward the back and the indent of the box on top. The ISOETEC logo should be facing front.
2. Place the CRT terminal on top of the box in the indent with the CRT screen facing front.
3. Plug the 1 foot - 4 conductor gray jumper wire into the modular jack located on the left side of the terminal.
4. Connect the other side of the 1 foot gray jumper cable to the 4 conductor modular jack located on the left side of the ISOETEC phone box.
5. Turn the Integrated keyboard upside-down positioned such that the modular jack in on the left.
6. Remove the two screws located on the left side of the keyboard.
7. Place the handset cradle onto the left side of the keyboard.
8. Secure the bracket to the keyboard using the 2 machine screws provided with the cradle.
9. Plug the 8 conductor male modular end of the black "Y" cable into the 8 conductor jack located on the left side of the ISOETEC phone box.
10. Plug the 4 conductor male modular end of the "Y" cable into the 4 conductor modular jack on the keyboard.
11. Place the 4 conductor handset cord jack into the "U" shaped holder on the cradle. The cord should be placed in from the back side of the connector so the cable lies next to the keyboard. Tighten the Allen screw with the Allen key provided in the kit.
12. Plug one end of the handset cord into the jack just installed on the handset cradle.
13. Place the other end of the handset cord into the handset.
14. Turn the keyboard key side up.
15. Place the handset onto the cradle.
16. Plug the AC line cord into the back of the CRT terminal, and into a dedicated AC outlet provided for the ISOETEC System/108 Integrated Operator Terminal. AN ISOBLOC surge suppressor should be installed at this point.

### 2.13.3 Description of the RS-422 Cable

The RS-422 cable (p/n 330006) used with the Integrated terminal is totally different from the RS-422 cable used on previous ISOETEC terminals. The following is a diagram of the cable needed on the Integrated operator's terminal.

MODULAR PLUG PIN #	COLOR	D-25 CONNECTOR PIN #
1	BLUE	7
2	YELLOW	3
3	GREEN	2
4	RED	4
5	BLACK	5
6	WHITE	No Connection

The DB- 25 connector side of this cable should be plugged into the port labeled MODEM on the Integrated operators terminal. The 6 pin male modular side should be plugged into a jack that terminates on port 3 or 4 of the System/108.

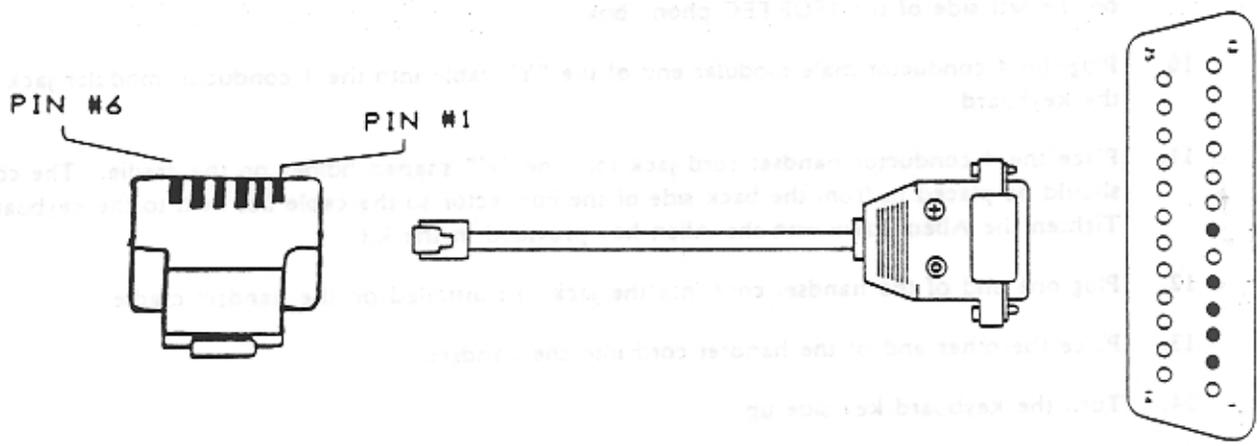


Figure 2-7 Integrated Terminal RS-422 Cable

### 2.13.4 Terminal Setup RS-422

The terminal, in default mode, is programmed to operate RS-422 at 9600 baud. To insure that proper default settings are on the terminal, follow the procedures listed below.

1. Press the CONTROL and SETUP (ICM) keys simultaneously. This places the terminal in the setup mode.
2. Press the RIGHT arrow key  $\blacktriangleright$  until the highlighted box is over DEFAULT ALL.
3. Press the key labeled F10. The highlighted box appears over EXIT.
4. Press the key labeled F10 again.

The terminal is now ready for operation as the Integrated Operator.

### 2.13.5 RS-232 Cable Description

The Integrated terminal can also be setup as an RS-232 device. The following cable is necessary to connect the Integrated terminal to an RS-232 port.

One side of this cable should be placed into the port labeled AUX on the back of the integrated terminal, and the other side of this cable should be plugged into ports 1 or 2 of the System/108.

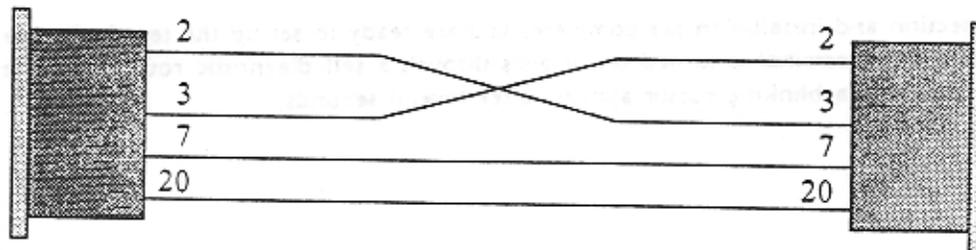


Figure 2-8 Pin Configuration For The Operator RS-232 Cable

### 2.13.6 Terminal Set-up RS-232

The programming of the terminal setup must be changed to convert it from RS-422 to RS-232. To convert, follow the instructions provided below.

1. Press the CONTROL and SETUP (ICM) keys simultaneously. The terminal enters the setup mode.
2. Press the key labeled F2. PERSONALITY=OPT'S TERM is highlighted.
3. Press DOWN arrow key twice. DATA/PRINTER=MODEM/AUX is highlighted.
4. Press the space bar. DATA/PRINTER=AUX/MODEM is highlighted.
5. Press F10 key. The terminal setup menu appears with EXIT highlighted.
6. Press the RIGHT arrow key twice. SAVE ALL is highlighted.
7. Press the F10 key.

The terminal is now ready to be connected to one of the RS-232 ports of the system.

*NOTE: It is very important to place the RS-232 cable into the AUX jack located on the back of the operator's terminal. If it is accidentally placed into the MODEM port, the terminal may appear to function, however, the terminal does not transmit proper characters.*

### 2.13.7 Self-Test

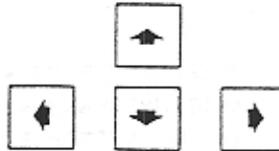
After site selection and installation are complete, you are ready to set up the terminal's operational parameters. Once the terminal is turned on, it goes through a self diagnostic routine. If the terminal is functioning normally, a blinking cursor appears after several seconds.

### 2.13.8 Summary of Operating Parameters

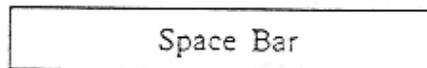
The basic operating parameters of the ISOETEC Terminal are preprogrammed in the terminal's memory. The terminal should not require any further programming. However, if the installer has a problem, he may be asked to check the terminal's setup parameters. This section should provide the installer with most of the information necessary to accomplish this.

1. Press the CONTROL and SETUP (ICM) keys simultaneously.
2. A setup line appears as the last line on the display. There are 9 setup screens for the ISOETEC Terminal. To scroll between screens, use the function keys F1 to F9.

To scroll between parameters, use



To scroll between selections, use



3. To save any changes after they are made, press F10 and using the arrow keys move the cursor to the SAVE ALL selection, then press F10 again.
4. To return the terminal to its standard default program, choose the DEFAULT A selection and then exit.
5. To return the terminal to its last set of SETUP parameters, choose the RESTORE / selection and then exit.

## 2.13.9 ISOETEC Terminal Default Programming Parameters

```

SCREEN #1   F1 DISP
COLUMNS = 80          STATUS = OFF          BACKGROUND = DARK
LINES      = 24        SCRL SPEED = JUMP      SCRN SAVER = ON
PAGE LENGTH = 1 * LINES  CURSOR = BLINK LINE  DISPLAY CURSOR = ON
ATTRIBUTE = LINE       ANSWERBACK MODE = OFF  ANSWERBACK CONCEAL = OFF
.....
SCREEN #2   F2 GENERL
PERSONALITY = OPT'S TERM  ENHANCE = OFF          FONT LOAD = ON
COMM MODE = FULL DUPLEX  END OF LINE WRAP = OFF  SEND ACK = OFF
DATA/PRINTER = MODEM/AUX  AUTO SCRL = ON        INIT TABS = OFF
RCVD CR = CR            MONITOR = OFF          WIDTH CHANGE CLEAR = OFF
.....
SCREEN #3   F3 KEYBRD
KEYCLICK = OFF          KEYLOCK = CAPS         KEY REPEAT = ON
RETURN = CR             ENTER = CR             CORNER KEY = FUNCT
XMT LIMIT = NONE       FKEY XMT LIMIT = NONE  BREAK = 250MS
WYSEWORD = OFF         LANGUAGE = US          MARGIN BELL = OFF
.....
SCREEN #4   F4 COMM
BAUD RATE = 9600        DATA/STOP BITS = 8/1  PARITY = NONE
RCV HNDSHAKE = NONE     XMIT HNDSHAKE = NONE
AUX BAUD RATE = 9600    AUX DATA/STOP BITS = 8/1  AUX PARITY = NONE
AUX RCV HNDSHAKE = DSR  AUX XMT HNDSHAKE = NONE
.....
SCREEN #5   F5 MISC
BLOCK END = US/CR      LABELS = OFF          WPRT INTENSITY = NORMAL
AUTO PAGE = OFF        SAVE LABELS = OFF     WPRT REVERSE = OFF
TVI955 ATTRIBUTE =     PAGE EDIT = OFF       WPRT UNDERLINE = OFF
NO SPACE
VP60 BLK END = NONE    TEST = OFF
.....
SCREEN #6   F6 TABS
TABS = DO NOT MAKE ANY CHANGES IN THIS SCREEN
.....
SCREEN #7   F7 A/BACK
ANSWER BACK = DO NOT MAKE ANY CHANGES IN THIS SCREEN
.....
SCREEN #8   F8 F/KEYS
UNSHIFTED DIRECTION = REMOTE          SHIFTED DIRECTION = REMOTE
.....
SCREEN #9   F9 LABELS
LABEL F1 = DO NOT MAKE ANY CHANGES
LABEL sF1 = DO NOT MAKE ANY CHANGES
.....
SCREEN #10  F10 EXIT
THIS SCREEN IS USED TO EXIT SETUP, SAVE SETUP PARAMETERS AND DEFAULTING
THE PARAMETERS BACK TO THE FACTORY SETTINGS

```

### 2.13.10 Site Selection

Select a suitable site for the operator terminal. This site **MUST** not be any further than 1000 feet (when using the RS-422 ports, or 50 feet when using the RS-232 ports) from the CPU. Place the terminal in a well lit area, on a stable platform (desk, etc.), and at a comfortable height that will minimize fatigue on the operator. The terminal should also be placed in an area with good air circulation.

### 2.13.11 Wiring To The System

The Integrated Operator Terminal is now assembled and ready to be connected to the system. Follow the instructions found in the *Cabling and Cross Connection* section of this manual.

## 2.14 ISOETEC ELECTRONIC PHONE INTERFACE - IEPI

The IEPI is an add-on board built into the base cover of ISOETEC Electronic Phone which allows the use of the phone on the digital ISOETEC System/108. Both the 26-key and the 14-key Electronic Phone can be used with the IEPI. The Electronic Display Phone cannot be used with the System/108.

26-key IEPI is p/n 82030

14-key IEPI is p/n 82020

The following instructions detail how to convert an ISOETEC Electronic Phone for use on the SYSTEM/108, and can be used for converting both a 14-key and 26-key telephone.

1. Turn the ISOETEC Electronic Phone upside-down.
2. Remove the four screws located in the corners of the base.
3. Lift the base cover.
4. Carefully disconnect the modular connector from the clip holding it to the base cover.
5. Remove the base cover. The cover is no longer used.
6. Connect the modular plug of the IEPI to the modular connector of the telephone.
7. Place the IEPI over the Electronic Telephone, and reinstall the four screws in the corners of the new base.
8. Turn the IEPI telephone over, and connect to the station cable jack.

## 2.15 WALL MOUNTING DIGITAL TELEPHONES

The telephones used with the ISOETEC System/108 can also be wall-mounted with the use of wall mounting kits. These kits include a wall mounting bracket, and a new plastic base for the telephone.

Use the following list to order the correct kit for the type of telephone to be wall-mounted.

### 28-KEY DIGITAL TELEPHONE

Kit (includes bracket and base) p/n 82144

Bracket Number p/n 82180

Base Number p/n 82181

### 17-KEY DIGITAL TELEPHONE

Kit (includes bracket and base) p/n 82244

Bracket Number p/n 82561

Base Number p/n 82260

### 6-KEY DIGITAL TELEPHONE

Kit (includes bracket and base) p/n 82544

Bracket Number p/n 82561

Base Number p/n 82560

### 2.15.1 Wall Connecting Jacks

Almost any type of 6 wire wall jack can be used in conjunction with the wall mounting kits. Flush mounts, standard wall phone plates, and standard RJ-11 jacks can be used.

*Note: If standard RJ-11 type jacks are used, they should be mounted approximately 2.5 inches below the wall mounting bracket.*

### 2.15.2 Mounting

1. Choose a suitable mounting location for the wall phone.
2. Install the wall connecting jack (wall plate) vertically using normal installation procedures.
3. Mount the Wall Bracket over the wall plate using 4 screws. Note that the bracket TOP is labeled. Make sure the modular connector of the jack lines up with the square hole in the center of the Wall Bracket.
4. Remove the existing telephone base (4 screws), and install the new Wall Mount Base.
5. Route the line cord from the wall jack through the hole provided at the bottom of the wall bracket. Plug the free end into the connector at the bottom of the telephone.
6. Tilt the telephone forward and line up the hooks at the bottom of the bracket so that they engage with the slots cut in the bottom of the telephone base. Tilt the phone back and lock the telephone into the hooks at the top of the bracket.
7. Push any spare line cord back into the bottom of the wall bracket.
8. Loosen the screw securing the handset hanger hook and turn it around to the wall mount position. See Figure 2-12.

### 2.15.3 How To Remove The Telephone

1. Lift the top hooks by inserting your index fingers in the slots provided under the top hooks (see Figure 2-10) and tilt the top of the phone out away from the bracket.
2. Lift the telephone to disengage it from the bottom hooks.

### 2.15.4 Mounting Using Surface Mount RJ-11 Jacks

1. Choose a suitable mounting location for the wall phone.
2. Install the connecting jack vertically using normal installation procedures.
3. Mount the Wall Bracket approximately 2.5 inches above the RJ-11 jack using 4 screws. Note that the bracket TOP is labeled. See Figure 2-11.
4. To continue, follow instructions 4 through 8 in the mounting procedure.

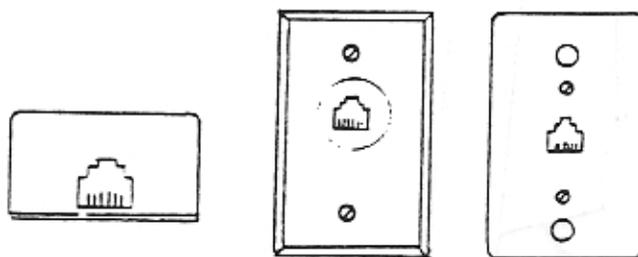


Figure 2-9 Possible Wall Jacks

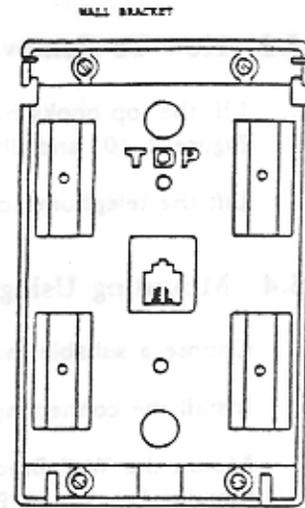
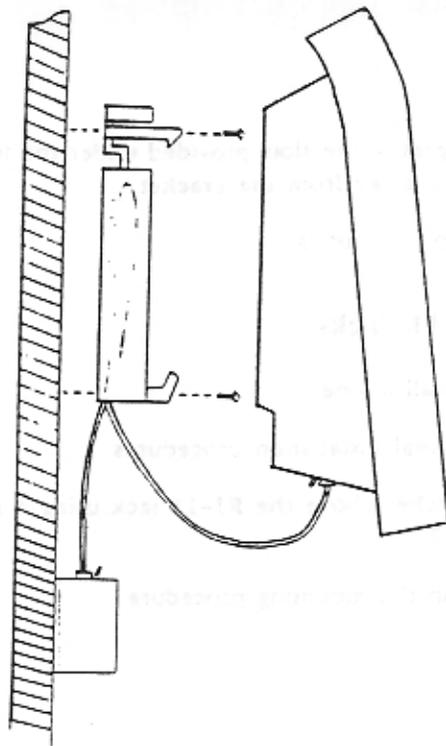


Figure 2-10 Wall Mounted Telephone

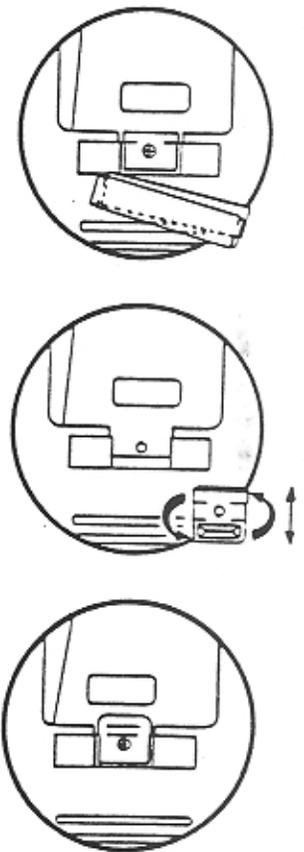
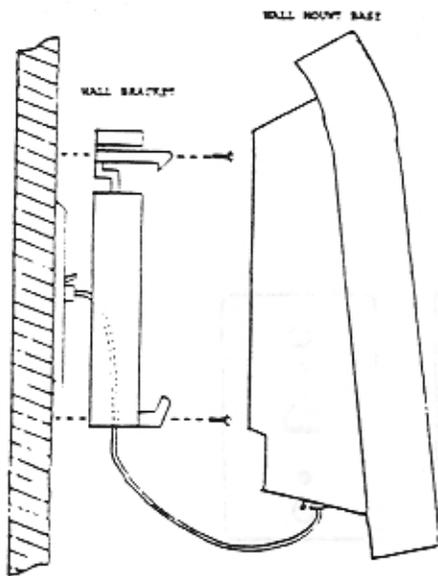


Figure 2-12

Figure 2-11 Surface Mount Jack

## 2.16 OFF PREMISE EXTENSION INTERFACE - OPXI

The ISOETEC System/108 can be used with standard, tone dial, 2500 type telephones with the use of the Off Premise Extension Interface (OPXI) part number 15780. This interface is also used to connect devices such as answering machines, MODEMS, Answering/Announcement devices, and VX ports to the ISOETEC System/108.

The OPXI is considered a telephone by the System/108. One OPXI requires one station port. The OPXI is wired to the system in the same manner as a digital telephone (see the *Cabling and Cross Connection* section of this manual). The OPXI requires the use of an external 48 volt DC power supply. Each OPXI requires approximately 100 milliamps of current from the power supply.

## 2.17 DIGITAL DATA INTERFACE

The Digital Data Interface (DDI), part number 15790, is used with the Data Feature of the ISOETEC System/108 in connections which do not require the use of the Digital Display Telephone. One DDI requires one station port.

The Digital Data Interface is considered a station by the ISOETEC System/108. The DDI is wired to the system in the same manner as a digital telephone (see the *Cabling and Cross Connection* section of this manual).

## 2.18 BACKGROUND MUSIC AND MUSIC ON HOLD

The source music for Music On Hold (MOH) and Background Music (BGM) is provided to the system through an RCA type connectors labeled J4 and J5 on the VCM/DCM. These connectors is located in the lower edge of the card. See Figure 2-13 for the location of these connectors. Background Music and Music on Hold volumes can both be adjusted through potentiometers located below each connector. The potentiometer labeled R6 is for the Background Music volume. The potentiometer labeled R3 is for the Music On Hold volume. To adjust the Music On Hold volume, place a call to one of the system's CO lines. Answer the call and place it on hold. Listen to the volume of the MOH in the originating telephone and adjust R3 to a comfortable listening level. To adjust Background Music, press the digit [\*] on the dial pad of a near by station. Adjust the speaker volume of the telephone set to maximum with the [VOLUME ▲] key. Adjust R6 to a comfortable listening level.

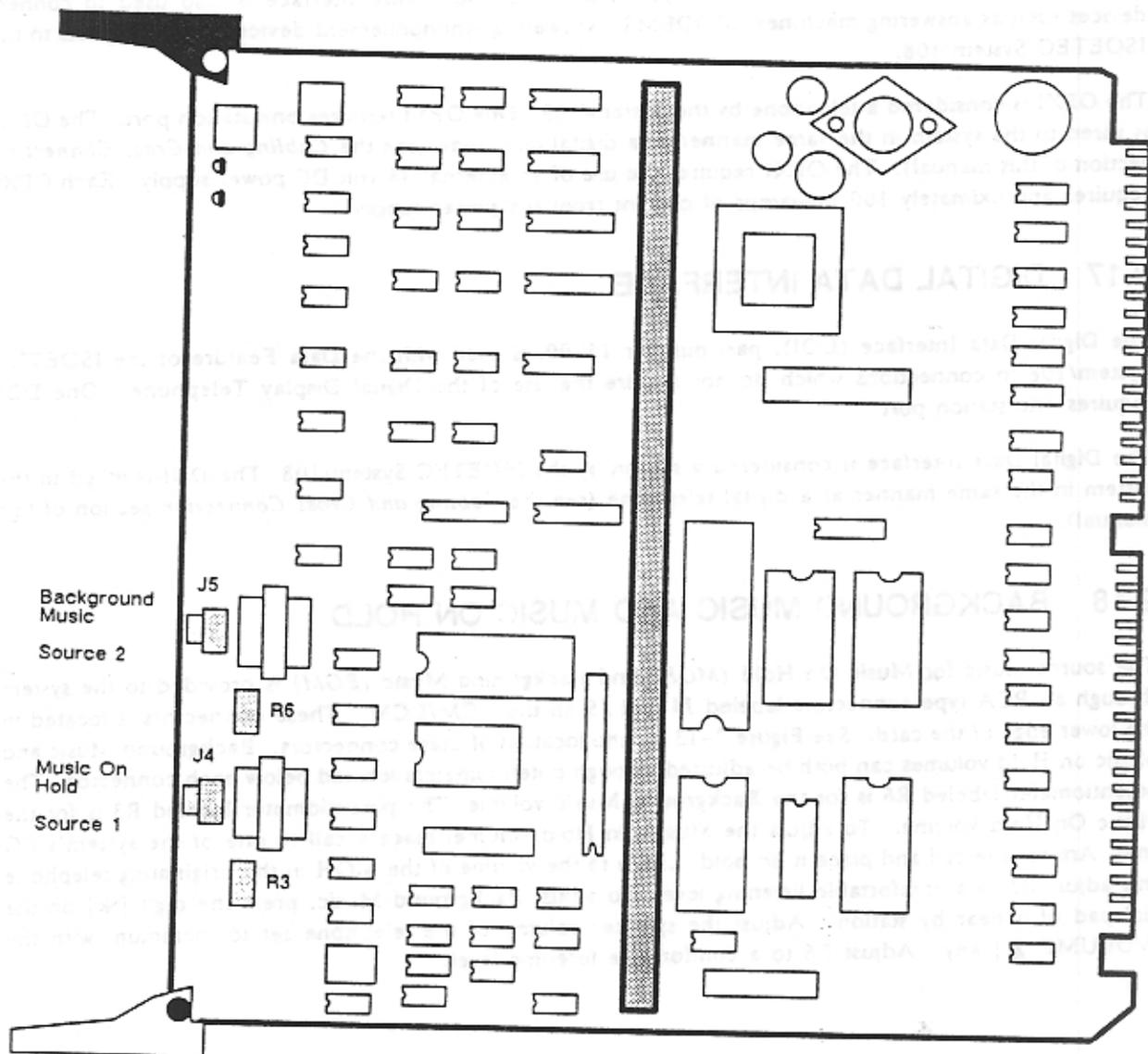


Figure 2-13 VCM/DCM

## Section 3

# Cabling and Cross Connection

### 3.1 STATION PORT CONNECTIONS

Telephones are connected to the system via randomly twisted, 2 pair, 22 or 24 gauge wire. The station cable run from the main distribution frame to the station wall jack should not exceed 1200 feet for 24 gauge (1500 feet with 22 gauge randomly twisted wire). It is recommended that the station cable contain a minimum of 3 (preferably 4) pairs of wires to allow for future use.

Only one station may be connected to a port. It is not possible to bridge station ports.

The system communicates with each phone using 4 wires. Two of the wires are used to send digital information (voice and control signals) from the system to the telephone, and two wires are used by the telephone to send digital information to the system. All 4 wires are necessary for the telephone to function.

Each telephone connected to a station port has two digital channels. The primary channel is used for voice communications only. The secondary channel is used with digital display phones to provide either a secondary talk path for off-hook announcing, or for serial data communications.

The Off Premise Extension Interface (OPXI), ISOETEC Electronic Phone Interface (IEPI), Relay/Sensor Interface (RSI), and the Digital Data Interface (DDI) are all considered to be telephones by the System/108. These interfaces are all wired to the system the same as a digital telephone.

Telephones are wired to the Main Distribution Frame (MDF) which is connected to the station port cards. Twelve stations can be connected to each port card.

Each port card is shipped with the 25 pair cable that connects it to the Main Distribution Frame. This cable has an exposed shield at one end, and must be used when installing the system to comply with FCC Part 15 regulations.

The station to MDF cable (p/n 01022) is installed with the exposed shield closest to the cabinet. A cable tie or similar device is used to secure the exposed braid to the bottom plate of the cabinet (see Figure 3-1 for more detail). The paint is removed from a section of the bottom plate to allow a ground connection between the exposed braid of the cable and the cabinet. The cable is then dressed out the back of the cabinet, and connected to the MDF. Once the cable is connected to the system, a standard 25 pair cable may be used, if necessary, to reach the MDF.

After running all station cables, tone out all cables to insure that there are no shorts on any of the station cable runs before connecting the Transient Surge Suppressor. If a short exists, correct the short before connecting the Suppressor to the system. Connecting the Transient Surge Suppressor with shorts in the station cables can cause improper grounding to the station port card. This improper grounding can cause damage to the station port card.

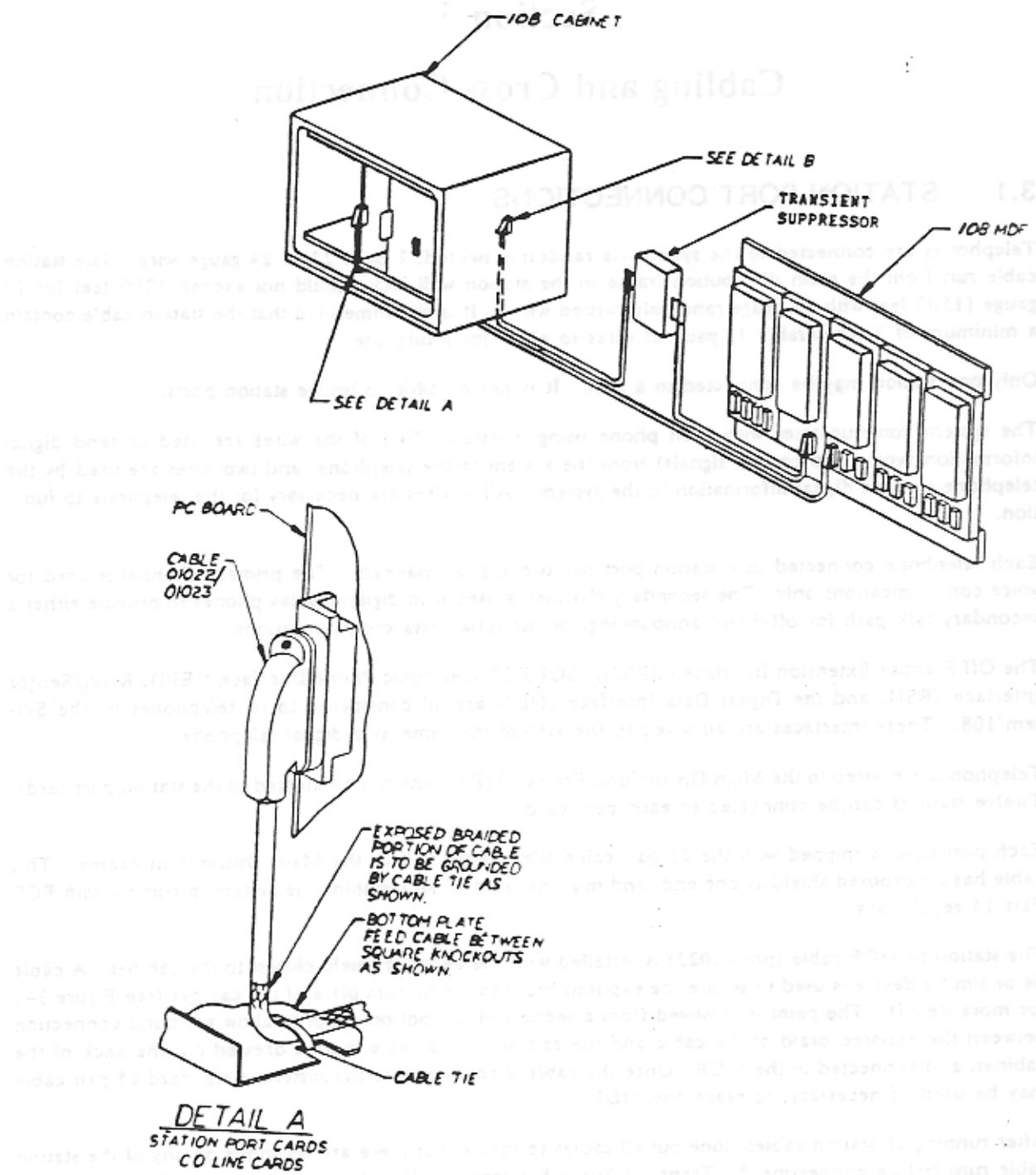
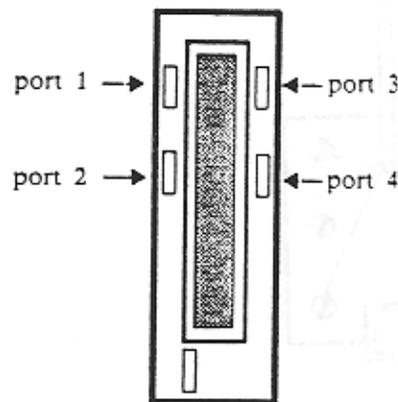
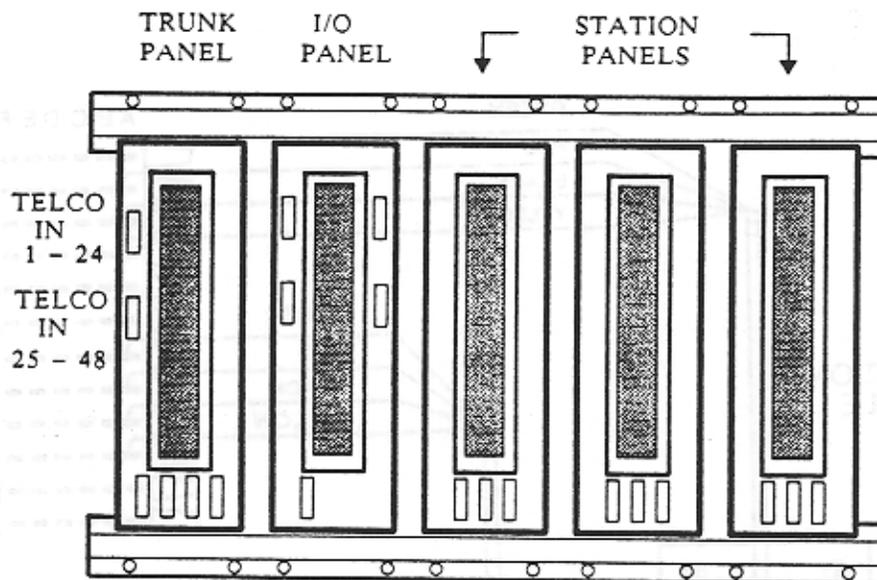


Figure 3-1 Port Cable To MDF

The ISOETEC Main Distribution Frames are designed to simplify and speed the installation time of ISOETEC Telephone Systems.

The System/108 uses the 228 Main Distribution Frame. The 228 MDF is designed with three basic panels: a trunk panel, an I/O panel, and station panels. The 228 MDF is equipped with 3 station panels. Additional station and trunk panels can be added as the system grows.

- 228 MDF - part number 220110
- 228 Trunk Panel - part number 220111
- 228 I/O Panel - part number 220112
- 228 Station Panel - part number 220113



I/O PORT PANEL

Figure 3-2 228 MDF

The Station Panel is a specially designed 66B6 connecting block with provisions for two 25 pair cable connections. These connectors are used to connect with the system port cards.

On each station panel there are six columns of connecting pins labeled A (left most column) through F (right most column). Connections between the 25 pair cables and station cables are achieved by bridging pairs of columns together. Columns B, D and E are wired to the 25 pair connectors, and thus to the station ports. The cables to the individual stations are wired to the connecting pins in columns A, C, and F. Bridging clips are used to connect columns A and B, columns C and D, and columns E and F.

Each station connection consists of 2 columns, and 6 rows of connecting pins. The first 4 rows of pins are connected to the 25 pair cable connected to the system. The remaining 2 rows of pins are not used at this time with the ISOETEC System/108.

Station cable is connected to the MDF at one end, and a modular connecting block at the other end. The modular line cord of the telephone is then plugged into the connecting block.

The diagram illustrates the connection between a station cable and a station panel. On the left, a 'STATION CABLE' is connected to a 'STATION CONNECTING BLOCK'. This block has four terminals, each connected to a central point. From this central point, four wires extend to the right: GREEN, RED, BLACK, and YELLOW. These wires connect to the top four rows of pins in columns B, D, E, and F respectively. The station panel has six columns of pins labeled A through F. The bottom two rows of pins in columns A, C, and F are also shown, but they are not connected to the station cable in this diagram.

Figure 3-3 228 MDF Station Panel Connections

3.4

Version J

A		B		C		D		E		F	
01	TT	09	TT	TT	17	TT	TR	TT	TR	TT	17
--	TR										
--	RT										
--	RR										
--	--	--	--	--	--	--	--	--	--	--	--
02	TT	10	TT	TT	18	TT	TR	TT	TR	TT	18
--	TR										
--	RT										
--	RR										
--	--	--	--	--	--	--	--	--	--	--	--
03	TT	11	TT	TT	19	TT	TR	TT	TR	TT	19
--	TR										
--	RT										
--	RR										
--	--	--	--	--	--	--	--	--	--	--	--
04	TT	12	TT	TT	20	TT	TR	TT	TR	TT	20
--	TR										
--	RT										
--	RR										
--	--	--	--	--	--	--	--	--	--	--	--
05	TT	13	TT	TT	21	TT	TR	TT	TR	TT	21
--	TR										
--	RT										
--	RR										
--	--	--	--	--	--	--	--	--	--	--	--
06	TT	14	TT	TT	22	TT	TR	TT	TR	TT	22
--	TR										
--	RT										
--	RR										
--	--	--	--	--	--	--	--	--	--	--	--
07	TT	15	TT	TT	23	TT	TR	TT	TR	TT	23
--	TR										
--	RT										
--	RR										
--	--	--	--	--	--	--	--	--	--	--	--
08	TT	16	TT	TT	24	TT	TR	TT	TR	TT	24
--	TR										
--	RT										
--	RR										
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--	EXT										
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Figure 3-4 228 MDF Station Panel Designations

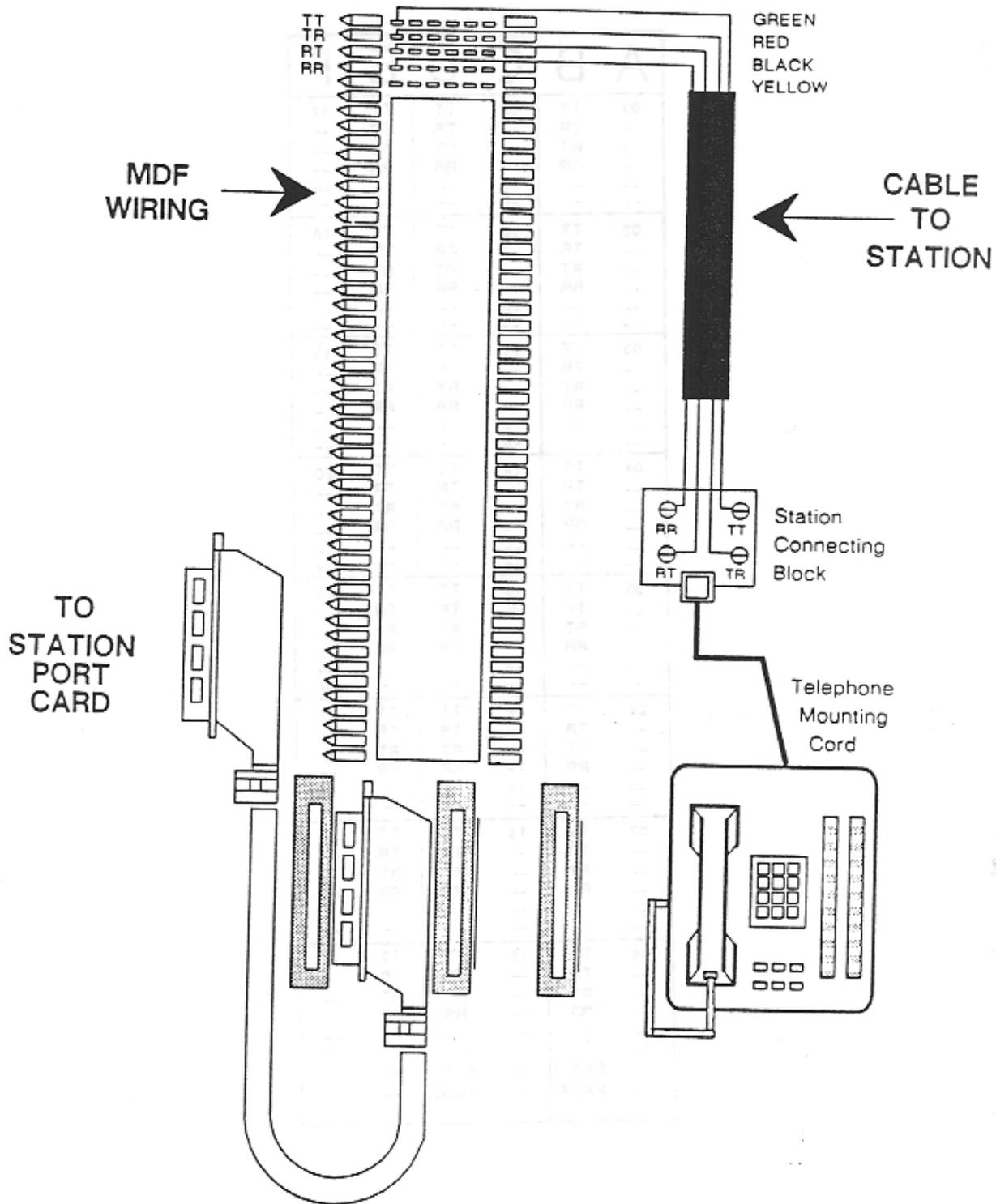


Figure 3-5 Station Wiring

For those who prefer to design their own main distribution frame, the following table lists the port configuration of the cable connected to a station port card.

Table 3-1 Station Port Configuration

CABLE PIN AND COLOR	PORT	LEAD DESIGNATION	CONNECTING BLOCK COLOR
26 wht/blu	001	Transmit Tip	green
1 blu/wht		Transmit Ring	red
27 wht/org	002	Receive Tip	black
2 org/wht		Receive Ring	yellow
28 wht/grn	003	Transmit Tip	green
3 grn/wht		Transmit Ring	red
29 wht/brn	004	Receive Tip	black
4 brn/wht		Receive Ring	yellow
30 wht/slt	005	Transmit Tip	green
5 slt/wht		Transmit Ring	red
31 red/blu	006	Receive Tip	black
6 blu/red		Receive Ring	yellow
32 red/org	007	Transmit Tip	green
7 org/red		Transmit Ring	red
33 red/grn	008	Receive Tip	black
8 grn/red		Receive Ring	yellow
34 red/brn	009	Transmit Tip	green
9 brn/red		Transmit Ring	red
35 red/slt	010	Receive Tip	black
10 slt/red		Receive Ring	yellow
36 blk/blu	011	Transmit Tip	green
11 blu/blk		Transmit Ring	red
37 blk/org	012	Receive Tip	black
12 org/blk		Receive Ring	yellow
38 blk/grn	013	Transmit Tip	green
13 grn/blk		Transmit Ring	red
39 blk/brn	014	Receive Tip	black
14 brn/blk		Receive Ring	yellow
40 blk/slt	015	Transmit Tip	green
15 slt/blk		Transmit Ring	red
41 yel/blu	016	Receive Tip	black
16 blu/yel		Receive Ring	yellow
42 yel/org	017	Transmit Tip	green
17 org/yel		Transmit Ring	red
43 yel/grn	018	Receive Tip	black
18 grn/yel		Receive Ring	yellow
44 yel/brn	019	Transmit Tip	green
19 brn/yel		Transmit Ring	red
45 yel/slt	020	Receive Tip	black
20 slt/yel		Receive Ring	yellow
46 vio/blu	021	Transmit Tip	green
21 blu/vio		Transmit Ring	red
47 vio/org	022	Receive Tip	black
22 org/vio		Receive Ring	yellow
48 vio/grn	023	Transmit Tip	green
23 grn/vio		Transmit Ring	red
49 vio/brn	024	Receive Tip	black
24 brn/vio		Receive Ring	yellow
50 vio/slt	EXT.	Tip	
25 slt/vio	PAGE	Ring	

## 3.2 TRUNK AND DID CONNECTIONS

The local telephone operating company usually provides CO lines on an RJ-21X connector. These lines are in turn connected to the TELCO IN jack on the 228 MDF. A 25 pair cable connects the TELCO OUT lines to the cable connector on each CO port card. Each cable connects 12 CO lines to the CO port cards. The connector on the CO port card is a female connector. Active lines are then connected by the use of bridging clips. The DID port card is wired the same as a CO port card. However, the Loop/ Ground Start Trunk port card is wired inverted with respect to tip and ring.

The trunk line to MDF cable (p/n 01023) is installed with the exposed shield closest to the cabinet. A cable tie or similar device is used to secure the exposed braid to the bottom plate of the cabinet (see Figure 3-1 for more detail). The paint is removed from a section of the bottom plate to allow a ground connection between the exposed braid of the cable and the cabinet. The cable is then dressed out the back of the cabinet, and connected to the MDF. Once the cable is connected to the system, a standard 25 pair cable may be used, if necessary, to reach the MDF.

Table 3-2 CO Port Wiring Configuration

CABLE PIN AND COLOR	PORT	CO and DID LEAD DESIGNATION	LOOP/GROUND START LEAD DESIGNATION
26 wht/blu	001	Tip	Ring
1 blu/wht		Ring	Tip
27 wht/org	002	Tip	Ring
2 org/wht		Ring	Tip
28 wht/grn	003	Tip	Ring
3 grn/wht		Ring	Tip
29 wht/brn	004	Tip	Ring
4 brn/wht		Ring	Tip
30 wht/slt	005	Tip	Ring
5 slt/wht		Ring	Tip
31 red/blu	006	Tip	Ring
6 blu/red		Ring	Tip
32 red/org	007	Tip	Ring
7 org/red		Ring	Tip
33 red/grn	008	Tip	Ring
8 grn/red		Ring	Tip
34 red/brn	009	Tip	Ring
9 brn/red		Ring	Tip
35 red/slt	010	Tip	Ring
10 slt/red		Ring	Tip
36 blk/blu	011	Tip	Ring
11 blu/blk		Ring	Tip
37 blk/org	012	Tip	Ring
12 org/blk		Ring	Tip

The remainder of the cable is not used.

3.3 EX-101 THE LINE COMBINATION PORT CARD

The EX-101 Line Combination Port Card provides for all of the features of the digital trunk ports and the line ports. The 6 main ports provide for all of the features of the digital trunk ports except there is only one digital channel. Therefore, the ports cannot be used for digital display phones which utilize the second voice path of the line feature.

The EX-101 Line Combination Port Card is connected to the main distribution frame in the same manner as the other port cards. The EX-101 port card is connected to the EX-101 Line Combination Port Card the same as a standard port card.

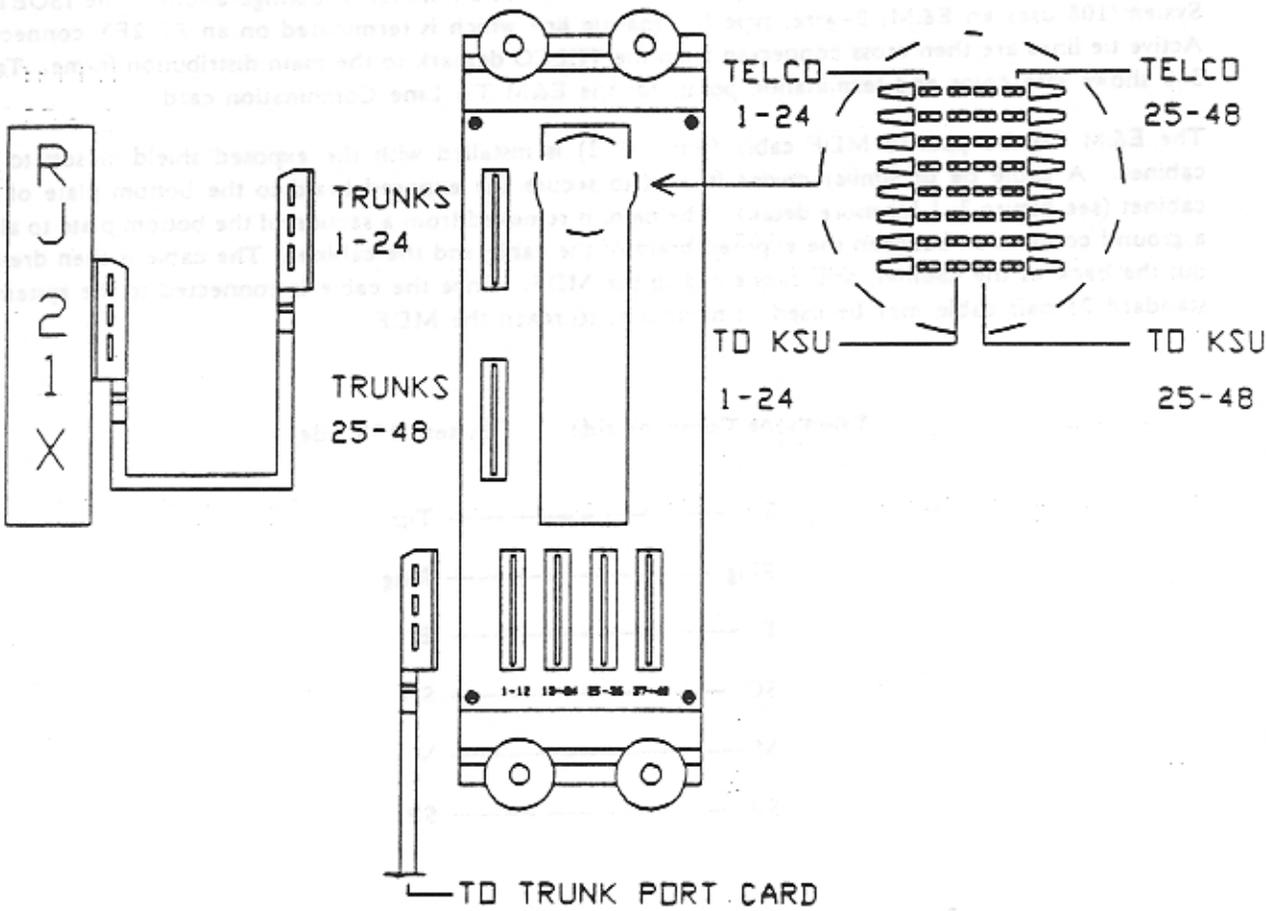


Figure 3-6 Trunk Cabling

### 3.3 E&M TIE LINE COMBINATION PORT CARD

The E&M Tie Line Combination port card provides 6 station ports and 4 tie line ports. The 6 station ports provide for all of the features of the digital telephone except there is only the primary digital channel. Therefore, these ports cannot be used to support display phones which utilize the second voice path, or the data feature.

The E&M tie line combination port card is connected to the main distribution frame in the same manner as the other port cards, via a 25 pair cable. Stations are wired to the E&M tie line combination port card the same as a station port card.

The local telephone operating company provides tie lines in a number of configurations. The ISOETEC System/108 uses an E&M, 2-wire, type II signal tie line which is terminated on an RJ-2FX connector. Active tie lines are then cross connected from the TELCO demark to the main distribution frame. Table 3-3 shows wire color and termination points for the E&M Tie Line Combination card.

The E&M Combo port to MDF cable (p/n 01022) is installed with the exposed shield closest to the cabinet. A cable tie or similar device is used to secure the exposed braid to the bottom plate of the cabinet (see Figure 3-1 for more detail). The paint is removed from a section of the bottom plate to allow a ground connection between the exposed braid of the cable and the cabinet. The cable is then dressed out the back of the cabinet, and connected to the MDF. Once the cable is connected to the system, a standard 25 pair cable may be used, if necessary, to reach the MDF.

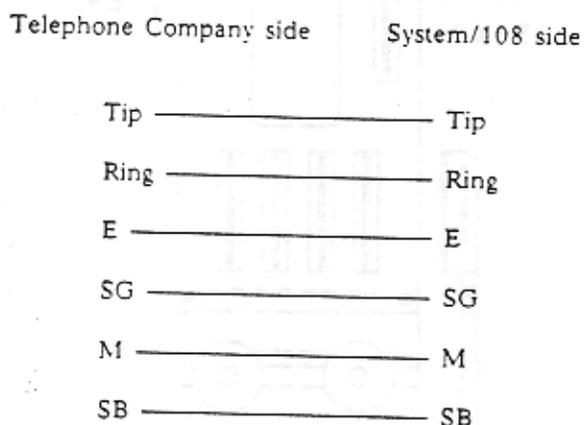


Figure 3-7 Tie Line Cross Connection

A	B	C	D	E	F
01 TT TR RT RR -- --	TL 2 -- -- -- -- --	E SG M SB -- --	TT 05 TR RT RR -- --		
02 TT TR RT RR -- --	TL 3 -- -- -- -- --	TIP RING E SG -- --	TT 06 TR RT RR -- --		
03 TT TR RT RR -- --	-- -- TL 4 -- -- --	M SB TIP RING -- --	TIP RING E SG -- --	TL 1 -- -- -- -- --	
04 TT TR RT RR -- --	-- -- -- -- -- --	E SG M SB -- --	M SB TIP RING -- --	TL 2 -- -- -- -- --	
05 TT TR RT RR -- --	01 -- -- -- -- --	TT TR RT RR -- --	E SG M SB -- --		
06 TT TR RT RR -- --	02 -- -- -- -- --	TT TR RT RR -- --	TIP RING E SG -- --	TL 3 -- -- -- -- --	
TL 1 -- -- -- -- --	TIP RING E SG -- --	03 -- -- -- -- --	TT TR RT RR -- --	M SB TIP RING -- --	TL 4 -- -- -- -- --
-- -- TL 2 -- -- -- --	M SB TIP RING -- --	04 -- -- -- -- --	TT TR RT RR -- --	E SG M SB -- --	-- -- -- -- -- --

Figure 3-8 228 MDF Designations For An E&M Tie Line

For those who prefer to design their own main distribution frame, the following table lists the port configuration of the cable connected to an E&M Tie Line port card.

Table 3-3 E&amp;M Tie Line Port Configuration

CABLE PIN AND COLOR	PORT	LEAD DESIGNATION	CONNECTING BLOCK COLOR
26 wht/blu	001	Transmit Tip	green
1 blu/wht		Transmit Ring	red
27 wht/org	002	Receive Tip	black
2 org/wht		Receive Ring	yellow
28 wht/grn	003	Transmit Tip	green
3 grn/wht		Transmit Ring	red
29 wht/brn	004	Receive Tip	black
4 brn/wht		Receive Ring	yellow
30 wht/slt	005	Transmit Tip	green
5 slt/wht		Transmit Ring	red
31 red/blu	006	Receive Tip	black
6 blu/red		Receive Ring	yellow
32 red/org	007	Transmit Tip	green
7 org/red		Transmit Ring	red
33 red/grn	008	Receive Tip	black
8 grn/red		Receive Ring	yellow
34 red/brn	009	Transmit Tip	green
9 brn/red		Transmit Ring	red
35 red/slt	010	Receive Tip	black
10 slt/red		Receive Ring	yellow
36 blk/blu	006	Transmit Tip	green
11 blu/blk		Transmit Ring	red
37 blk/org	007	Receive Tip	black
12 org/blk		Receive Ring	yellow
38 blk/grn	007	Tip	
13 grn/blk		Ring	
39 blk/brn	008	E	
14 brn/blk		SG	
40 blk/slt	009	M	
15 slt/blk		SB	
41 yel/blu	008	Tip	
16 blu/yel		Ring	
42 yel/org	009	E	
17 org/yel		SG	
43 yel/grn	009	M	
18 grn/yel		SB	
44 yel/brn	009	Tip	
19 brn/yel		Ring	
45 yel/slt	010	E	
20 slt/yel		SG	
46 vio/blu	010	M	
21 blu/vio		SB	
47 vio/org	010	Tip	
22 org/vio		Ring	
48 vio/grn	010	E	
23 grn/vio		SG	
49 vio/brn	010	M	
24 brn/vio		SB	
50 vio/slt	010		
25 slt/vio			

## 3.4 INPUT/OUTPUT PORTS

### 3.4.1 Integrated Operator Terminal

The ISOETEC Integrated Operator terminal is a serial data terminal operating at a baud rate of 9600 bps. Installation of the operator terminal requires an I/O port connection, and a connection to one of the station ports (usually the port that supports extension 3001). The terminal is usually connected to one of the two RS-422 input/output ports, but may be set up to be connected to one of the RS-232 ports.

The circuitry for the I/O ports resides on the CPU, and is brought to the main distribution frame via an 18 pair cable with a 36 pin connector. The cable is connected to the system backplane connector J13.

The backplane to MDF cable (p/n 01021) is installed with the exposed shield closest to the cabinet. A cable tie or similar device is used to secure the exposed braid to the bottom plate of the system cabinet (see Figure 3-9). The paint is removed from a section of the bottom plate to allow a ground connection between the exposed braid of the cable and the cabinet. The cable is dressed out the back of the cabinet, and terminated to the ISOETEC Transient Surge Suppressor (p/n 09010). An 18 pair cable is then connected from the ISOETEC Transient Surge Suppressor to the 228 MDF where access to the individual input/output ports is provided. The RS-232 ports are labeled ports 1 and 2. The RS-422 ports are ports 3 and 4.

Two separate 3 pair cables should be run between the main distribution frame, and the location chosen for the operator terminal.

*NOTE: The installation of the ISOETEC Transient Suppressor is required on all system installations.*

Terminate the station cable on the MDF station port selected for the operator terminal using the wiring chart for a digital station.

After running all station cables, tone out all cables to insure that there are no shorts on any of the station cable runs before connecting the Transient Surge Suppressor. If a short exists, correct the short before connecting the Suppressor to the system. Connecting the Transient Surge Suppressor with shorts in the station cables can cause improper grounding to the station port card.

*NOTE: This improper grounding can cause damage to the station port card.*

An ISOBLOC surge suppressor (ISOETEC p/n 440129) should be used with any terminal, or printer connected to the system.

3.4 INPUT/OUTPUT PORTS

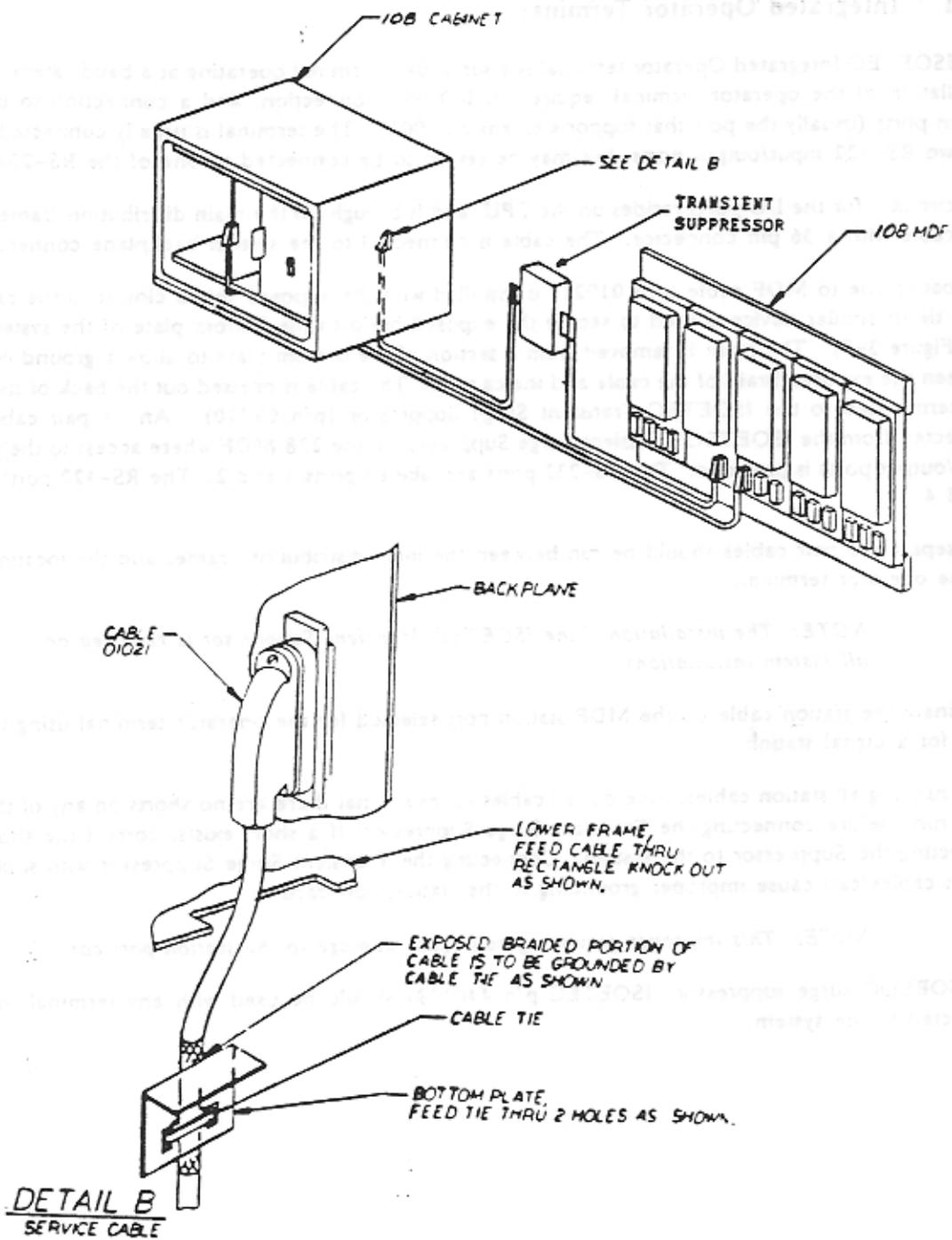


Figure 3-9 I/O (Service) Cable To MDF

The following is a description of the connection of an Operator terminal to an RS-422 port:

1. Terminate the cable for the RS-422 connection to the main distribution frame on I/O port 3 or port 4 using the chart below.

From the MDF (port 3 or 4) To the Operator Wall Jack

pin 1	—————	Green
pin 2	—————	Red
pin 3	—————	Black
pin 4	—————	Yellow
pin 5	—————	White

2. Plug the modular end of the RS-422 cable into the jack wired to one of the RS-422 ports.
3. Connect the other end of the cable (the DB-25 connector) into the connector labeled MODEM on the Integrated terminal.
4. Plug one end of the 6 foot line cord into the 6 conductor jack on the back of the ISOETEC phone box, and the other end into the station jack wired to one of the extension ports.

The Integrated Operator Terminal is now wired, and ready to be turned on.

Turn the power switch located on the right side of the terminal to the on position.

The screen of the terminal should first appear reverse video with all stars, and then appear blank with a cursor in the upper right corner of the terminal.

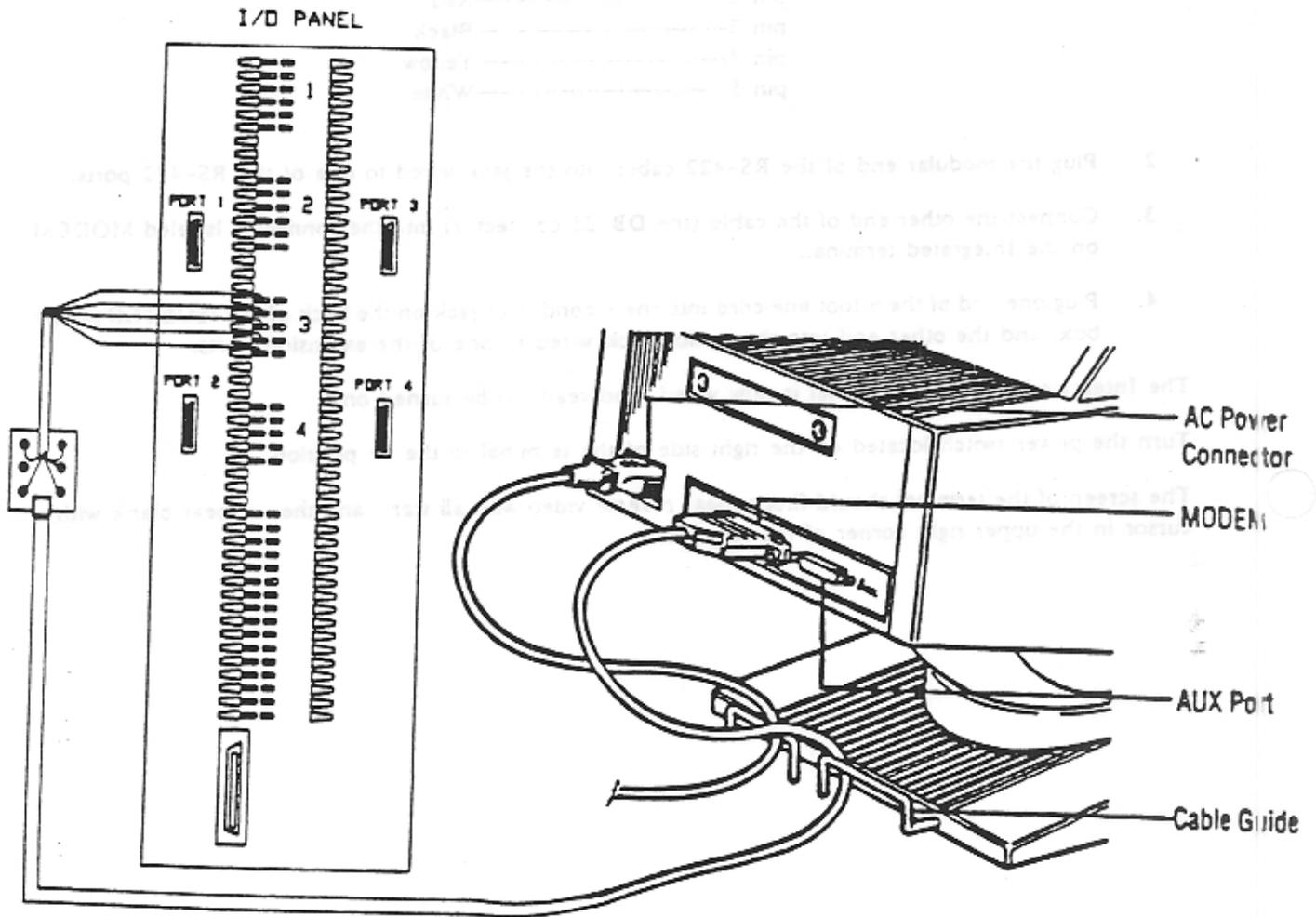


Figure 3-10 Operator Terminal Installation

### 3.4.2 Connection To An RS-232 Port

The ISOETEC System/108 Integrated Operator Terminal may also be connected to one of the system's RS-232 ports. The following is a description for connection to an RS-232 port:

1. The RS-232 ports can be accessed on the main distribution using one of two different methods of connection. Either a DB-25 type connector can be connected directly to the MDF, or a cable can be connected to the pins of the "66 B" type block. As the type of cabling and connections can vary with this type of operation, the pin to pin connections are listed in the following table. It is left to the discretion of the installer what type of connections to make.

From the MDF pins (port 1 or 2)	From the MDF connector (DB-25 type)	To CRT Terminal Connector (DB-25 type)
pin 1 -----	pin 2 -----	pin 3
pin 2 -----	pin 3 -----	pin 2
pin 3 -----	pin 5 -----	no connection
pin 4 -----	pin 6 -----	no connection
pin 5 -----	pin 7 -----	pin 7
pin 6 -----	pin 20 -----	pin 20

2. Make the connection between the MDF using either connection outlined above, and the AUX connector on the back of the terminal.
3. Plug one end of the 6 foot line cord into the 6 conductor jack on the back of the ISOETEC phone box, and the other end into the station jack wired to one of the extension ports.

The Integrated Operator Terminal is now assembled and wired, and ready to be turned on.

Turn the power switch located on the right side of the terminal to the on position.

The screen of the terminal should first appear reverse video with all stars, and then appear blank with a cursor in the upper right corner of the terminal.

### 3.4.3 Programming Port

A serial RS-232-C programming terminal can be connected to either I/O port 1 or port 2. The baud rate for the terminal is software selectable in system programming. Figure 3-11 below shows the wiring for the programming port. Ports 1 and 2 are configured as DCE.

#### MDF connector

- Pin 2 ----- Receive from terminal
- Pin 3 ----- Transmit to terminal
- Pin 5 ----- No connection
- Pin 6 ----- No connection
- Pin 7 ----- Ground
- Pin 20 ----- DTR

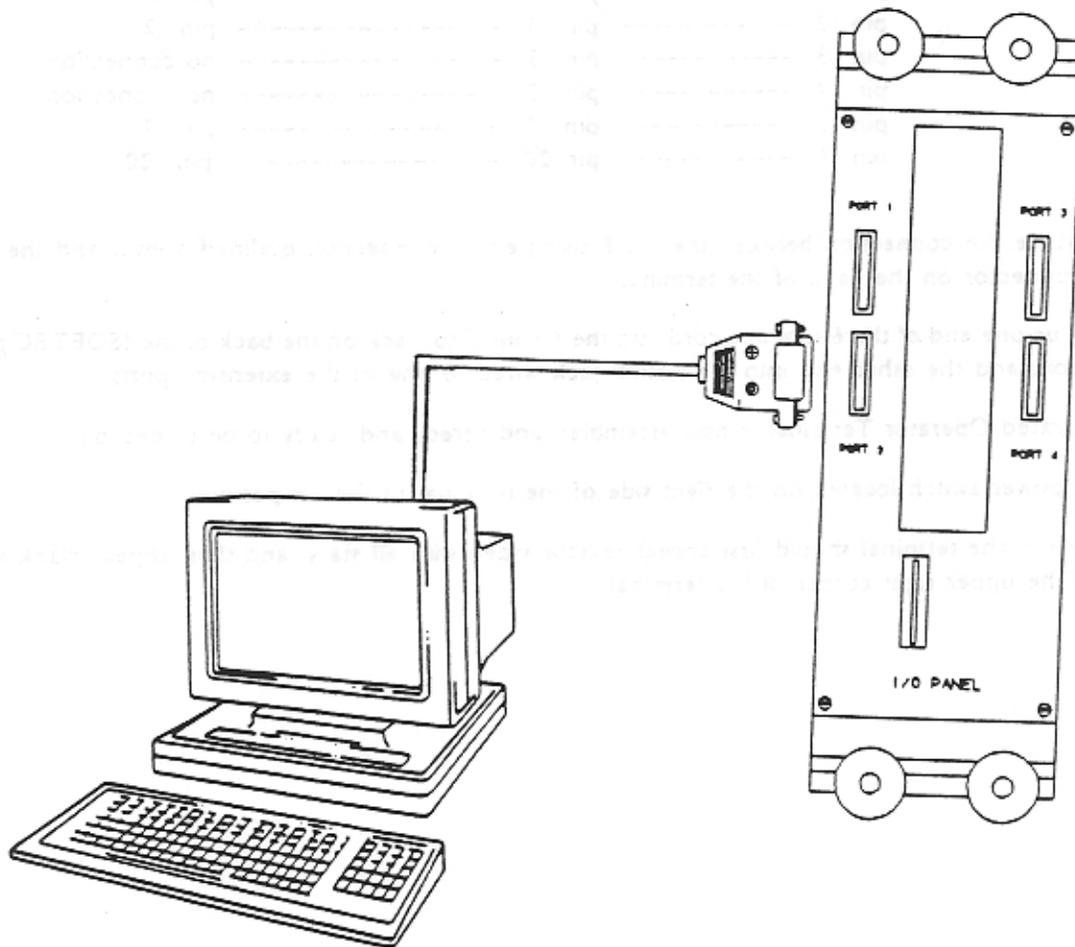


Figure 3-11 Wiring To The Programming Terminal

### 3.4.4 Station Message Detail Recording Device

A serial RS-232-C terminal/printer can be connected to either I/O port 1 or port 2. The baud rate for the terminal/printer and protocol is software selectable in system programming (see system programming for more information). Figure 3-12 below shows the wiring for the SMDR port. Ports 1 and 2 are configured as DCE.

**MDF connector**

Pin 2 ——— Receive from terminal

Pin 3 ——— Transmit to terminal

Pin 5 ——— CTS \*

Pin 6 ——— DSR \* These 2 pins are available if a particular printer requires them.

Pin 7 ——— Ground

Pin 20 ——— DTR

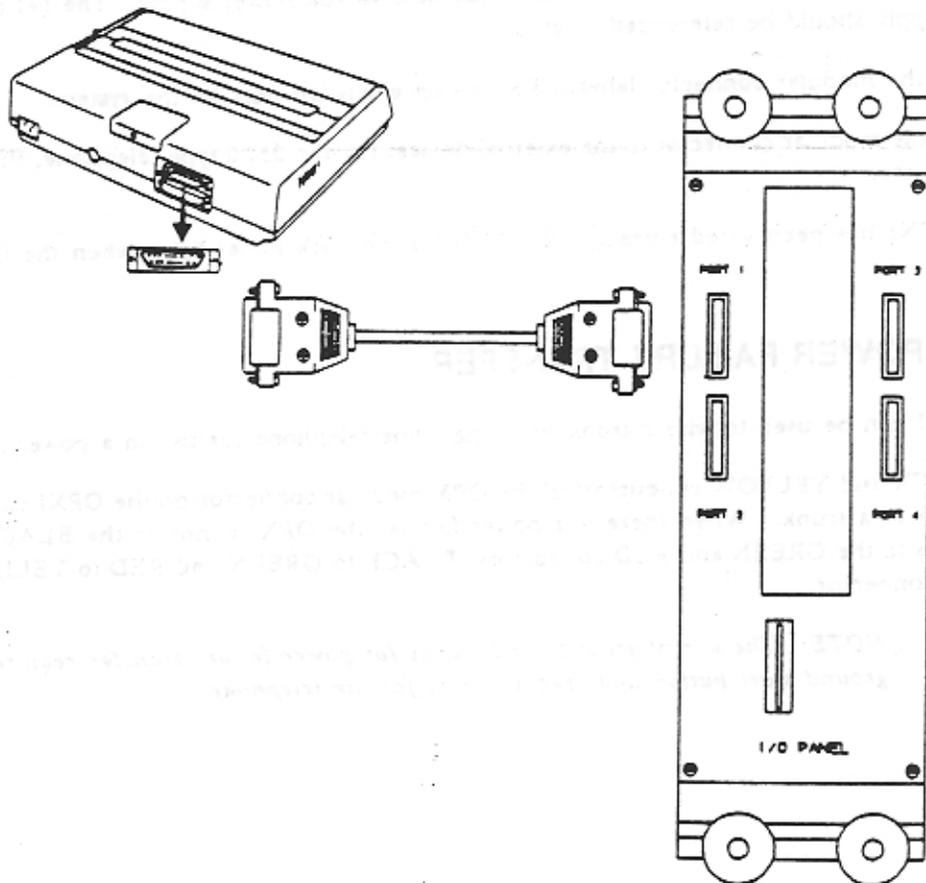


Figure 3-12 SMDR Cabling

### 3.5 EXTERNAL PAGE

An audio path exists on the last cable pair of each station port card that can be connected to an external paging system. Cross connect from the violet/slate pair of the station port cable to the input of the external page system.

### 3.6 OFF PREMISE EXTENSION INTERFACE

The Off Premise Extension Interface (OPXI) is wired to the System/108 like a digital telephone, and requires one station port. The OPXI requires an external 48 volt power supply capable of providing 100 milliamps of current per OPXI.

All connections to the OPXI are made on the back panel. The back panel has two modular jacks and a two wire cable. The two wire cable is used to correct the power supply to the OPXI. One modular jack, labeled KSU, is used to connect the OPXI to the station port of the system. The second modular jack, labeled OPX, is used to connect the OPXI to the 2500 type telephone or device.

Connect the black wire of the two wire power cord to the (-) negative side of the 48 volt power supply, and connect the red wire to the (+) positive side of a 48 volt power supply. The (+) positive side of the power supply should be referenced to ground.

Connect the modular connector labeled KSU to an extension port on the system.

Connect the modular connector to the external device, i.e. the 2500 type telephone, the IVIE port, ACD recorder, etc.

If the OPXI has been wired correctly, the LED on the back panel lights when the telephone is taken off-hook.

### 3.7 POWER FAILURE TRANSFER

The OPXI can be used to wire a trunk to a single line telephone for use in a power failure.

The BLACK and YELLOW conductors of the OPX modular connector on the OPXI can be wired to TIP and RING of a trunk. When there is a power failure, the OPX connects the BLACK and YELLOW conductors to the GREEN and RED conductors (BLACK to GREEN and RED to YELLOW) of the OPX modular connector.

*NOTE: The use of ground start trunks for power failure transfer requires a ground start button and special wiring for the telephone.*

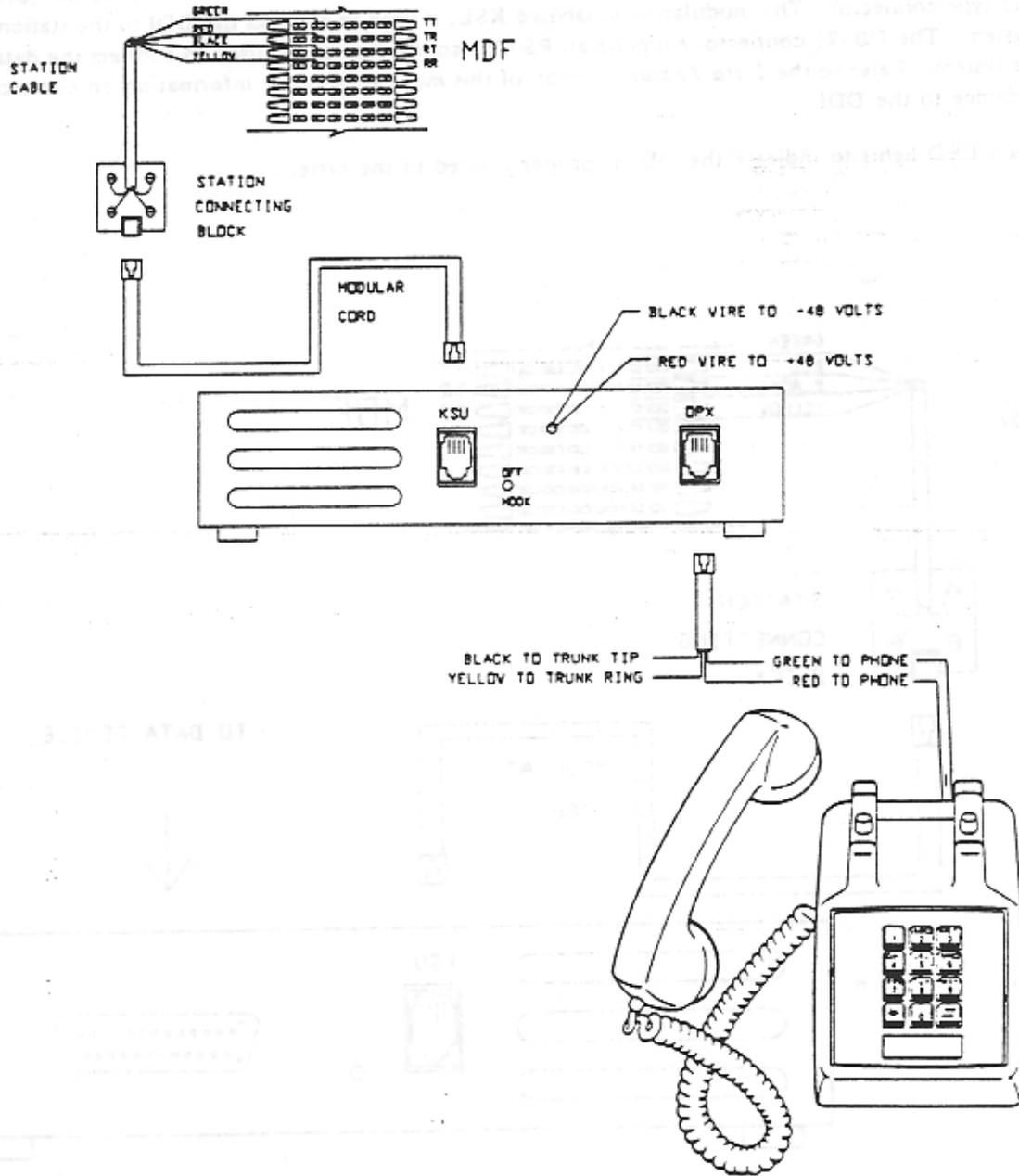


Figure 3-13 OPXI Installation

### 3.8 DIGITAL DATA INTERFACE

The Digital Data Interface (DDI) is wired to the System/108 like a digital telephone, and requires one station port.

All connections to the DDI are made on the back panel. The back panel has a modular jack and a DB-25 type connector. The modular jack, labeled KSU, is used to connect the DDI to the station port of the system. The DB-25 connector supports an RS-232 connection and is used to connect the data device to the system. Refer to the *Data Feature* section of this manual for more information on connecting the data device to the DDI.

A green LED lights to indicate the DDI is properly wired to the system.

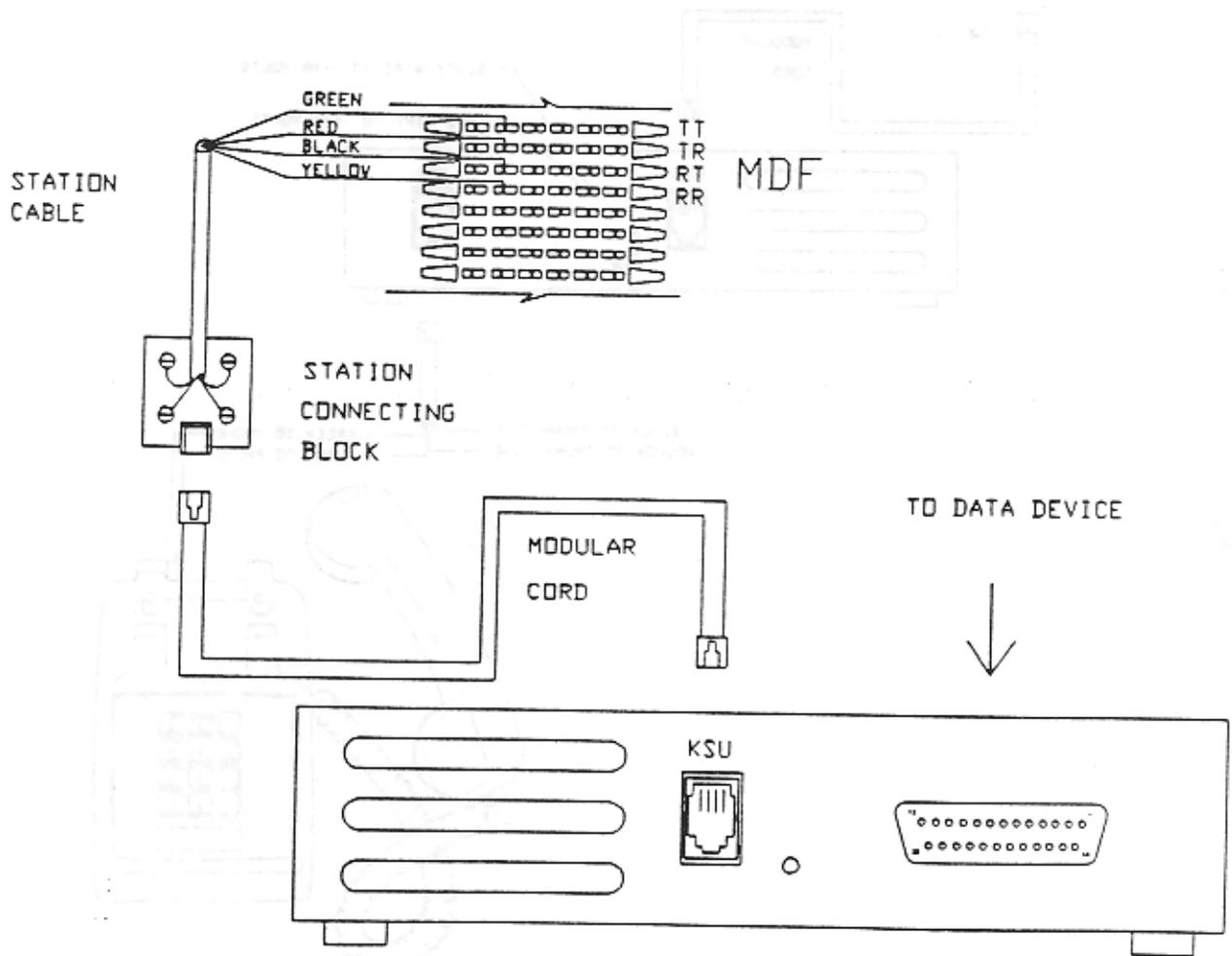


Figure 3-14 Digital Data Interface Wiring

## Section 4

# Station Operation

Please refer to the:     Station User Guide part number 770315  
                                  6-Key Telephone User Guide part number 770322  
                                  and the Operator User Guide part number 770316.



## Section 5

# Programming Information

### 5.1 INTRODUCTION

The ISOETEC® System/108 Telephone System is a stored program switching system. The operating system is stored in EPROM and configuration information is stored in battery backed RAM.

The CPU controlled system is designed to provide on-site or remote programming capability for system features. The menu-driven program allows each system to be customized for individual customer requirements through an external CRT and keyboard. The CRT/keyboard programming package should be ordered from ISOETEC to maintain system compatibility. The system is also equipped with a built-in MODEM to provide off-site programming and maintenance capabilities. Any function that can be accomplished by the on-site programming terminals can be accomplished remotely through the MODEM.

### 5.2 CONNECTING THE PROGRAMMING TERMINAL

System programming can be accomplished from any one of the input/output ports, including the port used as the operator position. Programming is accomplished by means of programming screens and screen graphics. Four types of terminals are supported. These are:

1. ISOETEC (The ISOETEC terminal and the ISOETEC Integrated terminal are supported with this terminal type).
2. QUME (109)
3. IBM/compatible
4. Wyse (WYSE 50, NOT the ISOETEC Integrated terminal).

Connect the terminal to one of the input/output ports using the wiring instructions found in Section 3 of this manual. The default baud rate for the ports is 9600 baud.

### 5.3 ACCESSING THE PROGRAMMING SCREENS

Once the programming terminal has been connected, the programming screens may be accessed. Begin by:

1. Press the ESCAPE key.

The system will prompt for a password. Access to the programming screens is protected by eight levels of passwords. Each level of password progressively allows more access to programming. Thus, an operator may be provided with a password to level one to access programming of the directory information, but prevented from making any changes to system programming. Level EIGHT allows the most access, and is used for all programming and maintenance functions.

2. Enter the password of the level to be accessed.
3. Press the RETURN key. If the correct password has been entered, the main menu will appear.
4. Enter the letter corresponding to the screen for the function to be performed. For example, to move to the station programming screen, press the A key.

To return to the main menu from any programming screen, press the ESCAPE key.

```

Welcome to the System 108 (C) 1986 ISOETEC Communications Inc.
Options: LCR CA1 Att
Version: v4.00x28 11/09/88      System is IDLE Thu 11-17-88  2:26 pm
Access Level = 08  Port = 2
Select one of the following:    <Esc> ... Display this menu

A .. Station Programming      | J .. PBX Key Progr.      | S .. LCR Tester
B .. System Programming      | K .. Change Password    | T .. Data Menu
C .. System Status Monitor   | L .. LCR Programming    | U .. Data Status
D .. BACKUP Program Memory   | M .. System Options     | V .. Call Accounting
E .. Exit Main Menu          | N .. Trunk Group Progr. | W .. Toll Restriction
F .. System Configuration    | O .. Directory          | X .. Access Levels
G .. Forwarding, VMS Plans   | P .. Account Codes      | Y .. Digit Translation
H ..                          | Q ..                    | Z .. Auto Attendant
I .. Line Maintenance        | R .. Reports

USE THE FOLLOWING SELECTIONS WITH CARE!!
Control-A ... Select Terminal Type |
Control-C ... Diagnostics          |

Control-F ... Default & RESET
Control-G ... RESET

Enter Letter or Control character >

```

Figure 5-1 Main Menu

## 5.4 PASSWORD - ACCESS LEVEL PROGRAMMING

Access to the various programming screens of the ISOETEC System/108 is controlled by 8 programmable passwords. The system software allows the programmer to define which passwords allow access to the different programming screens. This definition is accomplished on the *Access Levels - X* programming screen. The *Access Levels* programming screen itself can only be programmed from access level 8. The password protection scheme is arranged such that any screen that can be accessed by a particular level password can also be accessed by passwords accessing higher levels. For example, if the *Station Programming* screen is only to be accessed by a programmer using access level 6, it can also be accessed by a programmer using access levels 7 or 8.

### 5.4.1 What To Program

The *Access Levels* programming and default access levels are listed below. The screen is divided into 4 major areas:

1. Access programming for the *System* menus
2. Access programming for the *Reports* menus
3. Access programming for *Call Accounting Reports Option* menus
4. Access programming for the *ACD* menus.

The ACD menu is not used with the System/108.

Access Levels Programming						
<b>System</b>						
Menu Level	Menu Level	Menu Level	Menu Level	Menu Level	Menu Level	Menu Level
A 5	B 5	C 0	D 8	F 8	G 6	
H 0	I 5	J 5	L 6	M 6	N 5	
O 1	P 7	Q 3	R 1	S 0	T 7	
U 5	V 3	W 7	Y 7	Z 0		
CTR/A 0	CTR/C 5	CTR/F 8	CTR/G 8			
<b>Reports</b>						
Print 1 Clear 7			Call Accounting Select 7 Print 1 Clear 7			
<b>ACD</b>						
Menu Level	Menu Level	Menu Level	Menu Level	Menu Level	Menu Level	Menu Level
A 7	B 7	C 5	D 5	E 3	F 3	
G 3	H 3	I 3	J 3	K 3	L 7	
M 7	N 5	O 7	P 3			
CTR/F 8						
<b>Reports</b>						
Print 1 Define 7						

Figure 5-2 Access Level Programming Screen

Each major area lists the screens associated with it and the access level required to reach it. The access level for each screen can be changed to suit the requirements of the individual installation.

## 5.4.2 How To Program

The *Access Levels - X* programming screen can only be reached when using the password assigned to access level 8 (the manager's password).

If not already on the *Access Levels* programming screen, from the main programming menu, press the X key on the keyboard. The *Access Levels* programming screen appears with the cursor at the access level for the *A - Station Programming* screen.

1. Enter the number of the access level desired for the "A" programming screen.
2. Press the RETURN key.
3. Press the RETURN key a second time to move the cursor to the next entry position.
4. Continue entering the access levels for the different programming screens pressing the RETURN key after each entry.

The RETURN key is used to advance the cursor to the next entry to be made. The directional arrow keys (up, down, left, and right) can also be used to move the cursor to the desired Menu letter.

## 5.5 CHANGING PASSWORDS

### 5.5.1 Introduction

Access to the various programming screens of the ISOETEC System/108 is controlled by eight programmable passwords. All passwords must be changed at access level 8. The password to access level 8 must be known to change passwords.

### 5.5.2 How To Change Passwords

Enter system programming by typing the level 8 password at the "ENTER PASSWORD >" prompt and press the RETURN key. The programming main menu appears.

1. Press the K key on the keyboard. The system prompts for the manager's password. The manager's password is the password to access level 8.
2. Enter the level 8 password, and press the RETURN key. The "Password Definition" screen appears.
3. Using the RETURN key, or the UP and DOWN arrow keys, move the cursor to the password to be changed.
4. Enter the new password. The screen will not echo the characters typed.
5. Press the RETURN key. The system prompts for the password again for verification.
6. Enter the new password again exactly as before.
7. Press the RETURN key. If the two entries agree, the screen displays "Password was changed." If the two entries do not agree, the screen displays "Password was NOT changed."

8. Press the ESCAPE key to leave the programming screen and return to the main menu.

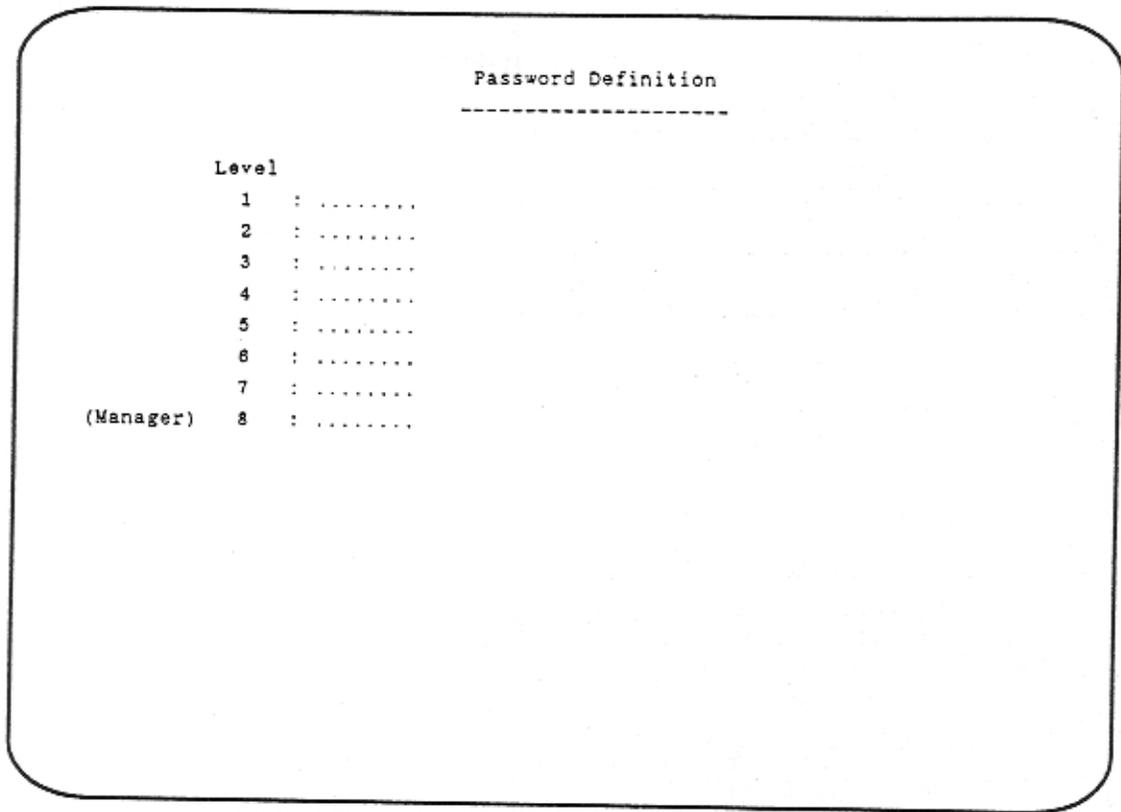


Figure 5-3 Password Defintion Screen

Press the ESCAPE key to test the program on screen and return to the main menu.

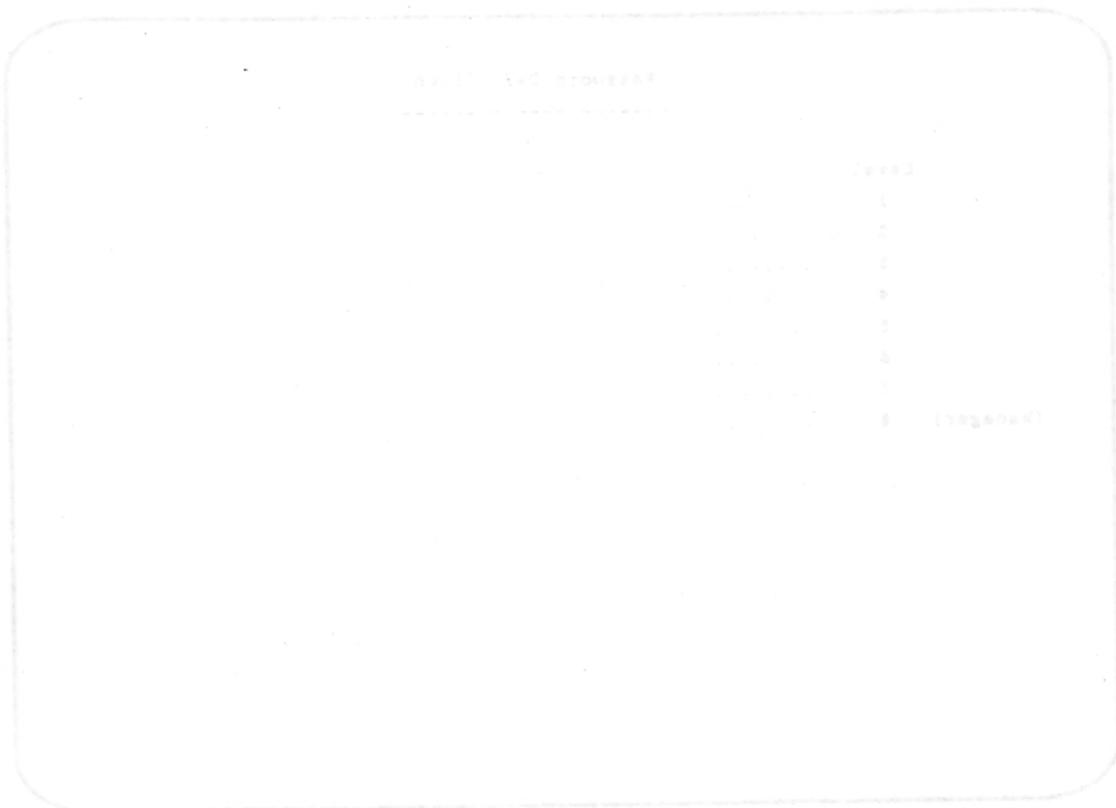


Figure 3-3 Password Entry Screen

# Section 6

## Port Configuration Programming

### 6.1 INTRODUCTION

The first step in programming the ISOETEC System/108 is to assign extension numbers for stations and line numbers for CO lines to the ports. When the system is defaulted, any port cards that are installed in the system are recognized and assigned extension numbers in the case of station port cards or line numbers in the case of CO line port cards.

The *System Configuration* programming screen (F screen) is used to assign extension and line numbers to the system's ports. The valid extension numbers in the system are 3001-3999. The leading digit can also be changed with the *Intercom Dialing Translation* programming screen.

### 6.2 ACCESSING THE SYSTEM CONFIGURATION SCREEN

The *System Configuration* programming screen (the F screen) is accessed by pressing F on the keyboard from the main menu. The ESCAPE key may be pressed while in any other programming screen to reach the main menu. If there is any problem reaching the main menu, or the F screen, refer to the section titled *ACCESSING THE PROGRAMMING SCREENS* in Section 5 - *Programming Introduction*.

### 6.3 WHAT TO PROGRAM

#### 6.3.1 Extension Numbers

Stations are given 4 digit extension numbers beginning with the leading digit (1-0) plus 001 through 999. Any port may be assigned any extension number within this range. CO lines are assigned line numbers in the same manner beginning with line 1 and proceeding for as many lines as the system is equipped for up to 108.

#### 6.3.2 Configuration Planning

Before attempting to program the system configuration, it is advisable to plan which extension numbers are to be assigned to which ports. However, it is easier to allow the system to configure the ports by using the default assignments. Enter the extension number assigned to each port in the space provided for station ports on the *System Configuration* programming screen. Enter the line number for CO lines in the space provided on the *System Configuration* programming screen.

# Section 6 Port Configuration Programming

## 6.1 INTRODUCTION

The first step in programming the ISOMETEC system is to assign extension numbers for stations and line numbers for CO lines in the ports. When the system is delivered, any port cards that are installed in the system are recognized and assigned extension numbers in the case of station port cards or line numbers in the case of CO line port cards.

The System Configuration programming screen (F screen) is used to assign extension and line numbers to the system's ports. The valid extension numbers in the system are 3001-3999. The leading digit can also be changed with the Extension Digits Installation programming screen.

## 6.2 ACCESSING THE SYSTEM CONFIGURATION SCREEN

The System Configuration programming screen (the F screen) is accessed by pressing F on the keyboard from the main menu. The ESCAPE key may be pressed at any time to return to the main menu. If there is any problem testing the main menu, or the F screen, refer to the section titled ACCESSING THE PROGRAMMING SCREENS in Section 2 - Programming Introduction.

## 6.3 WHAT TO PROGRAM

### 6.3.1 Extension Numbers

Stations are given a 4 digit extension number beginning with the leading digit (1-9) plus 001 through 999. Any port may be assigned any extension number within this range. CO lines are assigned line numbers in the same manner beginning with line 1 and proceeding for as many lines as the system is equipped for up to 108.

### 6.3.2 Configuration Planning

Before attempting to program the system configuration, consult the table to plan which extension numbers are to be assigned to which ports. However, it is easier to allow the system to configure the ports by using the default assignment. Enter the extension number assigned to each port in the space provided for station ports on the System Configuration programming screen. Enter the line number for CO lines in the space provided on the System Configuration programming screen.

the keyboard may be pressed. The A key will automatically configure the ports on the card with the first available extension/line numbers. Ports already configured will not be affected.

## 6.9 EXCHANGING PORT CARDS

When a port card is installed in the system, the system retains the type of card it is in memory. This information (card type) is retained even if the card is removed. Another type of card **MUST NOT** be installed in this slot until the type of card information is cleared from memory. To accomplish this, delete each port assignment on the card from the *System Configuration* programming screen **BEFORE** removing the card. A different type of card may then be safely installed.

System Configuration   A = Auto Config. C = Clear Port F = Default Config.														
----- R = Reset Port														
card	port +	01	02	03	04	05	06	07	08	09	10	11	12	
01	Stn	001	3001	3002	3003	3004	3005	3006	3007	3008	3009	3010	3011	3012
02	Stn	013	3013	3014	3015	3016	3017	3018	3019	3020	3021	3022	3023	3024
03	Rec	025	3025	3026	3027	3028	3029	3030	DTMF	DTMF	DTMF	DTMF	DTMF	DTMF
04	CO	037	1	2	3	4	5	6	7	8	9	10	11	12
05	GS	049	13	14	15	16	17	18	19	20	21	22	23	24
06	CO	061	25	26	27	28	29	30	31	32	33	34	35	36
07	DID	073	37	38	39	40	41	42	43	44	45	46	47	48
08	Tie	085	3031	3032	3033	3034	3035	3036	49	50	51	52		
09	---	097												

Figure 6-1 System Configuration Programming Screen

- Card Type:
- Stn - Station port
  - CO - CO port
  - Tie - Tie Line port
  - GS - Loop/Ground Start port
  - Rec - DTMF Receiver port
  - DID - Direct Inward Dial port

the keyboard may be pressed. The A key will automatically configure the port on the card with the first available extension line number. Ports already configured will not be affected.

## 8.9 EXCHANGING PORT CARDS

When a port card is installed in the system, the system retains the type of card it is in memory. This information (card type) is retained even if the card is removed. Another type of card MUST NOT be installed in this slot until the type of card information is cleared from memory. To accomplish this, delete each port assignment on the card from the System Configuration programming screen BEFORE removing the card. A different type of card may then be safely installed.

System Configuration | A = Auto Config | C = Clear Port | F = Details Config

---

F = Reset Port

Card	Port	01	02	03	04	05	06	07	08	09	10	11	12
01 STN	001	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
02 STN	011	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
03 REC	021	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036
04 CO	031	1	2	3	4	5	6	7	8	9	10	11	12
05 CO	041	13	14	15	16	17	18	19	20	21	22	23	24
06 CO	051	25	26	27	28	29	30	31	32	33	34	35	36
07 DID	061	37	38	39	40	41	42	43	44	45	46	47	48
08 TR	071	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036
09	081												

Figure 8-1 System Configuration Programming Screen

- Card Type:
- STN - Station port
  - CO - CO port
  - TR - Trunk Line port
  - GS - Loop Ground Station port
  - REC - DTMF Receiver port
  - DID - Direct Inward Dial port

## Section 7

# System Programming

### 7.1 INTRODUCTION

The *System Programming* screen is used to program the following areas into the system configuration:

#### 7.1.1 Operator Programming

Operator programming consists of which station port is being used as the operator station and which input/output port is being used to connect the operator terminal to the system. This information is programmed in the area labeled *Operator*.

#### 7.1.2 CO Line Parameters

The information regarding the CO lines' parameters (signaling type, recall timers, etc.) is programmed in the areas labeled *Ring*, *Lines*, and *ID Number*.

#### 7.1.3 External Page Programming

Each external page path is programmed with a corresponding dial access code. Day and Night line ringing assignments for the external page are programmed in this area. This information is programmed in the area labeled *External Zone*.

#### 7.1.4 Input/Output Port Programming

The 4 input/output ports' parameters are programmed in this area. The use of the port (programming/operator or SMDR), baud rate, and handshaking protocol are configured in the area labeled *Port*.

#### 7.1.5 Time/Date Information

The current time and date for the system is programmed in the area labeled *Time*.

#### 7.1.6 Music Source

The VCM/DCM has two connections for the input of music. These are labeled BGM for the background music source, and MOH for the music on hold source. However, one source may be used for both background music and music on hold. This is accomplished with the Music area of the *System Programming* screen. The source port for either the background music and/or music on hold can be changed through programming.

## 7.1.7 Various

This programming area contains miscellaneous system parameters. There are 2 parameters that effect SMDR, a parameter for DID programming, and a timer used with ground start trunks.

Each area of programming is discussed separately. Please read each section discussing what should be programmed in each area and fill out the configuration programming sheets before attempting to program the system.

## 7.2 ACCESSING THE SYSTEM PROGRAMMING SCREEN

The *System Programming* screen (the B screen) is accessed by pressing B on the keyboard from the main menu. The ESCAPE key may be pressed while in any other programming screen to reach the main menu. If there is any problem reaching the main menu, or the B screen, refer to the section titled *ACCESSING THE PROGRAMMING SCREENS* in Section 5 - *Programming Introduction*.

System Programming			
[T]ime 2:28 pm Thu 11-17-88	[O]perator A = 3001	Port = 3	
	Operator B = ****	Port = *	
[R]ing Low = 010 PFS = 010	Operator C = ****	Port = *	
Ring High = 050 Ratio = 060	Operator D = ****	Port = *	
[L]ine 001 port 025 Name	[E]xternal Zone 01	Page 00	
Line Type = 000 DTMF N SMDR Enable N	ID Number 001	Day N Night N	
ID Number = 001	Ground Start N		
Public N	TIE/DID N	[P]ort = 1	Installed Y
	[A] ID Number 001	Speed = 9600	Protocol = NONE
ID Class = 00		Printer 0	Computer Port N Type 000
Trunk Group = 01		SMDR N	Incom N Local N Long Dist N
Hunt Group = 00		[M]usic Source	MOH 1 BCM 1
Drop Pulse = 014		[V]arious	
Pause Time = 005s		Cost After = 020	DID Digits 3
Flash Time = 025*50ms		Local Call Cost Limit = \$0.00	
Orbit Recall = 006*10s		Ground Start Timer = 008*50ms	

Figure 7-1 System Programming Screen

## 7.3 OPERATOR PROGRAMMING

### 7.3.1 What To Program

After discussion with the customer, fill in the Operator section of the System Programming Configuration sheet. This sheet will be used when actually entering the information into the system. The operator station consists of two separate connections to the system. One connection is used to supply screen data to the terminal. This connection is to one of the RS-422 input/output ports (ports 3 or 4). The second connection is to one of the station ports, which provides an audio connection to the operator station. Determine which extension number is to be used for the operator station. Enter the extension number on the System Programming Configuration sheet next to *Operator A*. Determine which I/O port is to be used for the operator station. Enter the port number next to *Port*.

Continue with the same procedure for the second operator position.

### 7.3.2 Default Values

Operator A = 3001 Port = 3  
 Operator B = \*\*\*\*\* Port = \*  
 Operator C = \*\*\*\*\* Port = \*  
 Operator D = \*\*\*\*\* Port = \*

### 7.3.3 How To Program

If not already in the *System Programming* screen, from the main menu press the B key.

1. Press the O key. The cursor moves to the Operator programming area.
2. Enter the extension number of the main operator.
3. Press the RETURN key.
4. Press the TAB key. The cursor moves to *Port*.
5. Enter the I/O port number for the main operator.
6. Press the RETURN key.
7. If a second operator position is to be programmed, press the RETURN key a second time. Otherwise, continue with the next section to be programmed.
8. Enter the extension number of the second operator.
9. Press the RETURN key.
10. Press the TAB key. The cursor moves to *Port*.
11. Enter the I/O port number for the second operator.
12. Press the RETURN key.

The third and fourth operator positions are programmed in a similar manner.

## 7.4 CO LINE PROGRAMMING

### 7.4.1 What To Program

CO lines have several different parameters that must be programmed. Each line in the system can be assigned a name to aid in identification. This name will appear on the operator terminal whenever the line is used. The name is programmed in the Line area.

The first thing to program for CO lines is the line type.

- 000 Standard CO lines such as FX, WATS, and DDD lines, etc.
- 012 This line type is used when the line is connected to a PBX extension (or Centrex). This line type prevents the transmitter from being muted when the line is flashed.
- 020 Lines that are allowed to be accessed when the *LCR OUT ONLY* option is set.
- 100 Supervised DISA lines.
- 101 Supervised DISA lines only when the system is in the NIGHT mode.
- 200 Unsupervised DISA lines.
- 201 Unsupervised DISA lines only when the system is in the NIGHT mode.
- 250 Used to dedicate a trunk for the system MODEM.
- 251 Access to the MODEM only when the system is in NIGHT mode.

The following line types are used for tie lines:

- 001 Wink start, return supervision on answer.
- 002 Wink start, return supervision on ring.
- 003 Return supervision on answer.
- 004 Return supervision on ring.

The next thing to be considered is the dial signaling. CO lines can be provided with either pulse signaling, also called rotary, and DTMF signaling, also called tone dialing. If a line is to use DTMF signaling, the DTMF parameter should be programmed for Y (yes).

If SMDR (Station Message Detail Recording) information is to be collected for this line, the SMDR parameter should be programmed to Y (yes).

If the trunk line being programmed is a ground start trunk, the GROUND START parameter must be set to Y (yes), otherwise it is left programmed N (no). The use of ground start trunks requires the use of the Loop/Ground Trunk port card (p/n 15620) and not the COI port card (p/n 15600).

The PUBLIC parameter allows trunk lines programmed as direct appearance keys on stations to be accessed even if there is a call in progress on these lines. This feature is provided to allow multiple stations access to the same line in a style similar to 1A2 key systems. To allow access to a busy trunk, set the PUBLIC parameter to Y (yes), otherwise this parameter should be left programmed to N (no). This feature has no meaning for trunk lines accessed by group keys.

System Programming			
[Time 2:28 pm Thu 11-17-88	Operator A = 3001	Port = 5	
	Operator B = 3002	Port = 6	
[Ring Low = 010 PPS = 010	Operator C = 3003	Port = 7	
Ring High = 050 Ratio = 080	Operator D = 3004	Port = 8	
[L]ine 001 port 025 Name	[E]xternal Zone 01	Page 00	
Line Type = 000 DTMF N SWDR Enable N	ID Number 001	Day N Night N	
ID Number = 001	Ground Start N		
Public N	TIE/DID N		
	[A] ID Number 001		
ID Class = 00			
Trunk Group = 01			
Hunt Group = 00			
Drop Pulse = 014			
Pause Time = 005s			
Flash Time = 025*50ms			
Orbit Recall = 008*10s			
	[P]ort = 1	Installed Y	
	Speed = 9600	Protocol = NONE	
	Printer 0	Computer Port N Type 000	
	SWDR N	Incom N Local N Long Dist N	
	[M]usic Source	NOH 1 BGM 1	
	[V]arious		
	Cost After = 020	DID Digits 3	
	Local Call Cost Limit = 90.00		
	Ground Start Timer = 008*50ms		

Figure 7-2 System Programming Screen

The TIE/DID parameter allows incoming dialed calls on tie lines to follow the DID translation table. This parameter effects only tie lines. It has no meaning for DID trunks.

The remainder of the parameters, including the ringing assignments for stations, are programmed according to line ID number, rather than by line. There are 64 available line ID numbers. Any line can be made a member of any line ID, however, a line may be a member of only one line ID. For systems with 64 lines or less, each line should have its own line ID to simplify ringing assignment programming. This is not mandatory, it just makes programming easier. For systems with more than 64 lines, consideration must be given as to which lines will have the same parameters and station ringing scheme. These lines will then be programmed with the same line ID.

Once the lines have been assigned a line ID, it is time to program the parameters for each line ID.

#### ID Class

The ID class is used with toll restriction. If toll restriction is to be used with the system, planning for ID class should be done after reading the toll restriction section of this manual.

#### Trunk Group

Trunks are arranged into groups for access by the group keys on stations, and by Least Cost Routing. There are ten possible trunk groups in the system. Typically, lines that are connected to the same type of service are arranged into the same groups. For example, all DDD lines may be placed in one

group, all Band 5 WATS may be placed in another group, all FX lines to the same location may be placed in another group. Planning for Trunk groups should be done carefully, with the following taken into consideration: the type of facilities the customer is to use (WATS lines, FX lines, direct dial lines, IDDD lines, etc.), what stations will be allowed to access what lines, toll restriction, and least cost routing. This is not an exclusive list of things to think about before planning the trunk group.

#### Hunt Group

Stations can be arranged in groups to allow an outside line to be transferred to groups of stations rather than an individual extension. Calls entering the hunt group will be routed to the first available station in a circular fashion. CO lines can be programmed to ring directly into a station hunt group by programming the line ID with the same hunt group number as the station hunt group. Lines programmed to ring a hunt group in this fashion should not be given ringing assignments on any stations. There are 36 hunt groups available. However, one hunt group is reserved for use with IVIE (ISOETEC's Voice Integrated Exchange). If a line is to ring into a station hunt, enter the number of the hunt group on the System Programming Configuration sheets.

#### Drop Pulse

This value is the amount of time the trunk may be open before the ISOETEC System/108 will consider the line to be disconnected. This value should not be changed from its default value unless problems with disconnections (either being disconnected or not being disconnected) are experienced. The value entered is in 50 millisecond increments. A value of zero is used if the system is to ignore all line breaks from the Central Office. If, for some reason, this value is to be permanently changed, enter the value on the System Programming Configuration sheet.

#### Pause Time

The pause time is used with speed dial numbers when a manual pause is entered as part of the dialed number. Pause may be needed in dialing a number for a variety of reasons. A pause time of 5 seconds is usually sufficient. If the value is to be changed from the default value, enter the time, in seconds, for the pause in the System Programming Configuration sheet. The value may be any number between 0 and 255.

#### Flash Time

The flash time is used to send a preprogrammed flash (or open line) on a CO line. This is most often used when the line does not originate from a Central Office, but rather from another telephone switching system (PBX). Each incremental setting represents 50 milliseconds. If the timer is set for 000, when the line is manually flashed, the flash duration will be for as long as the CO line key is held down (there is no programmed period of time). When the line key is flashed, the flash duration will be for the flash timer value, or the amount of time the key is held down, whichever is longer. If the flash timer for a line is to be changed from the default value, determine the length of the flash time (a typical flash time is 1/2 second or 500 milliseconds). Divide the time in milliseconds by 50 and enter this value on the System Programming Configuration sheets for each line ID to be changed. Thus the entry for 500 msec. would be 10.

**Orbit Recall** The amount of time a call remains in orbit (parked) is programmable on a per line ID basis. This amount is the time before a call placed in orbit will recall to the party that placed the call in orbit. Determine the amount of time (0 - 255 seconds) for recall of orbit calls (determined from the planning meeting with the customer), and enter the time for each line ID in the System Programming Configuration sheet.

### 7.4.2 Default Values

The default line type for all lines is 000.  
All lines are DTMF N (no), SMDR Enable is N (no).

Each Line from 1 through 64 is assigned a corresponding line ID, i.e. line 1 is line ID 1, line 2 is line ID 2, etc.

ID Class	0
Trunk Group	1
Hunt Group	0
Drop Pulse	014*50 milliseconds (700 milliseconds)
Pause Time	5 seconds
Flash Time	025*50 milliseconds (1.25 secs.)
Orbit Recall	006*10 seconds (60 secs.)

### 7.4.3 How To Program

Name, Line Type, DTMF, SMDR Enable, ID number, Ground Start, Public, and TIE/DID.

If not already in the *System Programming* screen, from the main menu press the B key.

*NOTE: If a parameter is to be the same for all lines, the copy function may be used. After entering the parameter, press the C key to copy the parameter to all lines.*

1. Press the L key.
2. Enter the line number of the line to be programmed, and press the RETURN key. Or, the I and D keys can be used to increment and decrement the line number.
3. Press the RETURN key. The cursor moves to the *Name* area.
4. Enter some identifying information (up to 10 characters) for this line, such as the telephone number, or company name.
5. Press the RETURN key.
6. Press the RETURN key a second time. The cursor moves to line type.
7. Enter the line type for the line from the System Programming Configuration sheets.
8. Press the RETURN key.
9. Enter Y (yes) for the line if DTMF signaling is to be used. Enter N (no) for the line if pulse signaling is to be used.

10. Press the RETURN key.
11. Enter Y (yes) for the line if SMDR information is to be recorded. Enter N (no) for the line if SMDR information is NOT to be recorded.
12. Press the RETURN key. The cursor moves to *ID number*.
13. Enter the ID number for the line if it is to be different from the default value, and press the RETURN key.
14. If Ground Start is to be changed, enter Y (yes) if the line is Ground Start, and press the RETURN key.
15. If Public is to be changed, enter Y (yes) if the line is to be accessed even though it may be in use, and press the RETURN key.
16. If the line being programmed is a tie line, and the DID translation table is to be used for dialed extensions, enter a Y (yes), and press the RETURN key.
17. Continue programming all remaining lines using the System Programming Configuration sheet as reference.

### ID Number parameters

*NOTE: If a parameter is to be the same for all lines, the copy function may be used. After entering the parameter, press the C key to copy the parameter to all lines.*

1. Press the A key.
2. Enter the ID number to be programmed. Or, the I and D keys can be used to increment and decrement the line number.
3. Press the RETURN key.
4. Program the members of the *ID Number* area as necessary using the information on the System Programming Configuration sheet.
5. Use the TAB key to move the cursor left/right. Use the RETURN key to move the cursor up/down.
6. Press the RETURN key after each value is entered:

## 7.5 RING PARAMETERS

The ring parameters section is used to adjust the sensitivity of the frequency for CO line ring detection. These values are not normally adjusted from the default value. Ring Low is the lowest frequency that will be detected. Ring High is the highest frequency that will be detected. These parameters effect all lines in the system.

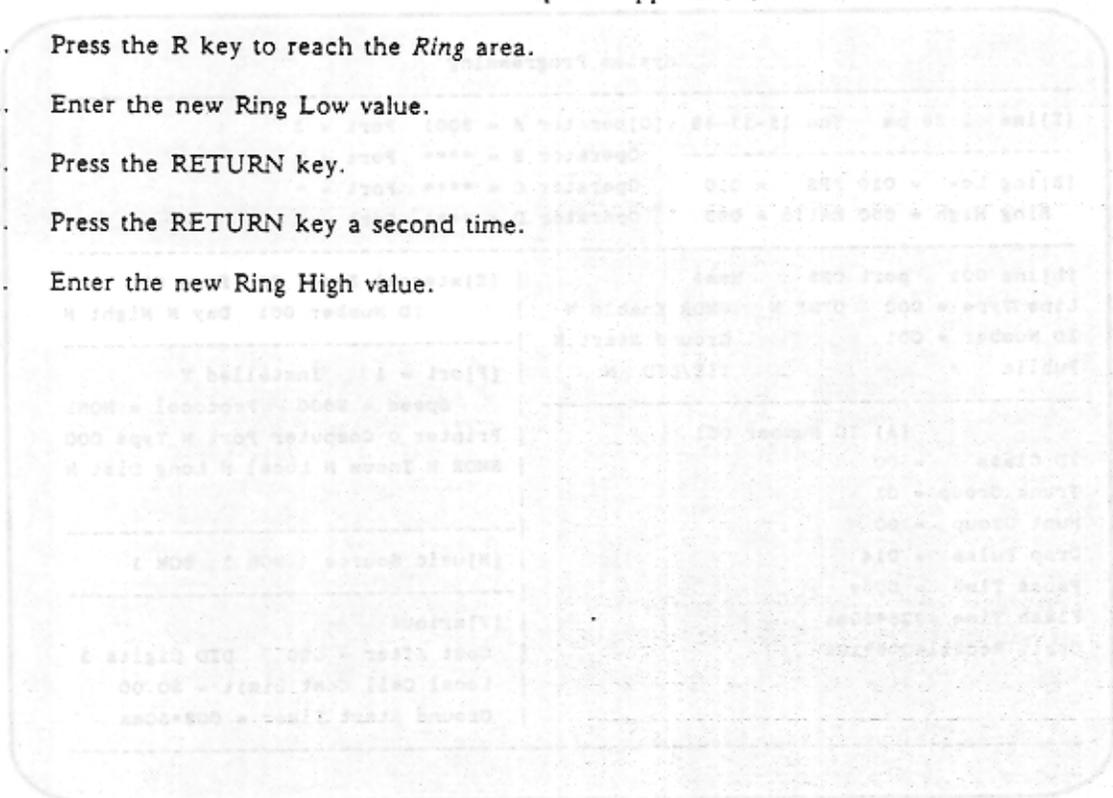
This area may also be used to adjust the dialing rate, and the make to break ratio for pulse dialing.

### 7.5.1 How to Program

#### Ring Low, Ring High

If these values do need to be altered for some special application,

1. Press the R key to reach the *Ring* area.
2. Enter the new Ring Low value.
3. Press the RETURN key.
4. Press the RETURN key a second time.
5. Enter the new Ring High value.



PPS, Ratio

1. Press the R key to reach the *Ring* area.
2. Press the TAB key.
3. Enter the new PPS (choices are either 010 for 10 pps or 020 for 20 pps).
4. Press the RETURN key.
5. Press the RETURN key a second time.
6. Enter the new Ratio.
7. Press the RETURN key.

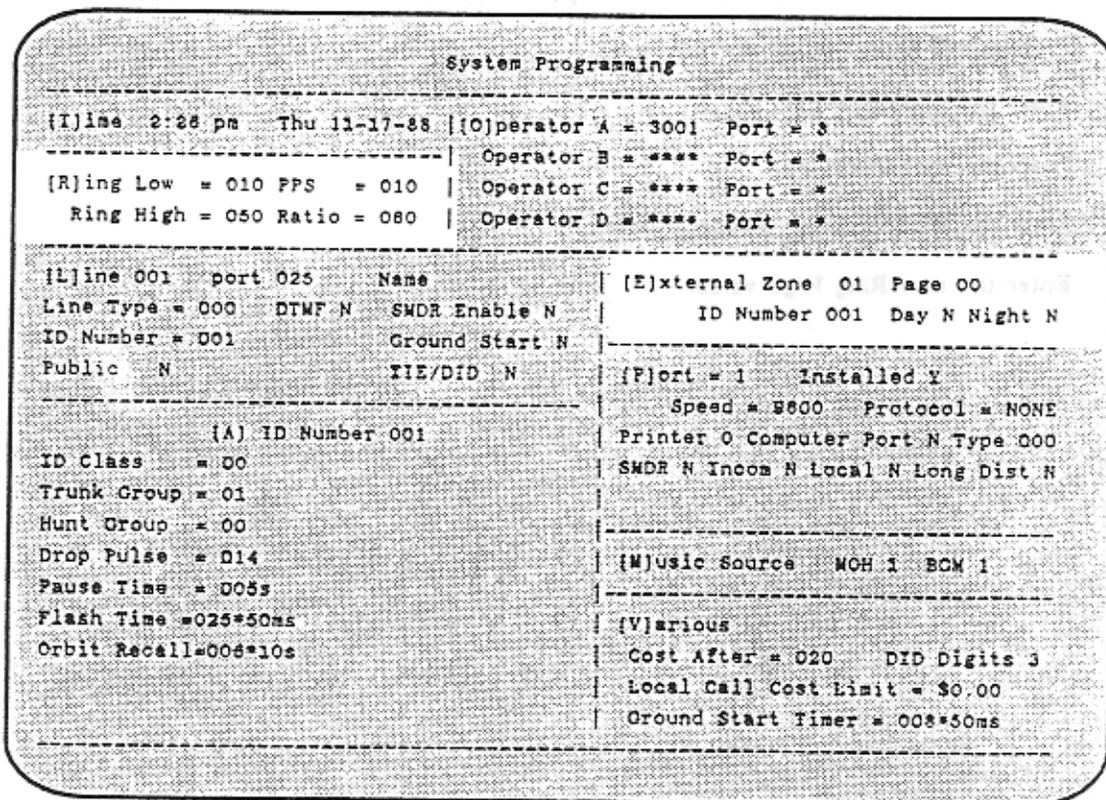


Figure 7-3 System Programming Screen

## 7.6 EXTERNAL ZONE PROGRAMMING

### 7.6.1 What To Program

Each station port card (p/n 15640) is equipped with an audio path that may be connected to an external paging system. The audio path may be used for voice announcements, CO line ringing indication (day and/or night ring), and to provide background music. The *External Zone* on the System Programming Configuration sheet refers to the slot the station port card is installed in, not the paging zone. *Page* refers to the page zone for the external path. This page zone is the dial access code used to reach the external path. *ID Number* and *Day* and *Night* are used to assign CO line ringing to the external path.

If external paging is to be used, assign an access code (61 through 69, or 60 for all page) to the external page path. Enter the zone and page access code on the System Programming Configuration sheet.

If the external page is to be used for CO line ringing, determine which line ID numbers are to ring and whether the ring is to ring during the day, night, or both. Enter this information for each external page path on the System Programming Configuration sheet.

The background music is turned on and off from the operator station and does not need any programming.

### 7.6.2 Default Values

All external page zones default to no page access zone, and no ringing assignments.

### 7.6.3 How to program

If not already in the *System Programming* screen, from the main menu press the B key.

#### Page Zone Access Codes

1. Press the E key. The cursor moves to the External Zone programming area.
2. Enter the slot number of the external page path to be programmed for the System Programming Configuration sheet.
3. Press the RETURN key.
4. Press the TAB key. The cursor moves to *Page*.
5. Enter the access code to be used for this path (61 through 69, or 60 for all page). A code of zero is used if the path is not to be used for voice announcements.
6. Press the RETURN key.
7. Continue to program the remaining page paths. Press the TAB key to move the cursor back to *External Zone*. The I key on the keyboard can be used to increment the External Zone number. The D key on the keyboard can be used to decrement the External Zone number.

## Line Ringing Assignments

1. Press the RETURN key to move the cursor back and forth between the *External Zone* line and the *ID Number* line.
2. Enter the ID number of the line ID to be programmed to ring over the external page path.
3. Press the RETURN key. The cursor will move to *Day*.
4. Enter a Y (yes) if the line ID number is to ring the External page during the DAY. An N (no) is entered if the line ID is not to ring during the DAY.
5. Press the RETURN key to move the cursor to *Night*. Enter a Y (yes) if the line ID number is to ring the External page during NIGHT mode operation. An N is entered if the line ID is not to ring during NIGHT mode.
6. The TAB key may be pressed while on the *ID number* line to increment the line ID number. Press the RETURN key to move back and forth along the *ID number* line.
7. Continue programming the remaining line ID numbers, and External Zones using the System Programming Configuration sheets as a guide.

System Programming			
[T]ime 2:26 pm Thu 11-17-88	[O]perator A = 3001	Port = 3	
	Operator B = ****	Port = *	
[R]ing Low = 010 PPS = 010	Operator C = ****	Port = *	
Ring High = 050 Ratio = 080	Operator D = ****	Port = *	
[L]ine 001 port 025 Name	[E]xternal Zone 01 Page 00		
Line Type = 000 DTMF N	SMDR Enable N	ID Number 001 Day N Night N	
ID Number = 001	Ground Start N		
Public N	TIE/DID N		
[A] ID Number 001	[P]ort = 1 Installed Y		
ID Class = 00	Speed = 9800 Protocol = NONE		
Trunk Group = 01	Printer 0 Computer Port N Type 000		
Hunt Group = 00	SMDR N Incom N Local N Long Dist N		
Drop Pulse = 014			
Pause Time = 005s	[M]usic Source MOH 1 BCM 1		
Flash Time = 025*50ms			
Orbit Recall = 008*10s	[V]arious		
	Cost After = 020 DID Digits 3		
	Local Call Cost Limit = \$0.00		
	Ground Start Timer = 008*50ms		

Figure 7-4 System Programming Screen

## 7.7 INPUT/OUTPUT PORT PROGRAMMING

### 7.7.1 What To Program

The Input/Output Ports are programmed for baud rate, and handshaking protocol. The port that is used as the SMDR port is further programmed for the types of SMDR information to be printed. The port can also be assigned a printer number (0-4). This number corresponds to the printer number used when printing REPORTS.

The port used for the operator terminal should be programmed for 9600 baud, and no protocol.

The baud rate for the programming terminal should be programmed to match the baud rate of the terminal being used. For the ISOETEC terminal, the baud rate should be 9600 and no protocol.

The baud rate and protocol for the SMDR device should be programmed to match the device being used. In addition, the SMDR device must be programmed for the types of calls to be programmed. The types are incoming, local, and long distance.

Possible baud rates are:

300  
1200  
2400  
4800  
9600

Possible handshakes are:

None  
DTR  
X\_ON

### 7.7.2 Default Values

All four I/O Ports default the same.

Port = 1,2,3, and 4    Installed Y  
Speed = 9600    Protocol = NONE  
Printer 0 Computer Port N Type 000  
SMDR N Incom N Local N Long Dist N

### 7.7.3 How to program

If not already in the *System Programming* screen, from the main menu press the B key.

Programming and Operator terminal

1. Press the P key on the keyboard. The cursor moves to *Port*.
2. Enter the port number to be programmed.
3. Press the RETURN key. The cursor moves to *Installed*.

4. If the port is not to be used, press the N key.
5. Press the RETURN key. The cursor moves to *Speed*.
6. Press the I key until the desired baud rate is shown.
7. Press the TAB key. The cursor moves to *Protocol*.
8. Press the I key until the desired protocol is shown.
9. Press the RETURN key.
10. Press the P key to return the cursor to *Port*. Enter the new port to be programmed, and press the RETURN key. The I key on the keyboard can be used to increment the Port number. The D key on the keyboard can be used to decrement the Port number. Continue to program the remaining ports.

#### Printer Number

1. Press the RETURN key until the cursor is beside *Printer*.
2. Enter the desired printer number 1 through 4.
3. Press the RETURN key.

#### SMDR device

1. Program the baud rate and protocol using the directions for the programming terminal.
2. Press the RETURN key until the cursor is beside *SMDR*.
3. Enter a Y (yes) to make the port an SMDR port.
4. Press the TAB key to move the cursor to right/left.
5. Enter a Y (yes) for each type of call to be recorded by the SMDR port.

## 7.8 TIME/DATE INFORMATION

### 7.8.1 How to Program

If not already in the System Programming screen, from the main menu press the B key.

1. Press the T key.
2. Enter the time in 24 hour clock format.
3. Press the RETURN key.
4. Press the RETURN key a second time.
5. Enter the date in month-day-year format.
6. Press the RETURN key.

## 7.9 MUSIC SOURCE

### 7.9.1 What to Program

The VCM/DCM has two connections for the input of music. These are labeled BGM for the background music source, and MOH for the music on hold source. However, one source may be used for both background music and music on hold. This is accomplished with the Music area of the System Programming screen. The source port for either the background music and/or music on hold can be changed through programming.

The music on hold source connector is source 1; the background music connector is source 2.

### 7.9.2 Default Values

The MOH and BGM default to connector 1; the music on hold source.

### 7.9.3 How to Program

If not already in the *System Programming* screen, from the main menu press the B key.

1. Press the M key.
2. Enter the source for the music on hold.
3. Press the RETURN key.
4. Enter the source for the background music.

*NOTE: BGM and MOH may have the same source.*

## 7.10 VARIOUS

### 7.10.1 What to program

The Cost After parameter is used with SMDR (Station Message Detail Recording or the Call Accounting Reports Option) to determine how long after a call has been dialed, the costing process should begin.

The local call cost limit is also used by SMDR in conjunction with Least Cost Routing to define for the system what calls can be considered local by price rather than by dialed number.

DID digits defines for the system how many digits the local telephone operating company is expected to transmit to the system on a DID call.

The Ground Start Timer is the amount of time the system places a ground on the ring side of a trunk to request service. This value should not be changed unless problems are experienced starting ground start trunks. Audio is not turned on while ground is applied to the line.

### 7.10.2 Default Value

The default value for Cost After is 20 seconds. The default value for Local Cost Limit is \$0.00. The default value for DID Digits is 3.

The Ground Start Timer is  $008 * 50\text{ms}$  (.4 seconds).

### 7.10.3 How to Program

If not already in the *System Programming* screen, from the main menu press the B key.

1. Press the V key.
2. Enter the time in seconds.
3. Press the RETURN key.
4. If the *DID digits* value is to be changed, enter the new value, and press the RETURN key.
5. Press the RETURN key a second time to move to Local Cost Limit.
6. Enter the Local Cost Limit, and press the RETURN key.
7. Press the RETURN key to move the cursor to the Ground Start Timer.
8. Enter the new value, and press the RETURN key.

# Section 8

## Station Programming

### 8.1 INTRODUCTION

The ISOETEC® System/108 digital multiline telephone station is a very easy to use, and versatile telephone. Each multiline telephone has a number of fully programmable feature keys. Most of the features incorporated into the ISOETEC System/108 require the use of one of these programmable keys. The ISOETEC digital telephones are available in the following sizes:

- 29-key display telephone with 20 programmable keys and 3 'soft keys',
- 28-key telephone with 22 programmable keys,
- 17-key telephone with 11 programmable keys,
- 6-key telephone.

A standard, tone dial, single line (2500 type) telephone set may also be used with the ISOETEC System/108 with the use of the OPX Interface connected to one of the station ports. It may be necessary to program certain key positions, in station programming, for the 6 key and single line phones, even though the phones do not physically have feature keys.

Each extension number is also programmed for a variety of parameters, and may be programmed for ringing and access to outside lines.

*NOTE: The programming of a station follows the extension number, and not the port number. Thus, when moving an extension to an existing telephone, only the extension number of the port needs to be changed. The programming of that extension number will remain.*

In order to ensure an easy job of programming, and for ease of operation, it is extremely important to discuss with the customer the features that will be used with the system, and the layout of the keys on the stations. To provide uniformity, it is recommended, where possible, to place like keys in the same positions on each station.

The following sections describe each feature as it relates to programming a station. A description of how to program each area of station programming will be found at the end of the area description, rather than after each individual feature.

Determine which stations are to ring (day mode and/or night mode), and which stations are to have outgoing access to which outside lines (day mode and/or night mode). This information will be programmed in the Ring/Access area for each station to be programmed.

Determine which stations are to use which features. The Keys programming section describes the function of each key. The following is a list of features which require one or more key positions on a station:

ACCOUNT CODE (not needed on a display phone)  
ADD ON  
BAD LINE  
BARGE IN

- CALL BACK (not needed on a display phone)
- CALL COVERAGE (Pilot Keys)
- CALL FORWARD
- DATA FEATURE
- DIRECT STATION SELECTION/BUSY LAMP FIELD APPEARANCE
- DIRECT TRUNK APPEARANCE
- DO NOT DISTURB
- IN/OUT
- LEAST COST ROUTING
- MIC MUTE
- NIGHT MODE (operator station only)
- NIGHT ANSWER
- MESSAGE WAITING
- PATCH
- PBX FEATURE
- PICK UP
- RELEASE
- SAVE/REPEAT
- SERIAL
- SPLIT
- TRUNK GROUP
- UNI KEY
- VMS

Determine from the following list and the descriptions found later in this section which parameters must be programmed for each station. These parameters are programmed in the *Timers* area of the *Station Programming* screen.

- Camp-on timer
- Recording Number
- Hunt group
- Day class
- Night class
- LCR class
- Prime line
- Page zone
- Forced account
- Pickup group
- Cost limit in dollars
- Ring type
- Hold Recall in seconds
- Transfer Recall in seconds
- Handsfree CO
- Handsfree ICM Handsfree Receive
- Auto Answer
- Auto 2nd Path
- Allow 2nd Path
- Group in
- Busy on Hold
- Block Barge in

Block Barge Tone  
 Out LCR Only  
 Total Toll  
 SMDR Enable  
 Busy on DID

## 8.2 ACCESSING THE STATION PROGRAMMING SCREEN

The *Station Programming* screen (the A screen) is accessed by pressing the A key while in the main menu. The ESCAPE key may be pressed while in any other programming screen to reach the main menu. If there is any problem reaching the main menu, or the A screen, refer to the section titled *ACCESSING THE PROGRAMMING SCREENS* in Section 5 - *Programming Introduction*.

## 8.3 PROGRAMMING STATION RING/ACCESS

### 8.3.1 What to program

Each individual station can be programmed on a per Line ID basis to have outside lines ring the station. The *CO line Programming* section in Section 7 describes what a line ID is. The station is programmed with a separate ring assignment for when the system is in the day mode, and for when the system is in the night mode. Determine from the customer which outside lines are to ring on which stations, and whether they are to ring in the day mode, night mode or both. Determine the outside lines' corresponding line IDs. Enter this information for each station on the *Station Programming Configuration* sheets.

Each individual station can be programmed on a per Line ID basis to have outgoing access to outside lines. The station is programmed with a separate access for when the system is in the day mode, and for when the system is in the night mode. Determine from the customer which stations are to have outgoing access to which outside lines, and whether they are to have access in the day mode, night mode or both. Determine the outside lines' corresponding line IDs. Enter this information for each station on the *Station Programming Configuration* sheets.

### 8.3.2 Default Values

Extensions 3001 through 3006

Day Ring	Y
Night Ring	Y
Day Access	Y
Night Access	Y

Extensions 3007 through 3108

Day Ring	N
Night Ring	N
Day Access	Y
Night Access	Y

### 8.3.3 How to program

If not already in the *Station Programming* screen, from the main menu press the A key. The Day Ring, Night Ring, Day Access, and Night Access for each station are programmed by Line ID number. Refer to Figure 8-1 for an example of the *Station Programming* screen.

1. When the *Station Programming* screen is entered, the cursor is at the extension number position. The extension number of the station to be programmed can be entered. The I and D keys can be used to Increment and Decrement the extension number.

2. If the extension number was entered, press the RETURN key.
3. Press L on the keyboard. The cursor moves to the Ring/Access area.
4. Enter the Line ID number to be programmed. Press the RETURN key. The I and D keys can be used to Increment and Decrement the Line ID number.
5. Once the cursor is in the Ring/Access area, the LEFT ARROW key can be used to decrement the Line ID number. The RIGHT ARROW key can be used to increment the Line ID number.
6. Working from the Station Programming Configuration sheets, enter the information for each Line ID number.
7. Press the RETURN key after each entry to advance the cursor to the next entry. Press the L key at any time to bring the cursor back to select the Line ID number.

Programming aids have been included in this programming area. These programming aids are the copy functions and are outlined in the following section.

```

[E]xt 3001 port 001 name          type 17K      time 2:26 p Thu 11-17-88
-----
[L]ine ID Number - 001      c=ext->exts | [T]imers
  day ring:  Y          x=col->ext | Camp on timer =003*10s Hands free co Y
  night ring: Y          v=col->ext | Recording Num = 000   Hands free ICM Y
  day access: Y          z=row->ext | Hunt group   = 000   Hands free Rec Y
  night access: Y        w=row->ext | Day class    = 000   Auto Answer   Y
-----
                                | Night class   = 000   Auto 2nd Path N
                                | LCR class    = 000   Allow 2nd Path N
[K]eys  [H]                    | Prime line   = 000   Group in      N
01 [ 0300 ] 0020 02 [ 0300 ] 0020 | Page zone    = 080   Busy On Hold  N
03 [ 0300 ] 0020 04 [ 0300 ] 0020 | Forced account= 000   Bk Barge In  N
05 [ 0818 ] 0000 06 [ 0818 ] 0000 | Pickup group = 000   Bk Barge Tone Y
07 [ 3001 ] 0000 08 [ 3002 ] 0000 | Pilot NoAnsw = 000s  Out LCR Only  N
09 [ 3003 ] 0000 10 [ 3004 ] 0000 | Cost limit   = $0.00 Total Toll   N
11 [ 3005 ] 0000 12 [ 3006 ] 0000 | Ring type    = 01   SMDR Enable  N
13 [ 0800 ] 0001 14 [ 0800 ] 0002 | Hold Recall  = 006*10s Hook Release N
15 [ 0800 ] 0003 16 [ 0800 ] 0004 | Trans Recall = 006*10s VMS/Attend. N
17 [ 0700 ] 0001 18 [ 0700 ] 0002 |                                     Analog Phone N
19 [ 0810 ] 0060 20 [ 0802 ] 0000 |                                     Busy on DID  N
21 [ 0803 ] 0000 22 [ 0809 ] 0000 |
[c] all lines to all extns or timer to all extns, [x] line to all lines in extn
[v] line to all extns, [z] ring to all lines, [w] ring to all extns
  
```

Figure 8-1 Station Programming Screen

## 8.4 COPY FUNCTIONS FOR RING/ACCESS

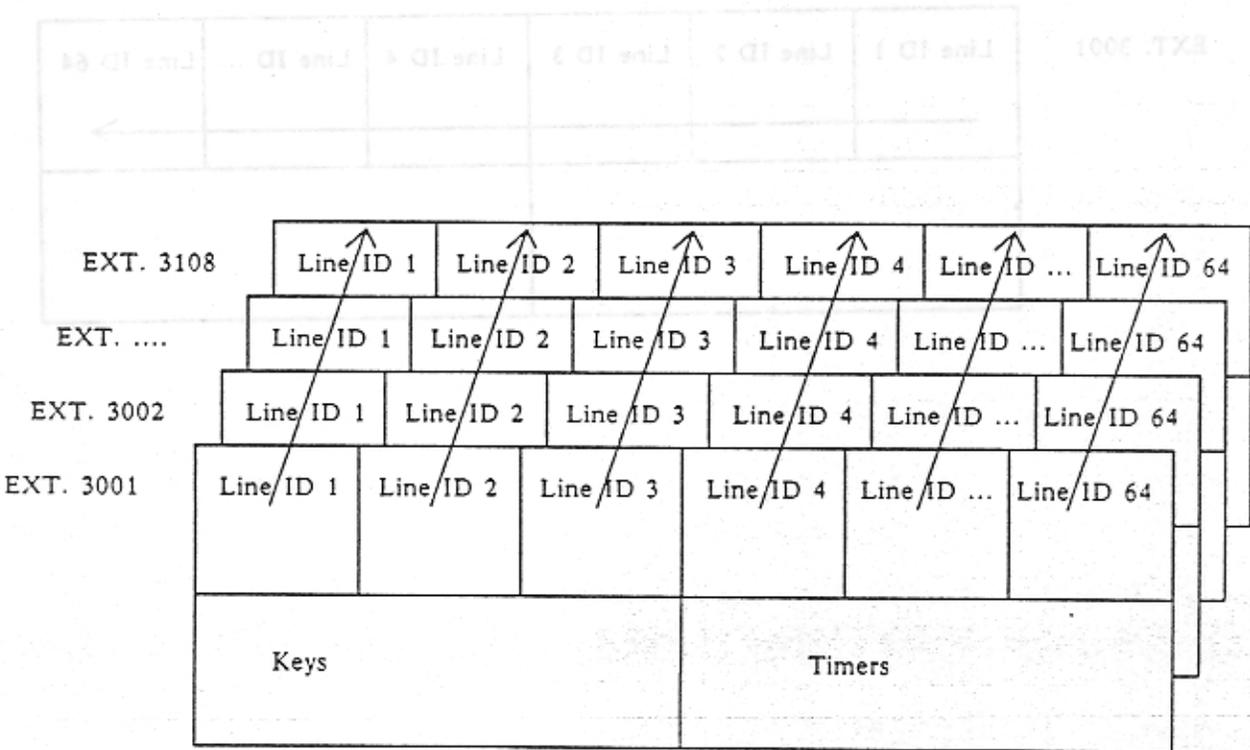
### Copy function C:

Copy function C copies every Line ID to every station. To copy every Line ID to every station, the cursor must be on the line with Line ID Number.

Line ID on station programming =

Day Ring        Y or N  
 Night Ring     Y or N  
 Day Access     Y or N  
 Night Access   Y or N

Copy function C is also used to copy individual *Timer* values to all extensions, or a particular *Key code* to all extensions.



Copy function X:

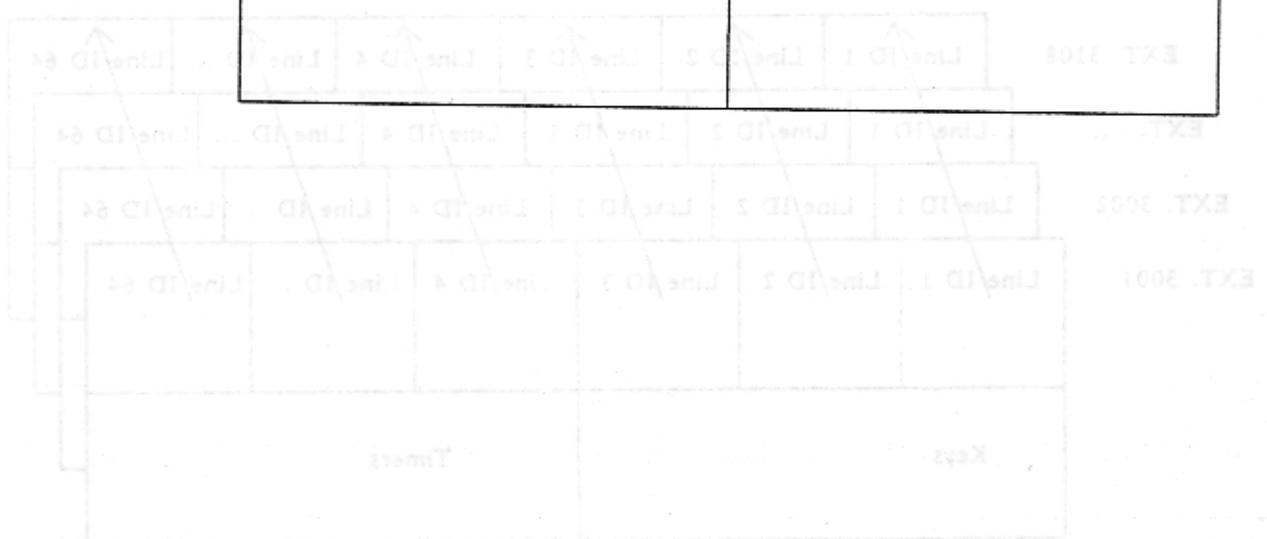
Copy function X copies one Line ID to all Line IDs for one extension. This will copy all four parameters to every Line ID. It will not copy Line IDs to other extensions. To copy one Line ID to every other Line ID, the cursor must be on the line with Line ID Number.

Line ID on station programming =

- Day Ring        Y or N
- Night Ring     Y or N
- Day Access     Y or N
- Night Access   Y or N

EXT. 3001

Line ID 1	Line ID 2	Line ID 3	Line ID 4	Line ID ...	Line ID 64
→					



Station Programming

Copy function V:

Copy function V copies one particular Line ID to every extension. This will copy all four parameters of the Line ID to every extension. To copy one Line ID to every extension, the cursor must be on the line with Line ID Number.

Line ID on station programming =

Day Ring Y or N  
 Night Ring Y or N  
 Day Access Y or N  
 Night Access Y or N

EXT. 3108	Line ID 1	Line ID 2	Line ID 3	Line ID 4	Line ID ...	Line ID 64
EXT. ....	Line ID 1	Line ID 2	Line ID 3	Line ID 4	Line ID ...	Line ID 64
EXT. 3002	Line ID 1	Line ID 2	Line ID 3	Line ID 4	Line ID ...	Line ID 64
EXT. 3001	Line ID 1	Line ID 2	Line ID 3	Line ID 4	Line ID ...	Line ID 64

**Copy function Z:**

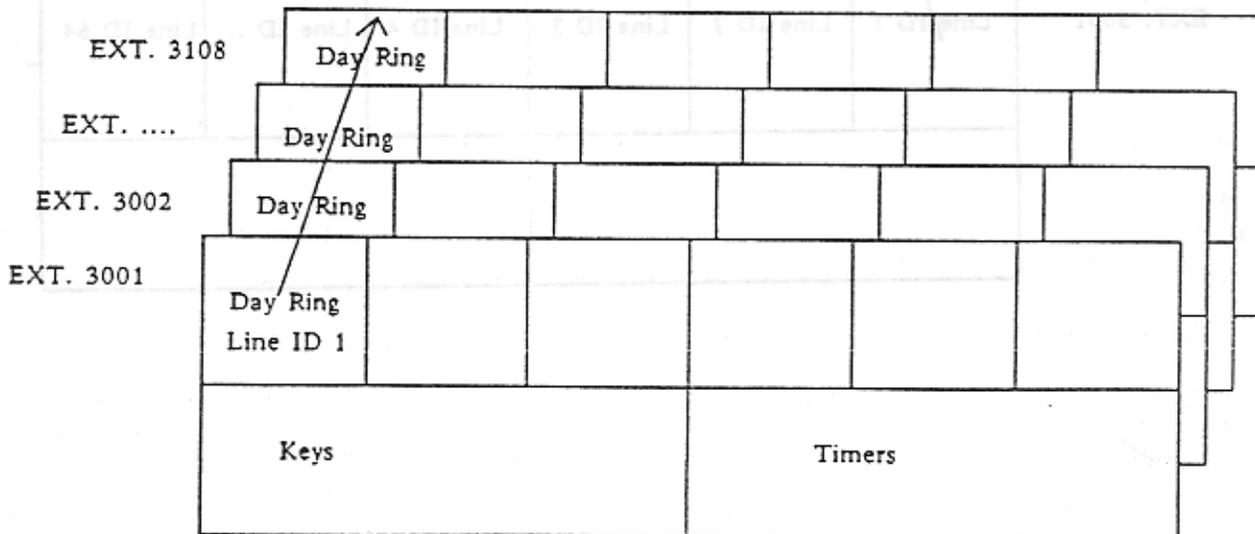
Copy function Z copies *one parameter* of the Line ID, e.g. Day Ring to all other Line IDs. The other parameters will not be copied. To copy one parameter to all other Line IDs, the cursor must be positioned on the line with the parameter. For example, to copy Day Ring to all Line IDs, position the cursor next to Day Ring and press Z.

EXT. 3001

Day Ring Line ID 1	Day Ring Line ID 2	Day Ring Line ID 3	Day Ring Line ID 4	Day Ring Line ID ...	Day Ring Line ID 64

**Copy function W:**

Copy function W copies *one parameter* of one Line ID to every extension. The other parameters will not be copied. To copy one parameter to all other extensions, the cursor must be positioned on the line with the parameter. For example, to copy one line ID's Day Ring to all other extensions, position the cursor next to Day Ring and press W.



## 8.5 KEYS PROGRAMMING

The next step in programming a station, and the one most visible to a user, is the programming of the feature keys (buttons) on the station. Most of the features available to a station user require (or are made easier by) a key programmed for that feature. Listed below are all the keys that can be programmed on a station. Along with each key is a description of what the key is used for. Discuss with the customer what keys are needed on which stations. At the end of the descriptions is a section covering how to program keys on a station.

Each key is programmed on a station by using a key code. The key code for each feature key is listed in the description of the key. Table 8-1 summarizes these key codes. Certain feature keys also require additional information to be programmed. This information is added with the use of the sub-code. The feature key description lists which keys need a sub-code, and what the available sub-codes mean.

### 8.5.1 ACCOUNT CODE KEY

The ACCOUNT CODE key is used to enter up to ten digits (eight digits for Forced Account Codes) into the SMDR call record for both incoming and outgoing calls. If the customer is to make use of this feature to track call records according to use, determine which stations are to be equipped with ACCOUNT CODE keys and their position on each station. Enter the key code for the ACCOUNT CODE key (key code 813) in the proper key position for each station on the Station Programming Configuration sheets. Only one ACCOUNT CODE key is needed per station.

*NOTE: Do not program an ACCOUNT CODE key on a display phone. The ACCOUNT CODE key appears on one of the soft keys when it is needed.*

The FORCED Account Code feature makes use of the ACCOUNT CODE key. If the customer intends to use Forced Account Codes, provide a key for each station selected by the customer.

### 8.5.2 ADD ON KEY

The ADD ON key is used in a manner similar to the TR/CON key to establish a conference call. The difference is the ADD ON key is used when more than two internal parties are to be involved in the conference. For stations that are to make such conferences, determine the key position, and enter the key code for an ADD ON key (key code 806) to the appropriate position on the Station Programming Configuration sheets. Only one ADD ON key is needed per station.

### 8.5.3 BAD LINE KEY

The BAD LINE key is used in conjunction with Least Cost Routing to help identify bad lines within a facility or Other Common Carrier Service. The use of the BAD LINE key will increment a counter in the Line Utilization screen of the Reports Menu. If a station is authorized to make such a report, enter the key code for the BAD LINE key (key code 819) into a key position on the Station Programming Configuration sheets. Only one BAD LINE key is used per station.

### 8.5.4 BARGE IN KEY

The BARGE IN key is provided to allow an authorized party to enter into an existing conversation. The stations which are being entered into must be programmed to allow such entry. If a station is to be permitted to enter a conversation in this manner, enter the key code of a BARGE IN key (key code 816) into a key position for that station on the Station Programming Configuration sheets. Only one BARGE IN key is used per station.

### 8.5.5 CALL BACK KEY

The CALL BACK key can be used by a station user calling a busy extension to complete the call when the called station becomes free. A queued call remains in the system until both the called party and calling party are available. The CALL BACK key may also be used for line queuing. When all outside lines in a particular Trunk Group are busy, a station user can activate this feature which will ring the station back when a line becomes available. If a station is to use the call back feature, enter the key code for a CALL BACK key (key code 807) on the Station Programming Configuration sheets for that station. Only one CALL BACK key is used per station.

*NOTE: Do not program a CALL BACK key on a display phone. The CALL BACK key appears on one of the soft keys when it is needed.*

### 8.5.6 CALL COVERAGE KEYS (Pilot keys)

A set of key codes exists in the ISOETEC System/108 which provide the ability to have an extension ring when another extension in the system is ringing with a trunk call. These keys are used in place of LEAST COST ROUTING keys or TRUNK GROUP keys to make/receive trunk calls. Each key behaves like an LCR key for outgoing calls, and like a DIRECT APPEARANCE key for incoming calls. These keys provide a feature that is similar to the "Square Group" feature in the System/96, but more flexible. The keys give the ability for a station to provide call coverage on trunk calls to other stations. It is the keys that are being covered, not the stations themselves. Thus, if a call is made/received on a key other than the PILOT keys, it is not covered. Intercom calls are not covered.

Each extension that is to be covered is assigned a PILOT key(s) corresponding to its extension number. This same key is then assigned to another extension (the extension which is to provide the coverage). Calls made or received on this key may be handled by either extension. The code for this new key is the extension number to be covered. For example, if the extension numbers in the system begin with a 3, and if extension 3012 is to be covered by a secretary, assign key code 3012 to a key position on extension 3012, and to a key position on the secretary's extension.

Each key is then assigned a sub-key code which describes the way the PILOT key will function on the extension it appears on. The same key may be programmed to function one way on one extension, and a different way on another extension. If a sub-code of zero is entered, the key becomes a DSS key and not a PILOT key. The following describes how the key may be programmed:

A key with a sub-code of:

- 101 - functions as a BLF key only.
- 111 - functions as a BLF key and the phone rings.
- 121 - functions as a BLF key and the phone has a delayed ring. An extension with a PILOT key programmed with this sub-key code starts to ring after the covered station has been ringing a pre-programmed amount of time. The programmed time is taken from the covered extension's station programming. This is found on the *Station Programming* screen (A - screen) in the timers section, and is called *Pilot NoAnswr*. This timer is in increments of seconds.
- 131 - functions as a BLF key and the phone rings only if covered station is busy.
- 141 - functions as a BLF key and the phone has delayed ring, or rings if the covered station is busy.

*NOTE: If total coverage is desired, do not program group keys, or direct appearance trunk keys on the covered extensions.*

**Example 1:**

A company has two managers whose telephones are covered by a single secretary. The first manager is extension 3012. The second manager is extension 3045. The secretary is extension 3033. It is desired that only the secretary's telephone rings whenever there is a call for the first manager. It is desired that when there is a call for the second manager, the secretary's station rings only if the second manager's extension is busy.

The following is programmed:

Extension 3012 (first manager) is assigned key code 3012 sub-code 101. (This extension does not ring for an incoming call on this key).

Extension 3045 (second manager) is assigned key code 3045 sub-code 111.

Extension 3033 (secretary) is assigned two keys. Key code 3012 sub-code 111 (for the first manager), and key code 3045 sub-coded 131 (for the second manager).

**Example 2:**

ABC Company's president, Mr. Daniel, wishes his secretary to answer his extension, but only if it has rung for 30 seconds. Mr. Daniel's extension is 3005, and his secretary is extension 3006. The following is to be programmed:

Extension 3005 is assigned a key code 3005 sub-code 111.

Extension 3006 is assigned a key code 3005 sub-code 121.

The 30 second timer is programmed for extension 3005 (the covered extension) in station programming. Set the *Pilot NoAnswr* parameter in the *Timers* area to 30 (for 30 seconds).

Since these PILOT keys take the place of LCR keys or TRUNK GROUP keys, it is often desired to have more than one key assigned per phone. In this case the sub-code for the PILOT keys changes slightly. The first digit in the sub-code is always 1. The second digit denotes the use of the key (see table above). The third digit denotes the number of the key (1-8). Only 8 keys with the same key code are permitted per extension. Therefore, if the second PILOT key is to act as a BLF key only, the sub-code is 102. Note the third digit is a 2, denoting the second key of the same key code on the station.

A second key with a sub-code of:

- 1 0 2 - key functions as a BLF key only
- 1 1 2 - key functions as a BLF key and phone rings
- 1 2 2 - key functions as a BLF key and phone has a delayed ring
- 1 3 2 - key functions as a BLF key and phone rings only if covered station is busy
- 1 4 2 - key functions as a BLF key and phone has delayed ring, or rings if the covered station is busy.

And so on for the 3rd to 8th key of the same key code.

When there is more than one key of the same key code on the extensions, the keys with the same last digit in the sub-code work together.

The PILOT keys have the highest priority (over TRUNK GROUP keys, UNI keys, etc.) for receiving calls on the station.

*NOTE: Direct appearance keys cannot be covered, and should not be programmed on extensions which are to be covered.*

## NIGHT OPERATION

The CALL COVERAGE keys do NOT operate when the system is in the NIGHT MODE unless an option is set on the *System Options* programming screen. If it is desired that the CALL COVERAGE keys are not to operate at night, provide a trunk group key or an LCR key on extensions with CALL COVERAGE keys.

If CALL COVERAGE keys must work during night mode, set the NIGHT CALL COVERAGE option to Y (yes) on the *System Options* programming screen.

Enter the key code for the CALL COVERAGE key in a key position for each desired station.

### 8.5.7 CALL FORWARD KEY

The CALL FORWARD KEY allows calls to an extension to be automatically rerouted to another extension. This can be done for all calls, when the extension is busy with another call, when there is no answer, or when either busy or no answer. If a CALL FORWARD key is to be programmed, enter the key code for a CALL FORWARD key (key code 809) on the Station Programming Configuration sheets. The CALL FORWARD key can also be programmed to forward all calls to a predetermined extension when the key is pressed without entering the call forward sequence. This is accomplished by programming the extension number of the station that is to receive the forwarded calls into the sub-code area for the CALL FORWARD key. Only the last three digits of the extension number are entered in to the sub-code area. For example, to forward calls to extension number 3042, enter 042 in the sub-code area. Only one CALL FORWARD key is used per station.

*NOTE: When the system is in the NIGHT mode, Call Forward is affected by the NIGHT FORWARD ON option on the System Options programming screen.*

### 8.5.8 DATA HOT LINE KEY

The DATA HOT LINE key is used with the Data Feature for one key access to call another data port. Enter the key code for a DATA HOT LINE key (key code 828) on the Station Programming Configuration sheets for each station required. The particular data port (001-108) to be accessed by the key is programmed as the sub-code for the key. Enter the sub-code for each key to be programmed on the Station Programming Configuration sheets. A station may be programmed with as many DATA HOT LINE keys as will fit on the station.

### 8.5.9 DATA ON/OFF KEY

The DATA ON/OFF key is required to use the data switching capability of the ISOETEC System/108. The DATA ON/OFF key enables a user to establish a connection to any idle data port, and communicate to any serial device connected to the ISOETEC System/108. For all stations that are to use the data feature, enter the key code for a DATA ON/OFF key (key code 829) in a key position on the Station Programming Configuration sheets. Only one DATA ON/OFF key is needed per station.

### 8.5.10 DIRECT TRUNK APPEARANCE KEY

Any trunk connected to the ISOETEC System/108 may appear as an individual trunk on any station. Enter the line number for the particular trunk (001-108) to be programmed in a key position on the Station Programming Configuration sheets. A station may have as many direct trunk appearances as will fit on the station.

### 8.5.11 DIRECT STATION SELECTION (DSS) KEY

The Direct Station Selection/Busy Lamp Field Key may be programmed by the user to enable rapid access to an internal station. The lamps associated with these keys can be used to provide a visual indication of the status of the extension the key is programmed for. Instead of having to dial 4 digits to call a station, the DSS key can be pressed to call preprogrammed extensions. Enter the 4 digit extension number for each DSS key to be programmed with a sub-code of zero in a key position on the Station Programming Configuration sheets. If a sub-code other than zero is entered, the DSS key becomes a PILOT key. A station may have as many DSS keys as will fit in the station.

An option on the *System Options* programming screen allows DSS keys to be used for *Call Pick-up*.

### 8.5.12 DO NOT DISTURB KEY

A station can block all ringing, pages, background music, and barge-in by activating the DND mode. Enter the key code for a DND key (key code 803) in one of the key positions for each station to use the feature on the Station Programming Configuration sheets. A station uses only one DND key.

### 8.5.13 ICM KEY

The ICM key has two functions. It is used when a station is programmed for Prime Line use to access internal dial tone. The ICM key is pressed before taking the station off-hook to receive internal dial tone. The ICM key can also be used if stations wish an LED indication of internal calls on hold, or transferred internal calls. Enter the key code for an ICM key (key code 818, sub-code 000) in a key position on the Station Programming Configuration sheets.

### 8.5.14 IN/OUT KEY

This feature key allows an extension to indicate to callers that the user is not at the station. Enter the key code for an IN/OUT key (key code 821) in a key position on each station to use this feature on the Station Programming Configuration sheets. Only one key per station is needed.

### 8.5.15 LCR KEY

An LCR key is a TRUNK GROUP key used to access the Least Cost Routing feature. If a station is to have a Least Cost Routing key, enter a key code of 300 with a sub-code of 20 on the Station Programming Configuration sheet into a key position. On the Station Programming Configuration sheet, the sub-code is entered immediately to the right of the key position. A station may be programmed for as many LCR keys as will fit on the station.

*NOTE: It is recommended that a station have at least two LCR or TRUNK GROUP keys to allow for receiving a second call, or to make a conference.*

### 8.5.16 MESSAGE WAITING KEY

A lamp indication may be left at a called station when a caller receives a busy signal or a ring-no answer through the use of a message waiting key. A station will require a MESSAGE WAITING key if it intends to activate the MESSAGE WAITING lamp at another station. Enter the key code for a MESSAGE WAITING key (key code 804) in a key position on the Station Programming Configuration sheets. Only one MESSAGE WAITING key is needed per station.

### 8.5.17 MIC MUTE KEY

This feature key allows the microphone and the transmitter in the handset of a station to be attenuated. An outside party will not be able to hear a normal conversation carried out in the room while this feature is active. Enter the key code for a MIC MUTE key (key code 801) in a key position on the Station Programming Configuration sheets. Only one key is to be programmed per station.

### 8.5.18 NIGHT ANSWER KEY

A key can be provided for stations which do not ring when the system is in the night mode, to enable the station to answer incoming outside line calls. This is the NIGHT ANSWER key. For all stations which are to have a NIGHT ANSWER key, enter the key code for a NIGHT ANSWER key (key code 802) in a key position on the Station Programming Configuration sheets. Only one NIGHT ANSWER key is used per station.

### 8.5.19 NIGHT MODE KEY

The NIGHT MODE key is programmed on the operator station to enter the system into the night mode. On the operator's Station Programming Configuration sheet, enter the key code for a NIGHT MODE key (key code 800) in a key position. Only one NIGHT MODE key is to be programmed per operator station.

*NOTE: A NIGHT MODE key is not necessary when using the Integrated Operator Terminal.*

### 8.5.20 PAGE KEY

The PAGE key is used for single key access to one of the nine page zones or to page all zones. Enter the key code for a PAGE key (key code 810) in a key position on the Station Programming Configuration sheets. Enter the zone that the key is to access (61-69, or 60 for all zone page) in the sub-code area for each PAGE key. A station may have as many page keys as needed.

### 8.5.21 PATCH KEY

The PATCH key is used when a station originates a conference call with two outside parties and wishes to leave the conference, but have the two outside parties remain connected together. Enter the key code for a PATCH key (key code 812) in a key position on the Station Programming Configuration sheets for each station authorized to use this feature. Only one PATCH key is to be programmed per station.

### 8.5.22 PBX FEATURE KEY

Up to 40 programmable PBX feature keys can be assigned for single key emulation of PBX features. The PBX feature keys can be programmed to flash a line, wait for a time or for dial tone, or dial a feature sequence, or any combination of these. For each PBX feature key to be programmed on a station, enter the key code for a PBX feature key (key code 815) in a key position on the Station Programming Configuration sheets. The particular sequence to be used is programmed on the *PBX FEATURE KEY* programming screen. There are 40 possible PBX feature key sequences. To program the PBX key for a particular sequence, enter the sequence number (1-40) into the sub-code area for the PBX feature key. Any number of PBX FEATURE keys may be programmed as will fit on the station.

### 8.5.23 PICK UP KEY

Stations can be arranged into groups such that a call ringing any station in the group can be answered by any other station, using a single key. The advantage of the pickup group is that it is not necessary to know which extension in the group is ringing. There are 36 pickup groups with no limit to the amount of stations assigned to a group. However, a station can only be part of one pickup group. A station does not have to be part of the pickup group that he or she is trying to answer. For each station to make use of this feature, enter the key code for a PICK UP key (key code 808) in a key position on the Station Programming Configuration sheets. Enter the particular group (1-36) into the sub-code area for each key. A station may have as many PICK UP keys as needed.

### 8.5.24 RELEASE KEY

A RELEASE key is placed on a station that is using a headset rather than the handset. The RELEASE key is used in place of the switch-hook. For each station needing a RELEASE key, enter the key code for a RELEASE key (key code 811) in a key position on the Station Programming Configuration sheets. Only one RELEASE key is to be programmed per station.

### 8.5.25 RINGING GROUP PICKUP KEY

The RINGING GROUP PICKUP key allows a call ringing in a pickup group to ring any phone programmed with a RINGING GROUP PICKUP key. Formerly, GROUP PICKUP keys (key code 808) only flashed to indicate an incoming call. The key can be programmed to light only, to begin ringing immediately and light, or to begin ringing after a delay time and light immediately.

The key code for a RINGING GROUP PICKUP key is 9 + the group number 01 through 36. The key is also programmed with a sub-code:

- |           |   |
|-----------|---|
| 000       | = immediate ring  |
| 001 - 200 | = this number is multiplied by 10 seconds to give the delay time. |
| 201       | = the phone does not ring. The LED lights immediately.            |

### 8.5.26 SAVE/REPEAT KEY

A number dialed on an outside line can be saved for later re-dialing through the use of this feature key. Enter the key code for a SAVE/REPEAT key (key code 814) in a key position on the Station Programming Configuration sheets for each station to use this feature. Only one SAVE/REPEAT key is to be programmed per station.

### 8.5.27 SERIAL KEY

A station user can cause a transferred call to automatically recall their station upon completion for re-routing to another party. When the SERIAL key is used with the TR/CON (TTransfer CONFerence) key, the call that is transferred recalls the station when the transferred station disconnects from the call. The serial key is used prior to transferring an outside line call. Enter the key code for a SERIAL key (key code 820) in a key position on the Station Programming Configuration sheets for each station to use this feature. Only one SERIAL key is to be programmed per station.

### 8.5.28 SILENT MONITOR KEY

The SILENT MONITOR key is used in applications where it is necessary to monitor the conversation on outside line calls of a particular station. This feature is similar to the BARGE IN feature, but does not need to be activated for each call made by the monitored station. Enter the key code for the SILENT MONITOR key (key code 833) in a key position for each authorized station. Only one key is required per station.

### 8.5.29 SPLIT KEY

The SPLIT key allows a station user to place a call on hold, and switch to a waiting call. The user may then switch back and forth between the two calls with the use of one key. Enter the key code for a SPLIT key (key code 805) in a key position on the Station Programming Configuration sheets for each station.

### 8.5.30 STATION SPEED KEY

A station speed dial key allows a station to dial an outside number which is stored in station memory by pressing a single key. Every station can store up to 30 speed dial numbers with up to 30 digits each. A key can be programmed to access any one of the 30 speed dial numbers. Enter the key code for a STATION SPEED key (key code 600) in a key position on the Station Programming Configuration sheets. To program the key to access the particular station speed number, enter the number (1-30) of the particular station speed number in the sub-code area for each key. A station may have as many STATION SPEED keys as will fit on the station.

### 8.5.31 SYSTEM SPEED KEY

A station may have a key programmed that will dial one of the outside numbers stored in system memory. The system can store up to 200 outside numbers with 30 digits in each number. Enter the key code for a SYSTEM SPEED key (key code 700) in a key position on the Station Programming Configuration sheets. To program the key to access the particular system speed number, enter the number (1-200) of the particular system speed number in the sub-code area for each key. A station may have as many SYSTEM SPEED keys as will fit on the station.

### 8.5.32 TRUNK GROUP KEY

Stations access outgoing outside lines and answer incoming outside line calls by use of the TRUNK GROUP key. The CO lines are arranged into groups in system programming. Stations are then given the means to access a line in these groups through the use of the TRUNK GROUP key. Enter a TRUNK GROUP key for each Trunk Group that the station is permitted to use on the Station Programming Configuration sheets. The sub-code area of each key position is used to indicate the number of the Trunk Group that the key is to access. The key code for a TRUNK GROUP key is 300. The sub-codes range from 1 through 10 for the 10 trunk groups. Sub-code 20 is used when the TRUNK GROUP key is

used to access the LEAST COST ROUTING feature. For example, if a station is to access trunk group 2, enter on the Station Programming Configuration sheet key code 300 with a sub-code of 2 into a key position. If a station is to have a LEAST COST ROUTING key, enter a key code of 300 with a sub-code of 20 on the Station Programming Configuration sheet into a key position. On the Station Programming Configuration sheet the sub-code is entered immediately to the right of the key position. A station may be programmed for as many TRUNK GROUP keys as will fit on the station.

*NOTE: It is recommended that a station have at least two TRUNK GROUP keys to allow for receiving a second call, or to make a conference.*

### 8.5.33 UNI KEY

This feature key can be programmed on a station to allow incoming calls, on a line that does not appear on a station, to reach the station. For each station to use the UNI key, enter the key code for a UNI key (key code 400, sub-code 011) in a key position on the Station Programming Configuration sheets. A station usually only needs one UNI key, but any number may be programmed on a station.

### 8.5.34 VMS (VOICE MESSAGE SYSTEM) KEY

The VMS key is used in conjunction with the INFOSTAR/VX voice message system. This key's LED will light to indicate that a message has been received for that station in the voice message system. Enter the key code for a VMS key (also called a MAIL key) (key code 830) in a key position on the Station Programming Configuration sheets. Only one VMS key may be programmed on a station.

Table 8-1 Key Code Summary

Key Codes	Sub-key Codes	Description
3001 - 3108	-	DIRECT STATION SELECTION
001 - 108	-	DIRECT TRUNK APPEARANCE
300	1-10, 20	TRUNK GROUP, LCR
400	11	UNI
E001-E108	101-148	CALL COVERAGE (PILOT)
600	1-30	STATION SPEED
700	1-200	SYSTEM SPEED
800	-	NIGHT MODE
801	-	MIC MUTE
802	-	NIGHT ANSWER
803	-	DO NOT DISTURB
804	-	MESSAGE WAITING
805	-	SPLIT
806	-	ADD ON
807	-	CALL BACK
808	1-36	PICK UP
809	1-108	CALL FORWARD
810	60-69	PAGE
811	-	RELEASE
812	-	PATCH
813	-	ACCOUNT
814	-	SAVE/REPEAT
815	1-40	PBX
816	-	BARGE IN
817	-	not used
818	-	ICM
819	-	BAD LINE
820	-	SERIAL
821	-	IN/OUT
828	1-108	DATA HOT LINE
829	-	DATA ON/OFF
830	-	VMS
833	-	SILENT MONITOR
834	-	PARK

## 8.5.35 Default Key Values

Key 1	300	(0020)	LCR	Key 2	300	(0020)	LCR
Key 3	300	(0020)	LCR	Key 4	300	(0020)	LCR
Key 5	818	(0000)	ICM	Key 6	818	(0000)	ICM
Key 7	3001	(0000)	DSS key	Key 8	3002	(0000)	DSS key
Key 9	3003	(0000)	DSS key	Key 10	3004	(0000)	DSS key
Key 11	3005	(0000)	DSS key	Key 12	3006	(0000)	DSS key
Key 13	600	(0001)	Station Speed 1	Key 14	600	(0002)	Station Speed 2
Key 15	600	(0003)	Station Speed 3	Key 16	600	(0004)	Station Speed 4
Key 17	700	(0001)	System Speed 1	Key 18	700	(0002)	System Speed 2
Key 19	810	(0060)	Page All Zones	Key 20	802	(0000)	Night Answer
Key 21	803	(0000)	DND	Key 22	809	(0000)	Call Forward

## 8.5.36 How To Program

If not already on the *Station Programming* screen, from the main menu press the A key.

1. When the *Station Programming* screen is entered, the cursor is at the extension number position. The extension number of the station to be programmed can be entered. The I and D keys can be used to Increment and Decrement the extension number.

```

[E]xt 3001 port 001 name                type 17K      time 2:25 p Thu 11-17-88
-----
[L]ine ID Number - 001   c=ext->exts: [T]imers
   day ring:  Y          x=col->ext  | Camp on timer =003=10s Hands free co Y
   night ring: Y          v=col->exts | Recording Num = 000 Hands free ICM Y
   day access: Y          z=row->ext  | Hunt group   = 000 Hands free Rec Y
   night access: Y        w=row->exts | Day class    = 000 Auto Answer Y
-----
[K]eys [H]              [ Night class = 000 Auto 2nd Path N
01 [ 0300 ] 0020 02 [ 0300 ] 0020 | LCR class   = 000 Allow 2nd Path N
03 [ 0300 ] 0020 04 [ 0300 ] 0020 | Prime line  = 000 Group in   N
05 [ 0818 ] 0000 06 [ 0818 ] 0000 | Page zone   = 060 Busy On Hold N
07 [ 3001 ] 0000 08 [ 3002 ] 0000 | Forced account= 000 Bk Barge In N
09 [ 3003 ] 0000 10 [ 3004 ] 0000 | Pickup group = 000 Bk Barge Tone Y
11 [ 3005 ] 0000 12 [ 3006 ] 0000 | Pilot NoAnswer = 000a Out LCR Only N
13 [ 0600 ] 0001 14 [ 0600 ] 0002 | Cost limit   = $0.00 Total Toll N
15 [ 0600 ] 0003 16 [ 0600 ] 0004 | Ring type    = 01 SWDE Enable N
17 [ 0700 ] 0001 18 [ 0700 ] 0002 | Hold Recall  = 006=10s Hook Release N
19 [ 0810 ] 0060 20 [ 0802 ] 0000 | Trans Recall = 006=10s VMS/attend N
21 [ 0803 ] 0000 22 [ 0809 ] 0000 | Analog Phone N
                                     Busy on DID N
[c] all lines to all extns or timer to all extns, [x] line to all lines in extn
[v] line to all extns, [z] ring to all lines, [w] ring to all extns

```

Figure 8-2 Station Programming Screen

2. Enter the extension number of the station to be programmed.
3. Press the RETURN key.
4. Press the K key. The cursor moves to the *Keys* area.
5. Begin by entering the key code for key one.
6. Press the RETURN key.
7. If the key requires a sub code, press the S key. The cursor moves to the sub-code section of the key.
8. Enter the sub-code for the key.
9. Press the RETURN key to advance to the next key.
10. Enter the key code for the next key.
11. Press the RETURN key.

*NOTE: If a key position is to have the same value on all stations, the copy function may be used. Press the C key after entering the value of a key before moving on to the next key.*

Continue programming the remaining keys. Remember to enter the sub-codes for the keys that require them.

*NOTE: Program only those keys that appear on the station to be programmed, enter a key code of zero for the remainder. That is, for a digital 28 key phone, program 22 keys. For the digital display phone, program 20 keys, etc.*

The RETURN key will move the cursor from key to key. The TAB key is used to move the cursor between the two columns. The UP and DOWN arrow keys may also be used to move the cursor.

Press the E key to change the extension number (the I and D keys may also be used). The cursor will move to the top left corner of the screen. Enter the new extension number to be programmed. Press the RETURN key.

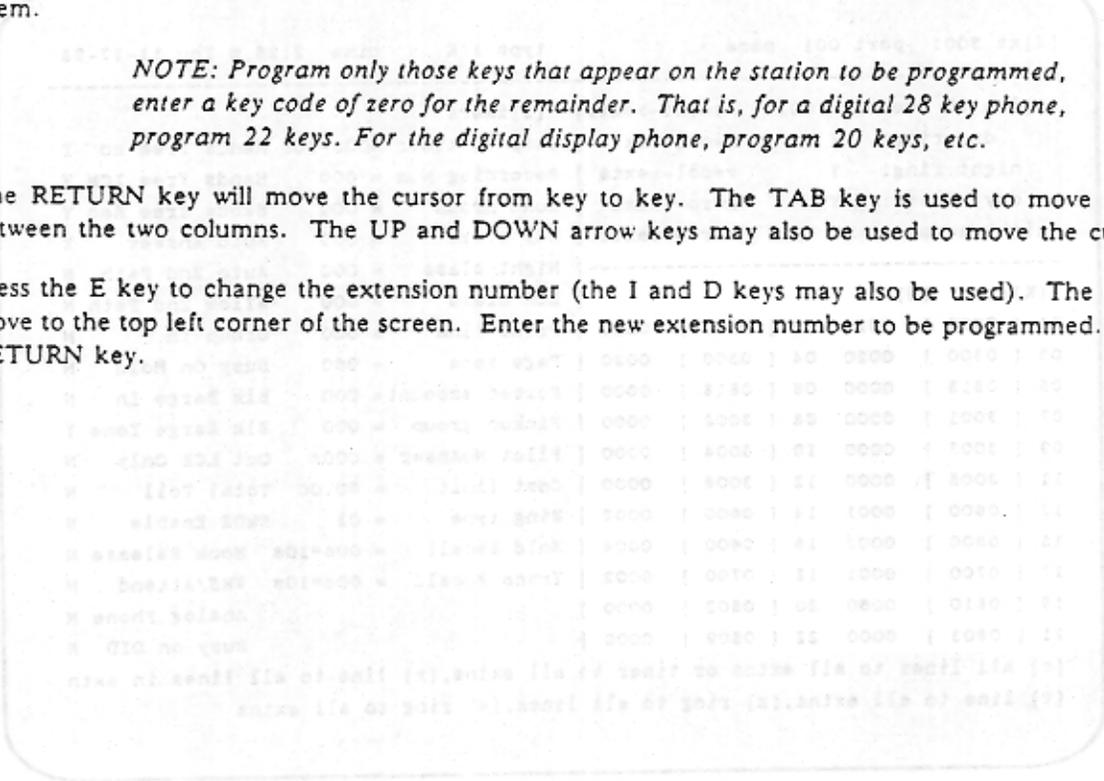


Figure 8-2 Station Programming Screen

## 8.6 TIMERS PROGRAMMING

The timers section is used to program a station with various parameters (i.e. recall timers, classes of service, etc.). The following paragraphs describe each parameter and its effects on a station.

### 8.6.1 Camp-on timer

When an outside line call is transferred to a busy station, a tone is heard by the busy station indicating that a call is waiting to be answered. The tone is repeated at intervals, until the call is answered. The amount of time between the repeated tones is controlled by the camp on timer. The value entered for the camp on timer is multiplied by ten by the system to determine the interval, in seconds, between camp on tones, for example, an entry of 003 is a 30 second interval. Enter the camp on timer for each station on the Station Programming Configuration sheets.

### 8.6.2 Recorder Number

Recorder Number is used with the Automated Attendant feature to define which extension numbers are connected to recorders or announcing devices. This number is then used when programming the *Automated Attendant* programming screen.

### 8.6.3 Hunt group

Stations can be arranged in groups to allow an outside line to ring, or to be transferred to groups of stations rather than an individual extension. Calls entering the hunt group will be routed to the first available station in a circular fashion. Stations in the same hunt group are given the same hunt group number. The hunt group number should be the same hunt group number that was given to the outside lines which are to ring those stations. The hunt group number for the lines was assigned in *System Programming*. Determine which stations are members of which hunt groups, and enter this hunt group number on the Station Programming Configuration sheets.

### 8.6.4 Day Class

A station's Day Class is the class of service of the station used with system Toll Restriction. The class of service determines what area codes, and exchanges within its home area code, a station is permitted to dial. The station class of service is used in conjunction with the line class (of service), and with the toll restriction tables. Before determining a station's Day Class, read the entire section *Toll Restriction* found later in this manual. The Day Class is the class of service of the station when the ISOETEC System/108 is in the day mode. There are 16 possible Day Classes other than zero. The meaning of the class number is determined in *Toll Restriction* programming. A station with a Day Class of 0 does not use the toll restriction feature. After the station's Day Class has been determined, enter the number on the Station Programming Configuration sheets for each station.

### 8.6.5 Night Class

A station's night class is used by the system in the same manner as the Day Class when the system is in the night mode. Refer to the section *Toll Restriction* before determining a station's Night Class. Enter the Night Class number on Station Programming Configuration sheets for each station.

### 8.6.6 LCR Class

A station's LCR class is used with the system's optional feature, Least Cost Routing. Least Cost Routing automatically determines from the outside number dialed by a station user, the least costly facility that is available to the system for the call to be dialed on. The station's LCR Class determines whether a station may use a more expensive route if all lines in the least costly route are busy, or if the station must wait for an available line in the least costly route. There are three LCR classes: LCR class 0, 1, and 2.

- 00 - The call is routed over the least costly route available. If all lines in that route are busy, the call is automatically dialed on the next less expensive route.
- 01 - If the least costly route is not available, you can manually override to the next available service by pressing the \* key.
- 02 - If the least costly route is not available, the caller must wait until it becomes available before placing the call. Or, use the call back feature, so when the service becomes available it will call you back. Upon answering the call back, the system will automatically re-dial the number for you.

### 8.6.7 Prime Line

An extension may be programmed to automatically access a particular CO line or Trunk Group as soon as the phone is taken off-hook. The actual line to be used (or trunk group) is programmed as the Prime Line. Determine the outside line or outside line group to be used by the station, and enter this number on the Station Programming Configuration sheets. Individual outside lines are entered by their actual line number. Outside line groups are entered as "23" plus the trunk group number (1 through 9) or "240" for group 10. For example, if a station is making outside line calls using trunk group 2, enter "232" for the Prime Line on the Station Programming Configuration sheets. LCR dial tone may also be accessed by entering "250".

### 8.6.8 Page Zone

A station may be made a member of a page zone. The station will then receive pages only when that particular zone is dialed, or when page all zones is used. There are nine possible page zones numbered from 61 through 69. If a station user wishes to receive only pages from page all zones, enter the page zone number as 60. If the station user does not wish to receive any pages, a page zone number of 0 may be entered. After determining the page zone, enter this information on the Station Programming Configuration sheets. A station may be a member of only one page zone.

### 8.6.9 Forced Account Class

An extension can be programmed to force the entry of an account code before each outside line call is made. A station's Forced Account Code class of service also determines whether or not the account code that is entered is verified against a table of authorized account codes.

The station's day and night class of service are used to restrict a user from dialing a particular type of call (long distance, local, etc.). The class of service of the station is changed (for the one call) when an account code is entered.

#### FAC CLASS      USED FOR

- |            |   |
|------------|---|
| 00         | Forced account codes are not in effect. Station cannot over-ride any toll restriction caused by Day/Night class of service.   |
| 01 thru 16 | An account code must be entered if the station user is dialing an outside line call. The account code entered is NOT checked against the Account Code Table for validation. The station's Day/ Night class of service changes to the number entered as the FORCED ACCOUNT CLASS.  |
| 17         | Forced entry of account code when used in conjunction with a station's day or night class of service. The entered account number is checked against the validation table ( <i>Account Codes</i> programming screen). The station's Day/Night class of service is changed to the COS assigned to the account code number. Account codes can still be added to SMDR record. |

### 8.6.10 Pickup Group

Stations can be arranged into groups such that a call ringing any station in that group can be answered by any station using a single key. The advantage of the pickup group is that it is not necessary to know which extension in the group is ringing. There are 36 pickup groups with no limit to the number of stations assigned to one group. A station may be a member of only one pickup group. *Pickup Group* is used to place a station into a particular pickup group. Determine the pickup group number, and enter it on the Station Programming Configuration sheets. If a station is not to be a member of a Pickup Group, enter a 0.

### 8.6.11 Pilot NoAnswer

This timer is used with stations equipped with CALL COVERAGE (Pilot) keys. Stations programmed with delay ring, or busy/delay ring CALL COVERAGE keys begin to ring after the primary extension has rung for the Pilot NoAnswer amount of time. This timer is programmed in seconds.

### 8.6.12 Cost Limit

This feature is used with Least Cost Routing, and the Total Toll parameter to control the cost of outside line calls made by an extension. This limit is assigned on a per station basis. A dollar value from \$0.00 to \$9.99 can be entered. When a station user places an outside line call, the dollar value can be used in one of two ways depending on how the parameter "Total Toll" is set. Review this parameter before making a selection for Cost Limit. Determine the Cost Limit and enter the information on the Station Programming Configuration sheets.

### 8.6.13 Total Toll

Total Toll is used in conjunction with Least Cost Routing, and Cost Limit to control the cost of an outside line call made by a station user. This parameter can be set in one of two ways.

If set Y for Yes, when a station places an outside line call, a running total of the cost of the call is kept. When this cost exceeds the amount set for the station in "Cost Limit" a warning tone is given. Thirty seconds after the warning tone, the system will terminate the call.

If set N for No, the outside number dialed by the station user is priced before the call is allowed to proceed. If the cost for the first minute of the call exceeds the amount set in "Cost Limit" for the station, the call cannot be placed. The station receives reorder tone.

Determine the Total Toll for each station, and enter the information on the Station Programming Configuration sheets.

### 8.6.14 Ring Type

The pitch of the ring tone a station user hears when his station is ringing can be adjusted with Ring Type. The Ring Type is normally adjusted from the station, and can also be programmed using the *Station Programming* screen. There are 10 possible ring types. This parameter is usually programmed after the system is in service. Enter this information on the Station Programming Configuration sheets.

*NOTE: The ring type for an extension connected to an OPXI has a different meaning. When programmed for ring type 01, the extension rings with two short rings. When programmed for ring type 02, the extension rings with one long ring.*

### 8.6.15 Hold Recall

The amount of time a call remains on hold before recalling the station is programmed with the Hold Recall. The value entered is multiplied by ten by the system to give the hold recall time in seconds, and is programmed on a per station basis. Determine the Hold Recall time for each station, and enter the number on the Station Programming Configuration sheets.

### 8.6.16 Transfer Recall

A call which is transferred to a station will recall to the station that transferred it if it is not answered within a programmed amount of time. This amount of time is the transfer recall time, and is programmed on a per station basis. The value entered is multiplied by ten by the system to give the transfer recall time in seconds. For example, if station A transfers a call to station B, and station B (transfer recall timer = 20 secs.) does not answer the call, after 20 seconds the call will re-ring at station A. Determine the Transfer Recall time for each station, and enter the number on the Station Programming Configuration sheets.

The following parameters are programmed for Yes or No only:

### 8.6.17 Handsfree CO

Each station may be programmed to prevent the use of the handsfree feature on outside line calls. When this parameter is programmed for NO, the handsfree microphone of the station will not be active for outside line calls. Determine the setting for each station (Y for YES or N for NO), and enter it on the Station Programming Configuration sheets.

### 8.6.18 Handsfree Ext

Each station may be programmed to prevent the use of the handsfree feature on internal calls. When this parameter is programmed for NO, the handsfree microphone of the station will not be active for internal calls. Determine the setting for each station (Y for YES or N for NO), and enter it on the Station Programming Configuration sheets.

### 8.6.19 Handsfree Rec

Each station may be programmed to prevent voice announced calls. With this parameter set for NO, all calls to the station will cause the station to ring. Determine the setting for each station (Y for YES or N for NO), and enter it on the Station Programming Configuration sheets.

### 8.6.20 Auto Answer

Each station may be programmed to answer any outside line call ringing the extension by lifting the handset (or pressing the HANDSFREE key). Otherwise, if an outside line call is ringing the extension (not a transferred call), the flashing outside line key must be pressed. To enable Auto Answer for a station, enter a Y (Yes) on the Station Programming Configuration sheets. To disable the feature, enter an N (No) on the Station Programming Configuration sheets.

### 8.6.21 Auto 2nd Path

This feature is only used when programming a digital display phone. When a digital display phone is using the handset during a call, the station may still be called via a second path. The second path uses the handsfree speaker, therefore second path cannot work if the station is using the handsfree feature. Auto 2nd Path determines whether another station user must dial a code, after receiving a busy signal, to voice announce to the busy station, or if the voice announce call is to activate the 2nd path automatically. To enable the display telephone to receive 2nd path calls automatically, enter a Y (yes) on the Station Programming Configuration sheets. To force another station user to intentionally use the 2nd path when calling the display phone, enter an N (no) on the Station Programming Configuration sheets.

### 8.6.22 Allow 2nd Path

A digital display telephone is designed with a second voice path which may be used to announce a waiting call when the station is already busy with another call. The station must be using the handset in order to receive a second voice path call. Determine if the feature is desired for the digital display telephones to be installed, and enter a Y (yes) on the Station Programming Configuration sheet for each desired extension. An N (no) means that the digital display telephone CANNOT receive a second voice path call.

### 8.6.23 Group In

Each station can be programmed for how incoming outside line calls ring on the station. Normally, (Group In programmed N for No) a call will ring on the first available TRUNK GROUP Key on the station beginning at the top left key. It will ring on that group key regardless of what trunk group the key is programmed for. To force a call ringing a station from a trunk group to ring a key programmed for that trunk group, Group In should be programmed Y for Yes. Stations which are programmed Y (yes) for Group In must have a TRUNK GROUP key for each trunk group that the station will receive calls from. Determine the setting for this parameter for all stations and enter the information on the Station Programming Configuration sheets.

### 8.6.24 Busy On Hold

This feature is not used in present software versions.

### 8.6.25 Block Barge In

Certain stations may be authorized to enter an existing conversation between two other parties. To enable a station to barge into another station, the Block Barge In parameter must be set to N for No. If Block Barge In is set to Y for Yes for any station, that station's conversations may not be broken into. Determine the Block Barge In for all stations and enter the information on the Station Programming Configuration sheets.

### 8.6.26 Block Barge Tone

This parameter is used in conjunction with the Barge In feature. When a station's conversation is barged into, there is a warning tone that proceeds the entry. To disable this tone for a station, the Block Barge Tone is set to Y for Yes. Determine the Block Barge Tone for all stations and enter the information on the Station Programming Configuration sheets.

### 8.6.27 Out LCR Only

The Out LCR Only parameter is used in conjunction with Least Cost Routing feature to prevent station users from circumventing the LCR feature by using TRUNK GROUP keys that may appear on the station. A station with Out LCR Only programmed Y for Yes can only make outside line calls using an LCR key (TRUNK GROUP key programmed for Least Cost Routing). Determine which stations are to be programmed for Out LCR Only, and enter this information on the Station Programming Configuration sheets.

### 8.6.28 SMDR Enable

A detail record of each outside line call made by a station can be made by the ISOETEC System/108. Each station can be enabled to have call record information provided by the ISOETEC System/108 at the end of each call. To enable Station Message Detail Recording for a station, enter a Y for Yes on the Station Programming Configuration sheets.

### 8.6.29 Hook Release

Hook Release is used with 6-key telephones which are using a headset instead of the handset. When Hook Release is programmed Y (yes), the switch-hook on the 6-key telephone works like the RELEASE key. When Hook Release is programmed as N (no), the switch-hook works normally.

### 8.6.30 VMS/Attend

If the extension is to be connected to IVIE as either a VMS port or an Automatic Attendant port, this value should be programmed Y (yes). Extensions which are connected to telephones should be programmed N (no).

### 8.6.31 Analog Phone

If the extension is to be connected to an IEPI (ISOETEC Electronic Phone Interface), this option should be programmed Y (yes).

## Section 9

# Directory Programming

### 9.1 INTRODUCTION

The *Directory* is used to assign the names of the station users to their particular extension numbers. The directory is used mainly by the System Operator during normal operation to transfer outside line calls. Each extension number can also be assigned a department number, and a number to indicate the order in which the names are listed on the operator's terminal within the department. This is provided to override the alphabetizing of the directory names within the department listing. There are ten department numbers. The *Directory Programming* screen contains 2 pages to accommodate all 108 possible extension numbers.

### 9.2 ACCESSING THE DIRECTORY PROGRAMMING SCREEN

The *Directory Programming* screen (the O screen) is accessed by pressing O on the keyboard from the main menu. The ESCAPE key may be pressed while in any programming screen to reach the main menu. If there is any problem reaching the main menu, or the O screen, refer to the section titled *ACCESSING THE PROGRAMMING SCREENS* in Section 5 - *Programming Introduction*. The *Directory Programming* screen can be reached with any one of the eight password levels. See Figure 9-1.

### 9.3 PROGRAMMING DIRECTORY

#### 9.3.1 What to Program

Each extension number is programmed with the name of the person to whom the extension number has been assigned. The name then appears in the directory portion of the operator's terminal during normal operation of the system. Up to 10 characters can be entered for each extension number. The operator terminal accesses the names in the directory, alphabetically. Therefore, it may be advisable to enter the station user's last name in the directory, followed by their first name, or first initial.

Each extension number can be programmed with a department number. There are ten department numbers. Along with the department number, a number can be entered which indicates the order in which the directory names appear on the operator terminal. The order numbers range from 0 through 10. Extension numbers with 0 will appear first and extension numbers with 10 will appear last. Extension numbers may have the same order number, in which case they will appear alphabetically within the same order number.

The first column on the Directory Programming screen is for the station user's name. The second column is for the department number. The third column is for the order number.

Del -> clear name		Directory		Page 1 of 2	
		-----		'0' -> page #	
3001		3019		3037	
3002		3020		3038	
3003		3021		3039	
3004		3022		3040	
3005		3023		3041	
3008		3024		3042	
3007		3025		3043	
3008		3026		3044	
3009		3027		3045	
3010		3028		3046	
3011		3029		3047	
3012		3030		3048	
3013		3031		3049	
3014		3032		3050	
3015		3033		3051	
3016		3034		3052	
3017		3035		3053	
3018		3036		3054	

Figure 9-1 Directory Programming Screen

### 9.3.2 Default Values

The directory's default programming is blank.

### 9.3.3 How to Program

If not already in the *Directory Programming* screen, from the main menu press the O key to reach directory programming. The Directory Programming screen consists of 2 pages.

The cursor appears in the upper right corner of the programming screen.

1. Enter the page number (1 or 2) to be programmed. The I and D keys can be used to increment and decrement the page number.
2. Press the RETURN key.
3. Enter the first name to be entered.
4. Press the RETURN key after each name is entered.

5. Press the TAB key.
6. Enter the department number.
7. Press the RETURN key.
8. Press the TAB key.
9. Enter the order number.
10. Press the RETURN key.

Use the RETURN key to move down each column.

The arrow keys can be used to move the cursor around the screen.

Press the " @ " key (Shift + @ ) to move the cursor back to the upper right hand corner of the programming screen.

Enter the page number (1 or 2) of the next screen to be programmed.

Continue until all extension numbers in use are programmed.

5. Press the TAB key

6. Enter the 4-part number

7. Press the RETURN key

8. Press the TAB key

9. Enter the order number

10. Press the RETURN key

Use the RETURN key to move down each column.

The arrow keys can be used to move the cursor around the screen.

Press the "Ⓢ" key (Shift + Ⓢ) to move the cursor back to the upper right hand corner of the programming screen.

Enter the page number (1 or 2) of the next screen to be programmed.

Continue with all extension numbers in the same program.

# Section 10

## Least Cost Routing

### 10.1 INTRODUCTION

Least Cost Routing (LCR) is an optional feature of the ISOETEC® System/108 which automatically selects the least expensive available route for an outside line call. The least expensive route for a call is calculated using a programmable average duration of a call. The cost of a call to a given dialed number is calculated for each facility and service a customer has available based on the Average Call Length. While an individual call may cost more because of this averaging of call length, the average phone bill is significantly reduced. The system also is constantly calculating the average length of a call. This value is found on the *LCR Programming* screen. The "calculated call average" can then be entered into LCR Average Call programming to obtain a more accurate average call length. In addition, each station can be assigned a class of service for LCR. This class of service determines under what circumstances a more expensive route may be used if all the lines in the least expensive route are busy.

Least Cost Routing can be provided to any ISOETEC System/108 without the addition of any hardware.

#### 10.1.1 Hardware requirements

The hardware necessary for Least Cost Routing is included with the standard ISOETEC System/108.

#### 10.1.2 Software Requirements

A Customized Data Base. This is generated by ISOETEC from information provided by the customer. This information includes number and types of facilities and services used, and the customer's area code and exchange. This data base is loaded into the system using the ISOETEC System/108 BACKUP Program Memory feature.

### 10.2 DEFINITIONS

The following definitions will help in understanding all of the possibilities that arise from LCR:

#### LATA (Local Access Transport Area)

This is the area served by your local operating company. All calls to numbers in this region are billed by the local operating company.

Depending on the size of the state, there can be more than one LATA. A LATA can have more than one area code, and an area code can be in more than one LATA.

*Example: New York State has more than one LATA, and one of the area codes within one of its LATA's is 203 which is also in Connecticut's LATA.*

**OCC (Other Common Carrier)**

This is a long distance network other than AT&T. For example, MCI.

**Equal Access**

The ability to use a desired long distance network other than AT&T, for example, Sprint, MCI, etc., as your primary service without having to manually dial their local access number, and then your security code. This has been described as '1+ dialing'. When you dial a long distance number (outside your LATA) it will automatically be routed, by the local operating company, via your primary service without dialing any additional numbers.

**Primary Carrier**

The long distance network that you choose to handle all of your long distance calls (out of LATA).

**Secondary Carrier**

A carrier that you manually choose as a second choice when placing a long distance call. When you want to use a secondary carrier, you must dial the carrier's 1-0-xxx number (see table 10-1) and then proceed dialing the long distance number.

Table 10-1 Carriers and Their Equal Access Code Numbers

VENDOR	CODE NUMBERS
AT&T	1-0-288
US SPRINT	1-0-333
MCI	1-0-222
ALLNET	1-0-444
WESTERN UNION	1-0-220
ITT	1-0-488
U.S. TELECOM	1-0-333
SBS SKYLINE	1-0-888
TDX	1-0-223

Your local operating company will handle all calls within your local designated LATA. All calls being placed outside of your LATA will be handled by your primary or secondary carrier depending on what you dial.

*NOTE: If you wish to use other than your local operating company to place a call within your LATA, you can do so, by dialing the local access number and security code of that particular carrier. (You cannot use the 1-0-xxx number to get a secondary carrier number within your designated LATA. You must direct dial the service). This is subject to your local operating company regulations.*

### 10.3 LCR PROGRAMMING

Least Cost Routing needs to be programmed on 4 different programming screens. Stations must be given LCR keys (Trunk Group keys that access LCR), and stations are given an LCR class of service. CO Lines must be arranged into groups for outgoing access. There are options on the *System Options* programming screen that can effect the operation of LCR. Finally, the *LCR Programming* screen must be programmed.

### 10.4 WHAT TO PROGRAM IN STATION PROGRAMMING

Each station that is to use Least Cost Routing must be provided with at least one and preferably more LCR keys. An LCR key is a TRUNK GROUP key with a special sub-code of 20. Enter the key code for a TRUNK GROUP key (key code 300) and sub-code of 20 in a key position or positions on the Station Programming Configuration sheets for each station.

Each station should also be assigned an LCR class of service. This class of service determines whether or not a station may use lines in a more costly route if all lines in the least costly route are busy. There are three LCR classes of service:

- LCR COS 0 – Automatic override – The call is routed over the least costly route available. If all lines in the least costly route are in use, the call is routed over the next less expensive route.
- LCR COS 1 – Manual override – The call is routed over the least costly route available. If all lines in the least costly route are in use, the call is not routed and a busy signal is heard. The call can be manually routed to the next less expensive route by dialing a \* on the dial pad.
- LCR COS 2 – No override – The call is routed over the least costly route available. If all lines in the least costly route are in use, the call is not routed. The call can be tried again at a later time, or Call Back (Trunk Queuing) can be used to obtain a line in the least costly route when one becomes available.

Determine the LCR class of service for each station, and enter it on the Station Programming Configuration sheets. Follow the instructions found in the *Station Programming* section to enter the information on the Station Programming Configuration sheets into the system.

## 10.5 WHAT TO PROGRAM IN SYSTEM PROGRAMMING

The only thing to program for LCR on the *System Programming* screen is the CO line's TRUNK GROUP. The TRUNK GROUP number is used to arrange lines in the same facility into groups for outgoing access. Beginning with group 1, arrange the CO lines into groups according to their use. For example, all DDD lines can be placed in group 1, all band 5 WATS lines can be placed in group 2, all band 3 WATS lines can be placed in group 3, etc. Determine the trunk group for all lines; follow the directions found in the *System Programming* section to enter the information on the System Programming Configuration sheets, and into the system program.

## 10.6 WHAT TO PROGRAM IN SYSTEM OPTIONS PROGRAMMING

The *System Options* programming screen contains 4 options that can effect the operation of Least Cost Routing: DISABLE AUTO SKIP, DISABLE LCR TONES, LCR HOOK FLASH, and LCR CENTREX OPTION.

### 10.6.1 DISABLE AUTO SKIP

Auto skip is a feature of LCR which is used with dial up services. If LCR attempts to dial a service and does not receive dial tone from the carrier, e.g. a busy signal is reached, the line will be dropped, and the phone number will be dialed on the next more expensive route. The service will then be presumed busy for 2 minutes, and the call will bypass this route. If disabled, LCR will keep trying to use the service. Enter a Y (yes) if auto skip is to be disabled. Enter an N (no) if auto skip is to be used.

### 10.6.2 DISABLE LCR TONES

When a station user dials a number using Least Cost Routing, the tones the system is dialing are heard. To disable hearing the dialing of digits, enter a Y (yes).

### 10.6.3 LCR HOOK FLASH

The LCR hook flash option allows the station user to flash the outside line when using LCR. A typical application for this feature is flashing an outside line that is connected to a PBX or Centrex.

### 10.6.4 LCR CENTREX OPTION

This option will allow a number less than 7 digits to be dialed out on LCR via trunk group 1. If this option is Y (yes), it will also strip the Centrex code that is assigned in the *LCR Programming* screen. A typical application of this feature is to allow calling of Centrex stations via an LCR key.

Determine each option and enter the information into the system following the directions in the *System Options* programming section.

## 10.7 WHAT TO PROGRAM IN LCR PROGRAMMING

The following paragraphs provide a brief description of the *LCR Programming* screen. After reading through each section, determine the entries that are to be made to the screen, and enter the information on the LCR Programming configuration sheet.

### 10.7.1 OCC SERVICE (Other Common Carrier Service)

The carriers will automatically appear when the LCR Menu is accessed. This is part of the LCR Database that is determined from the customer's information.

### 10.7.2 GRP NUM (Group Number)

The group number is the number of the trunk group that is programmed for the lines in the particular facility. The facilities trunk group number is programmed in the *System Programming* screen. A group number from 1 to 10 must be entered. Dial up services usually use the same trunk group number as the DDD lines. Do not put different type lines in the same group.

Example: DDD lines = Group 1, FX Lines = Group 2, Band 1 WATS = Group 3, etc.

### 10.7.3 LD 1+ (Long Distance Leading One)

Does the carrier need a leading one before dialing a long distance 10 digit number? Enter Y (yes) if the service requires a one (1) before the long distance 10 digit number. If N (no) is entered, only the 10 digit long distance number will be dialed.

*NOTE: The 1 preceding a long distance 7 digit number does not have to be programmed. When a 7 digit number is dialed, it will reference the LCR database, and the database will determine whether or not the 1 is needed.*

### 10.7.4 INTER LATA ACCESS NUMBER

When this category is first entered, dots (...) will appear, indicating that there is no information stored in memory. Enter in the dial up number, (or access number if using equal access).

*NOTE: To clear an entry in this field, press the N key, and stars (\*\*) will appear.*

*NOTE: Your primary service inter-LATA access number should be left null.*

### 10.7.5 LO 1+ (Local 1)

This category is set in conjunction with AC. When AC is set to Yes, do you want a 1 to precede the Area Code? If Y (yes) is entered, a 1 will precede the Area Code. If N (no) is entered, a 1 will not be dialed before the area code.

*NOTE: If AC is set to N (no), LO 1+ will have no effect on the system operation. The number will be dialed without an area code and will reference the LCR database to determine if a preceding 1 should be dialed before a seven digit number.*

### 10.7.6 AC (Area Code)

Do you want the area code to be dialed before the 7 or 8 digit number? If Y (yes) is entered, the local area code will precede the access number that is dialed. If N (no) is entered, the local area code will not be dialed.

Least Cost Routing Menu for Area Code 203 .Office Exchange 655. page 1 of 3

OCC	GRP	LD	INTR LATA	LO	INTRA LATA	SECURITY	SEC	SEC	CO	OC	MAX	
SERVICE	NUM	1+	ACCESS NUM	1+	AC	ACCESS NUM	CODE	ALW	1ST	PS	PS	COST
PR1	01	Y	.....	N	N	.....	.....	N	N	A	A	\$0.00
MP1	**	Y	.....	N	N	.....	.....	N	N	A	A	\$0.00
FX 203387	**	Y	.....	N	N	.....	.....	N	N	A	A	\$0.13
FX 203371	**	Y	.....	N	N	.....	.....	N	N	A	A	\$0.13
IWT 1	**	Y	.....	N	N	.....	.....	N	N	A	A	\$0.00
MPI	**	Y	.....	N	N	.....	.....	N	N	A	A	\$0.00

Average Call = 133 Sec |L.D=11 DICTS Y |Calc Average = 017 Sec |

AT&T Numbers (No Access): 000 000 000 000 000 000 000 000 000 000

Primary Service: CO: 001 Service Number 00

Figure 10-1 LCR Programming Screen

### 10.7.7 INTRA LATA ACCESS NUMBER

When this category is first entered, dots (...) will appear. This indicates that there is no information stored in memory. Simply enter in the dial up number.

### 10.7.8 SECURITY CODE

This category will come up with dots (...) to indicate that there is no security code in memory. Once the desired security code has been entered, and the field has been left, upon re-entry, the category will then appear blank. However, your security code is still in memory.

### 10.7.9 SEC ALW (Security Code Always)

If set to Y (yes), a Security Code will always be dialed, regardless of whether the access number has been dialed or not. If set to N (no), a Security Code will be dialed when needed.

### 10.7.10 SEC 1ST (Security Code first)

Determines whether the security code is dialed before the telephone number, or after. This depends on the OCC. If the security code is to be dialed before the telephone number, this parameter is programmed to Y (yes). If the security code is to follow the dialed number, the parameter is set to N (no).

### 10.7.11 CO PS (CO Line Pause)

Enter in the number of seconds the system is to wait for CO dial tone. An A for Auto pause will wait for CO dial tone to be detected, then proceed with the digits to be dialed. To enter an auto pause, enter 0 not A.

### 10.7.12 OC PS (Other Common Carrier Pause)

Enter in the number of seconds the system is to wait for Other Common Carrier dial tone. An A for Auto pause will wait for Carrier dial tone to be detected then proceed with the digits to be dialed. To enter an auto pause, enter 0 not A. In an 'equal access' area, make sure to put 01 as the OC PS for DDD service if DDD is not the primary service.

### 10.7.13 MAX COST

This is maximum cost per minute (usually used for FX lines). If the cost of the call for 1 minute exceeds the maximum cost per minute column, the call will not be permitted to be dialed out on that service.

### 10.7.14 Average Call

This is the time the system uses to calculate the least expensive route. This should be updated with the calculated average time and set to the nearest half minute.

### 10.7.15 LD = 11 Digits

Yes means a long distance number. Inter LATA consists of 10 or 11 digits. Leave set to Y (yes).

### 10.7.16 Calculated Average

The calculated average call time per system should be used to update the average call. This time can be set back to zero by clearing the J report. The J report can be found on the REPORTS MENU.

*NOTE: SMDR print should always be set to Yes or Calculated average time will not appear.*

### 10.7.17 AT&T Numbers (No Access)

This is used when a carrier service other than AT&T is the primary service to force routing of calls to the AT&T network. For example, some 800 numbers are not supported by OCCs. Enter these area codes in AT&T numbers.

### 10.7.18 Primary Service

This category is used when different CO lines are using different primary services. A code number will be entered under the line number to indicate the primary service of that line. The code number is the order in which the service appears in the LCR menu.

Example: DDD = 1, SBS = 2, TNX = 3.

page 2 of 3

Least Cost Routing Menu		
OCC	CENTREX	VOLUME
SERVICE	CODE	DISCOUNT
FR1	.....	000%
MF1	.....	000%
FX 203387	.....	000%
FX 203371	.....	000%
INT 1	.....	000%
MPI	.....	000%

Figure 10-2 LCR Volume Discount

### 10.7.19 CENTREX CODE

When using LCR with Centrex lines, some complications arise. A Centrex line requires an access code to dial an outside line through the Centrex system. This access code will be required when dialing out through the Centrex. The second page of the *LCR Programming* screen takes care of this situation. Determine the access code needed to dial out of the Centrex system, and enter this information on the second page of the *LCR Programming* screen.

### 10.7.20 VOLUME DISCOUNT

Certain OCC services, or facilities offered by AT&T, may offer volume discounts which effect the pricing of a call when the route determination is made. The volume discount is used to adjust the rate tables contained in the LCR data base to take advantage of these discounts.

### 10.7.21 LCR Exceptions

LCR Exceptions is a table that is used to bypass the normal decision-making process of the Least Cost Routing program. Calls to area codes and/or exchanges entered into this table are routed via the service indicated in the table instead of the least costly service arrived at by the program. The number dialed must match exactly an entry in the table in order for the system to use the exception.

page 3 of 3

NUMBER -	SRV								
1288	1	.....		.....		.....		.....	
845	1	.....		.....		.....		.....	
.....		.....		.....		.....		.....	
519	6	.....		.....		.....		.....	
418	6	.....		.....		.....		.....	
613	6	.....		.....		.....		.....	
506	6	.....		.....		.....		.....	
902	6	.....		.....		.....		.....	
418	6	.....		.....		.....		.....	
819	6	.....		.....		.....		.....	
709	6	.....		.....		.....		.....	
705	6	.....		.....		.....		.....	
807	6	.....		.....		.....		.....	
204	6	.....		.....		.....		.....	
308	6	.....		.....		.....		.....	
403	6	.....		.....		.....		.....	
604	6	.....		.....		.....		.....	
.....		.....		.....		.....		.....	
.....		.....		.....		.....		.....	
.....		.....		.....		.....		.....	

Figure 10-3 LCR Exceptions

## 10.8 ACCESSING THE LCR PROGRAMMING SCREEN

The *LCR Programming* screen (the L screen) is accessed by pressing L on the keyboard from the main menu. The ESCAPE key may be pressed while in any other programming screen to reach the main menu. If there is any problem reaching the main menu, or the B screen, refer to the section titled *ACCESSING THE PROGRAMMING SCREENS* in Section 5 - *Programming Introduction*.

## 10.9 HOW TO PROGRAM LCR

If not already on the *LCR Programming* screen, from the main menu, press L on the keyboard. The *LCR Programming* screen consists of 3 pages.

1. When the *LCR Programming* screen is entered, the cursor will be positioned at the first OCC service GRP NUM. The OCC Service names will appear on the screen based on the information contained in the customer's LCR data base.
2. Working from the LCR Programming configuration sheets, enter the information required.
3. Enter the trunk group number for the first OCC service. Press the RETURN key.

Least Cost Routing Menu for Area Code 203 ,Office Exchange 655. page 1 of 3

OCC SERVICE	GRP NUM	LD	INTER ACCESS NUM	LATA	LO	INTRA ACCESS NUM	LATA	SECURITY CODE	SEC ALW	SEC 1ST	CO PS	OC PS	MAX COST
PR1	01	Y	.....	N	N	.....			N	N	A	A	\$0.00
MP1	**	Y	.....	N	N	.....			N	N	A	A	\$0.00
FX 203387	**	Y	.....	N	N	.....			N	N	A	A	\$0.13
FX 203371	**	Y	.....	N	N	.....			N	N	A	A	\$0.13
IWT 1	**	Y	.....	N	N	.....			N	N	A	A	\$0.00
MPI	**	Y	.....	N	N	.....			N	N	A	A	\$0.00

Average Call = 133 Sec |L.D=11 DIGITS Y |Calc Average = 017 Sec |

AT&T Numbers (No Access): 000 000 000 000 000 000 000 000 000 000

Primary Service: CO: 001 Service Number 00

Figure 10-4 LCR Programming Screen

4. Press the TAB key to move the cursor to the right.
5. Enter a Y (yes) or N (no) for LD 1+. (Do NOT press the RETURN key)
6. Press the TAB key.
7. Enter the INTER LATA ACCESS NUM (if used). Press the RETURN key.
8. Press the TAB key.
9. Enter Y (yes) or N (no) for LO 1+. Press the TAB key.
10. Enter Y (yes) or N (no) for AC. Press the TAB key.
11. Enter the INTRA LATA ACCESS NUM (if used). Press the RETURN key.
12. Press the TAB key.
13. Enter the SECURITY CODE (if used). Press the TAB key.
14. Enter Y (yes) or N (no) for SEC ALW. Press the TAB key.
15. Enter Y (yes) or N (no) for SEC 1ST. Press the TAB key.
16. Enter the CO PS. Press the RETURN key.
17. Press the TAB key.
18. Enter the OC PS. Press the RETURN key.
19. Press the TAB key.
20. Enter the MAX COST (if used). Press the RETURN key.
21. Press the RETURN key. Continue programming the remaining OCC Services.

After all services have been entered, Press the RETURN key until the cursor reaches *Average Call*. Enter the length of the *Average Call*, and press the RETURN key.

The remaining parameters are programmed as needed. Use the RETURN key to move down the screen, and the TAB key to move to the right. The arrow keys do not function on this screen.

For the Primary Service, enter the CO line number to be entered. The I key can be used to increment the CO line number, and the D key to decrement the CO line number. Press the TAB key to enter the service number. Press the TAB key again to enter a new CO line number.

To reach the second page of the *LCR Programming* screen (CENTREX CODE and VOLUME DISCOUNT), press I on the keyboard.

Enter the information for the second page, using the TAB and RETURN keys. Press the RETURN key after each entry. The D key may be used to return to the first page of the *LCR Programming* screen.

To reach the third page of the *LCR Programming* screen (LCR EXCEPTIONS), press I on the keyboard.

1. Enter the area code or exchange desired.
2. Press the RETURN key after each entry.
3. Enter the service to route the call over.
4. Press the RETURN key after each entry.

The I and D keys may be pressed to increment and decrement to the next/previous programming screen.

LCR EXCEPTIONS page 3 of 3

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| NUMBER - SRV |
|--------------|--------------|--------------|--------------|--------------|
| 1288         | 1            | .....        | .....        | .....        |
| 845          | 1            | .....        | .....        | .....        |
| .....        |              | .....        | .....        | .....        |
| 519          | 6            | .....        | .....        | .....        |
| 418          | 6            | .....        | .....        | .....        |
| 613          | 6            | .....        | .....        | .....        |
| 508          | 6            | .....        | .....        | .....        |
| 902          | 6            | .....        | .....        | .....        |
| 418          | 6            | .....        | .....        | .....        |
| 819          | 6            | .....        | .....        | .....        |
| 709          | 6            | .....        | .....        | .....        |
| 705          | 6            | .....        | .....        | .....        |
| 807          | 6            | .....        | .....        | .....        |
| 204          | 6            | .....        | .....        | .....        |
| 308          | 6            | .....        | .....        | .....        |
| 403          | 6            | .....        | .....        | .....        |
| 604          | 6            | .....        | .....        | .....        |
| .....        |              | .....        | .....        | .....        |
| .....        |              | .....        | .....        | .....        |
| .....        |              | .....        | .....        | .....        |

Figure 10-5 LCR Exceptions

# Section 11

## Toll Restriction

### 11.1 INTRODUCTION

Toll Restriction is a feature which is used to prevent a station user from dialing particular area codes and/or exchanges on an outside line call. The system analyzes the telephone number as it is dialed and, based on station, system, and toll restriction table programming decides whether or not to permit the call to be placed.

Programming toll restriction in the ISOETEC System/108 is accomplished using three separate programming screens. Stations are assigned a class of service which is used by the system to apply a particular toll plan to a call. The station class is programmed on the *Station Programming* screen.

CO lines are also assigned a class of service. The class of service of the CO line a station user is placing a call on is compared to the class of service of the station making the call. The CO lines must also be arranged into trunk groups. These are programmed on the *System Programming* screen.

The *Toll Restriction* programming screen is used to program particular information about which area codes and/or exchanges are to be restricted from which stations using which CO lines. Up to the first 8 digits of a telephone number can be compared to the tables and restricted. A maximum of 26 patterns can be restricted for each station class of service. A maximum of 20 ALLOWED patterns can be programmed to override the RESTRICTED patterns.

There are 16 toll tables which reference a station's class of service.

### 11.2 DESCRIPTION

Each time a station user accesses an outside line, the system checks its class of service (the Day Class if the system is in DAY MODE, the NIGHT class if the system is in the night mode). If the station class is greater than zero, the station class is compared to the class of the CO line the station is attempting to dial the call on. If the station class is greater than the line class (line ID class), the system will check the number being dialed against the toll tables. Otherwise, the call will be allowed. If the system is checking the dialed number against the toll tables, the toll table with the same number as the station class of service will be referenced.

The digits are checked one by one against the patterns found in the RESTRICTED area of the programming screen. If a match is found in the patterns of the RESTRICTED area of the programming screen, the ALLOWED area of the programming screen is checked for a match. If a match is found in the ALLOWED area, the next digit dialed is examined. If a match is not found in the ALLOWED area, the call is restricted. Each RESTRICTED and ALLOWED pattern can be applied to each trunk group.

The patterns that are checked can be from 1 to 8 characters. The characters can be digits, or letters (A through J) which are used to indicate a range of digits. For example, the letter A can be used to represent any digit between 2 and 9. Up to ten such ranges of digits can be defined. The letter X is reserved to represent any digit 0 through 9. These ranges of digits are programmed in the EQUATES area of the programming screen.

The last area of the programming screen is the EXCEPTIONS area. If the first portion of a dialed number is included in the EXCEPTIONS area, those digits are ignored by the toll table, and the digits following the included portion are subject to toll restriction. This is useful to toll restrict calls that are using 'equal access' dial codes, such as 10288.

### 11.3 WHAT TO PROGRAM

Determine from the customer what type of toll plan is expected. This information includes what stations are to be restricted, and what area codes (and/or exchanges) these stations are to be restricted from. Determine if there are to be exceptions to these restrictions, for example, stations which are not to make any long distance calls, except on the WATS lines. The WATS lines would then be placed in a separate trunk group, and no patterns would be programmed for that trunk group.

There are 16 different tables that can be used to accomplish the restrictions. The toll table with the same number as the station class of service is the table that the system will reference when a station dials an outside line call. A station, however, can be programmed for only one of these tables.

Within each toll table are 4 main areas. The RESTRICTED area, the ALLOWED area, the EXCEPTIONS area, and the EQUATES area.

#### 11.3.1 Restricted Area

The RESTRICTED area contains two columns: the GROUP column, and the NUMBER column. Up to 26 line entries may be made in these columns. These entries determine the patterns that a dialed number is checked against. The GROUP column is numbered from 1 to 0 (trunk groups 1 through 10) across the top of the column. These numbers represent the ten different trunk groups the CO lines can be programmed into.

If a particular pattern is to apply to a trunk group, a Y (yes) is programmed under the trunk group number. Enter an N (no) if the pattern is not to be applied to a trunk group. Therefore, a particular pattern can be used for one trunk group, but not another. The NUMBER column is where patterns are entered. These are the patterns that the dialed number is checked against as it is dialed. If a match is found in this column, and the trunk group being used has a Y (yes) in the GROUP column for the matched pattern, the system proceeds to check the number in the ALLOWED area of the programming screen. If a match is not found in the NUMBER column of the RESTRICTED area, the call is allowed to proceed.

The patterns described in the preceding paragraph are made up of digits and/or letters which represent ranges of digits. For example, if the letter A stands for any digit between 2 and 9, and the letter B stands for any digit either 0 or 1, and the letter X stands for any digit, then the pattern 'ABX' represents any number from 200 through 919 which has a 0 or 1 as a middle digit. If this pattern were entered in the NUMBER column of the RESTRICTED area, and there were no entries in the NUMBER column in the ALLOWED area, all stations with a class of service the same as the toll table number (class) would be restricted from making all area code calls. A pattern could also contain up to 8 digits of a telephone number. If a pattern were entered as '9762323', that one telephone number could be restricted. If a pattern '976' were entered, all telephone numbers that begin with '976' could be restricted. If a pattern 'ABX976' were entered, telephone numbers that begin with '976' in all area codes could be restricted, and so on.

Enter the patterns for each toll plan in the RESTRICTED area of each toll plan on the Toll Restriction Configuration sheets.

[T] CLASS 01							
[U] RESTRICTED				[V] ALLOWED			
GROUP	NUMBER	GROUP	NUMBER	GROUP	NUMBER	GROUP	NUMBER
1234567890		1234567890		1234567890		1234567890	
YYYYYYYYYY	1ABX			YYYYYYYYYY	1800XX		
YYYYYYYYYY	1AAX			YYYYYYYYYY	1A11		
YYYYYYYYYY	0			YYYYYYYYYY			
YYYYYYYYYY	ABX						
		[W] Exceptions CO1	[Z] Equates			X = ANY DIGIT	
		1.	A = 2 to 9			F = 0 to 0	
		2.	B = 0 to 1			G = 0 to 0	
		3.	C = 0 to 0			H = 0 to 0	
		4.	D = 0 to 0			I = 0 to 0	
		5.	E = 0 to 0			J = 0 to 0	

Figure 11-1 Toll Restriction Table

### 11.3.2 Allowed Area

The ALLOWED area also contains a GROUP column and a NUMBER column. These columns contain the same type of information as the RESTRICTED area. Patterns found in the ALLOWED area are used to override the patterns in the RESTRICTED area. For example, if a restrict pattern is ABX (all area code like numbers), telephone numbers beginning with 800 could be allowed by placing '800XXXXX' in the NUMBER column, of the ALLOWED area. Note that all eight spaces must be filled in the ALLOWED area in order to provide a match. In the same manner, three digit numbers that end in 11 (911, 411, etc.) could be allowed by entering A11 in the NUMBER column of the ALLOWED area. This will allow a three digit number with the second and third digits of 1 to be dialed out. It would not allow a four digit or longer number to be dialed even if the second and third digit were 1.

Determine the station class of services to be used and the corresponding toll table. Using the Toll Restriction configuration sheets, design a toll plan for each station class of service. The line ID class of service for a CO line is generally left at zero, but may be changed in special circumstances.

Enter any patterns that are to override the restrict patterns in the ALLOWED area of each toll plan on the Toll Restriction Configuration sheets.

### 11.3.3 Equates Area

Determine the ranges of numbers that may be of use in simplifying the toll plan. The letter A is usually used to represent any number from 2 through 9. The letter B is usually used to represent either 0 or 1. The remaining letters (C through J) are free to be assigned as needed.

Enter the ranges of numbers next to the letter they are to be represented by in the EQUATES area of the configuration sheet.

### 11.3.4 Exceptions Area

If the first portion of a dialed number is included in the EXCEPTIONS area, those digits are ignored by the toll table, and the digits following the included portion are subject to toll restriction. This is useful to toll restrict calls that are using *equal access* dial codes, such as 10288. This area could also be used when dialing out on Centrex or PBX lines where the leading 9 is to be absorbed.

Enter any exceptions that are to be used in the EXCEPTIONS area of each toll plan on the Toll Restriction Configuration sheets.

## 11.4 ACCESSING THE STATION PROGRAMMING SCREEN

The *Toll Restriction* programming screen (the W screen) is accessed by pressing W on the keyboard from the main menu. The ESCAPE key may be pressed while in any other programming screen to reach the main menu. If there is any problem reaching the main menu, or the W screen, refer to the section titled *ACCESSING THE PROGRAMMING SCREENS* in Section 5 - *Programming Introduction*.

## 11.5 DEFAULT VALUES

Toll Class (table) 1.

RESTRICTED Patterns	1ABX
	1AAX
	0

FOR ALL TRUNK GROUPS

ALLOWED patterns	1800XXXX
	1A11

FOR ALL TRUNK GROUPS

Toll Class (table) 2 through 16 have no pattern entries.



3. Press the RETURN key. The cursor moves to the NUMBER column.
4. Enter a pattern. For example, 1ABX, 1212, etc.
5. Press the RETURN key. The information is now entered.
6. Press the RETURN key again. The cursor moves to the next line in the GROUP column.
7. Continue programming the RESTRICTED area.
8. When all restricted patterns are programmed, press the V key to move the cursor to the ALLOWED area.
9. Enter the GROUP and NUMBER (pattern) information as in the RESTRICTED area.
10. When all the ALLOWED information has been entered, press the W key.
11. Enter any EXCEPTIONS information. Press the RETURN key after each entry, and press the RETURN key again to move to the next line.
12. When all EXCEPTIONS have been programmed, press the Z key.
13. Press the RETURN key to move the cursor to the letter to be programmed.
14. Enter the EQUATES information, but do NOT press the RETURN key until both digits have been entered. The cursor will move to the second digit as soon as the first digit is entered.
15. Press the RETURN key to move the cursor to the next letter to be programmed.
16. When all information on the first toll table has been programmed, press the T key to change the number of the toll table to be programmed.
17. Enter the number of the toll table to be programmed.
18. Press the RETURN key.
19. Press the RETURN key a second time.
20. Press the U key to move the cursor to the RESTRICTED area. Continue programming the remaining toll tables.

The DELETE key can be used to backspace an incorrect entry.

The up and down arrow keys can be used to increment and decrement the toll table number, NOT to move around the screen.

## 11.7 TOLL RESTRICTION WITH LEAST COST ROUTING

When toll restriction is used with Least Cost Routing, programming toll restriction is very similar to programming the system for toll restriction when no LCR is used. The only difference occurs in programming the toll restriction tables. Instead of programming a pattern to be used on a trunk group, the pattern is programmed to be used on an LCR service.

## 11.8 HOW TO PROGRAM TOLL RESTRICTION WITH LCR

If not already on the *Toll Restriction* programming screen, from the main menu press the W key. There are 16 toll restriction tables, and 2 pages to each toll table. When using LCR program the second toll restriction screen, and NOT the first. The column headings are SERVICE and NUMBER, rather than, GROUP and NUMBER.

1. When the *Toll Restriction* programming screen is first entered, the cursor is in the GROUP column of the RESTRICTED area of Toll Table 1.
2. Press the S key. The screen shows the second programming screen. The GROUP column has changed to the SERVICE column.

[T] CLASS 01		[U] RESTRICTED		[V] ALLOWED			
SERVICE	NUMBER	SERVICE	NUMBER	SERVICE	NUMBER	SERVICE	NUMBER
1234567890		1234567890		1234567890		1234567890	
	1ABX					1800XX	
YYYYYYYYYY	1AAX					1A11	
	0						
YYYYYYYYYY	ABX						
		[W] Exceptions SO1	[Z] Equates	X = ANY DIGIT			
		1.	A = 2 to 9	F = 0 to 0			
		2.	B = 0 to 1	G = 0 to 0			
		3.	C = 0 to 0	H = 0 to 0			
		4.	D = 0 to 0	I = 0 to 0			
		5.	E = 0 to 0	J = 0 to 0			

Figure 11-3 Toll Restriction Table with LCR

3. Working from the Toll Restriction Configuration sheets, enter the service information for the first restrict pattern. Enter a Y (yes) for all services which are to use this pattern. Note the default pattern assigned to the first 3 patterns in toll table 1.
4. Press the RETURN key. The cursor moves to the NUMBER column.
5. Enter a pattern. For example, 1ABX, 1212, etc.
6. Press the RETURN key.
7. Press the RETURN key again. The cursor moves to the next line in the SERVICE column.
8. Continue programming the RESTRICTED area.
9. When all restricted patterns are programmed, press the V key to move the cursor to the ALLOWED area.
10. Enter the SERVICE and NUMBER (pattern) information as in the RESTRICTED area.
11. When all the ALLOWED information has been entered, press the W key.
12. Enter any EXCEPTIONS information. Press the RETURN key after each entry, and press the RETURN key again to move to the next line.
13. When all EXCEPTIONS have been programmed, press the Z key.
14. Press the RETURN key, to move the cursor to the letter to be programmed.
15. Enter the EQUATES information, but do NOT press the RETURN key until both digits have been entered. The cursor will move to the second digit as soon as the first digit is entered.
16. Press the RETURN key to move the cursor to the next letter to be programmed.
17. When all information on the first toll table has been programmed, press the T key to change the number of the toll table to be programmed.
18. Enter the number of the toll table to be programmed.
19. Press the RETURN key.
20. Press the RETURN key a second time.
21. Press the U key to move the cursor to the RESTRICTED area. Continue programming the remaining toll tables.

The DELETE key can be used to backspace an incorrect entry.

The UP and DOWN arrow keys can be used to increment and decrement the toll table number, NOT to move around the screen.

# Section 12

## System Options

### 12.1 INTRODUCTION

The *System Options* programming screen is used to customize certain features in the system. These features and what part of system performance they effect are described in the following paragraphs.

### 12.2 TOLL OPTIONS

The ISOETEC System/108 monitors the loop current of a trunk line to detect breaks in the current which may indicate a disconnect signal from the Central Office. This is especially useful with toll restriction as certain local operating companies may return the line to the dial state after one party has disconnected. If the system does nothing with these signals, it may be possible to dial on this new dial state without selecting a trunk. Thus, the toll restriction feature can be circumvented. The ISOETEC System/108 provides six options to define what action the system takes when it receives these breaks in current.

#### 12.2.1 What To Program

The TOLL OPTIONS are located on the *System Options* programming screen. There are two types of breaks in loop current that are of interest to the system. A FULL break is an open in loop current lasting for at least as long as the drop pulse time for the particular trunk on which the break occurs. A PARTIAL break is an open in current lasting anywhere from 50 milliseconds to the drop pulse time.

When the system detects a break in the loop current of a trunk, it waits 50 milliseconds. If, after 50 milliseconds, there is still a break in the current, the system checks the appropriate option on the *System Options* menu. If the trunk is connected to a station, it is in the "talk" state. The option for a partial break in the talk mode is checked. If the option is Y (yes), the trunk is released by the system. If the trunk is on hold, or in orbit, or ringing a station, it is in the "Non-talk" state. The option for a partial break in the non-talk mode is checked. If the option is Y (yes), the trunk is released.

If the option is N (no), the system continues monitoring the line until the drop pulse time is reached. If the line is still open, the system checks the options for a FULL line break. If the option is Y (yes), the line is released.

If the line is not released by either the FULL or PARTIAL options, the *Disable Dial Pad* is checked. If this option is Y (yes), the dial pad on the station the trunk is connected to is turned off to prevent further dialing of digits. If this option is N (no), no action is taken by the system.

## 12.2.2 Default Values

	FULL	PARTIAL
Talk Mode	N	N
Non-talk Mode	Y	N
Disable Dial Pad	Y	N (if not dropped)

## 12.2.3 How To Program Toll Options

If not already on the *System Options* programming screen, from the main menu, press M on the keyboard.

1. Press the T key. The cursor moves the *Toll Options* area.
2. Enter either Y (yes) or N (no) for each Toll Option. The RETURN key can be used to skip to the next option.
3. Press the RETURN key. The cursor moves to the next Toll Option. Continue programming the remaining options.

OPTIONS MENU

[O] -----

DISABLE AUTO SKIP = N		[T]oll Options
DISABLE LCR TONES = N		A line will be dropped under the following conditions
ENABLE OPERATOR CONF = N		IF drop count is: full partial AND line is in:
LCR HOOK FLASH = N		Talk Mode      N      N
LCR CENTREX OPTION = N		Non-talk Mode    Y      N
INTEGRATED CRT = Y		Disable Dial Pad Y      N (if not dropped)
SECOND TRANSPEE KEY = N		-----
DISABLE AUTO FAULT = N		
ENABLE AUTO PICKUP = N		
NIGHT CALL COVERAGE = N		
OPER. NIGHT RECALL = N		
NIGHT FORWARD ON = N		
OPEE PAGE ALL ZONES = N		
ENABLE HF MONITOR = N		
OPER. TRANSFER ICM = N		

Figure 12-1 Toll Option Programming Screen

## 12.3 LEAST COST ROUTING

The following options concern the Least Cost Routing feature of the system:

### 12.3.1 Disable Auto Skip

Auto Skip is a feature of LCR which is used with dial-up Other Common Carrier services. If LCR attempts to dial a service and does not receive dial tone from the carrier (e.g. a busy signal is reached) the line is released, and the telephone number is dialed on the next less expensive service. The skipped service will then be presumed busy for two minutes. The system performs in this manner if DISABLE AUTO SKIP is programmed N (no).

If DISABLE AUTO SKIP is programmed Y (yes), LCR will keep trying to use the least expensive service.

### 12.3.2 Disable LCR Tones

When a station user dials a number using Least Cost Routing, the DTMF tones the system is dialing can be heard by the user. To disable hearing the dialed digits, enter Y (yes).

### 12.3.3 LCR Hook Flash

The LCR HOOK FLASH option allows the station user to flash (momentarily disconnect) the outside line when using LCR. Normally, if the LCR key is pressed during a call, the call is disconnected and a new LCR dial tone is connected to the station. If it is desired to flash an outside line when using LCR keys, set this option to Y (yes).

A typical application for this feature is flashing an outside line that is connected to a PBX or Centrex to place the call on hold or make use of other features of the system the line is connected to.

### 12.3.4 LCR Centrex

This option will allow a number less than 7 digits to be dialed out on LCR via trunk group 1. If this option is Y (yes), it will also strip the Centrex code that is assigned in the *LCR Programming* screen. A typical application of this feature is to allow calling of Centrex stations via an LCR key.

## 12.4 OTHER SYSTEM OPTIONS

### 12.4.1 Disable Auto Fault

The ISOETEC System/108 tests the trunk lines every time they are used. If a call is not dialed on a trunk four times, the system takes the trunk out of service for three minutes. If this happens three consecutive times, the system takes the line out of service for one hour. An option on the *System Options* programming screen disables this feature. The option is called DISABLE AUTO FAULT. Set this option to Y (yes) to disable the feature.

### 12.4.2 Enable Operator Conference

The system operator is normally prevented from establishing a conference call. To enable the operator to establish a conference call, set this option to Y (yes).

### 12.4.3 Integrated CRT

This option must be set to Y (yes) if the system is equipped with the ISOETEC System/108 Integrated Operator Terminal. If a telephone is used as the operator station, this option should be set to N (no). On systems with more than one operator, this option effects all operators.

### 12.4.4 Second Transfer Key

With flexible numbering, the operator has a second transfer key (the key labeled IVIE on the terminal). This key is used whenever the operator is transferring a call to something other than an extension, e.g., a hunt group. An option on the *System Options* programming screen enables the use of this key. This is only set to Yes if the range of extension numbers surpasses 3108. When this option is set to Y, the Integrated Operator's terminal must use the SECOND TRANSFER key to transfer calls: to a hunt group, to the MODEM, to VX, or over a tie line.

The SECOND TRANSFER key is labeled IVIE on the Integrated Operator Terminal's keyboard.

### 12.4.5 Enable Auto Pickup

This option is used in conjunction with the Direct Station Selection (DSS) keys. DSS keys can be used to answer a ringing extension if this option is set to Y (yes).

### 12.4.6 Night Call Coverage

This option is used in conjunction with CALL COVERAGE keys (pilot keys). CALL COVERAGE keys normally do not function when the system is in the NIGHT mode. To enable them to work in the NIGHT mode, set this option to Y (yes).

### 12.4.7 Operator Night Recall

This option determines where unanswered calls recall to when the system is in the NIGHT mode. If this option is set to Y (yes), unanswered calls recall the extension programmed as operator. If this option is programmed to N (no), unanswered calls recall to extensions following the outside line's night ringing assignment.

### 12.4.8 Night Forward On

Call Forward is deliberately prevented when the system is in the NIGHT mode. If stations must forward when the system is in the NIGHT mode, set this option to Y (yes).

### 12.4.9 Operator Page All Zones

The PAGE key on the Integrated Operator Terminal can function in one of two ways. The PAGE key can either be used as a one key access to PAGE ALL ZONES when the option is set to N (no). Or, the key can be used with the addition of a single digit on the dial pad to page any one of the 10 zones when the option is set to Y (yes).

### 12.4.10 Enable HF Monitor

This option is used to enable the monitor feature on stations. The monitor feature activates the handsfree speaker while the handset is lifted. This allows persons in the same room to hear both sides of a telephone conversation. To activate this feature, set the option to Y (yes).

### 12.4.11 Operator Transfer ICM

If this option is set to Y (yes), the operator will be allowed to transfer intercom calls and put them on hold.

### 12.4.12 Default Values

DISABLE AUTO SKIP	= N	DISABLE AUTO FAULT	= N
DISABLE LCR TONES	= N	ENABLE AUTO PICKUP	= N
ENABLE OPERATOR CONF	= N	NIGHT CALL COVERAGE	= N
LCR HOOK FLASH	= N	OPER. NIGHT RECALL	= N
LCR CENTREX OPTION	= N	NIGHT FORWARD ON	= N
INTEGRATED CRT	= Y	OPER PAGE ALL ZONES	= N
SECOND TRANSFER KEY	= N	ENABLE HF MONITOR	= N
		OPER. TRANSFER ICM	= N

### 12.4.13 How To Program Other System Options

If not already on the *System Options* programming screen, from the main menu press M on the keyboard. If you are on the *System Options* programming screen, press the O key.

1. Enter either Y (yes), or N (no) for each Option. The RETURN key can be used to skip to the next option.
2. Press the RETURN key. The cursor moves to the next *Option*. Continue programming the remaining options.

```

                                OPTIONS MENU
                                -----
(O)                               [T]oll Options
DISABLE AUTO SKIP = N |
DISABLE LCR TONES = N | A line will be dropped under the following conditions
ENABLE OPERATOR CONF= N | IF drop count is: full partial AND line is in:
LCR HOOK FLASH = N |     Talk Mode      N      N
LCR CENTREX OPTION = N |     Non-talk Mode   Y      N
INTEGRATED CRT = Y |     Disable Dial Pad Y      N (if not dropped)
SECOND TRANSFER KEY = N | -----
DISABLE AUTO FAULT = N |
ENABLE AUTO PICKUP = N |
NIGHT CALL COVERAGE = N |
OPER. NIGHT RECALL = N |
NIGHT FORWARD ON = N |
OPER PAGE ALL ZONES = N |
ENABLE HF MONITOR = N |
OPER. TRANSFER ICM = N |

```

Figure 12-2 System Options Programming Screen

## Section 13

# Account Codes

### 13.1 INTRODUCTION

Account Codes are used in conjunction with Station Message Detail Recording (SMDR) to provide the user with a means of entering a number (that is meaningful to the user) from 1 to 10 digits long to an individual call record. Account codes can also be used if the Call Accounting Reports Option is being used.

The account codes can also be used with toll restriction to force station users to enter an account code when dialing particular telephone numbers (e.g. long distance numbers). When forcing a station user to enter an account code, the system can be programmed to check the account code against a table of valid account codes (from 1 to 8 digits long) before the call is allowed to be placed. Or, if desired, the system can be programmed such that an account code (from 1 to 10 digits) must be entered, but not a particular account code.

An ACCOUNT CODE key must be programmed on a 17-key, or 28-key telephone in order to use this feature. Neither digital display telephones, nor 6-key telephones require an account code key. The account code key appears as one of the soft keys on a display telephone. The 6-key telephone uses a dialed code to enter an account code number.

### 13.2 FORCED ACCOUNT CODES VERIFIED

A station user may be forced to enter an account code by using toll restriction to prevent a call being made to a certain number and, using the entered account code number, to over-ride the toll restriction. This ensures that an account code number is entered for calls to particular numbers. The account code table can contain up to 532 account code numbers, and an account code number can be from 1 to 8 digits long.

#### 13.2.1 What To Program

The use of valid (verified) forced account codes (VFAC) requires programming on 3 different programming screens: *Station Programming*, *Account Codes*, and *Toll Restriction*.

The first step in programming VFAC is to decide which extensions are to be forced to enter an account code number, and for what dialed numbers these codes are to be entered. These stations are then toll restricted from dialing those numbers. For example, a user wishes an account code to be entered by every station for any long distance call (area code call) made.

A toll restriction table is then constructed for the numbers that are not to be dialed without account codes entered. Refer to the *Toll Restriction* section for more details on constructing the toll table.

The number of the constructed toll table is then entered into the stations' Day/Night class using the *Station Programming*. The station then cannot dial any number restricted in the toll table.

The station's Forced account parameter is programmed to 17.

Valid numbers used as account codes are then entered into the *Account Codes*. These numbers are then assigned a class representing which toll table to check the dialed number against when the account code number is entered. This class, however, is generally left as 0 to permit unrestricted dialing when the account code number is entered.

### 13.2.2 How to Program

**Day/Night Class** - is entered on the *Station Programming* screen, *Timers* area.

**Forced Account** - is also entered on the *Station Programming* screen, *Timers* area. Set the Forced Account parameter to 17.

**Toll Restriction** - patterns are entered on the *Toll Restriction* programming screen.

**Account Codes** -

From the main menu, press P on the keyboard to reach the *Account Code* programming screens.

1. The cursor is located in the upper right corner of the programming screen. Enter the page number (1-7) to be programmed.
2. Press the RETURN key. The cursor moves to the first line of the page.
3. Enter an account code that is to be considered valid.
4. Press the RETURN key.
5. If the entry is correct, press the RETURN key a second time to advance the cursor to the next line.
6. Or, the TAB key can be pressed to move to the CLS column.
7. Enter the class for the account code.
8. Press the RETURN key.
9. If the entry is correct, press the RETURN key a second time to advance the cursor to the next line.
10. Continue programming until all desired account codes are entered.

To return the cursor to the upper right corner of the screen, press the SHIFT key (it may be labeled as an up arrow), and the "@" key.

Account Codes											
NUM	ACCOUNT	CLS	NUM	ACCOUNT	CLS	NUM	ACCOUNT	CLS	NUM	ACCOUNT	CLS
001	12345	000	020		000	039		000	058		000
002	1	000	021		000	040		000	059		000
003	12	000	022		000	041		000	060		000
004	123	000	023		000	042		000	061		000
005	1234	000	024		000	043		000	062		000
006		000	025		000	044		000	063		000
007		000	026		000	045		000	064		000
008		000	027		000	046		000	065		000
009		000	028		000	047		000	066		000
010		000	029		000	048		000	067		000
011		000	030		000	049		000	068		000
012		000	031		000	050		000	069		000
013		000	032		000	051		000	070		000
014		000	033		000	052		000	071		000
015		000	034		000	053		000	072		000
016		000	035		000	054		000	073		000
017		000	036		000	055		000	074		000
018		000	037		000	056		000	075		000
019		000	038		000	057		000	076		000

Figure 13-1 Account Codes Programming Screen

### 13.3 FORCED ACCOUNT CODES NOT VERIFIED

A station user may be forced to enter an account code by using toll restriction to prevent a call from being made to a certain number. This ensures that an account code number is entered for calls to particular numbers. An account code number can be from 1 to 10 digits long. However, the system does not check the entered account code, only the fact that an account code is entered.

#### 13.3.1 What to Program

The use of Forced Account Codes (FAC) requires programming on 2 different programming screens: *Station Programming*, and *Toll Restriction*.

The first step in programming FAC is to decide which extensions are to be forced to enter an account code number, and for what dialed numbers these codes are to be entered. These stations are then toll restricted from dialing those numbers. For example, a user wishes an account code to be entered by every station for any long distance call (area code call) made.

A toll restriction table is then constructed for the numbers that are not to be dialed without account codes entered. Refer to the *Toll Restriction* section for more details on constructing the toll table.

The number of the constructed toll table is then entered into the stations' Day/Night class using the *Station Programming*. The station then cannot dial any number restricted in the toll table.

A second toll restriction table is constructed for what the station is allowed to dial after an account code is entered. The number of the second table is then entered as the *Forced account* parameter in *Station Programming*.

### 13.3.2 Operation

When a station user selects a line to make an outside line call, and does not enter an account code before dialing the telephone number, the extension's Day/Night class is checked. If the day/night class is greater than zero, the digits dialed are checked against the toll restriction table with the same number as the day/night class. The call is then allowed or prevented based on the toll restriction table.

When a station selects a line to make an outside line call, and enters an account code number before dialing the telephone number, the system checks the *Forced account* parameter of the extension. If this parameter is 0, the system ignores any account code entered, and checks the day/night class and proceeds with any toll restriction. If the *Forced account* parameter is a number between 1 and 16, the station uses that number in place of the day/night class, and uses the toll restriction table with the same number as the *Forced account* parameter to determine whether or not the call is allowed to be placed.

When a station selects a line to make an outside line call, and enters an account code number before dialing the telephone number, the system checks the *Forced account* parameter of the extension. If this parameter is 17, the system first checks the *Account Codes* table for the entered account code number. If the entered account code number is found, the system uses the toll restriction table with the same number as found in the *CLS* column of the *Account Codes* screen, in place of the day/night class, to determine whether or not the call is allowed to be placed.

If the number is not found, it is treated as if no account code were entered, and uses the toll restriction table identified by the day/night class.

## 13.4 SUMMARY

An extension can be programmed to force the entry of an account code before any outside line call is made. A station's Forced Account Code class also determines whether or not the account code that is entered is verified against a table of authorized account codes.

The station's day and night class are used to restrict a user from dialing a particular type of call (long distance, local, etc.). The class of the station is changed (for the one call) when an account code is entered.

### FAC CLASS      USED FOR

- |            |   |
|------------|---|
| 00         | Forced account codes not in effect. Station cannot over-ride any toll restriction caused by Day/Night class.  |
| 01 thru 16 | An account code must be entered if the station user is dialing any outside line call. The account code entered is NOT checked against the Account Code Table for validation. The station's Day/ Night class changes to the number entered as the "Forced Account = ."   |
| 17         | Forced entry of account code when used in conjunction with a station's day or night class. The entered account number is checked against the validation table (P - Account Codes programming screen). The station's Day/Night class is changed to the class assigned to the account code number. Account codes can still be added to SMDR record. |

## 13.5 STATION OPERATION

### 13.5.1 Entering Forced Account Codes On A 6-Key Telephone

**Description:** A telephone may be programmed so that you must enter an account code in order to place an outside line call to certain telephone numbers (for example, long distance calls). This ensures that call records contain an appropriate indication of the nature of the call. An assigned account number (from 1 to 10 digits) must be entered after an outside line is selected, but before dialing the desired telephone number.

**How To:** Enter A Forced Account Code.

ACTION	RESULT	COMMENT
1. -(After selecting an outside line), Press [PROG] key.	[PROG] key LED will light.	The Account Code must be entered before dialing.
2. -Press [#] key.		
3. -Enter Account Code (1 to 10 digits).		
4. -Press [PROG] key.	[PROG] key LED will go out.	If 10 digits are entered, the LED will automatically go out, and the account code is entered.
5. -Dial desired telephone number.		

### 13.5.2 Forced Account Codes On A 17-Key Or 28-Key Telephone

Description: A telephone may be programmed so that you must enter an account code in order to place an outside line call to certain telephone numbers (for example, long distance calls). This ensures that call records contain an appropriate indication of the nature of the call. An assigned account number (from 1 to 10 digits) must be entered after an outside line is selected, but before dialing the desired telephone number.

#### How To: Enter A Forced Account Code.

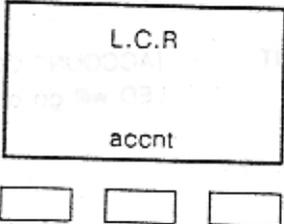
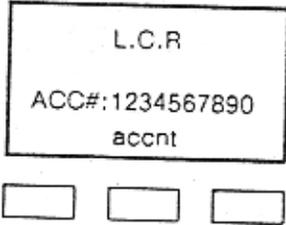
ACTION	RESULT	COMMENT
1. -(After selecting an outside line), press [ACCOUNT CODE] key.	[ACCOUNT CODE] key LED will light.	The Account Code must be entered before dialing the telephone number.
2. -Enter Account Code (1 to 10 digits).		
3. -Press [ACCOUNT CODE] key.	[ACCOUNT CODE] key LED will go out.	If 10 digits are entered, the LED will automatically go out, and the account code is entered.
4. -Dial desired telephone number.		

### 13.5.3 Forced Account Codes On A Digital Display Telephone

**Description:** A telephone may be programmed so that you must enter an account code in order to place an outside line call to certain telephone numbers (for example, long distance calls). This ensures that call records contain an appropriate indication of the nature of the call. An assigned account number (from 1 to 10 digits) must be entered after an outside line is selected, but before dialing the desired telephone number.

The digital display telephone uses a soft key to enter account codes. This soft key is located under the display and is the center key.

#### How To: Enter A Forced Account Code.

ACTION	RESULT	COMMENT
1. -(After selecting an outside line), press [ACCNT] soft key.		The Account Code must be entered before dialing the telephone number.
2. -Enter Account Code (1 to 10 digits).	Entered account code appears on display.	
3. -Press [ACCNT] soft key.		If 10 digits are entered, the account code is automatically entered.
4. -Dial desired telephone number.		

## Section 14

# PBX Feature Keys

### 14.1 INTRODUCTION

The ISOETEC System/108 can be used as a system connected to a larger PBX (or Centrex). Stations from the PBX are connected to the ISOETEC System/108's CO port card. Thus, an extension on the PBX is a CO line on the System/108. Many larger PBXs use complex dialing sequences to activate their features. PBX feature keys have been provided to simplify using those PBX features that are of interest to the System/108 user. The dialing sequence required by the PBX can be programmed on a single key of a System/108 telephone. There are 40 such sequences possible in the system. A feature key is programmed as a PBX key, and coded to follow one of the programmed sequences.

### 14.2 WHAT TO PROGRAM

The sequence to perform a particular feature of the larger PBX is programmed on the *PBX Feature Key* programming screen. Selecting the feature key position, and which sequence to follow is programmed on the Station Programming Screen.

Determine which PBX features are of interest to System/108 station users. Determine how these features are carried out. There are a number of PBX'S, and each has their own particular sequence for performing a feature. For example, to transfer a call between extensions, a PBX station may have to flash (momentarily depress) the switch-hook, dial a #, and the extension number to receive the call. Another PBX may use a different sequence.

There are 40 sequences that can be programmed on the *PBX Feature Key* programming screen. Each sequence is comprised of a combination of commands. Up to 10 commands may be assigned to one PBX key. These commands are listed below:

- F Flash the PBX line. This is the equivalent of a PBX station momentarily depressing the switch-hook.
- A Wait for dial tone from the PBX before continuing.
- P Pause n (n=number of seconds) before continuing.
- W Wait n (n=number of digits to wait) for the System/108 station user to dial n number of digits before continuing.
- D Dial the digits stored from the Wait command.

Dial digits 1-9, \*, and # may also be entered on the command. The system dials these digits as they are found in the command line.

For example, to transfer a call in a particular PBX, a station user must: flash the switch-hook, wait for dial tone, then dial 73 and the extension number (3 digits).

A System/108 user can be told: to transfer a PBX line to a station within the PBX, press the PBX feature key on their telephone and dial the desired extension number.

The PBX key assigned to their station would be programmed on the PBX Feature Key Programming Screen:

W 3 F A 7 3 D

When the station user presses the PBX key, the System waits for the user to dial the 3 digit extension number. The System then flashes the PBX line, waits for PBX dial tone, dials 7, 3, and the 3 digit extension number.

The PBX feature key is then assigned a position on each station. The key code for a PBX FEATURE key is 815. This key is also assigned a sub-code to indicate which of the 40 possible command lines the key is to use.

```

[E]xt 3025 port 037 name JULIE type time 11:14 a Thu 11-17-88
-----
[L]ine ID Number - 001 c=ext->exts | [T]imers
  day ring: N x=col->ext | Camp on timer =003*10s Hands free co Y
  night ring: N y=col->exts | Recording Num = 000 Hands free ICM Y
  day access: Y z=row->ext | Hunt group = 000 Hands free Rec Y
  night access: Y w=row->exts | Day class = 000 Auto Answer Y
  | Night class = 000 Auto 2nd Path N
[K]eys [H] 815 PBX Key | LCR class = 000 Allow 2nd Path N
01 [ 0300 ] 0020 02 [ 0815 ] 0001 | Prime line = 000 Group in N
03 [ 0300 ] 0020 04 [ 0300 ] 0020 | Page zone = 060 Busy On Hold N
05 [ 0818 ] 0201 06 [ 0818 ] 0201 | Forced account= 000 Blk Barge In N
07 [ 3001 ] 0000 08 [ 3002 ] 0000 | Pickup group = 000 Blk Barge Tone Y
09 [ 3003 ] 0000 10 [ 3004 ] 0000 | Pilot NoAnswr = 000s Out LCR Only N
11 [ 3005 ] 0000 12 [ 3008 ] 0000 | Cost limit = $0.00 Total Toll N
13 [ 0800 ] 0001 14 [ 0600 ] 0002 | Ring type = 01 SMDR Enable N
15 [ 0800 ] 0003 16 [ 0600 ] 0004 | Hold Recall = 006*10s Hook Release N
17 [ 0700 ] 0001 18 [ 0700 ] 0002 | Trans Recall = 006*10s VMS/Attend. N
19 [ 0810 ] 0080 20 [ 0802 ] 0000 | Analog Phone N
21 [ 0803 ] 0000 22 [ 0809 ] 0000 | Busy on DID N

(c) all lines to all extns or timer to all extns.(x) line to all lines in extn
(v) line to all extns.(z) ring to all lines,(w) ring to all extns
    
```

Figure 14-1 Station Programming Screen





## Section 15

# Call Accounting Reports Option

### 15.1 INTRODUCTION

The *Call Accounting Reports Option* is a feature of the ISOETEC® System/108 which allows outside line call information to be stored in system memory. These call records can then be processed, and printed to the SMDR printer. The call records may be sorted by extension (detail of records), or by account code (detail of records). A summary of extension, or account code activity can also be provided.

The call records contain information concerning the date and time a call was placed (or received), the telephone number dialed, the duration of the call, and the cost of the call.

Call Accounting Reports Option 1 - ORDER PART NUMBER 112002. This package can store up to 4,000 call records depending upon the length of the call record (e.g., long distance calls take more space than local calls, and local takes more space than incoming).

Storage capacity will vary with the types of calls stored. Calls that are tagged with account codes occupy more storage space.

When the *used storage space* reaches approximately 75%, "Account" lights on the operator's screen.

When the *used storage space* reaches approximately 99.9%, the system stops recording calls.

These packages are added to the system software by an authorized ISOETEC Service Center using the remote programming feature.

## 15.2 INSTALLATION

**Hardware Requirements** - The hardware necessary for *Call Accounting Reports Option* is included with the standard ISOETEC System/108.

**Software Requirements** - Software version 1.00 and above. This feature is added to system memory via the remote programming feature. A *Least Cost Routing Data Base* is also required for operation of this feature.

The installation of the *Call Accounting Reports Option* is accomplished in 2 steps.

1. An authorized ISOETEC Service Center installs the appropriate Option package.
2. A customized *Least Cost Routing Data Base* is loaded into the system.

**NOTE:** After the *Call Accounting* package has been added, all reports should be cleared to update the Period Covered.

See the *Installation* section of this manual for instructions on the connection of a printer.

## 15.3 PROGRAMMING

There are several programming steps which are needed for the proper operation of the *Call Accounting Reports Option*. Programming is necessary on the *Station*, *System*, and *Call Accounting* programming screens.

### 15.3.1 What To Program In Station Programming

*SMDR Enable*, found in the *Timers* area, must be programmed to Y (yes) for each extension number for which call records are to be stored. Refer to the *Station Programming* section of this manual for instructions on how to program the *Station Programming* screen.

### 15.3.2 What To Program In System Programming

*SMDR Enable*, found in the *Lines* area, must be programmed to Y (yes) for each trunk for which call records are to be stored.

The *Cost After* parameter is used with SMDR (Station Message Detail Recording, or the *Call Accounting Reports Option*) to determine how long after a call has been dialed, the costing process should begin.

The *Local Call Cost Limit* is also used in conjunction with Least Cost Routing to define for the system what calls can be considered local by price rather than by dialed number.

Refer to the *System Programming* section of this manual for instructions on how to program the *System Programming* screen.

### 15.3.3 What To Program in Call Accounting

The only thing to be programmed in the *Call Accounting* programming screen is what type of call records to store. The choices are: none, incoming, local, and toll calls, or any combination of the last three.

*NOTE: Depending on the type(s) of calls (Incoming, Toll Calls, Local Calls and None) selected for Call Accounting Record, the display Call Type will be displayed as indicated in the table below:*

Type of Calls Selected	Call Type Displayed
None	None
Incoming	Incoming
Toll Calls	Toll Only
Local Calls	Local Only
Incoming and Toll Calls	In & Toll
Incoming and Local Calls	In & Local
Toll and Local Calls	Outgoing
Incoming, Toll, and Local Calls	In & Out

The above describes the type(s) of calls which can be RECORDED. It must not be interpreted as the types of calls which can be viewed. For example, if "Incoming, Toll Calls and Local Calls" was selected, it is not possible to view only "Incoming" calls. This is not a function to sort the type of calls to be viewed.

15.3.3 What's Program in Call Accounting

The only thing to be programmed in the Call Accounting program is what type of call records to store. The choices are none, incoming, local, and toll. In any combination of the last three.

NOTE: Depending on the type of call selected, the program will display the appropriate call type. For example, if you select 'Incoming' and 'None', the program will only display incoming calls. If you select 'Incoming', 'Local', and 'None', the program will display incoming and local calls. If you select 'Incoming', 'Local', and 'Toll', the program will display incoming, local, and toll calls.

Type of Calls Selected: \_\_\_\_\_  
Call Type Desired: \_\_\_\_\_

```
CALL ACCOUNTING MENU
-----
START LOG DATE : Thu 07-07-88 10:49   TYPE OF CALLS : IN & OUT
NUM OF CALLS IN MEMORY = 100         USED STORAGE SPACE =  .94%

SELECT ONE OF THE FOLLOWING:

A. EXTENSION REPORT.
B. ACCOUNT REPORT.
C. SUMMARY OF EXTENSIONS REPORT.
D. SUMMARY OF ACCOUNTS REPORT.
E. SELECT [I]ncoming/[T]oll Calls/[L]ocal Calls/[N]one
F. CLEAR ALL THE REPORTS.

ENTER SELECTION>
```

Figure 15-1 Call Accounting Menu

### 15.3.4 How To Program Call Accounting

From the main menu, press V on the keyboard. The *Call Accounting* menu appears.

1. Press E while in the *Call Accounting* Menu. "Which one?" prompt appears on the screen.
2. Enter one of the following: I, T, L, A or N.
  - I = Incoming,
  - T = Toll,
  - L = Local,
  - A = All (Incoming, Toll, and Local),
  - N = None.
3. Repeat steps 1 & 2 to add another type.
4. Press ESCAPE to return to system main menu.

### 15.3.5 How To Clear the Reports

The system continues to store call records until the reports are cleared, or until the storage area is full. After the reports are cleared, the system begins to store new records. When the reports are cleared ALL reports are erased.

1. From the *Call Accounting* menu, press F on the keyboard. A warning message "All the data will be lost! Proceed (N)?" is displayed.
2. Press Y (yes) to clear the reports. Press any other key if you have changed your mind about clearing the reports.

## 15.4 REPORT DEFINITIONS

The following are definitions of the column headings used in the reports.

PERIOD COVERED	The beginning and ending dates for which the calls are recorded. The beginning date is equal to when the report was last cleared. The ending date is when the report is viewed, or printed.
DATE	The date of the incoming, or outgoing call.
TIME	The time of day which the call was placed, or answered in 24 hour clock format.
NUMBER DIALED	For outgoing calls, this is the telephone number dialed. A "?" shows in this column if a system speed dialing number containing a pause is dialed.
TYPE	Indicates whether the call was incoming (IN), or outgoing (OUT or SOUT). For calls placed via LCR, this column shows SOUT.
DURATION	The amount of time spent on the incoming, or outgoing call (hours:minutes:seconds).
RING	This applies only to incoming calls. It indicates the amount of time the incoming call rang before it was answered (minutes:seconds).
SERV	This applies to outgoing calls only. This is the carrier service used for the call. For example, DDD is Direct Distance Dial.
COST	The cost of the outgoing call is calculated using the <i>Least Cost Routing Data Base</i> .
ACCOUNT	The account code entered by the station user for incoming, or outgoing calls.
CALLS	The sum of incoming and outgoing calls.
INCOMING	The number of incoming calls answered.
OUTGOING	The number of outgoing calls.

*NOTE: Due to differences in timing calls, the cost totals for extensions on the Summary of Extension report may differ from those found on the System Management Extension Summary (I) Report.*



## 15.6 ACCOUNT REPORT

- ACTION** From the *Call Accounting* menu, press B. The prompt "WHICH ONE?(A for all)" appears.
- Enter the desired *account code*, and press the RETURN key. Or, press A to list all recorded account codes.
- Press the ESCAPE key to RETURN to the *Call Accounting* menu. Another *account code* may be entered, or press the escape key a second time to make another report selection.
- COMMANDS** The UP and DOWN arrow keys are used to scroll the report. The screen displays 12 calls at a time.
- PRINT** To print the report to the SMDR printer, press Y (yes) when the "Print Now" prompt appears on the bottom of the screen. The entire selected report prints, not just the page displayed.
- TOTALS** The totals at the bottom of each screen are the totals for that screen, and all previous screens. The report totals are listed on the last page of the report.

ACCOUNT 1234									
-----									
Period Covered: Thu 07-07-88 10:49 Through Fri 07-15-88 17:37									
EXT	DATE	TIME	NUMBER DIALED	TYPE	DURATION	RING	SERV	COST	
-----									
3007	07/13/88	11:08	914	OUT	:10		DDD	\$ .00	
3007	07/13/88	11:08	9*9	OUT	:09		DDD	\$ .00	
3007	07/13/88	11:10	914	OUT	:11		DDD	\$ .00	
3007	07/13/88	11:10	9*9146281532#	OUT	:14		DDD	\$ .00	
3003	07/15/88	12:27	98547	OUT	:17		DDD	\$ .00	
3003	07/15/88	17:32	12127590555	OUT	1:00		DDD	\$ .00	
3003	07/15/88	17:33	12127590555	OUT	:40		DDD	\$ .00	
3006	07/15/88	17:33	18035554846	OUT	:35		DDD	\$ .00	
3007	07/15/88	17:33	13125554878	OUT	:30		DDD	\$ .00	
3009	07/15/88	17:33	65689532	OUT	:26		DDD	\$ .00	
3003	07/15/88	17:36		IN	:45	:02			
Totals - CALLS   INCOMING   OUTGOING   DURATION   COST									
11   1   10   4:57   \$ .00									
Print Now _ [Use the arrow keys to scroll...]									

Figure 15-3 Account Code Report





## 15.9 TROUBLE SHOOTING

### SYMPTOM

### POSSIBLE CAUSES

---

Calls are not recording.

1. Station Programming:

SMDR parameter must be Y (yes) for desired station.

2. System Programming:

SMDR parameter must be Y (yes) for line the call is made on.

3. System Programming:

Lines must be in a trunk group; must not be programmed for trunk group zero.

4. Call Accounting Programming:

Must be programmed for call type, either incoming, toll, local, or some combination.

Call log date shows \*\* \*\*

Reports should be cleared (choice F on menu) before beginning use.

When "Account" appears in the operator's screen, the Call Accounting Package is approximately 75% filled, and should be printed (if desired), and then cleared.



## Section 16

# Data Feature

### 16.1 INTRODUCTION

The ISOETEC® System/108 Data Feature is a time division switched, point-to-point data transmission capability which permits simultaneous voice and data communications. The Data Feature offers the ability to transmit data information between personal computers, printers, MODEMs, CRT terminals, main frame computer ports, etc.

Data switching is accomplished through the VCM/DCM which is installed in the ISOETEC System/108 cabinet, and a digital display phone, or stand-alone Digital Data Interface (DDI) connected to each data communications device. The ISOETEC System/108 supports a total of 108 ports. These ports can be *either* voice ports, (digital telephones, CO lines, tie lines, etc.), voice/data ports (digital display telephones), *or* data ports (DDI).

The system is designed so that both voice and data are transmitted via the same data bus. Both the voice and data ports are non-blocking. Any data port can be connected to another data port regardless of other connections in the system.

The digital display phone, and DDI, allow any serial data communications device (which conforms to RS-232-C) to be connected to the ISOETEC System/108. Data information can be switched through the system at speeds from 300 to 38.4K baud asynchronous, and at 56K baud synchronous. The system is transparent to the devices being connected. There is no protocol, or data speed conversion done by the system. Any serial data communications devices that can communicate with each other using cable, can communicate with each other through the ISOETEC System/108.

The data switching is accomplished using the same wiring the telephone station uses for voice switching. The Data Feature can be added at any time without expensive rewiring. Installation is accomplished by installing a digital display telephone, or DDI at each location that is to use the Data Feature.

Data ports can be arranged into *hunt groups* to aid in sharing resources. For example, MODEMs connected to data ports can be arranged into hunt groups. A station user would only need to know the lead port number for the MODEMs and, when dialed, the system would connect the user to an available MODEM.

Data ports can also be *restricted* from calling other data ports. For example, station users can be prevented from accessing certain data ports connected to printers used for special projects (the printers are not available for general use).

## 16.2 INSTALLATION

Installation of the Data Feature is quick and simple. Installation consists of standard installation of digital display telephone sets.

Connection of the individual data communication devices requires that the installer be familiar with data communications terms, and has access to the appropriate information for connecting the variety of data communications devices that may be encountered. This information consists of, but is not limited to:

1. Is the device configured as data terminal equipment (DTE), or data communications equipment (DCE)?
2. What pin on the RS-232 type connector performs what function?
3. What signal leads are required to make the device operate?

When planning the installation of the data feature, use a digital display phone at any location that is to originate a data connection. A DDI can only be called; it cannot originate a connection. A digital display phone would typically be connected to a CRT terminal, or personal computer. A DDI would typically be connected to a printer, or a MODEM.

The station wiring for a digital display phone and a DDI is identical to a standard 28 key digital telephone. Follow the installation instructions in the *Installation*, and *Cabling and Cross Connection* sections of this manual.

The data connector of the digital display telephone, and the DDI is a 25 pin, type D connector which is configured as Data Communications Equipment with the following pin configurations:

Pin	Use	Direction
2	Receive Data	into telephone (or DDI)
3	Transmit Data	out of telephone (or DDI)
4	Request To Send	into telephone (or DDI)
5	Clear To Send	out of telephone (or DDI)
6	Data Set Ready	out of telephone (or DDI)
7	Signal Ground	
8	Data Carrier Detect	out of telephone (or DDI)
11	unassigned	into telephone (or DDI)
12	Secondary DCD	out of telephone (or DDI)
15	Transmit Clock	out of telephone (or DDI)
17	Receive Clock	out of telephone (or DDI)
19	Secondary RTS	into telephone (or DDI)
20	Data Terminal Ready	into telephone (or DDI)
22	Ring Indicator	out of telephone (or DDI)

The following diagram will aid in the design of cables to connect the many different configurations of data communications devices.

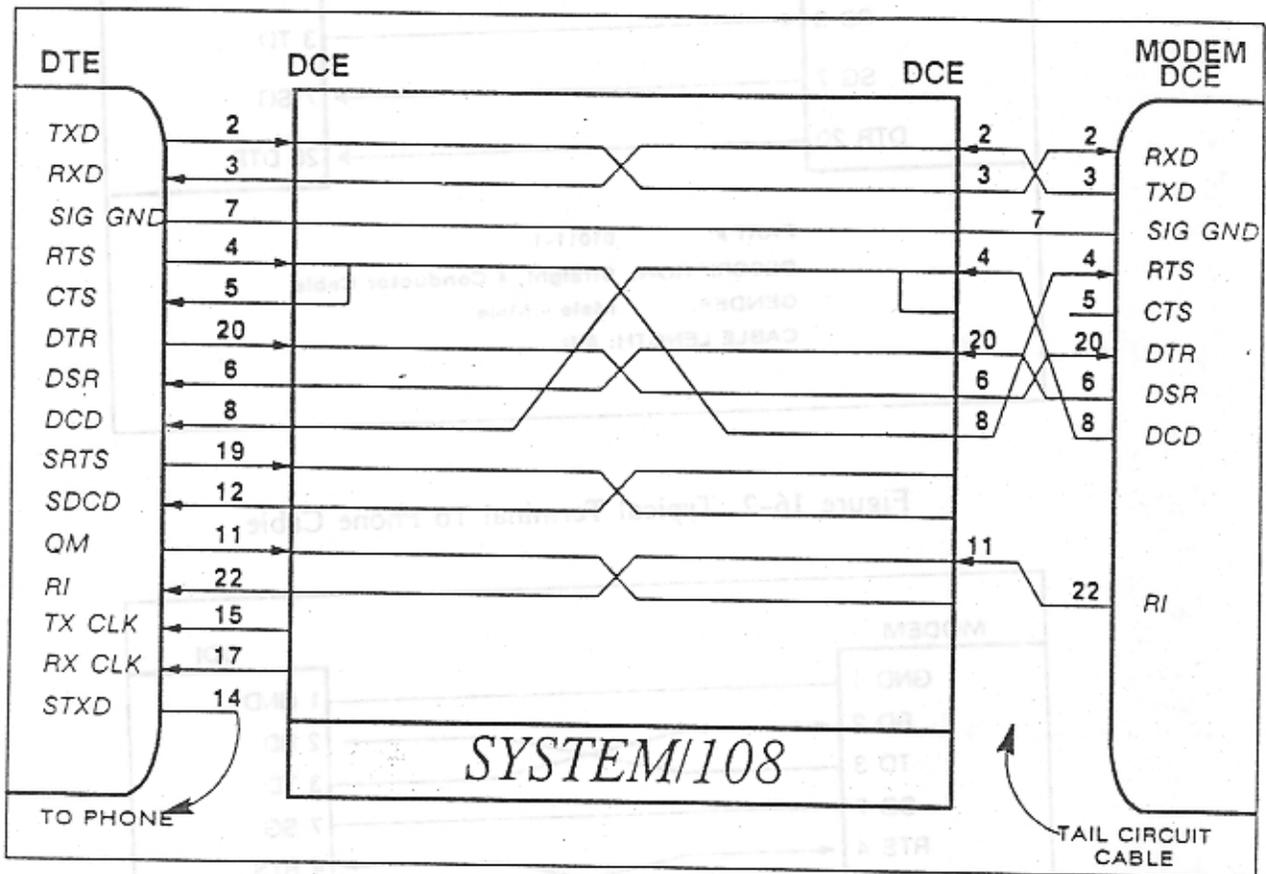


Figure 16-1 System/108 Data Switching

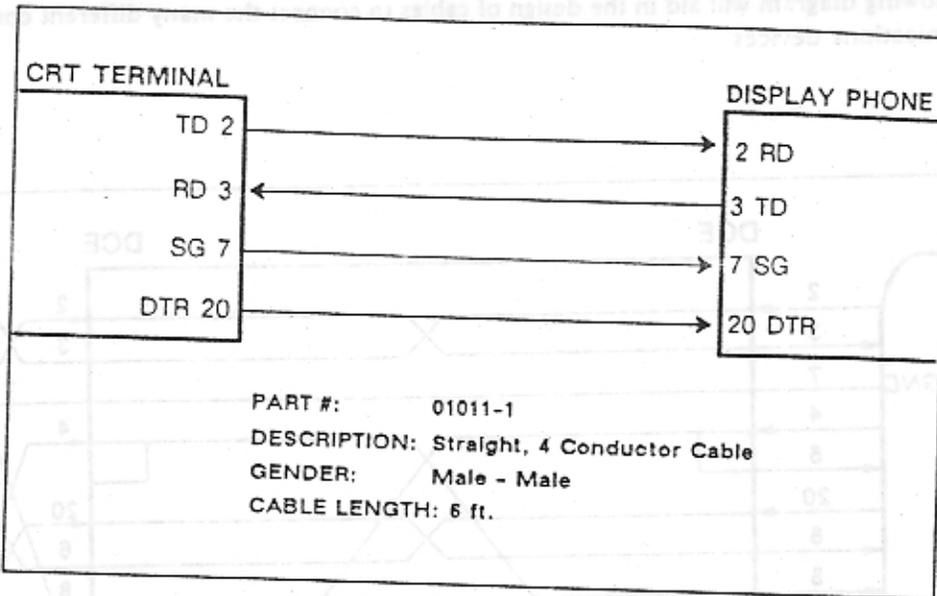


Figure 16-2 Typical Terminal To Phone Cable

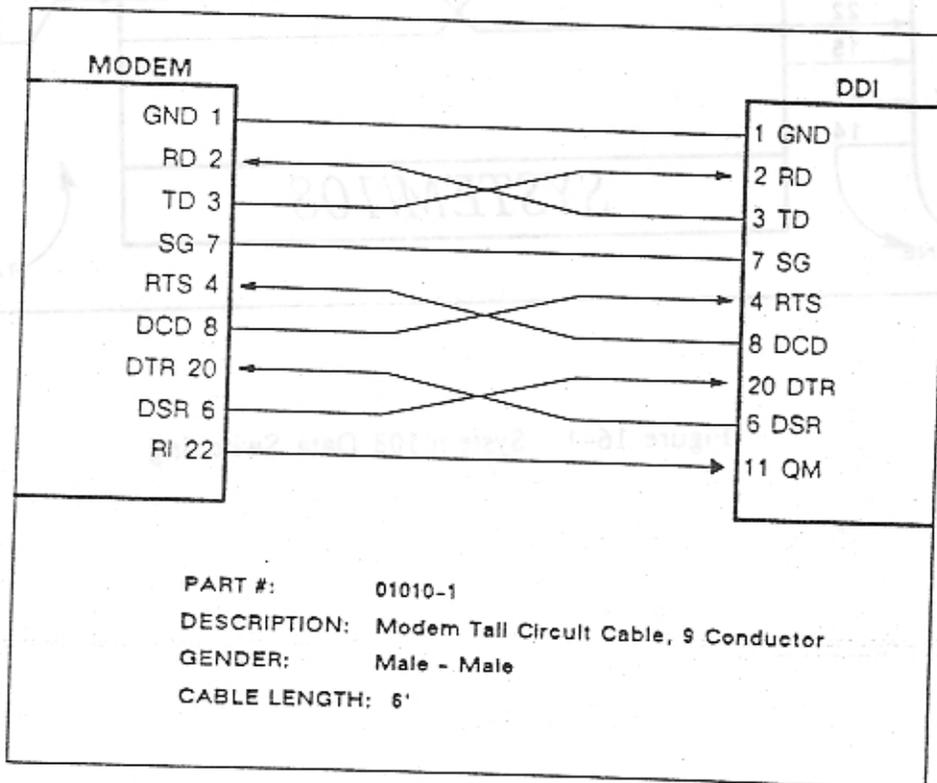


Figure 16-3 Typical MODEM To DDI Cable

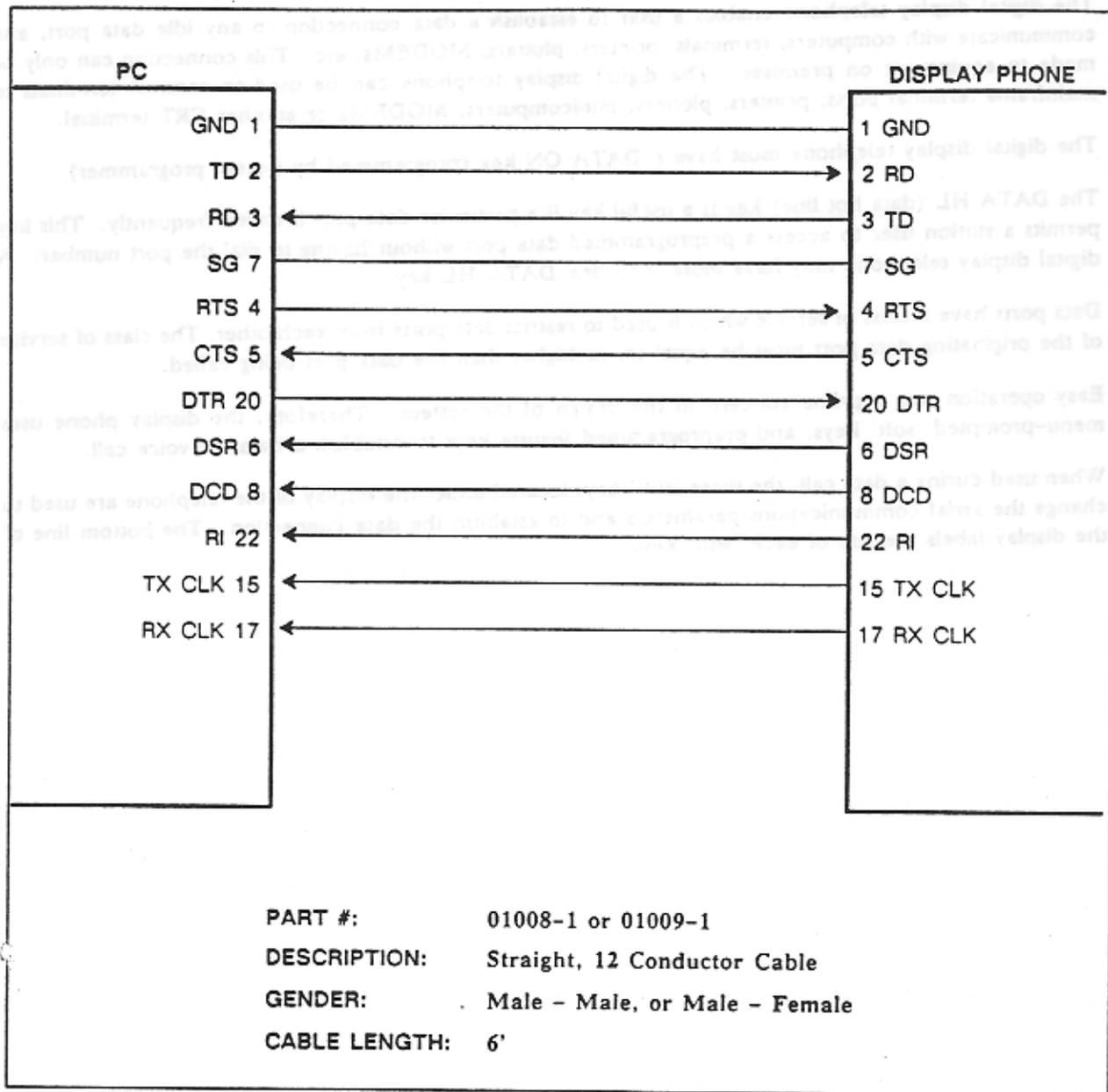


Figure 16-4 Typical Computer To Phone Cable

### 16.3 DATA STATION OPERATION

The digital display telephone enables a user to establish a data connection to any idle data port, and communicate with computers, terminals, printers, plotters, MODEMs, etc. This connection can only be made to equipment on premises. The digital display telephone can be used to connect terminals to mainframe terminal ports, printers, plotters, minicomputers, MODEMs or another CRT terminal.

The digital display telephone must have a DATA ON key (programmed by system programmer).

The DATA HL (data hot line) key is a useful key if a particular data port is called frequently. This key permits a station user to access a preprogrammed data port without having to dial the port number. A digital display telephone may have more than one DATA HL key.

Data ports have a class of service which is used to restrict data ports from each other. The class of service of the originating data port must be equal to, or higher than the data port being called.

Easy operation was a prime concern in the design of the system. Therefore, the display phone uses menu-prompted 'soft' keys, and preprogrammed feature keys to establish a data, or voice call.

When used during a data call, the three 'soft' keys located under the display of the telephone are used to change the serial communications parameters and to establish the data connection. The bottom line of the display labels the use of each 'soft' key.

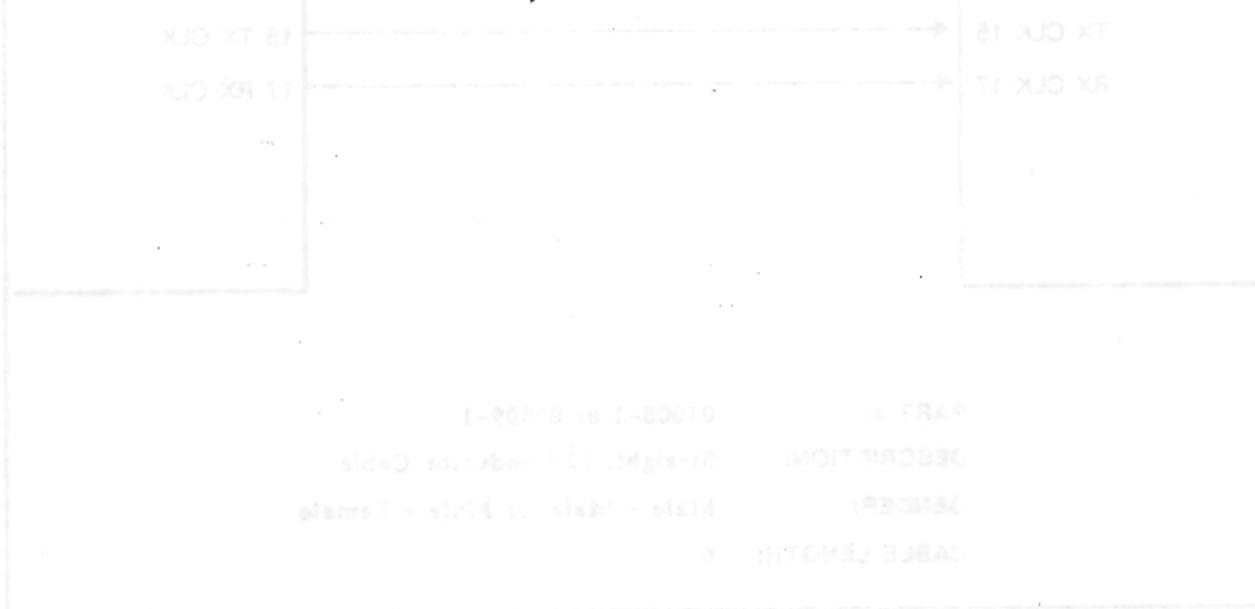


Figure 16-4 Typical Display To Phone Cable

### 16.3.1 Connecting To A Data Port

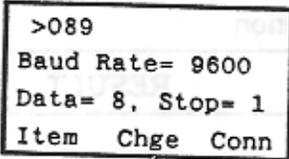
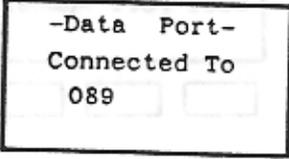
**Description:** A digital display phone can connect to a data port by either using the DATA ON key and dialing the port number, or by using a DATA HL key.

#### How To: Make A Data Connection.

ACTION	RESULT	COMMENT
1. Press the DATA ON key.	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;">           -Data Call- #069             Dial Port Number   <div style="display: flex; justify-content: space-around; width: 100%;"> <div style="border: 1px solid black; width: 30px; height: 15px;"></div> <div style="border: 1px solid black; width: 30px; height: 15px;"></div> <div style="border: 1px solid black; width: 30px; height: 15px;"></div> </div> </div>	The DATA ON key LED flashes. The data port of the station shows on the display.
2. Dial destination port number (001-108).	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;">           &gt;034            Baud Rate= 300            Data= 8, Stop= 1            Item Chge Conn   <div style="display: flex; justify-content: space-around; width: 100%;"> <div style="border: 1px solid black; width: 30px; height: 15px;"></div> <div style="border: 1px solid black; width: 30px; height: 15px;"></div> <div style="border: 1px solid black; width: 30px; height: 15px;"></div> </div> </div>	Change parameters, if desired, otherwise go to step 3.
3. Press the 'soft' key, under the display labeled Conn.	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;">           -Data Port-            Connected To            034   <div style="display: flex; justify-content: space-around; width: 100%;"> <div style="border: 1px solid black; width: 30px; height: 15px;"></div> <div style="border: 1px solid black; width: 30px; height: 15px;"></div> <div style="border: 1px solid black; width: 30px; height: 15px;"></div> </div> </div>	The Conn (connect) key is the 'soft' key located below the word Conn on the display.

To DISCONNECT from a data call, press the DATA ON key.

How To: Make A Data Connection Using The DATA HL Key.

ACTION	RESULT	COMMENT
1. Press the DATA HL key.		The DATA ON key LED flashes. Change parameters if desired. Otherwise, go to step 2.
2. Press the 'soft' key, under the display labeled Conn.		The Conn (connect) key is the 'soft' key located below the word Conn on the display.

### 16.3.2 Changing Communication Parameters

**Description:** A digital display phone may be permitted to change the baud rate, number of data bits (plus a parity bit), and the number of stop bits of the data port being called.

After the data port number is dialed (or DATA HL key is pressed), if the display appears as below, the communications parameters **CANNOT** be changed by the station.

The word ITEM does not show

```
>078
Baud Rate= 9600
Data= 8, Stop= 1
---- Chge Conn
```

However, if the display shows as below, the communications parameters **CAN** be changed by the station user.

The word ITEM does show

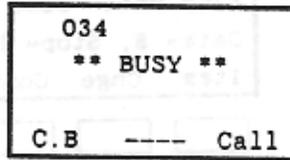
```
>034
Baud Rate= 9600
Data= 8, Stop= 1
Item Chge Conn
```

## How To: Change the baud rate, number of bits, and number of stop bits.

ACTION	RESULT	COMMENT
1. Press the 'soft' key under the word Item on the display.	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;">           034            Baud Rate=&gt; 300            Data= 8, Stop= 1            Item Chge Conn         </div> <div style="display: flex; justify-content: center; gap: 20px; margin-top: 5px;"> <input type="text"/> <input type="text"/> <input type="text"/> </div>	Note the arrow > next to Baud Rate. The Item 'soft' key moves this arrow to the different parameters.
2. If the baud rate is to be changed, press the Chge 'soft' key.	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;">           034            Baud Rate=&gt;1200            Data= 8, Stop= 1            Item Chge Conn         </div> <div style="display: flex; justify-content: center; gap: 20px; margin-top: 5px;"> <input type="text"/> <input type="text"/> <input type="text"/> </div>	The Baud Rate increments each time the Change 'soft' key is pressed. When the desired Baud Rate appears, move on to the next parameter.
3. The number of bits (8 or 9) is changed using the same method. Press the Item 'soft' key to move the arrow to the parameter to be changed.	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;">           034            Baud Rate= 1200            Data=&gt;8, Stop= 1            Item Chge Conn         </div> <div style="display: flex; justify-content: center; gap: 20px; margin-top: 5px;"> <input type="text"/> <input type="text"/> <input type="text"/> </div>	
4. Press the Chge 'soft' key to increment the values of the parameter.	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;">           034            Baud Rate= 9600            Data=&gt;9, Stop= 1            Item Chge Conn         </div> <div style="display: flex; justify-content: center; gap: 20px; margin-top: 5px;"> <input type="text"/> <input type="text"/> <input type="text"/> </div>	The number of stop bits (1 or 2) is also changed using this method.

### 16.3.3 When The Called Port Is Busy

**Description:** When the called data port is in use, the Call Back feature can be used to alert the station user that the data port is free, or a different data port can be called. Of course, the DATA ON key can be pressed to cancel the call, and the call can be tried again at a later time.



#### How To: Use Call Back To A Data Port.

ACTION	RESULT	COMMENT
1. Press the 'soft' key located under the C.B on the display.	<p>A screenshot of a device display showing the following text: "*Call back on*", "** BUSY **", and "C.B ---- Call". Below the display are three small rectangular buttons.</p>	
2. Press the DATA ON key.	<p>A screenshot of a device display showing the following text: "Wed May 18 3:49" and "*idle*". Below the display are three small rectangular buttons.</p>	The DATA ON key LED goes out.
After pressing the DATA ON key, wait for the port to be available. When the port calls back, the display appears as shown in step 3.		
3.	<p>A screenshot of a device display showing the following text: "&gt;Data Call Back&lt;" and "034". Below the display are three small rectangular buttons.</p>	The phone rings to indicate the data port is now available.

(continued)

How To: Use Call Back To A Data Port, continued.

ACTION	RESULT	COMMENT
4. Press the DATA ON key.	<div style="border: 1px solid black; padding: 5px; width: fit-content;">                     &gt;034                      Baud Rate= 9600                      Data= 8, Stop= 1                      Item Chge Conn                 </div> <div style="display: flex; justify-content: space-around; margin-top: 5px;"> <input type="text"/> <input type="text"/> <input type="text"/> </div>	
5. Press the 'soft' key, under the display labeled Conn.	<div style="border: 1px solid black; padding: 5px; width: fit-content;">                     -Data Port-                      Connected To                      034                 </div> <div style="display: flex; justify-content: space-around; margin-top: 5px;"> <input type="text"/> <input type="text"/> <input type="text"/> </div>	The connection is established.

How To: Call Another Data Port (when selected port is busy).

ACTION	RESULT	COMMENT
1. Press the 'soft' key located below CALL.	<div style="border: 1px solid black; padding: 5px; width: fit-content;">                     -Data Call- #069                      Dial Port Number                 </div> <div style="display: flex; justify-content: space-around; margin-top: 5px;"> <input type="text"/> <input type="text"/> <input type="text"/> </div>	
2. Dial another data port number (001-108).	<div style="border: 1px solid black; padding: 5px; width: fit-content;">                     &gt;062                      Baud Rate= 300                      Data= 8, Stop= 1                      Item Chge Conn                 </div> <div style="display: flex; justify-content: space-around; margin-top: 5px;"> <input type="text"/> <input type="text"/> <input type="text"/> </div>	

(continued)

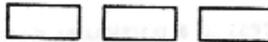
How To: Call Another Data Port when selected port is busy (continued).

ACTION	RESULT	COMMENT
--------	--------	---------

3. Press the 'soft' key, under the display labeled Conn.

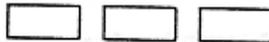
-Data Port-  
 Connected To  
 062

The connection is established.



If the data port being used to call another port is not allowed access to that port, the display indicates that the port is restricted.

071  
 Is Restricted  
 --- Call ---



The following paragraphs will refer to the display of each column on the Data Programming screen.  
 Application for port: If a port number is displayed in these columns cannot be changed.  
 Application for extension: The extension number of the display phone appears in the column whenever a display phone is selected. The ISDN extension number is also displayed for a digital display phone. The extension number (see the heading 2.8.2. ext 2012 is listed as 212) in the column.  
 Application for speed: Speed refers to the data transmission speed which the display phone or DDI is to transmit at. The transmission speed is also known as baud rate and is expressed in bits per second. Available baud rates for each data transmission are 300, 1200, 2400, 4800, 9600, 19200, 38400, 76800 and 153600. The baud rate for each data port and enter the extension on the Data Programming Configuration screen.

## 16.4 PROGRAMMING

Programming for the Data Feature is accomplished using 2 programming screens. A DATA ON key, and optional DATA HL keys are programmed in the KEYS area of the *Station Programming* screen. The data ports are programmed using the *Data Programming* screen.

### 16.4.1 Station Programming

Select the key position for the DATA ON key on the digital display phone, and enter the key code for the DATA ON key (key code 829) in a key position on the Station Programming Configuration sheets.

DATA HL keys provide one button access to a particular data port. Determine which data port the key is to access. Select a position for the DATA HL key on the display phone, and enter the key code for a DATA HL key (key code 828) in a key position on the Station Programming Configuration sheets. Enter the port number of the data port this key is to access in the sub-code area for the key. A display phone may have more than one DATA HL key.

Follow the instructions in the *Station Programming* section of this manual to enter the DATA ON key, and DATA HL key information into the system.

### 16.4.2 Data Port Programming

The *Data Programming* screen is used to assign baud rate, number of stop bits, hunt group number, class of service, and a name to the data ports. There are 3 pages to the programming screen to accommodate all 108 possible data ports.

*NOTE: The parameters (EXT, SPD, BT, etc.) of a port can be changed only when the port is IDLE.*

The following paragraphs will define the function of each column on the *Data Programming* screen.

- PRT - Abbreviation for port. The port numbers (001-108) displayed in these columns cannot be changed.
- EXT - Abbreviation for extension. The extension number of the display phone appears in this column whenever a display phone is installed. The ISOETEC System/108 automatically identifies a digital display phone, and enters the extension number (less the leading 3, e.g., ext 3012 is listed as 012) in this column.
- SPD - Abbreviation for Speed. Speed refers to the data transmission speed which the display phone, or DDI is to communicate at. Data transmission speed is also known as baud rate, and is expressed in bits/sec. Available baud rates for asynchronous transmission are: 300, 1200, 2400, 4800, 9600, 19.2K, and 38.4K. There is only one baud rate for synchronous transmission: 56K. The baud rate setting defaults to 300. Determine the baud rate for each data port and enter the information on the Data Programming Configuration sheets.

**BT** - Abbreviation for Bits. The term "bits" used in this context refers to the sum of the data bits and a parity bit. Determine the number of data and parity bits (8 or 9) for the data port, and enter the information on the Data Programming Configuration sheets.

Example: 7 Data Bits + 1 Parity Bit = 8 Bits  
 8 Data Bits + 1 Parity Bit = 9 Bits

The Bit selections available are "8" and "9"

**ST** - Abbreviation for Stop Bits. The stop bit selections available are "1" and "2". Determine the number of stop bits to be used for each data port, and enter the information on the Data Programming Configuration sheets.

Data Menu page 1 of 3

---

PRT	EXT	SPD	BT	ST	FX	HT	CL	NAME	PRT	EXT	SPD	BT	ST	FX	HT	CL	NAME
001	---	---	8	1	N	00	00		019	---	---	8	1	N	00	00	
002	---	---	8	1	N	00	00		020	---	---	8	1	N	00	00	
003	---	---	8	1	N	00	00		021	---	---	8	1	N	00	00	
004	---	---	8	1	N	00	00		022	---	---	8	1	N	00	00	
005	---	---	8	1	N	00	00		023	---	---	8	1	N	00	00	
006	---	---	8	1	N	00	00		024	---	---	8	1	N	00	00	
007	---	---	8	1	N	00	00		025	---	---	8	1	N	00	00	
008	000	---	8	1	N	00	00		026	---	---	8	1	N	00	00	
009	---	---	8	1	N	00	00		027	---	---	8	1	N	00	00	
010	---	---	8	1	N	00	00		028	---	---	8	1	N	00	00	
011	---	---	8	1	N	00	00		029	---	---	8	1	N	00	00	
012	---	---	8	1	N	00	00		030	---	---	8	1	N	00	00	
013	---	---	8	1	N	00	00		031	---	---	8	1	N	00	00	
014	---	---	8	1	N	00	00		032	---	---	8	1	N	00	00	
015	---	---	8	1	N	00	00		033	---	---	8	1	N	00	00	
016	---	---	8	1	N	00	00		034	---	---	8	1	N	00	00	
017	---	---	8	1	N	00	00		035	---	---	8	1	N	00	00	
018	---	---	8	1	N	00	00		036	---	---	8	1	N	00	00	

Figure 16-5 Data Programming Screen

**FX -** Abbreviation for Fix. This option is used to prevent station users from changing a ports communications parameters (SPD, BT, ST). Determine if station users are to be permitted to change the parameters of each data port and enter the information on the Data Programming Configuration sheets.

**HT -** Abbreviation for Hunt Group. Hunt Group allows any number of data ports to be arranged into a group, so that if the called port is busy, another idle port within that group will be accessed. If the data port is to be a member of a hunt group, determine the number of the hunt group, and enter the information on the Data Programming Configuration sheets.

There are a total of 36 Hunt Groups numbered 01 through 36.

**CL -** Abbreviation for class of service. Any data port can be programmed so that it can only be accessed from specific data ports, (e.g., can only be accessed from certain terminals). The class of service codes are 00 through 99. A data port is restricted from any data port which has a higher class of service. Determine the class of service of each data port, and enter the information on the Data Programming Configuration sheets.

**EXAMPLE:** A data port having CL = 00 is restricted from data ports having CL = 01, 02, 03...99. A data port having CL = 00 can only call ports which have CL = 00.

**EXAMPLE:** A data port having CL = 99 is not restricted from any ports, (i.e., a data port having CL = 99 can call ports with CL = 00, 01, 02...99).

**EXAMPLE:** A data port having CL = 50 cannot call data ports having CL=51, 52, 53, 54...99. A Data port having CL = 50 can only call data ports having CL = 00, 01, 02...50.

**NOTE:** If a user calls a restricted port, the following will be displayed on the phone:

071  
Is Restricted  
CALL



**NAME -** To identify the port, type the name of the device or the user (e.g., Computer, Printer, Plotter, etc.). List the name of each port on the Data Programming Configuration sheets.

## 16.5 ACCESSING THE DATA PROGRAMMING SCREEN

The *Data Programming* screen (T screen) is accessed by pressing the T key. The ESCAPE key may be pressed while in any other programming screen to reach the main menu. If there is any problem reaching the main menu, or the T screen, refer to *ACCESSING THE PROGRAMMING SCREENS* in the *Programming Introduction* section of this manual.

## 16.6 DEFAULT DATA PORT VALUES

All data ports default to :

SPEED = blank  
 BITS = 8  
 STOP = 1  
 FIX = N  
 HUNT = 0  
 CLASS = 0

## 16.7 HOW TO PROGRAM THE DATA PROGRAMMING SCREEN

If not already on the *Data Programming* screen, from the main menu, press the T key. There are 4 pages to the programming screen.

1. When the *Data Programming* screen is first entered, the cursor is located in the SPD column of the first data port.
2. Working from the Data Configuration sheets, set the baud rate for the first data port.
3. The baud rate is set by pressing the I key to increment the baud rate, or the D key to decrement. The baud rate cannot be entered directly from the keyboard.
4. Press the TAB key to move the cursor to the BT column.
5. The bits is set by pressing the I key to increment from 8 to 9, or the D key to decrement.
6. Press the TAB key to move the cursor to the ST column.
7. The stop bits is set by pressing the I key to increment from 1 to 2, or the D key to decrement.
8. Press the TAB key to move the cursor to the FX column.
9. Enter a Y (yes) if station users are not permitted to change the parameters of this data port. Enter an N (no) if parameters can be changed by station users.
10. Press the TAB key to move the cursor to the HT column.
11. If this data port is a member of a hunt group, enter the hunt group number (01-36), and press the RETURN key.
12. Press the TAB key to move the cursor to the CL column.

13. If this data port is to have a class of service, enter the class of service (00-99), and press the RETURN key.
14. Press the TAB key to move the cursor to the NAME column.
15. Enter a descriptive name for the port, up to 8 characters.
16. Press the RETURN key to enter the name.
17. Press the TAB key to return to the SPD column.
18. Press the RETURN key to reach the next data port to be programmed. Continue pressing the RETURN key slowly until the line to be programmed is reached.
19. Continue programming the remaining data ports.

The current page being programmed is listed in the upper right corner of the programming screen. Press the "@" key (Shift + @) to move the cursor to the page position. Press the I key to increment the page number; press the D key to decrement the page number.

## 16.8 DATA DISA

The DISA feature of the ISOETEC System/108 can be used to make a data connection through the system. This is useful when a MODEM is connected to one of the data ports. The system can be programmed to make a data connection between the MODEM and another preselected data port whenever the MODEM's extension number is called through DISA.

### 16.8.1 Installation

Installing this feature requires a MODEM, a Digital Data Interface, and an OPX Interface. The OPXI is wired to any one of the station ports. Connect the telephone side of the OPXI to the line position of the MODEM.

The DDI is wired to another station port. The MODEM is then connected to the DDI using an RS-232 type cable. Refer to the *Installation and Cabling* sections for more information on installing the DDIs and OPXIs.

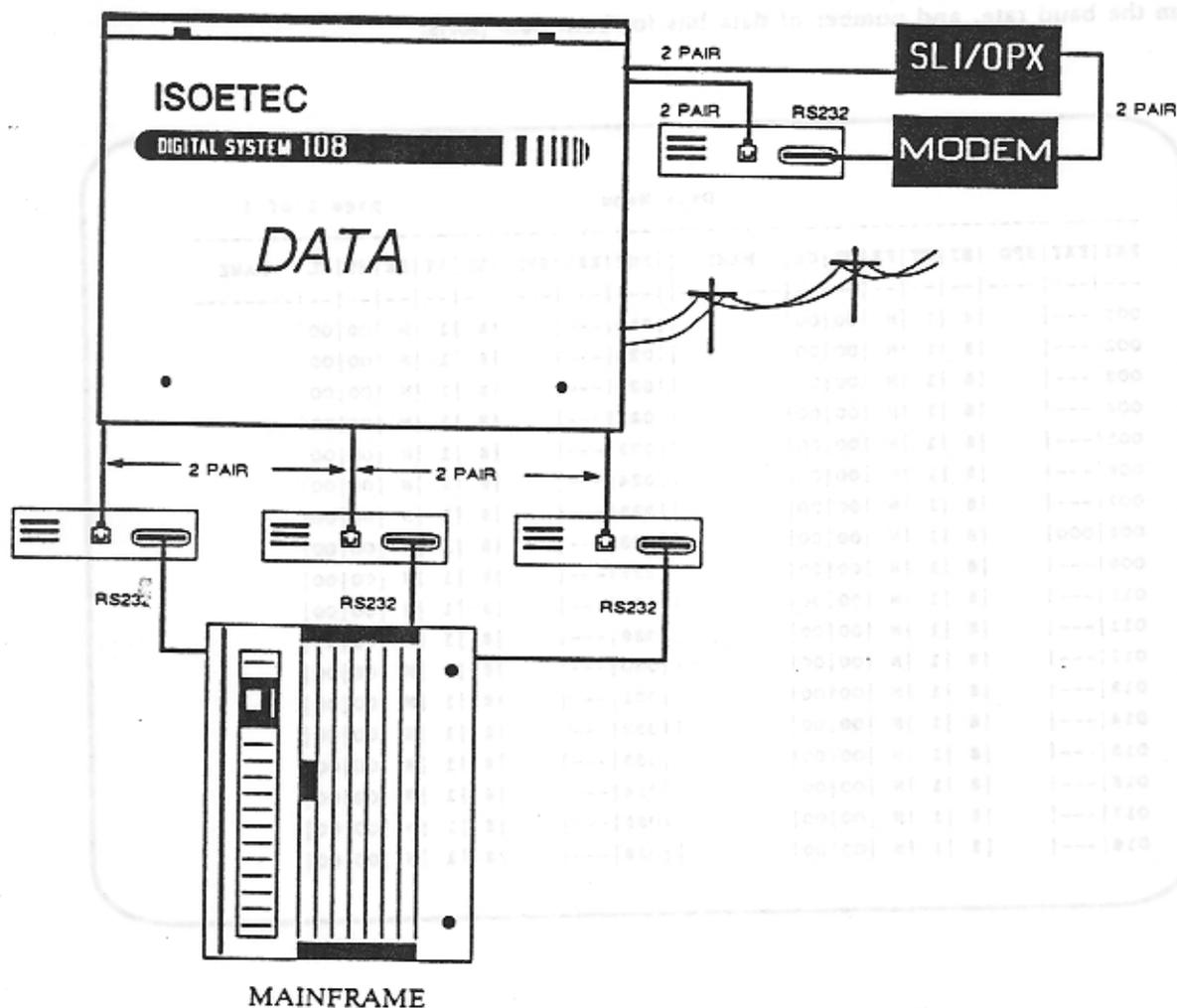


Figure 16-6 Data DISA Connections

## 16.8.2 Programming

Data DISA is programmed using the Data Programming screen, and the System Programming screen.

### SYSTEM PROGRAMMING

Select the line or lines that are to be used for the DISA feature. Assign the selected lines a DISA line type (100, 101, 200, 201). Refer to the *System Programming* section for more information on programming line types.

### DATA PROGRAMMING SCREEN

The DATA menu is used to arrange the connection of the MODEM's DDI to another preselected data port. Enter the last 3 digits of the OPXI's extension number in the EXT column of the MODEM's DDI port. Enter the same last 3 digits into the EXT column of the data port the MODEM is to connect to when DISA is used.

Program the baud rate, and number of data bits for both data ports.

Data Menu page 1 of 3

PRT	EXT	SPD	BT	ST	FX	HT	CL	NAME	PRT	EXT	SPD	BT	ST	FX	HT	CL	NAME
001	---		8	1	N	00	00		019	---		8	1	N	00	00	
002	---		8	1	N	00	00		020	---		8	1	N	00	00	
003	---		8	1	N	00	00		021	---		8	1	N	00	00	
004	---		8	1	N	00	00		022	---		8	1	N	00	00	
005	---		8	1	N	00	00		023	---		8	1	N	00	00	
006	---		8	1	N	00	00		024	---		8	1	N	00	00	
007	---		8	1	N	00	00		025	---		8	1	N	00	00	
008	000		8	1	N	00	00		026	---		8	1	N	00	00	
009	---		8	1	N	00	00		027	---		8	1	N	00	00	
010	---		8	1	N	00	00		028	---		8	1	N	00	00	
011	---		8	1	N	00	00		029	---		8	1	N	00	00	
012	---		8	1	N	00	00		030	---		8	1	N	00	00	
013	---		8	1	N	00	00		031	---		8	1	N	00	00	
014	---		8	1	N	00	00		032	---		8	1	N	00	00	
015	---		8	1	N	00	00		033	---		8	1	N	00	00	
016	---		8	1	N	00	00		034	---		8	1	N	00	00	
017	---		8	1	N	00	00		035	---		8	1	N	00	00	
018	---		8	1	N	00	00		036	---		8	1	N	00	00	

Figure 16-7 Data Programming Screen

### 16.8.3 Operation

When the DISA line is called, the extension number of the OPXI the MODEM is connected to is dialed. When the MODEM answers, the system makes a data connection between the MODEM's DDI and the preselected data port.

### 16.8.4 Testing

1. Dial the DISA line's telephone number. System dial tone should be heard when the line is answered.
2. Enter the DISA authorization code if used.
3. Dial the OPXI's extension number (that the MODEM is connected to). When the MODEM answers, a connection should be made between the MODEM's data port and the desired data port. The Data Status Monitor should display this connection.
4. Disconnect from the DISA line. The system should drop the data connection.

## 16.9 DATA STATUS MONITOR

The Data feature also incorporates a real time monitor of data connections. The *Data Status Monitor* (U-screen) displays active data connections. The *Data Status Monitor* can also be used to connect data ports together.

### 16.9.1 How To Access The Data Status Monitor

From the main menu, press the U key. The *Data Status Monitor* appears.

### 16.9.2 Making Data Connections With The Programming Terminal

The *Data Status Monitor* can be used to connect data ports to each other.

1. Access the *Data Status Monitor*. (Press the U key while on the main menu). The cursor appears in the CONNECT area.
2. Enter the first port number.
3. Press the RETURN key.
4. Press the RETURN key again. The cursor moves to the next port.
5. Enter the port to be connected to.
6. Press the RETURN key.
7. Press the RETURN key again. The two ports are then connected to each other.

*NOTE: If the cursor is not in the CONNECT area, press the C key. The cursor will move to the CONNECT area.*

To DISCONNECT two previously connected ports:

1. Access the *Data Status Monitor*. (Press the U key while on the main menu). The cursor appears in the **CONNECT** area.
2. Press the D key. The cursor moves to the **DISCONNECT** area.
3. Enter the port number of either port in the connection to be broken.
4. Press the RETURN key.
5. Press the RETURN key again. The ports are disconnected.

**NOTE:** The Data Status Monitor can only be used to disconnect ports that were connected using the **MONITOR**. It cannot be used to break connections that were established at a display telephone.

Data Status Monitor

---

PRT	STAT	PRT												
008														

CONNECT:

---

Port: \_\_\_ to Port: \_\_\_

DISCONNECT:

---

Port: \_\_\_

Figure 16-8 Data Status Screen

## Section 17

# System Management Reports

### 17.1 INTRODUCTION

The ISOETEC System/108 provides management reports for use in evaluating the call handling performance of the telephone system. This information is available through the use of the *Reports* menu in system programming.

The 13 management Reports will help the customer control costs through better utilization of trunks. These reports provide information necessary to make the trunk configuration, (how many, and what type of lines), Least Cost Routing package, and other features of the phone system as cost effective as possible. With ISOETEC's System/108 reports, the customer will be able to track the volume of incoming calls handled by the system, judge how timely incoming calls are being answered, detect peak periods of telephone traffic, and determine their most costly extension users.

The *Reports Menu* is accessed through system programming, and can be reached using either the Operator's CRT terminal, or a separate programming terminal. The reports can also be read using the remote programming feature of the ISOETEC System/108.

### 17.2 GENERAL

ISOETEC's System/108 provides 13 Management Reports covering extension activity, and line utilization. The reports are in a format which is easy to use, and will help effectively manage the telephone system. Each report may be printed to keep for further analysis.

#### GROUP UTILIZATION REPORTS (SCREENS A,B,C,D, and E)

Five reports offer you daily, hourly, and cumulative information on call activity per trunk group, including how many incoming or outgoing calls are received per hour. These reports record the number of lines in the trunk group, and total time in use for incoming and outgoing calls. These reports are especially useful for determining how many times all the trunks in a particular group are busy.

#### LINE UTILIZATION REPORTS (SCREENS F and G)

These reports make it possible to measure individual line (trunk) usage for a daily and cumulative period.

#### LCR STATISTICS REPORT (SCREEN H)

The use of this report requires that the system be equipped with the optional *Least Cost Routing* package. This package is a database, developed by ISOETEC specifically for each system, which contains pricing information for each type of telephone line in the system. With this package installed, the ISOETEC System/108 automatically selects the least expensive route for an outside line call.

This report provides *Least Cost Routing* statistics on a cumulative basis. The report indicates the name of the long distance service being used, the number of calls using that service, on a particular service, the number of times the system took a route out of service, and the total cost per call.

**EXTENSION SUMMARY REPORT (SCREEN I)**

The *Extension Summary Report* provides a list of each extension installed in the system, the assigned to that extension in the system directory, a count of the incoming and outgoing for each extension, the total number of calls. This report also provides the amount of time (in seconds and minutes) spent on both incoming and outgoing calls, and a total of this time. If the system is equipped with the Least Cost Routing feature, a total cost of outgoing calls per extension is provided.

**SYSTEM UTILIZATION REPORTS (SCREENS J,K,L, and M)**

The *System Utilization Reports* give information on how many calls are received and answered by the system. A report is available for a 60 minute, 30 minute, and 15 minute time period. The amount of Internal (Icm) calls, incoming calls, and unanswered calls is also reported. If the system is equipped with Least Cost Routing, the number of calls made through LCR, and the total amount of outgoing calls made is provided.

**PRINT AND CLEAR (SCREEN N)**

Any of the 13 System/108 reports may be **PRINTED** and/or **CLEARED**. The *Print and Clear* report allows you to program the system to print and/or clear any specific report automatically, on a weekly or monthly basis.

It is also possible to print and/or clear any or all reports manually whenever desired.



## 17.3 HOW TO REACH THE REPORTS

The *Reports* are accessed through system programming. You may use either the Operator's CRT Terminal, or a system programming terminal in order to reach the reports. The following pages describe how to enter system programming, and how to display each of the reports. Following the description of each screen is a section on the report schedule.

**ACTION** From the main menu, press R. The *Reports Menu* appears (see Figure 17-1).

**COMMENTS** You are now ready to access the individual Report screens. In order to exit a report screen and return to the *Reports Menu*, press the ESCAPE key.

```

                                REPORTS MENU
                                -----
Group Utilization
  A - Cumulative
  B - Daily
  C - 60 Minutes
  D - 30 Minutes
  E - 15 Minutes

Line Utilization
  F - Cumulative
  G - Daily

LCR Statistics
  H - Cumulative

Extension Summary
  I - Cumulative

System Utilization
  J - System Statistics
  K - 60 Minutes
  L - 30 Minutes
  M - 15 Minutes

Print and Clear
  N - Scheduler

SELECT ONE OF THE ABOVE >
  
```

Figure 17-1 Reports Menu

## 17.4 GROUP UTILIZATION REPORTS

### 17.4.1 How To Access Screen (A) Cumulative

**ACTION** From the *Reports menu*, press A.

**COMMENTS** Provides information concerning the activity of the assigned lines within each of the 10 trunk groups.

**COMMANDS** In order to exit this screen, and return to the *Reports Menu*, press ESCAPE on the keyboard.

*NOTE: Although this screen offers CUMULATIVE information, it may be cleared at any interval desired through the use of the Print and Clear scheduler.*

LINE GROUP UTILIZATION (A)									
-----									
Period Covered: Mon 01-04-88 06:11 Through Wed 01-06-88 11:29									
	Num of Calls		----- Hour:Min -----			Min:Sec			
Crp	In...	Out..	In...	Out...	Total	All	Times	Avg All	CO
Num	Bound	Bound	Usage	Usage	Usage	Busy	AllBsy	Busy	Lines
-----									
01	2336	1164	139:46	37:10	176:57	:00	1	:03	22
02									
03		379		12:45	12:45	2:50	172	:59	2
04	18	107	2:20	3:29	5:49	:11	19	:36	2
05	2	243	:03	6:50	6:54	7:04	247	1:42	1
06		1288		70:40	70:40	:00	1	:02	12
07									
08									
09	1	7	:06	:06	:13				4
10									
Tot	2355	3189	142:17	131:04	273:22	10:05	440	1:22	43

Print Now \_ Clear Now \_

Figure 17-2 Group Utilization - Cumulative

### 17.4.2 Screen Definitions - Cumulative

<b>Period Covered</b>	This line indicates the period from the last time the statistics were cleared until the current time that it is viewed (or printed).
<b>Grp Num</b>	A number representing each of the 10 trunk groups is listed in this column.
<b>In Bound</b>	The number of incoming calls received on trunks in each group.
<b>Out Bound</b>	The number of outgoing calls initiated on trunks assigned to each group.
<b>In Usage</b>	The time, in hours and minutes, for which the trunks assigned to a specific group were in use with incoming calls.
<b>Out Usage</b>	The time, in hours and minutes, for which the trunks assigned to a specific group were in use with outgoing calls.
<b>Total Usage</b>	The total amount of time, in hours and minutes, for which trunks assigned to a specific group were in use. This time is a total of the <i>In Usage</i> and <i>Out Usage</i> columns.
<b>All Busy</b>	The total time, in hours and minutes, for which all the trunks assigned to a specific group were busy.
<b>Times AllBsy</b>	The number of times all the trunks in a specific group were busy.
<b>Avg All Busy</b>	This is the <i>Times All Busy</i> divided by the number <i>All Busy</i> to obtain the average time in minutes and seconds for which all trunks assigned to a specific group were busy.
<b>CO Lines</b>	The number of trunks assigned to a specific group.

### 17.4.3 How To Access Screen (B) Daily

- ACTION** From the *Reports menu*, press **B**.
- COMMENTS** Provides information concerning the activity of the assigned lines within each of the 10 trunk groups on a daily basis.
- COMMANDS** In order to exit this screen, and return to the *Reports Menu*, press **ESCAPE** on the keyboard.

*NOTE: Although this screen offers DAILY information, it may be cleared at any interval desired through the use of the Print and Clear scheduler.*

DAILY LINE GROUP UTILIZATION (B)									
-----									
Period Covered: Tue 01-05-88 00:12 Through Tue 01-05-88 18:30									
-----									
Grp	In...	Out..	In...	Out...	Total	All	Times	Avg All	CO
Num	Bound	Bound	Usage	Usage	Usage	Busy	AllBsy	Busy	Lines
-----									
01	1170	583	70:06	18:31	88:37	:00	1	:03	22
02									
03		190		12:45	12:45	2:50	172	:59	2
04	16	107	2:20	3:29	5:49	:11	19	:36	2
05	2	243	:03	6:50	6:53	7:04	247	1:42	1
06		1290		70:45	70:45	:00	1	:02	12
07									
08									
09	1	7	:06	:06	:12				4
10									
Tot	1189	2413	72:35	112:26	185:01	10:05	440	1:22	43
-----									
Print Now _ Clear Now _									

Figure 17-3 Group Utilization - Daily

### 17.4.4 Screen Definitions - Daily

<b>Period Covered</b>	This line indicates the period from the last time the statistics were cleared until the current time that it is viewed (or printed).
<b>Grp Num</b>	A number representing each of the 10 trunk groups is listed in this column.
<b>In Bound</b>	The number of incoming calls received by trunks in each group.
<b>Out Bound</b>	The number of outgoing calls initiated on trunks assigned to each group.
<b>In Usage</b>	The time, in hours and minutes, within a 24 hour period for which the trunks assigned to a specific group were in use with incoming calls.
<b>Out Usage</b>	The time, in hours and minutes, within a 24 hour period for which the trunks assigned to a specific group were in use with outgoing calls.
<b>Total Usage</b>	The total amount of time, in hours and minutes, within a 24 hour period for which trunks assigned to a specific group were in use both incoming and outgoing.
<b>All Busy</b>	The total time, in hours and minutes, within a 24 hour period for which all the trunks in a specific group were busy.
<b>Times AllBsy</b>	The number of times all the trunks assigned to a specific group were busy.
<b>Avg All Busy</b>	This is the <i>Times All Busy</i> divided by the number <i>All Busy</i> to obtain the average time in minutes and seconds for which all the trunks assigned to a specific group were busy.
<b>CO Lines</b>	The number of trunks assigned to a specific group.

## 17.4.5 How To Access Screen (C) 60 Minutes

- ACTION** From the *Reports menu*, press C.
- COMMENTS** Provides an hourly summary of the activity of each of the trunk groups. The Trunk Group displayed on the screen is indicated in the upper left corner.
- COMMANDS** To move from one trunk group displayed to another, use I to increment, and D to decrement.
- The UP and DOWN arrow keys can be used to scroll the screen to view the remaining hours.
- To exit this screen and return to the *Reports Menu*, press ESCAPE on the keyboard.
- NOTE:** Although this screen offers CUMULATIVE information, it may be cleared at any interval desired through the use of the Print and Clear scheduler.

```

Line Group:01,          (C) HOURLY LINE GROUP UTILIZATION
-----
Period Covered: Mon 01-04-88 06:12 Through Wed 01-06-88 11:30
|----- Hour:Min -----| |Min:Sec
From| To |In...|Out...|Abndn|In...|Out...|Total|All|# All|Avg All
| | |Bound|Bound|Calls|Usage|Usage|Usage|Busy|# Busy|Busy
-----
06:00|07:00| 1| | | :00| | :00| | | |
07:00|08:00| 14| 10| 4| :14| :08| :22| | | |
08:00|09:00|120| 34| 5| 5:03| :45| 5:48| | | |
09:00|10:00|266|108| 3|14:45| 3:28|18:13| | | |
10:00|11:00|306|174| 3|20:03| 5:58|26:01| | | |
11:00|12:00|277|148| 2|18:20| 4:19|22:40| | | |
12:00|13:00|208| 95| 3|12:43| 3:38|16:22| | | |
13:00|14:00|228|109| 4|12:08| 2:48|14:57| | | |
14:00|15:00|226|113| 7|13:41| 3:08|16:50| | | |
15:00|16:00|252|110| 2|14:09| 3:34|17:44| | | |
16:00|17:00|280|110| 3|14:47| 4:47|19:35| :00| 1| :03
17:00|18:00|113| 80| 2| 9:06| 2:24|11:30| | | |

Totals - 2341|1166| 44|140:21| 37:12|177:33| :00| 1| :03

Print Now _ Clear Now _ [ Use the arrow keys to scroll.. ]

```

Figure 17-4 Group Utilization - 60 Minutes

## 17.4.6 Screen Definitions - 60 minutes

<b>Period Covered</b>	This line indicates the period from the last time the statistics were cleared until the current time that it is viewed (or printed).
<b>From/To</b>	This is the hourly period on which the system is reporting.
<b>In Bound</b>	The number of incoming calls received on trunks in each group on an hourly basis.
<b>Out Bound</b>	The number of outgoing calls initiated on trunks assigned to each group on an hourly basis.
<b>Abndn Calls</b>	The number of incoming calls which were not answered.
<b>In Usage</b>	The time, in hours and minutes, within a 60 minute period, for which the trunks assigned to a specific group were in use with incoming calls.
<b>Out Usage</b>	The time, in hours and minutes, within a 60 minute period, for which the trunks assigned to a specific group were in use with outgoing calls.
<b>Total Usage</b>	The total amount of time, in hours and minutes, within a 60 minute period, for which trunks assigned to a specific group were in use both incoming and outgoing.
<b>All Busy</b>	The total time, in hours and minutes, within a 60 minute period, for which all the trunks assigned to a specific group were busy.
<b># All Busy</b>	The number of times all trunks in a specific group were busy within a 60 minute time period.
<b>Avg All Busy</b>	This is the <i>Times All Busy</i> divided by the number <i>All Busy</i> to obtain the average time in minutes and seconds for which all trunks assigned to a specific group were busy.

### 17.4.7 How To Access Screen (D) 30 minutes

- ACTION** From the *Reports menu*, press D.
- COMMENTS** Provides the same information as the Hourly report in 30 minute increments. The trunk group being displayed is indicated in the upper left corner.
- COMMANDS** To move from one line group displayed to another, use I to increment, and D to decrement.
- The UP and DOWN arrow keys can be used to scroll the screen to view the remaining half hours.
- To exit this screen and return to the *Reports menu*, press ESCAPE on the keyboard.
- NOTE: Although this screen offers CUMULATIVE information, it may be cleared at any interval desired through the use of the Print and Clear scheduler.*

```

Line Group:01.          (D) HOURLY LINE GROUP UTILIZATION
-----
Period Covered: Mon 01-04-88 06:12 Through Wed 01-06-88 1:31
                | ----- Hour:Min ----- | |Min:Sec
From| To |In...|Out...|Abndn|In... |Out...|Total |All  | # All|Avg All
  |   |Bound|Bound|Calls|Usage |Usage |Usage |Busy | Busy| Busy
-----
06:00|06:30|   |   |   |   |   |   |   |   |
06:30|07:00| 1|   |   | :00|   | :00|   |   |
07:00|07:30| 5| 6|   | :04| :05| :10|   |   |
07:30|08:00| 9| 4| 4| :09| :02| :12|   |   |
08:00|08:30|41| 8| 4| 1:42| :12| 1:55|   |   |
08:30|09:00|79|26| 1| 3:20| :33| 3:54|   |   |
09:00|09:30|130|49| 2| 7:41| 1:53| 9:35|   |   |
09:30|10:00|136|59| 1| 7:03| 1:34| 8:38|   |   |
10:00|10:30|155|85| 2| 9:59| 2:13|12:12|   |   |
10:30|11:00|151|89| 1|10:03| 3:44|13:48|   |   |
11:00|11:30|179|89| 1|11:47| 2:20|14:08|   |   |
11:30|12:00| 98| 60| 1| 6:33| 1:59| 8:32|   |   |

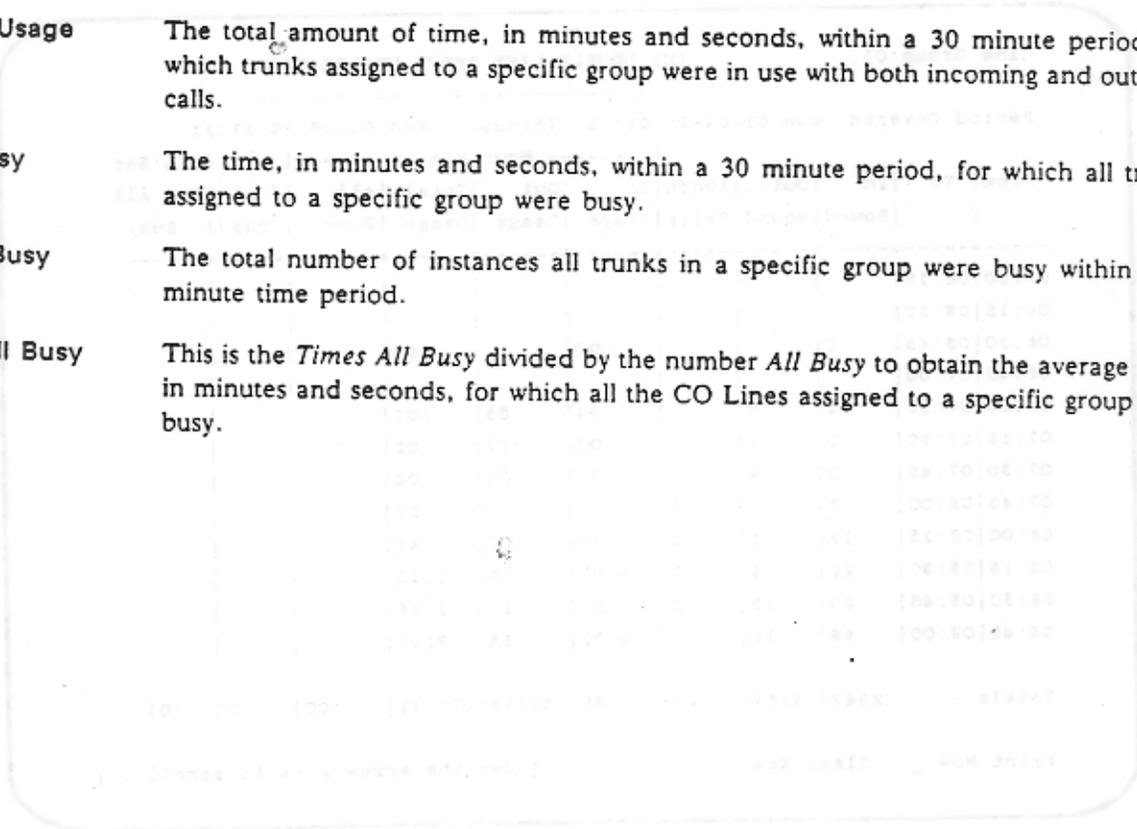
Totals -      2341|1167| 44|140:21| 37:13|177:34| :00| 1| :03

Print Now _   Clear Now _           [ Use the arrow keys to scroll.. ]
    
```

Figure 17-5 Group Utilization - 30 Minutes

### 17.4.8 Screen Definitions - 30 Minutes

- Period Covered** This line indicates the period from the last time the statistics were cleared until the current time that it is viewed (or printed).
- From/To** This is the 30 minute period on which the system is reporting.
- In Bound** The number of incoming calls received by trunks in each group on a 30 minute basis.
- Out Bound** The number of outgoing calls initiated on trunks assigned to each group on a 30 minute basis.
- Abndn Calls** Calls which were not answered in a 30 minute period.
- In Usage** The time, in minutes and seconds, within a 30 minute period, for which the trunks assigned to a specific group were in use with incoming calls.
- Out Usage** The time, in minutes and seconds, within a 30 minute period, for which the trunks assigned to a specific group were in use with outgoing calls.
- Total Usage** The total amount of time, in minutes and seconds, within a 30 minute period, for which trunks assigned to a specific group were in use with both incoming and outgoing calls.
- All Busy** The time, in minutes and seconds, within a 30 minute period, for which all trunks assigned to a specific group were busy.
- # All Busy** The total number of instances all trunks in a specific group were busy within a 30 minute time period.
- Avg All Busy** This is the *Times All Busy* divided by the number *All Busy* to obtain the average time, in minutes and seconds, for which all the CO Lines assigned to a specific group were busy.



### 17.4.9 How To Access Screen (E) 15 minutes

- ACTION** From the *Reports menu*, press E.
- COMMENTS** Provides the same information as the Hourly report in 15 minute increments. The trunk group being displayed is indicated in the upper left corner.
- COMMANDS** To move from one line group displayed to another, use I to increment, and D to decrement.
- The UP and DOWN arrow keys can be used to scroll the screen to view the remaining hours.
- To exit this screen and return to the *Reports Menu*, press ESCAPE on the keyboard.
- NOTE: Although this screen offers CUMULATIVE information, it may be cleared at any interval desired through the use of the Print and Clear scheduler.*

Line Group:01. (E) HOURLY LINE GROUP UTILIZATION

-----

Period Covered: Mon 01-04-88 06:12 Through Wed 01-06-88 11:31

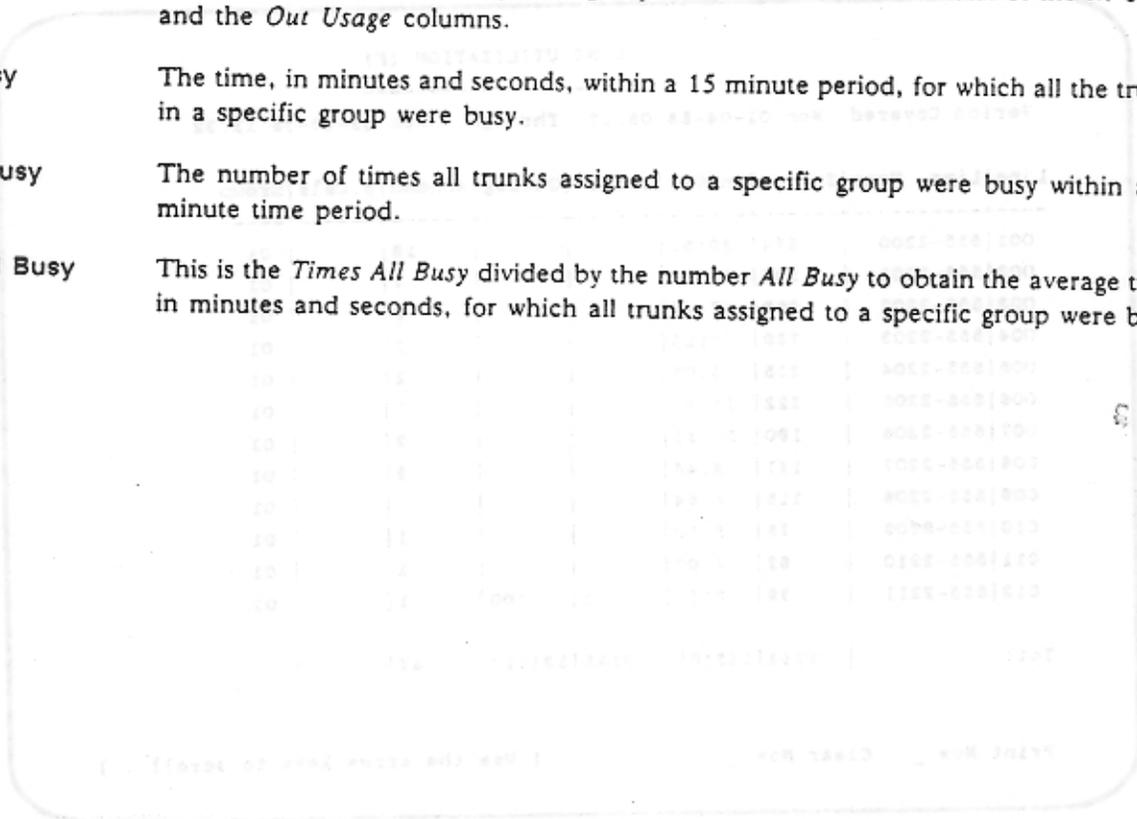
		Hour:Min					Min:Sec			
From	To	In...	Out...	Abndn	In...	Out...	Total	All	# All	Avg All
		Bound	Bound	Calls	Usage	Usage	Usage	Busy	Busy	Busy
06:00	06:15									
06:15	06:30									
06:30	06:45	1			:00		:00			
06:45	07:00									
07:00	07:15	4	3		:04	:03	:07			
07:15	07:30	1	3		:00	:02	:02			
07:30	07:45	2	4		:02	:02	:04			
07:45	08:00	7		4	:07		:07			
08:00	08:15	19	2	2	:34	:07	:41			
08:15	08:30	22	6	2	1:07	:05	1:13			
08:30	08:45	30	15	1	:58	:17	1:16			
08:45	09:00	49	11		2:22	:15	2:37			
<b>Totals -</b>		2342	1167	44	140:28	37:13	177:41	:00	1	:03

Print Now \_ Clear Now \_ [ Use the arrow keys to scroll.. ]

Figure 17-6 Group Utilization - 15 Minutes

### 17.4.10 Screen Definitions - 15 Minutes

- Period Covered** This line indicates the period from the last time the statistics were cleared until the current time that it is viewed (or printed).
- From/To** This is the 15 minute period on which the system is reporting.
- In Bound** The number of incoming calls received by trunks assigned to each group on a 15 minute basis.
- Out Bound** The number of outgoing calls initiated on trunks assigned to each group on a 15 minute basis.
- Abndn Calls** Calls which were not answered in a 15 minute period.
- In Usage** The time, in minutes and seconds, within a 15 minute period, for which trunks in a specific group were in use with incoming calls.
- Out Usage** The time, in minutes and seconds, within a 15 minute period, for which trunks assigned to a specific group were in use with outgoing calls.
- Total Usage** The total amount of time, in minutes and seconds, within a 15 minute period, for which trunks assigned to a specific group were in use. This is a total of the *In Usage* and the *Out Usage* columns.
- All Busy** The time, in minutes and seconds, within a 15 minute period, for which all the trunks in a specific group were busy.
- # All Busy** The number of times all trunks assigned to a specific group were busy within a 15 minute time period.
- Avg All Busy** This is the *Times All Busy* divided by the number *All Busy* to obtain the average time, in minutes and seconds, for which all trunks assigned to a specific group were busy.



## 17.5 LINE UTILIZATION

### 17.5.1 How To Access Screen (F) Cumulative

**ACTION** From the *Reports menu*, press **F**.

**COMMENTS** The *Line Utilization* report makes it possible to measure individual line usage on a cumulative basis. It obtains information about line usage on both incoming and outgoing calls, abandoned calls on each line, bad calls, and indicates the group to which these lines are programmed.

**COMMANDS** To exit this screen and return to the *Reports menu*, press **ESCAPE** on the keyboard.

The **UP** and **DOWN** arrow keys are used to scroll the screen to view the remaining installed lines. The screen displays the statistics for twelve lines at a time.

*NOTE: Although this screen offers CUMULATIVE information, it may be cleared at any interval desired through the use of the Print and Clear scheduler.*

LINE UTILIZATION (F)								
-----								
Period Covered: Mon 01-04-88 06:12 Through Wed 01-06-88 11:32								
Line	Line Name	Incom.	In Usg	Outgo.	OutUsg	Abndnd	B. Cals	Group
-----								
001	555-2200	374	20:57			18		01
002	555-2201	306	19:14			7		01
003	555-2202	298	17:42			6		01
004	555-2203	239	16:08			2		01
005	555-2204	235	13:05			2		01
006	555-2205	222	11:46			-		01
007	555-2206	180	10:11			2		01
008	555-2207	141	8:46			3		01
009	555-2208	115	6:54					01
010	555-2209	75	5:50			1		01
011	555-2210	62	4:07			1		01
012	555-2211	39	2:33	1	:00	1		01
Tot:		2363	143:01	3198	131:27	44		

Print Now \_ Clear Now \_ [ Use the arrow keys to scroll.. ]

Figure 17-7 Line Utilization - Cumulative

17.5.2 Screen Definitions - Cumulative

- Period Covered** This line indicates the period from the last time the statistics were cleared until the current time that it is viewed (or printed).
- Line** This 3-digit number indicates the specific trunk number for which statistics are being accumulated.
- Line Name** The telephone number or name assigned to a specific line in system programming.
- Incom.** The number of incoming calls received on a specific line during the cumulative time period.
- In Usg** The amount of time, in hours and minutes, that a specific line was in use with incoming calls.
- Outgo.** The number of outgoing calls made on a specific line during the cumulative time period.
- OutUsg** The amount of time, in hours and minutes, that a specific line was in use with outgoing calls.
- Abndnd** This column indicates how many calls were abandoned by Outside callers after receiving no answer on a specific trunk.
- B.Cals** This column indicates how many bad calls, or calls which were received by the system on a line which was not functioning properly, were reported through a programmed Bad Line key at an extension.
- Group** The trunk group to which a specific line is assigned.

## 17.5.3 How To Access Screen (G) Daily

**ACTION** From the *Reports* menu, press G.

**COMMENTS** This *Line Utilization* report makes it possible to measure line usage on a daily (24 hour) basis. It obtains information about line usage on both incoming and outgoing calls, abandoned calls on each line, bad call volume, dropped calls, and indicates the group to which these calls were directed.

**COMMANDS** To exit this screen and return to the *Reports Menu*, press ESCAPE on the keyboard.

The UP and DOWN arrow keys are used to scroll the screen to view the remaining installed lines. The screen displays the statistics for twelve lines at a time.

*NOTE:* Although this screen offers DAILY information, it may be cleared at any interval desired through the use of the Print and Clear scheduler.

DAILY LINE UTILIZATION (G)										
-----										
Period Covered: Wed 01-06-88 00:02 Through Wed 01-06-88 11:33										
Line	Line Name	Incom.	In Usg	Outgo.	OutUsg	Abndnd	B.Cals	SysDrp	OutSrv	Group
-----										
001	555-2200	58	2:43			2				01
002	555-2201	24	2:16			1				01
003	555-2202	43	2:09							01
004	555-2203	29	1:55							01
005	555-2204	21	1:25					1		01
006	555-2205	25	1:39							01
007	555-2206	23	1:18							01
008	555-2207	15	1:21							01
009	555-2208	16	:44							01
010	555-2209	8	:29							01
011	555-2210	8	:20			1				01
012	555-2211	5	:29							01
Tot:		285	17:36	383	14:37	4		2		

Print Now \_ Clear Now \_ [ Use the arrow keys to scroll.. ]

Figure 17-8 Line Utilization - Daily

## 17.5.4 Screen Definitions - Daily

<b>Period Covered</b>	This line indicates the period from the last time the statistics were cleared until the current time that it is viewed (or printed).
<b>Line</b>	This 3-digit number indicates the specific trunk number for which statistics are being accumulated.
<b>Line Name</b>	The telephone number or name assigned in system programming to a specific line.
<b>Incom.</b>	The number of incoming calls made to a specific line during a 24 hour time period.
<b>In Usg</b>	The amount of time, in hours and minutes, within the 24 hour time period, that a specific trunk was in use with incoming calls.
<b>Outgo.</b>	The number of outgoing calls made on a specific trunk during the 24 hour time period.
<b>OutUsg</b>	The amount of time, in hours and minutes, within the 24 hour time period, when a specific trunk was in use with outgoing calls.
<b>Abndnd</b>	This column indicates how many calls were abandoned by Outside callers after receiving no answer on a specific line.
<b>B.Cals</b>	This column indicates how many bad calls, or calls which were received by the system on a line which was not functioning properly, were reported through a programmed Bad Line key at an extension.
<b>SysDrp</b>	The number of calls released from the system, in a 24 hour time period, due to a drop signal from the Central Office.
<b>OutSrv</b>	The number of times within a 24 hour period which a specific line was taken out of service by the system.
<b>Group</b>	The trunk group to which a specific line is assigned.



### 17.6.2 Screen Definitions - LCR Statistics

- Period Covered** This line indicates the period from the last time the statistics were cleared until the current time that it is viewed (or printed).
- Service Name** The name of the Long Distance services, (MCI, Sprint, etc.) being used with the system.
- Num of Calls** The number of calls made during the cumulative period using each service.
- Total Usage** The amount of time, in hours and minutes, calls were made using each service during the cumulative time period.
- Calls Overflow** The number of calls attempting to use a particular Long Distance service which had to be diverted to the *next* least expensive carrier because the lines assigned to the desired service were all in use.
- Out of Serv** The number of times a particular Long Distance carrier is taken out of service during the cumulative time period.  
The system can be programmed to take a long distance carrier choice out of service for several minutes if dial tone is not received from the carrier.
- Bad Calls** The number of Bad calls on lines associated with each Long Distance service used with the system. These bad line calls are entered into the system by use of a Bad Line key programmed at the individual stations.
- Total Cost** The total cost accumulated by each Long Distance service during the cumulative time period.

Service Name	Num of Calls	Total Usage	Calls Overflow	Out of Serv	Bad Calls	Total Cost
MCI	12	01:15	0	0	0	1.20
Sprint	15	02:30	0	0	0	1.50
ATT	10	01:45	0	0	0	1.00
WorldCom	8	01:20	0	0	0	0.80
Verizon	5	00:45	0	0	0	0.50
Other	3	00:30	0	0	0	0.30
<b>TOTAL</b>	<b>53</b>	<b>07:30</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>5.30</b>

## 17.7 EXTENSION SUMMARY

### 17.7.1 How To Access Screen (I) Extension Summary

**ACTION** From the *Reports menu*, press I.

**COMMENTS** The *Extension Summary* presents information on each extension installed in the system. The name of the individual assigned to each extension, and a report on the total number of incoming and outgoing calls, the cost of these calls, and the duration of each call is summarized.

**COMMANDS** To exit this screen and return to the *Reports Menu*, press ESCAPE on the keyboard.

Use the UP and DOWN arrow keys to scroll the screen in order to view the statistic of the remaining extensions. The screen displays twelve extensions at a time.

*NOTE: Although this screen offers CUMULATIVE information, it may be cleared at any interval desired through the use of the Print and Clear scheduler.*

EXTENSION SUMMARY (I)							
-----							
Period Covered: Wed 01-06-88 08:04 Through Wed 01-06-88 11:34							
Ext	Name	Tot Calls	Tot Cost	Incoming	In Time	Outgoing	Out Time
061	CHARLIE		\$ .00				
062	FRED		\$ .00				
063	BETTY	21	\$ 3.36	4	:26	17	:33
064	JIM	15	\$ 8.01	3	:14	12	:31
065	TOM	19	\$ 7.11	3	:22	16	:28
066	DAWN	2	\$ .93			2	:01
067	MILLIE	6	\$ .00	6	:10		
068	EDWARD	17	\$ 4.18	8	:33	9	:07
069	PAT	1	\$ .00	1	:03		
070	SUSAN	13	\$ 3.59	7	:27	6	:19
071	KIM	6	\$ .85	4	:11	2	:03
072	LINDA	7	\$ 1.63	1	:32	6	:43
TOTALS:		677	\$ 130.40	287	14:23	390	14:09

Print Now \_ Clear Now \_ [ Use the arrow keys to scroll.. ]

Figure 17-10 Extension Summary

## 17.7.2 Screen Definitions - Extension Summary

<b>Period Covered</b>	This line indicates the period from the last time the statistics were cleared until the current time that it is viewed (or printed).
<b>Ext</b>	The number of the extension the summary is for.
<b>Name</b>	The name assigned to the extension in the system directory.
<b>Tot Calls</b>	The total number of incoming and outgoing calls made or received by an extension.
<b>Tot Cost</b>	The total cost of outgoing calls made or received by an extension. A Least Cost Routing data base is needed for call costing.
<b>Incoming</b>	The number of incoming calls made to a specific extension.
<b>In Time</b>	The amount of time spent by each particular extension on incoming calls.
<b>Outgoing</b>	The number of outgoing calls made by a specific extension.
<b>Out Time</b>	The amount of time spent by each particular extension on outgoing calls.

*NOTE: Due to differences in timing calls, the totals for extensions on the Extension Summary report may differ from those found on SMDR and Call Accounting Reports.*

## 17.8 SYSTEM UTILIZATION

### 17.8.1 How To Access Screen (J) System Statistics

**ACTION** From the *Reports menu*, press J.

**COMMENTS** This report gives statistics on the system's call history. This report includes the total number of calls, the cost of outgoing calls, and a break down of incoming, unanswered, Internal (Icm) calls, and unanswered calls. The report also offers information on call wait time, and percentages of how many calls waited to be answered for different periods of time, thus making analysis of system and line utilization accurate and informative.

**COMMANDS** To exit this screen and return to the *Reports Menu*, press ESCAPE on the keyboard.

*NOTE: This screen may be cleared at any interval desired through the use of the Print and Clear scheduler.*

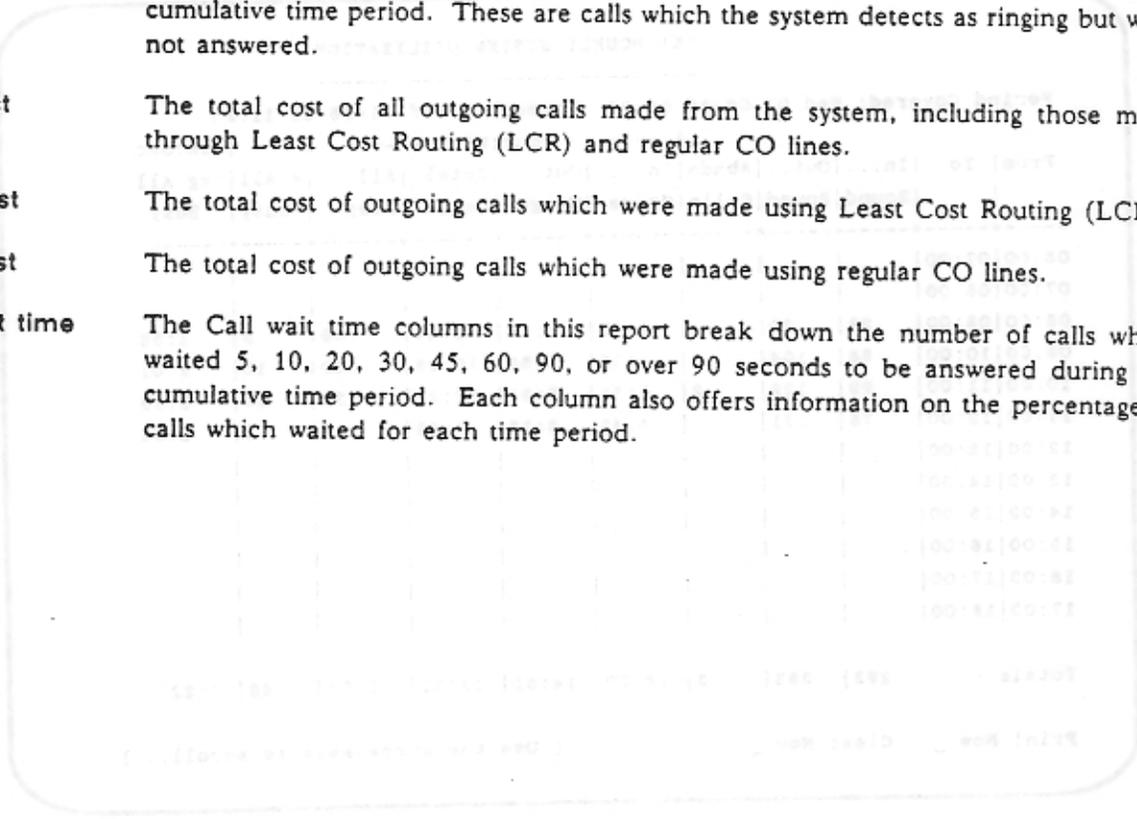
SYSTEM CALL HISTORY (J)							
-----							
Period Covered: Wed 01-06-88 08:04 Through Wed 01-06-88 11:35							
Tot Calls	LCR Calls	Reg Calls	Icm Calls	Incoming	Unanswr		
868	382	11	185	290	3		
Tot Cost	LCR Cost	Reg Cost					
\$ 130.57	\$ 124.29	\$ 6.28					
Call wait time:							
5 Sec	10 Sec	20 Sec	30 Sec	45 Sec	60 Sec	90 Sec	Over
143	189	251	281	289	290		
% 49.31	% 65.17	% 86.55	% 96.89	% 99.65	% 100.00		
Print Now _ Clear Now _							

Figure 17-11 System Statistics

### 17.8.2 Screen Definitions - System Statistics

ACTION

- Period Covered** This line indicates the period from the last time the statistics were cleared until the current time that it is viewed (or printed).
- Tot Calls** The total number of incoming and outgoing calls made or received through the system within the cumulative time period.
- LCR Calls** Total number of outgoing calls which originated from the system using Least Cost Routing lines during the cumulative time period.
- Reg Calls** The total number of regular outgoing (non LCR) calls which originated from the system during the cumulative time period.
- Icm Calls** The total number of Intercom (Internal) calls made during the cumulative time period.
- Incoming** The number of incoming calls which were made to the system during the cumulative time period.
- Unanswr** The total number of unanswered calls which were registered by the system during the cumulative time period. These are calls which the system detects as ringing but were not answered.
- Tot Cost** The total cost of all outgoing calls made from the system, including those made through Least Cost Routing (LCR) and regular CO lines.
- LCR Cost** The total cost of outgoing calls which were made using Least Cost Routing (LCR).
- Reg Cost** The total cost of outgoing calls which were made using regular CO lines.
- Call wait time** The Call wait time columns in this report break down the number of calls which waited 5, 10, 20, 30, 45, 60, 90, or over 90 seconds to be answered during the cumulative time period. Each column also offers information on the percentage of calls which waited for each time period.



### 17.8.3 How To Access Screen (K) 60 Minutes

**ACTION** From the *Reports menu*, press K.

**COMMENTS** This report includes information on system statistics on an hourly (60 minute) basis. Areas covered include time periods covered, the number of incoming and outgoing calls, abandoned calls, the total hours and minutes that the system is in use with incoming calls, outgoing calls, and a total of both, the minutes and seconds and number of instances that the system lines are all busy, and an average time for which the system is all busy.

**COMMANDS** To exit this screen, and return to the *Reports Menu*, press ESCAPE on the keyboard.

The UP and DOWN arrow keys can be used to scroll the screen to view the remaining hours. The screen displays twelve 1 hour periods at a time.

*NOTE: This screen may be cleared at any interval desired through the use of the Print and Clear scheduler.*

(K) HOURLY SYSTEM UTILIZATION

-----

Period Covered: Wed 01-06-88 08:04 Through Wed 01-06-88 11:35

From   To		In...   Out..		Abndn	In...   Out...		Total	All	# All	Avg All
		Bound	Bound	Calls	Usage	Usage	Usage	Busy	Busy	Busy
06:00	07:00									
07:00	08:00									
08:00	09:00	28	39		1:30	1:14	2:44	:09	5	1:56
09:00	10:00	88	104	1	5:15	4:50	10:05	:10	10	1:01
10:00	11:00	99	129	2	6:51	5:31	12:22	:28	23	1:13
11:00	12:00	78	121		4:43	3:15	7:58	:15	8	1:54
12:00	13:00									
13:00	14:00									
14:00	15:00									
15:00	16:00									
16:00	17:00									
17:00	18:00									
<b>Totals -</b>		293	393	3	18:20	14:51	33:11	1:03	46	1:22

Print Now \_ Clear Now \_ [ Use the arrow keys to scroll.. ]

Figure 17-12 System Utilization - 60 Minutes

### 17.8.4 Screen Definitions - 60 Minutes

- Period Covered** This line indicates the period from the last time the statistics were cleared until the current time that it is viewed (or printed).
- From/To** This is the hourly period on which the system is reporting.
- In Bound** The number of incoming calls made to the system in the indicated time period.
- Out Bound** The number of outgoing calls made from the system in the indicated time period.
- Abndn Calls** The number of calls which were unanswered by the system.
- In Usage** The amount of time, in hours and minutes, that the system was in use with incoming calls during the indicated time period.
- Out Usage** The amount of time, in hours and minutes, that the system was in use with outgoing calls during the indicated time period.
- Total Usage** The amount of time, in hours and minutes, that the system was in use with incoming and outgoing calls during the indicated time period.
- All Busy** The amount of time, in hours and minutes, that all lines in the system were busy during the indicated time period.
- # All Busy** The number of times that all the trunks in the system were busy during the indicated time period.
- Avg All Busy** This is the *Times All Busy* divided by the number *All Busy* to obtain the average time, in minutes and seconds, for which all trunks assigned to a specific group were busy.

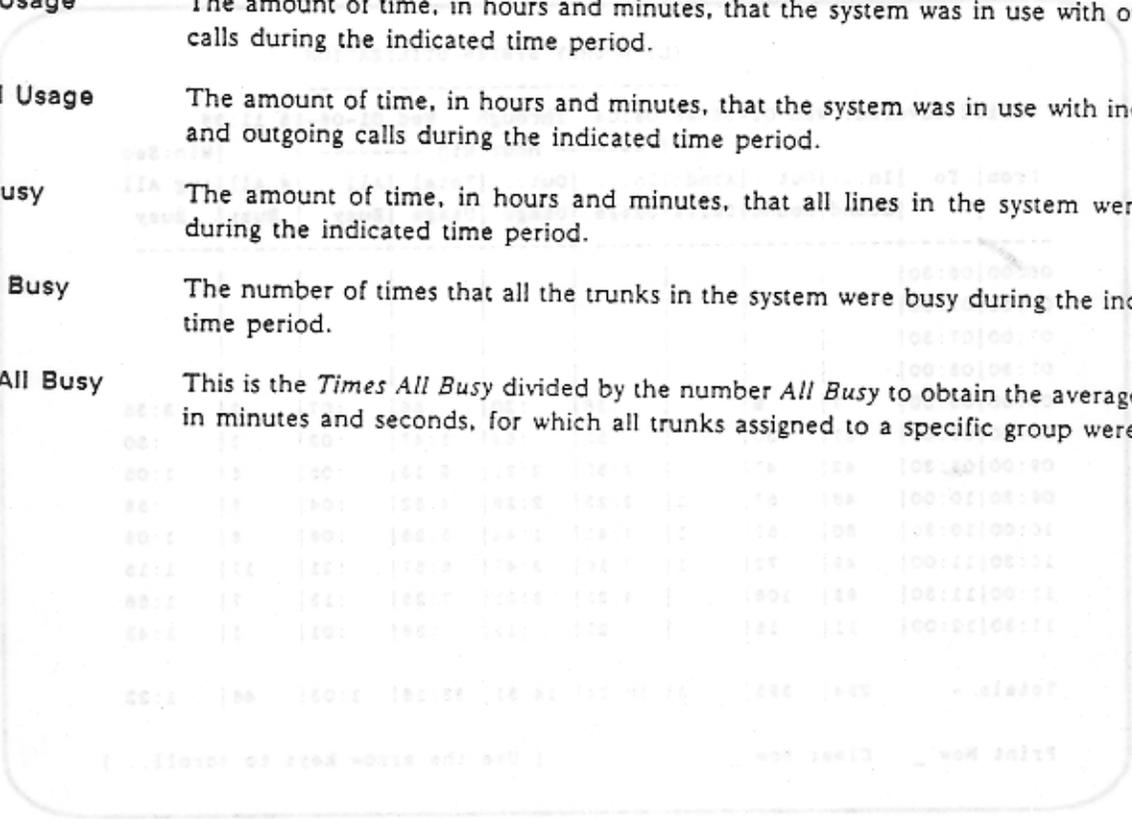


Figure 17-13 System Utilization - 30 Minutes

## 17.8.5 How To Access Screen (L) 30 Minutes

- ACTION** From the *Reports menu*, press L.
- COMMENTS** This report provides the same information as the Hourly report in 30 minute increments.
- COMMANDS** To exit this screen, and return to the *Reports Menu*, press ESCAPE on the keyboard. The UP and DOWN arrow keys can be used to scroll the screen to view the remaining hours. The screen displays twelve 30 minute periods at a time.
- NOTE: This screen may be cleared at any interval desired through the use of the Print and Clear scheduler.*

(L) HOURLY SYSTEM UTILIZATION										
-----										
Period Covered: Wed 01-06-88 08:04 Through Wed 01-06-88 11:36										
----- Hour:Min -----    Min:Sec										
From	To	In...	Out..	Abndn	In...	Out...	Total	All	# All	Avg All
		Bound	Bound	Calls	Usage	Usage	Usage	Busy	Busy	Busy
-----										
06:00	06:30									
06:30	07:00									
07:00	07:30									
07:30	08:00									
08:00	08:30	7	9		:36	:20	:56	:07	2	3:35
08:30	09:00	21	30		:53	:54	1:47	:02	3	:50
09:00	09:30	42	47		2:52	2:21	5:13	:05	5	1:05
09:30	10:00	48	57	1	2:23	2:29	4:52	:04	5	:58
10:00	10:30	50	57	1	3:41	1:44	5:25	:06	6	1:08
10:30	11:00	49	72	1	3:10	3:47	6:57	:21	17	1:15
11:00	11:30	68	108		4:23	3:01	7:25	:13	7	1:56
11:30	12:00	11	15		:23	:13	:36	:01	1	1:43
Totals -		294	393	3	18:24	14:51	33:16	1:03	46	1:22
Print Now _ Clear Now _ [ Use the arrow keys to scroll.. ]										

Figure 17-13 System Utilization - 30 Minutes

### 17.8.6 Screen Definitions - 30 Minutes

- Period Covered** This line indicates the period from the last time the statistics were cleared until the current time that it is viewed (or printed).
- From/To** This is the 30 minute period on which the system is reporting.
- In Bound** The number of incoming calls made to the system in a 30 minute time period.
- Out Bound** The number of outgoing calls made from the system in a 30 minute time period.
- Abndn Calls** The number of calls which were unanswered in a 30 minute time period.
- In Usage** The amount of time, in hours and minutes, that the system was in use with incoming calls during a 30 minute time period.
- Out Usage** The amount of time, in hours and minutes, that the system was in use with outgoing calls during a 30 minute time period.
- Total Usage** The amount of time, in hours and minutes, that the system was in use with incoming and outgoing calls during a 30 minute time period.
- All Busy** The amount of time, in hours and minutes, that all trunks in the system were busy during a 30 minute time period.
- # All Busy** The number of times that all the lines in the system were busy during a 30 minute time period.
- Avg All Busy** This is the Times All Busy divided by the number All Busy to obtain the average time, in minutes and seconds, for which all trunks assigned to a specific group were busy.

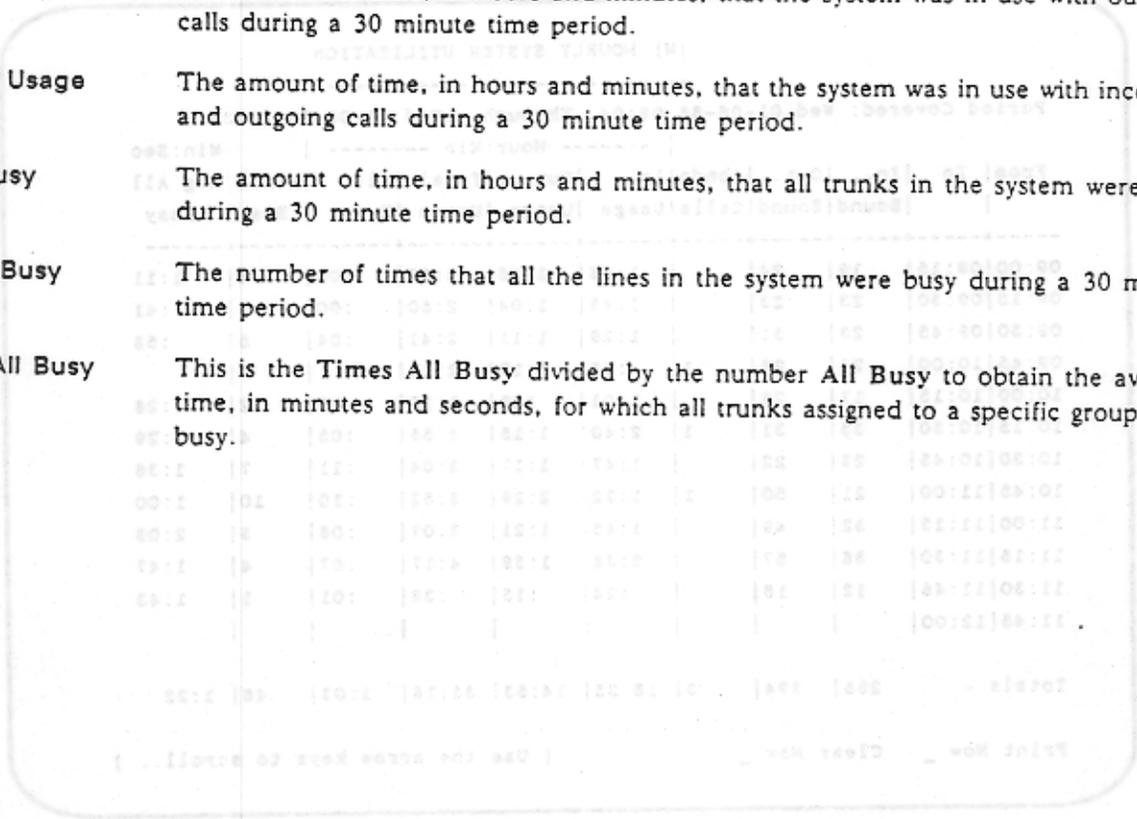


Figure 17-14 System Utilization - 30 Minutes

## 17.8.7 How To Access Screen (M) 15 Minutes

- ACTION** From the *Reports menu*, press M.
- COMMENTS** This report provides the same information as the *Hourly report* in 15 minute increments.
- COMMANDS** To exit this screen, and return to the *Reports Menu*, press ESCAPE on the keyboard.
- The UP and DOWN arrow keys can be used to scroll the screen to view the remaining hours. The screen displays twelve 15 minute periods at a time.
- NOTE: This screen may be cleared at any interval desired through the use of the Print and Clear scheduler.*

(M) HOURLY SYSTEM UTILIZATION										
-----										
Period Covered: Wed 01-06-88 08:04 Through Wed 01-06-88 11:38										
----- Hour:Min -----     Min:Sec										
From	To	In...	Out..	Abndn	In...	Out...	Total	All	# All	Avg All
		Bound	Bound	Calls	Usage	Usage	Usage	Busy	Busy	Busy
-----										
09:00	09:15	19	24		1:06	1:16	2:23	:04	4	1:11
09:15	09:30	23	23		1:45	1:04	2:50	:00	1	:41
09:30	09:45	23	31		1:29	1:11	2:41	:04	5	:58
09:45	10:00	23	26	1	:53	1:17	2:11			
10:00	10:15	17	26		1:01	:28	1:29	:00	2	:28
10:15	10:30	33	31	1	2:40	1:15	3:55	:05	4	1:29
10:30	10:45	28	22		1:47	1:17	3:04	:11	7	1:36
10:45	11:00	21	50	1	1:22	2:29	3:52	:10	10	1:00
11:00	11:15	32	49		1:45	1:21	3:07	:06	3	2:08
11:15	11:30	36	57		2:38	1:39	4:17	:07	4	1:47
11:30	11:45	12	16		:24	:15	:39	:01	1	1:43
11:45	12:00									
Totals -		295	394	3	18:25	14:53	33:18	1:03	46	1:22
Print Now _		Clear Now _		[ Use the arrow keys to scroll.. ]						

Figure 17-14 System Utilization - 15 Minutes

## 17.8.8 Screen Definitions - 15 Minutes

<b>Period Covered</b>	This line indicates the period from the last time the statistics were cleared until the current time that it is viewed (or printed).
<b>From/To</b>	This is the 15 minute period on which the system is reporting.
<b>In Bound</b>	The number of incoming calls made to the system in a 15 minute time period.
<b>Out Bound</b>	The number of outgoing calls made from the system in a 15 minute time period.
<b>Abndn Calls</b>	The number of calls which were unanswered in a 15 minute time period.
<b>In Usage</b>	The amount of time, in hours and minutes, that the system was in use with incoming calls during a 15 minute time period.
<b>Out Usage</b>	The amount of time, in hours and minutes, that the system was in use with outgoing calls during a 15 minute time period.
<b>Total Usage</b>	The amount of time, in hours and minutes, that the system was in use with incoming and outgoing calls during a 15 minute time period.
<b>All Busy</b>	The amount of time, in hours and minutes, that all trunks in the system were busy during a 15 minute time period.
<b># All Busy</b>	The number of times that all the trunks in the system were busy during a 15 minute time period.
<b>Avg All Busy</b>	This is the Times All Busy divided by the number All Busy to obtain the average time, in minutes and seconds, for which all trunks assigned to a specific group were busy.

## 17.9 PRINTING AND CLEARING REPORTS

Each report may be printed and/or cleared manually. When an individual report screen is selected, the cursor is positioned in the lower left corner of the that screen, next to *Print Now*. In order to **PRINT** a specific report, press Y (yes) on the keyboard. The system prints the report as soon as the Y (yes) key is pressed.

The report prints to the printer listed in the *Report Scheduler*. If no printer is specified, the report prints to the printer designated as the SMDR printer.

In order to **CLEAR** that report, press the RETURN key, which moves the cursor to *Clear Now*. Press the Y (yes) key. The system clears the report as soon as the Y (yes) key is pressed. Refer to the section titled "NOTES ON CLEARING REPORTS" before attempting to clear any of the reports.

### 17.9.1 How To Access And Use The Report Scheduler

**ACTION** From the *Reports menu*, press N.

**COMMENTS** As described, it is possible to print and/or clear a report whenever desired manually. If you wish, the system can be programmed to automatically print and/or clear any or all of the reports on a regular basis using the report scheduler.

**COMMANDS** To exit the *Report Scheduler* and return to the *Reports Menu*, press ESCAPE on keyboard.

Using the following keys enter commands which allow you to move the cursor to the desired areas of the *Report Scheduler* screen.

<b>RETURN KEY</b>	Moves the cursor down the screen.
<b>TAB KEY</b>	Moves the cursor across the screen.
<b>UP ARROW KEY</b>	Increments the DOW (Day Of Week) and DOM (Day Of Month).
<b>DOWN ARROW KEY</b>	Decrements the DOW (Day Of Week) and DOM (Day Of Month).
<b>I and D KEY</b>	Increments and decrements the group numbers.

REPORT SCHEDULER													
Report	GRP	-----Weekly-----			-----Monthly-----			-----Daily-----			Printer		
		DOW	Time	Clr	Prt	DOM	Time	Clr	Prt	Prd	Strt	Clr	Prt
A			. 00	N	N		. 00	N	N		. 00	Y	N
B			. 00	N	N		. 00	N	N		. 00	Y	N
C	01		. 00	N	N		. 00	N	N		. 00	Y	N
D	01		. 00	N	N		. 00	N	N		. 00	Y	N
E	01		. 00	N	N		. 00	N	N		. 00	Y	N
F			. 00	N	N		. 00	N	N		. 00	Y	N
G			. 00	N	N		. 00	N	N		. 00	Y	N
H			. 00	N	N		. 00	N	N		. 00	Y	N
I			. 00	N	N		. 00	N	N		. 00	Y	N
J			. 00	N	N		. 00	N	N		. 00	Y	N
K			. 00	N	N		. 00	N	N		. 00	Y	N
L			. 00	N	N		. 00	N	N		. 00	Y	N
M			. 00	N	N		. 00	N	N		. 00	Y	N

ENTER THE LETTER X TO CLEAR THE AUTO PRINTOUT

Figure 17-15 Print/Clear Scheduler

### 17.9.2 Screen Definitions - Report Scheduler

- Report** The letter, A through M, indicated the report to be printed and/or cleared.
- GRP** Indicates the trunk group number of the report. Reports C, D, and E each contain 10 separate reports, one for each trunk group, which can be programmed to print and/or clear separately.
- Weekly Scheduler:*
- DOW** The day of the week on which you wish to print and/or clear a report. The range is from Sun. to Sat.
- Time** The hour at which you wish to print and/or clear a report. Enter the time in a 24 hour clock, for example enter 13 for 1 p.m.
- Clr** Enter Y (yes) if you want to clear a report, or N (no) if you do not want to clear a report on a desired day and time.
- Prt** Enter Y (yes) if you want to print a report, or N (no) if you do not want to print a report.

*Monthly Scheduler:*

- DOM            The day of the month on which you wish to print and/or clear a report. The range is from 1 to 31.
- Time           The hour at which you wish to print and/or clear a report. Enter the time in a 24 hour clock, for example enter 13 for 1 p.m.
- Clr            Enter Y (yes) if you want to clear a report, or N (no) if you do not want to clear a report.
- Prt            Enter Y (yes) if you want to print a report, or N (no) if you do not want to print a report.

*Daily Scheduler:*

- Prd            The hourly period for which you wish to print and/or clear a report, in hourly increments from 01 through 23.
- Strt           The hour at which you wish the report to print and/or clear. The report begins at this time and continues to print after every interval period (the time entered in the Prd column).
- Clr            Enter Y (yes) if you want to clear a report, or N (no) if you do not want to clear a report after this interval.
- Prt            Enter Y (yes) if you want to print a report, or N (no) if you do not want to print a report.
- Printer        The assigned number of the printer, 1 through 4, to which you wish to send the report to be printed. The printer name or number is assigned through System Programming, B from the Main System Menu. If no printer number is assigned the reports will print to the device programmed as the SMDR printer.

### 17.9.3 Example

Use the screen shown in Figure 17-16 for reference while looking at screen N on your programming terminal.

In the example, you will be entering information to print and clear the 30 minute *Group Utilization Report* for trunk group 5. This is report D. In the example, the report is to be printed and cleared on a weekly (Tuesday at 6 pm), monthly (at 1 am on the 1st), and printed at 6 hour intervals daily.

When the scheduler screen is first displayed, the cursor is located in the GRP column of Report A.

Press the RETURN key until the cursor reaches the D report.

Use the I (increment) and/or D (decrement) key to reach 05.

#### *Weekly:*

Use the TAB key to move the cursor right to the DOW column.

Use the UP or DOWN arrow key to increment or decrement to Tue, which is the day used in the example that you would like to to print and/or clear report D on a weekly basis.

Use the TAB key to move the cursor to the Time column. Enter 18 for 6 pm.

Use the TAB key to move the cursor to the Clr column. Type Y (yes).

Use the TAB key to move the cursor to the Prt column. Type Y (yes).

#### *Monthly:*

Use the TAB key to move the cursor right to the DOM column.

Use the UP or DOWN arrow key to increment or decrement to 01, which is the day used in the example that you would like to print and clear report D on a monthly basis.

Use the TAB key to move the cursor to the Time column. Enter 1 for 1 am.

Use the TAB key to move the cursor to the Clr column. Type in Y (yes).

Use the TAB key to move the cursor to the Prt column. Type Y (yes).

#### *Daily:*

Use the TAB key to move the cursor to the Prd column. This is the time period, in hours, at which time you want to print and/or clear report D. Type in 6.

Use the TAB key to move the cursor to the Strt column, and enter the hour at which time you want report D to begin to print.

Use the TAB key to move the cursor to the Clr column. Type in N (no).

Use the TAB key to move the cursor to the Prt column. Type Y (yes).

Printer:

Use the TAB key to move the cursor to the Printer column. Enter the number of the printer, 1 through 4 to which you want report D sent to be printed. This printer number must be assigned through System Programming, which is accessed by pressing B from the System Main Menu.

REPORT SCHEDULER						
	-----Weekly-----		-----Monthly-----		-----Daily-----	
Report	GRP	DOW,Time,Clr,Prt	DOW,Time,Clr,Prt	Prd,Strt,Clr,Prt	Printer	
A						
B						
C						
D	05	Tue, 18:00, Y Y	Mon,23:00,Y Y	01, 23	. N , Y	2
E						
F						
G						
H						
I						
J						
K						
L						
M						

ENTER THE LETTER X TO CLEAR THE AUTO PRINTOUT

Figure 17-16 Report Scheduler

## 17.10 NOTES ON CLEARING REPORTS

Some of the ISOETEC System/108 reports share common information which is held in system memory. Clearing any one of these reports erases the common statistical information from memory, and the system begins collecting new information. There are two such groups of reports: the *Group Utilization* reports for 60 minutes, 30 minutes, and 15 minutes (reports C,D, and E), and the *System Utilization* reports for 60 minutes, 30 minutes, and 15 minutes (reports K,L, and M). Therefore, if report D is cleared, reports C and E are also cleared. If report M is cleared, reports K and L are also cleared.

Do NOT clear any of the reports (manually or automatically) in these two groups until all of the desired information contained in each of the reports has been examined (or printed). This is especially important when programming the *Print/Clear Scheduler* (i.e. *Report Scheduler*). The system processes the requests to print and clear a report in the order in which they appear on the *Report Scheduler*. Therefore, to print report E, report C and D must not be cleared by the *Report Scheduler*. To print report M, report K and L must not be cleared by the *Report Scheduler*. When the M report is cleared, reports K and L will also be cleared.

## 17.11 NOTES ON THE PRINT SCHEDULER

When the ISOETEC System/108 is turned on for the first time, a basic program configuration exists that allows the system to operate before any programming is done. The basic configuration is called the "default program" or just the "default". The default program for the *Print Scheduler* is all reports are cleared daily at midnight (entered as 00 for the time) and are not printed. This includes the reports designated as CUMULATIVE. They are cleared every day until programmed otherwise with the *Print Scheduler*.

In order to accumulate statistics in a report for a week, change the "clr" (clear) in the daily column for that report to N (no), and the "clr" (clear) in the weekly column to Y (yes).

In order to accumulate statistics in a report for a month, change the "clr" (clear) in the daily column for that report to N (no), and the "clr" (clear) in the monthly column to Y (yes) (the "clr" in the weekly column must also be N (no)).

Reports C,D, and E each contain 10 reports, one for each of the 10 trunk groups in the system. Each one of the trunk group reports can be programmed to print/clear individually. Thus you can print a *Report By Hour* for trunk group 1 daily without printing the remaining trunk groups. Remember NOT to clear the report until all the information desired for ALL the trunk groups on reports C,D, and E has been obtained.

All reports default to the printer programmed as the SMDR printer.

## 17.12 WHAT DOES ALL THIS INFORMATION MEAN?

Do you have enough trunks to handle your outside line traffic?

Are you paying for trunks that are never (hardly ever) used?

How long is a customer (client) waiting before the phone is answered?

Are customers hanging up before being answered?

Do you need more answering positions? If so, do they need to be attended at all times, or are there peak periods of incoming traffic?

Are the majority of phone calls (in dollars) being made by the right people?

Are your long distance services being utilized?

One or more of the reports provided by the ISOETEC System/108 can be used to help you answer these questions. The answers also depend on the individual business and your individual requirements.

One of the more useful pieces of information about your systems trunk traffic is a measure of how many times all the trunks in a particular group are busy. This information is found on the GROUP UTILIZATION reports, and can be accumulated for any period desired (CUMULATIVE REPORT), and analyzed for each trunk group for intervals of an hour (Report C), 30 minutes (report D), and 15 minutes (report E). If the information indicates that all trunks in a group are busy too many times (this depends on the individual business), it may be time to order more trunks for that group.

If there are no all busy indications, then perhaps there are too many trunks in a group. A look at Reports F and G (LINE UTILIZATION) will show how many times each individual line is used (incoming and outgoing). Trunks with very low usage may not be needed.

The SYSTEM CALL HISTORY contains information regarding the total number of calls handled by the system, how many calls are unanswered, and how long a time between the system detecting an incoming call and the call being answered by someone in the system.

The CALL WAIT TIME lists how many calls were answered within 5 seconds, how many were answered within 10 seconds, and so on at 20, 30, 45, 60, and 90 second intervals. Use this information along with the hourly reports to judge if more answering positions are needed.

Some of the reports contain information regarding the cost of trunk calls. The Least Cost Routing feature (optional) is needed to acquire the pricing information needed to cost calls. If the LCR feature is not installed in your system these columns will show a cost of \$0.

If Least Cost Routing is installed, its performance can be displayed using Report H (LCR Statistics). The Calls Overflowed column gives an indication of calls that were routed to a second (or further) choice because the primary choice is all busy. This number may indicate the need for more trunks for a particular service.

The EXTENSION SUMMARY report gives a listing by extension of the telephone activity of a particular extension. This gives an indication of the number of calls handled by individuals, and gives a break down of incoming and outgoing calls. If the system is equipped with LCR a total cost for outgoing calls is also recorded.

The reports can also be of use for trouble shooting and maintaining the system. The LINE UTILIZATION reports contain information concerning abandoned calls (calls which the outside caller hangs up before someone in the system answered), bad lines (indicated by a station user pressing a "Bad Line" key on the telephone), calls which the system drops, and an indication of how many times the system has taken a particular line out of service.

## Section 18

### Tie Lines

#### 18.1 INTRODUCTION

The ISOETEC System/108 can accommodate 2-wire tie lines with the use of the E&M Tie Line Combination card (part number 15680). Each E&M Tie Line Combination card supports the use of four tie lines, and six digital stations (these ports do NOT support data or a second voice path). Also, the tie line card does not have an external page path. The tie line card can be installed in any port card slot of the System/108.

##### 18.1.1 Circuit Ordering Information

Facility Interface Code - TL12M  
Service Code - 9.0 Y  
Network Termination - RJ-2FX

The Facility Interface Code (FIC) for the tie lines supported by the System/108 is TL12M.

Provided below is a description of what TL12M means:

- T - The type of private line service being provided. T stands for Tie Line.
- L - The transmission parameters provided by the service ordered. L stands for lossless Interface.
- 1 - The number of wires used for transmission. 1 stands for 1 pair (2 wires).
- 2 - The type of signaling being used. 2 stands for type II signaling interface. This means it uses contact closure signaling with 4 wires (E,SG,M and SB).
- M - The type of outgoing signaling. M stands for battery required on M lead to originate call.

It is recommended to have the tie lines terminated by the local telephone operating company in an RJ-2FX connecting arrangement.

#### TL-12M Tie Line

##### Terminated on an RJ-2FX Connector

- T - Tip
- R - Ring
- E - Incoming service request
- SG - Signal Ground
- M - Outgoing Service request
- SB - Signal Battery (-48 volts)

Having the local telephone operating company terminate the tie lines on an RJ-2FX connector allows for easy identification of tie line wires and easy termination to the ISOETEC System/108 Tie Line Card.

## 18.2 INSTALLATION

The E&M tie line combination port card provides 6 station ports and 4 tie line ports. The 6 station ports provide for all of the features of the digital telephone except there is only the primary digital channel. Therefore, these ports cannot be used to support display phones which utilize the second voice path, or the data feature.

*NOTE: If the system is to be installed with E&M Tie Line Combination, a separate 48 volt DC regulated power supply is required. Refer to the Installation section of this manual.*

The E&M tie line combination port card is connected to the main distribution frame in the same manner as the other port cards, via a 25 pair cable. Stations are wired to the E&M tie line combination port card the same as a station port card.

The local telephone operating company provides tie lines in a number of configurations. The ISOETEC System/108 uses an E&M type II signal tie line terminated on an RJ-2FX connector. Active tie lines are then cross connected from the TELCO demark to the main distribution frame. Table 18-1 shows wire color and termination points for the tie lines. Table 18-2 shows wire configuration when using an ISOETEC Main Distribution Frame.

The E&M Combo port to MDF cable (p/n 01022) is installed with the exposed shield closest to the KSU. A cable tie or similar device is used to secure the exposed braid to the bottom plate of the KSU cabinet (see figure 3-1 for more detail). The paint is removed from a section of the bottom plate to allow a ground connection between the exposed braid of the cable and the cabinet. The cable is then dressed out the back of the cabinet, and connected to the MDF. Once the cable is connected to the system, a standard 25 pair cable may be used if necessary to reach the MDF.

Telephone Company side		System/108 side
Tip	-----	Tip
Ring	-----	Ring
E	-----	E
SG	-----	SG
M	-----	M
SB	-----	SB

Figure 18-1 Tie Line Cross Connection

Table 18-1 E&amp;M Combination Port Cable Configuration

CABLE PIN AND COLOR	PORT	LEAD DESIGNATION	CONNECTING BLOCK COLOR
26 wht/blu	001	Transmit Tip	green
1 blu/wht		Transmit Ring	red
27 wht/org	002	Receive Tip	black
2 org/wht		Receive Ring	yellow
28 wht/grn	003	Transmit Tip	green
3 grn/wht		Transmit Ring	red
29 wht/brn	004	Receive Tip	black
4 brn/wht		Receive Ring	yellow
30 wht/slt	005	Transmit Tip	green
5 slt/wht		Transmit Ring	red
31 red/blu	006	Receive Tip	black
6 blu/red		Receive Ring	yellow
32 red/org	007	Transmit Tip	green
7 org/red		Transmit Ring	red
33 red/grn	008	Receive Tip	black
8 grn/red		Receive Ring	yellow
34 red/brn	009	Transmit Tip	green
9 brn/red		Transmit Ring	red
35 red/slt	010	Receive Tip	black
10 slt/red		Receive Ring	yellow
36 blk/blu	007	Transmit Tip	green
11 blu/blk		Transmit Ring	red
37 blk/org	008	Receive Tip	black
12 org/blk		Receive Ring	yellow
38 blk/grn	009	Tip	
13 grn/blk		Ring	
39 blk/brn	010	E	
14 brn/blk		SG	
40 blk/slt	007	M	
15 slt/blk		SB	
41 yel/blu	008	Tip	
16 blu/yel		Ring	
42 yel/org	009	E	
17 org/yel		SG	
43 yel/grn	010	M	
18 grn/yel		SB	
44 yel/brn	009	Tip	
19 brn/yel		Ring	
45 yel/slt	010	E	
20 slt/yel		SG	
46 vio/blu	007	M	
21 blu/vio		SB	
47 vio/org	008	Tip	
22 org/vio		Ring	
48 vio/grn	009	E	
23 grn/vio		SG	
49 vio/brn	010	M	
24 brn/vio		SB	
50 vio/slt	007		
25 slt/vio			



## 18.3 PROGRAMMING

All tie line programming is accomplished using the *System Programming* screen, choice B on the main menu. A tie line is considered a trunk by the system, and is programmed in the LINES area of the programming screen. Refer to the *System Programming* section for instructions on programming this screen.

Tie lines can use either rotary or DTMF signaling.

Set DTMF Y (yes) for DTMF lines; Set DTMF N (no) for rotary lines.

Line type is used to program the actions of the signal leads under different conditions.

- Line Type
- 0 immediate return signaling
  - 1 wink start, return supervision on answer
  - 2 wink start, return supervision on ring
  - 3 return supervision on answer
  - 4 return supervision on ring

Set TIE/DID to N (no) if tie line is to receive System/108 extensions numbers. Set TIE/DID to Y (yes) if tie line is to use the DID translation table for extension numbers.

System Programming			
[T]ime 2:28 pm	Thu 11-17-88	[O]perator A = 3001	Port = *
		Operator B = ****	Port = *
[R]ing Low = 010 PPS	= 010	Operator C = ****	Port = *
Ring High = 050	Ratio = 080	Operator D = ****	Port = *
[L]ine 001	port 025	Name	[E]xternal Zone 01 Page 00
Line Type = 000	DTMF N	SMDR Enable N	ID Number 001 Day N Night N
ID Number = 001		Ground Start N	
Public N		TIE/DID N	[P]ort = 1 Installed Y
	[A] ID Number 001		Speed = 9600 Protocol = NONE
ID Class = 00			Printer 0 Computer Port N Type 000
Trunk Group = 01			SMDR N Incom N Local N Long Dist N
Hunt Group = 00			
Drop Pulse = 014			[M]usic Source MOH 1 BCM 1
Pause Time = 005s			[V]arious
Flash Time = 025*50ms			Cost After = 020 DID Digits 3
Orbit Recall = 008*10s			Local Call Cost Limit = 30.00
			Ground Start Timer = 008*50ms

Figure 18-2 System Programming Screen

## 18.4 TESTING

When installing a tie line from one location to another it is very important to have a knowledgeable technician on both the near end and far end location (Near End - The location where your tie lines are terminated at, Far End - The location that your tie lines are terminated to). Both technicians should be equipped with a butt set (telephone test set), an ohm-meter, and a regular screw driver. An inspection of the equipment should then take place to make sure that both the near end and the far end have been provided with the proper equipment.

The following inspection should take place for each ISOETEC system.

1. Locate the local telephone operating company terminating block. This will be referred to as the d'mark point.
2. There should be 6 wires terminated for each TL12M interface. If there are more than 6 wires, or less than 6 wires, then the tie line interface that was delivered is not a TL12M.
3. The next step is to identify each wire and its designation. The identity of each wire should be indicated by a tag left by your local telephone operating company.
4. The leads required by an ISOETEC System/108 are as follows:

T  
R  
E  
SG  
M  
SB

5. A voltage measurement between SG and SB on the local telephone operating company side of the d'mark should be taken to insure -48 volts DC is present.

### 18.4.1 Initial Testing

Once an inspection has been made and it has been determined that all proper equipment has been delivered, the following test can be performed between the Near End and the Far End local telephone operating company interfaces.

#### NEAR END TECHNICIAN

(Person working with the System/108 in this case)

If the circuit is connected to the telephone system at the distant end, the following can be performed:

On the local telephone operating company side of the demark:

1. Place your butt set on T and R of the first tie line circuit.
2. Place your ohm meter between E and SG of the first tie line circuit.
3. Take a metal screwdriver and short your M lead to your SB lead. By doing this you are requesting dial tone from the distant end.
4. Depending on the type of supervision (see supervision below) the tie line is set up for at the distant end, you will then receive a ZERO ohm indication on your meter. This indicates that the other end has acknowledged your request and is responding with the appropriate supervision.

### Supervision -

A tie line can be set up for different supervisions. Supervision on the tie line is used to determine when a party hangs up by monitoring the E and M leads. Below is a list of the supervisions the ISOETEC System/108 offers.

**IMMEDIATE SUPERVISION** - When a short is placed between the E and SG leads, the system places an immediate short across the M and SB leads.

**RING SUPERVISION (with Wink)** - When a short is placed between the E and SG leads, the system gives a momentary closure on the M and SB leads. After the called extension begins to ring, the M lead is then shorted to the SB lead until the call is terminated.

**OFF-HOOK SUPERVISION (with Wink)** - When a short is placed between the E and SG leads, the system provides a momentary closure on the M and SB leads. Once the called extension is taken off-hook, the M lead is then shorted to the SB lead and remains closed for the duration of the call.

**RING SUPERVISION (no Wink)** - After the called extension begins to ring, the M lead is then shorted to the SB lead until the call is terminated.

**OFF-HOOK SUPERVISION (no Wink)** - Once the called extension is taken off-hook, the M lead is then shorted to the SB lead and remains closed for the duration of the call.

The Far End technician should then perform a similar test to insure that he is able to receive dial tone when calling into the Near End, and also to insure proper supervision on his end (remember to connect the System/108 to the tie line circuit before this test).

### 18.4.2 Testing the System/108

After both the Near End and Far End local telephone operating company equipment has been determined to be in proper working order, an individual test of the ISOETEC System/108 should be performed on each tie line circuit that is to be connected to the local telephone operating company interface. The test that should be performed is as follows:

1. Place a butt set on monitor across the T and R leads on the ISOETEC side of the block. A high pitched tone may be heard while the tie line is in idle mode.
2. Take a metal screw driver and short the E lead to the SG lead. This should give you System/108 dial tone on your butt set. If the supervision is set up for immediate, a click from the closure of the M lead to the SB lead will be heard. If you do not hear the click, you can monitor the closure of the M lead to the SB lead by placing an ohm meter across the M and SB leads and checking for a zero ohm indication.

If you are using an ISOETEC MDF, remember to skip the TWO spare leads after every 4 wires you punch down.

After all the ISOETEC circuits and Far End circuits have been tested, place your bridging clips on each tie line circuit.

## 18.5 TIE LINE OPERATION

The following is a description of what a tie line can and can't do. Every attempt will be made to discuss the important features, however, if a feature is not mentioned, it does not mean that it will work in conjunction with the tie lines.

The following features are NOT available on Tie Lines calling into a System/108.

### Direct Ringing into a Hunt Group -

A Tie line *cannot* be assigned to ring directly into a hunt group of a System/108. If you would like to obtain access to a specific hunt group via a tie line, you must dial 4 plus the hunt group number you would like to obtain access to (1-36).

### Direct Ringing into an ACD Group -

A Tie line *cannot* be assigned to ring directly into an ACD group of a system/108. If you would like to obtain access to a specific ACD group, you must dial 47 plus the ACD group number you would like to obtain access to.

### Paging -

An incoming tie line entering the System/108 *cannot* access the page.

### Page Pickup -

A tie line entering the System/108 *cannot* dial 75 to pick up a page.

### Orbit Pickup -

A tie line entering the System/108 *cannot* pick up a line that has been placed into an orbit zone.

### Account Code Entry-

A tie line entering the System/108 *cannot* enter any kind of account code, forced, verified or voluntary.

### Toll Restriction -

An incoming tie line *cannot* be toll restricted.

Camp-on tone -

An incoming tie line user *cannot* issue camp-on tones to a busy party.

Speed Dial -

An incoming tie line entering a 108 *cannot* access the Station or System speed dial numbers.

The following features are available on Tie Lines calling into a System/108.

Call an Extension -

A tie line entering a System/108 can access an extension by dialing the appropriate 4 digit number (3001 - 3108).

Trunk Access -

A tie line entering the System/108 can access a CO line by dialing 9 plus the three digit line number (001 - 108).

NOTE: Trunk access cannot be denied to a person calling into a System/108 via a tie line. Also, the person calling into the tie line in the System/108 cannot be toll restricted.

LCR Access -

A tie line entering into the System/108 can obtain access to LCR by dialing (9\*) plus the number they wish to call.

NOTE: Items such as LCR class of service, Cost Limit, and Out LCR only will not pertain to a tie line entering into the System/108 and accessing LCR.

SMDR/Call Accounting Reports -

A tie line calling into the system can be recorded on SMDR. The tie line and all associated lines and/or extensions you wish to have recorded on SMDR must have SMDR Enable set to Y. Also, the tie line will appear as extension 000 when it accesses a CO line to dial a number and is recorded on SMDR. Asterisks will appear in the Account Code field.

Hunt Group Access -

A tie line entering into the System/108 can access a hunt group by dialing 4 plus the hunt group number (01 - 36).

Line Group Access -

A tie line entering into the System/108 can access a line group by dialing 93 plus the line group number (01 -10).

Operator Access -

A tie line entering into the System/108 can access the main operator by dialing 0. To access secondary operators, you must dial their extension numbers.

Ringing Assignment -

A tie line entering the System/108 can be assigned to ring on several stations. To access the ringing assignment of the tie line, the caller must press the star key after receiving tie line dial tone.

*NOTE: The ringing assignment of a tie line entering the System/108 can also be accessed by not dialing anything upon receiving tie line dial tone from the System/108. After 10 seconds, the tie line entering the System/108 will reference the ringing assignment and ring the appropriate phones.*

Establishing a conference -

A tie line entering the System/108 can be conferenced with a CO line or station.

*NOTE: A tie line should not be conferenced with another tie line.*

Transferring a Tie line call -

A tie line call entering a System/108 can be transferred in the same manner you transfer a regular CO call (to another extension, to an orbit zone, to a hunt group, etc.).

Placing a tie line call on hold -

A tie line call entering the System/108 can be placed on hold the same way a regular CO call is placed on hold (exclusive hold will also work).

Directed call Pickup -

A tie line call entering into a System/108 that is ringing an extension can be picked up by another extension by dialing 2 plus the extension number the tie line is ringing (3001 - 3108).

Station Forwarding -

A tie line entering into a System/108 will follow station forwarding.

System Forwarding -

A tie line entering into a System/108 will follow system forwarding.

VMS Forwarding -

A tie line entering into a System/108 will follow VMS forwarding.

Tie/DID Dialing Plan -

A tie line entering into a System/108 can be programmed so it will reference the same dialing scheme as the DID lines.

The following features are available on Tie Lines calls out of the System/108 with software version 1.00.

**Dial Select -**

A tie line leaving the System/108 can be accessed by dialing 9 plus the tie line number (001 - 108).

**Group select -**

A tie line can be accessed by dialing 93 plus the group number (01 to 10).

**Key Assignment -**

A tie line can be assigned to a programmable key using either a direct appearance line number, or trunk group access. Once the key is pressed, you will obtain access to the tie line.

**Group keys -**

Tie lines can be assigned to group keys. When the group key is pressed, you will receive an available tie line.

**Prime line (by line or group) -**

A tie line can be assigned to prime line of a station, so when the station goes off hook, they will obtain the outgoing tie line.

**Call Back -**

If an outgoing tie line is busy, you can place a call back to that tie line. Once the outgoing tie line becomes available, it will ring on your extension.

**Camp-on -**

A station can camp-on to a busy tie line. To camp on to a busy outgoing tie line, press the digit 2 upon receiving busy tone.

**Restrict Access -**

Access can be restricted on an outgoing tie line on a per station basis.

**Toll Restriction -**

A outgoing tie line can be toll restricted.

**Forced Account Codes -**

An outgoing tie line can require forced account codes (on a per station basis).

**Voluntary Account Codes -**

An outgoing tie line can have voluntary account codes.

**SMDR and Call Accounting -**

An outgoing tie line can be recorded on SMDR and/or Call Accounting.

Conferencing -

An outgoing tie line can be added to a CO or station conference.

*NOTE: Two outgoing tie lines should not be conferenced together.*

DISA -

An outgoing tie line can be accessed via DISA.

Speed Dial -

A system and/or station speed dial can be used on an outgoing tie line.

Last Number Redial -

A last number re-dial can be used on an outgoing tie line.

### 18.1.2 Tie Line Dialing and Supervision

Once you have ordered the correct tie line from your local telephone operating company, you must now determine what type of tie line you are going to be interfacing with.

Tie lines can be configured with several different types of supervision (immediate signaling, return supervision on ring, return supervision on answer, wink start with return supervision on ring, or wink start with return supervision on answer).

Please remember, that, in order for systems connected by tie lines to communicate with each other, they must both be set up with the same type of line supervision and dialing method (Rotary or DTMF). A Rotary dial tie line will not work with a DTMF dial tie line, and vice versa. If tie line supervisions are not the same, the tie lines may not work at all, or could remain locked up after a call is terminated.

## Section 19

# Trunk Group Programming

### 19.1 INTRODUCTION

The *Trunk Group Programming* screen has 2 separate uses. Incoming calls can be diverted to another outside telephone number. The ISOETEC System/108 can be placed in the NIGHT mode automatically based on the time of day, and the day of the week.

### 19.2 CALL DIVERSION

The *Trunk Group Programming* screen uses the SYSTEM SPEED DIAL feature to route incoming calls to another outside number. Calls can be diverted based on the time of day, and day of the week. Each of the system's 10 TRUNK GROUPS can be programmed separately for call diversion.

When a TRUNK GROUP is set for call diversion, any incoming call in that trunk group will be connected to an outgoing trunk in a selected group, and the designated SYSTEM SPEED DIAL number will be dialed.

Programming a trunk group for CALL DIVERSION consists of selecting which trunk group the outgoing call is to be placed on, which SYSTEM SPEED DIAL NUMBER is to be dialed, and when CALL DIVERSION is to be *active*. The TRUNK GROUP can also be assigned a name with up to 10 characters. This name appears on any of the *System Reports* which reference the trunk group.

CALL DIVERSION can be activated and deactivated on a weekday, on Saturday, or on Sunday, beginning at any time, and ending at any time.

#### 19.2.1 What To Program

Determine which TRUNK GROUP'S incoming calls are to be diverted.

Determine which TRUNK GROUP is to be selected for the outgoing call.

Determine the outside telephone number these calls are to be diverted to. Enter this telephone number into a SYSTEM SPEED DIAL BIN using the operator's position.

Determine when CALL DIVERSION is to start, and when it is to stop. CALL DIVERSION can begin and end at any time on a weekday, on Saturday, and on Sunday.

#### 19.2.2 How To Program Call Diversion

If not already on the *Trunk Group Programming* screen, from the main menu, press the N key. If the cursor is in another portion of the *Trunk Group Programming* screen, press SHIFT and '@' simultaneously.

1. Press the RETURN key to move the cursor to the TRUNK GROUP to be programmed.

2. Enter the name of the TRUNK GROUP, if desired, up to 10 characters, and press the RETURN key.
3. Press the TAB key. The cursor moves to the OUT GRP column.
4. Enter the number of the TRUNK GROUP to be used for the outgoing call, and press the RETURN key.
5. Press the TAB key. The cursor moves to the SPEED DIAL BIN column.
6. Enter the bin number (001-200) of the SYSTEM SPEED DIAL number to be used, and press the RETURN key.
7. Press the TAB key. The cursor moves to the WEEKDAY ENABLE column.
8. If CALL DIVERSION is to be active at any time on a weekday, press Y. Otherwise, this should be N.
9. Press the TAB key. The cursor moves to the START column.

Trunk Group Programming      'e' --> 1st group

---

Grp#	Name	Call Diversion		Weekdays		Saturday		Sunday	
		Out grp	System Speed Dial BIN (1-200)	Enable start stop	Enable start stop	Enable start stop	Enable start stop		
1	ABC	01 002		Y 11:40 12:00		N 00:00 00:00		N 00:00 00:00	
2		00		N 00:00 00:00		N 00:00 00:00		N 00:00 00:00	
3		00		N 00:00 00:00		N 00:00 00:00		N 00:00 00:00	
4		00		N 00:00 00:00		N 00:00 00:00		N 00:00 00:00	
5		00		N 00:00 00:00		N 00:00 00:00		N 00:00 00:00	
6		00		N 00:00 00:00		N 00:00 00:00		N 00:00 00:00	
7		00		N 00:00 00:00		N 00:00 00:00		N 00:00 00:00	
8		00		N 00:00 00:00		N 00:00 00:00		N 00:00 00:00	
9		00		N 00:00 00:00		N 00:00 00:00		N 00:00 00:00	
10				N 00:00 00:00		N 00:00 00:00		N 00:00 00:00	

---

The system will automatically switch to Night Mode (\$) Y at | Y|17:58|11:00 | Y|00:00|00:00 | Y|00:00|00:00

Figure 19-1 Trunk Group Programming Screen

10. Enter the time CALL DIVERSION is to start in 24 hour clock format.
11. Press the TAB key. The cursor moves to the STOP column.
12. Enter the time CALL DIVERSION is to stop in 24 hour clock format.
13. Press the TAB key. The cursor moves to the SATURDAY ENABLE column.
14. If CALL DIVERSION is to be active at any time on Saturday, press Y. Otherwise, this should be N.
15. Press the TAB key. The cursor moves to the START column.
16. Enter the time CALL DIVERSION is to start in 24 hour clock format.
17. Press the TAB key. The cursor moves to the STOP column.
18. Enter the time CALL DIVERSION is to stop in 24 hour clock format.
19. Press the TAB key. The cursor moves to the SUNDAY ENABLE column.
20. If CALL DIVERSION is to be active at any time on Sunday, press Y. Otherwise, this should be N.
21. Press the TAB key. The cursor moves to the START column.
22. Enter the time CALL DIVERSION is to start in 24 hour clock format.
23. Press the TAB key. The cursor moves to the STOP column.
24. Enter the time CALL DIVERSION is to stop in 24 hour clock format.
25. Press the RETURN key. The cursor moves back to the NAME column of the next TRUNK GROUP. Continue programming the remaining TRUNK GROUPS to be diverted.

When CALL DIVERSION is active in a particular TRUNK GROUP, Dvrt appears in the CALL DIVERSION column of the TRUNK GROUP.

Make certain the System clock is properly set on the *System Programming* screen.

The TRUNK GROUP will begin to divert calls the next time the system clock reaches the time indicated in a START column.

## 19.3 AUTOMATIC NIGHT MODE

The ISOETEC System/108 can be placed into the NIGHT mode using the *Trunk Programming* screen. NIGHT mode can be activated and deactivated on a weekday, on Saturday, or on Sunday, beginning at any time, and ending at any time.

### 19.3.1 What To Program

Determine at what time the System is to enter the NIGHT mode, and at what time the System is to leave the NIGHT mode.

### 19.3.2 How To Program Automatic Night Mode

If not already on the *Trunk Group Programming* screen, from the main menu, press the N key. If the cursor is in another portion of the *Trunk Group Programming* screen, press SHIFT and 'S' simultaneously.

1. If the *Trunk Group Programming* screen is to be used to place the system in the NIGHT mode, press the Y key.

Trunk Group Programming											'e' --> 1st group	
Grp #	Name	Call Diversion		Weekdays		Saturday		Sunday		System Speed	Enable	
		Out	Dial BIN (1-200)	start	stop	start	stop	start	stop			
1	ARC	01	002	Y	11:40	12:00	N	00:00	00:00	N	00:00	00:00
2		00		N	00:00	00:00	N	00:00	00:00	N	00:00	00:00
3		00		N	00:00	00:00	N	00:00	00:00	N	00:00	00:00
4		00		N	00:00	00:00	N	00:00	00:00	N	00:00	00:00
5		00		N	00:00	00:00	N	00:00	00:00	N	00:00	00:00
6		00		N	00:00	00:00	N	00:00	00:00	N	00:00	00:00
7		00		N	00:00	00:00	N	00:00	00:00	N	00:00	00:00
8		00		N	00:00	00:00	N	00:00	00:00	N	00:00	00:00
9		00		N	00:00	00:00	N	00:00	00:00	N	00:00	00:00
10				N	00:00	00:00	N	00:00	00:00	N	00:00	00:00

The system will automatically switch to Night Mode (\$)

Y	17:58	11:00	Y	00:00	00:00	Y	00:00	00:00
---	-------	-------	---	-------	-------	---	-------	-------

Figure 19-2 Trunk Group Programming Screen

2. Press the TAB key.
3. If NIGHT mode is to be activated automatically at any time on a weekday, press Y. Otherwise, this should be N.
4. Press the TAB key. The cursor moves to the START column.
5. Enter the time NIGHT mode is to start in 24 hour clock format.
6. Press the TAB key. The cursor moves to the STOP column.
7. Enter the time NIGHT mode is to stop in 24 hour clock format.
8. Press the TAB key. The cursor moves to the SATURDAY ENABLE column.
9. If NIGHT mode is to be active at any time on Saturday, press Y. Otherwise, this should be N.
10. Press the TAB key. The cursor moves to the START column.
11. Enter the time NIGHT mode is to start in 24 hour clock format.
12. Press the TAB key. The cursor moves to the STOP column.
13. Enter the time NIGHT mode is to stop in 24 hour clock format.
14. Press the TAB key. The cursor moves to the SUNDAY ENABLE column.
15. If NIGHT mode is to be active at any time on Sunday, press Y. Otherwise, this should be N.
16. Press the TAB key. The cursor moves to the START column.
17. Enter the time NIGHT mode is to start in 24 hour clock format.
18. Press the TAB key. The cursor moves to the STOP column.
19. Enter the time NIGHT mode is to stop in 24 hour clock format.

Make certain the System clock is properly set on the *System Programming* screen.

The SYSTEM will enter the NIGHT mode the next time the system clock reaches the time indicated in a START column.

1. Press the TAB key.
  2. If NIGHT mode is to be activated during the next time (in a weekday), press Y. Otherwise, this should be N.
  3. Press the TAB key. The cursor moves to the START column.
  4. Enter the time NIGHT mode is to start in 24 hour clock format.
  5. Press the TAB key. The cursor moves to the OFF column.
  6. Enter the time NIGHT mode is to stop in 24 hour clock format.
  7. Press the TAB key. The cursor moves to the TODAY ENABLE column.
  8. If NIGHT mode is to be active at any time today, press Y. Otherwise, this should be N.
  9. Press the TAB key. The cursor moves to the START column.
  10. Enter the time NIGHT mode is to start in 24 hour clock format.
  11. Press the TAB key. The cursor moves to the OFF column.
  12. Enter the time NIGHT mode is to stop in 24 hour clock format.
  13. Press the TAB key. The cursor moves to the NIGHT OF ENABLE column.
  14. If NIGHT mode is to be active at any time in the next night, press Y. Otherwise, this should be N.
  15. Press the TAB key. The cursor moves to the START column.
  16. Enter the time NIGHT mode is to start in 24 hour clock format.
  17. Press the TAB key. The cursor moves to the OFF column.
  18. Enter the time NIGHT mode is to stop in 24 hour clock format.
- Make certain the System clock is properly set on the System Programming screen.
- The SYSTEM will enter the NIGHT mode the next time the system clock reaches the time indicated in the START column.

# Section 20

## Direct Inward Dial

### 20.1 INTRODUCTION

Direct Inward Dialing (DID) trunks allow an outside caller to directly dial an extension within the ISOETEC System/108, without the need of the call being handled by the attendant answering position. All DID calls originate in the Central Office of the local telephone operating company and terminate at the ISOETEC System/108. DID trunks are used for incoming calls only. Separate trunks must be provided for outgoing service.

The telephone network transmits extension number information to the ISOETEC System/108. Usually 3 or 4 digits (the last 3 or 4 digits of a telephone number) are transmitted to the telephone system, however the ISOETEC System/108 can accept the transmission of from 2 to 7 digits. The DID trunks are terminated to the ISOETEC System/108 DID port card (part number 15610). Each DID port card can terminate 12 DID trunks. At present, the ISOETEC System/108 accepts only PULSE (rotary) signaling on the DID lines, and gives a WINK start to the Central Office.

DID Tagging is another feature which allows the user to assign a name of their choice to each DID number by programming 10 characters or less. This feature allows an outside caller to directly dial an extension within the System/108, without the need of the call being handled by the attendant answering position. The DID programming screen can be used to add a label (up to 10 characters) to each DID number. After the name is programmed, it is then displayed on the operator's screen in the Call Pending Box, and on the LCD display of a display phone. When a DID is re-routed or transferred, the DID will keep its programmed tag throughout the duration of the call sequence.

### 20.2 REGISTRATION AND CONNECTION

Part 68 Registration Numbers:

Hybrid     DHF-7AS-10268-MF-E

PBX        DHF-7AS-10267-PF-E

Facility Interface Code     02RV2-T

Ringer Equivalence         0.0B

Network Connection         RJ21-X

### 20.3 HARDWARE REQUIREMENTS

DID port card (part number 15610)

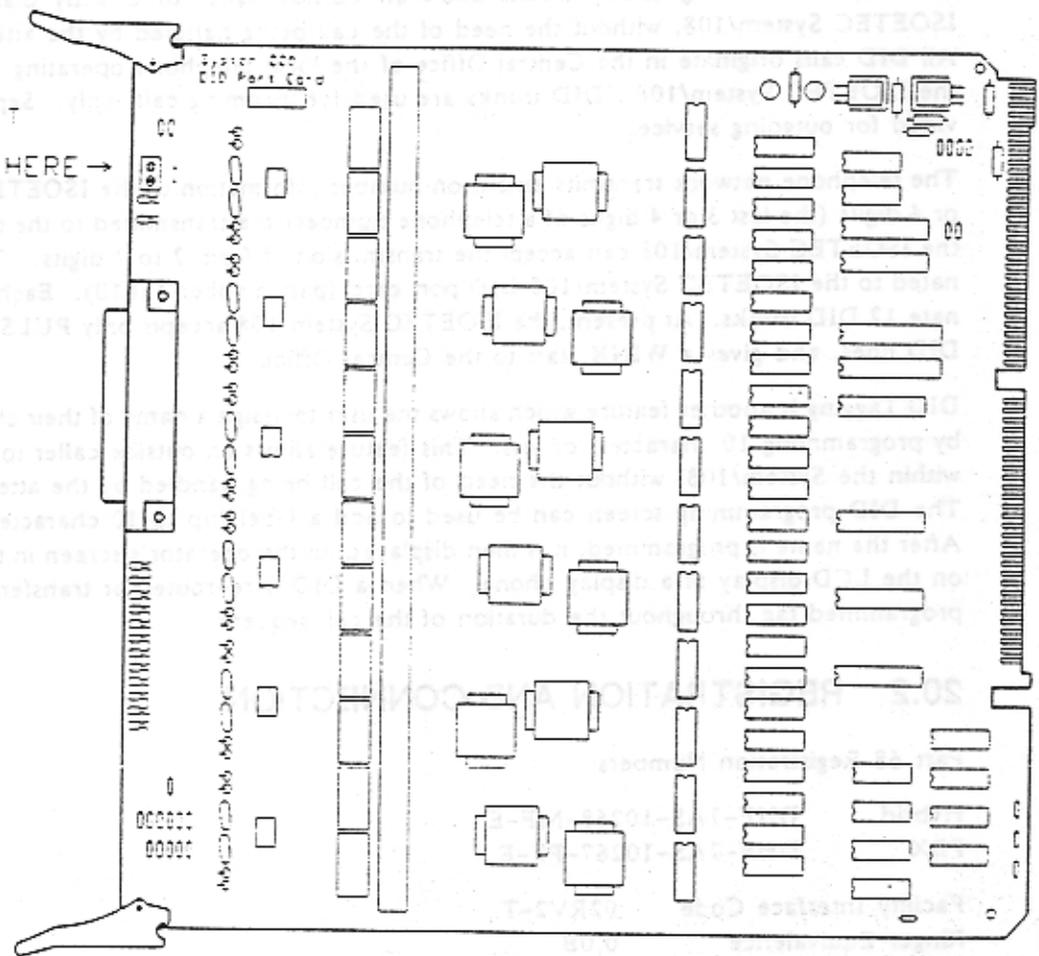
48 volt DC power supply

The DID card revision B requires an external 48 volt power supply. The power supply is connected to the port card by screw terminals located on the top outer edge of the card. Each card draws a maximum of 600 milliamps of current when all circuits are in use. The size power supply depends on the number of DID cards installed. Previous versions of this card (revision A) do NOT require the external power supply, but are powered by the system (36 volts). However, only 2 such DID port cards can be installed in the System/108.

20.1 INTRODUCTION

Direct Inward Dialing (DID) cards allow an attendant to answer an extension within the ISOTEC System, without the need of the attendant's extension number, and terminate a

ATTACH 48 VOLT  
POWER SUPPLY HERE →



20.3 HARDWARE REQUIREMENTS

DID port card (part number 13410)  
48 volt DC power supply

The DID card requires a minimum 18 volt power supply. The power supply is connected to the port card by screw terminals. The power supply should provide a maximum of 600 millamps of current when all cards are in use. The power supply should be connected to the number of DID cards installed. Previous versions of the card required 5 VOLT input to the external power supply, but are covered by the system (35 volts). If the system is installed, the DID port card can be installed in the System.

## 20.4 SOFTWARE REQUIREMENTS

Software version 1.00 supports DID. The DID feature does NOT have to be loaded remotely by ISOETEC in these software versions.

## 20.5 INSTALLATION

The DID port card can be installed in any one of the 19 port card slots of the System/108. Connect the 48 volt power supply to the screw terminals located on the outer edge of the board. The screw terminals are labeled for polarity.

The local telephone operating company usually provides DID lines on an RJ-21X connector. These are connected to the TELCO IN jack on the Main Distribution Frame. A 25 pair cable connects the TELCO OUT jack to the cable connector on each DID port card. Each cable connects 12 DID lines to the DID port cards. The connector on the DID port card is a female connector. Active lines are then connected by the use of bridging clips. Table 20-1 shows wire color and termination points for the incoming lines.

TABLE 20-1 DID Port wiring configuration

CABLE PIN AND COLOR	PORT	LEAD DESIGNATION
26 wht/blu	001	Tip
1 blu/wht		Ring
27 wht/org	002	Tip
2 org/wht		Ring
28 wht/grn	003	Tip
3 grn/wht		Ring
29 wht/brn	004	Tip
4 brn/wht		Ring
30 wht/slt	005	Tip
5 slt/wht		Ring
31 red/blu	006	Tip
6 blu/red		Ring
32 red/org	007	Tip
7 org/red		Ring
33 red/grn	008	Tip
8 grn/red		Ring
34 red/brn	009	Tip
9 brn/red		Ring
35 red/slt	010	Tip
10 slt/red		Ring
36 blk/blu	011	Tip
11 blu/blk		Ring
37 blk/org	012	Tip
12 org/blk		Ring

## 20.6 WHAT TO PROGRAM

Each DID port is assigned a CO line number. When the DID port card is installed in the ISOETEC System/108, the system automatically configures the ports for the next 12 CO lines. If different line numbers are desired, follow the instructions for changing port assignments found in the *Port Programming* section of this manual.

The address information transmitted from the network must be translated into extension numbers (or line IDs). This is accomplished through the use of the *DID Programming* screen. This programming screen is not listed on the main menu, but can be reached through the *Digit Translation* programming screen.

The *Digit Translation* programming screen is a menu with two choices: A - DID Programming (this is the one), and B - Intercom Dialing.

Digit Translation Tables

---

Select one of the following :

A ... DID Programming

B ... Intercom Dialing

Enter Selection >

CO Line	DID Num	Ext/Id
1	001	101
2	002	102
3	003	103
4	004	104
5	005	105
6	006	106
7	007	107
8	008	108
9	009	109
10	010	110
11	011	111
12	012	112

Figure 20-2 Digit Translation Menu

The *DID Programming* screen is 3 pages long, and contains translation for 108 DID numbers. The DID number (the address information transmitted by the telephone network) can be from 2 to 7 digits. This information is entered in the "DID Num" column. The System/108 extension number to which the DID number is to be translated is entered in the column "Ext/Id".

The system MODEM can be called via the DID lines by assigning one of the DID telephone numbers to "ID" 65 on the DID programming screen.

## 20.7 ACCESSING THE DIGIT TRANSLATION PROGRAMMING SCREEN

The *Digit Translation* programming screen (the Y Screen) is accessed by pressing Y on the keyboard from the main menu. The ESCAPE key may be pressed while in any other programming screen to reach the main menu. Programmable passwords are available to limit access to the programming screens. The default access to the DID programming is by password levels 7 and 8 only.

DID Programming| C = Copy F = Fill Del = Delete Page 1 of 3

---

Ind DID Dgts - Ext/ID Use Name	Ind DID Dgts - Ext/ID Use Name
001  - N	019  - N
002  - N	020  - N
003  - N	021  - N
004  - N	022  - N
005  - N	023  - N
006  - N	024  - N
007  - N	025  - N
008  - N	026  - N
009  - N	027  - N
010  - N	028  - N
011  - N	029  - N
012  - N	030  - N
013  - N	031  - N
014  - N	032  - N
015  - N	033  - N
016  - N	034  - N
017  - N	035  - N
018  - N	036  - N

Figure 20-3 DID Programming Screen

## 20.8 HOW TO PROGRAM

If not already in the *Digit Translation* programming screen (see Figure 20-2), from the main menu, press the Y key. Then press A on the keyboard to reach DID programming.

1. The cursor is located in the upper right corner of the programming screen. Enter the page number to be programmed.
2. Press the RETURN key. The cursor moves to the first position of the "DID Dgts" column.
3. Enter the DID number to be translated.
4. Press the RETURN key.
5. Press the RETURN key a second time to move the cursor to the "Ext/Id" column.
6. Enter the extension number that the DID number translates into.
7. Press the RETURN key.
8. Press the RETURN key again. The cursor moves to the "Use" column.
9. Enter a Y for DID tagging, and press the RETURN key.
10. If all the DID numbers are to be tagged, the user can enter a C before entering RETURN to copy Y to all the numbers.
11. Enter the desired name that is to be associated with that specific DID number. Press the RETURN key.
12. Continue entering information and pressing the RETURN key until all numbers to be translated and tagged are entered.

There are two copy function keys associated with this screen:

Pressing the C key while in either column copies that line of information to all lines.

Pressing the F key while in the *DID Dgts* column increments that line of information for the next 99 lines.

Pressing the F key while in the *Ext/Id* column increments that line of information from the present line till the end.

To move the cursor back to the *page* position, press the SHIFT key and the "@" key on the keyboard at the same time.

DID Programming C = Copy F = Fill Del = Delete Page 1 of 3

Ind DID Dgts - Ext./ID Use Name	Ind DID Dgts - Ext./ID Use Name
001  - N	019  - N
002  - N	020  - N
003  - N	021  - N
004  - N	022  - N
005  - N	023  - N
006  - N	024  - N
007  - N	025  - N
008  - N	026  - N
009  - N	027  - N
010  - N	028  - N
011  - N	029  - N
012  - N	030  - N
013  - N	031  - N
014  - N	032  - N
015  - N	033  - N
016  - N	034  - N
017  - N	035  - N
018  - N	036  - N

Figure 20-4 DID Programming Screen

## 20.9 OPERATION

An outside caller dials the telephone number of one of the DID numbers assigned to a particular installation. The call is routed through the public switched network to the Central Office serving the installation. The Central Office switch determines which subscriber the call is to be routed to. An idle DID trunk is selected. The CO may test the trunk before continuing. The CO then seizes the idle DID trunk by going from a high resistance state to a low resistance state (it goes off-hook on the line). The ISOETEC System/108 responds by reversing the polarity of tip and ring for a brief moment and then returns to the original polarity (this is the "wink").

When the CO detects the reverse battery "wink", it begins sending dial pulse information to the System/108 (it dials rotary). This dial pulse information is usually the last 3 or 4 digits of the telephone number. After the ISOETEC System/108 has collected all the dial information, it uses the *DID Programming* table to translate this information into the System/108 extension number. The call is then routed to the extension, ring back tone is connected to the outside caller, and the extension begins to ring.

When the called station answers, the polarity of tip and ring is again reversed and held in this state for the duration of the call. The outside caller is then connected to the extension.

If the outside caller disconnects, the CO opens the loop and returns the trunk to the idle state. The System/108 (depending on the programming of the *Toll Options*) then releases the line.

If the extension called hangs up the phone, the System/108 returns the polarity on tip and ring to normal. The Central Office detects this, disconnects the call, and returns the line to the idle state.

## 20.10 NOTES

### 20.10.1 CALLED STATION BUSY

If the extension being called is busy with another call, the outside caller is connected to ring back tone, and the call is camped-on to the busy extension.

### 20.10.2 CALLED STATION IS FORWARDED

If the called extension is forwarded to another extension, the DID call follows the forward.

### 20.10.3 CALLED STATION IS DND

If the called station is in DND mode, the outside caller is connected to ring back tone, the LED on the called extension blinks, but no ring tone is heard.

### 20.10.4 CALLED STATION IS OUT (IN/OUT key is pressed)

If the called station is in the OUT mode, the outside caller is connected to ring back tone, the LED on the called extension blinks, but no ring tone is heard.

# Section 21

## Flexible Numbering

### 21.1 INTRODUCTION

Flexible Numbering allows the technician to CUSTOMIZE the leading digit of the ISOETEC System/108 dialing scheme to any other leading digit (1-0). The system defaults to 3. The range of extension numbers starts at 3001 and ends at 3999.

When using the Flexible Numbering, the customer should be made aware that when customizing, or changing the leading digits, it affects the ENTIRE dialing scheme as ALL digits are used for access codes, or features as listed below:

---

<i>Default Digit</i>	<i>Feature Access</i>
1	Ring for Intercom calls
2	Camp-on, Pickup ringing extension
3	Extension numbers
4	Hunt Groups
5	Orbits
6	Paging Access
7	Feature Codes
8	ACD Agents (not used with the System 108)
9	CO Access
0	Operator

---

## 21.2 PROGRAMMING THE DIGIT TRANSLATION SCREEN

1. From the Main Menu, press the Y key. The *Digit Translation* menu appears.

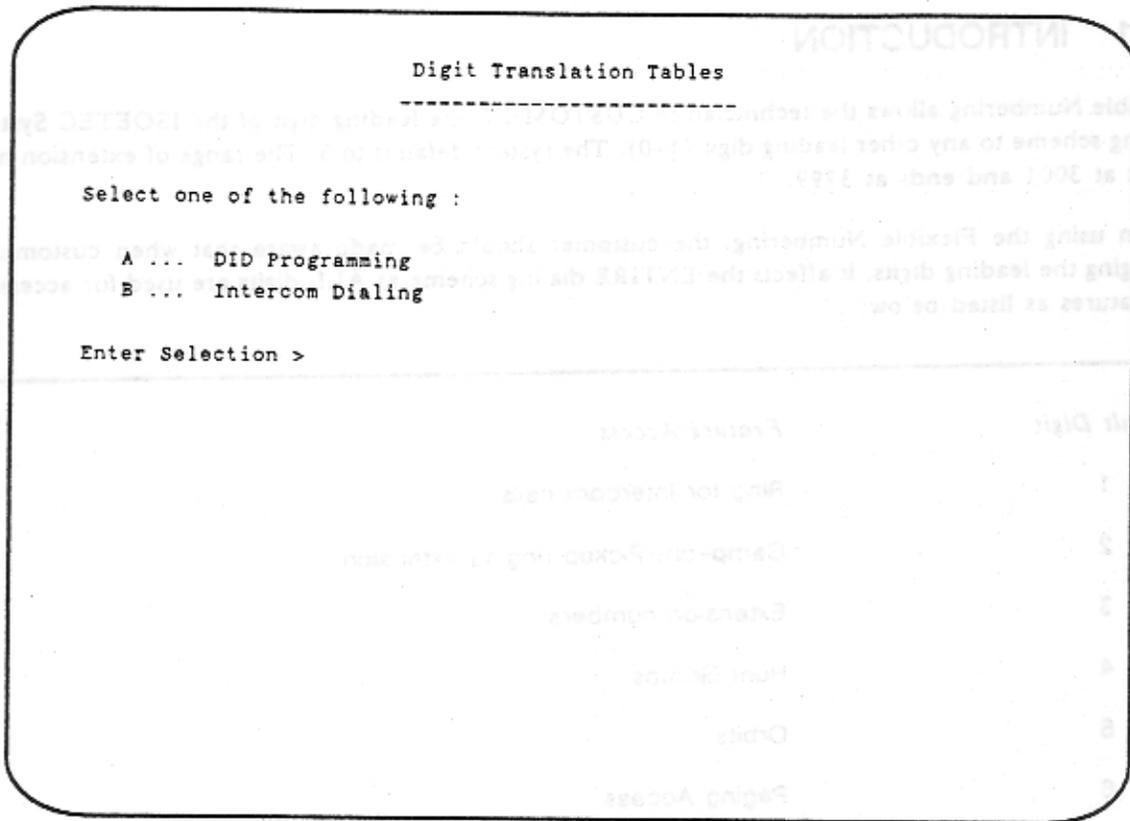


Figure 21-1 Digit Translation Table

2. From the *Digit Translation* menu, press the B key to enter the *Intercom Dialing* programming screen.

Selecting B, or Intercom Dialing, will ONLY give you the *Intercom Dialing Translation* table.

## 21.3 INTERCOM DIALING TRANSLATION

First Digit Dialed:	1	2	3	4	5	6	7	8	9	0
Translated:	1	2	3	4	5	6	7	8	9	0

The upper row of digits is the Default Set of Digits and cannot be changed. The lower row of digits is the Translation Set of Digits.

To change an access code digit, press the RETURN key until the cursor is on the desired digit you wish to change. Enter the new digit followed by pressing the RETURN key.

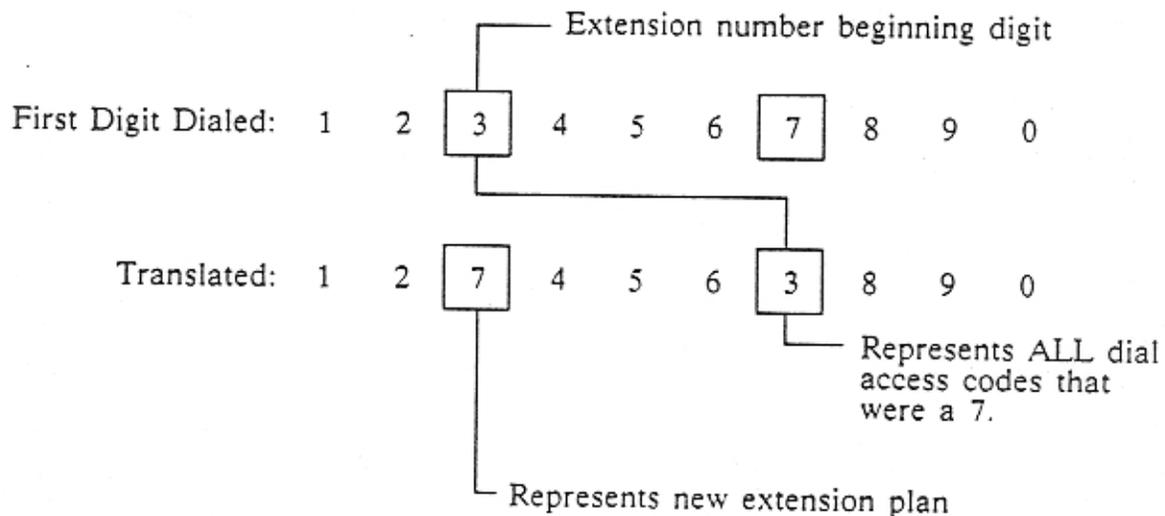
### Example:

First Digit Dialed:	1	2	3	4	5	6	7	8	9	0
Translated:	1	2	7	4	5	6	3	8	9	0

The above example represents the swapping of digits. Numbers 3 and 7 have been changed.

*NOTE: ALL STATIONS IN THE SYSTEM MUST BEGIN WITH THE SAME LEADING DIGIT.*

### INTERCOM DIALING TRANSLATION TABLE



The *Intercom Dialing Translation* programming screen is used to change the LEADING DIGIT of the extension numbering plan (or other leading digit) only. However, the range of extension numbers is the LEADING DIGIT + 001 through 999.

After the *Intercom Dialing Translation* programming screen has been programmed, the *System Configuration* programming screen (F screen) is used to define the actual extension numbers.

After programming the *Intercom Dialing Translation*, the system must be RESET before the number plan changes take effect.

## 21.4 RESETTING THE SYSTEM

To reset the system from the programming terminal, the following steps must be taken:

1. Press CONTROL and G to reset the system. The system asks for confirmation, "Type 'OK' and RETURN twice to EXECUTE."
2. Type O and K, and press the RETURN key twice. The system resets. Enter the appropriate password and continue programming.

**Example:**

First Digit Dialed	1	2	3	4	5	6	7	8	9	0
Translated	1	2	3	4	5	6	7	8	9	0

The above example represents the swapping of digits 3 and 7 have been changed.

**NOTE: ALL STATIONS IN THE SYSTEM WILL RECEIVE WITH THE SAME LEADING DIGIT**

**INTERCOM DIALING TRANSLATION TABLE**



The Intercom Dialing Translation programming screen is used to change the LEADING DIGIT of the extension numbering plan (or other leading digit) only. However, the range of extension numbers is the LEADING DIGIT + 001 through 999.

After the Intercom Dialing Translation programming screen has been programmed, the System Configuration non-programming screen (E screen) is used to dial a range of extension numbers.

After programming the Intercom Dialing Translation screen, you may be RESET before the number plan changes take effect.

**2.1.4. RESETTING THE SYSTEM**

To reset the system from the programming terminal, the following steps must be taken:

1. Press CONTROL and 0 to reset the system. The system will continue to Type 'OK' and RETURN until an EXECUTE.
2. Type 0 and E and press the RETURN key twice. The system resets. Enter the appropriate password and continue programming.

## Section 22

# Forwarding And VMS Plans

### 22.1 INTRODUCTION

The Call Forward feature and Call Forward to the INFOSTAR™/VX are programmed on the *Forwarding and VMS Plans* programming screen.

A phone can be forwarded to different destinations for Forward on Busy, Forward No Answer, and Forward All Calls.

Different destinations can be programmed based on whether the call being forwarded is an internal or outside line call.

An intercom call can now be forwarded to a hunt group as well as another extension or VMS.

An outside line call can be forwarded to a hunt group, a system speed dial number, an extension, or VMS.

A phone can have separate Call Forward Plans for when the system is in the DAY mode, and for when the system is in the NIGHT mode.

This screen is also used to program the information necessary to interface the INFOSTAR™/VX.

A station user can program the extension for Call Forward All Calls, and Call Forward All Calls to the INFOSTAR™/VX. The remainder of the Call Forward schemes are programmed on the *Forwarding and VMS Plans* programming screen.

### 22.2 CALL FORWARDING FROM A TELEPHONE

The following is a list of all the valid phone dial codes for forwarding from a telephone.

#### DIAL TO

---

- 7\*3 - Forward all intercom and CO calls to VMS (INFOSTAR/VX) in the DAY mode.
- 7\*5 - Forward all intercom and CO calls to VMS (INFOSTAR/VX) in the NIGHT mode.
- 7\*7 - Forward all intercom and CO calls to the extension that is indicated in the ALL columns of intercom and CO calls on the G screen in the DAY mode.
- 7\*8 - Forward all intercom and CO calls to the extension that is indicated in the ALL columns of intercom and CO calls on the G screen in the NIGHT mode.
- 7\*\* - Turn off Call Forward All Calls that is indicated in the ALL columns of intercom and CO calls on the G screen in the DAY mode. This includes Call Forward All Calls to INFOSTAR/VX.
- 7\*9 - Turn off Call Forward All Calls that is indicated in the ALL columns of intercom and CO calls on the G screen in the NIGHT mode. This includes Call Forward All Calls to INFOSTAR/VX.

The CALL FORWARD key can be used to activate Call Forward All Calls. In addition, the key can be used to change the destination extension.

FORWARD key + extension number	Enters the forwarding destination extension number in both the intercom and CO ALL columns of the G screen (Day), and forwards the phone.
FORWARD key + 5 + extension number	Enters the forwarding destination extension number in both the intercom and CO ALL columns of the G screen (Night), and forwards the phone.
FORWARD key	Pressing the FORWARD key activates forwarding of that extension to the destination that is indicated in the intercom and CO ALL columns of the G screen.

## 22.3 WHAT TO PROGRAM

The *Forwarding and VMS Plans* programming screen is used to program the Call Forward schemes for each extension in both the DAY and NIGHT modes, and to program information needed for INFOS-TAR/VX (VMS). The following information concerns only the Call Forwarding feature of this screen. Information regarding programming for INFOSTAR™/VX is presented in a separate section of this document.

For each extension, entries are made in the Intercom (ICM) and CO Calls columns of the programming screen. Both of these columns are further divided into separate entries for:

Call Forward on Busy	- Busy
Call Forward on No Answer	- No Ans
Call Forward All Calls	- All

Each entry in these columns consists of the *destination* for the forward, plus a Y (yes) or N (no) to activate the Call Forward for each condition. The entries made for the Call Forward on Busy and Call Forward on No Answer are fixed on the programming screen, i.e., the station user cannot change these entries from the telephone. However, the entries made in the Call Forward All columns can be changed from a telephone.

For each extension, determine the Call Forward destination of intercom calls for each of the three conditions (Busy, No Answer, and All Calls) in both the DAY and NIGHT modes. Possible destinations are: another extension number, INFOSTAR/VX, or a hunt group.

For each extension, determine the Call Forward destination of outside line (CO) calls for each of the three conditions (Busy, No Answer, and All Calls) in both the DAY and NIGHT modes. Possible destinations are: another extension number, INFOSTAR/VX, a hunt group, or a system speed dial number.

**NOTE:** An intercom call cannot be forwarded to a system speed dial number.

There are two timers which must be determined. The BUSY timer is used with the Call Forward on Busy feature to forward outside line (CO) calls. When an extension is busy, a CO call to that extension waits the BUSY timer multiplied by 10 seconds before forwarding to the indicated destination. During this time, the CO call is camped-on to the extension. The BUSY timer is NOT used when forwarding intercom calls. These calls are forwarded immediately.

The NO ANSWER (NoAns) timer is used with the Call Forward on No Answer feature to forward both intercom calls and outside line (CO) calls. After a call (intercom or CO) rings at an extension for the NO ANSWER timer multiplied by 10 seconds, it is forwarded to the indicated destination.

Only intercom calls that actually ring the extension are forwarded, i.e., if a phone is called with Voice Announce, the call does not forward.

The column labeled VMS and the box on the right side of the screen also labeled VMS are used with INFOSTAR/VX.

```

Forwarding and VMS Plans| Exxx=extn,V=VMS,Hxx=hunt,Axxx=ACD,*=spd   Pg 1 of 6
-----' G=D-N [S] Day   Mode [F]ill Mailboxes -----
 [T]  VMS |----- ICM Calls -----|----- CO Calls -----|Timers *10| V[M]S
Ext |Box# pf| Busy |No Ans| All | Busy |No Ans| All | Busy NoAns| Disconn code
3001|      |N    |N     |N   |N    |N   |N   | 00s 00s |
3002|      |N    |N     |N   |N    |N   |N   | 00s 00s | Auto Att N
3003|      |N    |N     |N   |N    |N   |N   | 00s 00s | Prefix
3004|      |N    |N     |N   |N    |N   |N   | 00s 00s | Atten Grp 36
3005|      |N    |N     |N   |N    |N   |N   | 00s 00s | VMS Grp 36
3006|      |N    |N     |N   |N    |N   |N   | 00s 00s | Trnsfr
3007|      |N    |N     |N   |N    |N   |N   | 00s 00s |
3008|      |N    |N     |N   |N    |N   |N   | 00s 00s |
3009|      |N    |N     |N   |N    |N   |N   | 00s 00s |
3010|      |N    |N     |N   |N    |N   |N   | 00s 00s |
3011|      |N    |N     |N   |N    |N   |N   | 00s 00s |
3012|      |N    |N     |N   |N    |N   |N   | 00s 00s |
3013|      |N    |N     |N   |N    |N   |N   | 00s 00s |
3014|      |N    |N     |N   |N    |N   |N   | 00s 00s |
3015|      |N    |N     |N   |N    |N   |N   | 00s 00s |
3016|      |N    |N     |N   |N    |N   |N   | 00s 00s |
3017|      |N    |N     |N   |N    |N   |N   | 00s 00s |
3018|      |N    |N     |N   |N    |N   |N   | 00s 00s |
  
```

Figure 22-1 Forwarding And VMS Plans Programming Screen

## 22.4 PROGRAMMING THE FORWARDING AND VMS PLANS SCREEN

The following is an explanation on how to program the *Forwarding and VMS Plans* (G screen).

From the main menu, press G. The *Forwarding and VMS Plan* appears.

Across the top of the G screen are CAPITAL letters indicating the valid entries for the destination columns of the G screen. This can be seen in the following figure.

The G screen has a total of 6 pages. These pages are accessed by entering the *Page* section on the right side of the screen.

This section of the screen can be accessed by pressing the SHIFT and "@" keys simultaneously. Once you are in this portion of the screen, you can enter the desired page number from 1 to 6, or press the I and D keys to increment and decrement through the pages.

The G screen also allows the user to have different forwarding parameters for DAY and NIGHT modes. To switch from the DAY to NIGHT screen, or the NIGHT to DAY screen, press the S key. The screen being programmed is indicated by the word Day or Night at the top center of the screen.

Forwarding and VMS Plans | Exxx=extn,V=VMS,Hxx=hunt,Axxx=ACD,\*=spd Pg 1 of 6  
 ----- G=D-N [S] Day Mode {F}ill Mailboxes -----

[T]	VMS	ICM Calls			CO Calls			Timers *10		V[M]S
Ext	Box# pf	Busy	No Ans	All	Busy	No Ans	All	Busy	NoAns	Disconn code
3001		[N]	[N]	[N]	[N]	[N]	[N]	[00s]	[00s]	
3002		[N]	[N]	[N]	[N]	[N]	[N]	[00s]	[00s]	Auto Att N
3003		[N]	[N]	[N]	[N]	[N]	[N]	[00s]	[00s]	Prefix
3004		[N]	[N]	[N]	[N]	[N]	[N]	[00s]	[00s]	Atten Grp 38
3005		[N]	[N]	[N]	[N]	[N]	[N]	[00s]	[00s]	VMS Grp 38
3006		[N]	[N]	[N]	[N]	[N]	[N]	[00s]	[00s]	Trnsfr
3007		[N]	[N]	[N]	[N]	[N]	[N]	[00s]	[00s]	
3008		[N]	[N]	[N]	[N]	[N]	[N]	[00s]	[00s]	
3009		[N]	[N]	[N]	[N]	[N]	[N]	[00s]	[00s]	
3010		[N]	[N]	[N]	[N]	[N]	[N]	[00s]	[00s]	
3011		[N]	[N]	[N]	[N]	[N]	[N]	[00s]	[00s]	
3012		[N]	[N]	[N]	[N]	[N]	[N]	[00s]	[00s]	
3013		[N]	[N]	[N]	[N]	[N]	[N]	[00s]	[00s]	
3014		[N]	[N]	[N]	[N]	[N]	[N]	[00s]	[00s]	
3015		[N]	[N]	[N]	[N]	[N]	[N]	[00s]	[00s]	
3016		[N]	[N]	[N]	[N]	[N]	[N]	[00s]	[00s]	
3017		[N]	[N]	[N]	[N]	[N]	[N]	[00s]	[00s]	
3018		[N]	[N]	[N]	[N]	[N]	[N]	[00s]	[00s]	

Figure 22-2 Forwarding and VMS Plans Programming Screen

The DAY forwarding scheme is referenced when the system is in the DAY mode, and the NIGHT forwarding scheme is referenced when the system is entered into the NIGHT mode.

*NOTE: To use the NIGHT forwarding sequence, the "Night Forward On" option in the System Options programming screen (M screen) must be set to Y (yes), otherwise calls will not be forwarded when the system is in the NIGHT mode.*

Once the desired page and mode (DAY or NIGHT) has been selected, the individual extension forwarding schemes may be programmed.

1. Press the T key. The cursor moves to the first extension in the VMS column. This column only needs to be programmed if INFOSTAR/VX is being used.
2. Using the UP and DOWN arrow keys, move the cursor to the desired extension.
3. Press the RETURN key, or use the LEFT and RIGHT arrow keys to move the cursor to the desired column.
4. If Call Forward for this condition is to be active, press the Y (yes) key. If all extensions are to have this value, press the C key to copy to all extensions.
5. Press the RETURN key.
6. Enter the destination for Call Forward under this condition. The destination is entered by pressing the appropriate LETTER followed by the destination. Choose the appropriate letter from the following list of valid destinations.

**Exxx** Extension Number - This entry indicates the extension number you wish to forward calls to. This entry can be used in the intercom calls and/or CO calls columns of the G screen.

To enter the extension number, press E plus the last three digits of the extension you wish to forward calls to (000 to 999). Press RETURN key to enter selection.

The appropriate leading digit of the extension you wish to forward to will be derived from the system translation table and displayed.

**V** VMS - This entry, when entered in the intercom calls and CO calls section of the G screen will direct the calls to INFOSTAR/VX. Press RETURN key to enter selection.

**Hxx** Hunt Group - This entry is used to forward intercom calls and CO calls to a hunt group.

To enter a hunt group, press H plus the two digit hunt group number (01 to 36). Press RETURN key to enter.

**\*** System Speed Dial number - Indicates the System Speed Dial Number you wish to forward CO calls to (001 to 200). This parameter will only work with CO calls. Enter \* plus the three digit system speed dial number you wish to divert your call to. Press the RETURN key.

Forwarding and VMS Plans   Exxx=extn,V=VMS,Hxx=hunt,Axxx=ACD,*=spd Pg 1 of 8										
----- C=D-N [S] Day Mode {F}ill Mailboxes -----										
[T]	VMS	ICM Calls			CO Calls			Timers *10		V{M}S
Ext	Box# pf	Busy	No Ans	All	Busy	No Ans	All	Busy	NoAns	Disconn code
3001		N	N	N	N	N	N	00s	00s	
3002		N	N	N	N	N	N	00s	00s	Auto Att N
3003		N	N	N	N	N	N	00s	00s	Prefix
3004		N	N	N	N	N	N	00s	00s	Atten Grp 36
3005		N	N	N	N	N	N	00s	00s	VMS Grp 36
3006		N	N	N	N	N	N	00s	00s	Trnsfr
3007		N	N	N	N	N	N	00s	00s	
3008		N	N	N	N	N	N	00s	00s	
3009		N	N	N	N	N	N	00s	00s	
3010		N	N	N	N	N	N	00s	00s	
3011		N	N	N	N	N	N	00s	00s	
3012		N	N	N	N	N	N	00s	00s	
3013		N	N	N	N	N	N	00s	00s	
3014		N	N	N	N	N	N	00s	00s	
3015		N	N	N	N	N	N	00s	00s	
3016		N	N	N	N	N	N	00s	00s	
3017		N	N	N	N	N	N	00s	00s	
3018		N	N	N	N	N	N	00s	00s	

Figure 22-3 Forwarding and VMS Plans Programming Screen

7. If all extensions are to have this destination, press the C key to copy to all extensions.
8. Using the RETURN key, move the cursor to the next column for that extension to be programmed.
9. When all desired destinations for the extension have been programmed, move the cursor to the TIMERS column.
10. Enter the BUSY timer, and press the RETURN key. If all extensions are to have this value, press the C key to copy to all extensions.
11. Press the RETURN key again.
11. Enter the NO ANSWER timer, and press the RETURN key. If all extensions are to have this value, press the C key to copy to all extensions.
12. Continue programming the remaining extensions.

## 22.5 DAY/NIGHT COPY FUNCTION

A DAY/NIGHT copy function has also been added. This copy function will copy the DAY forwarding entries for an extension to the NIGHT screen, or the NIGHT forwarding entries to the DAY screen.

To copy an extensions DAY forwarding entries to NIGHT or vice versa, press the letter G when the cursor is on one of the forwarding parameters for that extension.

## 22.6 INFOSTAR™/VX

The INFOSTAR™/VX is an optional feature of the System/108 which provides the user with an integrated voice message system. Stations can be forwarded such that VX takes messages when the station user is unable to answer the call.

The INFOSTAR™/VX system allows users located away from their own extension to call INFOSTAR/VX and check their messages. An INFOSTAR/VX user calling from an outside line can be transferred to the VX system, allowing them to follow INFOSTAR/VX's voice prompts to check their messages, or leave messages for other users. Outside callers can be transferred directly to a station user's INFOSTAR/VX mailbox, even if a station is not forwarded to VX.

Each person using INFOSTAR/VX is assigned their own message space called a "mailbox" which is protected by a user-defined password. Thus, the user is the only one who can review messages left in their mailbox.

All commands to INFOSTAR/VX are issued through the dial pad on the user's telephone. Upon entering INFOSTAR/VX, the mailbox system provides voice prompts which take the user, step-by-step, through INFOSTAR/VX features. Two important programmable feature keys used in INFOSTAR/VX are the VMS (Voice Message System) key and the CALL FORWARD key. These keys are available on the 17-key, 28-key, and the display telephones only.

The VMS key allows one button access to the user's mailbox. Pressing the VMS key on the user's telephone prompts the system to dial a series of codes which brings the user directly to the Password level of INFOSTAR/VX. On the ISOETEC System/108 6-key telephone, which provides no programmable feature keys, the user dials each of the codes to proceed, step-by-step, through the various INFOSTAR/VX levels in order to reach their mailbox.

The VMS key also acts as a message waiting indicator by lighting on the the user's telephone when new messages have been left in INFOSTAR/VX. The VMS key will remain lit until the user has listened to all new messages.

When the PROGRAM key on the 6-key telephone is lit, it serves as both a mail key and a message key. The lit PROGRAM key provides no Call Forwarding indication, but indicates to the user that a message has been either left in INFOSTAR/VX, or may have been left by another phone. Pressing the lit PROGRAM key brings the user directly to the Voice Message System without the user having to dial each of the VMS codes.

The CALL FORWARD key allows the user to see the Call Forward status on their telephone. The CALL FORWARD key will light on the user's telephone when their extension is forwarded to INFOSTAR/VX or to another extension.

Programming for INFOSTAR/VX is done on the *Forwarding and VMS Plans* programming screen. The Hunt group associated with INFOSTAR/VX may consist of 2, 4, or 8 station ports, depending on the particular application required. The ports can be used for voice messages or a combination of voice messages and Automated Attendant.

## 22.7 WHAT TO PROGRAM

Programming for INFOSTAR™/VX is done on the *Forwarding and VMS Plans* programming screen (the G screen). This screen is used for both INFOSTAR/VX programming and Call Forward programming.

The screen is divided into two areas. The box on the right side of the screen is used to program specifics about the INFOSTAR/VX system being used and the hunt group number of the extensions connected to INFOSTAR/VX. The remainder of the screen is used to program Call Forward information for each extension. The following paragraphs provide a brief description of the G Screen. After reading through each section, determine the entries that are to be made to the G Screen, and enter the information.

### 22.7.1 V[M]S

On the right hand side of the G screen under the V[M]S heading are six fields to be considered when programming the G screen. They are explained as follows:

#### Dis (Disconnect Code)

The System/108 automatically transmits this code to INFOSTAR/VX upon termination of a call to INFOSTAR/VX. This code is used to prevent INFOSTAR/VX ports from being tied up when a user, on an internal call to INFOSTAR/VX, hangs up without manually dialing the necessary disconnect code (### or \*\*\*, for example).

This field can be up to 8 digits long and will transmit any DTMF signal (i.e. 0 - 9, #, \*).

#### Auto Att (Automated Attendant)

The Automated Attendant field should be programmed Y (yes) if the system's INFOSTAR/VX ports are to be used as both INFOSTAR/VX ports AND Automated Attendant ports. The Automated Attendant, when programmed Y (yes), interacts with the "Prefix" (explained below) and "pf" fields. Depending on the specific Voice Message System being used, when the VMS key on the user's telephone is pressed, the system adds the necessary prefix and suffix digits to the MAILBOX numbers, providing the required dialing sequence for direct access to INFOSTAR/VX. See example below in Prefix section.

*NOTE: The Auto Att is only used for INFOSTAR/VX's Auto Attendant and is not considered if the built-in System/108 Auto Attendant is being used.*

#### Prefix

The Prefix is programmed only if the Automated Attendant field is programmed Y (yes). It is used only when a particular Voice Message System requires a prefix digit to enter their system. This field will transmit any DTMF signal (0-9, #, \*), and will be added as the prefix digit to the MAILBOX NUMBER when the VMS key on the telephone is pressed.

Example: Auto Att = Y, Prefix = 9, pf = 0

If a user presses the VMS key on their telephone, the following sequence occurs:

1. An INFOSTAR/VX port rings.
2. INFOSTAR/VX answers at the Automated Attendant level.
3. The system then dials the Prefix digit, in this case 9. This brings the user to the "Enter Mailbox Number" level in the INFOSTAR/VX system.
4. The system then dials the MAILBOX number.
5. The system dials the "pf" number next (in this case, 0), and the user arrives at the "Please Enter Your Password" level.

Thus, when the VMS key on the user's telephone is pressed, the total digit stream sent to the INFOSTAR/VX port is: 9 + MAILBOX NUMBER + 0.

### Atten Grp (Attendant Group)

This field references the extension Hunt group that has Automated Attendant ports connected to them. Enter the Hunt group number.

```

Forwarding and VMS Plans| Exxx=extn.V=VMS.Hxx=hunt.Axxx=ACD.*=spd Pg 1 of 6
----- G=D-N [S] Day Mode [F]ill Mailboxes -----
 [T] VMS |----- ICM Calls ----|----- CO Calls ----|Timers *10| V[M]S
Ext |Box# pf| Busy |No Ans| All | Busy |No Ans| All |Busy NoAns| Disconn code
3001| | |N |N |N |N |N |N | 00s 00s |
3002| | |N |N |N |N |N |N | 00s 00s | Auto Att N
3003| | |N |N |N |N |N |N | 00s 00s | Prefix
3004| | |N |N |N |N |N |N | 00s 00s | Atten Grp 36
3005| | |N |N |N |N |N |N | 00s 00s | VMS Grp 36
3006| | |N |N |N |N |N |N | 00s 00s | Trnsfr
3007| | |N |N |N |N |N |N | 00s 00s |
3008| | |N |N |N |N |N |N | 00s 00s |
3009| | |N |N |N |N |N |N | 00s 00s |
3010| | |N |N |N |N |N |N | 00s 00s |
3011| | |N |N |N |N |N |N | 00s 00s |
3012| | |N |N |N |N |N |N | 00s 00s |
3013| | |N |N |N |N |N |N | 00s 00s |
3014| | |N |N |N |N |N |N | 00s 00s |
3015| | |N |N |N |N |N |N | 00s 00s |
3016| | |N |N |N |N |N |N | 00s 00s |
3017| | |N |N |N |N |N |N | 00s 00s |
3018| | |N |N |N |N |N |N | 00s 00s |
    
```

Figure 22-4 Forwarding and VMS Plans Programming Screen

## VMS Grp (VMS Group)

This field references the extension Hunt group that has VMS ports connected to them. This is the Hunt group that will be referenced by the system when the VMS key is pressed, when a call is transferred to INFOSTAR/VX, or when a call is forwarded to INFOSTAR/VX. Enter the Hunt group number, usually 36.

*Note: In most applications of INFOSTAR/VX, the Atten Grp and the VMS Grp should be the same Hunt group.*

## Trnsfr

Some Voice Message Systems allow the use of forwarding codes which are used to direct forwarded calls to a user's personal greeting more directly. This programmed code is forwarded to the Voice Message System if a call is being forwarded to INFOSTAR/VX under any of the following conditions: 1) Busy, 2) Ring No Answer, 3) All calls, or 4) Busy and Ring No Answer.

*NOTE: If Auto Att is programmed for Y (yes), this code will never be transmitted. See Tables 1 and 2 for a list of codes sent by the system during INFOSTAR/VX operations.*

Forwarding and VMS Plans   Exxx=extn,V=VMS,Hxx=hunt,Axxx=ACD,*wspd Pg 1 of 6										
----- G=D-N (S) Day Mode [F]ill Mailboxes -----										
(T)	VMS	ICM Calls			CO Calls			Timers *10		V(M)S
Ext	Box# pf	Busy	No Ans	All	Busy	No Ans	All	Busy	NoAns	Disconn code
3001		N	N	N	N	N	N	00s	00s	
3002		N	N	N	N	N	N	00s	00s	Auto Att N
3003		N	N	N	N	N	N	00s	00s	Prefix
3004		N	N	N	N	N	N	00s	00s	Atten Grp 36
3005		N	N	N	N	N	N	00s	00s	VMS Grp 36
3006		N	N	N	N	N	N	00s	00s	Trnsfr
3007		N	N	N	N	N	N	00s	00s	
3008		N	N	N	N	N	N	00s	00s	
3009		N	N	N	N	N	N	00s	00s	
3010		N	N	N	N	N	N	00s	00s	
3011		N	N	N	N	N	N	00s	00s	
3012		N	N	N	N	N	N	00s	00s	
3013		N	N	N	N	N	N	00s	00s	
3014		N	N	N	N	N	N	00s	00s	
3015		N	N	N	N	N	N	00s	00s	
3016		N	N	N	N	N	N	00s	00s	
3017		N	N	N	N	N	N	00s	00s	
3018		N	N	N	N	N	N	00s	00s	

Figure 22-5 Forwarding and VMS Plans Programming Screen

## 22.7.2 [T] VMS

This section of the G screen is used to enter parameters that are used to call forward an extension under a number of circumstances. The VMS section includes the following fields:

**Box#**

This field associates the "Mailbox" numbers with the listed extension numbers (0000 through 9999). For simplicity in an installation, it is recommended that these "mailbox" numbers be programmed to be the same as their associated extension numbers. If a particular application of VMS does not make this possible, then "mailbox" numbers other than the extension number may be programmed. If other numbers are used, however, a predictable number pattern should be maintained.

This "mailbox" number is part of the digit stream that will be sent to the INFOSTAR/VX port when the VMS key on the user's telephone is pressed, or if a call is transferred or forwarded to INFOSTAR/VX.

*NOTE: The same "Mailbox" number will be used in both the Day and Night Programming screens.*

**pf (Prefix/Suffix)**

This field is used as a prefix whenever an Automated Attendant is NOT being used as part of INFOSTAR/VX. An entry in this field is necessary only if the particular INFOSTAR/VX system being installed requires a prefix or suffix to allow access to the INFOSTAR/VX system. The pf digit is a code used by the system to identify a caller calling into INFOSTAR/VX as a valid mailbox user. A typical application using pf would be to enter a prefix that would allow the user to enter INFOSTAR/VX at their password level. The entry can be up to two digits and transmits any DTMF signal (0-9, #, and \*).

*NOTE: As with the MAILBOX number, the pf parameter will be identical for both the DAY and NIGHT Programming modes.*

If the Automated Attendant (Auto Att) field located under the V[M]S section of the G screen is programmed N (no), then whatever digit(s) programmed in the pf field will be the prefix digit(s) transmitted to the INFOSTAR/VX port when the VMS key on the telephone is pressed. This field transmits any DTMF signal (0-9, #, \*).

Example: For Auto Attendant = N (No)

pf = prefix = #

If a user presses the VMS key on their telephone, the following sequence occurs:

1. An INFOSTAR/VX port rings.
2. INFOSTAR/VX answers at the "ENTER MAILBOX NUMBER" level.
3. The system then dials the "pf" digit (in this case, #)
4. Finally, the system dials the MAILBOX number.

Thus, when the VMS key on the telephone is pressed, the total digit stream sent to the INFOSTAR/VX port is: # + MAILBOX NUMBER.

If the Auto Att field on the Forwarding and VMS Plans Programming screen is programmed Y (yes), then pf becomes the suffix digit which is transmitted to the INFOSTAR/VX port when the VMS key on the telephone is pressed. (See definition of Auto Att field). It allows the user to skip over the Automated Attendant and go directly into INFOSTAR/VX. This suffix is used whenever an Automated Attendant is being used as part of INFOSTAR/VX.

Table 22-1

### INFOSTAR/VX DIALING SEQUENCES

ACTION	Dialing Sequence for AUTO ATT = N	Dialing Sequence for AUTO ATT = Y
Press the VMS key.	Pr + Mailbox number	Prfx + Mailbox number +pr
Operator transfer to VX.	Forward code + mailbox number	Prfx + Mailbox number
Extension transfer to VX.	Forward code + mailbox number	Prfx + Mailbox number
Extension forward to VX.	Forward code + mailbox number	Prfx + Mailbox number
Internal extension disconnect.	Disconnect code	Disconnect code

Table 22-2

### INFOSTAR/VX DIALING PARAMETERS

ACTION	DIALING PARAMETERS
Light the Message Waiting Indicator.	76 + Mailbox number
Extinguish the Message Waiting Indicator.	77 + Mailbox number
Transfer an extension.	Flash + # + Extension number
Reconnect to a transfer.	Flash + *
Outgoing call code.	9 + * + Outgoing telephone number

## 22.8 ACCESSING THE PROGRAMMING SCREEN

The *Forwarding and VMS Plans* programming screen (the G screen) is accessed by pressing the G key from the main menu. The ESCAPE key may be pressed while in any other programming screen to reach the main menu. If there is any problem reaching the main menu, or the G Screen, refer to the section titled "ACCESSING THE PROGRAMMING SCREENS" in Section 5 - *Programming Introduction*.

## 22.9 DEFAULT VALUES

Box#	blank
pf	blank
Disconn	blank
Auto Att	N
Prefix	blank
Atten Grp	36
VMS Grp	36
Busy	N
No Answer	N
All	N
Busy time	00
No Answer time	00
Trnsfr	blank

```

Forwarding and VMS Plans | Exxx=extn,V=VMS,Hxx=hunt,Axxx=ACD,*=spd   Pg 1 of 6
----- G=D-N [S] Day   Mode [F]ill Mailboxes -----
 [T]  VMS |----- ICM Calls -----|----- CO Calls -----|Timers *10|  V[M]S
Ext |Box# pf| Busy |No Ans| All  | Busy |No Ans| All  | Busy NoAns| Disconn code
3001|      |N    |N     |N    |N    |N    |N    | 00s 00s |
3002|      |N    |N     |N    |N    |N    |N    | 00s 00s | Auto Att N
3003|      |N    |N     |N    |N    |N    |N    | 00s 00s | Prefix
3004|      |N    |N     |N    |N    |N    |N    | 00s 00s | Atten Grp 36
3005|      |N    |N     |N    |N    |N    |N    | 00s 00s | VMS Grp 36
3006|      |N    |N     |N    |N    |N    |N    | 00s 00s | Trnsfr
3007|      |N    |N     |N    |N    |N    |N    | 00s 00s |
3008|      |N    |N     |N    |N    |N    |N    | 00s 00s |
3009|      |N    |N     |N    |N    |N    |N    | 00s 00s |
3010|      |N    |N     |N    |N    |N    |N    | 00s 00s |
3011|      |N    |N     |N    |N    |N    |N    | 00s 00s |
3012|      |N    |N     |N    |N    |N    |N    | 00s 00s |
3013|      |N    |N     |N    |N    |N    |N    | 00s 00s |
3014|      |N    |N     |N    |N    |N    |N    | 00s 00s |
3015|      |N    |N     |N    |N    |N    |N    | 00s 00s |
3016|      |N    |N     |N    |N    |N    |N    | 00s 00s |
3017|      |N    |N     |N    |N    |N    |N    | 00s 00s |
3018|      |N    |N     |N    |N    |N    |N    | 00s 00s |

```

Figure 22-6 Forwarding and VMS Plans Programming Screen

## 22.10 HOW TO PROGRAM INFOSTAR/VX

### Programming the DAY mode

If not already on the *Forwarding and VMS Plans* Programming screen, from the main menu, press the G key. The *Forwarding and VMS Plans* Programming consists of 6 pages.

The cursor will be in the upper right corner of the programming screen, on page 01 of the G screen.

1. Enter the page number (1 through 6) to be programmed. The I and D keys can be used to increment and decrement the page number.
2. Press the RETURN key.
3. Press the RETURN key again. The cursor moves to the Box# column. The T key may also be pressed to move the cursor to the Box# column.
4. Enter the "Mailbox" number of the extension to be programmed (0000 to 9999), and press the RETURN key. The F key may be pressed at this point in programming the Box# column to increment through a sequence of mailbox numbers for all 108 extensions.

*Example: If 001 is entered in the mailbox section of the G screen and the F key is pressed, extensions 2 through 108 will be assigned mailbox numbers 002 through 108, respectively.*

5. If "Mailbox" numbers are entered individually, press the RETURN key after each "Mailbox" number is entered.
6. Press the TAB key. The cursor moves to the pf column.
7. Enter the pf (prefix/suffix) digit as the particular application requires.
8. Press the RETURN key.
9. Press the RETURN key.
10. Press the M key. The cursor moves to the Disconn (Disconnect code) parameter of the V[M]S column.
11. Enter the Disconnect code, and press the RETURN key.
12. Press the RETURN key again, and the cursor moves to the Auto Att parameter. (The ARROW keys may also be used to move around the G screen.)
13. Enter Y (yes) if all of the INFOSTAR/VX ports are to be used as both Automated Attendant and VMS ports. Otherwise, this parameter should be programmed N (no).
14. Press the RETURN key, and the cursor moves to the Prefix parameter.
15. Enter the Prefix digit, if applicable, and press the RETURN key.
16. Press the RETURN key again, and the cursor moves to the Atten Grp parameter.

17. Enter the Atten Grp number, and press the RETURN key.
18. Press the RETURN key again, and the cursor moves to the VMS Grp parameter.
19. Enter the VMS Grp number, recalling that, in most applications of INFOSTAR/VX, the VMS Grp number and the Atten Grp number should be the same.
20. Press the RETURN key.
21. Continue programming the remaining extension's following the same programming procedure for all extensions.

*NOTE: The COPY function may be used for the ICM Calls, and CO Calls sections of the G screen to program a parameter identically for all extensions. Press the C key after an entry has been made, and that entry will be copied down the column for all remaining extensions.*

Forwarding and VMS Plans   Exxx=extn,V=VMS,Hxx=hunt,Axxx=ACD,*=spd Pg 1 of 6											
----- G=D-N [S] Day Mode [F]ill Mailboxes -----											
(T)	VMS	ICM Calls			CO Calls			Timers *10		V[M]S	
Ext	Box# pf	Busy	No Ans	All	Busy	No Ans	All	Busy	NoAns	Disconn code	
3001		N	N	N	N	N	N	00s	00s		
3002		N	N	N	N	N	N	00s	00s	Auto Att N	
3003		N	N	N	N	N	N	00s	00s	Prefix	
3004		N	N	N	N	N	N	00s	00s	Atten Grp 36	
3005		N	N	N	N	N	N	00s	00s	VMS Grp 36	
3006		N	N	N	N	N	N	00s	00s	Trnsfr	
3007		N	N	N	N	N	N	00s	00s		
3008		N	N	N	N	N	N	00s	00s		
3009		N	N	N	N	N	N	00s	00s		
3010		N	N	N	N	N	N	00s	00s		
3011		N	N	N	N	N	N	00s	00s		
3012		N	N	N	N	N	N	00s	00s		
3013		N	N	N	N	N	N	00s	00s		
3014		N	N	N	N	N	N	00s	00s		
3015		N	N	N	N	N	N	00s	00s		
3016		N	N	N	N	N	N	00s	00s		
3017		N	N	N	N	N	N	00s	00s		
3018		N	N	N	N	N	N	00s	00s		

Figure 22-7 Forwarding and VMS Plans Programming Screen



## Section 23

# Automated Attendant

### 23.1 DESCRIPTION

The System/108 Automated Attendant feature (p/n 111077) incorporates six internal, software-driven Automated Attendants which can be programmed to inform callers where to go and what to dial to arrive at the desired destination. The information provided by the Automated Attendants is delivered to the caller via pre-recorded greetings which may offer extension numbers, Hunt group numbers, Voice Mail, or information on how to reach the Operator for further assistance. Each attendant position requires a Digital Voice Announcer to provide the attendant greeting. This is the greeting that the calling party will hear when the attendant answers an incoming call. These pre-recorded greetings may be programmed to deliver different information to the caller, depending on whether the system is in the DAY mode or the NIGHT mode. The attendants will each answer pre-defined CO Hunt Groups, numbered 37 through 42.

Extensions and groups may be programmed to be excluded from access by incoming callers. The System also offers a Night feature which allows the attendants to disconnect incoming calls after the Greeting is delivered, or divert incoming calls to another number.

Four different dial access schemes are supported by the Automated Attendant feature. Depending on which of the four dialing schemes is selected, the caller dials either one, two, or three digits to access groups or sub-attendants.

### 23.2 REQUIREMENTS

#### 23.2.1 Hardware Requirements

The following is a list of hardware requirements for installation of the System/108 Automated Attendant feature:

- (1) DTMF/Station Port Card (p/n 15650)  
(6 DTMF Receivers/6 Station Ports)  
One Card will answer six incoming lines, simultaneously.
- (1) AEC Model 212+ Digital Voice Announcer (p/n 440125)  
One Voice Announcer will deliver up to two Attendant Greetings, simultaneously.
- (1) OPX Interface (p/n 15780)  
One Interface for each Digital Voice Announcer Message.
- (1) Tri Output Power Supply (p/n 550005)  
One Power Supply will power 10 OPX Interfaces.

The hardware necessary to implement the Automated Attendant feature is dependent upon the amount of calls the attendant will be responsible for answering. One DTMF/Station Port Card is required for each of the six lines that will be answered simultaneously. One Digital Voice Announcer is required for every two attendant greetings (AEC Model 212+).

### 23.2.2 Software Requirements

This feature is added to the System software by an authorized ISOETEC Service Center using the remote programming feature. Before installing the Automated Attendant feature in the System/108, an authorized Customer Service Representative from ISOETEC must be contacted in advance so that arrangements can be made for remote programming.

## 23.3 AUTOMATED ATTENDANT PROGRAMMING

### 23.3.1 Introduction

The Automated Attendant is programmed on the *Automated Attendant* programming screen. The following paragraphs provide a brief description of each parameter on the *Automated Attendant* programming screen. After reading through each section, determine the entries that are to be made to the screen, and enter the information on the *Automated Attendant* programming Screen.

*NOTE: The ACD feature is not available with the System/108 when using the System/108 CPU (p/n 19300).*

### 23.3.2 Attn

These columns define the parameters for each of the six Automated Attendants. Each Attn answers a particular Trunk Hunt Group, numbered 37 through 42:

- Attn 1 will answer any CO Line in Hunt Group 37.
- Attn 2 will answer any CO Line in Hunt Group 38.
- Attn 3 will answer any CO Line in Hunt Group 39.
- Attn 4 will answer any CO Line in Hunt Group 40.
- Attn 5 will answer any CO Line in Hunt Group 41.
- Attn 6 will answer any CO Line in Hunt Group 42.

### 23.3.3 Ext

This field allows the programmer to exclude certain extension numbers from being accessed through the Automated Attendant feature. Enter the extension number you wish to exclude, or scroll through the numbers by pressing the I or D key. Enter N (No) in this column if this extension is not to be reached via that Automated Attendant.

### 23.3.4 Hunt

This field allows the programmer to exclude certain Hunt Group numbers from being accessed through the Automated Attendant feature. Enter the Hunt Group number you wish to exclude, or scroll through the numbers by pressing the I or D key. Enter N (No) in this column if this Hunt Group is not to be reached via that Automated Attendant.

AUTOMATED ATTENDANT							
Function		Attn 1	Attn 2	Attn 3	Attn 4	Attn 5	Attn 6
[E]xt	3001	Y	Y	Y	Y	Y	Y
ACD	01	Y	Y	Y	Y	Y	Y
Hunt	01	Y	Y	Y	Y	Y	Y
VMS		Y	Y	Y	Y	Y	Y
Main Menu		0	0	0	0	0	0
-----							
[A] Day Selections							
-----							
Greeting Rec		00	00	00	00	00	00
-----							
[B] Night Selections							
-----							
Greeting Rec		00	00	00	00	00	00
Divert		N	N	N	N	N	N
Release		N	N	N	N	N	N
-----							
[F] Attendant 1 Scheme 01 - [Ext->E001-E108 , Hunt->H01-H36 , ACD-> A01-A15]							

Figure 23-1 Automated Attendant Programming Screen

### 23.3.5 VMS

This field allows the programmer to exclude access to VMS through the Automated Attendant feature. This will prevent a caller from dialing 2, or direct dialing the VMS Hunt group. Enter N (No) in this column if VMS is not to be reached via that Automated Attendant.

### 23.3.6 Main Menu

This is not used at this time.

### 23.3.7 Day Selections

This defines the Recorder number containing the greeting that the caller will hear when this Automated Attendant answers the incoming line while the system is in DAY mode.

### 23.3.8 Greeting Rec

Enter the Recorder Number that contains the appropriate greeting for that incoming line Hunt group while the system is in DAY mode.

### 23.3.9 Night Selections

This defines the Recorder number containing the greeting that the caller will hear when this Automated Attendant answers the incoming line while the system is in NIGHT mode.

### 23.3.10 Greeting Rec

Enter the Recorder Number that contains the appropriate greeting for that incoming line Hunt group while the system is in NIGHT mode.

### 23.3.11 Divert

Enter Y (Yes) in this column if an incoming call received by this Attn should be diverted by the system to another telephone number. The caller will hear ringing but no greeting. The caller will then be transferred directly to the extension to which the Attendant is programmed. The diversion parameters are setup on the "N" screen, *Trunk Group Programming*.

### 23.3.12 Release

Enter Y (Yes) in this column if an incoming call received by this Attn should be released from the line after the night greeting has been delivered and the recorder goes on hook.

### 23.3.13 Attendant Scheme

This sets up the various Dial Access Schemes for each Auto Attendant. Type in the Attendant number and, using the RIGHT and LEFT arrow keys, scroll through the various dial access schemes.

Figure 23-1 Automated Attendant Programming Screen

## 23.4 DIAL ACCESS SCHEMES

### 23.4.1 Scheme 01

--- Ext 3001-3108 , Hunt->401-436, ACD->801-815

When a caller is answered by an Auto Attendant using scheme 01, the caller may dial:

4 digit Extension numbers - 3001 to 3108

3 digit Hunt group numbers - 401 to 436

Dialing the digit 2 brings the caller to VMS.

*NOTE: The ACD feature is not available with the System/108.*

### 23.4.2 Scheme 02

--- Ext 3001-3108 , Hunt->41-76, ACD->81-95

When a caller is answered by an Auto Attendant using scheme 02, the caller may dial:

4 digit Extension numbers - 3001 to 3108

2 digit Hunt group numbers - 41 to 76

Dialing the digit 2 brings the caller to VMS.

*NOTE: The ACD feature is not available with the System/108.*

### 23.4.3 Scheme 03

--- ACD->1 through 0 , Hunt 1 through 9

When a caller is answered by an Auto Attendant using scheme 03, the caller may dial:

1 digit Hunt group numbers

*NOTE: The ACD feature is not available with the System/108.*

The Hunt groups are shown as 1 through 9, which allows the caller single digit access to the first nine hunt groups.

### 23.4.4 Scheme 04

--- ATTENDANTS-> 1 through 6

When a caller is answered by an Auto Attendant using scheme 04, the caller must dial one digit, which brings the caller to another Auto Attendant greeting. This Attendant can then have its own greetings and dial access scheme. This scheme is useful when setting up sub-directories and sub-menus.

## 23.5 CALL PROCESS - DAY MODE

1. A call rings on a line which has been programmed to be in one of the Auto Attendant Hunt groups.
2. The system rings the recorder which has been dedicated to that Attendant.
3. The recorder answers, and starts to deliver its greeting.

NOTE: At any time during the greeting, the caller can dial extensions or group numbers.

4. The system waits 15 seconds after the recorder goes on hook, before presuming that the caller has a rotary telephone or needs assistance. In this case, the system then checks the ring assignment for the line the call rang in on, and rings all the telephones which are programmed to ring on that line in DAY mode.
5. If the caller has dialed a valid extension or group number, the caller will be transferred to that extension or group.
  - a. If the EXTENSION is busy or there is no answer, the calling party will hear ringback. If the destination party is busy, they will hear a camp on tone. The call will then follow the Transfer Recall Timer + 30 seconds, and then recall to the Operator.
  - b. If the HUNT GROUP is busy or ring no answer, the calling party will hear music on hold. The call will then circulate through the group for 2 minutes and then recall to the operator.
6. If the caller dials an INVALID NUMBER or dials ZERO, the system will ring all of the telephones that have been programmed to ring on that line.

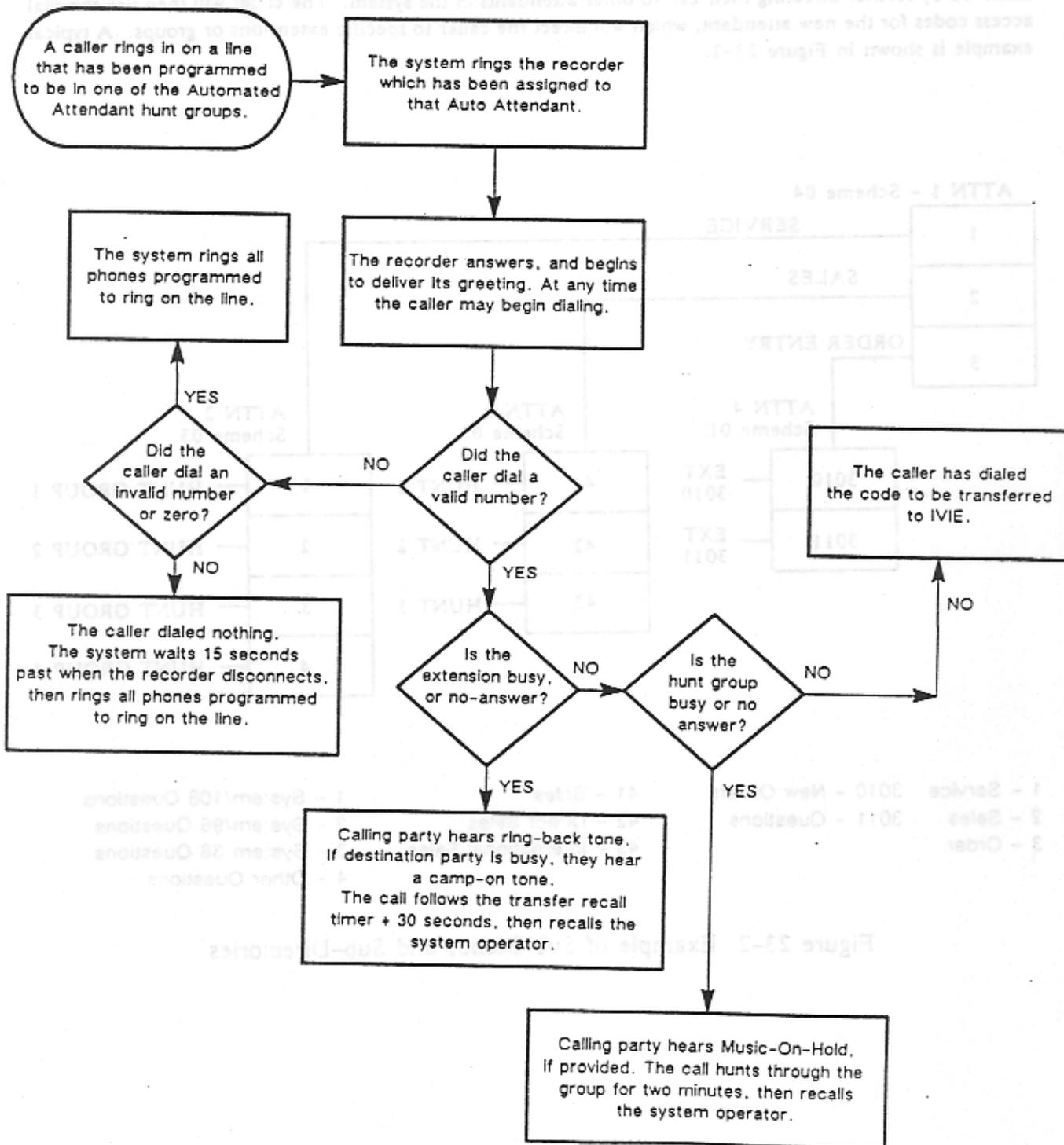
## 23.6 CALL PROCESS - NIGHT MODE

Normal night call process is the same as for DAY mode with the exception that the callers will be greeted with the recording specified as the Night Recorder, and recalls will follow the ring assignments set up for NIGHT mode.

In the NIGHT mode, the Automated Attendant may be programmed to either divert or release incoming calls:

- Diversion -** If the Automated Attendant has been programmed to divert incoming calls, they will not go to the Night Greeting. The caller will immediately be diverted off premises following the *Trunk Group Programming* set up in the "N" screen.
- Release -** If the Automated Attendant has been programmed to release calls, the calling party will be greeted with the recording specified as the NIGHT Recorder. When the recorder goes on hook, the line will be released. The calling party cannot dial extension or group numbers.

**AUTOMATED ATTENDANT  
CALL PROCESS - DAY MODE**



## 23.7 SETTING UP SUB-MENUS/DIRECTORIES

The Automated Attendant feature may be used to set up sub-menus which direct callers to specific groups or extensions. This is accomplished by using Dial Access Scheme 04.

For example, callers can be greeted with a recording that allows them to reach Sales, Service or Order Administration by dialing just one digit. After dialing the department they wish to contact, the caller may be instructed to dial another selection for specific information within the desired department. This is achieved by further directing their call to other attendants in the system. The caller will then use the dial access codes for the new attendant, which will direct the caller to specific extensions or groups. A typical example is shown in Figure 23-2.

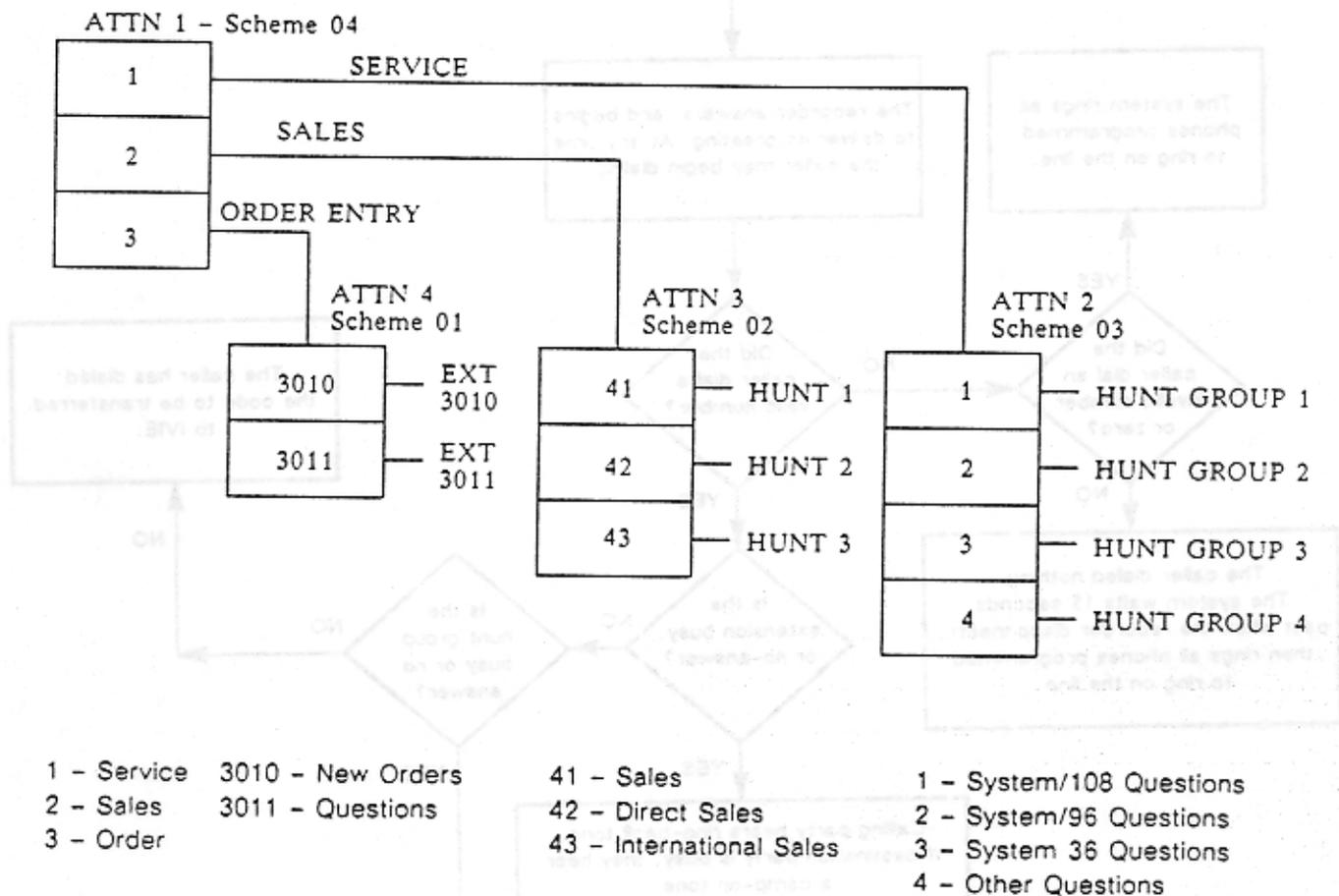


Figure 23-2 Example of Sub-Menus and Sub-Directories

## 23.8 SUGGESTED AUTOMATED ATTENDANT GREETINGS

The following are suggestions for Greeting recordings for the Automated Attendants. The type of dial access scheme selected will determine what kind of information the caller will need in order to reach a desired extension or group number. The following examples may be referred to when recording a Greeting on the Digital Voice Announcer to ensure that the caller will be given sufficient information on how to reach their destination.

### 23.8.1 Using Dial Access Scheme 01:

Thank you for calling the "XYZ Company". If you know the Extension number of the person you would like to reach, please dial it now. Dial 401 for Sales, 402 for Marketing. To reach the main operator, dial 0. To reach VMS, dial 2. If you have a rotary telephone, please stay on the line for further assistance.

### 23.8.2 Using Dial Access Scheme 02:

Thank you for calling the "XYZ Company". If you know the Extension number of the person you would like to reach, please dial it now. Dial 41 for Sales, 42 for Marketing. To reach the main operator, dial 0. To reach VMS, dial 2. If you have a rotary telephone, please stay on the line for further assistance.

### 23.8.3 Using Dial Access Scheme 03:

Thank you for calling the "XYZ Company". Please dial 1 for Sales, 2 for Marketing, 3 for Service, 4 for Order Entry. To reach the main operator, dial 0. To reach VMS, dial 2. If you have a rotary telephone, please stay on the line for further assistance.

### 23.8.4 Using Dial Access Scheme 04:

Any combination of the above three greetings can be used to set up a greeting for Scheme 04.

## 23.9 ACCESSING THE AUTOMATED ATTENDANT PROGRAMMING SCREEN

The *Auto Attendant* programming screen (the Z screen) is accessed by pressing Z on the keyboard from the main menu. The ESCAPE key may be pressed while in any other programming screen to reach the main menu. If there is any problem reaching the main menu, or the Z screen, refer to the section titled *ACCESSING THE PROGRAMMING SCREENS* in Section 5 - *Programming Introduction*.

## 23.10 DEFAULT VALUES

Ext (Attn 1 through Attn 6)	Y
ACD (Attn 1 through Attn 6)	Y
Hunt (Attn 1 through Attn 6)	Y
VMS	Y
Main menu	0
Greeting Rec (Day Selection)	0
Greeting Rec (Night Selection)	0
Divert	N
Release	N

## 23.11 HOW TO PROGRAM THE AUTOMATED ATTENDANT

If not already in the *Auto Attendant* programming screen, from the main menu, press the Z key. The *Auto Attendant* programming screen consists of one page, and is divided into seven programming sections. The programming procedure is as follows:

### To Include Or Exclude Extensions -

1. When the *Auto Attendant* programming screen is entered, the cursor is at the extension number position. The I and D keys can be used to increment and decrement the extension number.
2. Enter the extension number to be programmed.
3. Press the RETURN key.
4. Press the TAB key. The cursor will move to the Attn 1 column in the extension number row.
5. Enter Y (Yes) if the programmed extension is to be accessed through Auto Attendant 1. An N (No) is entered if the extension is not to be accessed through Auto Attendant 1.

*NOTE: The ACD feature is not available with the System/108.*

### To Include Or Exclude Hunt Groups -

8. Press the RETURN key. The cursor will move down the Attn 1 column to the Hunt group number row. Use the I and D keys on the keyboard to increment or decrement Hunt group numbers, or type in the desired Hunt Group number directly.
9. Enter Y (Yes) in the Attn 1 column if the programmed Hunt group is to be accessed through Auto Attendant 1. An N (No) is entered if the Hunt group is not to be accessed by the Auto Attendant.

*NOTE: If no Hunt groups exist, an N (No) must be entered in the Attn columns for these parameters. Otherwise, the system will still attempt to transfer callers to these non-existent groups.*

## To Allow Or Restrict Access To VMS -

10. Press the RETURN key. The cursor will move down the *Attn 1* column to the VMS row.
11. Enter Y (Yes) if VMS is to be accessed through Auto Attendant 1. An N (No) is entered if VMS is not to be accessed through Auto Attendant 1.
12. Press the RETURN key.

## To Select The Greeting Recorder Number -

13. Press the A key on the keyboard. The cursor moves to the *Greeting Rec* position for Attn 1 in Day Selections.
14. Enter the Recorder number which contains the appropriate greeting for the programmed incoming Hunt group, while the system is in DAY mode.
15. Press the RETURN key.

## To Select Night Options -

16. Press the B key on the keyboard. The cursor moves to the *Greeting Rec* position for Attn 1 in Night Selections.
17. Enter the Greeting Rec number which contains the appropriate greeting for the programmed incoming line Hunt group, while the system is in NIGHT mode.
18. Press the RETURN key.
19. Press the RETURN key a second time. The cursor moves to the *Divert* position.
20. Enter a Y (Yes) if an incoming call received by this Attn should be diverted by the system to another telephone number.
21. Press the RETURN key. The cursor moves to the *Release* position.
22. Enter a Y (Yes) if an incoming call received by this Attn should be released from the line after the night recording is delivered and the recorder goes on hook.

## To Select Dial Access Schemes -

23. Press the F key. The cursor moves to the *Attendant-Scheme* position. The I and D keys may be used to increment or decrement Attendants 1 through 6.
24. Using the RIGHT and LEFT arrow keys, select the desired Dial Access Scheme for the programmed Attn.
25. Press the RETURN key. Continue to program the remaining Attendants (2 through 6) for this extension in the same manner, until all the extensions are programmed.

## 23.12 MAINTENANCE AND TROUBLESHOOTING

The following section provides descriptions of various problems which may arise during operation of the Automated Attendant feature, and guides the technician systematically through locating the source of the problem. The technician can trace and diagnose a problem, and simply change the status of an extension or group number, or exchange a faulty item with a replacement.

Troubleshooting flow charts outline a specific procedure to follow, and offer the technician a simple step-by-step approach to diagnosing and resolving a problem with the System.

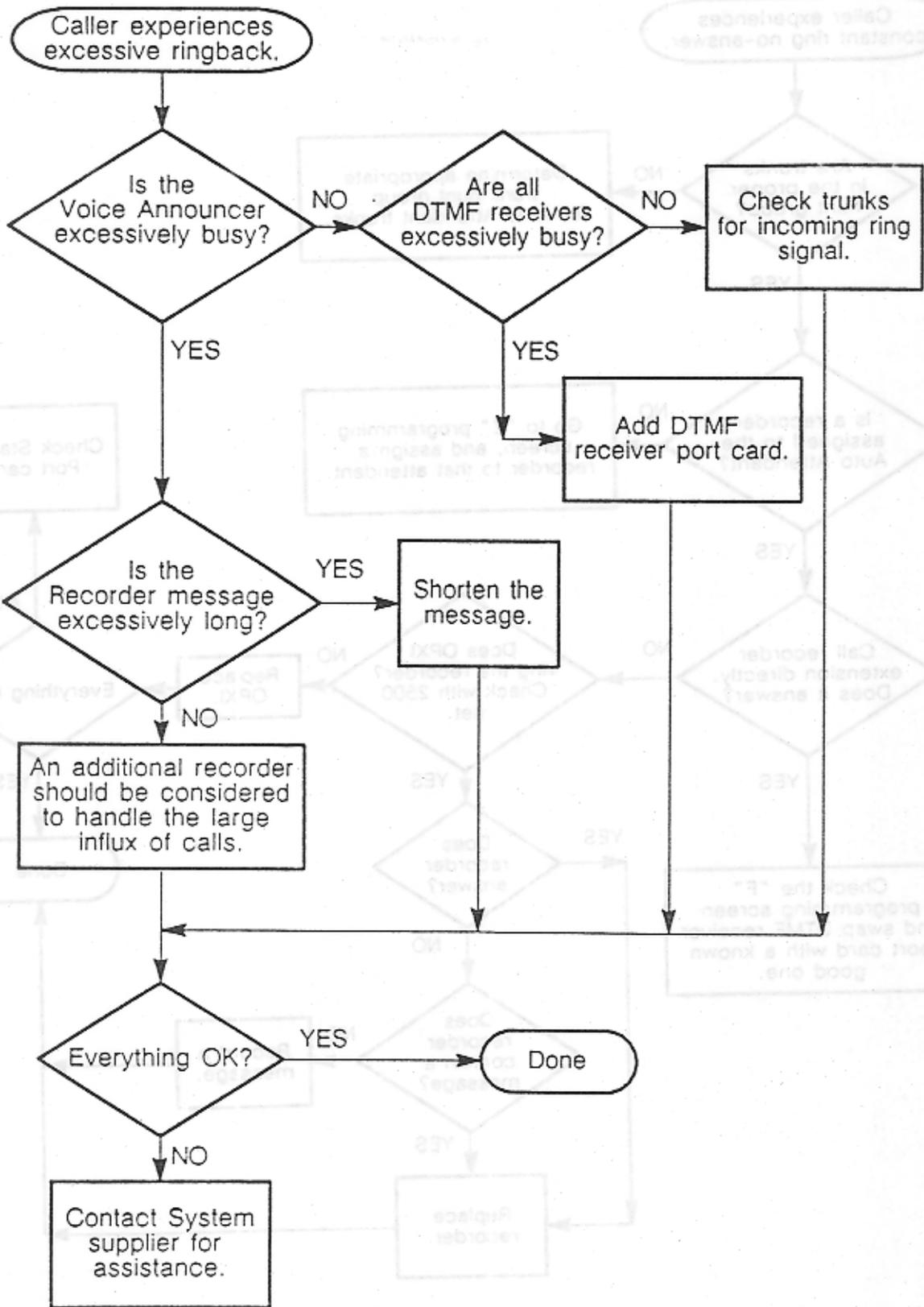
The Operational Symptoms Index is arranged in three columns: Symptom, Description, and Flow Chart/Page Number. Refer to the Symptoms column to locate the problem the Automated Attendant is experiencing. The Description column defines the symptom in greater detail. The troubleshooting flow chart associated with the symptom is listed adjacent to the description, in the Flow Chart/Page Number column.

Turn to the indicated flow chart and follow the appropriate steps to diagnose and resolve the problem.

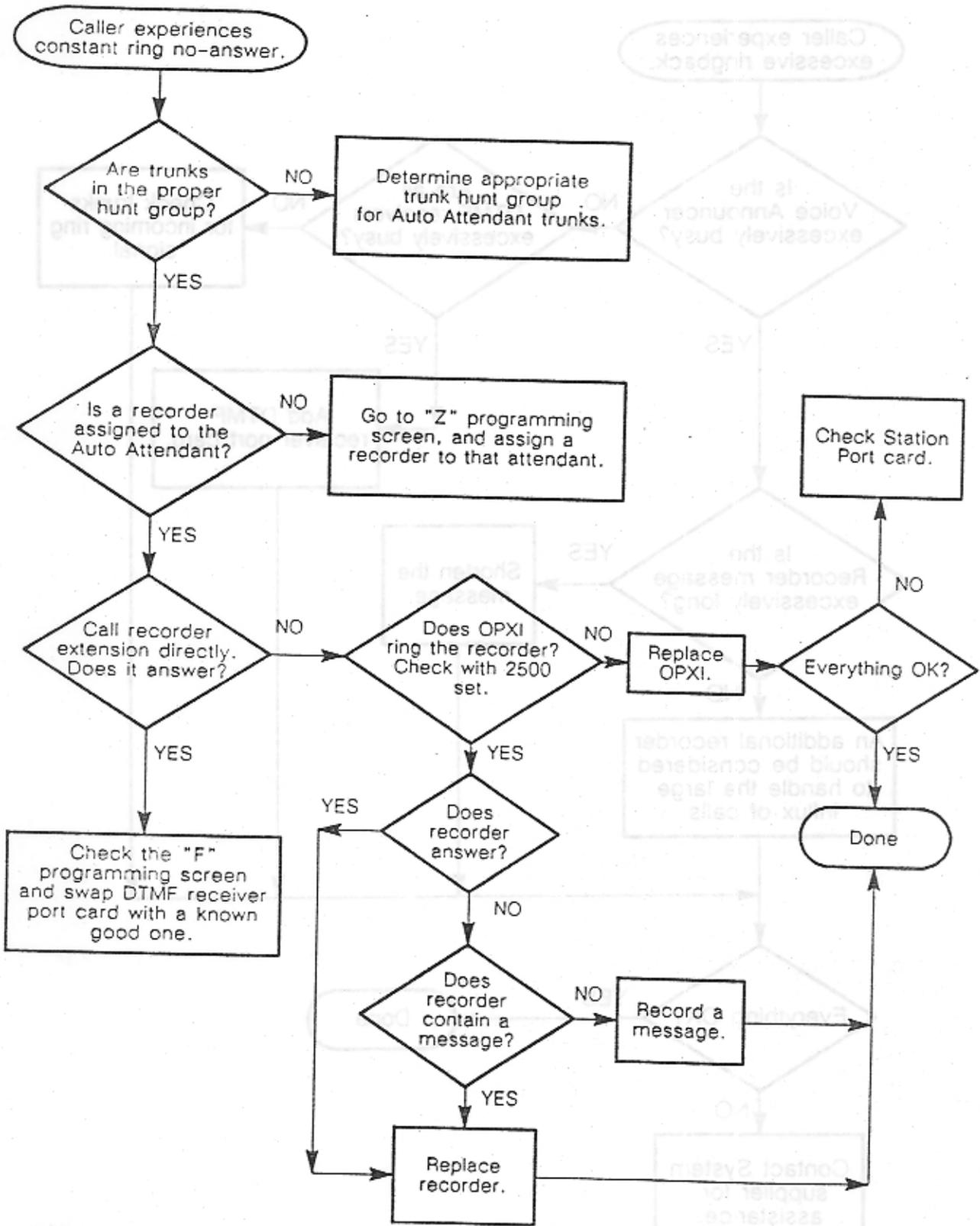
### OPERATIONAL SYMPTOMS INDEX

<i>SYMPTOM</i>	<i>DESCRIPTION</i>	<i>FLOW CHART PAGE NO.</i>
Excessive Ringback	System rings a long time before it eventually answers.	23.13
Ring-No-Answer	Caller hears ring, but System will not answer.	23.14
Will Not Process Calls	The System will not perform call placement after Recorder delivers its Greeting.	23.15
Talk Off	Characterized by a recorded message being cut off, or by having the System respond as if it were given a DTMF command.	23.16
System Disconnect	System disconnects caller after Recorder delivers its Greeting.	23.16

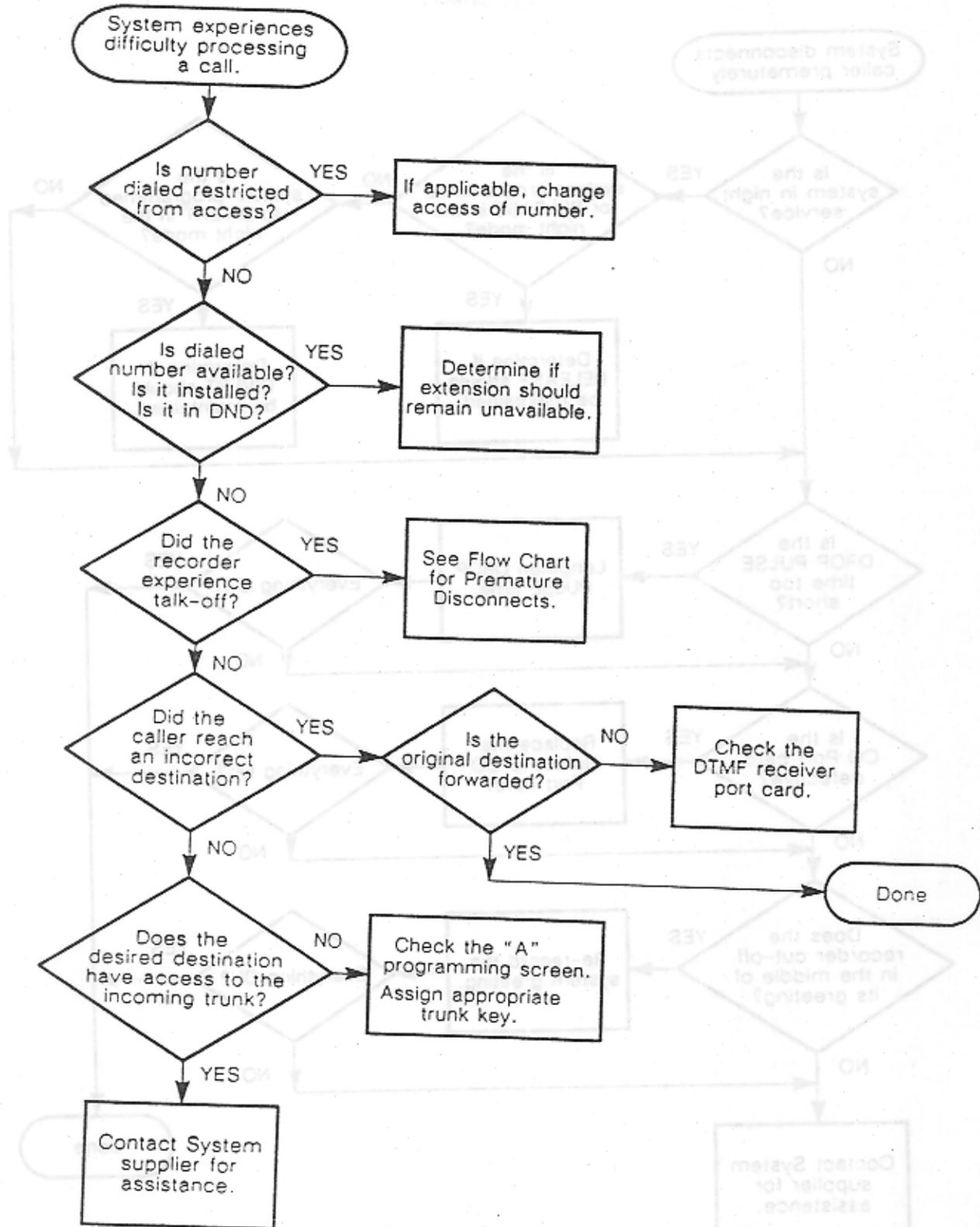
EXCESSIVE RINGBACK



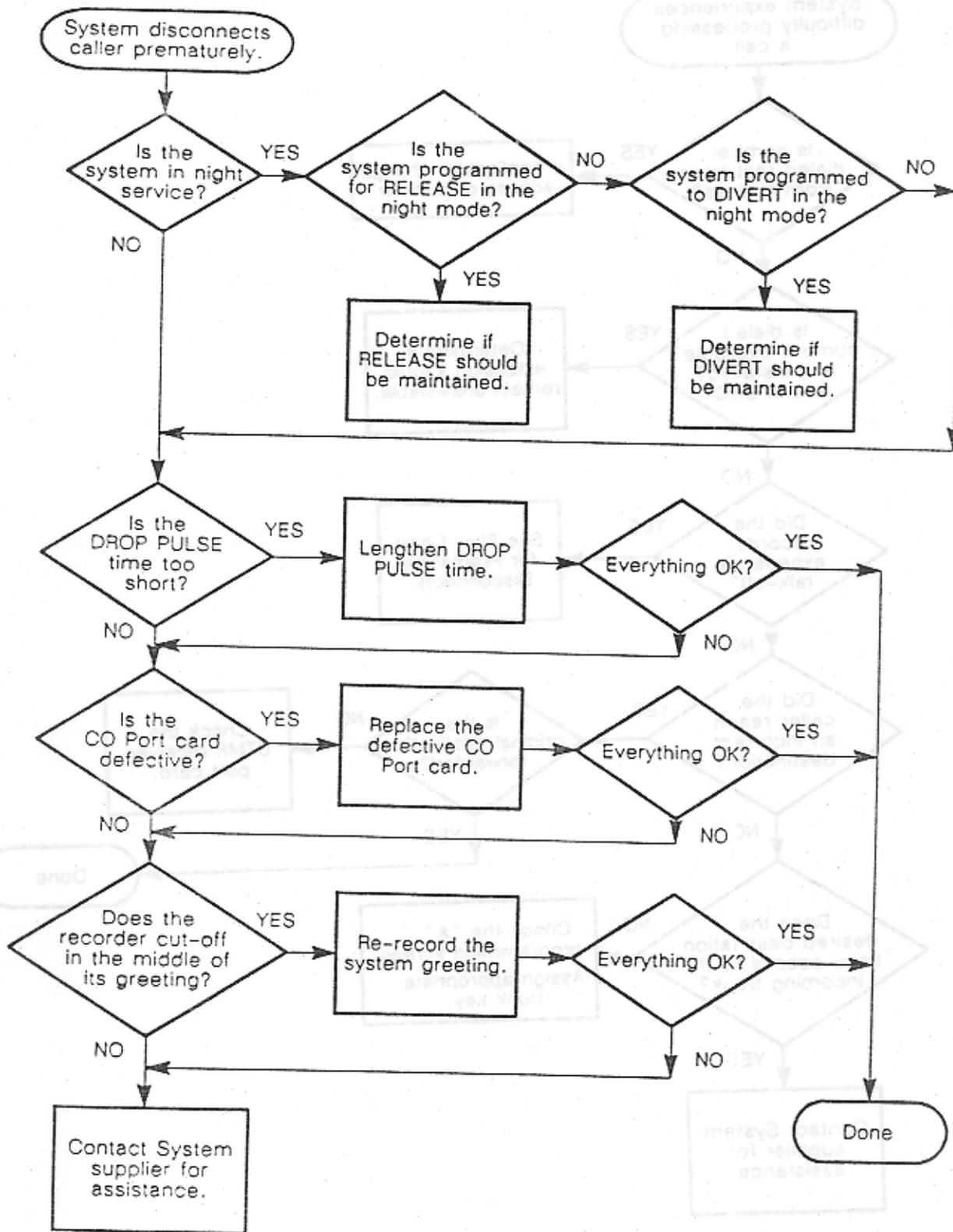
# CONSTANT RING NO-ANSWER



### PROBLEMS PROCESSING A CALL



### PREMATURE DISCONNECTS



### 23.13 CHECKING THE SYSTEM STATUS MONITOR CODES

The *System Status Monitor* indicates the current operating status of the Auto Attendant. The following is a list of the status codes which appear on the *System Status Monitor* Screen (the C Screen), and their definitions. When attempting to diagnose a problem which occurs during operation of the Auto Attendant feature, these definitions will assist the user in identifying the status of the Digital Voice Announcer.

- ATTW - Caller is waiting for Attendant Recorder to come off hook and deliver its Greeting.
- ATTR - Caller is in the process of listening to the Recorder Greeting.
- ATTD - Attendant Recorder has disconnected and has gone on hook.
- RING<- Caller has been sent to the ring assignment for that line.

### 23.13 CHECKING THE SYSTEM STATUS MONITOR CODES

The System Status Monitor indicates the current operating status of the Auto Attendant. The following is a list of the status codes which appear on the System Status Monitor Screen (the C Screen), and their definitions. When a attempt to diagnose a problem which occurs during operation of the Auto Attendant feature, these definitions will assist the user in identifying the cause of the Digital Voice Announcer.

- ATTW - Caller is waiting for Attendant Recorder to come off hook and deliver its Greeting.
- ATTR - Caller is in the process of listening to the Recorder Greeting.
- ATTD - Attendant Recorder has disconnected and has gone on hook.
- RING< - Caller has been sent to the ring assignment for that line.

## Section 24

# Maintenance

### 24.1 INTRODUCTION

The ISOETEC System/108 has a number of built-in tools to aid in trouble-shooting problems that may arise. These tools are software utilities that can be selected from the programming terminal. The system's remote programming capabilities enable these routines to also be run from a remote service center. It is possible to identify a number of problems before dispatching a service technician to the site. Some types of problems can even be corrected remotely.

The system is equipped with a real-time system STATUS MONITOR. This screen can be used to monitor the connections between stations, and between trunks and stations. The DIAGNOSTICS menu can be used to select a trunk line test.

In addition to the trunk test, the system checks each trunk every time it is used, and can remove a problem trunk from service.

The programming terminal can also be used to reset the system, or to erase all programming and return the system to its default program.

### 24.2 SYSTEM PROGRAMMING

The CPU controlled system is designed to provide on-site or remote programming capability for system features. The menu-driven program allows each system to be customized for individual customer requirements through an external CRT and keyboard. The system is also equipped with a built-in modem to provide off-site programming and maintenance capabilities. Any function that can be accomplished by the on-site programming terminals can be accomplished remotely through the modem.

### 24.3 CONNECTING THE PROGRAMMING TERMINAL

System programming can be accomplished from any one of the input/output ports, including the port(s) used as the operator position. Programming is accomplished by means of programming screens and screen graphics. Four types of terminals are supported. These are:

1. ISOETEC (The ISOETEC terminal and the ISOETEC Integrated terminal are supported with this terminal type).
2. QUME (109)
3. IBM/compatible
4. Wyse (WYSE 50, NOT the ISOETEC Integrated terminal).

Connect the terminal to one of the input/output ports using the wiring instructions found in the *Cabling and Cross Connection* section of this manual. The default baud rate for the ports is 9600 baud.

## 24.4 ACCESSING THE PROGRAMMING SCREENS

Once the programming terminal has been connected, the programming screens may be accessed. Begin by:

1. Press the ESCAPE key. The system will prompt for a password.
2. Enter the ACCESS LEVEL 8 password. The LEVEL 8 password should be used for all maintenance functions.
3. Press the RETURN key. If the correct password has been entered, the main menu will appear.
4. Enter the letter corresponding to the screen for the function to be performed. For example, to move to the station programming screen, press the A key.

To return to the main menu from any programming screen press the ESCAPE key.

```
Welcome to the System 108 (C) 1988 ISOETEC Communications Inc.
Options: LCR CA1 Att
Version: v4.00X28 11/09/88      System is IDLE Thu 11-17-88  2:26 pm
Access Level = 08  Port = 2
Select one of the following:  <Esc> ... Display this menu
```

A .. Station Programming	J .. PBX Key Progr.	S .. LCR Tester
E .. System Programming	K .. Change Password	T .. Data Menu
C .. System Status Monitor	L .. LCR Programming	U .. Data Status
D .. BACKUP Program Memory	M .. System Options	V .. Call Accounting
E .. Exit Main Menu	N .. Trunk Group Progr.	W .. Toll Restriction
F .. System Configuration	O .. Directory	X .. Access Levels
G .. Forwarding, VMS Plans	P .. Account Codes	Y .. Digit Translation
H ..	Q ..	Z .. Auto Attendant
I .. Line Maintenance	R .. Reports	

USE THE FOLLOWING SELECTIONS WITH CARE!:

Control-A ... Select Terminal Type |  
Control-C ... Diagnostics |

Control-F ... Default & RESET  
Control-G ... RESET

Enter Letter or Control character >

Figure 24-1 Main Menu

## 24.5 HOW TO RESET THE SYSTEM

In addition to the reset switch located on the CPU, the system can be reset through the use of the programming terminal.

*NOTE: RESETTING the system terminates all active connections between stations and between stations and trunks.*

From the main menu:

1. Press the CONTROL and G keys simultaneously.

The terminal screen displays the following message:

You have selected RESET.

Type 'OK' and RETURN twice to EXECUTE or ANY OTHER KEY TO ABORT

2. Press the O key and the K key. (If you have changed your mind about resetting the system, it is not too late. Just press any other key on the keyboard and the main menu will return.)
3. Press the RETURN key twice.

The system RESETS. The terminal displays a message to enter your password.

## 24.6 HOW TO DEFAULT THE SYSTEM

The system programming can be erased, and returned to the factory programming, from the programming terminal.

*NOTE: DEFAULTING erases all previous program information. Select this with caution. The system is also reset when defaulted. The system terminates all active connections between stations and between stations and trunks.*

From the main menu:

1. Press the CONTROL and F keys simultaneously.

The terminal screen displays the following message:

You have selected DEFAULT and RESET.

Type 'OK' and RETURN twice to EXECUTE or ANY OTHER KEY TO ABORT

2. Press the O key and the K key. (If you have changed your mind about defaulting the system, it is not too late. Just press any other key on the keyboard and the main menu will return.)
3. Press the RETURN key twice.

The system DEFAULTS and RESETS. Several seconds later, the terminal displays a message to enter your password.



The following is a list of the codes that can appear in the STAT (status) column:

AttD	Attendant Recorder has disconnected, and gone on-hook.
AttR	A caller is in the process of listening to Attendant Recorder greeting.
AttW	A caller is waiting for the Attendant Recorder to come off-hook, and deliver its greeting.
AtWr	Indicates that all Automated Attendants are busy and the line is waiting for an Attendant Recorder.
A2Sz	The trunk is programmed for PUBLIC and has been seized outgoing. This is similar to DIAL.
CBck	When the Call Back feature has been used on a busy CO line, this indicates that the trunk is now available and is ringing the station.
CORb	Indicates the trunk has been placed in orbit. The two digits following CORb indicate the orbit zone.
CnCO	A conference has been established between a station and two trunks.
CnSt	A conference has been established between two stations and one trunk.
COWt	The system is waiting for loop current from the Central Office. This is usually seen briefly just after a station selects a line, and just after the station disconnects.
CPbx	Station user has activated their PBX feature key.
DaCO	A CO line accessed through DISA.
DaWt	DISA is waiting for DTMF receiver.
Ddgt	The DID trunk is seized by the CO and is either waiting for the CO to deliver dialed digits, or is in the process of receiving dialed digits from the CO.
Dial	The trunk has been selected by a station for an outgoing call, and the station is still dialing digits.
Disa	A CO line which has been programmed for DISA (Direct Inward System Access) is in use.
Drng	A valid DID number has been dialed and is ringing a station.
Dvrt	Indicates that a CO line has been diverted through System programming.
DWnk	The system is winking to the CO, indicating that it is ready to receive dialed DID digits.
EHld	A trunk call has been put on Exclusive Hold.
Flsh	This appears briefly when a trunk is flashed.
Hing	A trunk has rung into a Hunt group and all stations in that Hunt group are busy.
Hold	The station has placed the trunk on Hold.

HRcl	The trunk has timed out from either a transfer or hold and is recalling the station.
HRng	A trunk is ringing a station in a Hunt group.
MntC	This is a silent monitor call with a station that initiated the silent monitor.
Mntr	A station has activated silent monitor.
Modm	The trunk is connected to the system modem.
OutS	The trunk has been removed from service by the LINE MAINTENANCE programming screen.
PrDv	A line programmed to divert has no available lines to which it may divert.
PrTn	This stands for pre-transfer. The station has pressed the TR/CON key, but the trunk is not yet transferred.
Ptch	A station has initiated an unsupervised conference.
Ring <--	An incoming ring signal has been detected for this trunk. The system should be ringing the stations programmed to ring on this trunk.
Talk	The trunk is connected to the station, and is in the talk mode.
Test	The system is testing the line via the <i>Diagnostics</i> programming screen, accessed from the main menu.
TiDt	The station has accessed a tie line, and has dial tone. The system is waiting for digits to be dialed.
TiRg	An incoming tie line call is ringing a station after dialing a valid extension number, access code, or Hunt group number.
TiTr	A trunk has been transferred to a tie line.
TiWt	The station has disconnected, and the system is in the process of releasing the tie line.
TmpO	The trunk has been temporarily removed from service by the system. See AUTOMATIC TRUNK TESTING.
Xfrd	This represents Transfer. The trunk has been transferred to another station.

## 24.8 AUTOMATIC TRUNK TESTING

The system tests each trunk every time it is selected for an outgoing call. If a number is not dialed on an outgoing trunk 4 times, the system considers the line in trouble and takes the trunk out of service for three minutes. If the system removes the trunk from service 3 consecutive times, the system takes the line out of service for an hour. If desired, an option on the *System Options* programming screen disables this feature.

## 24.9 TRUNK TESTING - DIAGNOSTICS

The system contains a built-in trunk testing routine. This routine may be used to test a single trunk, or all trunks. The routine tests for loop current, and dial tone from the Central Office. If dial tone is received, the system dials a digit to break dial tone, and then listens for noise on the line.

If loop current is detected, the test records a V in the LP column. Otherwise, an X is recorded.

If dial tone is detected, the test records a V in the DT column. Otherwise, an X is recorded.

If noise is not detected, the test records a V in the NS column. Otherwise, an X is recorded.

LINE TEST: (Enter line number to test or A for all ____)															
LINE	LP	DT	NS	LINE	LP	DT	NS	LINE	LP	DT	NS	LINE	LP	DT	NS
001	V	V	V	022	X			043	X						
002	V	V	V	023	X			044	X						
003	V	V	V	024	X			045	X						
004	V	V	V	025	X			046	Testing						
005	V	V	V	026	X										
006	V	V	V	027	X										
007	V	V	V	028	X										
008	V	V	V	029	X										
009	V	V	V	030	X										
010	V	V	V	031	X										
011	V	V	V	032	X										
012	X			033	X										
013	X			034	X										
014	X			035	X										
015	X			036	X										
016	X			037	X										
017	X			038	X										
018	X			039	X										
019	X			040	X										
020	X			041	X										
021	X			042	X										

Figure 24-3 Line Test

The line test may be run while the system is in operation. If a line to be tested is busy, the test skips over the trunk and tests the remaining trunks. When all idle trunks are tested, the system waits until the busy trunks are idle, and then performs the test. The test can be stopped at any time from the programming terminal.

To run the line test:

From the main menu, press the CONTROL and C keys simultaneously.

The *Diagnostics Menu* appears.

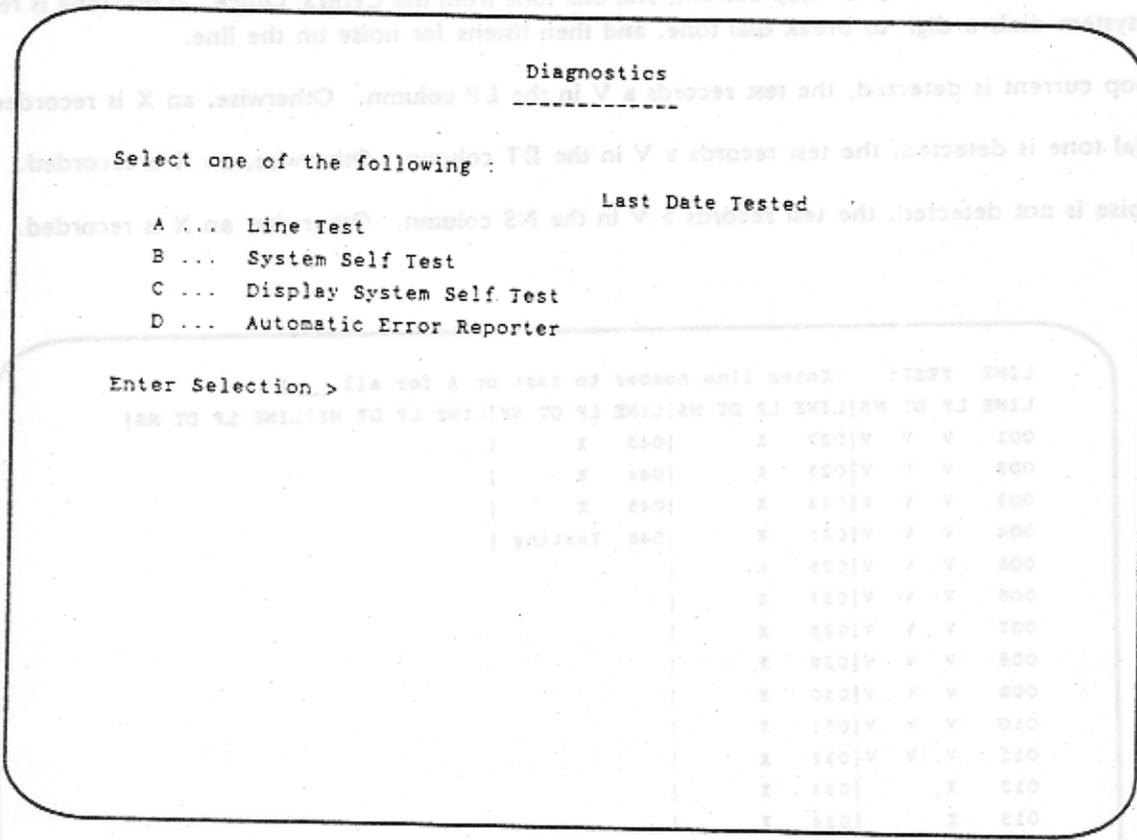


Figure 24-4 Diagnostics Menu

1. Press the A key. The *Line Test* screen appears.
2. Enter the line number to be tested. To test all lines, press the A key (the test begins immediately).
3. Press the RETURN key. The test begins.
4. To stop the test, press the ESCAPE key. Press the ESCAPE a second time to return to the *Diagnostics Menu*.

## 24.10 BAD LINE KEY AND THE REPORTS

Another useful method of determining a bad trunk is the use of the BAD LINE key. Any extension can be programmed with the BAD LINE key. The customer can be instructed to press the key whenever a problem (such as a noisy line) is detected. Each time this key is pressed, it increments a counter for each line. This counter can be seen on the LINE UTILIZATION REPORT - F. This report is found in the Report Menu (choice R on the main menu).

The column labeled B.CALS indicates the number of times the BAD LINE key has been pressed for each trunk. Once identified, the trunk can then be tested, and appropriate corrective action can be taken.

LINE UTILIZATION (F)									
-----									
Period Covered: Mon 01-04-88 08:12 Through Wed 01-06-88 11:32									
Line	Line Name	Incom.	In Usg	Outgo.	OutUsg	Abndnd	B.Cals	Group	
-----									
001	555-2200	374	20:57			16		01	
002	555-2201	306	19:14			7		01	
003	555-2202	298	17:42			6		01	
004	555-2203	239	16:08			2		01	
005	555-2204	235	13:05			2		01	
006	555-2205	222	11:48			1		01	
007	555-2206	190	10:11			2		01	
008	555-2207	141	8:46			3		01	
009	555-2208	115	6:54					01	
010	555-2209	75	5:50			1		01	
011	555-2210	62	4:07			1		01	
012	555-2211	39	2:33	1	:00	1		01	
Tot:		2363	143:01	3198	131:27	44			
Print Now _ Clear Now _ [ Use the arrow keys to scroll... ]									

Figure 24-5 Line Utilization Report

## 24.11 TESTING LOOP AND GROUND START TRUNKS

When checking trunks at the d'mark (the point where the trunks are connected to the local telephone operating company), it is important to first determine whether the trunks are loop or ground start, or a combination of the two. The two types of trunks require slightly different testing techniques.

### 24.11.1 Testing Loop Start Lines - Outgoing

1. Remove the bridging clips connecting the system to the RJ21X for the line to be tested.

*CAUTION: Ring voltage may be present across TIP and RING signaling an incoming call.*

2. On the TELCO side of the D'mark, place a telephone test set (butt in set) in MONITOR mode across TIP and RING of the line under test, and determine if a conversation is in progress.
3. If no conversation is heard, place the test set in TALK mode. Dial tone should be heard.
4. Dial a known local number. The call should complete.
5. Install the bridging clips for the line.

If the line does not have dial tone, or the call does not complete (i.e. ring back or busy tone is heard), report the line to the local telephone operating company.

*NOTE: Incoming ONLY lines (e.g. 800 numbers) may not have dial tone. This is normal.*

### 24.11.2 Testing Loop Start Lines - Incoming

1. Remove the bridging clips connecting the system to the RJ21X for the line to be tested.

*CAUTION: Ring voltage may be present across TIP and RING signaling an incoming call.*

2. On the TELCO side of the d'mark, place a telephone test set (butt in set) in MONITOR mode across the TIP and RING of the line under test, and determine if a conversation is in progress.
3. From another telephone, dial the telephone number of the line under test. Ring generator should be heard. (A volt meter could also be used to detect ring voltage.)
4. Place the test set in the TALK mode. The call should be answered.

### 24.11.3 Testing Ground Start Lines - Outgoing

1. Remove the bridging clips connecting the system to the RJ21X for the line to be tested.

*CAUTION: Ring voltage may be present across TIP and RING signaling an incoming call.*

2. On the TELCO side of the d'mark, place a telephone test set (butt in set) in MONITOR mode across the TIP and RING of the line under test, and determine if a conversation is in progress.
3. If no conversation is heard, place a ground on the RING side of the trunk. Dial tone should be heard. If no dial tone is heard, presume the wires are reversed, and place the ground on the TIP side of the line.
4. Place the test set in TALK mode. Dial tone should still be heard. Remove the ground from the RING side of the line.
5. Dial a known local number. The call should complete.
6. Install the bridging clips for the line.

If the line does not have dial tone, or the call does not complete (i.e. ring back or busy tone is heard), report the line to the local telephone operating company.

*NOTE: Incoming ONLY lines (e.g. 800 numbers) may not have dial tone. This is normal.*

*NOTE: Ground start trunks must be connected to the System/108 with the proper polarity. Refer to the Cabling and Cross Connection section for more information.*

### 24.11.4 Testing Ground Start Lines - Incoming

1. Remove the bridging clips connecting the system to the RJ21X for the line to be tested.

*CAUTION: Ring voltage may be present across TIP and RING signaling an incoming call.*

2. On the TELCO side of the d'mark, place a telephone test set (butt in set) in MONITOR mode across the TIP and RING of the line under test, and determine if a conversation is in progress.
3. From another telephone, dial the telephone number of the line under test. Ring generator should be heard. (A volt meter could also be used to detect ring voltage.)
4. Place the test set in the TALK mode. The call should be answered.

## 24.12 TRUNK - BUSY OUT

Once a bad trunk has been identified, it may be removed from service, without disturbing system programming, by using the *Line Maintenance* programming screen.

### TO BUSY OUT A TRUNK:

From the main menu, press the I key. The *Line Maintenance* screen appears.

1. Press the RETURN key to move the cursor to the line number to be made busy. The ARROW keys may also be used to move the cursor around the screen.
2. Press the O key to make the trunk busy outgoing. Or, the B key may be pressed. The B key makes the trunk busy outgoing, and seizes the line (the line appears off-hook).

### TO REMOVE THE BUSY:

3. Press the R key to remove the busy out.

LINE MAINTENANCE											
(b=BUSY I/O , o =BUSY OUTGOING ONLY)											
001	002	003	004	005	006	007	008	009	010	011	012
013	014	015	016	017	018	019	020	021	022	023	024
025	026	027	028	029	030	031	032	033	034	035	036
037	038	039	040	041	042	043	044	045	046	047	048
049	050	051	052	053	054	055	056	057	058	059	060
061	062	063	064	065	066	067	068	069	070	071	072
073	074	075	076	077	078	079	080	081	082	083	084
085	086	087	088	089	090	091	092	093	094	095	096
097	098	099	100	101	102	103	104	105	106	107	108

Figure 24-6 Line Maintenance Screen

# 24.13 STATION TROUBLES

Symptom

Possible Causes

Station totally inoperative.	<ol style="list-style-type: none"> <li>1. Station not connected.</li> <li>2. Defective telephone.</li> <li>3. Bad line cord.</li> <li>4. Defective station jack.</li> <li>5. Cabling shorted or open.</li> <li>6. Station port card bad.</li> <li>7. Station is too far from system.</li> </ol>
Station handset does not work but handsfree works.	<ol style="list-style-type: none"> <li>1. Broken hook switch.</li> <li>2. Defective handset.</li> <li>3. Defective handset cord.</li> <li>4. Defective telephone.</li> </ol>
Station Handsfree does not work (or clips) but handset is O.K.	<ol style="list-style-type: none"> <li>1. Defective telephone.</li> </ol>
Station cannot access a CO line.	<ol style="list-style-type: none"> <li>1. CO line defective.</li> <li>2. CO line has no key appearance on telephone.</li> <li>3. CO line access programmed N (No).</li> </ol>
LED's flash intermittently.	<ol style="list-style-type: none"> <li>1. Defective wiring.</li> <li>2. Loose connections.</li> <li>3. Defective line cord.</li> <li>4. Defective telephone.</li> </ol>
Station does not ring on CO calls.	<ol style="list-style-type: none"> <li>1. CO line programmed not to ring.</li> <li>2. CO line problem.</li> <li>3. Defective telephone.</li> <li>4. Station is in Do Not Disturb or In/Out.</li> <li>5. Extension is forwarded.</li> </ol>
Station does not ring on internal calls.	<ol style="list-style-type: none"> <li>1. Defective telephone.</li> <li>2. Station is disconnected.</li> <li>3. Station is in Do Not Disturb or In/Out.</li> <li>4. Extension is forwarded.</li> </ol>
No internal dial tone either on handset or handsfree.	<ol style="list-style-type: none"> <li>1. Defective handset.</li> <li>2. Defective telephone.</li> <li>3. Extension is programmed for Auto Pick Up to non-existent CO line.</li> </ol>

Symptom	Possible Causes
Extension cannot be called.	<ol style="list-style-type: none"> <li>1. Station is in Do Not Disturb or In/Out.</li> <li>2. Defective telephone.</li> <li>3. Station not connected.</li> <li>4. Station programmed for no handsfree receive.</li> <li>5. Wrong extension number.</li> </ol>
Low volume.	<ol style="list-style-type: none"> <li>1. Volume turned down.</li> <li>2. Defective handset.</li> <li>3. Defective telephone, or telephone not adjusted properly.</li> </ol>
Static.	<ol style="list-style-type: none"> <li>1. Defective handset.</li> <li>2. Defective handset cord.</li> <li>3. Loose connections in cabling.</li> <li>4. Noisy CO line.</li> </ol>
Station constantly resets.	<ol style="list-style-type: none"> <li>1. Defective line cord.</li> <li>2. Loose connections in cabling.</li> <li>3. Defective telephone.</li> <li>4. Bad station port card.</li> </ol>
Station cannot transmit.	<ol style="list-style-type: none"> <li>1. Station has mute key on.</li> <li>2. Defective handset.</li> <li>3. Defective handset cord.</li> <li>4. Defective telephone.</li> <li>5. Using handsfree, and <i>HandsFree Originate</i> is programmed N (No).</li> </ol>
Station cannot hear.	<ol style="list-style-type: none"> <li>1. Volume adjust too low.</li> <li>2. Defective handset.</li> <li>3. Defective handset cord.</li> <li>4. Defective telephone.</li> </ol>
Programmed features inoperative.	<ol style="list-style-type: none"> <li>1. Check feature keys programming.</li> </ol>
Station does not receive pages.	<ol style="list-style-type: none"> <li>1. Station in wrong page zone.</li> <li>2. Station in No Page zone.</li> <li>3. Station is in Do Not Disturb/Out.</li> </ol>

## 24.14 USING THE SPEAKERPHONE

The *sensitivity* of the speakerphone unit is controlled to a great extent by the *volume control*. If noisy conditions are affecting the quality of handsfree conversation, then adjust the volume a couple of steps. This sensitivity control should allow the flexibility to maintain quality handsfree conversations.

### SPEAKERPHONE RANGE

The speakerphone's working range under optimum conditions is ten feet from the telephone set in any direction. If positioned within about 2 to 3 feet from the telephone, speak in a normal voice level. If the user speaks too loudly at this range, their voice may sound hollow to the person to whom they are speaking. Portions of the conversation may also be missed.

### NOISY LINES

If the speakerphone is being used on a noisy CO line, lower the volume a few steps. This will reduce the clipping and improve the transmission quality.

### NOISY ENVIRONMENTS

Rooms constructed with bare hard walls and floors tend to reflect sound. These reflections of sound cause the speakerphone to sound hollow and unnatural. A solution to this problem is to place sound absorbing material on the walls, carpets on the floors, and drapes covering the windows.

### CLIPPING PROBLEMS

Clipping may be caused by several sources:

#### CLIPPING SOURCE

#### SOLUTION

Excessive background noise in immediate vicinity.

Raise the volume control a few steps.

Excessive noise on the CO line.

Lower the volume control a few steps.

Both parties trying to speak simultaneously.

Wait until the other party stops speaking before starting to speak.

## 24.15 OPERATOR MAINTENANCE

### 24.15.1 CRT Terminal Problems

Before attempting to trouble-shoot problems with Operator Terminals, a few primary set-up procedures should be verified before continuing with the remaining trouble-shooting procedures. First, determine if the cable coming into the back of the terminal is connected properly:

Part Number 440017

RS 422 connected to MODEM  
RS 232 connected to AUX

Part Number 440015

RS 422 connected to EIA  
RS 232 connected to EIA

Next, ensure that the terminal SET-UP is correct. Refer to the *Installation* section of this manual for the proper terminal set-up.

When trouble-shooting problems with the Operator Terminals, it is important to know whether, or not, the terminal is receiving and transmitting data. If the user is pressing keys on the keyboard of the terminal and nothing is happening, then two possible problems exist:

1. The data is not being transmitted from the terminal to the KSU, or
2. The data is being transmitted from the terminal, but the KSU is not confirming the data back to the Operator terminal.

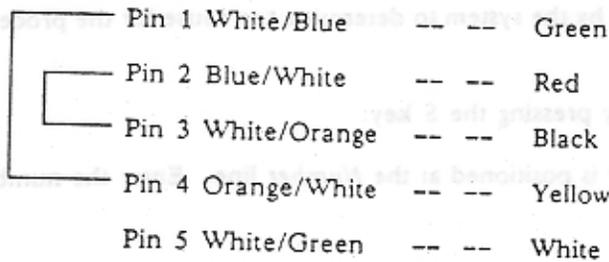
The following procedure should be performed to determine whether the Operator terminal problem is a transmit or receive problem:

1. A simple loop-back adapter can be made using an ordinary modular station jack (AA-625-4 or equivalent). Wire the jack by connecting the RED lead to the BLACK lead, and the GREEN lead to the YELLOW lead.
2. Plug the RS-422 cable from the terminal into the loop-back adapter.
3. Type some characters on the terminal keyboard. Any characters that are typed from the keyboard should be repeated on the screen. This test will determine if the terminal is transmitting and receiving data, or if the short cable coming from the terminal is defective.
4. If the typed characters are appearing on the screen exactly as typed, then a loop-back test should be performed at the MDF.
5. At the MDF, remove the bridging clips on the terminal side.

6. On the terminal side of the block:

Loop pin 1 (W/B) to pin 4 (O/W)

Loop pin 2 (B/W) to pin 3 (W/O)



Terminal side of the MDF

7. At the Operator terminal, type some characters and determine if the typed characters appear on the screen. If the typed characters do not repeat on the screen, check the jack and the cable run from the KSU. If the characters do echo to the screen, then check the KSU, or the I/O (service) cable.

### 24.15.2 Audio Problems

If the terminal appears to be working properly, but calls are still unable to be processed, check the ISOETEC Phone Box.

The following replaceable items should be checked if the Operator is experiencing any of the following audio problems:

Symptom	Possible causes
Low audio, static, excessive noise.	<ol style="list-style-type: none"> <li>1. Defective headset.</li> <li>2. Defective handset cord.</li> <li>3. Problems with ISOETEC Phone Box.</li> <li>4. Defective 4 conductor gray jumper cord leading from ISOETEC Phone Box to the Station port.</li> <li>5. Defective 8 conductor black "Y" cable leading from keyboard to ISOETEC Phone Box.</li> <li>6. Defective 6 conductor modular line cord.</li> <li>7. Operator Terminal problems.</li> <li>8. Problems with the CPU.</li> </ol>

## 24.16 HOW TO USE THE LCR TESTER

When the system experiences difficulty in processing certain numbers, refer to the LCR TESTER (the S screen). When a call is not processed, or is intercepted by either a recorded announcement or the Operator, the LCR TESTER provides information on which service the dialed number should have gone out on, the cost of the call, and what number was actually dialed. Identifying these variables then allows the technician to manually access the service chosen by the system to determine the cause for the processing problem.

The LCR Tester is entered from the main menu by pressing the S key:

1. When the LCR Tester is entered, the cursor is positioned at the *Number* line. Enter the number attempting to be dialed.
2. Press the RETURN key.
3. If the entered number is typed correctly, press the RETURN key again.
4. The cursor moves to *Date*. Enter the date, if it is incorrect.
5. Press the RETURN key.
6. The cursor moves to *Time*. Enter the time, if it is incorrect.
7. Press the RETURN key.
8. The cursor moves to the *Duration* parameter. Enter the length of the call desired.
9. Press the RETURN key. The system then displays the cost of the call, the number that the system dialed, and a list of the services the call should go out on, starting with the least expensive, and on up to the most costly route.

L.C.R. Tester Program for Area Code 203, Office Exchange 655.

---

Number \_\_\_\_\_ DATE 11-17-88 TIME 14:36 Duration 03:00

---

Service	Cost	Number Dialed
<hr/>		

## 24.17 REMOTE PROGRAMMING

The ISOETEC System/108 is equipped with a built-in 300/1200 baud MODEM which permits a technician to access the system from a remote location. The remote location requires only a terminal (one that is supported by system screen graphics) and a MODEM. The technician can then carry out any programming or maintenance that can be accomplished from an on-site programming terminal.

This feature could also be of use to a company communications manager to access a System/108 from another location. A personal computer, with suitable terminal emulation software, can be used in place of a terminal. The system's BACKUP and RESTORE feature can then be utilized.

Access to the MODEM is gained by either programming a trunk to be answered by the MODEM, or by transferring to the MODEM.

A trunk can be programmed to be answered by the MODEM by assigning the trunk a MODEM line type (250 or 251). The line type is programmed on the *System Programming* screen. A trunk with a line type of 250 is answered by the MODEM at all times. A trunk with a line type of 251 is answered by the MODEM whenever the system is in the NIGHT mode.

A trunk can be transferred to the MODEM by transferring the call to extension 99 or 9# (not 3099 or 309#).

When the built-in MODEM answers, carrier tone is heard. The remote MODEM can then be turned on.

Press the ESCAPE key. The system prompts for a password. Enter your password.

## 24.18 BACKUP PROGRAM MEMORY

The ISOETEC System/108 has a utility which permits the system configuration to be saved on a storage device. The saved configuration can then be reloaded at a later time. This storage device is usually a personal computer.

There are too many possible combinations of personal computers and MODEMS to give detailed instructions on saving/restoring the system configuration. Instructions are given on how to tell the system to transmit the information to the personal computer.

Using a personal computer with suitable communications software, and a MODEM, call the System/108, and connect with the system MODEM. The system's MODEM supports either 300 or 1200 baud. The system uses XMODEM protocol to send/receive system configuration. The call can be transferred to the MODEM from a System/108 station by:

1. Press the TRAN/CON key. Internal dial tone is heard.
2. Dial 99, and replace the handset. The call is transferred to the MODEM.

Once the connection is established, press the ESCAPE key. The system prompts for a password. Enter the appropriate password. The main menu appears.

1. Press the D key. The *Backup* screen appears.

There are 4 choices. S - Save PROGRAM memory, L - Save LCR memory, V - Save Call Accounting memory, and Restore.

Note: ACD is not available with the System/108.

2. Press the letter corresponding to the portion of memory to be saved. (If a file is being sent to the system press R for RESTORE).
3. The system is ready to begin transmitting (or receiving) the desired configuration.
4. Issue the appropriate command to the personal computer to save (or send) the file.

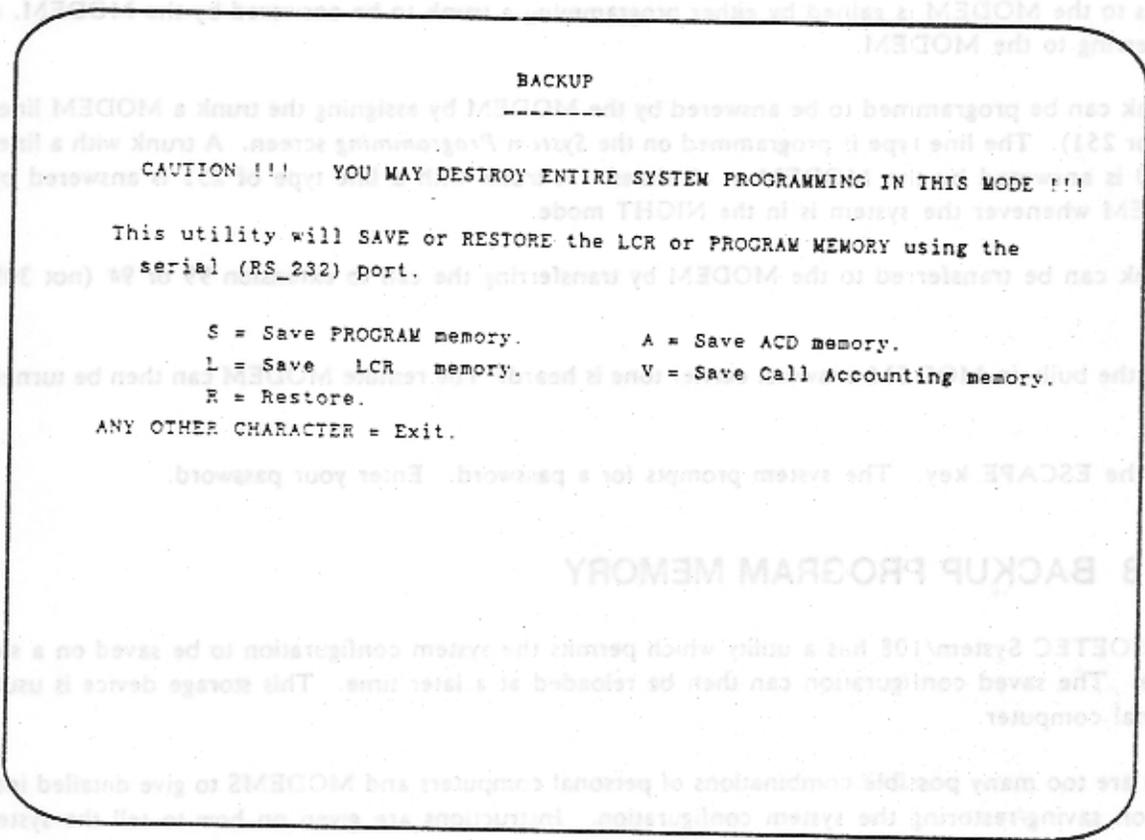


Figure 24-7 Backup Memory Screen

SPECIAL NOTE: This note concerns all versions of the ISOETEC System/108. When the system programming is restored after defaulting, using the "Backup System Programming", the system MUST be reset immediately after the restore is complete. Otherwise, the system continues to use the configuration (port numbers to station/CO numbers) that was present before the restore operation. This can cause a great deal of confusion within the system.

# ISOETEC® System/108

## Technical Specifications

### TECHNOLOGY

Fully featured digital telephone system with 108 ports. Distributed, stored program, microprocessor (68000) controlled. The system utilizes time division switching techniques, and pulse code modulation. System memory consists of 512K EPROM, and 256K of battery-backed RAM.

The data bus for voice transmission and data transmission provides 256 time slots. The system is non-blocking between ports.

Data communications between phones and common equipment is accomplished through time division.

Data and power are provided to the key phones through two pair, random twisted cable.

### CAPACITY

Ports	108 (Ports may be either stations or trunks). Stations and trunks occupy the ports in increments of 12.
Operator Terminals	Up to 4 (There are 2 RS-232 connections and 2 RS-422 connections, any of which may be programmed for the operator terminal).
Hunt Groups	36
SMDR Port	Any of the 4 ports may be used for SMDR.
Station Card	Each Station port card supports 12 digital stations. Each station card provides one audio path for an external page.
Trunk Card	Each COI and Loop/Ground Start port card supports 12 trunks.
DID card	Each DID card connects 12 DID lines. DID lines require dial pulse (rotary) signalling through loop pulses (dry contacts).
Tie Lines	Each E&M Tie Line Combination card supports four 2-wire, E&M Type II signal tie lines, and six digital stations.

## Technical Specifications

DTMF Receiver

Each DTMF Receiver combination card contains six DTMF receivers, and six digital stations.

Page Zones

Nine, plus all zone.

External Page Zones

One per station port card to a maximum of nine.

### LOOP LIMITS

Digital Key Phone

Maximum length of station loop is 1500 feet (4 wire, 22 AWG, inside wiring, random twisted cable) (1200 feet with 24 AWG).

Operator Terminal  
(RS-422)

Maximum loop length 1000 feet.

OPXI

1000 Ohms nominal, not including telephone.

CO

2.2K Ohms maximum (with 48 volt battery).

### POWER AND ENVIRONMENTAL

Input power requirements

117 VAC  $\pm$  10%, 60 Hz single phase.

Operating Temperature

32° to 104° F (0° TO 40° C)

Storage Temperature

-40° to 140° F (-40° to 60° C)

Relative Humidity

10% to 90% non condensing at maximum temperature.

Power Consumption

360 Watts.

BTU

1200.

### PHYSICAL

Cabinet

15" high by 17" long by 14 1/2" deep

Weight: 39.6 lbs.

Power supply

11 3/4" high by 5 1/2" long by 12" deep

Weight: 4.13 lbs.

Total

15" high by 17" long by 14 1/2" deep

Weight: 64 lbs. fully loaded

**TRUNK ORDERING INFORMATION**

*Public Network:*

Interface Port Card	Facility Interface	Ringer Equivalence	Network Jack
CO Port (p/n 15600)	02LS2	1.9 B	RJ21X
Loop/Ground used Loop (p/n 15620)	02LS2	1.9 B	RJ21X
Loop/Ground used Ground (p/n 15620)	02GS2	1.9 B	RJ21X
Direct Inward Dial (p/n 15610)	02RV2-T	0.0 B	RJ21X

*Private Leased Lines:*

Interface	Facility Interface	Service Code	Network Jack
E&M Tie Line Combo (p/n 15680)	TL12M	9.0 Y	RJ2FX
OPXI (p/n 15780)	OL13C	9.0 Y	RJ21X or RJ11C

**FCC REGISTRATION NUMBERS**

KEY System: DHF-7AS-10270-KF-E  
 Hybrid System: DHF-7AS-10268-MF-E  
 PBX System: DHF-7AS-10267-PF-E

**ELECTRICAL**

**COI Specifications**

CO Line AC Impedance 600 Ohms nominal  
 CO Line DC Resistance 225 Ohms @ 20mA  
 85 Ohms @ 100mA

**Insertion Loss**

OPX to Trunk 0db + 1db, 300Hz to 3,400Hz.  
 Digital Phones Acoustically tested (Station to CO).  
 FOLR: -50db Typical  
 ROLR: 38db Typical  
 SOLR: -3db Typical

Technical Specifications

Loss Deviation	
OPX to Trunk Digital Phones	+1db, 300Hz to 3.400Hz. +2db -3db
Return Loss	Better than 16db from 300Hz to 600Hz. Better than 20db from 600Hz to 3,300Hz.
Out-of-Bound Signal Power	Better than 60db from 4KHz to 1MHz.
Group Delay	600ms @ 800Hz. Digital Phone to CO: Total
Group Delay Distortion	As per CCITT recommendation G.712.
Idle Channel Noise	Less than 18dbrnc0 for all connections.
Cross Talk Attenuation	Greater than 75dbm Station to CO Line and Station to Station.
Single Frequency Distortion (300Hz - 3400Hz)	Station to CO Line and Station to Station: better than 2.0% or 34db. Output level -30dbm to 0dbm.
Ringing Sensitivity	16Hz to 30Hz at 40VRMS minimum. 30Hz to 67Hz at 50VRMS minimum.
Ringer Equivalence	1.9B
CO Line Signaling	
DTMF	Frequency pair at -5dbm + 1.0dbm. Frequency tolerance + 1.5%.
Dial pulse	10pps and 20pps programmable.
Input Level Range	+10db maximum.
<b>MISCELLANEOUS</b>	
Music Input (MOH and BGM)	Can be driven by any receiver or tapeplayer with output impedance of 2K ohms or less.
System Tones	Multi-frequency or single frequency tones. Ten user selectable ringing tones. All other signaling tones are non-selectable.
Modem Baud Rate	300/1200 Baud full duplex. conforms to Bell 212 standards.

Information subject to change without notice as process in engineering or manufacturing methods may warrant.

JAIN  
VIRGINIA

# Technical Facts

EXECUTONE

ISOETEC® DIGITAL SYSTEM

No. 1684  
February 14, 1990  
For ISOETEC Distributors

## 108 PORT CONFIGURATION CPU SOFTWARE VERSION 2.11

Software release 2.11 is now available for the ISOETEC® Digital System using the 108 port CPU (p/n 19300). This replaces software version 1.03, and is included in all new shipments of the 108 port CPU. This software version supports the use of the OPX LSI port card in the 108 port cabinet. The following paragraphs give a brief description of the enhanced features. Add this Tech Facts to the back of the ISOETEC Digital System /108 Technical Manual, part number 770330A.

### New Software Enhancements

**OPX Flash** - This feature allows a single line telephone (or similar device) which is connected to the System/108 to flash a CO line utilizing the programmed Flash Timer for each *Line ID*. This becomes necessary when the system is connected to a PBX or Centrex for call transferring. To flash an outside line from a single line telephone, momentarily press and release the switch-hook, then dial [#] and [9] on the dial pad.

*NOTE: An outgoing tie line cannot be flashed.*

**Hunt Group Busy Recall Timer** - This feature enhances the Hunt Group scheme through the *Orbit Recall Timer*. The *Orbit Recall Timer* is now employed to specify the amount of time a call will hunt for an available member of the Hunt Group ONLY when all the members are busy before it recalls to the Operator or the ringing assignment. The *Hunt Group Busy Recall Timer (Orbit Recall)* is in increments of 10 seconds.

**Call Forward Busy Timer** - The *Call Forward Busy Timer* on the *Forward* and *VMS Plans* programming screen has been changed so that the timer is ignored and intercom and CO calls forward immediately when the station is in the Do Not Disturb or OUT mode.

*NOTE: In the case where Call Forward All Calls is activated, the All Call destinations take precedence over the Busy destination.*

**Enhancements To The Operator Terminal** - An option has been added to the *System Options* programming screen to extend the duration of dialed DTMF tones on trunks from the Integrated Operator Terminal to 350 milliseconds. This option is called *Operator Digit 350 milliseconds*. The default for *Operator Digits 350 milliseconds* is No.

(Continued)

File a copy of this Technical Facts in your Master Technical Facts File and in your ISOETEC System/108 Technical Manual part number 770330A. Also list is on the Record of Changes Page.

John Monroe  
Product Management

## Voice Mail Enhancements

VMS Integration - Voice Message System Integration is a down-loadable option that has been added to the system. The part number for this option is p/n 440252.

Two programmable values have been added to the *Forwarding and VMS Plans* programming screen. These values are used to adjust the timing of the interaction between the system and the Voice Message System. These values are *VMS Delay*, and *Answer*.

*VMS Delay* - *VMS Delay* is a new entry in the VMS portion of the *Forwarding, VMS Plans* screen (G screen.) This entry determines the delay time between the Voice Message System answering the call, and the System/108 sending the mailbox number to the VMS.

The *VMS Delay* value is entered in 50 millisecond increments, and has a default value of 16 (800 milliseconds). Valid entries are from 00-99. If an entry of 00 is used, the mailbox number will never be transmitted.

*Answer Delay* - In the VMS portion of the *Forwarding, VMS Plans* Screen there is a new entry called *Answer*. The *Answer* timer has been developed to prevent conflicts on the VMS ports between calls to the VMS port and VMS system calling to light a message waiting indicator. The system will reroute the call if the VMS port goes off-hook within the *Answer* amount of time. The *Answer* value is entered in 50 millisecond increments.

*NOTE: The VMS Attendant option on the Station Programming screen must be set to Y (yes) on the VMS ports. The Ring Type for VMS ports should be programmed 01.*

*Answer* has a default value of 05 (250 milliseconds). Valid entries are from 00-99. If an entry of 00 is used, there will be no delay.

To program these new voice mail timers:

From the *Main Menu*, press G for the *Forwarding, VMS Plans* screen. The screen appears.

Press M for the VMS section.

Press the RETURN key until the cursor is on the *VMS Delay* entry.

Enter the desired value, and press the RETURN key.

Press the RETURN key until the cursor is on the *Answer* entry.

Enter the amount of delay desired, and press the RETURN key.

## Conference Calls And The 6-key Telephone

During a conference call, the TR/CON key LED lights steady to indicate the conference call. It does not blink as stated in the "6-key Telephone User Guide."

## Split Feature And The Single Line Telephone

The split feature on a single line telephone has been changed in this software version for the 108 port configuration of the ISOETEC Digital System. When the single line phone receives a camp-on tone, flashing the switch-hook will put the current call on hold. Then internal dial tone will be given for 2 seconds. If nothing is dialed, the camped on call is automatically connected. This gives the user the opportunity to transfer the first call at the same time making it easier to split between two calls.

## OPX LSI Port Card

This software version supports the use of the OPX LSI port card in the ISOETEC Digital System /108. The OPX LSI port card (p/n 15660) is an 8 port card that can be installed in any port card slot in the cabinet from J1 through J8. The OPX port card can be used to support any conventional tip and ring, DTMF device such as 2500-type telephones, Voice Message System ports, loud ringing bells, or OPXs (Off-Premise Extensions). This card does not support digital stations.

When used with off-premise stations, the facility interface code is OL13B, and the service code is 9.0 Y. The loop limit is 9000 feet.

*NOTE: The OPX port card will not work with rotary dial devices. There is no power failure transfer on this card.*

### POWER REQUIREMENTS

The OPX port card requires externally supplied 48 volts DC and ring generator for power. It is suggested that the UL Listed ISOETEC® TRI OUTPUT power supply (p/n 550005) be utilized for external power. Every two OPX port cards will require one TRI OUTPUT power supply. Each OPX port card draws a maximum of 500 milliamps, and requires at least 2 watts of ring generator. Consult the National Electric Code requirements for wiring Class 2 and Class 3 voltages before installing the OPX LSI port card.

### STONE RECEIVERS

The OPX port card also requires a DTMF Receiver port card (p/n 15650) to be installed in the system because there are no DTMF tone receivers on the OPX port card itself. It is recommended that one DTMF Receiver port card be used for every four OPX port cards. This number can vary depending on the amount of traffic on the OPXs. If the OPXs experience delays in obtaining dial tone, another DTMF Receiver port card should be added.

### INSTALLATION

The OPX port card can be installed in any port card slot from J1 through J8. Observing the polarity marked on the card, connect the externally supplied 48 volts and ring generator to the connectors on the edge of the card.

The *System Configuration* programming screen can be selected to confirm that the system has recognized the OPX port card(s). The card identifier will indicate Sli and show eight ports installed.

The OPX port card to MDF cable (p/n 01037) is installed with the exposed shield closest to the cabinet. A cable tie or similar device is used to secure the exposed braid to the bottom plate of the cabinet. The paint is removed from a section of the bottom plate to allow a ground connection between the exposed braid of the cable and the cabinet. The cable is then dressed out the back of the cabinet, and connected to the MDF.

### POSSIBLE INSTALLATION PROBLEMS

The following may help identify possible problems that may occur when installing the OPX LSI Port Card. The OPX LSI card may not provide any side tone. To remedy this problem, check to see if the 48 volt DC power supply has been connected with the wrong polarity, or is not connected at all.

Another possible problem is that the OPX LSI Port card may not provide dial tone, but side tone is present. To remedy this problem, check to see that the DTMF Receiver port card is installed. A DTMF Receiver port card must be present in the system when using the OPX LSI port card.

If all telephones connected to the OPX port card do not ring, make certain ring generator has been connected to the proper terminals.

Refer to Figure 1 and Figure 2 for wiring the power supplies to the card.

When the port card is to be used with OPXs, if the TIP side of the circuit is not grounded, the power supplies can be wired to the card as follows:

- |    |   |                |
|----|---|----------------|
| P3 | 1 | - 48 volts     |
|    | 2 | + 48 volts     |
| P3 | 3 | Ring generator |
|    | 4 | Ring generator |

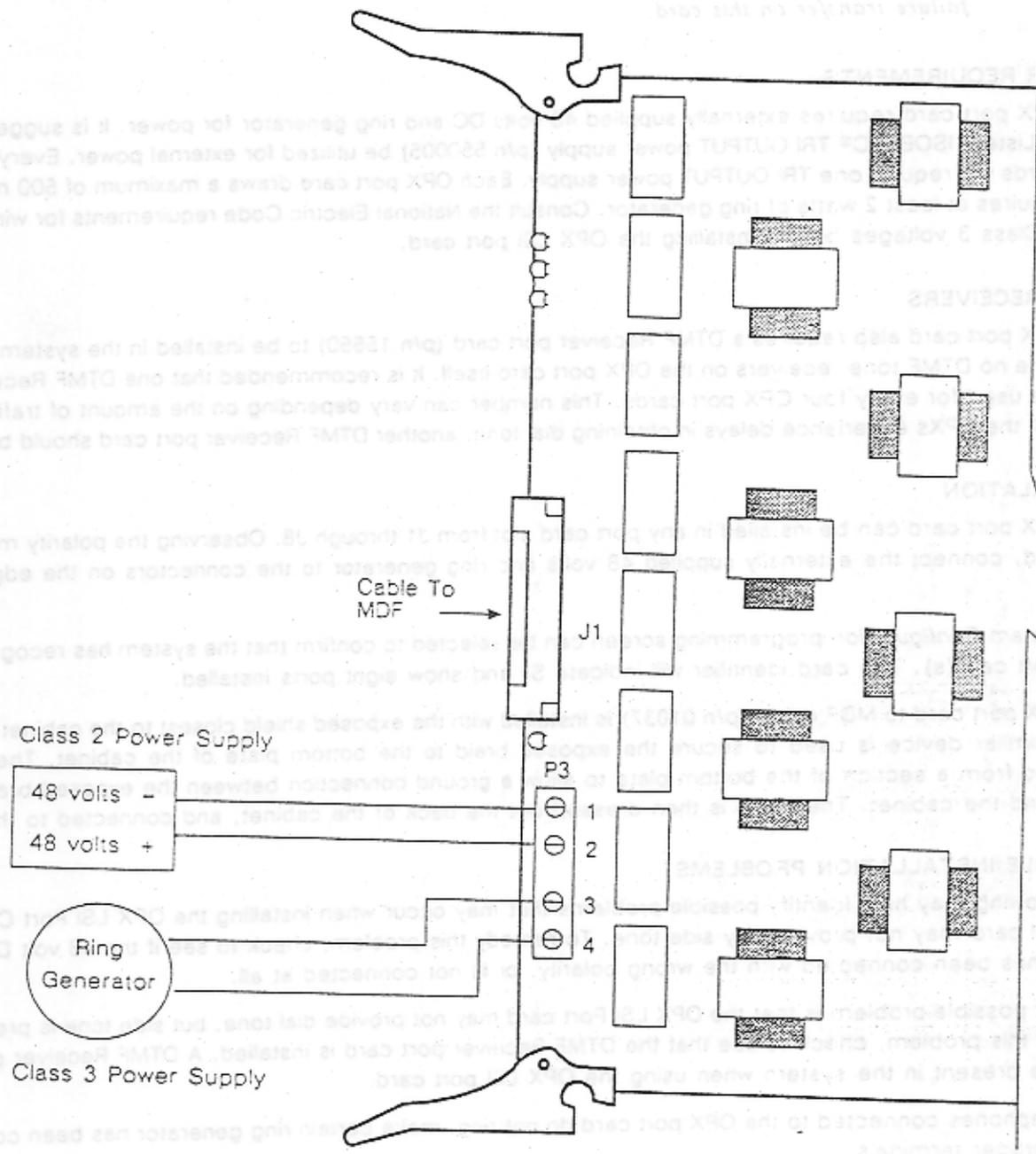


Figure 1 OPX LSI Port Card Power Connections

When the port card is to be used with OPXs, if the TIP side of the circuit is grounded, the power supplies can be wired to the card as follows:

- |    |   |   |
|----|---|---|
| P3 | 1 | - 48 volts and one side of the Ring generator |
|    | 2 | Ground  |
| P3 | 3 | Ground  |
|    | 4 | Ring generator                                |

Connect a wire between 2 and 3. Also connect the ground to the same point as the Telco ground. Do not use the Telco ground itself.

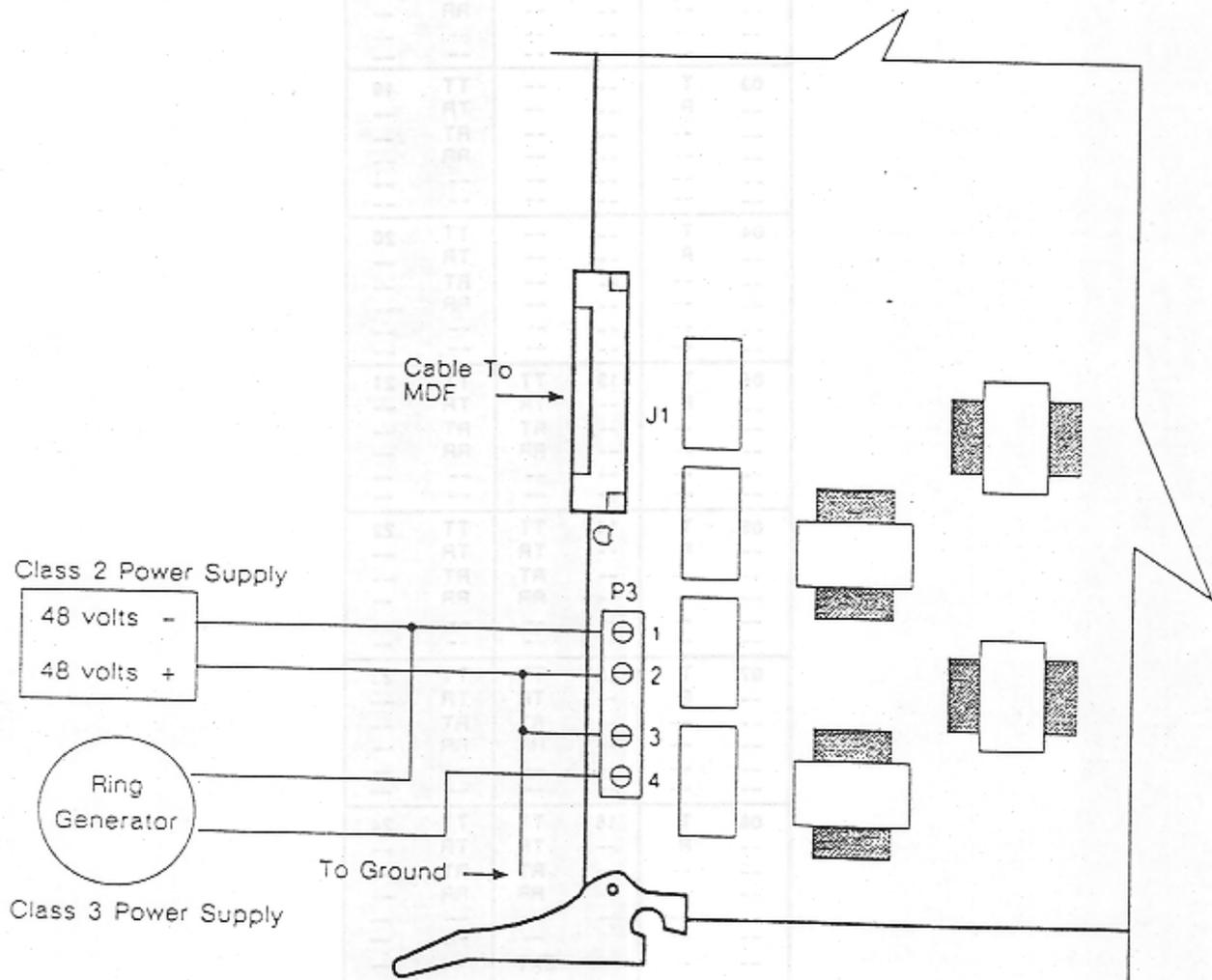


Figure 2 OPX LSI Port Card Power Connections With Tip Grounded

The MDF connections to the OPX port card are shown in the following diagram:

	A	B	C	D	E	F
01	T	--	--		TT	17
--	R	--	--		TR	--
--	--	--	--		RT	--
--	--	--	--		RR	--
--	--	--	--		--	--
--	--	--	--		--	--
02	T	--	--		TT	18
--	R	--	--		TR	--
--	--	--	--		RT	--
--	--	--	--		RR	--
--	--	--	--		--	--
--	--	--	--		--	--
03	T	--	--		TT	19
--	R	--	--		TR	--
--	--	--	--		RT	--
--	--	--	--		RR	--
--	--	--	--		--	--
--	--	--	--		--	--
04	T	--	--		TT	20
--	R	--	--		TR	--
--	--	--	--		RT	--
--	--	--	--		RR	--
--	--	--	--		--	--
--	--	--	--		--	--
05	T	13	TT	TT	TT	21
--	R	--	TR	TR	TR	--
--	--	--	RT	RT	RT	--
--	--	--	RR	RR	RR	--
--	--	--	--	--	--	--
--	--	--	--	--	--	--
06	T	14	TT	TT	TT	22
--	R	--	TR	TR	TR	--
--	--	--	RT	RT	RT	--
--	--	--	RR	RR	RR	--
--	--	--	--	--	--	--
--	--	--	--	--	--	--
07	T	15	TT	TT	TT	23
--	R	--	TR	TR	TR	--
--	--	--	RT	RT	RT	--
--	--	--	RR	RR	RR	--
--	--	--	--	--	--	--
--	--	--	--	--	--	--
08	T	16	TT	TT	TT	24
--	R	--	TR	TR	TR	--
--	--	--	RT	RT	RT	--
--	--	--	RR	RR	RR	--
--	--	--	--	--	--	--
--	--	--	--	--	--	--
--	--	--	EXT	--	--	--
--	--	--	PAGE	--	--	--

Figure 3 MDF Station Panel Designations For The OPX LSI Card

# ISOETEC® Digital System Feature Comparison

Software Level Where Feature First Appeared:

FEATURE	System/228 CPU				System/108 CPU	
	4.25	4.51	5.26	5.52	1.03	2.11
ACD Simultaneous Forward				X		
Alarm			X			
Alternate Dialing		X				
Answer (G Screen)		X				X
Auto Attendant Digit Timeout		X				
Auto Attendant Enhancements			X	X		
Auto Attendant Music Option				X		
Busy on DID	X				X	
Busy on Tie Lines		X				
Call Forward Busy Timer				X		X
Call Forward to an Auto Attendant				X		
Conference Gain On-System Option		X				
Dialing by Name			X			
Digital Voice Announcer support		X			X	
DID Tagging	X				X	
Direct Speed Dial				X		
DISA/Tie Line Groups Dial Option				X		
Disable LCR Tones Option-Sys Option	X				X	
Display Telephone Messages	X				X	
Divert Limit (B Screen)		X				
DND Override				X		
DNIS Option (with T1 or DID)				X		
DSS Console support			X			
Extension Numbers over 228	X				X	
Expanded Operator Programming			X			
Flexible Numbering	X				X	
G Screen Updated	X				X	
Hands Free Camp On		X				
Handset Barge-In			X			
Hunt Group Busy Recall Timer				X		X
Hunt Pick (LCR)			X			
Message Waiting Key				X	X	
MOH by CO				X		
Multiple DISA Calls		X				
Operator Digits 350 ms-Sys Option			X			X
Operator Second Transfer Key	X				X	
Operator Transfer Icm Calls	X				X	
OPX Flash				X		X

# EXECUTONE Information Systems, Inc.

## Corporate Memorandum

July 20, 1990

To: All District Managers  
All Sales Managers  
All Salespeople  
All Major Accounts Managers  
All Independent Distributors

FROM: Terry Atwood, Director of Marketing and Product  
Management - Voice and Base

No.: 90-1472

SUBJ: Isoetec Digital System 108 CPU vs. 228 CPU Feature Set

Please Distribute Copies To:

Distributor/District Manager  
 Sales Manager  
 Sales Staff  
 Operations Manager  
 Operations Staff  
 Technical Staff  
 Accounting  
 Purchasing Manager

DAVID  
LAWRENCE  
7/24/90

*Terry Atwood*

The following is an updated list of features that the current version of IDS 228 CPU software (6.50) contains that the new version of 108 CPU software (3.04) does not. If any of these features are needed with an IDS 108 port cabinet, the 228 CPU must be used:

- Account Code Entry via Speed Dial Buttons
- ACD
- Attendant Alarms
- Alternate Dialing
- Auto Attendant Busy and No Answer Recordings
- Auto Attendant Music Option
- Auto Attendant Dial Scheme #5
- Busy on Tie Lines
- Busy DID Hunt Group Option
- Call Forward To Auto Attendant
- Call Forward To Station Speed Dial Key
- Conference Gain
- DATA
- Dial By Name
- DID Voice Mail Forward Option
- DID Call Accounting Option
- Direct Speed Dial Access via Button
- DISA/TIE Trunk Group Dial Access
- Divert Limit
- DND Override
- DNIS Option
- Handsfree Camp-on
- Handset Barge-In
- IN/OUT Feature on 6-Key Phone
- Large Internal Call Accounting

# EXECUTONE Information Systems, Inc.

## Corporate Memorandum

July 20, 1990

To: All District Managers  
All Sales Managers  
All Operations Managers  
All Independent Distributors  
All Major Accounts Managers

FROM: Terry Atwood, Director of Marketing and Product  
Management - Voice and Base

No.: 90-1477

SUBJ: **New Software for the IDS 108 CPU**

Recommended Distribution:

Distributor/District Manager  
 Sales Manager  
 Sales Staff  
 Operations Manager  
 Operations Staff  
 Technical Staff  
 Accounting  
 Purchasing Manager

*Terry Atwood*

*PAVIE  
JA  
VIRE  
- Jul  
D. STEVE  
Kend*

We are pleased to announce the immediate availability of an enhanced version of software for the ISOETEC Digital System 108 CPU. This version is called 3.04. Beginning on July 23, 1990, all new IDS 108 CPUs shipped from Poway will contain this updated software.

The new 3.04 adds two major features, the absence of which has been forcing you to utilize a 228 CPU in the 108 cabinet. These features are:

**DSS SUPPORT.** The 108 CPU will now support up to a total of ten (10) IDS DSS units. Up to three of these units can be associated with a single digital telephone. This will allow you to offer your prospects back-up telephone answering and departmental secretarial coverage capabilities.

**NAMES WITH EXTENSIONS ON ATTENDANT TERMINAL DISPLAY.** It is now possible to display the directory programmed telephone user name with their extension number on the Attendant Terminal. This feature is a system option and is limited to displaying 60 names/extensions. The names/extensions displayed on the terminal can be selected by indicating, in the Directory menu, those that should not appear.

The DATA feature, previously supported by the IDS 108 CPU software, is no longer supported in version 3.04. From this point forward, if the customer requires the DATA feature, you must utilize the 228 CPU. As you will remember, 228 CPU software version 6.50 will support the DATA feature in the 108 cabinet although prior versions of 228 CPU software will not.

A more detailed description of these features as well as the other enhancements in 3.04 is contained in the attached Technical Facts No. 1696.

Please make certain that all appropriate personnel in your organizations receive copies of this document. Also, a copy should be placed in the "Technical Facts" sections of all your IDS Technical Manuals.

# Technical Facts

EXECUTONE

ISOETEC® DIGITAL SYSTEM

No. 1696

12 July, 1990

For ISOETEC Distributors

## SOFTWARE VERSION 3.04

Software release 3.04 is now available for the ISOETEC® Digital System using the 108 port CPU (p/n 19300). This replaces software version 2.11, and is included in all new shipments of the 108 port CPU shipped on or after 23 July 1990. This software version supports the use of the DSS Console, and adds the *Display Extension Name* feature to the Integrated Operator Terminal, enhancements to the *Forward and VMS* programming screen, a digit time out feature to the Automated Attendant, support for Software Defined Networks, and options for Single Line telephones.

**NOTE:** The Data Feature found in previous software versions has been REMOVED from this software version. The Data Feature can be added to the 108 port configuration of the system by installing the 228 port CPU (p/n 15300) with software version 6.50 and having the 108 Port Option (p/n 112008) added. The option is added using the Remote Programming feature.

The following paragraphs give a brief description of the enhanced features. Add this Tech Facts to the back of the ISOETEC Digital System /108 Technical Manual, part number 770330A.

An updated version of the "ISOETEC Digital System Feature Comparison" is attached to this Tech Facts.

## Software Enhancements

**Enhancements To The Integrated Operator Terminal** - A second type of *Extension Status* display has been added to the Integrated Operator. Rather than displaying the usual first 160 extensions, the system can be programmed such that 60 extensions along with the names assigned to the extension in the *Directory* are displayed. The option to turn on *Display Extension Names* is found on the *System Options* programming screen. The option is called OPER EXT NAMES. Set this option to Y (yes) to display 60 extensions with their *Directory* names. This is a system-wide option which effects all Operator Terminals connected to the system.

Names can be removed from the *Extension Status* display by entering *Directory Programming* screen, and pressing CONTROL and O at the same time while the cursor is on the name to be removed. An asterisk appears next to the name indicating the name is not to appear on the operator screen. This does not remove the name from the directory, only from the operator screen. The same procedure is used to return a name to the operator screen. Press CONTROL and O at the same time while the cursor is on the name to be added. The asterisk will be removed, and the name appears on the operator screen.

(Continued)

File a copy of this Technical Facts in your Master Technical Facts File and in your ISOETEC System/108 Technical Manual part number 770330A. Also list it on the Record of Changes Page.

John Monroe  
Product Management

attachment

Software Defined Network—This software version can now support AT&T's Software Defined Network. This network is a private network that utilizes Tie Lines. This configuration allows a caller (calling within the SDN network) to dial to different locations using a seven digit number. SDN eliminates the caller from having to dial 11 digits to reach a destination located within another area code. *Software Defined Network* is available with a special *Least Cost Routing* package.

It is important to contact the *Least Cost Routing* Department to insure proper turn on notification. The *Least Cost Routing* Department requires a minimum of 45 days prior notification to program the LCR package for full networking programming, and to generate databases after routing tables have been completed. The customer is responsible for providing a list of networking numbers to the *Least Cost Routing* Department. If additional networking numbers are desired, the subscriber must notify the *Least Cost Routing* Department.

To process an SDN number through LCR, the caller must press an LCR key and dial [\*] plus the 7-digit SDN number. The identifier, [\*], is used by the system to distinguish the SDN number from a local 7-digit number. The system recognizes [\*], and checks the LCR database to ensure that the 7-digit number is valid. The LCR program then seizes the line, and processes the call.

The location to which a call is directed is identified by the first three digits of the seven digit number. The last four digits (or DID's) determine the extension number of the party being called in that particular location.

NOTE: Similar services can also be provided by other long distance carriers such as MCI and Sprint. Their networks are VNET® and VPM<sup>SM</sup> respectively.

SLI SDN Enable Option— This option enables single line telephones to access Software Defined Network. A single line telephone dialing [9] + the CO group number can now be connected directly to the CO line.

The following steps allow a single line telephone user to access *Software Defined Network* when *SLI SDN Dial Option* is programed Y (Yes) on the *System Options programming* screen.

Lift the handset.

Dial [9] + [0] on the dial pad.

Dial the 7-digit SDN number.

DIALING CODES For SLI SDN ENABLE:

FEATURE	SLI SDN ENABLE = Y	SLI SDN ENABLE = N
SDN Call	[9][0] number	N/A
CO Group 10	N/A	[9][0] number
Last Number Redial	[9][#]	[9][#]
LCR	[9][*] number	[9][*] number
LCR with Acct Code	N/A	[9][*][*] acct cde [*] number
SDN with Acct Code	[9][0][*] act cde [*] number	N/A

Enhancements to the Forward and VMS Programming Screen – Two new values, Digit Duration and Volume, have been added to the *Forward and VMS Programming* screen. Digit Duration is used to extend the length of the DTMF tones sent to the Voice Message System. The duration of each tone is the number entered as Digit Duration times 60 milliseconds. Volume adjusts the volume of the DTMF digits sent to VMS. Valid entries range from 0 to 15. The value 0 is equivalent to -32 dB and 15 is equivalent to +6 dB.

440 Hertz Tone for Single Line Telephones – The extensions serving Single Line Telephones can be programmed to generate 440 Hertz tone whenever the extension is off-hook and not connected to a station or a trunk. This is used to send dial tone to external devices (such as Voice Message Systems and Automated Attendants) to detect when the outside party has disconnected. To program a Single Line Extension to generate the tone, program the *Day Class* in the *Timers* area of the *Station Programming* screen to 16 for the desired extension number. This programs the extension for both the Day and Night mode.

Automated Attendant – The amount of time the Automated Attendant waits for dialed digits is now adjustable. The timer, found on the *Automated Attendant* programming screen, is called *Digit Timeout*, and is programmed in seconds. Valid entries are from 00 to 99 seconds.

## DSS Console

The *DSS Console* (p/n 82400-2) is the size of the 17-key telephone and has 44 programmable buttons. These buttons can be programmed in the same manner as the programmable buttons on the 28-key telephone. The *DSS Console* is equipped with a speaker for audible tones. A maximum of 10 DSS consoles can be installed on the system. Three DSS consoles can be assigned to one telephone. Each DSS requires one digital station port.

[C] DSS Assignment

DSS Stations Assignment		12:09 p Tue 12-20-89
DSS - Extn		
01 3003		
02 0000		
03 0000		
04 0000		
05 0000		
06 0000		
07 0000		
08 0000		
09 0000		
10 0000		

Figure 1 DSS Stations Assignment

### HOW TO PROGRAM

DSS programming is performed on the *Station Programming* screen. From the *Main Menu*, press A to access the *Station Programming* screen.

**NOTE:** Before assigning an extension as a DSS Console, check the Timers area of the extension number to which the DSS is to be connected. Make certain there are no values programmed which will interfere with the operation of the DSS console. For example, make certain Prime Line = 0, Recording Num = 0, etc. Take care when using the Copy function in the Timers area on a system which has DSS Consoles. Even though the Timers cannot be seen on the DSS Console screen, they still effect the operation on the extension number.

1. Press G. The *DSS Assignment* screen will appear. See Figure 1. The *DSS Assignment* screen defaults to no extensions entered as DSS Consoles.

**NOTE:** The DSS Assignment screen can be reached from any extension number.

2. Enter each extension number you have a DSS installed on. This entry will identify these extensions as DSS stations and provide the *DSS Programming* screen when that extension number is selected.
3. Press the ESCAPE key. This will bring you back to the *Station Programming* screen.
4. Enter the extension number of the DSS you wish to program.
5. A *DSS Programming* screen will appear. See Figure 2. The *DSS Programming* screen defaults to the same feature key codes as any extension.

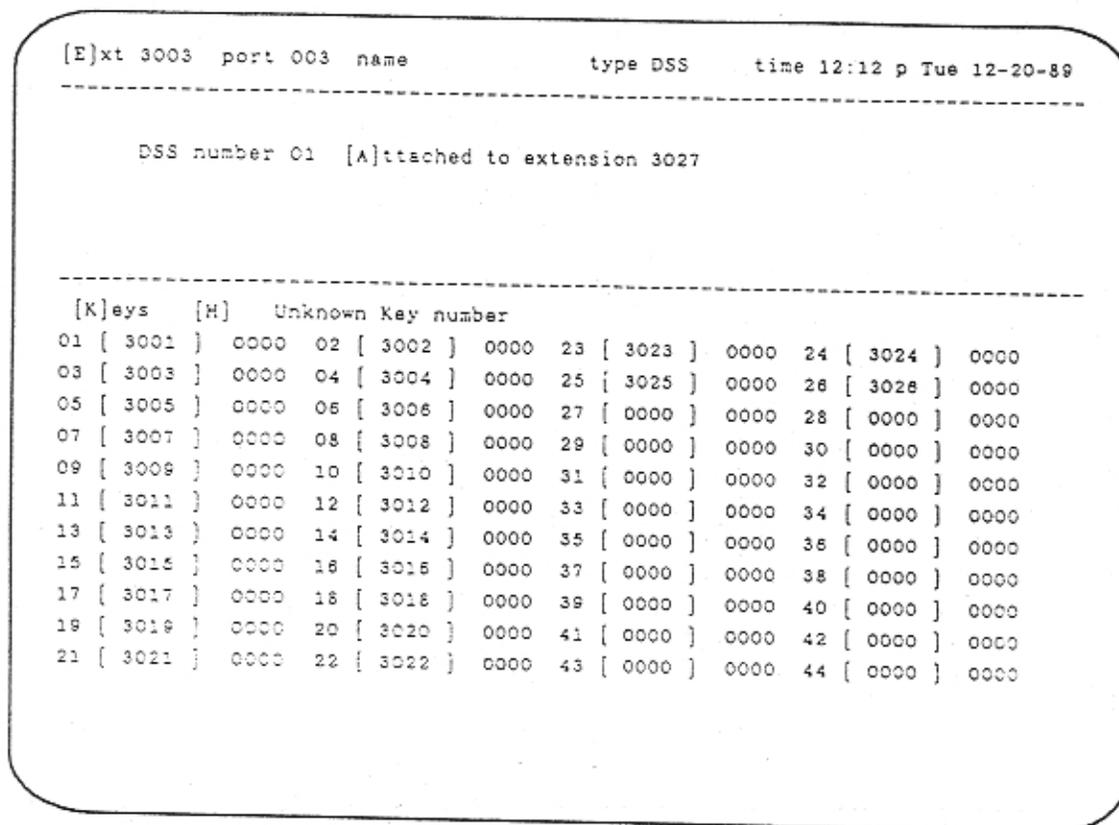


Figure 2 DSS Programming Screen

6. Press A. This brings you into the *DSS Assignment* area of the screen. Enter the extension number of the station using this *DSS Console*.
7. Press K. This brings you to the *Keys* area of the *DSS Programming* screen. Program the 44 available keys with the desired key codes. The keys appear on the *DSS Console* in the same manner as they appear on the *DSS Programming* screen.

The DSS programming is completed.

### How To Obtain Additional Copies Of This Facts

This Technical Facts is intended to be copied for any additional quantity required; therefore, the Technical Facts is not available through the EXECUTONE Inside Sales/Customer Service Department.

# ISOETEC® Digital System Feature Comparison

Software Level Where Feature First Appeared:

FEATURE	15300 CPU - 228 ports					19300 CPU - 108 ports		
	4.25	4.51	5.26	5.52	6.50	1.03	2.11	3.04*
Account Codes and Speed Dial Keys					X			
ACD Simultaneous Forward				X				
Alarm			X					
Alternate Dialing		X						
Answer (G Screen)		X					X	
Auto Attendant and ACD (137-142)					X			
Auto Attendant Digit Timeout		X						X
Auto Attendant Enhancements			X	X				
Auto Attendant Music Option				X				
Auto Attendant Scheme 5					X			
Busy on DID	X						X	
Busy on DID Hunt Group					X			
Busy on Tie Lines		X						
Call Forward Busy Timer				X			X	
Call Forward to an Auto Attendant				X				
Call Forward to Station Speed Dial					X			
Conference Gain On-System Option		X						
Data Feature in the 108 port cabinet					X			
Dialing by Name			X					
Digital Voice Announcer support		X					X	
DID and Call Accounting Reports Option					X			
DID On & DID Digits (Fwd&VMS)					X			
DID Tagging	X						X	
Direct Speed Dial				X				
DISA/Tie Line Groups Dial Option				X				
Disable LCR Tones Option-Sys Option	X						X	
Display Extension Names			X					X
Display Telephone Changes					X			
Display Telephone Messages	X						X	
Divert Limit (B Screen)		X						
DND Override				X				
DNIS Option (with T1 or DID)				X				
DSS Console support			X					X
Extension Numbers over 228	X						X	
Expanded Operator Programming			X					
Flexible Numbering	X						X	
G Screen Updated	X						X	
Hands Free Camp On		X						

# ISOETEC® Digital System Feature Comparison

Software Level Where Feature First Appeared:

FEATURE	System/228 CPU				System/108 CPU	
	4.25	4.51	5.26	5.52	1.03	2.11
OPX Port Card support			X			X
Remote Silent Monitor	X					
Ringing Group Pickup	X				X	
SLI Dial Option				X		
SLI SDN Enable Option				X		
SLT Automatic ACD Logon				X		
SLT Conference		X			X	
SMDR Prints Calls over 59:59	X				X	
Software Defined Network				X		
System Reset Timer		X				
System Speed Dial Numbers to 999		X				
Tap On Extension			X			
Transparent Intercom Dialing			X			
Unsupervised Conference Key				X		
VMS Delay (G Screen)		X				X
VMS Integration Downloadable				X		X
6 Key Phones with ACD			X			
6 Key Phones In/Out Feature				X		

Note: A System/228 CPU may be installed in a System/108 cabinet to add the features supported by the System/228 CPU. However, the Data Feature cannot be used when a System/228 CPU is installed in a System/108 cabinet.

# ISOETEC® Digital System Feature Comparison

Software Level Where Feature First Appeared:

FEATURE	15300 CPU-228 ports					19300 CPU-108 ports		
	4.25	4.51	5.26	5.52	6.50	1.03	2.11	3.04*
Handset Barge-In			X					
Hunt Group Busy Recall Timer				X			X	
Hunt Pick (LCR)			X					
ILATA					X		X	
Integrated Operator Remove Extension Names					X			X
LCR Key Out Only					X			
LVFAC					X			
Message Waiting Key				X		X		
MOH by CO				X				
Multiple DISA Calls		X						
Operator Digits 350 ms-Sys Option			X				X	
Operator Second Transfer Key	X					X		
Operator Transfer Icm Calls	X					X		
OPX Flash				X			X	
OPX Port Card support			X				X	
Remote Silent Monitor	X							
Ringing Group Pickup	X					X		
Screened Transfer for VMS & Auto Att.					X			
SLI Dial Option				X			X	
SLI SDN Enable Option				X				
SLT Automatic ACD Logon				X				
SLT Conference		X				X		
SMDR Prints Calls over 59:59	X					X		
Software Defined Network				X				X
System Reset Timer		X						
System Speed Dial Numbers to 999		X						
System Speed Dial Override Toll Restriction					X			
Tap On Extension			X					
T1 Support					X			
Transparent Intercom Dialing			X					
Unsupervised Conference Key				X				
VMS Delay (G Screen)		X					X	
VMS Integration Downloadable				X			X	
Volume and Digit Duration (Fwd & VMS)					X			X
4-wire E&M Tie Line port card support					X			
440Hz Tone for Single Line Telephones					X			X
6 Key Phones with ACD			X					
6 Key Phones In/Out Feature				X				

\* Version 3.04 does not support the optional Data Feature.

# EXECUTONE Information Systems, Inc.

## Corporate Memorandum

February 21, 1990

To: All District Managers  
All Sales Managers  
All Operations Managers  
All Independent Distributors

FROM: Terry Atwood, Director of Marketing

No.: 90-1373

SUBJ: **New Software for Isoetec Digital System 108 CPU**

### Recommended Distribution:

- Distributor/District Manager
- Sales Manager
- Sales Staff
- Operations Manager
- Operations Staff
- Technical Staff
- Accounting
- Purchasing Manager

DAVIS  
Lain  
Vign...

*Terry Atwood*

I am pleased to announce the availability of a new, updated version of software for the Isoetec Digital System 108 CPU. This software, version 2.11, replaces current version 1.03 and will begin shipping on all new 108 CPUs (part number 19300) immediately.

Among the feature and capability enhancements included in 2.11 are the following:

The capability to utilize the 8-port SLT/OPX Station Card (part number 15660). (Remember that when this port card is utilized in the system, the DTMF Receiver Combo card and the tri-output power supply are required.)

The call transfer and camp-on features for single-line 2500 type telephones have been modified. The new operation offers a user who is on the telephone and receives a camp-on tone the choice of transferring the first call before accepting the camped-on call or just placing the first call on hold.

The voice mail integration software has been removed and is now a downloadable software option. This feature in the 108 has been assigned the same part number (440252) as well as the same cost and retail pricing as the 228 voice mail integration software. Although you must always order this software when you connect a voice mail system to the 108, the charge for it is applicable only when the customer wishes to connect a non-Executone/Isoetec provided voice mail system.

Occasionally it becomes necessary for you to upgrade the software in an existing /108 system to add new features or to enhance the operation of existing features. It is not our intention to charge you for the voice mail integration in these cases. In order for us to administer this program properly, we must receive a list from you of all your /108 systems currently installed with voice mail. These installations will be "grandfathered" and, if you must upgrade the software to 2.11, the Darien LCF.

department will download the integration software at no charge. Please send this list to Mildred Whitehead in Darien as soon as possible but no later than March 30th.

Further details regarding these enhancements as well as others available in this new release of software can be found in Technical Facts No. 1684 dated 2/14/90 and mailed to you from Scottsdale today.

If you have any questions, please feel free to contact John Monroe in the Darien Product Management department or me in Scottsdale.

# EXECUTONE Information Systems, Inc.

## Corporate Memorandum

February 22, 1990

To: All District Managers  
All Sales Managers  
All Operations Managers  
All National Accounts Managers  
All Independent Distributors

From: Terry Atwood, Director of Marketing

No.: 90-1378

Subj: Isootec Digital System 108 CPU Features

### Recommended Distribution:

- Distributor/District Manager
- Sales Manager
- Sales Staff
- Operations Manager
- Operations Staff
- Technical Staff
- Accounting
- Purchasing Manager

Over the past few months, there has been a significant amount of confusion regarding the features that the 108 CPU (part number 19300) provides in the 108 port cabinet and, therefore, when the 228 CPU should be substituted.

The following features contained in the current shipping version (5.52) of the 228 CPU software are not included in the current shipping version (2.11) of the 108 CPU (the major features are bolded):

- ACD (Basic, Dynamic, Advanced and Custom)**
- Alarm Indication on Attendant Console
- Alternate Dialing (dial 9 and 8 for outside access)
- Automated Attendant Busy and No Answer Recordings**
- Automated Attendant Programmable Digit Timeout
- Automated Attendant Music Option (during call transfer)
- Busy on Tie Lines
- Call Forward to Automated Attendant (via G screen)
- Conference Gain (system wide option)
- Dial By Name (intercom calls)**
- Direct Speed Dial (single button access)**
- DISA/TIE Group Option
- Divert Limit (programmable)
- DND Override (via programmed button on telephone)
- Dialed Number Identification Service (DNIS)
- DSS Console**
- Handsfree Camp-on (display/data sets)
- Handset Barge-in (attendant)
- IN/OUT Feature on 6-Key Telephone
- Music-On-Hold by CO Line
- Operator Terminal Display Name with Extension Number**
- Operator Terminal Programmable Function Keys
- Page Over Tie Lines

Remote Access to Silent Monitor  
Software Defined Network (SDN)  
**Silent Monitor**  
SLT Access to SDN  
System Reset Timer (automatic daily)  
**System Speed Dial Expansion (to 999 numbers)**  
Tap-On Extension  
**Transparent Intercom Dialing**  
Unsupervised Conference Key

In addition to these features, the 108 CPU has only one call accounting option with the ability to store approximately 4,000 calls.

If greater call accounting call record storage or any of the above features are required in a system utilizing the 108 port cabinet, the 228 CPU is required.

Remember that when the 228 CPU is used in the 108 port cabinet:

The DATA feature cannot be used.

The VCM/DCM (part number 15460-1) should be used.

The Memory Module III (part number 15290) is required for ACD, Call Accounting and Automated Attendant.

Remember, also, that the recent introduction of 108 CPU software version 2.11 includes support for the OPX/SLT 8-port station card. The 228 CPU is no longer required to support this card.

If you have any questions, please give me a call.

# EXECUTONE Information Systems, Inc.

## Corporate Memorandum

February 22, 1990

To: All District Managers  
All Sales Managers  
All Operations Managers  
All National Accounts Managers  
All Independent Distributors

FROM: Terry Atwood, Director of Marketing

No.: 90-1379

SUBJ: Isoetec Digital System Feature  
Comparisons

### Recommended Distribution:

- Distributor/District Manager
- Sales Manager
- Sales Staff
- Operations Manager
- Operations Staff
- Technical Staff
- Accounting
- Purchasing Manager

Attached you will find an updated feature comparison chart for the Isoetec Digital System.

The additions include the new features added to the 108 port configuration with the 1.03 and 2.11 versions of 108 CPU software.

Please make sure that your sales, technical and CSR personnel receive copies of this document.

Large Verified Forced Account Codes  
LCR Key Out Only  
Line Types 81-84 and 90  
Music-on-Hold by CO Line  
Page Over Tie Lines  
Remote Silent Monitor  
Silent Monitor  
System Reset Timer  
System Speed Dial Bins up to 201-999  
System Speed Dial Overrides Toll Restriction  
Tap-On Extension  
Target Tie Line To Auto Attendant  
Transparent Intercom Dialing  
T-1 Compatibility  
Unsupervised Conference Key  
VMS/ATT Screened Transfers

Please make certain that all appropriate employees in your organizations receive a copy of this document.

# IDS 84 CONFIGURATION PRODUCT DESCRIPTION

## 22200 EQUIPMENT CABINET

The Equipment Cabinet contains the power supply and the mother board which has eight card slots. One card slot is used for the CPU/VCM (p/n 22350). Five card slots support the 4x8 CO/STA cards (p/n 22550). Two card slots can be used to support a choice of the following existing IDS cards:

15610	DID line card (12 circuits)
15620	GS/LS CO line card (12 loop or ground start circuits)
15650	DTMF Combo card (6 receivers & 6 digital stations)
15660	SLT/OPX station card (8 SLT circuits)
1680	2 wire E&M TIE Line Combo card (4 TIE & 6 phone only stations)
15700	Digital Station card (supports only the 1st 8 of 12 circuits)
15590	LSI GS/LS CO line card (12 circuits)

NOTE: No more than two existing IDS cards can be installed in the 22200 cabinet.

## 22350 LSI CPU/VCM CARD

This card provides all memory and common control functions, plus all voice switching required for the system. It has a built-in 300 baud modem, one RS-232 port, and one audio input jack for BGM/MOH source. Also provided are connectors for the installation of an optional I/O Port Expansion Module and a 1200 baud modem module. One CPU/VCM is required per system.

## 22360 I/O EXPANSION MODULE

The I/O Expansion Module installs optionally on the LSI CPU/VCM card (p/n 22350). It adds one RS-232 I/O port and one RS-422 I/O port. These ports can be used to support the need for additional I/O ports for either printer, programming terminal or Integrated Operator Terminal stations.

## 22370 1200 BAUD EXPANSION MODEM MODULE

The 1200 Baud Expansion Modem Module installs on the LSI CPU/VCM card (p/n 22350). It allows the 1200 baud rate to be used for the remote system access features. All systems should be configured using this module.

## 22550 LSI 4X8 CO/STATION CARD

The 4x8 CO/Station card provides four loop start C.O. line interfaces and eight station positions. Up to five of these cards can be used in the IDS 84 Port Configuration cabinet. Each card can support one DTMF Receiver Module (22560).

## 22560 DTMF RECEIVER MODULE

This module installs optionally on the 4x8 CO/Station card (p/n 22550). The module provides the system with one DTMF receiver. It is used to support DISA, Auto Attendant and SLT station port cards. A maximum of five modules can be installed on the system.

**220002 84 MDF**

The 84 MDF is a main distribution frame consisting of two panels. One panel will support the C.O. line modular termination needs for up to five 4x8 CO/Station cards. The other panel will provide station termination needs for up to three CO/Station cards.

**220001 4x8 STATION PANEL**

This station panel is the same as used on the 84 MDF with a mounting frame. It can be used to terminate the station cables for up to three 4x8 CO/Station cards.

**22830 84 FERRITE KIT**

The 84 Ferrite Kit contains additional ferrite rings and cores required for installation on cables which exit the cabinet when more than four port cards are installed.

## STATION DEVICES SUPPORTED

The following is a listing of the existing station devices which can be used with this system:

### INTEGRATED OPERATOR TERMINAL

Part Number 40120

The Integrated Operator Terminal is comprised of three separate packages which require assembly. These packages are: the CRT, the integration kit, and the terminal connector. The completed assembly combines the operation of a phone with the visual cues provided by the CRT. This combination allows efficient call handling for the main attendant in a company. NOTE: Function and operation of the operator's terminal is identical to that of other IDS configurations. The IDS 84 port configuration, using the LSI CPU/VCM card and the optional I/O Expansion Module, will support up to three Integrated Operator Terminal positions. Each position requires the use of a RS-232 or RS-422 I/O port and a digital station port.

### 29 KEY DIGITAL DISPLAY PHONE

Part Number 82300

The 29-Key Digital Display Phone includes 20 programmable feature/line keys, 3 soft keys for display, 6 fixed function keys, a 64 character liquid crystal display, internal speaker and microphone for full handsfree operation, and a thumb wheel contrast adjustment for the LCD display.

### 28 KEY DIGITAL PHONE

Part Number 82100

The 28-Key Digital Phone provides 22 programmable feature/line keys, internal speaker and microphone for full handsfree operation and 6 fixed function keys.

### 17 KEY DIGITAL PHONE

Part Number 82200

The 17-Key Digital Phone provides 11 programmable feature/line keys, internal speaker and microphone for internal handsfree operation and 6 fixed function keys.

### 6 KEY DIGITAL PHONE

Part Number 82500

The 6-Key Digital Phone provides 6 fixed function keys controlling volume (Up & Down), transfers & conferences, outside line access, hold, and programming.

## Installation

1. Once the system has been installed and all stations are tested and working enter the Station Key log and clear it by pressing "C".
2. Make sure that all of the stations are showing the correct type of phone next to the respective station number.
3. Monitor the counters and make sure there are no changes.

## Trouble-shooting

If any counter has a high number, then do the following:

1. Check all the cabling to that station.

Check the punch down, the wiring of the jack, the base cord, and all amphenol connections.

2. If the problem still occurs replace the phone.
3. If the counter is still incrementing move the station to another port.

If the counter no longer changes replace the station card that previously supported the phone.

4. If the problem still persists contact the Technical Operations Group.

## DSS CONSOLE

The DSS uses a digital station port, is the size of a 17-Key Digital Phone, and has a total of 44 programmable keys. These keys may be programmed as DSS keys or feature keys. There may be a total of 10 DSS consoles per system and 3 DSS consoles may be assigned to one telephone. Each DSS console requires a station port.

## OPX INTERFACE

Part Number 15780

Requires the Tri-output Power Supply

The ISOETEC OPX Interface is a stand-alone unit which connects to a digital station port. It provides an interface for connection of single line (2500 type) telephones or other DTMF analog peripheral equipment. This unit can also provide Power Failure Transfer of one loop start CO line to an SLT connected to the OPXI.

## DIGITAL VOICE ANNOUNCER

Part Number 15870

Required for the Automated Attendant Option

The Digital Voice Announcer is a device that can answer a call via the Automated Attendant and play a pre-recorded message. The Digital Voice Announcer is the size of an OPX interface and is connected to a digital station port. The maximum message length is 63 seconds and is retained by a battery for a minimum of 72 hours in the event of a power failure.

## ELECTRONIC PHONE INTERFACE (EPI) 14K And 26K

Part Number 82020

Part Number 82030

The EPI is an add-on board built into the base cover of the ISOETEC Analog Electronic Phone which allows the use of the phone on the IDS. There are two models of the EPI. The 82020 is used with the Analog 14-Key Electronic Phone and the 82030 is used with the 26-Key Analog Electronic Phone. The Analog Electronic Display Phone does not work with the IDS 84 port configuration.

## COMMON IDS CARD SUPPORTED

Note: A maximum of two IDS common cards can be installed in the 22200 Cabinet.

### STATION PORT CARD

Part Number 15700

The station card provides the capability for connecting 8 digital phones to the system. The last 4 circuits are not supported. Provision has been made on the card for an output connection to the external page.

### LSI LOOP/GROUND START TRUNK CARD

Part Number 15590

Requires the Tri-output Power Supply

The card supports up to 12 loop start or ground start trunk lines.

### E + M TIE LINE COMBINATION PORT CARD

Part Number 15680

Requires the Tri-output Power Supply

This card provides 6 digital station ports and four 2-wire type II tie lines. The station ports provide for all of the features of the digital telephone except the Second Path Features.

### DID PORT CARD

Part Number 15610

Requires the Tri-output Power Supply

The DID port Card can provide access to 12 DID trunks.

### OPX PORT STATION CARD

Part Number 15660

Requires the Tri-output Power Supply and a DTMF Receiver Combination Port Card (p/n 15650) or DTMF Receiver Module (22560).

The OPX Port Card can be used to support any conventional tip and ring DTMF device such as 2500 sets, voice mail ports, FAX machines, or OPX's. The OPX Port Card is an 8 port card that can only be used in slots J1 and/or J2. The OPX Port Card will not work with rotary dial devices, and does not include power failure transfer.

### DTMF RECEIVER COMBINATION PORT CARD

Part Number 15650

This card provides six digital station ports and six DTMF receiver ports. The station ports provide all of the features of the digital telephone except the Second Path feature.

# Technical Facts



ISOETEC® DIGITAL SYSTEM

No. 1726

February 22, 1991

For Independent ISOETEC Product Distributors

## 84 PORT CONFIGURATION

This Technical Facts is being issued to provide a technical description of the 84 port configuration of the ISOETEC Digital System and procedures for installation and programming. Add this Tech Facts to the back of the ISOETEC Digital System/108 Technical Manual, part number 770330A.

### DESCRIPTION

The 84 port configuration introduces several new hardware components to the ISOETEC Digital System. A backplane has been designed in combination with a new CPU/VCM card, and a new 4x8 CO/Station port card.

### CABINET-BACKPLANE

This cabinet-backplane (p/n 22200) contains connectors for 8 circuit cards and one slot for the power supply. The power supply is an integral part of the cabinet-backplane. There are 5 connectors for 4x8 CO/Station port cards, 2 for other IDS port cards, and one for the CPU/VCM card. The card connectors are labeled J1 through J9 and are numbered from left to right. Connector J9 is for the power supply. The connectors are offset for the different types of circuit cards to avoid improper installation.

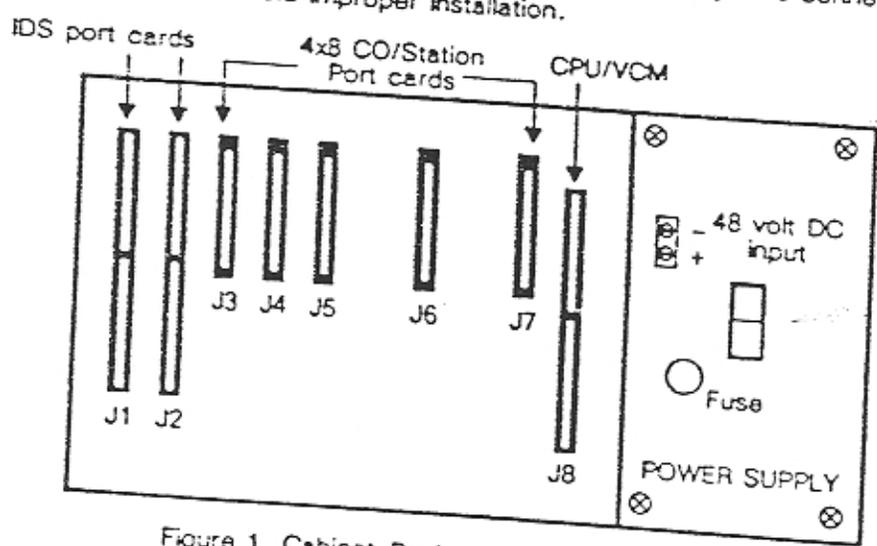


Figure 1 Cabinet-Backplane (p/n 22200) Layout

File a copy of this Technical Facts in your Master Technical Facts File and in your ISOETEC System/108 Technical Manual part number 770330A. Also list is on the Record of Changes Page.

John Monroe  
Product Management

### CPU/VCM - 22300

The CPU/VCM (p/n 22300) for the 84 port configuration combines the operation of the CPU, and the Voice Control Module into one card.

This circuit board is used exclusively in this configuration of the system. The CPU/VCM is responsible for all control functions, execution of all logic operations, and control of system modules. The CPU/VCM contains a 16-bit microprocessor (68000), and is capable of addressing 768 kilobytes of EPROM memory, 256 kilobytes of battery-backed static RAM, and a real time clock. There is one RS-232 input/output port on the CPU/VCM. The system reset switch is mounted on the CPU/VCM. System software, which is provided in EPROM memory, is installed on the Memory Module. The Memory Module is shipped with and mounted on the CPU/VCM.

**NOTE:** The reset button must be held in for at least 3 seconds before the system will reset.

The CPU/VCM contains the circuitry necessary for voice switching and conference connections. The CPU/VCM is responsible for all system tones, system timing, and station status control. The CPU/VCM contains the DTMF tone generators, the circuitry and connection (an RCA type jack) for background music and music on hold, and the system 300 baud MODEM. One CPU/VCM is required per system.

### 4X8 CO/STATION PORT CARD - 22500

This port card can only be installed in the cabinet-backplane part number 22200. The 4x8 CO/Station port card (p/n 22500) contains the circuitry necessary to connect 8 ISOETEC digital telephones, and 4 loop start CO lines to the system. See Figure 5. ISOETEC Digital stations may be placed a maximum of 1200 feet (using 24 gauge wire) from the 4x8 CO/Station card. The circuitry for the loop start CO lines can accommodate either polarity of tip and ring, and provides high voltage protection for the tip and ring inputs. The 4x8 CO/Station port card supports loop start CO lines only. These lines may be either DTMF signal or pulse signal. This card also has the circuitry necessary to support an external page. The card provides a place to mount a DTMF Receiver module. This DTMF Receiver module (p/n 22510) can be shared by all ports in the system, and is used for the Auto Attendant and DISA features, and the OPX port card.

### IDS PORT CARDS

The following standard ISOETEC Digital System port cards may be installed in the 2 IDS port card slots. These port cards function fully regardless of the configuration of the system.

- LSI Station (15700)

**NOTE:** When used in the 84 port configuration, system software addresses the first 8 of 12 digital stations ports on the Station port card. The remaining 4 ports are not used in this configuration.

- Loop/Ground Start Trunk # (p/n 15590)
- DTMF Receiver Combination (p/n 15650) Revision E or higher
- E&M Tie Line Combination (p/n 15680)
- OPX LSI (p/n 15660)
- Direct Inward Dial (p/n 15610)

**NOTE:** The T1 port card (p/n 15510) cannot be installed in the 84 port configuration of the system.

The following discontinued ISOETEC Digital System port cards may also be installed in the 2 IDS port card slots:

- Loop/Ground Start Trunk (p/n 15620)
- CO Interface (p/n 15600)
- Station (p/n 15640) - see above NOTE for LSI Station port card

## POWER SUPPLY

The system power supply is installed inside the cabinet in the first slot on the right. The power supply is designed to be an integral part of the system. When ordering the system cabinet, the power supply is included and already installed. See Figure 1.

## OPERATOR STATION

The standard operator station is a telephone with up to three DSS Consoles programmed to work with the telephone. The telephone and each DSS Console require a connection to a digital station port. In addition to the features available to all telephones, the operator also has the ability to program System Speed Dial numbers into the system, activate Background Music over an external paging system, and program certain other system features. The system supports a maximum of 3 operator positions.

## DSS CONSOLE

The DSS Console is the size of the 17-key telephone and has 44 programmable buttons. These buttons can be programmed with any of the key codes used with a 28-key telephone. The DSS is equipped with a speaker for audible tones. There can be a maximum of 10 DSS Consoles on the 84 port configuration of the system. Three DSS Consoles can be assigned to one extension.

## INTEGRATED OPERATOR TERMINAL

The Integrated Operator Terminal is optional on the 84 port configuration. This is a CRT terminal which gives a visual display of office calling activity, an accompanying keyboard used in conjunction with the terminal to give it commands, and a handset. The terminal is connected to the RS-232 input/output port of the CPU/VCM (p/n 22300). The Integrated Operator Terminal also requires a connection to a station port. The system supports one Integrated Operator Terminal.

## TELEPHONES

The 84 port configuration supports all ISOETEC Digital System telephones.

## FEATURE DESCRIPTION

All standard features available in software version 3.06 of CPU part number 19300 (108 port configuration) are available in software version 84-1.4 of the 84 port configuration. See the ISOETEC Digital System 108 Technical Manual (p/n 770330) for a description of these features.

**NOTE:** The system has one input/output port. This port may be used for either a programming terminal, Integrated Operator Terminal, or for a serial printer. If a serial printer is installed, the I/O port programming and all future system programming must be done using the built-in MODEM and the Remote Programming feature.

**NOTE:** The system does support the Management Reports feature, however, there is only the one input/output port. Therefore, the reports may be displayed on a terminal, but may not be printed out manually. The Report Scheduler can be used if a printer is connected to the I/O port. The Report Scheduler must be programmed using the Remote Programming feature.

**NOTE:** The system does support the Call Accounting Reports Option, however, there is only the one input/output port. Therefore, the reports may be displayed on a terminal, but may not be printed out. The reports can be printed if a printer is connected to the I/O port, however the Remote Programming feature must be used to tell the system to print the reports.

## FCC REGULATIONS

### PART 15

**WARNING:** This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference in which case the user, at his own expense, will be required to take whatever measures may be required to correct the interference.

The port cards are shipped with shielded cables. These cables must be used to install the system, and connected in accordance with the instructions provided in this manual to insure compliance with the Class A limits.

### PART 68

Before starting system installation, there are established FCC rules and regulations which must be observed. These rules permit this system to be directly connected to the telephone network. Standardized jacks are used for these connections. This equipment should not be used on party lines or coin operated lines.

FCC rulings state that the owner of the system to be installed give the local telephone company sufficient advance notice of intention to use privately owned telephone equipment. The owner must also furnish information as to the identification of the particular lines to be connected to the system and the affected telephone numbers. FCC registration information on the model name, FCC-assigned registration number and ringer equivalence information must also be furnished. The ringer equivalence (REN) is used to determine how many devices can be connected to a telephone line. In most areas, the sum of RENs of all devices on one line should not exceed five. If too many devices are attached, they may not ring properly.

Should there be any question that the customer-provided equipment may cause harm to the telephone network, the local operating company is required to notify the customer of an impending temporary interruption of service. The customer must be given the opportunity to correct the existing problem, if possible. The telephone company must also advise the customer of their rights for filing complaints before the FCC.

The telephone company may make changes in its technical operations and procedures. If such changes affect the compatibility or use of this system, the telephone company is required to give adequate notice of the changes.

Under no circumstances is the equipment to be altered or modified without written approval of the manufacturer. Failure to gain permission for any modification will void the warranty. If a system malfunction is suspected, the connectors terminating the equipment to the CO lines should be disconnected.

### SERVICE REQUIREMENTS

In the event of equipment malfunction, all repairs should be performed by an ISOETEC authorized agent. It is the responsibility of users requiring service to report the need for service to an ISOETEC authorized agent.

### SUPPLEMENT FOR CANADIAN EQUIPMENT

**NOTICE:** The Canadian Department of Communications label identifies certified equipment. This certification means that the equipment meets certain telecommunications network protective, operational and safety requirements. The Department does not guarantee the equipment will operate to the user's satisfaction.

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. In some cases, the company's inside wiring associated with a single line individual service may be extended by means of a certified connector assembly (telephone extension cord). The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations.

Repairs to certified equipment should be made by an authorized Canadian maintenance facility designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment.

Users should ensure, for their own protection, that the electrical ground connections of the power utility, telephone lines and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.

**CAUTION:** Users should not attempt to make such connections themselves, but should contact the appropriate electric inspection authority, or electrician, as appropriate.

The Load Number assigned to each terminal device denotes the percentage of the total load to be connected to a telephone loop which is used by the device, to prevent overloading. The termination on a loop may consist of any combination of devices subject only to the requirement that the total of Load Numbers does not exceed 100. An alphabetic suffix is also specified in the Load Number for the appropriate ringing type (A or B), if applicable. The Load Number for the accompanying equipment is 100. As a consequence, no additional equipment may be connected to any telephone loop to which this equipment is being connected.

CONNECTING ARRANGEMENT CODE: CA11A

This equipment does not exceed the Class A limits for Radio noise emissions from digital apparatus set out in the Radio Interference Regulation of the Canadian Department of Communications.

## TRUNK ORDERING INFORMATION

*Public Network:*

Interface Port Card	Facility Interface	Ringer Equivalence	Network Jack
4x8 CO/Station Port (p/n 22500)	02LS2	1.9 B	RJ14C or RJ21X

NOTE: Refer to the IDS 108 Technical Manual, Installation Section, for Trunk Ordering Information for other IDS port cards

## FCC REGISTRATION NUMBERS:

The ISOETEC® Digital System is registered with the Federal Communications Commission three ways. The registration number used depends on which features are being provided to the customer.

Key System: DHF7AS-10270-KF-E

Hybrid System: DHF7AS-10268-MF-E

PBX System: DHF7AS-10267-PF-E

In order to be used as a key system, the system must not use the following features:

Group Keys

Least Cost Routing

OPX Outgoing trunk access

Prime line access by group

Six key telephones

If any of these features are used, the system MUST be used as a Hybrid, or a PBX.

## SITE REQUIREMENTS

Selection of a suitable location is the most basic, yet most critical consideration in the installation of a telephone system. The following factors should be considered when choosing an appropriate location for equipment installation:

- Ample space must be allowed to remove the cabinet cover, to access assemblies and cards within the cabinet and allow space for the MDF (Main Distribution Frame).
- Location of CO/PBX line terminations must be considered when selecting a location for the cabinet. In the case of telephone company lines, FCC approved connectors supplied by the telephone company, should be within 5 feet (1.5 meters) of the cabinet/main distribution frame.
- To minimize the length of cable runs between the stations and the system cabinet, the location of the majority of the telephone sets (stations) should be taken into consideration when selecting a location for the cabinet.
- A well ventilated, and well lighted area having an optimum temperature range of 60° to 80° F and a relative humidity range of 5 to 90% (non-condensing) must be provided.
- Area lighting should be adequate for installation and maintenance of the system. Hazardous or flammable materials should be removed from the vicinity. The immediate area must not be subject to flooding or excess moisture. The cabinet should be isolated from areas of moving machinery or equipment. It is also recommended that static electricity-producing carpets not be installed in this area.
- A separately fused, dedicated 117 Volts AC,  $\pm 10\%$ , 15 Amp., 60 Hz, single phase, 3-wire (parallel blade with ground) power outlet should be located within 5 feet (1.5 meters) of the system power supply.
- The cabinet and main distribution frame should be placed in an electrically noise free environment, isolated and shielded from equipment that causes electro-magnetic interference (EMI) or radio frequency interference (RFI). Examples of electrical noise are rotating electrical machinery and arc welding equipment. Floor coverings that generate static electricity should be avoided.
- The system cabinet should not be installed close to any equipment which may produce RFI (Radio Frequency Interference) such as a radio frequency transmitter.
- If the system is to be installed in a location prone to lightning strikes, provide lightning protection on the power line, any station cable runs outside the building, and CO lines.

## INSTALLATION PLANNING

Prior planning of the installation will aid in a smooth cut-over and a satisfied customer. Select a suitable location for the system. Determine the number of telephones of each type, the number of 4x8 CO/Station cards, station port cards, and CO line port cards from the sales contract and discussions with the customer.

**NOTE:** Only one station set is allowed per extension number. It is not possible to bridge station ports so that an extension number may appear in more than one location.

Programming information should also be gathered from the customer at this time so that the system may be programmed either before, or while the system is being installed.

Determine the location and type of each telephone, and mark floor plans accordingly.

Determine the location for the operator stations, and mark the floor plans.

Arrange for power cabling (if necessary) and station cabling of the site.

If the system is to be installed in an area subject to frequent lightning storms, consideration should be given to providing additional lightning protection on the CO lines beyond what is provided by the local telephone operating company.

NOTE: Installers should be trained and thoroughly familiar with the basic components of the ISOETEC Digital System before attempting installation of this product.

## CABINET INSTALLATION

### PREPARATION

Once the area for the telephone equipment has been selected, mount a plywood back board to the wall. The back board size will vary depending upon the size of the MDF. The entire system and frame will be mounted on a 4' x 6' x 3/4" plywood. If mounting the cabinet alone, the minimum back board size is 25" x 17" x 3/4". A fully loaded cabinet can weigh approximately 64 lbs. Make certain proper mounting procedures are followed.

NOTE: Check local building and electrical codes before mounting the system. For example, certain areas may require a flame retardant plywood back board.

Mount the cabinet to the plywood using 3/4" #12 pan-head sheet metal screws such that the top of the cabinet is approximately three feet (1 meter) from the ceiling, and bottom is four feet (1.2 meters) from the floor. Make certain before mounting the cabinet that circuit cards slide easily in and out of their respective card slots.

Use the mounting template supplied with the cabinet to locate the mounting holes (see also Figure 2). Drill the holes and mount the cabinet.

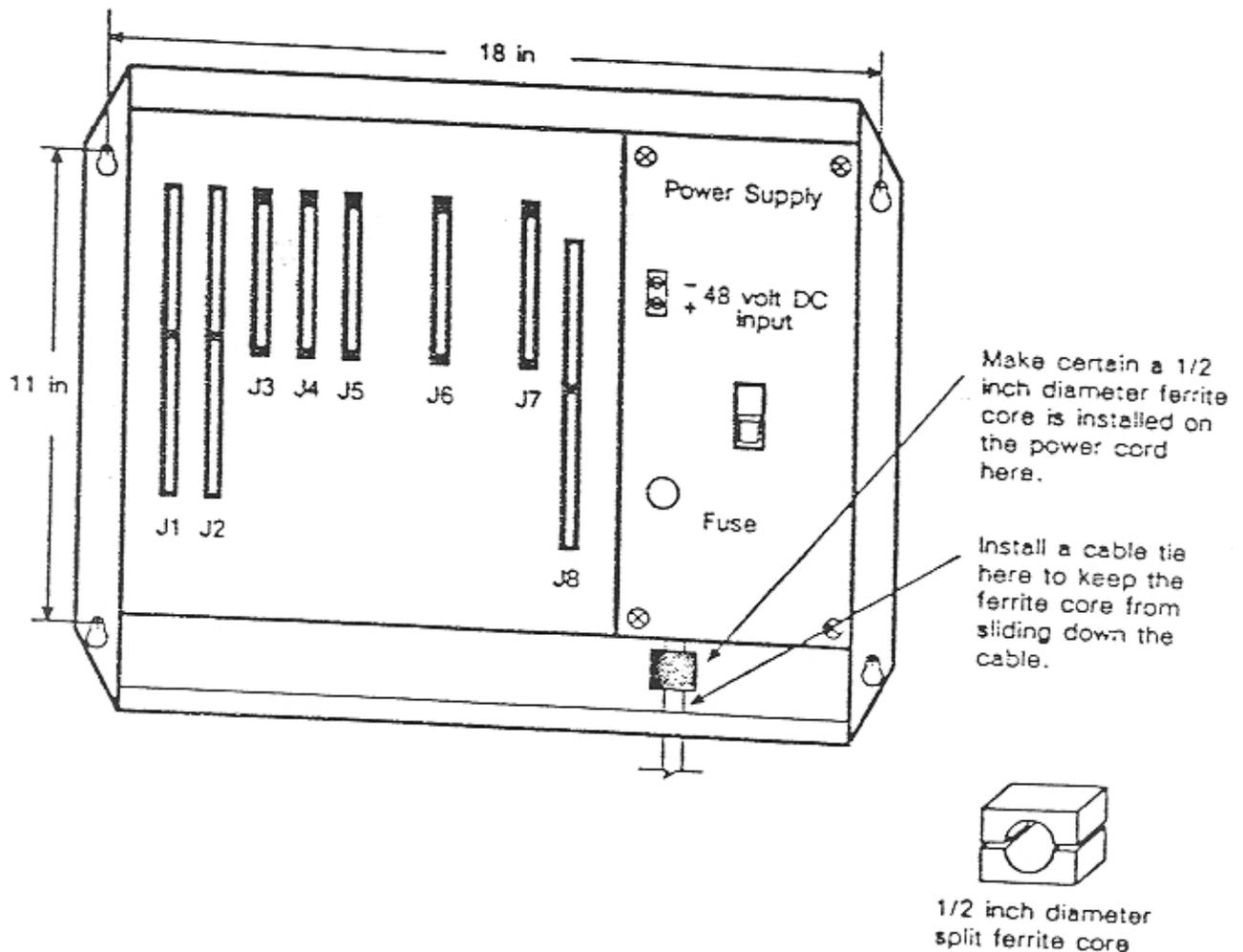


Figure 2 Mounting Holes For The Cabinet

## GROUNDING THE SYSTEM

The system does not require a cold water ground.

## POWER SUPPLY

The power supply is mounted inside of the cabinet. The power supply cord plugs into an isolated, dedicated, and dedicated ground 117 Volt AC outlet for power. This outlet should be located within 5 feet (1.5 meters) of the power supply.

**NOTE:** Make certain a 1/2 inch diameter ferrite core is in place on the power cord at a point as close to the power supply as possible. If this core is not in place, it is shipped with the cabinet and must be installed before operating the system. See Figure 2 for the proper location. Keep the ferrite core from sliding down the cable by installing a cable tie on the power cord just below the ferrite core.

The power supply is installed inside the system cabinet, on the right side, in the first card slot (J9). The power supply is designed to be an integral, structural part of the system. Do not attempt to install the system, or interface cards unless the power supply is installed with all four screws securely in place. The cabinet, part number 22200, includes the power supply already installed. The power supply is recognized under the Component Program of Underwriters Laboratories Inc.

The power supply is unique in that the transformer is not present on the power supply card and its enclosure. The transformer is mounted inside the cabinet next to the bottom right of the backplane. When the power supply card is installed, the transformer is totally enclosed by the power supply card's "L" shaped enclosure, and the right side of the cabinet. This creates a totally enclosed, operational, power supply. Since the transformer is installed in the cabinet, and the power supply card is removable from the cabinet, the AC connections are made directly to the system backplane.

**WARNING:** Since hazardous voltages are always present on the backplane while the system AC power cord is plugged in, AT NO TIME SHOULD THE POWER SUPPLY CARD BE REMOVED WHILE THE SYSTEM AC POWER CORD IS PLUGGED IN. THE POWER SUPPLY BOARD AND ITS "L" SHAPED METAL ENCLOSURE PROVIDE THE ONLY PROTECTION FROM SHOCK HAZARD WHILE THE AC POWER CORD IS PLUGGED IN. There are very few instances when the power supply card should be removed. If an instance arises where it must be removed, ALWAYS unplug the system AC power cord FIRST.

The power supply cord plugs into an isolated, dedicated, and dedicated ground 117 volt AC outlet for power. This is necessary to prevent possible voltage spikes and transients that may be caused by equipment sharing the same AC circuit.

The AC connection to the power supply requires a parallel blade with a ground receptacle. A three wire to two wire isolation adapter should not be used. The use of an ISOBLOK surge suppressor (ISOETEC p/n 440129) is required.

## OTHER POWER REQUIREMENTS

The spring connectors on the front panel of the power supply are used to connect a 48 volt DC power supply to the system. This supplies 48 volts to the backplane for use with the Loop/Ground Start Trunk II port card and the E&M Tie Line Combination card.

**NOTE:** If a Loop/Ground Start Trunk II port card is to be installed and ground start trunks are to be used, connect the positive side of the 48 volts DC supplied to the cabinet to the same ground source as the telephone company ground. Do not use the telephone company ground itself.

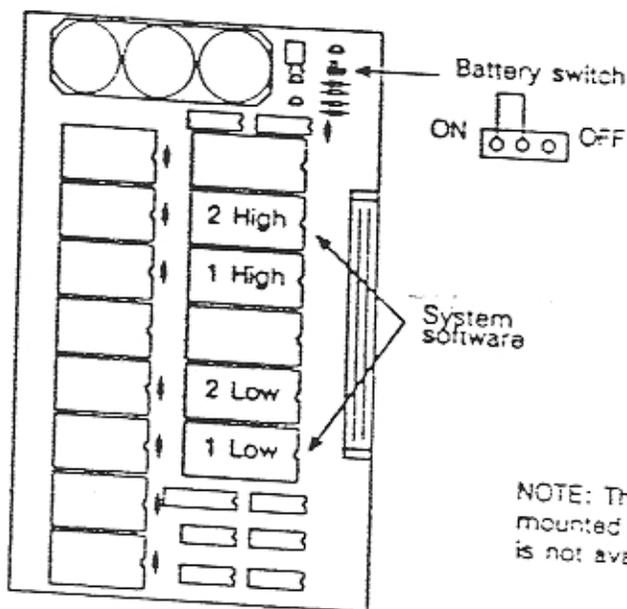
If the system is to be installed with E&M Tie Line Combination or Loop/Ground Start Trunk # port cards, a separate 48 volt DC regulated power supply is required. The power output for the power supply depends on how many of each type card is to be installed. Each of these port cards draws approximately 60 milliamps per card. The power supply is wired to the connector on the left side of the system power supply (see Figure 1).

### CIRCUIT CARD REQUIREMENTS

The number of telephones and lines required determine how many port cards are needed. In addition, a CPU/VCM card is required.

#### CPU/VCM CARD - 22300

The combination Central Processor Unit (CPU) and Voice Control Module (VCM) card is installed in the next right-most slot of the backplane in slot J8. The power supply is installed in the right-most slot. Remove the Memory Module and activate the battery backup switch (see Figure 3) at this time. Mount the Memory Module on the CPU/VCM before installing the card in its slot. The CPU/VCM board is inserted into the slot with components on the card facing the right. This board must NOT be installed with the power on. The edge connector on the CPU/VCM is offset to prevent it from being installed in an incorrect slot. Do not force the card into another slot. One CPU/VCM is required per system.



NOTE: The Memory Module is shipped mounted on the CPU/VCM - 22300 and is not available separately.

Figure 3 Memory Module

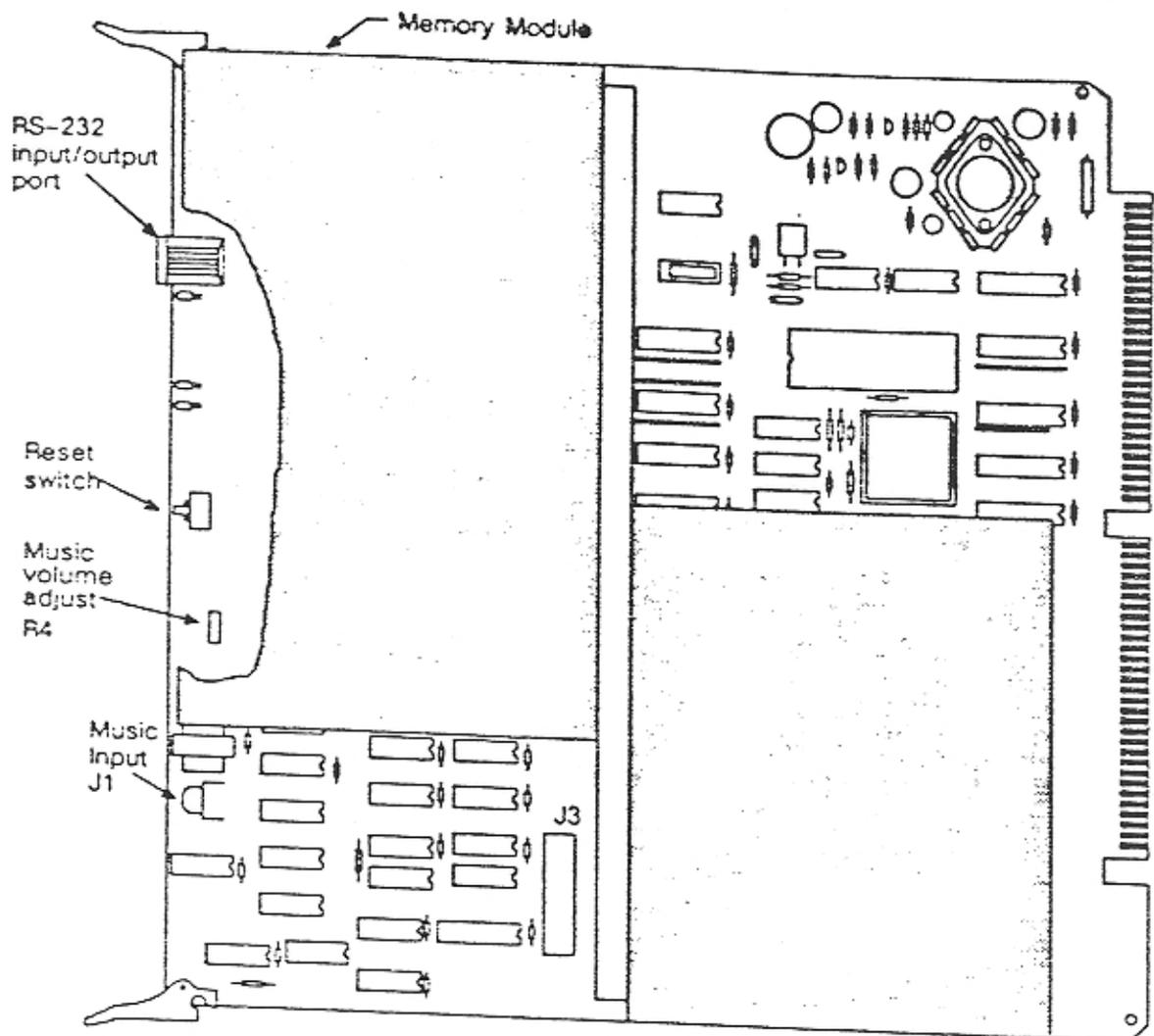


Figure 4 CPU/VCM Card - 22300

### 4x8 CO/STATION PORT CARD - 22500

The 4x8 CO/Station card is installed in slots J3 through J7 only. One card is installed for each 4 CO lines and 8 stations to be connected. This card also has the circuitry necessary to support an external page. The external paging system is connected using the last pair in the port card-to-MDF cable. The edge connectors on port cards are offset to prevent them from being inserted into another slot.

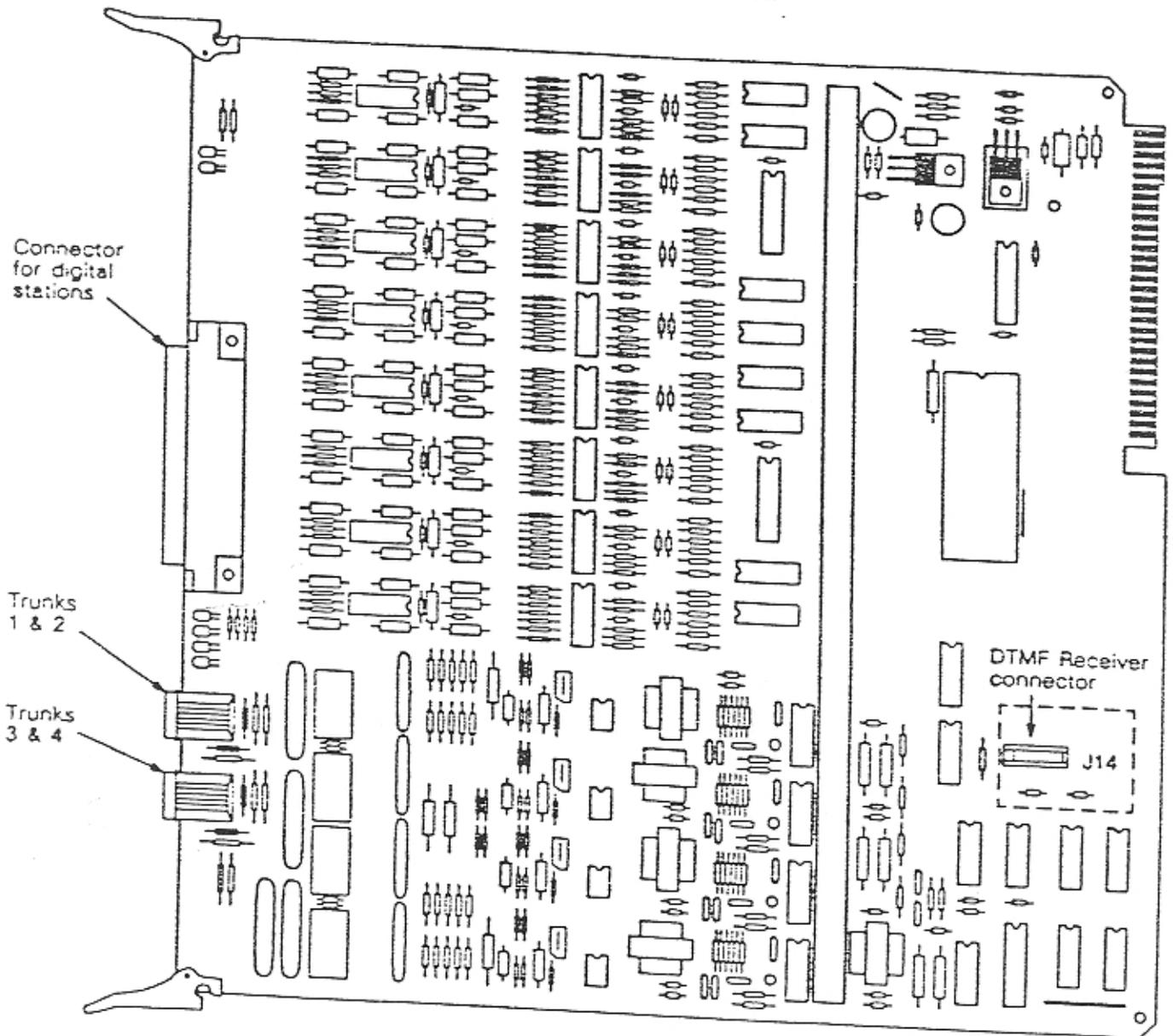


Figure 5 4x8 CO/Station Port Card - 22500

### DTMF RECEIVER MODULE - 22510

A DTMF Receiver module can be mounted on each of the 4x8 CO/Station cards. Locate the connector of DTMF Receiver over connector J14 on the 4x8 card such that the module is lined up with the outline on the card. Make certain the pins of the connector are lined up and press the module into place.

**CAUTION:** Make certain the module connector is seated properly before powering up the 4x8 card. If the module is installed incorrectly, the module may be damaged.

## IDS PORT CARDS

The following standard ISOETEC Digital System port cards may be installed in the 2 IDS port card slots (J1 and J2): LSI Station (15700), Loop/Group Start Trunk II (p/n 15590), DTMF Receiver Combination (p/n 15650) Revision E or higher, E&M Tie Line Combination (p/n 15680), OPX LSI (15660), and DTD (p/n 15610).

NOTE: When used in the 84 port configuration, system software addresses the first 8 of 12 digital stations ports on the Station port cards. The remaining 4 ports are not used in this configuration.

NOTE: An external 48 volt DC power supply must be connected to the system when using the the Loop/Group Start Trunk II or the E&M Tie Line port card. The positive side of the power supply must be connected to ground when using ground start trunks.

NOTE: Stations using the second voice path of a digital display telephone MUST be connected to a 4x8 CO/Station or a Station port card. The DTMF Receiver and E&M Tie Line port cards do not support the second voice path of a digital display telephone.

## MAIN DISTRIBUTION FRAME

The IDS Main Distribution Frames are designed to simplify and speed the installation time of an ISOETEC Digital System. One 84 MDF connects up to 20 CO lines provided by the 4x8 CO/Station port cards and up to 24 stations (three 4x8 CO/Station port cards). A separate 4x8 Station Panel is required when installing the remaining two 4x8 CO/Station port cards. An IDS Station Panel may also be used to wire a 4x8 CO/Station port card. If other IDS port cards are to be installed in the system, use the appropriate IDS MDF panel. For example, the E&M Tie Line port card would use the IDS Station panel (p/n 220113). An L/G Start Trunk II card would use an MDF Trunk panel (p/n 220111).

84 MDF (part number 220002):

- 1 - CO panel (up to 20 CO lines)
- 1 - 4x8 Station panel (up to 24 stations)

4X8 Station Panel (part number 220001)

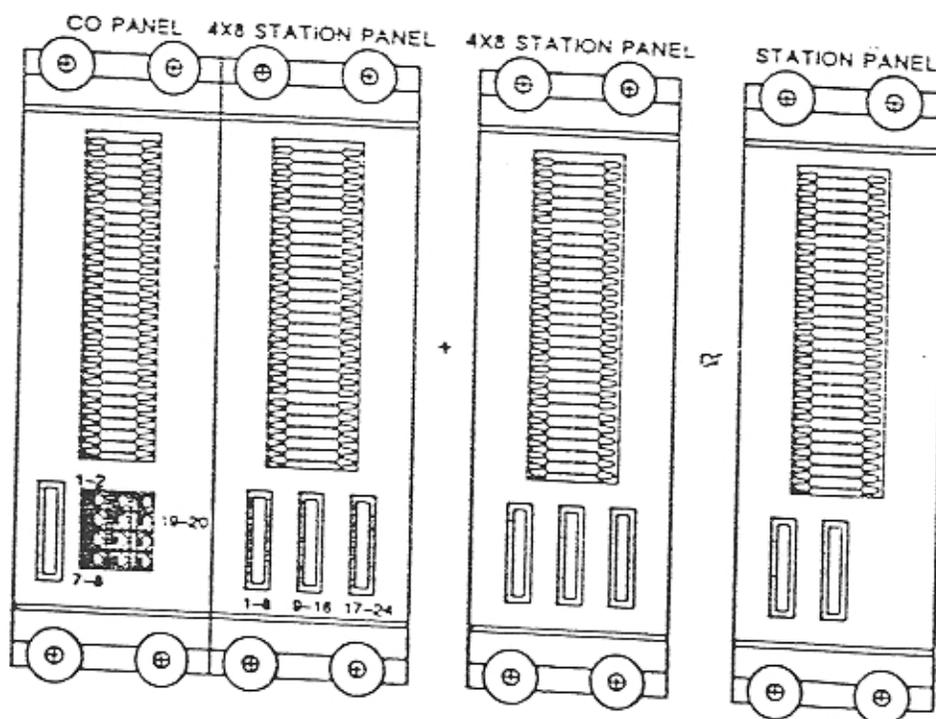


Figure 6 84 MDF And Extra Panels

## WIRING TELEPHONES TO THE MDF

Telephones are connected to the station ports via industry-standard twisted, 2-pair, 22 or 24 gauge wire. The station cable run from the main distribution frame to the station wall jack should not exceed 1200 feet. It is recommended that the station cable contain 4 pairs of wires.

Station cable is connected to the MDF at one end, and a modular connecting block at the other end. See Figure 10 for Station Panel designations. The modular line cord of the telephone is then plugged into the connecting block.

Only one station may be connected to a port. It is not possible to bridge station ports.

The system communicates with each phone using 4 wires. Two of the wires are used to send digital information (voice and control signals) from the system to the telephone, and two wires are used by the telephone to send digital information to the system. All 4 wires are necessary for the telephone to function. Each telephone connected to a station port has two digital channels. The primary channel is used for voice communications only. The secondary channel is used with digital display phones to provide a secondary talk path for off-hook announcing.

The Off Premise Extension Interface (OPXI), ISOETEC Electronic Phone Interface (IEPI), DSS Console, and Digital Voice Announcer are all considered to be telephones by the system. These interfaces are all wired to the system the same as a digital telephone.

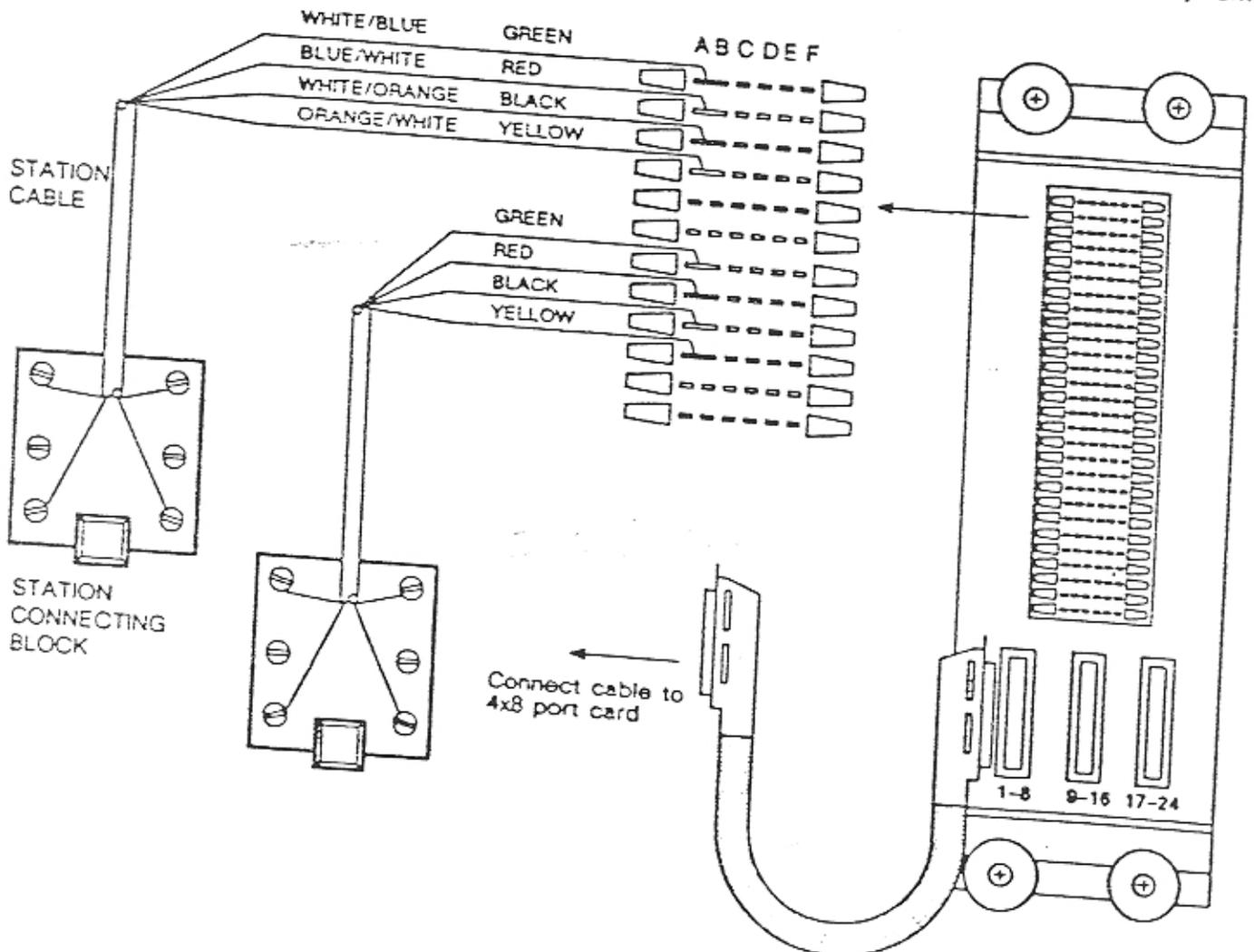


Figure 9 Station Wiring

For those who prefer to design their own main distribution frame, the following table lists the port configuration of the cable connected to a 4x8 CO/Station port card.

Table 1 4x8 CO/Station Port Card Station Cable Configuration

CABLE PIN AND COLOR	PORT	LEAD DESIGNATION	CONNECTING BLOCK COLOR
26 wht/blu	001	Transmit Tip	green
1 blu/wht		Transmit Ring	red
27 wht/org	002	Receive Tip	black
2 org/wht		Receive Ring	yellow
28 wht/grn	003	Transmit Tip	green
3 grn/wht		Transmit Ring	red
29 wht/brn	004	Receive Tip	black
4 brn/wht		Receive Ring	yellow
30 wht/slt	005	Transmit Tip	green
5 slt/wht		Transmit Ring	red
31 red/blu	006	Receive Tip	black
6 blu/red		Receive Ring	yellow
32 red/org	007	Transmit Tip	green
7 org/red		Transmit Ring	red
33 red/grn	008	Receive Tip	black
8 grn/red		Receive Ring	yellow
34 red/brn	009	Transmit Tip	green
9 brn/red		Transmit Ring	red
35 red/slt	010	Receive Tip	black
10 slt/red		Receive Ring	yellow
36 blk/blu	011	Transmit Tip	green
11 blu/blk		Transmit Ring	red
37 blk/org	012	Receive Tip	black
12 org/blk		Receive Ring	yellow
38 blk/grn	013	Transmit Tip	green
13 grn/blk		Transmit Ring	red
39 blk/brn	014	Receive Tip	black
14 brn/blk		Receive Ring	yellow
40 blk/slt	015	Transmit Tip	green
15 slt/blk		Transmit Ring	red
41 yel/blu	016	Receive Tip	black
16 blu/yel		Receive Ring	yellow
42 yel/org	017	Transmit Tip	green
17 org/yel		Transmit Ring	red
43 yel/grn	018	Receive Tip	black
18 grn/yel		Receive Ring	yellow
44 yel/brn	019	Transmit Tip	green
19 brn/yel		Transmit Ring	red
45 yel/slt	020	Receive Tip	black
20 slt/yel		Receive Ring	yellow
46 vio/blu	021	Transmit Tip	green
21 blu/vio		Transmit Ring	red
47 vio/org	022	Receive Tip	black
22 org/vio		Receive Ring	yellow
48 vio/grn	023	Transmit Tip	green
23 grn/vio		Transmit Ring	red
49 vio/brn	024	Receive Tip	black
24 brn/vio		Receive Ring	yellow
50 vio/slt	EXT. PAGE	Transmit Tip	green
25 slt/vio		Transmit Ring	red

## WIRING CO LINES TO THE 4X8 CO/STATION PORT CARD

The local telephone operating company usually provides CO lines on an RJ-21X connector. These lines are in turn connected to the TELCO IN jack on the 84 MDF. Active lines are then connected by the use of bridging clips from the left side of the MDF to the right side. Modular cords are then used to connect the modular jacks on the MDF to the modular CO line jacks on the 4x8 CO/Station port cards (see Figure 5). Each jack connects two CO lines to the port card. These jacks are wired in the same manner as an RJ14C connector, i.e., two CO lines per connector. One CO line is wired to the green/red pair. The second CO line is wired to the black/yellow pair. The pin sequence for the CO line connector is as follows:

Pin		
1	_____	n/c
2	_____	Tip 2
3	_____	Ring 1
4	_____	Tip 1
5	_____	Ring 2
6	_____	n/c

All CO line modular cables attached to an LSI 4x8 CO/Station port card must pass through a 1/2" thick, 2-3/8" diameter, round Fair Rite ferrite core three times before exiting the system in order to comply with FCC regulations. Two ferrites are included with the system cabinet. If the system is expanded, an additional core is required. Order part number (to be determined). Wrap each modular cable around the core three times as shown in Figure 11. Up to 5 cables can be wrapped around one ferrite core.

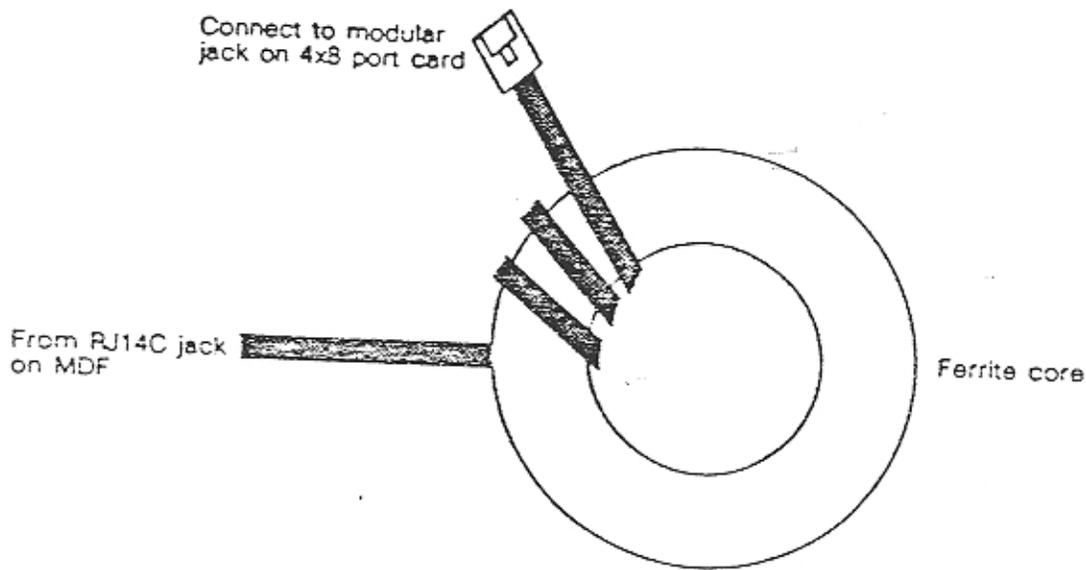


Figure 11 CO line Cable Through Ferrite Core

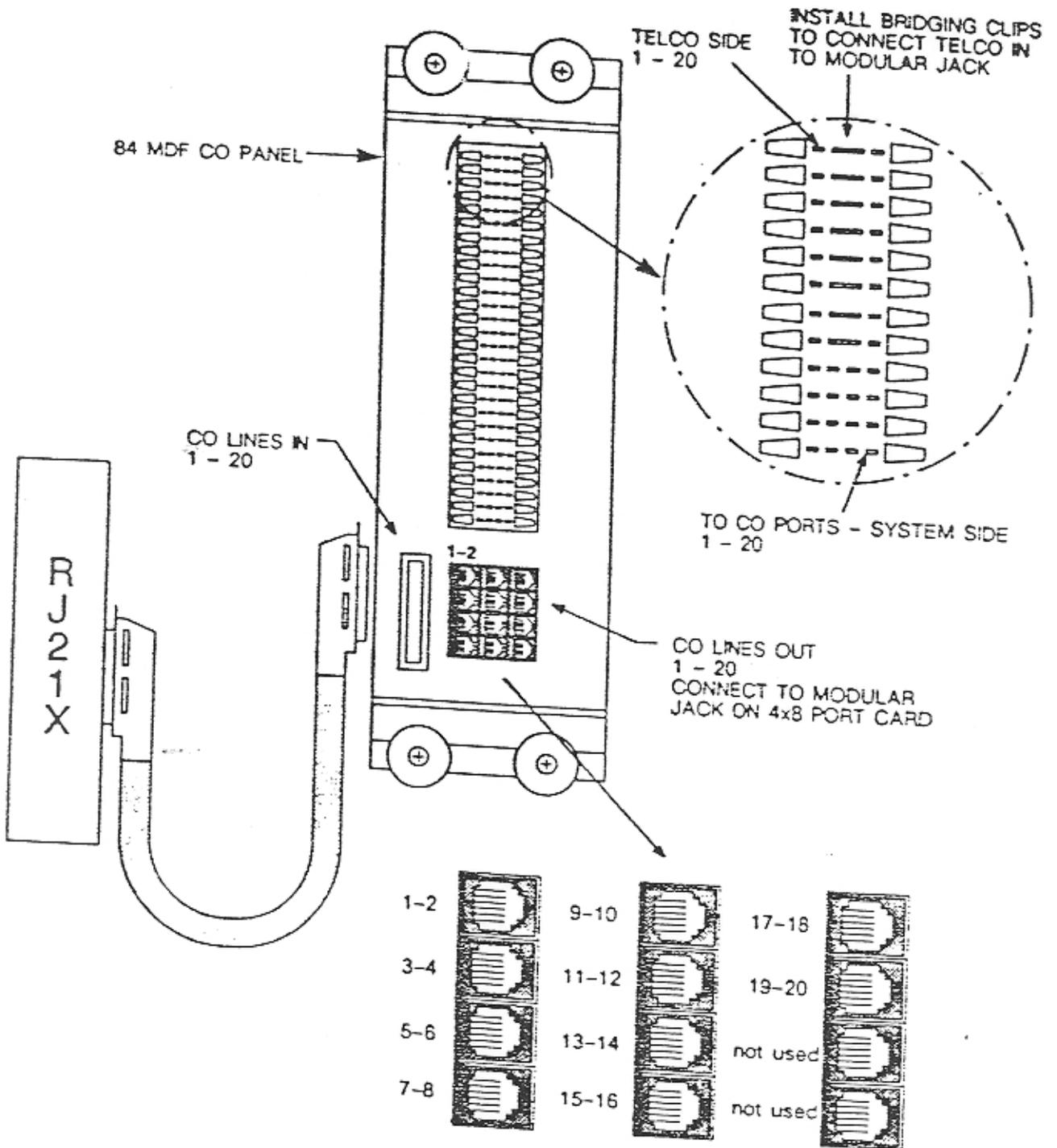


Figure 12 CO Line Cabling

### CONNECTING MUSIC TO THE SYSTEM

The source for Music On Hold (MOH) and Background Music (BGM) is connected to the system through an RCA type connector labeled J1 on the front edge of the CPU/VCM. See Figure 4 for the location of J1. Background Music/Music on Hold volume can be adjusted through a potentiometer located on the outside edge of the CPU/VCM. The potentiometer is labeled R4. To adjust the volume, place a call to one of the system's CO lines. Answer the call and place it on hold. Listen to the volume of the MOH in the originating telephone and adjust R4 to a comfortable listening level. To adjust Background Music, press the digit [\*] on the dial pad of a near by

station. Adjust the speaker volume of the telephone set to maximum with the [VOL ▲] key. Adjust R4 on the CPU/VCM to a comfortable listening level.

**NOTE:** The use of a radio broadcast, or pre-recorded music for Music On Hold could be perceived as a violation of copyright laws.

## POWER APPLICATION

### INPUT POWER SITE REQUIREMENTS

A separately fused, dedicated 117 Volts AC,  $\pm 10\%$ , 60 Hz, single phase, three wire (parallel blade with ground) power outlet should be located within 5 feet (1.5 meters) of the primary power supply.

**CAUTION:** The primary power line must be dedicated and isolated to prevent the inadvertent turning off of the system when lights or wall circuits are turned off.

The use of an ISOBLOK surge suppressor (ISOETEC p/n 440129) is required for system installation, and is STRONGLY recommended for any terminals or printers connected to the system.

Outlet wiring requirements should follow standard National Electric Code wiring practices for a 3 wire outlet.

**CAUTION:** Do NOT use 3 blade to 2 blade adapters. A properly grounded outlet is mandatory for proper system operation. Do NOT cut the ground blade from the system electrical plug.

### POWER UP

After all circuit cards are installed, make certain that they are seated firmly in their connectors.

Turn ON the power supply with the red switch located on the power supply housing.

## WIRING TO THE RS-232 PORT

The circuitry for the RS-232 I/O port resides on the CPU. This I/O port can be used for a programming terminal, Integrated Operator Terminal, or serial printer.

The RS-232 port is accessed using the 8-pin modular connector located on the outside edge of the CPU. See Figure 4.

Pin	Designation
1	
2	Receive Data (to system)
3	Signal Ground
4	Transmit Data (from system)
5	
6	Data Set Ready (to system)
7	
8	Data Terminal Ready (from system)

## INSTALLATION OF A PROGRAMMING OR OPERATOR TERMINAL

The ISOETEC® Terminal (p/n 440017) can be connected to the system's I/O port to provide a programming terminal, or Integrated Operator Terminal. The port on the CPU is Port 1, and is configured for an RS-232 type connection. Serial devices connected to this port may be located up to 50 feet from the cabinet. Port 1 defaults to 9600 baud.

Configure the terminal for RS-232 operation.

### TERMINAL SET-UP RS-232

The programming of the terminal setup must be changed to convert it from RS-422 to RS-232. To convert, follow the instructions provided below.

1. Turn the power switch located on the right side of the terminal to the on position. The screen of the terminal should first appear reverse video with all stars, and then appear blank with a cursor in the upper left corner of the screen.
2. Press the CONTROL and SETUP (ICM) keys simultaneously. The terminal enters the setup mode.
3. Press the key labeled F2. PERSONALITY=OPT'S TERM should be highlighted. If not, press the SPACE BAR until OPT'S TERM appears.
4. Press the DOWN arrow key twice. DATA/PRINTER=MODEM/AUX is highlighted.
5. Press the space bar. DATA/PRINTER=AUX/MODEM is highlighted.
6. Press the key labeled F4.
7. Move the cursor to AUX RCV HANDSHAKE.
8. Press the SPACE BAR until NONE is displayed.
9. Move the cursor to AUX XMT HANDSHAKE.
10. Press the SPACE BAR until NONE is displayed.
11. Press F10 key. The terminal setup menu appears with EXIT highlighted.
12. Press the RIGHT arrow key twice. SAVE ALL is highlighted.
13. Press the F10 key.

### WIRING AN ISOETEC TERMINAL

To wire the ISOETEC Terminal (p/n 440017) to the RS-232 port on the CPU/VCM, use serial kit part number 440096. This kit contains a 7 foot, 8-wire modular cable, an 8-pin modular jack and a DB-25 connector. The jack and DB-25 connector must be wired together before use. Wire the modular to DB-25 connector as shown in Table 3.

Modular Connector Wire Color	DB-25 Pin #	Terminal Signals
BK	2	Receive Data
BL	3	Transmit Data
BN	6	Data Set Ready
RD	7	Signal Ground
GN	20	Data Terminal Ready

The modular cable must pass through a 1/2" thick, 2-3/8" diameter, round Fair Rite ferrite core three times before exiting the cabinet in order to comply with FCC regulations. Wrap each modular cable around the core three times as shown in Figure 11.

Connect the 8-pin modular end of the cable to the port on the CPU/VCM. Connect the other end to the connector labeled AUX on the back of the terminal. See Figure 13.

*NOTE: It is very important to place the RS-232 cable into the AUX jack located on the back of the terminal. If it is accidentally placed into the MODEM port, the terminal may appear to function, however, the terminal does not transmit proper characters.*

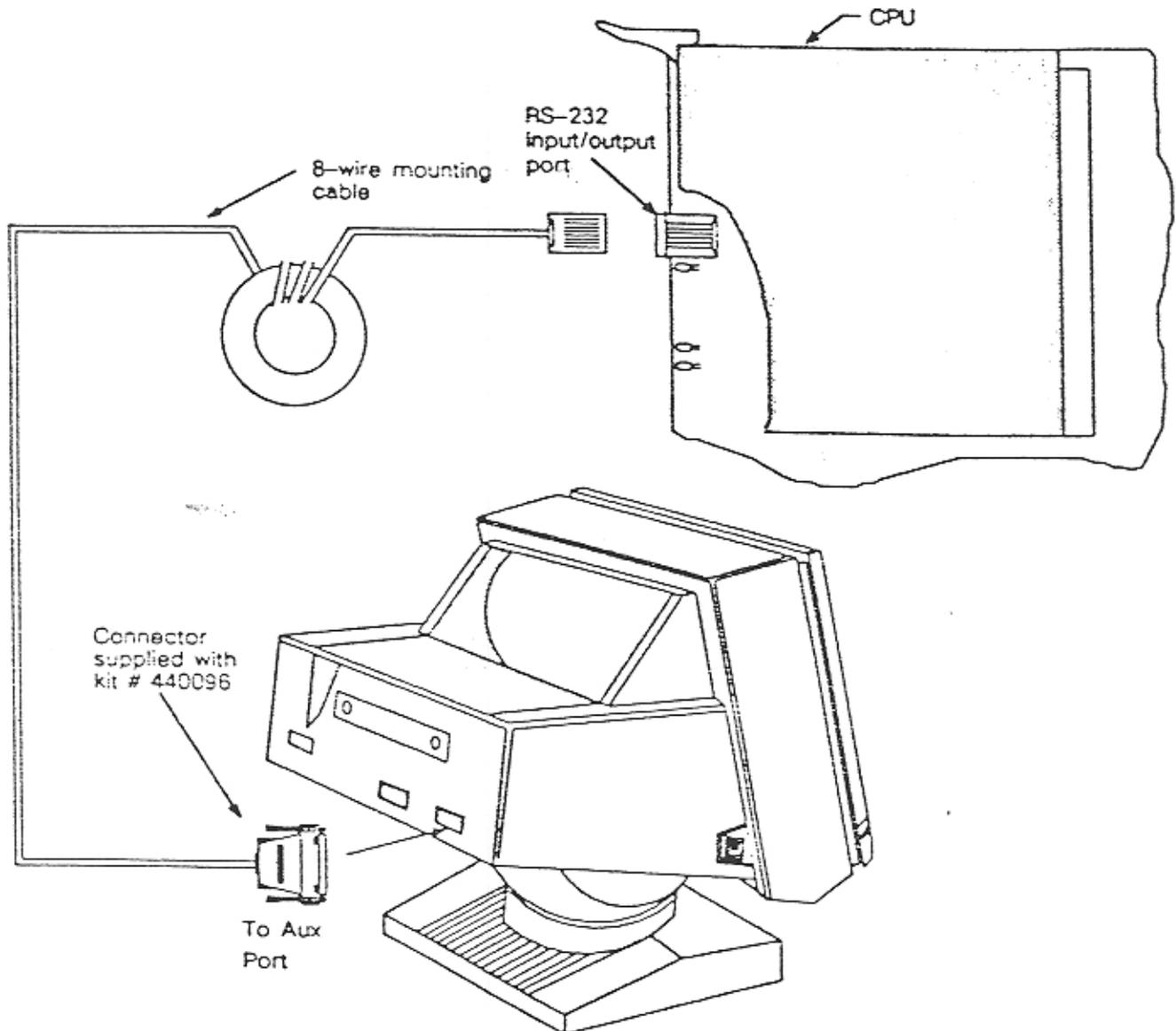


Figure 13 Wiring An ISOETEC Terminal To The CPU

## IDS PORT CARDS

The following standard IDS port cards may be installed in the 2 IDS port card slots. These port cards function fully regardless of the configuration of the system.

- LSI Station (15700)

NOTE: When used in the 84 port configuration, system software addresses the first 8 of 12 digital stations ports on the Station port card. The remaining 4 ports are not used in the 84 port configuration.

- Loop/Ground Start Trunk II (p/n 15590)
- DTMF Receiver Combination (p/n 15650) Revision E or higher
- E&M Tie Line Combination (p/n 15680)
- OPX LSI (p/n 15660)
- Direct Inward Dial (p/n 15610)

NOTE: The T1 port card (p/n 15510) cannot be installed in the 84 port configuration of the system.

The following discontinued IDS port cards may also be installed in the 2 IDS port card slots:

- Loop/Ground Start Trunk (p/n 15620)
- CO Interface (p/n 15600)
- Station (p/n 15640) - see above NOTE for LSI Station port card

## POWER SUPPLY

The system power supply is installed inside the cabinet in the first slot on the right. The power supply is designed to be an integral part of the system. When ordering the system cabinet, the power supply is included and already installed. See Figure 1.

## OPERATOR STATION

The standard operator station is a telephone with up to three DSS Consoles programmed to work with the telephone. The telephone and each DSS Console require a connection to a digital station port. In addition to the features available to all telephones, the operator also has the ability to program System Speed Dial numbers, activate Background Music over an external paging system, and program certain other system features. The system supports a maximum of 3 operator stations.

## DSS CONSOLE

The DSS Console is the size of the 17-key telephone and has 44 programmable buttons. These buttons can be programmed with any of the key codes used with a 28-key telephone. The DSS is equipped with a speaker for audible tones. There can be a maximum of 10 DSS Consoles on the 84 port configuration of the system. Up to 3 DSS Consoles can be assigned to one extension.

## INTEGRATED OPERATOR TERMINAL

The optional Integrated Operator Terminal is a CRT terminal which gives a visual display of office calling activity, an accompanying keyboard used in conjunction with the terminal to give it commands, and a handset. The terminal is connected to one of the input/output ports on the LSI CPU/VCM (p/n 22350) or optional I/O Expansion module (p/n 22360). The Integrated Operator Terminal also requires a connection to a digital station port. The system supports a maximum of 3 Integrated Operator Terminals.

## TELEPHONES

The 84 port configuration supports all IDS telephones.

## Station Key Log Screen

A new diagnostic screen has been added to the IDS 84 in software version 84-2.15. This screen allows the installer to test all of the stations after the system and phones have been installed. It also aids the service technician in trouble-shooting erratic LEDs or erratic station operation.

The Station Key Log is broken up into three columns. Each column contains a station number, a phone type, and a counter. The Station Key Log only lists those stations that appear on the System Configuration Screen (screen F).

Next to the station number is the type of phone being used by that station. If this area is empty a phone is NOT installed and this station number is not being used.

The next column counts the number of keys received by the system from that station. If more than 14 keys are received from the station within 1 second this column will increment by one. Pressing "C" on this menu will clear all the counters. The counters are dynamic. This means they will increment when viewing this screen.

The station number and phone types are NOT dynamic on this screen. This means if a station was unplugged or added to the system while viewing this screen the change will NOT be displayed. The display must be refreshed by pressing "ESC" then re-entering the menu.

Station Key log

-----

[C] Clear This Display

Ext.3001 [DSP] 0000	Ext.3002 [28K] 0000	Ext.3003 [17K] 0000
Ext.3004 [DSS] 0000	Ext.3005 [DSP] 0000	Ext.3006 [DSP] 0000
Ext.3007 [DSP] 0000	Ext.3008 [DSP] 0000	Ext.3009 [28K] 0000
Ext.3010 [17K] 0000	Ext.3011 [28K] 0000	Ext.3012 [DSP] 0000
Ext.3013 [DSP] 0000	Ext.3014 [28K] 0000	Ext.3015 [DSP] 0000
Ext.3016 [17K] 0000		

To enter this menu:

1. Enter the Diagnostics menu by pressing "Ctrl" and "C" simultaneously from the main menu.
2. Enter the Station key Log by pressing "C".

## CABINET-BACKPLANE

This cabinet-backplane (p/n 22200) contains connectors for 8 circuit cards and one slot for the power supply. The power supply is an integral part of the cabinet-backplane. There are 5 connectors for LSI 4x8 CO/Station port cards, 2 for other IDS port cards, and one for the LSI CPU/VCM card. The card connectors are labeled J1 through J9 and are numbered from left to right. Connector J9 is for the power supply. The connectors are offset for the different types of circuit cards to avoid improper installation.

## LSI CPU/VCM - 22350

The LSI CPU/VCM (p/n 22350) for the 84 port configuration combines the operation of the CPU, and the Voice Control Module into one card.

This circuit board is used exclusively in this configuration of the system. The LSI CPU/VCM is responsible for all control functions, execution of all logic operations, and control of system modules. The LSI CPU/VCM contains a 16-bit microprocessor (68000), and a real time clock. System software is provided in EPROM memory and is installed on the LSI CPU/VCM. The design of the CPU/VCM permits different size EPROMs to be addressed based on a switch setting on the card. Software version 84-2.0, and above, resides in 512 kilobytes of EPROM memory (4 - 1 megabit EPROMs) and uses 256 kilobytes of battery-backed static RAM. Provision has been made on the card to address up to 4 megabytes of EPROM memory and up to 2 megabytes of static RAM.

There is one RS-232 input/output port on the LSI CPU/VCM, and a connector to support the use of an optional I/O Expansion module (p/n 22360). The I/O Expansion module adds one RS-232 I/O port and one RS-422 I/O port to the system.

**NOTE:** The optional I/O Expansion module cannot be installed on the CPU/VCM part number 22300.

The system reset switch is mounted on the LSI CPU/VCM.

**NOTE:** The reset button must be held in for at least 3 seconds before the system will reset.

The LSI CPU/VCM contains the circuitry necessary for voice switching and conference connections, and is responsible for all system tones, system timing, and station status control. The LSI CPU/VCM contains the DTMF tone generators, the circuitry and connection (an RCA type jack) for background music and music on hold, and the system 300 baud MODEM. An optional 1200 baud modem (p/n 22370) can be installed on the LSI CPU/VCM card. One LSI CPU/VCM is required per system.

**NOTE:** The optional 1200 baud modem module cannot be installed on the CPU/VCM part number 22300.

## LSI 4x8 CO/STATION PORT CARD - 22550

This port card can only be installed in the cabinet-backplane part number 22200. The LSI 4x8 CO/Station port card (p/n 22550) contains the circuitry necessary to connect 8 digital telephones, and 4 loop start CO lines to the system. See Figure 4. Digital telephones may be placed a maximum of 1200 feet from the LSI 4x8 CO/Station card. The circuitry for the loop start CO lines can accommodate either polarity of tip and ring, and provides high voltage protection for the tip and ring inputs. The LSI 4x8 CO/Station port card supports loop start CO lines only. These lines may be either DTMF signal or pulse signal. This card also has the circuitry necessary to support an external page. The card provides a place to mount a DTMF Receiver module. This DTMF Receiver module (p/n 22560) contains one DTMF Receiver which can be shared by all ports in the system, and is used for the Auto Attendant and DISA features, and the LSI OPX port card.

**NOTE:** The DTMF Receiver module (part number 22560) cannot be installed on the 4x8 CO/Station port card (p/n 22500).

**NOTE:** The DTMF Receiver module (part number 22510) used on the 4x8 CO/Station port card (p/n 22500) cannot be installed on the LSI 4x8 CO/Station port card (p/n 22550).

## SUPPLEMENT FOR CANADIAN EQUIPMENT

**NOTICE:** The Canadian Department of Communications label identifies certified equipment. This certification means that the equipment meets certain telecommunications network protective, operational and safety requirements. The Department does not guarantee the equipment will operate to the user's satisfaction.

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. In some cases, the company's inside wiring associated with a single line individual service may be extended by means of a certified connector assembly (telephone extension cord). The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations.

Repairs to certified equipment should be made by an authorized Canadian maintenance facility designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment.

Users should ensure, for their own protection, that the electrical ground connections of the power utility, telephone lines and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.

**CAUTION:** Users should not attempt to make such connections themselves, but should contact the appropriate electric inspection authority, or electrician, as appropriate.

The Load Number assigned to each terminal device denotes the percentage of the total load to be connected to a telephone loop which is used by the device, to prevent overloading. The termination on a loop may consist of any combination of devices subject only to the requirement that the total of Load Numbers does not exceed 100. An alphabetic suffix is also specified in the Load Number for the appropriate ringing type (A or B), if applicable. The Load Number for the accompanying equipment is 100. As a consequence, no additional equipment may be connected to any telephone loop to which this equipment is being connected.

CONNECTING ARRANGEMENT CODE: CA11A

This equipment does not exceed the Class A limits for Radio noise emissions from digital apparatus set out in the Radio Interference Regulation of the Canadian Department of Communications.

### TRUNK ORDERING INFORMATION

*Public Network:*

Interface Port Card	Facility Interface	Ringer Equivalence	Network Jack
LSI 4x8 CO/Station port (p/n 22550)	02LS2	1.9 B	RJ14C or RJ21X

**NOTE:** Refer to the IDS 108 Technical Manual, Installation Section, for Trunk Ordering Information for other IDS port cards

### FCC REGISTRATION NUMBERS:

The IDS is registered with the Federal Communications Commission three ways. The registration number used depends on which features are being provided to the customer.

Key System: DHF7AS-10270-KF-E  
Hybrid System: DHF7AS-10268-MF-E  
PBX System: DHF7AS-10267-PF-E

In order to be used as a key system, the system must not use the following features:

Group Keys

Least Cost Routing

OPX Outgoing trunk access

Prime line access by group

Six key telephones

If any of these features are used, the system MUST be used as a Hybrid, or a PBX.

## SITE REQUIREMENTS

Selection of a suitable location is the most basic, yet most critical consideration in the installation of a telephone system. The following factors should be considered when choosing an appropriate location for equipment installation:

- Ample space must be allowed to remove the cabinet cover, to access assemblies and cards within the cabinet and allow space for the MDF (Main Distribution Frame).
- Location of CO/PBX line terminations must be considered when selecting a location for the cabinet. In the case of telephone company lines, FCC approved connectors supplied by the telephone company, should be within 5 feet (1.5 meters) of the cabinet/main distribution frame.
- To minimize the length of cable runs between the stations and the system cabinet, the location of the majority of the telephone sets (stations) should be taken into consideration when selecting a location for the cabinet.
- A well ventilated, and well lighted area having an optimum temperature range of 60° to 80° F and a relative humidity range of 5 to 90% (non-condensing) must be provided.
- Area lighting should be adequate for installation and maintenance of the system. Hazardous or flammable materials should be removed from the vicinity. The immediate area must not be subject to flooding or excess moisture. The cabinet should be isolated from areas of moving machinery or equipment. It is also recommended that static electricity-producing carpets not be installed in this area.
- A separately fused, dedicated 117 Volts AC,  $\pm 10\%$ , 15 Amp., 60 Hz, single phase, 3-wire (parallel blade with ground) power outlet should be located within 5 feet (1.5 meters) of the system power supply.
- The cabinet and main distribution frame should be placed in an electrically noise free environment, isolated and shielded from equipment that causes electro-magnetic interference (EMI) or radio frequency interference (RFI). Examples of electrical noise are rotating electrical machinery and arc welding equipment. Floor coverings that generate static electricity should be avoided.
- The system cabinet should not be installed close to any equipment which may produce RFI (Radio Frequency Interference) such as a radio frequency transmitter.
- If the system is to be installed in a location prone to lightning strikes, provide lightning protection on the power line, any station cable runs outside the building, and CO lines.

## INSTALLATION PLANNING

Prior planning of the installation will aid in a smooth cut-over and a satisfied customer. Select a suitable location for the system. Determine the number of telephones of each type, the number of LSI 4x8 CO/Station port cards, station port cards, and CO line port cards from the sales contract and discussions with the customer.

**NOTE:** Only one station set is allowed per extension number. It is not possible to bridge station ports so that an extension number may appear in more than one location.

Programming information should also be gathered from the customer at this time so that the system may be programmed either before, or while the system is being installed.

Determine the location and type of each telephone, and mark floor plans accordingly. Determine the location for the operator stations, and mark the floor plans.

Arrange for power cabling (if necessary) and station cabling of the site.

If the system is to be installed in an area subject to frequent lightning storms, consideration should be given to providing additional lightning protection on the CO lines beyond what is provided by the local telephone operating company.

**NOTE:** Installers should be trained and thoroughly familiar with the basic components of the IDS before attempting installation of this product.

## CABINET INSTALLATION

### PREPARATION

Once the area for the telephone equipment has been selected, mount a plywood back board to the wall. The back board size will vary depending upon the size of the MDF. The entire system and frame will be mounted on a 4' x 6' x 3/4" plywood. If mounting the cabinet alone, the minimum back board size is 25" x 17" x 3/4". A fully loaded cabinet can weigh approximately 64 lbs. Make certain proper mounting procedures are followed.

**NOTE:** Check local building and electrical codes before mounting the system. For example, certain areas may require a flame retardant plywood back board.

Mount the cabinet to the plywood using 3/4" #12 pan-head sheet metal screws such that the top of the cabinet is approximately three feet (1 meter) from the ceiling, and bottom is four feet (1.2 meters) from the floor. Make certain before mounting the cabinet that circuit cards slide easily in and out of their respective card slots.

Use the mounting template supplied with the cabinet to locate the mounting holes (see also Figure 2). Drill the holes and mount the cabinet.

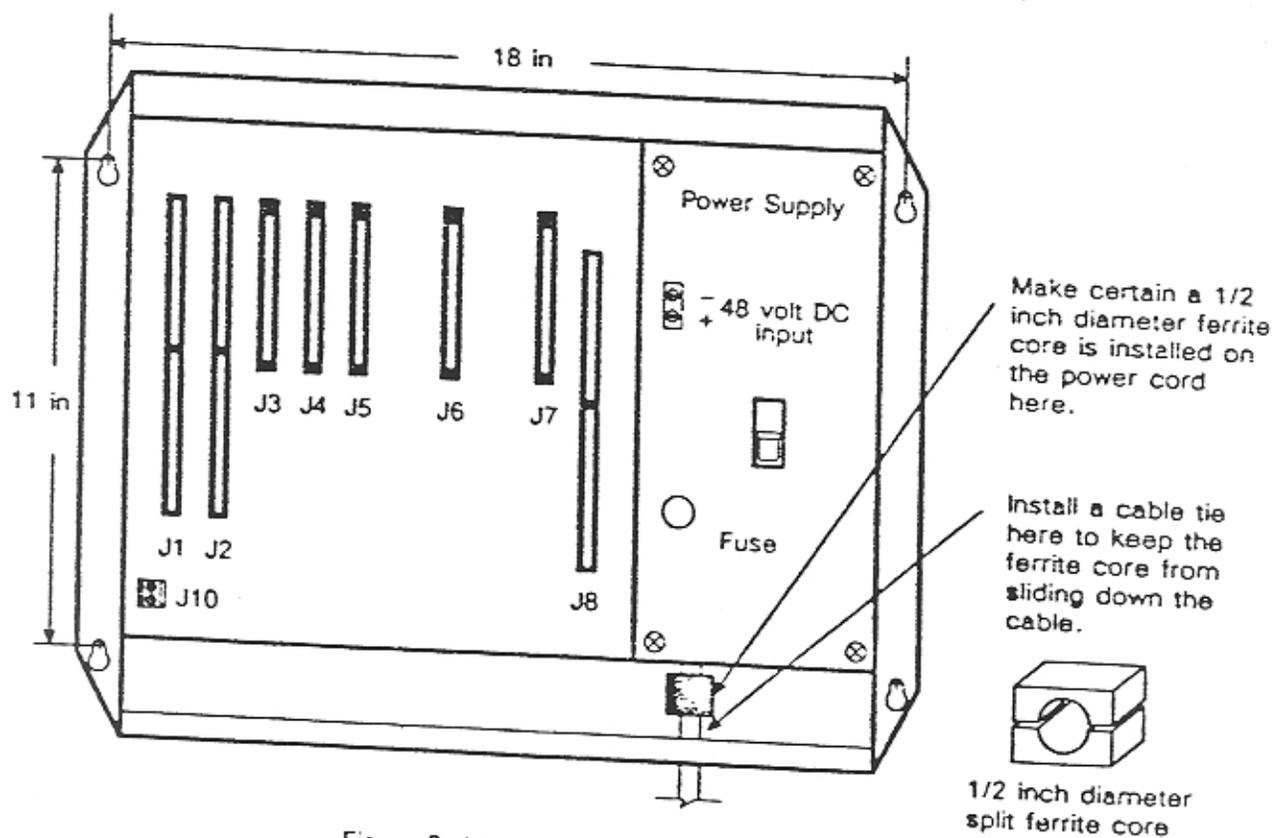


Figure 2 Mounting Holes For The Cabinet

## GROUNDING THE SYSTEM

Immediately after the system cabinet is mounted, the system must be properly grounded. To ensure proper system operation, a good earth ground must be provided. In most cases, this can be provided by a metallic (unpainted) cold water pipe. The installer should verify that there are no insulated joints such as non-metallic pipe sections which will isolate the earth ground.

Earth ground must be provided using 12 AWG or larger stranded insulated wire kept as short as possible, but no longer than 250 feet.

NOTE: The ground wire requirements for cabinet part number 22200 are different than the present requirements for other IDS cabinets.

The earth ground is connected to the backplane on the lower left corner to connector J10 (see Figure 2). The earth ground should be connected to the backplane prior to installation of any circuit boards.

Any installed lightning protection should be provided with its own earth ground separate from the earth ground provided for the system.

## POWER SUPPLY

The power supply is installed inside the system cabinet, on the right side, in the first card slot (J9). The power supply is designed to be an integral, structural part of the system. Do not attempt to install the system, or interface cards unless the power supply is installed with all four screws securely in place. The cabinet, part number 22200, includes the power supply already installed.

The power supply is unique in that the transformer is not present on the power supply card and its enclosure. The transformer is mounted inside the cabinet next to the bottom right of the backplane. When the power supply card is installed, the transformer is totally enclosed by the power supply card's "L" shaped enclosure, and the right side of the cabinet. This creates a totally enclosed, operational, power supply. Since the transformer is installed in the cabinet, and the power supply card is removable from the cabinet, the AC connections are made directly to the system backplane.

## WARNING

Since hazardous voltages are always present on the backplane while the system AC power cord is plugged in, AT NO TIME SHOULD THE POWER SUPPLY CARD BE REMOVED WHILE THE SYSTEM AC POWER CORD IS PLUGGED IN. THE POWER SUPPLY BOARD AND ITS "L" SHAPED METAL ENCLOSURE PROVIDES PROTECTION FROM SHOCK HAZARD WHILE THE AC POWER CORD IS PLUGGED IN. There are very few instances when the power supply card should be removed. If an instance arises where it must be removed, ALWAYS unplug the system AC power cord FIRST.

The power supply cord plugs into a dedicated, and dedicated ground 117 volt AC outlet for power. This is necessary to prevent possible voltage spikes and transients that may be caused by equipment sharing the same AC circuit. This outlet should be located within 5 feet (1.5 meters) of the power supply.

The AC connection to the power supply requires a parallel blade with a ground receptacle. A three wire to two wire isolation adapter should not be used. The use of an ISOBLOK surge suppressor (EISI p/n 440129) is required.

NOTE: Make certain a 1/2 inch diameter ferrite core is in place on the power cord at a point as close to the power supply as possible. If this core is not in place, it is shipped with the cabinet and must be installed before operating the system. See Figure 2 for the proper location. Keep the ferrite core from sliding down the cable by installing a cable tie on the power cord just below the ferrite core.

## OTHER POWER REQUIREMENTS

If the system is to be installed with E&M Tie Line Combination or Loop/Ground Start Trunk II port cards, a separate 48 volt DC regulated power supply is required. The spring connectors on the front panel of the power supply are used to connect this power supply to the system (see Figure 1 and Figure 15). This supplies 48 volts to the backplane.

If the system is to be installed with OPX LSI or DID port cards, a 48 volt DC regulated power supply is also required. However, the connectors on each port card are used to connect this power supply to the card.

The required power output of the power supply depends on how many of these port cards are to be installed. Each of the E&M Tie Line Combination or Loop/Ground Start Trunk II port cards draws approximately 60 milliamps per card. Each of the OPX LSI or DID port cards draws a maximum of 600 milliamps per card. The use of the UL Listed Tri-output power supply (p/n 550005) is strongly recommended for providing these external voltages.

**NOTE:** If a Loop/Ground Start Trunk II port card is to be installed and ground start trunks are to be used, connect the positive side of the 48 volts DC supplied to the cabinet to the same ground source as the telephone company ground. Do not use the telephone company ground itself.

## CIRCUIT CARD REQUIREMENTS

The number of telephones and lines required determines how many port cards are needed. In addition, an LSI CPU/VCM card is required.

### LSI CPU/VCM CARD - 22350

The combination Central Processor Unit (CPU) and Voice Control Module (VCM) card is installed in the next right-most slot of the backplane in slot J8. The power supply is installed in the right-most slot. System software, which is provided in EPROM, resides on the LSI CPU/VCM (see Figure 3 for EPROM locations). Activate the battery backup switch (see Figure 3) at this time. Mount any optional modules (I/O Expansion and/or 1200 baud modem) on the LSI CPU/VCM before installing the card in its slot. The LSI CPU/VCM board is inserted into the slot with components on the card facing the right. This board must NOT be installed with the power on. The edge connector on the LSI CPU/VCM is offset to prevent it from being installed in an incorrect slot. Do not force the card into another slot. One LSI CPU/VCM is required per system.

**NOTE:** For software version 84-2.0, and above, make certain the EPROM selection switch (SW1) is set for 1 megabit EPROMs, i.e., all switches off. The system may not boot if these switches are incorrectly set.

EPROM SIZE	SWITCH SW1		
	SA	SB	SC
1 MB	OFF	OFF	OFF
2 MB	ON	OFF	OFF
4 MB	ON	ON	OFF
8 MB	ON	ON	ON

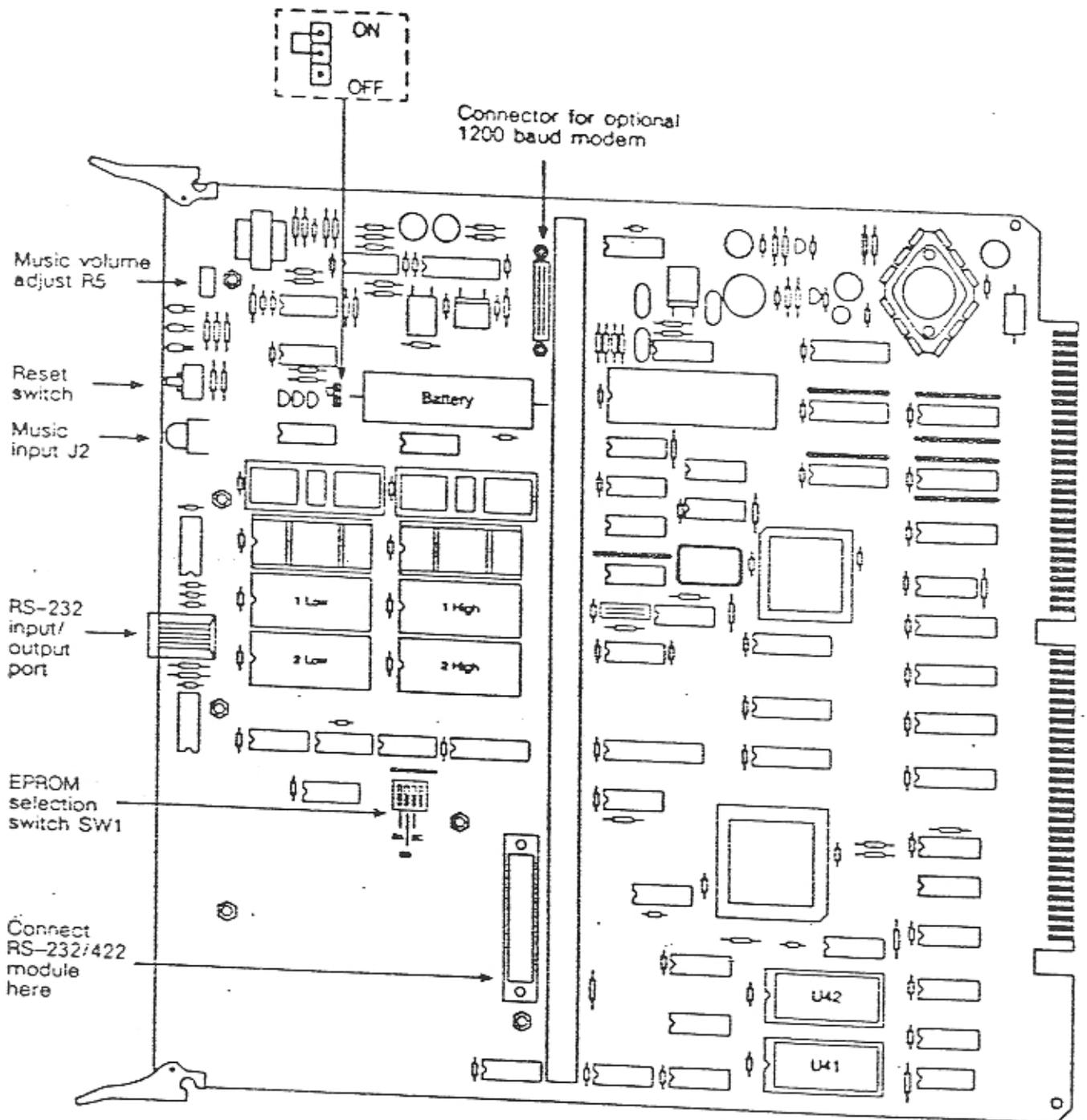


Figure 3 LSI CPU/VCM Card - 22350

### LSI 4x8 CO/STATION PORT CARD - 22550

The LSI 4x8 CO/Station port card is installed in slots J3 through J7 only. One card is installed for each 4 CO lines and 8 stations to be connected. This card also has the circuitry necessary to support an external page. The external paging system is connected using the last pair in the port card-to-MDF cable. The edge connectors on port cards are offset to prevent them from being inserted into another slot.

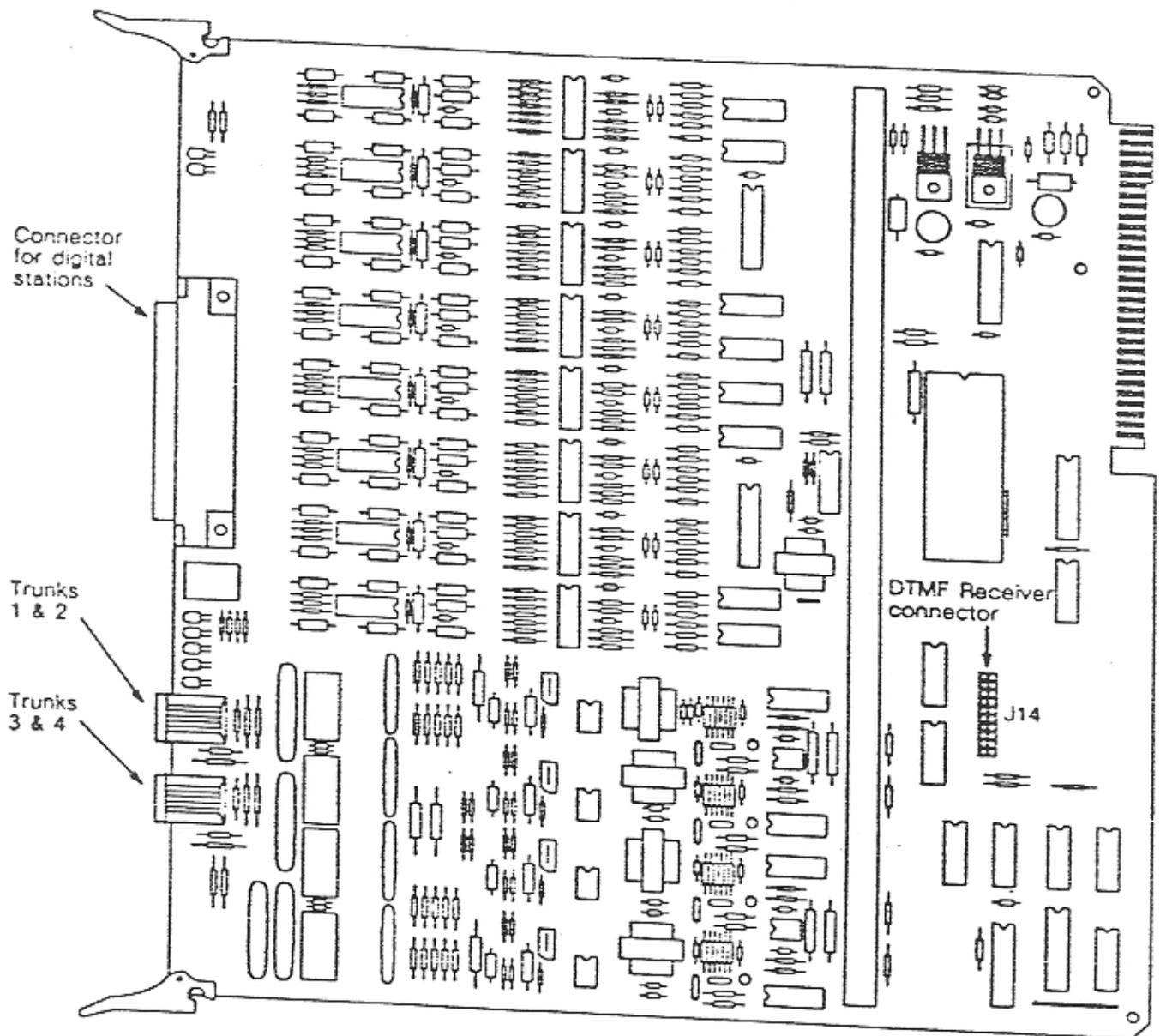


Figure 4 LSI 4x8 CO/Station Port Card - 22550

### DTMF RECEIVER MODULE - 22560

One DTMF Receiver module can be mounted on each of the LSI 4x8 CO/Station port cards (p/n 22550). Each DTMF Receiver module contains one DTMF Receiver. Locate the connector of DTMF Receiver over connector J14 on the 4x8 card. Make certain the pins of the connector are lined up, and press the module into place. Secure the module to the card using the plastic spacer and hardware provided with the module.

## IDS PORT CARDS

The following standard IDS port cards may be installed in the 2 DS port card slots (J1 and J2): LSI Station (15700), Loop/Ground Start Trunk II (p/n 15590), DTMF Receiver Combination (p/n 15650) Revision E or higher, E&M Tie Line Combination (p/n 15680), OPX LSI (p/n 15660), and DID (p/n 15610).

NOTE: When used in the 84 port configuration, system software addresses the first 8 of 12 digital stations ports on the Station port card. The remaining 4 ports are not used in this configuration.

NOTE: An external 48 volt DC power supply must be connected to the system when using the the Loop/Group Start Trunk II or the E&M Tie Line port card. The positive side of the power supply must be connected to ground when using ground start trunks.

NOTE: Stations using the second voice path of a digital display telephone MUST be connected to an LSI 4x8 CO/Station or a Station port card. The DTMF Receiver and E&M Tie Line port cards do not support the second voice path of a digital display telephone.

## MAIN DISTRIBUTION FRAME

The IDS Main Distribution Frames are designed to simplify and speed the installation of the system. One 84 MDF connects up to 20 CO lines provided by the LSI 4x8 CO/Station port cards and up to 24 stations (three LSI 4x8 CO/Station port cards). A separate 4x8 Station Panel is required when installing the remaining two LSI 4x8 CO/Station port cards. An IDS Station Panel may also be used to wire an LSI 4x8 CO/Station port card. If other IDS port cards are to be installed in the system, use the appropriate IDS MDF panel. For example, the E&M Tie Line port card would use the IDS Station panel (p/n 220113). An L/G Start Trunk II card would use an MDF Trunk panel (p/n 220111).

84 MDF (part number 220002):

1 - CO panel (up to 20 CO lines)

1 - 4x8 Station panel (up to 24 stations)

4X8 Station Panel (part number 220001)

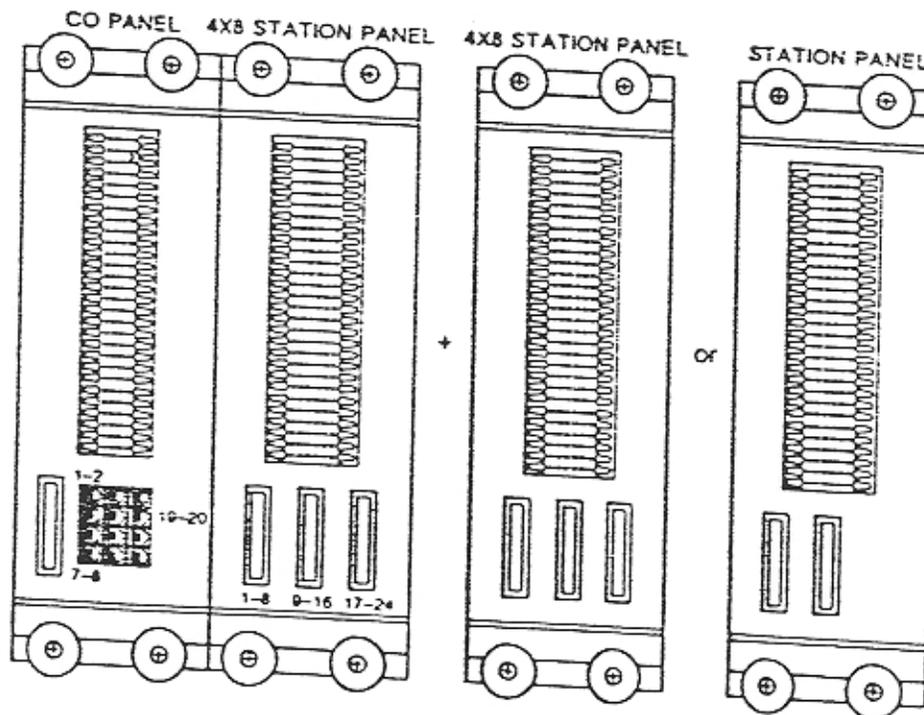


Figure 5 84 MDF And Extra Panels

### 4x8 STATION PANEL - 220001

The 4x8 station panel is a specially designed 6686 connecting block with provisions for three 25-pair cable connections. These connectors are used to connect with the LSI 4x8 CO/Station port cards.

On each station panel there are six columns of connecting pins labeled A (left most column) through F (right most column). Connections between the 25-pair cables and station cables are achieved by bridging pairs of columns together. Columns B, D and E are wired to the 25-pair connectors, and thus to the station ports. The cables to the individual telephones are wired to the connecting pins in columns A, C, and F. Bridging clips are used to connect columns A and B, columns C and D, and columns E and F.

Each station connection consists of 2 columns, and 6 rows of connecting pins. The first 4 rows of pins are connected to the 25-pair cable connected to the system. Unless otherwise noted, the remaining 2 rows of pins are not used with the IDS.

### CO LINE CONNECTIONS

The local telephone operating company usually provides CO lines on an RJ-21X connector. These lines are in turn connected to the TELCO IN jack on the 84 MDF. Active lines are then connected by the use of bridging clips from the left side of the MDF to the right side. Standard 4 or 6-conductor modular mounting cords are then used to connect the modular jacks on the MDF to the modular CO line jacks on the LSI 4x8 CO/Station port card. These modular jacks are wired for an RJ-14 connection. Each modular connector on the MDF wires TWO CO lines to each modular jack on the LSI 4x8 CO/Station port card.

### WIRING THE LSI 4x8 CO/STATION PORT CARD TO THE MDF

Each 4x8 card provides 8 digital station ports. The station ports are wired to the Main Distribution Frame via a 25-pair cable. Each port card is shipped with the 25-pair cable that connects it to the MDF. This cable has an exposed shield at one end, and must be used when installing the system to comply with FCC Part 15 regulations.

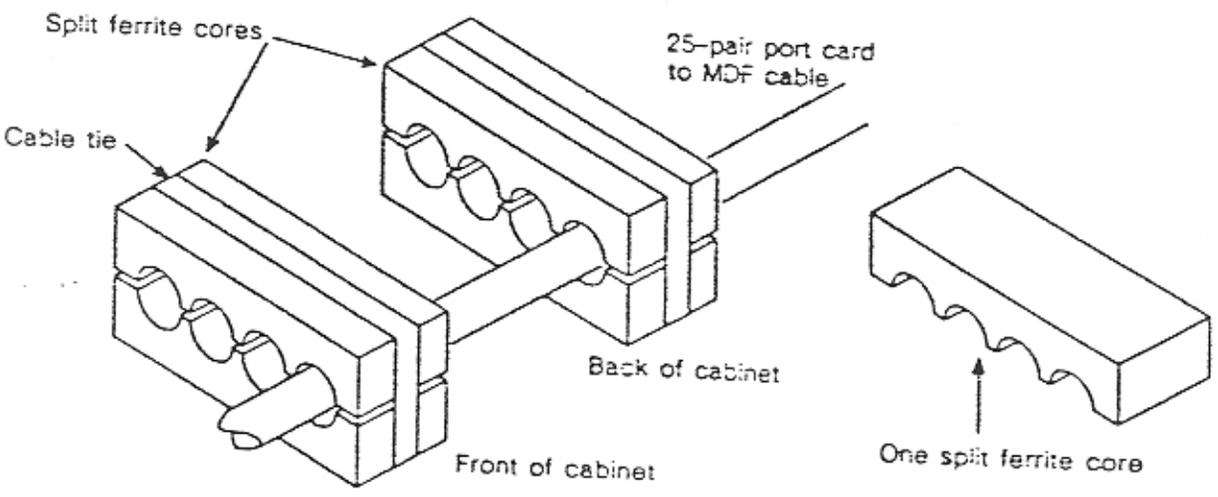


Figure 6 Fair-Rite Ferrite Core

The station-to-MDF cable (p/n 01023) is installed with the exposed shield closest to the cabinet. A cable tie or similar device is used to secure the exposed braid to the bottom plate of the cabinet (see Figure 7 for more detail). The paint is removed from a section of the bottom plate to allow a ground connection between the exposed braid of the cable and the cabinet. The cable is then dressed out the back of the cabinet, and connected to the MDF. Once the cable is connected to the system, a standard 25-pair cable may be used, if necessary, to reach the MDF. All cables attached to an LSI 4x8 CO/Station port card must pass through a Fair-Rite ferrite core as it exits the port card and again before exiting the cabinet in order to comply with FCC regulations. Four split ferrites cores are shipped with the cabinet. This is enough for four station cables. If the system is expanded

beyond 4 port cards, an additional set of ferrite cores must be ordered and installed. Order part number 22830. Run the cable over the bottom plate of the cabinet and through the ferrite cores.

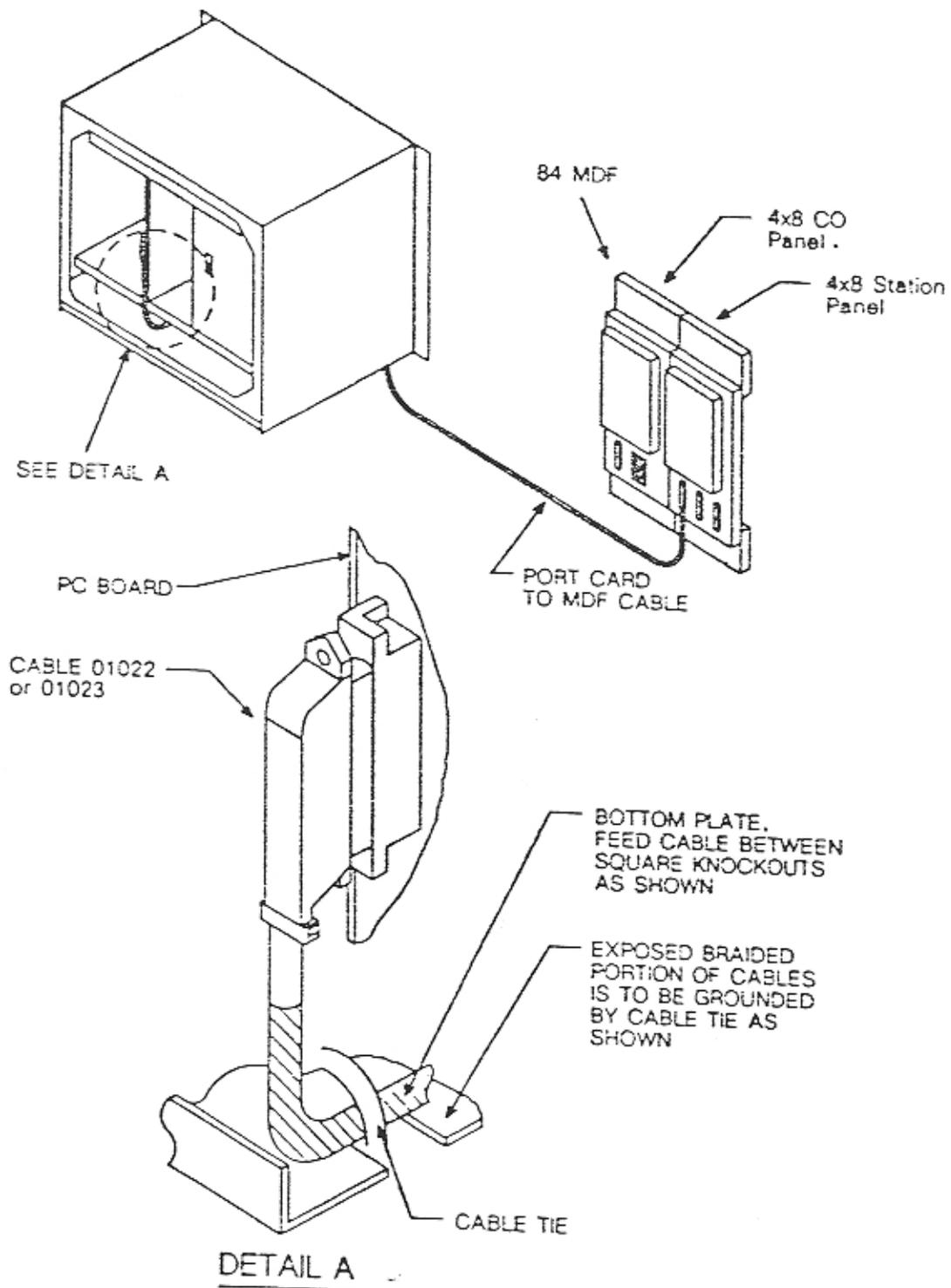


Figure 7 Port Cable To MDF

# WIRING TELEPHONES TO THE MDF

Telephones are connected to the station ports via industry-standard twisted, 2-pair, 22 or 24 gauge wire. The station cable run from the main distribution frame to the station wall jack should not exceed 1200 feet (regardless of wire gauge). It is recommended that the station cable contain 4 pairs of wires.

Station cable is connected to the MDF at one end, and a modular connecting block at the other end. See Figure 9 for Station Panel designations. The modular line cord of the telephone is then plugged into the connecting block.

**NOTE:** Only one station may be connected to a port. It is not possible to bridge station ports.

The system communicates with each phone using 4 wires. Two of the wires are used to send digital information (voice and control signals) from the system to the telephone, and two wires are used by the telephone to send digital information to the system. All 4 wires are necessary for the telephone to function. Each telephone connected to a station port has two digital channels. The primary channel is used for voice communications only. The secondary channel is used with digital display phones to provide a secondary talk path for off-hook announcing.

The Off Premise Extension Interface (OPXI), Electronic Phone Interface (EPI), DSS Console, and Digital Voice Announcer are all considered to be telephones by the system. These interfaces are all wired to the system the same as a digital telephone.

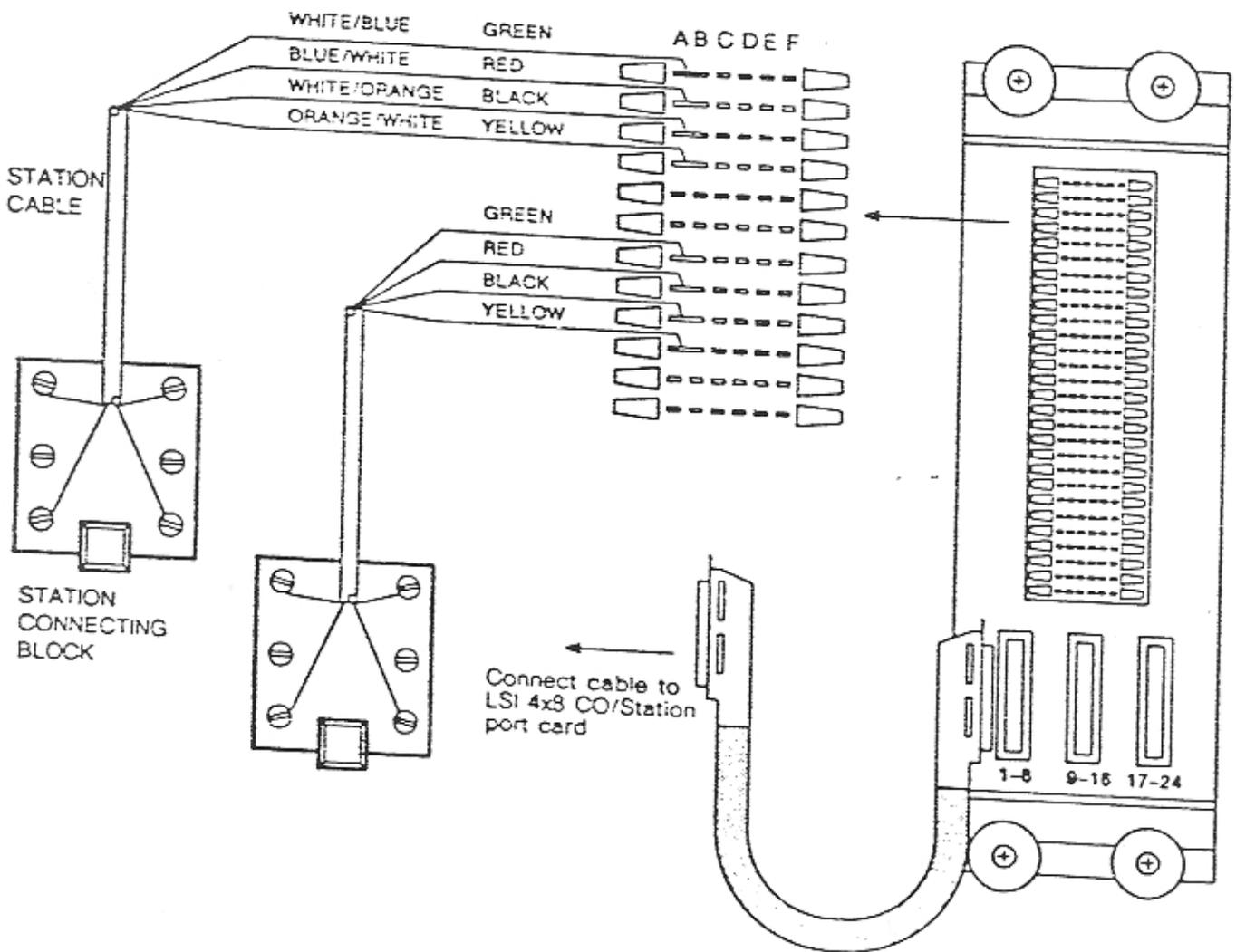


Figure 8 Station Wiring

A		B		C		D		E		F	
01	TT	09	TT	17	TT						
--	TR	--	TR	--	TR						
--	RT	--	RT	--	RT						
--	RR	--	RR	--	RR						
--	--	--	--	--	--						
02	TT	10	TT	18	TT						
--	TR	--	TR	--	TR						
--	RT	--	RT	--	RT						
--	RR	--	RR	--	RR						
--	--	--	--	--	--						
03	TT	11	TT	19	TT						
--	TR	--	TR	--	TR						
--	RT	--	RT	--	RT						
--	RR	--	RR	--	RR						
--	--	--	--	--	--						
04	TT	12	TT	20	TT						
--	TR	--	TR	--	TR						
--	RT	--	RT	--	RT						
--	RR	--	RR	--	RR						
--	--	--	--	--	--						
05	TT	13	TT	21	TT						
--	TR	--	TR	--	TR						
--	RT	--	RT	--	RT						
--	RR	--	RR	--	RR						
--	--	--	--	--	--						
06	TT	14	TT	22	TT						
--	TR	--	TR	--	TR						
--	RT	--	RT	--	RT						
--	RR	--	RR	--	RR						
--	--	--	--	--	--						
07	TT	15	TT	23	TT						
--	TR	--	TR	--	TR						
--	RT	--	RT	--	RT						
--	RR	--	RR	--	RR						
--	--	--	--	--	--						
08	TT	16	TT	24	TT						
--	TR	--	TR	--	TR						
--	RT	--	RT	--	RT						
--	RR	--	RR	--	RR						
--	--	--	--	--	--						
--	EXT	--	EXT	--	EXT						
--	PAGE	--	PAGE	--	PAGE						

4x8 Station Panel Designations

A		B		C		D		E		F	
01	TT	--	--	13	TT						
--	TR	--	--	--	TR						
--	RT	--	--	--	RT						
--	RR	--	--	--	RR						
--	--	--	--	--	--						
02	TT	--	--	14	TT						
--	TR	--	--	--	TR						
--	RT	--	--	--	RT						
--	RR	--	--	--	RR						
--	--	--	--	--	--						
03	TT	--	--	15	TT						
--	TR	--	--	--	TR						
--	RT	--	--	--	RT						
--	RR	--	--	--	RR						
--	--	--	--	--	--						
04	TT	--	--	16	TT						
--	TR	--	--	--	TR						
--	RT	--	--	--	RT						
--	RR	--	--	--	RR						
--	--	--	--	--	--						
05	TT	09	TT								
--	TR	--	TR								
--	RT	--	RT								
--	RR	--	RR								
--	--	--	--								
06	TT	10	TT								
--	TR	--	TR								
--	RT	--	RT								
--	RR	--	RR								
--	--	--	--								
07	TT	11	TT								
--	TR	--	TR								
--	RT	--	RT								
--	RR	--	RR								
--	--	--	--								
08	TT	12	TT								
--	TR	--	TR								
--	RT	--	RT								
--	RR	--	RR								
--	--	--	--								
--	EXT	--	EXT								
--	PAGE	--	PAGE								

IDS Station Panel Designations if connected to a 4x8 card

NOTE: The cover panel of an IDS MDF Station Panel is not labeled for an LSI 4x8 CO/Station port card. Use the configuration described above.

Figure 9 4x8 Station Panel and IDS Station Panel Designations

For those who prefer to design their own main distribution frame, the following table lists the port configuration of the cable connected to an LSI 4x8 CO/Station port card.

Table 1 LSI 4x8 CO/Station Port Card Station Cable Configuration

CABLE PIN AND COLOR	PORT	LEAD DESIGNATION	CONNECTING BLOCK COLOR
26 wht/blu	001	Transmit Tip	green
1 blu/wht		Transmit Ring	red
27 wht/org	002	Receive Tip	black
2 org/wht		Receive Ring	yellow
28 wht/grn	003	Transmit Tip	green
3 grn/wht		Transmit Ring	red
29 wht/brn	004	Receive Tip	black
4 brn/wht		Receive Ring	yellow
30 wht/slt	005	Transmit Tip	green
5 slt/wht		Transmit Ring	red
31 red/blu	006	Receive Tip	black
6 blu/red		Receive Ring	yellow
32 red/org	007	Transmit Tip	green
7 org/red		Transmit Ring	red
33 red/grn	008	Receive Tip	black
8 grn/red		Receive Ring	yellow
34 red/brn	009	Transmit Tip	green
9 brn/red		Transmit Ring	red
35 red/slt	010	Receive Tip	black
10 slt/red		Receive Ring	yellow
36 blk/blu	011	Transmit Tip	green
11 blu/blk		Transmit Ring	red
37 blk/org	012	Receive Tip	black
12 org/blk		Receive Ring	yellow
38 blk/grn	013	Transmit Tip	green
13 grn/blk		Transmit Ring	red
39 blk/brn	014	Receive Tip	black
14 brn/blk		Receive Ring	yellow
40 blk/slt	015	Transmit Tip	green
15 slt/blk		Transmit Ring	red
41 yel/blu	016	Receive Tip	black
16 blu/yel		Receive Ring	yellow
42 yel/org	017		
17 org/yel			
43 yel/grn	018		
18 grn/yel			
44 yel/brn	019		
19 brn/yel			
45 yel/slt	020		
20 slt/yel			
46 vio/blu	021		
21 blu/vio			
47 vio/org	022		
22 org/vio			
48 vio/grn	023		
23 grn/vio			
49 vio/brn	024		
24 brn/vio			
50 vio/slt	025		
25 slt/vio			
	EXT. PAGE	Tip Ring	

## WIRING CO LINES TO THE LSI 4x8 CO/STATION PORT CARD

The local telephone operating company usually provides CO lines on an RJ-21X connector. These lines are in turn connected to the TELCO IN jack on the 84 MDF. Active lines are then connected by the use of bridging clips from the left side of the MDF to the right side. Modular cords are used to connect the modular jacks on the MDF to the modular CO line jacks on the LSI 4x8 CO/Station port cards (see Figure 4 and Figure 11). Each jack connects two CO lines to the port card. These jacks are wired in the same manner as an RJ14C connector, i.e., two CO lines per connector. One CO line is wired to the green/red pair. The second CO line is wired to the black/yellow pair. The pin sequence for the CO line connector is as follows:

Pin		
1	—————	n/c
2	—————	Tip 2
3	—————	Ring 1
4	—————	Tip 1
5	—————	Ring 2
6	—————	n/c

All CO line modular cables attached to an LSI 4x8 CO/Station port card must pass through a 1/2" thick, 2-3/8" diameter, round Fair-Rite ferrite core three times before exiting the system in order to comply with FCC regulations. Two ferrites are included with the system cabinet. If the system is expanded, an additional core is required. Order part number 22830. Wrap each modular cable around the core three times as shown in Figure 10. Up to 5 cables can be wrapped around one ferrite core.

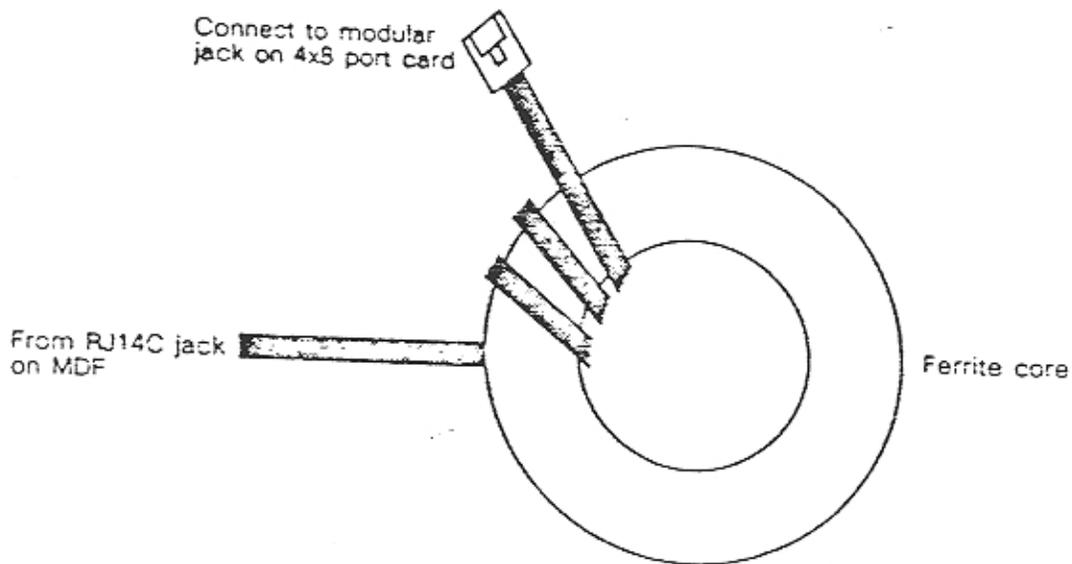


Figure 10 CO line Cable Through Ferrite Core

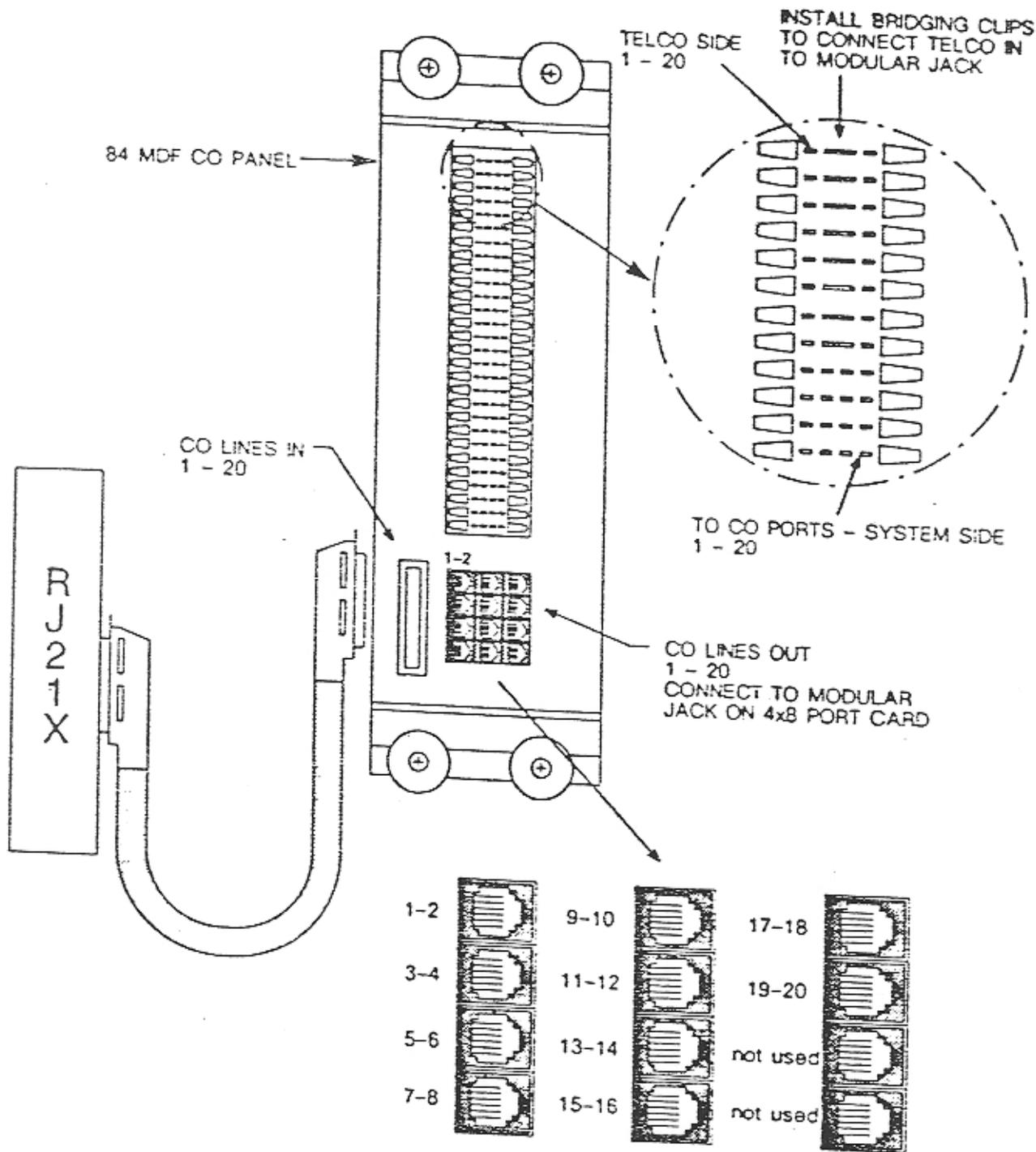


Figure 11 CO Line Cabling

### CONNECTING MUSIC TO THE SYSTEM

The source for Music On Hold (MOH) and Background Music (BGM) is connected to the system through an RCA type connector labeled J2 on the front edge of the LSI CPU/VCM. See Figure 3 for the location of J2. Background Music/Music on Hold volume can be adjusted through a potentiometer located on the outside edge of the LSI CPU/VCM. The potentiometer is labeled R5. To adjust the volume, place a call to one of the system's CO lines. Answer the call and place it on hold. Listen to the volume of the MOH in the originating telephone and adjust R5 to a comfortable listening level. To adjust Background Music, press the digit [\*] on the dial pad of a near by station.

Adjust the speaker volume of the telephone set to maximum with the [VOL ▲] key. Adjust R5 on the LSI CPU/VCM to a comfortable listening level.

NOTE: The use of a radio broadcast, or pre-recorded music for Music On Hold could be perceived as a violation of copyright laws.

## POWER APPLICATION

### INPUT POWER SITE REQUIREMENTS

A separately fused, dedicated 117 Volts AC,  $\pm 10\%$ , 60 Hz, single phase, three wire (parallel blade with ground) power outlet should be located within 5 feet (1.5 meters) of the power supply.

CAUTION: The primary power line must be dedicated to prevent the inadvertent turning off of the system when lights or wall circuits are turned off.

The use of an ISOBLOK surge suppressor (EISI p/n 440129) is required for system installation, and is STRONGLY recommended for any terminals or printers connected to the system.

Outlet wiring requirements should follow standard National Electric Code wiring practices for a 3 wire outlet.

CAUTION: Do NOT use 3 blade to 2 blade adapters. A properly grounded outlet is mandatory for proper system operation. Do NOT cut the ground blade from the system electrical plug.

### POWER UP

After all circuit cards are installed, make certain that they are properly seated in their connectors.

Turn ON the power supply with the red switch located on the power supply housing.

### WIRING TO THE RS-232 PORTS

The circuitry for the built-in RS-232 I/O port resides on the LSI CPU/VCM. The optional I/O Expansion module (p/n 22360) adds a second RS-232 port to the system. Either I/O port can be used for a programming terminal, Integrated Operator Terminal, or serial printer.

The RS-232 ports are accessed using 8-pin modular connectors located on the outside edge of the LSI CPU/VCM card (p/n 22350). See Figure 12.

LSI CPU/VCM (p/n 22350) 8-pin RS-232 Connector	
Pin	Designation
1	no connection
2	no connection
3	Data Terminal Ready (from system)
4	Signal Ground
5	Received Data (from system)
6	* Transmitted Data (into system)
7	Clear To Send (no connection)
8	no connection

## WIRING TO THE RS-422 PORT

The circuitry for the RS-422 I/O port resides on the I/O Expansion module. This I/O port can be used for a programming terminal, or an Integrated Operator Terminal.

The RS-422 port is accessed using the 6-pin modular connector located on the outside edge of the I/O Expansion module. See Figure 12.

Table 3	
I/O Expansion 6-pin RS-422 Connector	
Pin	Designation
1	Signal Ground
2	TX-
3	RX-
4	RX+
5	TX+
6	no connection

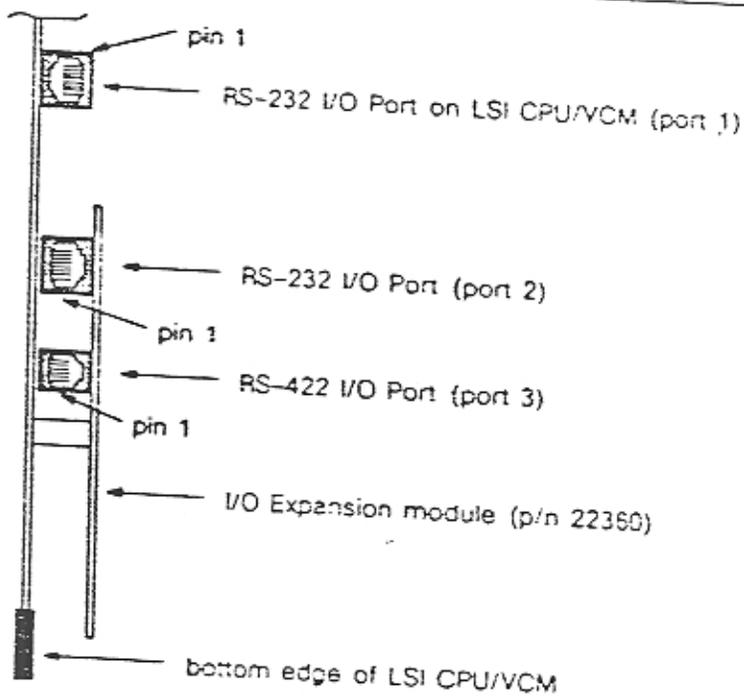


Figure 12 System Input/Outputs

## INSTALLATION OF A PROGRAMMING OR OPERATOR TERMINAL - RS-232

The Integrated Terminal (p/n 440017) can be connected to one of the system's RS-232 I/O ports to provide a programming terminal, or Integrated Operator Terminal. The port on the LSI CPU/VCM is designated Port 1, and is configured for an RS-232 type connection. The port on the I/O Expansion module is designated Port 2, and is configured for an RS-232 type connection. Serial devices connected to these ports may be located up to 50 feet from the cabinet. Ports 1 & 2 default to 9600 baud.

Configure the terminal for RS-232 operation with XON/XOFF protocol.

### TERMINAL SET-UP RS-232

The programming of the terminal setup must be changed to convert it from RS-422 to RS-232. To convert, follow the instructions provided below.

1. Turn the power switch located on the right side of the terminal to the on position. The screen of the terminal should first appear reverse video with all stars, and then appear blank with a cursor in the upper left corner of the screen.
2. Press the CONTROL and SETUP (ICM) keys simultaneously. The terminal enters the setup mode.
3. Press the key labeled F2. PERSONALITY=OPT'S TERM should be highlighted. If not, press the SPACE BAR until OPT'S TERM appears.
4. Press the DOWN arrow key twice. DATA/PRINTER=MODEM/AUX is highlighted.
5. Press the space bar. DATA/PRINTER=AUX/MODEM is highlighted.
6. Press the key labeled F4.
7. Move the cursor to AUX RCV HNDSHAKE.
8. Press the SPACE BAR until XON/XOFF is displayed.
9. Move the cursor to AUX XMT HNDSHAKE.
10. Press the SPACE BAR until XON/XOFF is displayed.
11. Press F10 key. The terminal setup menu appears with EXIT highlighted.
12. Press the RIGHT arrow key twice. SAVE ALL is highlighted.
13. Press the F10 key.

### WIRING AN INTEGRATED TERMINAL

To wire the Integrated Terminal (p/n 440017) to the RS-232 port on the LSI CPU/VCM or the I/O Expansion module, use serial kit part number 440096. This kit is supplied with the cabinet (p/n 22200) and contains a 7 foot, 8-wire modular cable, an 8-pin modular jack and a DB-25 connector. The jack and DB-25 connector must be wired together before use. Wire the modular to DB-25 connector as shown in Table 4.

Modular Connector Wire Color	DB-25 Pin #	Designations
Black	7	Signal Ground
Yellow	2	Transmitted Data (from system)
Green	3	Received Data (into system)

The modular cable must pass through a 1/2" thick, 2-3/8" diameter, round Fair-Rite ferrite core three times before exiting the cabinet in order to comply with FCC regulations. Wrap each modular cable around the core three times as shown in Figure 10.

Connect the 8-pin modular end of the cable to the port on the LSI CPU/VCM or the I/O Expansion module. Connect the other end to the connector labeled AUX on the back of the terminal. See Figure 13.

**NOTE:** It is very important to place the RS-232 cable into the AUX jack located on the back of the terminal. If it is accidentally placed into the MODEM port, the terminal may appear to function, however, the terminal does not transmit characters properly.

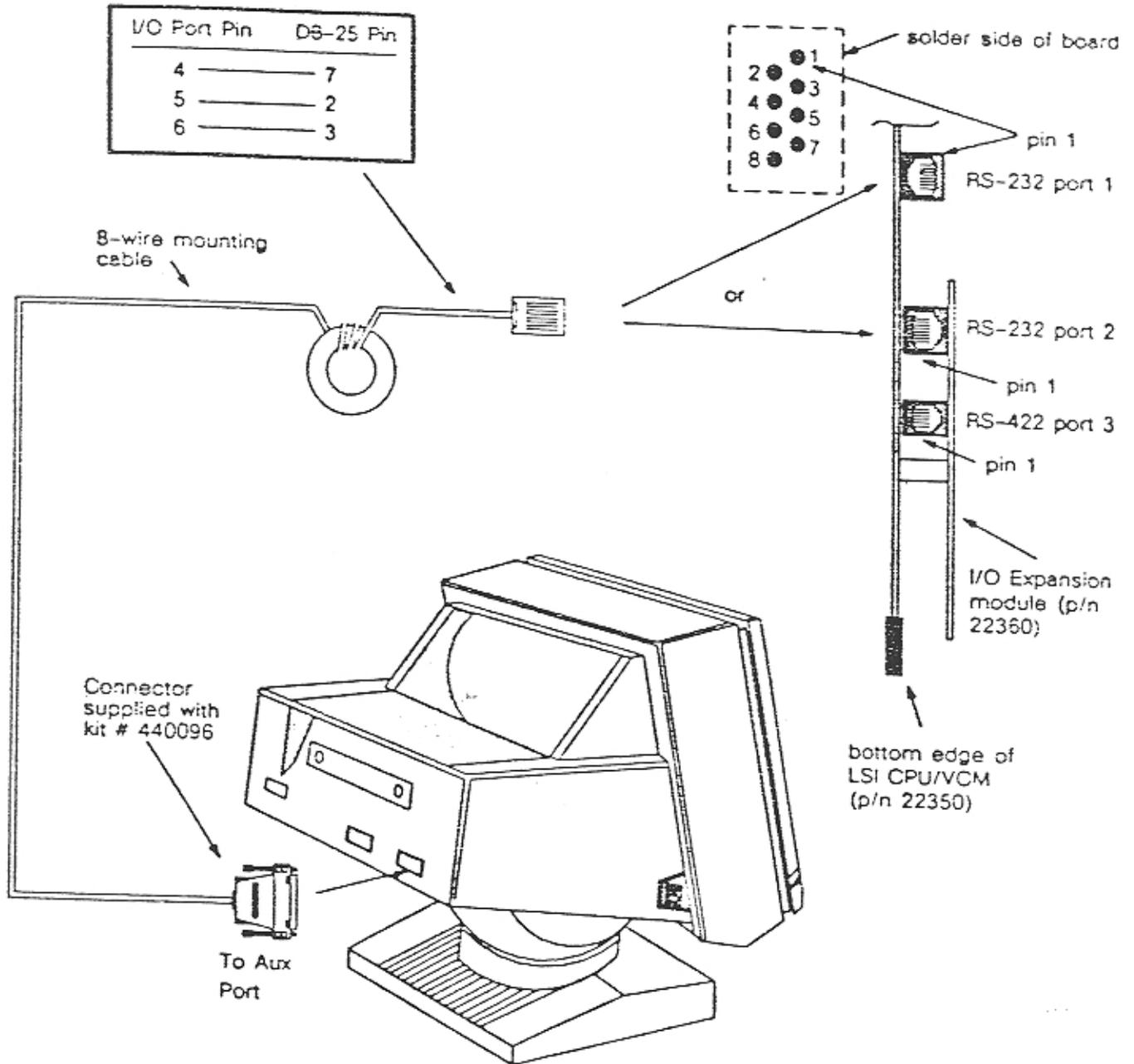


Figure 13 Wiring An Integrated Terminal To The LSI CPU/VCM - 22350

## WIRING AN INTEGRATED TERMINAL TO THE RS-232 USING STATION CABLE

An integrated terminal can be installed up to 50 feet from the cabinet when using either of the RS-232 ports. Run an 8-conductor, 22 or 24 AWG, shielded cable with drain wire (Alpha Cable Co. p/n 5905 or equivalent) between the location chosen for the terminal and the cabinet. Terminate the cable on an 8-conductor station connecting block mounted as close as possible to the CWP connection of the cabinet (see Figure 15). Wire the connecting block as shown in Table 5 and Figure 14. Connect the shield bare wire to the CWP connector J10 of the cabinet. The other end of the cable is wired to a standard 6-conductor station connecting block (RJ-11C type). Use the modular to DB-25 cable (p/n 30006) to wire from the connecting block to the AUX port of the terminal. Using the 8-conductor modular mounting cord provided with the serial kit (p/n 440096), make a connection between the 8-conductor station connecting block and the RS-232 jack on the LSI CPU/VCM or the I/O Expansion module. The modular cord must pass through a ferrite core in the same manner described previously.

8-conductor modular connecting block	Shield cable wire color
Red	White/Green
Green	Blue/White
Yellow	White/Orange

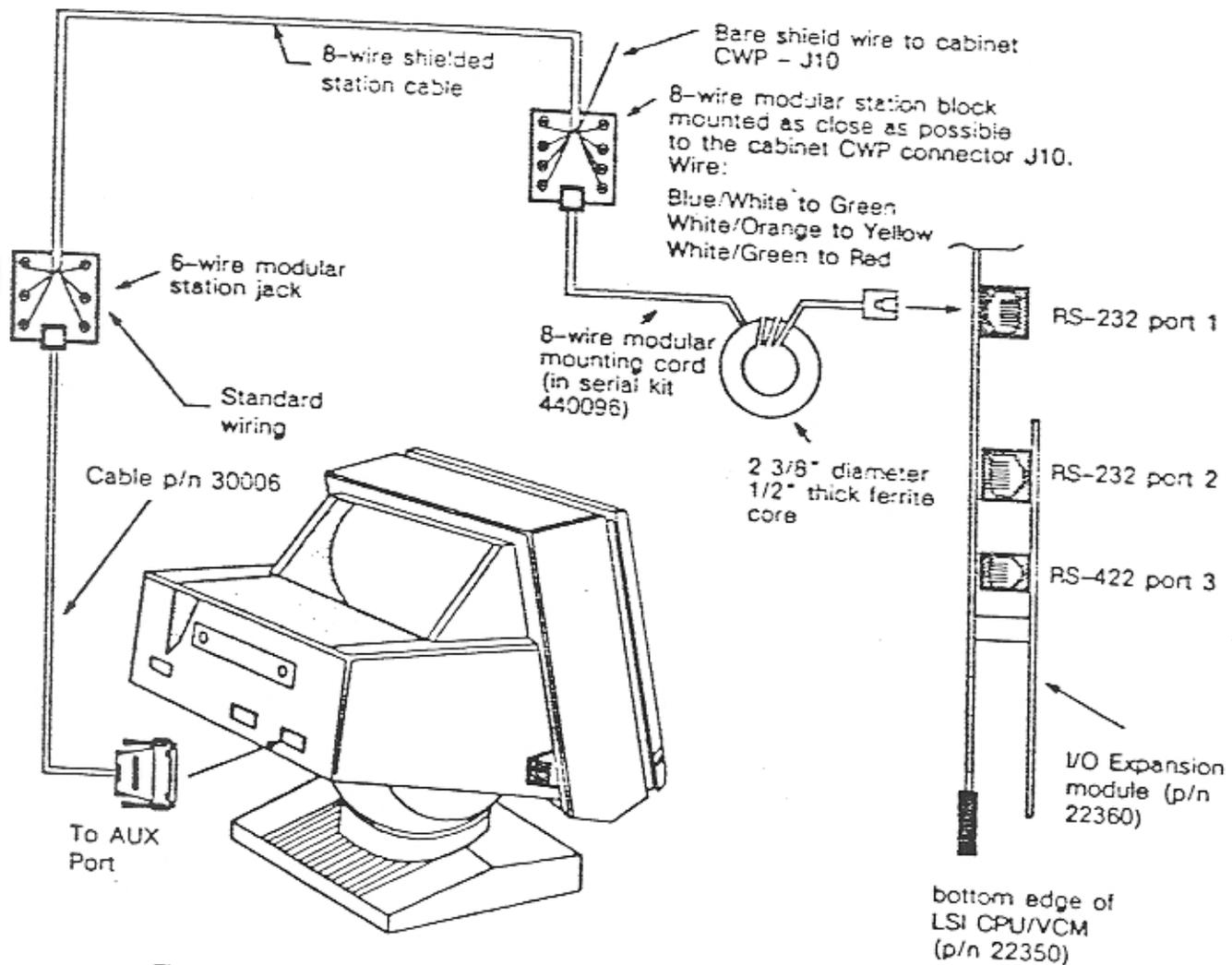


Figure 14 Wiring An Integrated Terminal To The RS-232 Port Using Station Cable

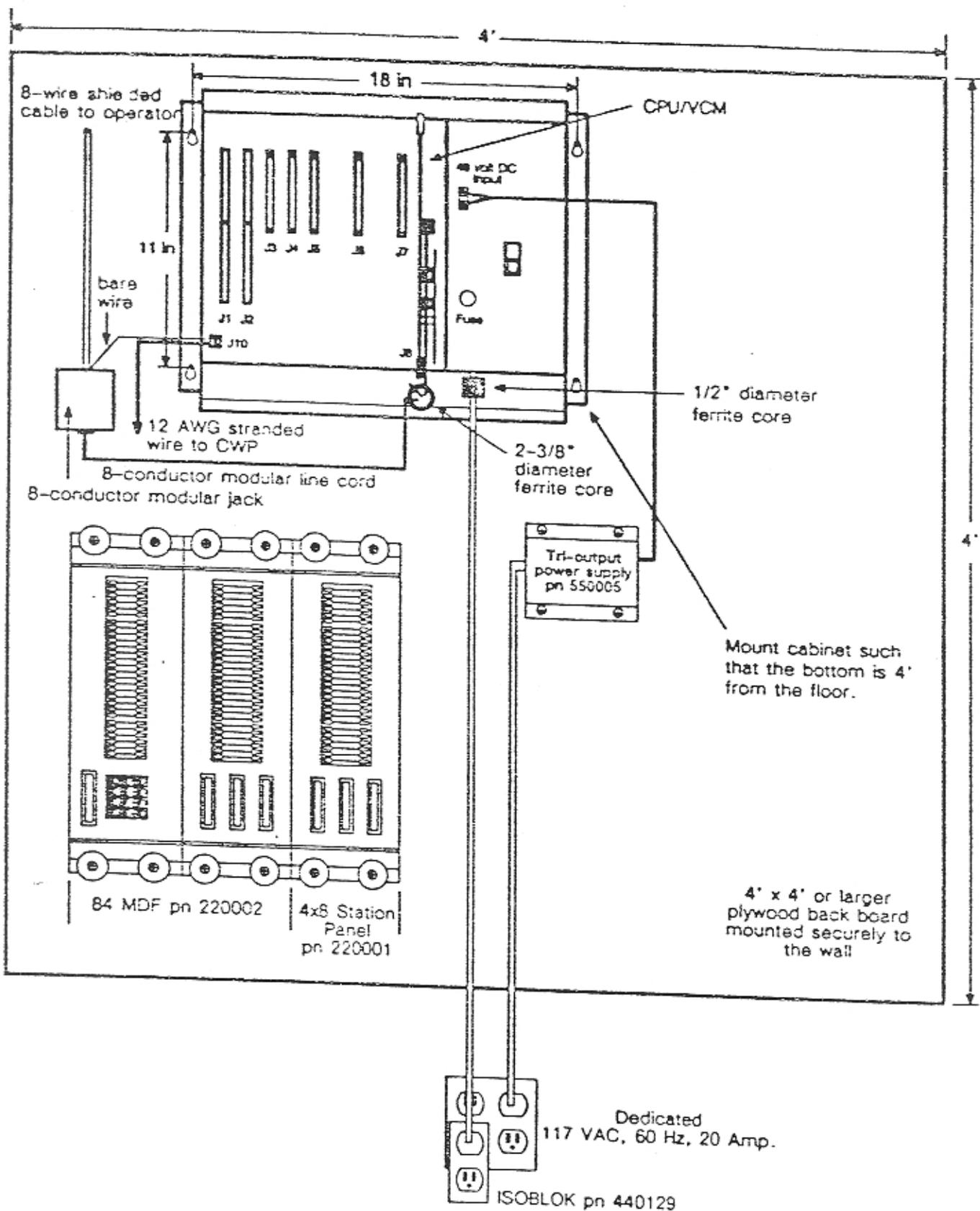


Figure 15 Installation Overview

## INSTALLATION OF A PROGRAMMING OR OPERATOR TERMINAL - RS-422

The Integrated Terminal (p/n 440017) can be connected to the system's optional RS-422 I/O port to provide a programming terminal, or Integrated Operator Terminal. The port on the I/O Expansion module is Port 3, and is configured for an RS-422 type connection. Serial devices connected to this port may be located up to 1000 feet from the cabinet. Port 3 defaults to 9600 baud.

Configure the terminal for RS-422 operation.

### TERMINAL SET-UP RS-422

The programming of the terminal setup is shipped RS-422. To make certain of the setup, follow the instructions provided below.

1. Turn the power switch located on the right side of the terminal to the on position. The screen of the terminal should first appear reverse video with all stars, and then appear blank with a cursor in the upper left corner of the screen.
2. Press the CONTROL and SETUP (ICM) keys simultaneously. The terminal enters the setup mode.
3. Press the RIGHT arrow (➡) key until DEFAULT ALL is highlighted.
4. Press F10 key. The terminal setup menu appears with EXIT highlighted.
5. Press the RIGHT arrow (➡) key twice. SAVE ALL is highlighted.
6. Press the F10 key. The terminal is now ready for RS-422 operation.

### WIRING AN INTEGRATED TERMINAL TO THE RS-422 PORT USING STATION CABLE

An Integrated terminal can be wired to the RS-422 I/O port using a 6-conductor modular mounting cord, 6 or 8-wire shielded station cabling, two 6-conductor modular station connecting blocks, and the modular to DB-25 cable (p/n 30006).

1. Install a 6 or 8-wire, 22 or 24 AWG, shielded with drain wire station cable between the location selected for the terminal and as close as possible to the CWP connector J10 of the system cabinet.
2. Terminate the terminal end of the cable to a standard modular station connecting block.
3. The end of the cable near the cabinet is also terminated on a modular station connecting block, however, this connecting block is wired in a non-standard manner. The bare shield wire is connected to J10-CWP of the cabinet. See Figure 16.
4. Plug the DB-25 end of the modular-to-DB-25 cable (p/n 30006) into the MODEM port of the terminal. Plug the modular end of the cable into the station connecting block.
5. At the cabinet end of the station cable, connect a standard 6-conductor modular mounting cable to the RS-422 port on the I/O Expansion module. This cable must be wrapped around a ferrite core in the same manner described previously. Plug the other end of this cable into the station connecting block.

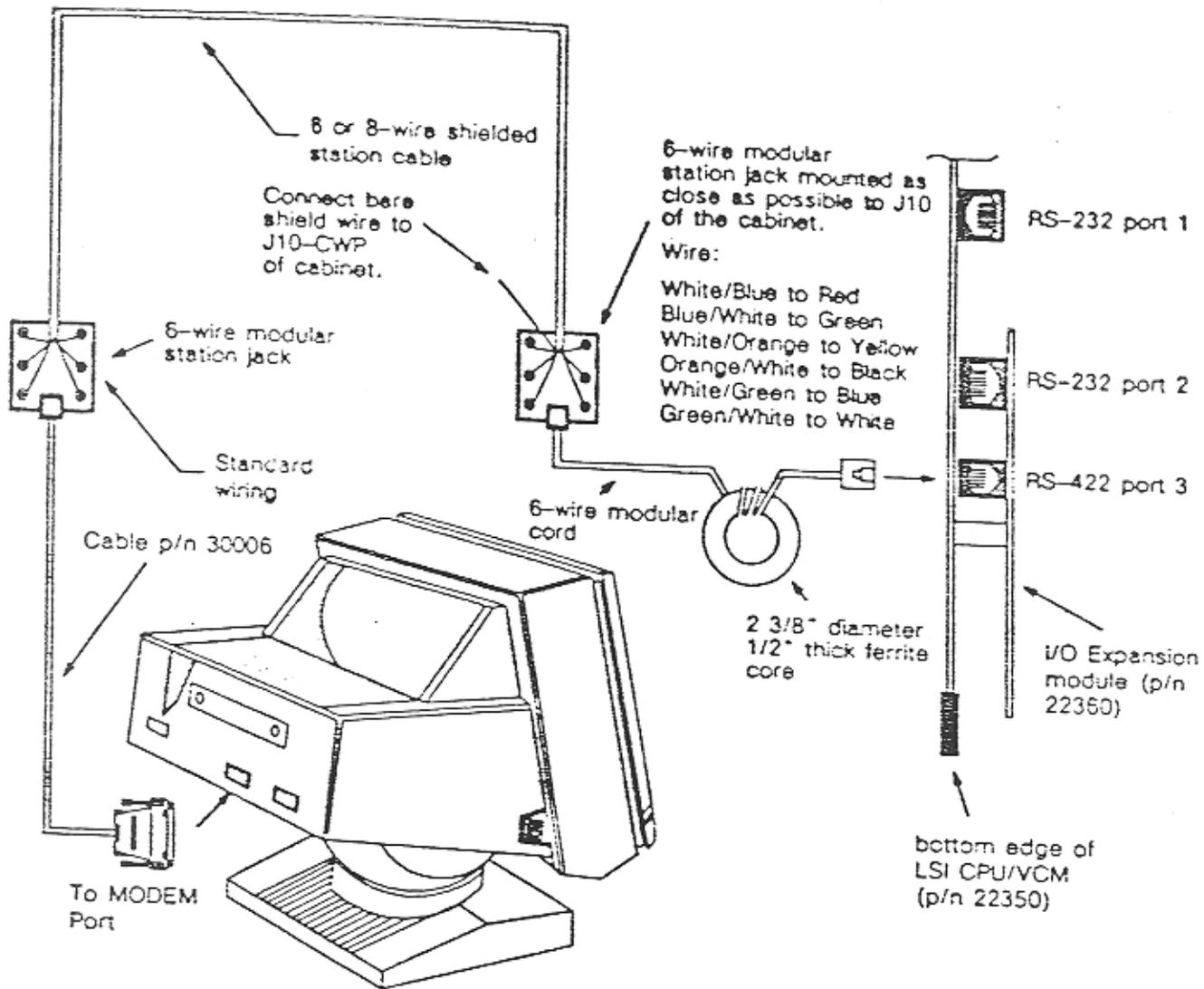


Figure 16 Wiring An Integrated Terminal To the RS-422 Port Using Station Cable

**OKIDATA 182T SET-UP**

1. Remove the access cover and the platen knob. Remove the screws that hold down the front cover.
2. Lift the cover until it comes free of the machine. Remove the cover and put it aside.
3. Locate the switches on the serial interface (BANK 1 and BANK 2), and on the main board.
4. With a small screwdriver, gently change the switches to the needed settings. Set the protocol for DTR on pin 20. Make certain the switch settings match those in Table 8. The factory setting for the baud rate is 9600. If a different baud rate is desired, the first three switches of BANK 2 are used. Refer to Table 9.

Table 8								
Switch settings								
Switch #	1	2	3	4	5	6	7	8
BANK 1	on	on	on	on	on	on	on	on
BANK 2	see Table 9	see Table 9	see Table 9	off	on	off	off	off
MAIN BOARD	off	off	off	off	on	off	on	off

Table 9			
BAUD RATE SELECTIONS BANK 2 - SWITCHES 1, 2, & 3			
Baud Rate	Switch 1	Switch 2	Switch 3
19,200	on	on	on
*9,600	off	on	on
4,800	on	off	on
2,400	off	off	on
1,200	on	on	off
600	off	on	off
300	on	off	off
110	off	off	off

5. Reassemble the printer, and connect the power cord.
- The printer is now ready to be installed.

## CONNECTION TO THE RS-232 PORT

A printer can be connected to one of the system's RS-232 I/O ports. The port on the LSI CPU/VCM is designated Port 1, and is configured for an RS-232 type connection. The port on the I/O Expansion module is designated Port 2, and is configured for an RS-232 type connection. Serial devices connected to these ports may be located up to 50 feet from the cabinet. Ports 1 & 2 default to 9600 baud. To wire the printer to either RS-232 port, use serial kit part number 440096. This kit contains a 7 foot, 8-wire modular cable, an 8-pin modular jack and a DB-25 connector. The jack and DB-25 connector must be wired together before use. Wire the modular to DB-25 connector as shown in Table 10.

Connector Color	DB-25 Pin #	Terminal Signals
Green	2	Transmitted Data (into system)
Yellow	3	Received Data (from system)
Black	7	Signal Ground
Red	20	Data Terminal Ready

The modular cable must pass through a 1/2" thick, 2-3/8" diameter, round Fair-Rite ferrite core three times before exiting the system in order to comply with FCC regulations. Wrap each modular cable around the core three times as shown in Figure 10.

Connect the 8-pin modular end of the cable to the port on the LSI CPU/VCM, or the I/O Expansion module. Connect the other end to the serial connector on the back of the printer. See Figure 17.

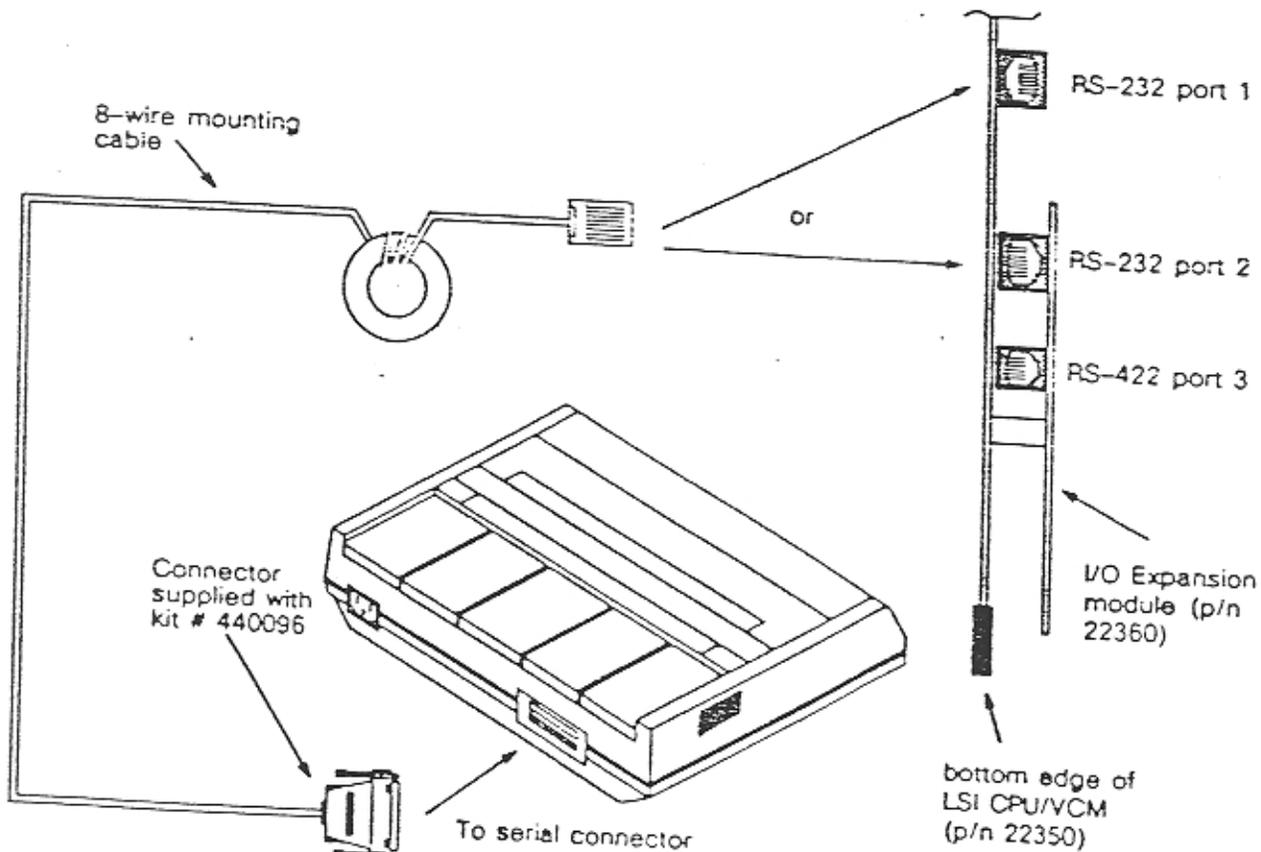


Figure 17 Wiring A Printer To The CPU

## PROGRAMMING/FEATURE DIFFERENCES

The 84 port configuration is programmed using a programming terminal and programming screens. The following programming screens reflect the configuration:

- System Configuration -
  - The LSI 4x8 CO/Station port card displays as 8 stations and 4 CO lines on one program line.
- System Programming -
  - The 84 port configuration has a maximum of three operator positions.
  - There are 32 line ID numbers in the system.
  - There is only one music source input for both *Background Music* and *Music on Hold*.
  - The integrated operator uses XON/XOFF protocol.
  - The *System Reset Timer* is available in this configuration.
- Station Programming - There are 5 *Ring Types* rather than 11.
- Backup Program Memory
  - The *Digit Timeout* parameter on the *Auto Attendant* screen is saved in system programming.
  - All other Auto Attendant programming information is saved using the *Automated Attendant* selection.

## OPTIONAL SOFTWARE FEATURES

Use the following part numbers to order the optional IDS features available for the 84 port configuration using the LSI CPU/VCM - 22350.

- Automated Attendant - 114002
- Call Accounting Reports Option 1 - 114001
- Voice Message System Integration - 440256
- Least Cost Routing - 10001

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