Preface

Objectives

The *Cisco VCO/4K System Administrator's Guide* describes how to configure the various components of your Cisco Systems switch. This guide provides instructions on how to access and use the system administration functions. While recommendations are made as to the purpose of each function, the specific host application may suggest other possibilities. Use this guide as an introduction or "road map" to system administration.

System administration refers to the menu-driven functions resident on the switch. These functions include Database Administration, System Configuration, Maintenance, and Diagnostics. Each function is described in detail throughout the remainder of this manual.

Note This guide pertains to all Cisco system configurations running VCO/4K system software V5.1 FSR 00 or greater. Information in this guide includes all features and enhancements up to 5.2(0).

Audience

This guide is intended for all personnel with system administrator privileges. You should be familiar with the components of the switch as well as the system administrator master console. The master console is your access to the system administration functions.

When navigating the system administration menus and screens, you will be directed to use certain command actions such as keyboard entries. These command actions are frequently used throughout this manual. Refer to Chapter 2, "Getting Started," for detailed information.

Certain on-screen commands are available throughout the system administration software. These commands appear in the lower right corner of the screen, and provide visual instruction or direction.

Document Organization

This publication is organized as follows:

Chapter 1, "System Overview," provides an overview of the VCO/4K system.

Chapter 2, "Getting Started," describes how to log in, log out, move the cursor, use the system administration keys and the basic design features of VCO/4K system administration.

Chapter 3, "Database Administration," describes how to define inpulse and outpulse rules, group resources, create answer supervision and ISDN templates, configure line and trunk card characteristics, and more, using the system administration features of the Database Administration menu.

Chapter 4, "System Configuration," describes how to specify VCO/4K system interaction with peripheral equipment, storage devices, and host computers using the system administration features of the System Configuration menu.

Chapter 5, "Maintenance," describes how to make changes to VCO/4K system hardware and software using the system administration features of the Maintenance menu.

Chapter 6, "Diagnostics," describes how to test and view the operating status of various system components using the system administration features of the Diagnostics menu.

Appendix A, "Supervision Signaling," describes two VCO/4K system signaling capabilities:

- Signaling generation and detection for analog line and trunk interface cards
- T1 and E1 supervision signaling

Appendix B, "T1/PRI Synchronization to Master Timing Link," describes T1/PRI synchronization—a dynamic process in the VCO/4K system that varies according to the Master Timing Link selection entered by the administrator under the Maintenance menu.

Appendix C, "Administration Keyboard Types," describes the keyboard types supported for each system administration interface—local console, remote maintenance console, or optional Ethernet Telnet connection.

Appendix D, "Customized Signaling and Span Types," describes the Interface Controller Card (ICC) Universal Protocol Generator (UPG) Update Tool. The tool allows you to modify the default .upg files in order to create custom Interface Controller Card (ICC) protocol data files for E&M and CAS/R2 protocols.

Document Conventions

This guide provides the following consistent visual clues to identify text and important descriptions:

Note Means *reader take note*. Notes contain helpful suggestions.

Tips Means *the following are useful tips*.

Caution Means *reader be careful*. In this situation, you might do something that could result in loss of data.

Warning **Means danger. You are in a situation that could cause bodily injury. Before you work on any equipment, you must be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents.**

Related Documentation

You may want to refer to the following documents that apply to your Cisco VCO/4K configuration:

- *Cisco VCO/4K System Software Version 5.n(n) Release Notes*
- *Cisco VCO/4K System Administrator's Guide*
- *Cisco VCO/4K System Messages*
- *Cisco VCO/4K Software Installation Guide*
- *Cisco VCO/4K Hardware Installation Manual*
- *Cisco VCO/4K Card Technical Descriptions*
- Product supplements for optional software, including:
    - *Cisco VCO/4K Management Information Base (MIB) Reference*
    - *Cisco VCO/4K Standard Programming Reference*
    - *Cisco VCO/4K Extended Programming Reference*
    - *Cisco VCO/4K ASIST Programming Reference*
    - *Cisco VCO/4K TeleRouter Reference Guide*
    - *Cisco VCO/4K ISDN Supplement*
    - *Cisco VCO/4K Ethernet Supplement*
    - *Cisco VCO/4K IPRC Supplement*
   - Applicable tone plan supplements

System Administration Menu Structure

When referring to the system administration menu structure, the terms "menu," "function," "option," and "screen" are used throughout this guide. Figure 1 provides a sample menu structure format.

The system administration main menu displays four functions: Data Base Administration, System Configuration, Maintenance, and Diagnostics. You can access these functions while the system is processing calls. Each function displays multiple options, which, when selected, display a screen.

For example, from the system administration *main menu*, select the Data Base Administration *function*, then select the Card Summary *option* to view the information displayed in the Card Summary screen.

Figure 1   *System Administration Menu Structure Format*
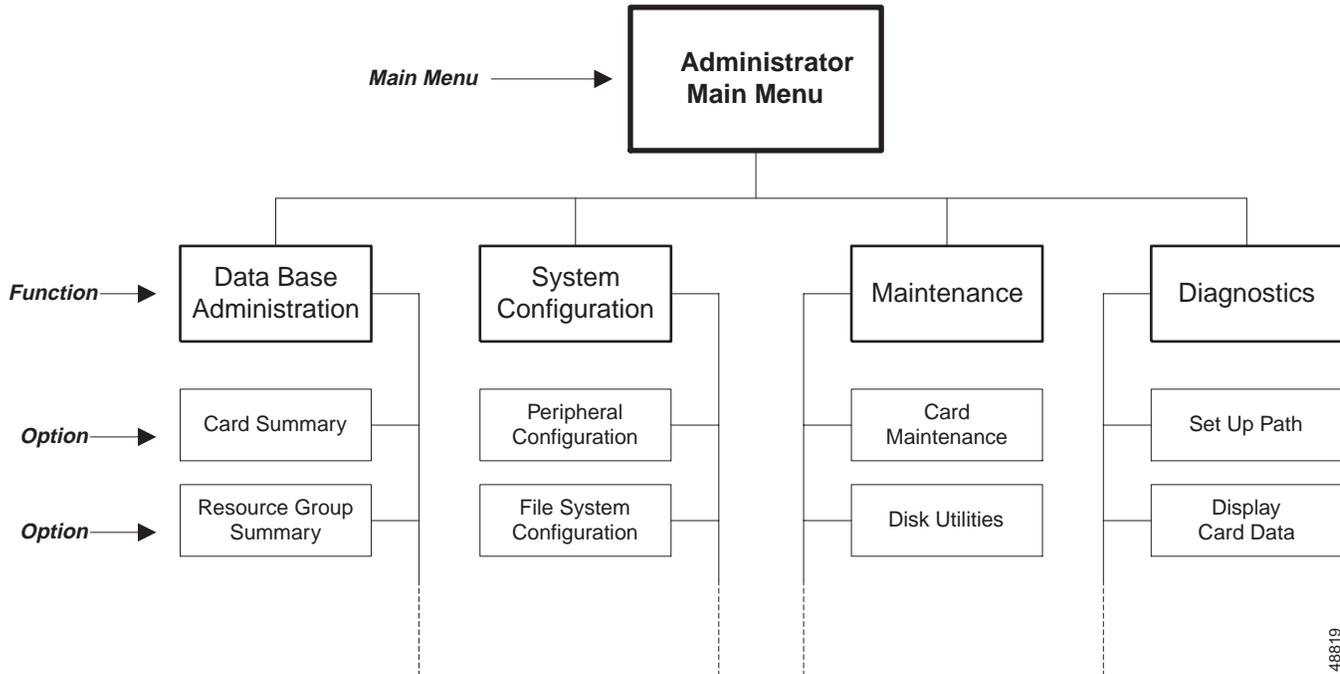
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- http://www-china.cisco.com
- http://www-europe.cisco.com

Documentation CD-ROM

Cisco documentation and additional literature are available in a CD-ROM package, which ships with your product. The Documentation CD-ROM is updated monthly and may be more current than printed documentation. The CD-ROM package is available as a single unit or as an annual subscription.

Ordering Documentation

Cisco documentation is available in the following ways:

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  http://www.cisco.com/cgi-bin/order/order_root.pl

- Registered Cisco.com users can order the Documentation CD-ROM through the online Subscription Store:

  http://www.cisco.com/go/subscription

- Nonregistered Cisco.com users can order documentation through a local account representative by calling Cisco corporate headquarters (California, USA) at 408 526-7208 or, in North America, by calling 800 553-NETS(6387).

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Cisco Systems, Inc.
Document Resource Connection
170 West Tasman Drive
San Jose, CA 95134-9883

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http://www.cisco.com

Technical Assistance Center

The Cisco TAC website is available to all customers who need technical assistance with a Cisco product or technology that is under warranty or covered by a maintenance contract.

Contacting TAC by Using the Cisco TAC Website

If you have a priority level 3 (P3) or priority level 4 (P4) problem, contact TAC by going to the TAC website:

http://www.cisco.com/tac

P3 and P4 level problems are defined as follows:

- P3—Your network performance is degraded. Network functionality is noticeably impaired, but most business operations continue.

- P4—You need information or assistance on Cisco product capabilities, product installation, or basic product configuration.

In each of the above cases, use the Cisco TAC website to quickly find answers to your questions.

To register for Cisco.com, go to the following website:

http://www.cisco.com/register/

If you cannot resolve your technical issue by using the TAC online resources, Cisco.com registered users can open a case online by using the TAC Case Open tool at the following website:

http://www.cisco.com/tac/caseopen

Contacting TAC by Telephone

If you have a priority level 1 (P1) or priority level 2 (P2) problem, contact TAC by telephone and immediately open a case. To obtain a directory of toll-free numbers for your country, go to the following website:

http://www.cisco.com/warp/public/687/Directory/DirTAC.shtml

P1 and P2 level problems are defined as follows:

- P1—Your production network is down, causing a critical impact to business operations if service is not restored quickly. No workaround is available.

- P2—Your production network is severely degraded, affecting significant aspects of your business operations. No workaround is available.

System Overview

This chapter provides an overview of Cisco Systems switching systems. The switches are intelligent digital telecommunications peripherals that provide an interface to the public network. The systems take actions based on events occurring on its switched network interfaces, commands issued by an optional host computer, and internal configurations. These actions and events are reported in system files.

Cisco switching systems are available in three hardware configurations: VCO/4K, VCO/20, VCO/80; and two software configurations: standard operational mode and extended operational mode. All VCO systems can operate in either mode.

The extended operational mode refers to the extended host application programming interface (API). The extended host API is designed for messages to handle the 4,096 address range and tone plan identification. The extended host API is required for the switch to operate in extended operational mode. Refer to *Cisco VCO/4K Software Installation Guide* for detailed information about setting up your system for extended operational mode.

The difference between 2K and 4K hardware configurations is the backplane assembly of the switch. The backplane is the high-speed communications line to which all individual cards are connected. The backplane (bus) runs at a very high speed because it must carry many conversations, address information, and considerable signaling.

VCO/4K system software V5.x can run on VCO/Series or SDS switches, but only VCO/Series switches can use all 4,096 time slots. The C-bus hardware is installed on VCO/4K systems at the time of manufacture; VCO/20 and VCO/80 systems may be upgraded with an optional upgrade kit. Table 1-1 describes the feature compatibilities of the switching systems.

Table 1-1   System Feature Compatibility

System Feature	VCO/20	VCO/4K	VCO/80	SDS
2,048 ports	Yes	Yes	Yes	Yes
4,096 ports[1]	Yes[2]	Yes	Yes[1]	No
Standard operational mode	Yes	Yes	Yes	Yes
Extended operational mode	Yes	Yes	Yes	Yes
A- and B-bus	Yes	Yes	Yes	Yes
C-bus	Yes[1]	Yes	Yes[1]	No

1. To take advantage of the 4,096 ports, both the Extended Operational Mode and C-bus Enabled System Feature flags must be enabled.

2. With optional upgrade kit.

The following hardware components comprise the basic Cisco switching system:

- VCO/Series switch
- Optional host computer
- Master console
- Optional printer

The master console provides access to system administration menus and screens. Configure the components of the switch from the master console.

The host computer houses the host application. The switch houses the operating system, switch system software, and database information. It is also the storage cabinet for the control circuit, port interface, and service circuit cards. These cards are installed in the card slots of the cabinet, and are controlled by switch system software. If your host is configured with an Ethernet connection, you can access the switch remotely via Telnet.

Redundancy preserves configuration and database information if a card or system fails. Redundant systems maintain traffic if the main system fails.

The Cisco switch is a highly flexible call processing system that can use a digit matching process of dialed digits when the optional TeleRouter software is used. The main components of a Cisco switching system include a switch and a master console. The master console is where you access the switch to locally configure, change and add cards, and program new applications. If an optional host is connected to the system, the switch and host communicate via Cisco's open API messages.

The switch receives incoming digits (in most cases, the ANI and dialed number) from a CO (central office). The system is informed that digits have been received, and processes the digits based on how they are configured in the various databases within the switch. The digits are then outpulsed to the far end CO. The CO transfers the digits to the called party (dialed number).

Each Cisco switching system is unique in that it can be configured based on how you want to receive the incoming digits and send the outgoing digits. Incoming and outgoing digits are described as follows:

- Incoming Digits—The digits/signals sent by the telephone company are recognized by the inpulse type. The inpulse type defines the signaling protocol used on the incoming calls for a particular trunk, and consist of inpulse rules. Inpulse rules define the digit collection method.

  Examples of digit collection tokens supported are DTMF, MF, and MFCR2.

- Outgoing Digits—After the digits are received, they must be configured for signaling and outpulsing to the far end on an outgoing call. The outpulse rule and answer supervision template handle this process.

  Examples of digit tokens supported are DTMF, MF, and MFCR2. Answer supervision includes dial tone, busy, reorder, wink, ringback, and voice detection.

VCO/Series Switch

The Cisco VCO/Series switches are programmable, nonblocking digital systems that support a wide range of telephony services. Cisco switches support a universal card slot architecture. This architecture allows for incremental expansion.

VCO/4K Switch

The VCO/4K supports up to 4,096 ports in a single rack configuration via the C-bus.

VCO/4K systems shipped from Cisco Systems display a **VCO 4K Series** label on the front of the VCO chassis and an **IV K** label on the front panel of each individual card.

To operate in 4K mode, Type 2 cards are required. Type 2 cards are compatible with the C-bus, and are designated as Type 2 by the **IV K** label on the front panel of the card. All Type 2 cards can operate in 2K mode. Refer to Table 1-2 for the attributes of all available Cisco cards.

Table 1-2   Card Type Attributes

Card	Redundancy	Diagnostics Control	Card Downloads	Card Type	Time Slot Access
2-Wire Trunk[1]	n+1 / cool	Local	Firmware	Type 1	2K
4XE1[1]	n+1 / cool	Remote	Volatile	Type 1	2K
4XT1[1]	n+1 / cool	Remote	Volatile	Type 1	2K
AAC	—	Local	Firmware	—	—
BRC[1]	1+1 / warm	Local	Firmware	Type 1	—
CPA[1]	n+1 / cool	Local	Volatile	Type 1	2K
CPU (MVME147-023)	1+1 / warm	Local	Volatile	—	—
D+I[1]	n+1 / cool	Local	Volatile	Type 2	4K
DCC[1]	n+1 / cool	Local	Firmware	Type 1	2K
DID[1]	n+1 / cool	Local	Firmware	Type 1	2K
DRC 24/48[1]	n+1 / cool	Local	Volatile	Type 1	2K
DRC 8[1]	n+1 / cool	Local	Firmware	Type 1	2K
DTG	1+1 / warm	Local	Firmware	Type 2	2K
DTG-2	1+1 / warm	Local	Firmware	Type 2	2K
E&M Trunk[1]	n+1 / cool	Local	Firmware	Type 1	2K
E1[1]	n+1 / cool	Local	Firmware	Type 1	2K
E1-PRI (NTDASS2, DPNSS)[1]	n+1 / cool	Local	Volatile	Type 1	2K
E1-PRI 120 ohms (NET5)[1]	n+1 / cool	Local	Volatile	Type 1	2K
ICC E1[2]	n+1 / cool	Remote	Flash	Type 2	4K
ICC T1[3]	n+1 / cool	Remote	Flash	Type 2	4K
IPRC 8, 64, 128 [4]	n+1 / cool	Local	Volatile	Type 2	4K
LTC-8	n+1 / cool	Local	Firmware	Type 1	2K
MRC (MF Receiver)[1]	n+1 / cool	Local	Firmware	Type 1	2K
MFCR2[1]	n+1 / cool	Local	Firmware	Type 1	2K
MVDC T1[1]	n+1 / cool	Remote	Volatile	Type 1	2K
NBC3	1+1 / warm	Remote	Volatile	Type 2	—
PRI (4ESS, 5ESS, NTI)[1]	n+1 / cool	Local	Volatile	Type 1	2K
PRI/N (4ESS, 5ESS, NTI, NI-2, NTT)[1]	n+1 / cool	Local	Volatile	Type 1	2K

Table 1-2   Card Type Attributes (continued)

Card	Redundancy	Diagnostics Control	Card Downloads	Card Type	Time Slot Access
SLIC-2[5]	n+1 / cool	Local	Firmware	Type 1	2K
SPC [6]	n+1 / cool	Remote	Flash	Type 2	4K
SSC	1+1 / hot	Remote	Volatile	Type 2	4K
SWI[1]	1+1 / warm	—	—	—	—
T1[1]	n+1 / cool	Local	Firmware	Type 1	2K
UTC[1]	n+1 / cool	Local	Firmware	Type 1	2K

1. This card type is not supported in VCO/4K system software version 5.2(0) and higher.

2. In addition to in-band signaling, the ICC-E1 supports the following ISDN variants: NET5, TS 014, and QSIG. Refer to the *Cisco VCO/4K ISDN Supplement* for more information.

3. In addition to in-band signaling the ICC-T1 supports the following ISDN variants: 4ESS, 5ESS, NI-2, NTI, NTT, and NTT_CS. Refer to the *Cisco VCO/4K ISDN Supplement* for more information.

4. The IPRC card, with play-only capability (no record capability), is supported in a C-bus enabled switch.

5. The SLIC-2 card is supported in VCO/4K system software version 5.2(0) and higher in 2K mode only.

6. The SPC (Service Platform Card) currently supports DTMF reception, DCC - conference, MFCR2, CPA (Call Progress Analysis), and MFR1 detection.

The following list defines the headers and attributes displayed in Table 1-2.

Card

Lists, in alphabetical order, all Cisco port interface and service circuit cards.

Redundancy

Describes the action required to replace a card into a redundant system.

n+1

Additional resources are available, by populating the switch with one more card than is actually required. All resources are put within a common resource group, so the loss of a card does not affect the application's operation.

1+1

A unit/function is backed up by another identical unit/function.

cool

The standby redundancy configuration that means cards installed in the switch do not share any information. Upon failure, all transactions in progress are lost.

warm

The standby redundancy configuration that means at a certain checkpoint, the data is synchronized across a pair of facilities, such as the active facility and standby facility. Synchronization occurs only at specific points during call processing. Therefore, calls in progress may be lost (torn down) if the active facility or a manual switchover fails.

hot

The standby redundancy configuration that means data synchronization is based on identical real-time processing on both pairs of facilities. Upon failure of the active resource, or manual switchover of these facilities, the standby resource takes over for the active resource with no loss of calls or related functionality.

Diagnostics Control

Defines the access method available for running diagnostic testing. Some cards do not allow remote access of the information.

Local

The operating status of various system components can be tested or viewed from the switch location only.

Remote

The operating status of various system components can be tested or viewed from a remote location.

Card Downloads

Defines the upgrade method required for each card type.

Firmware

Nonvolatile. The card must be removed from the switch to replace the firmware (PROMs).

Volatile

A download is required for a cold boot or cold restart.

Flash

Live upgrade: A download is not required unless the stored card application does not match the download file on disk.

Card Type

Defines the Cisco card as Type 1 or Type 2.

Type 1

Type 1 cards are only supported by the A- and B-buses (2,000 ports), and prevent other cards in the system from supporting 4,000 ports. These cards are not physically compatible with the C-bus hardware. A system with C-bus hardware enabled does not allow Type 1 cards to be brought into service. Therefore, the 4K port configuration is not available if Type 1 cards are installed in your system.

Type 2

Type 2 cards are compatible with the C-bus hardware, that is, they can function in a 4K port switch, and are designated as Type 2 by the **IV K** label on the front panel of the card. Some Type 2 cards support only 2,000 ports but do not prevent other cards from supporting 4,000 ports; others are fully capable of handling 4,000 ports. Some Type 2 cards can be used in a 2K port configuration system configured with the A- and B-bus, but you are limited to 2,048 ports.

Time Slot Access

The card's ability to access the 2K or 4K port configuration via the C-bus.

2K is contiguous. Contiguous refers to the process of allocating individual time slots which are adjacent to one another. This method limits the number of available time slots in situations where sufficient time slots are available but, because they are fragmented, cannot be applied to a particular card.

4K is noncontiguous. Noncontiguous allows the system to allocate fragmented time slots. It is not necessary for all time slots for a card to be adjacent to one another.

VCO/20 and VCO/80 Switches

The VCO/20 supports integrated turnkey solutions or highly distributed switching requirements. The VCO/80 provides expanded card slot capacity for larger configurations. Both switches provide the same functionality, and support up to 2,048 ports.

A VCO/80 switch configured with all Type 2 cards in a single subrack can be fitted to enable C-bus and run as a 4K port switch. The SDS-500 and SDS-1000 may not run as a 4K port switch; they are restricted to approximately 2,000 ports.

If you are upgrading your existing VCO switch to a VCO/4K switch, a C-bus retrofit kit and 4K labels are included in your upgrade package.

Configuration and database information, such as card setup and inpulse/outpulse rules, is stored on the hard drive of all the switches. In a redundant system, two databases are stored—one on each hard drive.

Optional Host Computer

The host computer is the traffic director for all calls coming into the switch. When the switch detects an incoming call, it sends a report to the host. The report contains inpulse rule information. Based on the information received, the host sends a command back to the switch with call control instructions according to the application requirements, specifying how to outpulse the digits, whether to send supervision signaling, or whether to perform any other action stored in the database.

The VCO/4K can be controlled by virtually any type of host computer, from PCs to mainframes. The size and speed of the host depends on traffic volume. In most cases, a mainframe, or multiple host computers, allows for faster message handling and minimizes the possibility of a host overload and loss of traffic. The switch supports up to eight hosts and Ethernet links.

The host computer is connected to the switch via Ethernet or a serial port. If you are using an Ethernet connection (TCP/IP), the host is plugged into the ETHERNET port on the front of the CPU-TM card. If a serial cable is used, the host is connected to the SERIAL port on the front of the CPU-TM card.

Master Console

The master console is where you configure, add, or make changes to cards, and program new applications. The console is designed with VT220/320 emulation. Sunview, Xview, and PC-type keyboard layouts are also supported.

When you log in to the system from the local master console, you can perform system administration functions within the switch. As system administrator, you can log on to the master console to perform the following functions:

- Define inpulse and outpulse rules
- Change the configuration of an entire card or a single port
- Add a card to the system
- Configure system peripherals, file systems, administration access, and host communication ports
- Verify the version/revision level of system software or firmware
- View the current status of a card or port as part of the host application debugging process
- Load software onto the system
- View the overall system status
- Run diagnostic routines on trunk or receiver circuits

Software Components

Various software components are necessary for a call to be processed through the Cisco switching system. Call routing decisions or call completions cannot be made by the generic software without direct host control.

Optional software applications are available, and depend on the features your system provides and the requirement of the application.

System Software

Cisco switch system software is real-time software that controls the functionality of the Cisco switches. System software Version 5.2 is the most current system software for the VCO/4K switch. Multiple software diskettes contain the system software Version 5.2 files. These files include the executable files, database files and card download files.

Optional Host Control Software

The host control software should be created on the optional host to properly utilize the command and report structure used to control call processing.

System Log Files

The system maintains log files of all error and status messages generated by the system controller. Log files are stored by month and date. For example, the file for December 23 is identified as A-DEC23.LOG, where "A" identifies the system controller for which messages are generated. Up to 31 days of messages are stored on the system disk before being overwritten. A-DEC23.LOG, for example, is overwritten on the 23rd day of January. You can print or view the log files from the Print/Display System Log File screen, which you access from the Maintenance menu. You can also copy the files from the hard disk via the Disk Utilities screen, which you also access from the Maintenance menu.

When the Ethernet Communications option is used, you can also store log files on a remote device through the Ethernet Network File System (NFS) facility. Refer to the *Cisco VCO/4K Ethernet Guide* for more information.

Each message is preceded by a time stamp that includes the VCA for that system, the date/time the message was generated, and an identifier showing the controller and its status at the time of the message. This identifier is in the format X-SSS, where X = controller side A or B, and SSS = ACT (Active) or SBY (Standby). For example, "A-ACT" indicates that controller A was active when the message was generated.

In a redundant system, both system controllers store both sets of log files, one for each side. Log files are marked according to the system controller for which they were generated: either "A-" for the A side or "B-" for the B side. Each side sends its messages across the update channel. A sample log file printout for a redundant system is shown in Figure 1-1. Possible messages are described in *Cisco VCO/4K System Messages*.

Figure 1-1   Typical System Log File Printout — Redundant System

```
    #01 Fri Apr 30, 1999 13:51:06 A-ACT
FRM101: CARD OOS - RLS 1,1,17 (CARD ALRM SET)
    #DF Fri Apr 30, 1999 13:51:01 B-SBY
FRM101: CARD OOS - RLS 1,1,17 (CARD ALRM SET)
    #DF Fri Apr 30, 1999 13:52:45 B-SBY
FRM095: Card Restored - RLS 1,1,17 (CARD ALRM CLRD)
    #01 Fri Apr 30, 1999 13:52:54 A-ACT
FRM095: Card Restored - RLS 1,1,17 (CARD ALRM CLRD)
```

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In a nonredundant system, log file extensions are not used. Each message is preceded by a time stamp that includes the VCA for that system and the date/time the message was generated. A sample log file printout for a nonredundant system is shown in Figure 1-2. Possible messages are listed in *Cisco VCO/4K System Messages*.

Figure 1-2   System Log File Printout — Nonredundant System

```
    #00 Fri Apr 30, 1999 10:30:00
FRM504: Major Alarm Set For - ALM011: No Hosts Available
    #00 Fri Apr 30, 1999 10:30:00
FRM503: Minor Alarm Set For - ALM010: Host Communications Failure
    #00 Fri Apr 30, 1999 10:30:05
HST003: Host <ADLC-4 > Restored
    #00 Fri Apr 30, 1999 10:30:05
FRM511: Major Alarm Clear For - ALM011: No Hosts Available
    #00 Fri Apr 30, 1999 10:30:10
HST001: Host Manager Initialization Complete
    #00 Fri Apr 30, 1999 10:30:12
FRM087: NBC Status Set To Active
    #00 Fri Apr 30, 1999 10:30:12
FRM086: NBC Hardware Tests Passed
```

Available Disk Space Monitored on Switch Hard Drive

With system software V5.1 FSR00 PUN23, or greater, the system automatically monitors the 80-MB hard drive in the switch for available disk space. Disk space on the hard drive can fill up quickly due to large trace and log files. The trace and log files can grow excessively due to the following circumstances:

- The trace functionality was not turned off after a debug or maintenance session.
- A large number of messages are continuously being logged to the log file.

The system continuously monitors the trace and log files to avoid large files using excessive disk space. Trace and log files should not exceed 1 MB. If the system detects that either file has exceeded 1 MB, it generates an alarm message (ALM096 for a trace file, and ALM097 for a log file.) Refer to the *Cisco VCO/4K System Messages* for alarm messages and meanings.

In addition, each midnight, the system verifies that a minimum of 30 MB is available on the hard drive. If the system detects that available disk space has fallen below 30 MB it generates an ALM093 alarm message. This message notifies you to delete unnecessary files until available disk space exceeds 30 MB.

If the system detects that available disk space has fallen below 15 MB it generates an ALM094 alarm message. The system then automatically creates disk space by performing the following steps:

Step 1   Delete all but the last (currently being used by the system) core files.

Step 2   Delete trace files exceeding 15 days.

Step 3   Delete log files exceeding 15 days.

Step 4   Delete trace files exceeding 1 day.

Step 5   Delete log files exceeding 1 day.

After executing each step, the system verifies available disk space. If available disk space exceeds 30 MB at any point during the deletion process, subsequent steps are not performed. However, if the system fails to generate more than 30 MB of available disk space after performing all steps it generates an ALM095 alarm message.

ALM093, ALM094, and ALM095 are cleared at midnight if the condition that set these alarms no longer exists. In addition, the log files are updated, the System Alarms Display screen is updated, and the $F0 (Alarm Condition Cleared) host reports are sent. Refer to *Cisco VCO/4K System Messages* for descriptions of alarm messages ALM093 to ALM097.

Getting Started

System administration refers to the menu-driven functions that interface with the database, system configuration, maintenance, and diagnostics software resident on the switch. You can access these functions from the master console.

Installing Software

Use Installation Utilities to install system software, screen formats, database tables, and to download files. The system software and all optional software applications are shipped with an Installation Utilities version specific to the software. You will need to access the Installation Utilities screen as part of the installation process. Refer to the *Cisco VCO/4K System Software Version 5.n(n) Release Notes* for detailed information.

Logging In and Out

System administration is accomplished through one of three terminal configurations:

- Local Video Display Terminal (VDT)

- Remote TTY via modem

- Telnet TTY (if the system is equipped with the Ethernet Communications option)

For information on these configurations, refer to the "Peripheral Configuration" section on page 4-2.

A user can log in through any one of the three types as long as they are properly configured. However, only one type can be configured and active at any point in time. For example, if the master console is configured, Telnet TTY users cannot configure their terminal for system administration. If users attempt to configure their terminals for system administration while another system administrator terminal is active, one of the following error messages appears:

```
User <username> Logged In On Console
User <username> Logged In On Remote
User <username> Logged In On Telnet
```

Initial Login

Your system was shipped with a single preconfigured username: *admin* (lowercase letters). There is no password associated with this username. The admin username has access to all system screens and utilities. This allows you or installation personnel to gain access to system administration and configure the system. Once usernames and passwords have been defined, you can delete the admin username to restrict unauthorized access.

⚠️

Caution   Passwords and usernames are case sensitive and must be typed exactly as entered in the database.

Logging In

To access system administration functions, you must first log in to the master console with a valid username and password. The system provides a password check to prevent unauthorized personnel from accessing system administration functions. When the system is booted, the System Login screen appears.

To access the main menu and system administration functions, perform the following steps:

Step 1   Type your username and press **Return**.

The cursor advances to the Password field.

Step 2   Type your personal password, if applicable, and press **Return**.

The system checks the system configuration files for verification. If your username and password are valid, the Administrator Main Menu is displayed.

✎

Note   If you are unable to log in to the system, you may need to reselect the keyboard type. The information in the Peripheral Configuration file must match the terminal you are using. Press **CTRL** and **K** simultaneously to reselect the keyboard type. The keyboard type options appear in the bottom right corner of the screen. Select **V** for VT220, **S** for Sun, **X** for Xview, or **U** for Universal.

Logging in from a Remote Console

Users can log in to the system from a remote console via a modem. The system acknowledges a remote login attempt when it detects connect signals—a CONNECT message (in ASCII) followed by a carriage return (<CR>) or line feed (<LF>) over the TTY01/Modem port.

✎

Note   These connect signals are automatically generated by the Hayes 1200 Smartmodem recommended and supplied by Cisco Systems. Cisco recommends that users purchase a Type 212A asynchronous modem, and configure the modem according to system requirements (refer to the OEM documentation supplied with the modem for setup and operation parameters).

Approximately 3 seconds after these signals are detected, the System Login screen is displayed. Users can then log in and perform system administration functions. Password checking for remote login is the same as for the local console. A failed login attempt is written to the system log file.

Note The operating parameters for the remote maintenance modem must match the settings defined in the system database within the Peripheral Configuration function (refer to the "Peripheral Configuration" section on page 4-2). Refer to the OEM documentation supplied with the modem for instructions on configuring the modem's operating characteristics.

A user can log in to the system from a remote location only if the Local TTY console is not logged on. If a user attempts to log on remotely while the local console is in use, the "User <username> Logged In On Console" message appears on screen, where <username> is the username with which the connection was established. While the remote console is in use, the local console cannot log on. If an attempt is made to log on to the local console while the remote console is in use, the "User <username> Logged In On Remote" message appears on the screen.

Logging in Over Ethernet by Establishing a Telnet Session

You can perform system administration functions over a Telnet connection with the Telnet TTY option if your system is equipped with the Ethernet Communications option. Refer to the "Peripheral Configuration" section on page 4-2 for more information.

Logging Out Manually

When you have performed all system administration functions, log out of the system by following these steps:

Step 1 Press **Main Menu** to return to the Main Menu screen.

The Main Menu screen appears.

Step 2 Press **Prev Menu** or **Exit.**

The System Login screen appears.

Logging Out Automatically

The system software logs out any console if no input is received from it within 15 minutes, unless a Diagnostic display screen is in use. Any key that is pressed during this 15-minute interval resets the timer. After 15 minutes of local console inactivity, or 5 minutes of remote console inactivity, the display returns to the login screen. When this occurs, the "Local Console Timed Out" message appears on the screen. If the console was connected remotely, that is also indicated in the message.

For local and Telnet access, the system will not log you out after 15 minutes of inactivity if the screen displayed on the console is updating (the cursor is continuously scrolling through the fields). (Not all screens provide the screen update feature.)
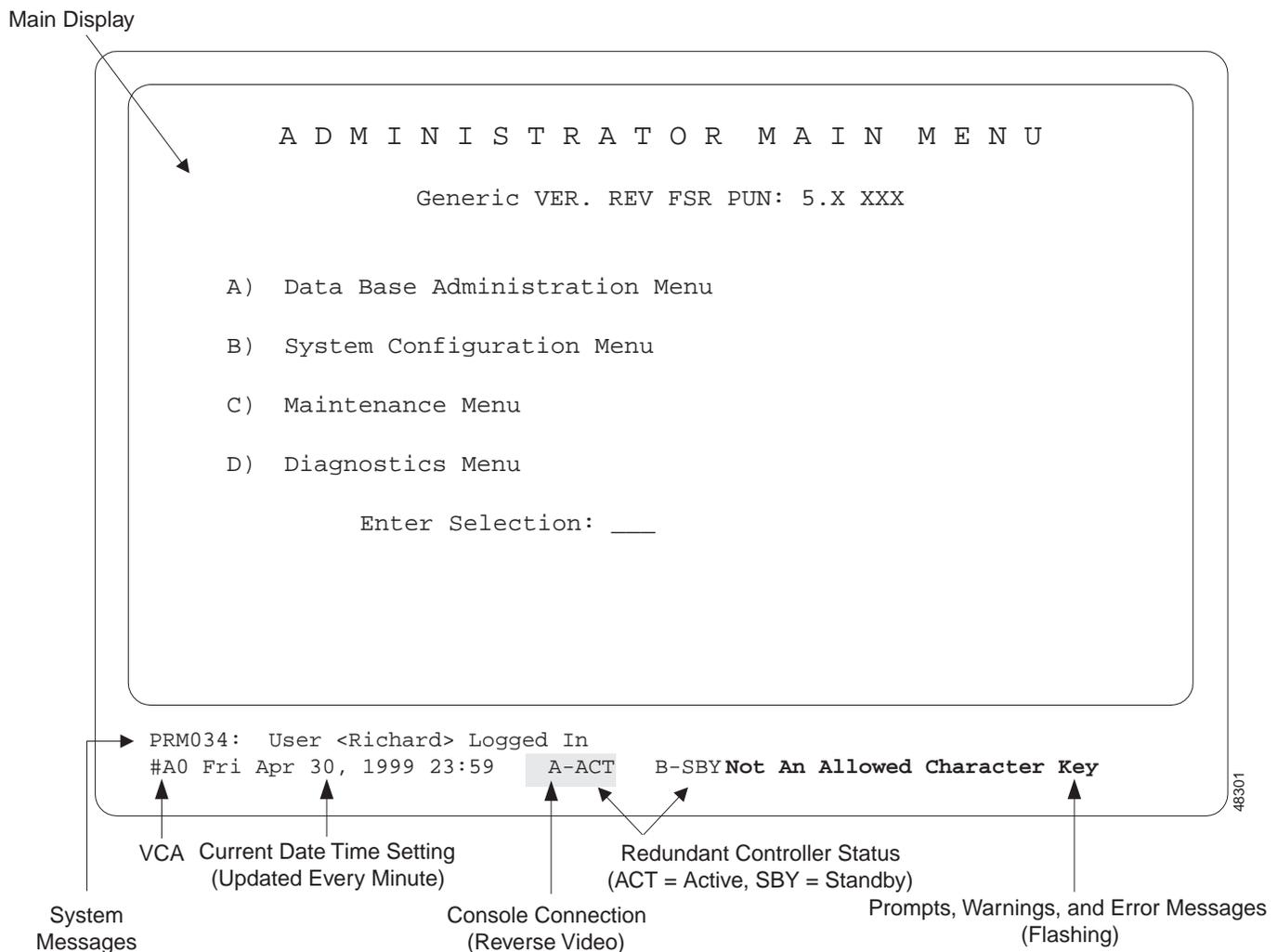
> **Note** While the Telnet connection is established, the local master console is disabled (a login screen is not displayed at the local console). If you are logged in via Telnet, and you know other users may need to log in via the local master console, make sure the screen update feature has ceased. Press any key to cease screen updating.

Master Console Screen

The master console screen is divided into several areas of information. These areas are identified in Figure 2-1, followed by a brief description.

Figure 2-1   Master Console Screen Layout

Main Display

```
        A D M I N I S T R A T O R   M A I N   M E N U

                Generic VER. REV FSR PUN: 5.X XXX


        A)  Data Base Administration Menu

        B)  System Configuration Menu

        C)  Maintenance Menu

        D)  Diagnostics Menu

                Enter Selection: ___



 PRM034:  User <Richard> Logged In
 #A0 Fri Apr 30, 1999 23:59     A-ACT    B-SBY Not An Allowed Character Key
```

VCA   Current Date Time Setting
(Updated Every Minute)

Redundant Controller Status
(ACT = Active, SBY = Standby)

System
Messages

Console Connection
(Reverse Video)

Prompts, Warnings, and Error Messages
(Flashing)

Main Display—The largest area on the screen. This area provides access to system administration functions and options.

System Messages—Displays system error and status messages, which are also sent to the system printer and system log file. A complete list of these messages and their meanings is provided in the Cisco VCO/4K System Messages.

VCA—Identifies the Virtual Communications Address assigned to your system by the host computer.

Current Date Time Setting—Indicates the current day, date, and time according to the system clock.

Console Connection/Redundant Controller Status—Displays only on redundant systems. It indicates the controller to which the master console is connected: A or B, and Active or Standby. The connected controller is shown in reverse video.

Prompts, Warnings, and Error Messages—Informs you when data has been entered incorrectly, you are attempting to use an invalid key, or a system error has occurred. A list of all possible on-screen messages, and from which function they are generated, is provided in the Cisco VCO/4K System Messages.

Console Entry and Editing Keys

The master console's VT220/320 keyboard is divided into the following areas: main keypad, cursor movement keys, administrative keypad, and programmable function keys. These areas are displayed in Figure 2-2, followed by a description of each area and its function with the System Administration software.

Figure 2-2   System Administration Keyboard
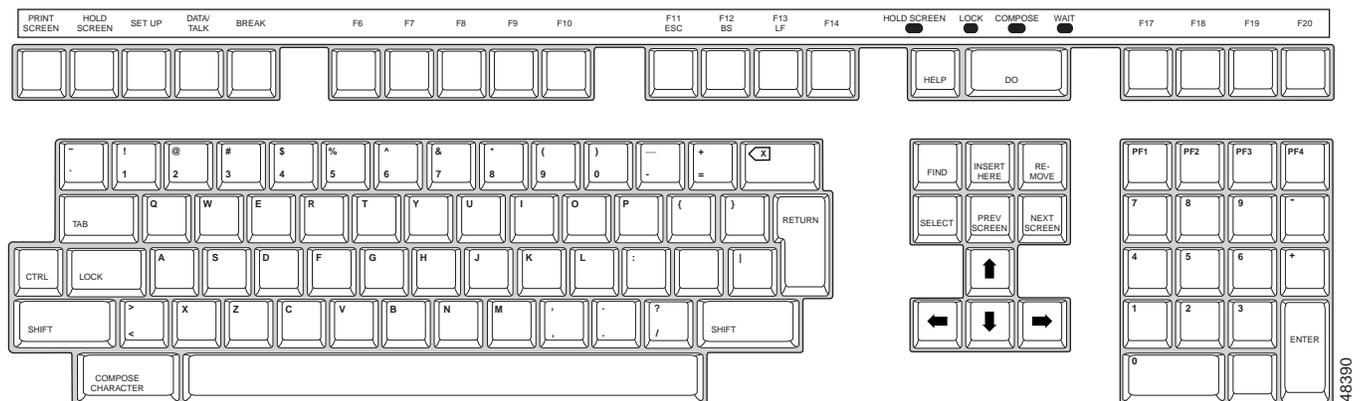
Main Keypad

The main keypad contains the group of keys used to type data into the system. All alphanumeric information is specified using this keypad. Throughout this guide, the phrase *Data entry via main keypad* means to use the keys on the main keypad to type information into the fields.

The special purpose keys on the main keyboard are:

- Tab—Use the Tab, and within certain screens the backtab (<) key, to move among sets of data (such as between inpulse rules), or as a rapid method of displaying other data in the Diagnostic screen. Its use is mentioned where applicable.

- Return—Use the Return key in place of the Enter key on the administrative keypad.

Cursor Movement Keys

Use the following keys for cursor movement:

- Hyphen key (-) and equal key (=)—move the cursor in the direction indicated within a data entry field.

- Plus key (+)—Moves the cursor to the first data entry field on a screen.

- Left bracket key ([ )—Moves the cursor to the last data entry field on a screen.

Administrative Keypad

The administrative keypad used by a VT220/320 console provides special functions unique to the system. These functions and the keys to which they assigned are shown in Figure 2-3. Each function is defined in Table 2-1.

Figure 2-3   Administrative Keypad
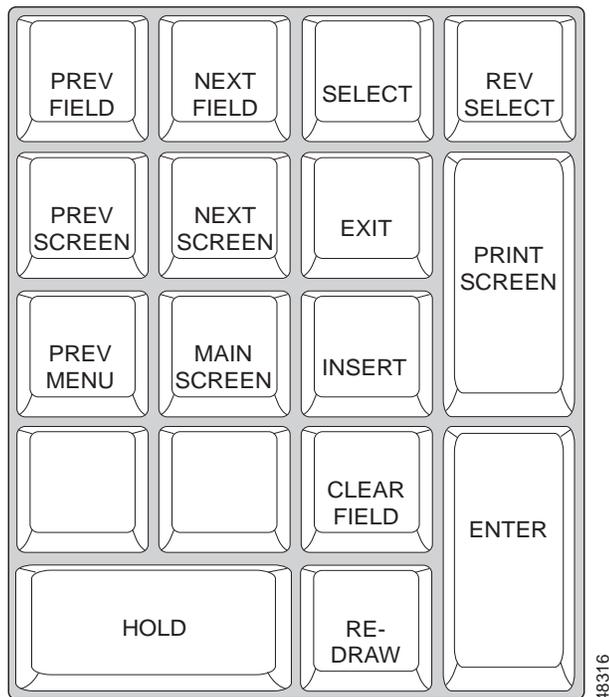
Table 2-1   Administrative Keypad Definitions

VT220 Label	System Label	Function
PF1	PREV FIELD	Advances the cursor to the previous data entry field.
PF2	NEXT FIELD	Advances the cursor to the next data entry field.
PF3	SELECT	Throughout this guide the use of this key is indicated by *Data entry via Select key*. Scrolls forward through a list of values for certain data entry fields.

Table 2-1   Administrative Keypad Definitions (continued)

VT220 Label	System Label	Function
PF4	REV SELECT	Throughout this guide the use of this key is indicated by *Data entry via Select key*. Scrolls backward through a list of values for certain data entry fields.
7	PREV SCREEN	Displays the previous screen for multiscreen functions.
8	NEXT SCREEN	Displays the next screen for multiscreen functions.
9	EXIT	Displays the screen from which the current screen was accessed.
-	STOP PRINT	Stops printing triggered by the print system log function or print database functions.
4	PREV MENU	Displays the top-level screen for that menu branch.
5	MAIN MENU	Displays the Administrator Main Menu.
6	INSERT	Inserts a token into an inpulse or outpulse rule list.
,	PRINT SCREEN	Prints a hard copy of the currently displayed screen.
1	—	—
2	—	—
3	CLEAR FIELD	Clears the data in the field in which the cursor is located.
0	HOLD	Toggles dynamic displays On/Off within certain Diagnostics screens.
.	REDRAW	Updates the display after screen changes have been made.
Enter	ENTER	Instructs the system to accept data currently displayed (perform a command, update a database, etc.) The Return key on the main keypad can also be used.

Programmable Function Keys

You can map up to 15 programmable function keys to system administration screens. Use the VT220/320 keys marked F6 through F20 for single keystroke access, as defined by system default parameters or from the Screen Access Configuration screen.

Menu Structure

System administration is organized in four major functions: Database Administration, System Configuration, Maintenance, and Diagnostics. You can access these functions from the master console's Administrator Main Menu while the system is processing calls.

Figure 2-4 shows the functions available from the four main system administration functions.

Figure 2-4   System Administration Menu Structure

ADMINISTRATOR MAIN MENU

Database Administration	System Configuration	Maintenance	Diagnostics
Card Summary	Peripheral Configuration	Card Maintenance	Set Up Path
Resource Group Summary	File System Configuration	Disk Utilities	Display Card Data
Inpulse Rules	Host Configuration	Print/Display System Log File	Display Port Data
Outpulse Rules	Password Configuration	Print/Display System Trace File	Display Conference Summary
Print Database Summary	Clock/Calendar Configuration	Switch ACT System To SBY	Display Conference Data
Print Database Detail	System Feature Configuration	Master Timing Link Selection	Test Service Circuits
BRC Config. Summary	Screen Access Configuration	Card Alarm Display	Test Port Card
Answer Supervision Templates	Software/ Firmware Configuration	System Alarm Display	Display Call Generation Ports
Routing Table Summary	License Configuration	Shutdown System	Monitor Call Progress Tones
ISDN Supervision Templates	System Host Configuration	Voice Prompt Maintenance	Display Routing Statistics
ISDN Message Templates	Ethernet/NFS/ SNMP Config.	Core Dump	System Trace Configuration
ISDN NFAS Group Summary	FTP Password Configuration	Live Upgrade Control Menu	Send Packet Utility
Subrate Configuration	Multiple Tone Plan Config.		Subrate Connection Display
SPC-TONE Plan Config.			Subrate Statistics Display

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Database Administration

Use this function, and related options, to specify line and trunk card characteristics, resource groups, inpulse and outpulse rules, and answer supervision templates. You can also print hard copies of all or part of the database.

System Configuration

Use this function, and related options, to specify system interaction with peripheral equipment, storage devices, and host computers. You can also assign system passwords, change the system clock, and view the system software/firmware configuration.

Maintenance

Use this function, and related options, when changes are made in system hardware or software. These changes include adding or deleting cards, changing the operational status of cards, maintaining the disk, and managing the system log file.

Diagnostics

Use this function, and related options, to test or view the operating status of various system components. These functions are especially useful for debugging during the application development process because they allow the engineer to view call processing activity for a port.

Access to Other Screens and Menus

When a screen is displayed, you can access other screens by pressing the appropriate key on the administrative keypad. The following screens are accessible from most other screens:

- Administrator Main Menu—Press the **Main Menu** key.
- Function Screen—Press the **Prev Menu** or **Exit** key.

Note When you have the option of accessing a screen from within a screen, the steps required are mentioned in that section. For example, from the Card Maintenance screen, you can access the Programmable Trunk Configuration screen: move the cursor to the **DISP CARD** field, then type any key and press **Enter**. To return to the Card Summary screen, rather than going back to the main menu, press the **Prev Screen** key.

In some cases, the information on the screen is updated every few seconds to show the current status. To access the above mentioned screens, you must first *halt the screen updates,* then press the appropriate key on the administrative keypad.

System Initialization

When powered up or reset, the system first checks if a floppy diskette has been inserted into the drive. If a disk is there, the system checks for the files necessary to boot the system. If the boot files are not on that disk, the system issues an error message.

If no floppy diskette is present, the system checks the hard disk for boot files. If the boot files are on that disk, the system begins the tasks necessary for normal system operation. Changes in card LED status that take place during system initialization are described in the installation manual for your hardware platform.

The system can also be booted from information contained on one or more floppy diskettes; either the system software diskettes or a optional software diskette. Refer to the *Cisco VCO/4K Software Installation Guide* for instructions on using the Installation Utilities.

Resetting or Rebooting the System

You might need to reset (or reboot) the system, either under the direction of Cisco Systems Technical Support or as part of a procedure described in this or another system publication. This is accomplished via the Alarm Arbiter Card (AAC).

The AAC card has two Reset buttons on the front panel, one for each system controller in a redundant system. In a nonredundant system, you can only use the side A Reset button for system reboot. Set the Select toggle switch to **A** for nonredundant systems. The status indicator always shows side **A** as active when the system is in operation.

Each side of a redundant system can be reset independently of the other. The status indicator shows the currently active side. Special controller reboot considerations for redundant system configurations should be taken into account.

- Control must be transferred to the standby side before the currently active side is reset (either by host command or from the Switch ACT System to SBY screen). Regardless of whether the Select toggle switch is set to the active side or Auto, when the active side is reset, control is not transferred to the standby side. When the active system controller is reset, all calls are lost. When system initialization has completed for that side, call processing is reestablished.

- When booting the system from floppy diskette, set the Select toggle switch to the active side. This prevents an accidental reset of the active side during the boot from floppy diskette.

Booting from System Software and Optional Software Diskettes

To boot the system from system software or optional software diskettes, follow these steps:

⚠

Caution   These steps automatically load the generic software into system memory, but do not save the files on the hard drive. If the system is later reset, the software files currently in memory are lost. The initialization process attempts to reload system software into memory from the floppy drive first, and then from the hard drive.

Step 1   If the system is redundant, set the Select toggle switch to the active side.

Step 2   Insert Generic Disk 2 or a optional software diskette into the disk drive.

> **Note** The system requests you to insert SUMMA4 in the floppy drive; SUMMA4 is the same as the disk labeled Disk 3.

Step 3 Power up the system or press the Alarm Arbiter Card (AAC) **Reset** button for the side to be booted from floppy diskette.

The system performs several diagnostic tests, and the **"**V300 Initializing…" and "Reading boot file from device A:" messages appear on the screen.

Step 4 Proceed to one of the following substeps, depending upon your boot procedure. Proceed to Substep a. if you are booting the system from the generic diskettes. Proceed to Substep b. if you are booting the system from a optional software diskette.

   a. The "Loading file A:[filename]" message appears on the screen while the first generic diskette is being read, where [filename] is the name of the file currently being loaded. Several of these messages appear during this process. This is followed by the "Please insert disk volume [volumename]" and "Press ENTER key when ready:" messages, which indicate that the system is ready to read the diskette named. The process is repeated until all required files have been loaded. Proceed to Step 5.

   b. The "Loading file A:[filename]" message appears on the screen while the diskette is being read. The system takes several minutes to boot from the optional software diskette, then the Installation Utilities menu is displayed. Refer to the *Cisco VCO/4K Software Installation Guide* for more information on the Installation Utilities. Do not proceed to Step 5. The system boot is complete.

Step 5 Remove the diskette, insert the diskette indicated, and press **Enter**.

> **Note** The system requests you to insert SUMMA4B in the floppy drive; SUMMA4B is the same as the disk labeled Disk 2.

The "Loading file A:[filename]" message appears on the screen while the diskette is being read. The process is repeated until all required files have been loaded. When all files are loaded, the System Login screen is displayed. The system boot is complete.

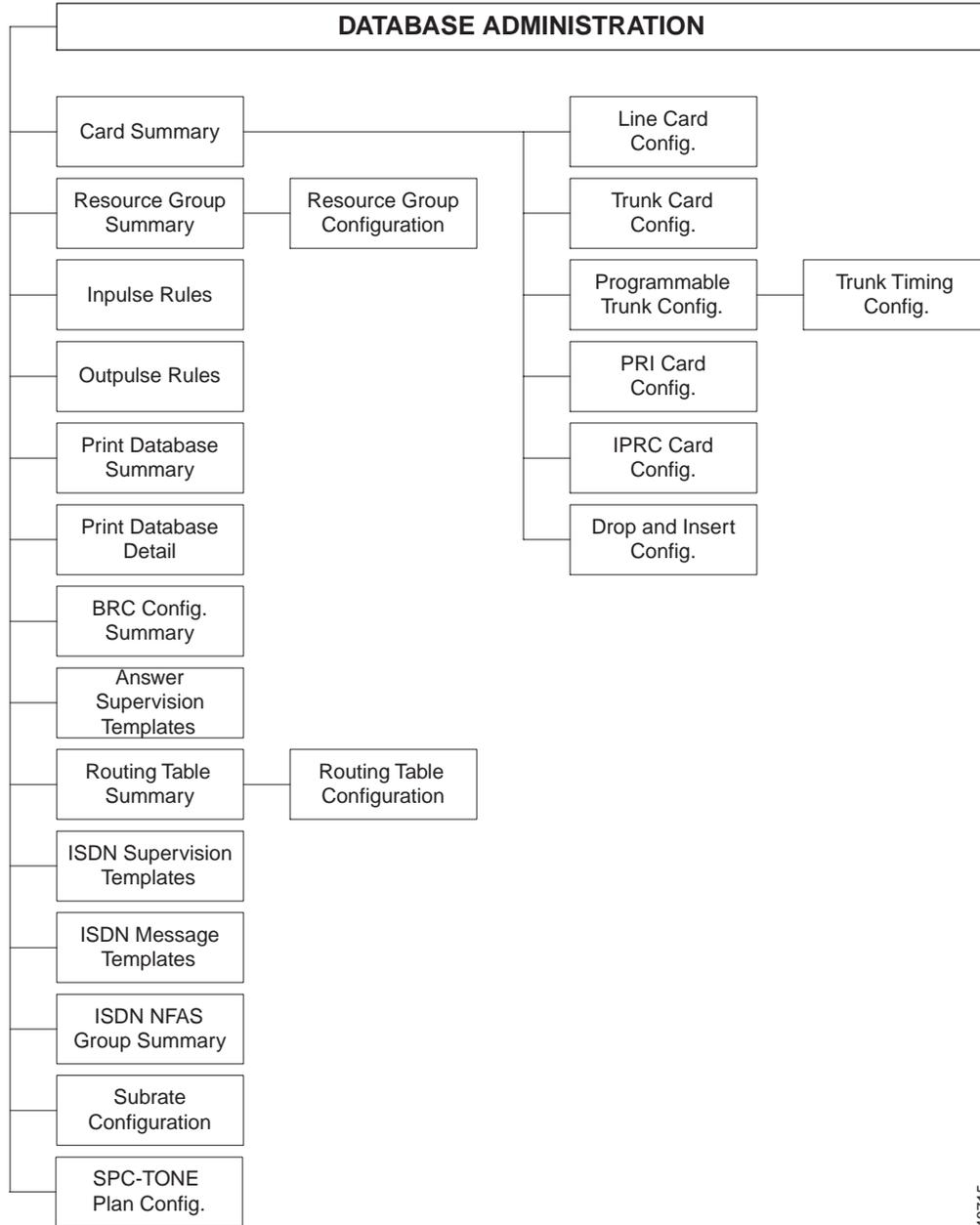The system is now ready for call processing.

Database Administration

Use the Database Administration menu (see Figure 3-1) to perform the following:

- Define inpulse and outpulse rules
- Group resources
- Create answer supervision and ISDN templates
- Configure line and trunk card characteristics

Figure 3-1   Database Administration Menu Structure

DATABASE ADMINISTRATION

- Card Summary
  - Line Card Config.
  - Trunk Card Config.
  - Programmable Trunk Config. — Trunk Timing Config.
  - PRI Card Config.
  - IPRC Card Config.
  - Drop and Insert Config.
- Resource Group Summary — Resource Group Configuration
- Inpulse Rules
- Outpulse Rules
- Print Database Summary
- Print Database Detail
- BRC Config. Summary
- Answer Supervision Templates
- Routing Table Summary — Routing Table Configuration
- ISDN Supervision Templates
- ISDN Message Templates
- ISDN NFAS Group Summary
- Subrate Configuration
- SPC-TONE Plan Config.

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Note   You can configure the TeleRouter and ISDN optional software packages from Database Administration. You can only access menu selections associated with optional software packages if the option(s) are installed on the system. For example, to access and update the Routing Table Summary screen, you must install the TeleRouter software overlay. Refer to the *Cisco VCO/4K TeleRouter Reference Guide* for information on TeleRouter features; ISDN functions are discussed in the *Cisco VCO/4K ISDN Supplement*.

Accessing the Database Administration Menu Screen

Complete the following steps to access Database Administration Menu screen

Step 1   Access the Administrator Main Menu screen.

Step 2   Type **A** and press **Enter**.

The Database Administration Menu appears (see Figure 3-2). The cursor is located in the Enter Selection field.

Step 3   Type the letter that precedes the option you want and press **Enter**.
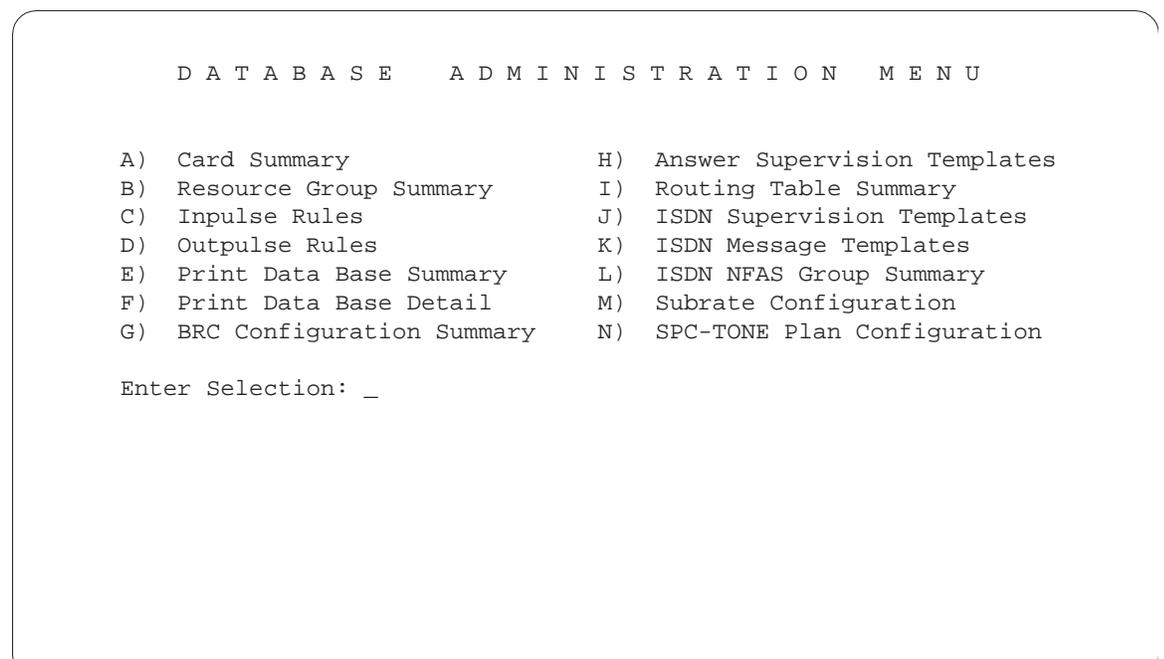
Figure 3-2   Database Administration Menu

```
        D A T A B A S E     A D M I N I S T R A T I O N     M E N U


   A)   Card Summary                 H)   Answer Supervision Templates
   B)   Resource Group Summary       I)   Routing Table Summary
   C)   Inpulse Rules                J)   ISDN Supervision Templates
   D)   Outpulse Rules               K)   ISDN Message Templates
   E)   Print Data Base Summary      L)   ISDN NFAS Group Summary
   F)   Print Data Base Detail       M)   Subrate Configuration
   G)   BRC Configuration Summary    N)   SPC-TONE Plan Configuration


   Enter Selection: _
```

Table 3-1 summarizes the characteristics of port interface, service circuit, and control circuit cards that reside in VCO and SDS port subracks. The table describes the card names, card type, and number of ports currently supported for each card.

The remainder of this chapter describes each function within the Database Administration menu option.

Table 3-1   System Card Characteristics

| Card Name	Card Front Panel Name	System Admin Selection Name	Card Type [1]	Max. No. of Ports
Bus Repeater Card	BRC	Bus Repeater Card	CC	—
Call Progress Analyzer	CPA	Call Progress Analyzer	SC	24
Digital Conference Card	DCC	Conference Card	SC	64
Digital Tone Generator	DTG	Tone Generator	SC	64

Table 3-1   System Card Characteristics (continued)

Card Name	Card Front Panel Name	System Admin Selection Name	Card Type [1]	Max. No. of Ports
Digitized Voice Card	DVC	Announcement	SC	8
Direct Inward Dial	DID	Direct Inward Dial	PI	8
Drop + Insert Card	D+I	Drop & Insert Card	PI	8
DTMF Receiver Card, 8 Port	DRC	8 Port DTMF Receiver	SC	8
DTMF Receiver Card, 24 Port	DRC 24	24 Port DTMF Receiver	SC	34
DTMF Receiver Card, 48 Port	DRC 48	48 Port DTMF Receiver	SC	48
E+M Trunk Card	E+M	E + M Trunk	PI	8
Earth/Loop Connect Trunk Card	ECT/LCT	ECT/LCT/UTC	PI	8
Eight Line Test Card	LTC-8	LTC-8	PI	8
Four Span Programmable E1 Card	4xE1	Four Span E1 Card	PI	128
Four Span Programmable T1 Card	4xT1	Four Span T1 Card	PI	96
Integrated Prompt/Record Card, 8 Port	IPRC	8 Port Prompt/Record	SC	8
Integrated Prompt/Record Card, 64 Port	IPRC 64	64 Port Prompt/Record	SC	64
Integrated Prompt/Record Card, 128 Port	IPRC 128	128 Port Prompt/Record	SC	228
Interface Controller Card T1[2]	ICC T1	ICC-T1	PI	384
Interface Controller Card E1[3]	ICC E1	ICC-E1	PI	512
Multiprotocol Voice/Data Card	MVDC T1	MVDC-T1 Trunk	PI	96
MF Receiver Card	MRC	MF Receiver	SC	8
MF Compelled R2 Signaling Transceiver	MFCR2	MFCR2 Register	SC	8
Network Bus Controller	NBC3	N/A	CC	N/A
Primary Rate Interface (4ESS, 5ESS, NTI)	PRI	Primary Rate Interface	PI	24
Primary Rate Interface, DASS2 NT	E1-PRI	Primary Rate/DASS2 NT	PI	32
Primary Rate Interface, DPNSS	E1-PRI	Primary Rate/DPNSS	PI	32
Primary Rate Interface, NET5 (European ISDN variants)	E1-PRI (120 Ohms)	Primary Rate/NET5-EURO	PI	32
Primary Rate Interface/NFAS (4ESS, 5ESS, NTI, NI-2, NTT)	PRI/N	Primary Rate/NFAS	PI	24
Service Platform Card	SPC	SPC[4]	SC	[5]
Single Span E1 Trunk Card	E1	E 1 Trunk	PI	32
Single Span T1 Trunk Card	T1	T 1 Trunk	PI	24

Table 3-1   System Card Characteristics (continued)

Card Name	Card Front Panel Name	System Admin Selection Name	Card Type [1]	Max. No. of Ports
Subrate Switching Card	SSC	Subrate Switch Card	SC	[6]
Subscriber Line Interface Card	SLIC-2	Subscriber Line	PI	8
Universal Trunk Card	UTC	ECT/LCT/UTC	PI	8

1. CC = Control Circuit, PI = Port Interface, SC = Service Circuit.

2. In addition to in-band signaling, the ICC-T1 supports the following ISDN variants: 4ESS, 5ESS, NI-2, NTI, NTT, and NTT_CS. Refer to the *Cisco VCO/4K ISDN Supplement*.

3. In addition to in-band signaling, the ICC-E1 supports the following ISDN variants: NET5, TS 014, and QSIG. Refer to the *Cisco VCO/4K ISDN Supplement*.

4. The SPC is currently available as SPC-DTMF, SPC-CONF, SPC-MFCR2, SPC-CPA, SPC-MFR1.

5. Call your Cisco Systems sales representative for port information.

6. User definable, in multiples of 8.

Card Summary

Use the Card Summary screen to view the location, type, status, and number of unused ports for all Network Bus Controller (NBC), Bus Repeater Card (BRC), network interface, and internal service circuit cards in the system. The Card Summary screen also provides access to the line and trunk card configuration screens (see Figure 3-3).

Figure 3-3   Card Summary Menu Structure
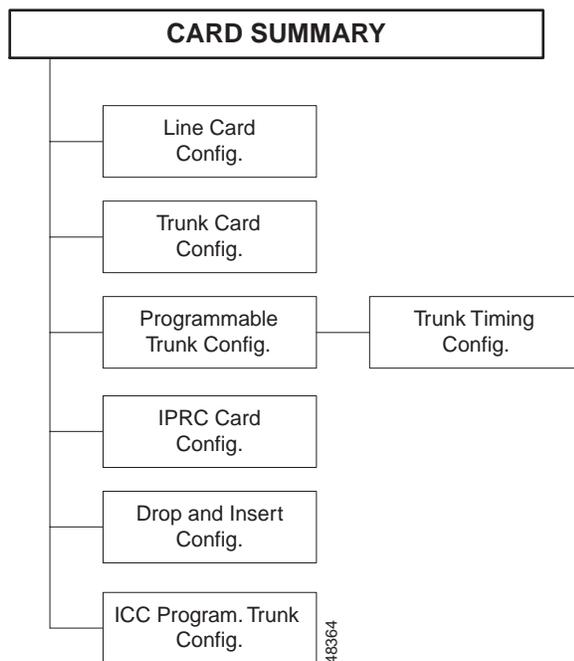
> **Note** You cannot add or delete cards from the Card Summary screen. Refer to Chapter 4 for information about the Card Maintenance screen.

Accessing the Card Summary Screen

Complete the following steps to access the Card Summary screen:

Step 1 Access the Administrator Main Menu screen.

Step 2 Type **A** and press **Enter**.

The Database Administration Menu screen appears.

Step 3 Type **A** and press **Enter**.

The Card Summary screen appears (see Figure 3-4). The cursor is located in the first DISP CARD field.

Figure 3-4   Card Summary Screen

```
                         C A R D    S U M M A R Y

LOCATION                                          UNUSED      DISP
R   L   S          CARD TYPE          STATUS      PORTS       CARD
----------   ----------------------   --------   ------       ----
1   1   1-1    Network Bus               A          0          _
1   1   1-2    Tone Generator            A          1          _
1   1   2-1    Network Bus               S          0          _
1   1   2-2    Tone Generator            S          1          _
1   1   7-1-1  ICC-T1                    O          2          _
1   1   8-1-1  ICC-T1                    O          2          _
1   1   9      Subscriber Line           A          0          _
1   1   10     Subscriber Line           A          0          _
_   _   ____   _____    _        ____         _
_   _   ____   _____    _        ____         _
_   _   ____   _____    _        ____         _
_   _   ____   _____    _        ____         _
_   _   ____   _____    _        ____         _
_   _   ____   _____    _        ____         _
_   _   ____   _____    _        ____         _
```

Card Summary can consist of up to 10 screens, with each screen displaying 15 card entries. Each entry is displayed according to its location within the system.

> **Note** There may be more than one card entry for multi-interface cards.

Use the **Prev Screen** and **Next Screen** keys to page through the entries. Use the **Print Screen** key to obtain a hard copy of any of these screens.

Card Summary Screen Field Definitions

The Card Summary screen contains the following fields:

LOCATION R L S—*Display only*. The Rack-Level-Slot/Group/Span hardware address (physical location) of the card. Change this field from the Card Maintenance screen.

> **Note**   For Four Span T1, Four Span E1, and MVDC T1 cards, you must specify a span as well as a slot.

CARD TYPE—*Display only*. Indicates the kind of card in that location. Change this field from the Card Maintenance screen.

STATUS—*Display only*. Indicates the current status of the card. Change this field from the Card Maintenance screen. Valid values and their meanings are:

A—Active. Ports on this card can be involved in active calls and can be allocated to new calls.

O—Out of Service. No ports on this card can be involved in active calls; no ports are allocated to new calls.

S—Standby. Valid for one of the two NBC cards in redundant systems only, one or more DTG cards in either a redundant or nonredundant system, or BRCs.

M—Maintenance. One or more ports on this card may be involved in active calls; no ports are allocated to new calls.

D—Diagnostics. No ports on this card are involved in calls or allocated to new calls.

C—Camped On. Status change to Diagnostics mode was attempted while ports on this card were still involved in calls; no ports are allocated to new calls and the card remains in this mode until further administrator action.

P—Payload Loopback. Diagnostic state.

R—Remote Loopback. Diagnostic state.

UNUSED PORTS—*Display only*. Indicates the number of ports not currently active on this card; for Four Span T1/E1 or MVDC T1 cards, indicates the number of ports not currently active on individual spans. Valid only for network interface and internal service circuit ports. Change this field from the Card Maintenance screen.

DISP CARD—*Data entry via main keypad*. Display Card; provides access to the Line, Trunk, and Programmable Trunk screens. Any character is valid for entry. Bus and internal service circuit cards cannot be displayed. Refer to the "Accessing Other Screens" section on page 3-7 for instructions on using this field.

Accessing Other Screens

You can access the following screens from the Card Summary:

- Line Card Configuration—Use the **Prev Field** or **Next Field** key to position the cursor in the DISP CARD field corresponding to the Subscriber Line Interface CARD (SLIC) or Eight Line Test Card (8LTC) for which you want to display configuration information. Type any character, then press **Enter**.

- Trunk Card Configuration—Use the **Prev Field** or **Next Field** key to position the cursor in the DISP CARD field corresponding to the trunk card for which you want to display configuration information. Type any character, then press **Enter**.

- Programmable Trunk Configuration—Use the **Prev Field** or **Next Field** key to position the cursor in the DISP CARD field corresponding to the Four Span T1/E1 or MVDC T1 card for which you want to display configuration information. Type any character and press **Enter**.

Line Card Configuration

Use the Line Card Configuration screen to assign a name, default inpulse rule, and class of service (COS) to individual ports on a SLIC or 8LTC. You cannot add, delete, or assign cards to a resource group from this screen. Refer to "Resource Group Configuration" section on page 3-34 for resource group configuration information. Refer to Chapter 4, "System Configuration," for information about adding or deleting cards to or from the database.

Accessing the Line Card Configuration Screen

Complete the following steps to access the Line Card Configuration screen:

Step 1   Access the Card Summary screen (refer to the "Accessing the Card Summary Screen" section on page 3-6).

Step 2   Use the **Prev Field**, **Next Field**, **Tab** or < key to position the cursor in the DISP CARD field corresponding to the SLIC or 8LTC for which you want to display configuration information.

Step 3   Type any character and press **Enter**.

The Line Card Configuration screen appears (see Figure 3-5). The cursor is located in the first NAME field.

Figure 3-5 Line Card Configuration Screen

```
           L I N E   C A R D   C O N F I G U R A T I O N


     CARD LOCATION:                    RACK 1   LEVEL 1   SLOT 9
     CARD TYPE:                        Subscriber Line
     CARD STATUS:                      Out of Service


                            GROUP     INPULSE
     PORT    NAME    GROUP    NAME      RULE        COS
     ----  --------  -----  ---------  -----     -------
      1     ATT9       3       ATT       0          A2
      2     ATT10      3       ATT       0          A2
      3     ATT11      3       ATT       0          A2
      4     ATT12      3       ATT       0          A2
      5     ATT13      3       ATT       0          A2
      6     ATT14      3       ATT       0          A2
      7     ATT15      3       ATT       0          A2
      8     ATT16      3       ATT       0          A2
```

The Line Card Configuration screen consists of one screen. Use the **Print Screen** key to obtain a hard copy of this screen. Use the **Tab** and **<** keys to move between the NAME fields.

Line Card Configuration Screen Field Definitions

The Line Card Configuration screen contains the following fields:

CARD LOCATION—*Display only.* The Rack-Level-Slot hardware address (physical location) of the card. Change this field from the Card Maintenance screen.

CARD TYPE—*Display only.* Indicates the kind of card in that location. Change this field from the Card Maintenance screen. Figure 3-5 shows the Subscriber Line card.

CARD STATUS—*Display only.* Indicates the current status of the card. Change this field from the Card Maintenance screen. Possible values and their meanings are:

Active—Ports on this card can be involved in active calls and allocated to new calls.

Out of Service—No ports on this card can be involved in active calls; no ports are allocated to new calls.

Maintenance—One or more ports on this card may be involved in active calls; no ports are allocated to new calls.

Diagnostics—No ports on this card are involved in calls or allocated to new calls.

PORT—*Display only.* Indicates the port number on the card. There are eight ports on a line card.

NAME—*Data entry via main keypad.* Optional database entry used to identify individual circuits. Each port name should be unique and descriptive of port usage. Enter up to eight uppercase and lowercase alphanumeric characters.

GROUP—*Display only.* Indicates the number of the resource group to which this port belongs. If no resource group is assigned, the value in this field is 0. Change this field from the Resource Group Configuration screen. Valid values are from 1 to 63 in standard operational mode or 1 to 224 in extended mode.

GROUP NAME—*Display only.* Indicates the name of the resource group to which this port belongs. If no resource group assignment is made, this field is blank. Change this field from the Resource Group Summary and Resource Group Configuration screens. Up to eight uppercase and lowercase alphanumeric characters can be entered.

INPULSE RULE—*Data entry via main keypad.* Determines the inpulse rule processed when this port goes off-hook. Default inpulse rules are used for incoming ports only (class of service = T, 2, AT, or A2). Define the inpulse rule from the Inpulse Rules Table screen. Valid values are 0 (no default inpulse rule) or from 1 to 30 in standard operational mode or 1 to 255 in extended mode.

COS—*Data entry via main keypad.* Class of service; determines the software operating characteristics for this port. Ports on the same card can have different COS values. Possible values and their meanings are:

O—Originating. Calls originating from the system; outgoing calls initiated by host command.

T—Terminating. Calls terminating at the system; incoming calls initiated by actions outside the system or forced by host command.

2—2-Way. Calls originating from the system or calls terminating at the system; outgoing calls initiated by host command, incoming calls initiated by outside actions.

AO—Always Off-hook and Originating. Calls originating from the system; port goes off-hook at system reset and remains off-hook; outgoing calls initiated by host command.

AT—Always Off-hook and Terminating. Calls terminating at the system; port goes off-hook at system reset and remains off-hook; incoming calls initiated by outside actions or forced by host command.

A2—Always Off-hook and 2-Way. Calls originating from the system or calls terminating at the system; port goes off-hook at system reset and remains off-hook; outgoing calls initiated by host command, incoming calls initiated by outside actions or forced by host computer.

> **Note**   COS values such as U2 and T2 may appear in this field during system operation. These values are internal processing representations and cannot be assigned.

Changing Line Card Parameters

Complete the following steps to change the Name, Inpulse Rule, or COS fields:

Step 1   Display the Line Card Configuration screen for the card you want to change (refer to "Accessing the Line Card Configuration Screen" section on page 3-8).

The cursor is located in the NAME field of the first port on the card.

Step 2   Type the name information, if any, and press the **Next Field** key.

The cursor skips over the GROUP and GROUP NAME fields and moves to the INPULSE RULE field for that port.

Step 3   Type the inpulse rule number, if any, and press the **Next Field** key.

The cursor moves to the COS field for that port. If you do not enter an inpulse rule number, the field display remains 0.

Step 4   Type the class of service character(s), if any, and press the **Next Field** key.

The cursor moves to the NAME field for the next port. Use the **TAB** and **<** keys to move between NAME fields.

⚠️

Caution   You must assign all line and trunk ports a class of service. Failure to do so may cause disruptions during system operation.

Step 5   Repeat Step 2 through Step 4 until all changes are made, and press **Enter**.

The system database is automatically updated.

Step 6   Press the **Exit** key to return to the Card Summary screen.

To exit the Line Card Configuration screen without making any changes, press the **Exit**, **Prev Menu**, or **Main Menu** keys. No changes are made to the database unless you press **Enter**.

Trunk Card Configuration

Use the Trunk Card Configuration screen to assign a name, hardware type, default inpulse rule, and class of service (COS) to individual ports on a trunk card. Cards are not added, deleted, or assigned to a resource group from this screen. Refer to "Resource Group Configuration" section on page 3-34 for resource group configuration information. Refer to Chapter 4, "System Configuration," for information on adding or deleting cards to or from the database.

Accessing the Trunk Card Configuration Screen

Complete the following steps to access the Trunk Card Configuration screen from the Card Summary screen:

Step 1   Access the Card Summary screen (refer to the "Accessing the Card Summary Screen" section on page 3-6).

Step 2   Use the **Prev Field** or **Next Field** key to position the cursor in the DISP CARD field corresponding to the trunk card for which you want to display configuration information.

Step 3   Type any character and press **Enter**.

The Trunk Card Configuration screen appears (see Figure 3-6). The cursor is located in the NAME field.

Figure 3-6   Trunk Card Configuration Screen

```
             T R U N K   C A R D   C O N F I G U R A T I O N

       CARD LOCATION:                 RACK 1   LEVEL 1   SLOT 6
       CARD TYPE:                     Universal Trunk Card
       CARD STATUS:                   Out of Service
       Signaling Mode:


           TRUNK                 GROUP     HDWR.    INPULSE
  PORT     NAME       GROUP      NAME      TYPE      RULE      COS
  ----   --------    -----    ---------   -----    -------    ----
   1      UTC1          4       TRUNKS      GS         2        2
   2      UTC2          4       TRUNKS      GS         2        2
   3      UTC3          4       TRUNKS      GS         2        2
   4      UTC4          4       TRUNKS      GS         2        2
   5      UTC5          4       TRUNKS      GS         2        2
   6      UTC6          4       TRUNKS      GS         2        2
   7      UTC7          4       TRUNKS      GS         2        2
   8      UTC8          4       TRUNKS      GS         2        2
```

The Trunk Card Configuration screen can consist of up to three screens. Each screen contains information for eight ports, arranged in ascending order. Use the **Tab** and **<** keys to move between the NAME fields. Use the **Prev Screen** and **Next Screen** keys to page through the entries. Use the **Print Screen** key to obtain a hard copy of any of these screens.

Trunk Card Configuration Screen Field Definitions

The Trunk Card Configuration screen contains the following fields:

CARD LOCATION—*Display only.* The Rack-Level-Slot hardware address (physical location) of the card. Change this field from the Card Maintenance screen.

CARD TYPE—*Display only.* Indicates the kind of card in that location. Change this field from the Card Maintenance screen.

CARD STATUS—*Display only.* Indicates the current status of the card. Change this field from the Card Maintenance screen. Valid values and their meanings are:

Active—Ports on this card can be involved in active calls and can be allocated to new calls.

Out of Service—No ports on this card can be involved in active calls; no ports are allocated to new calls.

Maintenance—One or more ports on this card may be involved in active calls; no ports are allocated to new calls.

Diagnostics—No ports on this card are involved in calls or allocated to new calls.

Camped On— T1 card only. Status change to Diagnostics mode was attempted while ports on this card were still involved in calls; no ports are allocated to new calls; card remains in this mode until further administrator action.

SIGNALING MODE—*Display only.* Indicates the card's signaling mode.

PORT—*Display only.* Indicates the port number on the card.

TRUNK NAME—*Data entry via main keypad.* Optional database entry used to identify individual circuits. Each port name should be unique and descriptive of port usage. Up to eight uppercase and lowercase alphanumeric characters are accepted.

GROUP—*Display only.* Indicates the number of the resource group to which this port belongs. If no resource group assignment is made, this field is blank. Change this field from the Resource Group Configuration screen. Valid values are from 1 to 63 in standard operational mode or 1 to 224 in extended mode.

GROUP NAME—*Display only.* Indicates the name of the resource group to which this port belongs. If no resource group is assigned, this field is blank. Change this field from the Resource Group Summary and Resource Group Configuration screens. Up to eight uppercase and lowercase alphanumeric characters are accepted.

HDWR. TYPE—*Data entry via Select key.* Determines the type of trunk interface circuit used for this port. Not all trunk card types require an entry for this field. Table 3-2 shows valid combinations of card type and hardware type.

Table 3-2   Trunk Card and Hardware Type Combinations

Card Type	Hardware Type			
	Loop Start	Ground/Earth Start	2-Wire E+M	4-Wire E+M
T1	—	No	No	Yes
UTC outgoing	Yes	Yes	No	No
UTC incoming	—			
DID	—			
E+M	—			
ECT/LCT outgoing	Yes	Yes	No	No
ECT/LCT incoming	—			

INPULSE RULE—*Data entry via main keypad.* Determines the inpulse rule processed when this port goes off-hook. Default inpulse rules are used for incoming ports only (class of service = T, 2, AT, or A2). The inpulse rule selected must be defined from the Inpulse Rules Table screen. Valid values are 0 (no default inpulse rule) or from 1 to 30 in standard operational mode or 1 to 255 in extended mode.

COS—*Data entry via main keypad.* Class of service; determines the software operating characteristics for this port. Ports on the same card can have different COS values. Valid values and their meanings are:

O—Originating. Calls originating from the system; outgoing calls initiated by host command.

T—Terminating. Calls terminating at the system; incoming calls initiated by actions outside the system or forced by host command.

2—2-Way. Calls originating from the system or calls terminating at the system; outgoing calls initiated by host command, incoming calls initiated by outside actions.

AO—Always Off-hook and Originating. Calls originating from the system; port goes off-hook at system reset and remains off-hook; outgoing calls initiated by host command.

AT—Always Off-hook and Terminating. Calls terminating at the system; port goes off-hook at system reset and remains off-hook; incoming calls initiated by outside actions or forced by host command.

A2—Always Off-hook and 2-Way. Calls originating from the system or calls terminating at the system; port goes off-hook at system reset and remains off-hook; outgoing calls initiated by host command, incoming calls initiated by outside actions or forced by host computer.

Note   Internal class of service values such as U2 and T2 may appear during system operation. These values are internal processing representations and cannot be assigned.

Changing Trunk Card Parameters

Complete the following steps to change the Trunk Name, Hdwr. Type, Inpulse Rule, and COS fields from the Trunk Card Configuration screen:

Step 1   Display the Trunk Card Configuration screen for the card you want to change (refer to the "Accessing the Trunk Card Configuration Screen" section on page 3-11).

The cursor is located in the NAME field of the first port on the card.

Step 2   Type the name information, if any, and press the **Next Field** key.

The cursor skips over the GROUP and GROUP NAME fields and moves to the HDWR. TYPE field for that port.

Step 3   Use the **Select** and **Rev Select** keys to step through the values until the correct hardware type is shown, and press the **Next Field** key.

The cursor moves to the INPULSE RULE field for that port.

Step 4   Type the inpulse rule number, if any, and press the **Next Field** key.

The cursor moves to the COS field for that port. If you do not enter an inpulse rule number, the field displays 0.

Step 5   Type the class of service character(s), if any, and press the **Next Field** key.

The cursor moves to the NAME field for the next port.

Caution   You must assign a class of service to all line and trunk ports. Failure to do so may cause disruptions during system operation.

Step 6   Repeat Step 2 through Step 5 until you have made all changes for the eight ports displayed.

   • If the card has only 8 ports, proceed to Step 7.

   • If the card has more than 8 ports, press the **Next Screen** key to display ports 9 to 16. Make any changes necessary, and press the **Next Screen** key to display ports 17 to 24 and make any changes necessary. Use the **Prev Screen** and **Next Screen** keys to move among the screens until all changes are made, and proceed to Step 7.

Step 7   Press **Enter**.

The system database is automatically updated.

Step 8   Press the **Exit** key to return to the Card Summary screen.

To exit the Trunk Card Configuration screen without making any changes, press the **Exit**, **Prev Menu**, or **Main Menu** key. No changes are made to the database unless you press **Enter**.

Programmable Trunk Configuration

The Four Span T1, Four Span E1, MVDC T1, 16-Span ICC T1, and 16-span ICC E1 cards provide programmable trunks. Use the two Programmable Trunk Configuration screens to modify span configuration and port signaling options, and access the Trunk Timing Configuration screen:

- Programmable Trunk Configuration—Four Span T1, Four Span E1, and MVDC T1 card configuration
- ICC Programmable Trunk Configuration—16-Span ICC T1 and 16-span ICC E1 card configuration

The Programmable Trunk Configuration screens support propagation of port parameters across an entire span. When you select or modify the SIG. TYPE, INPULSE RULE, or COS (class of service) fields on port 1 for a given span, the "Enter Y to propagate port 1 values" prompt appears. This feature reduces duplicate data entry.

Note   To add cards, you must access the Card Maintenance screen. Refer to Chapter 5, "Maintenance," for more information about the Card Maintenance screen.

Accessing the Programmable Trunk Configuration Screen

Complete the following steps to access the Programmable Trunk Configuration screen:

Step 1   Access the Card Summary screen (refer to the "Accessing the Card Summary Screen" section on page 3-6).

Step 2   Use the **Prev Field** or **Next Field** key to position the cursor in the DISP CARD field corresponding to the programmable trunk for which you want to display configuration information.

Step 3   Type any character and press **Enter**.

The Programmable Trunk Configuration screen appears. Figure 3-7 shows a configuration screen for the MVDC T1 card. The cursor is located in the SPAN TYPE field.

Figure 3-7   Programmable Trunk Configuration Screen (MVDC T1)

```
      P R O G R A M M A B L E   T R U N K   C O N F I G U R A T I O N


SPAN LOCATION:  R,L,S 1 1 13-3     STATUS:    Maintenance
CARD TYPE:      MVDC T1 Trnk       SPAN TYPE: ESF         CODE: B8ZS
TXGAIN: -6db    TXCLCK: SCLK       SLIP: 255  LAW: Mu     LENG: 133-265
RXGAIN: -6db    RFCLCK: RCVD       OOF: 255


        TRUNK                 GROUP       SIG.   INPULSE
PORT    NAME      GROUP       NAME        TYPE    RULE      COS     TIMING
----    --------  -----       ---------   -----   -------   -----   ------
 1      T1        4           T1S         E&M     2         2
 2      T2        4           T1S         FXOL    2         2
 3      T3        4           T1S         FXOG    2         2
 4      T4        4           T1S         FXSL    2         2
 5      T5        4           T1S         FXSG    2         2
 6      T6        4           T1S         E&M     2         2
 7      T7        4           T1S         E&M     2         2
 8      T8        4           T1S         E&M     2         2
```

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The ICC Programmable Trunk Configuration screen differs slightly in that the LAW field at the top of the screen has been relocated to replace the TIMING field to the right of the screen, and an ALM field has been added. These differences are shown in Figure 3-8.

Figure 3-8   Programmable Trunk Configuration Screen (ICC T1)

```
        I C C   P R O G R A M M A B L E   T R U N K   C O N F I G U R A T I O N


   SPAN LOCATION: R,L,S 1 1 4-1-1    STATUS: Out of Service
   CARD TYPE: ICC-T1                 SPAN TYPE: SF       CODE: AMI
   TXGAIN: 0db    TXCLCK: SCLK       SLIP: 255  ALM: SYS  LENG: 0-133
   RXGAIN: 0db    RFCLCK: LOOP       OOF: 17

          TRUNK                 GROUP        SIG.     INPULSE
   PORT   NAME      GROUP       NAME         TYPE      RULE      COS    LAW
   ----   --------  -----       ---------    -----    -------    -----  ----
    1     T1        4           T1S          E&M        0          2     Mu
    2     T2        4           T1S          CLEAR      0          2     Mu
    3     T3        4           T1S          CLEAR      0          2     Mu
    4     T4        4           T1S          CLEAR      0          2     Mu
    5     T5        4           T1S          CLEAR      0          2     Mu
    6     T6        4           T1S          E&M        0          2     Mu
    7     T7        4           T1S          E&M        0          2     Mu
    8     T8        4           T1S          E&M        0          2     Mu
```

The Programmable Trunk Configuration screen displays up to eight ports and their corresponding information, arranged in ascending order.

T1 Programmable Trunk Configuration Screen Field Definitions

The Programmable Trunk Configuration screens for the Four Span T1, MVDC T1, and ICC T1 cards contain the following fields:

SPAN LOCATION—*Display only.* Identifies the Rack-Level-Slot hardware location, as well as the span. Change the span location from the Card Maintenance screen.

CARD TYPE—*Display only.* Indicates the kind of card. Change the card type from the Card Maintenance screen.

TXGAIN—*Data entry via Select key.* Indicates the transmit gain control. Valid values are –6 db, –3 db, 0 db, +3 db, +6 db. The default value is 0 db.

RXGAIN—*Data entry via Select key.* Indicates the reference gain control. Valid values are –6 db, –3 db, 0 db, +3 db, +6 db. The default value is 0 db.

TXCLCK—*Data entry via Select key.* Indicates the transmit clock (timing source) for this span. Valid values are SCLK, LOOP, and 1544; SCLK = system clock, LOOP = incoming line, and 1544 = board crystal.

RFCLCK—*Data entry via Select key.* Indicates the reference clock (timing source) for this span. Applies only if this span is specified as the current timing source using either the Master Timing Link Selection screen or the T1 Synchronization Control ($C0 02) command. Valid values are LOOP or 1544; LOOP = incoming line, 1544 = board crystal.

> **Note** When you choose a span as the master timing source, the reference clock for the span creates the system clock.

STATUS—*Display only.* Indicates the current status of the span. Change the status of a span from the Card Maintenance screen. Valid values and their meanings are:

   Active—Ports on this span can be involved in active calls and can be allocated to new calls.

   Out of Service—No ports on this span can be involved in active calls; no ports are allocated to new calls.

   Maintenance—One or more ports on this span may be involved in active calls; no ports are allocated to new calls.

   Diagnostics—No ports on this span are involved in calls or allocated to new calls.

   Remote—No ports on this span are involved in calls or allocated to new calls.

   Payload—No ports on this span are involved in calls or allocated to new calls.

SPAN TYPE—*Data entry via Select key.* Indicates the format of the T1 stream. You can change this value only when the span status is out of service (OOS). Valid values are the following:

   SF—Superframe

   ESF—Extended Superframe

   SF_NR—Superframe without robbed bit signaling

   ESF_NR—Extended Superframe without robbed bit signaling

> **Note** If you select the SF_NR or ESF_NR span type, the per port SIG TYPE field is ignored. An ESF_NR span type with a B8ZS code type provisions all 24 channels as 64K clear. To provision an individual channel as 64K clear, provision the ESF span type and the signaling type of the channel as CLEAR.

SLIP—*Data entry via main keypad.* Determines the number of transmit or receive slips that can be detected for this span in a 24-hour period, before threshold processing occurs. Control this processing with the SLIP/OOF feature flag. Separate slip maintenance counts are maintained for receive and transmit slips. When either of these counters reaches the limit, threshold processing occurs. The current slip count appears on the Card Display screen. Slip counters are reset at midnight and when this value is changed from the Card Display screen. Valid values are from 0 to 255. Use 0 when slip maintenance processing is inhibited (recommended when TRX Clock = LOOP). The default value is 255.

> **Note** The system updates and displays SLIP counts every 10 seconds. The SLIP counts initially displayed may not be accurate. Wait 10 seconds after the Card Display appears to ensure that system has updated the field.

OOF—*Data entry via main keypad.* Determines the number of Out of Frames (OOFs) detected for this span in a 24-hour period, before threshold processing occurs. Control this processing with the SLIP/OOF feature flag. The OOF counter is reset at midnight and when this value is changed. Valid values are from 0 to 255. Use 0 when OOF maintenance processing is inhibited (not recommended). The default value is 17.

LAW—*Data entry via Select key.* Indicates the span voice coding on the T1 stream. The system automatically turns off translation when calls specify unrestricted digital information bearer capability. Valid values are A-law and Mu-law.

> **Note**   For the ICC, this field indicates the voice coding of the individual port rather than the span as in other programmable trunk cards. Valid values are A for A-law, Mu for Mu-law, and SYS for system backplane law. (A-law and Mu-law values pertain to the network, and the SYS setting pertains to the system backplane.) When the port is set to SYS, the port law value matches the entry in the Set System to A-Law field in the System Features screen. This is especially useful for ports carrying signaling data which cannot undergo law conversion.

ALM—*Data entry via Select key.* (ICC Programmable Trunk Configuration screen only.) Indicates the alarm specification file for the ICC T1 non-ISDN interfaces. The alarm spec file determines the behavior regarding T1 protocol alarms. The generic software checks the card database and, when the card is activated, downloads the alarm spec file designated in the ALM field.

Valid values include A03 and SYS. The default value is SYS.

CODE—*Data entry via Select key.* Indicates the code on the T1 span. Valid values include AMI, B7ZS, and B8ZS; AMI = Alternate Mark Inversion, B7ZS = Bit 7 Zero substitution, and B8ZS = Bipolar with 8 zero substitution.

LENG—*Data entry via Select key.* Indicates the line equalization used for the T1 stream. Valid values are the line length, in feet, from 0 to 133, 133 to 266, 266 to 399, 399 to 533, and 533 to 655.

PORT—*Display only.* Indicates the port number on the span. Only eight ports are displayed at one time. For cards with more than eight ports, press the Next Screen key to view the remaining ports. Information is not displayed for OOS spans.

TRUNK NAME—*Data entry via main keypad.* Optional database entry to identify individual circuits. Each name should be unique and describe the port usage. Up to eight uppercase and lowercase alphanumeric characters are accepted. Information is not displayed for OOS spans.

GROUP—*Display only.* Indicates the number of the resource group to which this port belongs. If no resource group is assigned, this field is blank. Change the group from the Resource Group Configuration screen. Valid values are from 1 to 63 in standard operational mode or 1 to 224 in extended mode. Information is not displayed for OOS spans.

GROUP NAME—*Display only.* Indicates the name of the resource group to which this port belongs. If no resource group is assigned, this field is blank. Change the group name from the Resource Group Configuration screen. Up to eight uppercase and lowercase alphanumeric characters are accepted. Information is not displayed for OOS spans.

SIG. TYPE—*Data entry via Select key.* Determines the signaling type. Valid values are E+M, FXO Loop Start (LS), FXO Ground Start (GS), FXS LS, FXS GS, IE+M, or CLEAR. Valid customized values are: E&M03, E&M04, E&M05, and E&M06; refer to Appendix D, "Customized Signaling and Span Types," for instructions on creating customized signaling types.

An ICC-T1 span with an E+M SIG. TYPE selection uses the following inband signaling timing values, which are contained in the iccem.upg file. The iccem.upg file is downloaded to the ICC when one or more ICC-T1 span(s), with E+M selected for the SIG. TYPE, is activated:

- WINK-DET. MIN = 100 ms
- WINK-DET. MAX = 350 ms
- WINK-SEND = 240 ms

- FLASH-DET. MIN = 100 ms

- FLASH-DET. MAX = 350 ms

- FLASH SEND = 240 ms

- OFFHK MIN = 375 ms

- ONHK MIN = 375 ms

- GUARD TIME = 100 ms

When you select or modify the signaling type on port 1, the "Enter Y to propagate port 1" values message appears. Press **Y** to configure and all remaining ports with the same parameter entered for port 1.

Note   Propagate parameter data does not appear for other ports until a screen refresh is performed.

INPULSE RULE—*Data entry via main keypad*. Determines the inpulse rule processed when this port goes off-hook. Default inpulse rules are used for incoming ports only (class of service = T, 2, AT, or A2). Define the inpulse rule from the Inpulse Rules Table screen. Valid values are 0 (no default inpulse rule) or from 1 to 30 in standard operational mode or 1 to 255 in extended mode.

When you select or modify the inpulse rule on port 1, the "Enter Y to propagate port 1 values" message appears. Press **Y** to configure remaining ports with the same parameter entered for port 1.

Note   Propagate parameter data does not appear for other ports until a screen refresh is performed.

COS—*Data entry via main keypad*. Class of service; used for resource grouping and B-channel allocation; determines the software operating characteristics for this port. Different spans on the same card can have different COS marks.

When you select or modify the COS on port 1, the "Enter Y to propagate port 1 values" message appears. Press **Y** to configure remaining ports with the same parameter entered for port 1.

Note   Propagate parameter data does not appear for other ports until a screen refresh is performed.

The default value is 2. Valid values and their meanings are:

O—Originating. Calls originating from the system; outgoing calls initiated by host command.

T—Terminating. Calls terminating at the system; incoming calls initiated by actions outside the system or forced by host command.

2—2-Way. Calls originating from the system or calls terminating at the system; outgoing calls initiated by host command, incoming calls initiated by outside actions. This is the default value.

AO—Always Off-hook and Originating. Calls originating from the system; port goes off-hook at system reset and remains off-hook; outgoing calls initiated by host command.

AT—Always Off-hook and Terminating. Calls terminating at the system; port goes off-hook at system reset and remains off-hook; incoming calls initiated by outside actions or forced by host command.

A2—Always Off-hook and 2-Way. Calls originating from the system or calls terminating at the system; port goes off-hook at system reset and remains off-hook; outgoing calls initiated by host command, incoming calls initiated by outside actions or forced by host computer.

> **Note**   Internal COS values such as U2 and T2 may appear during system operation. These values are internal processing representations and cannot be assigned.

TIMING—*Data entry via main keypad.* Provides access to the Trunk Timing Configuration screen where you specify the timing for each port on a card.

> **Note**   This field does not apply to the ICC.

E1 Programmable Trunk Configuration Screen Field Definitions

The E1 Programmable Trunk Configuration screen (for the Four Span E1 and ICC E1) is slightly different from the T1 Programmable Trunk Configuration screen. This screen contains the following fields:

SPAN LOCATION—*Display only.* Identifies the Rack-Level-Slot hardware location, as well as the span. Change the span location from the Card Maintenance screen.

CARD TYPE—*Display only.* Indicates the kind of card. Change the card type from the Card Maintenance screen.

TXGAIN—*Data entry via Select key.* Indicates the transmit gain control. Valid values are –6 dB, –3 dB, 0 dB, +3 dB, +6 dB. The default value is 0 dB.

RXGAIN—*Data entry via Select key.* Indicates the reference gain control. Valid values are –6 dB, –3 dB, 0 dB, +3 dB, +6 dB. The default value is 0 dB.

TXCLCK—*Data entry via Select key.* Indicates the transmit clock (timing source) for this span. Valid values are SCLK, LOOP, and 2048; SCLK = system clock, LOOP= incoming line, and 2048 = board crystal.

RFCLCK—*Display only.* Indicates the reference clock (timing source) for this span. Applies only if this span is specified as the current timing source using either the Master Timing Link Selection screen or the T1 Synchronization Control ($C0 02) command. Valid values are LOOP or 2048; LOOP = incoming line, 2048 = board crystal.

> **Note**   When you choose a span as the master timing source, the reference clock for the span creates the system clock.

STATUS—*Display only.* Indicates the current status of the span. Change the status of a span from the Card Maintenance screen. Valid values and their meanings are:

Active—Ports on this span can be involved in active calls and can be allocated to new calls.

Out of Service—No ports on this span can be involved in active calls; no ports are allocated to new calls.

Maintenance—One or more ports on this span may be involved in active calls; no ports are allocated to new calls.

Diagnostics—No ports on this span are involved in calls or allocated to new calls.

Remote—No ports on this span are involved in calls or allocated to new calls.

Payload—No ports on this span are involved in calls or allocated to new calls.

SPAN TYPE—*Data entry via* **Select** *key.* Indicates the format of the E1 stream. You can change this value only when the span status is OOS. Valid values are CAS/R2, CAS/MC, and CCS/31B. CAS/R2 = Channel Associated signaling/R2 mode, CAS/MC = Channel Associated signaling/Mercury Mode, CCS/31B = Common Channel Signaling/31 Bearer channels. Valid customized values are: Cas03, Cas04, Cas05, and Cas06. Refer to Appendix D, "Customized Signaling and Span Types," for instructions on creating customized span types.

Note   If you specify the CCS/31 format, you cannot access the TS16 field.

SLIP—*Data entry via main keypad.* Determines the number of transmit or receive slips that can be detected for this span in a 24-hour period, before threshold processing occurs. Control this processing with the SLIP/OOF feature flag. Separate slip maintenance counts are maintained for receive and transmit slips. When either of these counters reaches the limit, threshold processing occurs. The current slip count appears on the Card Display screen. Slip counters are reset at midnight and when this value is changed on the Card Display screen. Valid values are from 0 to 255. Use 0 when slip maintenance processing is inhibited (recommended when TRX Clock = LOOP). The default value is 255.

Note   The system updates and displays slip counts every 10 seconds. The slip count initially displayed may not be accurate. Wait 10 seconds after the Card Display appears to ensure that system has updated the field.

OOF—*Data entry via main keypad.* Determines the number of Out of Frames (OOFs) detected for this span in a 24 hour period, before threshold processing occurs. Control this processing with the SLIP/OOF feature flag. The OOF counter is reset at midnight and when this value is changed. Valid values are from 0 to 255. Use 0 when OOF maintenance processing is inhibited (not recommended). The default value is 17.

LAW—*Data entry via Select key.* Indicates the span's voice coding on the E1 stream. The system automatically turns off translation when calls specify unrestricted digital information bearer capability. Valid values are A-law and Mu-law.

Note   For the ICC, this field indicates the voice coding of the individual port rather than the span as in other programmable trunk cards. Valid values are A for A-law, Mu for Mu-law, and SYS for system backplane law. (A-law and Mu-law values pertain to the network, and the SYS setting pertains to the system backplane.) When the port is set to SYS, the port law value matches the entry in the Set System to A-Law field in the System Features screen. This is especially useful for ports carrying signaling data which cannot undergo law conversion.

ALM—*Data entry via Select key.* (ICC Programmable Trunk Configuration screen only.) Indicates the alarm specification file for the ICC E1 non-ISDN interfaces. The alarm spec file determines the behavior regarding E1 protocol alarms. The generic software checks the card database and, when the card is activated, downloads the alarm spec file designated in the ALM field. Valid values include A02 and SYS. The default value is SYS.

Note   Select A02. Do not use the default value of SYS.

CRC—*Data entry via Select key.* Indicates if CRC checking is enabled. Valid values are ON or OFF.

CODE—*Display only.* Indicates the code on the span. Valid values are AMI and HDB3.

TS0—*Data entry via main keypad.* Specifies international or national bits of Timeslot 0. Use the bit format, i1Annnnn, where i = International bits, A = a remote alarm indicator (CCITT default), and n = National bits.

TS16—*Data entry via main keypad.* Specifies extra bits and the C and D bits of Timeslot 16. Enter spare bits "0000xyxx" where x = extra bits and y = a remote alarm indicator (CCITT default). Use bits 3 and 4 to specify the C and D bits.

Note   For systems in China, the C and D bits must be set to 1.

PORT—*Display only.* Indicates the port number on the span. There are 32 ports on an E1 span. Information is not displayed for OOS spans.

NAME—*Data entry via main keypad.* Optional database entry used to identify individual circuits. Each port name should be unique and descriptive of port usage. Up to eight uppercase and lowercase alphanumeric characters are accepted. Information is not displayed for OOS spans.

GROUP—*Display only.* Indicates the number of the resource group to which this port belongs. If no resource group is assigned, this field is blank. Change the group from the Resource Group Configuration screen. Valid values are from 1 to 63 in standard opera-tional mode or 1 to 224 in extended mode. Information is not displayed for OOS spans.

GROUP NAME—*Display only.* Indicates the name of the resource group to which this port belongs. If no resource group is assigned, this field is blank. Change the group name from the Resource Group Configuration screen. Up to eight uppercase and lowercase alphanumeric characters are accepted.

SIG. TYPE—*Display only.* Specifies the signaling type in the SPAN TYPE field.

An ICC-E1 span with a CAS/R2 SIG. TYPE does not use timing inband signaling; all signals are immediate. The icccasr2.upg file contains a guard time value of 100 ms; the file is downloaded to the ICC when one or more ICC-E1 span(s), with CAS/R2 selected for the SIG. TYPE, is activated.

An ICC-E1 span with a CCS/31 SIG. TYPE does not use timing inband signaling; all signals are immediate. The icccics31.upg file contains a guard time value of 250 ms; the file is downloaded to the ICC when one or more ICC-E1 span(s), with CCS/31 selected for the SIG. TYPE, is activated.

INPULSE RULE—*Data entry via main keypad.* Determines the inpulse rule processed when this port goes off-hook. Default inpulse rules are used for incoming ports only (class of service = T, 2, AT, or A2). Define the inpulse rule from the Inpulse Rules Table screen. Valid values are 0 (no default inpulse rule), or from 1 to 30 in standard operational mode or 1 to 255 in extended mode.

COS—*Data entry via main keypad.* Class of service used for resource grouping and B-channel allocation; determines the software operating characteristics for this port. Ports on the same card can have different COS marks. Valid values are:

O—Originating. Calls originating from the system; outgoing calls initiated by host command.

T—Terminating. Calls terminating at the system; incoming calls initiated by actions outside the system or forced by host command.

2—2-Way. Calls originating from the system or calls terminating at the system; outgoing calls initiated by host command, incoming calls initiated by outside actions.

AO—Always Off-hook and Originating. Calls originating from the system; port goes off-hook at system reset and remains off-hook; outgoing calls initiated by host command.

AT—Always Off-hook and Terminating. Calls terminating at the system; port goes off-hook at system reset and remains off-hook; incoming calls initiated by outside actions or forced by host command.

A2—Always Off-hook and 2-Way. Calls originating from the system or calls terminating at the system; port goes off-hook at system reset and remains off-hook; outgoing calls initiated by host command, incoming calls initiated by outside actions or forced by host computer.

> **Note**   Internal COS values such as U2 and T2 may appear during system operation. These values are internal processing representations and cannot be assigned.

TIMING—*Data entry via main keypad*. Provides access to the Trunk Timing Configuration screen used to specify the timing for each port on a card. This field does not apply to the ICC.

Changing the Timing for a Port

Use the Trunk Timing Configuration screen to specify the timing for each port on a programmable trunk card.

Accessing the Trunk Timing Configuration Screen

Complete the following steps to access the Trunk Timing Configuration screen from the Programmable Trunk Configuration screen:

Step 1   Access the Programmable Trunk Configuration screen (refer to the "Accessing the Programmable Trunk Configuration Screen" section on page 3-15).

Step 2   Use the **Prev Field** or **Next Field** key to position the cursor in the TIMING field which corresponds to the trunk card for which you want to display configuration information.

Step 3   Type any character and press **Enter**.

The Trunk Timing Configuration screen appears (see Figure 3-9).

Figure 3-9   Trunk Timing Configuration Screen

```
              T R U N K   T I M I N G   C O N F I G U R A T I O N

     SPAN LOCATION: R, L, S 1 1 13-3  STATUS:  Maintenance
     CARD TYPE:   Four Span T1 Card


                  WINK-DET.  WINK   FLASH-DET  FLASH   OFFHK
     PORT   NAME   MIN  MAX   SEND   MIN  MAX   SEND   MIN   GUARD
     ----   ------  ---- ----  ----   ---- ----  ------  ----  -----
      1     t1      13   35    24     30   80    50      4     20
      2     t2      __   __    __     __   __    __      __    __
      3     t3      __   __    __     __   __    __      __    __
      4     t4      __   __    __     __   __    __      __    __
      5     t5      __   __    __     __   __    __      __    __
      6     t6      __   __    __     __   __    __      __    __
      7     t7      __   __    __     __   __    __      __    __
      8     t8      __   __    __     __   __    __      __    __
```

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Complete the following steps to access the Trunk Timing Configuration screen from the Trunk Card Configuration screen:

Step 1 Access the Trunk Card Configuration screen (refer to the "Accessing the Trunk Card Configuration Screen" section on page 3-11).

Step 2 Use the **Prev** or **Next Field** key to position the cursor anywhere in the TIMING column.

Step 3 Type any character and press **Enter**.

The Trunk Timing Configuration screen appears (see Figure 3-9).

Complete the following steps to modify the timing.

> **Note** For an E1 card, timing is provisioned per span. To modify the timing, you only need to modify port 1 and the other ports adopt the same value.

Step 1 Access the Trunk Timing Configuration screen (refer to the "Accessing the Trunk Timing Configuration Screen" section on page 3-24).

Step 2 Use the **Prev** or **Next Field** key to position the cursor. Change the desired field and press **Enter**. Valid values are 0 to 255 (measured in units of 10 ms).

> **Note** When you modify port 1 and press Enter, the "Enter Y to Propagate Port 1 Values" message appears.

Step 3   To change all ports with this value, type **Y**. To change only port 1, type **N**.

Trunk Timing Configuration Screen Field Definitions

The Trunk Timing Configuration screen contains the following fields:

SPAN LOCATION—*Display only.* Identifies the Rack-Level-Slot hardware location, as well as the span. Change this field from the Card Maintenance screen.

CARD TYPE—*Display only.* Indicates the kind of card in the span location. Change the card type from the Card Maintenance screen.

STATUS—*Display only.* Indicates the current status of the card. Change the status of a card from the Card Maintenance screen. Valid values and their meanings are:

Active—Ports on this span can be involved in active calls and can be allocated to new calls.

Out of Service—No ports on this span can be involved in active calls; no ports are allocated to new calls.

Maintenance—One or more ports on this span may be involved in active calls; no ports are allocated to new calls.

Diagnostics—No ports on this span are involved in calls or allocated to new calls.

Remote—No ports on this span are involved in calls or allocated to new calls.

Payload—No ports on this span are involved in calls or allocated to new calls.

PORT—*Display only.* Indicates the port number on the card.

NAME—*Data entry via main keypad.* Optional database entry used to identify individual circuits. Each port name should be unique and descriptive of port usage. Up to eight uppercase and lowercase alphanumeric characters are accepted.

WINK-DET. MIN—*Data entry via main keypad.* Indicates the minimum wink detect time. For E1, this is the time to wait for the delayed dial signal. To disable wink detection, set WINK-DET. MIN and WINK-DET-MAX to 0.

Note   When an incoming call is detected in the E1-CAS/R2 call model, the board generates a SEIZE ACK. If the outgoing side does not detect the SEIZE ACK within the minimum wink detect time, a supervision error occurs and the call is idled.

When an incoming call is detected in the E1-CAS/Mercury call model, the board asserts a delay dial; the delay dial is removed upon the execution of a wink token. On the outgoing side, the minimum delay dial time is programmable with a WINK-DET-MIN. If the delay dial does not last long enough, it is ignored.

WINK-DET. MAX—*Data entry via main keypad.* Indicates the maximum wink detect time. To disable wink detection, set WINK-DET. MIN and WINK-DET-MAX to 0. Not used for E1.

WINK SEND—*Data entry via main keypad.* Indicates the wink send time. For E1, this is the time period of the delayed dial signal.

FLASH-DET. MIN—*Data entry via main keypad.* Indicates the minimum flash detect time. To disable flash detection, set FLASH-DET. MIN and FLASH-DET-MAX to 0. Not used for E1.

FLASH-DET. MAX—*Data entry via main keypad.* Indicates the maximum flash detect time. To disable flash detection, set FLASH-DET. MIN and FLASH-DET-MAX to 0. Not used for E1.

FLASH SEND—*Data entry via main keypad.* Indicates the flash send time. Not used for E1.

OFFHK MIN—*Data entry via main keypad.* For Four Span T1 or MVDC T1 cards, indicates the minimum off-hook time. OFFHK MIN also affects the minimum on-hook timing. For Four Span E1 cards, OFFHK-MIN is a misnomer and is used for on-hook timing.

GUARD—*Data entry via main keypad.* Indicates the guard time.

IPRC Card Configuration

Use the IPRC Card Configuration screen to define the IPRC configuration parameters. This screen provides fields in which you specify the length of time after which to chop the end of a newly recorded prompt, the interval timer for checksum verification, and the prompt libraries supported by the card. The IPRC Card Configuration screen also contains fields that display rack position, SCSI attached state, and card operating state. Refer to the *Cisco VCO/4K IPRC User's Supplement* for configuration procedures. In addition, the IPRC Card Configuration screen provides fields that enable you to configure the port density in 8-port increments, thus reallocating time slots based on the defined port density. The 64 and 128 port IPRCs may be configured to support less than the physical port capacity.

> **Note** Due to the potential re-allocation of timeslots and removal of prompt information loaded on the IPRC, you must remove the IPRC from service prior to making any changes from this screen.
>
> The IPRC card is supported in a C-bus enabled switch, however, there is no recording capability.

Accessing the IPRC Card Configuration Screen

Complete the following steps to access the IPRC Card Configuration screen:

Step 1   From the Administrator Main Menu, type **A** and press **Enter**.

The Database Administration Menu screen is displayed.

Step 2   Type **A** and press **Enter**.

The Card Summary screen is displayed.

Step 3   Press the **Next Screen** key until you see the Prompt/Record card listed.

Step 4   Press the **Next Field** key until the cursor is located in the DISP CARD field of the Prompt/Record card.

Step 5   Type any character and press **Enter**.

The IPRC Card Configuration screen is displayed (see Figure 3-10).

Figure 3-10   IPRC Card Configuration Screen

```
                    I P R C   C A R D   C O N F I G U R A T I O N


      CARD LOCATION: R, L, S__ __ ____      STATUS:_____

  PCM LIMIT:       ___
  PLAYBACK PORTS:    ___
  RECORD CHANNELS:   ___
  END OF RECORD CHOP: _____SEC
  CHECKSUM VERIFICATION INTERVAL TIMER: _____   ____HOUR

  ALLOCATED PROMPT CAPACITY:_____MIN
  AVAILABLE PROMPT CAPACITY:_____MIN

  SUPPORTED PROMPT LIBRARIES:


   ____ _____  ____ _____  ____ _____  ____ _____


   ____ _____  ____ _____  ____ _____  ____ _____


   ____ _____  ____ _____  ____ _____  ____ _____
```

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IPRC Card Configuration Screen Field Definitions

The IPRC Card Configuration screen contains the following fields:

CARD LOCATION—*Display only.* Shows the rack, level, and slot position of the IPRC.

STATUS—*Display only.* Displays the current operating state of the IPRC. Valid states are Active, Out of Service, Maintenance, and Diagnostic.

PCM LIMIT—*Data entry.* Use this field to input a maximum value for PCM cutoff. This value limits the level of the prompts. Valid values are from 0 to 127, with 0 being the loudest volume, and 127 the softest. The software on the IPRC clips any PCM value that is less than the defined limit. The recommended value for Mu-law prompt data is 10.

PLAYBACK PORTS—*Select field.* Defines the number of playback ports supported by the IPRC. The number of playback ports is allocated in increments of eight ports, up to the physical limit of ports supported by the IPRC. This field allows you to free up time slots if all ports on an IPRC are not required. The default value for this field is the maximum physical capacity of the IPRC board: 8, 64, or 128.

RECORD CHANNELS—*Display only.* Shows the number of record channels supported by this IPRC card. The number of record channels is controlled by the physical port configuration. There is no additional overhead introduced by the number of record channels, so they do not need to be configured.

END OF RECORD CHOP—*Data entry.* The end-of-record chop parameter defines how much of a prompt is cut from the end of a newly recorded prompt. Valid values, in seconds, are from 0.0 to 99.9. The default value is 0.1.

CHECKSUM VERIFICATION INTERVAL TIMER—*Select and data entry.* There are two fields associated with the checksum timer. Use these fields to define the periodic interval for the IPRC to verify the integrity of the prompt information loaded on the IPRC. The first field is a select field that enables

or disables the interval timer. The second field is a data entry field that accepts a value from 0 to 24, which corresponds to the interval time in hours. An interval time of 0 causes immediate verification of the checksum. The default values for the interval timer are Disabled and 24.

ALLOCATED PROMPT CAPACITY—*Display only.* Displays the amount of prompt capacity defined for this IPRC. This figure represents the total prompting minutes used by the prompt libraries assigned to this IPRC.

AVAILABLE PROMPT CAPACITY—*Display only.* This field displays the remaining prompt capacity for this IPRC. This figure represents the total prompting minutes available for recording, or for additional library assignment.

SUPPORTED PROMPT LIBRARIES—*Data entry and display only.* Use this group of fields to assign prompt libraries to the IPRC. Each prompt library assignment entry consists of two fields. The first field is a numeric entry field that specifies the library. The second field automatically displays the name of the prompt library, if one has been defined. You can assign up to 16 prompt libraries to an IPRC. You must number multiple prompt libraries consecutively. Valid values are from 1 to 16.

Drop and Insert Card Configuration

Use the Drop and Insert Card Configuration screen (see Figure 3-11), to configure the eight ports on the Drop and Insert (D+I) card.

Figure 3-11   Drop and Insert Card Configuration Screen

```
        D R O P    A N D    I N S E R T    C A R D    C O N F I G U R A T I O N


  CARD LOCATION:        RACK 1    LEVEL 1    SLOT 14
  CARD TYPE:            Drop & Insert Card
  CARD STATUS:          Out of Service


                                            BIT PACKING        SLIP ALARM
     PORT        DATA RATE      TERMINATION     ORDER           THRESHOLD
     ----        ---------      -----------  ------------       --------
   --
      1           64KB             DCE          NORMAL              1
      2           64KB             DCE          NORMAL              1
      3           64KB             DCE          NORMAL              1
      4           64KB             DCE          NORMAL              1
      5           64KB             DCE          NORMAL              1
      6           64KB             DCE          NORMAL              1
      7           64KB             DCE          NORMAL              1
      8           64KB             DCE          NORMAL              1
```

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Drop and Insert Card Configuration Screen Field Definitions

The Drop and Insert Card Configuration screen contains the following fields:

CARD LOCATION—*Display only.* The Rack-Level-Slot hardware address (physical location) of the card. Change this field from the Card Maintenance screen.

CARD TYPE—*Display only.* Indicates the kind of card in that location. Change this field from the Card Maintenance screen. Figure 3-5 shows the Subscriber Line card.

CARD STATUS—*Display only.* Indicates the current status of the card. Change this field from the Card Maintenance screen. Possible values and their meanings are:

Active—Ports on this card can be involved in active calls and allocated to new calls.

Out of Service—No ports on this card can be involved in active calls; no ports are allocated to new calls.

Maintenance—One or more ports on this card may be involved in active calls; no ports are allocated to new calls.

Diagnostics—No ports on this card are involved in calls or allocated to new calls.

PORT—*Display only.* Shows the port number.

DATA RATE—*Selectable field.* Each serial port is capable of synchronous operation at either 56 or 64 kilobits per second (kbps). When operating at 64 kbps, each 8 bits of data received is placed into a PCM time slot. When operating at 56 kbps, each 7 bits of data received is placed into a PCM time slot in the most significant 7 bits.

TERMINATION—*Selectable field.* Determines the termination option: DCE or DTE. DCE is the preferred configuration.

When a port is configured for DCE (data communications equipment) operation, the port uses the system clock to create the transmit and receive clocks. The transmit and receive data paths are not subject to data slips.

When a port is configured for DTE (data terminating equipment) operation, the port uses the received clocks to transmit data as well as receive data. Because receive clocks may not be locked to the switch's system clock, the transmit and receive data paths are subject to data slips.

BIT PACKING ORDER—*Selectable field.* Determines the bit ordering: Normal or Reverse. The bits may be packed into a PCM byte in the normal or reverse order as shown in Table 3-3

.

Table 3-3   Bit Packing in a PCM Byte

Mode	Bit 7 MSB[1]	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0 LSB[2]
64 kbps Normal	1st bit	2nd bit	3rd bit	4th bit	5th bit	6th bit	7th bit	8th bit
56 kbps Normal	1st bit	2nd bit	3rd bit	4th bit	5th bit	6th bit	7th bit	Fixed at 0
64 kbps Reverse	8th bit	7th bit	6th bit	5th bit	4th bit	3rd bit	2nd bit	1st bit
64 kbps	7th bit	6th bit	5th bit	4th bit	3rd bit	2nd bit	1st bit	Fixed at 0

1. MSB = most significant bit.

2. LSB = least significant bit.

SLIP ALARM THRESHOLD—*Numeric entry via main keypad.* Defines the number of slip errors that need to occur before an alarm is declared. Valid values are 0 to 255. A 0 value disables alarming.

When the number of slips is greater than the number of slips allowed, a Slip Error report is generated. You can view the slip error information in the Errors/Thresholds field from the Port Display screen.

Resource Group Summary

Use Resource Group Summary to name a resource group, specify the way in which the resources of that group are selected for use, and provide access to the Resource Group Configuration screens.

Internal service circuits must be grouped in order for the system to function properly. Create one group for each circuit type, ensuring that all circuits of that type are members of that group.

Network interface circuits should be grouped for optimum system performance and statistics collection. Network interface circuit groups and their members are application dependent.

Note If you inadvertently add the same card twice into a resource group through SNMP, and then delete it through the master console, that database is corrupted. Never add the same card into a resource group twice.

Accessing the Resource Group Summary Screen

Complete the following steps to access the Resource Group Summary screen:

Step 1 Access the Administrator Main Menu screen.

Step 2 Type **A** and press **Enter**.

The Database Administration Menu screen appears.

Step 3 Type **B** and press **Enter**.

The Resource Group Summary screen appears (see Figure 3-12). The cursor is located in the first NAME field.

Figure 3-12   Resource Group Summary Screen

```
              R E S O U R C E    G R O U P    S U M M A R Y
                                                            Start NO: 1
                 HUNT PORT THRESHLD                    HUNT PORT THRESHLD
     NO   NAME   TYPE CNT  RHNT BSY DSP    NO   NAME   TYPE CNT  RHNT BSY DSP
     ---- ------ ---- ---- ---- --- ---    ---- ------ ---- ---- ---- --- ---
     1    MFRVC  CYCLIC 0     0   0   _    17          _____ 0     0   0   _
     2    T1VRU  CYCLIC 0     0   0   _    18          _____ 0     0   0   _
     3    ATT    CYCLIC 0     0   0   _    19          _____ 0     0   0   _
     4    TRUNKS CYCLIC 0     0   0   _    20          _____ 0     0   0   _
     5    DTMFRCV CYCLIC 0    0   0   _    21          _____ 0     0   0   _
     6           _____ 0    0   0   _    22          _____ 0     0   0   _
     7           _____ 0    0   0   _    23          _____ 0     0   0   _
     8           _____ 0    0   0   _    24          _____ 0     0   0   _
     9           _____ 0    0   0   _    25          _____ 0     0   0   _
     10          _____ 0    0   0   _    26          _____ 0     0   0   _
     11          _____ 0    0   0   _    27          _____ 0     0   0   _
     12          _____ 0    0   0   _    28          _____ 0     0   0   _
     13          _____ 0    0   0   _    29          _____ 0     0   0   _
     14          _____ 0    0   0   _    30          _____ 0     0   0   _
     15          _____ 0    0   0   _    31          _____ 0     0   0   _
     16          _____ 0    0   0   _    32          _____ 0     0   0   _
```

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The Resource Group Summary screen consists of one screen. Use the **Print Screen** key to obtain a hard copy of this screen. Use the **Tab** and **<** keys to move between NAME fields.

Resource Group Summary Screen Field Definitions

The Resource Group screen contains the following fields:

Start NO:—*Data entry via main keypad*. **Type the resource group number you want to make accessible on the screen. Valid values are from 1 to 63 in standard operational mode, or 1 to 224 in extended mode. To access this field, press the Prev Field key while the cursor is located in the NAME field.**

NO—*Display only*. Indicates the number of the resource group. Valid values are from 1 to 63 in standard operational mode, or 1 to 224 in extended mode.

NAME—*Data entry via main keypad*. Determines the name of the resource group. Group name should be descriptive of the usage of the member circuits. Up to eight uppercase and lowercase alphanumeric characters are accepted.

HUNT TYPE—*Data entry via Select key*. Determines the way in which the system selects resources for use from this group. Valid selections are the following:

- CYCLIC—Initial hunt (after power-up/reboot) begins with position 1; subsequent hunts begin with position following last successfully allocated resource.

- ROTARY—Hunt always begins with position 1.

✎

Note   If a resource group contains SPC-CONF, the system hunts via the Rotary method only (regardless of the selection made in this field).

PORT CNT—*Display only.* Displays the number of circuits currently in this resource group. The number is updated when changes are made to the group via the Resource Group Configuration screen. Valid values are from 0 to 999 in standard operational mode or 0 to 1920 in extended mode.

THRESHOLDS, RHUNT—*Data entry via main keypad.* Auto Retry (rehunt) for outgoing ports only (COS = O or AO; also COS = 2 and used as outgoing in a call). Indicates the number of times per call the system rehunts this group for a new outgoing port if an outgoing supervision error is encountered. The number of rehunts for a current call can be viewed from the Port Display screen (refer to the "Display Port Data" section on page 6-10). Valid values are from 0 to 5. A value of 0 disables this feature for the group.

THRESHOLDS, BUSY—*Data entry via main keypad.* Auto makebusy for outgoing ports only (COS = O or AO; also COS = 2 and used as outgoing in a call). Indicates the number of times a supervision error can be detected for a port in this group before the system takes that port out of service (make busy). Current number of supervision errors for a port can be viewed from the Port Display screen (refer to Chapter 6, "Diagnostics"). Possible values range between 0 and 255; a value of 0 disables this feature for the group. The error count is cleared at midnight.

DSP—*Data entry via main keypad, access to another screen(s).* Display Group; provides access to the Resource Group Configuration screens. Any character on the main keypad is valid for entry. Refer to the "Changing Resource Group Parameters" section on page 3-33 for instructions on using this field.

Changing Resource Group Parameters

Complete the following steps to change the name and hunt type for each group from the Resource Group Summary screen:

Step 1   Access the Resource Group Summary screen (refer to the "Accessing the Resource Group Summary Screen" section on page 3-31).

The cursor is located in the NAME field of the first group.

Step 2   Type the Name information, then press the **Next Field** key.

The cursor moves to the HUNT TYPE field.

Step 3   Use the **Select** and **Rev Select** keys to scroll through the selections until the desired hunt type is displayed, then press the **Next Field** key.

The cursor moves to the THRESHLD, RHNT field.

Step 4   Type the auto retry value and press the **Next Field** key, or just press the **Next Field** key to leave this entry unchanged (0).

The cursor moves to the THRESHLD, BSY field.

Step 5   Type the auto makebusy value and press the **Next Field** key, or just press the **Next Field** key to leave this entry unchanged (0).

The cursor moves to the DSP field.

Step 6   If you want to assign a name and hunt type to another resource group, press the **Next Field** key and repeat Step 2 and Step 3. Press the **Tab** or **<** keys to move between NAME fields.

Step 7   When you have made all changes, press **Enter**.

The system database is automatically updated.

Step 8 To display or edit a resource group member, use the **Next Field** and **Prev Field** keys to position the cursor in the DISP field corresponding to that group, type any character and press **Enter** (refer to "Resource Group Configuration" section on page 3-34 for information on the Resource Group Configuration screen). If no further resource group changes are to be made, press the **Exit** or **Prev Menu** key to return to the Database Administration menu.

To exit the Resource Group Summary screen without making any changes, press the **Exit**, **Prev Menu**, or **Main Menu** key. No changes are made to the database unless you press **Enter**.

Accessing Other Screens

Complete the following steps to access the Resource Group Configuration screen from the Resource Group Summay screen:

Step 1 Press the **Prev Field**, **Next Field**, **Tab**, or **<** key to position the cursor in the DISP field corresponding to the resource group you want to edit or display.

Step 2 Type any character, and press **Enter**.

The Resouce Group Configuration screen appears.

Resource Group Configuration

Use Resource Group Configuration to assign ports or spans in a card to a resource group. You can add an entire span to a resource group, but not the entire card. Each port can belong to only one resource group. The card/port information must already be entered into the database. Refer to Chapter 4, "System Configuration," for information about adding or deleting cards to or from the database from the Card Maintenance screen.

You must group internal service circuits for the system to function properly. Create one group for each circuit type; all circuits of that type must be members of that group.

Group network interface circuits for optimum system performance and statistics collection. Network interface circuit groups and their members are application dependent.

With a single command, you can add or delete all ports on a card from a group. This feature is useful when you create internal service circuit resource groups, especially those containing Digital Conference Cards with 64 ports per card.

Note If DTMF Receiver Cards (DRCs) are assigned to a resource group, a Service Platform Card (SPC) cannot be added to the same resource group.

Accessing the Resource Group Configuration Screen

Complete the following steps to access the Resource Group Configuration screen from the Resource Group Summary screen:

Step 1   Access the Resource Group Summary screen (refer to the "Accessing the Resource Group Summary Screen" section on page 3-31).

Step 2   Use the **Prev Field**, **Next Field**, **Tab** or **<** key to position the cursor in the DSP field corresponding to the resource group you want to edit or display.

Step 3   Type any keypad character and press **Enter**.

The Resource Group Configuration screen appears, as shown in Figure 3-13. The cursor is located in the Add/Delete/Card (A/D/C) field.

Figure 3-13   Resource Group Configuration Screen

```
           R E S O U R C E   G R O U P   C O N F I G U R A T I O N

    RESOURCE GROUP Ð #2          NAME Ð DENVER

POS      PORT    LOCATION                     PORT          LOCATION
         NAME    R  L   S    P        POS  NAME         R   L   S    P
---     -------  -  -  ----  --       ---  ----------   -   -  ----  --
 1      T1       1  1  13-1  1        __   _____   _   _  ____  __
 2      T1       1  1  13-1  2        __   _____   _   _  ____  __
 3      T1       1  1  13-1  3        __   _____   _   _  ____  __
 4      T1       1  1  13-1  4        __   _____   _   _  ____  __
 5      reg T1   1  1     5  1        __   _____   _   _  ____  __
__      _____  _  _  ____  __       __   _____   _   _  ____  __
__      _____  _  _  ____  __       __   _____   _   _  ____  __
__      _____  _  _  ____  __       __   _____   _   _  ____  __
__      _____  _  _  ____  __       __   _____   _   _  ____  __
__      _____  _  _  ____  __       __   _____   _   _  ____  __
__      _____  _  _  ____  __       __   _____   _   _  ____  __
__      _____  _  _  ____  __       __   _____   _   _  ____  __

          Add/Delete/Card (A/D/C) _    POS ___      R L S P _ _  ____ __
```

The Resource Group Configuration screen consists of up to 42 screens. Each screen contains information for 24 ports. The list of ports on the screen indicates the port's position within the resource group. Use the **Prev Screen** and **Next Screen** keys to page through the screens. Use the **Print Screen** key to obtain a hard copy of any of these screens.

Resource Group Configuration Screen Field Definitions

The Resource Group Configuration screen contains the following fields:

RESOURCE GROUP #—*Display only.* Indicates the number of the resource group displayed. Valid values are from 1 to 63 in standard operational mode or 1 to 224 in extended mode.

NAME—*Display only.* Indicates the name assigned to this resource group. Change this field from the Resource Group Summary screen. Up to eight uppercase and lowercase alphanumeric characters are accepted.

POS—*Display only.* Displays the port's position within the group. Position can determine the order in which resources are hunted and the frequency with which they are allocated.

PORT NAME—*Display only.* For network interface circuits, the name assigned to this circuit using the Line or Trunk Card Configuration screen. For internal service circuits, this field is blank (there is no facility for naming these circuits). Up to eight uppercase and lowercase alphanumeric characters are accepted.

LOCATION—*Display only.* Displays the Rack-Level-Slot-Port (R-L-S-P) hardware address (physical location) of the port. For Four Span T1/E1 and MVDC T1 cards, you must specify a span or the "Interface Required" message appears. Change this field from the Card Maintenance screen.

Add/Delete/Card (A/D/C)—*Data entry via main keypad.* Allows you to specify a function. Valid values and their meanings are:

- A—Add a single port or all ports on a card to the resource group.
- D—Delete a single port from the resource group.
- C—Delete all ports on a card from the resource group.

> **Note**   To add or delete ports on a multi-interface card, you must also specify the interface ID.

POS—*Data entry via main keypad.* Specifies the position number of the port for which the command is carried out. Valid values are from 1 to the number of group members, up to 999 in standard operational mode or 1920 in extended mode.

R L S P—Data entry via main keypad. Indicates the Rack-Level-Slot/Group/Span-Port (R-L-S-P) hardware address (physical location) of the port for which the command is carried out. For Four Span T1/E1 and MVDC T1 cards, you must specify a span or the "Interface Required" message appears.

Adding Individual Ports to a Resource Group

Complete the following steps to add a single port to a resource group:

Step 1   Display the Resource Group Configuration screen for the group to which you want to add ports (refer to the "Accessing the Resource Group Configuration Screen" section on page 3-34).

The cursor is located in the Add/Delete/Card (A/D/C) field.

Step 2   Type **A** and press the **Next Field** key.

The cursor moves to the POS field.

Step 3   Type the number of the position at which you want to add the port, then press the **Next Field** key.

The cursor moves to the R-L-S-P field.

Step 4   Type the hardware address of the port you want to add and press **Enter**. The screen is updated to show the addition of the new port.

Step 5   Repeat Step 2 through Step 4 for each port you want to add.

Step 6   Press the **Exit** key to return to the Resource Group Summary screen.

> **Note** The port is added at the position you specified unless the position you entered is greater than the last position. In this case, the new port is added to the end of the list, regardless of the position specified. For example, if there are 20 group members and a port is added with a specified position of 30, that port is assigned position 21.

To exit the Resource Group Configuration screen without making any changes, press the **Exit**, **Prev Menu**, or **Main Menu** key. No changes are made to the database unless you press **Enter**.

Adding All Ports on a Card

Add all ports on a card to a resource group with the **Add** command. This command adds the ports on the card you specify in order according to port number, starting at the position you specify.

If the system encounters a port that is already a member of another group, an "Already In A Resource Group" message appears and no further ports are added.

Complete the following steps to add all ports on a card to a resource group:

Step 1 Display the Resource Group Configuration screen for the group to which you want to add ports (refer to the "Accessing the Resource Group Configuration Screen" section on page 3-34).

The cursor is located in the Add/Delete/Card (A/D/C) field.

Step 2 Type **A** and press the **Next Field** key.

The cursor moves to the POS field.

Step 3 Type the number of the position from which you want to add the ports, then press the **Next Field** key.

The cursor moves to the R-L-S-P field.

Step 4 Type the hardware address of the card you want to add, specifying 0 for the port field, and press **Enter**.

The "Adding Ports" message appears, then the screen display is updated to show the addition of the new ports.

Step 5 Repeat Step 2 through Step 4 for each card you want to add.

Step 6 Press the **Exit** key to return to the Resource Group Summary screen.

To exit the Resource Group Configuration screen without making any changes, press the **Exit**, **Prev Menu**, or **Main Menu** key. No changes are made to the database unless you press **Enter**.

Deleting an Individual Port

Complete the following steps to delete an individual port from a resource group:

Step 1 Display the Resource Group Configuration screen for the group from which you want to delete ports (refer to the "Accessing the Resource Group Configuration Screen" section on page 3-34).

The cursor is located in the Add/Delete/Card (A/D/C) field.

Step 2   Type **D** and press the **Next Field** key.

The cursor moves to the POS field.

Step 3   Type the number of the position that corresponds to the port you want to delete, and press **Enter**.

The system displays the port's hardware address and an "Are You Sure?" message.

Step 4   If you are unsure, press **N** and a "No Delete Performed" message appears. To delete the port, press **Enter** again.

The screen is updated to reflect the deletion.

Step 5   Repeat Step 2 and Step 4 for each port you want to delete.

Step 6   Press the **Exit** key to return to the Resource Group Summary screen.

To exit the Resource Group Configuration screen without making any changes, press the **Exit**, **Prev Menu**, or **Main Menu** key. No changes are made to the database unless you press **Enter** twice.

Deleting All Ports on a Card

Complete the following steps to delete all ports on a card from a resource group:

Step 1   Display the Resource Group Configuration screen for the group from which you want to delete ports (refer to the "Accessing the Resource Group Configuration Screen" section on page 3-34).

The cursor is located in the Add/Delete/Card (A/D/C) field.

Step 2   Type **C** and press the **Next Field** key.

The cursor moves to the POS field.

Step 3   Type the number of the position that corresponds to a port address on the card you want to delete, and press **Enter**.

The system displays the card's hardware address and the "Delete All Ports For This Card?" message.

Step 4   If you are unsure, press **N** and a "No Delete Performed" message appears. To delete all ports on the card, press **Enter** again.

The system searches the resource group and deletes any ports for the card address that corresponds to the position specified. The "Deleting Ports" message appears, then the ports are deleted from the screen display.

Step 5   Repeat Step 2 through Step 4 for each card you want to delete.

Step 6   Press the **Exit** key to return to the Resource Group Summary screen.

To exit the Resource Group Configuration screen without making any changes, press the **Exit**, **Prev Menu**, or **Main Menu** key. No changes are made to the database unless you press **Enter** twice.

Inpulse Rules Table

Use the Inpulse Rules Table screens to define inpulse rules for call processing. An inpulse rule is a list of instructions defined by an application designer or administrator, and defines the signaling protocol used on incoming calls. You can define up to 16 instructions, in the form of tokens, for a single rule.

These instructions can be used to condition a line or trunk to wait for supervision events, collect MF/DTMF digits, and store received digits in an internal system call record. Inpulse rules can also access outpulse rules to allow outpulsing and waiting for supervision events. Inpulse rule processing ends when a blank line is encountered, or when 16 tokens are processed without encountering a Processing Control token (GOTO RULE [xx], DO IRULE [xx], or DO ORULE [xx]). You can define up to 30 inpulse rules in standard operational mode, or 255 in extended mode.

Accessing the Inpulse Rules Table Screen

Complete the following steps to access the Inpulse Rules Table screen:

Step 1   From the Administrator Main Menu screen, type **A** and press **Enter**.

Step 2   The Database Administration Menu screen appears.

Step 3   Type **C** and press **Enter**.

The Inpulse Rules Table screen appears (see Figure 3-14). The cursor is located in the first token field of inpulse rule #1.

Figure 3-14   Inpulse Rules Table Screen

The Inpulse Rules Table consists of multiple screens, each containing five inpulse rule columns. Use the **Prev Screen** and **Next Screen** keys to page through the screens. Use the **Next Field** and **Prev Field** keys to move between inpulse rules. Use the **Print Screen** key to obtain a hard copy of any of these screens.

Inpulse Rules Table Screen Field Definitions

The Inpulse Rules Table screen contains the following types of fields:

Start Rule #—*Data entry via main keypad.* Type the inpulse rule number you want to make accessible on the screen. Valid values are from 1 to 30 in standard operational mode, or 1 to 255 in extended mode. To access this field, press the Prev Field key while the cursor is located on the RULE # field.

RULE #—*Display only.* Identifies the inpulse rule displayed. Inpulse rules are specified by number when entered as the default on the Line and Trunk Card Configuration screens or entered via a command. Valid inpulse rule numbers are 1 to 30 in standard operational mode, or 255 in extended mode.

Data Entry Fields—*Data entry via Select key.* Sixteen "lines" are displayed under each RULE # heading; each of these lines contains two data entry fields. The first field is the token field, the second the additional data field. Not all tokens require additional data; in the token descriptions that follow, the notation [xx] indicates that additional data entry is required.

Inpulse Rule Token Definitions

Tokens are the unique instructions that, when combined, make up an inpulse rule. Each token takes advantage of a function within the system such as reporting control, digit collection, processing control, etc. The following list defines the functions designated for each token.

- Reporting Control—When rule completion, change of state, and address signaling for a port are reported to the host.

- Signaling Mode—A DTMF receiver, MF receiver, or MFCR2 transceiver is required to collect incoming digits. A signaling mode token must be used when a rule includes digit collection. DTMF tokens can also be used for dial pulse digit collection on SLIC and DID circuits only.

- Digit Collection Setup—The conditions for digit collection.

- Digit Collection—The appropriate receiver (as indicated by the Signaling Mode token) and the digit field in which digits are stored.

- Supervision Control— In-band or out-of-band signaling to the distant end (i.e., answer, wink, tone, voice prompt) or waits a specified length of time before continuing rule processing.

- Processing Control—Construction of rules with more than 16 tokens and outpulse rule execution.

- Prompt/Record Control—Prompt and record control for the IPRC.

Use the **Select** and **Rev Select** keys to display the tokens in the Inpulse Rules Table. The following pages define each token. The tokens are listed in alphabetical order rather than the order in which they are arranged on the screen.

Type any additional data required to complete a token. Refer to Table 3-4 for tone value data entry for the additional data fields.

System software options, such as TeleRouter and the ISDN PRI package, may have additional inpulse rule tokens to support the special functions of those options. Inpulse rule tokens associated with software options are described in the supplement document that accompanies the software.

ANSWER

Supervision Control. Provides answer supervision on the incoming port. This token can be used for all network interface circuit types except for SLIC or 8LTC. Refer to Appendix A, "Supervision Signaling," for information about the answer effect on each card. This token is ignored if the port executing the rule has an outgoing class of service.

APEND ANI [xx]

Digit Collection. Enables an attached DTMF receiver, MF receiver, or MFCR2 transceiver to collect digits and append them to the digits that are stored in the originating number field of the call record. Previous setup tokens determine how the inpulse action occurs. Valid values for the APEND ANI additional data field are 1 to 40.

If the signaling mode token preceding this token is MF, no entry is required for the additional data field. All digits detected between a single KP and ST pair within a 30-second period are collected, but only the first 12 are reported and stored for later outpulsing. If the signaling mode token preceding this token is DTMF, a value between 1 and 40 determines the number of digits that are collected, stored, and reported.

If the signaling mode token preceding this token is MFCR2, rule processing is suspended until MFCR2 collection is complete. End-of-digit tones (I-15) are not reported as part of the collection.

Note   Signal designation I-10 digits are automatically translated to "0" digits by the system when collected and stored in a digit field.

APEND FLD [xx]

Digit Collection. Enables an attached DTMF receiver, MF receiver, or MFCR2 transceiver to collect digits and append them to the digits stored in the call record digit field specified by the value in the additional data field. Up to 40 digits can be collected, reported, and stored for later outpulsing. The value in the additional data field can be 1, 2, 3, or 4. Previous setup tokens determine how the inpulse action occurs, but for DTMF collection this token must be preceded by a DIGITS [xx] token.

In MFCR2 processing, rule processing is suspended until the MFCR2 collection is complete. End-of-digit tones (I-15) are not reported as part of the collection.

Note   MFCR2 signal designation I-10 digits are automatically translated to "0" digits by the system when collected and stored in a digit field.

CLR CHAR1 [xx]

Collection Setup. Applies to DTMF and MFCR2 applications. In DTMF processing, this token specifies that a one-character DTMF digit string can be used to signal that all digits entered for the current collection field should be discarded and collection should begin again. This token allows the user to begin again if a mistake is made. When the specified character string is detected, the digit buffer for the current field is cleared and digit collection is restarted.

If this token is not used, the rule does not support a special clear character. The one-character DTMF string entered in the additional data field specifies the digit string; valid characters are 0 to 9, * and #. If the Enable 4th Column DTMF feature flag (used with the DTMF4 inpulse rule token) is enabled, the characters A through F are also valid.

In MFCR2 processing, CLR CHAR1 sets the backward supervision tone to SEND during the digit collection sequence. Valid values for the CLR CHAR1 additional data field are decimal values 0 to 15. If a valid digit is not entered, a default of 4 is sent. (4 corresponds to A-4, network congestion.) The backward tone specified is transmitted back to the forward register.

Note   The MFCR2 tones generated by CLR CHAR1 [xx] tokens may be either Group A or Group B R2 signaling tones. While Group A and B tones of the same designation (e.g., A-1 and B-1) are made up of the same frequencies, the tone meanings vary between the two groups. The forward register must interpret the meaning of the tone based on the call model used.

CLR CHAR2 [xx]

Collection Setup. Applies to DTMF applications. In DTMF processing, this token specifies that a two-character DTMF digit string can be used to signal that all digits entered for the current collection field should be discarded and collection should begin again. CLR CHAR2 [xx] allows the user to begin again if a mistake is made. When the specified character string is detected, the digit buffer for the current field is cleared and digit collection is restarted. If this token is not used, the rule does not support a special clear character. The two-character DTMF string entered in the additional data field specifies the digit string; valid characters are 0 to 9, * and #.

If the Enable 4th Column DTMF feature flag (used with the DTMF4 inpulse rule token) is enabled, the characters A through F are also valid.

CONT NREP

Collection Setup. Specifies to continue rule processing if a first digit, interdigit, or field collection timeout occurs. The CONT NREP suppresses a $D1 or corresponding $DD segment reporting a first digit timeout, otherwise performing exactly as the CONT REP token. This token should appear immediately preceding the Digit Collection token. If a timeout occurs, rule processing continues with the token following the Digit Collection token. Any digits collected are reported at the end of the rule unless they are overwritten by a subsequent collection.

CONT REP

Collection Setup. Specifies to continue rule processing in the event a DTMF/DP first digit, interdigit, or field collection timeout occurs and report the timeout and any digits to the host. This token should appear immediately preceding the Digit Collection token. If a timeout occurs, rule processing continues with the token following the Digit Collection token. A $D1 report is generated (or a segment is included in the $DD report) specifying a first digit, interdigit, or field timeout. In the case of interdigit and field timeouts, all digits collected to that point are reported. This token allows for continued rule processing even following a digit collection timeout.

DIGITS [xx]

Applies to DTMF and MFCR2 digit collection, and is used preceding IP FIELD [xx]. The DIGITS token specifies the number of digits to collect. Valid values for the additional data field (xx) are from 1 to 40. If no value is entered, the system defaults to 0.

When the data field is 0 in MFCR2 processing, digits are collected until the end-of-digit (I-15) tone is received.

Note   The I-15 tone is not reported in the digit report.

DO IRULE [xx]

Processing Control. Instructs the system to perform processing for the inpulse rule specified, then return to this rule. In an inpulse rule, this token allows the construction of rules with more than 16 steps. DO IRULE [xx] works in much the same way as a subroutine call within a program. When rule processing encounters this token, processing continues with the first token of the inpulse rule specified in the additional data field. At the end of the specified rule, processing continues with the token following the DO IRULE [xx] token in the original rule. The "subroutine" rule must not call another rule containing a GOTO RULE [xx], DO IRULE [xx], or DO ORULE [xx] token. If it does, the call is processed as if the original DO IRULE token were a GOTO RULE.

Valid values for the additional data field are 1 to 255.

DO ORULE [xx]

Processing Control. Instructs the system to perform processing for the outpulse rule specified, then return to this rule. It allows outpulse rule functions (outpulsing digits) during an inpulse rule, working in much the same way as a subroutine call within a program. When rule processing encounters this token, processing continues with the first token of the outpulse rule specified in the additional data field. At the end of the specified rule, processing continues with the token following the DO ORULE [xx] token in the original rule. The "subroutine" rule must not call another rule containing a GOTO RULE [xx], DO IRULE [xx], or DO ORULE [xx] token. If it does, the call is processed as if the original DO ORULE token were a GOTO RULE.

Valid values for the additional data field are 1 to 255.

DTMF

Signaling Mode. Must precede a Digit Collection Setup or Digit Collection token in the rule. DTMF indicates that a DTMF receiver port is required for digit collection. When this token is encountered, the system hunts the DTMF receiver resource group, links a port into the resource chain, but does not enable the port until a Digit Collection token is encountered.

This token must be used for all DTMF digit collection, even when SLIC, DID or UTC ports with onboard receivers are used.

Note   Dial pulse (DP) is supported only with a Universal Trunk Card (UTC), and running system softwareVersion 5.1, or higher, in 2K mode.

DTMF4

Signaling Mode. Only accessible if the Enable 4th Column DTMF feature flag is set to **Y** in the System Features screen. The DTMF4 token must precede a Digit Collection Setup or Digit Collection token in the rule. Selecting DTMF4 as an inpulse rule token allows the dependent END and CLR character token data fields to accept fourth-column DTMF digits. The TONE tokens accept a numeric identifier for the tones.

DTMF4 indicates that a DTMF receiver port that supports fourth column DTMF is required for digit collection. When this token is encountered, the system hunts the DTMF receiver resource group, links a port into the resource chain, but does not enable the port until a Digit Collection Token is encountered.

Using the DTMF4 token ensures that a receiver resource which supports fourth-column DTMF digits is linked into a given call.

END CHAR1 [xx]

Collection Setup. Applies to DTMF and MFCR2 applications. In DTMF processing, this token specifies that a one-character DTMF digit string can be used to signal that all digits are entered. The DTMF receiver stops digit collection when the specified character string is received.

If this token is not used, the rule does not support a special end-of-string character. The one-character DTMF string entered in the additional data field specifies the digit string; valid characters are 0 to 9, * and #. When the Enable 4th Column DTMF feature flag (used with the DTMF4 inpulse rule token) is enabled, the characters A through F are also valid.

In MFCR2 processing, END CHAR1 sets the backward supervision tone to SEND after the digit collection is complete. The completion of the digit collection is signified by a group I-15 tone. Valid values for the END CHAR1 additional data field are decimal values 0 through 15. If a valid digit is not entered, a default of 4 is sent. (4 corresponds to A-4, network congestion.) The backward tone specified is transmitted back to the forward register.

Note The MFCR2 tones generated by END CHAR1 [xx] tokens may be either Group A or Group B R2 signaling tones. While Group A and B tones of the same designation (e.g., A-1 and B-1) are made up of the same frequencies, the tone meanings vary between the two groups. The forward register must interpret the meaning of the tone based on the call model used.

END CHAR2 [xx]

Collection Setup. Applies to DTMF applications. In DTMF processing, this token specifies that a two-character DTMF digit string can be used to signal that all digits are entered. Use this token when the phone user can enter a varying number of digits (such as an account number), and the end of this digit string must be marked. The DTMF receiver stops digit collection when the specified character string is received.

If this token is not used, the rule does not support a special end of string character. The two-character DTMF string entered in the additional data field specifies the digit string; valid characters are 0 to 9, * and #. If the Enable 4th Column DTMF feature flag (used with the DTMF4 inpulse rule token) is enabled, the characters A through F are also valid.

GLARE [xx]

*Processing Control. E*xecutes a specified inpulse rule when an ISDN glare condition occurs. (Refer to Chapter 4 of the *Cisco VCO/4K ISDN Supplement* for detailed information about ISDN glare condition processing.) GLARE must always be the first token in the rule. The additional data field specifies which inpulse rule to execute. Valid values for this field are 1 to 30.

GOTO RULE [xx]

Processing Control. Allows the construction of rules with more than 16 steps. When rule processing encounters a GOTO RULE [xx] token, it continues processing with the first token of the inpulse rule specified in the additional data field. Rule processing does not return to the original rule unless directed by a subsequent GOTO RULE [xx] token. This token can be used to create an endless loop by specifying the original rule number in the additional data field. This feature can be used to present a repeating tone or voice card prompt to the incoming port, but should be used with caution. The value in the additional data field (1 to 255) corresponds to the rule number with which processing continues.

IP ANI [xx]

Digit Collection. Enables an attached DTMF receiver, MF receiver, or MFCR2 transceiver to collect digits. Digits are stored in the originating number field of the call record. Previous setup tokens determine how the inpulse action occurs. Valid values for the IP ANI additional data field are 1 to 40.

If the signaling mode token preceding this token is MF, no entry is required for the additional data field. All digits detected between a single KP and ST pair within a 30-second period are collected, but only the first 12 are reported and stored for later outpulsing. If the signaling mode token preceding this token is DTMF, a value of 1 to 40 determines the number of digits that are collected, stored, and reported. If the IP ANI is used more than once within the same call, the digits previously contained in the field are overwritten when the second digit string is collected.

If the signaling mode token preceding this token is MFCR2, rule processing is suspended until MFCR2 collection is complete. End-of-digit tones (I-15) are not reported as part of the collection. If the IP ANI is used more than once within the same call, the digits previously contained in the field are overwritten when the second digit string is collected.

Note   Signal designation I-10 digits are automatically translated to "0" digits by the system when collected and stored in a digit field.

IP CAT2

Digit Collection. Applies to MFCR2 digit collection. The IP CAT2 token allows for a single category digit collection. When an IP CAT2 token is encountered during inpulse rule processing, a single digit is collected and stored in Field 6 of the call record.

IP FIELD [xx]

Digit Collection. Enables an attached DTMF receiver, MF receiver, or MFCR2 transceiver to collect digits. Digits are stored in the call record digit field specified by the value in the additional data field. Up to 40 digits can be collected, reported, and stored for later outpulsing. The value in the additional data field can be 1, 2, 3, or 4. Previous setup tokens determine how the inpulse action occurs, but for DTMF collection this token must be preceded by a DIGITS [xx] token. If the same digit field is used more than once within the same call, the digits previously contained in the field are overwritten when the second digit string is collected.

In MFCR2 processing, rule processing is suspended until the MFCR2 collection is complete. End-of-digit tones (I-15) are not reported as part of the collection. If the IP ANI is used more than once within the same call, the digits previously contained in the field are overwritten when the second digit string is collected.

Note   MFCR2 signal designation I-10 digits are automatically translated to "0" digits by the system when collected and stored in a digit field.

LIBRARY [xx]

Prompt/Record Control. Defines the voice prompt library to use for both prompt playback and record operations for IPRCs. (DVC cards only support Library 1. Do not use this token with DVC cards.) Valid input range is 1 to 16, since 16 prompt libraries are supported by the system, or TMP. The LIBRARY token is used by the system controller software to hunt an IPRC port from the Announcement resource group that supports the specified prompt library. The default library ID is 1 if none is specified. The LIBRARY token must be specified before the RECORD or SPEAK token for proper operation.

> **Note**   The DVC is no longer available. Cisco Systems does, however, continue to support this card.

The TMP library identifier specifies that the play/record operation access the IPRC port's temporary array of prompts. Each IPRC port has access to 255 temporary prompts. The temporary prompts are maintained as long as the IPRC port is involved in the call. All temporary prompts are erased when the IPRC port is released. Temporary prompts are used in applications where prompt data is needed and is valid on a per call basis. One such application is automated operator services. In this application, the system records the caller's name, places an outbound call to the destination, and then plays back the caller's name to the called party so they can determine whether to accept the call.

LOOP ALL

Prompt/Record Control. Used for prompt playback operations to instruct the IPRC to continually loop the list of prompts being played. The playback continues until a subsequent inpulse rule or host command terminates the operation, or the IPRC port playing the prompt list is removed from the call. No additional input data is required for this token. The LOOP ALL token must be specified before the SPEAK token for proper operation.

LOOP LAST

Prompt/Record Control. Used for prompt playback operations to instruct the IPRC to continually loop the last prompt in a list of prompts being played. The playback will continue until a subsequent inpulse rule or host command terminates the operation, or the IPRC port playing the prompt list is removed from the call. No additional input data is required for this token. The LOOP LAST token must be specified before any SPEAK token for proper operation.

The LOOP LAST token will not suspend inpulse rule execution to allow other processing, such as digit collection.

MAX REC [xx]

Prompt/Record Control. Defines an upper limit, in seconds, for recording a particular prompt. The default value for the recording limit is 0 seconds, meaning no limit. The maximum limit, measured in seconds, is 255. This token is used in applications that need to provide a fixed time limit for recording prompt information. It also prevents one or a few prompts from consuming all memory capacity on a particular IPRC. The MAX REC token must be specified before the RECORD token for proper operation.

MF

Signaling Mode. Must precede a Digit Collection Setup or Digit Collection token in the rule. MF indicates that an MF receiver port is required for digit collection. When this token is encountered, the system hunts the MF receiver resource group, links a port into the resource chain, but does not enable the port until a Digit Collection Token is encountered. The MF receiver remains in the resource chain until an MFCR2 token is encountered, or until the end of rule processing.

MFCR2

Signaling Mode. Must precede a Digit Collection Setup or Digit Collection Token in the rule. MFCR2 indicates that an MFCR2 transceiver port is required for digit collection. When this token is encountered, the system hunts the MFCR2 transceiver resource group, links a port into the resource chain, but does not enable the port until a Digit Collection Token is encountered. The MFCR2 transceiver remains in the resource chain until an MF token is encountered, or until the end of rule processing.

NO REP

Reporting Control. Use when multiple successive inpulse/outpulse rules are to be processed using the "DO" tokens, which would generate multiple Inpulse Rule Complete ($DD) reports. NO REP suppresses reporting that normally occurs at the end of a rule. If digit collection is to be performed or there are other supervision events for which reports to the host are desired, the REP NEXT token should precede those events. Any digits collected in a rule that are not reported because of a NO REP token are reported in any subsequent $DD report for the call. Multiple collections from several rules can be reported using a single $DD report. This token reduces communication link and host processing overhead.

NO HOST [xx]

Processing Control. Executes a specified inpulse rule following the expiration of the host setup timer. The length of the host setup timer (in seconds) is configured on the Host Configuration screen. Valid values, in seconds, are 1 to 60. The system waits for the host to respond to an initial call report (incoming/outgoing Port Change of State or Inpulse Rule Complete report) until the timer expires. If a host command is not received, the system executes the inpulse rule indicated in the NO HOST [xx] token additional data field (rule number 1 to 30/255). If the NO HOST token is not used, the system begins Reorder and Permanent Signal processing for the port involved when the host setup timer expires.

Note NO HOST [xx] tokens are ignored during inpulse rule processing if the Host Setup Timer field is disabled. This setting prevents the host setup timer from even being started. The Host Setup Timer field is located in the System Configuration/ System Host Configuration screen.

The inpulse rule specified in the NO HOST [xx] token can contain voice prompts directing the caller to go on-hook or an alternate method of completing the call. If this "backup" rule does not include a NO HOST [xx] token, the port is subject to the host setup timer once a $DA, $DB, or $DD report is sent to the host.

RECORD [xx]

Prompt/Record Control. Initiates an IPRC record operation. Valid range for [xx] is 1 to 255. This token hunts for an IPRC containing the default or previously defined prompt library, erases the prompt specified (xx), and begins recording a new prompt from the line/trunk port executing the inpulse rule. The record operation terminates when the maximum record time is reached, if subsequent tokens in the inpulse rule terminate the recording (DTMF digit received), or when the IPRC port is released from the call. Refer also to the MAX REC token and the LIBRARY token.

RELEASE [xx]

Resource Control. Valid resource types are IPRC, MRC, DRC, DTG, CPA, and MCR. This token is used to remove the specified resource type from the call. Token processing releases the specified resource immediately if one exists in the call chain. This token is used to free up resources normally retained until the end of the rule processing.

To indicate which resource to retain, type the data in the additional data field as IPR (for IPRC), MRC (for MF receiver), DRC (for DTMF receivers), DTG, CPA, or MCR (for MFCR2). This data must be typed in uppercase letters; it is not selectable.

REP EACH

Reporting Control. Specifies that reports to the host are sent as events happen, as if the host was sending commands for every action in the inpulse rule(s). On-/off-hook and digit reports are sent to the host as the events occur, allowing the host to make routing or other application decisions before the end of rule processing. Communication link and host processing overhead can be high when using this token.

REP END

Reporting Control. Specifies that reports to the host are made only at the end of the inpulse rule execution. The report contains all the received DTMF and MF digits, the incoming port change of state, and any errors detected during digit collection. This token minimizes communication link and host processing overhead. REP END is the default reporting token.

REP NEXT

Reporting Control. Specifies that the event that immediately follows it is reported to the host when it happens; the reporting control mode then reverts to the one specified by the previous Reporting Control token. The on-/off-hook or digit report is sent to the host when the event occurs, allowing the host to make routing or other application decisions before the end of rule processing. Communication link and host processing overhead is not as high as with REP EACH.

In MFCR2 processing, REP NEXT is also used as an outpulse token.

RETAIN [xx]

Resource Control. Valid resource types are IPRC, DTMF receivers, MFCR2, MF receivers, and MRC. This token is used to hold on to a receiver port and is used to hold on to an IPR, DRC, MCR, and/or MRC resource following the execution of an inpulse rule. Without the RETAIN token, the rule releases all resources at the end of the rule's processing.

To indicate which resource to retain, type the data in the additional data field as IPR (for IPRC), DRC (for DTMF receivers), MCR (for MFCR2), and MRC (for MF receiver). This data must be typed in uppercase letters; it is not selectable.

This token is used in IPRC applications when a temporary prompt has been recorded and will need to be played at a later stage in the call. In some applications, multiple digit collections using the same DTMF receiver are required. Using RETAIN DRC ensures that the same DTMF receiver is kept in the call chain.

ROUTE [Tx]

Processing Control. Provides call routing based on the digits stored in the specified digit field. When this token is used, digits collected and stored in digit field "x" are matched against the patterns established in routing table "T" and routed accordingly. Route table values range from A to J. Additional

digit field values range from 1 to 5, with 1 to 4 corresponding to the numbered digit fields and 5 indicating the originating number (ANI) field. If a value of 0 is entered for "x", direct routing is performed.

Cisco recommends that a CONT NREP token be used in rules containing a ROUTE [Tx] token. The CONT NREP token continues rule processing in the event of a first digit, inter digit, or field collection timeout. This token prevents rule processing from ending before the ROUTE [Tx] token is processed.

The ROUTE [Tx] token must be the last token defined in an inpulse rule. Inpulse rule processing ceases after a routing action is performed. Any tokens after ROUTE [Tx] in an inpulse rule will not be executed.

SPEAK [xx]

Prompt/Record Control. Presents one of the library of system voice prompts stored on the Digitized Voice Card (DVC) or Integrated Prompt/Record Card (IPRC) when rule processing encounters this token. Any number of SPEAK [xx] tokens can be used in a rule. This token is most commonly used to prompt a user to enter digits or wait while a call is processed. Up to three digits can be entered in the additional data field to specify the prompt to present. For IPRCs, the valid range is 1 to 255, corresponding to each prompt in a library. Available prompts can vary depending on the version in use. When specifying a prompt number, verify that there is indeed a prompt associated with that number. No error message is generated during runtime for nonexistent prompts. Nonexistent prompts do not cause any disruption in the call. Refer to the *Cisco VCO/4K Standard Programming Reference* and the *Cisco VCO/4K Extended Programming Reference* for more information.

If an IPRC port has already been allocated to the call and does not support the specified library, the IPRC port is released and a new port is allocated. When the SPEAK token is encountered, a DVC or IPRC resource is allocated to the call from the announcement resource group. For IPRC operations, a resource that supports the specified prompt library is allocated. Multiple consecutive speak tokens are treated as one announcement. Refer also to the LIBRARY token.

Note   The DVC is no longer available. Cisco Systems does, however, continue to support this card.

STOP VOIC

Prompt/Record Control. Explicitly terminates any voice prompt operation in progress. This token is used to terminate playback or record operations. No additional input data is required for this token. One application for this token is to terminate a prompt operation when a DTMF digit is detected within the rule. (This is often referred to as barge-in.) The STOP VOIC token, in this case, is defined immediately after the tokens used to detect the digit.

TIM FDIG [xx]

Collection Setup. Applies to DTMF applications only. This token specifies the number of seconds rule processing waits for the first digit after the receiver is enabled before timing out (first digit timeout). Timing starts when the receiver is enabled. If the TIM FDIG [xx] token is not used in an inpulse rule, no first digit timing is performed. If no digits are entered, the inpulse rule waits indefinitely, or until a port disconnect or host-forced disconnect is detected. The timeout ends inpulse rule execution and releases any DRC port, but leaves all links and paths intact. The length of the timer in seconds is specified in the additional data field by a value of 1 to 30.

Note   Timers specified in seconds may vary up to ± 1/2 second in length. This variation affects the TIM FDIG token and is most pronounced in values set to 1 or 2 seconds.

TIM FIELD [xx]

Collection Setup. Applies to DTMF applications only. This token specifies the number of seconds rule processing waits for all expected digits to be received before timing out. Timing starts when the first digit is received. If this token is not used in an inpulse rule, field timing defaults to 20 seconds. Digits collected before timeout are returned to the host in an Inpulse Rule Complete or DTMF Digit report (depending on the Reporting Control token used), making this token useful for collecting a variable number of digits. The timeout ends inpulse rule execution and releases any DRC port, but leaves all links and paths intact. The length of the timer, in seconds, is specified in the additional data field by a value of 1 to 60.

Note   Timers specified in seconds may vary up to ± 1/2 second in length. This variation affects the TIM FIELD token and is most pronounced in values set to 1 or 2 seconds.

TIM INTER [xx]

Collection Setup. Applies to DTMF applications only. This token specifies the number of seconds rule processing waits for a digit after a digit is received before timing out (interdigit timeout). Timing starts when a digit is received. If this token is not used in an inpulse rule, interdigit timing defaults to 6 seconds. Digits collected before timeout are returned to the host in an Inpulse Rule Complete or DTMF Digit report. The timeout ends inpulse rule execution and releases any DRC port, but leaves all links and paths intact. The length of the timer in seconds is specified in the additional data field by a value of 1 to 10.

Note   Timers specified in seconds may vary up to ± 1/2 second in length. This variation affects the TIM INTER token and is most pronounced in values set to 1 or 2 seconds.

TONE CLR [xx]

Collection Setup. Applies to DTMF applications only. This token presents a standard system tone to the port when the DTMF receiver encounters the clear character string specified by the CLR CHAR [xx] token in this rule. Up to two digits can be entered in the additional data field to specify the tone to present. Available tones and their values are listed in Table 3-4.

TONE ENAB [xx]

Collection Setup. Presents one of the standard system tones to the port when the DTMF receiver, MF receiver, or MFCR2 transceiver in the call's resource chain is enabled. A receiver is enabled when rule processing encounters an IP ANI or IP FIELD [xx] token. This token is typically used to signal a user to begin entering digits. Up to two digits can be entered in the additional data field to specify the tone to present. Available tones and their values are listed in Table 3-4.

Note   The WINK ENAB and TONE ENAB tokens cannot be used together for the same digit collection.

TONE END [xx]

Collection Setup. Applies to DTMF applications only. This token presents a standard system tone to the port when the DTMF receiver encounters the end character string specified by the END CHAR token in this rule. Up to two digits can be entered in the additional data field to specify the tone to present. Available tones and their values are listed in Table 3-4.

TONE FDIG [xx]

Collection Setup. Applies to DTMF applications only. This token presents a standard system tone to the port when the first digit is detected by a DTMF receiver. This feature is useful for going from dial tone to quiet when the user starts dialing. Up to two digits can be entered in the additional data field to specify the tone to present. Available tones and their values are listed in Table 3-4.

TONE NOW [xx]

Supervision Control. Presents one of the standard system tones to the port when rule processing encounters this token. Up to two digits can be entered in the additional data field to specify the tone to present. Available tones and their values are listed in Table 3-4.

TONEPLAN (xx)

Digit Collection Setup. Enables specific ports to receive digits from a particular tone plan. Up to two digits can be entered in the additional data field to specify the tone plan ID. Consult the Multiple Tone Plan Configuration screen to determine the installed and configured tone plan IDs available in the VCO/4K system.

WAIT TIME [xx]

Supervision Control. Causes rule processing to pause for up to 10 seconds. This token is commonly used to allow time for the person on the phone to take some action (think time). The value (1 to 10) in the additional data field corresponds to the number of seconds to wait.

Note   Timers specified in seconds may vary up to ± 1/2 second in length. This variation affects the TIM INTER token and is most pronounced in values set to 1 or 2 seconds.

WINK ENAB

Collection Setup. Causes a wink signal to be sent to the distant end when the DTMF receiver, MF receiver, or MFCR2 transceiver in the call's resource chain is enabled. A receiver is enabled when rule processing encounters an IP ANI or IP FIELD [xx] token. Wink signals can be sent by DID, T1, MVDC T1, and E+M circuits. This token is typically used to signal a Central Office or other switch that the system is ready to accept digits. The WINK ENAB token can also be used to generate a hookflash on DID, T1, MVDC T1, E + M, and UTC circuits.

Note   The WINK ENAB and TONE ENAB tokens cannot be used together for the same digit collection.

WINK NOW

Supervision Control. Provides a wink signal on the incoming port. T1, MVDC T1, E+M and DID circuits can generate a wink. Refer to Appendix A, "Supervision Signaling,"for the wink effect on each card. This token can also be used to generate a hookflash on DID, T1, MVDC T1, E+M, and UTC circuits.

Table 3-4   Tone Values for Inpulse Rule Additional Data Fields

Tone Value	Tone	Tone Value	Tone
0	Beep	37	DTMF digit 4 (steady)
1	Quiet	38	DTMF digit 5 (steady)
2	1 kHz (TONE NOW only)	39	DTMF digit 6 (steady)
3	Dial Tone	40	DTMF digit 7 (steady)
4	380 Hz	41	DTMF digit 8 (steady)
5	440 Hz	42	DTMF digit 9 (steady)
6	480 Hz	43	DTMF digit A (steady)
7	1400 Hz	44	DTMF digit B (steady)
8	1000 Hz @ max CODEC output (TONE NOW only)	45	DTMF digit C (steady)
9	913.8 Hz SIT	46	DTMF digit D (steady)
10	404 Hz	47	DTMF digit * (steady)
11	1004 Hz	48	DTMF digit # (steady)
12	2804 Hz	49	MF digit 0 (steady)
13	Steady Ring Back	50	MF digit 1 (steady)
14	1760 Hz Payphone Trigger	51	MF digit 2 (steady)
15	Digital Test Pattern	52	MF digit 3 (steady)
16	Unused	53	MF digit 4 (steady)
17	Ringback (2 sec on/4 sec off)	54	MF digit 5 (steady)
18	Line Busy (0.5 sec on/0.5 sec off)	55	MF digit 6 (steady)
19	Reorder (0.25 sec on/0.25 sec off)	56	MF digit 7 (steady)
20	NAK tone (380 Hz 0.1 sec on/0.1 sec off)	57	MF digit 8 (steady)
21	BONG (Operator Access)	58	MF digit 9 (steady)
22 - 32	Unused	59	MF digit KP (steady)
33	DTMF digit 0 (steady)	60	MF digit ST (steady)
34	DTMF digit 1 (steady)	61	MF digit ST3P (steady)
35	DTMF digit 2 (steady)	62	MF digit STP (steady)
36	DTMF digit 3 (steady)	63	MF digit ST2P (steady)

Adding an Inpulse Rule

Complete the following steps to add an inpulse rule:

Step 1   Access the Inpulse Rules Table screen (refer to the "Accessing the Inpulse Rules Table Screen" section on page 3-39).

The cursor is located in the first token field of inpulse rule #1.

Step 2   Use the **Prev Screen**, **Next Screen**, **Tab**, <, **Prev Field**, and **Next Field** keys to advance the cursor to the first token field of the rule you want to add.

Step 3   Use the **Select** and **Rev Select** keys to scroll through the token selections until the correct token appears.

Step 4   Press the **Next Field** key.

- If the token you selected has no [xx] value, the cursor moves to the next token field and you are ready to select that token.

- If the token you selected has an [xx] value, type the digit(s) and press the **Next Field** key.

The cursor moves to the next token field and you are ready to select that token.

Step 5   Repeat Step 3 until all tokens and values for the inpulse rule are displayed on the screen, then press **Enter**.

The database is automatically updated.

Step 6   Repeat Step 3 through Step 5 for all inpulse rules you want to add.

Step 7   Press the **Exit** key to return to the Database Administration menu.

To exit the Inpulse Rules Table screen without making any changes, press **Exit**, **Prev Menu**, or **Main Menu**. No changes are made to the database unless you press **Enter**.

Adding an Inpulse Rule Token to a Rule

Complete the following steps to add a token to an existing inpulse rule:

Step 1   Access the Inpulse Rules Table screen (refer to the "Accessing the Inpulse Rules Table Screen" section on page 3-39).

The cursor is located in the first token field of inpulse rule #1.

Step 2   Use the **Prev Screen**, **Next Screen**, **Tab**, **<**, **Prev Field**, and **Next Field** keys to advance the cursor to the token field into which you want to insert the token.

Step 3   Press the **Insert** key.

All tokens including that field down move down one line, leaving the cursor in a blank field.

Step 4   Use the **Select** and **Rev Select** keys to scroll through the token selections until the correct token appears.

Step 5   Press **Next Field**.

- If the token you selected has no [xx] value, the cursor moves to the next token field and you are ready to select that token.

- If the token you selected has an [xx] value, type the digit(s).

Step 6   Repeat Step 2 through Step 5 for each token you want to add.

Step 7   Press **Enter** to automatically update the database.

Step 8   Press the **Exit** key to return to the Database Administration menu.

To exit the Inpulse Rules Table screen without making any changes, press **Exit**, **Prev Menu**, or **Main Menu**. No changes are made to the database unless you **Enter**.

Deleting an Inpulse Rule Token

Complete the following steps to delete an inpulse rule token:

Step 1   Access the Inpulse Rules Table screen (refer to the "Accessing the Inpulse Rules Table Screen" section on page 3-39).

The cursor is located in the first token field of inpulse rule #1.

Step 2   Use the **Prev Screen**, **Next Screen**, **Tab**, **<**, **Prev Field**, and **Next Field** keys to advance the cursor to the token field you want to delete.

Step 3   Use the **Select** and **Rev Select** keys to scroll through the token selections until a blank line appears. To delete more than one token in a rule, advance to that token and change it to a blank line.

Step 4   Press **Enter**.

The database is automatically updated and the screen display is updated to show the deletion of the token(s).

Step 5   Repeat Step 2 through Step 4 for each rule from which you want to delete one or more tokens.

Step 6   Press the **Exit** key to return to the Database Administration menu.

To exit the Inpulse Rules Table screen without making any changes, press **Exit**, **Prev Menu**, or **Main Menu**. No changes are made to the database unless you press **Enter**.

Deleting an Inpulse Rule

Complete the following steps to delete an inpulse rule:

Step 1   Access the Inpulse Rules Table screen (refer to the "Accessing the Inpulse Rules Table Screen" section on page 3-39).

The cursor is located in the first token field of inpulse rule #1.

Step 2   Use the **Prev Screen**, **Next Screen**, **Tab**, **<**, **Prev Field**, and **Next Field** keys to advance the cursor to the first token field of the rule you want to delete.

Step 3   Use the **Select** and **Rev Select** keys to scroll through the token selections until a blank line appears.

Step 4   Press the **Next Field** key.

The cursor advances to the next token field in the rule.

Step 5   Repeat Step 3 and Step 4 until all fields in the rule are blank, then press **Enter**.

The database is automatically updated.

Step 6   Repeat Step 2 through Step 5 for each rule you want to delete.

Step 7   Press the **Exit** key to return to the Database Administration menu.

To exit the Inpulse Rules Table screen without making any changes, press the **Exit**, **Prev Menu**, or **Main Menu** key. No changes are made to the database unless you press **Enter**.

Outpulse Rules Table

Use the Outpulse Rules Table screens to define outpulse rules for call processing. An outpulse rule is a list of instructions defined by an application designer or administrator, and defines the signaling protocol used on outgoing calls. You can define up to 16 instructions, in the form of tokens, for a single rule. These instructions can be used to condition a line or trunk to send supervision events or outpulse MF/DTMF digits. Outpulse rule processing ends when a blank line is encountered. When outpulse rules contain a Processing Control token (GOTO RULE [xx] or DO RULE [xx]), they can be used to create outpulse rules with more than 16 steps. You can define up to 30 outpulse rules in standard operational mode, or 255 in extended mode.

Outpulse rules can also access inpulse rules to perform functions such as digit collection, prompt playing, winks, and hookflashes. Outpulse rule recommendations and examples are contained in the *Cisco VCO/4K Standard Programming Reference* and the *Cisco VCO/4K Extended Programming Reference*.

Note   Although digit fields are capable of storing up to 40 digits, the maximum digit string that can be outpulsed from a single field is 26. If a field larger than 26 digits is specified to be outpulsed, it is automatically truncated; only the first 26 digits are outpulsed.

Accessing the Outpulse Rules Table Screen

Complete the following steps to access the Outpulse Rules Table screen:

Step 1   From the Administrator Main Menu screen, type **A** and press **Enter**.

Step 2   The Database Administration Menu screen appears.

Step 3   Type **D** and press **Enter**.

The Outpulse Rules Table screen appears (see Figure 3-15). The cursor is located in the first token field of outpulse rule #1.

Figure 3-15   Outpulse Rules Table Screen

```
                  O U T P U L S E    R U L E S    T A B L E
                                                        Start Rule # 1
      RULE # 1          RULE # 2         RULE # 3         RULE # 4          RULE # 5

   SEIZE            SEIZE            _____ ___    _____ ___     _____ ___
   OP MF            OP TONE          _____ ___    _____ ___     _____ ___
   WAIT WINK        OP DIGIT  8      _____ ___    _____ ___     _____ ___
   OP DIGIT  KP     _____ ___    _____ ___    _____ ___     _____ ___
   OP ANI           _____ ___    _____ ___    _____ ___     _____ ___
   OP DIGIT  ST     _____ ___    _____ ___    _____ ___     _____ ___
   _____ ___    _____ ___    _____ ___    _____ ___     _____ ___
   _____ ___    _____ ___    _____ ___    _____ ___     _____ ___
   _____ ___    _____ ___    _____ ___    _____ ___     _____ ___
   _____ ___    _____ ___    _____ ___    _____ ___     _____ ___
   _____ ___    _____ ___    _____ ___    _____ ___     _____ ___
   _____ ___    _____ ___    _____ ___    _____ ___     _____ ___
   _____ ___    _____ ___    _____ ___    _____ ___     _____ ___
   _____ ___    _____ ___    _____ ___    _____ ___     _____ ___
   _____ ___    _____ ___    _____ ___    _____ ___     _____ ___
   _____ ___    _____ ___    _____ ___    _____ ___     _____ ___
```

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The Outpulse Rules Table consists of multiple screens, each containing five outpulse rule columns. Use the **Prev Screen** and **Next Screen** keys to page through the screens. Use the **Tab** and **<** keys to move between outpulse rules. Use the **Print Screen** key to obtain a hard copy of any of these screens.

Outpulse Rules Table Screen Field Definitions

The Outpulse Rules Table screen contains the following types of fields:

Start Rule #—*Data entry via main keypad*. Type the outpulse rule number you want to make accessible on the screen. Valid values are from 1 to 30 in standard operational mode, or 1 to 255 in extended mode. To access this field, press Prev Field while the cursor is located at the RULE # field.

RULE #—*Display only*. Identifies the outpulse rule displayed. Valid outpulse rule numbers are 1 to 30 in standard operational mode, or 1 to 255 in extended mode.

Data Entry Fields—*Data entry via Select key and main keypad*. Sixteen "lines" are displayed under each RULE # heading; each of these lines contains two data entry fields. The first field is the token field, the second the additional data field. Not all tokens require additional data. In the token descriptions that follow, the notation [xx] indicates that additional data entry is required.

Outpulse Rule Token Definitions

Tokens are the unique instructions that, when combined, make up an outpulse rule. Each token takes advantage of a function within the system such as reporting control, signaling mode, processing control, etc.

The following list defines the functions designated for each token:

- Reporting Control—Notifies the host of supervision events detected on an incoming or outgoing port.

Reporting for individual signaling events specified by the WAIT SUP token is controlled by an intermediate answer supervision template, if preceded by an ANS SUP [xx] token.

Reporting for individual signaling events specified by FINAL SUP is controlled by either a final answer supervision template, if preceded by an ANS SUP [xx] token.

- Signaling Mode—Determines the type of outpulse signaling required; DTMF, MF, or TONE mode with OP DIGIT.

- Supervision Control—Conditions the port to detect and respond to answer supervision events before continuing with rule processing. Indicates which configurable answer supervision templates or preconfigured template to use for supervision. Can cause an outward seizure on an outgoing trunk.

- Digit Field—Determines when and what digits or tones are outpulsed.

- Processing Control—Allows you to construct rules with more than 16 tokens and inpulse rule execution.

Use the **Select** and **Rev Select** keys to display the tokens in the Outpulse Rules Table. Type any additional data required to complete a token.

The following pages define each token. The tokens are listed in alphabetical order rather than the order in which they are arranged on the screen.

Note   Non-ISDN ports use answer (in-band) supervision, while ISDN ports use ISDN (D-channel) signaling. Supervision processing is invoked through outpulse rule tokens. Tokens invoke either answer or ISDN supervision on a port. However, the FINAL SUP and WAIT SUP tokens provide concurrent answer and ISDN supervision.

ANS SUP [xx]

Supervision Control. Functions as a setup token for a subsequent WAIT SUP or FINAL SUP token. When the system encounters this token, call processing stores the number of the answer supervision template for later processing. The additional data entry field specifies the supervision template. The value for the additional data entry field can be a number from 1 to 24, the letter A (answer), or the letter W (wink).

DO IRULE [xx]

Processing Control. Instructs the system to perform processing for the inpulse rule specified, then return to this rule. In an outpulse rule, it allows inpulse rule processing functions such as digit collection and the presentation of voice prompts during an outpulse rule. This token works in much the same way as a subroutine call within a program. When rule processing encounters this token, processing continues with the first token of the inpulse rule specified in the additional data field. At the end of the specified rule, processing continues with the token following the DO IRULE [xx] token in the original rule. The "subroutine" rule must not call another rule containing a GOTO RULE [xx], DO IRULE [xx], or DO ORULE [xx] token. If it does, the call is processed as if the original DO IRULE token were a GOTO RULE.

DO ORULE [xx]

Processing Control. Instructs the system to perform processing for the outpulse rule specified, then return to this rule. It allows the construction of outpulse rules with more than 16 tokens. This token works in much the same way as a subroutine call within a program. When rule processing encounters this token, it continues processing with the first token of the outpulse rule specified in the additional data field. At the end of the specified rule, processing continues with the token following the DO ORULE

[xx] token in the original rule. The "subroutine" rule must not call another rule containing a GOTO RULE [xx], DO IRULE [xx], or DO ORULE [xx] token. If it does, the call is processed as if the original DO ORULE token were a GOTO RULE.

FINAL SUP

Supervision Control. Defines final answer supervision at the end of the rule processing. This token functions as setup tokens and can be defined anywhere within a rule. Once outpulse rule processing ends, final supervision processing begins for the template(s) specified by the preceding ANS SUP [xx] token. Final supervision processing continues until a supervision event is detected that ends template processing. Resources attached to the call, such as receivers, are released once outpulse rule processing ends. However, if an accompanying ANS SUP [xx] template requires call progress tone detection, a CPA port remains allocated to the call.

GOTO RULE [xx]

Processing Control. Allows the construction of rules with more than 16 tokens. When rule processing encounters a GOTO RULE [xx] token, it continues processing with the first token of the rule specified in the additional data field. Rule processing does not return to the original rule unless directed by a subsequent GOTO RULE [xx] token. Use this token to create an endless loop by specifying the original rule number in the additional data field. The looping rule must specify one of the following tokens: WAIT SUP, FINAL SUP, WAIT TIME [xx], OP DIGIT [xx], OP ANI, or OP FIELD [xx].

This feature should be used with caution. Valid values in the additional data field are from 1 to 30 in 2K mode or 1 to 255 in 4K mode, and corresponds to the rule number with which processing continues.

NO HOST [xx]

Processing Control. Executes a specified inpulse rule following the expiration of the host setup timer. If no host command is received in that time, the system executes the inpulse rule indicated in the NO HOST [xx] token data field (rule #1 to 30 in 2K mode or 1 to 255 in 4K mode).

OP ANI

Digit Field. In DTMF and MF processing, OP ANI outpulses the string stored in the originating number field of the system call record. Digits are sent in the outpulsing mode currently in force. The digit string was placed in this field with an Outgoing Port Control command, an Incoming Port Control command, or an IP ANI [xx] token in an inpulse rule.

In MFCR2 processing, OP ANI outpulses the A-Number (Calling Party Number), which is stored in the originating number field of the system call record. The host can populate the ANI field with an Outgoing Port Control command, or the field can be populated by a previous collection. End-of-digits tones (I-15) are appended to the digit string by the system if required.

> **Note**   MFCR2 digits stored as "0"s are automatically converted to I-10 digits by the system during outpulsing. End-of-digits tones (I-15) are appended to the digit string by the system if required.

OP CAT [xx]

Digit Field. Used in MFCR2 processing to outpulse the Calling Party Category. The additional data field indicates the Calling Party Category, which applies to all signaling in the outpulse rule. Valid values for the data fields are 0 to 13 and 15. OP CAT should precede OP ANI and OP FIELD tokens in a rule.

> **Note** The Calling Party Category cannot be modified using an Outgoing Port Control ($69) command. Users must select another outpulse rule to specify a different calling party service class.

OP CAT2

Digit Field. Used in MFCR2 processing to outpulse any category. Use the OP CAT2 token to outpulse different category digits from within a $69 command. Specify a single category digit in field 6 of the $69 command. When the system encounters the OP CAT2 token during outpulse rule processing, the generic software extracts the category digit from field 6 for outpulsing.

OP DIGIT [xx]

Digit Field. Outpulses a specific digit; only one digit can be specified with this token. Digits are sent in the outpulsing mode currently in force. The digit to be sent is specified in the additional data field. In DTMF signaling mode, valid digits are 0 to 9, *, #. When the Enable 4th Column DTMF feature flag is set to **Y**, valid digits are 0 to 9, *, #, and A to F. (The characters * and E are interchangeable, as are # and F.) In MF signaling mode, valid digits are 0 to 9, KP, ST, S1 (STP), S2 (ST2P), and S3 (ST3P). In tone signaling mode, the valid digits are 0 to 8 and correspond to the tones listed in Table 3-5.

OP DTMF

Signaling Mode. Sets the outpulse mode to DTMF. The system sends DTMF digits until it encounters an OP MF or OP TONE token, or until the end of the rule. If you do not specify the signaling mode in a rule, all outpulsing defaults to DTMF.

OP FIELD [xx]

Digit Field. In DTMF and MF processing, OP FIELD [xx] outpulses the digit string stored in one of the call record fields. Digits are sent in the outpulsing mode currently in force. The value (1 to 4) in the additional data field corresponds to the field in which the digits are stored. The digit string was placed in this field with an Outgoing Port Control command, an Incoming Port Control command, or an IP FIELD [xx] token in an inpulse rule.

> **Note** Execution of the OP FIELD token initiates the MFCR2 outdialing process. The calling party category and A-Number should be populated prior to executing this token if these fields are required by the MFCR2 transaction dialog.

In MFCR2 processing, OP FIELD outpulses the B-Number (called party), which is stored in the digit field specified. Valid values for the digit field are 1 to 4. The host can populate the field with an Outgoing Port Control command, or the field can be populated by a previous collection. End-of-digits tones (I-15) are appended to the digit string by the system if required.

> **Note** MFCR2 digits stored as "0" are automatically converted to I-10 digits by the system during outpulsing. End-of-digits tones (I-15) are appended to the digit string by the system if required.

OP MF

Signaling Mode. Sets the outpulse mode to MF. The system sends MF digits until it encounters an OP DTMF or OP TONE token, or until the end of the rule. MF digit strings must contain KP and ST start and end designators. If you do not specify the signaling mode, the output mode defaults to DTMF.

OP MFCR2

Signaling Mode. Sets the outpulse mode to MFCR2 and allocates an MFCR2 transceiver to the call chain. The outpulse mode remains in MFCR2 until the system encounters an OP DTMF, OP TONE, or OP MF token, or until the end of the rule. If you do not specify the signaling mode in a rule, all outpulsing defaults to DTMF.

OP PULSE

Signaling Mode. Sets the outpulse mode to dial pulse. Dial pulse digits can be sent from Earth Connect Trunk (ECT) and Loop Connect Trunk (LCT) ports. Digits are outpulsed in dial pulse mode until the system encounters an OP DTMF or OP TONE token, or until the end of the rule.

OP TONE

Signaling Mode. Sets outpulsing with in-band tones corresponding to OP DIGITs from 0 to 8. Tones are presented for 60 ms. Refer to Table 3-5 for valid digits and their corresponding tones. Tone mode sending can be used to alert an attendant that a particular call type is being attached. If you do not specify the signaling mode in a rule, all outpulsing defaults to DTMF.

Table 3-5   OP DIGIT Values for OP TONE Mode

Tone	Value
Quiet Tone	0
Dial Tone	1
Ring Back Tone	2
Busy Tone	3
380 Hz Tone	4
440 Hz Tone	5
480 Hz Tone	6
1400 Hz Tone	7
913.8 Hz SIT	8

RELEASE [xx]

Resource Control. Valid resource types are IPR, MRC, DRC, DTG, and CPA. The RELEASE token removes the specified resource type from the call. Token processing releases the specified resource immediately if one exists in the call chain. The RELEASE token works with the RETAIN token as it frees up resources normally retained until the end of the rule processing.

REP END

Reporting Control. Indicates when outpulse rule processing completes. Individual supervision events are reported to the host via Incoming Port Change of State ($DB) and Outgoing Port Change of State ($DA) reports, based on the answer supervision template condition tokens.

REP NEXT

Reporting Control. Used in an outpulse rule for MFCR2 processing only. This token causes the final backward supervision to be reported to the host in the Outgoing Port Change of State ($DA) report. The report is generated immediately after the detection of a final backward supervision event. If REP NEXT precedes an OP MFCR2 token in a rule, the detection of a Group-B, A-4, A-6 tone aborts the rule and generates a $DA report to the host that indicates the final backward supervision event was received.

RETAIN [xx]

Resource Control. Used to hold on to an IPRC or DRC resource following the execution of an outpulse rule. Without the RETAIN token, the rule releases all resources at the end of the rule's processing.

To indicate which resource to retain, the data must be IPR (for IPRC) or DRC (for DTMF). This data must be typed in; it is not selectable. Use either RETAIN IPR or RETAIN DRC.

SEIZE

Supervision Control. Performs an outward seizure on an outgoing trunk. Seizure is not performed during outpulse rule processing unless a SEIZE token is specified in a rule. A SEIZE token should precede any supervision tokens in an outpulse rule when an outward seizure is required. If the outgoing port is already seized, the token is ignored. Additional SEIZE tokens are ignored after the initial seizure. Seize effects for each card type are defined in Appendix A, "Supervision Signaling."

TIME SUP [xx]

Supervision Control. Works in conjunction with WAIT SUP and FINAL SUP tokens to perform grace or supervision timing. This token should immediately precede a WAIT SUP or FINAL SUP token in an outpulse rule. The additional data entry field of the TIME SUP [xx] token specifies the timer's duration in seconds (1 to 60). The system response to the timer's expiration is indicated by the answer supervision template identified by the accompanying ANS SUP [xx] token. If the timer expires during template processing, the system performs the action specified by the condition token in the template's TIME event field.

TONEPLAN (xx)

Digit Field. Enables specific ports to send digits associated with a particular tone plan. Up to two digits can be entered in the additional data field to specify the tone plan ID. Consult the Multiple Tone Plan Configuration screen to determine the installed and configured tone plan IDs available in the VCO/4K system.

WAIT SUP

Supervision Control. Defines intermediate answer supervision during outpulse rule processing. When this token is executed, outpulse rule processing pauses while answer supervision template processing begins for the template(s) specified by the preceding ANS SUP [xx] token. If the system detects a

supervision event that successfully ends template processing, the WAIT SUP token is satisfied and outpulse rule processing resumes. If a supervision event is detected that indicates a supervision error or call failure, rule processing is aborted.

WAIT TIME [xx]

Supervision Control. Causes rule processing to pause for up to 2.5 seconds. The value in the additional data field corresponds to the number of 250 ms intervals to wait; the valid range is 1 (250 ms) to 10 (2.5 seconds).

Note   Software options, such as TeleRouter and ISDN PRI, may have additional outpulse rule tokens to support the special functions of those options. Outpulse rule tokens associated with software options are described in the documentation that accompanies the software.

Adding an Outpulse Rule

Complete the following steps to add an outpulse rule:

Step 1   Display the Outpulse Rules Table screen (refer to the "Accessing the Outpulse Rules Table Screen" section on page 3-55).

The cursor is located in the first token field of outpulse rule #1.

Step 2   Use the **Prev Screen**, **Next Screen**, **Tab**, **<**, **Prev Field**, and **Next Field** keys to advance the cursor to the first token field of the rule you want to add.

Step 3   Use the **Select** and **Rev Select** keys to scroll through the token selections until the correct token appears.

Step 4   Press the **Next Field** key.

- If the token you selected has no [xx] value, the cursor moves to the next token field and you are ready to select that token.

- If the token you selected has an [xx] value, type the digit(s) and press the **Next Field** key.

The cursor moves to the next token field and you are ready to select that token.

Step 5   Repeat Step 3 and Step 4 until all tokens and values for the outpulse rule are displayed on the screen, then press **Enter**.

The database is automatically updated.

Step 6   Repeat Step 2 through Step 5 for all outpulse rules you want to add.

Step 7   Press the **Exit** key to return to the Database Administration menu.

To exit the Outpulse Rules Table screen without making any changes, press the **Exit**, **Prev Menu**, or **Main Menu** key. No changes are made to the database unless you press **Enter**.

Adding an Outpulse Token to a Rule

Complete the following steps to add a token to an existing outpulse rule:

Step 1   Display the Outpulse Rules Table screen (refer to the "Accessing the Outpulse Rules Table Screen" section on page 3-55).

The cursor is located in the first token field of outpulse rule #1.

Step 2   Use the **Prev Screen**, **Next Screen**, **Tab**, **<**, **Prev Field**, and **Next Field** keys to advance the cursor to the token field into which you want to insert the token.

Step 3   Press the **Insert** key.

All tokens including that field down move down one line, leaving the cursor in a blank field.

Step 4   Use the **Select** and **Rev Select** keys to scroll through the token selections until the correct token appears.

Step 5   Press the **Next Field** key.

- If the token you selected has no [xx] value, the cursor moves to the next token field and you are ready to select that token.

- If the token you selected has an [xx] value, type the digit(s).

Step 6   Repeat Step 2 through Step 5 for each token you want to add.

Step 7   Press **Enter** to automatically update the database.

Step 8   Press the **Exit** key to return to the Database Administration menu.

To exit the Outpulse Rules Table screen without making any changes, press **Exit**, **Prev Menu**, or **Main Menu**. No changes are made to the database unless you press **Enter**.

Deleting an Outpulse Rule Token

Complete the following steps to delete an outpulse rule token:

Step 1   Display the Outpulse Rules Table screen (refer to the "Accessing the Outpulse Rules Table Screen" section on page 3-55).

The cursor is located in the first token field of outpulse rule #1.

Step 2   Use the **Prev Screen**, **Next Screen**, **Tab**, **<**, **Prev Field**, and **Next Field** keys to advance the cursor to the token field you want to delete.

Step 3   Use the **Select** and **Rev Select** keys to step through the token selections until a blank line appears. To delete more than one token in a rule, advance to that token and change it to a blank line.

Step 4   Press **Enter**.

The database is automatically updated and the screen display is updated to show the deletion of the token(s).

Step 5   Repeat Step 2 through Step 4 for each rule from which you want to delete one or more tokens.

Step 6   Press the **Exit** key to return to the Database Administration menu.

To exit the Outpulse Rules Table screen without making any changes, press the **Exit**, **Prev Menu**, or **Main Menu** key. No changes are made to the database unless you press **Enter**.

Deleting a Outpulse Rule

Complete the following steps to delete an outpulse rule:

Step 1   Display the Outpulse Rules Table screen (refer to the "Accessing the Outpulse Rules Table Screen" section on page 3-55).

The cursor is located in the first token field of outpulse rule #1.

Step 2   Use the **Prev Screen**, **Next Screen**, **Tab**, **<**, **Prev Field**, and **Next Field** keys to advance the cursor to the first token field of the rule you want to delete.

Step 3   Use the **Select** and **Rev Select** keys to scroll through the token selections until a blank line appears.

Step 4   Press the **Next Field** key.

The cursor advances to the next token field in the rule.

Step 5   Repeat Step 3 and Step 4 until all fields in the rule are blank, and press **Enter**.

The database is automatically updated.

Step 6   Repeat Step 2 through Step 5 for each rule you want to delete.

Step 7   Press the **Exit** key to return to the Database Administration menu.

To exit the Outpulse Rules Table screen without making any changes, press **Exit**, **Prev Menu**, or **Main Menu**. No changes are made to the database unless you press **Enter**.

Print Database Summary

Use the Print Database Summary option of the Database Administration Menu screen to obtain a hard copy of the information displayed on the following system administration screens:

- Card Summary
- Resource Group Summary
- Inpulse Rules
- Outpulse Rules
- BRC Configuration Summary
- Answer Supervision Template

Complete the following steps to print the screen displays:

Step 1   Verify that the system printer is on line and ready to print.

Step 2   Access the Administrator Main Menu screen.

Step 3   Type **A** and press **Enter**.

The Database Administration Menu screen appears.

Step 4   Type **E** and press **Enter**.

The system displays each screen on the master console as it is printed. A "Reading Next Format" message appears at the bottom of the screen after each screen is displayed. When the system is finished printing, a "Print Operation Complete" message appears.

Step 5   To abort printing, press the **Stop Print** key.

Print Database Detail

Use the Print Database Detail option of the Database Administration Menu screen to obtain a hard copy of all information seen on all Database Administration screens. Complete the following steps to print the screen displays:

Step 1   Verify that the system printer is on line and ready to print

Step 2   Access the Administrator Main Menu screen.

Step 3   Type **A** and press **Enter**.

The Database Administration Menu screen appears.

Step 4   Type **F** and press **Enter**.

The system displays each screen on the master console as it is printed. A "Reading Next Format" message appears at the bottom of the screen after each screen is displayed. When the system is finished printing, a "Print Operation Complete" message appears.

Step 5   To abort printing, press the **Stop Print** key.

BRC Configuration Summary

Use BRC Configuration Summary to maintain a software list of BRC hardware connections. When the system is equipped with redundant BRCs, this list also shows which BRC pair is active and which is standby. Make sure all BRCs are entered into the database before you configure them from this screen. A BRC is identified by its Rack-Level-Slot hardware address. For information about entering cards into the database using the Card Maintenance utility, refer to Chapter 4, "System Configuration."

A BRC pair consists of a Master BRC (MBRC) and a Slave BRC (SBRC). The MBRC must reside in the master port subrack. The SBRC for the pair resides in either slot 1 or slot 2 of an expansion port subrack. The system uses this BRC pair to extend the communications bus from the master port subrack to the expansion port subrack. A BRC pair is required for each expansion port subrack in the system. BRC redundancy requires two pairs for each subrack.

The MBRC and SBRC are physically connected by a cable (refer to the *Cisco VCO/4K Hardware Installation Guide*) and logically connected (in the software) through the BRC Configuration Summary screen. Both the physical and logical connections must be made for communication to be established to an expansion port subrack; if not, the cards in that subrack cannot come into service.

Consider the following when configuring BRCs:

- The DIP switch on the BRC must be set for MBRC or SBRC, depending on which BRC is the master and which is the slave. The DIP switch positions are "M" for open and "S" for closed.

- MBRC: 1 through 10 set to "M" position.

- SBRC: 1 through 9 set to "S" position; setting 10 set to "M" position.

- MBRCs must have a Rack/Cabinet, Level value of 1,1.

- SBRCs must reside in Slot 1 or Slot 2 of an expansion port subrack. They cannot have a Rack/Cabinet, Level value of 1,1.

- The system does not verify that the hardware connection between BRCs is consistent with the information about the BRC Configuration summary screen.

- If one of the BRCs specified is already configured as part of another BRC pair, it is reconfigured to match the newly entered data. The unpaired BRC appears on the screen until it is removed from the database. Go to the Card Maintenance function to remove the BRC from the database.

- In the case of redundant BRCs, the first BRC pair that becomes available for service at boot up is selected as the active pair for a subrack.

Accessing the BRC Configuration Summary Screen

Complete the following steps to access the BRC Configuration Summary screen:

Step 1 Access the Administrator Main Menu screen.

Step 2 Type **A** and press **Enter**.

The Database Administration Menu screen appears.

Step 3 Type **G** and press **Enter**.

The BRC Configuration Summary screen appears (see Figure 3-16). The cursor is located in the first hardware address data entry field.

Figure 3-16 BRC Configuration Summary

```
             B R C   C O N F I G U R A T I O N   S U M M A R Y

Master       Current Status  Slave    Current Status    Redundant
BRC                          BRC                         Master BRC

1 1 5        Active          1 2 1    Active             1 1 6
1 1 6        Standby         1 2 2    Standby            1 1 5
1 1 7        Active          2 1 1    Active             1 1 8
1 1 8        Standby         2 1 2    Standby            1 1 7




             Connect BRC at: _ _ __ to BRC at: _ _ __
```

Use the BRC Configuration Summary screen to list up to 12 BRC pairs (full system configuration with redundant BRCs), which are ordered according to the location of the MBRC within the system. Use the **Print Screen** key to obtain a hard copy of this screen.

BRC Configuration Summary Screen Field Definitions

The BRC Configuration Summary screen contains the following fields:

Master BRC—*Display only.* The Rack-Level-Slot hardware address (physical location) of the MBRC. Master BRCs can reside in any slot in the master port subrack (Rack/Cabinet 1, Level 1) and do not have to be in any set order. Change this field by entering the data in the Connect BRC data entry fields.

Current Status—*Display only.* Displays the current status of the Master BRC. Valid values and their meanings are:

- **Active**—BRC/pair is currently in use for communication between master and expansion port subrack.

- **Out of Service**—Either MBRC or SBRC is not currently available for use; may be physically installed and out of service, or not installed.

- **Standby**—BRC/pair is available but not currently in use; either redundant pair or single BRC of the pair.

Slave BRC—*Display only.* The Rack-Level-Slot hardware address (physical location) of the SBRC. Change this field by entering the data in the Connect BRC data entry fields.

Current Status—*Display only.* Displays the current status of the Slave BRC. Valid values are their meanings are:

Active—BRC/pair is currently in use for communication between master and expansion port subrack.

Out of Service—Either MBRC or SBRC is not currently available for use; may be physically installed and out of service, or not installed.

Standby—BRC/pair is available but not currently in use; either redundant pair or single BRC of the pair.

Redundant Master BRC—*Display only.* For systems with redundant BRCs, the Rack-Level-Slot hardware address (physical location) of the MBRC associated with the same expansion port subrack as the Master BRC indicated by the first field on this line. If no redundant BRC exists, this field is blank. The status of the redundant Master BRC can be determined by its hardware address and current status in the Master BRC and Current Status fields. Change this field by entering the data in the Connect BRC data entry fields.

Connect BRC—*Data entry via main keypad.* Enter the R-L-S hardware address of the MBRC and SBRC that are physically connected. Cards can be entered in any order.

Configuring BRC Pairs

Complete the following steps to enter the BRC configuration into the system database:

Step 1 Access the BRC Configuration Summary screen (refer to the "Accessing the BRC Configuration Summary Screen" section on page 3-66.

The cursor is located in the Connect BRC at: field.

Step 2 Type the hardware address of the first BRC:

a. Type the Rack number and press the **Next Field** key.

The cursor moves to the Level field.

b. Type the Level number and press the **Next Field** key.

The cursor moves to the Slot field.

c. Type the Slot number and press the **Next Field** key.

The cursor moves to the Rack field for the second BRC.

d. Type the Rack/Cabinet number for the second BRC and press the **Next Field** key.

The cursor moves to the Level field for the second BRC.

e. Type the Level number of the second BRC and press the **Next Field** key.

The cursor moves to the Slot field for the second BRC.

f. Type the Slot number of the second BRCand press **Enter**.

When you press **Enter**, the system verifies that the addresses you specified are contained in the database as BRCs and the pair consists of an MBRC and an SBRC. If these conditions are met, the screen display is updated to show the new BRC pair. The Current Status and Redundant Master BRC fields are updated according to the conditions described earlier in this subsection. The cursor returns to the Connect BRC at: field.

Step 3   Repeat Step 2 for each BRC pair you want to configure.

Step 4   Press the **Exit** key to return to the Database Administration menu.

To exit the BRC Configuration Summary screen without making any changes, press **Exit** or **Prev Menu**. No changes are made to the database unless you press **Enter**.

Answer Supervision Template

Use the Answer Supervision Template screens to configure answer supervision templates for use with WAIT SUP and FINAL SUP outpulse rule tokens. Each template is a set of system responses to the detection of specific signaling events. Signaling events include detection of call progress tones such as dial tone, ringback, busy tone, reorder, and special information (SIT) tones. Other recognized signaling events are voice detection, voice cessation, wink, true answer, grace timing, pager cue tones, and hookflash.

Eight condition tokens specify individual system responses (and combinations of responses) to a signaling event, such as report generation and using the detection of the event as an indicator of error conditions and failed calls. These condition tokens are defined for each signaling event; events are disregarded when no token is defined for the event.

In addition to the 24 configurable templates, there are three preconfigured templates for WAIT SUP W, WAIT SUP A and FINAL SUP A outpulse rule tokens. These templates are used for detecting wink, intermediate answer and final answer. No CPA card is required to process these tokens.

When CPA cards are installed in the system, answer supervision templates must be downloaded to each card. Changes to templates are put into effect immediately and are downloaded to all CPA cards. Place the CPA cards in Maintenance mode until the download is complete. Any CPA ports involved in active calls during the download are not affected. All template changes should be made before you press Enter to limit the time the CPAs are out of service due to downloading. Multiple downloads interfere with CPA port allocation.

Accessing the Answer Supervision Template Screen

Complete the following steps to access the Answer Supervision Template screen:

Step 1   Access the Administrator Main Menu screen.

Step 2   Type **A** and press **Enter**.

The Database Administration Menu screen appears.

Step 3   Type **H** and press **Enter**.

The Answer Supervision Template screen appears (see Figure 3-17). The cursor is located in the Dial Tone token field of Template 1.

Figure 3-17 Answer Supervision Template Screen

```
          A N S W E R   S U P E R V I S I O N   T E M P L A T E S

                1       2       3       4       5       6       7       8
             --------------------------------------------------------------
Dial Tone    OK      _____  FAIL    _____  _____  _____  _____  _____
Ringback     _____  _____  FAIL    REP     _____  _____  _____  _____
Busy         FAIL    REP     FAIL    _____  _____  _____  _____  _____
Reorder      FAIL    FAIL    FAIL    ERROR   _____  _____  _____  _____
SIT Tones    FAIL    FAIL    OKREP   FAIL    _____  _____  _____  _____
Ring Cess.   _____  ANSREP  FAIL    ANSREP  _____  _____  _____  _____
Voice Det.   _____  _____  _____  _____  _____  _____  _____  _____
Voice Cess.  _____  ANSREP  FAIL    ANSREP  _____  _____  _____  _____
Wink         ERROR   ERROR   ERROR   ERROR   _____  _____  _____  _____
Answer       ERROR   ERROR   ERROR   ANSREP  _____  _____  _____  _____
Time         _____  FAIL    ERROR   FAIL    _____  _____  _____  _____
Hook Flash   _____  _____  _____  _____  _____  _____  _____  _____
Paper Cue    _____  _____  _____  _____  _____  _____  _____  _____
ISUP Tone    _____  _____  _____  _____  _____  _____  _____  _____
ISUP Cess.   _____  _____  _____  _____  _____  _____  _____  _____
```

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The Answer Supervision Templates display consists of three screens, each containing eight template columns. Use the **Prev Screen** and **Next Screen** keys to page through the screens. Use the **Tab** and **<** keys to move between templates. Use the **Print Screen** key to obtain a hard copy of any of these screens.

Answer Supervision Template Screen Field Definitions

The Answer Supervision Templates screen contains the following types of fields:

Template #—*Display only*. Displays the specific template configuration for use with WAIT SUP and FINAL SUP outpulse rule tokens. Valid numbers are 1 to 24.

Data Entry Fields—*Data entry via Select key*. Specify the signaling events to be detected, and consequent actions taken when each event is detected, including host reporting, incoming port answerback, and indicating error conditions. Each event and the hardware required to detect it is described below:

Dial Tone—Signal indicating the connected equipment is ready to receive digits. Combined 350 Hz and 440 Hz steady tone; event reported after approximately 0.75 seconds (requires CPA).

Ringback—Signal indicating a connection is established to the called equipment (although the call is not completed until answer supervision is received). Audible ringback is a combination of 440 Hz and 480 Hz with a cadence of 2 seconds on/4 seconds off. Ringback, including nonprecise or "dirty" ringback, is reported after two cycles (requires CPA).

Busy—Signal indicating the called equipment is in use. Combined 480 Hz and 620 Hz tone with a 0.5 seconds on/0.5 seconds off cadence; event reported after two (precise) or three (nonprecise) cycles of this pattern (requires CPA).

Reorder—Signal indicating an error condition (all circuits busy, invalid destination, Permanent Signal Condition, etc.). Combined 480 Hz and 620 Hz tone with a 0.25 seconds on/0.25 seconds off cadence; event reported after two (precise) or three (nonprecise) cycles of this pattern (requires CPA).

SIT Tones—Signals providing additional information (special information tones). Signal frequencies and cadences depend on system applications. Standard tones are used for invalid dialed numbers and changed numbers. All SIT tones are treated the same; different SIT tone types are not distinguished (requires CPA).

Ring Cess.—Silence detected immediately after presence of ringback is established. Event reported after 3 to 6.5 seconds of silence once ringback is detected (requires CPA).

Voice Det.—Signal within the range of human speech. Signal must be within 200 Hz to 3400 Hz. Event reported after 0.25 to 0.50 seconds (requires CPA).

Voice Cess.—Silence detected immediately after presence of voice is established. Event reported after 0.5 to 1 seconds of silence once voice is detected (requires CPA).

Wink—Signal indicating the distant end is ready to receive outpulsed address digits from the originating central office. Signal is a brief off-hook/on-hook on an unanswered circuit (detected on T1, MVDC T1, E+M and UTC ports only).

Answer—True answer supervision received from the distant end. Answer supervision varies based on link/trunk type (detected on all line/trunk types except for DID and Loop Start UTC).

Time—Expiration of a timer on a port waiting for supervision. When an ANSBK or ANSREP token is specified, the timeout functions as a grace timer. When an ERROR or FAIL token is specified, the timeout indicates a supervision error or a call failure, respectively. Timer is started when template processing begins and ends when an event that satisfies the template is detected. The timers duration is specified in a preceding TIME SUP [xx] outpulse rule token. If no token is specified, timing is not performed (supported for all line/trunk types).

Hook Flash—Signal indicating a change in the status of the call (depending on application). Signal is a brief on-hook/off-hook (detected by SLIC and E+M only).

Pager Cue—Signal presented by pager terminal equipment requesting the callback number (the callback number is then transmitted to the paged party). Signal is nominally a three to four 1400 Hz tone burst at 100–125 ms intervals (requires CPA).

ISUP Tone—Signal that indicates the detection of an ISDN user part continuity test tone.

ISUP Cess.—Silence detected immediately after presence of an ISDN user part continuity test tone is established.

Answer Supervision Template Tokens

Use the **Select** and **Rev Select** keys to display the condition tokens. The following pages define each token. The tokens are listed in alphabetical order rather than the order in which they are arranged on the screen.

ANSBK and ANSREP

Supervision events marked with ANSBK tokens end template processing and cause the system to answerback over the incoming port (assuming it is not already answered). A report is not sent to the host. When the event is detected and answerback sent, a WAIT SUP outpulse rule token is satisfied and rule processing continues. Because the outgoing port is considered answered when answerback is sent, the call automatically goes to stable state when outpulse rule processing completes (unless a FINAL SUP token is specified).

Events assigned ANSBK tokens may serve as both intermediate and final supervision. When ANSBK tokens are used in a template called by a WAIT SUP outpulse rule token, a FINAL SUP token is not necessary (assuming the WAIT SUP can only be satisfied by an event assigned ANSBK or ANSREP). ANSBK tokens can be assigned to the Time event field for grace timing during supervision processing. Because answerback signals initiate billing during network calls, ANSBK tokens should be assigned carefully.

Events assigned ANSREP tokens are handled similarly to ANSBK tokens, but also generate a report to the host.

ERROR

Specifies that the signaling event should be treated as a supervision error and causes a rehunt for another outgoing port (if the outgoing resource group is configured for rehunting). The error count for the outgoing port is incremented, and an Outgoing Port Change of State ($DA) report is generated indicating a supervision error and whether a rehunt was performed. Template processing ends and the outpulse rule is aborted. The incoming port is left in CP_SETUP state if no rehunt is performed. If a rehunt is performed successfully, outpulse rule processing starts again on the new outgoing port.

> **Note** The rehunt threshold assigned to the outgoing resource group may affect call processing if multiple supervision errors are detected during a call attempt. If the number of supervision errors exceeds the rehunt threshold, the system considers the call attempt as failed (call failures are discussed in the FAIL condition token subsection). Rehunt thresholds are set via system administration on the Resource Group Summary screen.

ERROR events should be assigned to supervision events which are unexpected during supervision processing but are not fatal. For example, assigning an ERROR token to Reorder tone manages situations where the system encounters a bad trunk circuit. If the outgoing resource group is configured for rehunting, another trunk circuit is selected and the call continues without host intervention.

FAIL

Specifies that the signaling event indicates a failed call. The outgoing port is removed from the call (no rehunt performed) and the incoming port is left in setup. An Outgoing Port Change of State ($DA) report is generated indicating a failed call attempt. Template processing ends when the event is detected and the outpulse rule is aborted.

FAIL events indicate that the call cannot be completed regardless of whether another outgoing port is selected. FAIL tokens are frequently assigned to Busy tone, SITs (identifying an invalid dialed number or a number that requires a "1" for long-distance service, for example) and supervision timing (ring/no answer).

OK and OKREP

Supervision events marked with OK tokens end template processing when detected but are not reported to the host. When the event is detected during intermediate supervision, the WAIT SUP [xx] outpulse rule token is satisfied and rule processing continues. When the event is detected during final supervision (after an outpulse rule containing a FINAL SUP [xx] setup token), template processing ends; however, the port is only considered answered if the OK token was assigned to the Answer event field.

Events assigned OK tokens require detection for outpulse rule processing to continue, but do not need to be reported to the host (reducing host link traffic). This condition token is commonly assigned to events such as dial tone in intermediate supervision templates (called by a WAIT SUP [xx] outpulse rule token); the event must be detected before outpulsing digits, for example.

Events assigned OKREP tokens are handled similarly to OK tokens, but also generate a report to the host.

QUIT

Specifies that the signaling event causes outpulse rule processing to abort. Template processing ends, and the outgoing port returns to the state it was in prior to outpulse rule processing (CP_IDLE, CP_ATT, CP_SETUP or CP_STAB) but is not removed from the call. An Outgoing Port Change of State ($DA) report is generated indicating an outpulse rule failure. The QUIT condition can occur any time during outpulse rule processing, even after the port is considered answered.

QUIT tokens are similar to FAIL tokens, but differ in that the call retains the outgoing port when the token is processed. These tokens are designed especially for use with supervision timers that begin after a call becomes stable.

REP

Supervision events marked with REP tokens are reported to the host when detected but do not end template processing. An Outgoing Port Change of State ($DA) or Incoming Port Change of State ($DB) report is generated containing one of two Change byte codes (10 or 80) and the appropriate Answer Supervision code for the event. Template processing continues until an event marked with another type of condition token is detected. REP tokens function the same for both intermediate and final supervision.

Events assigned REP tokens can be used to inform the host of a call's progress without interfering with outpulse rule processing. For example, REP tokens can signal the host when to begin billing for services such as voice mail. REP tokens are also useful in experimental answer supervision templates to determine the supervision events that may be encountered in a particular call scenario and the order they occur.

Preconfigured Templates

Three preconfigured templates exist for wink and answerback during both outpulse rule processing and a wait for final supervision. The W and A templates, when used with WAIT SUP tokens, perform the functions of the WAIT WINK and WAIT ANS outpulse rule tokens of previous VCO/4K system software releases. When used with a FINAL SUP outpulse rule token, the A template waits for answerback during final supervision. The supervision events and system responses for the three templates are shown in Table 3-6.

.

Table 3-6   Preconfigured Template Settings

Outpulse Rule Token	Event	Condition Token Settings
WAIT SUP W	Wink	OK
	Answer	ERROR
	Time	ERROR
WAIT SUP A	Wink	ERROR
	Answer	ANSBK
	Time	ERROR
FINAL SUP A	Wink	ERROR
	Answer	ANSREP
	Time	ANSREP

The preconfigured templates are not displayed, and cannot be changed or deleted by system administration. The other eight signaling events (dial tone, ringback, etc.) are not detected when an A or W template is used. A TIME SUP [xx] must precede a WAIT SUP W, WAIT SUP A or FINAL SUP A outpulse rule token for the timer expiration response (condition token in the TIME field) to be performed. Note that the timer response specified functions for all card types.

Adding an Answer Supervision Template

Complete the following steps to add an answer supervision template:

Step 1 Display the Answer Supervision Templates screen (refer to the "Accessing the Answer Supervision Template Screen" section on page 3-68).

The cursor is located in the first token field of Template 1.

Step 2 Use the **Prev Screen**, **Next Screen**, **Tab**, **<**, **Prev Field**, and **Next Field** keys to advance the cursor to the first token field of the template you want to add.

Step 3 Use the **Select** and **Rev Select** keys to scroll through the condition token selections until the correct token appears.

Step 4 Press the **Next Field** key.

Step 5 Repeat Step 3 and Step 4 until all condition tokens for the template are displayed on the screen.

Step 6 Repeat Step 2 through Step 5 for all other templates.

Step 7 When you have addes all the templates, press **Enter**.

The "Press 'ENTER' To Update Templates" message appears.

Step 8 Press **Enter**.

The "Supervision Templates File Updated" message appears. The templates are written to the system hard disk, and the indicated number of CPA(s) are put in Maintenance mode for downloading. Active calls are not affected when a CPA card is placed in maintenance mode. When the CPA(s) are reset, the screen is updated to show the changes and the cursor returns to the first token field of Template 1.

Step 9 When you have added all the templates, press the **Exit** key to return to the Database Administration Menu screen.

To exit the Answer Supervision Template screen without making any changes, press the **Exit**, **Prev Menu**, or **Main Menu** key. No changes are made to the database unless you press **Enter**.

Adding a Condition Token to an Answer Supervision Template

Complete the following steps to add a condition token to an existing supervision template:

Step 1 Display the Answer Supervision Templates screen (refer to the "Accessing the Answer Supervision Template Screen" section on page 3-68).

The cursor is located in the first token field of Template 1.

Step 2 Use the **Prev Screen**, **Next Screen**, **Tab**, **<**, **Prev Field**, and **Next Field** keys to advance the cursor to the token field into which you want to insert the token.

Step 3 Use the **Select** and **Rev Select** keys to scroll through the condition token selections until the correct token appears.

Step 4 Press the **Next Field** key.

Step 5 Repeat Step 2 through Step 4 for each condition token you want to add.

Step 6 Press **Enter**.

The "Press 'ENTER' To Update Templates" message appears.

Step 7 Press **Enter**.

The "Supervision Templates File Updated: message appears. The templates are written to the system hard disk, and the indicated number of CPA(s) are put in Maintenance mode for downloading. Active calls are not affected when a CPA card is placed in maintenance mode. When the CPA(s) are reset, the screen is updated to show the changes and the cursor returns to the first token field of Template 1.

Step 8 Press the **Exit** key to return to the Database Administration Menu screen.

To exit the Answer Supervision Templates screen without making any changes, press the **Exit**, **Prev Menu**, or **Main Menu** key. No changes are made to the database unless you press **Enter**.

Deleting a Condition Token From an Answer Supervision Template

Complete the following steps to delete a condition token from a template:

Step 1 Display the Answer Supervision Templates screen (refer to the "Accessing the Answer Supervision Template Screen" section on page 3-68).

The cursor is located in the first token field of Template 1.

Step 2 Use the **Prev Screen**, **Next Screen**, **Tab**, **<**, **Prev Field**, and **Next Field** keys to advance the cursor to the token field you want to delete.

Step 3 Use the **Select** and **Rev Select** keys to step through the condition token selections until a blank line appears. To delete more than one condition token in a template, advance to that token and change it to a blank line.

The screen display is updated to show the deletion of the token(s).

Step 4   Repeat Step 2 and Step 3 for each template from which you want to delete one or more condition tokens.

Step 5   Press **Enter** after all deletions are made.

The "Press 'ENTER' To Update Templates" message appears.

Step 6   Press **Enter**.

The "Supervision Templates File Updated" message appears.The templates are written to the system hard disk, and the indicated number of CPA(s) are put in Maintenance mode for downloading. Active calls are not affected when a CPA card is placed in maintenance mode. When the CPA(s) are reset, the screen is updated to show the changes and the cursor returns to the first token field of Template 1.

Step 7   Press the **Exit** key to return to the Database Administration Menu screen.

To exit the Answer Supervision Templates screen without making any changes, press the **Exit**, **Prev Menu**, or **Main Menu** key. No changes are made to the database unless you press **Enter**.

Deleting an Answer Supervision Template

Complete the following steps to delete a supervision template:

Step 1   Display the Answer Supervision Templates screen (refer to the "Accessing the Answer Supervision Template Screen" section on page 3-68).

The cursor is located in the first token field of Template 1.

Step 2   Use the **Prev Screen**, **Next Screen**, **Tab**, **<**, **Prev Field**, and **Next Field** keys to advance the cursor to the first token field of the template you want to delete.

Step 3   Use the **Select** and **Rev Select** keys to step through the condition token selections until a blank line appears.

Step 4   Press the **Next Field** key.

The cursor advances to the next token field in the template.

Step 5   Repeat Step 3 and Step 4 until all fields in the template are blank.

Step 6   Repeat Step 2 through Step 5 for each template you want to delete.

Step 7   Press **Enter**.

The "Press 'ENTER' To Update Templates" message appears.

Step 8   Press **Enter**.

The "Supervision Templates File Updated" message appears. The templates are written to the system hard disk and the screen is updated to show the changes. The cursor returns to the first token field of Template 1.

Note   Deleting a template does not cause a CPA download. Templates are deleted when the system is rebooted.

Step 9   Press **Exit** to return to the Database Administration menu.

To exit the Answer Supervision Templates screen without making any changes, press the **Exit**, **Prev Menu**, or **Main Menu** key. No changes are made to the database unless you press **Enter**.

Routing Table Summary

Use the following screens to define the routing characteristics for the TeleRouter software option:

- Routing Table Summary
- Routing Table Configuration

Instructions for using these utilities are contained in the *Cisco VCO/4K TeleRouter Reference Guide*.

ISDN Call Processing Menu Options

Use the following ISDN associated screens associated to set up templates used in ISDN call processing:

- ISDN Supervision Template
- ISDN Message Templates
- ISDN Message Templates
- ISDN NFAS Group Summary
- NFAS Configuration

Use these screens when the optional ISDN package is installed on the system. Instructions for using these utilities are contained in the *Cisco VCO/4K ISDN Supplement*.

Subrate Configuration

Use the Subrate Configuration screen to configure the service provided by one or two Subrate Switching Cards (SSCs and to define system-wide subrate configuration parameters:

- Subrate card redundancy
- Timeslot size for the subrate matrix
- Timeslot threshold warning level
- Idle code pattern configurations or idle trunk assignments for each subrate
- Alarm severity configuration for alarms associated with subrate switching.

Accessing the Subrate Configuration Screen

Complete the following steps to access the Subrate Configuration screen:

Step 1   Access the Administrator Main Menu screen.

Step 2   Type **A** and press **Enter**.

The Database Administration Menu screen appears.

Step 3   Type **M** and press **Enter**.

The Subrate Configuration screen appears (see Figure 3-18).

Figure 3-18 Subrate Configuration Screen

```
                 S U B R A T E     C O N F I G U R A T I O N

              Active Subrate Card Location: 1 1 10
              Standby Subrate Card Location: 1 1 15

                     Subrate Card Redundancy: ENABLED
                 Timeslots Allocated For Subrate: 888
             Timeslot Threshold Warning Level: 75 Percent of Capacity

                              Idle Code Configuration
     Subrate Type  Pattern    R L  S    P B   Subrate Type  Pattern    R L  S    P B
       8 Kb  FIXED  0                          40 Kb   FIXED 00000
      16 Kb  TRUNK             1 1 10-1 2 1    48 Kb   FIXED 000000
      24 Kb  FIXED  000                        56 Kb   FIXED 0000000
      32 Kb  FIXED  0000                       64 Kb   FIXED 00000000

                            Alarm Severity Configuration
         Loss Of All Subrate Cards  MAJOR     Timeslot Threshold MAJOR
         Loss Of Subrate Redundancy MAJOR     Timeslot Exhaust   MAJOR
```

The Subrate Configuration screen consists of one screen. Use the **Tab** and **<** keys to move between the individual fields. To obtain a hard copy of the Subrate Configuration screen, press the **Print Screen** key.

Subrate Configuration Screen Field Definitions

The Subrate Configuration screen contains the following fields.

Active Subrate Card Location—*Display only.* Displays the subrate card designated as the primary or active subrate card by the system. Primary means that this card was the first subrate card brought into service with respect to redundancy.

Standby Subrate Card Location—*Display only.* Displays the subrate card designated as the redundant subrate card by the system. The redundant card is automatically assigned by the system if subrate card redundancy is enabled. If subrate card redundancy is disabled, these fields are empty.

Subrate Card Redundancy—*Data entry via Select key and main keypad.* Enables or disables subrate card redundancy. The default value is ENABLED.

- DISABLED—No card level redundancy is activated.
- ENABLED (default)—Card level redundancy is activated.

Timeslots Allocated For Subrate—*Data entry via main keypad.* Specifies the number of backplane time slots to be allocated for subrate use. SSC time slots are assigned one-to-one to destination bearer channels. This element defines the size of the subrate matrix to be managed by the system. A timeslot matrix can handle up to 8000 8-kpbs subrate connections. Valid entries for this field (when the subrate card is in the system) are 8 to 2048 in increments of 8 (initial value: 0). Time slots must be allocated to the SSC before using the SSC.

Timeslot Threshold Warning Level—*Data entry via main keypad*. Specifies the timeslot threshold level (in percentage of capacity) that when reached, generates an alarm condition. Timeslots are consumed as subrate connections are made. Valid values for this field are 1 to 99. The default value is 75.

Idle Code Configuration—*Data entry via main keypad*. Specifies the idle code configuration for each subrate. Two types of idle code configuration are provided: FIXED bit pattern and TRUNK port subrate channel. FIXED bit pattern gets its idle code from what you enter; the idle data from external equipment provides the code for TRUNK configurations.

> FIXED—the idle code is specified by a bit map in which each bit is defined as a 0 or 1. The subrate channel itself defines the number of bits in the pattern (8 Kb has one bit; 16 Kb has two bits; and so on). The SSC provides the FIXED idle patterns in the first eight SSC timeslots. The FIXED pattern mode is transmitted to subrate channels when they are not listening to other subrate channels.

> TRUNK—port subrate channel configurations, subrate channels are set to listen to the specified RLSPB (rack, level, slot, port, bit) when they are not listening to other subrate channels. For the TRUNK mode, it is assumed that some external equipment is providing the idle data (or perhaps silence tone) for the subrate.

> Each subrate channel supports a separate idle code configuration. Use the following fields to define each subrate channel idle code configuration.

Subrate—*Display only*. Defines the subrate channel to be configured.

Type—*Data entry via Select key or main keypad*. Defines the idle code configuration type. Valid entries for this field are FIXED or TRUNK. The default value is FIXED.

Pattern—*Data entry via main keypad*. When the Type field is set to FIXED, this field specifies the idle code pattern. Set the idle pattern by a bit map where each bit is defined as a 0 or a 1. The default value for the pattern is all zeroes.

RLSPB—*Data entry via main keypad*. When the Type field is set to TRUNK, this set of five fields specifies the trunk port subrate channel providing the idle code channel. Specify the trunk port subrate channel by rack, level, slot, port position, and bit offset within the time slot to the subrate channel. Valid entries for RLSP are any defined and active trunk port interface in the system. Table 3-7 provides valid entries for the bit offset. They represent offset from the first bit in the subrate channel.

Table 3-7   Bit Offset Entries

Subrate Channel	Valid Bit Offset Entry
8 Kb	1 – 8
16 Kb	1 – 7
24 Kb	1 – 6
32 Kb	1 – 5
40 Kb	1 – 4
48 Kb	1 – 3
56 Kb	1 – 2
64 Kb	1 – 1

Alarm Severity Configuration—*Data entry via Select key or main keypad*. Use these four fields to configure the severity level for all alarm conditions related to subrate switching functionality. Valid entries for the alarm severity levels are:

> MINOR—Generates a minor alarm.

MAJOR—Generates a major alarm.

CRITICAL—Generates a critical alarm.

The alarm conditions associated with subrate switch operation are the following:

Loss Of All Subrate Functionality—This condition exists if the active and standby subrate cards fail or are removed from service. The system cannot make any subrate connections, and all established subrate connections are lost. This condition is cleared when at least one subrate card returns to service. The default value is MAJOR.

Loss Of Subrate Redundancy—This condition exists if one of the subrate cards in a redundant configuration fails, or is removed from service. There is no loss of service for this condition. This condition is cleared when the nonactive subrate card returns to service and is fully synchronized to the active subrate card. The default value is MAJOR.

Timeslot Threshold—This condition occurs if the timeslot threshold warning level is exceeded. This condition is intended to be used as a warning indicator that subsequent subrate connection requests may fail due to timeslot capacity exhaustion. This condition is cleared when the timeslot usage drops to a level that is 10 percent less than the threshold. The default value is MAJOR.

Timeslot Exhaust—This condition occurs when all timeslot capacity is consumed by subrate connections. Any future subrate connection requests to allocate additional subrate timeslots will fail due to timeslot capacity exhaustion. This condition is cleared when timeslot usage drops to the threshold warning level. The default value is MAJOR.

SPC-TONE Plan Configuration

Use the SPC-TONE Plan Configuration screen to assign specific tone plans to individual SPC spans of the VCO/4K when using the multiple tone plan feature.

Note   The SPC-TONE Plan Configuration screen and the multiple tone plan feature are supported with VCO/4K system software Version 5.2(0) and higher.

Accessing the SPC-TONE Plan Configuration Screen

Complete the following steps to access the SPC-TONE Plan Configuration screen:

Step 1   Access the Administrator Main Menu screen.

Step 2   Type **A** and press **Enter**.

The Database Administration Menu screen appears.

Step 3   Type **N** and press **Enter**.

The SPC-TONE Plan Configuration screen appears (see Figure 3-19).

Figure 3-19   SPC-TONE Plan Configuration Screen

```
                         SPC-TONE Plan Configuration

    LOCATION
    R   L   S              CARD TYPE          STATUS   TONE PLAN NAME   TONE PLAN ID
    _____             _____      _____   _____   _____

    1   1   14-1-1        SPC-TONE              O       _____        0
    _   _   _____        _____       _      _____       ___
    _   _   _____        _____       _      _____       ___
    _   _   _____        _____       _      _____       ___
    _   _   _____        _____       _      _____       ___
    _   _   _____        _____       _      _____       ___
    _   _   _____        _____       _      _____       ___
    _   _   _____        _____       _      _____       ___
    _   _   _____        _____       _      _____       ___
    _   _   _____        _____       _      _____       ___
    _   _   _____        _____       _      _____       ___
    _   _   _____        _____       _      _____       ___
    _   _   _____        _____       _      _____       ___
    _   _   _____        _____       _      _____       ___
    _   _   _____        _____       _      _____       ___

                                        End Of SPC Static Tone Plan Table
```

The SPC-TONE Plan Configuration screen consists of one screen. Use the **Tab** and **<** keys to move between the individual fields. To obtain a hard copy of the SPC-TONE Plan Configuration screen, press the **Print Screen** key.

SPC-TONE Plan Configuration Screen Field Definitions

The SPC-TONE Plan Configuration screen contains the following fields.

Location R L S—*Display only.* Describes the location of the SPC-TONE card type within the VCO/4K chassis.

Card Type—*Display only.* Describes the card type defined in the associated Location RLS field.

Status—*Display only.* Describes the current status of the associated Card Type field. Possible states are as follows:

A—Active.

O—Out of service.

M—Maintenance.

S—Standby.

Tone Plan Name—*Display only.* Identifies the name of the associated Tone Plan ID field.

Tone Plan ID—*Data entry via main keyboard.* Contains the tone plan ID number of the associated Tone Plan Name field.

Assign Tone Plans to SPC Spans

Complete the following steps to assign specific tone plans to individual SPC spans:

Step 1   Access the Card Maintenance screen via the Maintenance Menu screen.

Step 2   Define an available slot, group, and span (R-L-S).

Step 3   Add a DSP as SPC-TONE card type for the R-L-S defined in Step 2.

> ✎
>
> **Note**   Ensure that the added SPC-TONE card type remains out of service (O) until your reach Step 10.

Step 4   Access the Database Administration Menu screen.

Step 5   Type **N** and press **Enter**.

The SPC-TONE Plan Configuration screen is displayed (see Figure 3-19). The R-L-S and card type configured in Step 2 and Step 3 are displayed in the first row of data. The cursor is located in the first row's Tone Plan ID field.

Step 6   Use the **Select** key to select an appropriate tone plan ID for the span in the corresponding row. Refer to the Multiple Tone Plan Configuration screen for a list of all available tone plans—those that are installed and configured in the VCO/4K system database.

Step 7   Press **Enter**.

The new configuration is saved to the VCO/4K system database and the SPC-TONE Plan Configuration screen is refreshed.

Step 8   From the Administrator Main Menu, type **C** and press **Enter**.

The Maintenance Menu screen is displayed.

Step 9   Type **A** and press **Enter** to access the Card Maintenance screen.

The Card Maintenance screen is displayed.

Step 10   Change the SPC span defined in Step 2 to active (A).

Step 11   Repeat Step 1 through Step 10 to configure all remaining SPC-TONE spans necessary for your configuration requirements.

System Configuration

Use the System Configuration menu option to specify the system's interaction with peripheral equipment, storage devices, and host computers.

Use the System Configuration Menu screen, to perform the following tasks:

- Specify devices and directories for file system storage and retrieval
- Configure host parameters, interfaces, and software overlays
- Define operating parameters for system printers and local or remote master consoles, including Ethernet Telnet connections (if applicable)
- Add system users and modify passwords and access levels
- Assign access levels and map function keys to each system administration screen

Figure 4-1 shows the options accessible from the System Configuration menu.

Figure 4-1   System Configuration Menu Structure
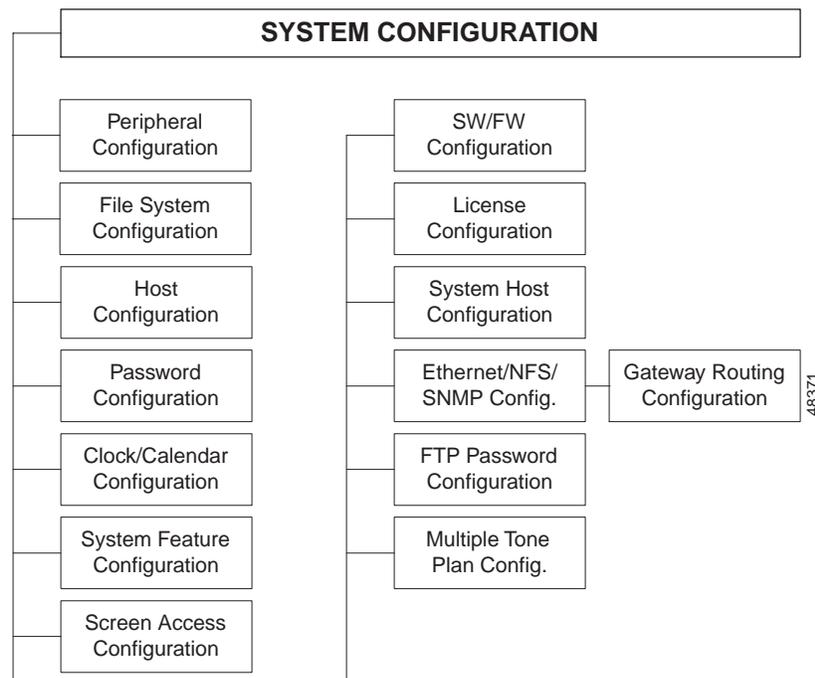
Accessing the System Configuration Menu Screen

Complete the following steps to access the System Configuration Menu screen.

Step 1   Access the Administrator Main Menu screen.

Step 2   Type **B** and press **Enter**.

The System Configuration Menu screen appears (see Figure 4-2). The cursor is located in the Enter Selection field.

Step 3   Type the letter that precedes the option you want and press **Enter**.

Figure 4-2   System Configuration Menu

```
          S Y S T E M    C O N F I G U R A T I O N    M E N U

          A) Peripheral Configuration
          B) File System Configuration
          C) Host Configuration
          D) Password Configuration
          E) Clock/Calendar Configuration
          F) System Feature Configuration
          G) Screen Access Configuration
          H) Software/Firmware Configuration
          I) License Configuration
          J) System Host Configuration
          K) Ethernet/NFS/SNMP Configuration
          L) FTP Password Configuration
          M) Multiple Tone Plan Configuration
          Enter Selection: _
```

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The remainder of this chapter describes each function within the System Configuration menu option.

Peripheral Configuration

Use Peripheral Configuration to define operating parameters for system peripheral equipment. System peripherals include local master console, remote master console connected to the system by a modem, and system printers.

You can perform system administration tasks through one of three interface types:

- Master Console

- Remote TTY

- Telnet TTY (if the system is equipped with the Ethernet Communications option)

Master consoles are connected to your system with EIA/TIA-232 cables. These cables attach to the Serial Port 1/Console port on the front panel of the CPU-TM card.

Use the Peripheral Configuration screen to define the keyboard type, baud rate, stop bits, bits per character, and parity protocols for communication between the local console and the system.

You can perform remote system administration via a remote maintenance modem. The modem connects to your system with EIA/TIA-232 cables. These cables attach to the Serial Port 2/TTY01 port on the front panel of the CPU-TM card. The communication parameters for remote consoles are the same as for local consoles. You must match the setup parameters for remote consoles to the communication parameters you define from the Peripheral Configuration screen.

Note   The system acknowledges a remote login attempt when it detects a CONNECT message (in ASCII) followed by a carriage return (CR) or line feed (LF) over the TTY01/Modem port. These connect signals are automatically generated by the 9600 etc/e modem recommended and supplied by Cisco Systems.

You can perform system administration functions over a Telnet connection with the Telnet TTY option. An RJ-45 connector from a network source connects to a transceiver unit. This unit, in turn, attaches to the Ethernet port located on the front panel of the CPU-TM card. Refer to the *Cisco VCO/4K Ethernet Guide* for detailed information regarding Telnet operation requirements.

The default keyboard type for the local console and remote TTY01/modem settings is a VT220/320 terminal. Additional keyboard configurations are also supported for local/ remote master consoles. The keyboard type setting determines how the system interprets the application keypad and function keys for data input from the terminal. Refer to Appendix C, "Administration Keyboard Types," for an explanation of how the application and function keys are mapped for each keyboard type.

Note   VT220/320 terminals use a series of command menus (outside of system administration) that prompt you for console setup parameters. These setup parameters must match the protocols defined for the console from the Peripheral Configuration screen for successful communication. Instructions for configuring VT220/320 terminals are contained in the *Cisco VCO/4K Hardware Installation Guide*. For other types of consoles, refer to the OEM instructions supplied with the master console for navigating through setup menus. Default peripheral settings in the system database are described in "Peripheral Configuration Screen Field Definitions" section on page 4-5.

VCO/4K system software provides XON/XOFF support for both local and remote consoles; this option is configured only at the console level and cannot be modified through system administration.

Only parallel printers are supported by systems. Select the end-of-line terminator(s) (CR, LF, or both) to match the setting required for specific parallel printers. Refer to the *Cisco VCO/4K Technical Descriptions* for descriptions of CPU serial/parallel port locations and usage.

In redundant systems the peripheral configuration information is not transferred over the update channel; you must configure it for both CPUs.

Accessing the Peripheral Configuration Screen

Complete the following steps to access the Peripheral Configuration screen:

Step 1   Access the System Configuration Menu screen (refer to the "Accessing the System Configuration Menu Screen" section on page 4-2).

Step 2   Type **A** and press **Enter**.

The Peripheral Configuration screen is displayed (see Figure 4-3). The cursor is located in the **Local TTY** field.

Figure 4-3   Peripheral Configuration Screen

```
            P E R I P H E R A L    C O N F I G U R A T I O N


   Local TTY:     Console           Keyboard Type:  VT220
      Baud Rate: 9600               Bits/Char:      8
      Stop Bits: 1                  Parity:         None
                 XON/XOFF:     Enable

   Remote TTY:    TTY01/Modem       Keyboard Type:  VT220
      Baud Rate: 2400               Bits/Char:      8
      Stop Bits: 1                  Parity:         None
                 XON/XOFF:     Enable

   Telnet TTY:    Telnet            Keyboard Type:  VT220

   Printer:       Printer
      End of Line Terminator:  CR+LF
```

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The Peripheral Configuration menu consists of one screen. Use the **Print Screen** key to obtain a hard copy of this screen.

You can define the peripheral settings from the Peripheral Configuration screen prior to saving the configurations in the system database (by pressing **Enter** only after all changes have been made).

⚠

Caution   Use caution when defining the communication parameters for each master console, especially when selecting the keyboard type. If the configuration stored in the database does not match the actual equipment and/or protocols used, the master console will be unable to communicate with the system when a user attempts to log in. If this condition occurs, you must reselect the keyboard type from the Login screen.

Complete the following steps to reselect the keyboard type, if necessary:

Step 1   Press the **Ctrl** and **K** keys simultaneously.

The following message appears in the bottom right corner of the login screen:

```
Keybrd: VT220 (V), Sun (S), Xview (X), Univ (U)
```

Step 2   Select the new keyboard type by pressing the appropriate letter.

The reselection is complete.

Peripheral Configuration Screen Field Definitions

The Peripheral Configuration screen contains the following fields:

Local TTY—*Display only.* The only valid value is Console. It specifies that the master console is local VDT with VT100 display emulation.

You must configure the console Keyboard Type, Baud Rate, Stop Bits, Bits/Char, and Parity fields using the **Next Field** and **Select** keys.

Note For four-span cards, you must specify a span as well as a slot.

XON/XOFF (local)—*Data entry via Select key.* Valid values are Enable (default) or Disable. When enabled, the XON/XOFF flow control protocol for asynchronous serial transmission is active for the local TTY.

Remote TTY—*Display only.* The only valid value is TTY01/Modem. It specifies that the master console is on a remote system.

You must configure the console Keyboard Type, Baud Rate, Stop Bits, Bits/Char, and Parity fields using the **Next Field** and **Select** keys.

XON/XOFF (remote)—*Data entry via Select key.* Valid values are Enable (default) or Disable. When enabled, the XON/XOFF flow control protocol for asynchronous serial transmission is active for the remote TTY.

Telnet TTY—*Display only.* The only valid value is Telnet. It specifies that you are accessing the system through an Ethernet Telnet connection (optional Ethernet software must be installed). You only need to configure the keyboard type when you select this field.

Note Once the Telnet connection is established, the local master console is disabled. (That is, a login screen is not displayed at the local TTY console.) A Telnet session can be established from a host computer; the host must be equipped with the appropriate terminal emulation software. For more information on Telnet connections, refer to the *Cisco VCO/4K Ethernet Guide*.

Keyboard Type—*Data entry via Select key.* Specifies how the system interprets the application keypad and function keys on the local master console for data input. Valid values are:

VT220—Standard VT220/230 escape codes for the application keys and F6 to F20 function keys. Default setting.

Sunview—Sun escape codes for the application keypad and F2 to F12 function keys.

Xview—Sun escape codes for the application keypad and F2 to F10 function keys when using Xterm (VT100 terminal emulator) within Sun's Openlook windows environment.

Universal—Accommodates keyboards that do not support any of the previous escape code sequences. Allows users to generate application and function key escape codes through two- and three-key sequences. The **Num Lock** key must be set for Universal keyboard operation.

Baud Rate—Applies to Console and TTY01/Modem options. The baud rate specifies the speed (in bits per second) at which data is transmitted over the link. Valid values are 300, 1200, 2400, 4800, 9600, and 19200 bps. The default value for Console is 9600. The default value for TTY01/Modem is 2400.

Bits/Char—Applies to Console and TTY01/Modem options. Specifies the number of bits used to represent a character, excluding parity and stop bits. Valid values are 7 and 8. The default value is 8.

Stop Bits—Applies to Console and TTY01/Modem options. Specifies the number of stop bits used. Valid values are 1 and 2. The default value is 1.

Parity—Applies to Console and TTY01/Modem options. Specifies whether error checking using a parity bit is to be performed. Valid values are NONE, EVEN, and ODD. The default setting is NONE.

Printer—Specifies the type of system printer supported. Currently, only parallel printers are supported for system operation.

End of Line Terminator—Specifies the terminating character(s) used to indicate the end of a printer line. The value in this field must match the terminator specified in the printer setup (refer to the documentation supplied with the printer). Valid values for this field are CR (carriage return), LF (line feed), and CR+LF (carriage return and line feed).

Using the Peripheral Configuration Screen

Complete the following steps when you finish configuring the peripherals:

Step 1   Verify your configuration selections.

Step 2   Press **Enter**.

The "Enter to Confirm New Configuration(s)" message appears.

Step 3   Press **Enter**

The configuration is saved to the system. No changes are made to the database unless you press **Enter**. When the system finishes updating the database with the new information, the **"**PRM039: Peripheral Configuration Updated" message appears.

To exit the Peripheral Configuration screen without making any changes, press the **Exit**, **Prev Menu**, or **Main Menu** key.

> **Note**   For VT220/320 terminals, press the **F3** key to access the Modify VT220 Setup and configure the protocol parameters to match the screen. For other terminal types, refer to the documentation supplied with the terminal to modify the operating parameters. Once all changes are made, return to the Peripheral Configuration screen and press any key.

File System Configuration

Use File System Configuration to specify the devices/directories for storing and retrieving the system log and system trace files. System log files list all error and status messages generated by the diagnostic, fault recovery, and maintenance generic tasks. System trace files list the messages passed between the system and the host, and/or internal messages sent between the NBC and service circuit/network interface cards.

The storage device and directory for boot/download files and system database files is fixed.

The Network File System (NFS) directory specifications must be unique for each system CPU handled by a host. In a redundant system, the following pathnames could be used:

- F:/System_Name/Log/A/

- F:/System_Name/Trace/A/
- F:/System_Name/Log/B/
- F:/System_Name/Trace/B/

From the File System Configuration screen, you can specify the diskette drive (device A:) to store and retrieve system log and trace files. However, the system does not create the necessary directory while configuring the file system. If there is not a directory on the diskette, a PRM 018 message is generated when the system attempts to write the log/trace file to the diskette. To correct this problem, create a directory for the log or trace files on the diskette.

In redundant systems, the file system configuration information is not transferred over the update channel. Therefore, you must configure it for both CPUs.

Accessing the File System Configuration Screen

Complete the following steps to access the File System Configuration screen:

Step 1   Access the System Configuration Menu screen (refer to the "Accessing the System Configuration Menu Screen" section on page 4-2).

Step 2   Type **B** and press **Enter**.

The File System Configuration screen is displayed (see Figure 4-4). The cursor is located in the Default Device field corresponding to the system log files.

Figure 4-4   File System Configuration Screen

```
          F I L E   S Y S T E M   C O N F I G U R A T I O N


    Boot/Download Files
       Default Device:      C:
       Default Directory:   /boot/

    System Database Files
       Default Device:      C:
       Default Directory:   /dbase/

    System Log Files
       Default Device:      C:
       Default Directory:   /log/

    System Trace Files
       Default Device:      C:
       Default Directory:   /trace/
```

File System Configuration consists of one screen. Use the **Print Screen** key to obtain a hard copy of this screen.

File System Configuration Screen Field Definitions

The File System Configuration screen contains two types of user-definable fields. These fields are accessible only in the System Log Files and System Trace Files areas of information.

Default Device—Data entry via Select key. Indicates the default device for storing and retrieving files. Valid values and their meanings are:

A—Floppy disk drive

C—Hard disk drive

F—NFS device accessed via Ethernet link

Default Directory—Data entry via main keypad. Indicates the standard directory for storing and retrieving each system file. You can include uppercase or lowercase alphanumeric characters and special characters in directory names. Insert a slash character (/) between directory names to specify a series of subdirectories.

Defining File System Configurations

Complete the following steps to define file system configurations:

> **Note** You cannot define (modify) the file system configurations for boot/download and database files.

Step 1   Display the File System Configuration screen (refer to the "Accessing the File System Configuration Screen" section on page 4-7).

The cursor is located in the Default Device field corresponding to the Log Files.

Step 2   Use the **Prev Field** and **Next Field** keys to position the cursor in the Default Device or Default Directory field corresponding to the file type you want to change.

- To change the Default Device setting, use the **Select** and **Reverse Select** keys to step through the values until the correct device is shown.

- To change the Default Directory, specify the directory name (in MS-DOS or NFS format) using upper- and/or lowercase alphanumeric characters and / characters to indicate subdirectories.

Step 3   Repeat Step 2 for each file system setting you want to change.

Step 4   Press **Enter**.

The system verifies the configuration information. If the information is valid, the "Enter To Confirm New Configuration(s)" message appears.

Step 5   Press **Enter**.

The "Changing XXXXX File System" message appears, where XXXXX is the name of each file system modified. This message appears for each file system change. Once all file system changes are made, the "File System(s) Successfully Configured" message appears.

Note If you do not create a diskette directory for the log/trace file, a PRM 018 message is generated when the system attempts to write the files to the diskette.

To exit the File System Configuration screen without making any changes, press **Exit**, **Prev Menu**, or **Main Menu**. No changes are made to the database unless you press **Enter**.

Host Configuration

Use Host Configuration to configure host interfaces and software overlays and to indicate the status of alarm conditions for host interfaces. You can configure up to eight external (host computer) and one internal (software overlay) interfaces for the system.

The following constraints are placed on the host configuration:

- In general, the larger the number of defined host interfaces, the more system processing time that is dedicated to host interface processing. This is especially true of multiple Ethernet interfaces.

- You may define up to two ADLC interfaces. ADLC support is standard on all systems. You can configure both links for the maximum baud rate of 19.2 kbps.

- You may define up to eight Ethernet interfaces (sockets). Ethernet support is available as an option on all systems.

- You may define a total of eight external interfaces. These interfaces can be any mix of ADLC or Ethernet, within the limits stated above.

- Configure the internal interface only if the TeleRouter software overlay is to be used. If you do not configure the internal interface, TeleRouter call routing is not performed.

For additional information on the ADLC protocol and the Ethernet communication option, refer to the *Cisco VCO/4K Host Communication Guide* and the *Cisco VCO/4K Ethernet Guide*. TeleRouter is documented in the *Cisco VCO/4K TeleRouter Reference Guide*.

In redundant systems the host configuration information is not transferred over the update channel. Therefore, it must be configured for both CPUs.

If you select an inactive host, an alarm is set and is displayed on the System Alarm Display screen until the host is activated.

The host communication parameters to be defined differ, in accordance with the specified interface. These parameters are listed in Table 4-1. For example, if the Interface field of the Host Configuration screen specifies the Internal interface, you must define the host name, overlay name and trace parameters only.

Table 4-1   Host Interface and Applicable Parameters

Interface	Parameter
Internal	Host Name (fixed Overlay)
	Overlay Name (TeleRouter or blank space)
	Trace

Table 4-1   Host Interface and Applicable Parameters (continued)

Interface	Parameter
SIO Port 3	Host Name
SIO Port 4	Poll Timeout
	Baud Rate
	Retry Counter
	Parity
	Trace
	Block Factor
	Modem
	Protocol (fixed at ADLC)
	Format
	Reset Time
	Alarm State
Ethernet	Host Name
	Connect Password (for local port)
	Loc. Port (logical port number of local port)
	Remote Internet Address
	Remote (logical port number of remote port)
	Trace
	Protocol (fixed TCP)
	Alarm State
	Reset Time

Host Configuration Call Teardown Upon Host Link Failure Feature

The call teardown upon host link failure feature is implemented on a per-host-link basis. The Host Configuration screen processing includes a field that defines the action to be taken upon host link failure—the Failure Action field. This field allows you to select one of the following actions:

- No action—Causes no processing to occur for calls controlled by a failed host link.

- Clear controlling host identifier—Allows the software to clear the controlling host identifier on all calls controlled by a host if that host fails. Subsequently, the clearing of the controlling host association facilitates the ability of an alternate host link to take over for the failed host.

- Call teardown—Is processed within call processing upon notification from the Host Manager that the host link has failed. All calls controlled by the failed host link are torn down. Line/trunk ports marked as Always Off-hook class of service are sent back to idle state. All other line/trunk ports are processed through Permanent Signaling Conditioning.

Accessing the Host Configuration Screen

Complete the following steps to access the Host Configuration screen:

Step 1   Access the System Configuration Menu screen (refer to the "Accessing the System Configuration Menu Screen" section on page 4-2).

Step 2   Type **C** and press **Enter**.

The Host Configuration screen is displayed (see Figure 4-5). The cursor is located in the first Interface field.

Figure 4-5   Host Configuration Screen

```
                  H O S T     C O N F I G U R A T I O N

Interface    Internal      TeleRouter
Host Name    Overlay
Trace (1/0)  0



Interface    Ethernet      Connect.Password _____  Loc. Port  1066
Host Name    Host 0 ___    Rem.Inet.AddR    INADDR_ANY        Rem. Port  0
Trace (1/0)  0             Failure Action   Call Teardown
Protocol     TCP           Alarm State      Off               Ping Freq  0
Reset Time   60            Ping Fail Limit  0

Interface    SIO Port 3    Poll Timeout     15                Baud Rate  9600
Host Name    Host1 ____    Retry Counter    5                 Parity     None
Trace (1/0)  0             Block Factor     5                 Modem      No
Protocol     ADLC          Failure Action   None              Format     8D/1S
Reset Time   0             Alarm State      Off
```

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![Note icon]

Note   The Host Configuration screen contents adjust dynamically, depending on the value you specified in the Interface field. Figure 4-5 shows the possible combinations of fields that can be displayed for the Internal, SIO/ADLC, and Ethernet interfaces. All possible fields for this screen are identified in Table 4.1, and described in the "Host Configuration Screen Field Definitions" section on page 4-11.

Host Configuration Screen Field Definitions

You can configure up to three types of host interfaces from the Host Configuration screen. The displayed host interface fields are determined by the value specified in the Interface field, and are divided into two groups: General and Interface Specific. The fields are defined as follows.

Host Configuration Screen General Fields

Interface—*Data entry via Select key*. Specifies the type of interface being configured. Also determines what data entry fields are displayed on the screen. Valid selections are:

Internal—Internal software overlay; optional TeleRouter software currently supported. You can specify only one internal interface.

SIO Port 3—ADLC asynchronous communication via port 3 on the CPU-TM card. You can specify only one SIO Port 3 interface.

SIO Port 4—ADLC asynchronous communication via port 4 on the CPU-TM card. You can specify only one SIO Port 4 interface.

Ethernet—Ethernet TCP/IP communication via the Ethernet port on the CPU-TM card. You can specify up to eight Ethernet interfaces.

Host Name—*Data entry via main keypad*. Required entry. Identifies the interface. The host name can be up to 10 alphanumeric characters, uppercase and lowercase.

Note   If you select an inactive host, an alarm is set and displayed on the System Alarm Display screen until the host is activated.

Trace—*Data entry via main keypad*. Specifies whether the trace utility is enabled for this interface. The system trace function is described in the "System Trace Configuration" section on page 6-34. Valid values and their meanings are:

0—Trace facility not enabled.

1—Trace facility enabled; trace messages output to printer and/or trace file.

Failure Action—*Data entry via Select key*. Specifies the action to take when a host link fails. Valid selections are:

None—No action is taken for the calls controlled by the failed host (default).

Call Teardown—All calls controlled by the failed host link are torn down.

Clear Cntrl Host—The controlling host identifier flag is cleared on all calls controlled by the failed host, so that any other available host can take control of the call.

Alarm State—*Display only*. Indicates the current alarm state for a host interface. Valid values and their meanings are:

Off—No alarm condition exists for this host interface link.

On—An alarm condition exists for this host interface link. The presence of an alarm state for an interface indicates that link is currently out of service due to an error condition on either the system or host end. Refer to logfile messages to determine the cause of the link failure.

Host Configuration Screen Interface Specific Fields—Ethernet

Connect Password—*Data entry via main keyboard*. The ASCII string the host must issue in reply to the system when establishing a socket; used only when the Enable Host Password Check feature is set to Y. Up to 16 ASCII characters are allowed. Valid values depend on the application. This field may be blank if password checking is not performed.

Loc. Port—*Data entry via main keyboard*. The local port number from which this socket accepts data. Valid values are a valid Ethernet port number greater than 1023. The value must be supplied by the Ethernet administrator.

Host Name—*Data entry via main keyboard*. The host link used in system error and logfile messages. Up to 10 alphanumeric characters are allowed. Each link should have a unique name.

Rem. Inet Addr—*Data entry via main keyboard or via Select key*. (Remote Internet Address) The internet address of the host running the socket application. Use the INADDR_ANY wildcard character to enable communication with any host. If a specific host is required, a valid internet address is required in hexadecimal notation; convert the UNIX dot format to hexadecimal then precede the address with 0x. To disable all pinging for Ethernet host detection failure, set the Remote Internet Address to INADDR_ANY. The remote internet address should be supplied by the Ethernet administrator, otherwise, use a wildcard.

Rem. Port—*Data entry via main keyboard*. (Remote Port) Specifies the Ethernet port address from which the system controller accepts data. Valid values are 0 or a valid Ethernet Port number greater than 1023. The value must be supplied by the Ethernet administrator.

Trace—*Data entry via main keyboard*. The system trace facility is enabled for this socket (refer to the *Cisco VCO/4K System Administrator's Guide*). Valid values are 0 and 1. A value of 0 indicates that trace is not enabled. A value of 1 indicates that trace is enabled; messages will be sent to the printer and log file. A value of 0 is recommended for normal operation; 1 for troubleshooting.

Failure Action—*Data entry via Select key*. Specifies the action to take when a host link fails. Refer to the "Host Configuration Call Teardown Upon Host Link Failure Feature" section on page 4-10 for a complete description of this field. Valid values and their meanings are:

> None—action is taken for the calls controlled by the failed host (default)

> Call Teardown—all calls controlled by the failed host link are torn down

> Clear Cntrl Host—the controlling host identifier flag is cleared on all calls controlled by the failed host, so that any other available host can take control of the call

Protocol—*Display only*. Defines the data transfer protocol used on this host link. The value for Ethernet is fixed at TCP.

Alarm State—*Display only*. Indicates the current alarm state for a host interface. Valid values are Off and On. Off means that no alarm condition exists for this host interface link. On means that an alarm condition exists for this host interface link. The presence of an alarm state for an interface indicates that link is currently out of service due to an error condition on either the system or host end. Refer to logfile messages to determine the cause of the link failure.

Ping Freq—*Data entry via main keyboard*. When the host is configured with Ethernet, you may enter data for the detection of an Ethernet link failure. Ping Freq specifies the time, in seconds, between probes. Valid values are from 0 to 60. To disable the host detection failure feature, set the Ping Freq and Ping Fail Limit fields to zero; probe once every minute. See also Rem.Inet.Addr. The default value is 0, indicating that probing should occur once every minute.

Reset Time—*Data entry via main keyboard*. Specifies the amount of time, in seconds, that the system waits after a link failure/reset before reestablishing the link. Valid values are from 0 to 999; the system requires a value of at least 1 minute (60 seconds). The default value is 60 (1 minute).

Ping Fail Limit—*Data entry via main keyboard*. Defines the number of consecutive failed probes to determine that an Ethernet connection is lost—see also Ping Freq. Valid values are from 0 to 10. The default value is 1 if the Ping Frequency is non-zero. (The default of 1 can be overridden with any value other than 0.) The default is 0 if the Ping Frequency is 0. (The default of 0 cannot be overridden.) This is once-a-minute probing. Any missing probe is declared a lost connection; the switch closes the connection by freeing up all sockets tied to the local ports and generates alarm messages. See also Rem.Inet.Addr.

Host Configuration Screen Interface Specific Fields—SIO-Port 3 and SIO-Port 4

Protocol—*Display only.* Defines the data transfer protocol used on this host link. Value for SIO-Port 3 and SIO-Port 4 is fixed at ADLC.

Reset Time—*Data entry via main keypad.* Specifies the amount of time, in seconds, the system waits after a link failure/reset before reestablishing the link. Valid values are from 0 to 999. A value of 60 seconds is recommended.

Poll Timeout—*Data entry via Select key.* Specifies the amount of time the system waits to be polled by the host before the system assumes an error condition exists on the link. Valid values are from 0 to 300 in increments of 1. Each count specifies a 1-second interval. A value of 15 seconds is recommended.

> **Note** A value of 0 means there is an infinite wait; a value of 0 is not recommended for this timer because the system uses this timeout to determine when a link failure has occurred.

Retry Counter—*Data entry via main keypad.* Specifies the number of times the system retransmits a message before it assumes that an error condition exists on the link. Valid values are from 0 to 255. A value of 5 is recommended.

Block Factor—*Data entry via main keypad.* Specifies the number of messages allowed in a multiblocked transmission. The system allows transmit blocks to be constructed with a message count up to this value. Valid values are from 1 to 32 in increments of 1. A value of 5 is recommended.

Format—*Data entry via Select key.* Specifies the number of stop bits used with the 8-bit data character. Valid selections are:

8 Data/1 Stop—8 data bits and 1 stop bit.

8 Data/2 Stop—8 data bits and 2 stop bits.

Baud Rate—*Data entry via Select key.* Specifies the speed (in bits per second), at which data is transmitted over the link. Valid selections are 300, 1200, 2400, 4800, 9600, and 19200.

Parity—*Data entry via Select key.* Specifies whether error checking using a parity bit is to be performed. Valid selections are:

NONE—No parity bit error checking performed.

ODD—Odd parity bit error checking performed.

EVEN—Even parity bit error checking performed.

Modem—*Data entry via Select key.* Specifies if a modem is used between this port and the host computer. Valid values are No and Yes. If Yes, full modem control signaling is used.

Defining Host/Overlay Configurations

Configure each link between the system and a host computer from the Host Configuration screen. These links include the internal link between system call processing and the TeleRouter software overlay. Configure each link by specifying the interface (either internal or a physical port on the CPU-TM card) and assigning a set of parameters to that interface. You must define host links/overlays for both CPUs in a redundant system.

The Host Configuration screen consists of three data entry screens. The first screen contains data fields for configuring the internal link and up to two host links; the other two screens contain data fields for configuring up to three host links. Use the **Tab** key to move from one Interface field to the next. Use the

Next Field and **Prev Field** keys to move from field to field within an interface specification. After you have finished specifying all link parameters, press **Enter**. The links are then reset and the configuration information is implemented.

> **Note** If you select an inactive host, an alarm is set and is displayed on the System Alarm Display screen until the host is activated.

Complete the following steps to define link configurations:

Step 1 Access the Host Configuration screen (refer to the "Accessing the Host Configuration Screen" section on page 4-11).

The cursor is located in the Interface Internal field.

- If no internal interface is to be defined, press the **Tab** key. The cursor moves to the **Interface** field for the first external link. Go to Step 3.
- If a TeleRouter interface is to be defined, press the **Select** key until TELEROUTER is displayed in the field. Press the **Next Field** key. The cursor moves to the Trace data entry field.

Step 2 Type the correct value to enable or disable tracing for the Internal interface.

- If additional interfaces are to be defined, go to Step 3.
- If no additional interfaces are to be defined, go to Step 5.

Step 3 To define an external interface, use the **Select** key to display the correct interface value.

The values displayed are determined by the value specified in the Interface field.

Step 4 Use the **Prev Field** and **Next Field** keys to move to the data entry field to be specified. Fill in the field using the **Select** or **Reverse Select** key, or the main keypad. Repeat this process for all fields required for the link configuration to be defined.

- If additional interfaces are to be defined, press the **Tab** key to move to the next Interface field and repeat Step 3 through Step 4.
- If no additional interfaces are to be defined, go to Step 5.

Step 5 Press **Enter**.

Step 6 The "Press Enter to update configuration" message appears.

Step 7 Press **Enter**.

The "Host configuration updated" message appears. The configuration data is written to the database, and the link is taken out of service and reestablished. This process takes several seconds.

Step 8 Press the **Exit** key to return to the System Configuration menu.

Password Configuration

Use Password Configuration to create or change system passwords and set access levels for up to 16 users. You must identify each system user with a unique username, an alphanumeric password, and an access level. The ability to update this configuration information is limited by a user's access level.

The system supports four levels of system administration access: Levels 0, 1, 2, and 3. Only Level 0 (highest access) users can add and delete system users. Users with lower access levels can only change their own password. Only users can change their password.

Access levels determine the user's ability to modify screen information and update the system database. Access levels are linked to each administration screen via the Screen Access Configuration screen. For more information on limiting screen modifications, refer to the "Screen Access Configuration" section on page 4-30.

The Password Configuration screen has two main areas: a display area that lists the current users and their associated access levels, and a data entry area in which you can add, delete, or change user password configuration information.

Accessing the Password Configuration Screen

Complete the following steps to access the Password Configuration screen:

Step 1 Access the System Configuration Menu screen (refer to the "Accessing the System Configuration Menu Screen" section on page 4-2).

Step 2 Type **D** and press **Enter**.

The Password Configuration screen is displayed (see Figure 4-6). The cursor is located in the Add/Del/Change field.

Figure 4-6   Password Configuration Screen

```
                   P A S S W O R D   C O N F I G U R A T I O N

        Username            Access Level        Username            Access Level
        admin                    0




                            Add/Del/Change:    _ (A/D/C Only)
                            Username:
                            Current Password:
                            New Password:
                            Verify Password:
                            Access Level:
```

Password Configuration consists of one screen. Use the **Print Screen** key to obtain a hard copy of this screen.

Password Configuration Screen Field Definitions

The Password Configuration screen contains the following fields:

Username—*Display only.* Shows the functional name assigned to each system user.

Access Level—*Display only.* Shows the current access level of each system user. Valid values are 0, 1, 2 and 3.

Add/Delete/Change (A,D,C only)—Data entry via main keypad. Specifies the function you want to perform. Valid values are:

> A—Add a username to the database.
>
> D—Delete a username from the database.
>
> C—Change a password or access level in the database.

Username—*Data entry via main keypad.* Specifies the name assigned to the system user. From 3 to 15 uppercase and/or lowercase alphanumeric characters are allowed in this field. You must enter the username for all command functions.

Current Password—*Data entry via main keypad.* Specifies the password currently associated with the username entered. From 4 to 12 uppercase and/or lowercase alphanumeric characters are allowed in this field. This field is accessible only when you select C at the Add/Delete/Change (A,D,C only) field. All data entered in this field is hidden by asterisk (*) characters for security.

New Password—*Data entry via main keypad.* Specifies the new password assigned to the user (after you choose the A or C command). From 4 to 12 uppercase and/or lowercase alphanumeric characters are allowed in this field. All data entered in this field is hidden by asterisk (*) characters for security.

Verify Password—*Data entry via main keypad.* Verifies the exact spelling and case of the new password (after you select the A or C command). The data in this field must exactly match the contents of the New Password field. All data entered in this field is hidden by asterisk (*) characters for security.

Access Level—*Data entry via main keypad.* Specifies the access level assigned to each user. Database update is limited based on access level (refer to the "Screen Access Configuration" section on page 4-30 for information on the Screen Access Configuration screen). Valid values are:

> 0—Read and database update access to all screens.
>
> 1—Varies based on Screen Access Configuration.
>
> 2—Varies based on Screen Access Configuration.
>
> 3—Read access only to all screens.

Adding a New User

You can add a new user to the system database with the Add function of the Password Configuration screen. Only a Level 0 user can add other system users to the database. To complete this command, a Level 0 user must enter the Add (**A**) command, user name, password, and access level information. The default access level (if no level is specified) for new users is Level 3; however, any access level (0, 1, 2 and 3) can be assigned.

Complete the following steps to add a user to the database:

Step 1   Display the Password Configuration screen (refer to the "Accessing the Password Configuration Screen" section on page 4-16).

The cursor is located in the Add/Del/Change: (A/D/C Only) field.

Step 2   Type **A** and press the **Next Field** key.

The cursor moves to the Username field.

Step 3   Type the user's functional username and press the **Next Field** key.

The cursor moves to the New Password field.

Step 4   Type the new password and press the **Next Field** key.

The cursor moves to the Verify Password field.

Step 5   Type the password again to verify the entry and press the **Next Field** key.

The entry must exactly match the value entered in the New Password field. If the password is correctly reproduced, the cursor moves to the Access Level field. If the password is not verified, the "This Does Not Match The New Password" message appears.

Step 6   Type the access level and press **Enter**.

The database is automatically updated and the screen shows the addition of the user to the list. The cursor returns to the Add/Del/Change: (A/D/C Only) field.

Step 7   Repeat Step 2 through Step 6 to add all additional users to the system.

Step 8   Press the **Exit** key to return to the System Configuration menu.

To exit the Password Configuration screen without making any changes, press the **Exit**, **Prev Menu**, or **Main Menu** key. No changes are made to the database until you press **Enter**.

Deleting a User

To delete a user from the system database, use the Delete function. To complete this command, enter the Delete (**D**) command and username. Only a Level 0 user can delete other system users from the database. Users cannot delete themselves while they are currently logged in to the system.

Complete the following steps to delete a user from the database:

Step 1   Display the Password Configuration screen (refer to the "Accessing the Password Configuration Screen" section on page 4-16).

The cursor is located in the Add/Del/Change: (A/D/C Only) field.

Step 2   Type **D** and press the **Next Field** key.

The cursor moves to the Username field.

Step 3   Type the user's functional username and press **Enter**.

The "Enter to Delete User xxxxx" message appears, where xxxxx = the username of the system user to delete.

Step 4   Press **Enter**.

The database is automatically updated and the screen is updated to reflect the deletion. The cursor returns to the Add/Del/Change: (A/D/C Only) field.

Step 5   Repeat Step 2 through Step 4 for all users you want to delete.

Press the **Exit** key to return to the System Configuration menu.

To exit the Password Configuration screen without making any changes, press the **Exit**, **Prev Menu**, or **Main Menu** key. No changes are made to the database until you press **Enter**.

Changing a Password/Access Level

All system users can change their own password in the system database. To complete this command, the user must enter the Change (**C**) command, username, current and new passwords, and access level information.

Complete the following steps to change a user's password:

Step 1   Display the Password Configuration screen (refer to the "Accessing the Password Configuration Screen" section on page 4-16).

The cursor is located in the Add/Del/Change: (A/D/C Only) field.

Step 2   Type **C** and press the **Next Field** key.

The cursor moves to the Username field.

Step 3   Type the user's functional username and press the **Next Field** key.

The cursor moves to the Current Password field.

Step 4   Type the user's current password, exactly as it exists in the database, and press the **Next Field** key.

The cursor moves to the New Password field.

Step 5   Type the new password (or the current password if you are only changing the access level) and press the **Next Field** key.

The cursor moves to the Verify Password field.

Step 6   Type the new/current password again to verify the entry and press the **Next Field** key. The entry must exactly match the value entered in the New Password field.

If you type the password correctly, the cursor moves to the Access Level field. If the password is not verified, the "This Does Not Match The New Password" message appears.

Step 7   To modify an access level, type the new access level and press **Enter**; otherwise, do not type and press **Enter**.

The database is automatically updated and the cursor returns to the Add/Del/Change: (A/D/C Only) field.

Step 8   Repeat Step 2 through Step 7 for all remaining passwords to be modified.

Step 9   Press the **Exit** key to return to the System Configuration menu.

To exit the Password Configuration screen without making any changes, press **Exit**, **Prev Menu**, or **Main Menu**. No changes are made to the database unless **Enter** is pressed.

Clock/Calendar Configuration

Use the Clock/Calendar Configuration screen to change the system date and time settings. The time can also be reset by the host with the Configure VCA/Set System Clock ($C0 00) command.

The clock should be set by the host on a regular basis to ensure that host time and system time are synchronized. This is especially important if you need to determine the cause of system errors by comparing the log files kept by the system to any log files kept by the host.

Accessing the Clock/Calendar Configuration Screen

Complete the following steps to access the Clock/Calendar Configuration screen:

Step 1   Access the System Configuration Menu screen (refer to the "Accessing the System Configuration Menu Screen" section on page 4-2)

Step 2   Type **E** and press **Enter**.

The Clock/Calendar Configuration screen appears (see Figure 4-7). The cursor is located in the Month field.

Figure 4-7   Clock/Calendar Configuration Screen

```
            C L O C K  /  C A L E N D A R   C O N F I G U R A T I O N




              Day Of Week   Month    Date    Year
                  Fri        Apr      30     1999




                  Hours     Minutes   Seconds
                   12          8         18
```
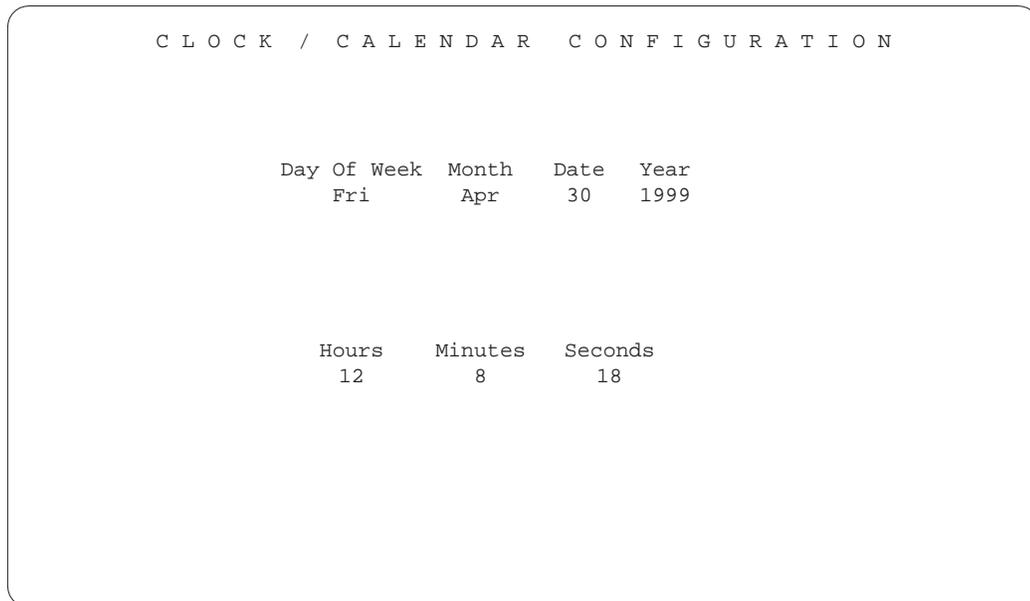
Clock/Calendar Configuration consists of one screen. Use the **Print Screen** key to obtain a hard copy of this screen. The Day of Week field is display only.

Setting the System Clock/Calendar

When you are changing the settings on the system clock/calendar, and a field is to be left unchanged, no entry is required in that field.

Complete the following steps to change the system clock/calendar setting:

Step 1   Display the Clock/Calendar Configuration screen (refer to the "Accessing the Clock/Calendar Configuration Screen" section on page 4-20).

The current system date/time information is displayed. The cursor is located in the Month field.

Step 2   Use the **Select** and **Reverse Select** keys to scroll through the selections until the correct month is shown.

- If no other field is to be changed, press **Enter**. The database is automatically updated and the new date/time is displayed on the screen.

- If other changes are required, press the **Next Field** key. The cursor moves to the Date field.

Step 3   Type the date—the data for this field may be one or two digits.

- If no other field is to be changed, press **Enter**. The database is automatically updated and the new date/time is displayed on the screen.

- If other changes are required, press the **Next Field** key. The cursor moves to the Year field.

Step 4   Type the year—the data for this field must be four digits; only values of 1991 or later are accepted.

- If no other field is to be changed, press **Enter**. The database is automatically updated and the new date/time is displayed on the screen.

- If other changes are required, press the **Next Field** key. The cursor moves to the Hours field.

Step 5   Type the hour in 24-hour format [00 (midnight) through 23 (11 PM)]—the data for this field may be one or two digits.

- If no other field is to be changed, press **Enter**. The database is automatically updated and the new date/time is displayed on the screen.

- If other changes are required, press the **Next Field** key. The cursor moves to the Minutes field.

Step 6   Type the minutes (00 through 59)—the data for this field may be one or two digits.

- If no other field is to be changed, press **Enter**. The database is automatically updated and the new date/time is displayed on the screen.

- If other changes are required, press the **Next Field** key. The cursor moves to the Seconds field.

Step 7   Type the seconds (00 through 59)—he data for this field may be one or two digits.

- If no other field is to be changed, press **Enter**. The database is automatically updated and the new date/time is displayed on the screen.

- If other changes are required, press the **Next Field** key. The cursor moves to the Day of Week field.

Step 8   Press the **Exit** key to return to the System Configuration menu.

To exit the Clock/Calendar Configuration screen without making any changes, press the **Exit**, **Prev Menu**, or **Main Menu** key. No changes are made to the database unless you press **Enter**.

System Feature Configuration

Use System Feature Configuration to view all currently enabled system feature flags from the System Feature screen. From this screen, you can modify system operating characteristics to meet specific application requirements.

Accessing the System Feature Configuration Screen

Complete the following steps to access the System Feature Configuration screen:

Step 1   Access the System Configuration Menu screen (refer to the "Accessing the System Configuration Menu Screen" section on page 4-2).

Step 2   Type **F** and press **Enter**.

The System Features screen appears (see Figure 4-8). The cursor is located in the first Allowed (Y,N) field.

Figure 4-8   System Features Screen

```
                    S Y S T E M   F E A T U R E S

         FEATURES                              FEATURES
                   ALLOWED (Y,N)                           ALLOWED (Y,N)
Redundant System                N    Send All ISDN Connect Reports   N
Output Periodic Alarm Reports   N    Enable $66 Cmd Host Checking     N
Card/Alarm Status at Init.      N    Cut Thru For Non-ISDN Alerting   N
Manual Intervention For SLIP/OOF N   Enable 4th Column DTMF           N
Enable Grace Timing On Null Rule N   Set System to A-Law              Y
Disable Card Error Report/Reset N    Enable AllPortsDeactivated Alrm  N
Enable Digit Field Reporting    N    $EA Reports on DChannel RESTART  N
Suppress PSC/Rule Abort Messages N   Send All ISDN Disconnect Report  N
Enable Host Password Check      N    Convert Reorder Tone To Busy     N
Force Bearer/Lap Activation     N    K1197 Layer 3 Testing            N
Enable MFC-R2 Supervised Clear  N    Enable Host Call Ref             N
Enable SLIC Guarded Disconnect  N    Extended Operation Mode Set      N
Enable CPA Monitor Disconnect   N    C-bus Mode Enabled               N
Revert to Basic Redundancy      N
Send Reports Before Guard Time  N
Enable ISDN Manual Disconnect   N
```

48345

The System Features screen consists of one screen. Use the **Print Screen** key to obtain a hard copy.

> **Note**   When you change a system feature setting, you may need to reboot the system for the change to take effect. Refer to Table 4-2 for a list of system feature flags and the activation method for each flag.

Table 4-2   System Feature Flag Activation Method

System Feature Flag	Takes Effect Immediately	Switch Needs Rebooting
Redundant System		X
Output Periodic Alarm Reports		X
Card/Alarm Status at Init.		X
Manual Intervention For SLIP/OOF	X	

Table 4-2   System Feature Flag Activation Method (continued)

System Feature Flag	Takes Effect Immediately	Switch Needs Rebooting
Enable Grace Timing On Null Rule	X	
Disable Card Error Report/Reset	X	
Enable Digit Field Reporting	X	
Suppress PSC/Rule Abort Messages	X	
Enable Host Password Check	X	
Force Bearer/Lap Activation	X	
Enable MFC-R2 Supervised Clear	X	
Enable SLIC Guarded Disconnect	X	
Enable CPA Monitor Disconnect	X	
Revert to Basic Redundancy	X	
Send Reports Before Guard Time	X	
Enable ISDN Manual Disconnect	X	
Send All ISDN Connect Reports	X	
Enable $66 Cmd Host Checking	X	
Cut Thru For Non-ISDN Alerting	X	
Enable 4th Column DTMF	X	
Set System to A-Law	X[1]	
Enable AllPortsDeactivated Alrm	X	
$EA Reports on DChannel RESTART	X	
Send All ISDN Disconnect Report	X	
Convert Reorder Tone To Busy	X	
K1197 Layer 3 Testing	X	
Enable Host Call Ref	X	
Extended Operational Mode Set	Display Only	
C-bus Mode Enabled	Display Only	

1. ICC and SPC cards need to be removed from service and reactivated before the setting takes effect.

System Features Screen Field Definitions

The System Features screen consists of the following fields:

FEATURES—*Display only.* Shows the system features. Feature definitions are listed in the "System Feature Descriptions" section on page 4-24.

ALLOWED (Y,N)—*Data entry via main keypad.* Indicates whether the corresponding feature is enabled or disabled. Valid values are Y and N.

System Feature Descriptions

This section describes current system features. If the feature flags on the System Features screen differ from Figure 4-8, contact Cisco Systems TAC.

Note   The **Suppress PSC/Rule Abort Messages** feature flag applies only when the optional TeleRouter software overlay is installed on the system. The **Enable Host Password Check** feature flag applies only when the optional Ethernet software is installed on the system.

Redundant System

Informs the initialization software whether the system control configuration is redundant or nonredundant. Redundant systems contain a second system controller and an additional NBC. However, even with the proper hardware, a system will not function as a redundant system unless this feature is enabled. If you change this feature setting, you must reboot the system for the change to take effect.

Output Periodic Alarm Reports

When enabled, major/minor alarm reports are output to the system printer 5 minutes after system initialization is complete, and every 30 minutes thereafter. If you anticipate heavy call traffic, disable this feature to reduce processing overhead on the system. If you change this feature setting, you must reboot the system for the change to take effect.

Card/Alarm Status at Init.

When enabled, this feature blocks the printing of card restored and alarm messages for every card during the initial ten minutes following a system boot. The card restored and alarm messages in large systems slow the system boot and lead to performance problems; in those systems, you should enable this feature. If you change this feature setting, you must reboot the system for the change to take effect.

Manual Intervention for SLIP/OOF

The system automatically takes a programmable trunk card out of service when the Slip or out-of-frame (OOF) limit is reached. The limit for OOFs is 17; the error threshold of slips is 256. Both error threshold counters are reset at midnight. If you set this feature to **Y**, the system takes the card out of service and does not attempt to reset it. You must manually set the card back to active from the Card Maintenance screen. If you set this feature to **N**, the card returns to active automatically when the condition clears.

Enable Grace Timing on Null Rule

The null outpulse rule (rule 0) performs an outward seizure (SEIZE token), a wait for final answer (FINAL SUP A token), and starts a 30-second grace timer. If you set this feature to Y, the outgoing port is considered answered if either true answer is detected or the grace timer expires. If you set this feature to N, only detection of true answer supervision is accepted as the final answer. Refer to the *Cisco VCO/4K Standard Programming Reference* and the *Cisco VCO/4K Extended Programming Reference* for more information on the null outpulse rule.

Disable Card Error Reporting and Card Error Threshold Reset

Set this feature to **Y** to disable printing the card error report and prevent resetting the card error threshold counters. Normally, a card error report is printed at its occurrence and the threshold counters are reset at midnight.

Enable Digit Field Reporting

Enable this feature to cause the Optional Field Designator byte to appear in MF Digit ($D0), DTMF Digit ($D1), and Spoken Digit ($D4) reports. The Optional Field Designator byte indicates the field that the system stores the digits reported. When you set this feature to **Y**, the Optional Field Designator byte appears in the byte offset position normally reserved for the digit string, and the digit string is shifted to the next byte offset. Refer to the *Cisco VCO/4K Standard Programming Reference* and the *Cisco VCO/4K Extended Programming Reference* for more information on digit reporting.

Suppress PSC/Rule Abort Messages

For use only with the optional TeleRouter software overlay. When enabled, this feature prevents Permanent Signal Condition and inpulse rule abort messages from being written to the system log while operating TeleRouter in an unhosted environment. Certain types of line equipment use the tones issued during Permanent Signal processing to determine disconnects. This feature suppresses the PSC messages generated by this normal occurrence with these line types. Also, certain situations may generate Inpulse Rule abort messages due to incoming call abandons prior to call routing. This feature prevents system log files from becoming filled with inpulse rule abort messages.

Enable Host Password Check

Set to **N** to disable Ethernet password checking. This allows a link to be established without requiring that the correct password be received on that link. This feature is useful when a small, closed network is used for host-to-system communication. Ethernet passwords are defined with the Host Configuration screen; refer to the "Host Configuration" section on page 4-9 for more information.

Force Bearer/Lap Activation

During Diagnostic procedures, use this feature to force ISDN B-channels to Active without the D-channel being active. Set this feature to **Y** to enable the function or **N** to disable the function. The default is **N**.

> **Note**   Use this feature under the direction of Cisco Systems TAC.

Enable MFC-R2 Supervised Clear

A system-wide feature that supports automatic call release on outgoing ports in response to backward MFCR2 supervision tones. If you set this feature to **Y**, an outgoing port is released when the system detects a specified backward tone during R2 signaling. (Note that backward tones are country specific.) The system performs disconnect processing appropriate for the port type involved and generates an Outgoing Port Change of State ($DA) report indicating a supervision error and specifying the backward tone detected. Refer to your country supplement for information on the backward supervision tones.

> **Note**   This system feature enables/disables automatic call release on a system-wide basis. If the feature is enabled (feature flag set to **Y**), any outgoing port receiving the backward error tones is automatically released. If the feature is disabled (feature flag set to **N**), the outgoing port remains in setup state unless out-of-band supervision or a host command changes the port state.

Enable SLIC Guarded Disconnect

Enables or disables the Guarded Disconnect option, which is available for special SLIC cards. If you set the feature flag to **Y**, the special SLIC card can send an out-of-band Calling Party Disconnect signal to the two-wire devices connected to the card. If you set the feature to **N**, the Guarded Disconnect option is disabled. The default value is **N**, which is also the value for normal operation.

Enable CPA Monitor Disconnect

Enables the UTC devices that cannot pass out-of-band end-of-call signals to detect in-band tones when the calling party abandons the call. When the system receives this tone, it treats it as a positive disconnect. Set the flag to **Y** to enable the feature. However, in order for it to function, make sure the following conditions also exist:

- A CPA port must be attached to the UTC throughout the call to monitor the in-band tone. This is done automatically when the feature flag is enabled and the incoming UTC is answered using an Answer token in the inpulse rule.
- The BUSY in Supervision Template #24 must be specified as OK and the template must be downloaded to the CPA.

The default value for the flag is **N**, which is also the value for normal operation.

Revert to Basic Redundancy

Enhanced redundancy enables both system controllers to consistently track conference calls and ports in SETUP. Set the Revert to Basic Redundancy feature to **Y** to disable tracking. Set the feature to **N** to enable tracking.

Send Reports Before Guard Time

Specifies whether to send the Incoming Port Change of State Report ($DB) before or after guard timing completes. If you set the feature flag to **Y**, the $DB is sent to the host before guard timing is complete. If you set the feature flag to **N**, the $DB report is sent to the host after guard timing is complete.

Enable ISDN Manual Disconnect

Allows the host to control disconnects. If you enable this feature (set the flag to **Y**), the system reports the DISCONNECT message to the host via the ISDN Port Change of State ($EA) report. The RELEASE message will not be sent until an ISDN Port Control ($49) command is received by the system from the host.

If you disable this feature (set the flag to **N**), the system processes the DISCONNECT automatically. All DISCONNECT IEs are reported to the host via the $EA report, and a RELEASE message is returned to the network.

Send All ISDN Connect Reports

Specifies whether to send the ISDN Port Change of State ($EA) report each time an ISDN Connect message event is received from an ISDN D-channel. If you set the feature flag to **Y**, the $EA report is sent to the host for every ISDN Connect message received. If you set the feature flag to **N**, the ISDN supervision template configuration or an ISDN Port Control ($49) command controls how $EA reports for Connect messages are sent.

Enable $66 Command Host Checking

Enables or disables the host checking of the Voice Path Control ($66) command. If you set this feature flag to **Y**, the system accepts $66 commands only from the host link assigned to the call. (The controlling host assigns the link based on the Incoming Call Distribution field configuration.) If you set this flag to **N**, the system accepts $66 host commands from any host link, regardless of the host link assigned as controlling host.

Note that this feature flag is valid only when the Host Control Checking option is enabled. (Refer to the "System Host Configuration" section on page 4-38 for information on Host Control Checking.) If Host Control Checking is disabled, the $66 Command Host Checking flag is ignored (i.e., $66 commands are accepted from any host link even though the flag is set to **Y**).

Cut Thru For Non-ISDN Alerting

Enables or disables the sending of ringback tones to the incoming ports, or the ability to let incoming ports listen to outgoing ports when alerting messages are received in ISDN to non-ISDN connections.

If you set this feature flag to **Y**, the incoming ports listen to the outgoing ports when alerting messages are received in ISDN to non-ISDN connections.

If you set this feature flag to **N**, a ringback tone is sent to incoming ports in ISDN to non-ISDN connections.

Enable 4th Column DTMF

If you enable this feature, $D1 segments attached to $DD or $ED reports follow the enhanced format.

Set System to A-Law

Determines the backplane law for the system. This flag is used to configure the MVDC, ICC, and SPC cards. Refer to the *Cisco VCO/4K Technical Descriptions* to determine the method for setting backplane law for other card types. To prevent an incorrect system configuration, ensure that all service circuit cards and port interface cards are configured for the same law.

Valid values are **Y** and **N**. If you set the flag to **Y**, the system backplane law is set to A-law (European standard). If you set the flag to **N**, the system is set to Mu-law (North American standard). The default is **N**.

> **Note**   If you change the value of this feature flag, the ICC and SPC do not detect the change until you take the card out of service and then bring the card back into service.

> **Note**   When in the System Features screen, you are setting the backplane law. When in the Programmable Trunk Configuration screen, you are setting the network law. In the ICC Programmable Trunk Configuration screen, the SYS value set in the LAW field will cause the network law configuration for that port to match the system backplane law. This is especially useful for configuring signaling channels which should not undergo any law conversions.

Enable All Ports Deactivated Alarm

If you set this feature flag to **Y**, this option raises a PRI/N card alarm when all the ports on the card are deactivated. An Alarm Condition ($F0) report is sent to the host specifying which card caused the alarm. A minor system alarm is raised and the event is logged if the system alarm condition does not already exist.

The new alarm is raised only when all the ports are deactivated from the Card Maintenance screen, the $90 command from the host, or through a far end port-state transition to out of service.

When at least one of the deactivated ports becomes available for use, the card alarm is cleared and the event is logged. An $F0 is generated to the host, specifying the card in which the alarm condition is cleared. The minor system alarm is cleared and the event is logged if there are no other occurrences of the same alarm.

For the alarm to clear, a port which has been deactivated must be made available from the Card Maintenance screen, the $90 command from the host, or through a far end port-state transition to out of service.

When all the ports of a PRI/N card are deactivated, a card alarm is raised and this event is logged.

$EA Reports on DChannel RESTART

For use with ISDN. This feature allows you to enable/disable the generation of ISDN Port Change of State ($EA) reports for the D-channel, and all associated B-channels, when the system receives a D-channel RESTART message by setting the feature flag to either **Y** to enable, or **N** to disable.

If you enable this feature, an $EA report is generated for the D-channel, and all associated B-channels, when the system receives a D-channel RESTART message.

If you disable this feature, $EA reports are not generated for D-channel RESTART messages.

Send All ISDN Disconnect Report

For use with Japanese ISDN. This feature allows you to enable/disable the sending of ISDN Port Change of State ($EA) reports each time a DISCONNECT message is received from an ISDN D-channel by setting this feature flag to either **Y** to enable, or **N** to disable.

When set to **N** (disabled), disconnect report handling is consistent with system software releases prior to V4.2 FSR00. When set to **Y** (enabled), the system functions properly with Japanese ISDN.

Convert Reorder Tone To Busy

For use with Japanese networks. Allows you to select an alternate busy tone for Japanese networks which use a normal busy tone instead of the reorder tone during PSC (Permanent Signaling Condition) processing on a port.

Valid values are **N** and **Y**. When set to **N**, the normal reorder tone is presented during PSC. When set to **Y**, the normal busy tone is presented.

K1197 Layer 3 Testing

Not for customer use. This flag is used during tests performed with the K1197 Conformance tester. Valid values are **Y** and **N**. Set to **Y** (enabled) and the Datalink Release report is ignored. Enabling this feature also causes Sync Source switching to stop. Set to **N** to disable conformance testing.

Enable Host Call Ref

For use with ISDN configurations. Allows you to enable/disable the 2 B-channel transfer feature by setting the feature flag to either **Y** to enable, or **N** to disable.

If you enable this feature, the system passes the call reference up to the host, which enables the host application to support 2 B-channel transfer. The call reference value is sent to the host in byte offsets 20 and 21 of the ISDN Port Change of State ($EA) report with standard mode API. The call reference value is sent to the host in byte offsets 25 and 26 of the $EA report with extended mode API.

For ISDN message types, with the exception of RELEASE COMPLETE, the VCO/4K sends the call reference value to the host. If the VCO/4K receives a RELEASE COMPLETE message, the call reference value is not sent to the host, but instead sends a replacement call reference value, xFFFE.

For incoming ISDN calls, the network switch is responsible for generating the call reference value. For outgoing ISDN calls, the VCO/4K is responsible for generating the call reference value.

If you disable this feature, the 2 B-channel transfer feature is disabled.

Extended Operation Mode Set

This flag is read-only. If enabled (set to **Y**), extended operational mode is activated. Activate extended mode during the installation process by selecting the Set Extended Operational Mode option from the Installation Utilities screen. To configure your VCO system for 4,000+ ports, both the **Extended Operation Mode Set** and **C-bus Mode Enabled** flags must be set to **Y**.

C-bus Mode Enabled

This flag is read-only. If set to **Y**, C-bus is enabled, and the switch can take advantage of the 4,000+ ports. If set to **N**, C-bus is disabled, and your system is limited to 2,000+ ports. To configure your VCO system for 4,000+ ports, both the **C-bus Mode Enabled** and E**xtended Operation Mode Set** flags must be set to **Y**.

Enabling and Disabling System Features

Complete the following steps to enable or disable a system feature flag:

Step 1 Display the System Features screen (refer to the "Accessing the System Feature Configuration Screen" section on page 4-22).

The cursor is located in the first Allowed (Y/N) field.

Step 2 Use the **Prev Field** and **Next Field** keys to position the cursor in the Allowed (Y/N) field corresponding to the feature you want to enable or disable.

Step 3 Type **Y** or **N**, depending on the setting you want for that feature.

Step 4 Repeat Step 2 and Step 3 for each feature setting you want to change.

Step 5 Press **Enter**.

The database is automatically updated.

Step 6 Press the **Exit** key to return to the System Configuration menu.

To exit the System Features screen without making any changes, press the **Exit**, **Prev Menu**, or **Main Menu** key. No changes are made to the database unless you press **Enter**.

Screen Access Configuration

Use Screen Access Configuration to control database access and function key assignments for all system administration screens and menus. This function applies the same access levels (0, 1, 2, and 3) assigned to each system user from the Password Configuration screen. Refer to the "Password Configuration" section on page 4-15 for more information on assigning access levels to system users.

All system users, including Level 3, can view all administration screens and functions. On the other end of the range, Level 0 users can both view and modify all system database tables.

The ability of Level 1 and Level 2 users to modify database tables depends entirely on the values entered in the Screen Access Configuration screen. These settings work in a pyramid fashion. Level 2 users can modify database tables for all screens marked with Level 2 or Level 3 access. Similarly, Level 1 users can modify the tables for all screens marked with Level 1, Level 2 or Level 3 access. Level 0 users reside at the top of the pyramid; they can change database information for screens marked with any access level.

You can also use Screen Access Configuration to map up to 15 programmable function keys to system administration menus and screens. VT220/320 keys marked **F6** through **F20** can be used for single keystroke access, including the keys labeled **Help** and **Do**. Refer to Appendix C, "Administration Keyboard Types," for function key mapping for keyboard types other than VT220/320.

Accessing the Screen Access Configuration Screen

Complete the following steps to access the Screen Access Configuration screen:

Step 1 Access the System Configuration Menu screen (refer to the "Accessing the System Configuration Menu Screen" section on page 4-2).

Step 2 Type **G** and press **Enter**.

The Screen Access Configuration screen appears (see Figure 4-9). The cursor is located in the Access Level field.

Figure 4-9   Screen Access Configuration Screen

```
    S C R E E N    A C C E S S    C O N F I G U R A T I O N    (Screen 1 of 6)


        Format Name                 Access Level     Function Key
        BRC Config.                      0               ___
        CPA Monitor                      3               ___
        Call Generation Port Disp.       3               ___
        Card Alarm Display               3               ___
        Card Cutover                     0               ___
        Card Display                     3               F17
        Card Maintenance                 0               F9
        Card Summary                     3               F10
        Clock/Calender Config.           0               F18
        Conference Display               3               ___
        Conference Summary               3               ___
        D+I Card Config.                 3               ___
        D+I Port Display                 0               ___
        Database Admin. Menu             3               F11
        Database Retrieve                0               ___
        Database Store                   0               ___
```

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The Screen Access Configuration option consists of six screens. Use the **Print Screen** key to obtain a hard copy of each screen.

Screen Access Configuration Screen Field Definitions

The Screen Access Configuration screens consist of the following fields:

Format Name—*Display only.* Shows the title of the screen format, listed alphabetically.

Access Level—*Data entry via main keypad.* Specifies the access level assigned to the screen format. Valid values are 0 to 3.

Function Key—*Data entry via Select key.* Specifies the function key assigned to the screen to provide single keystroke access. VT220/320 keys marked **F6** to **F20** can be used; the **F15** selection corresponds to the **Help** key on VT220/32 keyboards, while **F16** indicates the **Do** key. Use function keys only for screens residing immediately under a menu; you cannot assign function keys to screens residing under submenus (such as the Line/Trunk/PRI card configuration screens).

Note   Function key mapping varies for keyboard types other than VT220/320. Refer to Appendix C, "Administration Keyboard Types," for more information.

Configuring Screen Access

Screen Access Configuration contains six pages of screen titles, listed in alphabetical order. Only Level 0 users can perform screen access changes. Access levels can be modified for most screens. All menu screens and the System Login and Password Configuration screens are permanently assigned Level 3 access; the access level for these screens cannot be changed. Similarly, the access level for the System Feature Configuration screen is fixed at Level 0.

You can assign function keys to all menus and all screens immediately residing under a menu. You cannot assign function keys to screens residing under submenus (requiring data entry on the submenu before they can be accessed). When a function key is assigned to a screen, it is removed from the available listing.

Complete the following steps to assign access levels and programmable function keys:

Step 1   Access the Screen Access Configuration screen (refer to the "Accessing the Screen Access Configuration Screen" section on page 4-30).

The cursor is located in the first Access Level field.

Step 2   Use the **Next Field** and **Prev Field** keys to position the cursor in the Access Level or Function Key field that corresponds to the screen assignment you want to change. The fields that cannot be modified (access levels permanently set or screens residing under submenus) are bypassed.

• To change the access level, type the level number (**0**, **1**, **2** or **3**) and press the **Next Field** key.

• To assign a function key, use the **Select** and **Reverse Select** keys to step through the values until the correct function key is shown and press the **Next Field** key.

Step 3   Repeat Step 2 for each screen assignment you want to change.

Step 4   Press **Enter**.

The "Screen Access Table Updated" message appears and the database is automatically updated.

To exit the Screen Access Configuration screen without making any changes, press the **Exit**, **Prev Menu**, or **Main Menu** key. No changes are made to the database until you press **Enter**.

Software/Firmware Configuration

Use Software/Firmware Configuration to display the following items for the system controller (Side A or B) to which the system administration terminal is currently connected:

• Version revision, field service release (FSR), PUN, and checksum for all system software (generic) executable files on the floppy disk drive, hard disk drive, or loaded into system memory (DRAM)

• Version revision, PUN, and checksum for each data download file on the floppy disk drive (boot.sds file must be present), hard disk drive, or loaded into system memory (DRAM)

• Version and revision of the VRTX operating system currently installed

Accessing the Software/Firmware Configuration Screen

Complete the following steps to access the Software/Firmware Configuration screen:

Step 1   Access the System Configuration Menu screen (refer to the "Accessing the System Configuration Menu Screen" section on page 4-2).

Step 2   Type **H** and press **Enter**.

The Software/Firmware Configuration screen appears (see Figure 4-10). The cursor is located in the DETAILED DIRECTORY OF DEVICE field.

Figure 4-10   Software/Firmware Configuration Screen

```
        S O F T W A R E / F I R M W A R E    C O N F I G U R A T I O N

                VRTX OS x.xx    IFX x.xx    TNX x.xx

                       DETAILED DIRECTORY OF DEVICE:

     SDS GENERIC EXECUTABLE FILES              SDS DATA DOWNLOAD FILES
     VER.REV FSR PUN:  5.01 xxx xxx
  File Name    Ver.Rev Pun   Check Sum      File Name   Ver.Rev Pun   Check Sum
  ---------    -----------   ---------      ----------  -----------   ---------
  GLOBALS.EXE                $xxxxxxxx      MVDCT1.DWN    x.xx        $xxxxxxxx
  REDMGR.EXE                 $xxxxxxxx      NBC.DWN       x.xx        $xxxxxxxx
  PERMGR.EXE                 $xxxxxxxx      IPRC.DWN      x.xx        $xxxxxxxx
  SYSWD.EXE                  $xxxxxxxx      CPA.DWN       x.xx        $xxxxxxxx
  NETMGR.EXE                 $xxxxxxxx      DTMF.DWN      x.xx        $xxxxxxxx
  HOSTMGR.EXE                $xxxxxxxx      4xT1.DWN      x.xx        $xxxxxxxx
  SNMP.EXE                   $xxxxxxxx      4xE1.DWN      x.xx        $xxxxxxxx
  ETHERMGR.EXE               $xxxxxxxx      SPC.DWN       x.xx        $xxxxxxxx
  TELERTE.EXE                $xxxxxxxx      ICC.DWN       x.xx        $xxxxxxxx
```

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Software/Firmware Configuration consists of one screen. Use the **Print Screen** key to obtain a hard copy of this screen.

Software/Firmware Configuration Screen Field Definitions

The Software/Firmware Configuration screen consists of the following fields:

VRTX OS—*Display only.* Shows the version and revision (x.xx) of the operating system firmware PROM installed on the CPU board to which the administration terminal is connected.

IFX—*Display only.* Shows the version and revision (x.xx) of the file system component of the operating system firmware PROM installed on the CPU board to which the administration terminal is attached.

TNX—*Display only.* Shows the version and revision (x.xx) of the network component of the operating system firmware PROM installed on the CPU board to which the master console is attached.

DETAILED DIRECTORY OF DEVICE—*Data entry via Select key.* Specifies the device for which to display the configuration information. Valid values are:

A—Display configuration for files on device A: (floppy drive)

C—Display configuration for files on device C: (hard drive)

<SYSTEM> GENERIC EXECUTABLE FILES—*Display only.* Shows the filename, version and revision (x.x), field service release (FSR), and checksum for all V5.x files resident on the device selected. The fields are arranged according to the descriptions that follow.

VER.REV FSR PUN—Specifies the version revision level, field service release (FSR) level, and PUN of the generic release.

File Name—Specifies the name of the executable file for which information is displayed. Executable files are indicated by the .exe file extension.

Ver.Rev Pun—The version revision level and PUN of the executable file is not displayed for each executable file. The system software .exe files, with the exception of optional software products, share the same software version number displayed in the VER. REV FSR PUN field on the left side of the screen.

Note If you are running a customer patch, you may see an inconsistency in the SPC.DWN and ICC.DWN file version revision numbers listed in this column. The inconsistency is due to the two character field length; customer patch version revision numbers are greater than two digits and the system converts them to binary coded digits for display purposes. Formal releases always contain two digits and do not experience this inconsistency.

Check Sum—Specifies the checksum calculated for the file on the hard disk.

<SYSTEM> DATA DOWNLOAD FILES—*Display only.* Indicates the filename, version and revision (x.xx), PUN, and checksum for all data download files resident on the device selected. The fields are arranged according to the descriptions that follow.

File Name—Specifies the name of the download file for which information is displayed. Download files are indicated by the .dwn extension. Examples of some of the valid values and their meanings are:

Ver.Rev Pun—Specifies the version revision level and PUN level of the download file.

Check Sum—Specifies the checksum calculated for the file on the hard disk.

Displaying System Software/Firmware Configuration

Complete the following steps to display the system software/firmware configuration for a particular device:

Step 1 Access the Software/Firmware Configuration screen (refer to the "Accessing the Software/Firmware Configuration Screen" section on page 4-32).

The cursor is located in the Detailed Directory of Device field.

Step 2 Use the **Select** key to specify the value of the device for which you want to view the configuration.

Step 3 Press **Enter**.

The configuration information for the device selected is displayed.

Step 4 Repeat Step 2 and Step 3 for all devices for which the configuration is to be displayed.

Press the **Exit** key to return to the System Configuration menu.

License Configuration

Use License Configuration to update your Timeslot Allocation License or display the system's current usage of time slots. This section describes Timeslot Allocation Licensing and the License Configuration screen.

Timeslot Allocation Licensing

With a few exceptions, each port on the system uses a time slot. VCO/4K systems are shipped with 1024 preallocated time slots, which support up to 1,024 individual ports. Once your system configuration reaches 1024 ports, you cannot add more cards to the system until you upgrade your timeslot license. Timeslot licenses are sold in 536-slot increments, up to a maximum of 4088 time slots for VCO/4K systems and 1936 for VCO/20 systems. (See your sales representative for further information on upgrading your Timeslot Allocation License.)

> **Note** DRC24 and DRC48 ports do not consume time slots.

Timeslot Allocation Licensing is nontransferable; you cannot take the license from one system and use it on another.

Accessing the License Configuration Screen

Complete the following steps to access the License Configuration screen:

Step 1 Access the System Configuration Menu screen (refer to the "Accessing the System Configuration Menu Screen" section on page 4-2).

Step 2 Type **I** and press **Enter**.

The License Configuration screen appears (see Figure 4-11). The cursor is located in the Enter License # field.

Figure 4-11   License Configuration Screen

```
                          LICENSE CONFIGURATION


                                      A - Side              B - Side

Number of Time-Slots Allocated            272                   272
Number of Time-Slots Available           3816                  3816
Number of Time-Slots Licensed            4088                  4088




Serial Number                     08003e23e953          08003e24223b
License Number                    c6c9c9d9511b          8e14ce61741c

Enter License #:                  _____          _____
```

The sample shown in Figure 4-11 is from a redundant system. The screen on a nonredundant system does not include the column of information listed under B-Side.

License Configuration Screen Field Definitions

The License Configuration screen contains the following fields:

Number of Time-Slots Allocated—*Display only.* Shows the number of time slots that are currently assigned within the system.

Number of Time-Slots Available—*Display only.* Shows the maximum number of time slots available within your system, including the "free" DTG time slots.

Number of Time-Slots Licensed—*Display only.* Shows the number of time slots purchased for your system.

The values for these fields increase and decrease as you add and delete cards from the system database. If you continue to add cards until the Number of Time-Slots Allocated field exceeds the Number of Time-Slots Licensed field, the system will operate normally, but the last card (and any subsequent cards) will not be added to the database. (Refer to *Cisco VCO/4K System Messages* for information on warning and error messages.)

In addition, the number of time slots available may be more or less than the number of time slots licensed for the following reasons:

- A 2K system may have more than 2000 time slots licensed. The maximum number of time slots available in a 2K system is 1936.

- The DTG time slots are "free," that is, provided at no charge by Cisco. The number of time slots available is adjusted upward to reflect the free DTG time slots.

Note   Timeslot information is also displayed on the Card Maintenance and main menu screens.

Serial Number—*Display only.* Shows the serial number of the system's CPU card. This number is encoded in the card at the factory and cannot be altered. A unique license number is associated with this serial number.

License Number—*Display only.* Displays the license number associated with the serial number of your CPU. If your system does not have a Timeslot Allocation License, this field is blank.

Enter License #—*Data entry via main keyboard.* Use this field to enter a new license number when you update your Timeslot Allocation License or when you replace the CPU card.

The serial number and license number are directly correlated; there is only one valid license number for each CPU serial number and port configuration. To obtain the value for this field, contact Cisco TAC.

If you enter an invalid number in the Enter License # field, the Invalid License Number error message appears and the value in the License Number field is not updated. Note that any attempts to change the license number are entered in the log file.

Updating the Timeslot Allocation License

You must update the Timeslot Allocation License each time you replace the system's CPU card or purchase a license for additional time slots.

When you update the Timeslot Allocation License on redundant systems, keep the following points in mind:

- License both sides of redundant systems for the same amount of time slots. If the number of time slots is different, the system uses the lower number for both sides.

- Both sides have access to the Licensing Configuration screen, and both the active and the standby side can be updated from the active controller. However, the standby controller only allows you to display information.

Complete the following steps to update the Timeslot Allocation License:

Step 1   If your system is redundant, make sure that you are operating from the active side.

Step 2   Access the License Configuration screen (refer to the "Accessing the License Configuration Screen" section on page 4-35).

The cursor is located in the Enter License # field.

Step 3   If you are using VCO/4K system software Version 5.1(3) or lower, proceed to Step 3a. If using VCO/4K system software Version 5.1(4) or higher, proceed to Step 3b.

   a. Contact Cisco TAC, if using system software Version 5.1(3) or lower, and advise them of the number shown in the Serial Number field. If you have a redundant system, advise them of the number for side A. Proceed to Step 4.

   b. Enter the Universal License Code, **summa4**, in both the A-Side and the B-Side Enter License # fields. Do not enter a license number in this field; it is not necessary to obtain a license number from Cisco Systems to obtain time slots. The system is configured for the maximum number of time slots available. 2K systems receive 1936 time slots, and 4K systems receive 4088 time slots. Proceed to Step 6.

Step 4   When TAC allocates a new license number to you, enter the number in the Enter License # field and press **Enter**. If you entered the serial number correctly, the License Configuration is updated. If you did not enter the license number correctly, the "Invalid License Number" error message appears. Reenter the number and press **Enter**.

Step 5 If you have a redundant system, advise TAC of the serial number listed under side B. Repeat Step 4 for side B from the active controller.

Step 6 Press the **Prev Menu** or **Exit** key to exit the License Configuration screen.

You can exit the License Configuration screen by pressing the **Enter** key without entering any numbers.

System Host Configuration

Use System Host Configuration to define general system-wide host configuration parameters, including host setup timer functionality, response to all host link failure conditions, host control of call load, host control verification, distribution of new incoming calls, reporting no host alarms at initialization, and reporting system initialization to all hosts.

Accessing the System Host Configuration Screen:

Complete the following steps to access the System Host Configuration screen:

Step 1 Access the System Configuration Menu screen (refer to the "Accessing the System Configuration Menu Screen" section on page 4-2).

Step 2 Type **J** and press **Enter**.

The System Host Configuration screen appears (see Figure 4-12). The cursor is located in the Host Setup Timer field.

Figure 4-12 System Host Configuration Screen

```
              S Y S T E M    H O S T    C O N F I G U R A T I O N


              Host Setup Timer:   DISABLED
  All Host Link Failure Action:   MAJOR ALARM
      Host Control Of Call Load:  DISABLED
         Host Control Checking:   DISABLED
     Incoming Call Distribution:  BROADCAST
   No Host Alarm Reports At Init: DISABLED
  Report System Init To All Hosts: DISABLED
  Conf Calls in Host Failure Proc: EXCLUDED
```

Host Load Sharing

Host load sharing is controlled by the Incoming Call Distribution field. Set this parameter field to CYCLIC to enable load sharing. A list of all active host links is maintained by the system. When load sharing is enabled, this list is referred to for each new call attempt to obtain the next active host link, which is then assigned to the call. As other host links become active, they are added to the list. As host links fail, they are removed from the list, so that the load is always shared among all active links. Refer to the "Redundancy Modifications" section on page 4-40 for related enhancements on redundant systems.

If a command is received for a call in which no controlling host has been assigned, the host issuing the command will be assigned. In addition, commands received from a host that is not controlling the call are rejected if you have enabled Host Control Checking.

Host Setup Timer, if enabled, is performed for the assigned host link. If the assigned host process does not respond to the initial call report within the defined setup timer interval, the call is torn down. A line/trunk port marked as Always Off-hook class of service is set back to idle state. Line/trunk ports with other classes of service are processed through permanent signaling conditioning (PSC).

Use the NO HOST token in an inpulse rule to modify the processing performed upon expiry of the host setup timer. In the event of a host timeout, the NO HOST token forces rule processing to execute the inpulse rule specified in the data field of the NO HOST token. This behavior can cause delays in tearing down a call which is not responded to by a host. Note that a self-referential NO HOST rule token can cause the inpulse rule to loop indefinitely.

TeleRouter

The distribution of call reports does not apply to the informational routing reports generated by the TeleRouter software overlay (internal host). The routing reports are sent to either the controlling host associated with a given port involved in a call routing action, or are broadcast to all hosts.

Call Processing Behavior for the All Host Link Failure Action Parameter

The enhancements to the call processing behavior are summarized as follows:

- Host Setup Timer—This feature uses a configurable timer (1 to 60 seconds) to trap the condition where a host link fails to respond to a call attempt. If the timer expires and no host has responded to the call, the call is torn down and sent through PSC (or idled for Always Off-hook). This behavior also covers the case where no host is available to process the call.

- Default inpulse rule processing modifies the behavior of the Host Setup Timer parameter processing. If you define an inpulse rule for a port, then the Host Setup Timer is started upon rule completion. This means that the call may not be immediately torn down in this case. Note also the modified behavior when using the NO HOST inpulse rule token; this behavior is described in the "Host Load Sharing" section on page 4-39.

- Fatal Alarm on All Host Link Failure Action—This feature causes a fatal alarm condition if all host links fail. The fatal condition initiates a system controller switchover in a redundant system. The standby controller becomes active and processes all new call attempts; the previously active controller reboots. This existing system feature may also be useful for handling the failure of all host links.

- Conditional Switchover—Supports the capability to switch over on failures of all host links, assuming the standby side is online and has active links.

Screen Modifications

The host setup timer processing provides the reorder sequence when no host link is available to control the call (provided the NO HOST token is not used to modify this behavior; refer to Host Load Sharing for a description). Use the Host Setup Timer field in the System Host Configuration screen to enable or disable host setup timing, as well as to configure the duration of the timer.

Use the All Host Link Failure Action field to generate a fatal alarm (system shutdown and reboot) or perform a conditional switchover (no reboot; redundant systems only) when all host links fail.

Call Processing Modifications

In the case of fatal alarm processing associated with the failure of all host links, no check for active host links on the standby controller are made before switching over and shutting down.

A system switchover occurs only if the standby controller is online (file synchronization complete) and has active host links. The active controller that switches to standby will not reboot following the conditional switchover. Redundant systems will not switch over when all hosts fail and the standby is not online (that is, ready to process calls) when conditional switchover is enabled. Furthermore, should a host link become active on the standby controller following the loss of all host links on the active controller, no switchover is initiated. However, the active host on the standby controller can initiate a switchover via a host command, thereby taking over call processing responsibilities.

Redundancy Modifications

To support the conditional switchover functionality, each side of a redundant switch must be aware of the number of active external host links on the other side.

Following file synchronization after a system boot, the number of active external host links associated with each side of a redundant system is transmitted by that side to the other side. Furthermore, any time the number of active host links changes on either side, that fact is transmitted to the other side. This allows both sides of a redundant switch to be aware of the number of active host links on each side.

System Host Configuration Screen Field Definitions

The System Host Configuration screen contains the following fields:

Host Setup Timer—*Data entry via Select key and the main keypad*. Enables or disables host setup timer functionality, and configures the duration of the setup timer. The setup timer refers to the length of time that a host has to respond to a new call report. The valid range for the setup timer is from 1 to 60 seconds. The default value is 6. When host setup timing is disabled, the timer duration is not displayed. Valid selections are:

> Disabled—Host setup timer processing is not performed.

> Enabled—Host setup timer processing is performed based on the specified host setup timer value. This is the default selection.

All Host Link Failure Action—*Data entry via Select key*. Specifies the action that will be taken if all host links fail during system operation. Valid selections are:

> Major Alarm—A major alarm is generated if all host links fail. This is the default selection.

> Fatal Alarm—A fatal alarm is generated if all host links fail. The system controller will shut down and reboot, and if the system is redundant, initiate a system switchover.

Conditional Switchover—A major alarm is generated if all host links fail. A system switchover will be initiated if the standby controller is online (file synchronization completed) and has active host links. No system reboot will be performed following a conditional switchover.

Host Control Of Call Load—*Data entry via Select key.* Enables or disables host control of call load feature. This feature is in effect when the host links are marked as ready to process calls. No call reports are issued to a host link until it is marked as available to process calls. Valid selections are:

Disabled—Host links are marked as available as soon as the link is established. This is the default value.

Enabled—Host links are not marked as available until a Host Call Load Control ($C0 04) command is received from the host.

Host Control Checking—*Data entry via Select key.* Enables or disables host control verification. Valid selections are:

Disabled—No host control verification is performed. Commands are accepted from any host link, regardless of the host link assigned as controlling host. This is the default.

Enabled—Commands are accepted only from the host link assigned to the call. Controlling host assignment is made based on the Incoming Call Distribution field selection.

Incoming Call Distribution—*Data entry via Select key.* Specifies how new incoming calls are distributed to available host links. Valid selections are:

Broadcast—Reports for new calls are sent to all available host links. The first host to respond to the report will be assigned as controlling host. This is the default.

Cyclic—Reports for new calls are uniformly distributed among all available host links. One host link will be assigned to the call by the system and all reports for that call will be sent only to the assigned host link. If Host Control Checking is enabled, then resource commands for the call will only be accepted from the assigned host link. The reports that are eligible for cyclic distribution are:

- $D0—MF digit collection
- $D1—DTMF digit collection
- $D4—Speech report
- $DA—Outgoing port change of state
- $DB—Incoming port change of state
- $EA—ISDN port change of state
- $ED—ISDN inpulse rule complete

No Host Alarm Reports At Init—*Data entry via Select key.* Enables or disables the suppression of alarm reports during the first five minutes following system initialization. During system initialization, several alarm conditions are set and cleared as part of normal processing. An Alarm Condition ($F0) report is normally issued to all active host links whenever an alarm condition is set or cleared. Enabling this feature suppresses these reports until the system is beyond the initialization period.

Disabled—$F0 alarm reports are issued to all active host links during initialization. This is the default.

Enabled—$F0 alarm reports are suppressed for the first five minutes following system initialization.

Report System Init To All Hosts—*Data entry via Select key.* Enables or disables the sending of Active/Standby Mode ($DC) reports to indicate that the system has completed initialization and is ready to process calls.

Disabled—No Active/Standby Mode ($DC) report is issued when Phase 3 system initialization has completed. This is the default.

Enabled—Active/Standby Mode ($DC) report is issued when Phase 3 system initialization has completed.

Conf Calls in Host Failure Proc—*Data entry via Select key.* Determines whether to include the voice path to/from a conference in the alarm message if a host link fails. (Refer to the All Host Link Failure Action field definition earlier in this section for detailed information regarding the actions that will be taken if all host links fail during system operation.) Valid selections are:

Included—Conference call voice paths are included in the alarm messages generated if a host link fails.

Excluded—Conference call voice paths are not included in the alarm messages generated if a host link fails.

Ethernet/NFS/SNMP Configuration

Use Ethernet/NFS/SNMP Configuration to configure the Ethernet/NFS/SNMP optional software.

Accessing the Ethernet/NFS/SNMP Configuration Screen

Complete the following steps to access the Ethernet/NFS/SNMP Configuration screen:

Step 1 Access the System Configuration Menu screen (refer to the "Accessing the System Configuration Menu Screen" section on page 4-2).

Step 2 Type **K** and press **Enter**.

Step 3 The Ethernet/NFS/SNMP Configuration screen appears (see Figure 4-13). The cursor is located in the Current System Internet Address field.

Figure 4-13   Ethernet/NFS/SNMP Configuration Screen

```
                    ETHERNET/NFS/SNMP CONFIGURATION

        Current System Internet Address       = 10.3.1.12_____

        New System Internet Address On Reboot = 10.3.1.12_____
        Enable NFS File Access                = N
        NFS Server Internet Address           = 192.9.202.1_____
        NFS Server Name                       = summa4_____
        NFS Mount Directory Point             =
                /home/server/sit/nfs/sit8vcoa_____
        Target System Name                    = sit8vcoa_____
        Target System User Id                 = 189_____
        Target System Group Id                = 30_____
        Target System Umask                   = 0__
        System Subnet Mask                    = 255.0.0.0_____
        Gateway Routing Configuration         = _
        SNMP Management Station IP Address    = _____
```

Ethernet/NFS/SNMP Configuration consists of one screen. Use the **Prev Field** and **Next Field** keys to move through the fields. Use the **Print Screen** key to obtain a hard copy of this screen.

IP Subnet Mask Configuration

When Ethernet is initially installed, the system reads the information in the Current System Internet Address field and supplies a default value for class A, B, or C subnets in the System Subnet Mask field. If you want to change the class after the initial installation, type an IP address class type value into the System Subnet Mask field. The values corresponding to the class type are:

- A—255.0.0.0
- B—255.255.0.0
- C—255.255.255.0

If you assign a new class of IP address at some point after the initial installation, you must also type in the appropriate system subnet mask. The system will not automatically reconfigure subnet mask based on your new IP address. You must reboot the system after changing the subnet mask in order for the new value to take effect.

Ethernet/NFS/SNMP Configuration Screen Field Definitions

The Ethernet/NFS/SNMP Configuration screen contains the following fields.

Current System Internet Address—*Display only.* Shows the Internet address for the switch.

New System Internet Address On Reboot—*Data entry via main keypad.* Specifies the VCO system Internet address to change to on reboot.

Note   If you have already disabled NFS Access, you can skip over the NFS-related fields and continue on to configure the Gateway Routing Table parameters.

Enable NFS File Access—*Data entry via main keypad*. Specifies whether NFS file access is enabled. Valid values are N for not enabled, or Y for enabled.

NFS Server Internet Address—*Data entry via main keypad*. Indicates the Internet address assigned to the device (usually the host computer) on which the log and trace files are to be stored. This value must be supplied by the Ethernet administrator.

NFS Server Name—*Data entry via main keypad*. Indicates the name assigned to the device (usually the host computer) on which the log and trace files are to be stored. This value must be supplied by the Ethernet administrator.

NFS Mount Directory Point—*Data entry via main keypad*. Indicates the name of the mount directory device into which the log and trace files are to be stored. This value must be supplied by the Ethernet administrator.

Target System Name—*Data entry via main keypad*. Indicates the name assigned to the system by the Ethernet administrator.

Target System User ID—*Data entry via main keypad*. Indicates the UNIX user ID assigned to the system by the Ethernet administrator.

Target System Group ID—*Data entry via main keypad*. Indicates the UNIX group ID assigned to the system by the Ethernet administrator.

Target System Umask—*Data entry via main keypad*. Indicates the user mask assigned to the system by the Ethernet administrator. Cisco Systems, Inc. recommends a value of 0x0 unless used on the LAN.

System Subnet Mask—*Data entry via main keypad*. Indicates the value of the IP address class type (class A, B, or C subnets). Valid values include nonnull characters.

Gateway Routing Configuration—*Data entry via main keypad*. Provides access to the Gateway Routing Configuration screen. Type any character and press **Enter**.

SNMP Management Station IP Address—*Data entry via main keypad*. Allows the user to enter an IP address of the SNMP station; the IP address can be changed as needed and there is no need for rebooting the system. The new IP address is saved to memory and to NVRAM. Type the IP address, then press **Enter**.

Gateway Routing Configuration

Use the Gateway Routing screen to gain access to a Cisco switch over a gateway.

Accessing the Gateway Routing Screen

Complete the following steps to access the Gateway Routing screen:

Step 1   Access the Ethernet/NFS/SNMP Configuration screen (refer to the "Accessing the Ethernet/NFS/SNMP Configuration Screen" section on page 4-42).

Step 2   Enter any character and press **Enter**.

The Gateway Routing Configuration screen appears (see Figure 4-14).

Figure 4-14   Gateway Routing Configuration Screen

```
           G A T E W A Y     R O U T I N G     C O N F I G U R A T I O N

                   Current System Internet Address: 10.3.1.12_____

           Route      Destination Subnet Address        Gateway IP Address

             1              255.255.255.0__                38.231.236.1___
             2              0.0.0.0_____                0.0.0.0_____
             3              0.0.0.0_____                0.0.0.0_____
             4              0.0.0.0_____                0.0.0.0_____
```

Gateway Routing Configuration consists of one screen. Use the **Prev Field** and **Next Field** keys to move through the fields. Use the **Print Screen** key to obtain a hard copy of this screen.

Gateway Routing Configuration Screen Field Definitions

The Gateway Routing Configuration screen has various fields. The data entry fields correspond to the following supported gateways:

Current System Internet Address—*Display only*. Shows the current Internet address for the gateway.

Destination Subnet Address—*Data entry via main keypad*. Indicates the Internet address of the destination host or the destination network. A valid Internet address in standard notation (12.13.14.15) must be supplied by the Ethernet administrator.

Gateway IP Address—*Data entry via main keypad*. Indicates the address assigned to the gateway through which the destination host can be accessed. A valid Internet address in standard notation (12.13.14.15) must be supplied by the Ethernet administrator.

FTP Password Configuration

Use file transfer protocol (FTP) to create and remove directories, rename and delete files, and move files between a remote host and the VCO/4K switch. For example, use FTP to transfer VCO/4K core dump files from the VCO/4K to a remote host. The file can then be compressed or split (refer to the "FTP quote Command" section on page 4-50) and sent to Cisco for analysis.

To grant FTP access permission to the VCO, you must add privileged users to the database via the FTP Password Configuration screen.

Accessing the FTP Password Configuration Screen

Complete the following steps to access the FTP Password Configuration screen:

Step 1   Access the System Configuration screen (refer to the "Accessing the System Configuration Menu Screen" section on page 4-2).

Step 2   Type **L** and press **Enter**.

The FTP Password Configuration screen appears (see Figure 4-15).

Figure 4-15 FTP Password Configuration Screen

```
        F T P    P A S S W O R D    C O N F I G U R A T I O N

   Username        Access Level        Username      Access Level




                   Add/Del/Change:  _  (A/D/C Only)
                   Username:
                   Current Password:
                   New Password:
                   Verify Password:
                   Access Level:
```

To add a user, you must identify each user with a unique username, an alphanumeric password, and an access level. The access level must be set at 0, 1, 2, or 3 but has no affect on FTP usage.

The FTP Password Configuration screen contains a display-only area that lists the current users and their associated access levels, and a data entry area in which you can add, delete, or change user password configuration information.

FTP Password Configuration Screen Field Definitions

The FTP Password Configuration screen contains the following fields:

Username—*Display only.* Shows the functional name assigned to each system user.

Access Level—*Display only.* Shows the current access level of each system user. Valid values are 0, 1, 2 and 3. (This field has no affect on FTP usage.)

Add/Delete/ Change (A/D/C only)—*Data entry via main keypad.* Specifies the function you want to perform. Valid values are:

A—Adds a username to the database.

D—Deletes a username from the database.

C—Changes a password or access level in the database.

Username—*Data entry via main keypad*. Specifies the name assigned to the system user. A username can consist of 3 to 15 uppercase and/or lowercase alphanumeric characters. You must enter the username for all command functions.

Current Password—*Data entry via main keypad*. Use when changing a user password, to specify the password currently associated with the username entered. Note that this field is accessible only when you type C in the Add/Delete/ Change (A/D/C only) field. All data entered in this field is hidden by asterisk (*) characters for security.

New Password—*Data entry via main keypad*. Use when entering a new user or when changing a user's password, to specify the new password assigned to the user. Note that this field is accessible after you type either A or C in the Add/Delete/ Change (A/D/C only) field. A password can consist of 4 to 12 uppercase and/or lowercase alphanumeric characters. All data entered in this field is hidden by asterisk (*) characters for security.

Verify Password—*Data entry via main keypad*. Verifies the exact spelling/case of the new password (after you type A or C in the Add/Delete/ Change (A/D/C only) field). The data in this field must exactly match the contents of the New Password field. All data entered in this field is hidden by asterisk (*) characters for security.

Access Level—*Data entry via main keypad*. Specifies the access level assigned to each user. Valid values are 0, 1, 2 and 3. Although this field must be set for each user, it has no affect on FTP usage.

FTP Transfer of Files

The remote file transfer process is based on standard FTP, which involves two connections:

- Remote site—For the transfer of commands and reports.

- VCO/4K—For the transfer of data (file data transfer, directory listing transfer, etc.).

Note FTP is a TCP/IP or Internet tool and requires implementation on the remote site.

The following limitations apply:

- The data connection uses a specific address and is opened dynamically as required, then closed after transfer of data. The networking software in use has a limitation: an address, once used, cannot be used again for approximately 2 minutes. Therefore, it is strongly recommended that for successful transfer of data, an approximate 2-minute interval be scheduled between successive file transfers.

Note Due to the 2-minute limitation, do not use wildcards to transfer files as this would open data transfer connections in rapid succession.

- Transfer binary files in binary mode only.

- The current implementation of FTP restricts access to the C:\ drive only on the VCO/4K system.

- In accordance with the DOS file system, the file and directory names should be limited to eleven characters as follows:

  - Eight characters for the primary name.

– Three characters for the extension.

If the filename exceeds these limits and the files are transferred from the remote site to the VCO/4K, an unsuccessful file creation error occurs on the VCO/4K.

Accessing the VCO/4K via FTP

Complete the following steps to access the VCO/4K through FTP:

Step 1   Configure the VCO system for access. Add the users who will be allowed access to the VCO/4K through FTP. Use the FTP Password Configuration screen to add users.

Step 2   Invoke FTP from the FTP workstation. Type **ftp hostname**, where *hostname* is the IP address of the VCO. If the connection is successful, you are prompted for a username at the FTP prompt.

Step 3   Log in to the VCO/4K. If you enter a valid username, the system prompts for the password. If you enter an invalid username or password, the system returns the "Login failed" message.

Note   Only one user can access the system through FTP at a time. If a user is already logged in to the system, any subsequent login does not proceed until the current FTP user exits. Then the login procedure continues.

After you connect and log in to the VCO/4K system, you can create or remove directories, rename or delete files, or move files between the remote host and the VCO/4K.

Note   There is no correlation between the VCO/4K login (refer to the "Password Configuration" section on page 4-15) and the FTP login.

Examples of valid FTP commands are described in the following sections:

- "Transferring Files via FTP" section on page 4-48.
- "FTP quote Command" section on page 4-50.
- "Additional FTP Commands" section on page 4-52.

Note   Although FTP supports other commands, only the commands listed in this document are supported. If you encounter difficulties with unsupported commands, log out of the application and log in.

Transferring Files via FTP

You can transfer files between a remote host and the VCO/4K. Use the procedures described in the following sections to transfer files:

- "Setting the Mode for FTP".
- "Transferring Files from the VCO/4K to a Remote Host".
- "Transferring Files from a Remote Host to the VCO/4K".

Setting the Mode for FTP

Complete the following steps to set the mode for FTP:

Step 1   Log in to the system (refer to the "Accessing the VCO/4K via FTP" section on page 4-48).

Step 2   Type **type** at the FTP prompt to verify the current mode for the transfer of files.

> ✎
> **Note**   Binary files must be transferred in binary mode only.

The system responds by displaying the current mode.

Step 3   Type **ascii** to set the ASCII mode for file transfer, if needed. This is the default mode.

Step 4   Type **bin** to set the binary mode for file transfer.

Transferring Files from the VCO/4K to a Remote Host

Complete the following steps to transfer files from the VCO/4K to a remote host:

Step 1   Log in to the system (refer to the "Accessing the VCO/4K via FTP" section on page 4-48).

Step 2   Set the file transfer mode to binary (refer to the "Setting the Mode for FTP" section on page 4-49).

Step 3   Type **cd <pathname>** to navigate to the directory on the remote host where to transfer the files.

> ✎
> **Note**   The *pathname* is the directory on the remote host. For example: **cd C:/temp/dir**.

Step 4   Type **get <filename>** to transfer the file from the current directory on the VCO/4K to the directory on the remote host indicated in Step 1.

> ✎
> **Note**   The *filename* is the name of the file to transfer. For example: get C:/corel. If you want to change the name of the *filename* as you transfer it to the remote host, use the following command: **get <filename> <newfilename>**. The *newfilename* is the designated filename on the remote host after the transfer. The original *filename* remains unchanged on the VCO/4K.

Transferring Files from a Remote Host to the VCO/4K

Complete the following steps to transfer files from the remote host to the VCO/4K:

Step 1   Log in to the system (refer to the "Accessing the VCO/4K via FTP" section on page 4-48).

Step 2   Set the file transfer mode to binary (refer to the "Setting the Mode for FTP" section on page 4-49).

Step 3   Type **cd <pathname>** to navigate to the directory on the remote host where the file to be transferred resides.

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> **Note**   The *pathname* is the directory on the remote host. For example: **cd C:/temp/dir**.

Step 4   Type **put <filename>** to transfer the file from the remote host to the current directory on the VCO/4K.

> **Note**   The *filename* is the name of the file to be transferred.

FTP quote Command

You can invoke the compress, uncompress, split, and join functions through FTP. You can also invoke these functions on the VCO/4K from the Disk Utilities screen. Refer to the "Disk Utilities" section on page 5-12 for information on these Disk Utilities functions.

Use the **quote** command at the FTP prompt to execute the functions described in the following sections:

- "Compressing a File" section on page 4-50.
- "Uncompressing a File" section on page 4-50.
- "Splitting a File" section on page 4-50.
- "Joining a File" section on page 4-51.

> **Note**   The **quote** command is case sensitive; it must be typed in lowercase. The compress, uncompress, split, and join commands are not case sensitive; they may be typed in uppercase or lowercase.

Compressing a File

Type **quote compress <filename>** to compress a file, where *filename* is the name of the file to be compressed. For example, **quote compress C:core1**.

> **Note**   The name of the file to be compressed cannot contain a file extension.

Uncompressing a File

Type **quote uncompress <filename>** to uncompress a file, where *filename* is the name of the file to be uncompressed. For example, **quote uncompress C:core1**.

Splitting a File

Type **quote split <filename> <file_size>** to split a file, where *filename* is the name of the file to be split, and *file_size* is the desired size (in bytes) of the file segments. For example: **quote split C:core1 1440000**

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✎

Note   The recommended split size for floppy disks is 1,440,000 bytes.

Joining a File

Type **quote join <destination_filename> <source_filename>** to join a file, where *destination_filename* is the name of the file that is to contain all the file segments to be joined, and *source_filename* is the file segment(s) to be joined or appended to the *destination_filename.*

The destination file (i.e., *destination_filename*) is the file defined to be the composite of all the split files. After all file segments are joined, the destination file is identical to the original file before the split process occurred.

✎

Note   If the destination filename already exists, the source files are appended to it.

The source files (*source_filename*) are the files that will comprise the new (destination) file. The source files are the file segments that resulted from the split file function.

You can specify the source file by filename with no extension. If the filename is designated without an extension, all files with that filename are joined. For example, **quote join c:joinfile core1**

In the example above, the files are joined as if the extension was designated with the multicharacter (*) wildcard. The order is based on the alpha character ordering of the file's extension.

The join operation supports alphabetic ordered wildcard symbols. You can specify the source file with one of the following single character wildcards:

- The question mark (?).
- The asterisk (*).

The join operation automatically appends the split files in alphabetic order to the destination file. For example, use of the **?** wildcard in the file extension, **quote join c:joinfile core1.x??** This command joins all files named core1 with an extension beginning with x, followed by any two characters, to a file named joinfile. It joins multiple files because of the use of the **?** wildcard.

For example, use of the ***** wildcard in the file extension: **quote join c:joinfile core1.*** This command joins all files named core1, with *any* extension, to a file named joinfile. It joins *all* files because of the use of the * wildcard.

You may also initiate the join operation for each individual split file by indicating the specific filename with the full extension. For example, **quote join c:joinfile core1.xaa**. If you use this method, you must specify the files in the correct order by file extension (alphabetic order) in order to reproduce the original file. If there are additional file segments to be added to the destination file, you must use the syntax above to append each one. For example, the next command would be **quote join c:joinfile core1.xab**.

If you issued this command after the **quote join c:joinfile core1.xaa** command, the file named core1.xab would be appended to the file named joinfile, after the contents of the file core1.xaa.

✎

Note   If you append one file at a time, you must append the files in the order which you want them added to the destination file.

Additional FTP Commands

You can type the following additional FTP commands at an FTP prompt to manipulate files and directories:

ls—Lists the files in the current directory.

dir—Lists the file and directory names in the current VCO/4K directory, along with additional information such as size, date of creation, and date of recent modification.

pwd—Displays the current directory pathname.

cd <pathname>—Changes the current directory to the directory indicated by *pathname*. The *pathname* is a directory. Use only absolute pathnames starting with /. All absolute pathnames are relative to the C: drive.

mkdir <dirname>—Creates a new directory under the current directory. The *dirname* is the directory name. If you are unable to create a directory (typically as a result of restricted privileges), an error message is displayed.

rmdir <dirname>—Removes the directory indicated. The *dirname* is the directory name. The directory must be empty. The directory must be located in the current directory. If the directory does not exist, an error message is displayed.

delete <filename>—Deletes the *filename* indicated from the current directory. If the *filename* does not exist, an error message is displayed. If the *filename* does not reside in the current directory, include a pathname in the command.

rename <filename new_filename>—Renames the *filename* to the *new_filename*.

rename <dirname new_dirname>—Renames the *dirname* to the *new_dirname*.

bye—Exits the FTP application.

close—Closes the FTP session but does not exit the FTP application.

Multiple Tone Plan Configuration

Use the Multiple Tone Plan Configuration screen to configure the tone plans associated with the multiple tone plan feature. Several tone plans can be configured in a single VCO/4K, with no more than six of the tone plans containing MFCR2 tones. Refer to the *Cisco VCO/4K System Software Version 5.2(n) Release Notes* for a list of currently available tone plans.

The DTG/DTG2 cards are not supported for users of the multiple tone plan feature. Complete the following steps before using the VCO/4K system administration multiple tone plan feature configuration menu options:

Step 1   Ensure that the default multiple tone plan SPC-TONE card type is in service (SPC-TONE provides the same functionality as DTG/DTG2).

Step 2   Ensure that the SPC-OUTP outpulsing resource is in service and added to a resource group.

Step 3   Take the DTG/DTG2 cards out of service (OOS).

You are now ready to configure the multiple tone plan feature.

Accessing the Multiple Tone Plan Configuration Screen

Complete the following steps to access the Multiple Tone Plan Configuration screen:

Step 1   Access the Administrator Main Menu screen.

Step 2   Type **B** and press **Enter**.

The System Configuration Menu screen is displayed. The cursor is located at the Enter Selection prompt.

Step 3   Type **M** and press **Enter**.

The Multiple Tone Plan Configuration screen appears (see Figure 4-16).

Figure 4-16   Multiple Tone Plan Configuration Screen

```
        M u l t i p l e   T o n e   P l a n   C o n f i g u r a t i o n

                     Default Tone Plan:   NORTHAMERICA

    TONE PLAN ID          NAME           TONE PLAN ID          NAME
        1.    _____           11.    _____
        2.    _____           12.    _____
        3.    _____           13.    _____
        4.    _____           14.    _____
        5.    _____           15.    _____
        6.    _____           16.    _____
        7.    _____           17.    _____
        8.    _____           18.    _____
        9.    _____           19.    _____
       10.    _____           20.    _____




                        0 Tones Installed
```

The Multiple Tone Plan Configuration screen consists of one screen. The data that this screen contains is used to identify specific tone plans with which to further configure the VCO/4K system via the following administration screens and extended mode commands:

- SPC-TONE Plan Configuration screen
- Inpulse Rules Table screen
- Outpulse Rules Table screen
- ISDN Port Control ($49) command
- Voice Path Control ($66) command
- DTMF Collection Control ($67 Standard) command
- DTMF Collection Control ($67 Enhanced) command
- MF Collection Control ($68) command
- Outgoing Port Control ($69) command

   • Incoming Port Control ($6A) command

Refer to the *Cisco VCO/4K Extended Programming Reference* for more information on extended mode commands.

Multiple Tone Plan Configuration Screen Field Definitions

The Multiple Tone Plan Configuration screen contains the following fields.

Default Tone Plan—*Data entry via Select key*. Identifies the name of the default tone plan installed.

> **Note**   Any installed tone plan can be the default tone plan.

Tone Plan ID—*Display only*. Describes the tone plan ID number associated with the Name directly to its right.

Name—*Date entry via Select key*. Identifies the name of the tone plan associated with the Tone Plan ID directly to its left.

n Tones Installed—*Display only*. Identifies the number of tone plans, other than the default, installed on the VCO/4K system. Access the Tone Files Installation/Removal screen to determine the names of the tone plans installed.

Configure the Multiple Tone Plan Feature

Complete the following steps to assign multiple tone plan names to ID numbers in the system database:

Step 1   Access the Multiple Tone Plan Configuration screen (refer to the "Accessing the Multiple Tone Plan Configuration Screen" section on page 4-53).

The cursor is located at the Default Tone Plan entry field.

Step 2   Use the Select key to select the appropriate default tone plan for your configuration requirements.

> **Note**   If the correct default tone plan is listed, proceed to Step 3.

Step 3   Use the **Next Field** key to position the cursor in the Name entry field associated with the first Tone Plan ID.

Step 4   Use the **Select** key to select an appropriate tone plan for your configuration requirements.

Step 5   Press the **Next Field** key to position the cursor in the next available Name entry field.

Step 6   Use the **Select** key to select an appropriate tone plan for your configuration requirements.

Step 7   Repeat Step 5 and Step 6 for the remaining Name fields, as needed.

Step 8   Press **Enter**.

The following message appears at the bottom of the screen:

```
Press 'Y' to Confirm Change
```

Step 9   Press **Y**.

The following message appears at the bottom of the screen:

```
Tone Configuration Changed!
```

Note   Your configuration may not require that all available tone plan selections be made; select only those needed. Refer to the *Cisco VCO/4K System Software Version 5.2(n) Release Notes* as you configure the multiple tone plans in the VCO/4K system to ensure that the limit of six MFCR2 tone plans in one system is not exceeded.

The selections are saved to the VCO/4K system configuration table; the data is now backed up and can be restored after a system reboot.

You have assigned multiple tone plan names to ID numbers. Refer to the "SPC-TONE Plan Configuration" section on page 3-79 to assign specific tone plans to individual SPC spans of the VCO/4K.

Maintenance

Use the Maintenance group of functions to make changes to the system hardware or software:

- Add, delete, or change the status of line, trunk or service circuit cards.
- Print or display system logs and trace files.
- Switch the active controller in redundant systems.
- Add, delete, edit, update, or test files in voice prompt libraries.
- Set internal, incoming, or external timing link selection for digital trunks.

Figure 5-1 shows the options accessible from the Maintenance Menu screen.

Figure 5-1   Maintenance Menu Structure
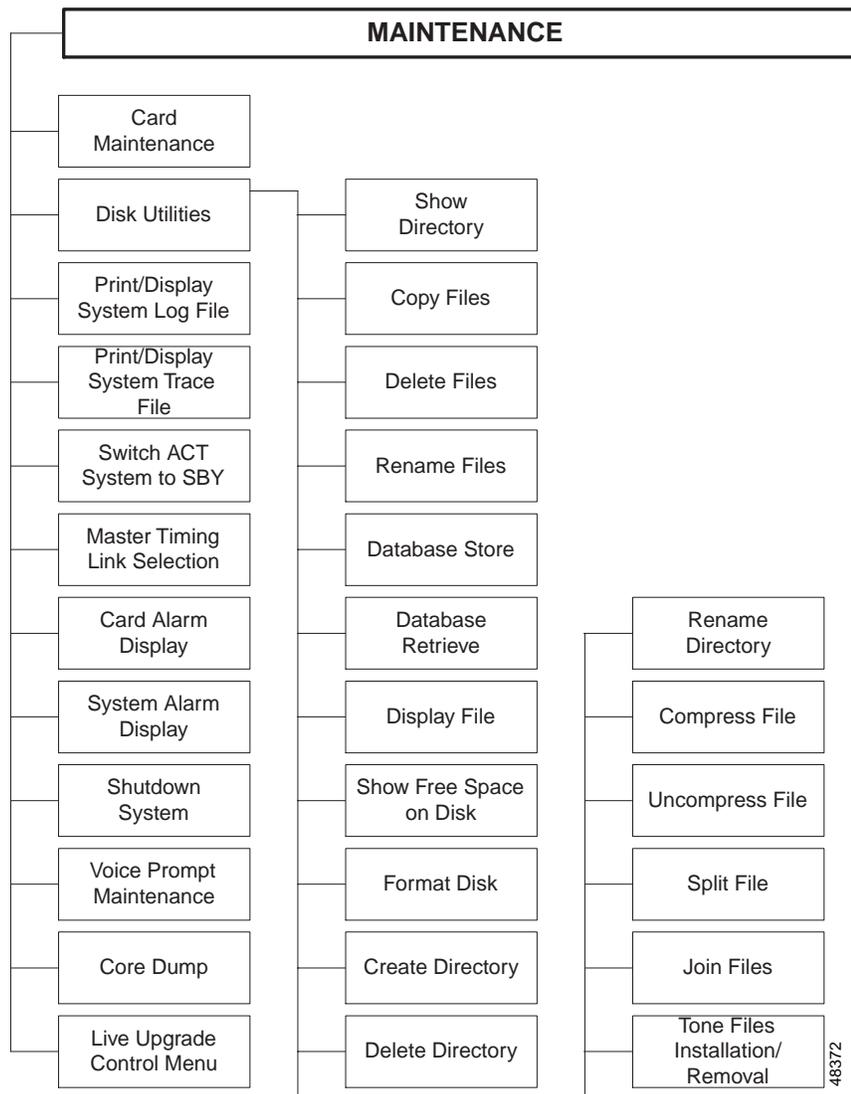
Accessing the Maintenance Menu Screen

Complete the following steps to access the Maintenance Menu screen:

Step 1   Access the Administrator Main Menu screen.

Step 2   Type **C** and press **Enter**.

The Maintenance Menu screen appears (see Figure 5-2). The cursor is located in the Enter Selection field.

Figure 5-2   Maintenance Menu

```
                  M A I N T E N A N C E    M E N U

          A) Card Maintenance
          B) Disk Utilities
          C) Print/Display System Log File
          D) Print/Display System Trace File
          E) Switch ACT System To SBY
          F) Master Timing Link Selection
          G) Card Alarm Display
          H) System Alarm Display
          I) Shutdown System
          J) Voice Prompt Maintenance
          K) Core Dump
          L) Live Upgrade Control



             Enter Selection: _
```

The cursor is located in the Enter Selection field. Type the letter that precedes the function you want and press **Enter**. To return to the Administrator Main Menu, press the **Prev Menu**, **Main Menu**, or **Exit** key. The functions that can be accessed from this menu are discussed in the remainder of this chapter.

Card Maintenance

Use Card Maintenance to add cards to or delete cards from the database and change the status of a card, a port on a card, or a span on a card.

Accessing the Card Maintenance Screen

Complete the following steps to access the Card Maintenance screen:

Step 1   Access the Maintenance Menu screen (refer to the "Accessing the Maintenance Menu Screen" section on page 5-2).

Step 2   Type **A** and press **Enter**.

The Card Maintenance Menu screen appears (see Figure 5-3). The cursor is located in the ADD, DELETE, CHANGE STATUS (A,D,C,P) field.

Figure 5-3   Card Maintenance Screen

```
                         C A R D    M A I N T E N A N C E

              R L S        CARD TYPE              V.RV   S
              --------     --------------------   -----  -
              1 1 1-1      Network Bus            X.XX   A
              1 1 1-2      Tone Generator         X.XX   A
              1 1 2-1      Network Bus            X.XX   S
              1 1 2-2      Tone Generator         X.XX   S
              1 1 7-1-1    ICC-T1                 X.XX   A
              1 1 7-1-2    ICC-T1                 X.XX   O
              1 1 7-1-3    ICC-T1                 X.XX   M
              1 1 7-1-4    ICC-T1                 X.XX   M




ADD, DELETE, CHANGE STATUS (A,D,C,P): _   _ _ ____   _____ _
   AND PORT DEFINITION:             272 Out Of 1152 Time-Slots Allocated
 1- 64 _____ _____ _____ _____ _____ _____ _____ _____
65-128 _____ _____ _____ _____ _____ _____ _____ _____
```

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Card Maintenance consists of up to 15 screens. Each screen lists 11 card entries, ordered according to their location within the system. A message towards the bottom of each screen states the number of time slots for which your system is licensed (actual number of purchased time slots) and how many time slots are currently in use (allocated).

✎
Note   In the example in Figure 5-3, 1152 time slots were purchased for that switch, of which 272 have already been allocated. The time slot information on the Card Maintenance screen should match the time slot information displayed on the main menu and License Configuration screens.

Use the **Prev Screen** and **Next Screen** keys to page through the listings. Use the **Print Screen** key to obtain a hard copy of any of these screens.

Card Maintenance Screen Field Definitions

The Card Maintenance screen contains the following fields:

R L S—*Display only.* The Rack-Level-Slot/Group/Span hardware address (physical location) of the card.

CARD TYPE—*Display only.* Shows the kind of card in that location. You can change this field using the ADD, DELETE, CHANGE STATUS AND PORT DEFINITION (A,D,C,P) field.

V.RV—*Display only.* The version and revision level of the firmware installed on the card. Use this field to verify that firmware revisions for all network interface and service circuit cards are at the current level. The information in this field appears only if the status (S) of the card is other than Out of Service (O). For a listing of current firmware version/revision levels, refer to the current customer release notes.

Note If you are running a customer patch, you may see an inconsistency in the SPC.DWN and ICC.DWN file version revision numbers listed in this column. The inconsistency is due to the two character field length; customer patch version revision numbers are greater than two digits and the system converts them to binary coded digits for display purposes. Formal releases always contain two digits and do not experience this inconsistency.

S—*Display only.* The current status of the card. You can change this field using the ADD, DELETE, CHANGE STATUS AND PORT DEFINITION (A,D,C,P) field. Valid values are:

A—Active. Ports on this card can be involved in active calls and can be allocated to new calls.

O—Out of service. No ports on this card can be involved in active calls; no ports are allocated to new calls.

S—Standby. Valid for one of the two NBC3s in redundant systems only, one of the two DTG or DTG-2s in redundant systems, redundant BRCs, or redundant Subrate Switching Cards (SSCs).

Note VCO/4K and VCO/20 systems support only the DTG-2 Tone Generator card. VCO/80 systems support either the DTG-2 or DTG.

M—Maintenance. One or more ports on this card may be involved in active calls; no ports are allocated to new calls.

D—Diagnostics. No ports on this card are involved in calls or allocated to new calls.

C—Camped on. Status change to Diagnostics mode was attempted while ports on this card were still involved in calls; no ports are allocated to new calls; card remains in this mode until you take further action.

R—Remote Loopback. Valid only for PRI and programmable trunk cards.

P—Payload Loopback. Valid only for programmable trunk cards.

ADD, DELETE, CHANGE STATUS AND PORT DEFINITIONS (A,D,C,P)—*Data entry via main keypad.* Specifies the function to perform.

Note You can add or delete Four Span T1/E1, MVDC T1, and ICC cards while the change state and port options are performed on a span. Operating on a span requires an interface identifier (i.e., 1 1 4-3, or 1 1 4-3-1 for ICC and SPC cards).

Note You have the option of changing the status of all spans of an MVDC T1 or ICC card with a single command, or specifying a particular span. For example, to activate a card, type **1 1 4** and all spans in slot 4 are activated.

Adding a Card

You can add a card to the system database from the Add function of the Card Maintenance screen. The card does not have to be installed in the system before it can be added to the database.

Consider the following when adding a card to the database:

- When a card other than a programmable trunk card is added, its initial status is O (out of service). Use the Change Status function to bring the card on line and make it available for use by the system. Refer to the "Changing the Status of a Card" section on page 5-7 for information on the Change Status function.

- When you add a programmable trunk card (Four Span T1, Four Span E1, MVDC T1, and ICC), all ports are allocated. When a programmable trunk card is deleted, all spans must be OOS. Ports are displayed one span at a time. The download occurs when the first span is activated.

- When adding an NBC3 card, the card location must have an R-L-S of either 1 1 1-1 or 112-1. No other hardware address is valid for an NBC3.

- A BRC can reside in Slots 3 to 16 of the Master Port Subrack or Slot 1 or 2 of an Expansion Port Subrack.

    Note   BRCs are only supported in VCO/80 and SDS-1000 systems.

- Deactivate individual ports on a card or span when you add a card by combining the Add command with the Port Definition command. Directions for this operation are included in this subsection. Refer to the "Changing the Status of a Port" section on page 5-11 for more information on the Port Definition command.

- Except for DRC 24, DRC 48, and SPC-DTMF, each port on a card consumes one time slot of the total time slots licensed. When you add a new card to the database, the number of available time slots is reduced by the number of ports on the card. When you are within 64 time slots of your Time slot Allocation Capacity, you are warned with a message. When adding a new card causes the number of ports to exceed the timeslot capacity, an error message is displayed and you are unable to add this or other cards to the system until you remove existing cards or upgrade your Timeslot Capacity License. (Contact your Cisco Systems Sales Representative for information on upgrading your license.)

    Note   Each SPC-TONE, DTG-2 or DTG consumes 64 time slots. These time slots are "free," that is, provided at no charge by Cisco. The number of time slots available is adjusted upward to reflect the free DTG time slots, as displayed in the Card Maintenance, License Configuration, and main menu screens. Sixty-four time slots in the range of 0x4C0 to 0x4FF are reserved for each service engine configured as SPC-TONE.

- You can adjust the number of time slots required for a 64- or 128-port IPRC card by modifying the PLAYBACK PORTS field on the IPRC Card Configuration screen.

- When adding a Subrate Switching Card (SSC), you must first allocate the ports. To allocate SSC ports, go to Database Administration, then to the Subrate Configuration screen. Type the number of ports to be allocated, in multiples of 8, in the Timeslots Allocated for Subrate field.

Complete the following steps to add a card to the database:

Step 1   Access the Card Maintenance screen (refer to the "Accessing the Card Maintenance Screen" section on page 5-3).

The Card Maintenance screen appears. The cursor is located in the command field.

Step 2   Type **A** and press the **Next Field** key. The cursor moves to the first R-L-S field.

Step 3   Type the physical location: rack/cabinet number, level number, and slot number, and press the **Next Field** key after each entry.

The cursor moves to the Card Type field and the "Hit 'Select' Key To Select Card Type..." message appears.

Step 4   Use the **Select** and **Reverse Select** keys to scroll through the values until the correct card type is displayed.

> **Note**   The Announcement and Primary Rate/DSS1 card types, although selectable, are not supported.

Step 5   Deassign ports as required:

- If no ports are to be deassigned (marked as unavailable) at this time, proceed to Step 6.

- To deassign individual ports, use the **Next Field** key to advance the cursor to the port(s) to be placed out of service. Use the space bar to eliminate information in that field and deassign the port(s).

Step 6   Press **Enter**.

The "Card Is Added, But Out Of Service!" message appears as the database is automatically updated. The screen display is updated to show the addition of the card to the list. The Status field indicates the card is out of service, and all ports are shown as available. The cursor returns to the command field.

Step 7   Repeat Step 2 through Step 6 for all cards you want to add.

Step 8   Press the **Exit** key to return to the Maintenance Menu screen, or remain at this screen to change the status of the new cards.

To exit the Card Maintenance screen without making any changes, press the **Exit**, **Prev Menu**, or **Main Menu** key. No changes are made to the database unless **Enter** is pressed.

Changing the Status of a Card

You can place cards and spans in Active, Out of service, Diagnostics, Maintenance, Remote Loopback, or Payload Loopback mode using the Card Maintenance screen.

Consider the following when making card and/or span status changes:

- A card must be in the database before its status can be changed.

- When you change a card to Active, the screen is not updated until the card is brought into service.

- If you place a card into Active or Maintenance mode, you must first physically install it in the system.

- To reset an active card, change the status from Active to Out of Service then back to Active.

- You can place a card into Diagnostics mode only if it is already in Active or Maintenance mode.

- When you change a card to Out of service, any calls linked to the ports on that card are torn down. If any ports on the card are involved in active calls, a message indicating the number of ports on the card that are involved in active calls is displayed, along with a prompt to continue or abort the process. If you continue, the calls are torn down and the card status is changed. If you abort the process, there is no change to the card status or the active calls.

- You can change a card with ports involved in active calls from Active to Maintenance or Diagnostic mode without affecting calls in progress (except for programmable trunk cards; refer to the next item in this list). When the card mode is changed from Active, ports on the card are no longer hunted for call allocation.

- You can change cards other than programmable trunk cards to Active, Maintenance, Out of service, Diagnostics, or Remote Loopback mode. (Remote Loopback only applies to PRI/N cards.)

- You can change programmable trunk cards to Active or Out of service mode. When a programmable trunk card is active, each span can be changed to Active, Maintenance, Out of Service, Diagnostics, Remote Loopback, or Payload Loopback. (Payload Loopback applies only to programmable trunk cards in ESF mode. In this mode, the T1 stream is looped back to the network with a new frame.)

- When a programmable trunk card changes from Active or Maintenance to Diagnostics mode, any calls linked to the ports on that card are torn down. If any ports on the card are involved in active calls, a message indicating the number of ports on the card that are involved in active calls is displayed, along with a prompt to continue or abort the process. If you continue, the calls are torn down and the card status is changed. If you abort the process, there is no change to the card status or the active calls. On programmable trunk cards the T1 signal is looped back to the card while it transmits a signal consisting of all unframed ones. This causes a loss of carrier on Rev. B T1 cards.

- The status of an NBC3 cannot be changed from this function. BRC switchover is caused by changing one of the active BRCs to Out of Service. The redundant pair then automatically transitions to active while the first pair is reset and is placed in standby mode. A BRC can be changed to Out of Service only if there is a redundant BRC pair for the affected subrack, and that pair is in standby mode. BRCs cannot be placed into Maintenance, Standby, or Diagnostic mode; only Active or Out of Service. BRCs are Active only in pairs; if one card in the pair goes out of service (such as when it is physically removed from the rack), the other card transitions to standby causing immediate loss of service to the port subrack in systems with nonredundant BRCs.

- You can take DTG or DTG-2 cards out of service only if another DTG or DTG-2 in standby mode exists in the subrack.

- When an IPRC is changed to Active mode, the voice announcement application is downloaded to it automatically from hard disk, if necessary. IPRCs are only downloaded following a power-up reset or if the application on the card does not match the download file on the system disk. If a download is not successful, the card remains in Maintenance mode. If the download is successful, the voice prompt information is downloaded and the IPRC goes to Active.

Note Any active IPRC that has not had prompts downloaded to it has a status of Maintenance.

- When a CPA is changed to Active mode, the tone detection application is downloaded to it automatically from hard disk, if necessary. CPAs are only downloaded following a power-up reset or if the application on the card does not match the download file on the system disk. If a download is not successful, the card remains in Maintenance mode (any active CPA that is downloaded has a status of Maintenance). If a download is successful, the CPA goes to Active. When a status change to Diagnostic mode is performed, the system checks if any ports on the card specified are linked to a call. If one or more ports are active, the card is placed into Camped On mode. Diagnostic routines

can now be run; the system skips any ports linked into a call. If, later, you attempt to change from Camp On to Diagnostics, the system again checks if any ports on that card are still linked into a call. If so, the "Ports Still Active, Left In Camp On" message is displayed.

- Remote Loopback mode applies only to PRI and programmable trunk cards. This mode allows you to run diagnostics on the total loop (trunks from the far end interface to the VCO and back to the far end). The card must first be Active before its status can be changed to Remote Loopback. Refer to the *Cisco VCO/4K ISDN Supplement* and the *Cisco VCO/4K Technical Descriptions* for more information on the ISDN PRI option.

- Do not change the status of a DTG to out of service if the VCO/4K is configured with both DTG and SPC-OUTP outpulsing resources, unless you first verify that the SPC-OUTP is in service and added to a resource group.

Complete the following steps to change the status of a card:

Step 1   Access the Card Maintenance screen (refer to the "Accessing the Card Maintenance Screen" section on page 5-3).

The cursor is located in the ADD, DELETE, CHANGE STATUS AND PORT DEFINITION (A,D,C,P) field.

Step 2   Type **C** and press the **Next Field** key.

The cursor moves to the first R-L-S field.

Step 3   Type the physical location: rack/cabinet number, level number, and slot number, and press the **Next Field** key after each entry.

The display is updated to show the card type, current status, available ports, and the screen that contains the selected card's listing, if not already displayed. The cursor moves to the State field and the "Type Status, Then Depress Enter!" message appears.

✎
Note   For Four Span T1/E1 and MVDC T1 cards, you must specify the span, otherwise the message "Interface Required" appears. For ICC and SPC cards, you must specify the group and interface.
When changing the status of a multi-span card, you do not need to specify a particular span, although this option is still available. For example, to activate all spans of a multispan card, type **1 1 14** and all spans in slot 14 become active.

Step 4   Type the appropriate character in the Status field and press **Enter**. Refer to "Card Maintenance Screen Field Definitions" section on page 5-4 for field descriptions.

- If you type O, or if the card type is a programmable trunk card and you typed D, proceed to Step 5.

- If you type A, D (other than a programmable trunk card), M, or R, the database is automatically updated and the screen display is updated to indicate any additional status messages and the change of status when it occurs. The cursor returns to the ADD, DELETE, CHANGE STATUS AND PORT DEFINITION (A,D,C,P) field and the "Card Status Is Changed" message appears.

If no ports on the specified card are involved in active calls, the database is automatically updated and the screen display is updated to show the change of status when it occurs. The cursor returns to the command field and the "Card Status Is Changed" message appears.

If ports on the card specified are involved in active calls, the "xx ports active, Continue/Abort (C/A)" message appears.

Step 5   Perform the status change in one of the following two ways:

- To perform the status change now, type **C** and press **Enter**.

All ports on this card involved in active calls are detached and the calls are torn down. The database is automatically updated and the screen display is updated to show the change of status when it occurs. The cursor returns to the ADD, DELETE, CHANGE STATUS AND PORT DEFINITION (A,D,C,P) field and the "Card Status Is Changed" message appears.

- To abort and attempted later, type **A** and press **Enter**. The "Operation Aborted" message appears. (There is no effect on any call in progress and the card status is not changed.)

Step 6   Repeat Step 2 through Step 5 for all status changes you want to make.

Step 7   Press the **Exit** key to return to the Maintenance Menu screen.

To exit the Card Maintenance screen without making any changes, press the **Exit**, **Prev Menu**, or **Main Menu** key. No changes are made to the database unless you press **Enter**.

Deleting a Card

Use the Delete function on the Card Maintenance screen to delete a card from the system database. Consider the following when deleting a card from the system database:

- A card must be out of service to be deleted, and all ports on that card must be removed from their resource group. Refer to the "Changing the Status of a Card" section on page 5-7 for information on changing the status of a card.
- Refer to Chapter 3, "Database Administration," for information on the Resource Group Summary and Configuration functions.

Complete the following steps to delete a card from the database:

Step 1   Access the Card Maintenance screen (refer to the "Accessing the Card Maintenance Screen" section on page 5-3).

The cursor is located in the ADD, DELETE, CHANGE STATUS AND PORT DEFINITION (A,D,C,P) field.

Step 2   Type **D** and press the **Next Field** key.

The cursor moves to the first R-L-S field.

Step 3   Type the physical location: rack/cabinet number, level number, and slot number, and press the **Next Field** key after each entry.

> **Note**   You can delete an MVDC T1, ICC, or SPC by card or by span. To delete by card, type the rack, level, and slot numbers. To delete by span, type the rack, level, and slot/group/span or interface.

The display is updated to show the card type, current status, available ports, and the screen that contains the selected card's listing, if not already displayed. The "To Delete Card, Depress Enter!" message appears.

Step 4   Press **Enter**.

The "Are You Sure? Then, Depress Enter!" message appears.

Step 5   Press **Enter**.

Step 6   The database is automatically updated and the screen display is updated to show the modifications. The cursor returns to the ADD, DELETE, CHANGE STATUS AND PORT DEFINITION (A,D,C,P) field, and the "Card is Deleted" message appears.

Step 7   Repeat Step 2 through Step 5 for all cards you want to delete.

Step 8   Press the **Exit** key to return to the Maintenance Menu screen.

To exit the Card Maintenance screen without making any changes, press the **Exit**, **Prev Menu**, or **Main Menu** key. No changes are made to the database unless you press **Enter** twice.

Changing the Status of a Port

You can mark individual ports on an internal service circuit or network interface card as unavailable (0) from the Port Definition function on the Card Maintenance screen. Ports previously marked as unavailable can also be returned to use (1) with this function. This function is also known as activating or deactivating a port.

Consider the following when changing the status of a port:

- If you use the Diagnostics Set Up Path function, first deactivate the port for which a path is to be set by entering **P**. While the port is deactivated, it cannot be allocated to a call. To make the port available for use, enter **P** to activate it.

- Use the **P** command to reset a port. First deactivate the port, then reactivate it.

- Because the NBC3s and BRCs have no ports, you cannot use this command for those cards. If you use this command for these cards, the system displays an error message.

- When you deactivate one or more ports, the system checks to see if any are involved in active calls. If so, a message indicating the number of ports involved in active calls is displayed, along with a prompt to continue or abort the process. If you continue, the calls are torn down and the ports are deactivated. If you abort the process, there is no change to the port or the active calls.

- When you deactivate a port, call processing no longer attempts to allocate it to any call; you do not need to remove the port from its resource group. This allows maintenance personnel to minimize the effects of a single port failure on the system.

- Outgoing ports that were deactivated by the Auto Makebusy feature are displayed in the same way that ports were deactivated from this screen: the port field contains 00. Ports deactivated by Auto Makebusy can be reactivated from this screen. (The Auto Makebusy feature monitors alarm thresholds for outgoing ports. When the alarm threshold for a port is exceeded, Auto Makebusy automatically deactivates that port.)

Complete the following steps to change the status of a port:

Step 1   Access the Card Maintenance screen (refer to the "Accessing the Card Maintenance Screen" section on page 5-3).

The cursor is located in the ADD, DELETE, CHANGE STATUS AND PORT DEFINITION (A,D,C,P) field.

Step 2   Type **P** and press the **Next Field** key.

The cursor moves to the first R-L-S field.

Step 3   Type the physical location: rack/cabinet number, level number, and slot number, and press the **Next Field** key after each entry.

The display is updated to show the card type, current status, available ports, and the screen that contains the selected card's listing, if not already displayed. The cursor moves to the first Port field and the "Type Port Numbers, Then Depress Enter!" message appears.

> ✎
>
> **Note**   For Four Span T1/E1 and MVDC T1 cards, you must specify the span or the message "Interface Required" appears. For ICC and SPC cards, you must specify the group and interface.

Step 4   Use the **Prev Field**, **Next Field** keys, and the main keypad, to move the cursor to the desired port. Ports are organized sequentially, in clusters of eight.

   a.   To remove a port from service, move the cursor to the port and type **0**.

   b.   To make a port available, move the cursor to the port and type **1**.

Step 5   After you change the status of a port, press **Enter**.

Step 6   Complete one of the following options, which are dependent upon your configuration requirements:

   •   If no ports are being deactivated or if none of the ports specified to be deactivated are involved in active calls, the "Adjusting Ports" message appears while the database is being updated.

      When completed, the display is updated and the "Done!" message appears.

      The cursor is located in the ADD, DELETE, CHANGE STATUS AND PORT DEFINITION (A,D,C,P) field. Proceed to Step 8.

   •   If any of the ports specified are involved in active calls, the "xx ports active, Continue/Abort (C/A)" message appears. Proceed to Step 7.

Step 7   Complete one of the following options, which are dependent upon your configuration requirements:

   •   To perform the status change now, type **C** and press **Enter**.

      All ports specified that are involved in active calls are detached and the calls are torn down. While the database is being updated, the "Adjusting Ports" message appears.

      When completed, the display is updated and the "Done!" message appears.

      The cursor returns to the ADD, DELETE, CHANGE STATUS AND PORT DEFINITION (A, D, C, P) field. Proceed to Step 8.

   •   To abort the status change and try again later, type **A** and press **Enter**.

      The "Operation Aborted" message appears.

      The cursor returns to the ADD, DELETE, CHANGE STATUS AND PORT DEFINITION (A, D, C, P). There is no effect on any call in progress and the card status is not changed. Proceed to Step 8.

Step 8   Repeat Step 2 through Step 7 for any cards on which you want to change port status.

Step 9   Press the **Exit** key to return to the Maintenance Menu screen.

To exit the Card Maintenance screen without making any changes, press the **Exit**, **Prev Menu**, or **Main Menu** key. No changes are made to the database you press **Enter**.

Disk Utilities

The Disk Utilities menu provides access to the DOS-based utilities that allow you to perform the following functions:

- View directory listings for the hard and floppy disks
- Copy files between the hard and floppy disk or to another directory on the hard disk
- Delete files from the hard or floppy disk
- Rename files
- Store all database files on floppy disk (database backup)
- Retrieve all database files from a floppy disk
- Display the contents of a file (in hex)
- Show how much free space exists on the hard or floppy drive
- Format the hard disk
- Install and remove multiple tone plan feature tone plan files

The system hard and floppy drives use the same DOS disk format as IBM-compatible PCs. The system floppy disk drives require 3.5-inch double-sided, high-density (DS, HD) diskettes. Floppy disks formatted or copied on a DOS PC are compatible with the system. There are some differences between PC-DOS and system DOS; refer to the "Filename Conventions" section on page 5-13.

Filename Conventions

To move system files, use the same basic filename conventions as standard PC-DOS, with the exception of the backslash (\) character. Files are identified by a drive specifier (A: for floppy drive and C: for hard drive), a filename of between one and eight alphanumeric characters, and a three-character filename extension following a period (.ext). In addition, you can specify a file as part of a directory path. The VCO/4K file system requires you to use a forward slash (/) character to separate directories and filenames (similar to UNIX) rather than standard PC-DOS backslash (\) character.

Two wildcard characters can also be used within filenames and extensions:

- A question mark (?) is a single-character wildcard.
- An asterisk (*) is a multi-character wildcard.

When you use a question mark (?) in a filename or extension, it indicates that any character can occupy that position. For example, the filename AB?DE.XYZ specifies all filenames with five characters, begin with AB, have any next character, are followed by DE, and end with the extension XYZ.

When you use an asterisk (*) in a filename or extension, it indicates that any character can occupy that position. It also indicates that any characters can occupy the remaining positions in the filename or extension. The asterisk wildcard is commonly used to specify all files with the same extension (*.XYZ) or all files with a common filename (ABCDE.*).

Two terms are used to describe the relationship of files during a Copy File operation:

- Source file—the original file being copied (Copy From? field).
- Destination file—the original file being copied (Copy From? field).

Note   These terms appear both in this text and in messages written to the screen and system log file.

Accessing the Disk Utilities Menu Screen

Complete the following steps to access the Disk Utilities Menu screen:

Step 1   Access the Administrator Main Menu screen.

Step 2   Access the Maintenance Menu screen (refer to the "Accessing the Maintenance Menu Screen" section on page 5-2).

Step 3   Type **B** and press **Enter**.

The Disk Utilities Menu screen appears (see Figure 5-4). The cursor is located in the Enter Selection field.

Figure 5-4   Disk Utilities Screen

```
                    D I S K    U T I L I T I E S    M E N U

        A) Show Directory                M) Compress File
        B) Copy Files                    N) Uncompress File
        C) Delete Files                  O) Split File
        D) Rename Files                  P) Join Files
        E) Database Store                 Q) Tone Files Installation/Removal
        F) Database Retrieve
        G) Display File
        H) Show Free Space On Disk
        I) Format Disk
        J) Create Directory
        K) Delete Directory
        L) Rename Directory

                Enter Selection: _
```
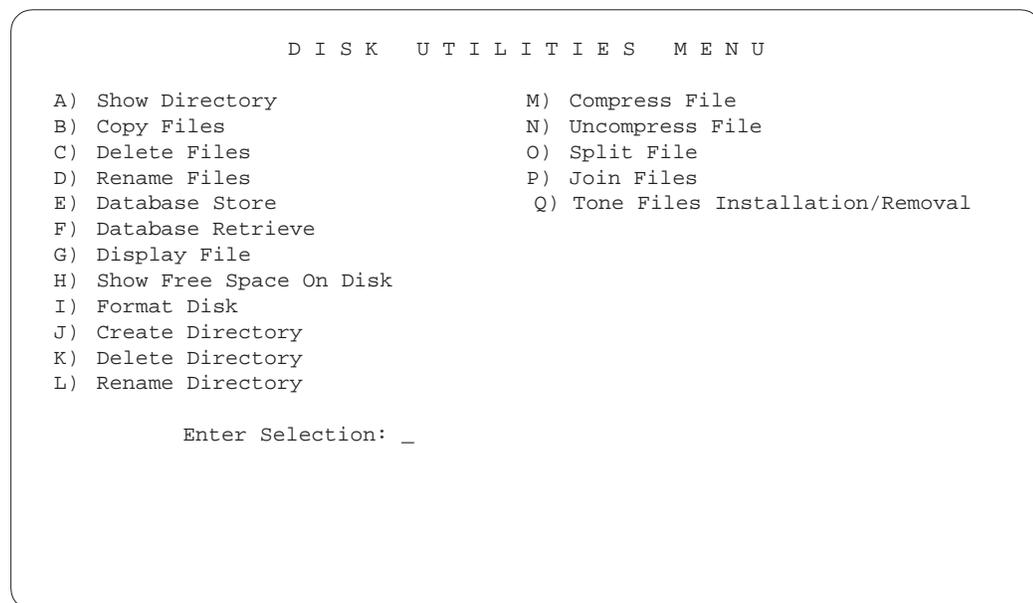
Use the **Print Screen** key to obtain a hard copy of this screen.

The Disk Utilities Menu screen options are described in the following sections:

- Show Directory, page 5-15.
- Copy Files, page 5-17.
- Delete Files, page 5-18.
- Rename Files, page 5-19.
- Database Store, page 5-20.
- Database Retrieve, page 5-20.
- Display File, page 5-21.
- Show Free Space on Disk, page 5-22.
- Format Disk, page 5-23.

- Create Directory, page 5-24.

- Delete Directory, page 5-25.

- Rename Directory, page 5-25.

- Compress File, page 5-26.

- Uncompress File, page 5-27.

- Split File, page 5-27.

- Join Files, page 5-29.

- Tone Files Installation/Removal, page 5-31.

Show Directory

Use the Show Directory option to view a list of all directories and files contained in a specified directory on either the system hard drive (C:) or floppy drive (A:). To view a directory on the floppy drive, insert the floppy disk into the drive before you press **Enter**. The system displays the following information:

- File/Directory name—The name of the file. Directories are indicated by the characters <DIR> following the directory name.

- File Extension—The three-character file extension for that file. Directories do not have a file extension.

- File Size—The size of the file in bytes. Directory sizes are not displayed.

- Creation Date—The date the file or directory was created or altered.

- Creation Time—The time (in HH:MM:SS format) at which the file was created or altered. A 24-hour clock format is used, for example, 15:30:00 is 3:30 p.m.

Complete the following steps to view a directory listing:

Step 1   Access the Disk Utilities Menu screen (refer to the "Accessing the Disk Utilities Menu Screen" section on page 5-14).

Step 2   Type **A** and press **Enter**.

The Disk Directory screen appears (see Figure 5-5). The cursor is located in the data entry field.

Figure 5-5   Disk Directory Screen

```
                    D I S K   D I R E C T O R Y


        What Directory?

        _____
```

Step 3   Perform one of the following actions, which is dependent upon your needs:

- To list a hard drive (C:) directory, proceed to Step 4.
- To list a floppy drive (A:) directory, insert the floppy diskette into the drive and proceed to Step 4.

Step 4   Type the complete directory name you wish to display (including the drive designation), and press **Enter**.

The "Reading Directory…" message appears while the system accesses the specified directory. The screen then clears and displays a directory listing similar to that shown in Figure 5-6. The number of files in the directory is shown on the message line.

Step 5   To view another directory, press the **Exit** key and return to Step 3.

Figure 5-6   Hard Disk (C:) Directory Sample

```
SUMMA4              0    0- 0- 0   00:00:00
BOOT          <DIR>      1-22-99   10:54:02
DBASE         <DIR>      4-30-99   15:02:18
LOG           <DIR>      4-30-99   13:06:36
TRACE         <DIR>      1- 6-99   10:37:52
CORE2          8423732   1-14-99   12:01:30
CORE1             1770   1-22-99   14:36:06
GLOBALS EXE     612753   3-14-99   02:14:06
HOSTMGR EXE      34598   3-14-99   02:14:06
SYSWD   EXE      11019   3-14-99   02:14:06
PRI     DWN     107632   3-14-99   02:14:06
PERMGR  EXE     922091   3-14-99   02:14:06
BOOT    VCO        204   3-14-99




#DF Fri Apr  30, 1999 13:09 A-SBY B-ACT 13 files
```

To return to the Disk Utilities Menu screen before viewing another directory, press **Enter**.

Copy Files

Use the Copy Files option to copy files from one disk to another, and to copy files from one directory to another on the same disk.

If the file already exists on the destination disk, it is overwritten by the source file. A system status message shows the number of files copied. Use of wildcards in specifying filenames is supported as described in the "Filename Conventions" section on page 5-13.

Copy a single file by specifying the source and destination filenames. This process is especially useful when updating card download files, such as NBC or ICC downloads (NBC.DWN and ICC.DWN, respectively). The following example specifies to copy the ICC download file from the top-level directory on the floppy disk to the top-level directory on the hard disk. The destination filename in this example is the same as the source filename:

- Source file—A:ICC.DWN

- Destination file—C:/BOOT/ICC.DWN

You can copy all Trace files on the system hard disk to a Trace directory on a floppy disk by specifying the following source and destination files:

> Source file—C:/TRACE/*.*

> Destination file—A:/TRACE

Complete the following steps to copy one or more files:

Step 1   Access the Disk Utilities Menu screen (refer to the "Accessing the Disk Utilities Menu Screen" section on page 5-14).

Step 2   Type **B** and press **Enter**.

The Copy Files screen appears (see Figure 5-7). The cursor is located in the Copy From? field.

Figure 5-7   Copy Files Screen

```
                    C O P Y   F I L E S


     Copy From?

     _____

     Copy To?

     _____
```

Step 3   Complete one of the following steps, which is dependent upon your configuration needs:

- To copy a file from one directory to another on the hard drive (C:), proceed to Step 4.
- To copy a file between the floppy drive (A:) and the hard drive (C:), insert the floppy disk into the drive and proceed to Step 4.

Step 4   Type the filename you wish to copy and press the **Next Field** key.

The cursor moves to the Copy To? field.

Step 5   Type the destination filename and press **Enter**.

The "Copying Files…" message appears while the system copies the specified file. When copying is complete, the "X Files Copied" message appears, where X indicates the number of copied files. The system automatically returns to the Disk Utilities Menu screen after several seconds.

Delete Files

Use the Delete Files option to delete files from either the hard or floppy disk. A system status message shows the number of files deleted. Use of wildcards in specifying filenames is supported as described in the "Filename Conventions" section on page 5-13.

Delete a single file by specifying its filename. The following example specifies to delete the ICC download file from the hard disk:

Filename to delete—C:ICC.DWN

Delete all system log files on the hard disk by specifying the following filename:

Filename to delete—C:/LOG/*.*

Complete the following steps to delete one or more files:

Step 1   Access the Disk Utilities Menu screen (refer to the "Accessing the Disk Utilities Menu Screen" section on page 5-14).

Step 2   Type **C** and press **Enter**.

The Delete Files screen appears. The cursor is located in the Delete What Files? field—the only field on the screen.

Step 3   Complete one of the following steps, which is dependent upon your configuration needs:

a.   To delete a file from the hard drive (C:), proceed to Step 4.

b.   To delete a file from a floppy disk (A:), insert the floppy disk into the drive and proceed to Step 4.

Step 4   Type the filename you need to delete and press **Enter**.

The screen is refreshed and displays a list of the files to be deleted. The "OK TO DELETE FILES <Y/N>?" message appears.

Step 5   Type **Y** and press **Enter** to delete the files indicated.

Note   If you type **N** and press **Enter**, the display to returns to the Disk Utilities Menu screen and the operation is aborted.

When deleting is complete, the "X Files Deleted" message appears, where X signifies the number of files that were deleted. The system automatically returns to the Disk Utilities Menu screen after several seconds.

Rename Files

Use the Rename Files option to change the name of a file. If the device is also changed as part of the rename operation, the source file is deleted.

Note   Use of wildcards in specifying filenames is not supported for the Rename Files function.
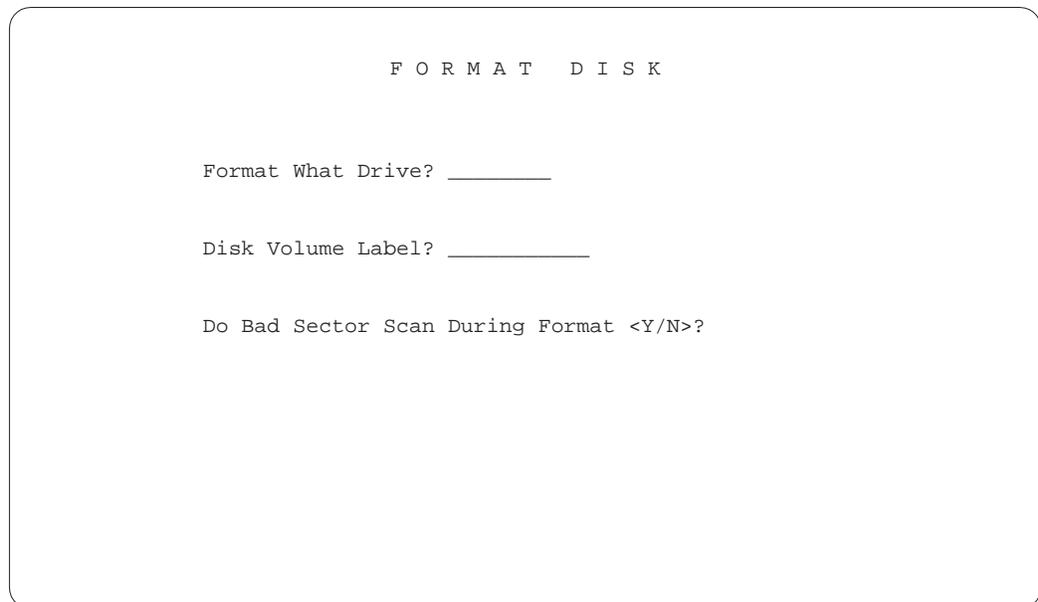
Complete the following steps to rename a file:

Step 1   Access the Disk Utilities Menu screen (refer to the "Accessing the Disk Utilities Menu Screen" section on page 5-14).

Step 2   Type **D** and press **Enter**.

The Rename Files screen appears. The Rename From? field and the Rename To? field are displayed on the screen. The cursor is located in the Rename From? field.

Step 3   Complete one of the following steps, which is dependent upon your configuration needs:

•   To rename a file that is located on the hard drive (C:), proceed to Step 4.

•   To rename a file that is on a floppy disk, insert the disk into the A: drive and proceed to Step 4.

Step 4   Type the filename you want to rename, and press the **Next Field** key.

The cursor moves to the Rename To? field.

Step 5   Type the new filename and press **Enter**.

The "Renaming Files…" message appears while the system renames the specified file. When the operation is complete, the "X Files Renamed" message appears, where X indicates the number of renamed files. The system automatically returns to the Disk Utilities Menu screen after several seconds.

Database Store

Use the Database Store option to copy the system database from the hard disk to a floppy disk. This function allows you to make backup copies of the database to protect the system against accidental data loss.

When you access this function, the system automatically copies all files contained in the C:/DBASE directory to the A:/directory. Any files with the same filenames, as the database files that exist on the floppy disk, are overwritten.

Complete the following steps to back up the database from the hard disk (C:) to a floppy disk (A:):

Step 1   Access the Disk Utilities Menu screen (refer to the "Accessing the Disk Utilities Menu Screen" section on page 5-14).

Step 2   Type **E** and press **Enter**.

The Database Store screen appears. The cursor is located in the only field on the screen:

OK To Store Database From C: to A: <Y/N>?

Step 3   Insert a formatted floppy disk into the A: drive.

Step 4   Type **Y** and press **Enter**.

The "Storing Data Base…" message appears. As each database file is copied, its filename appears. When all database files are copied, the "Data Base Stored" message appears.

The system automatically returns to the Disk Utilities Menu screen after several seconds.

Database Retrieve

Use the Database Retrieve option to copy system database files from a floppy disk to the system hard disk. The database files in the C:/DBASE directory are overwritten during this process.

Caution   Make sure that the data to be copied from the floppy disk is the most current version available. Always verify that the replacement data on the hard disk will not destroy important changes and updates made to the database.

Note   To place new database tables into active system memory, you must reboot the system from the hard disk after retrieving the database from a floppy disk. This process disrupts in-progress calls and removes the system from operation for a period of several minutes.

Complete the following steps to retrieve the database from a floppy disk (A:) and place copy them to the hard disk (C:):

Step 1   Access the Disk Utilities Menu screen (refer to the "Accessing the Disk Utilities Menu Screen" section on page 5-14).

Step 2   Type **F** and press **Enter**.

The Database Retrieve screen appears. The cursor is located in the only field on the screen:

OK To Retrieve Database from A: to C:?

Step 3   Insert the database backup floppy diskette into the drive.

Step 4   Type the **Y** and press **Enter**.

The "Retrieving Data Base…" message appears. As each database file is copied, its filename appears. When all database files are copied, the "Data Base Retrieved" message appears. The system automatically returns to the Disk Utilities menu after several seconds.

Display File

Use the Display File option to display the contents of a file as a raw hex and ASCII file. The exact filename must be specified.

Note   The use of wildcard characters is not allowed with this option.

The Display File screen is divided into three columns:

Address—The beginning address for the data displayed on that line. Addresses are expressed in hex.

Hex data—The hex values of the data contained in the file at the address indicated.

ASCII data—The ASCII values of the data contained in the file at the address indicated.

Twenty rows of data are displayed at a time. Use the **Prev Screen** and **Next Screen** keys to page through the data.

Note   The Display File screen is generally used as a diagnostic tool under the direction of Cisco TAC.

Complete the following steps to display the contents of a file:

Step 1   Access the Disk Utilities Menu screen (refer to the "Accessing the Disk Utilities Menu Screen" section on page 5-14).

Step 2   Type **G** and press **Enter**.

The Display File screen appears. The cursor is located in the Display What File? field—the only field that appears on the screen.

Step 3   Complete one of the following steps, which is dependent upon your configuration needs:

  • To display a file that is located on the hard drive, proceed to Step 4.

- To display a file that is located on a floppy drive, insert the floppy disk into the drive and proceed to Step 4.

Step 4   Type the filename (including the device to be displayed) and press **Enter**.

The screen refreshes and displays the file data—similar to that shown in Figure 5-8.

Figure 5-8   File Data Screen Sample

```
00000000: de ad 10 00 00 00 00 36 53 59 53 54 45 4d 20 44   |.......6SYSTEM D
00000010: 41 54 41 20 20 20 20 20 56 45 52 20 35 2e 30 2e   | ATA     VER 5.1.
00000020: 35 30 2e 32 31 00 20 20 20 20 20 20 4a 61 6e 20   | 50.21.      Jan
00000030: 32 32 2c 20 31 39 39 38 20 31 34 3a 33 36 3a 30   | 22, 1998 14:36:0
00000040: 37 00 05 00 32 15 07 ce 01 16 0e 24 07 00 de ad   | 7...2......$....
00000050: 12 00 00 00 00 12 43 41 55 53 45 20 4f 46 20 44   |......CAUSE OF D
00000060: 55 4d 50 20 20 20 50 52 45 56 20 45 58 43 45 50   | UMP   PREV EXCEP
00000070: 54 49 4f 4e 20 20 05 00 de ad 18 00 00 00 06 5a   | TION  .........Z
00000080: 45 58 43 45 50 54 49 4f 4e 20 44 41 54 41 20 20   | EXCEPTION DATA
00000090: 56 45 52 20 34 2e 31 2e 30 30 2e 30 4f 63 74 20   | VER 4.1.00.0Dec
000000a0: 31 37 2c 20 31 39 39 37 20 20 38 3a 31 33 3a 35   | 17, 1998  8:13:5
000000b0: 33 0a 45 78 63 65 70 74 69 6f 6e 3a 20 4c 69 6e   | 3.Exception: Lin
000000c0: 65 20 31 31 31 31 20 45 6d 75 6c 61 74 6f 72 0a   | e 1111 Emulator.
000000d0: 45 78 63 65 70 74 69 6f 6e 20 56 65 63 74 6f 72   | Exception Vector
000000e0: 20 4f 66 66 73 65 74 3a 20 24 32 43 0a 54 61 73   |  Offset: $2C.Tas
000000f0: 6b 20 49 44 20 4e 75 6d 62 65 72 20 30 78 31 38   | k ID Number 0x18
00000100: 0a 20 20 20 20 53 52 20 3d 20 31 30 30 34 20 20   | .    SR = 1004
00000110: 20 54 72 61 63 65 20 3d 20 4f 46 46 20 41 63 74   |  Trace = OFF Act
00000120: 69 76 65 20 73 74 61 63 6b 20 3d 20 55 53 50 20   | ive stack = USP
00000130: 20 20 49 6e 74 65 72 72 75 70 74 20 6d 61 73 6b   |   Interrupt mask
```

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Step 5   Use the **Prev Screen** and **Next Screen** keys to scroll through the file data.

Step 6   Press **Enter** to return to the Disk Utilities menu

Show Free Space on Disk

Use the Show Free Space on Disk option to view the amount of free space on either the hard drive or a floppy disk. Free space is shown in the number of bytes available.

Complete the following steps to display the amount of free space:

Step 1   Access the Disk Utilities Menu screen (refer to the "Accessing the Disk Utilities Menu Screen" section on page 5-14).

Step 2   Type **H** and press **Enter**.

The Show Free Disk Space screen appears. The cursor is located in the Show Space On What Drive? field—the only field that appears on the screen.

Step 3   Complete one of the following steps, which is dependent upon your configuration needs:

- To display a file that is located on the hard drive (C:), proceed to Step 4.

- To display a file that is located on a floppy disk, insert the floppy disk into the drive and proceed to Step 4.

Step 4   Type the device name (either **C:** or **A:**) and press **Enter**.

The "xxx Bytes Free on X:" message appears, where xxx signifies the number of bytes of free space available on the device X. The system automatically returns to the Disk Utilities Menu screen after several seconds.

Format Disk

Use Format Disk option to perform the following functions:

- Format the hard disk.
- Assign a volume label to the disk being formatted.

⚠
Caution   Formatting a disk erases all data contained on it. Use of the Format Disk function is not recommended for the system hard disk; if formatting and initial software installation is required, use of the Software Installation Utilities is recommended.
To protect information on floppy diskettes from accidental erasure, use the diskette's write protect tab.

Complete the following steps to format a disk:

Step 1   Access the Disk Utilities Menu screen (refer to the "Accessing the Disk Utilities Menu Screen" section on page 5-14).

Step 2   Type **I** and press **Enter**.

The Format Disk screen appears (seeFigure 5-9).

Figure 5-9   Format Disk Screen

```
                    F O R M A T   D I S K



        Format What Drive? _____



        Disk Volume Label? _____



        Do Bad Sector Scan During Format <Y/N>?
```

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The cursor is located in the Format What Drive? field.

Step 3   Type the device that corresponds to the disk you wish to format (**C:** or **A:**) and press the **Next Field** key.

The cursor moves to the Disk Volume Label field.

Step 4   Type the volume label for the disk being formatted (if a volume label is being used) and press the **Next Field** key.

The cursor moves to the Do Bad Sector Scan During Format <Y/N>? field.

Step 5   Type **Y** or **N** (**Y** is recommended) and press **Enter**.

The screen is refreshed and displays the disk to be formatted and the "OK TO FORMAT DISK <Y/N>?" message appears. The cursor is located in data entry field.

Step 6   Type **Y** and press **Enter** to format the indicated disk.

> **Note**   Typing any other character followed by **Enter** causes the display to return to the Disk Utilities Menu screen and abort the operation.

The "Formatting Disk…" message appears.

When formatting is complete, the "Device X: Formatted" message appears, where X indicates the formatted disk. The system automatically returns to the Disk Utilities Menu screen after several seconds.

Create Directory

Use the Create Directory option to create a directory on either the hard drive (C:) or a floppy disk (A:).

Complete the following steps to create a directory:

Step 1   Access the Disk Utilities Menu screen (refer to the "Accessing the Disk Utilities Menu Screen" section on page 5-14).

Step 2   Type **J** and press **Enter**.

The Create Directory screen appears. The cursor is located in the Create Which Directory? field—the only field on the screen.

Step 3   Complete one of the following steps, which is dependent upon your configuration needs:

- To create a directory on the hard drive, type **C:/<directory name>** and press Enter.
- To create a directory on the floppy drive, insert the floppy disk in the drive and type **A:/<directory name>** and press Enter.

Step 4   Press the **Prev Menu** key to see the directory listed.

The Disk Utilities Menu screen appears.

Step 5   Type **A** and press **Enter**.

The Disk Directory screen appears. The cursor is located in the What Directory? field.

Step 6   Depending on the drive in which you created the directory, type **C:/** or **A:/** and press **Enter**.

The new directory appears in the directory listing.

Step 7   To return to the Disk Utilities menu, press **Enter** or press the **Prev Menu** key twice.

Delete Directory

Use the Delete Directory option to delete a directory from either the hard drive (C:) or a floppy disk (A:).

Complete the following steps to delete a directory:

Step 1   Access the Disk Utilities Menu screen (refer to the "Accessing the Disk Utilities Menu Screen" section on page 5-14).

Step 2   Type **K** and press **Enter**.

The Delete Directory screen appears. The cursor is located in the Delete Which Directory? field—the only field on the screen.

Step 3   Complete one of the following steps, which is dependent upon your configuration needs:

- To delete the directory from the hard drive, type **C:/<directory name>** and press **Enter**.
- To delete the directory from a floppy disk, insert the floppy diskette into the drive, type **A:/<directory name>** and press Enter.

Step 4   Press the **Prev Menu** key to verify that the directory was deleted.

The Disk Utilities Menu screen appears.

Step 5   Type **A** and press **Enter**.

Step 6   The Disk Directory screen appears. The cursor is located in the What Directory? field.

Step 7   Depending on the drive in which you deleted the directory, type **C:/** or **A:/** and press **Enter**.

Step 8   Verify that the directory was deleted from the directory listing by reading the display.

Step 9   To return to the Disk Utilities menu, press **Enter** or press the **Prev Menu** key twice.

Rename Directory

Use the Rename Directory option to rename a directory on the hard drive (C:).

Complete the following steps to rename a directory on the hard drive:

Step 1   Access the Disk Utilities Menu screen (refer to the "Accessing the Disk Utilities Menu Screen" section on page 5-14).

Step 2   Type **L** and press **Enter**.

The Rename Directory screen appears (see Figure 5-10). The cursor is located in the Rename From? field.

Figure 5-10   Rename Directory Screen

Step 3   Type **C:/<original directory name>**, where <original directory name> is the current name of the directory.

Step 4   Press the **Next Field** key.

The cursor moves to the Rename To? field.

Step 5   Type a new directory name: **C:/<new directory name>**, where <new directory name> is the directory's new name).

Step 6   Press **Enter**.

The directory has a new name.

Compress File

Use the Compress File option to decrease the size of a file without losing information. You may want to compress a file to facilitate a file transfer, or to copy a file to another device. Consider the following when decreasing the size of a file:

- The name of the file to be compressed cannot contain a file extension. If the filename contains an extension, rename the file before compressing.
- When a file is compressed, the filename is the same as the original file with an extension of .Z.
- Any file compressed on the VCO/4K can be uncompressed on a UNIX workstation or any other computer with a utility based on the BSD 3.2 UNIX implementation.

Complete the following steps to decrease the size of a file:

Step 1   Access the Disk Utilities Menu screen (refer to the "Accessing the Disk Utilities Menu Screen" section on page 5-14).

Step 2   Type **M** and press **Enter**.

The Compress File screen appears. The cursor is located in the Compress What File? field—the only field displayed on the screen.

Step 3   Enter the drive and name of the file to be compressed on the blank line. For example, **C:core1**.

Step 4   Press **Enter**.

The size of the file has been decreased.

Uncompress File

Use the Uncompress File option to expand a compressed file to its original size and content. Refer to the previous section, "Compress File" section on page 5-26 for information on compressing files. Consider the following when uncompressing files:

- The file to be uncompressed must have a .Z filename extension). If the file to be compressed does not have a .Z extension, rename the file.

- When a file is uncompressed, the filename is the same as the compressed filename but without the .Z extension. You can rename the file with an extension.

- Any file compressed on the VCO, on a UNIX workstation, or other computer with a utility based on the BSD 3.2 UNIX implementation, can be uncompressed on the VCO/4K.

Complete the following steps to uncompress a file:

Step 1   Access the Disk Utilities Menu screen (refer to the "Accessing the Disk Utilities Menu Screen" section on page 5-14).

Step 2   Type **N** and press **Enter**.

The cursor is located at the Uncompress What File? field—the only field displayed on the screen.

Step 3   Enter the drive and filename of the file to be uncompressed. For example, **C:core1**.

> **Note**   You can enter the filename with or without the .Z extension. If you enter the filename without an extension, the software assumes the .Z extension.

Step 4   Press **Enter**.

The file is uncompressed.

Split File

Use the Split File option to split a large file into a series of smaller files. This may be required if you need to copy a large file on to a floppy disk.

All files accessible to the VCO switch can be split into a series of smaller files. The algorithm used requires an output filename and the number of bytes for each segmented file. The split function then produces the required number of file parts, each a segment of the original file. The sum of the files produced from the split comprises the total size of the original file.

Consider the following when splitting files:

- The recommended split size for floppy disks is 1,440,000 bytes.
- There is a maximum of 512 files that may result through the split operation. This should be taken into consideration when indicating the split file size.

Complete the following steps to split a large file into a series of smaller files:

Step 1   Access the Disk Utilities Menu screen (refer to the "Accessing the Disk Utilities Menu Screen" section on page 5-14).

Step 2   Type **O** and press **Enter**.

The Split File screeen appears (see Figure 5-11).

Figure 5-11   Split File Screen

```
                        S P L I T    F I L E




          Split What File?


          _____

          Split File Size:


          _____
```

The cursor is located at the Split What File? field.

Step 3   Type the drive (C:/ or A:/) and filename of the file to be split.

Step 4   Press the **Next Field** key to move the cursor to the Split File Size field.

Step 5   Type the size (number of bytes) of each split file segment.

Step 6   Press **Enter**.

The file has been split into several smaller files.

An example of a split file is described as follows:

- File drive and filename—C:core1
- Size of files to create—1440000

The resulting file segments are each 1,440,000 bytes. The total of the file segments in bytes equals the original file size. The last file segment may be less than the indicated size, depending on the size of the original file.

The output of the Split File operation results in a series of files with the designated output filename and an extension, as shown below.

- filename.xaa
- filename.xab
- filename.xac
- filename.xad

The file extensions increase in alphabetic order as necessary to accommodate the full contents of the original file. For example, if the original core1 file to be split is 8.4 MB, the following split filenames and sizes would result:

- core1.xaa—1440000
- core1.xab—1440000
- core1.xac—1440000
- core1.acd—1440000
- core1.xae—1440000
- core1.xaf—1200000

The total of all split files, core.xaa through core.xaf, is 8,400,000 bytes (or 8.4 MB) which is the size of the original core file.

Join Files

Use the Join Files option to reassemble split files back into the original file. Refer to the "Split File" section on page 5-27 for information on splitting files. Joining files requires you to understand the concepts of source and destination files. Refer to the "Joining Files—Source and Destination Files" section on page 5-29.

Joining Files—Source and Destination Files

The source files (the files associated with the Join From? field) are the files that will comprise the new file. The source files are the file segments that resulted from the split file operation.

You can specify the source file by filename with no extension. If the filename is designated without an extension, all files with that filename are joined. The files are joined as if the extension was designated with the multicharacter (*) wildcard. The order is based on the alpha character ordering of the file's extension.

The join operation supports alphabetic ordered wildcard symbols. You can specify the source file with the single-character wildcard—the question mark (?), or the multi-character wildcard—the asterisk (*). The join operation automatically appends the split files in alphabetic order to the destination file.

You may also initiate the join operation for each individual split file by indicating the specific filename with the full extension. Note however, that if this method is used, you must specify the files in the correct order by file extension (alphabetic order) to accurately reproduce the original file.

The destination file (the file associated with the Join To? field) is the file which is to be the composite of all the split files. After joining all file segments, the destination file is identical to the original file before the split process occurred.

Note   If the destination filename already exists, the source files are appended to it.

Complete the following steps to join split files:

Step 1   Access the Disk Utilities Menu screen (refer to the "Accessing the Disk Utilities Menu Screen" section on page 5-14).

Step 2   Type **P** and press **Enter**.

The Join Files screen appears (see Figure 5-12).

Figure 5-12   Join Files Screen


```
                    J O I N    F I L E S



        Join From?

        _____

        Join To?

        _____
```

The cursor is located in the Join From? field.

Step 3   Enter the drive and filename of the source file. Consider the following when entering data into this field:

Note   Enter the complete source file path name and filename, with extension, in the Join From? field.
Only one filename can be specified in the Join From? field. However, wildcard characters can be used to join several files. Refer to the next section, *Source Files* for information on the use of wildcard characters.

Step 4   Press the **Next Field** key to move the cursor to the Join To? field.

Step 5   Enter the desired name of the destination file—the file which is to contain all source file(s).

Step 6   Press **Enter**.

The files are joined.

Tone Files Installation/Removal

Use the Tone Files Installation/Removal option to install and remove tone plans associated with the multiple tone plan feature. The multiple tone plan feature enables you to install and administratively configure several tone plans in a single VCO/4K switch. You may also select and configure tone plans from several extended mode host application commands and from inpulse/outpulse rule configuration. Refer to the *Cisco VCO/4K Extended Programming Reference* for information on selecting and configuring tone plans with extended mode commands. Contact Cisco TAC for a list of available tone plans.

Accessing the Tone Files Installation/Removal Screen

Complete the following steps to access the Tone Files Installation/Removal screen:

Step 1 Access the Disk Utilities Menu screen (refer to the "Accessing the Disk Utilities Menu Screen" section on page 5-14).

Step 2 Type **Q** and press **Enter**.

The Reading Next Format message is displayed briefly at the lower right of the Disk Utilities Menu screen and the Tone Files Installation/Removal screen appears (see Figure 5-13).

Figure 5-13   Tone Files Installation/Removal Screen

```
                   Tone Files Installation/Removal

  LOC    TONE PLAN     LOC    TONE PLAN     LOC    TONE PLAN     LOC    TONE PLAN
  000 NORTHAMERICA     ___ _____   ___ _____   ___ _____
  ___ _____    ___ _____   ___ _____   ___ _____
  ___ _____    ___ _____   ___ _____   ___ _____
  ___ _____    ___ _____   ___ _____   ___ _____
  ___ _____    ___ _____   ___ _____   ___ _____
  ___ _____    ___ _____   ___ _____   ___ _____
  ___ _____    ___ _____   ___ _____   ___ _____
  ___ _____    ___ _____   ___ _____   ___ _____
  ___ _____    ___ _____   ___ _____   ___ _____
  ___ _____    ___ _____   ___ _____   ___ _____
  ___ _____    ___ _____   ___ _____   ___ _____
  ___ _____    ___ _____   ___ _____   ___ _____

              Install or Remove Tone Files (I/R):_
```

Tone Files Installation/Removal Screen Field Definitions

The Tone Files Installation/Removal screen fields are arranged in eight columns and twelve rows in the center of the screen and a single field at the bottom of the screen. The eight columns form four pairs; each pair consists of a Loc column and a Tone Plan column. Each Loc field is associated with the Tone Plan field directly to its right. The Tone Files Installation/Removal screen fields are described below.

Loc—*Display only.* Describes the location of the installed tone plan listed in the associated Tone Plan field. Locations are defined as follows:

> 000—The VCO/4K system C:/BOOT directory; default tone plan location.

> 001 to 047—The VCO/4K system C:/TONE directory.

Tone Plan—*Display only.* Contains the name of the installed tone plan listed in the associated Loc field.

Install or Remove Tone Files (I/R)—*Data entry via main keyboard.* Allows you to install or remove a tone plan. Valid options are as follows:

> I—Install a tone plan.

> R—Remove a tone plan.

Multiple Tone Plan File Installation via Disk Utilities

Complete the following steps to install multiple tone plans with the VCO/4K system software Disk Utilities administration screens:

Step 1   Insert a tone plan diskette into the VCO/4K system active side.

Step 2   Access the Tone Files Installation/Removal screen (refer to the "Accessing the Tone Files Installation/Removal Screen" section on page 5-31.

The Tone Files Installation/Removal screen is displayed (see Figure 5-13). The cursor is located in the Install or Remove (I/R) field.

Step 3   Type **I** and press **Enter**.

The "Enter Path of Tone Files To Install" message appears.

> **Note**   If you type an invalid character, the "Invalid Operation Specified" message appears and the screen is refreshed. Repeat Step 3.

Step 4   Type **A:/** and press **Enter**.

The tone plan files are copied from the diskette to the VCO/4K system C:/TONE directory. The cursor moves to the Install or Remove Tone Files (I/R) field and the following message appears at the bottom right of the Tone Files Installation/Removal screen:

```
Tone Files for CHINA3 Are Installed
```

> **Note**   If you type an invalid path name, the "Tone Files Not Found" message appears and the screen is refreshed. Repeat Step 3.

The tone plan copied in Step 4 is installed in a subdirectory of the VCO/4K system C:/TONE directory and assigned a fixed number between 001 and 047.

Step 5   Repeat Step 3 and Step 4 to install the tone plans needed to meet your configuration requirements.

Step 6   If you have a nonredundant system or if all required tone plans have been installed to meet your configuration requirements, the multiple tone plan installation procedure is complete. If you have a redundant system, log in to the standby side and proceed to Step 7. Refer to the *Cisco VCO/4K Administrator's Guide* for instructions on changing the active side.

Step 7   Repeat Step 1 through Step 6 on the standby side.

The multiple tone plans are installed.

Multiple Tone Plan File Installation via FTP

You may also install multiple tone plan via file transfer protocol (FTP). Complete the following steps to install multiple tone plan files via FTP:

Step 1   Access the Disk Utilities Menu screen (refer to the "Accessing the Disk Utilities Menu Screen" section on page 5-14).

Step 2   Type **J** and press **Enter** to access the Create Directory screen.

The Create Directory screen is displayed. The cursor is located at the beginning of the blank line.

Step 3   Type **C:/TEMP** and press **Enter** to create a temporary directory on the VCO/4K hard drive.

The TEMP directory is created on the active side of the VCO/4K system.

Step 4   Start an FTP client.

Step 5   Type **mkdir temp** and press **Enter** to create a temporary directory within the FTP client.

Step 6   Type **cd temp** and press **Enter** to access the newly created directory within the FTP client.

Step 7   Type **bin** and press **Enter** to set the FTP client to binary mode.

Step 8   Type **mput *.*** and press **Enter** to transfer the tone plan files to the VCO/4K C:/TEMP directory created in Step 3.

Step 9   Close the FPT client.

Step 10   From the Administrator Main Menu screen, type **C** and press **Enter**.

The Maintenance Menu screen is displayed.

Step 11   Type **B** and press **Enter**.

The Disk Utilities Menu screen is displayed. The cursor is located at the Enter Selection prompt.

Step 12   Type **Q** and press **Enter**.

The Reading Next Format message appears briefly at the lower right of the Disk Utilities Menu screen and the new Tone Files Installation/Removal screen is displayed (see Figure 5-13).

✎
Note   Default tone plans are preinstalled on VCO/4K systems. Figure 5-13 lists North America as the preinstalled default tone plan at location 000 (the C:/BOOT directory). Your default tone plan may be different.

The cursor is located in the Install or Remove Tone Files (I/R) field.

Step 13   Type **I** and press **Enter**.

The "Enter Path of Tone Files To Install" message appears.

> **Note** If you type an invalid character, the "Invalid Operation Specified" message appears and the screen is refreshed. Repeat Step 13.

Step 14 Type **C:/TEMP** and press **Enter**.

The tone plan files are copied from the VCO/4K system C:/TEMP directory to the C:/TONE directory. The cursor moves to the Install or Remove Tone Files (I/R) field, and messages similar to the following appear at the bottom right of the Tone Files Installation/Removal screen:

```
Tone Files for CHINA3 Are Installed.
```

> **Note** If you type an invalid path name, the "Tone Files Not Found" message appears and the screen is refreshed. Repeat Step 14.

Step 15 Repeat Step 1 through Step 14 on the standby side.

The multiple tone plans are installed.

Multiple Tone Plan File Removal

Complete the following steps to remove a tone plan associated with the multiple tone plans feature:

Step 1 Access the Disk Utilities Menu screen (refer to the "Accessing the Disk Utilities Menu Screen" section on page 5-14).

Step 2 Type **Q** and press **Enter**.

The Tone Files Installation/Removal screen is displayed. The cursor is located in the Install or Remove Tone Files (I/R) field.

Step 3 Type **R** and press **Enter**.

The "Enter LOC# of Tone Files to Remove" message appears.

> **Note** If you type an invalid character, the "Invalid Operation Specified" message appears and the screen is refreshed. Repeat Step 3.

Step 4 Type the Loc field number of tone plan you want to remove from the VCO/4K configuration.

Step 5 Press **Enter**.

The "Tone Files For xxx Is Removed" message appears, where xxx represents the tone plan Loc number.

> **Note** If you type an invalid Loc number, the "Tone Files Not Found!" message appears. Repeat Step 3 through Step 5.

Step 6 Repeat Step 3 through Step 5 for all other tone plans you want to remove from the VCO/4K configuration.

The removal of multiple tone plan associated tone plans is complete.

Select (Print/Display) System Log File

Use the Print/Display System Log File function to view or obtain a hard copy of the system event and error log. This log may contain status and error messages generated by the system. Specify, by date, the portion of the log you want to print or display.

In a redundant system, the system keeps log files for both the active and standby controller. You can specify either log for printing or viewing. Refer to "System Log Files" section on page 1-7 the for an overview of the system log. System status and error messages are listed in *Cisco VCO/4K System Messages*.

Log files are stored according to month and date. Up to 31 log files can be stored on the system's hard disk. If you use the Ethernet communications option, log files can be stored on a remote disk drive with the Ethernet Network File System (NFS) facility. Specify the device on which the log files are stored via the File System Configuration screen; refer to Chapter 4, "System Configuration," for more information. The Ethernet communications option is discussed in the *Cisco VCO/4K Ethernet Guide*.

⚠️
Caution   The system may delete log files in an attempt to free up hard disk space. Refer to the "Available Disk Space Monitored on Switch Hard Drive" section on page 1-8 for detailed information.

Accessing the Select System Log File Screen.

Complete the following steps to access the Select System Log File screen:

Step 1   Access the Maintenance Menu screen (refer to the "Accessing the Maintenance Menu Screen" section on page 5-2).

Type **C** and press **Enter**.

The Select System Log File screen appears (see Figure 5-14). The cursor is located in the OPERATION field.

Figure 5-14   Select System Log File Screen

```
        S E L E C T    S Y S T E M    L O G    F I L E


                    OPERATION: Display


                    DATE OF LOG FILE:

                        MONTH: Apr  DAY: 7



                    FOR REDUNDANT SYSTEMS

                        A-SIDE OR B-SIDE: a
```

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The System Log File screen consists of one screen. Use the **Print Screen** key to obtain a hard copy of this screen.

Printing a System Log File

Complete the following steps to print a system log:

Step 1 Access the Select System Log File screen (refer to the "Accessing the Select System Log File Screen." section on page 5-35).

Step 2 Use the **Select** key to scroll through the values until the Print selection is displayed.

Step 3 Press the **Next Field** key.

Step 4 Use the **Select** key to scroll through the values until the month for which you want to print the log file is displayed.

Step 5 Press the **Next Field** key.

Step 6 Type the date for which you want to print the log file.

Step 7 Complete one of the following steps, which is dependent upon your system's configuration:

• If your system is redundant, press the **Next Field** key.

The cursor moves to the A-SIDE or B-SIDE field.

Use the **Select** key to scroll through the values to specify the system controller for which you want to print the log file and press **Enter**.

• If your system is nonredundant, proceed to Step 8.

Step 8 Press **Enter**.

The "Printing Log File For..." message appears.

✎

Note   To abort printing, press the **Stop Print** key.

Step 9   Press the **Exit** key to return to the Maintenance Menu screen.

Displaying a System Log File

Complete the following steps to display a system log file:

Step 1   Access the Select System Log File screen (refer to the "Accessing the Select System Log File Screen." section on page 5-35).

Step 2   Use the **Select** key to scroll through the values until the Display selection is displayed.

Step 3   Press the **Next Field** key.

Step 4   Use the **Select** key to scroll through the values until the month for which you want to display the log file is displayed.

Step 5   Press the **Next Field** key.

Step 6   Type the date for which you want to display the log file.

Step 7   Complete one of the following steps, which is dependent upon your system's configuration:

- If the system is redundant, press the **Next Field** key.

  The cursor moves to the A-SIDE or B-SIDE field.

  Use the **Select** key to scroll through the values to specify the system controller for which you want to display the log file and press **Enter**.

- If the system is nonredundant, proceed to Step 8.

Step 8   Press **Enter**.

The log file appears.

Step 9   Use the **Prev Screen** and **Next Screen** keys to page through the listings. If you press the **Prev Screen** key at the first screen, the screen displays the message listings at the end of the log file.

Step 10   Press **Prev Menu** twice to return to the Maintenance Menu screen.

Select (Print/Display) System Trace File

Use the Print/Display System Trace File function to view or obtain a hard copy of the system trace file. This file contains all messages that were sent across the host communication interfaces for which tracing was enabled. In systems equipped with the TeleRouter software overlay, messages generated by that software are also printed if enabled for the internal interface. Tracing is enabled from the Host Configuration screens; refer to Chapter 4, "System Configuration," for more information. You can specify the portion of the file to print or display by date.

Trace files are time-stamped and stored sequentially according to month and date. Up to 31 trace files can be stored on the system's hard disk. When the Ethernet communications option is used, trace files can be stored on a remote disk drive by using the Ethernet Network File System (NFS) facility. Specify the device on which the trace files are stored via the File System Configuration screen; refer to Chapter 4, "System Configuration," for more information. The Ethernet communications option is discussed in the *Cisco VCO/4K Ethernet Guide*.

Note   The system opens a trace file when tracing is enabled and closes the file when tracing is disabled. If tracing is left in enable mode over a period of days, all of the data in the file is date stamped using the date from the day when the file was first opened.

Caution   The system may delete trace files in an attempt to free up hard disk space. Refer to the "Available Disk Space Monitored on Switch Hard Drive" section on page 8 for detailed information.

Accessing the Select System Trace File Screen

Complete the following steps to access the Select System Trace File screen:

Step 1   Access the Maintenance Menu screen (refer to the "Accessing the Maintenance Menu Screen" section on page 5-2).

Type **D** and press **Enter**.

The Select System Trace File screen appears (see Figure 5-15). The cursor is located in the OPERATION field.

Figure 5-15   Select System Trace Screen

```
                S E L E C T    S Y S T E M    T R A C E    F I L E


                        OPERATION: Print


                        DATE OF LOG FILE:

                           MONTH: Apr   DAY: 7
```
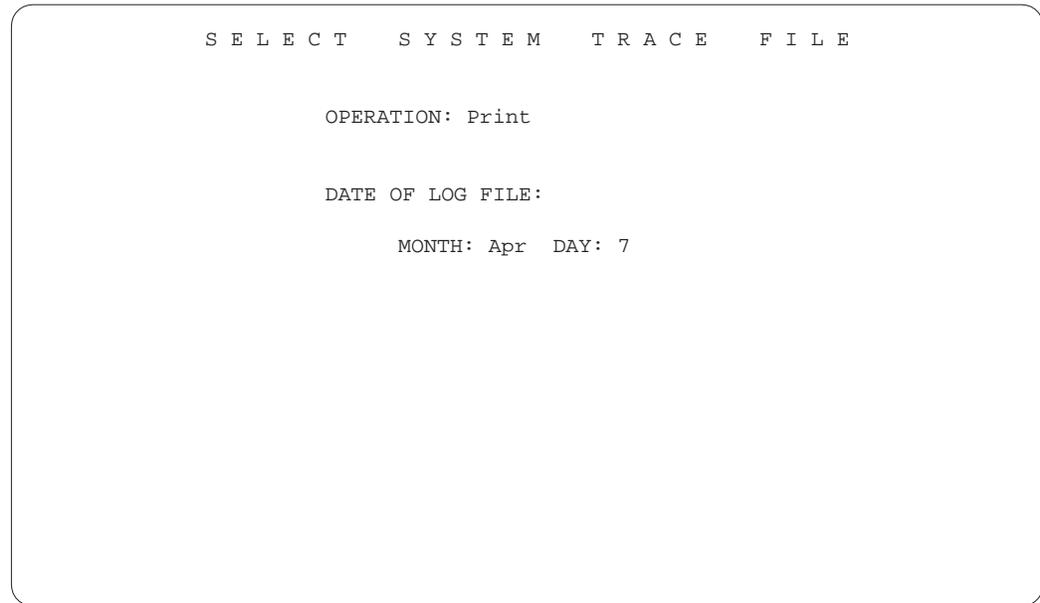
The Select System Trace File screen consists of one screen. Use the **Print Screen** key to obtain a hard copy of this screen.

Printing a Trace File

Complete the following steps to print a system trace file:

Step 1 Access the Select System Trace File screen (refer to the "Accessing the Select System Trace File Screen" section on page 5-38).

Step 2 Use the **Select** key to scroll through the values until the Print selection is displayed.

Step 3 Press the **Next Field** key.

Step 4 Use the **Select** key to scroll through the values until the month for which you want to print the trace file is shown.

Step 5 Press the **Next Field** key.

Step 6 Type the date for which you want to print the trace file.

Step 7 Press **Enter**.

The "Printing Trace File For..." message appears.

✎
Note   To abort printing, press the **Stop Print** key.

Step 8 Press the **Exit** key or press the **Prev Menu** key twice to return to the Maintenance Menu screen.

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Displaying a Trace File

Complete the following steps to display a system trace file:

Step 1 Access the Select System Trace File screen (refer to the "Accessing the Select System Trace File Screen" section on page 5-38).

Step 2 Use the **Select** key to scroll through the values until the Display selection is shown.

Step 3 Press the **Next Field** key.

Step 4 Use the **Select** key to scroll through the values until the month for which you want to display the trace file is shown.

Step 5 Press the **Next Field** key.

Step 6 Type the date for which you want to display the trace file.

Step 7 Press **Enter**.

The trace file appears.

Step 8 Use the **Prev Screen** and **Next Screen** keys to page through the listings. Press the **Prev Screen** key at the first screen displays to display the message listings at the end of the trace file.

Step 9 Press the **Prev Menu** key once or the **Exit** key twice to return to the Maintenance Menu screen.

Switch ACT (Active) System to SBY (Standby)

The Switch ACT System to SBY option applies to redundant system configurations only. It allows you to switch control from the current active side to the standby side. In order for this function to have any effect on system operation the following conditions must be met:

- The master console must be connected to the active controller.

- The Select switch on the Alarm Arbiter Card (AAC) must be set to AUTO.

You can switch control with this function or the Change Active Controllers ($C0 01) command; refer to *Cisco VCO/4K Standard Programming Reference* and *Cisco VCO/4K Extended Programming Reference* for more information. When this function is used, switchover does not occur until the standby side controller is booted and has successfully completed file synchronization with the active side controller.

Switching an Active System To Standby

Complete the following steps to switch an active system to standby from the master console:

Step 1 Access the Maintenance Menu screen (refer to the "Accessing the Maintenance Menu Screen" section on page 5-2).

Step 2 Type **E** and press **Enter**.

The "ENTER to Confirm Switchover" message appears.

Step 3 Press **Enter**.

The "System Switch Initiated" message appears.

No other on-screen indication of switchover is provided. Log file messages to the system printers show the progress of the switchover. Figure 5-16 and Figure 5-17 show sample log files for a switchover from the A side to the B side.

Figure 5-16   System Switchover Log FIle - A Side

```
            #01 30-MAR-1999 13:48:27 A-ACT
    FRM088: NBC Status Set To Inactive
     #01 30-MAR-1999 13:48:27 A-SBY
    FRM007: Transition From Active To Standby
     #DF 30-MAR-1999 13:48:17 B-SBY
    FRM087: NBC Status Set To Active
     #DF 30-MAR-1999 13:48:17 B-ACT
    FRM006: Transition From Standby to Active
```

Figure 5-17   System Switchover Log File - B Side

```
            #DF 30-MAR-1999 13:48:27 B-SBY
    FRM087: NBC Status Set To Active
     #DF 30-MAR-1999 13:48:27 B-ACT
    FRM006: Transition From Standby To Active
     #01 30-MAR-1999 13:48:17 A-ACT
    FRM088: NBC Status Set To Inactive
     #01 30-MAR-1999 13:48:17 A-SBY
    FRM007: Transition From Active to Standby
```

Master Timing Link Selection

Use the Master Timing Link Selection option to select the system T1 or PRI timing source. Timing can be derived from system internal clocking or from an incoming T1 or PRI bit stream. If, when incoming timing is used, the incoming reference is lost, the system automatically tries to resynchronize using the internal clock. Synchronization is discussed further in Appendix B, "T1/PRI Synchronization to Master Timing Link."

You can change T1 synchronization from the Master Timing Link Selection screen or by using the T1 Synchronization Control ($C0 02) command; refer to the *Cisco VCO/4K Standard Programming Reference* and the *Cisco VCO/4K Extended Programming Reference* for more information. Both methods allow you to do the following:

- Switch to internal synchronization

- Switch to external synchronization

- Change Master Timing Link for incoming synchronization

    - Primary only

    - Secondary only

    - Both primary and secondary

If you select incoming synchronization from the Master Timing Link Selection screen, you must enter the primary and secondary link values. The link values correspond to the hardware address of the digital trunk card to be used as the timing reference. (If you use the host command, specify a port address residing on that card.) The system verifies that the card specified is on-line, a digital trunk card, and that the primary and secondary values are not the same card. If these conditions are met, the database is updated on both the active and standby sides before the system attempts to synchronize to the new values. Refer to Appendix B, "T1/PRI Synchronization to Master Timing Link," for a flowchart detailing the synchronization process.

Accessing the Master Timing Link Selection Screen

Complete the following steps to access the Master Timing Link Selection screen:

Step 1   Access the Maintenance Menu screen (refer to the "Accessing the Maintenance Menu Screen" section on page 5-2).

Step 2   Type **F** and press **Enter**.

The Master Timing Link Selection screen appears (see Figure 5-18). The cursor is located in the Change Timing Source To field.

Figure 5-18   Master Timing Link Selection Screen

```
        M A S T E R    T I M I N G    L I N K    S E L E C T I O N


            Current Timing Source: Primary

            Change Timing Source To: Internal



            Incoming E1/T1/PRI Links:

            Primary    R,L,S  1 1 11-3
            Secondary  R,L,S  1 1 13-4
```

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Master Timing Link Selection consists of one screen. Use the **Print Screen** key to obtain a hard copy of this screen.

Master Timing Link Selection Screen Field Definitions

The Master Timing Link Selection screen contains the following fields:

Current Timing Source—*Display only.* Shows the source of the reference signal currently used for T1 synchronization. Valid values are:

Internal—Use clocking supplied by NBC for synchronization.

External—Use external network synchronization.

Primary/Secondary—Derive clocking from incoming digital stream.

Change Timing Source To—*Data entry via Select key.* Specifies the source to use as the reference signal for synchronization. Valid values and the additional data required, if necessary, are:

Internal—Use clocking supplied by NBC for synchronization.

External—Use external network synchronization.

Incoming—Derive clocking form incoming digital stream; primary link value required, secondary link value optional.

Primary R,L,S—*Data entry via main keypad.* This field is displayed only if Incoming timing is specified. Specifies the Rack-Level-Slot/Group/Span hardware address (physical location) of the card from which clocking should be derived. The hardware address must correspond to an on-line digital trunk card. For Four Span T1/E1, MVDC T1, and ICC T1/E1 cards, you must specify the span as well as the slot or the "Interface Required" message appears.

Secondary R,L,S—*Data entry via main keypad.* This field is displayed only if Incoming timing is specified. Specifies the Rack-Level-Slot/Group/Span hardware address (physical location) of the card from which clocking is derived if the primary signal is lost. The hardware address must correspond to an on-line digital trunk card other than that specified as the primary link value.

Note   Cisco Systems recommends that you do not select two spans from the same programmable trunk card as Primary and Secondary links.

Changing the Master Timing Link

Complete the following steps to change the master timing link:

Note   To exit the Master Timing Link Selection screen without making any changes, press the **Exit**, **Prev Menu**, or **Main Menu** key before you press **Enter** the first time (Step 3 and Step 4). To abort the operation after pressing **Enter** the first time, press any key; the screen reverts to the original values and remains displayed. No changes are made to the database unless you press **Enter** twice.

Step 1   Access the Master Timing Link Selection screen (refer to the "Accessing the Master Timing Link Selection Screen" section on page 5-42).

Step 2   Use the **Select** and **Reverse Select** keys to scroll through the values until the correct timing source is shown.

Step 3   Complete one of the following options, which depends upon your selection in Step 2.

  • If the selection is Internal or External, press **Enter**. The database is automatically updated and the synchronization change is made. Proceed to Step 6.

  • If the selection is Incoming, the Primary R,L,S and Secondary R,L,S fields are displayed. Press the **Next Field** key.

The cursor moves to the primary rack field.

Step 4 Type the physical location of the digital trunk card, or press the **Next Field** key to leave the primary value unchanged:

    a. Type the Rack/Cabinet number and press the **Next Field** key.

    b. Type the Level number and press the **Next Field** key.

    c. Type the Slot/Group/Span number and press the **Next Field** key.

Step 5 Type the physical location of the digital trunk card if a secondary value is to be specified, or press **Enter** if there is no secondary value:

    a. Type the Rack/Cabinet number and press the **Next Field** key.

    a. Type the Level number and press the **Next Field** key.

    a. Type the Slot/Group/Span number and press the **Next Field** key.

Step 6 Press **Enter**.

The "Press ENTER to Change Master Timing Link" message appears.

Step 7 Press **Enter**.

The system verifies the link values, if any. When verification is complete, the database is automatically updated and the timing change is made.

Step 8 Press the **Exit** key to return to the Maintenance Menu screen.

Card Alarm Display

Use the Card Alarm Display option to view a listing of the current alarm conditions for all network interface and internal service circuit cards, or a specific card. Alarm conditions shown on this display result in system alarms; the appropriate alarm messages are output to the system printer and the log file.

Alarm conditions are automatically set and cleared at system reboot. These alarm conditions generate messages to the host in the form of Alarm Condition ($F0) reports. You can disable the generation of this report at system initialization from the System Feature Configuration screen. More information about alarm messages is contained in *Cisco VCO/4K System Messages*.
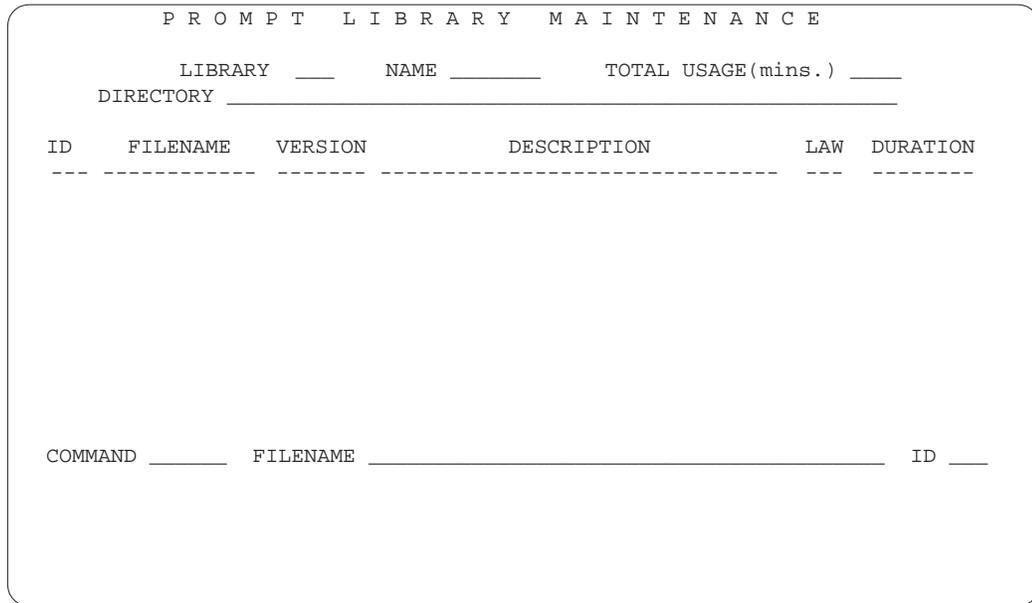
Accessing the Card Alarm Display Screen

Complete the following steps to access the Card Alarm Display screen:

Step 1 Access the Maintenance Menu screen (refer to the "Accessing the Maintenance Menu Screen" section on page 5-2).

Step 2 Type **G** and press **Enter**.

The Card Alarm Display screen appears (see Figure 5-19). The cursor is located in the CARD TO DISPLAY field. Up to 30 current alarm conditions are listed in the RLS field.

Figure 5-19   Card Alarm Display Screen

```
                    C A R D    A L A R M    D I S P L A Y

      MA = MAJOR    MI = MINOR              CARD TO DISPLAY: _ _ ____

 R  L  S       ALARM STATE                    R  L  S     ALARM STATE
 1  1   5   MI Card Failure (Comm)
 1  1   7   MA PRI/T1 Carrier Failure
 1  1  11   MI Card Failure (Comm)
```

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The Card Alarm Display screen can consist of one or more screens. Each screen lists 30 messages, ordered according to hardware address. The number of screens depends on the number of alarm conditions currently in force. Use the **Prev Screen** and **Next Screen** to page through the listings. Use the **Print Screen** key to obtain a hard copy of any of these screens. This screen does not get updated automatically. To update the display to show the most recent alarms, press the **Redraw** key.

Card Alarm Display Screen Field Definitions

The Card Alarm Display screen consists of the following fields:

CARD TO DISPLAY—*Data entry via main keyboard*. Type in the Rack-Level-Slot/Group/ Span of the card you want to display.

R L S—*Display only*. Shows the Rack-Level-Slot/Group/Span hardware address (physical location) of the card for which an alarm exists.

ALARM STATE—*Display only*. Shows the alarm condition that exists for the card at the corresponding hardware address. MA indicates a major alarm, MI indicates a minor alarm. Valid values and their meanings are:

MA PRI/T1 Carrier Failure—Loss of carrier. A carrier loss greater than 2 seconds is detected.

MA PRI/T1 Card Failure (Comm)—PRI/T1 card was removed from service or NBC can no longer communicate with the card.

MA PRI/T1 Out of Frame—Out-of-Frame (OOF) condition for a PRI/T1 card exists.

MI Card Failure (Comm)—Failure of all ports on a card, card was removed from service, or NBC can no longer communicate with the card.

MI Port Failure—Single port failure; currently unused.

MI PRI/T1 Remote Alarm Present—Remote failure (yellow alarm).

MI PRI/T1 Out of Frame Mtn Lmt—Maintenance threshold for PRI/T1 Out-of-Frame (OOF) conditions is reached. For PRI, this threshold is set from the PRI Card Configuration screen. For T1, this threshold is fixed at 4.

MI PRI/T1 Slip Mtn Limit—Maintenance threshold for PRI/T1 slips is reached. For PRI, this threshold is set from the PRI Card Configuration screen. For T1, this threshold is fixed at 255.

No Alarm Conditions Present—No alarm conditions for any card.

Displaying Alarms for a Specific Card

Complete the following steps to locate and display alarm messages for a specific card:

Step 1   Access the Card Alarm Display screen (refer to the "Accessing the Card Alarm Display Screen" section on page 5-44).

Step 2   Type the physical location in the CARD TO DISPLAY field.

Step 3   Type the Rack/Cabinet number and press the **Next Field** key.

Step 4   Type the Level number and press the **Next Field** key.

Step 5   Type the Slot number and press the **Next Field** key.

Step 6   Press the **Exit** key to return to the Maintenance Menu screen.

System Alarms Display

The System Alarms Display option displays a list of the types of alarms present on the system. If the alarm is caused by a card-related failure, use the Card Alarm Display screen to determine its exact cause. From this screen, you can also silence the external alarm contact on the AAC.

System alarms fall into seven categories: Fatal, Critical, Major, Minor, Aux 1, Aux 2, and Non-Alarmed Events. The specific alarm is identified by ALM messages. These same messages are output to the system printer and log file. A count of occurrences for each alarm is maintained on this screen. This counter is reset at system initialization.

Accessing the System Alarms Display Screen

Complete the following steps to access the System Alarms Display screen:

Step 1   Access the Maintenance Menu screen (refer to the "Accessing the Maintenance Menu Screen" section on page 5-2).

Step 2   Type **H** and press **Enter**.

The System Alarms Display screen appears (see Figure 5-20). The cursor is located in the Alarm Severity field. All current alarm conditions, if present, are listed.

Figure 5-20 System Alarms Display Screen

```
                 S Y S T E M   A L A R M S   D I S P L A Y

Alarm Severity:  _____          Audible Cutoff ( Y/N ) _


                      Alarm Description            Occurrences


              _____      ____
              _____      ____
              _____      ____
              _____      ____
              _____      ____
              _____      ____
              _____      ____
              _____      ____
              _____      ____
              _____      ____
              _____      ____
              _____      ____
              _____      ____
              _____      ____
```

The System Alarm Display can consist of multiple screens. Each screen lists up to 14 messages. Use the
Print Screen key to obtain a hard copy of this screen. This screen does not get updated automatically.
Use the **Redraw** key to update the display to show the most recent alarms.

System Alarms Display Screen Field Definitions

The System Alarms Display screen contains the following fields:

Alarm Severity—*Data entry via Select key*. Specifies the type of system alarms to display. Valid values
and their meaning are

> Fatal—Condition has caused a system reset or control switchover in a redundant system. Immediate
> corrective action is required.

> Critical—Condition is severe and service affecting. Escalation to a Fatal condition is likely.
> Immediate corrective action is required.

> Major—Condition is service affecting, although not as urgent as a Critical condition. Immediate
> corrective action is recommended.

> Minor—Condition does not have a serious affect on system operation.

> Aux 1—Host has set an AUX 1 alarm using the Set/Reset Host Alarms ($C0 03) command.

> Aux 2—Host has set an AUX 2 alarm using the Set/Reset Host Alarms ($C0 03) command.

> Non-Alarmed Events—Condition is non-service affecting, such as system printer off-line.

Audible Cutoff (Y,N)—*Optional. Data entry via main keypad*. Specifies whether to disable the AAC
alarm contact to stop any external CO alarms tied to the switch.

Alarm Descriptions—*Display only*. Shows the alarm conditions present for the system. Possible values
and their meaning are listed in *Cisco VCO/4K System Messages*.

Occurrences—*Display only*. Shows the number of times this error has occurred.

Displaying Alarm Conditions

Complete the following steps to display current system alarm conditions:

Step 1   Access the System Alarms Display screen (refer to the "Accessing the System Alarms Display Screen" section on page 5-46).

Step 2   Use the **Select** and **Reverse Select** keys to scroll through the values until the correct alarm severity is shown.

Step 3   Press **Enter**.

The display is updated to show all alarms and occurrences for the severity level chosen.

Step 4   Press **Exit** to return to the Maintenance Menu screen.

To exit the System Alarms Display screen, press the **Exit**, **Prev Menu**, or **Main Menu** screen.

Disabling the Audible Alarm

Complete the following steps to disable the external alarm contacts on the AAC:

Step 1   Access the System Alarms Display screen (refer to the "Accessing the System Alarms Display Screen" section on page 5-46).

Step 2   Press the **Next Field** key.

The cursor moves to the Audible Cutoff (Y/N) field.

Step 3   Type **Y** and press **Enter**.

The "Press ENTER to Clear Alarms" message appears.

Step 4   Type **Y** and press **Enter**.

The "Alarms Cleared by System Administrator" message appears. The alarm contact on the AAC is opened, turning the external alarm off.

> **Note**   Alarm LEDs on the AAC are disabled when the Audible Cutoff option is chosen. Refer to the *Cisco VCO/4K Technical Descriptions* for more information.

Step 5   Press the **Exit** key to return to the Maintenance Menu screen.

To exit the System Alarms Display screen, press the **Exit**, **Prev Menu**, or **Main Menu** key.

Shutdown System

Use the Shutdown System option to reset the system controller from the master console. When you select this option, the system closes all open system files, terminates host communication, and resets the system controller.

In a nonredundant system, selecting this option tears down all calls being carried by the system. If the system is redundant, control is passed to the standby system controller and all stable calls are maintained. Calls that have not reached a stable state are torn down.

Complete the following steps to shut down the system and reset the system controller:

Step 1   Access the Maintenance Menu screen (refer to the "Accessing the Maintenance Menu Screen" section on page 5-2).

Step 2   Type **I** and press **Enter**.

The Shutdown System screen with the "ENTER To Confirm Shutdown" message appears.

Step 3   Press **Enter**.

The following messages appear:

FRM528: System Shutdown Performed By System Administrator.

PRM024: File System Closed Successfully.

All host links are disabled and the system controller is rebooted. The Maintenance Menu screen and the "PRM024: File System Closed Successfully" message are displayed until system initialization begins.

Prompt Library Maintenance

Use the Voice Prompt Maintenance option to display the Prompt Library Maintenance screen which allows you to access multiple prompt libraries. The fields within the upper portion of the screen allow you to define a logical name for a library, assign a default directory to a library, and display the total prompt usage for a library.

The main area of the screen displays up to ten prompt entries in a library. The prompt ID, filename, version, description, encoding method (A-law, Mu-law), and duration (in seconds), are displayed for each prompt.

The lower portion of the screen allows you to add, delete, update, and test prompts, edit prompt attributes, and update the IPRC supporting a library. Procedures for each of these options are described in this section.

The prompt library configuration information (library name and directory) are maintained automatically on both sides of a redundant controller. You must add the prompt files separately to both sides of a redundant system; the disk utilities do not provide a means for copying files from one controller to another.

Refer to the *Cisco VCO/4K IPRC User's Supplement* for procedures pertaining to this screen.

Accessing the Prompt Library Maintenance Screen

Complete the following steps to access the Prompt Library Maintenance screen:

Step 1   Access the Maintenance Menu screen (refer to the "Accessing the Maintenance Menu Screen" section on page 5-2).

Step 2   Type **J** and press **Enter**.

The Prompt Library Maintenance screen appears (see Figure 5-21).

Figure 5-21   Prompt Library Maintenance Screen

```
        P R O M P T   L I B R A R Y   M A I N T E N A N C E

          LIBRARY ____    NAME _____    TOTAL USAGE(mins.) ____
        DIRECTORY _____

   ID    FILENAME    VERSION          DESCRIPTION           LAW  DURATION
   ---  ------------ -------  -------------------------------  ---  --------




            
            


      COMMAND _____   FILENAME _____  ID ___
```

Prompt Library Maintenance Screen Field Definitions

The Prompt Library Maintenance screen contains the following fields:

LIBRARY—*Data entry via administration keypad.* Type a valid entry, from 1 to 16, to specify the library number to display.

NAME—*Data entry via main keypad.* Assign a logical name to the prompt library. This field accepts up to ten alphanumeric characters for the library name.

TOTAL USAGE (mins.)—*Display only.* Shows the total minute usage of all prompts in the library.

DIRECTORY—*Data entry via main keypad.* Assign a default device and directory for the prompt library. This field accepts up to 31 characters for the directory specification. The directory specification must include a device identifier (C: or F:) and a directory path (/boot/voice0).

ID—*Display only.* Shows the prompt ID assigned to this prompt file. Valid prompt IDs are 1 to 255.

FILENAME—*Display only.* Shows the filename for this prompt file entry.

VERSION—*Display only.* Shows the version of this prompt entry. The version is extracted from the prompt file.

DESCRIPTION—*Display only.* Shows the prompt file description for this prompt entry. The description is extracted from the prompt file.

LAW—*Display only.* Shows the encoding method (A-law or Mu-law) for the prompt file entry. The law is extracted from the prompt file. This field is an information only field; it does not examine the prompt data to determine the encoding method.

DURATION—*Display only.* Displays the duration, in seconds, for the prompt entry. The duration is calculated according to the length of the prompt file data.

COMMAND—*Data entry via Select key.* Specify a prompt maintenance action. When you press the **Select** key, the following options cycle through this field:

ADD—Use to add a prompt file to the library.

DELETE—Use to delete a prompt file from the library.

EDIT—Use to edit prompt attributes in a prompt file. When you select EDIT, additional fields appear at the bottom of the screen:

VERSION—*Data entry via administration keypad.* Specify or modify the version for a prompt file entry. Valid values are 1 to 255.

DESCRIPTION—*Data entry via administration keypad.* Specify or modify the description for a prompt file entry. Valid values are 1 to 999.

LAW—*Data entry via Select key.* Specify or modify the encoding method for a prompt file entry. This entry is an information field. Valid law entries are A (A-law) and M (Mu-law).

TEST—Use to test a string of prompts. When you select TEST, additional fields appear at the bottom of the screen:

MONIT RLSP—*Data entry via main keypad.* Specify a line or trunk port to play a list of voice prompts as part of a test announcement. The line/trunk port specified by these fields must be deactivated from the Card Maintenance screen or Change Port Status ($90) command before it can be used for prompt testing.

PROMPTS—*Data entry via main keypad.* Group of 12 fields used to specify a string of voice prompts to play to a line/trunk for testing.

Refer to the *Cisco VCO/4K IPRC User's Supplement* for procedures for each of these functions.

ID—*Data entry via administration keypad.* Use this field as part of the EDIT maintenance action. Specify or modify the prompt ID for a prompt file entry. Valid values are 1 to 255.

FILENAME—*Data entry via main keypad.* Define the prompt filename, source device, and directory. Filename is used for the Add, Delete, Edit, Test, and Update maintenance actions. Filename is a valid DOS filename (8 characters and 3 character extension). You can use a wildcard (*) to identify a group of prompt files for the Add, Delete, and Update actions.

UPDATE—Use to update all IPRCs supporting this prompt library.

Core Dump

The Core Dump option results in the automatic storage of detailed information following a system failure, or at your request (see Figure 5-22).

The information in the core file contains data sets with information regarding the reason(s) the file is being created and why the system failed. The core file contains the following information:

- System version, revision, field service release (FSR) number, and PUN number.
- Failure mode.
- Context of failed task.
- Register information.
- Time and date.
- Memory image (volatile and nonvolatile).

Core Dump Functionality

The system automatically creates a core file when there is an exception, a watchdog timeout, or at your request.

Note the following considerations with automatically created core files:

- The core file includes the reason for failure, system data, context data (if appropriate), and memory contents.
- Exception data includes system and stack data at the time of the failure.
- Failure data is not written to the log file.
- A watchdog enhancement allows for the specification of which task failed in the event of a watchdog time-out.
- There is a switchover in the case of a shutdown (redundant systems only) at which time the core file is created.

Initiating a Core Dump

Complete the following steps to initiate a core dump:

Step 1 Access the Maintenance Menu screen ("Accessing the Maintenance Menu Screen" section on page 5-2).

Step 2 Type **K** and press **Enter**.

The Core Dump options does not present you with a new screen. The Maintenance Menu screen remains displayed, and the "SHUTDOWN following Core Dump (Y/N)?" message appears at the bottom right of the screen (see Figure 5-22).

Figure 5-22   Maintenance Menu Screen—Core Dump Option Selected
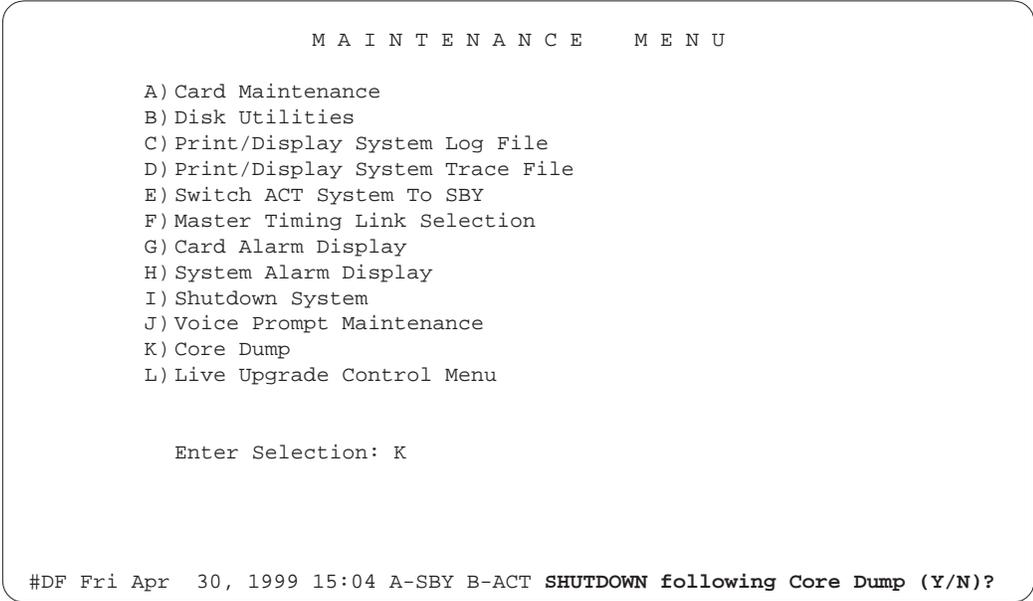
```
                    M A I N T E N A N C E    M E N U

         A) Card Maintenance
         B) Disk Utilities
         C) Print/Display System Log File
         D) Print/Display System Trace File
         E) Switch ACT System To SBY
         F) Master Timing Link Selection
         G) Card Alarm Display
         H) System Alarm Display
         I) Shutdown System
         J) Voice Prompt Maintenance
         K) Core Dump
         L) Live Upgrade Control Menu


            Enter Selection: K




 #DF Fri Apr  30, 1999 15:04 A-SBY B-ACT  SHUTDOWN following Core Dump (Y/N)?
```

Step 3 Complete one of the following options, which is dependent upon your needs:

- To shut down the system after a core dump type **Y** and press **Enter**.

  The "ENTER To Confirm Core Reboot" message appears. Press **Enter** to confirm the shutdown.

- To be keep the system in operation after a core dump type **N** and press **Enter**. This is the default option.

> ✎
>
> **Note**   If you press Enter and do not indicate a SHUTDOWN option, the system remains in operation after a core dump.

The core file is generated after you press **Enter** in response to the "SHUTDOWN following Core Dump (Y/N)?" message.

The system automatically writes the core file to the C:/ directory. When a system is initialized, it checks to make certain there is enough disk space for the largest core file. If there is not enough space, a message is issued indicating a problem. Refer to *Cisco VCO/4K System Messages* for a description of messages related to the core dump feature.

When a core file is generated, the file is named core1. Note that core1 is the *current* core file. If an older core file already exists in the directory, the existing (older) file's name is increased by one and is saved with the new filename. For example, if a core1 file exists, the file is renamed to core2 and the new core file is named core1. If there is a core1 and a core2 file on the system, the core1 file is renamed core2, and the core2 file is renamed core3. The new core file is named core1. The system maintains up to four core files.

Sending a Core Dump File for Analysis

You may be asked to send a core dump file to Cisco for analysis. Use one of the following methods that to copy the file from the VCO/4K. A Cisco TAC representative can assist you with copying and sending the file to Cisco.

1. Use FTP, the Remote File Transfer feature, on your VCO/SDS system and transfer the file to a workstation. Refer to the "FTP Password Configuration" section on page 4-45 for information on FTP.

2. Split the core dump (core1) file and copy the resulting file segments on to floppy disks, and mail them to Cisco Systems. Refer to the "Split File" section on page 5-27 for more information on splitting files.

3. If you have the Ethernet option and NFS, mount the F: drive (the network drive) and move the file to the F: drive. After the file is on the network drive, use one of the following methods to send the file to Cisco:

   - A file transfer method with which you are familiar.

   - Contact a Cisco TAC representative to assist you.

Live Upgrade Control

Use the Live Upgrade Control option to update software on a redundant system without loss of calls, and with a minimum reduction in capacity. The process consists of converting the system controller to a new release, then switching over the port and service cards that need to be upgraded.

Refer to the *Cisco VCO/4K Software Installation Guide* for detailed information regarding the Live Upgrade procedure.

Diagnostics

The Administrator's Main Menu screen Diagnostics option allows you to test or view the operating status of various system components (see Figure 6-1). Use the Diagnostics menu option to perform the following functions:

- Create voice paths between ports.
- Display card, port, or conference data.
- Test control circuit and port interface port cards.
- Display virtual call generation port data.
- Monitor call progress tones during call processing.
- Configure and enable/disable system message tracing.

Figure 6-1   Diagnostics Menu Structure
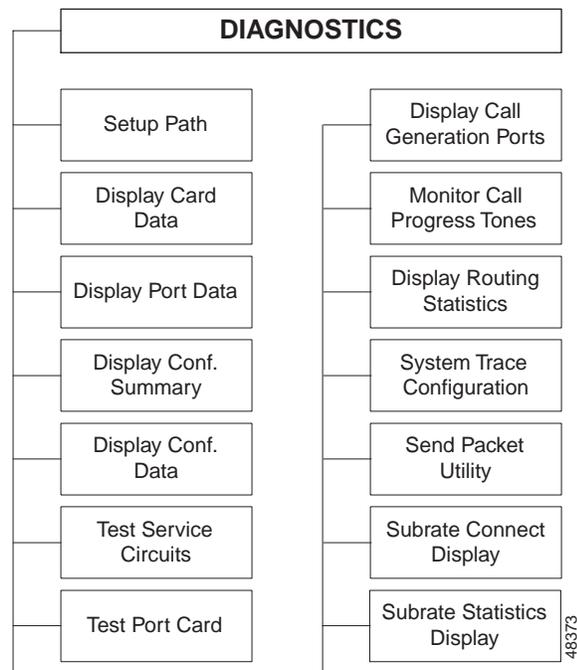
Note   You can access menu selections associated with optional software packages only if the
option(s) are installed on the system. For example, the TeleRouter software overlay must
be installed on the system in order to access and update the Routing Statistics Display
screen. Refer to the *Cisco VCO/4K TeleRouter Reference Guide* for information about
TeleRouter features. ISDN features are discussed in the *Cisco VCO/4K ISDN Supplement*.

Accessing the Diagnostic Menu Screen

Complete the following steps to access the Diagnostic Menu screen:

Step 1   Access the Administrator's Main Menu.

Step 2   Type **D** and press **Enter**.

The Diagnostic Menu screen appears (see Figure 6-2). The cursor is located in the Enter Selection field.

Figure 6-2   Diagnostic Menu Screen

```
                    D I A G N O S T I C    M E N U


         A)   Set Up Path
         B)   Display Card Data
         C)   Display Port Data
         D)   Display Conference Summary
         E)   Display Conference Data
         F)   Test Service Circuits
         G)   Test Port Card
         H)   Display Call Generation Ports
         I)   Monitor Call Progress Tones
         J)   Display Routing Statistics
         K)   System Trace Configuration
         L)   Send Packet Utility
         M)   Subrate Connection Display
         N)   Subrate Statistics Display



              Enter Selection: _
```

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Type the letter that precedes the option you want and press **Enter**.

The remainder of this chapter describes each option within the Diagnostic Menu screen.

Set Up Path

Use Set Up Path to create a voice path between two ports (referred to as A and B). A voice path is a physical, system-switched connection that allows the transfer of in-band signaling and/or voice energy. In-band signaling can consist of MF or DTMF digits, tones, or voice prompts. Ports can be specified by hardware or software address. Port A and Port B do not have to be linked into the same resource chain in order to create a voice path.

System resources are divided into two categories:

- Senders—The source of voice and in-band signaling information.

- Receivers—Resources which listen to voice and in-band signaling information.

When you create a voice path, you must designate one port as the sender and one port as the receiver. Table 6-1 lists the valid system senders and receivers.

Table 6-1   System Resources—Senders and Receivers

Senders	Receivers	Senders and/or Receivers
Tone channels	DRC ports	SLIC ports
DVC ports	MRC ports	DID ports
IPRC ports	CPA ports	UTC ports
—	MFCR2 ports	Single span T1 channels
—	—	Single span E1 channels
—	—	PRI B-channels
—	—	E+M ports
—	—	DCC ports
—	—	Four span T1 channels
—	—	Four span E1 channels
—	—	MVDC T1 channels

If both ports specified can send and receive, a two-way voice path is created. Otherwise, the voice path is one way. Up to eight voice paths can exist simultaneously.

When you create a voice path from the Set Up Path function, the system first checks to see if both ports are removed from service. Refer to the "Changing the Status of a Port" section on page 5-11 for more information on changing the status of a port.

You can also create paths using the Voice Path Control ($66) command. Refer to the *Cisco VCO/4K Standard Programming Reference* and the *Cisco VCO/4K Extended Programming Reference* for more information.

> **Note**   System tones, such as those listed at the bottom of the Set Up Paths screen, can be simultaneously accessed by any port or ports in the system. Therefore, do not take the DTG out of service at any time.

Accessing the Set Up Paths Screen

Complete the following steps to access the Set Up Paths screen:

Step 1 Access the Diagnostic Menu screen (refer to the "Accessing the Diagnostic Menu Screen" section on page 6-2).

Step 2 Type **A** and press **Enter**.

The Set Up Paths screen appears (see Figure 6-3). The cursor is located in the Add or Delete Path (A or D) field.

Figure 6-3   Set Up Paths Screen

```
                     S E T   U P   P A T H S

  Add or Delete Path (A or D) _              Path Number _

   Port                           Port
   Address ____   R,L,S,P _ _ __ ___   Address ____   R,L,S,P _ _ __ ___

                          CURRENT PATH LIST

     PA   R L S P      PA   R L S P       PA   R L S P      PA  R L S P
  1 ____  _ _ _ __    ____  _ _ _ __   5 ____  _ _ _ __    ____ _ _ _ __
  2 ____  _ _ _ __    ____  _ _ _ __   6 ____  _ _ _ __    ____ _ _ _ __
  3 ____  _ _ _ __    ____  _ _ _ __   7 ____  _ _ _ __    ____ _ _ _ __
  4 ____  _ _ _ __    ____  _ _ _ __   8 ____  _ _ _ __    ____ _ _ _ __

  4C0  Quiet        4C5  480 Hz                 4CA  1004 Hz   0 dBm
  4C1  1 kHz CCITT  4C6  1400 Hz                4CB  2804 Hz   0 dBm
  4C2  Dial Tone    4C7  1000 Hz MAX. OUTPUT    4D0  Ring Back
  4C3  380 Hz       4C8  913.8Hx SIT            4D1  Busy
  4C4  440 Hz       4C9  404 Hz  0 dBm          4D2  Reorder
```

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Set Up Path option consists of one screen. Use the **Print Screen** key to obtain a hard copy of this screen.

Set Up Paths Screen Field Definitions

The Set Up Paths screen consists of the following areas of information—Data Entry, Current Path List, and System Tone List.

The Data Entry area contains the following fields:

Add or Delete Path (A or D)—*Data entry via main keypad*. Specifies the function to perform and the additional data required to complete the command. Valid values are the following:

A—Add. Set up a new voice path.

D—Delete. Tear town an existing voice path.

Path Number—*Data entry via main keypad*. Specifies the path you want to delete. This field is only accessible if you type D in the Add or Delete Path (A or D) field.

Port Address—*Data entry via main keypad*. Specifies the software address (hexadecimal logical identifier). Use either this field or the R L S P field to specify the ports between which a path is created. There is a port address field for each port in the path (A and B).

R L S P—*Data entry via main keypad*. Specifies the physical location of the Rack-Level-Slot/Group/Span (R-L-S-P hardware address). Use either this field or the port address field to specify the ports between which a path is created. There is an R L S P field for each port in the path (A and B).

The Current Path List area of information shows the ports associated with each active path. Ports are represented by both port address and hardware address:

PA—*Display only*. Shows the software address (hexadecimal logical identifier) of the ports between which a path exists. There is a port address field for each port in the path (A and B).

R,L,S,P—*Display only*. Shows the physical location (R-L-S-P hardware address) of the ports between which a path exists. There is one rack, level, slot, port (R L S P) field for each port in the path (A and B).

The System Tone List area of information provides a quick reference to the port address of selected system tones with which paths can be created.

Adding a Voice Path

Complete the following steps to add (create) a voice path:

Step 1 Access the Set Up Paths screen (refer to the "Accessing the Set Up Paths Screen" section on page 6-4).

Step 2 Type **A** in the Add or Delete Path (A or D) field and press the **Next Field** key.

The cursor moves to the PA (port address) field for the first port in the path (A).

Step 3 Specify port A by using one of the following options—either by software or by hardware address:

- By software address: Type the port address and press the **Next Field** key until the cursor advances to the port address field for the second port in the path (B).

- By hardware address: Press the **Next Field** key to advance the cursor to the R L S P field. Type the value for each field, and press the **Next Field** key until the cursor advances to the port address field for the second port in the path (B).

Step 4 Specify port B by using one of the following options—either by software or by hardware address:

- By software address: Type the port address and press **Enter**. If a voice path is successfully created, the "Path Complete" message appears.

  The Current Path List area is updated to show the addition of the path, and the cursor returns to the Add or Delete Path (A or D) field. Proceed to Step 5.

- By hardware address: Press the **Next Field** key to advance the cursor to the R L S P field. Type the value for the Rack/Cabinet, Level, and Slot fields and press the **Next Field** key. Type the port value, and press **Enter**. The "Path Complete" message appears.

  The Current Path List area is updated to show the addition of the path, and the cursor returns to the Add or Delete Path (A or D) command field. Proceed to Step 5.

Step 5 Press the **Exit** key to return to the Diagnostic Menu screen.

To exit the Set Up Path screen without making any changes, press the **Exit**, **Prev Menu**, or **Main Menu** key. No changes are made to the system unless you press **Enter**.

Deleting a Voice Path

Complete the following steps to delete a voice path:

Step 1   Access the Set Up Paths screen (refer to the "Accessing the Set Up Paths Screen" section on page 6-4).

Step 2   Type **D** in the Add or Delete Path (A or D) field and press the **Next Field** key.

The cursor moves to the Path Number field.

Step 3   Type the number of the path you want to delete and press **Enter**. All active paths are shown in the Current Path List.

The "Path Deleted" message appears. The Current Path List is updated to show the deletion of the path and the cursor returns to the "Add or Delete Path (A or D)" field.

Step 4   Press the **Exit** key to return to the Diagnostics Menu screen.

To exit the Set Up Path screen without making any changes, press the **Exit**, **Prev Menu**, or **Main Menu** key. No changes are made to the system unless you press **Enter**.

Display Card Data

Use the Card Display option to view the current status of any card in the system database. This option also provides access to the Port Display screen described in the "Accessing the Port Display Screen from the Card Display Screen" section on page 6-10.

You can specify the card you want to display in the Card Display screen by either hardware address or base address (the card's lowest port address divided by eight). The amount of information displayed for a card depends upon the card type. Refer to the "Card Display Screen Field Definitions" section on page 6-7 for screen content information.

Accessing the Card Display Screen

Complete the following steps to access the Card Display screen:

Step 1   Access the Diagnostics Menu screen (refer to the "Accessing the Diagnostic Menu Screen" section on page 6-2).

Step 2   Type **B** and press **Enter**.

The Card Display screen appears (see Figure 6-4). The cursor is located in the R,L,S field.

Figure 6-4   Card Display Screen

```
                    C A R D       D I S P L A Y

R,L,S 1 1 1-2  Display Port (Y/N) N 1st Port Adr 480   Card Type TONE  FW 0.00
Card Status ( 2) Out of Srvc        Comm Errors 0    Poll Queue Dormant

                    1  -- 8  9  -- 16  17 -- 24  25 -- 32    ALARM STATES
Port Available      01111111 11111111 11111111 11111111    Alarms Clear
Idle(0) / In Use(1) 00000000 00000000 00000000 00000000
Diagnostics
Voice Path Trace    00000000 00000000 00000000 00000000
NBC Msg. Trace      00000000 00000000 00000000 00000000
Host Msg. Trace     00000000 00000000 00000000 00000000

                    33 -- 40 41 -- 48 49 -- 56 57 -- 64
Port Available      11111111 11111111 11111111 11111111
Idle(0) / In Use(1) 00000000 00000000 00000000 00000000
Diagnostics
Voice Path Trace    00000000 00000000 00000000 00000000
NBC Msg. Trace      00000000 00000000 00000000 00000000
Host Msg. Trace     00000000 00000000 00000000 00000000
```

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Note The Card Display screen consists of one screen for all cards with the exception of the IPRC card, which has two screens. Press the **Next Screen** key to access the IPRC's second screen; to return to the first screen press the **Prev Screen** key.

Press the **Print Screen** key to obtain a hard copy of a screen.

Using the Card Data Screen

Once a card is selected for display, the information is updated every few seconds to show the current status. You can stop the updates by pressing any key except the **Print Screen** or **Hold** key. Updating resumes when you press **Enter**. Press the **Hold** key to freeze the screen display; press it again to continue the screen updates.

Card Display Screen Field Definitions

The Card Display screen fields represented on a particular screen depend upon the type of card displayed. These fields and their dependencies are described in the following list:

R,L,S—*Data entry via main keypad*. Valid for all card types. Specifies the Rack-Level-Slot/Group/ Span hardware address (physical location) of the card for which data is displayed. The card can also be specified by 1st Port Adr; in this case, this field is used to display the card's hardware address.

Display Port (Y/N)—*Data entry via main keypad*. Valid for all card types. Provides direct access to the Port Display screen. Refer to the "Accessing the Port Display Screen from the Card Display Screen" section on page 6-10.

1st Port Adr—*Data entry via main keypad*. Valid for all card types. Specifies the first port address of the card for which data is displayed. The card can also be specified by R,L,S; in this case, this field is used to display the card's first port address.

Card Type—*Display only*. Valid for all card types. Shows the type of card for which data is displayed.

FW—*Display only*. Valid for all card types. Shows the version and revision of the firmware in use. The firmware version is displayed to the left of the decimal, the revision to the right. The contents of this field are displayed only when the card is not out of service.

Card Status—*Display only*. Shows the current card status. Valid values are:

A—Active.

O—Out of service.

S—Standby. Valid for one of the two NBC cards in redundant systems only, one or more DTG cards in either a redundant or nonredundant system, or one or more BRCs in a redundant BRC configuration.

M—Maintenance. Valid for programmable trunk cards when card alarms are present; for DVC, IPRC, and CPA when download to the card is not complete; and taking a card out of service from Card Maintenance without affecting calls in progress.

D—Diagnostics. Set from the Card Maintenance screen when diagnostic tests are to be performed.

Comm Errors—*Display only*. Valid for all card types except NBC. Shows the number of communication bus errors that have occurred between this card and the NBC since the last system boot. The maximum value for this counter is 255; when that value is reached, the counter is reset to 0. A communication bus error occurs when the NBC cannot poll a card. Possible causes include garbled data or timeouts waiting for the card to respond.

Poll Queue—*Display only*. Valid for all card types except NBC. Shows the polling queue in which this card resides. Polling queues are used by the system software to determine the frequency with which a card is polled by the NBC. Valid field entries are:

Active—Applies to all network interface and internal service circuit cards; shows the card is on line and being polled by the NBC.

Dormant—Applies to all network interface and internal service circuit cards; shows the card is currently awaiting further system processing action and is not being polled.

Maintenance—Applies to all network interface and internal service circuit cards; shows the card is currently awaiting system processing action and is not being polled.

Inactive—These cards are not polled or are not defined in the database.

Use the following port information fields to display per-port information for the card selected. The fields are displayed in clusters; a cluster is a group of eight contiguous ports. Information for up to eight clusters (64 ports) can be displayed in this area for all card types. The IPRC card is an exception—it has 16 clusters (128 ports). The IPRC card's clusters 9 through 16 are displayed on a second screen; press the **Next Screen** button to access a display of ports 65 through 128. A binary number represents each cluster, with the ports listed in increasing order. Cluster 1 contains information for ports 1 to 8, Cluster 2 represents ports 9 to 16, and so on. Not all fields are relevant to all port types. The following descriptions list the applicable port types:

Port Available—Applies to all network interface and internal service circuit cards. Shows if this port is available for use by the system. Ports show as unavailable if you have not yet defined them using the Port Definition (P) function within the Card Maintenance screen, or become unavailable when their error thresholds are exceeded (outgoing network interface ports only). Valid values are 0 and 1:

0—Port is unavailable for use.

1—Port is available for use.

Idle(0) / In Use(1)—Applies to all network interface circuits. Bytes are not displayed for all other port types. Shows whether the port is currently on- or off-hook. Valid values are 0 and 1:

0—On-hook.

1—Off-hook.

Diagnostics—Reserved for future development; bytes containing all zeros are currently displayed for network interface circuits.

Voice Path Trace—Shows whether a voice path trace task is running on this port. This task is enabled/disabled from the System Trace Configuration screen (refer to the "System Trace Configuration" section on page 6-34). Valid values are 0 and 1:

0—No tracing is in progress.

1—Voice path tracing is running on this port.

NBC Msg. Trace—Shows whether an NBC message trace task is running on this port. This task is enabled/disabled from the System Trace Configuration screen (refer to the "System Trace Configuration" section on page 6-34). Valid values are 0 and 1:

0—No tracing is in progress.

1—NBC message tracing is running on this port.

Host Msg. Trace—Shows whether a host message trace task is running on this port. This task enabled/disabled from the System Trace Configuration screen (refer to the "System Trace Configuration" section on page 6-34). Valid values are 0 and 1:

0—No tracing is in progress.

1—Host message tracing is running on this port.

ALARM STATES—*Display only.* A group of fields that display current alarm conditions for the card selected. Up to five major/minor alarms can be displayed in this field. Refer to Chapter 4, "System Configuration," for information on card alarms.

SLIPS—*Display only.* Valid for programmable trunk cards. Shows the number of slips detected for this programmable trunk card.

Out of Frames—*Display only.* Valid for programmable trunk cards. Shows the number of out of frame (OOF) conditions detected for this programmable trunk card.

Displaying Card Data

Complete the following steps to view the current status of a card:

Step 1   Access the Card Display screen (refer to the "Accessing the Card Display Screen" section on page 6-6).

The cursor is located in the R,L,S data entry field.

Step 2   Specify the card to display by using one of the following options—either by software or by hardware address:

• By software address: Press the **Next Field** key until the cursor moves to the 1st Port Address field. Type the port address and press **Enter**.

The screen displays the current status of the card entered. The system continues to update this information every few seconds.

- By hardware address: Type the value for the R (rack) field and press the **Next Field** key. Type the value for the L (level) field and press the **Next Field** key. Type the value for the S (slot/group/span) field and press **Enter**.

  The screen displays the current status of the card entered. The system continues to update this information every few seconds.

Step 3   Stop the screen updates by completing one of the following options:

- To stop the screen updates temporarily, press the **Hold** key; press it again to resume screen updates.

- To stop the screen updates entirely, press any key except the **Print Screen** or **Hold** key. Updating stops and the cursor returns to the R,L,S field.

Step 4   Press the **Exit** or **Prev Menu** key to return to the Diagnostics Menu screen.

Accessing the Port Display Screen from the Card Display Screen

You can access the Port Display screen from the Card Display screen. Complete the following steps:

Step 1   Access the Card Display screen (refer to the "Accessing the Card Display Screen" section on page 6-6).

Step 2   Stop the screen updates by pressing any key except the **Print Screen** or **Hold** key.

The cursor moves to the R,L,S field.

Step 3   Press the **Next Field** key until the cursor moves to the Display Port (Y/N) field.

Step 4   Type **Y** and press **Enter**.

The Port Display screen appears.

Display Port Data

Use the Port Display option to view current call processing activity for any port. This is a valuable debugging tool because it allows the application designer to watch a call's progress. Call processing states, rule processing, links, paths, and digit collection activity can all be monitored from the Port Display screen.

Specify the port for which information is displayed by either hardware or port address. When you access this screen via the Card Display screen, the card's physical location is already shown in the hardware address field. The majority of the fields on the Port Display screen are for display only; no actions can be performed on this port from this screen.

Information on virtual call generation ports can also be displayed from the Port Display screen. The R,L,S address for all virtual call generation ports is 0,0,0; the port numbers range from 1 to 999. Virtual call generation ports are assigned contiguous logical port addresses from $8000 to $83E6. Refer to the "Display Call Generation Ports" section on page 6-28 for more information on virtual call generation ports.

Accessing the Port Display Screen

Complete the following steps to access the Port Display screen:

Step 1   Access the Diagnostics Menu screen (refer to the "Accessing the Diagnostic Menu Screen" section on page 6-2).

Step 2   Type **C** and press **Enter**.

The Port Display screen appears (see Figure 6-5). The cursor is located in the R L S P field.

Figure 6-5   Port Display Screen

```
                       P O R T    D I S P L A Y

RLSP:  _ _ ____ ___   PA ____   COS _____    TRACE: Host _  NBC _  Voice _
CURRENT STATE          In/Outpulse Rule ___   Token        ___      CURRENT LINKS
Major       _____   Resource Group  ___   Conference ___      R L S   P
Supplementary _____  Listening To RLSP   _ _ ____ ___  PA ___ _ _ ____ ___
ISDN IN SERV I_CONNECT Conf/Assoc Port RLSP  _ _ ____ ___  PA ___ _ _ ____ ___
Call ID      ____                                                 _ _ ____ ___
Port Pointer          _____        Attempts        ____       _ _ ____ ___
Dynamic Port Pointer  _____        Completions     ____       _ _ ____ ___
Start Record Pointer  _____        Errors/Threshold  ___/___ _ _ ____ ___
End Record Pointer    _____        Rehunts/Threshold ___/___ _ _ ____ ___
                                                                 _ _ ____ ___
ANI ___ _____      _ _ ____ ___
(1) ___ _____
(2) ___ _____
(3) ___ _____
(4) ___ _____
        _____
        _____
```

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You can access the Port Display screen in several different ways. Refer to the following sections for information on how to access the Port Display screen from various administration screens:

- "Accessing the Port Display Screen from the Card Display Screen" section on page 6-10.
- "Accessing Other Screens from the Conference Display Screen" section on page 6-21.
- "Accessing Other Screens from the Call Generation Ports Display Screen" section on page 6-30.

The Port Display consists of one screen. Use the **Print Screen** key to obtain a hard copy of this screen. Once a port is selected for display, the information is updated every few seconds to show the current status. You can stop the updates by pressing any key except **Print Screen** or **Hold**. Updating resumes when you press **Enter**. Press the **Hold** key to freeze the screen display; press it again to continue the screen updates.

Port Display Screen Field Definitions

The contents of the fields in the Port Display screen depend upon the status of the port. The fields are as follows:

R L S P—*Data entry via main keypad.* Specifies the rack-level-slot/group/span-port hardware address (physical location) of the port for which data is displayed. The port can also be specified by port address; in this case, this field displays the port's hardware address.

✎

Note   For programmable trunk cards, you must specify a span as well as the slot or the "Interface Required" message appears.

PA—*Data entry via main keypad.* Port Address; specifies the software address (hexadecimal logical identifier) of the port for which data is displayed. The port can also be specified by hardware address; in this case, this field displays the port's software address.

COS—*Display only.* Applies to network interface circuits only. Indicates the class of service assigned to this port via the Line and Trunk Card Configuration screens (refer to the "Trunk Card Configuration" section on page 3-11). The COS assigned in the database is always displayed for the port; any internal COS is displayed in addition to the database value. Valid values are:

O—Originating. Calls originating from the system; outgoing calls initiated by host command.

T—Terminating. Calls terminating at the system; incoming calls initiated by actions outside the system; can also be an internal COS representation for a port with COS = 2 or that is currently in use as an incoming circuit.

U—Internal representation for a port with COS = 2 or A2 that is currently in use as an outgoing circuit.

C—Internal representation for any port currently involved in a conference.

2—2-Way. Calls originating from the system or calls terminating at the system; outgoing calls initiated by host command, incoming calls initiated by outside actions or forced by host command.

AO—Always Off-hook and Originating. Calls originating from the system; port goes off-hook at system reset and remains off-hook; outgoing calls initiated by host command.

AT—Always Off-hook and Terminating. Calls terminating at the system; port goes off-hook at system reset and remains off-hook; incoming calls initiated by outside actions or forced by host command.

TRACE: Host, NBC, Voice—*Data entry via main keypad.* Use these three fields to enable/disable host, NBC, or voice path tracing for the port displayed. To enable tracing, set the field(s) to 1; to disable trace, set the fields to 0. These fields function when the Port Addresses field(s) on the System Trace Configuration screen are set to SELECTED. Refer to the "System Trace Configuration" section on page 6-34 for more information on the Trace function.

CURRENT STATE—*Display only.* Two fields that show the current call processing activity for the port specified. If no activity is present, the major state is CP_IDLE. Refer to the *Cisco VCO/4K Standard Programming Reference* and the *Cisco VCO/4K Extended Programming Reference* for more information on major and supplementary states. Two additional fields are provided for information on ISDN port and call states, and are displayed only for ISDN channels. Refer to the *Cisco VCO/4K ISDN Supplement* for a listing of ISDN port and call states.

In/Outpulse Rule, Token—*Display only.* These two fields apply to network interface circuits only, and show the rule and token currently being processed. Rules are defined from the Inpulse and Outpulse Rules Table screens (refer to the "Outpulse Rules Table" section on page 3-55). If no rule processing is taking place, these fields are blank. When the major state is CP_INPULSE, these fields represent inpulse rule processing; otherwise, the data in these fields represents outpulse rule processing. The rule number is prefixed with I (inpulse) or O (outpulse) to also indicate which type of rule is being processed.

Resource Group—*Display only.* Shows the resource group to which the specified port belongs. Assign ports to groups from the Resource Group Configuration screens (refer to the "Resource Group Configuration" section on page 3-34). A resource group of 0 indicates that this port does not belong to a group.

Conference—*Display only*; also used to access the Conference Display screens. Shows the conference in which the specified port is participating. This field is blank if the port is not currently involved in a conference. When data is displayed in this field, use the **Tab** key to advance the cursor to the Conference number field and access the Conference Display screen.

Listening to RLSP, PA—*Display only*; also used to change port for which data is displayed. Two fields that indicate whether a voice path exists between the specified port and another port. If these fields are blank, no voice path currently exists. Ports are indicated by both hardware and software address (system tones are indicated by software address only). When data is displayed in these fields, use the **Tab** key to advance the cursor to the RLSP field and display the data for that port.

Conf/Assoc Port RLSP, PA—*Display only*; also used to change port for which data is displayed. Applies to network interface circuits and DCC circuits only. If the displayed port is actively participating in a conference, these ports identify the conference port or associated line/trunk port with which the displayed port is linked. If these fields are blank, the displayed port is not actively participating in a conference. Ports are indicated by both hardware and software address. When the port displayed is a line or trunk port, the port identified by these fields is a conference port. When a conference port is displayed, the port identified by these fields is a line or trunk port. When data is displayed in these fields, use the **Tab** key to advance the cursor to the RLSP field and display the data for that port.

Call ID—*Display only*; ISDN channels only. Shows the call ID assigned to this call attempt by the system. Refer to the *Cisco VCO/4K ISDN Supplement* for more information.

Port Pointer, Dynamic Data Pointer, Start Record Pointer, End Record Pointer—*Display only*. Four fields that display specific memory locations used by call processing. These fields are used by Cisco Systems Technical Support and Engineering personnel. Start and End Record Pointers are displayed for network interface circuits only.

Attempts—*Display only*. For network interface circuits, shows the number of attempted calls on this port for the current statistics period. For internal service circuits, shows the number of times the port was linked into a call's resource chain. Maximum value for this counter is 255. The count is reset when the host sends the command to start a new collection period. If the statistics feature is not enabled, the count does not reset (the host command is returned with an error code) and continues to increment until the maximum value is reached. Refer to the *Cisco VCO/4K TeleRouter Reference Guide* for instructions for enabling the statistics feature.

Completions—*Display only*. For network interface circuits, shows the number of completed calls on this port for the current statistics period. No value is displayed for internal service circuits. Maximum value for this counter is 255.

Errors/Threshold—*Display only*. Shows the number of supervision errors detected for this port (applies to network interface ports only) and the current error threshold value (when the ports are removed from service). Use the Resource Group Summary screen to set the error threshold. Refer to the "Resource Group Summary" section on page 3-31 for more information.

Rehunts/Threshold—*Display only*. Shows the number of times the current call has rehunted a resource group for a new outgoing port and the current threshold value (how many times the system rehunts before stopping and reporting a supervision error to the host). Displayed only when a call is active; otherwise the field remains blank. Set the rehunt threshold from the Resource Group Summary screen. Refer to the "Resource Group Summary" section on page 3-31 for more information.

CURRENT LINKS—*Display only*; also used to change port for which data is displayed. Provides a listing of the hardware address of all ports currently linked into the same resource chain or call as the specified port. If these fields are blank, no links currently exist. When data is displayed in these fields, use the **Tab** key to advance the cursor to each hardware address field and display the data for that port.

ANI—*Display only.* The first field on the line shows the format of the information contained in the field. The second field contains any digits collected due to inpulse rule processing (IP ANI token) or sent in by the host using an Outgoing Port Control ($69), Incoming Port Control ($6A), or ISDN Port Control ($49) command. Digits remain stored in this field for the duration of the call unless overwritten as a result of host command or inpulse rule processing. Valid values are:

BCD—Binary Coded Decimal; the standard system digit representation.

IA5—ASCII digits; contents stored as specified by ISDN Message Template processing of a D FLD token or a $49 command.

HEX—Hexadecimal information; contents stored as specified by ISDN Message Template processing of an I FLD or FLD token or $49 command.

(1) to (4)—*Display only.* The first field on each line shows the format of the information contained in the field. The second field contains any digits collected due to inpulse rule processing (IP Field [xx] token) or sent in by the host using an Outgoing Port Control ($69), Incoming Port Control ($6A), or ISDN Port Control ($49) command. Digits remain stored in this field for the duration of the call unless overwritten as a result of host command or inpulse rule processing. Valid values are:

BCD—Binary Coded Decimal; the standard system digit representation.

IA5—ASCII digits; contents stored as specified by ISDN Message Template processing of a D FLD token or $49 command.

HEX—Hexadecimal information; contents stored as specified by ISDN Message Template processing of an I FLD or FLD token or $49 command.

Displaying Port Data

Complete the following steps to view the current status of a port:

Step 1   Access the Port Display screen (refer to the "Accessing the Port Display Screen" section on page 6-10).

Step 2   Specify the port to display by using one of the following options—either by hardware or by software address:

- By hardware address: Type the value for the R L S P fields and press the **Next Field** key (if the Port Display screen was accessed from the Card Display, these fields are already filled in). Type the port value and press **Enter**.

    The screen is updated to show the current status of the port entered. The system continues to update this information every few seconds.

- By software address: Press the **Next Field** key until the cursor moves to the PA field. Type the port address and press **Enter**.

    The screen is updated to show the current status of the port entered. The system continues to update this information every few seconds.

Step 3   Stop the screen updates by completing one of the following options:

- To temporarily stop the screen updates, press the **Hold** key; press it again to resume screen updates.

- To stop the updates entirely, press any key except the **Print Screen** or **Hold** key. Updating stops and the cursor returns to the R,L,S,P fields.

Step 4   To display port data for any other port identified on the display, press **Tab** to move the cursor to that field and press **Enter**. The screen is updated with the current status of the new port. The system continues to update this information every few seconds.

Step 5   When no further ports are to be displayed, press the **Prev Menu** key to return to the Diagnostics Menu screen. If the Port Display screen was accessed from the Card Display or Conference Display, press the **Exit** key to return to the screen from which the Port Display was accessed. If the Port Display screen was accessed via the Diagnostics Menu screen, press the **Exit** key to return to the Diagnostics Menu screen.

Accessing Other Screens from the Port Display Screen

You can access the following screens from the Port Display screen:

- Card Display
- Conference Display
- Call Generation Ports Display

Accessing the Card Display Screen

Complete the following steps to access the Card Display screen from the Port Display screen:

Step 1   Stop the Port Display screen updates.

Step 2   Press the **Exit** key.

The Card Display screen appears.

Note   This procedure is valid if the Port Display screen was accessed from the Card Display screen.

Accessing the Conference Display Screen

Complete the following steps to access the Conference Display screen from the Port Display screen:

Step 1   Stop the Port Display screen updates.

Step 2   Complete one of the following options, which is dependent upon how you accessed the Port Display screen:

- If the Port Display screen was accessed from the Conference Display screen, press the **Exit** key. The Conference Display screen appears. Do not proceed to further steps.
- If the Port Display screen was accessed from any other screen than the Port Display screen, press Tab until the cursor moves to the Conference field.

Note   There must be a conference number shown in the Conference field.

Step 3   Press **Enter**.

The Conference Display screen associated with the conference number contained in Step 2.

Refer to the "Display Conference Data" section on page 6-18 for more information on the Conference Display screen.

Accessing the Call Generation Ports Display Screen

Complete the following steps to access the Card Display screen from the Port Display screen:

Step 1   Stop the Port Display screen updates.

Step 2   Press the **Exit** key.

The Call Generation Ports Display screen appears.

Note   This procedure is valid if the Port Display screen was accessed from the Call Generation Ports Display screen.

Refer to the "Display Call Generation Ports" section on page 6-28 for more information on the Call Generation Ports Display screen.

Display Conference Summary

The Conference Menu option lists all conference structures in the system. A conference structure consists of all conference ports allocated to a conference and their associated line/trunk ports, if any. Up to eight conference ports can be allocated to a single conference structure. The number of line or trunk ports in a conference can vary according to the type of voice path. A conference structure exists for as long as there are conference ports allocated to it. Up to 255 conference structures can exist simultaneously.

Conferences are controlled by the host using the Conference Control ($6D) command. For more information on this command and on conferencing, refer to the *Cisco VCO/4K Standard Programming Reference*, the *Cisco VCO/4K Extended Programming Reference*, and the *Cisco VCO/4K Conferencing Guide*.

Accessing the Conference Menu Screen

Complete the following steps to access the Conference Menu screen:

Step 1   Access the Diagnostic Menu screen (refer to the "Accessing the Diagnostic Menu Screen" section on page 6-2).

Step 2   Type **D** and press **Enter**.

Step 3   The Conference Menu screen appears (see Figure 6-6). The cursor is located in the Disp field.

Figure 6-6   Conference Menu

```
                        C O N F E R E N C E     M E N U

        CONF PORTS    LINES/TRNKS                    CONF PORTS    LINES/TRNKS
 No     Alloc Unused  1Way  2Way  Disp        No     Alloc Unused  1Way  2Way  Disp
 ──      –     –      ───    –     –           ──      –     –      ───    –     –
 ──      –     –      ───    –     –           ──      –     –      ───    –     –
 ──      –     –      ───    –     –           ──      –     –      ───    –     –
 ──      –     –      ───    –     –           ──      –     –      ───    –     –
 ──      –     –      ───    –     –           ──      –     –      ───    –     –
 ──      –     –      ───    –     –           ──      –     –      ───    –     –
 ──      –     –      ───    –     –           ──      –     –      ───    –     –
 ──      –     –      ───    –     –           ──      –     –      ───    –     –
 ──      –     –      ───    –     –           ──      –     –      ───    –     –
 ──      –     –      ───    –     –           ──      –     –      ───    –     –
 ──      –     –      ───    –     –           ──      –     –      ───    –     –
 ──      –     –      ───    –     –           ──      –     –      ───    –     –
 ──      –     –      ───    –     –           ──      –     –      ───    –     –
 ──      –     –      ───    –     –           ──      –     –      ───    –     –
```

The Conference menu can consist of up to four screens, each containing listings for up to 32 conferences. Use the **Prev Screen** and **Next Screen** keys to page through the listings. Press the **Print Screen** key to obtain a hard copy of any of these screens.

Conference Menu Screen Field Definitions

The Conference menu consists of the following fields and categories:

No—*Display only.* Shows the conference structure by the number call processing has assigned to it. Conference numbers range from 1 to 255.

CONF PORTS—*Display only.* Two fields that show the number of conference ports in the corresponding conference structure and how many are associated with line/trunk ports.

Alloc—Allocated; indicates the number of conference ports allocated to this conference that are currently associated with a line/trunk (being used). Ports are allocated using the Conference Control ($6D) command. The number of allocated ports can range from 1 to 8.

Unused—Indicates the number of conference ports allocated to this conference that are not currently associated with line/trunk ports (reserved but not currently used). The number of unused ports can range from 0 to 8.

LINES/TRNKS—*Display only.* Line and trunk ports; two fields that show the number of line/trunk ports that are actively participating in the corresponding conference.

1Way—Indicates the number of listen-only parties in the conference. Each one-way party corresponds to an actively participating line or trunk port. All one-way parties are associated with a single conference port in the conference structure. An unlimited number of one-way parties can participate in a conference; however, the screen displays from 0 to 999 only.

2Way—Indicates the number of talk-and-listen parties in the conference. Each two-way party corresponds to an actively participating line or trunk port. Each two-way party is associated with its own conference port in the conference structure. The number of two-way parties in a conference can range from 0 to 8.

Disp field—Data entry via main keypad, access to another screen(s). Display Conference; provides access to the Conference Display screen. Refer to the "Accessing Other Screens from the Conference Menu Screen" section on page 6-18 for instructions.

Accessing Other Screens from the Conference Menu Screen

You can access the following screens from the Conference Menu screen:

- Port Display
- Conference Display

Accessing the Port Display Screen

Complete the following steps to access the Port Display screen from the Conference Menu screen:

Step 1   Access the Conference Menu screen from Port Display screen.

Step 2   Press the **Exit** key.

The Port Display screen appears.

> **Note**   This procedure is valid if the Conference Menu screen was accessed from the Port Display screen.

Accessing the Conference Display Screen

Complete the following steps the access the Conference Display screen from the Conference Menu screen:

Step 1   Use the **Prev Menu** or **Next Field** key and move the cursor to the Disp field that corresponds to the conference number for which you want to display information.

Step 2   Type any character and press **Enter**.

The Conference Display screen appears.

Display Conference Data

Use the Conference Display option to view the status and participating line, trunk, and conference ports for any conference structure. Conferences are controlled by the host using the Conference Control ($6D) command. For more information on this command and on conferencing, refer to the *Cisco VCO/4K Standard Programming Reference*, the *Cisco VCO/4K Extended Programming Reference*, and the *Cisco VCO/4K Conferencing Guide*.

Accessing the Conference Display Screen

Complete the following steps to access the Conference Display screen:

Step 1   Access the Diagnostic Menu screen (refer to the "Accessing the Diagnostic Menu Screen" section on page 6-2).

Step 2   Type **E** and press **Enter**.

The Conference Display screen appears (see Figure 6-7). The cursor is located in the Conference No. field.

Figure 6-7   Conference Display Screen

The Conference Display screen can consist of multiple screens, each containing listings for up to 14 conference parties. Use the **Prev Screen** and **Next Screen** keys to page through the listings. Use the **Print Screen** key to obtain a hard copy of any of these screens.

Conference Display Screen Field Definitions

The Conference Display screen consists of the following fields:

Conference No.—*Data entry via main keypad.* A single field that specifies the conference structure for which to display data. Conference numbers are assigned by call processing when the conference structure is created. Conference numbers range from 1 to 255.

Status—*Display only.* Shows the current status of the conference structure for which data is displayed. Valid values are:

Active—Lines and trunks are assigned and participating in a conference.

Reserved—Conference ports are reserved but no lines or trunks are currently active.

Avail.—*Display only.* Shows the number of conference ports that are reserved for this conference but are not currently active (in use). The number of available conference ports can range from 0 to 8.

Act.—*Display only.* Active; shows the number of conference ports in use in this conference. The number of active conference ports can range from 0 to 8.

CONFERENCE PORTS—*Display only.* Identifies the conference ports allocated to this conference structure, gain or attenuation adjustment for each conference port, the number of line/trunk ports associated with a conference port, and whether the conference port is used for a one- or two-way path. If one or more line/trunk ports are associated with a conference port, that conference port is listed only for the first. Subsequent entries for that conference port are left blank until the list for the next conference port begins. The RLSP fields can also be used to access the Port Display screen for any conference port displayed.

RLSP—Specifies the physical location (R-L-S/G/S-P hardware address) of the conference port. Also used to access the Port Display screen.

PA—Port Address; specifies the software address (hexadecimal logical identifier) of the conference port.

In Scale—*Display only.* Shows adjustment, if any, made to the input level to this conference port. There are 15 preset adjustments ranging from –15 dB to +6 dB (–15, –13.5, –12, –10.5, –9, –7.5, –6, –4.5, –3, –2, –1, +1.5, +3, +4.5, and +6).

Out Scale—*Display only.* Shows adjustment, if any, made to the output level from this conference port. Valid values are 0 (no adjustment) and –3 dB (decrease by 3 dB).

Users—*Display only.* Shows the number of line/trunk ports listening to a conference port.

Path Type—Indicates the type of voice path for this conference port. If the path type is two-way, only one user is allowed for a conference port. If the path type is one-way, valid values for this field are from 1 to 999. Valid values are:

1—One-way, listen only.

2—Two-way, talk and listen.

> **Note** When using the Communication Assistance for Law Enforcement Act (CALEA) feature, the Path Type displays 2, which incorrectly indicates a two-way conference. CALEA conferences are one-way, talk only.

LINE/TRUNK PORT—*Display only.* Shows the line or trunk ports actively participating in this conference. If the conference status is Reserved, no line or trunk ports are listed.

RLSP—Four fields that specify the physical location (R-L-S/G/S-P hardware address) of the line/trunk port associated with the corresponding conference port. Also provides access to the Port Display screen.

PA—Port Address; specifies the software address (hexadecimal logical identifier) of the line/trunk port associated with the corresponding conference port.

Displaying a Conference

Complete the following steps to display all ports and information about a conference:

Step 1 Access the Conference Display screen (refer to the "Accessing the Conference Display Screen" section on page 6-19).

The cursor is located in the Conference No. field. If the Conference Display screen is accessed from the Conference Menu or Port Display screen, the Conference Display screen contains the conference number; otherwise this field is blank.

Step 2 Type the number of the conference for which you want to view information or leave the conference number already there unchanged (if accessed via the Conference menu or Port Display screen) and press **Enter**.

The screen displays the current status of the conference entered. The system continues to update this information every few seconds.

Step 3 Stop the screen updates by completing one of the following options:

- To stop the screen updates temporarily, press the **Hold** key; press it again to resume screen updates.

- To stop the screen updates entirely, press any key except the **Print Screen** or **Hold** key. Updating stops and the cursor returns to the Conference No. field.

Step 4 Repeat Step 2 or access the Port Display screen (refer to the "Accessing the Port Display Screen" section on page 6-10).

Step 5 To return to the Diagnostics menu, press the **Prev Menu** key. If the Conference Display screen was accessed from the Conference Menu or Port Display screen, press the **Exit** key to return to the screen from which the Conference Display screen was accessed; otherwise press the **Exit** key to return to the Diagnostics Menu screen.

Accessing Other Screens from the Conference Display Screen

You can access the following screens from the Conference Display screen:

- Conference Menu
- Port Display

Accessing the Conference Menu Screen

Complete the following steps to access the Conference Menu screen from the Conference Display screen:

Step 1 Access the Conference Display screen from the Conference Menu screen.

Step 2 Press the **Exit** key.

The Conference Menu screen appears.

> **Note** This procedure is valid if the Conference Display screen was accessed from the Conference Menu screen.

Accessing the Port Display Screen

Complete the following steps to access the Port Display screen from the Conference Display screen:

Step 1 Stop the Conference Display screen updates.

Test Service Circuits

Step 2   Complete one of the following options, which depends upon how you accessed the Conference Display screen:

- If you accessed the Conference Display screen via the Port Display screen, press the **Exit** key.

  The Port Display screen appears.

- If you accessed the Conference Display screen from the Diagnostics Menu screen, the cursor moves to the Conference No. field. Press **Tab** until the cursor moves to the R L S P field of any line, trunk, or conference port displayed. Press **Enter**.

  The Port Display screen is displayed for that hardware address.

Test Service Circuits

Use Test Service Circuits to test individual circuits on DTMF Receiver Cards (DRCs), MF Receiver Cards (MRCs) and Call Progress Analyzer cards (CPAs). You can test any or all receiver ports on the same card with a single command. Ports are tested in sequential order from the start port you specify to the end port you specify. You can also set this test to loop continuously so that each port is tested in sequence. The cycle is repeated until you terminate it.

When testing a DRC or MRC, a path is set between the selected circuit(s) and an outpulse channel; digits are then sent to that receiver. The system compares the digits sent with the digits received. If any discrepancies are detected, an error message and the two digit strings are sent to the error log and the system printer.

When testing a CPA card, dial tone, ringback, ringback cessation, busy, and reorder tone events are presented by the Digital Tone Generator (DTG) card to the CPA port(s) for detection. Any discrepancy between the presented tone and the reported detection is pegged as a test failure for the CPA port(s). Logfile and system printer error messages specify the port's address and the type of tone it failed to detect.

A port on a line/trunk or receiver port can be used to monitor the test. This port listens to the voice path between the service circuit being tested and the resource providing test digits or tones. By monitoring the digits and tones being passed, you can determine the exact point of test failure.

From the Card Maintenance screen, place the card on which the receiver ports reside in Diagnostic mode before you test it. If the card is not in Diagnostic mode, an error message appears and the test command is aborted. Take the port out of service from the Card Maintenance screen or a Change Port Status ($90) host command (refer to the *Cisco VCO/4K Standard Programming Reference* and the *Cisco VCO/4K Extended Programming Reference*).

If any ports are active when the card is placed in Diagnostic mode, the card automatically goes into Camped On mode. The Service Circuit Test function can be run on a card in Camped On mode; the test skips any nonidle ports on the card.

Press any key to abort a service circuit test in progress.

Accessing the Service Circuit Test Utility Screen

Complete the following steps to access the Service Circuit Test Utility screen:

Step 1   Access the Diagnostic Menu screen (refer to the "Accessing the Diagnostic Menu Screen" section on page 6-2).

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Step 2   Type **F** and press **Enter**.

The Service Circuit Test Utility screen appears (see Figure 6-8). The cursor is located in the Receiver R,L,S field.

Figure 6-8   Service Circuit Test Utility Screen

```
        S E R V I C E    C I R C U I T    T E S T    U T I L I T Y

        Receiver R,L,S    _ _ ___              Card Type ____
        DVC/IPRC R,L,S,P  _ _ ___ _            Monitor R,L,S,P _ _ ___ _

        Start Test at Port __            End Test at Port __

        Print Error Messages Only (Y/N) _
        Continually Loop Through Test (Y/N) _


        NOTE: Port numbers start at 1.  The start port MUST
              be specified.  If the end port is not specified,
              or if the end port is less than or equal to the
              start port, only the start port will be tested.
              Card must be previously put into the Diagnostic
              mode from the Card Maintenance Menu.
```

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The Service Circuit Test Utility consists of one screen. Use the **Print Screen** key to obtain a hard copy of this screen.

Service Circuit Test Utility Screen Field Definitions

The Service Circuit Test Utility screen contains the following fields:

Receiver R,L,S—*Data entry via main keypad*. Specifies the physical location (R,L,S hardware address) of the receiver card on which the tested ports reside.

Card Type—*Display only*. Shows the type of card selected. Possible values for this field are described in Table 3-1 of the "Accessing the Database Administration Menu Screen" section on page 3-3.

Monitor R,L,S,P—*Data entry via main keypad*. Four fields that specify the physical location (R,L,S,P port address) of a port on a line/trunk card or receiver card used to monitor the test. This port monitors the reception of test digits, spoken digits, and call progress tones. Possible port types include:

CPA

DRC

SLIC

DID

UTC

Single Span T1/E1

Four Span T1/E1

MVDC T1

ICC T1/E1

E + M

DCC

Start Test at Port—*Data entry via main keypad*. Specifies the port with which to begin the test. If you do not specify a Start Test at Port value, the test is not performed. Valid values are determined by the number of ports supported by the card type:

CPA—1 to 24

DRC—1 to 8

DRC 24/48—1 to 24 or 1 to 48

MRC—1 to 8

MFCR2—1 to 8

End Test at Port—*Data entry via main keypad*. Specifies the port with which to end the test. If you do not specify a value, or the value is less than or equal to the start port value, only the port contained in the Start Test at Port field is tested. Valid values are determined by the number of ports supported by the card type:

CPA—1 to 24

DRC—1 to 8

DRC24/48—1 to 24 or 1 to 48

MRC—1 to 8

MFCR 2—1 to 8

IPRC— 1 to 8

IPRC 64/128—1 to 64 or 1 to 128

Print Error Messages Only (Y/N)—*Data entry via main keypad*. Specifies whether to display and print test results as the test is being conducted or only if an error occurs. Printing messages (output to screen and system printer) slows execution of the test. Valid values are **Y** (print only error messages if they occur) or **N** (print results of test for all ports).

Continually Loop Through Test (Y/N)—*Data entry via main keypad*. Specifies whether or not the test should loop (cycle through port tests repeatedly until loop is terminated by user). Valid values are **Y** (run a continuous loop of tests) or **N** (only execute test once). Pressing any key on the keyboard stops the test.

Testing a Service Circuit

Complete the following steps to test one or more CPA, DTMF or MF receiver ports:

Step 1   Access the Service Circuit Test Utility screen (refer to the "Accessing the Service Circuit Test Utility Screen" section on page 6-22.

Step 2   Type the physical location of the receiver card—type the rack/cabinet number, level number, and slot/group/span number, and press the **Next Field** key after each field.

The cursor moves to the Monitor R,L,S,P field.

Step 3   If the test is to be monitored, proceed to Step 4; otherwise, proceed to Step 7.

Step 4   Press the **Tab** or **Next Field** key to advance the cursor to the Start Test at Port field.

Step 5   Type the physical location of the monitoring port.

Note   This port must be deactivated.

Step 6   Type the rack/cabinet number, level number, and slot/group/span number and press the **Next Field** key after each field.

The cursor moves to the Start Test at Port field.

Step 7   Type the port number with which to begin the test and press the **Next Field** key.

The cursor moves to the End Test at Port field.

Step 8   Type the port number with which to end the test and press the **Next Field** key.

The cursor moves to the Print Error Messages Only (Y/N) field.

Step 9   Choose the test reporting type by typing **Y** or **N**.

The cursor moves to the Continually Loop Through Test (Y/N) field.

Step 10   Choose the looping mode or single test execution mode by typing **Y** or **N** and press **Enter**.

The Card Type field is updated to show the type of receiver card specified, and the "Rcvr X, Test Y" message appears. X is the number of the port currently being tested and Y is the cumulative number of tests that were run.

If you chose loop mode, the tests run continuously until you press any key. When all ports are tested or the test loop is terminated, either the "Test Loop Complete ATP" or the "Test Loop Complete STF" message appears. ATP = All Tests Passed and STF = Some Tests Failed. The cursor returns to the R,L,S data entry field. The system printer logs all failed tests.

Step 11   Press the **Exit** key to return to the Diagnostics Menu screen.

Note   To abort a test in progress, press any key. Once the test is aborted, press **Exit** to return to the Diagnostics menu.

Test Port Card

Use the Test Port Card function to test individual Single Span T1, Four Span T1, MVDC T1, or ICC T1/E1 card channels or ISDN B-channels. The test sets a path over the selected channel(s) between selected DTMF or MF receiver circuit(s) and a tone channel, then sends digits to the receiver. The system compares the digits sent with the digits received. If any discrepancies are detected, an error message, the two digit test strings, and the addresses of the channel are sent to the error log and the system printer. You can test any or all channels on the same card with a single command. Channels are tested in sequential order from the start channel you specify to the end channel you specify.

Note   PRI D-channels cannot be tested using this utility.

Before a test is performed, you must use the Card Maintenance screen to place the cards on which the channels and receiver ports reside in Diagnostic mode. If either card is not in Diagnostic mode, an error message appears and the test command is aborted.

The card is put into a local loopback state which ends any active calls when placed in Diagnostic mode. Press any key to abort a test in progress. Channel looping across spans is not supported.

Accessing the Test Port Card Screen

Complete the following steps to access the Test Port Card screen:

Step 1   Access the Diagnostic Menu screen (refer to the "Accessing the Diagnostic Menu Screen" section on page 6-2).

Step 2   Type **G** and press **Enter**.

The Test Port Card screen appears (see Figure 6-9). The cursor is located in the Port Card R,L,S field.

Figure 6-9   Test Port Card Screen

```
                    T E S T   P O R T   C A R D


     Port Card  R,L,S  _ _ ___        Start Channel 1   End Channel 24


     MRC/DRC    R,L,S  _ _ ___        Start Port 1      End Port 8


     Port Card Type    ____           Receiver Type ____

     Print Error Messages Only (Y/N) Y
     Continually Loop Through Test (Y/N) N


     NOTE:      Both cards used for this test MUST FIRST be placed in
                Diagnostic mode using the Card Maintenance Screen.
```

The Test Port Card consists of one screen. Press the **Print Screen** key to obtain a hard copy of this screen.

Test Port Card Screen Field Definitions

The Test Port Card screen contains the following fields:

Port Card R,L,S—Data entry via main keypad. Specifies the physical location (R,L,S hardware address) of the card where the tested channels reside.

Start Channel — Data entry via main keypad. Specifies the channel with which to begin the test; this field must be specified or the default port, port 1, is used. Possible values are the following cards:

Single Span T1—1 to 24

Four Span T1—1 to 24

ICC T1—1 to 24

MVDC T1—1 to 24

ISDN PRI (channel 24, the D-channel, cannot be tested using this utility)—1 to 23

Single Span E1—1 to 32

Four Span E1—1 to 32

ICC E1—1 to 32

E1-PRI—1 to 32

End Channel — Data entry via main keypad. Specifies the channel with which to end the test. If you do not specify a value, or the value is less than or equal to the Start Channel value, only the port contained in that field is tested. Valid values are 1 to 24 for T1 protocols, and 1 to 32 for E1 protocols.

MRC/DRC R,L,S — Data entry via main keypad. Specifies the physical location (R,L,S hardware address) of the receiver card where the ports to be tested reside.

Start Port — Data entry via main keypad. Specifies the receiver port with which to begin the test. If you do not specify a port, the test is not performed. Valid values are 1 to 48.

End Port — Data entry via main keypad. Specifies the port with which to end the test. If you do not specify a port, or the value is less than or equal to the start port value, only the port contained in the Start Test at Port field is tested. Valid values are 1 to 48.

Port Card Type — Display only. Shows the port card type. Possible values for this field are described in Table 3-1 of the "Accessing the Database Administration Menu Screen" section on page 3-3.

Receiver Type — Display only. Shows the receiver card type. Possible values for this field are described in Table 3-1 of the "Accessing the Database Administration Menu Screen" section on page 3-3.

Print Error Messages Only (Y/N) — Data entry via main keypad. Specifies whether to display and print test results as the test is being conducted or only if an error occurs. Printing messages (output to screen and system printer) slows execution of the test. Valid values are **Y** (yes, print only error messages if they occur) or **N** (no, print results of test for all ports). Press any key on the keyboard to stop the test.

Continually Loop Through Test (Y/N) — Data entry via main keypad. Specifies whether to loop (cycle through port tests repeatedly) until you terminate the loop. Valid values are **Y** (yes, run a continuous loop of tests), or **N** (no, run one cycle of tests). Only error messages are printed in loop mode. Press any key on the keyboard to stop the test.

Testing a Channel

Complete the following steps to test one or more channels:

Step 1 Access the Test Port Card screen (refer to the "Accessing the Test Port Card Screen" section on page 6-26

Step 2 Type the rack/cabinet number, level number, and slot/group/span number (physical location of the port card) and press the **Next Field** key after each field.

> **Note**   The card must be in Diagnostic mode.

The cursor moves to the Start Channel field.

Step 3 Type the channel number with which to begin the test and press the **Next Field** key.

The cursor moves to the End Channel field.

Step 4 Type the T1 channel number with which to end the test and press the **Next Field** key.

The cursor moves to the MRC/DRC R,L,S field.

Step 5 Type the rack/cabinet number, level number, and slot/group/span number (physical location of the receiver card) and press the **Next Field** key after each field.

> **Note** The card must be in Diagnostic mode.

The cursor moves to the Start Port field.

Step 6 Type the port number with which to begin the test and press the **Next Field** key.

The cursor moves to the End Port field.

Step 7 Type the port number with which to end the test and press the **Next Field** key.

The cursor skips the Port Card Type and Receiver Type fields and moves to the Print Error Messages Only (Y/N) field.

Step 8 Type **Y** or **N**, depending upon whether you want to view all the test results or only error messages, and press the **Next Field** key.

The cursor moves to the Continually Loop Through Test (Y/N) field.

Step 9 Type **Y** or **N**, depending on whether you want to run a continuous test loop, and press **Enter**.

The Port Card Type and the Receiver Type fields are updated to show the type of receiver card specified and testing begins.

If all messages are printed, the display shows the address of the channels and receiver circuits currently being tested, with a pass/fail indication.

If you chose loop mode, the tests run continuously until you press any key. When all ports are tested or you terminate the test loop, either the "Test Loop Complete ATP" or "Test Loop Complete STF" message appears. ATP = All Tests Passed and STF = Some Tests Failed. The system printer logs all failed tests.

The cursor returns to the Port Card R,L,S field.

Step 10 Press the **Exit** key to return to the Diagnostics Menu screen.

To abort a test once the card is initialized, press any key. Once the test is aborted, press the **Exit** key to return to the Diagnostics Menu screen.

Display Call Generation Ports

Use Display Call Generation Ports option to view the status of all virtual call generation ports. A virtual port is a logical entity maintained by system internal processing. An internal resource group of 999 virtual ports is available for use in the system. This screen also provides access to the Port Display screen for viewing individual ports.

Accessing the Call Generation Ports Display Screen

Complete the following steps to access the Call Generation Ports Display screen:

Step 1   Access the Diagnostic Menu screen (refer to the "Accessing the Diagnostic Menu Screen" section on page 6-2).

Step 2   Type **H** and press **Enter**.

The Call Generation Ports Display screen appears (see Figure 6-10). The cursor is located in the Display Port (Y/N) field.

Figure 6-10   Call Generation Ports Display Screen

```
          C A L L    G E N E R A T I O N    P O R T S    D I S P L A Y
          Total In Use 0      Start Port #: 1      Display Port (Y/N) N

PORT STATUS (0/1) NO.              NO.            NO.            NO.
Idle/In Use        1   00000000   9   00000000   17  00000000   25   00000000
     Trace Off/On      00000000       00000000       00000000        00000000
Idle/In Use        33  00000000   41  00000000   49  00000000   57   00000000
     Trace Off/On      00000000       00000000       00000000        00000000
Idle/In Use        65  00000000   73  00000000   81  00000000   89   00000000
     Trace Off/On      00000000       00000000       00000000        00000000
Idle/In Use        97  00000000   105 00000000   113 00000000   121  00000000
     Trace Off/On      00000000       00000000       00000000        00000000
Idle/In Use        129 00000000   137 00000000   145 00000000   153  00000000
     Trace Off/On      00000000       00000000       00000000        00000000
Idle/In Use        161 00000000   169 00000000   177 00000000   185  00000000
     Trace Off/On      00000000       00000000       00000000        00000000
Idle/In Use        193 00000000   201 00000000   209 00000000   217  00000000
     Trace Off/On      00000000       00000000       00000000        00000000
Idle/In Use        225 00000000   233 00000000   241 00000000   249  00000000
     Trace Off/On      00000000       00000000       00000000        00000000
```
48318

The Call Generation Ports Display option consists of multiple screens. Use the **Print Screen** key to obtain a hard copy of this screen. If you choose to display all ports, the information is updated every few seconds to show the current status. To stop the updates, press any key except the **Print Screen** or **Hold** key. To resume updating, press **Enter**.

Call Generation Ports Display Screen Field Definitions

The Call Generation Ports Display screen contains the following fields:

Total in Use—*Display only.* Shows the total number of ports currently in use. Valid values are from 1 to 999.

Start Port #:—*Data entry via main keypad.* Use this field to navigate to a particular port.

Display Port (Y/N)—*Data entry via main keypad*; all card types. Provides direct access to the Port Display screen so you can view the status of individual ports.

PORT STATUS—*Display only.* A group of fields that display per-port information for call generation. The fields that make up this area are arranged in groups of eight contiguous ports. Information for 999 virtual ports is displayed in this area. A binary bit represents each port, with the ports listed in increasing order from left to right. The port number listed under the NO. heading corresponds to the left-most bit in the column.

Idle/In Use—Shows whether the port is currently linked into a call. Valid values are 0 for Idle or 1 for In Use.

Trace Off/On—Data entry via main keypad. Use these fields to enable/disable host message tracing for individual virtual call generation ports. To enable tracing, set the field(s) to 1; to disable trace, set the fields to 0. These fields are used by Cisco TAC and Engineering personnel.

Displaying Call Generation Port Data

Complete the following steps to view the current status of virtual call generation ports:

Step 1   Access the Call Generation Port Display screen (refer to the "Accessing the Call Generation Ports Display Screen" section on page 6-28. T

The cursor is located in the Display Port (Y/N) field.

Step 2   Complete one of the following options to choose between viewing all call generation ports or a specific port:

- To view the status of all call generation ports, press **Enter** for the default value of **N** in the Display Port (Y/N) field.

  The screen displays the status of each virtual call generation port. The system continues to update this information every few seconds.

- To view the status of individual call generation ports, type **Y** and press **Enter**.

  The Port Display screen is displayed for the internal R,L,S address 0,0,0. Refer to the "Display Port Data" section on page 6-10 for more information about using the Port Display screen.

Step 3   Stop the screen updates by completing one of the following options:

- To temporarily stop the screen updates, press the **Hold** key; press it again to resume screen updates.

- To stop the updates entirely, press any key except the **Print Screen** or **Hold** key. Updating stops and the cursor returns to the Display Port (Y/N) field.

Step 4   Press the **Exit** or **Prev Menu** key to return to the Diagnostics Menu screen.

Accessing Other Screens from the Call Generation Ports Display Screen

You can access the Port Display screen from the Call Generation Ports Display screen. Complete the following steps:

Step 1   Stop the screen updates.

The cursor moves to the Display Port (Y/N) field.

Step 2   Type **Y** and press **Enter**.

The Port Display screen appears.

Monitor Call Progress Tones

Use the Call Progress Tone Monitor option to verify the detection of call progress tones on a line/trunk port. A monitoring CPA port detects all signaling events occurring during a call. Event detections are shown on the screen and, optionally, on the system printer. Current port states and transitions for the monitored line/trunk port and any attached line/trunk port are displayed. The outpulse rule processed and current token being executed are also maintained.

Monitoring can continue while you perform other types of system administration. The Print option on the screen allows the test to continue and monitored events to be printed to the system printer after you exit the display. If you choose the Print option, you must manually deactivate the diagnostic.

Deactivate the CPA port used for monitoring via the Card Maintenance screen or a Change Port Status ($90) host command. If you do not deactivate the port, an error message appears immediately after the CPA port address is entered.

Accessing the Call Progress Tone Monitor Screen

Complete the following steps to access the Call Progress Tone Monitor screen:

Step 1   Access the Diagnostic Menu screen (refer to the "Accessing the Diagnostic Menu Screen" section on page 6-2).

Step 2   Type **I** and press **Enter**.

The Call Progress Tone Monitor screen appears (see Figure 6-11). The cursor is located in the CPA, RLSP field.

Figure 6-11   Call Progress Tone Monitor Screen

```
              C A L L    P R O G R E S S    T O N E    M O N I T O R

CPA      RLSP _ _ ____ ___    PA ____      Print (Y/N) N

Monitor  RLSP _ _ ____ ___    PA ____                RLSP _ _ ____ ___  PA ____
  Major State  _____                  Major State  _____
  Supplementary_____                  Supplementary_____
  Outpulse Rule__  Token _____         Outpulse Rule__  Token _____

   Event #    Supervisory Events                    SDS Actions
```

48307

The Call Progress Tone Monitor option consists of one screen. Press the **Print Screen** key to obtain a hard copy of this screen.

Call Progress Tone Monitor Screen Field Definitions

The Call Progress Tone Monitor screen contains the following fields:

CPA, RLSP—*Data entry via main keypad*. Specifies the physical location (R,L,S/G/S,P hardware address) of the CPA port to be used to monitor tones from the specified line/trunk port. You can also specify the port by port address; in this case, the field displays the port's hardware address.

CPA, PA—*Data entry via main keypad*. Specifies the logical port address of the CPA port to be used to monitor tones from the specified line/trunk port. You can also specify the port by R,L,S/G/S,P; in this case, the field displays the port's logical address.

Print (Y/N)—*Data entry via main keypad*. Specifies whether to print supervisory events and system actions to the system printer and to continue the monitoring after you exit the display. Valid values are Y (yes, print monitored events and continue monitor upon screen exit) or N (no, do not print log of events and stop monitoring when the screen is exited).

Monitor, RLSP—*Data entry via main keypad*. Specifies the physical location (R,L,S/G/S,P hardware address) of the line/trunk port being monitored. You can also specify the port by port address; in this case, the field displays the port's hardware address.

Monitor, PA—*Data entry via main keypad*. Specifies the logical port address of the line/trunk port being monitored. You can also specify the port by R,L,S/G/S,P; in this case, this field is used to display the port's logical address.

RLSP (Incoming/Outgoing)—*Display only*. Shows the hardware address of the line/trunk port attached to the monitored port. If the monitored port is an incoming line/trunk port, Outgoing precedes the hardware address. If the monitored port is an outgoing line/trunk port, Incoming precedes the hardware address.

PA (Incoming/Outgoing)—*Display only*. Shows the software address of the line/trunk port attached to the monitored port. If the monitored port is an incoming line/trunk port, Outgoing precedes the RLSP hardware address fields. If the monitored port is an outgoing line/trunk port, Incoming precedes the RLSP hardware address fields.

Major State—*Display only*. Shows the current call processing major state for the port specified. If no activity is present, the major state is CP_IDLE.

Supplementary—*Display only*. Shows the current call processing supplementary state for the port specified. If no activity is present, this field is blank.

Outpulse Rule, Token—*Display only*. Two fields that indicate the outpulse rule and token currently being processed. Rules are defined from the Outpulse Rules Table screens. If no rule processing is taking place, these fields are blank.

Event #—*Display only*. Shows the sequential order of the supervisory events. Values range from 1 to 99. Event numbers are reset each time the monitor is activated.

Supervisory Events—*Display only*. Shows the type of signaling event detected by the CPA monitoring the call. Valid events and their meanings are:

Dial Tone—The connected equipment is ready to receive digits.

Ringback—A connection is established to the called equipment.

Busy Tone—The called equipment is in use.

Reorder—Indicates an error condition (all circuits busy, etc.).

Sit Tones—Indicates additional information (special information tones).

Ringback Cess.—Silence immediately after presence of ringback is established.

Voice—Signal is within the range of human speech.

Voice Cess.—Silence detected immediately after presence of voice is established.

Pager Cue—Signal requesting the pager callback number.

SDS Actions—*Display only*. Shows the switch action corresponding to the supervisory event.

For detailed information on signal characteristics, refer to Chapter 3, "Database Administration."

Monitoring a Port

To monitor call progress tone events on a line/trunk port, follow these steps.

Step 1   Access the Call Progress Tone Monitor screen (refer to the "Accessing the Call Progress Tone Monitor Screen" section on page 6-31).

The cursor is located in the CPA, RLSP fields.

Step 2   Specify the monitoring CPA port to by using one of the following options—either by hardware or by software address:

- By hardware address: Type the value for the RLSP fields and press the **Next Field** key after entering each value.

    Press the **Next Field** key to skip over the PA field and move the cursor to the Print (Y/N) field.

- By software address: Press the **Next Field** key until the cursor moves to the PA field.

    Type the port address and press the **Next Field** key. The cursor moves to the Print (Y/N) field.

Step 3   Choose whether to print supervisory events, and whether to continue the monitoring after the user exits the utility, by typing **Y** or **N**.

The cursor moves to the Monitor RLSP fields.

Step 4   Specify the line/trunk port to monitor by using one of the following options—either by hardware or by software address:

- By hardware address: Type the value for the RLSP fields and press the **Next Field** key.

    Type the port value and press **Enter**.

- By software address: Press the **Next Field** key until the cursor moves to the PA field.

    Type the port address and press **Enter**.

If the monitored port is attached to another line/trunk port, the software and hardware addresses of the attached port appear on the screen. The screen displays the current port states, processed outpulse rules and tokens, and detected call progress tone events. The system continues to update this information every few seconds. If the Print (Y/N) option is enabled (set to **Y**), events are sent to the system printer in the following format:

```
DGN32: [EVENT] detected at RLSP X, X, XX, XX
```

Step 5   Stop the screen updates by completing one of the following options:

- To temporarily stop the screen updates, press the **Hold** key; press it again to resume screen updates.

- To stop the updates entirely, press any key except the **Print Screen** or **Hold**. key. Updating stops and the cursor returns to the CPA RLSP data entry fields.

Step 6 To return to the Diagnostics menu, press the **Prev Menu** or **Exit** key.

If the Print (Y/N) option is enabled (set to **Y**), the CPA port continues to monitor events after you exit the screen. Events are printed on the system printer. When you reaccess the Call Progress Tone Monitor screen, the previous data entered is redisplayed. To deactivate the monitoring, change the value in the Print (Y/N) field to **N** and exit the display. The screen data is cleared and no event messages are written to the system printer.

Display Routing Statistics

Use the Routing Statistics Display option to view the TeleRouter routing activity on an individual route or on all routes in a table. The screen shows routing attempts for a specified table and route. A utility is also provided to trace routing activity. An elapsed time counter indicates the duration of the statistics collection period.

Refer to the *Cisco VCO/4K TeleRouter Reference Guide* for Routing Statistics Display screen instructions.

System Trace Configuration

Use System Trace Configuration option to verify the exchange of messages between the host and the system, and between the NBC and other system cards. The Voice Path Trace option under the NBC message trace function produces a list of the connections between port addresses (showing voice paths between line/trunk ports or port addresses set to listen to static tones).

Accessing the System Trace Configuration Screen

Complete the following steps to access the System Trace Configuration screen:

Step 1 Access the Diagnostic Menu screen (refer to the "Accessing the Diagnostic Menu Screen" section on page 6-2).

Step 2 Type **K** and press **Enter**.

The System Trace Configuration screen appears (see Figure 6-12). The cursor is located in the HOST MESSAGE TRACE field.

Figure 6-12 System Trace Configuration Screen

```
          S Y S T E M    T R A C E    C O N F I G U R A T I O N

   HOST MESSAGE TRACE: DISABLED          MESSAGES: NONE
        Enable On Reboot:  N             __ __ __ __ __ __ __ __ __ __ __ __
        Reset/Clear Ports: N             __ __ __ __ __ __ __ __ __ __ __ __
        Host Connections:  NONE          __ __ __ __ __ __ __ __ __ __ __ __
        Port Addresses:    NONE
        Print Port List:   N             NETWORK STATUS: ALL
        Trace Output:      Printer       __ __ __ __ __ __ __ __ __ __ __ __


   NBC MESSAGE TRACE: DISABLED           MESSAGES: NONE
        Enable On Reboot:  N             __ __ __ __ __ __ __ __ __ __ __ __
        Reset/Clear Ports: N             __ __ __ __ __ __ __ __ __ __ __ __
        Voice Path Trace:  N             __ __ __ __ __ __ __ __ __ __ __ __
        Port Addresses:    NONE
        Print Port List:   N
        Trace Output:      Printer
```

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The System Trace Configuration option consists of one screen. Use the **Print Screen** key to obtain a hard copy of this screen.

System Trace Configuration Screen Field Definitions

The System Trace Configuration screen contains the following fields:

HOST MESSAGE TRACE—*Data entry via Select key.* Shows whether host message tracing is in progress or disabled. Valid entries are ENABLED (tracing in progress) or DISABLED (no trace task running).

NBC MESSAGE TRACE—*Data entry via Select key.* Shows whether NBC message tracing (and possibly voice path tracing) is in progress or disabled. Valid entries are ENABLED (tracing in progress) or DISABLED (no trace task running).

Note   The remaining screen fields define the parameters of the trace task. Most parameters apply to both host message tracing and NBC message tracing. The definition for each field identifies which tracing type it applies to (or if it applies to both).

Enable On Reboot—*Data entry via main keypad.* Specifies whether tracing begins or continues after a system reset. Valid values are Y (yes) and N (no). Applies to both host and NBC message tracing.

Reset / Clear Ports—*Data entry via main keypad.* Specifies whether to clear the tracing bit field settings for each selected port address. This applies when the Port Addresses field is set to SELECTED. Valid values are **Y** (yes) and **N** (no). Applies to both host and NBC message tracing.

Host Connections—*Data entry via Select key*. Specifies whether message tracing is performed over all host links or specific links only. Valid values are ALL, NONE, and SELECTED. If you choose SELECTED, the specific host link(s) are shown in the Host Configuration screen (refer to "Host Configuration" section on page 4-9 for more information). Applies to host message tracing only.

Voice Path Trace—*Data entry via main keypad*. Specifies whether voice path tracing is performed. Possible values are Y (yes) and N (no). NBC message tracing must be enabled for voice path tracing to be activated. Applies to NBC message tracing only.

Port Addresses—*Data entry via Select key*. Shows whether message tracing is performed for all system ports or only selected ports. Possible values are ALL, NONE, and SELECTED. If you choose SELECTED, the specific port addresses are shown in the tracing bit settings on the Port Display screen. Applies to both host and NBC message tracing.

Print Port List—*Data entry via main keypad*. Shows whether the system printer generates a list of the port addresses selected for tracing. Valid values are Y (yes) and N (no). Applies to both host and NBC message tracing.

Trace Output—*Data entry via Select key*. Shows the output device for trace messages. Applies to both host and NBC message tracing. Valid values are:

PRINTER—Messages are output to system printer only.

FILE—Messages are written to system trace files only.

BOTH—Messages are output to printer and system trace files.

MESSAGES—*Data entry via main keypad and Select key*. You can specify tracing for all host/NBC messages or for a selected set of message types.

Command field—*Data entry via Select key*. Specifies whether tracing is performed for all messages or a selected set. Possible values are ALL, NONE, and SELECTED. If you choose SELECTED, you can access the message type fields to specify message IDs. Applies to both host and NBC message tracing.

Message Type fields—*Data entry via main keypad*. Specifies the individual messages to be traced. You can enter up to 36 message IDs in these fields; message IDs normally consist of two digits/characters. Valid entries include all hexadecimal characters (0 to 9 and A to F) and the wildcard characters "*" and "?". Use the wildcard characters in the second digit/character position of the field to specify a range of messages. For example, entering 6? in a field indicates tracing for all valid messages with IDs between 60 and 6F.

In the case of messages with four digit/character IDs ($C0 01, $C0 02, etc.), enter only the last two digits in a field. Refer to the *Cisco VCO/4K Standard Programming Reference* and the *Cisco VCO/4K Extended Programming Reference* for a list of system host commands and reports. NBC message IDs are not published; contact Cisco TAC for more information.

NETWORK STATUS—*Data entry via main keypad and Select key*. Use this field to limit host message tracing to specific network status bytes.

Command field—*Data entry via Select key*. Shows whether tracing is performed for all network status byte values or a selected set. Valid selections are ALL, NONE, and SELECTED. If you choose SELECTED, you can access the status byte fields to specify values. Applies to host message tracing only.

Status Byte fields—*Data entry via main keypad*. Specifies the individual Network Status bytes to limit host tracing. You can enter up to 12 network status bytes; these bytes consist of two digits/characters. Valid entries include all hexadecimal characters (0 to 9 and A to F). Refer to the *Cisco VCO/4K Standard Programming Reference* and the *Cisco VCO/4K Extended Programming Reference* for a list of all network status bytes.

Tracing Host Messages

Complete the following steps to start a host message trace task:

Step 1   Access the System Trace Configuration screen (refer to the "Accessing the System Trace Configuration Screen" section on page 6-34).

The cursor is located in the HOST MESSAGE TRACE field.

Step 2   Use the **Select** and **Reverse Select** keys to toggle between the values until ENABLED is displayed, then press the **Next Field** key.

The cursor moves to the Enable On Reboot field.

Step 3   Type **Y** or **N** to enable or disable tracing after a system reset and press the **Next Field** key.

The cursor moves to the Reset / Clear Ports field.

Step 4   Type **Y** or **N** to clear or retain the tracing bit fields for each selected port and press the **Next Field** key.

The cursor moves to the Host Connections field.

Step 5   Use the **Select** and **Reverse Select** keys to toggle between the values until the correct host connection selection is shown and press the **Next Field** key.

> **Note**   If you choose SELECTED in the Host Connections field, the specific host(s) must be indicated on the Host Configuration screen. Refer to the "Host Configuration" section on page 4-9 for more information.

Step 6   Use the **Select** and **Reverse Select** keys to toggle between the values until the correct port address selection is shown and press the **Next Field** key.

> **Note**   If you choose SELECTED in the Port Addresses field, host message tracing bits for the specific port(s) must be set from the Port Display screen. Refer to "Display Port Data" section on page 6-10 for more information.

Step 7   Type **Y** or **N** to specify whether or not to print a list of the ports involved in the trace and press the **Next Field** key.

The cursor moves to the Trace Output field.

Step 8   Use the **Select** and **Reverse Select** keys to step through the values until the correct output device is shown and press the **Next Field** key.

The cursor moves to the MESSAGES field.

Step 9   Use the **Select** and **Reverse Select** keys to choose one of the following options:

- ALL—proceed to Step 11.
- NONE or SELECTED—press the **Next Field** key.

    The cursor moves to the NETWORK STATUS field.

Step 10   Use the **Prev Field**, **Next Field** key, and the main keypad, to specify the ID for each message type you want traced. When all message types are specified, proceed to Step 11.

Step 11   Press the **Next Field** key.

Step 12   Use the **Select** and **Reverse Select** keys to choose one of the following options:

- ALL—proceed to Step 13.

- SELECTED or NONE—press the **Next Field** key.

  Use the **Prev Field**, **Next Field**, and the main keypad to specify the network status byte values and proceed to Step 13.

Step 13   Press **Enter** to start the trace task. When the task has begun, press the **Exit** key to return to the Diagnostic Menu screen.

To exit the System Trace Configuration screen without making any changes, press the **Exit**, **Prev Menu**, or **Main Menu** key. No changes are made to the database unless you press **Enter**.

Tracing NBC Messages/Voice Paths

Complete the following steps to start an NBC message trace task:

Step 1   Access the System Trace Configuration screen (refer to the "Accessing the System Trace Configuration Screen" section on page 6-34).

The cursor is located in the NBC MESSAGE TRACE field.

Step 2   Use the **Select** and **Reverse Select** keys to toggle between the values until ENABLED is displayed, then press the **Next Field** key.

The cursor moves to the Enable On Reboot field.

Step 3   Type **Y** or **N** to enable or disable tracing after a system reset and press the **Next Field** key.

The cursor moves to the Reset/Clear Ports field.

Step 4   Type **Y** or **N** to clear or retain the tracing bit fields for each selected port and press the **Next Field** key.

The cursor moves to the Voice Path Trace field.

Step 5   Type **Y** or **N** to enable or disable voice path tracing and press the **Next Field** key.

The cursor moves to the Port Addresses field.

Step 6   Use the **Select** and **Reverse Select** keys to toggle between the values until the desired port address is shown and press the **Next Field** key.

The cursor moves to the Print Port List field.

> **Note**   If you chose SELECTED in the Port Addresses field, you must set NBC messages and voice path tracing bits for the specific port(s) from the Port Display screen. Refer to "Display Port Data" section on page 6-10 for more information.

Step 7   Type **Y** or **N** to specify whether or not to print a list of the ports involved in the trace and press the **Next Field** key.

The cursor moves to the Trace Output field.

Step 8   Use the **Select** and **Reverse Select** keys to step through the values until the correct output device is shown and press the **Next Field** key.

The cursor moves to the MESSAGES field.

Step 9   Use the **Select** and **Reverse Select** keys to choose one of the following options:

- ALL—press the **Next Field** key and proceed to Step 10.

- NONE or SELECTED—press the **Next Field** key and use the **Prev Field**, **Next Field** key, and the main keypad to specify the ID for each message type you want traced. Proceed to Step 10.

Step 10   Press **Enter** to start the trace task. When the task has begun, press the **Exit** key to return to the Diagnostic Menu screen.

To exit the System Trace Configuration screen without making any changes, press the **Exit**, **Prev Menu**, or **Main Menu** key. No changes are made to the database unless you press **Enter**.

Send Packet Utility

Use the Generic Packet Utility option to send hexadecimal data directly to a card via the Comm Bus. You can specify the card either by logical address or by hardware address. This utility should be used only under the direction of Cisco TAC.

Subrate Connection Display

Use the Subrate Connection Display option to display subrate connections and manually establish or remove subrate connections. The display function also provides you with a way to filter the connection display by trunk port interface. The filter reduces the amount of information presented on the screen.

Accessing the Subrate Connection Display Screen

Complete the following steps to access the Subrate Connection Display screen:

Step 1   Access the Diagnostic Menu screen (refer to the "Accessing the Diagnostic Menu Screen" section on page 6-2).

Step 2   Type **M** and press **Enter**.

The Subrate Connection Display screen appears (see Figure 6-13). The cursor is located in the Command field. The default selection is DISPLAY.

Figure 6-13 Subrate Connection Display Screen

```
          S U B R A T E    C O N N E C T I O N    D I S P L A Y

      Total Subrate Connections:  522          Filtered Connections: 8

           Command: DISPLAY      Refresh (Y/N): N
      Display Index: 1           Display Filter: 1 1 14-1 24 PA  5F


        Num     Mode    Subrate    R L  S    P  B      R L  S    P  B
         1     2-way    8 Kb     1 1 14-1 24  1    1 1 13-1 10  3
         2     2-way    8 Kb     1 1 14-1 24  2    1 1 18-1  5  2
         3     2-way    8 Kb     1 1 14-1 24  3    1 1  8-1 22  8
         4     2-way    8 kb     1 1 14-1 24  4    1 1 13-1  9  5
         5     2-way    8 kb     1 1 14-1 24  5    1 1 13-1 10  7
         6     2-way    8 kb     1 1 14-1 24  6    1 1 13-1 20  1
         7     2-way    8 kb     1 1 14-1 24  7    1 1 13-1 20  2
         8     1-way    8 kb     1 1 14-1 24  8    1 1 13-1  1  3
         9     1-way    8 kb     1 1 14-1 23  1    1 1 13-1  1  4
```

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The Subrate Connection Display option can consist of numerous screens. The upper part of the screen contains user input fields that control the operation of the screen. The lower part of the screen provides the actual connection display. A single screen displays up to 12 connections. Press the **Next Screen** or **Prev Screen** key to display additional connections.

Select DISPLAY to display subrate connections. You can also specify a display filter to reduce the size of the connection display output. At the Display Filter field, enter either the RLSP or the port address of the destination endpoint of the subrate path; do not enter its source endpoint. A path's destination endpoint makes it unique. A display filter that specifies the source for one-way connections results in no path being displayed, since paths are indexed by their destinations, not their sources.

Specify subrate connections as follows:

- Connection mode (one-way or two-way)
- Size of the connection (8 Kb, 16 Kb, . . . 64 Kb)
- Source trunk port (RLSP) and subrate bit offset (B)
- Destination trunk port (RLSP) and subrate bit offset (B)

For two-way connections, the source channel is also a destination. Press **Enter** to update the connection display.

Select ADD to manually establish subrate connections. When you establish a subrate connection, you must enter the mode, size, the sender and listener trunk ports, and bit offsets. Figure 6-14 shows the Subrate Connection Display screen after you select ADD. A new line appears where you enter the connection specification. The line displays the last specifications that you entered.

Figure 6-14   Establishing a Subrate Connection

```
         S U B R A T E    C O N N E C T I O N    D I S P L A Y

     Total Subrate Connections:  0      Filtered Connections:  0

            Command: ADD          Refresh (Y/N):  N
     Display Index: 0          Display Filter:  _ _ ____ __  PA:  ____
   Mode: 2-Way  Subrate:  8 Kb  Source: _ _ ____ __ _   Dest: _ _ ____ __ _
          Num     Mode    Subrate  R L  S   P  B    R L  S   P  B
```

Select DELETE to remove subrate connections. When you remove a subrate connection, you can enter either the connection number or the entire connection specification (mode, size, sender, listener).

Note   The Source and Dest fields of this version of the Subrate Connection Display screen (see Figure 6-14) cannot fully represent ICC rack, level, slot, group, and span data due to the fields' four character limitation.

Subrate Connection Display Screen Field Definitions

The Subrate Connection Display screen contains the following fields:

Total Subrate Connections—*Display only.* Shows the number of active subrate connections within the system.

Filtered Connections—*Display only.* Shows the number of subrate connections in the display buffer.

Command—*Data entry via main keypad or Select key.* Select the screen operation to be performed. Valid entries are:

DISPLAY—Display list of active subrate connections.

ADD—Establish a new subrate connection.

DELETE—Remove an existing subrate connection.

Refresh (Y/N)—*Data entry via main keypad.* Controls screen refresh. When refresh is enabled, screen processing updates the connection display every five seconds until you stop the refresh with a keystroke. Valid entries for this field are **Y** or **N**. The default value is N.

Display Index—*Data entry via main keyboard.* Specifies the number of the connection to start the display. If the display index is greater than the number of connections in the display buffer, the index is set to the last screen. When you press the **Next Screen** or **Prev Screen** key, the Display Index field is updated. The default value is 1.

Display Filter—*Data entry via main keyboard*. Specifies the trunk port location data to filter the list of subrate connections to be displayed. You can specify the trunk port location by rack, level, slot, port position (RLSP), or by timeslot port address (PA). In addition, when specifying a trunk port filter by RLSP, you can set the port field to zero as a wildcard entry to filter all ports on the trunk interface (e.g., all ports on a T1 span). Note that the display filter operates only on the listener channel specifications, so that duplicate paths are not displayed.

Note   This field cannot fully represent ICC rack, level, slot, group, and span data due to the field's four character limitation.

Num—*Display only*. Shows the connection index within the display buffer.

Mode—*Display or data entry via Select key or main keyboard*. If you select DISPLAY in the Command field, this field displays the connection modes of the subrate paths. If you select either ADD or REMOVE, this field defines the connection mode of a path as either one-way or two-way.

Subrate—*Display or data entry via Select key or main keyboard*. If you select DISPLAY in the Command field, this field displays connection sizes for the subrate paths. If you select either ADD or REMOVE, this field defines the connection size of a path in Kbits/second (8 Kb, 16 Kb, . . . 64 Kb).

RLSPB—*Display or data entry via Select key or main keyboard*. If you select DISPLAY in the Command field, this field displays the rack, level, slot, port, and bit offset containing the subrate channel for the source and destination trunk port interfaces. If you select either ADD or REMOVE, this field defines the RLSP required to address the source and destination trunk port interfaces.

Subrate Statistics Display

Use the Subrate Statistics Display option to display run-time subrate statistics information.

Accessing the Subrate Statistics Display Screen

Complete the following steps to access the Subrate Statistics Display screen:

Step 1   Access the Diagnostic Menu screen (refer to the "Accessing the Diagnostic Menu Screen" section on page 6-2).

Step 2   Type **N** and press **Enter**.

The Subrate Statistics Display screen appears (see Figure 6-15).

Figure 6-15   Subrate Statistics Display Screen

```
               S U B R A T E     S T A T I S T I C S     D I S P L A Y

        Active Subrate Card: 1 1 10        Standby Subrate Card: 1 1 15
                            Reset Statistics (Y/N): _

                            Timeslot Usage Statistics
                    Configured    In Use    Available    High
                       888         192         696        192


                          Subrate Connection Statistics
                                                       Timeslot    Other
           Subrate    Current    Cumulative    High    Failures   Failures
            8 Kb        243         9453        320        0          5
           16 Kb        101         3420        229        0          9
           24 Kb          0            0          0        0          0
           32 Kb          0            0          0        0          0
           40 Kb          0            0          0        0          0
           48 Kb          0            0          0        0          0
           56 Kb          0            0          0        0          0
           64 Kb          0            0          0        0          0
```

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The Subrate Statistics Display option consists of one screen. The upper portion of the screen provides basic configuration information and a field from which you can reset the statistics counts. The middle portion contains subrate timeslot usage statistics, and the lower portion provides the actual subrate connection statistics for each subrate. Once initiated, the statistics are continually refreshed every three seconds, until you stop the refresh by pressing any key.

Use the Reset Statistics field to clear the timeslot high usage count and all counts for each subrate. When reset, these statistics are set to zero. Note that the Configured, In Use, and Available timeslot usage counts cannot be cleared since they are defined by configuration, not run-time subrate traffic.

Subrate Statistics Display Screen Field Definitions

The Subrate Statistics Display screen contains the following fields:

Active Subrate Card—*Display only.* Shows the rack, level, and slot location of the active subrate card.

Reset Statistics (Y/N)—*Data entry via main keypad.* Use this field to clear the timeslot usage high count and the subrate connection statistics counts. Valid entries are **Y** or **N**. The default value is N.

Standby Subrate Card—*Display only.* Shows the rack, level, and slot location of the standby subrate card for subrate card redundancy configurations.

Timeslot Usage Statistics—*Display only.* Shows the configured number of time slots, the number of time slots currently in use (consumed) by subrate connections, remaining available time slots, and the maximum number of time slots in use at any point in time.

Subrate Connection Statistics—*Display only.* Shows the connection statistics for each subrate. The information displayed for each subrate includes current number of connections, cumulative connection total, maximum number of connections at any point in time, connection attempt failures due to timeslot exhaustion, and connection attempt failures due to other reasons.

Supervision Signaling

This appendix defines the signaling generation/detection capabilities for analog line and trunk interface cards; and T1 and E1 supervision signaling capabilities.

Refer to the *Cisco VCO/4K ISDN Supplement* for information on the PRI/N signaling characteristics.

Table A-1 through Table A-5 define the supervision signaling capabilities for the following cards: SLIC, DID, UTC Loop Start, UTC Ground Start, and E+M analog cards.

Table A-1   SLIC Analog Supervision Signaling Capabilities

Signaling	SLIC Capability
Seize Effect: Detect (inward)	Loop current
Seize Effect: Generate (outward)	Apply ring voltage (2.0 seconds on, 4.0 seconds off)
Wink: Detect	No
Wink: Generate	No
Hookflash: Detect	Loop open for 300 ms to 800 ms
Hookflash: Generate	No
Answer Supervision: Detect (true answer)	Loop closed at far end
Answer Supervision: Generate (answerback)	No
Disconnect: Detect	Loop open for > 800 ms at far end
Disconnect: Generate	No

Table A-2   DID Analog Supervision Signaling Capabilities

Signaling	DID Capability
Seize Effect: Detect (inward)	Loop current
Seize Effect: Generate (outward)	Not Applicable
Wink: Detect	No
Wink: Generate	Reverse battery for 200 ms
Hookflash: Detect	No
Hookflash: Generate	Nonreverse battery for 500 ms
Answer Supervision: Detect (true answer)	Not applicable

Table A-2   DID Analog Supervision Signaling Capabilities (continued)

Signaling	DID Capability
Answer Supervision: Generate (answerback)	Battery reversal
Disconnect: Detect	Loop open at far end
Disconnect: Generate	Nonreverse battery

Table A-3   UTC LS Analog Supervision Signaling Capabilities

Signaling	UTC Loop Start Capability
Seize Effect: Detect (inward)	Ring voltage
Seize Effect: Generate (outward)	Close loop
Wink: Detect	Battery reversal for 140 ms to 700 ms
Wink: Generate	No
Hookflash: Detect	No
Hookflash: Generate	Open loop for 500 ms
Answer Supervision: Detect (true answer)	Battery reversal
Answer Supervision: Generate (answerback)	Close loop
Disconnect: Detect	No
Disconnect: Generate	Open loop

Table A-4   UTC GS Analog Supervision Signaling Capabilities

Signaling	UTC Ground Start Capability
Seize Effect: Detect (inward)	Ring voltage
Seize Effect: Generate (outward)	Ground ring
Wink: Detect	Battery reversal for 140 ms to 170 ms
Wink: Generate	No
Hookflash: Detect	No
Hookflash: Generate	Open loop for 500 ms
Answer Supervision: Detect (true answer)	Battery reversal
Answer Supervision: Generate (answerback)	Close loop
Disconnect: Detect	Battery removed for > 700 ms at far end
Disconnect: Generate	Open loop

Table A-5   E+M Analog Supervision Signaling Capabilities

Signaling	E+M Capability
Seize Effect: Detect (inward)	E lead raised
Seize Effect: Generate (outward)	Raise M lead

Table A-5   E+M Analog Supervision Signaling Capabilities (continued)

Signaling	E+M Capability
Wink: Detect	E lead raised for 100 ms to 350 ms
Wink: Generate	Raise M lead for 250 ms
Hookflash: Detect	E lead lowered for 100 ms to 350 ms
Hookflash: Generate	Lower M lead for 250 ms
Answer Supervision: Detect (true answer)	E lead raised for > 350 ms
Answer Supervision: Generate (answerback)	Raise M lead
Disconnect: Detect	E lead lowered for > 150 ms
Disconnect: Generate	Lower M lead

Table A-6 through Table A-10 define the supervision signaling capabilities for T1 digital cards.

> **Note**   On the ICC T1 card, E+M signaling may be modified using the programmable protocol feature.

Table A-6   E+M Supervision Signaling Capabilities

Signaling	T1 E+M Capability
Seize Effect: Detect (inward)	A/B bits = 11 in Rx stream
Seize Effect: Generate (outward)	A/B bits = 11 in Tx stream
Wink: Detect	A/B bits = 11 in Rx stream for 110 ms to 350 ms
Wink: Generate	A/B bits = 11 in Tx stream for 250 ms
Hookflash: Detect	A/B bits = 00 in Rx stream for 300 ms to 800 ms
Hookflash: Generate	A/B bits = 00 in Tx stream for 500 ms
Answer Supervision: Detect (true answer)	A/B bits = 11 in Rx stream for > 350 ms
Answer Supervision: Generate (answerback)	A/B bits = 11 in Tx stream
Disconnect: Detect	A/B bits = 00 in Rx stream for > 800 ms
Disconnect: Generate	A/B bits = 00 in Tx stream

Table A-7   FXO LS Supervision Signaling Capabilities

Signaling	T1 FXO Loop Start Capability
Seize Effect: Detect (inward)	A/B bits = 11 in Rx stream
Seize Effect: Generate (outward)	Apply ringing Tx A/B bits = 00/01 (2.0 seconds on, 4.0 seconds off)
Wink: Detect	Not supported
Wink: Generate	Not supported
Hookflash: Detect	A/B bits = 01 in Rx stream for 300 ms to 800 ms
Hookflash: Generate	Not supported

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Table A-7   FXO LS Supervision Signaling Capabilities (continued)

Signaling	T1 FXO Loop Start Capability
Answer Supervision: Detect (true answer)	A/B bits = 11 in Rx stream
Answer Supervision: Generate (answerback)	A/B bits = 01 in Tx stream
Disconnect: Detect	A/B bits = 01 in Rx stream for > 800 ms
Disconnect: Generate	Not supported

Table A-8   FXS LS Supervision Signaling Capabilities

Signaling	T1 FXS Loop Start Capability
Seize Effect: Detect (inward)	Ring detected Rx A/B bits = 00/01 (2.0 seconds on, 4.0 seconds off)
Seize Effect: Generate (outward)	A/B bits = 11 in Tx stream
Wink: Detect	Not supported
Wink: Generate	Not supported
Hookflash: Detect	Not supported
Hookflash: Generate	A/B bits = 01 in Tx stream for 500 ms
Answer Supervision: Detect (true answer)	A/B bits = 01 in Rx stream
Answer Supervision: Generate (answerback)	A/B bits = 11 in Tx stream
Disconnect: Detect	Not supported
Disconnect: Generate	A/B bits = 01 in Tx stream

Table A-9   FXO GS Supervision Signaling Capabilities

Signaling	T1 FXO Ground Start Capability
Seize Effect: Detect (inward)	A/B bits = 00 in Rx stream
Seize Effect: Generate (outward)	Apply ringing Tx A/B bits = 00/01 (2.0 seconds on, 4.0 seconds off)
Wink: Detect	Not supported
Wink: Generate	Not supported
Hookflash: Detect	Not supported
Hookflash: Generate	Not supported
Answer Supervision: Detect (true answer)	A/B bits = 11 in Rx stream
Answer Supervision: Generate (answerback)	A/B bits = 01 in Tx stream
Disconnect: Detect	A/B bits = 01 in Rx stream for > 170 ms
Disconnect: Generate	A/B bits = 11 in Tx stream

Table A-10   FXS GS Supervision Signaling Capabilities

Signaling	T1 FXS Ground Start Capability
Seize Effect: Detect (inward)	Ring detected Rx A/B bits = 00/01 (2.0 seconds on, 4.0 seconds off)
Seize Effect: Generate (outward)	A/B bits = 00 in Tx stream
Wink: Detect	Not supported
Wink: Generate	Not supported
Hookflash: Detect	Not supported
Hookflash: Generate	Not supported
Answer Supervision: Detect (true answer)	A/B bits = 01 in Rx stream
Answer Supervision: Generate (answerback)	A/B bits = 01 in Tx stream
Disconnect: Detect	A/B bits = 01 in Rx stream for > 170 ms
Disconnect: Generate	A/B bits = 11 in Tx stream

Note You can adjust the timing values for four span cards from the Trunk Timing Configuration screen. These values include WINK-DET MIN and MAX, WINK SEND, FLASH-DET MIN and MAX, FLASH SEND, OFFHOOK MIN, and GUARD. The timing values for single span cards cannot be adjusted.

Note A flashhook affects the A/B bits the same as a call disconnect. A call disconnect cannot be declared until the MAX FLASH detect time expires. This can slow down call disconnects. To disable FLASH detect timing, set the FLASH-DET MIN and MAX times to 0.

Table A-11 defines the E1 CAS/R2 supervision signaling capabilities. Table A-12 defines the E1 CAS/Mercury supervision signaling capabilities.

Note On the ICC E1 card, CAS/R2 signaling may be modified using the programmable protocol feature.

Table A-11   E1 CAS/R2 Supervision Signaling Capabilities

Signaling	E1 CAS/R2 Capability
Seize: Detect	A/B bits = 00 in Rx stream
Seize: Generate	A/B bits = 00 in Tx stream
Seize Ack: Detect[1]	A/B bits = 11 in Rx stream
Seize Ack: Generate[2]	A/B bits = 11 in Tx stream
Answer: Detect	A/B bits = 01 in Rx stream
Answer: Generate	A/B bits = 01 in Tx stream
Clear Forward: Detect	A/B bits = 10 in Rx stream

Table A-11   E1 CAS/R2 Supervision Signaling Capabilities (continued)

Signaling	E1 CAS/R2 Capability
Clear Forward: Generate	A/B bits = 10 in Tx stream
Clear Back: Detect	A/B bits = 11 in Rx stream
Clear Back: Generate	A/B bits = 11 in Tx stream
Idle: Detect	A/B bits = 10 in Rx stream
Idle: Generate	A/B bits = 10 in Tx stream

1. WINK-DET MIN defines how long the Four Span E1 should wait for a Seize Ack. WINK report sent to VCO/4K system software.

2. Automatically generated by card within 40 ms.

Note   WINK SEND, WINK- DET MAX, and FLASH are not used by E1 cards.

Table A-12   E1 CAS/Mercury Supervision Signaling Capabilities

Signaling	E1 CAS/Mercury Capability
Seize: Detect	A/B bits = 01 in Rx stream
Seize: Generate	A/B bits = 01 in Tx stream
Delay Dial: Detect[1]	A/B bits = 01 in Rx stream
Delay Dial: Detect[2]	A/B bits = 01 in Tx stream within 30 ms
Proceed To Send: Detect	A/B bits = 11 in Rx stream
Proceed To Send: Generate[3]	A/B bits = 11 in Tx stream
Answer: Detect	A/B bits = 01 in Rx stream
Answer: Generate	A/B bits = 01 in Tx stream
Disconnect: Detect	A/B bits = 11 in Rx stream
Disconnect: Generate	A/B bits = 11 in Rx stream
Idle: Detect	A/B bits = 11 in Rx stream
Idle: Generate	A/B bits = 11 in Tx stream

1. WINK-DET MIN defines how long the delay must last. WINK report sent to the VCO/4K system software.

2. Automatically generated by card. Remains until WINK token is executed.

3. Generated when the WINK token is executed.

Note   WINK SEND, WINK-DET MAX, and FLASH are not used by E1 cards.

T1/PRI Synchronization to Master Timing Link

T1/PRI synchronization is a dynamic process in the system that varies according to the Master Timing Link selection that you enter under the Maintenance menu. Synchronization can be maintained by internal, incoming and external references.

The system always defaults to the internal 32-MHz reference signal on power-up, reset or when attempts to synchronize to incoming or external sources have failed. Error and status messages are generated by system software as the synchronization process moves through its tasks.

T1/PRI Synchronization Flowchart

Figure B-1 shows the basic sequence of tasks performed for T1/PRI synchronization to internal, incoming and external references. Administrators will find the flowchart to be helpful when trying to isolate problems caused when T1/PRI synchronization is not achieved.

The chart includes indications as to which error or status messages are output as tasks are being executed. Cross-reference is made to the message in the form "FRM xxx, yyy, zzz..." where xxx, yyy, zzz etc. refer to the number assigned to each FRM message. Definitions for each FRM message can be found in *Cisco VCO/4K System Messages*.

Figure B-1   T1/PRI Synchronization
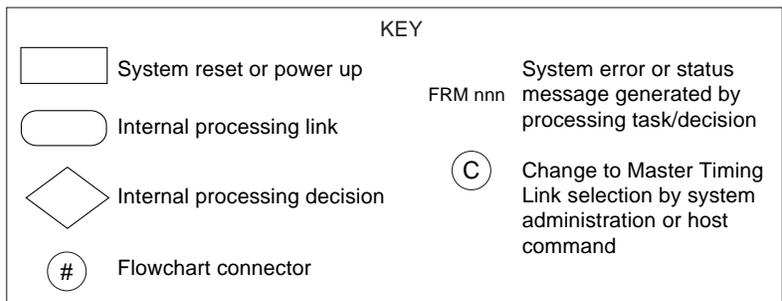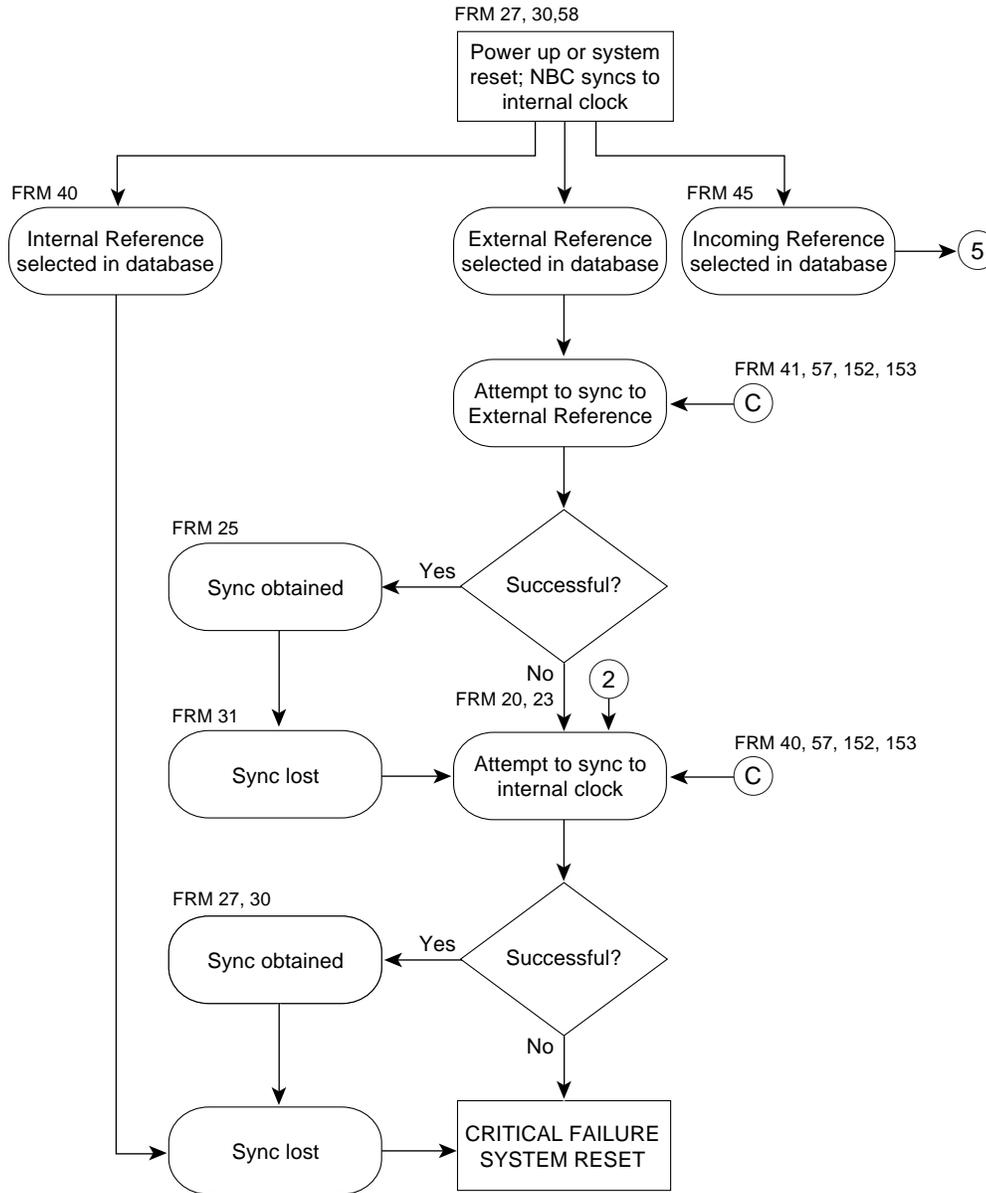
Figure B-2   T1/PRI Synchronization (continued)

T1/PRI Synchronization Flowchart
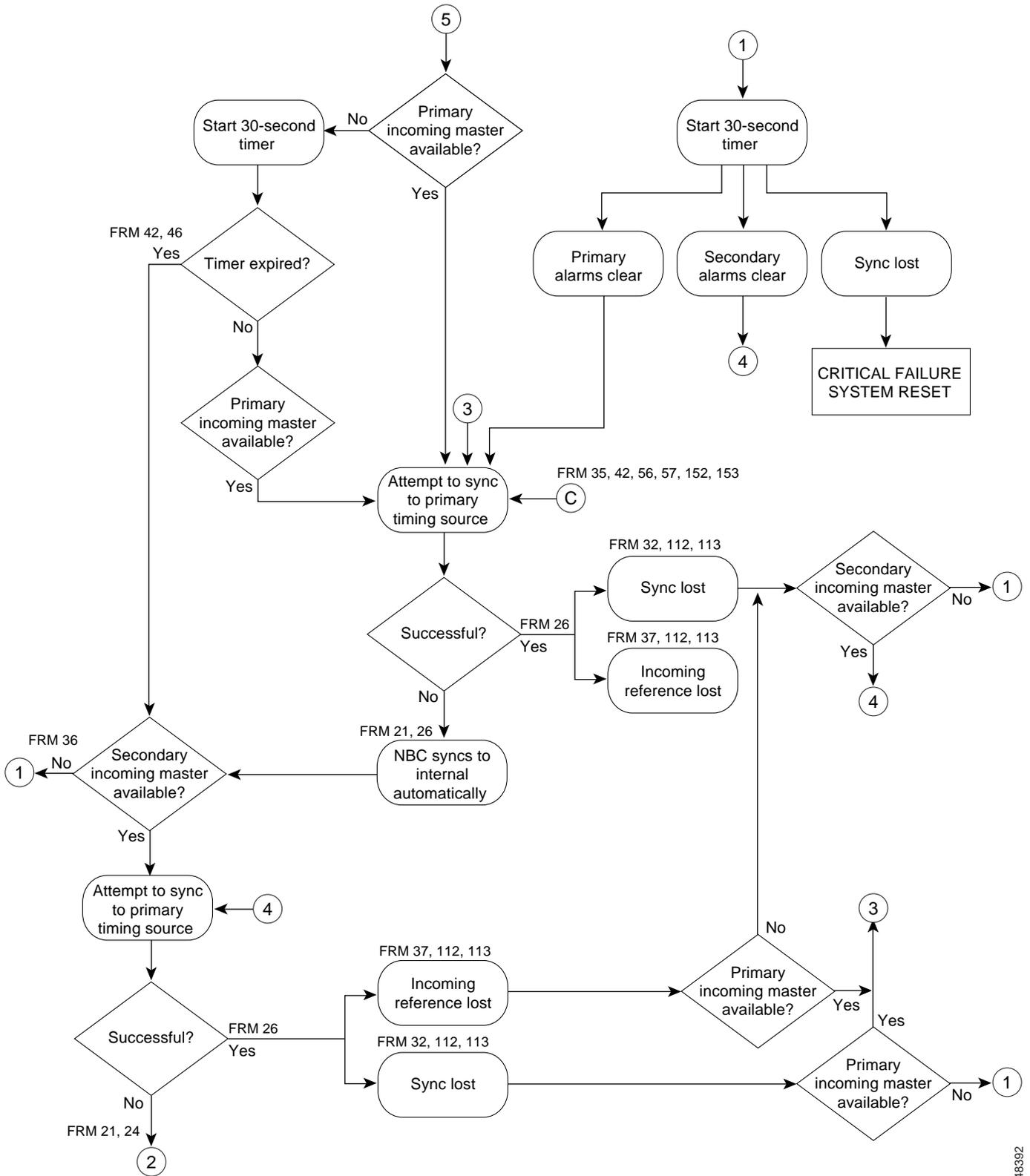
Administration Keyboard Types

The Peripheral Configuration utility allows users to select the keyboard type for each system administration interface (local console, remote maintenance console or optional Ethernet Telnet connection). The following keyboard types are supported:

- VT220: Uses standard VT220/230 escape codes for the application keys and function keys F6 to F20.

- Sunview: Uses Sun workstation escape codes for the application keypad and function keys F2 to F12.

- Xview: Uses Sun escape codes for the application keypad and function keys F2 to F10 when using Xterm (VT100 terminal emulator) within Sun's Openlook windows environment.

- Universal: Accommodates keyboards that do not support any of the previous escape code sequences. Allows users to generate application and function key escape codes through two- and three-key sequences. This universal setting supports PC keyboards as well as other Sun keyboard arrangements.

> **Note** The Num Lock key must be set for Universal keyboard operation.

These settings specify how the system interprets data input from the following areas of the system administration interface: the main keypad, the administrative keypad (generally known as application or numeric keypad), and the function keys.

The main keypad contains the group of keys used to type data into the system. All alphanumeric information is specified using this keypad. The same input requirements and restrictions apply to all keyboard types.

The administrative keypad provides special editing functions unique to the system. Each editing function is assigned to a specific key on the administrative keypad; however, these assignments vary between keyboard types. Table C-1 summarizes the mapping between editing functions and application keys for each keyboard type. Illustrations of the administrative keypad for all keyboards supported by the system are provided later in this appendix.

> **Note** The VT220/320 is the standard console used for system administration. Refer to Chapter 1, "System Overview," for information on VT220/320 application and function keys.

The Screen Access Configuration utility allows mapping of programmable function keys to system administration menus and screens for single keystroke access. Because the system is designed to use VT220/320 VDTs, the function key selection in the system database reflects the keys available on this keyboard type (F6 through F20). Function keys are mapped differently on other keyboard types, however. These differences are listed in Table C-2.

Table C-1   Administrative Keypad Mapping for All Keyboard Types

System Administration Key	VT220/320 Key	Sunview Key	Xview Key	Universal PC Key	Universal Sun Key
Prev Field	PF1	=	=	ESC 7	ESC 7
Next Field	PF2	/	/	ESC 8	ESC 8
Select	PF3	S	Pause	ESC S	ESC S
Reverse Select	PF4	–	PrSc	ESC –	ESC –
Prev Screen	7	7	7	ESC 4	ESC 4
Next Screen	8	8	8	ESC 5	ESC 5
Exit	9	9	9	ESC 9	ESC 9
Stop Print	-	2	2	ESC /	ESC /
Prev Menu	4	4	4	ESC 1	ESC 1
Main Menu	5	5	5	ESC 2	ESC 2
Insert	6	6	6	ESC 6	ESC 6
Print Screen	,	+	+	ESC +	ESC +
Clear Field	3	3	3	ESC 3	ESC 3
Hold	0	0	0	ESC 0	ESC 0
Redraw	.	.	.	ESC **.**	ESC **.**
Enter	Enter	Enter	Enter	Enter	Enter

Note The Universal keyboard setting requires two separate keystrokes to perform each administrative function. Press the **Esc** key, followed by a key on the application keypad or the corresponding number key. For example, to access the Main Menu screen when Universal is the keyboard type, press the **Esc** key and type **2** (separately).

Table C-2   Function Key Mapping for All Keyboard Types

System Function Key Assignment	VT220/320 Key	Sunview Key	Xview Key	Universal PC Key	Universal Sun Key
F6	F6	F2	F2	—	—
F7	F7	F3	F3	—	—
F8	F8	F4	F4	—	—
F9	F9	F5	F5	—	—
F10	F10	F6	F6	—	—
F11	F11	F7	F7	ESC F 1	ESC F 1

Table C-2   Function Key Mapping for All Keyboard Types (continued)

System Function Key Assignment	VT220/320 Key	Sunview Key	Xview Key	Universal PC Key	Universal Sun Key
F12	F12	F8	F8	ESC F 2	ESC F 2
F13	F13	F9	F9	ESC F 3	ESC F 3
F14	F14	F10	F10	ESC F 4	ESC F 4
F15	Help	F11	—	ESC F 5	ESC F 5
F16	Do	F12	—	ESC F 6	ESC F 6
F17	F17	Pause	—	ESC F 7	ESC F 7
F18	F18	PrSc	—	ESC F 8	ESC F 8
F19	F19	Scroll Lock Break	—	ESC F 9	ESC F 9
F20	F20	N/A	—	ESC F 0	ESC F 0

Note   The Universal keyboard setting requires three separate keystrokes to access screens assigned a programmable function key. Press the **Esc** key and type **F** (separately), followed by a key on the application keypad or the corresponding number key. For example, to access the screen assigned to F11 (via the Screen Access Configuration screen) when Universal is the keyboard type, press the **Esc** key, type **F**, and type **1**.

The remainder of this appendix contains quick-reference illustrations of the administrative keypad layouts.

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Figure C-1   Sunview Keyboard Administrative Keypad

F17	F18	F19	NUM LOCK
= PREV FIELD	**/** NEXT FIELD	***** SELECT	**-** REV SELECT
7 PREV SCREEN	**8** NEXT SCREEN	**9** EXIT	**+** PRINT SCREEN
4 PREV MENU	**5** MAIN MENU	**6** INSERT	
1	**2** STOP PRINT	**3** CLEAR FIELD	ENTER
0 HOLD		RE-DRAW	

48393
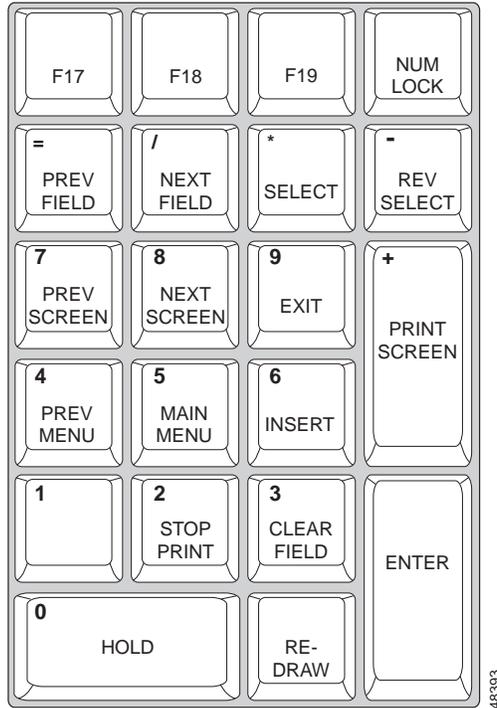
Figure C-2   Xview Keyboard Administrative Keypad

SELECT	REV SELECT	RE-DRAW	NUM LOCK
= PREV FIELD	**/** NEXT FIELD	*****	**-**
7 PREV SCREEN	**8** NEXT SCREEN	**9** EXIT	**+** PRINT SCREEN
4 PREV MENU	**5** MAIN MENU	**6** INSERT	
1	**2** STOP PRINT	**3** CLEAR FIELD	ENTER
0 HOLD			

48394
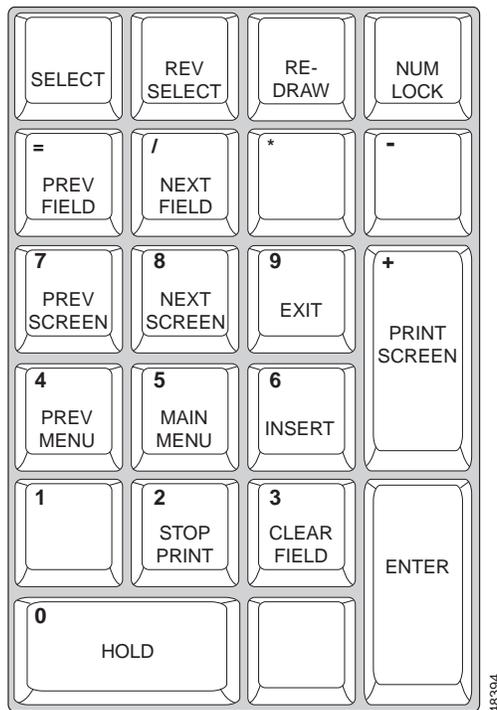
> ✎
> **Note** The Xview keyboard configurations requires a workstation running Xterm software (a VT100 emulator) within Sun's Openlook windows environment. The Xterm software must be started with the "-sf" command option to generate the necessary Sun escape codes. Contact Cisco TAC for more information on this requirement.

Figure C-3   Universal Administrative Keypad—PC Keyboards
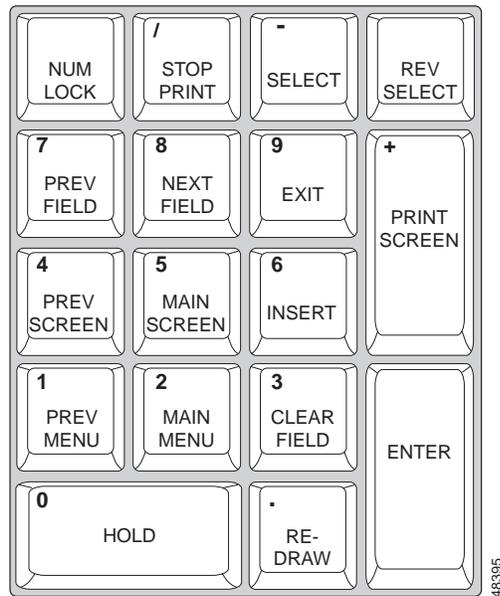
> ✎
> **Note** The Num Lock key must be set for Universal keyboard operation. Also, you must press and hold the Esc key simultaneously with the application key to perform the administration function listed on each key.

Figure C-4   Universal Administrative Keypad—Sun Keyboards
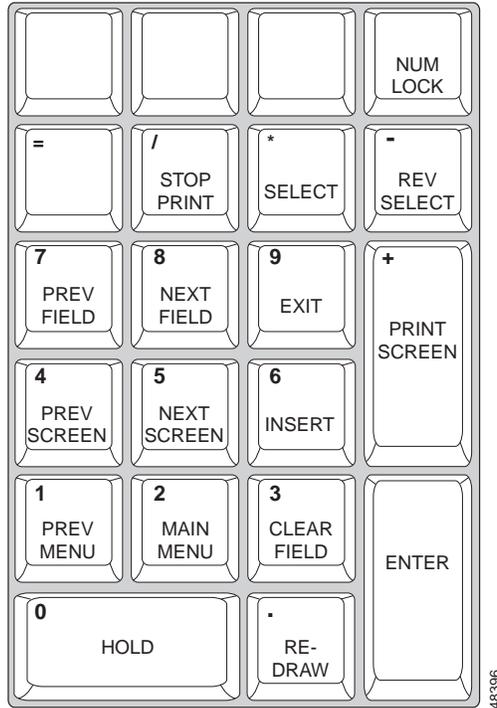
Note   The Num Lock key must be set for Universal keyboard operation. Also, you must press and hold the Esc key simultaneously with the application key to perform the administration function listed on each key.

Customized Signaling and Span Types

ICC UPG Update Tool—Introduction

The Interface Controller Card (ICC) Universal Protocol Generator (UPG) Update Tool is available for users of VCO/4K system software version 5.1(3) and higher. The tool allows users to modify the default .upg files in order to create custom ICC protocol data files for E&M and CAS/R2 protocols. Two versions of the ICC UPG Update Tool are provided on a floppy disk, shown in Figure D-1.

 • upgedsol.exe—For Sun Solaris workstation users

 • upgedwin.exe—For Microsoft Windows (2000, NT, 98, and 95) PC users

Figure D-1   ICC Protocol Generator Floppy Disk
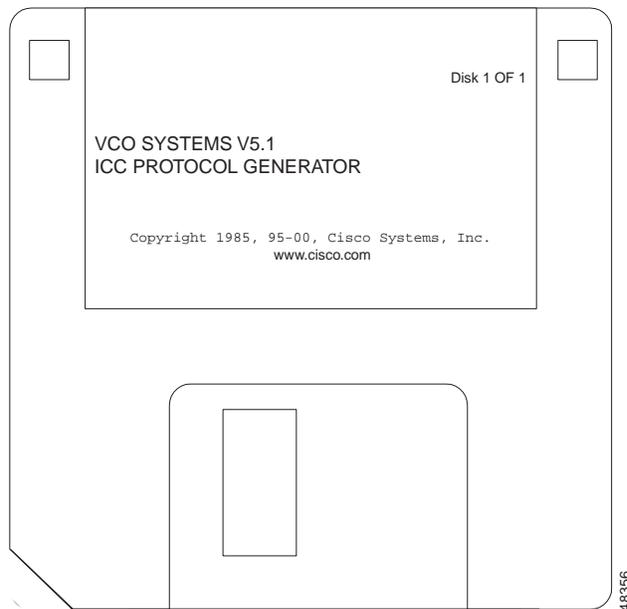
Two versions of the default files are provided on a disk:

 • iccem.upg—For the E&M, T1 protocol

 • icccasr2.upg—For the CAS/R2, E1 protocol

> **Note** Default files do not need to be customized for the system software to function properly. The ability to customize the default .upg files is provided for flexibility in signaling configurations.

Users must modify a system default .upg file to create a custom .upg file. Customize the iccem.upg file when using the E&M, T1 protocol. Customize the icccasr2.upg file when using the CAS/R2, E1 protocol. A maximum of four customized .upg files may be created; the ability to customize .upg files is provided for configuring flexibility in three signaling areas:

- ABCD signaling bit pattern
- Minimum and maximum detection times of signals (wink, seize, flash, etc.)
- Guard time

Installation Instructions

The ICC UPG Update Tool is a command line executable software program. The following sections describe the installation of the ICC UPG Update Tool and the creation of customized .upg files using either a Sun Solaris workstation or a PC workstation.

Install and Start the ICC UPG Update Tool with a Sun Solaris Workstation

Complete the following steps to install the ICC UPG Update Tool on a SUN Solaris workstation and create a customized .upg data file. For Microsoft Windows PC users, refer to the "Install and Start the ICC UPG Update Tool with a Microsoft Windows PC Workstation" section on page D-4 for tool installation instructions.

Step 1 Create a directory named UPGTOOL on your Sun workstation.

Step 2 Copy the upgedsol.exe executable file—the ICC UPG Update Tool—from the ICC PROTOCOL GENERATOR floppy disk to the UPGTOOL directory.

Step 3 Copy the appropriate default .upg file from floppy disk 6 to the UPGTOOL directory according to the following rules:

- Copy the iccem.upg file if you are using the E&M, T1 protocol.
- Copy the icccasr2.upg file if you are using the CAS/R2, E1 protocol.

Step 4 Start a new shell.

Step 5 Change to the UPGTOOL directory within the new shell.

Step 6 Type **./upgedsol.exe** and press **Enter** to start the tool.

An introductory message and prompt are displayed. (See Figure D-2.)

Figure D-2   ICC UPG Tool Introductory Message and Prompt—Sun Solaris Workstation

```
                        |           |
                      :|:         :|:
                     :|||:       :|||:
                 .:|||||||:..:|||||||:.
                  C i s c o   S y s t e m s

                     Cisco Systems, Inc.
          Enhanced Services and Migration Business Unit

                     ICC UPG Update Tool


               Copyright 2000  Cisco Systems, Inc.
                      Tool version: 2.2
                   Creation date: Tue 06/06/2000



Enter default ICC Protocol File Name:
```

Step 7   Enter the file name of the default .upg file copied in Step 3.

The ICC UPG Update Tool menu, and a prompt, are displayed. (See Figure D-3.)

Figure D-3   ICC UPG Update Tool Menu and Prompt—Sun Solaris Workstation

```
        ********************************************
        *                                          *
        *          UPG Update Tool                 *
        *                                          *
        *      1.  Display Rx Pulse data           *
        *      2.  Modify  Rx Pulse data           *
        *      3.  Display Tx Pulse data           *
        *      4.  Modify  Tx Pulse data           *
        *      5.  Display State Model              *
        *      6.  Modify State Model               *
        *      7.  Display Guard Time               *
        *      8.  Modify Guard Time                *
        *      9.  Create User Defined Data File    *
        *                                          *
        *      0.  Exit                             *
        *                                          *
        ********************************************
Enter your Choice:
```

The ICC UPG Update Tool menu options, and custom .upg file creation instructions, are described in the "Custom .upg File Creation Instructions" section on page D-5.

Install and Start the ICC UPG Update Tool with a Microsoft Windows PC Workstation

Complete the following steps to install and start the ICC UPG Update Tool on a Microsoft Windows PC workstation. For Sun Solaris users, refer to the "Install and Start the ICC UPG Update Tool with a Sun Solaris Workstation" section on page D-2 for tool installation instructions.

Step 1   Create a directory named UPGTOOL on your PC.

Step 2   Copy the upgedwin.exe executable file—the ICC UPG Update Tool—from the ICC PROTOCOL GENERATOR floppy disk to the UPGTOOL directory.

Step 3   Copy the appropriate default .upg file from floppy disk 6 to the UPGTOOL directory according to the following rules:

- Copy the iccem.upg file if using the E&M, T1 protocol.
- Copy the icccasr2.upg file if using the CAS/R2, E1 protocol.

Step 4   Open a Command Prompt window.

Step 5   Change to the UPGTOOL directory within the window.

Step 6   Type **upgedwin.exe** and press **Enter** to start the tool.

An introductory message and prompt are displayed in the window. (See Figure D-4.)

Figure D-4   ICC UPG Tool Introductory Message and Prompt—PC Workstation
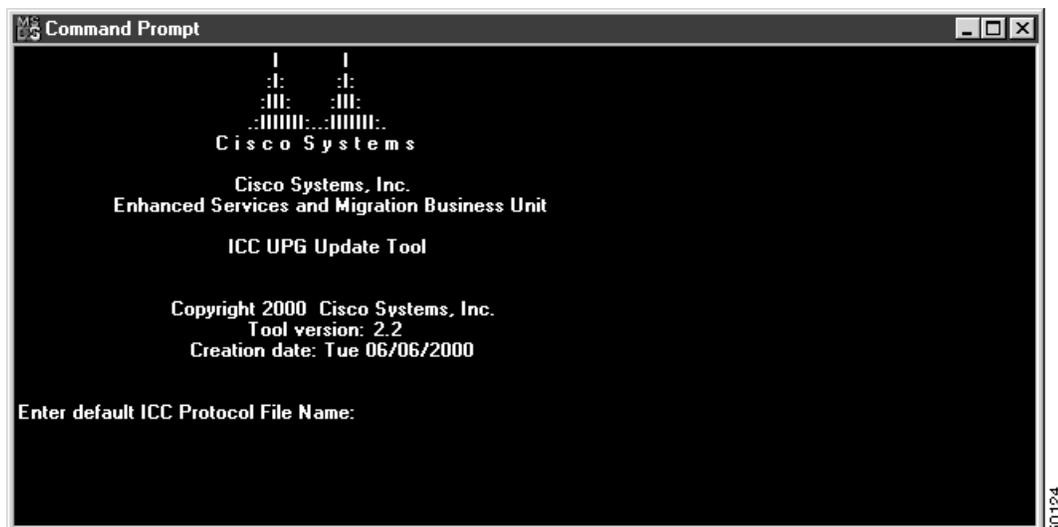
Step 7   Enter the file name of the default .upg file copied in Step 3.

The ICC UPG Update Tool menu, and a prompt, are displayed. (See Figure D-5.)

Figure D-5   ICC UPG Update Tool Menu and Prompt—PC Workstation

Refer to the "Custom .upg File Creation Instructions" section on page D-5 for a description of the ICC UPG Update Tool menu options, and custom .upg file creation instructions.

Custom .upg File Creation Instructions

The creation of custom .upg files is accomplished with the ICC UPG Update Tool. All customizing instructions are illustrated with figures representative of those seen while using a Sun Solaris workstation. PC workstation users see the same information, but in a Command Prompt window.

Sun Solaris workstations users, refer to Figure D-3 for the ICC UPG Update Tool menu. PC workstation users, refer to Figure D-5 for the ICC UPG Update Tool menu. The ICC UPG Tool menu options are described in Table D-1.

Table D-1   ICC UPG Tool Menu Options

Menu Option	Description
1. Display Rx Pulse data	Displays a list of receive pulse data (incoming signals)—data traveling from the network to the card—and describes how each is decoded by the protocol.
2. Modify Rx Pulse data	Allows users to modify the active bit pattern (ABCD bits) and the minimum and maximum detection times of each received pulse. The ABCD signaling bits for the CAS/R2, E1 protocol must not be modified.
3. Display Tx Pulse data	Displays a list of transmit pulse data (outgoing signals)—data traveling from the card to the network—that can be transmitted by the protocol, and describes how each is decoded by the protocol.

Table D-1   ICC UPG Tool Menu Options (continued)

Menu Option	Description
4. Modify Tx Pulse data	Allows the user to modify the active bit pattern (ABCD bits) and the minimum and maximum detection times of each transmitted pulse. The ABCD signaling bits for the CAS/R2, E1 protocol must not be modified.
5. Display State Model	Displays the current state model.
6. Modify State Model	Not available for customer use at this time.
7. Display Guard Time	Displays the current value of the guard time—the length of time that a port is held in guard state, after the port is abandoned.
8. Modify Guard Time	Allows the user to modify the length of the guard time.
9. Create User Defined Data File	Allows the user to save the customized .upg file.
0. Exit	Allows the user to exit the ICC UPG Update Tool menu.

Follow the procedures in the following sections to customize a default .upg file.

Display and Modify Receive Pulse Data—Options 1 and 2

Complete the following steps to display and modify the receive pulse data of a default .upg file:

Step 1   From the ICC UPG Update Tool menu, type **1** and press **Enter**.

The receive pulse data is displayed on your screen (see Figure D-6), followed by the ICC UPG Update Tool menu and the Enter your Choice prompt.

Figure D-6   Display Rx Pulse Data Screen

```
  ****   Receive Pulses   ****

                            Timing (ms)
Name                ABCD bits   Min    Max
------------------- --------- -----------
rx_seize                 12     375      0
rx_wink                  12     100    350
rx_flash                  0     100    350
rx_idle                   0     375      0
```
48346

Each protocol can detect a certain number of receive pulses (our example, Figure D-6, contains four). Each pulse is described by four parameters. (See Table D-2.)

Table D-2   Display Rx Pulse Data Parameters

Parameter	Description
Name	Name for the pulse; for debugging and maintenance only.
ABCD bits	The ABCD bit pattern identifying a specific signal. The pattern is a binary number from 0000 to 1111, which is displayed as decimal, 0 to 15.
Timing (ms), Min	Represents the minimum time, in milliseconds, that the active bit pattern (see Table D-3) must be present on the incoming line.
Timing (ms), Max	Represents the maximum time, in milliseconds, that the active bit pattern (see Table D-3) can be present on the incoming line.

Step 2   Type **2** and press **Enter** to modify the receive pulse data.

The first receive pulse data is displayed. (See Figure D-7.) The cursor is located after the Enter ABCD Bits value (0-15) [n] prompt. The default, or current, value is contained within the square brackets.

Figure D-7   First Receive Pulse Data Display—New ABCD Bits Prompt

```
Enter your Choice: 2

  ****  Receive Pulses  ****

Signal: 'rx_seize'
Enter ABCD Bits value (0-15)  [  12]:
```

Step 3   Modify the ABCD bit pattern, taking into account the following considerations:

Note   Only the active bit pattern is stored in the customized .upg file.

- For the E&M, T1 protocol, the receive pulses are defined by a certain sequence of changes in the A and B bits; the C and D bits are not used for defining receive pulses. Refer to Table D-3 for the default values of the ABCD bit patterns.

Table D-3   Default Values of the ABCD Bit Pattnerns

Signaling Name	Start Pattern	Active Pattern	End Pattern
Seize	0000	1100	—
Wink	0000	1100	0000
Flash	1100	0000	1100
Idle	1100	0000	—

- For the CAS/R2, E1 protocol, the receive pulses are defined as specific ABCD bit patterns. Refer to Table D-4 for the default values of the ABCD bit patterns.

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Table D-4   Default ABCD Bit Pattern Values for the CAS/R2, E1 Protocol

Signaling Name	Bit Pattern
Seize	0001
Seize Acknowledge	1101
Answer	0101
Clear Back	1101
Idle	1001

a. Convert the appropriate binary ABCD bit pattern to decimal.

b. Type the decimal value.

c. Press **Enter**.

Note Pressing **Enter** without first entering a value leaves the default, or current, value unmodified.

A new prompt—Enter Minimum Timer Value (ms) [n]—followed by the cursor, is displayed. (See Figure D-8.) The default, or current, value is contained within the square brackets.

Figure D-8   First Receive Pulse Data Display—Minimum Timer Selection Prompt

```
Enter your Choice: 2


  ****  Receive Pulses  ****

Signal: 'rx_seize'
Enter ABCD Bits value (0-15)   [  12]:
Enter Minimum Timer Value (ms) [ 375]:
```

48348

Step 4 Modify the minimum timer value, taking into account the following considerations:

• For the E&M, T1 protocol, the receive pulses are defined by a minimum time, in milliseconds, that the active bit pattern must be present on the incoming line. Refer to Table D-5 for the default minimum timer values. Adhere to E&M protocol industry standards for valid timer selections.

Table D-5   Default Minimum Timer Values for the E&M, T1 Protocol

Signaling Name	Minimum Time (ms)
Seize	375
Wink	100
Flash	100
Idle	375

• For the CAS/R2, E1 protocol, all bit patterns are valid the instant they are present; default minimum timer values are always 0. You must select 0 (zero) for the minimum timer value.

d. Type the appropriate minimum timer value for the seize receive pulse.

e. Press **Enter**.

> **Note** Pressing **Enter** without first entering a value leaves the default, or current, value unmodified.

A new prompt—Enter Maximum Timer Value (ms) [n]—followed by the cursor, is displayed. (See Figure D-9.) The default, or current, value is contained within the square brackets.

Figure D-9   First Receive Pulse Data Display—Maximum Timer Selection Prompt

```
Enter your Choice: 2

  ****  Receive Pulses  ****

Signal: 'rx_seize'
Enter ABCD Bits value (0-15)   [  12]:
Enter Minimum Timer Value (ms) [ 375]:
Enter Maximum Timer Value (ms) [   0]:
```

Step 5   Modify the maximum timer value, taking into account the following considerations:

- For the E&M, T1 protocol, the receive pulses are defined by a maximum time, in milliseconds, that the ABCD bit pattern can be present on the incoming line. Refer to Table D-6 for the default maximum timer values. Adhere to E&M protocol industry standards for valid timer selections.

Table D-6   Default Macimum Timer Values for the E&M, T1 Protocol

Signaling Name	Maximum Time (ms)
Seize	0
Wink	350
Flash	350
Idle	0

- For the CAS/R2, E1 protocol, the receive pulses are not defined by a maximum time; default maximum timer values are always 0. You must select 0 (zero) for the maximum timer value.

> **Note** A zero maximum timer value indicates that the pattern can remain indefinitely.

a. Type the appropriate maximum timer value for the seize receive pulse.

b. Press **Enter**.

> **Note** Pressing Enter without first entering a value leaves the default, or current, value unmodified.

The second receive pulse data is displayed, along with the Enter ABCD Bits value (0-15) [n] prompt.

Step 6   Repeat Step 3 through Step 5 for this and all remaining receive pulse data.

When all receive pulse data are modified, the ICC UPG Update Tool screen is displayed. Sun Solaris workstation users, refer to Figure D-3. Microsoft Windows PC workstations users, refer to Figure D-5.

Display and Modify Transmit Pulse Data—Options 3 and 4

Complete the following steps to display and modify the transmit pulse data of a default .upg file:

Step 1   From the ICC UPG Update Tool menu, type **3** and press **Enter**.

The transmit pulse data is displayed (see Figure D-10), followed by the ICC UPG Update Tool menu and the Enter your Choice prompt.

Figure D-10   Display Tx Pulse Data Screen

```
Enter your Choice: 3

  ****   Transmit Pulses   ****

Pulse                   Segment   ABCD bits   On Time (ms)
-------------------     -------   ---------   ------------
tx_seize                   1         12          350
tx_idle                    1          0          350
tx_wink                    1         12          240
tx_wink                    2          0          350
tx_flash                   1          0          240
tx_flash                   2         12          350
```

48350

Each protocol can send a certain number of transmit pulses (our example, Figure D-10, contains four). Each pulse is described by four parameters. (See Table D-7.)

> **Note**   The transmit pulses wink and flash are assigned two segments. Each segment contains an ABCD bit pattern value and an active bit pattern timing value. Both can be modified.

Table D-7   Display Tx Pulse Data Parameters

Parameter	Description
Pulse	Name of the pulse.
Segment	A numerical identifier for each segment of a pulse; a pulse is assigned one or two segments.
ABCD bits	The ABCD bit pattern that is to be transmitted. The pattern is a binary number from 0000 to 1111, which is displayed as decimal, 0 to 15.
On Time (ms)	Represents the guaranteed time, in milliseconds, that the active bit pattern (refer to Table D.8) will be transmitted on the outgoing line.

Step 2   Type **4** and press **Enter** to modify the transmit pulse data.

The first transmit Pulse ID data is displayed (seize). (See Figure D-11.) The cursor is located after the Enter ABCD Bits value (0-15) [n] prompt. The default, or current, value is contained within the square brackets.

Figure D-11   Transmit Pulse Data Display—ABCD Bits Value Prompt

```
Enter your Choice: 4


  ****  Transmit Pulses  ****

Signal: 'tx_seize'
Segment 1: Enter ABCD Bits value (0-15) [  12]:
```

Step 3   Modify the ABCD bit pattern, taking into account the following considerations:

- For the E&M, T1 protocol, the transmit pulses contain a certain sequence of changes in the A and B bits; the C and D bits are not used for defining transmit pulses. Refer to Table D-8 for the default values of the ABCD bit patterns.

Table D-8   Default ABCD Bit Pattern Values for the E&M, T1 Protocol

Signaling Name	Start Pattern	Active Pattern	End Pattern
Seize	0000	1100	—
Wink	0000	1100	0000
Flash	1100	0000	1100
Idle	1100	0000	—

- For the CAS/R2, E1 protocol, the transmit pulses are defined as specific ABCD bit patterns. Refer to Table D-9 for the default values of the ABCD bit patterns.

Table D-9   Default ABCD Bit Pattern Values for the CAS/R2, E1 Protocol

Signaling Name	Bit Pattern
Seize	0001
Seize Acknowledge	1101
Answer	0101
Clear Back	1101
Idle	1001

a. Convert the appropriate binary ABCD bit pattern to decimal.

b. Type the decimal value.

c. Press **Enter**.

Note   Pressing Enter without first entering a value leaves the default, or current, value unmodified.

A new prompt—Enter Time On Value (ms) [n]—followed by the cursor, is displayed. (See Figure D-12.)

Figure D-12 Transmit Pulse Data Display—Time On Prompt

```
Enter your Choice: 4


  ****  Transmit Pulses  ****

Signal: 'tx_seize'
Segment 1: Enter ABCD Bits value (0-15) [  12]:
Segment 1: Enter Time On Value (ms)     [ 350]:
```

Step 4   Modify the minimum timer value (segment 1 timer value), taking into account the following considerations:

- For the E&M, T1 protocol, the transmit pulses are described in part by the length of time, in milliseconds, that the active bit pattern must be present on the outgoing line. Refer to Table D-10 for the default minimum timer values. Adhere to E&M protocol industry standards for valid timer selections.

Table D-10 Default Minimum Timer Values for the E&M, T1 Protocol

Signaling Name	Minimum Time (ms)
Seize	375
Wink	100
Flash	100
Idle	375

- For the CAS/R2, E1 protocol, all bit patterns are valid the instant they are present; default minimum timer values are always 0. You must select 0 (zero) for the maximum timer value.

a.   Type the appropriate minimum timer value for the seize receive pulse.

b.   Press **Enter**.

Note   Pressing **Enter** without first entering a value leaves the default, or current, value unmodified.

Step 5   Use the following considerations to determine your next step.

- If the seize or idle transmit pulse was configured in Step 4, configuration for that transmit pulse in complete. Repeat Step 1 through Step 5 for the next transmit pulse displayed.

- If the wink or flash transmit pulse was configured in Step 4, proceed to Step 6.

Step 6   Modify the ABCD end bit pattern (segment 2) following the guidelines discussed in Step 3.

Step 7   Modify the maximum timer value (segment 2 timer value), taking into account the following considerations.

> **Note** Transmit pulses wink and flash are the only transmit pulses with maximum timer values. The maximum timer values are always contained in segment 2 of a transmit pulse.

- For the E&M, T1 protocol, the transmit pulses are defined by a maximum time, in milliseconds, that the ABCD bit pattern can be present on the outgoing line. Refer to Table D-11 for the default maximum timer values. Adhere to the E&M protocol standards for valid timer selections.

Table D-11   Default Maximum Timer Values for the E&M, T1 Protocol

Signaling Name	Maximum Time (ms)
Seize	0
Wink	350
Flash	350
Idle	0

- For the CAS/R2, E1 protocol, the transmit pulses do not contain by a maximum time; default maximum timer values are always 0. You must select 0 (zero) for the maximum timer value.

> **Note** A zero maximum timer value indicates that the pattern can remain indefinitely.

  a. Type the appropriate maximum timer value for the transmit pulse.

  b. Press **Enter**.

> **Note** Pressing Enter without first entering a value leaves the default, or current, value unmodified.

The next transmit pulse data is displayed, along with the Enter ABCD Bits value (0-15) [n] prompt.

Step 8 Repeat Step 3 through Step 5 for this and all remaining transmit pulse data.

When all transmit pulse data is modified, the ICC UPG Update Tool screen is displayed. SUN Solaris workstation users, refer to Figure D-3. Microsoft Windows PC workstation users, refer to Figure D-5.

Display and Modify the State Model—Options 5 and 6

> **Note** It is not necessary to access option 5 or option 6 to create a customized .upg file. Option 5 is display only, and option 6 is not available for customer use at this time. We advise proceeding to the "Display and Modify the Guard Time—Options 7 and 8" section on page D-14.

Complete the following steps to display the state model:

Step 1   From the ICC UPG Update Tool screen, type **5** and press **Enter**, to display the current state model. The current state model, which describes protocol states, is displayed. (See Figure D-13.)

Figure D-13   State Model Screen

```
Enter your Choice: 5


  ****   State Model   ****

#    State           Event            Next State
--   -----------     -----------      -----------
1    1:idle          1:tx_seize       3:wait_for_rx_ans
2    1:idle          4:abandon        7:guard
3    1:idle          5:alarm          8:alarm
.    .               .                .
.    .               .                .
.    .               .                .
```

The state model is described by four parameters. (See Table D-12.)

Table D-12   State Model Parameters

Parameter	Description
#	A sequential number list which gives the state model display structure.
State	The current state of the protocol.[1]
Event	Transition identifier; event possibly encountered.[1]
Next State	Resulting state; the state achieved if State and Event conditions are met.[1]

1. The last three parameters described in Table D-12 require some explanation. Using the #2 row of Figure D-13 as an example, if the current protocol state is idle (1:idle) and the abandon event is encountered, the next state which the protocol assumes is guard (7:guard).

The state model display is followed by the ICC UPG Update Tool menu.

Step 2   Proceed to the "Display and Modify the Guard Time—Options 7 and 8" section on page D-14. Do not select option 6.

✎ **Note**   Option 6 is not supported for customer use at this time. However, if you happen to select option 6, press **Enter** to accept default values until the ICC UPG Update Tool menu is displayed.

Display and Modify the Guard Time—Options 7 and 8

Complete the following steps to display and modify the guard time of a default .upg file:

Step 1   Type **7** and press **Enter**, to display the guard time.

The message in Figure D-14 is displayed, followed by the ICC UPG Update Tool menu and the Enter your Choice prompt.

Figure D-14 Display Guard Time Screen

```
Enter your Choice: 7


Guard Time = 200 ms.
```
48359

A port is held in the guard state, after it is abandoned (the call associated with that port has ended), for the length of time specified by the guard time.

Step 2   Type **8** and press **Enter** to modify the guard time.

The message in Figure D-15 is displayed. The cursor is located after the Enter new Guard Time in milliseconds [n] prompt. The default, or current, value is contained within the square brackets.

Figure D-15 Modify Guard Time Screen

```
Enter your Choice: 8


Enter new Guard Time in milliseconds [ 200]:
```
48360

Step 3   Type an appropriate guard time value and press **Enter**.

✎

Note   Pressing **Enter** without first entering a value leaves the default, or current, value unmodified.

The ICC UPG Update Tool menu is displayed. Sun Solaris workstation users, refer to Figure D-3. Microsoft Windows PC workstation users, refer to Figure D-5.

Save a Customized .upg Data File—Option 9

Complete the following steps to save the customized receive and transmit pulse modifications to a new .upg file:

Step 1   From the ICC UPG Update Tool screen, type **7** and press **Enter**.

The message in Figure D-16 is displayed. The cursor is located after the Enter (3-6) prompt.

Figure D-16 Create a User Defined Data File Screen

```
Enter your Choice: 9
Select the user defined file name (icc0x.upg),
Enter (3-6) :
```
48361

Step 2   Type a number from 3 to 6.

Step 3   Press **Enter**.

The information in Figure D-17 is displayed.

Figure D-17 Created File Screen

```
Enter your Choice: 9
Select the user defined file name (icc0x.upg),
Enter (3-6) : 4


protocol id:14
protocol name:E&M04
```

48362

The number entered in Step 2 is used to create three items:

- A customized .upg file containing the number entered in Step 2 in the form of icc0n.upg, where n is the number entered. For example, if the number 4 is entered, a file with the name icc04.upg is created.

- An identifier for the customized protocol in the form of USER0n, where n is the number entered in Step 2. For example, if the number 4 is entered, a protocol identifier with the name USER04 is created.

- A new protocol name—signaling type—in one of two forms:

    – E&M0n, for the E&M, T1 protocol, where n is the number entered in Step 2

    – Cas0n, for the CAS/R2, E1 protocol, where n is the number entered in Step 2

Note   A maximum of four customized .upg data files can be created and saved. Reuse an existing data file to create subsequent data files.

Table D-13 describes the items created with Step 2 for the E&M, T1 protocol.

Table D-13 Customized .upg File Elements for the E&M, T1 Protocol

Step 2 Number Entry	File Name	Protocol ID	Signaling Type
3	icc03.upg	USER03	E&M03[1]
4	icc04.upg	USER04	E&M04[1]
5	icc05.upg	USER05	E&M05[1]
6	icc06.upg	USER06	E&M06[1]

1. T1 signaling types are displayed as selectable SIG. TYPE field values within the VCO/4K software administration's ICC Programmable Trunk Configuration screen.

Table D-14 describes the items created with Step 2 for the CAS/R2, E1 protocol.

Table D-14 Customized .upg File Elements for the CAS/R2, E1 Protocol

Step 2 Number Entry	File Name	Protocol ID	Span Type
3	icc03.upg	USER03	Cas03[1]
4	icc04.upg	USER04	Cas04[1]
5	icc05.upg	USER05	Cas05[1]
6	icc06.upg	USER06	Cas06[1]

1. E1 signaling types are displayed as selectable SPAN TYPE field values within the VCO/4K software administration's ICC Programmable Trunk Configuration screen.

Note   Switch configuration with the customized .upg file makes use of the different files and names created in Step 2; keep accurate records.

Step 4   Press **Enter** to return to the ICC UPG Update Tool screen.

Exit from the ICC UPG Update Tool—Option 0

From the ICC UPG Update Tool screen, type **0** and press **Enter** to exit from the tool.

Copy the customized .upg file from the hard drive to a floppy disk.

A new custom .upg file is now ready for implementation on the VCO/4K switch. Refer to the "Switch Configuration with a Customized .upg File" section on page D-17 for complete configuration instructions.

Switch Configuration with a Customized .upg File

Complete the following steps to configure the VCO/4K switch with a customized .upg file.

Step 1   Access the VCO/4K software administration's Copy Files screen.

Step 2   Copy the customized .upg file from the floppy disk (the file created on the floppy disk with instructions in the "Custom .upg File Creation Instructions" section on page D-5) to the C:/BOOT directory on both the A and B sides of the switch.

Step 3   Access the VCO/4K software administration Card Maintenance screen.

Step 4   Take the entire ICC out of service (OOS).

Step 5   Access the Card Summary screen via the Database Administration menu.

Step 6   Display the span of the ICC you want to configure with the customized .upg file.

The ICC Programmable Trunk Configuration screen is displayed.

Step 7   Use the SIG. TYPE field (for the E&M, T1 protocol) to select the customized .upg file signaling type for each port for which it is appropriate. Use the SPAN TYPE field (for the CAS/R2, E1 protocol) to select the customized .upg file signaling type for each port for which it is appropriate.

✎

Note   The customized SIG. TYPE (T1) or SPAN TYPE (E1) field selections are those created in the "Save a Customized .upg Data File—Option 9" section on page D-15, and described in Table D-13 and Table D-14.

When you select or modify the signaling type on port 1, the "Enter Y to propagate port 1 values" message is displayed. Enter **Y** to configure all remaining ports with the same signaling type as that of port 1. Enter **N** to configure only port 1 with a particular signaling type.

Step 8   Access the VCO/4K software administration Card Maintenance screen.

Step 9   Activate the ICC.

The customized .upg file is now configured in the switch and the new protocol is implemented.

ICC UPG Update Tool Restrictions and Limitations

Keep the following restrictions and limitations in mind when configuring the switch with customized .upg files.

⚠

Caution   The ICC UPG Update Tool allows you to create customized .upg files that may not be valid for the VCO/4K system. Interruption of service and loss of calls may occur.

- A maximum of four customized .upg data files can be created and saved. Reuse an existing data file to create subsequent data files.

- The customized .upg file names are fixed—icc03.upg through icc06.upg.

- The customized .upg file names are not protocol specific; the names can designate either the E&M, T1 or the CAS/R2, E1 protocol.

- Users of customized .upg files must create new customized .upg files when upgrading system software. The new customized .upg files must be created using the new default .upg files.