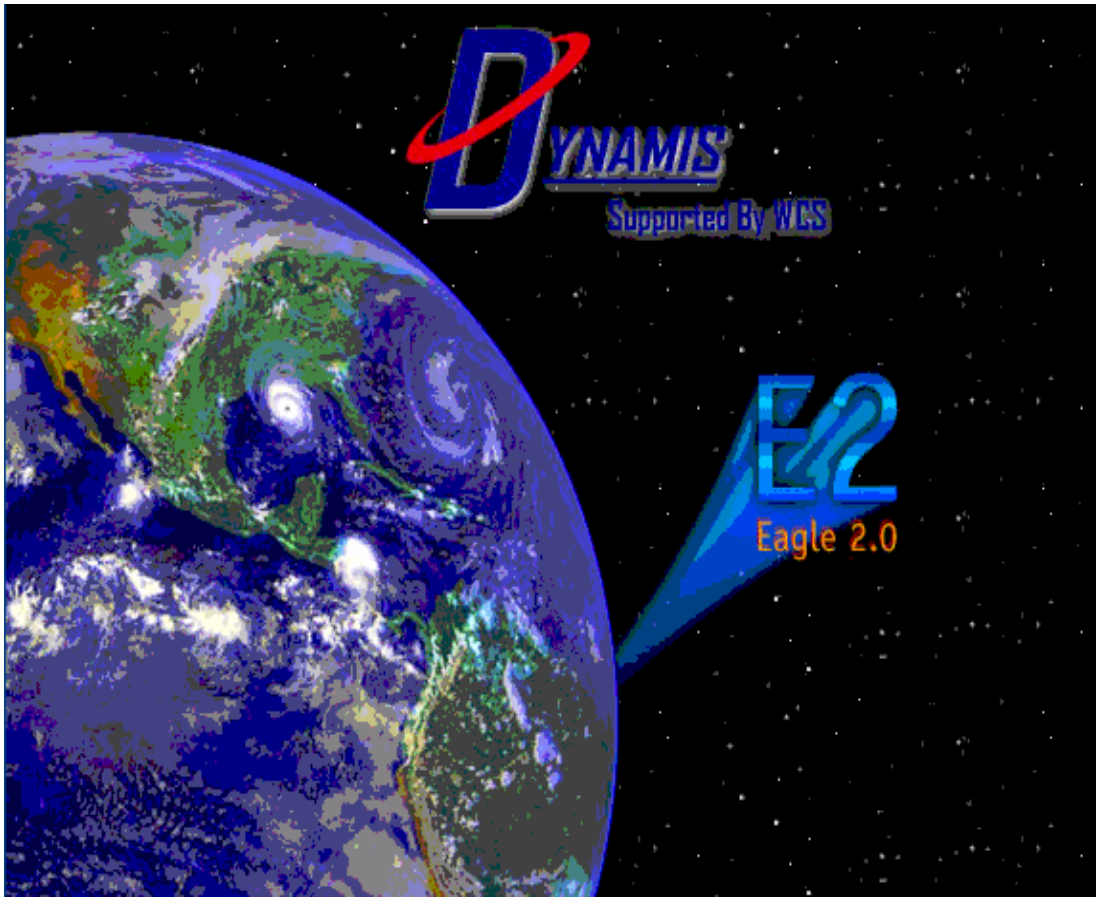

User's Manual

Version 4.7.6

May 1, 2007

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Table of Contents

1. System Overview

Overview

The E2 Eagle II Host Software ("Host"), combined with an EXS Switch, allows for a highly flexible user programmable switching system. The EXS Switch allows you to determine how you want to route the traffic. The Host provides call control and a Graphical User Interface (GUI) that enables you to create routing applications quickly and easily.

Theory of Operation

The Host is a call control system that uses a digit matching process of dialed digits. The main components of the Host include an EXS Switch and the Host. The Host and EXS Switch communicate via API (Application Programming Interface) messages. The way the Host works is the EXS Switch receives the incoming digits (in most cases, the ANI/CLI and dialed number). The Host is informed that digits have been received, and processes the digits based on how they are configured in the various tables within the Host. The Host sends the outgoing digits to the EXS Switch and the call is routed to the called party (the dialed number).

Each Host is unique since it is configured on how you want to receive the incoming digits and send the outgoing digits.

Incoming Digits

The digits/signals sent by the telco are recognized in the Host by the incoming type. The incoming type defines the signaling protocol used on the incoming calls for a particular trunk, and consists of incoming rules and inseize control instructions. Incoming rules define the digit collection method and inseize control instructions define the signaling used.

Incoming types supported in the Host include DTMF, DNIS, ANI, Feature Group D, and Auto Terminating, to name a few. They are described in detail in Appendix A.

Outgoing Digits

After the digits are received, they must be configured for signaling and outpulsing to the far end on an outgoing call. The completion type and ANI/CLI handle this process.

Completion types supported in the Host include Busy, Reorder, Ringing, Feature Group D, and Music on Hold, to name a few. They are described in detail in Appendices B and C.

Software and Hardware Components

There are various hardware and software components which comprise the basic Call Processing System. The hardware components include the Host Computer and the EXS Switch. The Host Computer houses the Host Software and Switch Software (the operating system of the EXS Switch). The switch houses the equipment items (line or service resource cards) installed in the card slots. The equipment items are controlled by the Host Software.

Host Computer

The Host Computer is a PC on which the Host Software, providing call control, is installed. The Host Computer is also where the E2START.TXT file and E2 executable, data, log, and system files are stored.

Remote Computer

The E2 Eagle GUI should be run on a separate remote computer, and **NOT on the same computer as the host**. Otherwise, performance of the host computer may degrade.

EXS Switch

The Excel family of switches is non-blocking digital systems with high density and Digital Signal Processing (DSP) technology. The switches accommodate standard telephone network and line interfaces, including T1, ISDN Primary Rate Interface (ISDN RI), E1, and SS7.

Host Software

The Host Software controls the EXS Switch. The Host provides various functions such as basic call processing, automatic call distribution, file maintenance, alarm logging and reporting, backup and restore facilities, operator services, and remote access.

Switch Software

The Switch Software is the operating system of the EXS Switch. The Switch Software is resident on the Host Computer and is downloaded to the EXS Switch.

SYSTEM OVERVIEW

The E2 Eagle Host is multi-tasking with real time programming capabilities, enabling you to configure, make changes, and add trunks and program new applications without disrupting in-service applications. The Host is not an applications generator. The Host is a call control system that allows you to create applications simply by programming routing tables and translation tables within the system.

All generic call processing functions are available and maintained by the Host. Programming screens are table/menu driven which create routing applications with ease. Configuration tables are saved in the system and used whenever the need occurs.

The Host provides automatic boot startup (pre-programmed), cold startup (the hardware must be powered off or restarted before startup), and warm startup (the hardware can remain operational).

Some additional features of the Host include:

- Supports fully redundant operations with the switch in the event of a CPU/ Matrix or host failure.
- Utilizes multi-tasking with real time programming capabilities.
- Provides many types of call control capabilities.
- Translates digits received from the incoming calls as required.
- Provides basic and enhanced call processing such as ACD (Automatic Call Distribution), Least Cost Routing, and Time of Day Routing.
- Uses an Application Programming Interface (API) over an Ethernet network for seamless integration with database applications. Several pre-packaged database applications such as Smart Calling Card (a.k.a. TAC, for Total Access Card), Smart Callback (a.k.a. International Callback), and Smart Long Distance (a.k.a. as ANI/PIN) integrate with E2 for delivery and management of enhanced services.
- Offers an open, flexible API for implementing new, enhanced services applications. The message set allows database access and call processing decisions external from the Host.
- Uses multiple network protocols that allow you to build call processing applications. Several types of call routing capabilities are available in the Host. Basic call routing uses a digit matching process on incoming dialed digits. Dialed digits are collected by means of incoming parameters and Inseize Control. The Host supports DTMF, MFR1, and MFR2 digit collection and generation as well as ISDN PRI D-Channel signaling.
- Provides a digit match operation that points each incoming call to a Route List. The Route List can be a Time of Day route. Each Route List can contain up to 20 Resource Groups. Digit translations are available for both "called" ANI and "calling party digits" received on the incoming call. Digits can be added, changed, or deleted from the match.

What's New: 2006-7, Version 4.7+

The following are enhancements made since the previous major releases in 2004 and 2005. Enhancements include:

Major Routing Enhancements

The E2 Host has been significantly enhanced to support advanced routing, including:

- Intrastate and Interstate least cost routing is supported, either based on the combination NPAs of the ANI/Dialed Number or DNIS/Dialed Number.
- Intra- and Inter-LATA least cost routing by (NPA_NXX) is supported by using a Master Routing Table to handle all combinations of NPA and NXX.
- Routing can be based on DNIS or ANI, as an alternative to the dialed number, or in addition to it, as routing may be directed to multiple tables
- Routing based on ISDN cause codes, including route advance, and route to a VRU to play a message
- Routing can be specified on the inbound channel basis, including routing by ANI, DNIS, destination number, inter-/intra-state routing, and/or account code billing by ANI

Major Translation Enhancements

Outbound translations, previously limited to primary and secondary translations, are now virtually unlimited. This is due to Post-Routing Options in the Resource Groups, and the fact that digit tables can point to other digit tables based on ANI, DNIS or dialed number, before finally selecting the outbound Resource Groups.

Translation may also be configurable by inbound port, due to the addition of Pre-Translation Tables associated with Feature Groups, and that Feature Groups may specify the appropriate Digit Table or Master Routing Table, based on ANI, DNIS, or Inter/Intra State.

XNET ONE Hardware Support

The E2 Host supports the one card Cantata Excel XNET-1 CPU card

ISDN NI 2 Support

Refer to NI 2 Configuration for details

Improved Backup and Restore

Virtually all configuration tables can be exported and imported, except for card configuration.

Support for Large Digit Tables

The digit table import process is improved to efficiently import large digit tables quickly. i.e. 20,000 records in less than 2 minutes instead of over an hour with earlier versions. In addition, a status screen displays to show progress and identify errors

Enhanced Billing Capabilities

The system has been enhanced to support tandem and postpaid billing capabilities without needing the server software:

- ANI Tables can configured, by ANI, either requiring a PIN for validation (using Index Tables) , or requiring a non-validated PIN for billing purposes only.
- Default ANI and/or DNIS can be specified when none is provided. This allows for billing and tracking in these cases, especially used for FXS & FXO lines, and VoIP billing for third-world countries.
- Time Synchonization for Hosts. One can easily set the active and standby hosts to the system date, thus synchronizing their time, essential for accurate billing during switchover.
- CDR fields have been extended for more complete billing records.

Easy Upgrade

The system is set up so it can easily import data from any older version to the new version.

What's New: 2004-5

This was the first significant rewrite of the Host Software since the 1999 version of ADS. Enhancements include:

SS7 Route Advance

When the system attempts an outgoing call via SS7, if the call fails, the system can perform any of the following based upon the cause code returned:

- Next available route – The next Resource Group will be used in the Route List. If the last Resource Group has been used, the incoming trunk is released with the Out Going trunk's return cause code.
- Play Busy Tone – The incoming trunk is play 10 cycles of busy tone before the trunk is released.
- Play Reorder Tone – The incoming trunk is play 10 cycles of reorder tone before the trunk is released.
- Release with Cause – The incoming trunk is release with the user define cause code.
- Route to VRU – The incoming trunk is routed to associated VRU SS7 Branding Route List. If the SS7 VRU Branding is not configured, the incoming trunk is released with the Out Going trunk's return cause code.
- If the cause code number is not in the list, a second out going attempt is made. After the second out dial attempt is made, the incoming trunk is released with the Out Going trunk's return cause code.

Refer to "SS7 Cause Code Setup" for details.

Integrate SS7 CPN with Smart Long Distance Application

The SS7 Calling Party Number (CPN) can now be used for billing and is integrated with the Smart Long Distance Application Server. This corresponds to the billing capabilities for the ANI/CLI of callers using ISDN and/or Channel Associated Signaling (CAS).

Refer to the "Use SS7 for charge number for CPN" and the Channel Features, Network List, SS7 Verify fields for details.

Configure Resource Group with CIP and TNS

The user can configure the Resource Group with the Carrier Identification Parameter. (CIP) and Transit Network Selection (TNS). Refer to Resource Groups, Channel Attributes, SS7 Parameters, and Figure 4-43 (Cause Code Routing screen) for details.

One Click Span in/out of service

The user can take a Span in/out of service from the Span – Channel State window with one click of a button.

Automatic Call Distribution

Automatic Call Distribution has been enhanced (Refer to "ACD Queues" for details).

Play ANI 900 Prompt to Conference Bridge

This gives you the capability of playing an announcement before entering a conference bridge. If this box is checked, and under Options, VRU Branding, the prompt configuration is set, the prompt will play.

Enhanced VRU Branding

VRU Branding is now more easily managed and more extensive (Refer to VRU Branding for details).

Least Cost Routing Using Digit Table Importing

Digit Table Importing is a very powerful feature. For example, some people use a spreadsheet listing a dozen or more carriers and their rates, which runs a macro that creates a .CSV file that specifies least cost routing to the cheapest three carriers. As rates change or new carriers are added, they simply rerun the macro and import the new file. For more details, contact your E2 Eagle technical representative.

Others

- The Stage II digit file can hold 30 entries
- SS7 support for the latest signaling codes and cards
- Incoming Type FGB AMA has been added
- Digit table options now include *108 Test Number* for loopback test to telcos, and *SMR* to handle that type of mobile calling.
- The digit table now includes a field for comments of up to 64 characters, which can be imported and exported

System Management Concepts

The telephone connection resource of the hardware switching system is commonly referred to as a trunk. When using the Host, each trunk in the switching equipment is composed of a span ID and a channel ID.

A span is a telephone facility containing a number of channels assigned to each T1/ E1 line card (24 channels in T1 spans, 30 in E1 spans) in the EXS Switch.

A Span ID is referred to as a Logical Span ID and must be assigned to properly perform any configuration, routing, or call processing. All references to the trunks in the system are identified by span and channel, with the span being the Logical ID.

The key to the processing of calls is the interaction of tables that are created in the system. Tables provide the interaction between the equipment, software, and application. The following are examples of some of the more important features in the System.

Equipment Screens

The use of the term "equipment" in this section relates to the cards installed in the switch. The Host provides configuration screens for the following cards:

- E1
- SDN
- MFDSP
- SS7
- T1

Each card installed in the EXS Switch is recognized by the Host. The Host presents a configuration screen for each card. The Host queries the switch during initial power up and constructs an equipment list showing each piece of installed equipment. By selecting a card from the list, the detailed information about that card is displayed on the screen. It is from this screen that Logical Span IDs, Service Circuit, and ISDN information is configured. The Logical ID assignment is critical to all other tables because it associates spans and channels to physical circuits.

Resource Group and Route List Configuration Tables

You can specify how each trunk (span and channel) in the system operates. Individual tables include Trunk Types, Trunk Features, Query Timers, and Digit Tables, each presenting a unique screen. When the E1 option is added to the Host, an additional category is displayed for configuring the E1 trunks.

The Resource Group and Route List tables are created to form hunting and trunk selection methods for routing outgoing calls. A Resource Group can be a single trunk or a group of trunks (up to 48 T1/60 E1 trunks).

Time of Day (TOD) Routing

Time of Day routing is used to change Resource Group choices based on time of day and day of week. The routes can be used to provide least cost routing or other applications requiring time or day sensitive routing. Up to 35 entries are allowed for each TOD route.

Automatic Call Distribution (ACD) Queues

Routing capabilities using ACD Queues is a standard feature of the Host and can provide many enhancements to call processing. ACD Queues are designed to provide automatic even call distribution between trunks or stations in a Resource Group. The distribution of the calls is based on the time each trunk has been busy. This feature also includes timed overflow, queue sizing, queue full routing, and overflow routing.

Digit Tables

Basic call routing uses a digit matching process of dialed digits. The collected digits are looked up in the Digit Tables for a match. The Digit Table provides the Route List pointer for outgoing calls, such as a unique table assigned to the trunk for the duration of the call. Digit translations are available for digits received on the incoming call. Digits can be added, changed, or deleted from the match. A successful match points to a Route List for outgoing trunk selection.

System Files and Records

All configuration information is stored on the Host Computer. This information is presented in the form of data files, log files, system files, and E2E Files.

Data Files

Data files contain user-definable information relating to digit tables, exclusion tables, Resource Groups, route lists, TOD groups, client applications, etc.

Log Files

Log files are created and used by the Host to log various functions and events. The information recorded in the log files includes critical errors, alarms, operator events, etc.

System Files

The system files are created and updated by the Host to store various system information such as login passwords, country codes, CIC codes, redundancy files, ISDN channels, board status messages, cable IDs, etc.

E2E Files

The E2E files are created and updated by the Host. These files contain information such as startup messages for all tasks, operator menus and prompts, call completion types, incoming start dial, disk copy text errors, etc.

2. System Admin

Overview

This chapter describes how to setup system specific information such as password security, EXS Switch configuration, and software management. Using the System Admin menu options, you can:

- Change the name, password, or security privilege of a user.
- Add a user to the system.
- Delete a user from the system.
- Select the desired method of Call Detail Record output.
- Specify the number of days in which the system will automatically delete the oldest CDR files.
- Configure the ACD event record output.
- Select a communications port that allows an active Host to communicate with a second Host acting as a standby.
- Select a TCP/IP port or log file to output alarm messages.
- Configure an Excel Server data link.
- Configure up to eight VRU links.
- Download Programmable Protocol Language (PPL) files that establish signaling variations if you have E1 facilities.
- Download a new or existing version of the System Software (Dynamis' operating system) to the Matrix CPU card.
- Download the LICENSE.CFG file to the EXS Switch.
- Send raw configuration commands to the EXS Switch.

Starting the Software

Launching the Host

The E2 Host Software should always be running on the Host system. When running, there should be a screen like the following displayed, or it should be minimized and an icon appears in the taskbar entitled “E2 Host.”

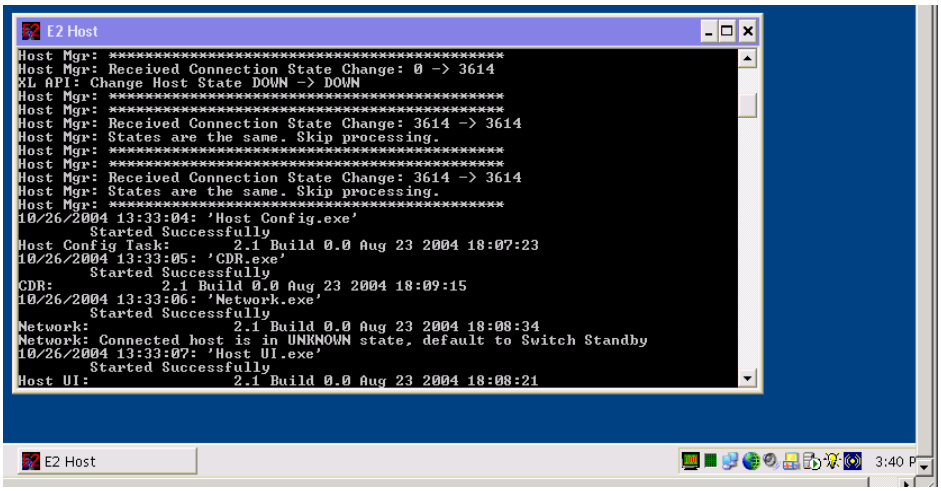


Figure 2-1
E2 Host Software, sample screen and icon in taskbar

If the host software is NOT running, then click on the “E2 Host” icon to begin:

Figure 2-2
E2 Host Icon for launching host

Launching the E2 GUI

The E2 GUI **should be launched on a separate computer from the E2 Host**. Click on the "E2 GUI" icon to begin:

Figure 2-3
E2 GUI Icon

You will be prompted to enter the name or IP address of the host computer:

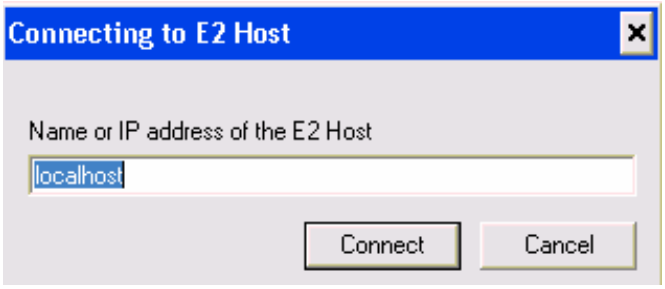


Figure 2-4
Name/IP Address Screen

The E2 Eagle launch screen will then appear:

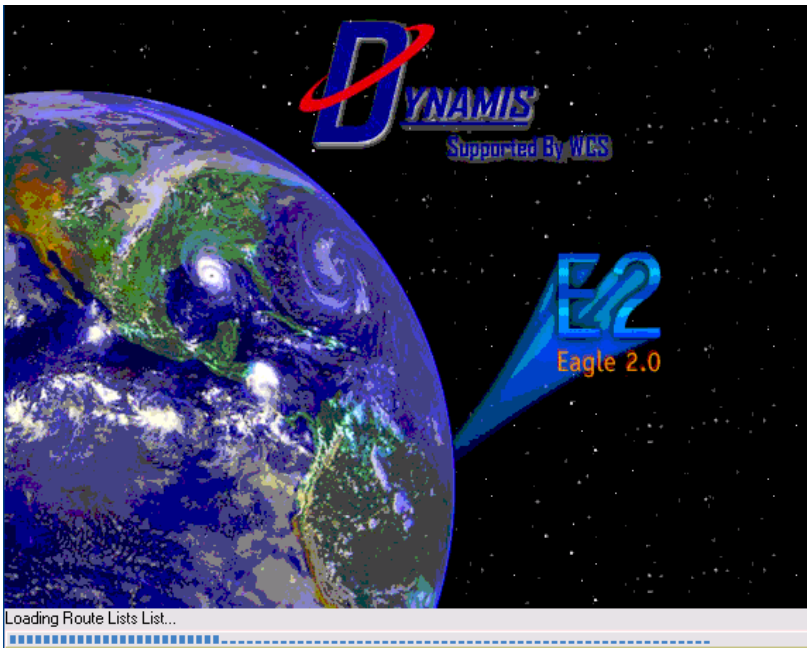


Figure 2-5
E2 Launching Screen

Then you will be prompted to login by entering your Name and Password:

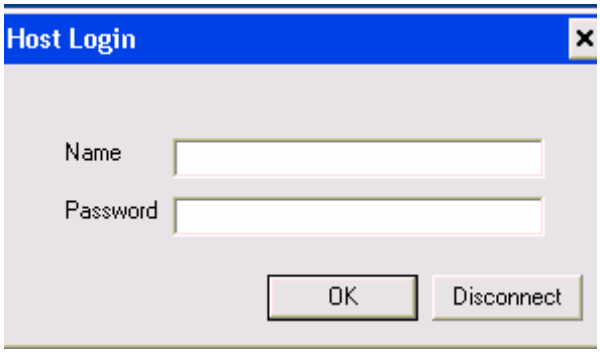


Figure 2-6
Login Screen

At this point, the main E2 GUI menu will appear:

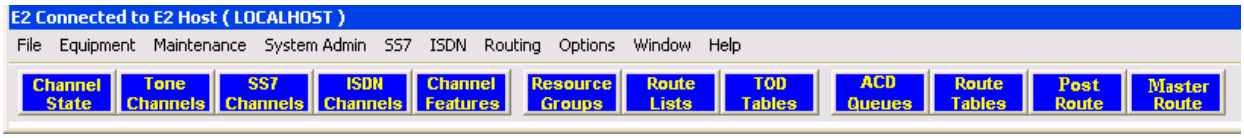


Figure 2-7
E2 GUI Main Menu

Password Management Screen

Under “System Admin”, select “Password Management”. The *Password Management* screen displays the user names and access privileges that you assign in the *User Attributes* screen (see ***Figure 2-3 User Attributes screen layout).***

Figure 2-8
Password Management screen layout

Clicking **Password Management** in the System Admin menu will activate this screen:

Figure 2-9
Password Management screen activation

Adding New User

To add a new user, click the *Password Management* screen's ADD button. In the resulting *User Attributes* screen (see ***Figure 2-10 User Attributes screen layout)***, enter the user's name, password and access privileges.

Modifying User

To modify user information, click a user name in the *Password Management* screen, then click the MODIFY button. In the resulting *User Attributes* screen (see ***Figure 2-10 User Attributes screen layout)***, change the user's name, password, or access privileges.

Deleting User

To delete a user, click a user name in the *Password Management* screen, then click the DELETE button.

User Attributes screen

The *User Attributes* screen enables you to add or modify a user's name, password, and access privileges.

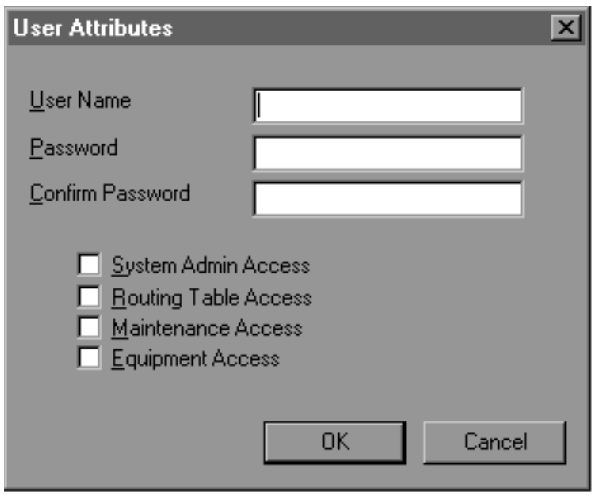


Figure 2-10
User Attributes screen layout

Clicking the *Password Management* screen's ADD or MODIFY button will activate the *User Attributes* screen.

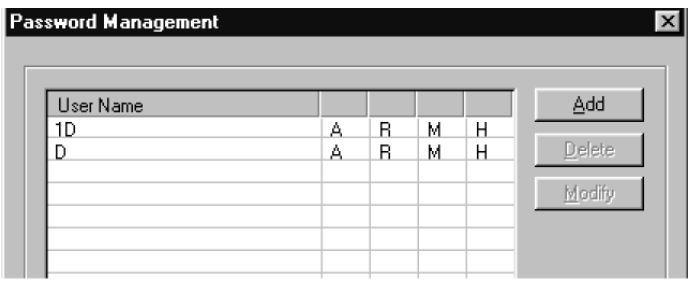


Figure 2-11
User Attributes screen activation

The following fields appear in the *User Attributes* screen:

User Name field

This field indicates a person to whom you want to give or subsequently deny access to the Host. Your ***required*** case-sensitive input is limited to 20 alphanumeric characters.

Password field

This field indicates the code validating this user's access to the Host. Your ***required*** case-sensitive input is limited to 20 alphanumeric characters.

Note—Your entry appears as a string of asterisks for security.

Confirm Password field

This field indicates for a second time the code validating this user's access to the Host in order to assure the first entry was correctly made. Your ***required*** case-sensitive input is the same entry you made in the **Password** field.

*Note—Your entry appears as a string of asterisks for security. If you fail to enter the same string as in the **Password** field, you will receive an error message allowing you to enter the original password.*

System Admin Access field

This field indicates, when checked, that the user has access to the Main Menu/ Toolbar's **System Admin** menu. When checked, the letter "A" (without quotes) appears in the *Password Management* screen's **User Name** field.

Routing Table Access field

This field indicates, when checked, that the user has access to the Main Menu/ Toolbar's **Routing Table** menu. When checked, the letter "R" (without quotes) appears in the *Password Management* screen's **User Name** field.

Maintenance Access field

This field indicates, when checked, that the user has access to the Main Menu/ Toolbar's **Maintenance** menu. When checked, the letter "M" (without quotes) appears in the *Password Management* screen's **User Name** field.

Equipment Access field

This field indicates, when checked, that the user has access to the Main Menu/ Toolbar's **Equipment** menu. When checked, the letter "H" (without quotes) appears in the *Password Management* screen's **User Name** field.

System Setup Screen

The *System Setup* screen enables you to:

- Select Call Detail Record (CDR) output options;
- Setup communication links for the switch, alarm, and redundant ports;
- Setup LAN connections for Ethernet communications between the Host and VRU, and the Host and an Dynamis Server; and
- Configure settings for output of an ACD event log and a remote switch log.

Clicking "**System Setup**" in the System Admin menu will display the various setup screens:

Figure 2-12
System Setup screen activation

Saving Changes

Clicking the APPLY button activates configuration changes and does not affect calls in progress. Clicking the OK or SAVE button activates configuration changes and exits the *System Setup* screen without effecting calls in progress.

Warning

Changes made to port selections do not take effect until you click the APPLY button or the OK button. Clicking APPLY or OK does not affect calls in process. However, new calls being presented are delayed for several seconds. Caution should be used when changing communication ports related to the Host link.

The *System Setup* screen contains areas for CDR Setup, Switch Setup, E2 HOST Redundant Link, Alarm Logging, and Network.

The following areas and their associated fields appear in the *System Setup* screen:

CDR Setup screen

This screen enables you to output Call Detail Record (CDR) files to the Host Computer's hard drive, and/or to a TCP/IP port. You can also set the number of days your system will keep CDR files until automatically deleted from the Host Computer's hard drive.

Note: You can copy CDR files to backup media using the Windows NT/2000 File Manager.

A CDR is a record of all the information pertaining to a particular telephone call (for example, who made the call, where it went, what time of day it was placed, how long it took, etc.). The CDR file names reflect the date the files were created (for example, Ammddyyx.TXT, where x reflects the version number of a particular day's CDR files). The Host creates a new file each time the current file reaches a size of 1.37 MB. For example, the first file created for a particular day would appear as A0530971.TXT. When that file reaches 1.37 MB (in the same day), a second file is created and would appear as A0530972.TXT.

The CDRtoday.ICD file contains the current day's call records and cannot be deleted because it is the current file being used by the system.

Note—When disk space on the Host Computer becomes limited, older files should be copied to other media and deleted from the hard drive. The number of files capable of being actively stored on the Host's hard drive depends on the size of the files and the total amount of available disk space.

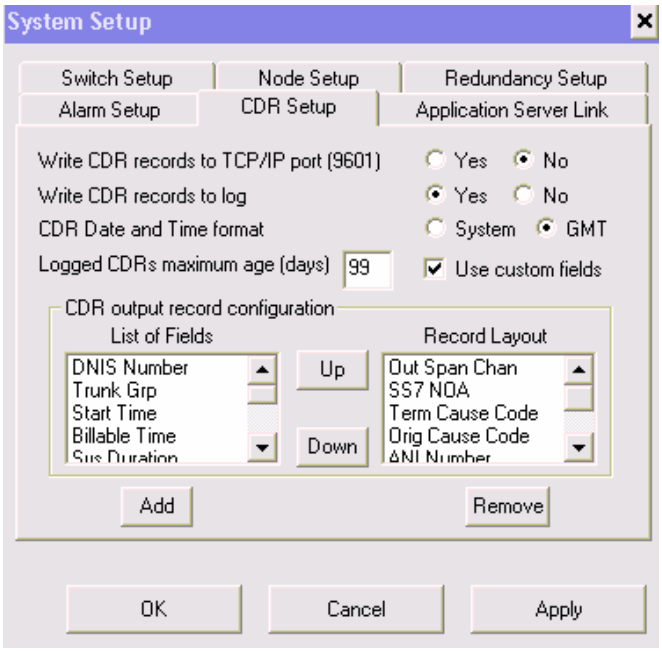


Figure 2-13
CDR Setup screen

To add a field, click on the field on the left hand side, then press the Add button. To remove a field, click on the field on the right hand side, then press the Remove button. To change the order of the output fields, click on the field on the right hand side, and click on the Up or Down buttons.

The fields you may select are the following:

- Answer State (NEW to version 4.7).
  - A Call was answered.
  - B Operator heard zip tone and hung up before call was connected.
  - C A conference bridge call.
  - D Caller hung up before a connection was made (call abandoned).
  - F Outsize failure reported by outgoing trunk.
  - H Hot line transfer.
  - O Not answered (Callback).
  - P Announcement trunk purge.
  - Q Call was in queue but then routed to termination group.
  - R Call released from queue before being routed.
  - S Operator hung up on caller
  - T Transferred call
  - W Call was no answer timed out
- ANI/CLI Number
- DNIS Number
- Dial Number
- In Span & Channel
- Out Span & Channel
- Resource Group (Outbound)
- Start Time
- Billable Time
- Sys Duration
- Orig Cause Code
- Term Cause Code
- SS7 NOA

Sample CDR files can be provided by your E2 technical representative.

Write CDR Records to TCP/IP Port field

This field indicates, when checked **Yes**, that the Host will write CDR files to a TCP**/**IP port. Click **Yes** to write CDR files to a TCP/IP port, or click **No** if you choose not to output CDR files to a TCP/IP port.

Note — Output to a TCP/IP port requires another computer to login as a Host client via port 9601. Third -party software is required to read this file and to manipulate its data.

Write CDR Records to log

This field indicates, when checked **Yes,** that CDRs will be saved to a file on the Host Computer's hard drive. Click **Yes** to save CDR files on the Host Computer's hard drive, or click **No** if you choose not to save CDR files to the Host Computer's hard drive.

CDR Date & Time Format (NEW)

New to version 4.7 – Either the System's local time can be specified, or GMT.

Logged CDRs maximum age (days)

This field indicates the number of days CDRs will be archived on the Host computer's hard drive. The Host archives CDRs on a daily basis, automatically deleting the oldest files after the specified number of days has been reached. This

feature prevents the Host Computer's hard drive from running out of disk space by maintaining only the most current records in the system.

Your ***required*** input is limited to 0-99 days. The default value is 0. Archived files remain stored on the hard disk until the number of days has been reached, or you manually delete the files.

Note — The Host Software does not allow you to delete the CDRtoday.ICD file. This file is in use and holds the CDRs for the current day's calls.

Switch Setup screen

This screen enables you to assign an IP Address to the EXS Switch and configure ACD event record and call processing activity (debug information) output.

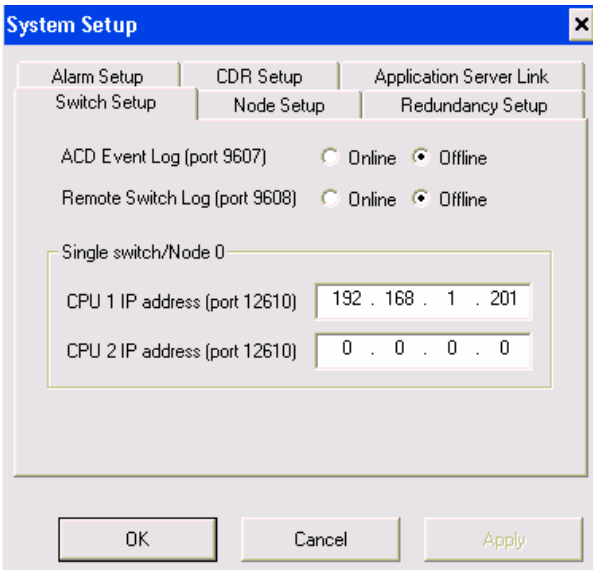


Figure 2-14
Switch Setup screen

ACD Event Log field

This field indicates the output of Automatic Call Distribution (ACD) event records. Click **Online** to view call processing activity in real time on a dedicated terminal, or click **Offline** to disconnect output of the ACD Event Log.

The Host generates ACD event records as calls progress through your Call Processing System. The records are identified by type and contain trunk and dialed number information. These records can be used to provide traffic analysis for fine tuning the queuing parameters.

Remote Switch Log field

This field indicates the output of the Remote Switch Log. Click **Online** to view call processing (debug) activity in real time on a dedicated terminal or click **Offline** to disconnect output of the Remote Switch Log.

The Remote switch log option provides important debugging information such as the date of the call, how the call was connected, and on which channel the call was accepted.

Switch IP Address

This field indicates the IP Address of the EXS Switch.

Alarm Setup screen

This screen enables you to write Alarm messages to a TCP/ IP port and Log file on the Host Computer's hard drive.

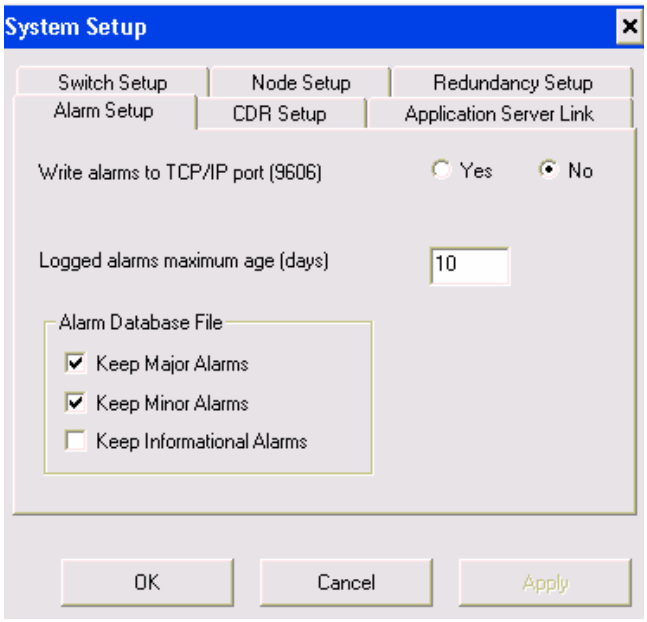


Figure 2-16
Alarm Setup screen

Write Alarms to TCP/IP Port

This field indicates, when checked **Yes**, that the Host will write alarms to a TCP/IP port. Click **Yes** to write alarms to a TCP/IP port, or click **No** if you choose not to write alarms to a TCP/IP port.

Logged alarms maximum age

This field indicates the number of days that alarm records will be archived on the Host computer's hard drive. The Host archives alarm records on a daily basis, automatically deleting the oldest files after the specified number of days has been reached. This feature prevents the Host Computer's hard drive from running out of disk space by maintaining only the most current records in the system. The alarm log file names are files\alarm.dbf and files\alarm.txt

Your ***required*** input is limited to 0-90 days. Archived records remain stored on the hard disk until the number of days has been reached, or you manually delete the records.

Keep Major/Minor/Informational Alarms

By checking these boxes, you may have these types of alarms displayed or ignored.

Redundancy setup screen

This screen enables you to select a communications port that allows an active (running) Host to communicate with a second Host acting as a standby.

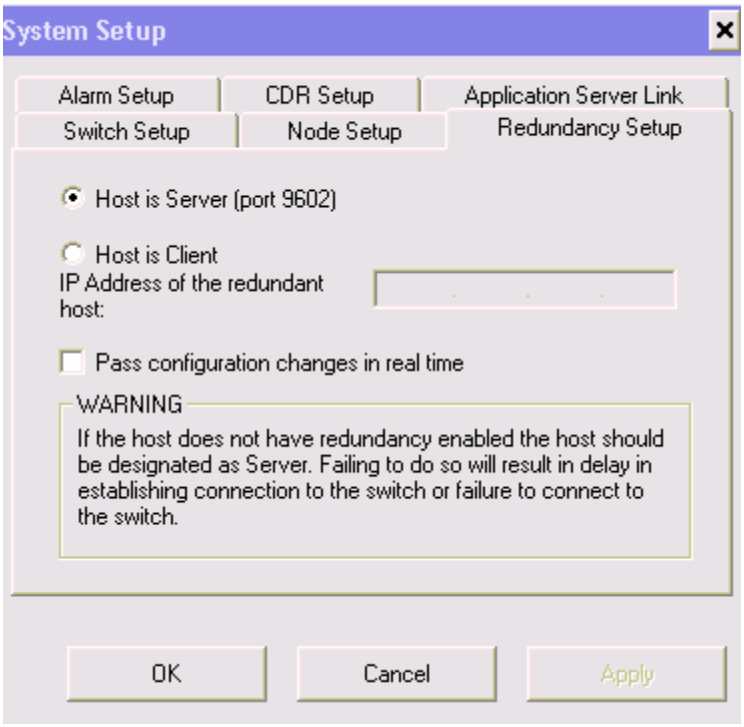


Figure 2-17
Redundancy Setup screen

Warning

The running of two different versions of software on the active and standby Hosts is unprecedented. Dynamis Switching specifically states in product manuals that the same software must be installed on both Hosts. Dynamis does not provide any guarantee that a failover from the active to the standby will function properly. Dynamis Switching will not provide any support if a problem should arise until both Hosts are running the same version of software and the problem occurs again. Dynamis Switching only tests redundancy with the same version on both Hosts.

Note—Hardware installation of two Matrix CPU cards is required. (Refer to the Installation section of the Excel Hardware Manual.) Only one card is active at any given time, the other is in a standby state. If, for any reason, the first card fails, the EXS Switch automatically sends a changeover message to the standby. Calls are not interrupted during the changeover process.

Client and Server, once operational, are always changing. No one machine is designated as either the Client or the Server. The Client initiates communication between the Hosts, and the Server is always in a waiting state.

When setting up the system for the first time, select one Host as the Server and the other Host as the Client.

The following fields appear in the **Redundancy setup** screen:

Host is Server Field

This field indicates, when checked, that you have designated this Host as Server.

Host is Client field

This field indicates, when checked, that you have designated this Host as Client. You must enter the IP Address of the Server Host.

Pass configuration changes in real time

Note: It is recommended that you NOT use this feature.

If this is checked (not recommended), then configuration changes you make to either host will automatically be passed to the other host. While this keeps both hosts configured the same, we recommend to **not** check this box, and instead transfer the changes manually. In this manner, one can make changes, test them, and by using the manual transfer capability either update the other host, or use the other host to revert both hosts to a previous configuration. Also, it reduces file corruption problems, which would be automatically transferred to both hosts if this box is checked.

Application Server Link screen

This area of the *System Setup* screen enables you to select an Applications Protocol Interface (API) link to an Dynamis Server providing database applications, such as Smart Calling Card or Smart Long Distance, or to provide integration with other types of servers. You can also select a communications port between the Host and up to eight VRUs.

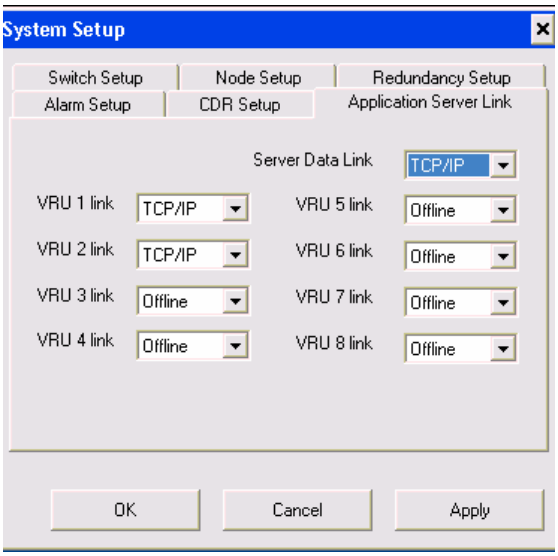


Figure 2-18
Application Server Link screen

Server Data Link list

This list indicates the desired server link for the Data Server. Click one of the following list items:

- Offline (default). No Data Server link connection.
- TCP/IP. For connecting the server over an Ethernet link. The Remote network name, Network IP address, and Well Known Port fields are displayed.
- NETBIOS. For connecting the server via NETBIOS. The Host network name and Remote network name as defined in the screen.

VRU *N* Link list

This list indicates the desired VRU link. You can connect up to eight VRUs to the Host. Click one of the following list items:

- Offline. No VRU link connection.
- TCP/IP. For connecting a VRU over an Ethernet link. The Remote network name, Network IP address, and Well Known Port fields are displayed.

Node Setup screen

This screen enables you to specify the IP address of all nodes in the system. While Redundancy Setup configures the IP addresses of the first node, if multiple nodes have been connected via EXNET, then all the IP addresses of the CPUs on the chassis must be configured using this screen. In the example below, there are two chassis connected via EXNET, with each chassis having one CPU card.

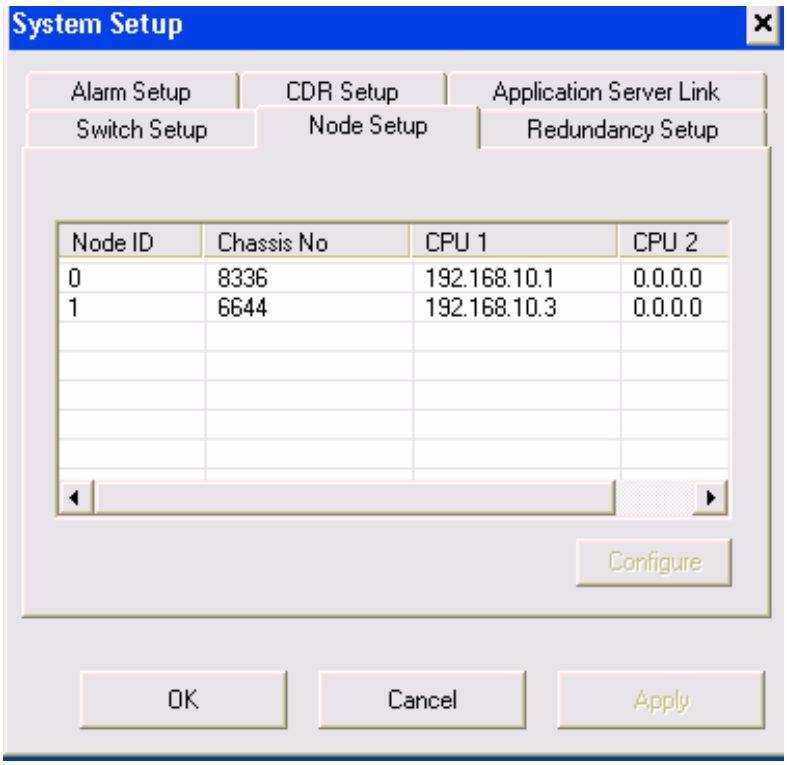


Figure 2-19
Node Setup screen

Highlight the node ID and click on the Configure button. The following screen appears. In this example, this shows the IP address of the single CPU (192.168.10.1) in node 0, and the IP address of the single CPU in node 1 (192.168.10.3), thus this reflects a two-switch system, both switches with nonredundant CPUs.

Note: contact your E2 Eagle representative for assistance in setting up nodes.

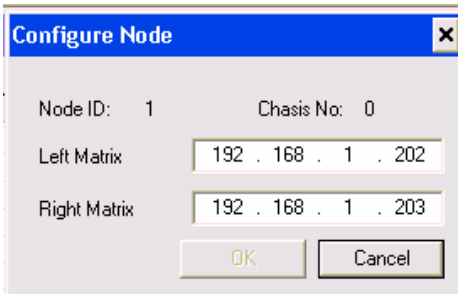


Figure 2-20
Configure Node screen

Software Download

Under the Administration Menu, there is the Software Download option, which allows for E1 PPL download, License Download, and Configuration Download.

E1 PPL Download screen

The E1 PPL Download screen enables you to download Programmable Protocol Language (PPL) signaling files to the EXS Switch. Excel Switch creates PPL files to tailor signaling used with E1 spans to match the variations found when connecting to different kinds of equipment in different countries.

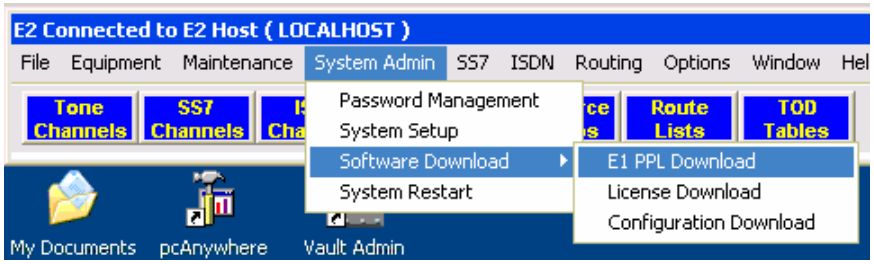


Figure 2-21
E1 PPL Download screen activation

You must copy custom PPL files to the Host's hard disk directory c:\dynamis\ppl_4x.raw. You must then download the files using the *E1 PPL Download* screen. The download operation takes a file from the hard disk directory into RAM for the Host which then loads the file into the EXS Switch.

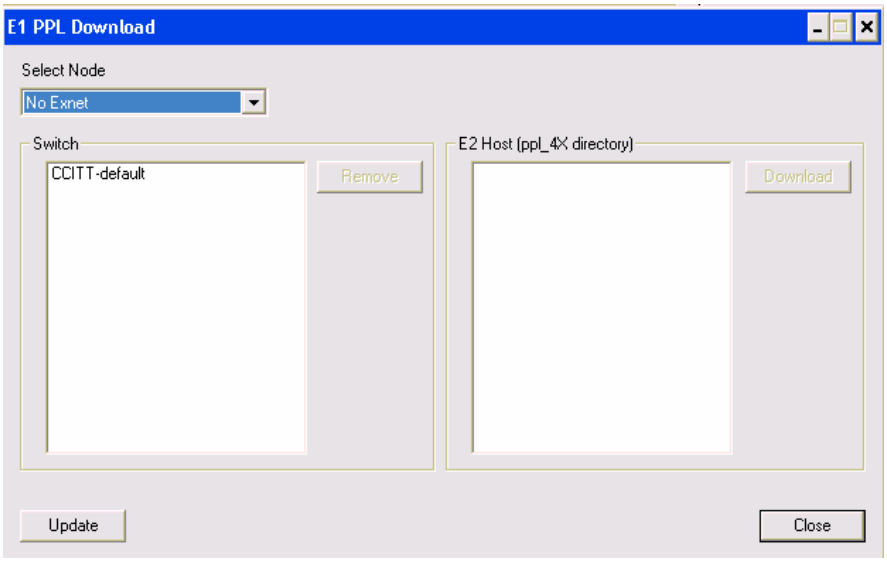


Figure 2-22
E1 PPL Download screen layout

On the System Admin menu, point to Software Download, and then click **E1 PPL Download** to activate this screen.

Downloading E1 PPL files

In the *E1 PPL Download* screen's **E2** field, click the custom PPL file you want to download to the EXS Switch, then click the DOWNLOAD button. A screen message notifies you when the download is complete.

The following fields appear in the *E1 PPL Download* screen:

Select Node list

This list indicates, in Exnet configurations, the node (EXS Switch) that will receive PPL files from the Host. In Exnet configurations, click a node ID from the list. If you are not using an Exnet configuration, the list defaults to **No Exnet.**

Switch field

This field indicates the PPL files on the EXS Switch. The default file is CCITT.

E1 PPL Download field

This field displays the PPL files available in the Host's hard disk directory

Switch Software Download screen

The *Switch Software Download* screen enables you to download new or existing System Software (PSOS's operating system) to the Matrix CPU card.

Warning

Dynamis, or WCS should be contacted prior to using this option. Certain versions of the Switch Software are only compatible with specific Excel hardware versions.

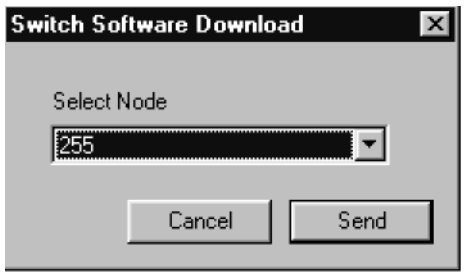


Figure 2-23
Software Download screen layout

On the System Admin menu, point to Software Download, then click **Switch Software Download** to activate this screen.

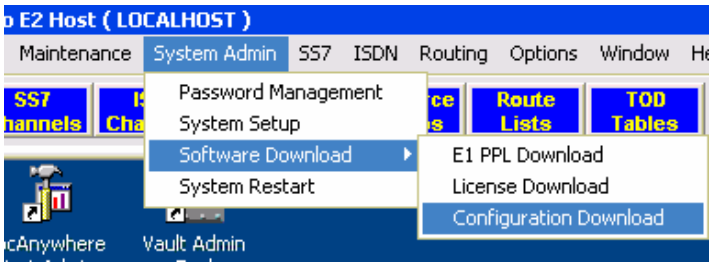


Figure 2-24
Switch Software Download activation

Downloading Switch Software

In the *Switch Software Download* screen's **Select Node** list, select the node ID of the EXS Switch that will receive the System Software, then click the SEND button.

Note—In Exnet configurations, click the node ID of the switch that will receive the System Software. If the configuration is not Exnet, the default node ID is 255.

For CPU versions 1.09 and lower, the download files must be located in the location excel_4X, with a PSOS4X.BIN.file.

For CPU versions 1.10 and higher, use of BootP and TFT server is required – refer to your E2 Software representative.

License Download screen

The *License Download* screen enables you to download the LICENSE.CFG file to the EXS Switch. The LICENSE.CFG file determines what functionality Excel Switching provides in your EXS Switch.

When you start the Host to communicate with an Excel Switch that is running Switch Software version 5.4 or higher, the startup process reads the LICENSE.CFG file in the Host Computer's \files subdirectory. This file determines what functionality the EXS Switch will offer you. If you do not find expected functionality on completion of the startup process, or if you contract for additional functionality after starting and configuring Switch Software version 5.4 or higher, you must download the LICENSE.CFG to the EXS Switch.

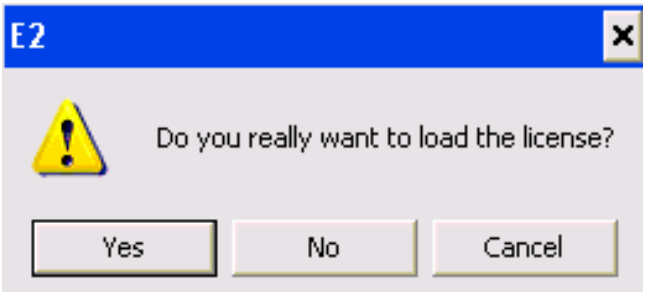


Figure 2-25
License Download screen layout

On the System Admin menu, point to Software Download then click **License Download** to activate this screen.

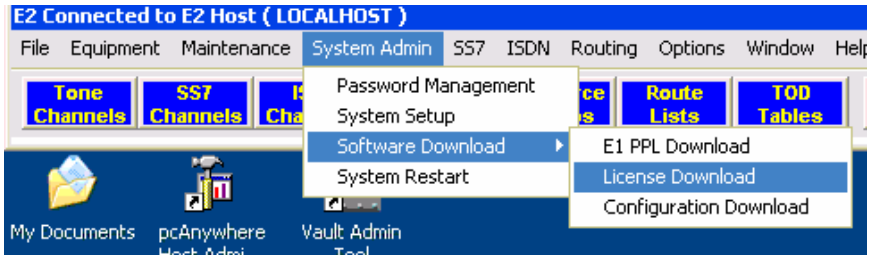


Figure 2-26
License Download screen activation

Downloading the LICENSE.CFG file

On the System Admin menu, point to Software Download then click **License Download**. In the resulting *License Download* screen, click the YES button to download the LICENSE.CFG file to the EXS Switch.

Backing up System Related Files

You should back up all system related files on a regular basis using the Windows NT File Manager. These files are stored in the Host computer's FILES_4X subdirectory.

Sample data, log, system, and E2E files are listed on the following pages:

Data files

Data files are identified by the .DAT filename extension. Data files are updated when changes are made through the Routing Tables or System Admin functions of the Host. The data files within the Host are as follows:

CALBACKxx.DAT
If using the Callback application, contains the VRU route list and other Callback information.

DNIS_xx.DAT
Contains user-definable Digit Table information (where xx is an index number used by the Trunk Assignment/Digit Tables).

EXCLU_xx.DAT
Contains user-definable Exclusion Table information (where xx is an index number used by the Trunk Assignment/Digit Tables).

IDS.DAT
Contains the conference IDs to be deleted on startup.

MUSIC.DAT
Contains trunk assignments for Music On Hold.

OUTGRP4X.DAT
Contains user-definable outgoing Resource Group information.

QUEUE1.DAT
Contains user-definable queue list table information.

ROUTELS1.DAT
Contains user-definable route list table information.

STAGE_II.DAT
Contains ANI xlate stage II digit information (maximum of 30 available).
Note: This is an enhancement, as previous versions only allowed 10

TAC4NAME.DAT
If using the TAC application (now marketed as Smart Calling Card), contains user-definable TAC accounts.

TOD_GRP.DAT
Contains user-definable Time of Day group information.

VRU900.DATC
Contains the VRU route list and branding number information for 900 completion type.

Log files

Log files are identified by the .LOG filename extension. Some log files can become very large and use up valuable hard disk space. The log files within the Host are as follows:

ADMIN.LOG
Contains critical error information.

ALARM.LOG
Records switch and VRU alarm events.

CDR.LOG
Records critical events regarding Call Detail Records.

CALLPROC.LOG
Records critical events regarding call processing.

DHI.LOG
Records critical events regarding routing.

EXIT.LOG
Records software exit information.

FUNCT.LOG
Records critical events regarding the Host tasks.

HARDWARE.LOG
Records critical events regarding physical aspects of the EXS Switch.

LAUNCHER.LOG
Records critical events regarding the startup of the Host tasks.

MAINT.LOG
Records critical events regarding logical aspects of the EXS Switch

NETWORK.LOG
Records critical events regarding the Dynamis Server applications and the VRU.

OPERATOR.LOG
Records critical events regarding the user interface.

STARTUP.LOG
Records critical events regarding logical aspects of the EXS Switch on startup.

SWITCH.LOG
Contains normal debug log file information for call processing (must be turned on/ off from the Maintenance menu).

SWITCH1.LOG
Contains archived debug log file information.

System files

System files are identified by the .SYS filename extension. The system files within the Host are as follows:

ACCT_4X.SYS
Contains ANI/Account code trunk assignments.

E24.SYS
Contains login passwords.

BDHARD5X.SYS
Contains the board status messages and cable ID information.

CCC_CODE.SYS
Contains a list of the country codes.

CIC_CODE.SYS
Contains Carrier Identification Code (CIC) information.

DNIS_TBL.SYS
Contains DNIS files and trunk assignments information.

FILESXFE1.SYS
Contains redundancy files that update the other host.

ISDN_B1.SYS
Contains the ISDN B Channel information.

ISDN_D2.SYS
Contains the ISDN D Channel information.

ISDNbmsg.SYS
Contains information for identically configured ISDN-B Channels.

OPERATOR SYS
Contains supervisor and attendant references.

PORT_5X.SYS
Contains all the trunk information for each span and channel.

PORT_TMR.SYS
Contains the trunk timer information for all span and channels.

TMR_4X.SYS
Contains information used by Startup to configure the timers.

XCLUE. SYS
Contains exclusion files and trunk assignments information.

E2E files

E2 files are identified by the .E2E filename extension. The E2 files within the Host are as follows:

E21_NT.E2E
Contains task module names for message passing.

E22_NT.E2E
Contains startup messages for all tasks.

E23.E2E
Contains operator menus for the system.

E24_3X.E2E
Contains operator text strings for the system.

E25_NT.E2E
Contains operator text popup menus for the system.

E26_3X.E2E
Contains

operator prompts for the system.

CALL_CMP.E2E
Contains call completion types information.

IN_GRP_4X.E2E
Contains incoming start dial information.

3. Monitoring Equipment

Introduction

The Host's chief function is to instruct the EXS Switch to put a call coming into the switch onto a trunk leaving the switch in a manner that will cause the call to reach its intended destination.

For the Host to perform this function, you must:

- know what resources you have in your EXS Switch,
- put these resources into service with required configurations,
- assure these resources are in a proper state, and
- be able to take these resources out of service for reconfiguration or replacement.

These resources take the form of hot-swappable components (including various cards of surface-mounted electronic devices) that are inserted into slots of a rack-mountable chassis. This chassis can be one of two form-factors: the EXS 1000 (formerly, the CSN) and the higher-capacity EXS 2000 (formerly, the LNX).

Each chassis has a midplane into which processing cards of various kinds are plugged from a front entry and into which I/O cards for these processing cards are plugged from a rear entry to form, in some cases, card-pairs. Some of these I/O cards (namely, those paired with T1 or E1 "line" or "network interface" cards) are points of attachment for cables from voice networks of local exchange and interexchange carriers and perhaps also from data networks; other I/O cards are actually HDLC devices to make certain processing cards (namely, ISDN and SS7 "common channel signaling" cards) redundant. One of these processing cards (namely, the EXNET Controller card) is a point of attachment for EXNET cables from other chassis that make up a multi-node EXS Switch.

You manage most of these resources or components in screens accessed from the *Equipment List* screen.

Equipment List

The *Equipment List* screen enables you to determine the distribution of components in your single-node or multinode EXS Switch, as well as to access screens that display the current status of these components and give you a means to put and take these components into and out of service, if not configure them.

Card-related icons

The Equipment List screen uses various icons to represent equipment that may be installed in your EXS Switch:

 icon. This icon represents various models of the digital signal processing card (see ***DSP Card*** for details on the functionality, monitorability and configurability of this kind of card). Associated with this icon is the node (if a multinode EXS Switch) and slot number where the specified card resides.

 icon. This icon represents various models of the E1 card (see ***E1 Card*** for details on the functionality, monitorability and configurability of this kind of card). Associated with this icon is the node (if a multinode EXS Switch) and slot number where the specified card resides, together with this card' parenthetically listed span IDs.

 icon. This icon represents the EX/CPU card (see ***EX/CPU Card*** for details on the functionality, monitorability and configurability of this kind of card). Associated with this icon is the node (if a multinode EXS Switch) and slot number where the specified card resides.

 icon. This icon represents the EXNET Controller card (see ***EXNET Controller card*** for details on the functionality of this kind of card). Associated with this icon is the node and slot number where the specified card resides, together with the ID of the ring of which it is a part, the number of packets it transfers per timeslot and an indication of whether the card both transmits ("X") and receives ("R") or just receives.

 icon. This icon represents various models of the fan tray (see ***Fan Tray*** for details on the functionality, monitorability and configurability of this fan tray). Associated with this icon is the node (if a multinode EXS Switch) and slot number where the specified fan tray resides.

 icons. The first icon represents the ISDN PRI card (see ***ISDN PRI Card*** for details), with the card in service. The second indicates the card is out of service. New to 2007, out of service cards may be configured. Associated with this icon is the node (if a multinode EXS Switch) and slot number where the specified card resides.

 icon. This icon represents the chassis (or node, in a multinode EXS Switch) and/or the chassis's (or node's) midplane (see ***Midplane*** for details on the functionality of this kind of card). Associated with this icon is the node (if a multinode EXS Switch) and logical slot number of the midplane, together with the chassis serial #.

 icon. This icon represents the power supply card (see ***Power Supply Card*** for details on the functionality, monitorability and configurability of this kind of card). Associated with this icon is the node (if a multinode EXS Switch) and slot number where the specified card resides.

 icon. This icon represents the SS7 card (see ***SS7 Card*** for details on the functionality, monitorability and configurability of this kind of card). Associated with this icon is the node (if a multinode EXS Switch) and slot number where the specified card resides.

 icon. This icon represents various models of the T1 card (see ***T1 Card*** for details on the functionality, monitorability and configurability of this kind of Card). Associated with this icon is the node (if a multinode EXS Switch) and slot number where the specified card resides, together with this card' parenthetically listed span IDs.

Two other icons indicate you have a serious problem with a card or a disparity between the configuration file in your Host and the actual configuration in your EXS Switch.

 icon. This icon indicates **a non-functioning card**. This card could not initialize and report itself to the EX/CPU card and therefore the Host. To regain this card's functionality, you must replace it.

 icon. This "X" icon indicates that a card recorded in your Host's configuration file, but the **card is not present** in your EXS Switch. This typically occurs when a person has removed a card without first stopping the software.

Host's configuration file (and "X" icon)

Not only does the Host's configuration file record the actual distribution of components in the EXS Switch, this file also holds data of configurations you have made for each of these distributed components.

Should you need to pull a card from the EXS Switch, then reinsert it (or replace it with the same model) in the same location, the Host will automatically download that card's configuration data to the EXS Switch to effect configuration of that card (which will have lost its configuration on being pulled).

Note—Once a card is reinserted/replaced and configured, the "X" icon, which displays after pulling this card, will be replaced with the icon that represents the kind of card now present.

Should you put a different model of a card in the exact place of the same kind of card, the Host will automatically download the configuration data to the EXS Switch to effect configuration of that kind of card (which will not have a configuration).

Note—Once a different model is inserted and configured, the "X" icon, which displays after pulling the other model, will be replaced with the icon that represents the kind of card now present.

In the case of a T1/E1 card, automatic configuration will occur on available spans. For example, if a 16-span model replaces an eight-span model, the configuration of the eight-span model will be retained in the first eight spans of the 16-span model; if an eight-span model replaces a 16-span model, the configuration of the 16-span model's first eight spans will be retained in the eight-span model and the configuration of the remaining eight spans will be removed from the configuration file.

In the case of an SS7 card, automatic configuration will occur on available links. For example, if a 16-link model replaces an four-link model, the configuration of the four-link model will be retained in the first four links of the 16-link model; if an fourlink model replaces a 16-link model, the configuration of the 16-link model's first four links will be retained in the four-link model and the configuration of the remaining 12 links will be kept the configuration file until you remove them.

Should you replace a card with a different kind, the Host will automatically delete configuration data for the removed card from the configuration file and stand ready to accept configuration data you will create.

Note—Once a new card is inserted, the Host will display an icon representing the kind of card now present. If the card is configurable, you must configure it.

Should you want to pull a card from the switch and not replace it, you need only pull the card, then select the card in the *Equipment List* screen, now represented by an "X" icon, and press the DELETE key to remove its configuration data from the configuration file.

Viewing Equipment by Type

In View by Type mode, the *Equipment List* screen's **View by Type** field enables you to view components of the same kind regardless of their physical location. For example, the *Equipment List* screen will group EX/CPU cards in physical chassis or node 0 (0-33) and node 1 (1-32).

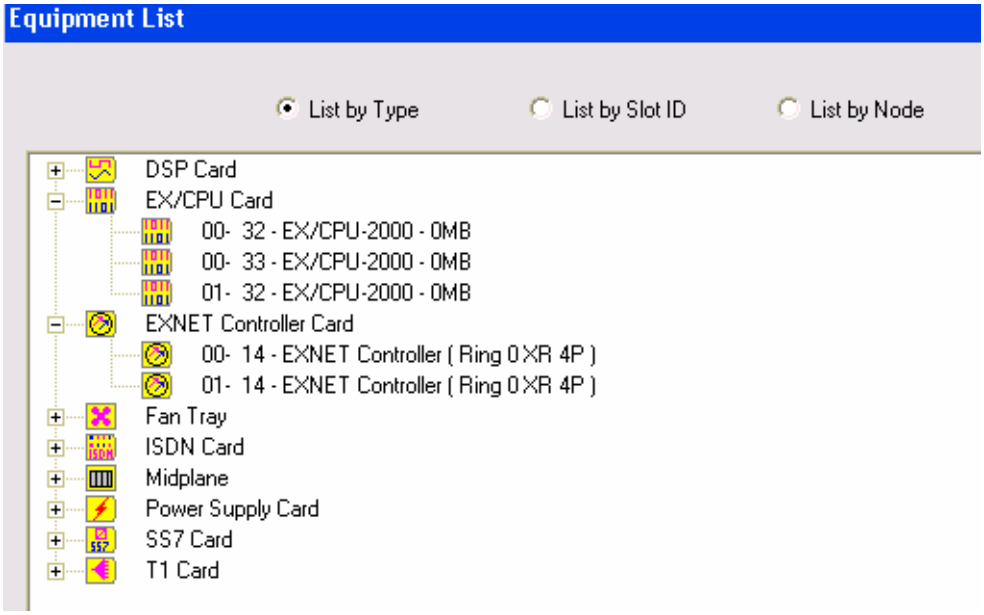


Figure 3-1
Equipment List screen layout (View by Type mode)

Clicking **List by Type** in the Main Menu/Tool Bar's Equipment menu will activate this screen and mode.

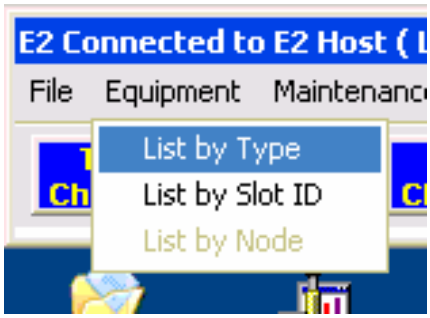


Figure 3-2
Equipment List screen activation (for View by Type mode)

Note—If you are already in the Equipment List screen in another mode, you can

also click the View by Type button to change the Equipment List screen to View by Type mode.

Viewing Equipment by Slot ID

In View by Slot ID mode, the *Equipment List* screen enables you to view equipment by the Slot ID, regardless of node, if in a multinode EXS Switch, or type, in numerical sequence.

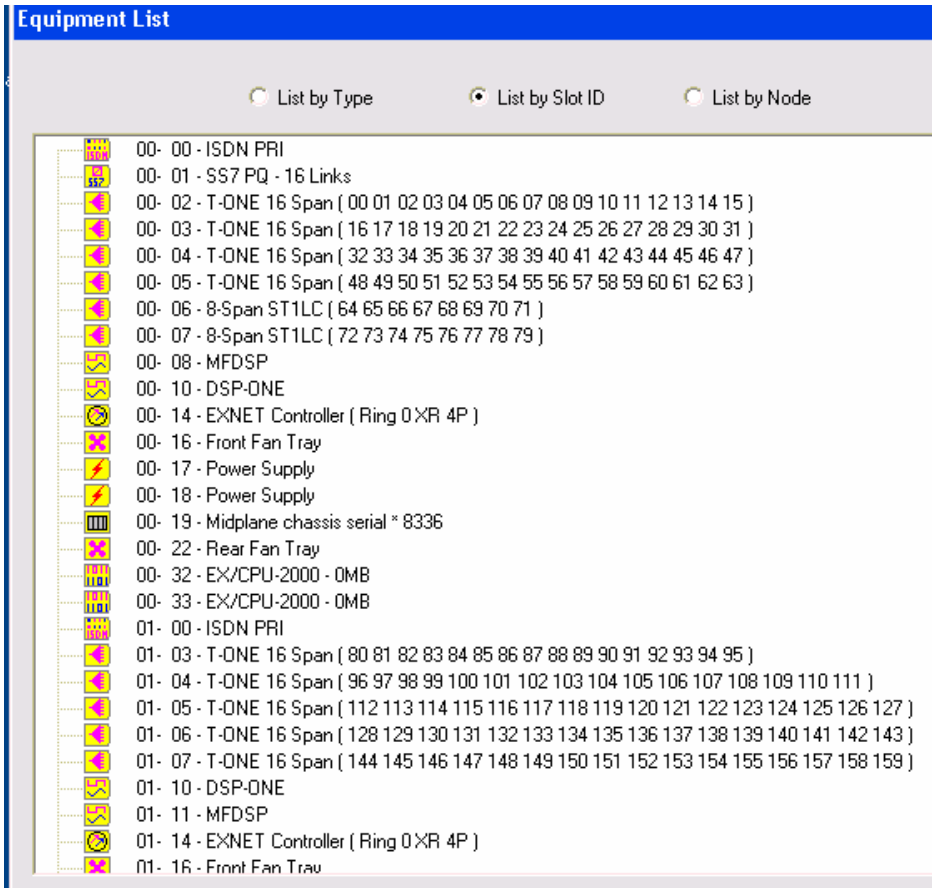


Figure 3-3
Equipment List screen layout (View by Slot ID mode)

Clicking **List by Slot ID** in the Main Menu/Tool Bar's Equipment menu will activate this screen and mode.

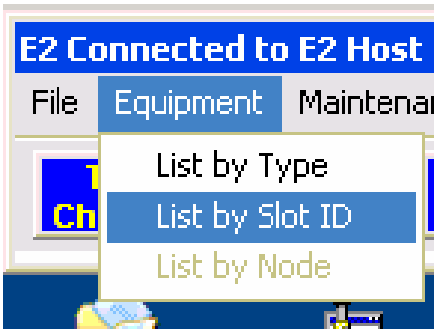


Figure 3-4
Equipment List screen activation (for View by Slot ID mode)

Note—If you are already in the Equipment List screen in another mode, you can also click the View by Slot ID button to change the Equipment List screen to View by

Slot ID mode.

Viewing Equipment by Node

In View by Node mode, the *Equipment List* screen enables you to view equipment by node in a fiberoptic ring configuration called EXNET.

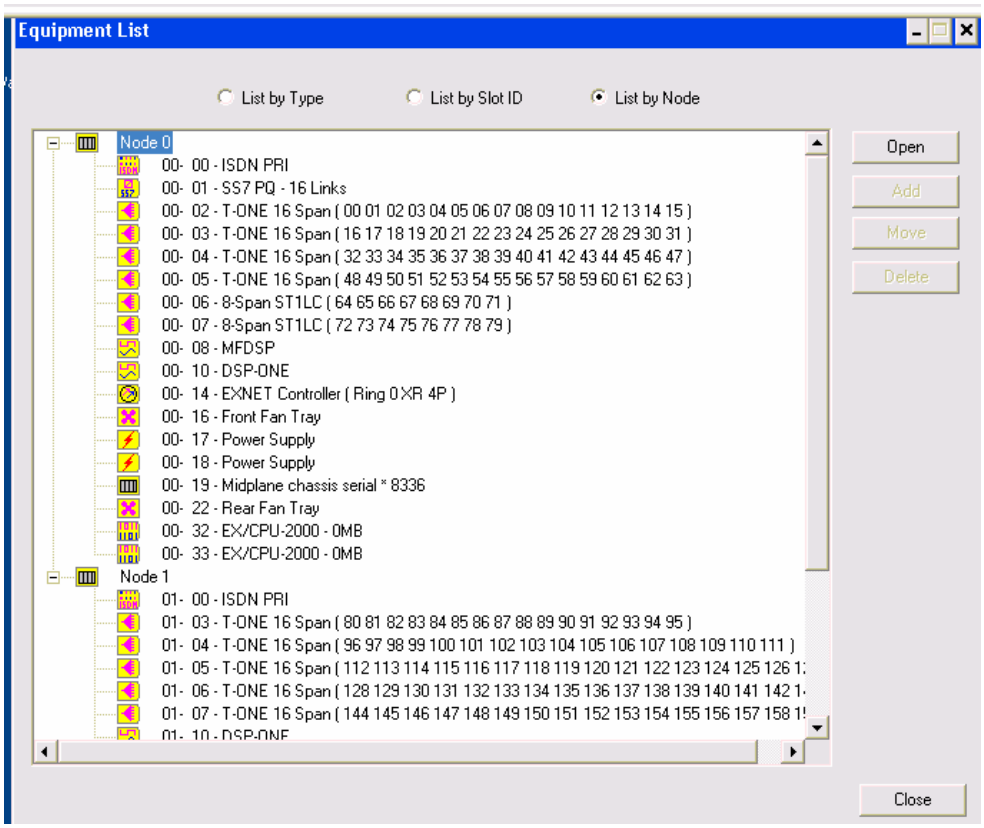


Figure 3-5
Equipment List screen layout (View by Node mode)

Clicking **List by Node** in the Main Menu/Tool Bar's Equipment menu will activate this screen and mode.

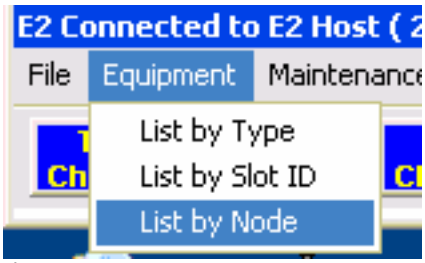


Figure 3-6
Equipment List screen activation (for View by Node mode)

Note — If you are already in the Equipment List screen in another mode, you can also click the View by Node button to change the Equipment List screen to View by Node mode.

This mode is available only if you have configured an EXNET ring.

Power Supply Card

The power supply card's purpose is to take in -48V DC from an external power source and put out 5V DC from each of its power modules (the EXS 1000 chassis' power supply has one module; the EXS 2000 chassis' power supply has three modules).

You cannot make power supply cards redundant. However, you can put an additional power supply card in the same node of your EXS Switch and wire it to the same or, more securely, to a different - 48V DC power source (see Excel Switching's ***Hardware installation and Maintenance Guide*** for details). The second power supply card's voltage will be pooled with the first. Should one power supply card fail, the EXS chassis can still have sufficient power from the other.

The *Power Supply Card* screen enables you to view the status of a power supply card.

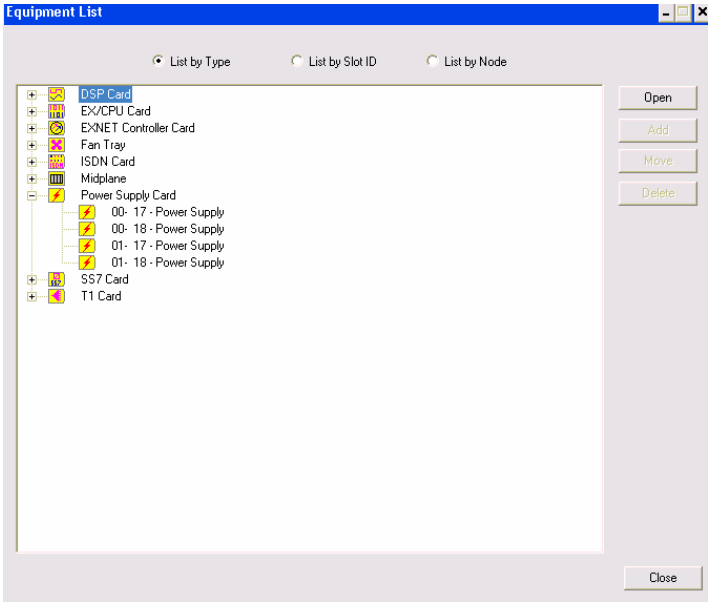


Figure 3-7
Power Supply Card screen layout

You can activate this screen by clicking **Power Supply Card** in the *Equipment List* screen's View by Type mode, then double-clicking a listed power supply card; or by clicking a listed power supply card in the *Equipment List* screen's View by Slot ID mode; or by clicking a selected node in the *Equipment List* screen's View by Node mode, then double-clicking a listed power supply card.

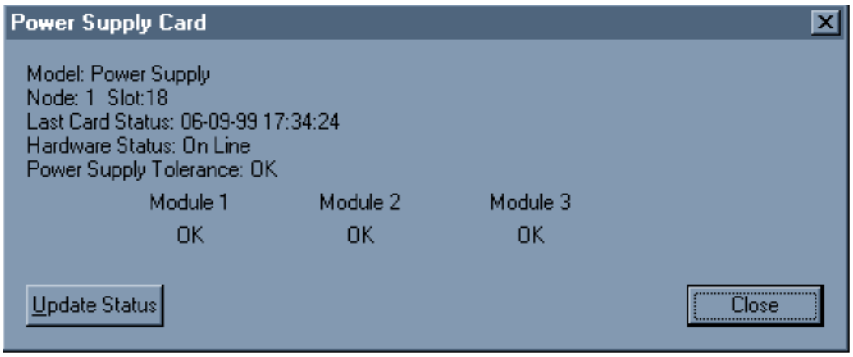


Figure 3-8
Power Supply Card screen activation (View by Type mode)

The following information appears in the *Power Supply Card* screen:

Model line

This line indicates the model of this power supply card.

Node/Slot line

This line indicates the node in the EXS Switch and slot (in the node's chassis) where this power supply card resides.

Note—In a single-node EXS Switch, "Node" does not display; in a multinode EXS Switch, "Node" will display together with an automatically-generated number identifying the node.

A chassis' power supply card is associated with slot 17 and/or 18.

Last Card Status line

This line indicates (in MM-DD-YY HH:MM:SS format) when this power supply card's status was last updated.

Hardware Status line

This line indicates whether this power supply card is in service. One of the following messages will occur:

- On Line. This card is providing power to the chassis.
- Off Line. This card is not providing power to the chassis. If you want to regain backup power, you must swap this card and call Dynamis' Customer Engineering immediately.

Module n line

This line indicates whether the numbered power supply module is supplying power to the chassis within tolerance. One of the following messages will occur:

- OK. This module is providing power to the chassis that is within tolerance.
- FAILED. This module is providing power to the chassis that is out of tolerance.

Note—If this power supply card serves an EXS 1000 chassis, disregard the status of modules 2-3.

Warning

Not replacing a power supply card that has modules out of tolerance can damage call processing cards and cause their operation to cease. Excel Switching strongly advises you to replace a power supply card with one or more defective modules immediately.

Updating card status

Clicking the *Power Supply Card* screen's UPDATE STATUS button after this screen has been active for a while will query this power supply card again to determine its current status, then display this status in the *Power Supply Card* screen.

Midplane

The chassis midplane's purpose is to provide various data and other buses that can:

- distribute power from the power supply to all cards in the chassis
- join I/O cards with the processing cards in the chassis that control them
- join redundant processing cards
- make I/O cards available to other nodes on an EXNET ring

The *Midplane* screen enables you to view the status of the midplane.

Figure 3-9
Midplane screen layout

You can activate this screen by clicking **Midplane** in the *Equipment List* screen's View by Type mode, then double-clicking a listed midplane; or by clicking a listed midplane in the *Equipment List* screen's View by Slot ID mode; or by clicking a selected node in the *Equipment List* screen's View by Node mode, then doubleclicking a listed midplane.

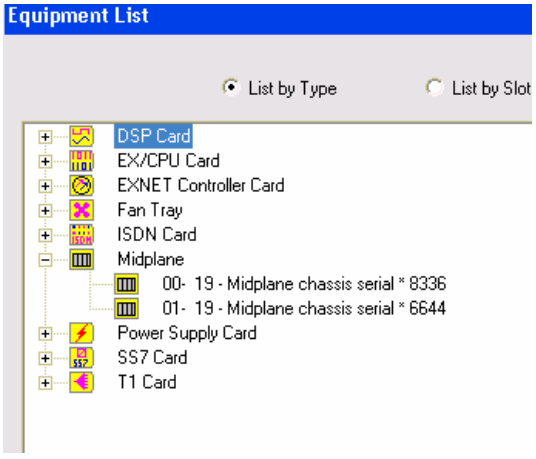


Figure 3-10
Midplane screen activation (View by Type mode)

The following information appears in the *Midplane* screen:

Model line

This line indicates the model of this midplane.

Node/Slot line

This line indicates the node in the EXS Switch and slot (in the node's chassis) where this midplane resides.

Note—In a single-node EXS Switch, "Node" does not display; in a multinode EXS Switch, "Node" will display together with an automatically-generated number identifying the node.

A chassis' midplane is associated with logical slot 19.

Last Card Status line

This line indicates (in MM-DD-YY HH:MM:SS format) when this midplane's status was last updated.

Chassis Serial line

This line indicates the serial number of the midplane.

Updating midplane status

Clicking the *Midplane* screen's UPDATE STATUS button after this screen has been active for a while will query this midplane again to determine its current status, then display this status in the *Midplane* screen.

Fan Tray

The fan tray's purpose is to mount multiple fans in your EXS Switch chassis. These fans force the chassis' warm air into its environs and draw the environ's relatively cooler air into the chassis to maintain the chassis's required operating temperature.

The *Fan Tray* screen enables you to view the status of a fan tray's multiple fans.

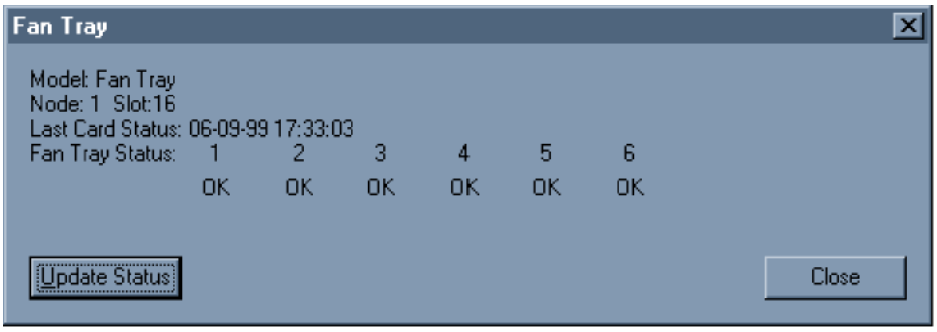


Figure 3-11
Fan Tray screen layout

You can activate this screen by clicking **Fan Tray** in the *Equipment List* screen's View by Type mode, then double-clicking a listed fan tray; or by clicking a listed fan tray in the *Equipment List* screen's View by Slot ID mode; or by clicking a selected node in the *Equipment List* screen's View by Node mode, then double clicking a listed fan tray.

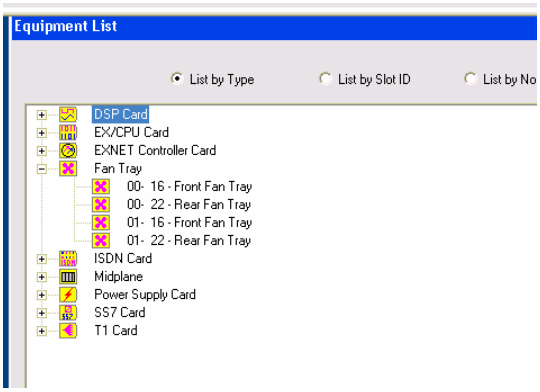


Figure 3-12
Fan Tray screen activation (View by Type mode)

The following information appears in the *DSP Card* screen:

Model line

This line indicates the model of this fan tray. Current models include:

- Fan Tray. This tray mounts six fans in the EXS 1000 chassis.
- Front Fan Tray. This tray mounts four fans in the EXS 2000 chassis's underside (accessed from the chassis' front).
- Rear Fan Tray. This tray mounts three fans in the EXS 2000 chassis's topside (accessed from the chassis' rear).

Node/Slot line

This line indicates the node in the EXS Switch and slot (in the node's chassis) where this fan tray resides.

Note—*In a single-node EXS Switch, "Node" does not display; in a multinode EXS Switch, "Node" will display together with an automatically-generated number identifying the node.*

An EX 1000 chassis' fan tray is associated with logical slot 16; an EX 2000 chassis' front fan tray is associated with logical slot 10 and its rear fan tray is associated with logical slot 22.

Last Card Status line

This line indicates (in MM-DD-YY HH:MM:SS format) when this fan tray's status was last updated.

Fan Tray Status line

This line indicates whether the numbered fan in its tray is in service. One of the following messages might occur:

- OK. This numbered fan is in service.
- FAILED. This numbered fan is not in service.

Note—*If this fan tray is an EX 2000 chassis' front fan tray, disregard the status of fans 5-6; if this fan tray is an EX 2000 chassis' rear fan tray, disregard the status of fans 4-6.*

Failure of a single fan will not usually endanger call processing or the cards performing this activity.

Warning

Not replacing failed fans will cause heat to build up inside the chassis; this buildup of heat will eventually damage call processing cards and cause their operation to cease. Excel Switching strongly advises you to replace failed fans immediately.

Updating fan tray status

Clicking the *Fan Tray* screen's UPDATE STATUS button after this screen has been active for a while will query this fan tray again to determine its current status then display this status in the *Fan Tray* screen.

DSP Card

The DSP card's purpose is to generate and receive tones (DTMF, MFR1, MFR2 CPA, CPG and bong) that can:

- represent address digits for routing a call within its channel,
- indicate the call's progress (for example, with dial tone or ringback), and/or
- prompt the caller for an action.

Another purpose of the DSP card is to provide a bridge for conferences of callers who can both speak and listen, and/or just listen.

To provide a node in your EXS Switch with particular tone or conferencing capabilities, you must select and assign these capabilities one for each of four digital signal processors on up to four SIMMs (single inline memory modules) per DSP card (16 DSPs maximum).

You cannot make DSP cards redundant. However, you can put an additional DSP card in the same node of your EXS Switch and its DSP resources will be pooled with the other. Should one DSP card fail, you can still have necessary support if the other DSP card's DSPs have been configured like the lost DSPs.

The *DSP Card* screen enables you to view the status of a DSP card, as well as to assign tone and conferencing capabilities to DSPs of the card.

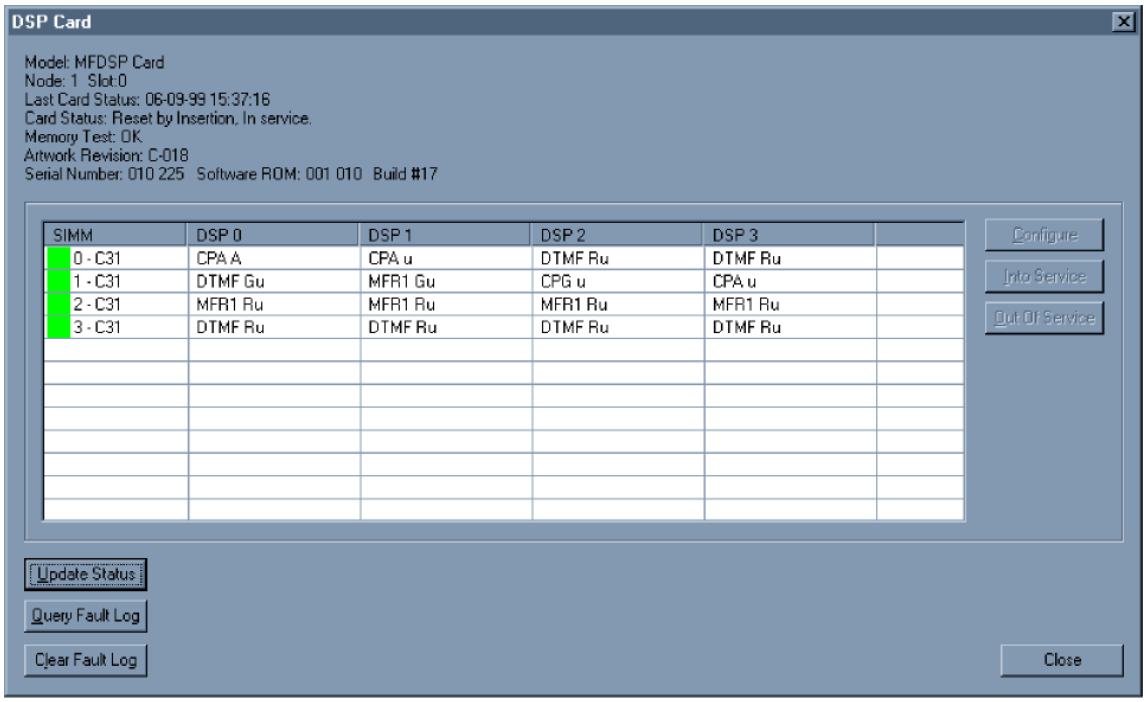


Figure 3-13
DSP Card screen layout

*Note—The DSP Card screen shows a **green icon** in the leftmost column when an adjacent SIMM is in service. A **red icon** displays when a SIMM is not in service.*

You can activate this screen by clicking **DSP Card** in the *Equipment List* screen's View by Type mode, then double-clicking a listed DSP card, or by clicking a listed DSP card in the *Equipment List* screen's View by Slot ID mode, or by clicking a selected node in the *Equipment List* screen's View by Node mode, then double clicking a listed DSP card.

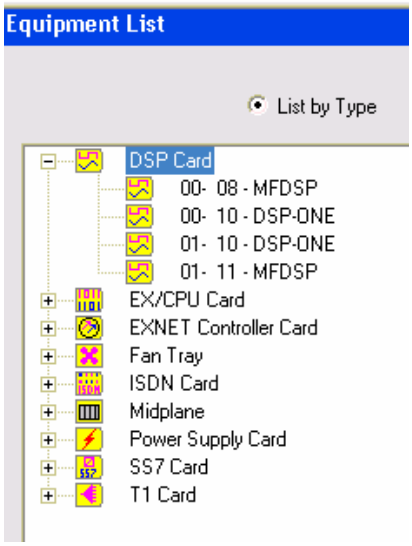


Figure 3-14
DSP Card screen activation (View by Type mode)

The following information appears in the *DSP Card* screen:

Model line

This line indicates the model of this DSP card. Current models include:

- DSP-ONE
- MFDSP

Node/Slot line

This line indicates the node in the EXS Switch and slot (in the node's chassis) where this DSP card resides.

Note — In a single-node EXS Switch, "Node" does not display; in a multinode EXS Switch, "Node" will display together with an automatically-generated number identifying the node.

Last Card Status line

This line indicates (in MM-DD-YY HH:MM:SS format) when this DSP card's status was last updated.

Card Status line

This line indicates whether this DSP card is in service, has suffered faults, has good memory and/or has good configuration data, as well as how it was last reset. One or more of the following messages might occur:

- Reset by insertion. An insertion of this DSP card in the chassis caused this card's last reset.
- Reset by software. A taking of this DSP card out of service then putting it back in service from the Host, or a powering down then up of the entire chassis, or a fault in this card caused this card's last reset.
- Reset by button. A push of this DSP card's RESET button caused this card's last reset.
- OUT OF SERVICE BY SWITCH. An EX/CPU card has reported this DSP card to be out of service. If this card's dipswitch 3 is set to ON, if another DSP card does not have this same message, and if resetting this card does not remove this message, you must swap this card and call Dynamis' Customer Engineering immediately.
- In service. This DSP card is in service.
- CONFIG DATA INVALID. The configuration data for this DSP card has been lost and has not been downloaded from the Host.
- FAULTS LOGGED. One or more faults have occurred in this DSP card. You must retrieve this card's Fault Log (see Querying Fault Log, below), then report its contents to Dynamis' Customer Engineering immediately.
- MEMORY TEST FAILED. This DSP card has failed a self-test of its memory. You must determine whether the card has a ROM or RAM problem (see Memory Test line, below).
- CARD FAILURE. This DSP card failed for an unspecified reason. If resetting this card does not remove this message, you must call Dynamis' Customer Engineering immediately.

Memory Test line

This line indicates the result of a self-test at the last status update of the integrity of ROM and RAM devices on this DSP card. The following messages can occur:

- OK. Test proved memory was reliable.
- ROM CHECKSUM FAILED. Test proved read-only memory was unreliable. You must swap the card and call Dynamis' Customer Engineering immediately.
- RAM TEST FAILED. Test proved random access memory was unreliable. If resetting this card does not remove this message, you must call Dynamis' Customer Engineering immediately.

Artwork Revision line

This line indicates the revision level of this DSP card's circuit design.

Serial Number line

This line indicates the serial number of this DSP card.

Software ROM line

This line indicates the major, then the minor revision of the ROM software (that is, the BIOS) installed on this DSP card.

Build # line

This line indicates the build number of the RAM software (that is, the System Software, sometimes called pSOS) downloaded from an EX/CPU card to this DSP card.

Note—The Switch Status screen displays the actual version of this software.

Updating card status

Clicking the *DSP Card* screen's UPDATE STATUS button after this screen has been active for a while will query this DSP card again to determine its current status, then display this status in the *DSP Card* screen.

Querying Fault Log

Clicking the *DSP Card* screen's QUERY FAULT LOG button displays this DSP card's Fault Log (see ***Fault Log query [with fault]*** for an EX/CPU card's Fault Log example).

Clearing Fault Log

Clicking the *DSP Card* screen's CLEAR FAULT LOG button clears this DSP card's Fault Log and resets the number of faults to zero (zero also appears when no faults are detected on a query) (see ***Fault Log cleared [or clear] of faults*** for an EX/CPU card's Fault Log example).

Putting SIMM into service

Clicking the *DSP Card* screen's INTO SERVICE button makes the selected SIMM available for call processing. A green icon indicates that the SIMM is in service.

Putting SIMM out of service

Clicking the *DSP Card* screen's OUT OF SERVICE button makes the selected SIMM unavailable for call processing.

Configuring DSPs

Selecting a displayed SIMM in the *DSP Card* screen, then clicking the CONFIGURE button after clicking the OUT OF SERVICE button enables you to configure DSPs on that SIMM.

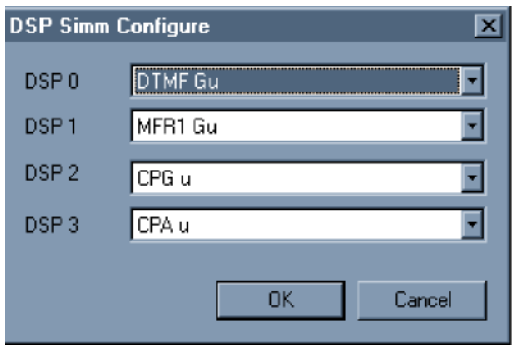


Figure 3-15 DSP
SIMM Configure screen layout

The following information appears in the *DSP SIMM Configure* screen:

DSP*n* lists

These lists indicate how a selected digital signal processor handles bong, CPA, CPG, DTMF, MFR1 and MFR2 tone signaling, or how it handles conferences of callers who can both speak and listen as well as callers who can only listen. Your ***required*** input is limited to the following choices:

- Bong A. DSP can simultaneously generate a bong tone prompt subject to A-law on up to 16 channels (if DSP-ONE model) or six channels (if MFDSP model) per node of your EXS Switch.
- Bong u. DSP can simultaneously generate a bong tone prompt subject to µ-law on up to 16 channels (if DSP-ONE model) or six channels (if MFDSP model) per node of your EXS Switch.
- Conf Mixed. DSP can support up to 34 simultaneous Conferences bridging four/seven speakers/listeners (if DSP-ONE model) or only one Conference bridging four/seven speakers/listeners (if MFDSP model) subject in part to A-law and in part to µ-law.
- Conxfer u. DSP can support up to 14 simultaneous Conferences bridging four/ seven speakers/listeners and a channel-limited number of listeners (if DSP-ONE model) or only one Conference bridging four/seven speakers/ listeners and a channel-restricted number of listeners (if MFDSP model) subject to

  µ-law.
- Conxfer A. DSP can support up to 14 simultaneous Conferences bridging four/seven speakers/listeners and a channel-limited number of listeners (if DSP-ONE model) or only one Conference bridging four/seven speakers/ listeners and a channel-restricted number of listeners (if MFDSP model) subject to A-law.
- CPA A. DSP can simultaneously receive Call Progress Analysis signals subject to A-law on up to 20 channels (if DSP-ONE model) or 13 channels (if MFDSP model) per node of your EXS Switch.
- CPA u (default for DSP 3 on SIMM 1). DSP can simultaneously receive Call Progress Analysis signals subject to µ-law on up to 20 channels (if DSP-ONE model) or 10 channels (if MFDSP model) per node of your EXS Switch.
- CPG A. DSP can simultaneously generate Call Progress Tone Group signals subject to A-law on all channels per node of your EXS Switch.

- CPG u (default for DSP 2 on SIMM 1). DSP can simultaneously generate Call Progress Tone Group signals subject to µ-law on all channels per node of your EXS Switch.
- DTMF GA. DSP can simultaneously generate DTMF signals subject to A-law on all channels per node of your EXS Switch.
- DTMF Gu (default for DSPs 0 and 1 on SIMM 1). DSP can simultaneously generate DTMF signals subject to µ-law on all channels per node of your EXS Switch.
- DTMF RA. DSP can simultaneously receive DTMF signals subject to A-law on up to 22 channels (if DSP-ONE model) or 13 channels (if MFDSP model) per node of your EXS Switch.
- DTMF Ru (default for DSPs 0, 1, 2 and 3 on SIMM 0 and DSPs 0, 1, 2 and 3 on SIMM 3). DSP can simultaneously receive DTMF signals subject to µ-law on up to 22 channels (if DSP-ONE model) or 13 channels (if MFDSP model) per node of your EXS Switch.
- Energy Detect – Review your Escel Switching Hardware Manual or contact your E2 technical representative if you wish to use this feature
- MFR1 GA. DSP can simultaneously generate MFR1 signals subject to A-law on all channels per node of your EXS Switch.
- MFR1 Gu. DSP can simultaneously generate MFR1 signals subject to µ-law on all channels per node of your EXS Switch.
- MFR1 RA. DSP can simultaneously receive MFR1 signals subject to A-law on up to 45 channels (if DSP-ONE model) or 13 channels (if MFDSP model) per node of your EXS Switch.
- MFR1 Ru (default for DSPs 0, 1, 2 and 3 on SIMM 2). DSP can simultaneously receive MFR1 signals subject to µ-law on up to 45 channels (if DSP-ONE model) or 13 channels (if MFDSP model) per node of your EXS Switch.
- MFR2 GAB. DSP can generate MFR2 signals subject to A-law in response to signals received by its node of your EXS Switch.
- MFR2 GAF. DSP can simultaneously generate MFR2 signals subject to A-law on all channels per node of your EXS Switch.
- MFR2 GuB. DSP can generate MFR2 signals subject to µ-law in response to signals received by its node of your EXS Switch.
- MFR2 GuF. DSP can simultaneously generate MFR2 signals subject to µ-law on all channels per node of your EXS Switch.
- MFR2 RA. DSP can simultaneously receive MFR2 signals subject to A-law on up to 30 channels (if DSP-ONE model) or 13 channels (if MFDSP model) per node of your EXS Switch.
- MFR2 Ru. DSP can simultaneously receive MFR2 signals subject to µ-law on up to 30 channels (if DSP-ONE model) or 13 channels (if MFDSP model) per node of your EXS Switch.
- Monitor All. DSP supports up to 34 simultaneous Conferences bridging four/ seven speakers/listeners and a channel-limited number of listeners (if DSPONE model) or only one Conference bridging four/seven speakers/listeners and a channel-limited number of listeners (if MFDSP model) subject in part to A-law and in part to µ-law.

Note—*Receivers handle only a limited number of channels; you must add receivers in a quantity that will match the total number of incoming channels of your EXS chassis or your switch will drop calls for want of a receiver. Generators of each kind handle all channels of your EXS chassis; you need not add more than one kind of receiver unless you require redundancy of that kind; for redundancy, you should put the second generator of a given kind on another DSP card in the same chassis, or at least on a different SIMM of the same card.*

MFR2 RA, MFR2 GAB and MFR2 GAF must be on same DSP card, if on different SIMMs. MFR2 Ru, MFR2 GuB and MFR2 GuF must be on same DSP card, if on different SIMMs.

T1 Card

The T1 card's purpose is to convey up to 24 sampled and quantized voice calls (and perhaps call control data) over each T1 span of your EXS Switch to and from voice networks (and perhaps data networks) within North America.

To be conveyed over an T1 span, voice calls must first be setup for connection and finally torn down once completed. The setting up and tearing down of a voice call can occur through an exchange *within that call's channel* of the tones and bit indications that make up MFR1 "channel-associated" signaling (a DSP card must be present in T1 card's chassis for this kind of signaling; see ***DSP Card***).

Alternatively, the setting up and tearing down of a voice call can occur through an exchange *not in the call's channel but in a separate channel* of the data messages that make up either ISDN or SS7 "common channel" signaling (an ISDN or SS7 card must be present in T1 card's chassis for this kind of signaling; see ***ISDN PRI Card*** or ***SS7 Card***). A given ISDN or SS7 data channel carries setup/teardown messages that can control many voice channels at one time; SS7 channels, or links, occur in T1 spans connected to an SS7 data network rather than to the voice network.

T1 cards can be paired with either a standard I/O card, a redundant I/O card, or a standby I/O card. Provided you have another T1 card in the same chassis paired with a standby I/O card, any T1 card you have paired with a redundant I/O card can fail and its calls will handled by the T1 card paired with the standby I/O card. In this "N+1" redundancy, only one T1 card can fail per chassis. T1 cards paired with standard I/O cards cannot be made redundant.

The T1 Card screen enables you to view the status of a T1 card, as well as to bring its T1 spans in and out of service and to give "N+1" redundancy to the T1 card.

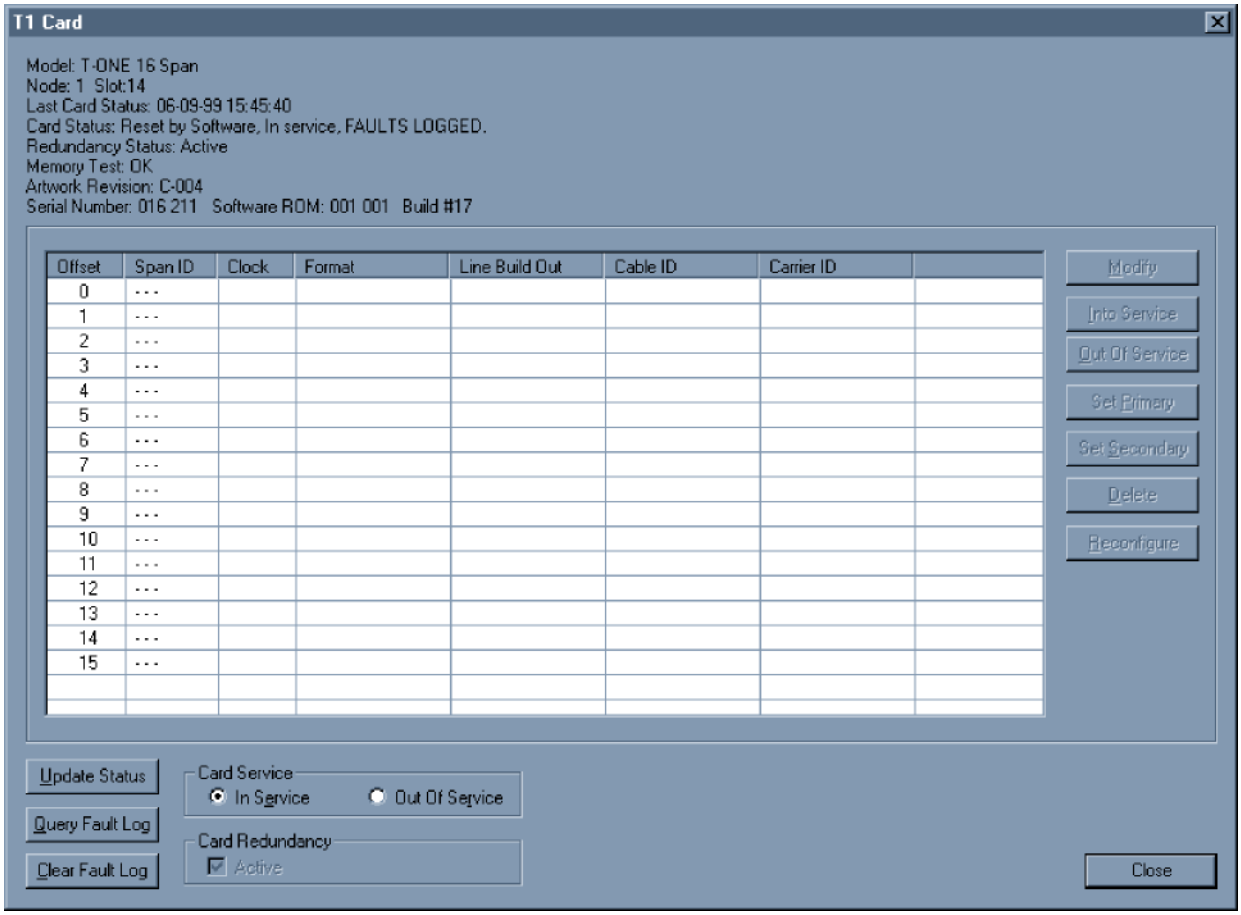


Figure 3-16
T1 Card screen layout

*Note—The T1 Card screen shows **no icon** in the leftmost column when the status of an adjacent offset on a card in service cannot be determined. An "**X**" **icon** displays when an offset has been in service but its card has been taken out of service, or when the Host has not been able to configure an assigned offset for some reason. An "!" **icon** displays when an offset's configuration is retained on the card but does not correspond to configuration data in the Host.*

You can activate this screen by clicking **T1 Card** in the *Equipment List* screen's View by Type mode, then double-clicking a listed T1 card, or by clicking a listed T1 card in the *Equipment List* screen's View by Slot ID mode, or by clicking a selected node in the *Equipment List* screen's View by Node mode, then double-clicking a listed T1 card.

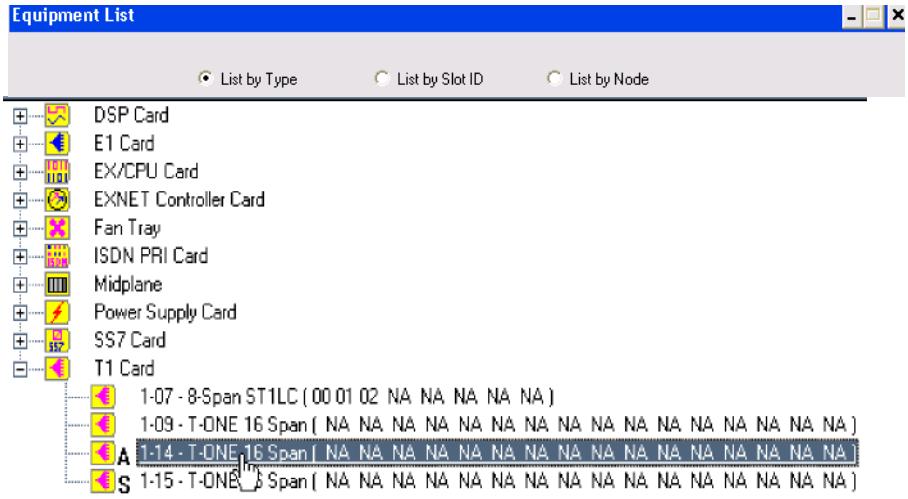


Figure 3-17
T1 Card screen activation

Note—The above figure shows redundant T1 cards. The highlighted card is active ("A"); one of the other T1 cards is standby ("S"); remaining T1 cards are paired with standard I/O cards and cannot be redundant.

The following information appears in the *T1 Card* screen:

Model line

This line indicates the model of this T1 card. Current models include:

- 4-Span ST1LC. This model supports 96 digital voice channels at 64 Kbps each.
- 8-Span ST1LC. This model supports 192 digital voice channels at 64 Kbps each.
- T-ONE 8-Span. This model supports 192 digital voice channels at 64 Kbps each.
- T-ONE 16-Span. This model supports 384 digital voice channels at 64 Kbps each.

Node/Slot line

This line indicates the node in the EXS Switch and slot (in the node's chassis) where this T1 card resides.

Note—In a single-node EXS Switch, "Node" does not display; in a multinode EXS Switch, "Node" will display together with an automatically-generated number identifying the node.

Last Card Status line

This line indicates (in MM-DD-YY HH:MM:SS format) when this T1 card's status was last updated.

Card Status line

This line indicates whether this T1 card is in service, has suffered faults, has good memory and/or has good configuration data, as well as how it was last reset. One or more of the following messages might occur:

- Reset by insertion. An insertion of this T1 card in the chassis caused this card's last reset.
- Reset by software. A taking of this T1 card out of service then putting it back in service from the Host, or a powering down then up of the entire chassis, or a fault in this card caused this card's last reset.
- Reset by button. A push of this T1 card's RESET button caused this card's last reset.
- Standby I/O present. This T1 card is associated with an "N+1" standby I/O card rather than a redundant I/O card and will handle traffic of a redundant I/O card associated with a failed T1 card if Redundancy Status (see below) is "Standby".

  Note—If Redundancy Status is "Non-redundant", you can click the OUT OF SERVICE button, then click the IN SERVICE button to change Redundancy Status to "Standby ".
- OUT OF SERVICE BY HOST. Someone has taken this T1 card out of service through the Host.
- OUT OF SERVICE BY SWITCH. An EX/CPU card has reported this T1 card to be out of service. If this card's dipswitch 3 is set to ON, if another T1 card does not have this same message, and if resetting this card does not remove this message, you must swap this card and call Dynamis' Customer Engineering immediately.
- In service. This T1 card is in service.
- CONFIG DATA INVALID. The configuration data for this T1 card has been lost and has not been downloaded from the Host.
- FAULTS LOGGED. One or more faults have occurred in this T1 card. You must retrieve this card's Fault Log (see Querying Fault Log, below), then report its contents to Dynamis' Customer Engineering immediately.
- MEMORY TEST FAILED. This T1 card has failed a self-test of its memory. You must determine whether the card has a ROM or RAM problem (see Memory Test line, below).
- CARD FAILURE. This T1 card failed for an unspecified reason. If resetting this card does not remove this message, you must call Dynamis' Customer Engineering immediately.

Redundancy Status line

This line indicates whether this T1 card was in a redundant mode (that is, matched with another card of the same kind in the same chassis, and either communicating with it or ready to communicate with it) and, if so, what relationship it had with the other card at the last status update. One of the following messages will occur:

- Non-redundant. This T1 card is not in redundant mode.
- Active. This T1 card is in redundant mode and is the card in control.

  Note—The letter "A" appears next to this card's icon in the Equipment List screen to indicate an active state.
- Standby. This T1 card is in redundant mode and is ready to take control if the active T1 card fails.

  Note—The letter "S" appears next to this card's icon in the Equipment List screen to indicate a standby state.
- Serving. This T1 card is in redundant mode and is providing service to a redundant I/O card whose associated T1 card has failed.

  Note—The letter "S" appears next to this card's icon in the Equipment List screen to indicate a serving state.

  If this T1 card is in a serving state, no other card in the chassis can be in this state; if another card is in this state, this T1 card cannot be in a serving state.
- Synchronizing. This T1 card is in redundant mode and is exchanging configuration data with the other T1 card.

  Note—If synchronization fails, this card will become non-redundant. An asterisk (*) appears next to this card's icon in the Equipment List screen to indicate a synchronizing state.
- FAIL. This T1 card has failed for an unspecified reason. If resetting this card does not remove this message, you must call Dynamis' Customer Engineering immediately.

  Note—The letter "F" appears next to this card's icon in the Equipment List screen to indicate a failed state.

Memory Test line

This line indicates the result of a self-test at the last status update of the integrity of ROM and RAM devices on this T1 card. The following messages can occur:

- OK. Test proved memory was reliable.
- ROM CHECKSUM FAILED. Test proved read-only memory was unreliable. You must swap the card and call Dynamis' Customer Engineering immediately.
- RAM TEST FAILED. Test proved random access memory was unreliable. If resetting this card does not remove this message, you must call Dynamis' Customer Engineering immediately.

Artwork Revision line

This line indicates the revision level of this T1 card's circuit design.

Serial Number line

This line indicates the serial number of this T1 card.

Software ROM line

This line indicates the major, then the minor revision of the ROM software (that is, the BIOS) installed on this T1 card.

Build # line

This line indicates the build number of the RAM software (that is, the System Software, sometimes called pSOS) downloaded from an EX/CPU card to this T1 card.

Note—The Switch Status screen displays the actual version of this software.

Updating card status

Clicking the *T1 Card* screen's UPDATE STATUS button after this screen has been active for a while will query this T1 card again to determine its current status, then display this status in the *T1 Card* screen.

Querying Fault Log

Clicking the *T1 Card* screen's QUERY FAULT LOG button displays this T1 card's Fault Log (see ***Fault Log query [with fault]*** for an EX/CPU card's Fault Log example).

Clearing Fault Log

Clicking the *T1Card* screen's CLEAR FAULT LOG button clears this T1 card's Fault Log and resets the number of faults to zero (zero also appears when no faults are detected on a query) (see ***Fault Log cleared [or clear] of faults*** for an EX/ CPU card's Fault Log example).

Putting T1 card in service

Clicking the *T1 Card* screen's IN SERVICE button makes this T1 card available for call processing.

Note—If you are putting the T1card in service after having configured it and taken it out of service, the Host will download the T1 configuration data the card lost when you took it out of service.

Putting T1 card out of service

Clicking the *T1 Card* screen's OUT OF SERVICE button makes this T1 card unavailable for call processing.

Note—You will want to take this card out of service if you need to test the card or if you discover the card is faulty. Taking this card out of service automatically clears all T1 configuration data and also takes voice channels out of service.

Returning T1 card to active status

Clicking the *T1 Card* screen's Active checkbox returns this once-failed T1 card back to active status.

E1 Card

The E1 card's purpose is to convey up to 30 sampled and quantized voice calls (and perhaps call control data) over each E1 span of your EXS Switch to and from voice networks (and perhaps data networks) outside North America and Japan.

To be conveyed over an E1 span, voice calls must first be setup for connection and finally torn down once completed. The setting up and tearing down of a voice call can occur through an exchange *within that call's channel* of the tones and bit indications that make up MFR2 "channel-associated" signaling (a DSP card must be present in E1 card's chassis for this kind of signaling; see Figure 3-13 ***DSP Card***.

Alternatively, the setting up and tearing down of a voice call can occur through an exchange *not in the call's channel but in a separate channel* of the data messages that make up either ISDN or SS7 "common channel" signaling (an ISDN or SS7 card must be present in E1 card's chassis for this kind of signaling; see ***ISDN PRI Card*** or ***SS7 Card***. A given ISDN or SS7 data channel carries setup/teardown messages that can control many voice channels at one time; SS7 channels, or links, occur in E1 spans connected to an SS7 data network rather than to the voice network.

E1 cards can be paired with either a standard I/O card, a redundant I/O card, or a standby I/O card. Provided you have another E1 card in the same chassis paired with a standby I/O card, any E1 card you have paired with a redundant I/O card can fail and its calls will be handled by the E1 card paired with the standby I/O card. In this "N+1" redundancy, only one E1 card can fail per chassis. E1 cards paired with standard I/O cards cannot be made redundant.

The *E1 Card* screen enables you to view the status of an E1 card, as well as to bring its E1 spans in and out of service and to give "N+1" redundancy to the E1 card.

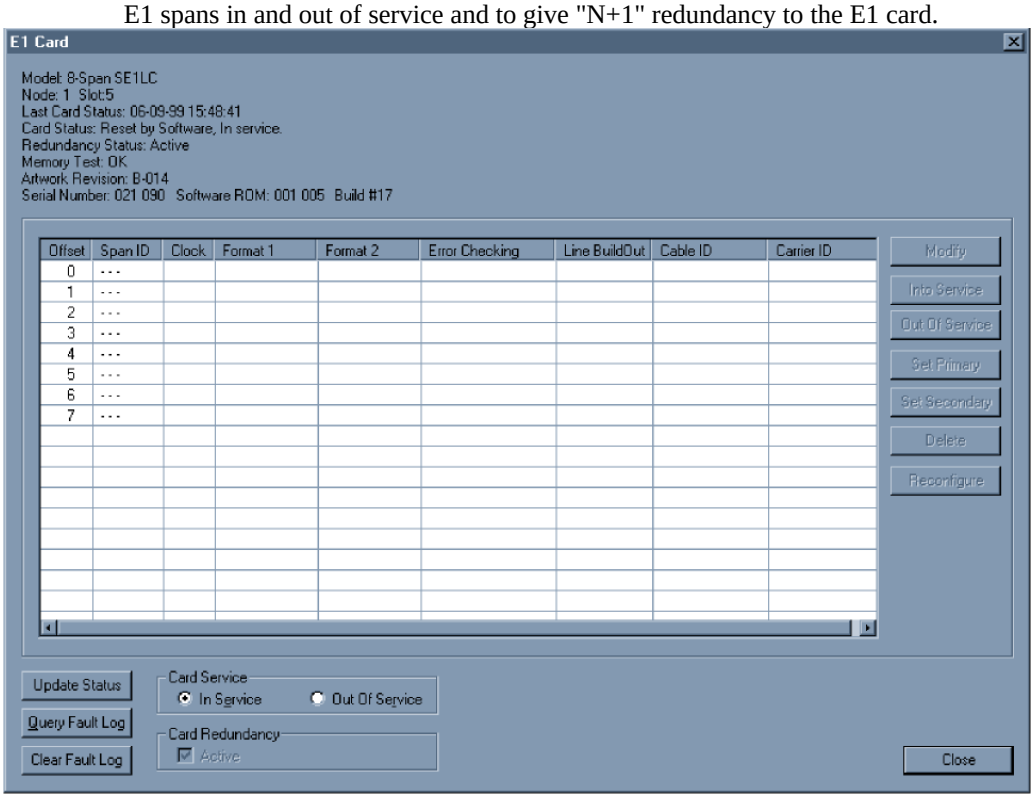


Figure 3-18
E1 Card screen layout

Note—The E1 Card screen shows ***no icon*** *in the leftmost column when the status of an adjacent offset on a card in service cannot be determined. An "**X**"* ***icon*** *displays when an offset has been in service but its card has been taken out of service, or when the Host has not been able to configure an assigned offset for some reason. An "!"* ***icon*** *displays when an offset's configuration is retained on the card but does not correspond to configuration data in the Host.*

You can activate this screen by clicking **E1 Card** in the *Equipment List* screen's View by Type mode, then double-clicking a listed E1 card; or by clicking a listed E1 card in the *Equipment List* screen's View by Slot ID mode; or by clicking a selected node in the *Equipment List* screen's View by Node mode, then double-clicking a listed E1 card.

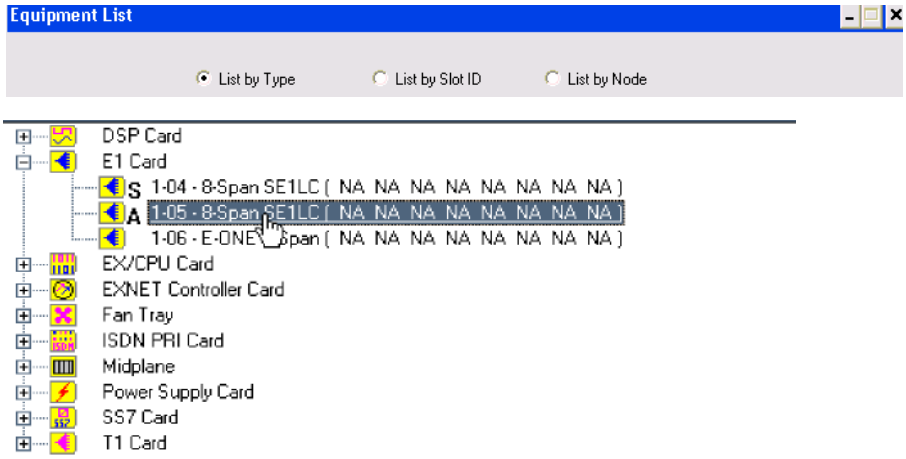


Figure 3-19
E1 Card screen activation (View by Type mode)

Note—The above figure shows redundant E1 cards. The highlighted card is active ("A"); one of the other E1 cards is standby ("S"); the remaining E1 card is paired with a standard I/O card and cannot be redundant.

The following information appears in the *E1 Card* screen:

Model line

This line indicates the model of this E1 card. Current models include:

- 4-Span SE1LC. This model supports 120 digital voice channels at 64 Kbps each.
- 8-Span SE1LC. This model supports 240 digital voice channels at 64 Kbps each.
- E-ONE 8-Span. This model supports 240 digital voice channels at 64 Kbps each.
- E-ONE 16-Span. This model supports 480 digital voice channels at 64 Kbps each.

Node/Slot line

This line indicates the node in the EXS Switch and slot (in the node's chassis) where this E1 card resides.

Note—In a single-node EXS Switch, "Node" does not display. In a multinode EXS Switch, "Node" will display together with an automatically-generated number identifying the node.

Last Card Status line

This line indicates (in MM-DD-YY HH:MM:SS format) when this E1 card's status was last updated.

Card Status line

This line indicates whether this E1 card is in service, has suffered faults, has good memory and/or has good configuration data, as well as how it was last reset. One or more of the following messages might occur:

- Reset by insertion. An insertion of this E1 card in the chassis caused this card's last reset.
- Reset by software. A taking of this E1 card out of service then putting it back in service from the Host, or a powering down then up of the entire chassis, or a fault in this card caused this card's last reset.
- Reset by button. A push of this E1 card's RESET button caused this card's last reset.
- Standby I/O present. This E1 card is associated with an "N+1" standby I/O card rather than a redundant I/O card and will handle traffic of a redundant I/O card associated with a failed E1 card if Redundancy Status (see below) is "Standby".

  Note—If Redundancy Status is "Non-redundant," you can click the OUT OF SERVICE button, then click the IN SERVICE button to change Redundancy Status to "Standby."
- OUT OF SERVICE BY HOST. Someone has taken this E1 card out of service through the Host.

- OUT OF SERVICE BY SWITCH. An EX/CPU card has reported this E1 card to be out of service. If this card's dipswitch 3 is set to ON, if another E1 card does not have this same message, and if resetting this card does not remove this message, you must swap this card and call Dynamis' Customer Engineering immediately.
- In service. This E1 card is in service.
- CONFIG DATA INVALID. The configuration data for this E1 card has been lost and has not been downloaded from the Host.
- FAULTS LOGGED. One or more faults have occurred in this E1 card. You must retrieve this card's Fault Log (see Querying Fault Log, below), then report its contents to Dynamis' Customer Engineering immediately.
- MEMORY TEST FAILED. This E1 card has failed a self-test of its memory. You must determine whether the card has a ROM or RAM problem (see Memory Test line, below).
- CARD FAILURE. This E1 card failed for an unspecified reason. If resetting this card does not remove this message, you must call Dynamis' Customer Engineering immediately.

Redundancy Status line

This line indicates whether this E1 card was in a redundant mode (that is, matched with another card of the same kind in the same chassis, and either communicating with it or ready to communicate with it) and, if so, what relationship it had with the other card at the last status update. One of the following messages will occur:

- Non-redundant. This E1 card is not in redundant mode.
- Active. This E1 card is in redundant mode and is the card in control.

  Note—The letter "A" appears next to this card's icon in the Equipment List screen to indicate an active state.
- Standby. This E1 card is in redundant mode and is ready to take control if the active E1 card fails.

  Note—The letter "S" appears next to this card's icon in the Equipment List screen to indicate a standby state.
- Serving. This E1 card is in redundant mode and is providing service to a redundant I/O card whose associated E1 card has failed.

  Note—The letter "S" appears next to this card's icon in the Equipment List screen to indicate a serving state.

  If this E1 card is in a serving state, no other card in the chassis can be in this state; if another card is in this state, this E1 card cannot be in a serving state.
- Synchronizing. This E1 card is in redundant mode and is exchanging configuration data with the other E1 card.

  Note—If synchronization fails, this card will become non-redundant. An asterisk (*) appears next to this card's icon in the Equipment List screen to indicate a synchronizing state.

- FAIL. This E1 card has failed for an unspecified reason. If resetting this card does not remove this message, you must call Dynamis' Customer Engineering immediately.

  Note—The letter "F" appears next to this card's icon in the Equipment List screen to indicate a failed state.

Memory Test line

This line indicates the result of a self-test at the last status update of the integrity of ROM and RAM devices on this E1 card. The following messages can occur:

- OK. Test proved memory was reliable.
- ROM CHECKSUM FAILED. Test proved read-only memory was unreliable. You must swap the card and call Dynamis' Customer Engineering immediately.
- RAM TEST FAILED. Test proved random access memory was unreliable. If resetting this card does not remove this message, you must call Dynamis' Customer Engineering immediately.

Artwork Revision line

This line indicates the revision level of this E1 card's circuit design.

Serial Number line

This line indicates the serial number of this E1 card.

Software ROM line

This line indicates the major, then the minor revision of the ROM software (that is, the BIOS) installed on this E1 card.

Build # line

This line indicates the build number of the RAM software (that is, the System Software, sometimes called pSOS) downloaded from an EX/CPU card to this E1 card.

Note—The Switch Status screen displays the actual version of this software.

Updating card status

Clicking the *E1 Card* screen's UPDATE STATUS button after this screen has been active for a while will query this E1 card again to determine its current status, then display this status in the *E1 Card* screen.

Querying Fault Log

Clicking the *E1 Card* screen's QUERY FAULT LOG button displays this E1 card's Fault Log (see ***Fault Log query [with fault]*** for an EX/CPU card's Fault Log example).

Clearing Fault Log

Clicking the *E1Card* screen's CLEAR FAULT LOG button clears this E1 card's Fault Log and resets the number of faults to 0 (0 also appears when no faults are detected on a query) (see ***Fault Log cleared [for clear] of faults*** for an EX/CPU card's Fault Log example).

Putting E1 card in service

Clicking the *E1 Card* screen's IN SERVICE button makes this E1 card available for call processing.

Note—If you are putting the E1 card in service after having configured it and taken it out of service, the Host will download the E1 configuration data the card lost when you took it out of service.

Putting E1 card out of service

Clicking the *E1 Card* screen's OUT OF SERVICE button makes **it** unavailable for call processing.

Note—You will want to take this card out of service if you need to test the card or if you discover the card is faulty. Taking this card out of service automatically clears all E1 configuration data and also takes voice channels out of service.

Returning E1 card to active status

Clicking the *E1 Card* screen's Active checkbox returns this once-failed E1 card back to active status.

EX/CPU Card

The EX/CPU card's purpose is to coordinate signaling and switching activities of other processing cards in the EXS Switch, as well as to distribute system software, resources and configurations to these processing cards as needed. Some of this coordination occurs through the EX/CPU card's interaction with the Host, to which the EX/CPU card reports card and other component statuses and from which it obtains interworking and routing solutions, as well as card configurations you create in the Host.

To communicate with other components of the EXS Switch and with the Host, the EX/CPU card must have an Ethernet connection with the Host and must be loaded with system software downloaded from the Host.

Provided you have two EX/CPU cards in appropriate slots of the same chassis (and have dedicated a Host computer to each of them), you can make one card active and the other standby. This relationship assures that one card, the standby card, can automatically assume (or be forced to assume) control of signaling and switching (based on interworking and routing solutions this standby card obtains directly from its own Host) should the other card, the active card, fail (or require maintenance).

The *EX/CPU Card* screen enables you to determine the status of an EX/CPU card, as well as to set the EXS Switch's time to the Host computer's clock.

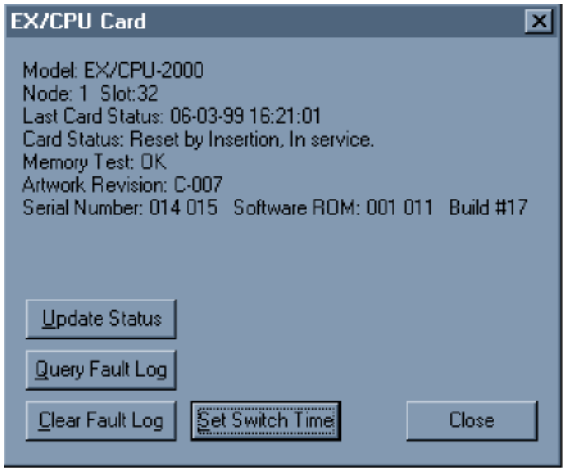


Figure 3-20
EX/CPU Card screen layout

You can activate this screen by clicking **EX/CPU Card** in the *Equipment List* screen's View by Type mode, then double-clicking a listed EX/CPU card, or by clicking a listed EX/CPU card in the *Equipment List* screen's View by Slot ID mode, or by clicking a selected node in the *Equipment List* screen's View by Node mode, then double-clicking a listed EX/CPU card.

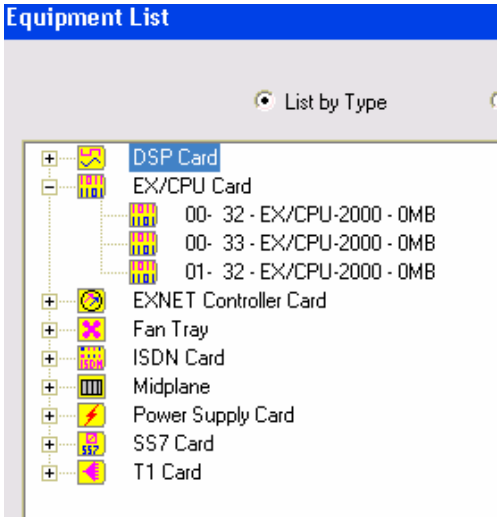


Figure 3-21
EX/CPU Card screen activation (View by Type mode)

The following information appears in the *EX/CPU Card* screen:

Model line

This line indicates the model of this EX/CPU card. Current models include:

- EX/CPU-1000. This model supports 1,048 ports.
- EX/CPU-2000. This model supports 2,048 ports.

Node/Slot line

This line indicates the node in the EXS Switch and slot (in the node's chassis) where this EX/CPU card resides.

Note—In a single-node EXS Switch, "Node" does not display. In a multinode EXS Switch, "Node" will display together with an automatically-generated number identifying the node.

Last Card Status line

This line indicates (in MM-DD-YY HH:MM:SS format) when this EX/CPU card's status was last updated.

Card Status line

This line indicates whether this EX/CPU card is in service, has suffered faults, has good memory and/or has good configuration data, as well as how it was last reset. One or more of the following messages might occur:

- Reset by insertion. An insertion of this EX/CPU card in the chassis caused this card's last reset.

- Reset by software. A taking of this EX/CPU card out of service then putting it back in service from the Host, or a powering down then up of the entire chassis, or a fault in this card caused this card's last reset.
- Reset by button. A push of this EX/CPU card's RESET button caused this card's last reset.
- OUT OF SERVICE BY SWITCH. The active EX/CPU card has reported this standby EX/CPU card to be out of service. If this card's dipswitch 3 is set to ON and if resetting this card does not remove this message, you must swap this card and call Dynamis' Customer Engineering immediately.
- In service. This EX/CPU card is in service.
- FAULTS LOGGED. One or more faults have occurred in this EX/CPU card. You must retrieve this card's Fault Log (see Querying Fault Log, below), then report its contents to Dynamis' Customer Engineering immediately.
- MEMORY TEST FAILED. This EX/CPU card has failed a self-test of its memory. You must determine whether the card has a ROM or RAM problem (see Memory Test line, below).
- CARD FAILURE. This standby EX/CPU card failed for an unspecified reason. If resetting this card does not remove this message, you must call Dynamis' Customer Engineering immediately.

Memory Test line

This line indicates the result of a self-test at the last status update of the integrity of ROM and RAM devices on this EX/CPU card. The following messages can occur:

- OK. Test proved memory was reliable.
- ROM CHECKSUM FAILED. Test proved read-only memory was unreliable. You must swap this card and call Dynamis' Customer Engineering immediately.
- RAM TEST FAILED. Test proved random access memory was unreliable. If resetting this card does not remove this message, you must call Dynamis' Customer Engineering immediately.

Artwork Revision line

This line indicates the revision level of this EX/CPU card's circuit design.

Serial Number line

This line indicates the serial number of this EX/CPU card.

Software ROM line

This line indicates the major, then the minor revision of the ROM software (that is, the BIOS) installed on this EX/CPU card.

Build # line

This line indicates the build number of the RAM software (that is, the System Software, sometimes called pSOS) downloaded to this EX/CPUcard.

Note—The Switch Status screen displays the actual version of this software.

Updating Card Status

Clicking the *EX/CPU Card* screen's UPDATE STATUS button queries this EX/CPU card to determine its current status, then display this status in the *EX/CPU Card* screen.

Querying Fault Log

Clicking the *EX/CPU Card* screen's QUERY FAULT LOG button displays this EX/CPU card's Fault Log.

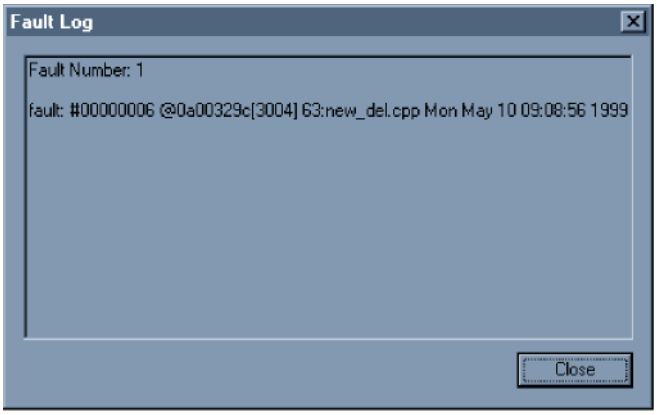


Figure 3-22
Fault Log query (with fault)

Clearing Fault Log

Clicking the *EX/CPU Card* screen's CLEAR FAULT LOG button clears this EX/CPU card's Fault Log and resets the number of faults to 0 (0 also appears when no faults are detected on a query).

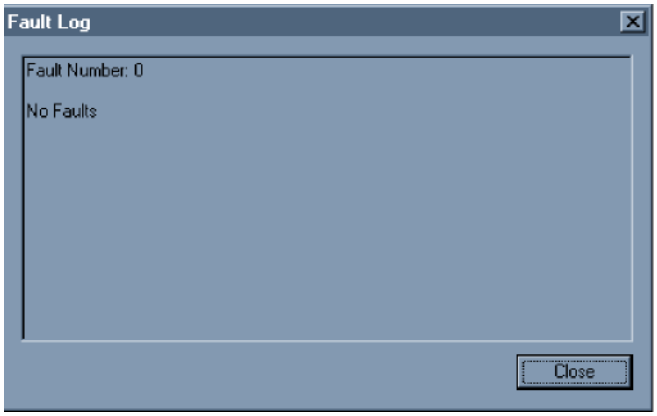


Figure 3-23
Fault Log cleared (or clear) of faults

Setting Switch Time

Clicking the *EX/CPU Card* screen's SET SWITCH TIME button coordinates this EX/CPU card's clock with the date and time of the Host computer's clock.

Note—*The EXS Switch's internal clock is the source of timestamps for this card's Fault Log, but not for timestamps on CDRs (Call Detail Records), which are generated and stamped by the Host.*

Coordinating this EX/CPU card to the Host computer's clock causes all other EX/CPU cards in your EXS Switch to coordinate themselves one by one with the Host computer's clock

We recommend that you download one of the popular programs that sets your Host computer, on a daily basis, to one of the atomic clocks, and that all PC components you use also synchronize their times on at least a daily basis. Clocks that are not synchronized can, within only a few weeks, drift enough that matching up log files from the various components becomes more difficult.

ISDN PRI Card

The ISDN PRI card's purpose is to control calls on voice-bearing B Channels in T1 and/or E1 spans of your EXS Switch. This control occurs through the setting up and eventually the tearing down of these calls in a separate data-bearing D Channel (one of 32 provided by the ISDN PRI card), rather than within each B Channel.

To communicate with ISDN (Integrated Services Digital Network) devices in the voice network, the ISDN PRI card must create data messages for and interpret data messages from these network devices. Software resident in the ISDN PRI card effects this communication.

You need only assign parameters for one (or more) D Channel(s), including its span and its channel in that span; you need only assign attributes for remaining channels in that span, which automatically become B Channels. At your option, you can assign a single D Channel to control up to 10 T1 spans of B Channels and assign a second D Channel to one of these other spans as a backup to the first D Channel.

Provided you have two ISDN PRI cards in adjacent slots of the same chassis (connected by an ISDN redundant I/O device), you can make one card active and the other standby. This relationship assures that one card, the standby card, can assume control of ISDN messaging should the other card, the active card, fail.

The *ISDN PRI Card* screen enables you to determine the status of an ISDN PRI card, as well as to configure ISDN D Channels, and to establish ISDN PRI card redundancy.

ISDN Offline Configuration – New to 2007

Beginning with Version 4.7, ISDN cards may be configured offline. Note that the icon in the equipment list will be different, as shown in the bottom of the figure below:

Figure 3-24
ISDN Offline Configuration

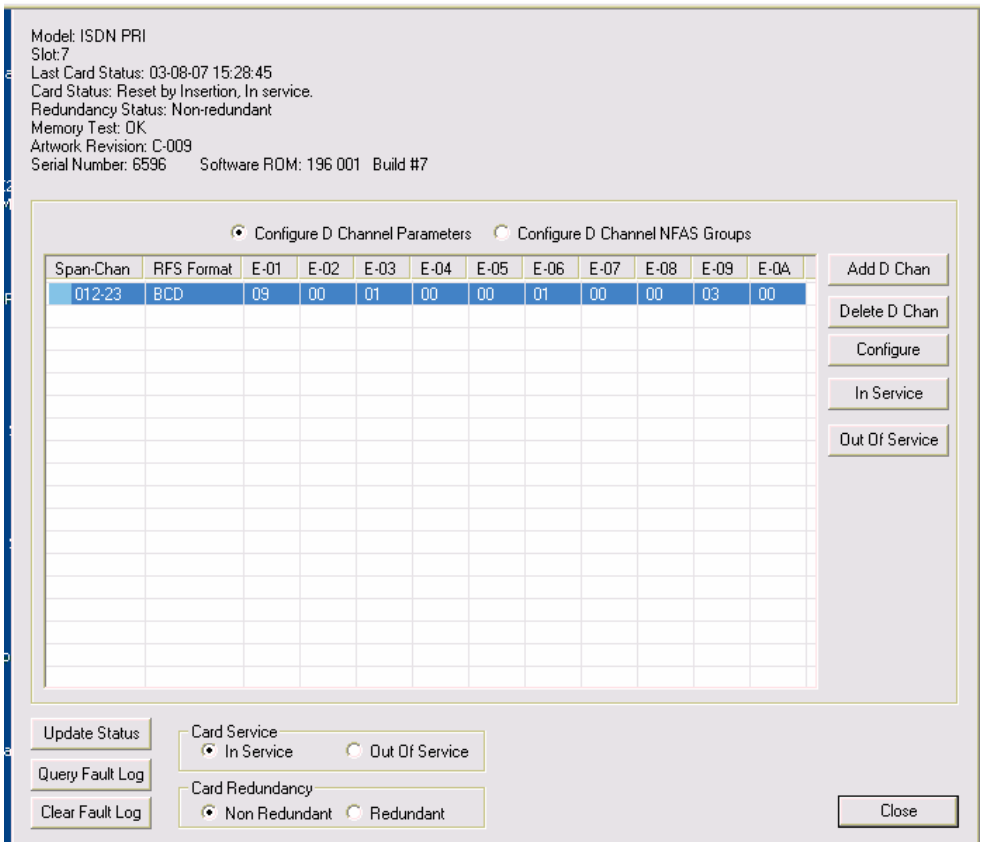


Figure 3-24
ISDN PRI Card screen layout

You can activate this screen by clicking **ISDN PRI Card** in the *Equipment List* screen's View by Type mode, then double-clicking a listed ISDN PRI card, or by clicking a listed ISDN PRI card in the *Equipment List* screen's View by Slot ID mode, or by clicking a selected node in the *Equipment List* screen's View by Node mode, then double-clicking a listed ISDN PRI card.

Figure 3-25
ISDN PRI Card screen activation (View by Type mode)

The following information appears in the *ISDN PRI Card* screen:

Model line

This line indicates the model of this ISDN PRI card.

Node/Slot line

This line indicates the node in the EXS Switch and slot (in the node's chassis) where this ISDN PRI card resides.

Note—In a single-node EXS Switch, "Node" does not display; in a multinode EXS Switch, "Node" will display together with an automatically-generated number identifying the node.

Last Card Status line

This line indicates (in MM-DD-YY HH:MM:SS format) when this ISDN PRI card's status was last queried and displayed in the *ISDN PRI Card* screen.

Note—This card's status is automatically updated on activation of the ISDN PRI Card screen.

Card Status line

This line indicates whether this ISDN PRI card is in service, has suffered faults, has good memory and/or has good configuration data, as well as how it was last reset. One or more of the following messages might occur:

- Reset by insertion. An insertion of this ISDN PRI card in the chassis caused this card's last reset.
- Reset by software. A taking of this ISDN PRI card out of service then putting it back in service from the Host, or a powering down then up of the entire chassis, or a fault in this card caused this card's last reset.
- Reset by button. A push of this ISDN PRI card's RESET button caused this card's last reset.
- OUT OF SERVICE BY HOST. Someone has taken this ISDN PRI card out of service through the Host.
- OUT OF SERVICE BY SWITCH. An EX/CPU card has reported this ISDN PRI card to be out of service. If this card's dipswitch 3 is set to ON, if another ISDN PRI card does not have this same message, and if resetting this card does not remove this message, you must swap this card and call Dynamis' Customer Engineering immediately.
- In service. This ISDN PRI card is in service.
- CONFIG DATA INVALID. The configuration data for this ISDN PRI card has been lost and has not been downloaded from the Host.
- FAULTS LOGGED. One or more faults have occurred in this ISDN PRI card. You must retrieve this card's Fault Log (see Querying Fault Log, below), then report its contents to Dynamis' Customer Engineering immediately.
- MEMORY TEST FAILED. This ISDN PRI card has failed a self-test of its memory. You must determine whether the card has a ROM or RAM problem (see Memory Test line, below).
- CARD FAILURE. This ISDN PRI card failed for an unspecified reason. If resetting this card does not remove this message, you must call Dynamis' Customer Engineering immediately.

Redundancy Status line

This line indicates whether this ISDN PRI card was in a redundant mode (that is, matched with another card of the same kind in the same chassis, and either communicating with it or ready to communicate with it) and, if so, what relationship it had with the other card at the last status update. One of the following messages will occur:

- Non-redundant. This ISDN PRI card is not in redundant mode.
- Active. The ISDN PRI card is in redundant mode and is the card in control.

  Note—The letter "A" appears next to this card's icon in the Equipment List screen to indicate an active state.
- Standby. This ISDN PRI card is in redundant mode and is ready to take control if an active processing card fails.

  Note—The letter "S" appears next to this card's icon in the Equipment List screen to indicate a standby state.
- Synchronizing. This ISDN PRI card is in redundant mode and is exchanging configuration data with the other ISDN PRI card.

  Note—If synchronization fails, this card will become non-redundant. An asterisk (*) appears next to this card's icon in the Equipment List screen to indicate a synchronizing state.
- FAIL. This ISDN PRI card has failed for an unspecified reason. If resetting this card does not remove this message, you must call Dynamis' Customer Engineering immediately.

Note—The letter "F" appears next to this card's icon in the Equipment List screen to indicate a failed state.

Memory Test line

This line indicates the result of a self-test at the last status update of the integrity of ROM and RAM devices on this ISDN PRI card. The following messages can occur:

- OK. Test proved memory was reliable.
- ROM CHECKSUM FAILED. Test proved read-only memory was unreliable. You must swap this card and call Dynamis' Customer Engineering immediately.
- RAM TEST FAILED. Test proved random access memory was unreliable. If resetting this card does not remove this message, you must call Dynamis' Customer Engineering immediately.

Artwork Revision line

This line indicates the revision level of this ISDN PRI card's circuit design.

Serial Number line

This line indicates the serial number of this ISDN PRI card.

Software ROM line

This line indicates the major, then the minor revision of the ROM software (that is, the

BIOS) installed on this ISDN PRI card.

Build # line

This line indicates the build number of the RAM software (that is, the System Software, sometimes called pSOS) downloaded from an EX/CPU card to this ISDN PRI card.

Note—The Switch Status screen displays the actual version of this software.

Updating card status

Clicking the *ISDN PRI Card* screen's UPDATE STATUS button after this screen has been active for a while will query this ISDN PRI card again to determine its current status, then display this status in the *ISDN PRI Card* screen.

Querying Fault Log

Clicking the *ISDN PRI Card* screen's QUERY FAULT LOG button displays this ISDN PRI card's Fault Log (see ***Fault Log query [with fault]*** for an EX/CPU card's Fault Log example).

Clearing Fault Log

Clicking the *ISDN PRI Card* screen's CLEAR FAULT LOG button clears this ISDN PRI card's Fault Log and resets the number of faults to 0 (0 also appears when no faults are detected on a query) (see ***Fault Log cleared[(or clear] of faults*** for an EX/CPU card's Fault Log example).

Putting ISDN PRI card in service

Clicking the *ISDN PRI Card* screen's IN SERVICE button makes this ISDN PRI card available for call processing.

Note—If you are putting the ISDN PRI card in service after having configured it and taken it out of service, the Host will download the ISDN configuration data the card lost when you took it out of service.

Putting ISDN PRI card out of service

Clicking the *ISDN PRI Card* screen's OUT OF SERVICE button makes this ISDN PRI card unavailable for call processing.

Note—You will want to take this card out of service if you need to test the card or if you discover the card is faulty. Taking this card out of service automatically clears all ISDN configuration data and also takes ISDN-controlled voice channels out of service.

Making ISDN PRI cards non- redundant

Clicking the *ISDN PRI Card* screen's NON REDUNDANT button takes this ISDN PRI card out of redundant mode.

Making ISDN PRI cards redundant

Clicking the *ISDN PRI Card* screen's REDUNDANT button puts this ISDN PRI card in redundant mode if a second ISDN PRI card has been installed in an adjacent slot and

both cards are connected to the SS7 redundant I/O device.

SS7 Card

The SS7 card's purpose is to control calls in the voice network that pass through selected T1 and/or E1 spans of your EXS Switch. This control occurs through the setting up and eventually the tearing down of these calls through a separate SS7 data network, rather than through the voice network itself.

To communicate with an SS7 network, the SS7 card must create data messages for and interpret data messages from this network. Software resident in the SS7 card, called an SS7 stack, effects this communication.

Each of four SS7 stacks on the SS7 card currently comprises an ISDN User Part (ISUP) and several Message Transfer Parts (MTPs) and provides the call control and messaging functions associated with these parts.

You can configure these stacks (along with associated link sets, links and routes/ destinations) to conform either to ANSI or to ITU specifications. Because up to four SS7 stacks can operate at the same time per node, your EXS Switch can work concurrently in both the ANSI and ITU worlds.

Provided you have two SS7 cards in adjacent slots of the same chassis (connected by an SS7 redundant I/O device), you can make one card active and the other standby. This relationship assures that one card, the standby card, can assume control of SS7 messaging should the other card, the active card, fail. Unlike EX/CPU and ISDN PRI card redundancy, however, the standby SS7 card can loadshare (subject to your configuration) SS7 messaging with the active SS7 card through its own links.

The *SS7 Card* screen enables you to determine the status of an SS7 card, as well as to configure SS7 stacks, link sets, links and routes/destinations for communication with an SS7 network, and to establish SS7 card redundancy.

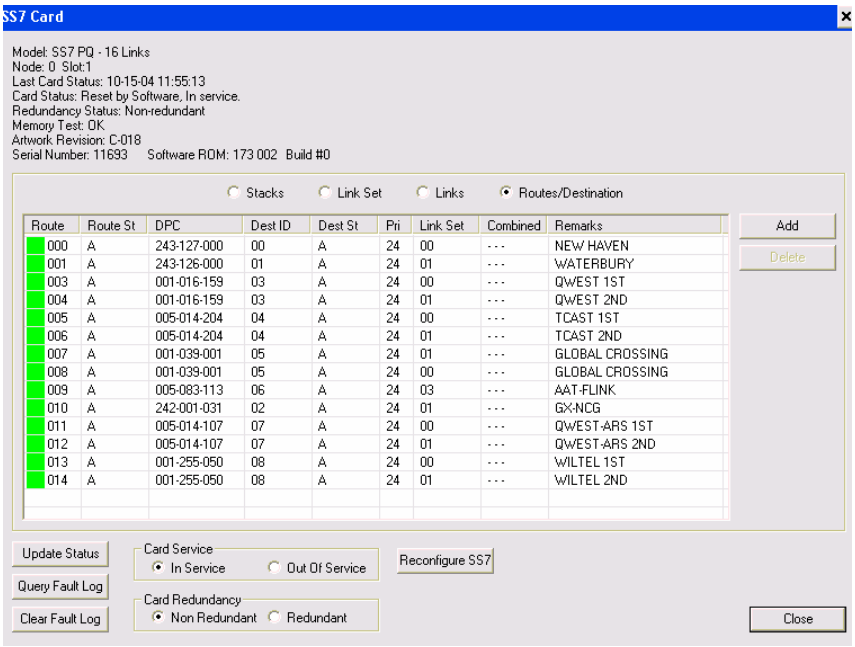


Figure 3-26 SS7 Card screen layout

*Note—The SS7 Card screen with Stacks selected shows **no icon** in the leftmost column when the status of an adjacent stack on a card in service cannot be determined. An **"X" icon** displays when a stack has been in service but its card has been taken out of service, or when the Host was not able to configure a stack for some reason.*

You can activate this screen by clicking **SS7 Card** in the *Equipment List* screen's View by Type mode, then double-clicking a listed SS7 card, or by clicking a listed SS7 card in the *Equipment List* screen's View by Slot ID mode, or by clicking a selected node in the *Equipment List* screen's View by Node mode, then double clicking a listed SS7 card.

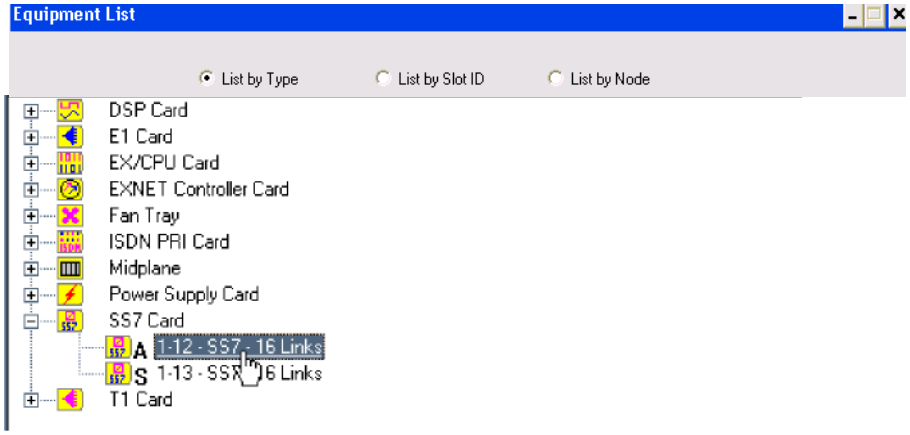


Figure 3-27
SS7 Card screen activation (View by Type mode)

Note—The above figure shows redundant SS7 cards. The highlighted card is active ("A"); the other is standby ("S").

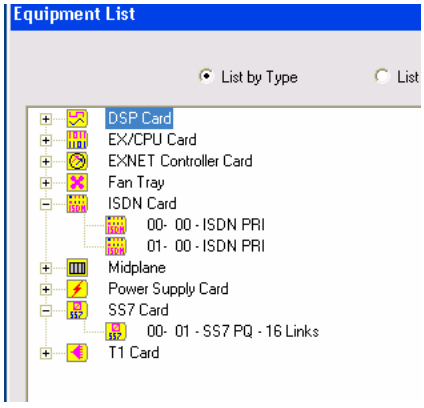


Figure 3-27B
SS7 Card screen activation (View by Type mode) – PowerQuick SS7 Card

The following information appears in the *SS7 Card* screen:

Model line

This line indicates the model of this SS7 card.

Node/Slot line

This line indicates the node in the EXS Switch and slot (in the node's chassis) where this SS7 card resides.

Note—In a single-node EXS Switch, "Node" does not display. Iin a multinode EXS Switch, "Node" will display together with an automatically-generated number identifying the node.

Last Card Status line

This line indicates (in MM-DD-YY HH:MM:SS format) when this SS7 card's status was last queried and displayed in the *SS7 Card* screen.

Note—This card's status is automatically updated on activation of the SS7 Card screen.

Card Status line

This line indicates whether this SS7 card is in service, has suffered faults, has good memory and/or has good configuration data, as well as how it was last reset. One or more of the following messages might occur:

- Reset by insertion. An insertion of this SS7 card in the chassis caused this card's last reset
- Reset by software. A taking of this SS7 card out of service then putting it back in service from the Host, or a powering down then up of the entire chassis, or a fault in this card caused this card's last reset.
- Reset by button. A push of this SS7 card's RESET button caused this card's last reset.
- OUT OF SERVICE BY HOST. Someone has taken this SS7 card out of service through the Host.
- OUT OF SERVICE BY SWITCH. An EX/CPU card has reported this SS7 card to be out of service. If this card's dipswitch 3 is set to ON, if another SS7 card does not have this same message, and if resetting this card does not remove this message, you must swap this card and call Dynamis' Customer Engineering immediately.
- In service. This SS7 card is in service.
- CONFIG DATA INVALID. The configuration data for this SS7 card has been lost and has not been downloaded from the Host. You must click the RECONFIGURE SS7 button immediately.
- FAULTS LOGGED. One or more faults have occurred in this SS7 card. You must retrieve this card's Fault Log (see Querying Fault Log, below), then report its contents to Dynamis' Customer Engineering immediately.

- MEMORY TEST FAILED. This SS7 card has failed a self-test of its memory. You must determine whether the card has a ROM or RAM problem (see Memory Test line, below).
- CARD FAILURE. This SS7 card failed for an unspecified reason. If resetting this card does not remove this message, you must call Dynamis' Customer Engineering immediately.

Redundancy Status line

This line indicates whether this SS7 card was in a redundant mode (that is, matched with another card of the same kind in the same chassis, and either communicating with it or ready to communicate with it) and, if so, what relationship it had with the other card at the last status update. One of the following messages will occur:

- Non-redundant. This SS7 card is not in redundant mode.
- Active. This SS7 card is in redundant mode and is the card in control.

  Note—The letter "A" appears next to this card's icon in the Equipment List screen to indicate an active state.
- Standby. This SS7 card is in redundant mode and is ready to take control if the active SS7 card fails.

  Note—The letter "S" appears next to this card's icon in the Equipment List screen to indicate a standby state.
- Synchronizing. This SS7 card is in redundant mode and is exchanging configuration data with the other SS7 card.

  Note—If synchronization fails, this card will become non-redundant. An asterisk (*) appears next to this card's icon in the Equipment List screen to indicate a synchronizing state.
- FAIL. This SS7 card has failed for an unspecified reason. If resetting this card does not remove this message, you must call Dynamis' Customer Engineering immediately.

  Note—The letter "F" appears next to this card's icon in the Equipment List screen to indicate a failed state.

Memory Test line

This line indicates the result of a self-test at the last status update of the integrity of ROM and RAM devices on this SS7 card. The following messages can occur:

- OK. Test proved memory was reliable.
- ROM CHECKSUM FAILED. Test proved read-only memory was unreliable. You must swap this card and call Dynamis' Customer Engineering immediately.
- RAM TEST FAILED. Test proved random access memory was unreliable. If resetting this card does not remove this message, you must call Dynamis' Customer Engineering immediately.

Artwork Revision line

This line indicates the revision level of this SS7 card's circuit design.

Serial Number line

This line indicates the serial number of this SS7 card.

Software ROM line

This line indicates the major, then the minor revision of the ROM software (that is, the BIOS) installed on this SS7 card.

Build # line

This line indicates the build number of the RAM software (that is, the System Software, sometimes called pSOS) downloaded from an EX/CPU card to this SS7 card.

Note—The Switch Status screen displays the actual version of this software.

Updating card status

Clicking the *SS7 Card* screen's UPDATE STATUS button after this screen has been active for a while will query this SS7 card again to determine its current status; then display this status in the *SS7 Card* screen.

Querying Fault Log

Clicking the *SS7 Card* screen's QUERY FAULT LOG button displays this SS7 card's Fault Log (see ***Fault Log query [with fault]*** for an EX/CPU card's Fault Log example).

Clearing Fault Log

Clicking the *SS7 Card* screen's CLEAR FAULT LOG button clears this SS7 card's Fault Log and resets the number of faults to 0 (0 also appears when no faults are detected on a query) (see ***Fault Log cleared [or clear] of faults*** for an EX/ CPU card's Fault Log example).

Putting SS7 card in service

Clicking the *SS7 Card* screen's IN SERVICE button makes this SS7 card available for call processing.

Note—If you are putting the SS7 card in service after having configured it and taken it out of service, the Host will download the SS7 configuration data the card lost when you took it out of service.

Putting SS7 card out of service

Clicking the *SS7 Card* screen's OUT OF SERVICE button makes this SS7 card unavailable for call processing.

Note—You will want to take this card out of service if you need to test the card or if you discover the card is faulty. Taking this card out of service automatically clears all SS7 configuration data and also takes SS7-controlled voice channels out of service.

Making SS7 cards non-redundant

Clicking the *SS7 Card* screen's NON REDUNDANT button takes this SS7 card out of redundant mode.

Making SS7 cards redundant

Clicking the *SS7 Card* screen's REDUNDANT button puts this SS7 card in redundant mode if a second SS7 card has been installed in an adjacent slot and both cards are connected to the SS7 redundant I/O device.

Reconfiguring SS7

Clicking the *SS7 Card* screen's RECONFIGURE SS7 button forces the Host to download SS7 configuration data to this SS7 card should its need for configuration data not be signaled to the Host.

EXNET Controller card

The EXNET Controller card's purpose is to carry voice traffic over a fiberoptic ring from/to T1 and/or E1 spans of the node housing this card to/from T1/E1 spans of other EXNET-ready nodes of your EXS Switch.

To communicate with other EXNET Controller cards on this ring, an EXNET Controller card packetizes voice traffic (itself encoded per timeslot or channel into eight-bit bytes by pulse code modulation), then multiplexes these packets for each channel of its node sending traffic to other nodes. This same EXNET Controller card reverses the process (that is, demultiplexes and depacketizes) for each channel of its node receiving traffic from other nodes. Software resident in the EXNET Controller card effects this communication.

You need only configure an identity of the ring over which EXNET Controller cards exchange packets, the number of packets exchanged per channel and whether a given card will both receive and transmit or will only receive packets.

The EXNET ring is self-healing. Should an EXNET Controller card fail somewhere in your multinode EXS Switch, all T1/E1 spans of other nodes will be lost to the node holding the failed card, but only that node's T1/E1 spans will be lost to other nodes on the ring. Provided you have two EXNET Controller cards per node, you can mirror the traffic of one ring on a second ring. Should an EXNET Controller card fail somewhere in your multinode EXS Switch, the other EXNET Controller card in the node will assure that all T1/E1 spans remain accessible to all nodes.

The *EXNET Card* screen enables you to determine the status of an EXNET Controller card, as well as to configure an EXNET ring.

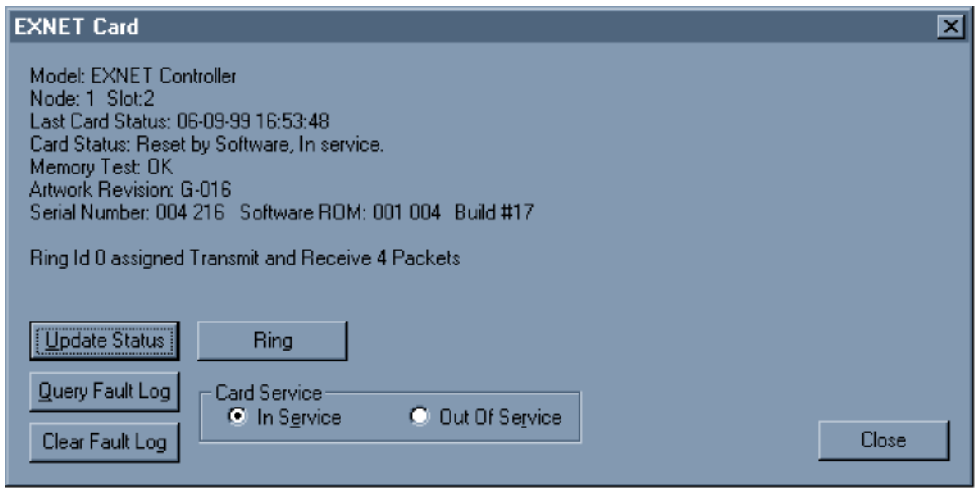


Figure 3-28
EXNET Card screen layout

You can activate this screen by clicking **EXNET Controller Card** in the *Equipment List* screen's View by Type mode, then double-clicking a listed EXNET Controller card, or by clicking a listed EXNET Controller card in the *Equipment List* screen's View by Slot ID mode, or by clicking a selected node in the *Equipment List* screen's View by Node mode, then double-clicking a listed EXNET Controller card.

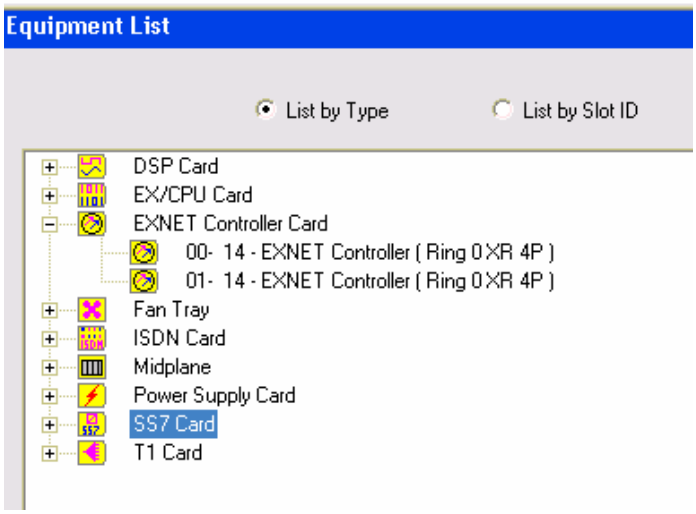


Figure 3-29
EXNET Card screen activation (View by Type mode)

The following information appears in the *EXNET Card* screen:

Model line

This line indicates the model of this EXNET Controller card.

Node/Slot line

This line indicates the node in the EXS Switch and slot (in the node's chassis) where this EXNET Controller card resides.

Last Card Status line

This line indicates (in MM-DD-YY HH:MM:SS format) when this EXNET Controller card's status was last queried and displayed in the *EXNET Card* screen.

Note—This card's status is automatically updated on activation of the EXNET Card screen.

Card Status line

This line indicates whether this EXNET Controller card is in service, has suffered faults, has good memory and/or has good configuration data, as well as how it was last reset. One or more of the following messages might occur:

- Reset by insertion. An insertion of this processing card in the chassis caused this card's last reset.
- Reset by software. A taking of this processing card out of service then putting it back in service from the Host, or a powering down then up of the entire chassis, or a fault in this card caused this card's last reset.
- Reset by button. A push of this processing card's RESET button caused this card's last reset.

- OUT OF SERVICE BY HOST. Someone has taken this processing card out of service through the Host.
- OUT OF SERVICE BY SWITCH. An EX/CPU card has reported this processing card to be out of service. If this card's dipswitch 3 is set to ON, if another EXNET Controller card does not have this same message, and if resetting this card does not remove this message, you must swap this card and call Dynamis' Customer Engineering immediately.
- In service. This processing card is in service.
- CONFIG DATA INVALID. The configuration data for this processing card has been lost and has not been downloaded from the Host.
- FAULTS LOGGED. One or more faults have occurred in this processing card. You must retrieve this card's Fault Log (see Querying Fault Log, below), then report its contents to Dynamis' Customer Engineering immediately.
- MEMORY TEST FAILED. This processing card has failed a self-test of its memory. You must determine whether the card has a ROM or RAM problem (see Memory Test line, below).
- CARD FAILURE. This processing card failed for an unspecified reason. If resetting this card does not remove this message, you must call Dynamis' Customer Engineering immediately.

Memory Test line

This line indicates the result of a self-test at the last status update of the integrity of ROM and RAM devices on this EXNET Controller card. The following messages can occur:

- OK. Test proved memory was reliable.
- ROM CHECKSUM FAILED. Test proved read-only memory was unreliable. You must swap the card and call Dynamis' Customer Engineering immediately.
- RAM TEST FAILED. Test proved random access memory was unreliable. If resetting this card does not remove this message, you must call Dynamis' Customer Engineering immediately.

Artwork Revision line

This line indicates the revision level of this EXNET Controller card's circuit design.

Serial Number line

This line indicates the serial number of this EXNET Controller card.

Software ROM line

This line indicates the major, then the minor revision of the ROM software (that is, the BIOS) installed on this EXNET Controller card.

Build # line

This line indicates the build number of the RAM software (that is, the System Software, sometimes called pSOS) downloaded from an EX/CPU card to this EXNET Controller card.

Note—The Switch Status screen displays the actual version of this software.

Actual configuration line

This line indicates the identity of the EXNET ring to which this EXNET Controller card is attached, whether this card transmits and receives or only receives packets, and whether three or four packets are transmitted per timeslot or channel.

Updating card status

Clicking the *EXNET Card* screen's UPDATE STATUS button after this screen has been active for a while will query this EXNET Controller card again to determine its current status, then display this status in the *EXNET Card* screen.

Querying Fault Log

Clicking the *EXNET Card* screen's QUERY FAULT LOG button displays this EXNET Controller card's Fault Log (see ***Fault Log query (with fault)*** for an EX/ CPU card's Fault Log example).

Clearing Fault Log

Clicking the *EX/CPU Card* screen's CLEAR FAULT LOG button clears this EXNET Controller card's Fault Log and resets the number of faults to 0 (0 also appears when no faults are detected on a query) (see ***Fault Log cleared (or clear) of faults*** for an EX/CPU card's Fault Log example).

Putting EXNET Controller card in service

Clicking the *EXNET Card* screen's IN SERVICE button makes this EXNET Controller card available for call processing.

Note—If you are putting the EXNET card in service after having configured it and taken it out of service, the Host will download the EXNET configuration data the card lost when you took it out of service.

Putting EXNET Controller card out of service

Clicking the *EXNET Card* screen's OUT OF SERVICE button makes this EXNET Controller card unavailable for call processing.

Note—You will want to take this card out of service if you need to test the card or if you discover the card is faulty. Taking this card out of service automatically clears all EXNET configuration data.

Configuring EXNET ring

Clicking the *EXNET Card* screen's RING button activates the *EXNET Ring Configure* screen in which you configure the fiberoptic EXNET ring that will link nodes of your EXS Switch.

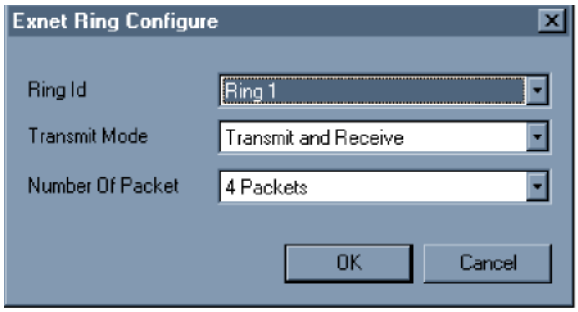


Figure 3-30
EXNET Ring Configure screen layout

The following information appears in the *EXNET Ring Configure* screen:

Ring ID list

This list indicates the identity of the fiberoptic ring to which you are assigning or have assigned this EXNET Controller card. Your ***required*** input is limited to the following choices:

- None (default)
- Ring 0
- Ring 1
- Ring 2
- Ring 3

Transmit Mode list

This list indicates how this EXNET Controller card handles voice-carrying packets. Your ***required*** input is limited to the following choices:

- Receive Only. This EXNET Controller card only receives voice-carrying packets from the fiberoptic ring.
- Transmit and Receive (default). This EXNET Controller card both transmits and receives voice-carrying packets to and from the fiberoptic ring.

Number of Packet list

This list indicates the number of voice-carrying packets carried per timeslot (each timeslot representing a voice channel) on the fiberoptic ring. Your ***required*** input is limited to the following choices:

- 4 Packets (default). Each timeslot carries four packets and supports both E1 traffic and a combination of E1 and T1 traffic.
- 3 Packets. Each timeslot carries three packets and supports only T1 traffic.

Updating EXNET ring status

Clicking **EXNET Management** in the Main Menu/Tool Bar's Maintenance menu will query the EXNET ring to determine its current status, then display this status in the *EXNET Management* screen.

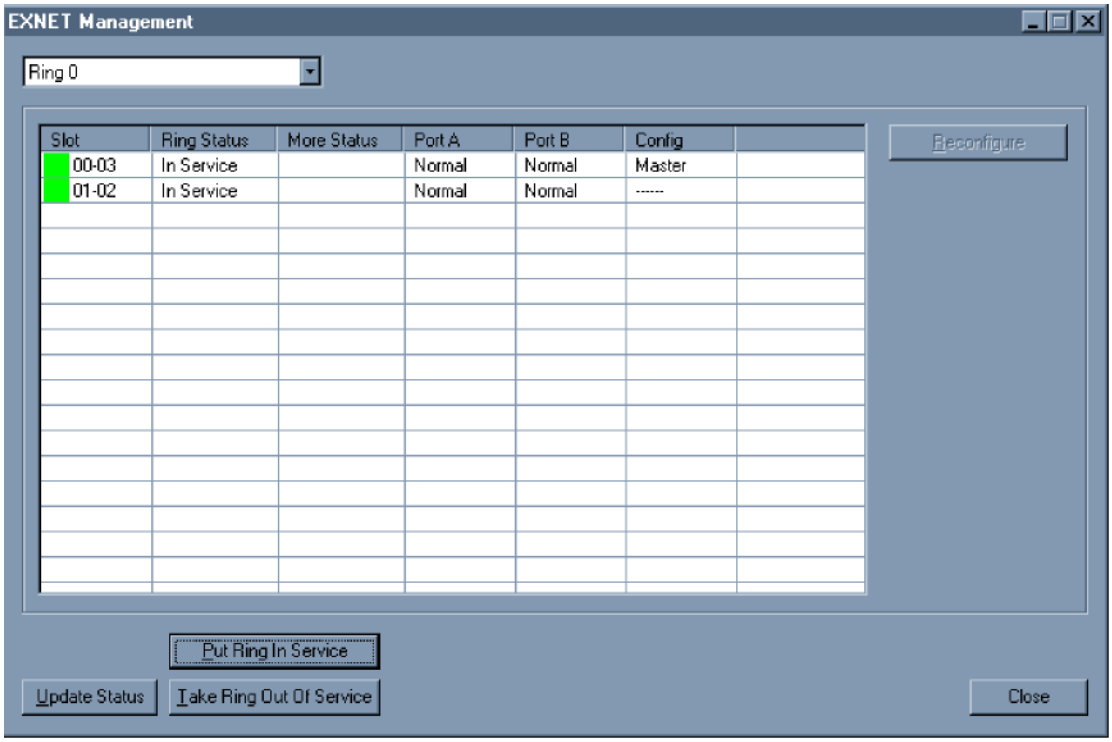


Figure 3-31
EXNET Management screen layout

*Note—The EXNET Management screen shows a **green icon** in the leftmost column when the ring to which the adjacent EXNET Controller card is attached is in service. A **red icon** displays when the EXNET ring is not in service. A **yellow icon** displays when the EXNET ring is getting ready to go into service.*

The following information occurs in the *EXNET Management* screen:

Ring ID (unlabeled) list

This column indicates the identity of the fiberoptic ring whose status you want to display. Your ***optional*** input is limited to the following choices:

- Ring 0
- Ring 1
- Ring 2
- Ring 3

Slot column

This column indicates the node and slot in the node (for example, 01-02, or slot 2 in node 1) where an EXNETcard resides on the specifed EXNET ring.

Ring Status column

This column indicates the status of the specified EXNET ring. One of the following values will occur:

- In Service. This EXNET ring is in service and able to support call processing between nodes.
- Out of Service. Someone has taken this EXNET ring out of service through the Host and the EXNET ring is not able to support call processing between nodes.
- Initializing. This EXNET ring is undergoing tests to validate its timing before going into service.

  Note—This message is the transitory second stage of putting an EXNET ring into service.

More Status column

This column indicates reasons why the specified EXNET ring is out of service if it was not taken out of service through the Host. One of the following values can occur:

- Matrix Error. The node holding the specified EXNET Controller card has been isolated from the EXNET ring because the EXNET Controller card has encountered errors while receiving voice-carrying packets from the TDM (time-division multiplexing) bus in the node's midplane. If resetting the EXNET Controller card does not return the node to the ring, call Dynamis' Customer Engineering immediately.
- Node Isolated. The node holding the specified EXNET Controller card has been isolated from the EXNET ring because both the card's ports have failed due either to failed light transceivers (unlikely), or to a dislodged fiberoptic cable connector (likely) or a damaged fiberoptic cable (likely) that prevents light transmission and/or reception. If reseating the suspect fiberoptic cable connector, or replacing the suspect fiberoptic cable itself, does not return the node to the ring, call Dynamis' Customer Engineering immediately.
- No Light. The specified EXNET Controller card is not able to receive light on one of its ports when in normal position rather than looped back.
- Out of Service. The active EX/CPU card has reported this EXNET ring to be out of service. If your attempt to put this EXNET ring back into service does not succeed, call Dynamis' Customer Engineering immediately.
- Unknown. This EXNET ring is out of service for an unknown reason. Call Dynamis' Customer Engineering immediately.

Port A/Port B columns

These columns indicate the status of port A or port B on the specified EXNET Controller card. One of the following values will occur:

- LpBack. This value indicates that traffic-carrying light transmitted on this port is being looped back and received on this same port.

Note—During an EXNET ring's initialization, ports are looped back. If one of a node's ports is looped back after the EXNET ring goes into service, a failure has occurred either in the transmitting or receiving fiberoptic cable of that port, or in the light transceiver of the port in the adjacent node to which this port is connected. Loopbacks in an up-and-running EXNET ring are the means for the ring to heal itself.

- Normal. This value indicates that the traffic-carrying light transmitted on this port is being received on a port (port B, if transmitted from port A, or port A, if transmitted from port B) of an EXNET Controller card in an adjacent node.

Config column

This column indicates whether the specified EXNET Controller card is master of the EXNET ring

Updating EXNET ring status

Clicking the *EXNET Management* screen's UPDATE STATUS button after this screen has been active for a while will query this EXNET ring again to determine its current status, then display this status in the *EXNET Management* screen.

Putting EXNET ring in service

Clicking the *EXNET Management* screen's PUT RING IN SERVICE button makes this EXNET ring available for call processing.

Putting EXNET ring out of service

Clicking the *EXNET Management* screen's TAKE RING OUT OF SERVICE button makes this EXNET ring unavailable for call processing.

Reconfiguring the EXNET ring

Clicking the *EXNET Management* screen's RECONFIGURE button reestablishes this EXNET ring's existing configuration.

4. Configuring Channels, Routes & Translations

Introduction

The Host's chief function is to instruct the EXS Switch to receive a call coming into the switch, translate the signals, and put it onto a channel leaving the switch in a manner that will cause the call to reach its intended destination.

For the Host to perform this function, you must configure the Host not only to recognize the inbound signals that are relevant to the call, but also to recognize (and perhaps manipulate) information that signals where and how this call should be routed.

CONFIGURATION SEQUENCE FOR ROUTING & TRANSLATION

IMPORTANT: Once you are familiar with the following steps, you will be able to effectively configure routing and translation.

STEP 1: Configure and Put T1/E1/ISDN/SS7 Channels Into Service

Configure and put into service channels in spans to/from the Switch's:

- T1 cards (see:***T1:C onfiguring and Putting T1 Channels into Service***)
- E1 Cards (see *E1: Configuring and Putting E1 Channels into Service*)
- Set up ISDN (see ISDN: Configuring and Putting ISDN Channels into Service)
- Set up SS7 (see SS7: Configuring and Putting SS7 Channels into Service)

STEP 2: Group Outbound Channels Into Resource Groups

Group channels (that is, the channels you have put into service) that will have a common destination and signaling type. See ***Resource Groups - Grouping Channels*** for details. Typically, there will be a different Resource Group for each unique combination of carrier and signaling type.

STEP 3: Build Inbound Pre-Translation Tables (Optional)

Build inbound Pre-Translation tables (see ***Pre-Translation Tables***) to translate digits before submitting to the Digit Tables for further processing. This feature is optional, based on whether Pre-Transation tables are specified in the "Assign Channel Features" step below.

STEP 4: Build ANI Validation & Index Tables (Optional)

Build Tables for billing by ANI and manual/default Account Code (see ***ANI Tables*** and ***Index Tables)*** This feature is optional, based on whether, in the "Assign Channel Features" step below, the field "Network" is set to "ANI Account" and an ANI Table is specified.

STEP 5: Build the NPA Table for Inter/Intra State Determination (Optional)

The NPA table correlates NPAs to determine if both legs of the call are in the same state (see The NPA Table). This feature is optional, based on whether, in the "Assign Channel Features" step below, the field "Lookup Type" is set to "DNIS Intra/Inter State" or "ANI Intra/Inter State".

STEP 6: Build Master Route Table for NPA/NXX Routing (Optional)

The Master Route table routes and/or translates by NPANXX (see Master Route Tables). This feature is optional, based on whether the table is called by another Digit Table, or by the Channel Features. (Usually, if in the "Assign Channel Features" step below, the field "Lookup Type" is set to "DNIS Intra/Inter State" or "ANI Intra/Inter State", then this type of table is selected in the InterState and IntraState Digit Table fields)

STEP 7: Assign Channel Features

Assign features to all channels handling traffic (see ***Channel Features***). Note that Channel Features can transfer processing immediately to a Digit Table – In this case follow the remaining steps, then build the digit table and return to Channel Features to transfer to the Digit Table.

STEP 8: Set up Time of Day Routing (Optional)

Specify routes that are valid at only certain times of certain days *(see **Making Routes Time-Sensitive***). This feature is optional.

STEP 9: Create ACD Queues (Optional)

Create Automatic Call Distribution Queues, for conditional call routing for holding calls waiting to be handled when a trunk becomes available. (see ACD Queues). This feature is optional, based on whether the Route List (set up in the next step) will add an ACD Queue

STEP 10: Create Post Routing Rules (Optional)

Different resource groups, within each route list (see next step), just before presenting the outbound call, may use the post routing rules to add a prefix or suffix to the DNIS, ANI and/or called number, and can present various ISDN and SS7 signaling (see Post Routing Rules). This feature is optional, based on whether the rule is called by a Route List's Resource Group (see next step),

STEP 11: Assign Resource Groups to Route Lists

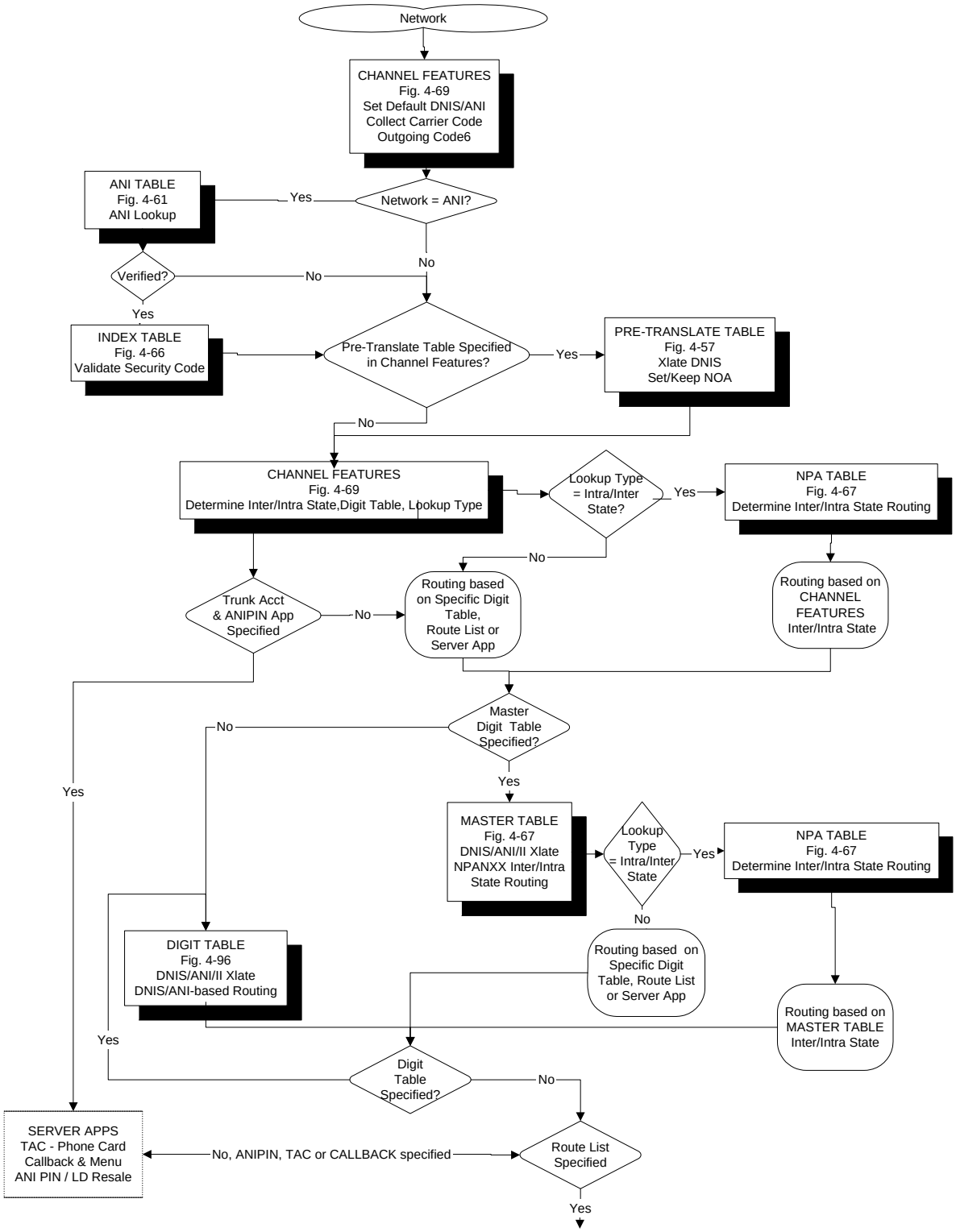
Create lists of resource groups that automatically provide a call with alternate routes to the same destination and optionally invoke post routing rules as specified in the previous step (see ***Route Lists: Creating Alternate Routes for Calls***).

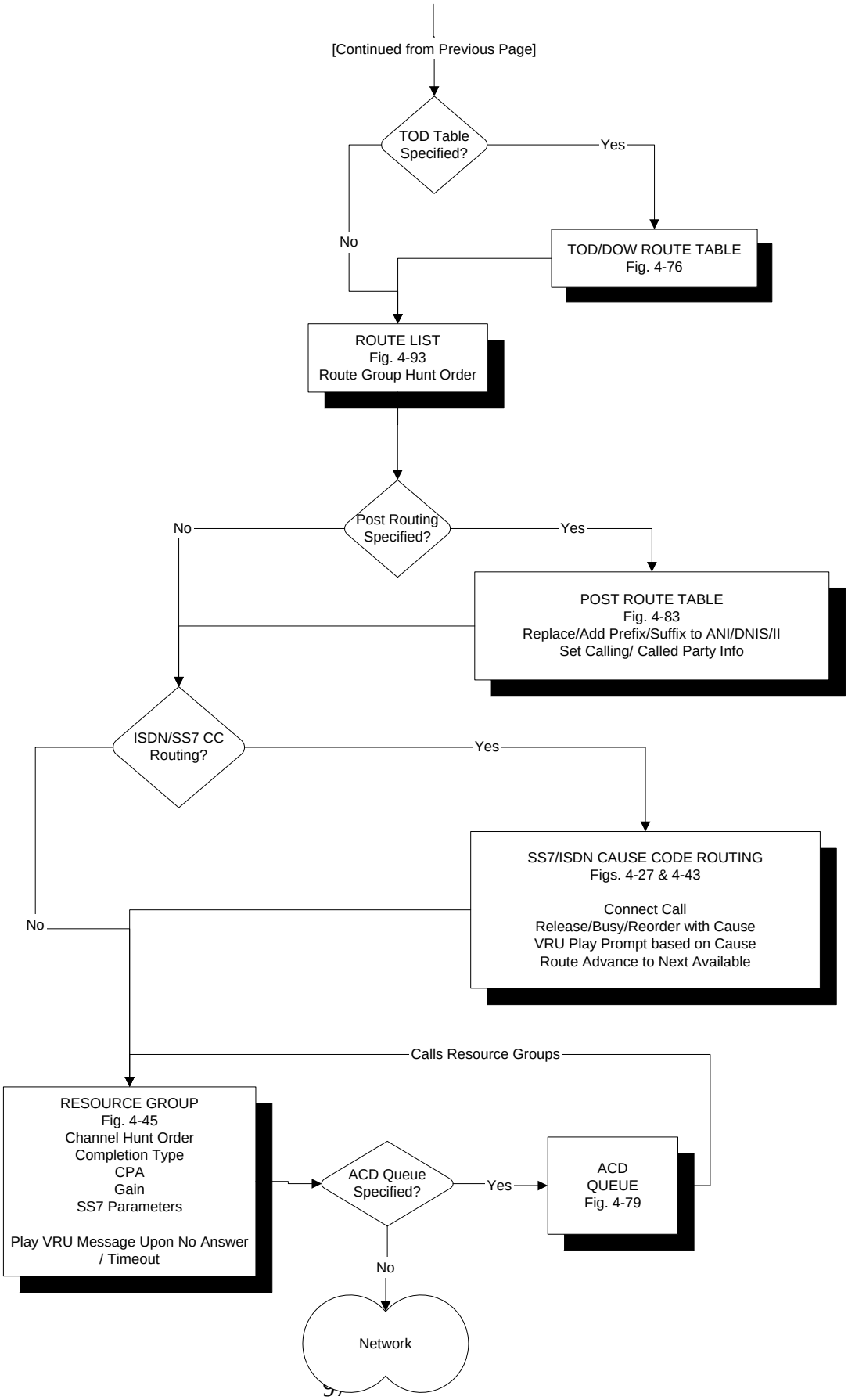
STEP 12: Build Digit Tables

Build tables that will recognize digits from both called party numbers (such as Dialed Numbers, DNISs and DIDs) and calling party numbers (such as ANIs and CLIs), then translate and/or route the calls to outbound Route Listes, TOD Route Lists, other Digit Tables, or applications requiring the Dynamis Server (see ***Building Digit Tables***).

CALL CONTROL DIAGRAMS

The following 2-page diagram describes how call processing is handled by the E2 host software. Key configuration information can be found by pressing ctrl-f then find the figure number displayed. It is recommended to be printed out or viewed at 150% zoom.




[Continued from Previous Page]
TOD Table Specified?
Yes
No
TOD/DOW ROUTE TABLE
Fig. 4-76
ROUTE LIST
Fig. 4-93
Route Group Hunt Order
Post Routing Specified?
No
Yes
POST ROUTE TABLE
Fig. 4-83
Replace/Add Prefix/Suffix to ANI/DNIS/II
Set Calling/ Called Party Info
ISDN/SS7 CC Routing?
Yes
SS7/ISDN CAUSE CODE ROUTING
Figs. 4-27 & 4-43
Connect Call
Release/Busy/Reorder with Cause
VRU Play Prompt based on Cause
Route Advance to Next Available
No
Calls Resource Groups
RESOURCE GROUP
Fig. 4-45
Channel Hunt Order
Completion Type
CPA
Gain
SS7 Parameters
Play VRU Message Upon No Answer / Timeout
ACD Queue Specified?
Yes
ACD QUEUE
Fig. 4-79
No
Network

T1: Configuring & Putting T1 Channels in Service

The Host can route calls through the EXS Switch only after you put into service the channels in the spans you have connected to the EXS Switch's line cards. Channels put into service are called channels. You must know what kind of equipment terminates these channels at their far end, regardless of whether they will carry calls to or from the EXS Switch, so you can configure them accordingly.

Presently, the EXS Switch can hold T1 and E1 line cards to support calls carrying their routing information. Accordingly, the Host can collect a call's digits, then route that call, whether these digits are signaled tonally (DTMF, MFR1, or MFR2) or in digital messages (ISDN, SS7).

Your channel configurations are sent to and stored in those line cards of the EXS Switch supporting the channels you have configured.

Channels in T1 Spans

Configuring T1 channels requires you to specify the T1 span that holds one, some , or all of this span's 24 channels (internally numbered 00 through 23) you want in service, then to assign tone attributes to the channels you select in the specified span.

Activating a T1 Span

The *T1 Span Attributes* screen enables you to specify a T1 span, one span at a time, holding channels you want to put into service.

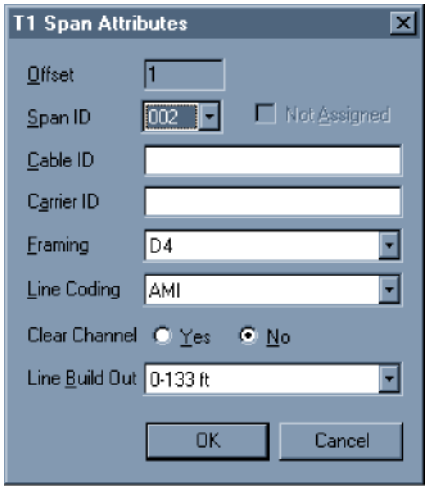


Figure 4-1 T1
Span Attributes screen layout

Clicking the MODIFY button in the *T1 Card* screen (itself activated by clicking **View by Type, View by Slot ID,** or **View by Node** in the Main Menu/Tool Bar's Equipment menu, then a specific T1 card) will activate this screen.

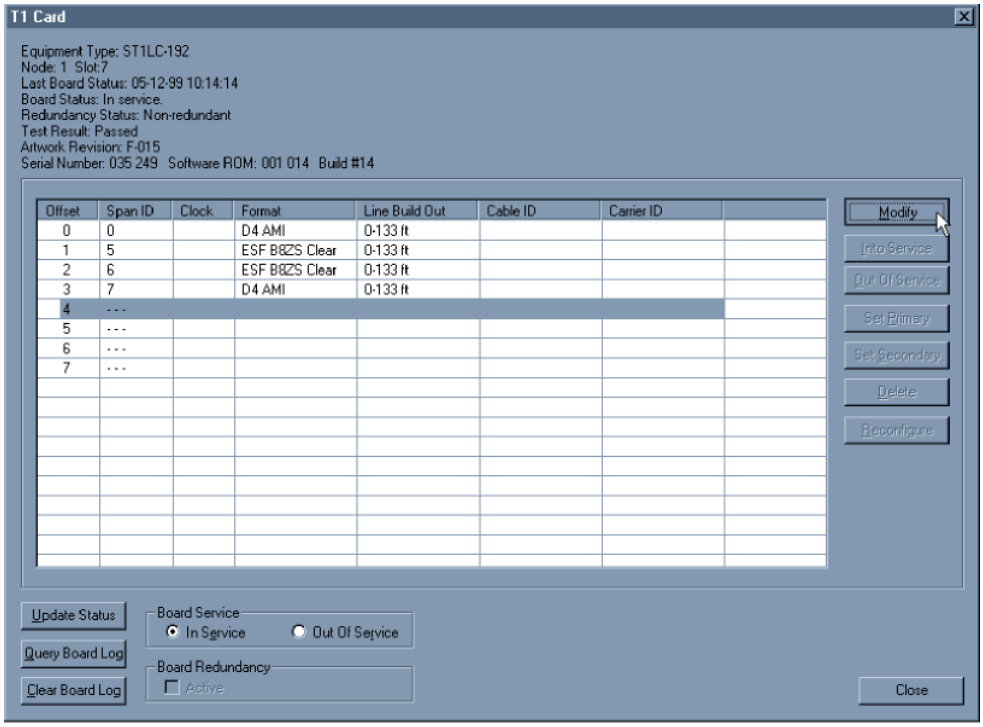


Figure 4-2
T1 Span Attributes screen activation

The following information appears in the *T1 Span Attributes* screen:

Offset field

This field indicates the physical T1 span, or offset, you selected in the *T1 Card* screen that holds channels you want to put in service.

NOTE—Excel Switching numbers its offsets from zero. An eight-span E1 card, for example, has eight offsets numbered 0 through 7.

Span ID list

This list indicates the logical identity of the selected physical T1 span, or offset, holding channels you want to put into service. Your ***required*** input is limited to the span IDs in this list.

NOTE— Only Span IDs not already associated with an offset are listed.

Not Assigned checkbox

This checkbox, when checked, deletes the specified span after you click the OK button.

Cable ID field

This field indicates an identity of this T1 span's physical cable. Your ***optional*** input is limited to 14 alphanumeric characters.

Note—A label on the cable matching this Cable ID will help you locate the cable if you need to move or replace it.

Carrier ID field

This field indicates an identity of the carrier providing service to this T1 span. Your ***optional*** input is limited to 14 alphanumeric characters.

Note—The Carrier ID will help you determine who to call if you need to troubleshoot a problem on this T1 span.

Note New Feature— The full Carrier ID and Cable ID is now displayed in the upper left corner of the Span/Channel State screen

Framing list

This list indicates what framing technique occurs on this T1 span. Your ***required*** input is limited to one of the following choices:

- D4 (default). This value indicates a framing technique that uses a 12-bit frame and robs the eighth (least significant) bit of each of 24 eight-bit time slots to signal voice-related information (for example, on-hook, off-hook) per channel.
- ESF (Extended Superframe Format). This value indicates a framing technique that uses a 24-bit frame and the 193rd bit as a framing bit.

Note—If this T1 span supports ISDN or SS7 signaling, you must select "ESF."

Line Coding list

This list indicates how line coding (or suppression) occurs on this T1 span. Your ***required*** input is limited to one of the following choices:

- AMI (Alternate Mark Inversion) (default). This value indicates a coding method that alternately inverts the polarity of successive ones (that is, marks).
- B8ZS (Binary 8 Zero Substitution). This value indicates a coding method that inserts two violations rather than a one for every seven zeros.

Note—If this T1 span supports ISDN or SS7 signaling, you must select "B8ZF."

Clear Channel buttons

These buttons indicate whether this T1 span provides full 64 Kbps per channel. Your ***required*** input is limited to one of the following choices:

- (default). This value indicates this T1 span permits robbed-bit signaling and therefore cannot provide full 64 Kbps per channel.
- Yes. This value indicates this T1 span provides full 64 Kbps per channel and therefore does not permit robbed-bit signaling.

Note—If this T1 span supports ISDN or SS7 signaling, you must select "Yes ."

Line Build Out list

This list indicates the length of this T1 span for which attenuation must be compensated. Your ***required*** input is limited to one of the following choices:

- 0-133 ft (default).
- 134-166 ft.
- 167-299 ft.
- 300-533 ft.
- 534-665 ft.

Viewing T1 span attributes

Once you click the *T1 Span Attributes* screen's OK button, the T1 span attributes you have added or changed will display in the *T1 Card* screen (scrollable if the screen is more than full) across the row of the Offset identifying this T1 span.

This row divides into columns that incorporate the meanings, if not the exact labels, of the *T1 Span Attributes* screen's parameters for the selected offset.

In addition, this row includes a **Clock** column that indicates whether or how the span is involved in clocking activities of the EXS Switch chassis to which the span is connected.

The **Clock** column can show the following values:

- (blank). This value indicates the span takes its network clocking from some other T1 or E1 span in its EXS Switch chassis.
- P. This value indicates the span is the primary source of network clocking for its EXS Switch chassis.

  Note—Clicking the SET PRIMARY button will cause the selected span to be the one and only primary clock source for the entire EXS Switch chassis. If this chassis is one of many nodes, each node must get its clock separately from the same place.
- S. This value indicates the span is the secondary source of network clocking for its EXS Switch chassis and will become the primary source if the primary source fails.

  Note—Clicking the SET SECONDARY button will cause the selected span to be the one and only secondary clock source for the entire EXS Switch chassis. If this chassis is one of many nodes, each node must get its clock separately from the same place.

To put this span into service, highlight the span's row, then click the INTO SERVICE button.

*Note—To determine whether the span is actually in service, activate the Spans and Channels Status screen, then select the span's Span ID in that screen's Span list (see **Span and Channel Status screen**).*

Giving attributes to T1 channels

The channels in the span are now ready to be assigned their tone signaling attributes. The *T1 Tone Channel Attributes* screen enables you to make these assignments.

If this T1 span supports SS7, you must instead give attributes to SS7 links (see, after ***Creating SS7 Stacks*** *and* ***Creating SS7 link sets***, ***Creating SS7 Links***) *and SS7 channels called CICs (see* ***Creating CICs or SS7 Channels***).

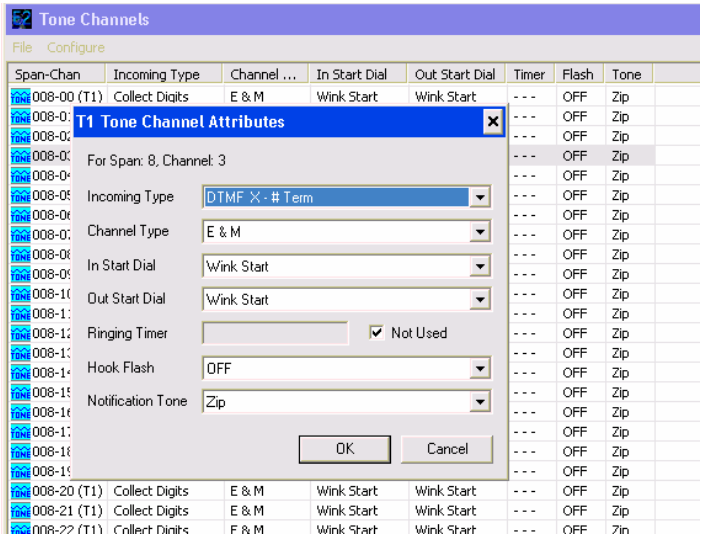


Figure 4-3
T1 Tone Channel Attributes screen layout

Selecting one or more channels of one or more T1 spans displaying in the *Tone Channels* screen, then clicking **Configure Tone Channel Attributes** in this screen's Channels menu, will activate the *T1 Tone Channel Attributes* screen (the *Tone Channels* screen itself is activated by clicking the TONE TRUNKS button in the Main Menu/Tool Bar).

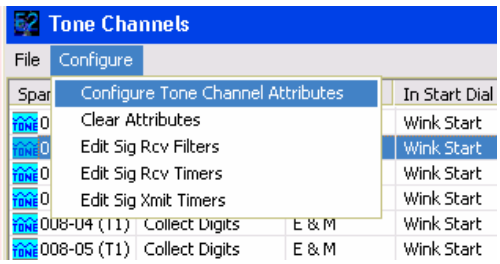


Figure 4-4 T1
Tone Channel Attributes screen activation

Note—Double-clicking a specific T1 channel will also activate the T1 Tone Channel Attributes screen.

Dragging a box around specific T1 channels will select all channels within the box (that is, the range of channels will be continuous). Start this box to the right of text in the window's leftmost column, then drag it leftward up or down, if the entire window is filled with columns; if the window does not have columns extending to the right side of the window, start this box beyond the rightmost column, then drag it leftward up or down.

Also, pressing SHIFT and clicking on specific T1 channels will select these channels and all channels in between (that is, the range of channels will be continuous). Alternatively, pressing CTRL and clicking on specific T1 channels will select only these specific channels (that is, the range of channels will be discontinuous).

Right-clicking a selected T1 channel, then selecting Configure Tone Channel Attributes, will also activate the T1 Tone Channel Attributes screen.

Selected channels must be on the same type of channel.

The attributes you select in the T1 Tone Channel Attributes screen will apply to all T1 channels in the T1 span(s) you selected in the Tone Channels screen.

The following information appears in the *T1 Tone Channel Attributes* screen:

Incoming Type list

This list indicates how an incoming call seizes a channel and how the call's digits are collected. Your ***required*** input is limited to the choices described in ***Appendix A – Incoming Types***.

.

Channel Type list

This list indicates the type of channel that is compatible with the configuration of equipment at the channel's far end. Your ***required*** input is limited to the following choices:

For analog channels:

- DID (Direct Inward Dialing). This value indicates the channel routes a call made outside a company to an extension within that company without passing through an operator or attendant.
- DPO (Dial Pulse Originating). This value indicates the channel sends rotary dialing to the far end.
- DPT (Dial Pulse Terminating). This value indicates the channel receives rotary dialing from the far end.

For T1/E1:

- E & M (default). This value indicates the channel exchanges signals between near and far end using separate leads (E & M) or digital bits (A & B).

  Note—*If this channel is connected to a VRU, you must select "E & M."*

- FXO Grd (Foreign Exchange Office Ground). This value indicates the channel sends signals, including a ring lead to indicate line seizure, as if from subscriber-end station equipment employing ground start to central office equipment.

- FXO Loop (Foreign Exchange Office Loop). This value indicates the channel sends signals, including a loop closure to indicate line seizure, as if from subscriber-end station equipment employing loop start to central office equipment.
- FXS Grd (Foreign Exchange Station Ground). This value indicates the channel sends signals, including talk battery and switched ringing current, as if from central office to subscriber-end station equipment employing ground start, and receives a ring lead ground start.
- FXS Loop (Foreign Exchange Station Loop). This value indicates the channel sends signals, including talk battery and switched ringing current, as if from central office employing loop start to subscriber-end station equipment, and receives a loop start seizure from a phone.

InStart Dial list

This list indicates how to start a channel's incoming call that is compatible with equipment at the channel's far end through which the call is being made. Your ***required*** input is limited to the following choices:

- Delay Dial. This value indicates the EXS Switch goes off-hook when a channel is seized (that is, receives a request for service) and remains in this state until connection with a receiver, then goes on-hook at connection and waits for the far end to send digits.
- Dial Tone. This value indicates the EXS Switch goes off-hook when a channel is seized (that is, receives a request for service) and remains in this state through connection with a receiver, through playing of dial tone to the far end and through receipt of digits sent from the far end.
- Immediate. This value indicates the EXS Switch goes off-hook when a channel is seized (that is, receives a request for service) and remains in this state through connection with a receiver and the immediate receipt of digits sent from the far end.

  Note—*If this channel is connected to a VRU, you must select "Immediate."*
- None (default). This value indicates no method has been assigned (no method is required to start an ISDN B Channel's incoming call).
- Wink Start. This value indicates the EXS Switch connects with a receiver when a channel is seized (that is, receives a request for service), then sends an off-hook/on-hook (that is, a "wink") to cause the far end to send its digits.

Out Start Dial list

This list indicates how to start a channel's outgoing call that is compatible with equipment channel's far end to which the call is being made. Your ***required*** input is limited to the following choices:

- Delay Dial. This value indicates the EXS Switch seizes (that is, requests service of) an outgoing channel and waits for the far end to go off-hook, then back on-hook, after which the switch sends digits to the far end in a format determined by the channel's digit table information.
- Dial Tone. This value indicates the EXS Switch seizes (that is, requests service of) an outgoing channel and waits for the far end to play dial tone, after

which the switch sends digits to the far end in a format determined by the channel's digit table information.

- Immediate. This value indicates the EXS Switch seizes (that is, requests service of) an outgoing channel and immediately sends digits to the far end in a format determined by the channel's digit table information.

  Note—*If this channel is connected to an VIC VRU, you must select "Immediate."*

- None (default). This value indicates no method has been assigned (no method is required to start an ISDN B Channel's outgoing call).
- Wink Start. This value indicates the EXS Switch seizes (that is, requests service of) an outgoing channel and waits for the far end to sends an off-hook/on-hook (that is, a "wink"), after which the switch sends digits to the far end in a format determined by the channel's digit table information.

Not Used checkbox

This checkbox, when checked, disables the Ringing Timer.

Ringing Timer field

This field indicates how many seconds of ringing can occur before billing starts on the T1 channel. Your ***required*** input is limited to 0-99.

Hookflash list

This list indicates whether this channel supports the momentary depression of a receiver button to signal for service (for example, a call to an operator, or the transfer of a call). Your ***required*** input is limited to the following choices:

- OFF (default). This value indicates this channel does not support hookflash.
- ON. This value indicates this channel supports hookflash.

Notification Tone list

This list indicates how calls on this T1 channel are made distinctive to an operator so that operator can respond with an appropriate brand. Your ***optional*** input is limited to the following choices:

- Beep (default). This value indicates the operator hears a beep tone
- Zip. This value indicates the operator hears a zip tone.

Note—*This list is meaningful only when this channel's Completion Type is set to "Operator" (see* ***Completion Type list****).*

Viewing attributes of all T1 channels

Once you click the *T1 Tone Channel Attributes* screen's OK button, the T1 channel attributes you have added or changed will display in the *Tone Channels* screen (scrollable if the screen is more than full) across the row of the Span-Chan identifying this T1 channel.

This row divides into columns that incorporate the meanings, if not the exact labels, of

the *T1 Tone Channel Attributes* screen's attributes for the selected T1 channel.

Note—If a selected Span-Chan refers instead to an E1 channel, columns will reflect attributes for this kind of channel.

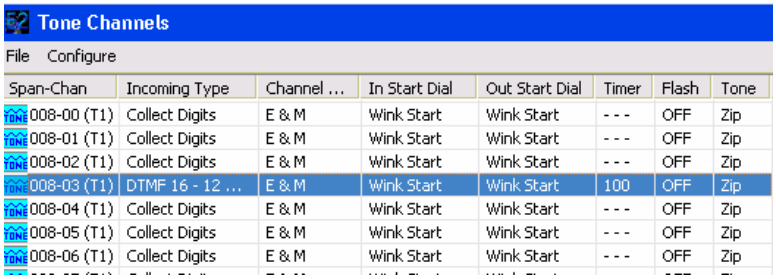


Figure 4-5 T1
Tone Channel screen layout

Changing reception filters

Dynamis Corporation configures reception filters with values specified in AT&T Publication 43801 and Bellcore TR-TSY-000506. You will need to change these default values only if networks to which your channels are connected do not follow these specifications.

Warning

Changing filters can stop call processing. Dynamis Corporation strongly advises you to consult WCS or Dynamis' Customer Engineering personnel before changing filter values.

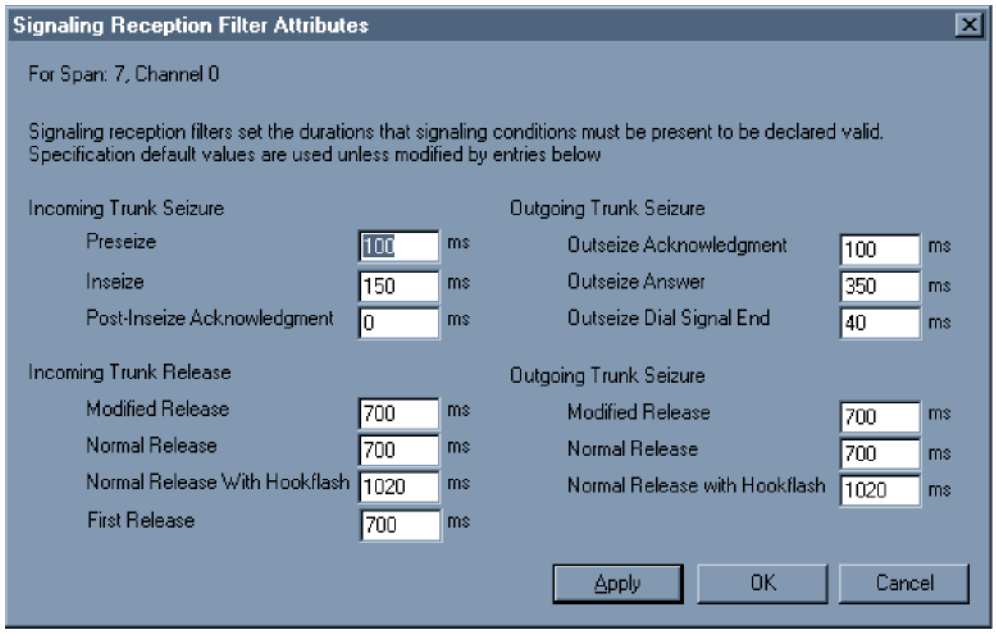


Figure 4-6
Signaling Reception Filter Attributes screen layout

Selecting one or more channels of one or more T1 spans displaying in the *Tone Channels* screen, then clicking **Edit Sig Rcv Filters** in this screen's Channels menu, will activate the *Signaling Reception Filter Attributes* screen (the *Tone Channels* screen itself is activated by clicking the TONE TRUNKS button in the Main Menu/Tool Bar).

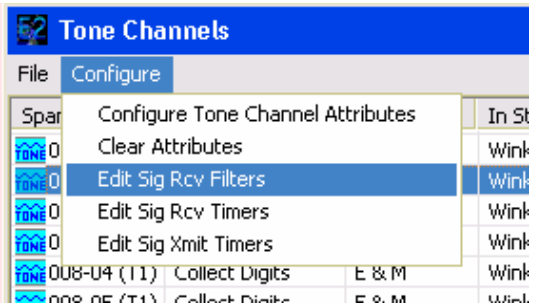


Figure 4-7
Signaling Reception Filter Attributes screen activation

Changing reception timers

Dynamis Corporation configures reception timers with values specified in AT&T Publication 43801 and Bellcore TR-TSY-000506. You will need to change these default values only if networks to which your channels are connected do not follow these specifications.

Warning

Changing timers can stop call processing. Dynamis Corporation strongly advises you to consult WCS or Dynamis' Customer Engineering personnel before changing timer values.

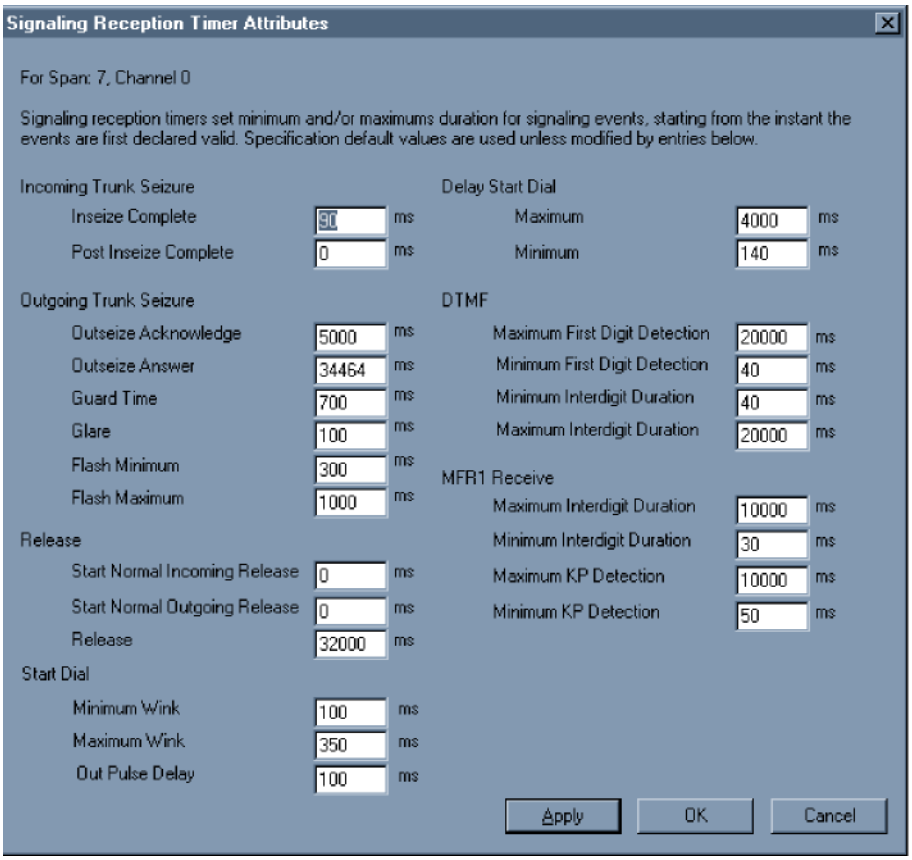


Figure 4-8
Signaling Reception Timer Attributes screen layout

Selecting one or more channels of one or more T1 spans displaying in the *Tone Channels* screen, then clicking **Edit Sig Rcv Timers** in this screen's Channels menu, will activate the *Signaling Reception Timer Attributes* screen (the *Tone Channels* screen itself is activated by clicking the TONE TRUNKS button in the Main Menu/Tool Bar).

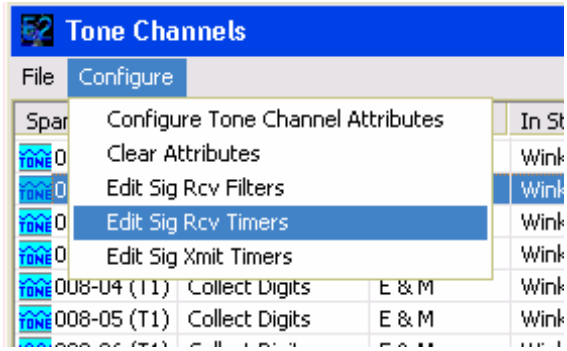


Figure 4-9
Signaling Reception Timer Attributes screen activation

Changing transmission timers

Excel Switching Corporation configures transmission timers with values specified in AT&T Publication 43801 and Bellcore TR-TSY-000506. You will need to change these default values only if networks to which your channels are connected do not follow these specifications.

Warning

Changing timers can stop call processing. Dynamis Corporation strongly advises you to consult Dynamis' Customer Engineering personnel before changing timer values.

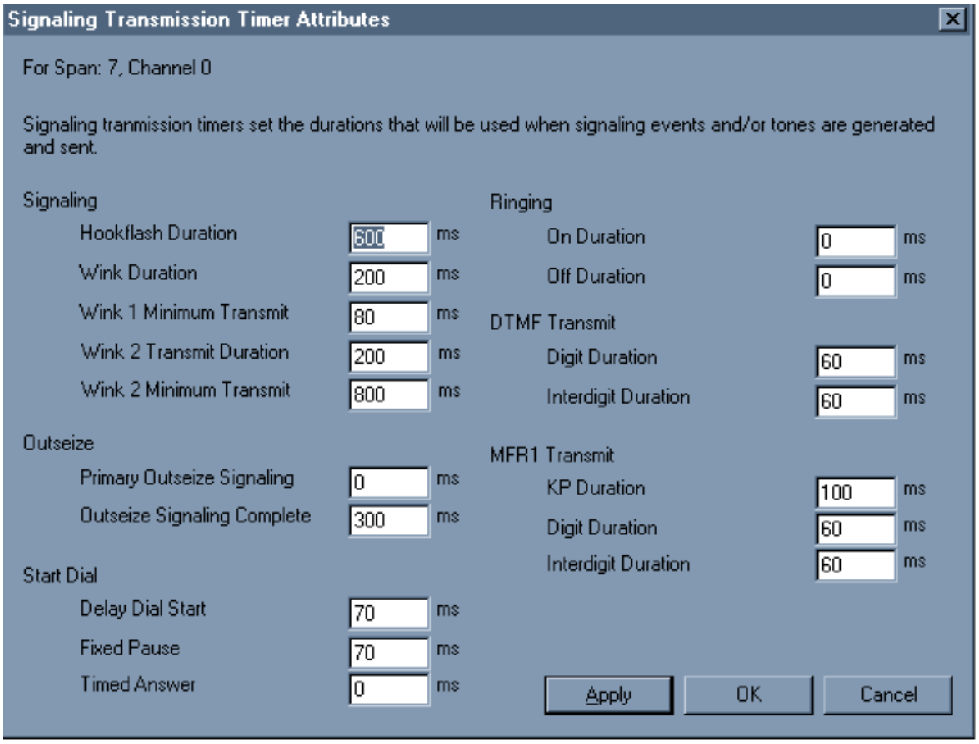


Figure 4-10
Signaling Transmission Timer Attributes screen layout

Selecting one or more channels of one or more T1 spans displaying in the *Tone Channels* screen, then clicking **Edit Sig Xmit Timers** in this screen's Channels menu, will activate the *Signaling Transmission Timer Attributes* screen (the *Tone Channels* screen itself is activated by clicking the TONE TRUNKS button in the Main Menu/Tool Bar).

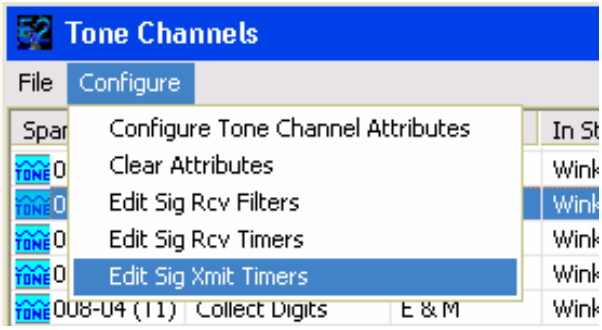


Figure 4-11
Signaling Transmission Timer Attributes screen activation

E1: Configuring & Putting E1 Channels into Service

Configuring E1 channels requires you to specify the E1 span that holds one, some , or all of this span's 30 voice channels (internally numbered 00 through 29) you want in service, then to assign tone attributes to channels you select in the specified span.

Activating an E1 span

The *E1 Span Attributes* screen enables you to specify an E1 span, one span at a time, holding channels you want to put into service.

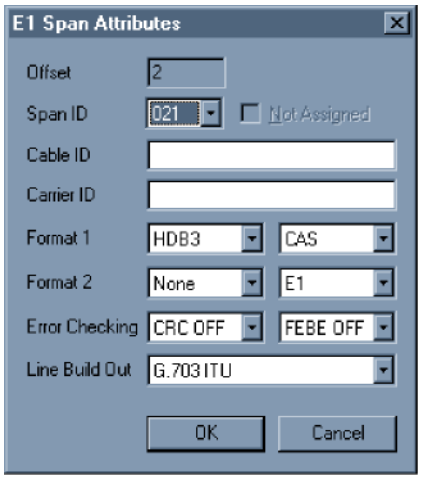


Figure 4-12
E1 Span Attributes screen layout

Clicking the MODIFY button in the *E1 Card* screen (itself activated by clicking **View by Type, View by Slot ID,** or **View by Node** in the Main Menu/Tool Bar's Equipment menu, then a specific E1 card) will activate this screen.

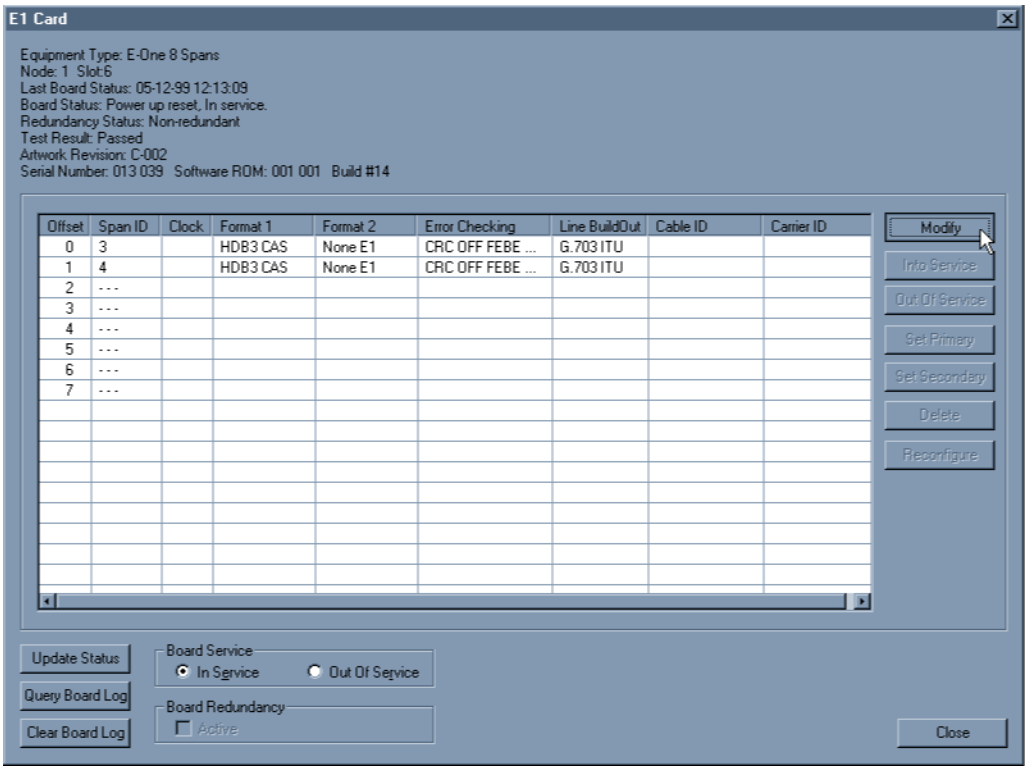


Figure 4-13 E1
Span Attributes screen activation

The following information appears in the *E1 Span Attributes* screen:

Offset field

This field indicates the physical E1 span, or offset, you selected in the *E1 Card* screen that holds channels you want to put in service.

NOTE—Excel Switching numbers its offsets from zero. An eight-span E1 card, for example, has eight offsets numbered 0 through 7.

Span ID list

This list indicates the logical identity of the selected physical E1 span, or offset, holding channels you want to put into service. Your ***required*** input is limited to the span IDs in this list.

NOTE— Only Span IDs not already associated with an offset are listed.

Not Assigned checkbox

This checkbox, when checked, deletes the specified span after you click the OK button.

Cable ID field

This field indicates an identity of this E1 span's physical cable. Your ***optional*** input is limited to 14 alphanumeric characters.

Note—A label on the cable matching this Cable ID will help you locate the cable if you need to move or replace it.

Carrier ID field

This field indicates an identity of the carrier providing service to this E1 span. Your ***optional*** input is limited to 14 alphanumeric characters.

Note—The Carrier ID will help you determine who to call if you need to troubleshoot a problem on this E1 span.

Note New Feature— The full Carrier ID and Cable ID is now displayed in the upper left corner of the Span/Channel State screen

Format 1 list (leftmost)

This list indicates how coding occurs on this E1 span. Your ***required*** input is limited to the following choices:

- AMI (Alternate Mark Inversion) (default). This value indicates a coding method that alternately inverts the polarity of successive ones (that is, marks).
- HDB3 (High Density Bipolar 3). This value indicates a coding method that does not allow three consecutive zeros.
  Note—If you select ISDN in the leftmost Format 2 list. If you select E1 in the leftmost Format 2 list to support SS7 traffic, you must select "HDB3 ". If this E1 span connects to an VIC VR U, you must select "HDB3 ".

Format 1 list (rightmost)

This list indicates how signaling occurs on this E1 span. Your ***required*** input is limited to the following choices:

- CAS (Channel Associated Signaling) (default). This value indicates that CAS occurs on this E1 span.

  Note—If this E1 span connects to an VIC VRU, you must select "CAS".

- CLEAR (Clear Channel). This value indicates that CAS does not occur on this E1 span.
  Note—If you select ISDN in the leftmost Format 2 list, you must select "CLEAR." If you select E1 in the leftmost Format 2 list to support SS7 traffic, you must select "CLEAR."

Format 2 list (leftmost)

This list indicates how transmission occurs on this E1 span. Your ***required*** input is limited to the following choices:

- All 0s. This value indicates only zeros are sent on this E1 span.
- None (default). This value indicates transmission occurs normally on this E1 span.

Note—If this E1 span connects to an VIC VRU, you must select "None." If you select E1 in the leftmost Format 2 list to support SS7 traffic, you must select "None."

Format 2 list (rightmost)

This list indicates how the protocol layer is managed on this E1 span. Your ***required*** input is limited to the following choices:

- E1 (default). This value indicates this E1 span is subject to E1 protocol.

  Note— If this E1 span connects to an VIC VRU, you must select "E1". You must select "E1" if this span supports SS7.

- ISDN. This value indicates this E1 span is subject to Euro-ISDN protocol.

Error Checking list (leftmost)

This list indicates whether this E1 span is subject to a cyclic redundancy check (CRC). Your ***required*** input is limited to the following choices:

- CRC OFF (default). This value indicates this E1 span is not subject to a cyclic redundancy check.

  Note—If this E1 span connects to an VIC VRU, you must select "CRC OFF."

- CRC ON. This value indicates this E1 span is subject to a cyclic redundancy check.

  Note—If you select ISDN in the leftmost Format 2 list, you must select "CRC ON". If you select E1 in the leftmost Format 2 list to support SS7 traffic, you must select "CRC ON."

Error Checking list (rightmost)

This list indicates whether this E1 span is subject to a far end block error (FEBE). Your ***required*** input is limited to the following choices:

- FEBE OFF (default). This value indicates this E1 span is not subject to a far end block error.

  Note—If this E1 span connects to an VIC VRU, you must select "FEBE OFF."

- FEBE ON. This value indicates this E1 span is subject to a far end block error.

  Note—If you select ISDN in the leftmost Format 2 list, you must select "FEBE ON." If you select E1 in the leftmost Format 2 list to support SS7 traffic, you must select "FEBE ON."

Line Build Out list

This list indicates the length of this E1 span for which attenuation must be compensated. Your ***required*** input is limited to one of the following choices:

- 0-133 ft.
- 134-166 ft.
- 167-299 ft.
- 300-533 ft.
- 534-665 ft.
- G. 703 ITU.

Note—If you select ISDN in the leftmost Format 2 list, you must select "G.703 ITU." If this E1 span connects to an VIC VRU, you must select "G. 703."

Viewing E1 span attributes

Once you click the *E1 Span Attributes* screen's OK button, the E1 span attributes you have added or changed will display in the *E1 Card* screen (scrollable if the screen is more than full) across the row of the Offset identifying this E1 span.

This row divides into columns that incorporate the meanings, if not the exact labels, of the *E1 Span Attributes* screen's parameters for the selected offset. In addition, this row includes a **Clock** column that indicates whether or how the span is involved in clocking activities of the EXS Switch chassis to which the span is connected.

The **Clock** column can show the following values:

- (blank). This value indicates the span takes its network clocking from some other T1 or E1 span in its EXS Switch chassis.
- P. This value indicates the span is the primary source of network clocking for its EXS Switch chassis.

  Note—Clicking the SET PRIMARY button will cause the selected span to be the one and only primary clock source for the entire EXS Switch chassis. If this chassis is one of many nodes, each node must get its clock separately from the same place.
- S. This value indicates the span is the secondary source of network clocking for its EXS Switch chassis and will become the primary source if the primary source fails.

Note—Clicking the SET SECONDARY button will cause the selected span to be the one and only secondary clock source for the entire EXS Switch chassis. If this chassis is one of many nodes, each node must get its clock separately from the same place.

To put this span into service, highlight the span's row; then click the INTO SERVICE button.

You must specify at least one E1 span for every switch in the telephone network to and from which your EXS Switch directly carries calls subject to SS7 control. You must also specify at least one E1 span for every switch in an SS7 network to and from which your EXS Switch directly exchanges SS7 control messages.

*Note—To determine whether the span is actually in service, activate the Spans and Channels Status screen, then select the span's Span ID in that screen's Span list (see **Span and Channel Status screen**.*

Giving attributes to E1 channels

The channels in the span are now ready to be assigned their tone signaling attributes. The *E1 Tone Channel Attributes* screen enables you to make these assignments.

Note—If this E1 span supports SS7, you must instead give attributes to SS7 links (see, after ***Creating SS7 Stacks*** and **Creating SS7 link sets**, ***Creating SS7 Links***) and SS7 channels called CICs (***Creating CICs or SS7 Channels***).

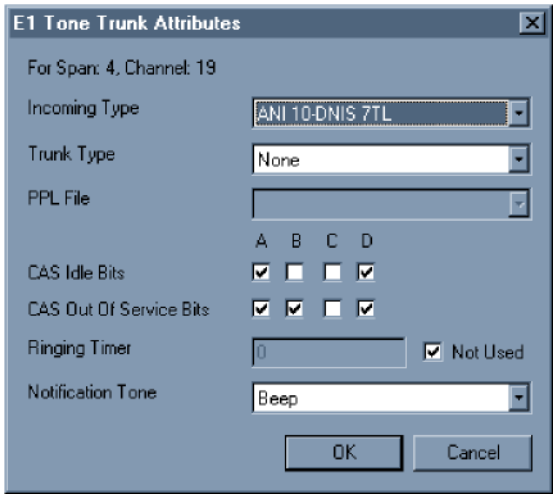


Figure 4-14 E1 Tone Channel Attributes screen layout

Selecting one or more channels of one or more E1 spans displaying in the *Tone Channels* screen, then clicking **Configure Tone Channel Attributes** in this screen's Channels menu, will activate the *E1 Tone Channel Attributes* screen (the *Tone Channels* screen itself is activated by clicking the TONE TRUNKS button in the Main Menu/Tool Bar).

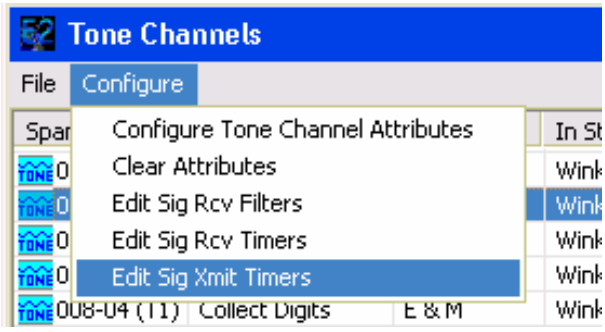


Figure 4-15 E1 Tone Channel Attributes screen activation

Note—Double-clicking a specific E1 channel will also activate the E1 Tone Channel Attributes screen.

Dragging a box around specific E1 channels will select all channels within the box (that is, the range of channels will be continuous). Start this box to the right of text in the window's leftmost column, then drag it leftward up or down, if the entire window is filled with columns; if the window does not have columns extending to the right side of the window, start this box beyond the rightmost column, then drag it leftward up or down.

Also, pressing SHIFT and clicking on specific E1 channels will select these channels and all channels in between (that is, the range of channels will be continuous). Alternatively, pressing CTRL and clicking on specific E1 channels will select only these specific channels (that is, the range of channels will be discontinuous).

Right-clicking a selected E1 channel, then clicking ***Configure Tone Channels Attributes,*** *will also activate the E1 Tone Channel Attributes screen.*

Selected channels must be on the same type of channel.

The attributes you select in the E1 Tone Channel Attributes screen will apply to all E1 channels in the E1 span(s) you selected in the Tone Channels screen.

The following information appears in the *E1 Tone Channel Attributes* screen:

Incoming Type list

This list indicates how an incoming call seizes a channel and how the call's digits are collected. Your ***required*** input is limited to the choices described in ***Appendix A – Incoming Types***

Channel Type list

This list indicates the type of channel that is compatible with the configuration of equipment at the channel's far end. Your ***required*** input is limited to the following choices:

- None (default). This value indicates no channel type has been assigned (no channel type is required for ISDN B Channels).
- PPL (Programmable Protocol Language). This value indicates the EXS Switch employs its own configuration file, based on Dynamis' Programmable Protocol Language, to control signaling on this channel.

PPL File list

This list indicates the PPL signaling configuration file that controls signaling on this channel. Your input, ***required*** if you have selected the PPL channel type, is limited to the named files in this list.

Note—If this E1 span connects to an VIC VRU, you must select "VoiceTek-4" PPL signaling configuration file.

CAS Idle Bits checkboxes

These checkboxes indicate a four-bit (ABCD) pattern to be sent across this channel to indicate the channel is idle. Your ***required*** input is limited to the following choices:

- A. This checkbox indicates the A bit is set to "1" when checked, or set to "0" when not checked.
- B. This checkbox indicates the B bit is set to "1" when checked, or set to "0" when not checked.
- C. This checkbox indicates the C bit is set to "1" when checked, or set to "0" when not checked.
- D. This checkbox indicates the D bit is set to "1" when checked, or set to "0" when not checked.

Note—Checking A and D will result in the commonly used bit pattern 1001 (hexadecimal digit "9").

CAS Out Of Service Bits checkboxes

These checkboxes indicate a four-bit (ABCD) pattern to be sent across this channel to indicate the channel is out of service. Your ***required*** input is limited to the following choices:

- A. This checkbox indicates the A bit is set to "1" when checked, or set to "0" when not checked.
- B. This checkbox indicates the B bit is set to "1" when checked, or set to "0" when not checked.
- C. This checkbox indicates the C bit is set to "1" when checked, or set to "0" when not checked.
- D. This checkbox indicates the D bit is set to "1" when checked, or set to "0" when not checked.

Note—Checking A, B and D will result in the commonly used bit pattern 1101 (hexadecimal digit "D").

Ringing Timer field

This field indicates how many seconds of ringing occur before billing starts on this E1 channel.

Your ***required*** input is limited to a number of seconds between 18 and 120.

*Note—When the **Not Used** checkbox is checked, the value in this field is zero. When unchecked, this checkbox displays a default 30 seconds.*

Not Used checkbox

This checkbox, when checked, disables the Ringing Timer.

Notification Tone list

This list indicates how calls on this E1 channel are made distinctive to an operator so that operator can respond with an appropriate brand. Your ***optional*** input is limited to the following choices:

- Beep (default). This value indicates the operator hears a beep tone.
- Zip. This value indicates the operator hears a zip tone.

*Note—This list is meaningful only when this channel's Completion Type is set to "Operator" (see **Completion Type list**.).*

Viewing attributes of all E1 Channels

Once you click the *E1 Tone Channel Attributes* screen's OK button, the E1 channel attributes you have added or changed will display in the *Tone Channels* screen (scrollable if the screen is more than full) across the row of the Span-Chan identifying this E1 channel.

This row divides into columns that incorporate the meanings, if not the exact labels, of the *E1 Tone Channel Attributes* screen's attributes for the selected E1 channel.

Note—If a selected Span-Chan refers instead to a T1 channel, columns will reflect attributes for this kind of channel.

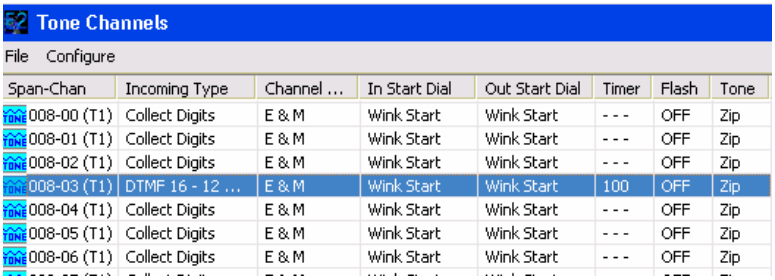


Figure 4-16
Tone Channels screen layout (for E1 Channels)

ISDN: Configuring and Putting ISDN PRI Channels Into Service

Configuring ISDN channels requires you to specify a T1 or E1 span that will become an ISDN PRI span holding the ISDN PRI B Channels you want in service, then to assign attributes to the ISDN D Channel that will control signaling on B Channels in this and perhaps other specified T1 or E1 spans, then to assign attributes to the B Channels themselves.

Once you have activated a span you intend to support ISDN PRI service (see ***Activating a T1 span*** or ***Activating an E1 span***, you must associate an ISDN D Channel resource in the ISDN card (itself pooling 32 such D Channel resources) with this span. The *Add ISDN Primary D Channel* screen enables you to make this association.

Note—In an EXNET ring, D Channel resources of one node's ISDN card cannot be associated with T1 or E1 spans of another node.

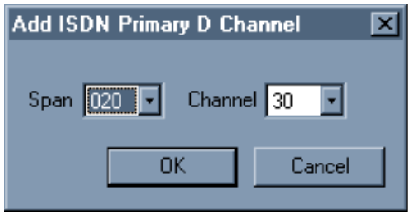


Figure 4-17

Add ISDN Primary D Channel screen layout

Clicking the ADD D CHAN button in the *ISDN Card* screen (itself activated by clicking **View by Type, View by Slot ID,** or **View by Node** in the Main Menu/Tool Bar's Equipment (menu) with this screen's Configure D Channel Parameters button engaged, then a specific channel in a span, will activate this screen.

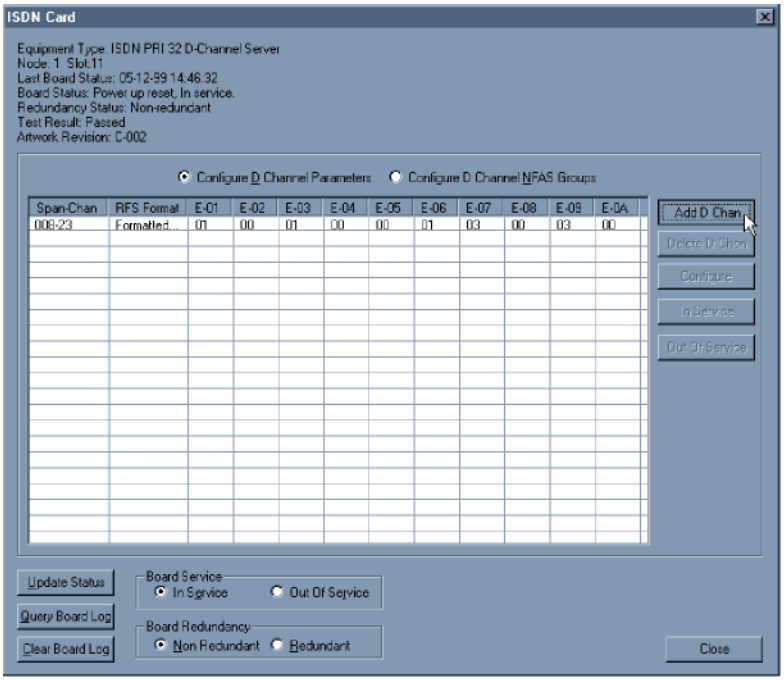


Figure 4-18

Add ISDN Primary D Channel screen activation

The following information appears in the *ISDN D Channel Parameters* screen:

Span list

This list indicates a span supporting ISDN PRI service. Your ***required*** input is limited to the span IDs in this list.

Channel list

This list indicates the channel in a span supporting ISDN PRI service that is the D Channel. Your ***required*** input is limited either to any channel (but typically channel 24, internally numbered 23) for ISDN PRI service on an actual T1 span, or to channel 30 (internally numbered 29) for ISDN PRI service on an E1 span (channel 30 is timeslot 16 on an actual E1 span).

Note—Channels in the span not specified as a D Channel automatically become B Channels.

Assigning attributes to D Channel

Once you have associated a D Channel with a span that will support ISDN PRI service, you must assign attributes to this channel. The *ISDN D Channel Parameters* screen enables you to## assign these attributes to the selected channel:

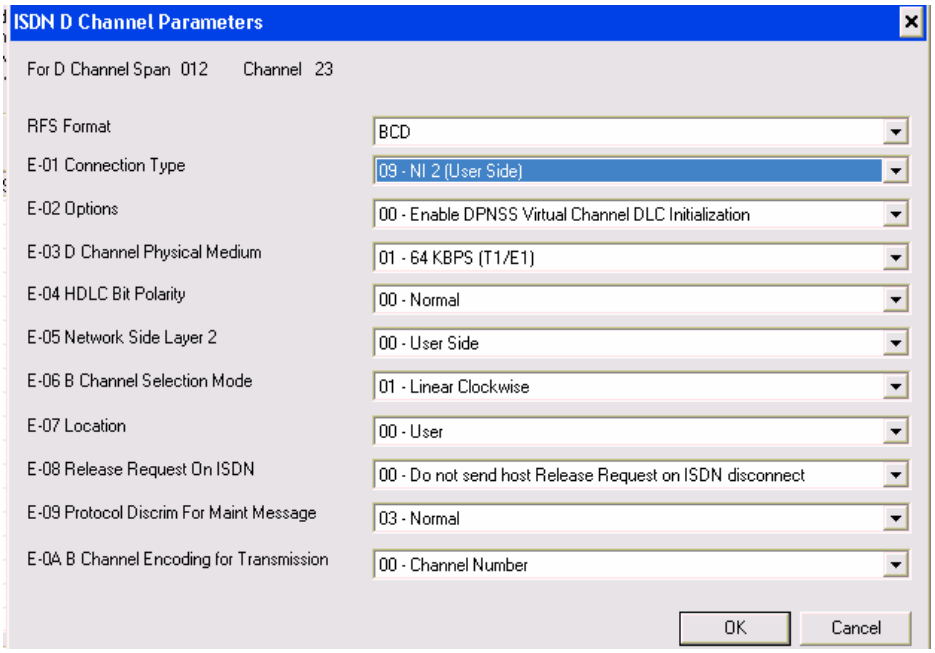


Figure 4-19
ISDN D Channel Parameters screen layout

Clicking the CONFIGURE button in the *ISDN Card* screen (itself activated by clicking **View by Type, View by Slot ID,** or **View by Node** in the Main Menu/Tool Bar's Equipment menu, then a specific ISDN card) will activate this screen for the selected D Channel.

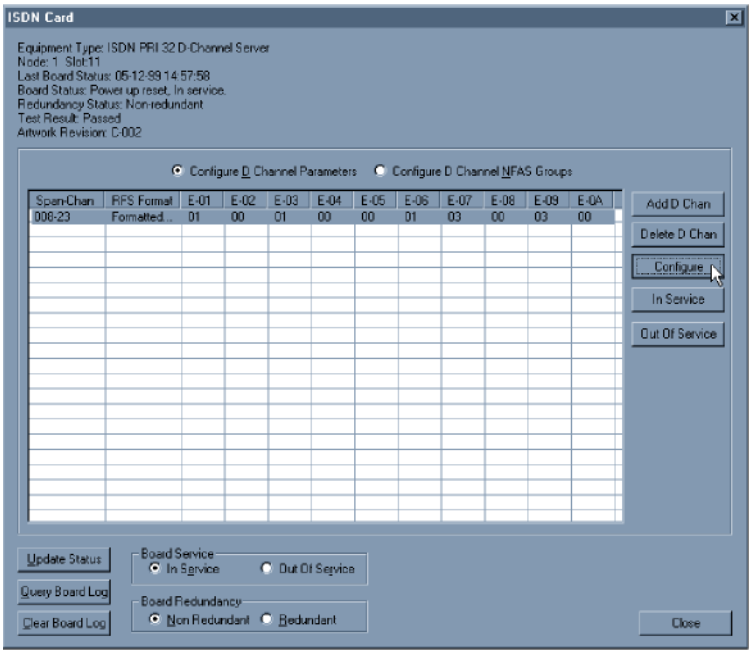


Figure 4-20
ISDN D Channel Parameters screen activation

The following information appears in the *ISDN D Channel Parameters* screen:

RFS Format list

This list indicates how a Request for Service is formatted for this D Channel. Your ***required*** input is limited to the following choices:

- BCD (Binary Coded Decimal; default). This value indicates a Request for Service is formatted in four-bit digits on this D Channel.
- Formatted IE. This value indicates a Request for Service is formatted as a data field in a Layer 3 message on this D Channel.

E-01 Connection Type list

This list indicates the standard connection type to which this D channel conforms. Your ***required*** input is limited to the following choices:

- 01- AT&T 4ESS Q.931 PRI User Side (default). This value indicates the D Channel conforms to the AT&T 4ESS standard for ISDN PRI as a user (in the User-Network interface) and will exchange Q.931-specified call control messages at 64 Kbps with any switch conforming to this standard.
- 02 - AT&T 5ESS Q.931 PRI User Side Custom. This value indicates the D Channel conforms to the AT&T 5ESS standard for ISDN PRI as a user (in the User-Network Interface) and will on connection exchange Q.931-specified call control messages at 64 Kbps with any switch conforming to this standard.
- 03 - Northern Tel DMS-100 Q.931 PRI User Side Custom. This value indicates the D Channel conforms to the Nortel DMS-100 standard for ISDN PRI as a user (in the User-Network Interface) and will exchange Q.931-specified call control messages at 64 Kbps with any switch conforming to this standard.

- 04 – Northern Telecom DMS – 250 Q 931 PRI User Side – Custom – New to 2007
- 05 – AUSTEL – New to 2007
- 06 - JATE (INS 1500). This value indicates the D Channel conforms to the Japanese INS-1500 standard for ISDN PRI as a user (in the User-Network Interface) and will exchange Q.931-specified call control messages at 64 Kbps with any switch conforming to this standard.
- 07 - Euro-ISDN (include French and German Delta). This value indicates the D Channel conforms to the Euro-ISDN standard for ISDN PRI (including French and German variants) as a user in the User-Network Interface and will exchange Q.931-specified call control messages at 64 Kbps with any switch conforming to this standard.
- 09 – NI 2 (User Side) – New to 2007
- 19 – NI 2 (Network Side) – New to 2007

E-02 Options list

This list indicates an option associated with this D Channel. Your ***required*** input is limited to the following choices:

- 00 - None (default).
  - 01 - Send Extract 12 Frames to Host in a Diag indication.

E-03 D Channel Physical Medium list

This list indicates the physical medium of this D Channel. Your ***required*** input is limited to the following choice:

- 01 - 64 KBPS (T1/E1) (default). This value indicates the physical medium for this D Channel is a T1 or E1 span.

E-04 HDLC Bit Polarity list

This list indicates the HDLC (High-level Data Link Control) bit polarity for this D Channel. Your ***required*** input is limited to the following choices:

- 00 - Normal (default). This value indicates this D Channel's bit polarity is normal.
- 01 - Inverted. This value indicates this D Channel's bit polarity is inverted. (typically used with D4 and AMI line coding on T1 spans).

E-05 Network Side Layer 2 list

This list indicates the type of terminal equipment this D Channel emulates in exchanging data with the network. Your *required* input is limited to the following choices:

- 00 - User Side (default). This value indicates this D Channel emulates subscriber terminal equipment in an ISDN connection.
- 01 - Network Side. This value indicates this D Channel emulates the central office terminal equipment in an ISDN connection (C/R bit is inverted).

E-06 B Channel Selection Mode list

This list indicates the order in which this D Channel will hunt for an available B Channel. Your ***required*** input is limited to the following choices:

- 00 - Disable. This value indicates this D Channel does not hunt for an available B Channel.
- 01 - Linear Clockwise.
- 02 - Linear Counter Clockwise.
- 03 - Circular Clockwise.
- 04 - Circular Counter Clockwise.

E-07 Location list

This list indicates the location of your EXS Switch that will be sent on this D Channel when a call control event (particularly a release) occurs. Your ***required*** input is limited to the following choices:

- 00 - User.
- 01 - Private Network Serving Local User.
- 02 - Public Network Serving Local User.
- 03 - Transit Network..
- 04 - Public Network Serving Remote User.
- 05 - Private Network Serving Remote User.
- 07 - International Network.
- 0A - Network Beyond Interworking Point.

E-08 Release Request On ISDN list

This list indicates whether the Host requests a release by this D Channel when a B Channel's far end disconnects. Your ***required*** input is limited to the following choices:

- 00 - Do not send host release request on ISDN disconnect.

E-09 Protocol Discrim Maint Message list

This list indicates how maintenance messages are passed on this D Channel. Your ***required*** input is limited to the following choice:

- 03 - Normal.

E-0A B Channel Encoding for Transmission

This list indicates how B Channels are encoded for transmission. Your ***required*** input is limited to the following choices:

- 00 - Channel Number.
- 01 - Slot Map.

NFAS: Associating D Channel with up to 10 T1 Spans

Instead of associating one D Channel per T1 or E1 span (an arrangement called ISDN Facility Associated Signaling or FAS), you may want the same D Channel to control signaling on up to 10 spans (T1 spans only) (a cost-effective arrangement called ISDN Non-Facility Associated Signaling or NFAS in which a full NFAS group can have a D Channel/B Channel Ratio of 1:239). The *NFAS Span Association* screen enables you to view spans whose signaling will be controlled by the same D channel.

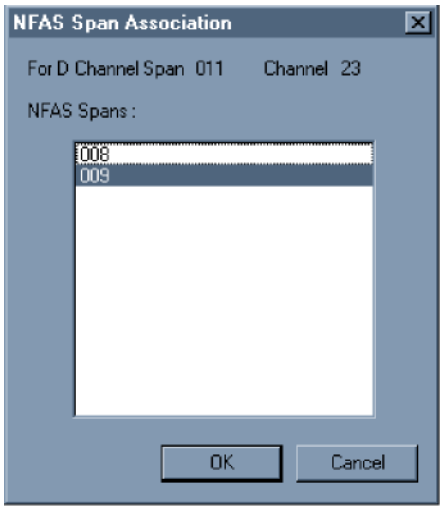


Figure 4-21
NFAS Span Association screen layout

Clicking the NFAS SPANS button in the *ISDN Card* screen (itself activated by clicking **View by Type, View by Slot ID,** or **View by Node** in the Main Menu/Tool Bar's Equipment menu) with this screen's Configure D Channel NFAS Groups button engaged, then up to nine specific spans, will activate this screen and add the selected spans to it.

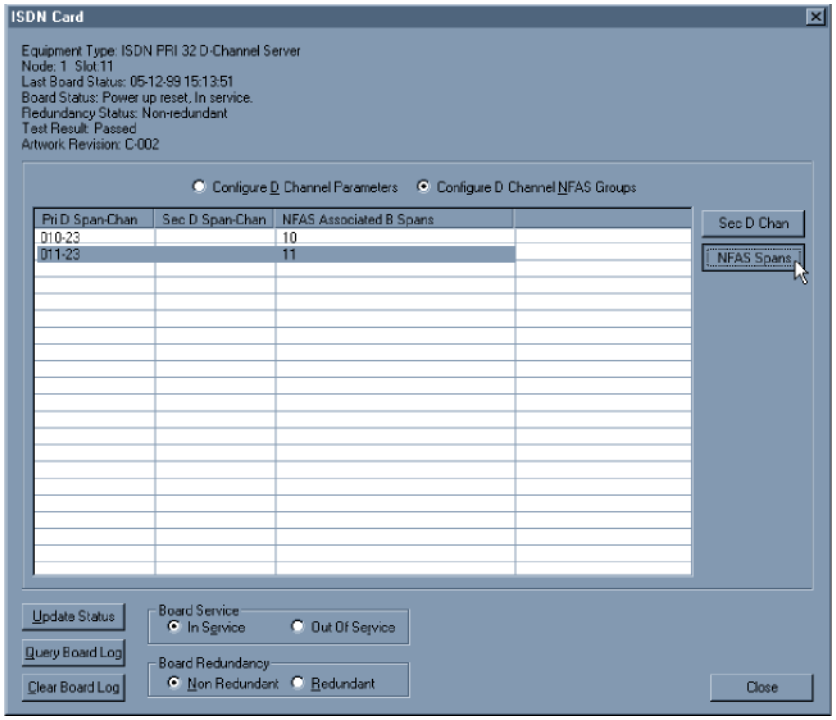


Figure 4-22
NFAS Span Association screen activation

The following information appears in the *NFAS Span Association* screen:

NFAS Spans field

This field indicates all T1 spans that are part of the same Non-Facility Associated Signaling group.

Backing up NFAS group's D Channel

Instead of losing an NFAS group's B Channels on failure of their one D Channel, you can create a redundant D Channel on a second T1 span within the same NFAS group (redundancy results in a D Channel/B Channel ratio of 2:238). The *Add ISDN Secondary D Channel* screen enables you to select a channel in a second T1 span that will serve as a backup D channel.

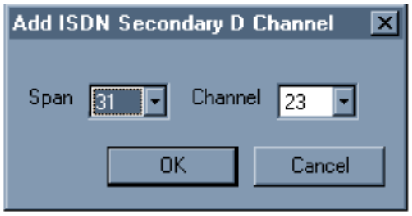


Figure 4-23
Add ISDN Secondary D Channel screen layout

Clicking the SEC D CHAN button in the *ISDN Card* screen (itself activated by clicking **View by Type, View by Slot ID,** or **View by Node** in the Main Menu/Tool Bar's Equipment menu) with this screen's Configure D Channel NFAS Groups button engaged, then an available D Channel, will activate this screen.

The following information appears in the *Add ISDN Secondary D Channel* screen:

Span list

This list indicates a span supporting ISDN PRI service (other than the span holding the primary D Channel with which this secondary D Channel is associated). Your ***required*** input is limited to the span IDs in this list.

Channel list

This list indicates the channel that is the backup or secondary D Channel of the primary D Channel you have assigned (see ***NFAS: Associating D Channel with up to 10 T1 spans***. Your ***required*** input is limited either to any channel (but typically channel 24, internally numbered 23) for ISDN PRI service on an actual T1 span, or to channel 30 (internally numbered 29) for ISDN PRI service on an E1 span (channel 30 is timeslot 16 on an actual E1 span).

Assigning attributes to B Channels

Once you have assigned attributes to the D Channel, and perhaps created NFAS groups and secondary D Channels, you must assign attributes to the B Channels associated with this D Channel. The *ISDN B Channel Parameters* screen enables you to assign these attributes to these channels.

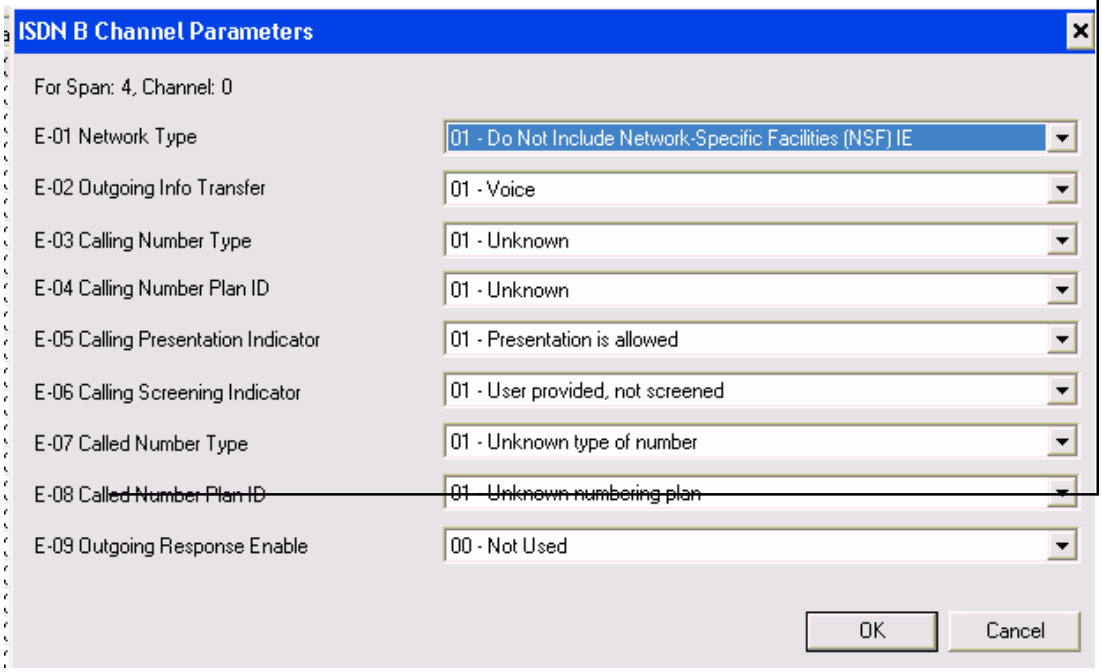


Figure 4-24
ISDN B Channel Parameters screen layout

Selecting one or more B Channels displaying in the *ISDN B Chan's* screen, then selecting **B Channel Configuration** in this screen's B Channel menu, will activate the *ISDN B Channel Parameters* screen (itself activated either by clicking **B Chan Configure** in the ISDN menu in the Main Menu/Tool Bar, or by clicking the ISDN B CHAN'S button in the Main Menu/Tool Bar).

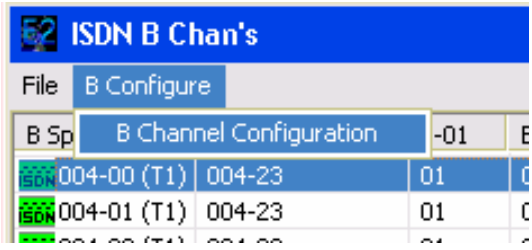


Figure 4-25
ISDN B Channel Parameters screen activation

The following lists appear in the *ISDN B Channel Parameters* screen:

E-01 Network Type list

This list indicates the B Channel's default network for outbound calls. Your ***required*** input is limited to the following choices:

- 01 - Do Not Include Network-Specific Facilities (NSF) IE
- 02 - AT&T Software Defined Network.
- 03 - AT&T Megacom 800 Service.
- 04 - AT&T Megacom.
- 05 - - AT&T Accunet
- 06 - AT&T Long Distance Service.
- 07 - AT&T International 800.
- 08 - AT&T Multiquest.
- 09 - Northern Telecom Private Net.
- 0A - Northern Telecom InWats.
- 0B - Northern Telecom OutWats.
- 0C - Northern Telecom Foreign Exchange.
- 0D - Northern Telecom Tie Channel.
- 0E - Northern Telecom TRO Call.

E-02 Outgoing Info Transfer list ??

This list indicates this B Channel's default request for bearer service capability on outbound calls. Your ***required*** input is limited to the following choices:

- 01 - Voice.
- 02 - 3.1 KHz audio.
- 03 - 56 KBPS.
- 04 - 64 KBPS.
- 05 - 64 KBPS Restricted.

E-03 Calling Number Type list

This list indicates this B Channel's default identification a Calling Party type of number on outbound calls. Your ***required*** input is limited to the following choices:

- 01 - Unknown.
- 02 - International number.
- 03 - National number.
- 04 - Subscriber number.
- 05 - Abbreviated number.

E-04 Calling Number Plan ID list

This list indicates this B Channel's default identification of a Calling Party number plan on outbound calls. Your ***required*** input is limited to the following choice:

- 01 - Unknown.
- 02 - ISDN Numbering Plan/Recommendation E.164/E.163.
- 03 - Private numbering plan.
- 04 - Telephony numbering plan.

E-05 Calling Presentation Indicator list

This list indicates this B Channel's default indication for call presentation on outbound calls. Your ***required*** input is limited to the following choices:

- 01 - Presentation is allowed.
- 02 - Presentation is restricted.
- 03 - Number not available due to interworking.

E-06 Calling Screening Indicator list

This list indicates this B Channel's default indication of call screening on outbound calls. Your ***required*** input is limited to the following choices:

- 01 - User provided, not screened.
- 02 - User provided, verified and passed.
- 03 - User provided, verified and failed.
- 04 - Network provided.

E-07 Called Number Type list

This list indicates this B Channel's default identification a Called Party type of number on outbound calls. Your required input is limited to the following choices:

- 01 - Unknown type of number.
- 02 - International number.
- 03 - National number.
- 04 - Subscriber number.
- 05 - Abbreviated number.

E-08 Called Number Plan ID list

This list indicates this B Channel's default identification of a Called Party number plan on outbound calls. Your ***required*** input is limited to the following choices:

- 01 - Unknown numbering plan.
- 02 - ISDN Numbering Plan//Recommendation E.164//E.163.
- 03 - Private numbering plan.
- 04 - Telephony numbering plan.

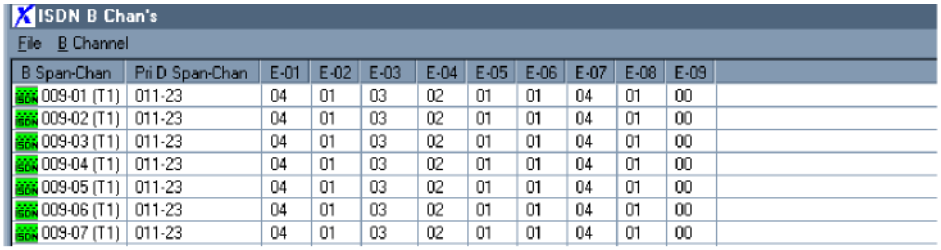
E-09 Outgoing Response Enable list

Not currently enabled.

Viewing attributes of all ISDN B Channels

Once you click the *ISDN B Channel Parameters* screen's OK button, the ISDN B Channel parameters you have added or changed will display in the *ISDN B Chan 's* screen (scrollable if the screen is more than full) across the row of the Span-Chan identifying this ISDN B Channel. This row divides into columns that incorporate the meanings, if not the exact labels, of the *ISDN B Channel Parameters* screen's parameters for the selected ISDN B Channel.

.



B Span-Chan	Pri D Span-Chan	E-01	E-02	E-03	E-04	E-05	E-06	E-07	E-08	E-09
009-01 (T1)	011-23	04	01	03	02	01	01	04	01	00
009-02 (T1)	011-23	04	01	03	02	01	01	04	01	00
009-03 (T1)	011-23	04	01	03	02	01	01	04	01	00
009-04 (T1)	011-23	04	01	03	02	01	01	04	01	00
009-05 (T1)	011-23	04	01	03	02	01	01	04	01	00
009-06 (T1)	011-23	04	01	03	02	01	01	04	01	00
009-07 (T1)	011-23	04	01	03	02	01	01	04	01	00

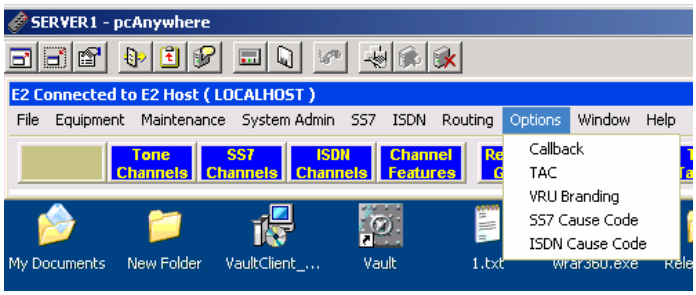
Figure 4-26 ISDN B Chan's screen layout ##

ISDN Cause Code Routing

This capability allows for different call routing based on the out going channel's return ISDN cause code. The ISDN call routing based on the out going trunk return ISDN cause code is a two-part setup.

- Configure the ISDN Cause Code table (described below)
- Assign the table to the Route List. see ***Grouping Channels***

The ISDN Cause Code table can be displayed by selecting the sub menu "ISDN Cause Code" under the GUI's "Option" heading:



.

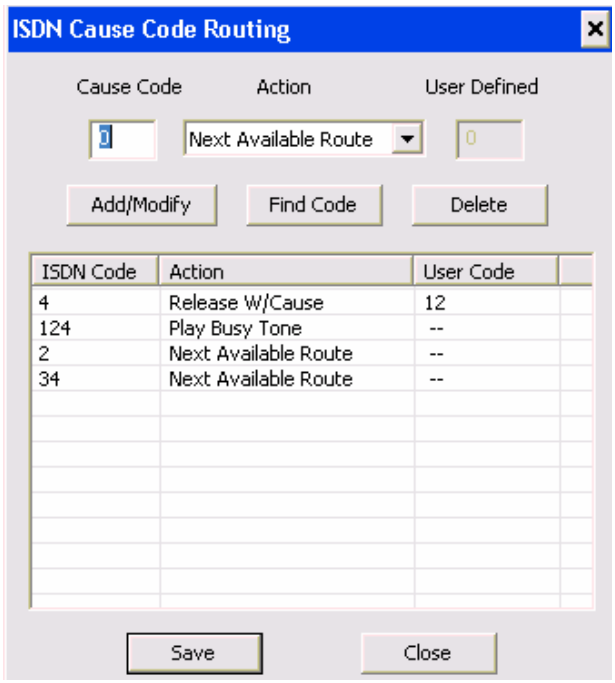


Figure 4-27 ISDN
Cause Code Activation, and Routing screens

When finished adding, changing, and/or deleting, press the Save button to save, to the Close button to exit without saving.

Add/Modify an ISDN Cause Code

Enter the cause code value, select a cause code action from the drop-down box, and if a return code is applicable, enter it in the User Defined field. Then press the Add/Modify button.

Delete an ISDN Cause Code

Select an ISDN code by clicking on it, then press the Delete button.

Find and ISDN Cause Code.

Enter the cause code value, and select the Find button.

ISDN Cause Code Values

The user will enter the ISDN cause code value between 1 and 200 in a decimal. The available action drop window will be enabled. If that cause code is returned, the following action descript below will happen:

- Next available route – The next Resource group will be used in the Route List. If the last Resource Group has been used, the incoming trunk is released with the Out Going trunk's return cause code.
- Play Busy Tone – The incoming trunk is play 10 cycles of busy tone before the trunk is released.
- Play Reorder Tone – The incoming trunk is play 10 cycles of reorder tone before the trunk is released.
- Release with Cause – The incoming trunk is release with the user define cause code, in the "User Code" field.
- Route to VRU – The incoming trunk is routed to associated VRU ISDN Branding Route List. If the ISDN VRU Branding is not configured, the incoming trunk is released with the Out Going trunk's return cause code.
- If the cause code number is not in the list, a second out going attempt is made. After the second out dial attempt is made, the incoming trunk is released with the Out Going trunk's return cause code.

VRU Cause Code Prompt

The ISDN VRU Branding is configured under the "Option" menu selection of "VRU Branding." The user configures the Route List and the digits to be sent to the VRU. The '&' character in the "Announcement Number" will cause the substitution of the Cause Code number into the digit string.

SS7: Configuring and Putting SS7 Channels into Service

Procedure

To enable the Host to a route call for which routing information is signaled through an SS7 network rather than within either its inbound leg or its outbound leg, you must complete the following steps

Step 1: Configure SS7 Stack

Configure SS7 stack(s) (that is, the message handler controlling/interpreting SS7 messages exchanged over its links with an SS7 network) on the SS7 card (see ***Creating SS7 Stacks***).

Step 2: Configure SS7 Link Sets

Configure an SS7 stack's set of links into an SS7 network (see ***Creating SS7 Link Sets***).

Step 3: Assign SS7 Links to Link Set

You must associate the channels you have in service with link sets (see Configure SS7 Links)

Step 4: Configure SS7 Network Routes

Configure destinations to other switches in the voice network through an SS7 network (see ***Creating SS7 Network Routes***).

Step 5: Group SS7 Channels into CICs

Group the SS7 channels by CICs. (**See *Creating CICs for SS7 Channels***)

- Set the CIC Options
- View the CIC Options
- View the CIC Status
- Verify a Match of CIC configurations
- Test Continuity / Stop the Continuity Test

Step 6: Configure SS7 Cause Code Routing

Configure the SS7 Cause Code table to handle call routing, or playing a VRU message, based on Cause Codes. (See ***Creating SS7 Cause Code Routing***).

Step 7: Cause Code Routing to VRU Prompt

If it is wished, certain SS7 cause codes can cause the call to be routed to the VRU to play a prompt, variable by cause code (see *VRU Cause Code Prompt)*

Creating SS7 Stacks

Having put channels (namely T1 channels or E1 channels) into service (see ***Putting Channels to/ from Switch into Service***), you must determine which of these channels will serve as links to an SS7 network. Because such links are actually message carriers for one of an SS7 card's four SS7 stacks, you must first configure the SS7 stack that will ultimately have links and link sets associated with it (see ***Creating SS7 Links***).

Assigning attributes to SS7 stack

The *SS7 Stack Attributes* screen enables you to create an SS7 stack with which SS7 link sets, SS7 links and SS7 network routes will be associated:

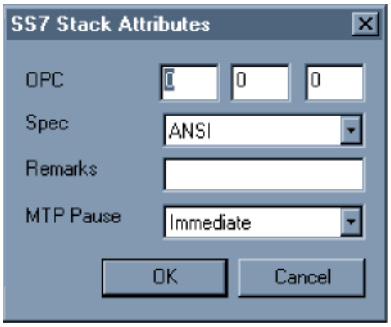


Figure 4-28
SS7 Stack Attributes screen layout

Selecting Stacks, then clicking the ADD button in the *SS7 Card* screen (itself activated by clicking **View by Type, View by Slot ID,** or **View by Node** in the Main Menu/Tool Bar's Equipment menu, then a specific SS7 card) will activate this screen.

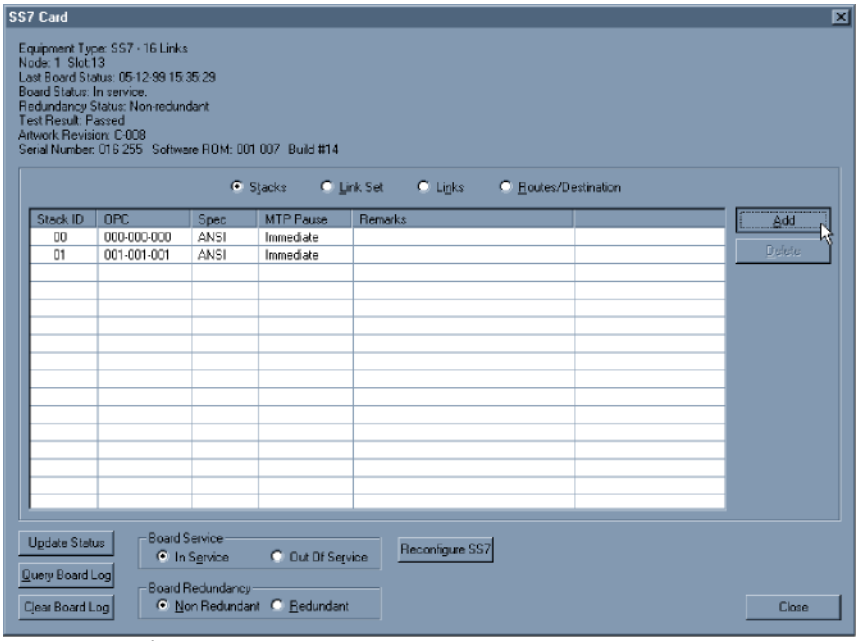


Figure 4-28
SS7 Stacks Attributes screen activation

Note: The SS7 Card screen with Stacks selected shows ***no icon*** *in the leftmost column when the status of an adjacent stack on a card in service cannot be determined. An* ***"X" icon*** *displays when a stack has been in service but its card has been taken out of service, or when the Host was not able to configure a stack for some reason.*

The following information appears in the *SS7 Stack Attributes* screen:

OPC fields

These fields indicate the unique three-part OPC (Originating Point Code) of one of the four possible SS7 stacks per SS7 card in your EXS Switch. Your ***required*** input is limited to the point code assigned this SS7 stack in your EXS Switch by your SS7 network provider.

Note: In SS7 networks subject to ANSI specification, the leftmost field designates a specific network (such as AT&T) numbered between 000 and 255; the center field designates a cluster of voice switches and packet-switching STPs (signal transfer points) numbered between 000 and 255; the rightmost field designates a specific voice switch or STP numbered between 000 and 255.

In SS7 networks subject to ITU specification, the leftmost field designates a world zone (such as Europe or Asia) numbered between 0 and 7; the center field designates an region, country, or network in the world zone numbered between 000 and 255; the rightmost field designates a specific SS7 network switch or STP numbered between 0 and 7.

Spec list

This list indicates the specification to which this SS7 stack conforms. Your ***required*** input is limited to the following choices:

- ANSI. This value indicates this SS7 stack conforms to signaling requirements of an SS7 network subject to ANSI (American National Standards Institute) specification.
- ITU. This value indicates this SS7 stack conforms to signaling requirements of an SS7 network subject to ITU (International Telecommunications Union) specification.

Remarks field

This field indicates a reminder to your personnel regarding this SS7 stack. Your ***optional*** input is limited to 24 alphanumeric characters.

MTP Pause list

This list indicates how this SS7 stack reacts to an MTP (Message Transfer Part) Pause indication from an SS7 network for a DPC (Destination Point Code) you have configured (see ***Creating SS7 Network Routes***). Your ***required*** input is limited to the following choices:

- Delayed. This value indicates this SS7 stack queues SS7 messages for the DPC for a brief period before either dropping these messages at the period's end or sending them onward on receipt within the period of an MTP Resume indication from an SS7 network for that DPC.
- Immediate (default). This value indicates your EXS Switch drops SS7 messages for that DPC until receipt of an MTP Resume indication for that DPC from an SS7 network.

Viewing attributes of all SS7 stacks

Once you click the *SS7 Stack Attributes* screen's OK button, the SS7 stack attributes you have added or changed will display in the *SS7 Card* screen across the row of the Stack ID identifying this SS7 stack.

This row divides into columns that incorporate the meanings, if not the exact labels, of the *SS7 Stack Attributes* screen's parameters for the selected SS7 stack.

Creating SS7 Link Sets

Having created one or more SS7 stacks (see ***Creating SS7 Stacks***) to exchange messages with the SS7 network over channels you have put into service (see ***Putting Channels to/from Switch into Service)***, you must create a group or set that will hold these channels or links.

Note—You can assign up to 64 SS7 link sets per EXS Switch whether you have one or two SS7 cards.

Assigning attributes to SS7 link sets

The *SS7 Link Set Attributes* screen enables you to create an SS7 link set with which SS7 links and also SS7 network routes will be associated:

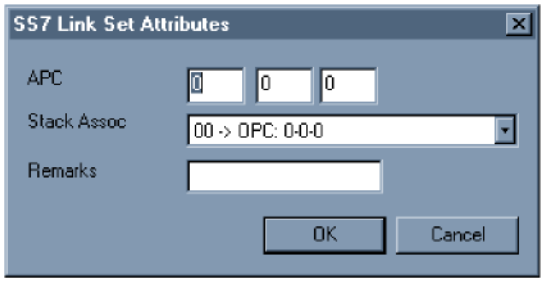


Figure 4-29
SS7 Link Set Attributes screen layout

Selecting Link Sets, then clicking the ADD button in the *SS7 Card* screen (itself activated by clicking **View by Type, View by Slot ID,** or **View by Node** in the Main Menu/Tool Bar's Equipment menu, then a specific SS7 card) will activate this screen.

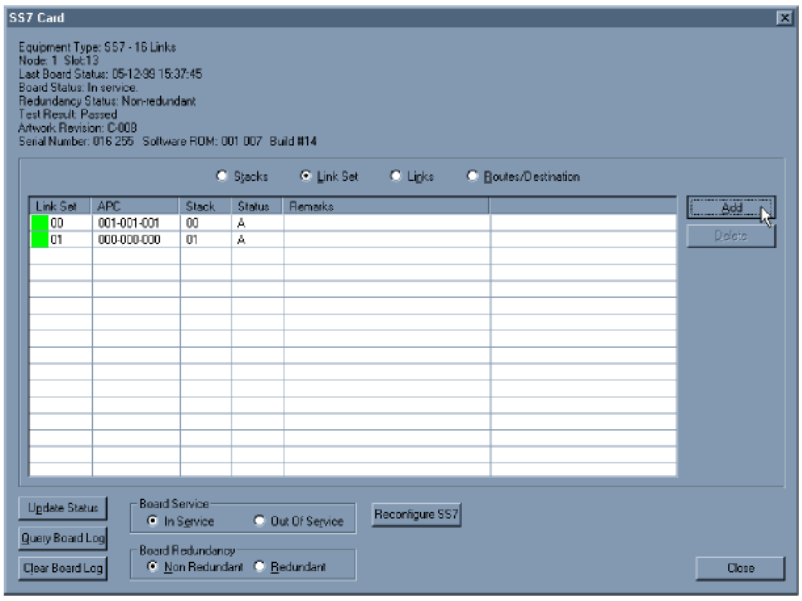


Figure 4-30 SS7
Link Set Attributes screen activation

*Note—The SS7 Card screen with Link Sets selected shows a **green icon** in the leftmost column when an adjacent link set is in service. A **red icon** displays when a link set is not in service. An **"X" icon** displays when a link set has been in service but its card has been taken out of service, or when the Host was not able to configure a link set for some reason.*

The following information appears in the *SS7 Link Set Attributes* screen:

APC fields

These fields indicate the unique three-part APC (Adjacent Point Code) of either an STP or a voice switch terminating this SS7 link set of your EXS Switch. Your ***required*** input is limited to the point code assigned the STP or voice switch by your SS7 network provider.

Note—In SS7 networks subject to ANSI specification, the leftmost field designates a specific network (such as AT&T) numbered between 000 and 255; the center field designates a cluster of voice switches and packet-switching STPs (signal transfer points) numbered between 000 and 255; the rightmost field designates a specific voice switch or STP numbered between 000 and 255.

In SS7 networks subject to ITU specification, the leftmost field designates a world zone (such as Europe or Asia) numbered between 0 and 7; the center field designates an region, country, or network in the world zone numbered between 000 and 255; the rightmost field designates a specific SS7 network switch or STP numbered between 0 and 7.

If a voice switch terminates this SS7 link set, the point code of that switch will be a DPC (Destination Point Code) of your EXS Switch. You must enter this DPC in the APC fields.

Stack Assoc list

This list indicates the OPC with which this SS7 link set is associated. Your ***required*** input is limited to the associations in this list.

Remarks field

This field indicates a reminder to your personnel regarding this SS7 link set. Your ***optional*** input is limited to 24 alphanumeric characters.

Viewing attributes of all SS7 link sets

Once you click the *SS7 Link Set Attributes* screen's OK button, the SS7 link set attributes you have added or changed will display in the *SS7 Card* screen across the row of the Link Set identifying this SS7 link set.

This row divides into columns that incorporate the meanings, if not the exact labels, of the *SS7 Link Set Attributes* screen's parameters for the selected SS7 link set.

In addition, this row includes a **Status** column indicating in real time the state of the link set. The **Status** column can show the following values:

- A. This value indicates the link set is available for SS7 messaging.
- U. This value indicates the link set is not available for SS7 messaging.

If the link set is available for SS7 messaging, it will show a green icon; if not, it will show a red icon. A link set can become unavailable due to bad links, routes, or destinations (see ***Viewing attributes of all SS7 links*** and ***Viewing route/destination attributes***).

Configuring SS7 Links

Having created one or more SS7 link sets network (see ***Creating SS7 Link Sets***), you must associate channels you have service (see ***Putting Channels to/from Switch into Service***) with a link set.

Note—You can assign up to 16 SS7 links per SS7 card (depending on model). You can associate as little as one SS7 link per link set.

Assigning attributes to SS7 links

The *SS7 Link Attributes* screen enables you to create an SS7 link with which SS7 network routes will be associated.

Note—In an EXNET ring, SS7 links of one node's SS7 card cannot be associated with T1 or E1 spans of another node.

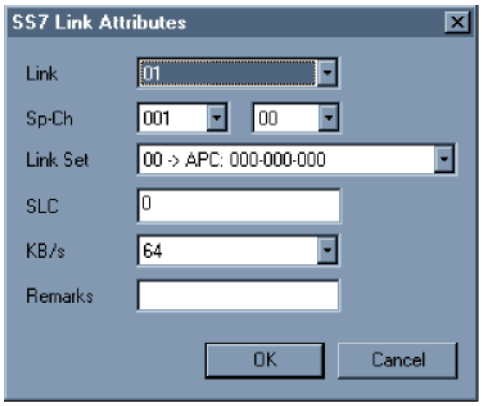


Figure 4-31
SS7 Link Attributes screen layout

Selecting Links, then clicking the ADD button in the *SS7 Card* screen (itself activated by clicking **View by Type, View by Slot ID,** or **View by Node** in the Main Menu/Tool Bar's Equipment menu, then a specific SS7 card) will activate this screen.

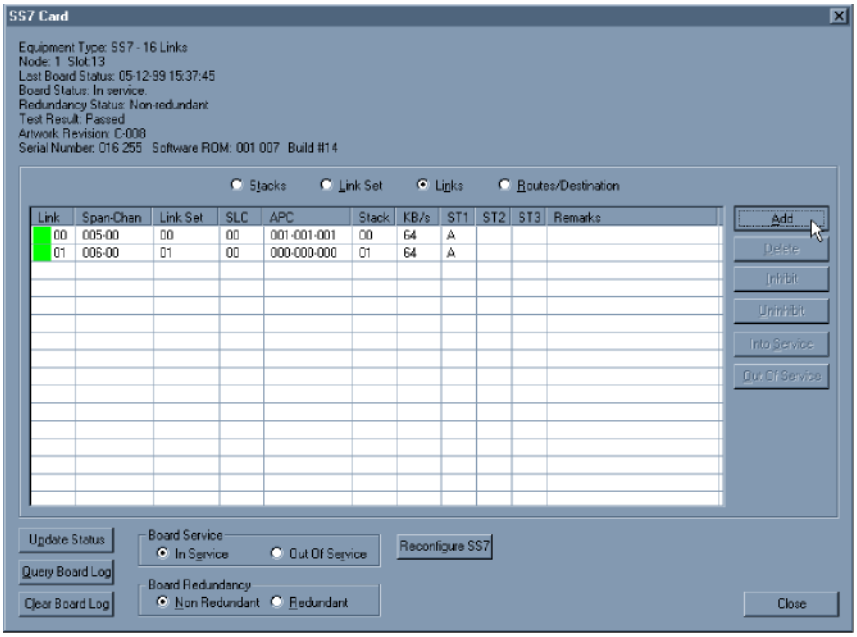


Figure 4-32
SS7 Link Attributes screen activation for rest of SS7

*Note—The SS7 Card screen with Links selected shows a **green icon** in the leftmost column when an adjacent link is in service. A **red icon** displays when a link is not in service. An "**X**" **icon** displays when a link has been in service but its card has been taken out of service, or when the Host was not able to configure a link for some reason.*

The following information appears in the *SS7 Link Attributes* screen:

Link list

This list indicates SS7 links you can configure. Your ***required*** input is limited to a link number between 00 and 31.

Sp-Ch lists

These lists indicate the channel (rightmost list) in the span (leftmost list) that is the SS7 link you specified in the **Link** list above. Your ***required*** input, which must be coordinated with your SS7 network provider, is limited to the channels and spans in these lists.

Link Set list

This list indicates the SS7 link set (identified by its number and its terminating APC) with which this SS7 link is associated. Your ***required*** input is limited to the associations in this list.

SLC field

This field indicates the Signaling Link Code that determines the order in which this SS7 link is hunted within its own SS7 link set for message distribution. Your ***required*** input, which must be coordinated with your SS7 network provider, is limited to a number between zero and 15.

KB/s list

This list indicates the bit rate at which SS7 messages are passed across this SS7 link. Your ***required*** input, which must be coordinated with your SS7 network provider, is limited to the following choices:

- 56. This value indicates this SS7 link's bit rate is 56 kilobits per second.
- 64. This value indicates this SS7 link's bit rate is 64 kilobits per second.

Remarks field

This field indicates a reminder to your personnel regarding this SS7 link set. Your ***optional*** input is limited to 24 alphanumeric characters.

Viewing attributes of all SS7 links

Once you click the *SS7 Link Attributes* screen's OK button, the SS7 link attributes you have added or changed will display in the *SS7 Card* screen across the row of the Link identifying this SS7 link.

This row divides into columns that incorporate the meanings, if not the exact labels, of the *SS7 Link Attributes* screen's parameters for the selected SS7 link.

In addition, this row includes an **ST1,** an **ST2** and an **ST3** column together indicating in real time the state of the link.

The **ST1** column can show the following values:

- A. This value indicates the link is available for SS7 messaging.
- F. This value indicates the link has failed for some reason.
- U. This value indicates the link is not available for SS7 messaging.

The **ST2** column can show the following values:

- LI. This value indicates the destination is locally inhibited from exchange of SS7 messaging.

  Note—Clicking the INHIBIT button will cause the selected link to show this status.

- RI. This value indicates the destination is remotely inhibited from exchange of SS7 messaging.

The **ST3** column can show the following value:

- RB. This value indicates the link remotely blocked.

If the link is available for SS7 messaging, it will show a green icon; any other state or combination of states will create a red icon for the link. If all links in a link set are red, the associated link set will also be red and not available for SS7 messaging (see ***Viewing attributes of all SS7 link sets***).

To put this link into service, highlight the link's row, then click the INTO SERVICE button.

Creating SS7 Network Routes

Having created one or more SS7 links (see ***Creating SS7 Links***), you must create a destination for the SS7 link set to which you have assigned these links. The resulting route passes through an SS7 network to terminate at a voice switch channeled in the voice network to your EXS Switch.

The *SS7 Route and Destination Attributes* screen enables you to create an SS7 network route:

Assigning route/ destination attributes

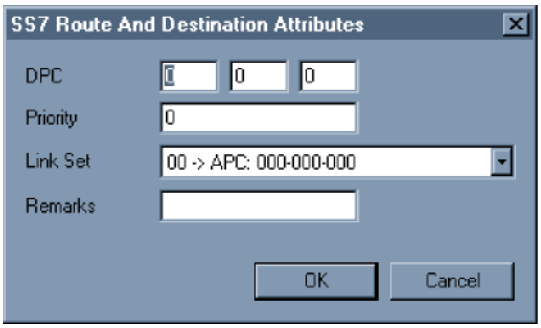


Figure 4-33
SS7 Route And Destination Attributes screen layout

Selecting Routes/Destinations, then clicking the ADD button in the *SS7 Card* screen (itself activated by clicking **View by Type, View by Slot ID,** or **View by Node** in the Main Menu/ Tool Bar's Equipment menu, then a specific SS7 card) will activate this screen.

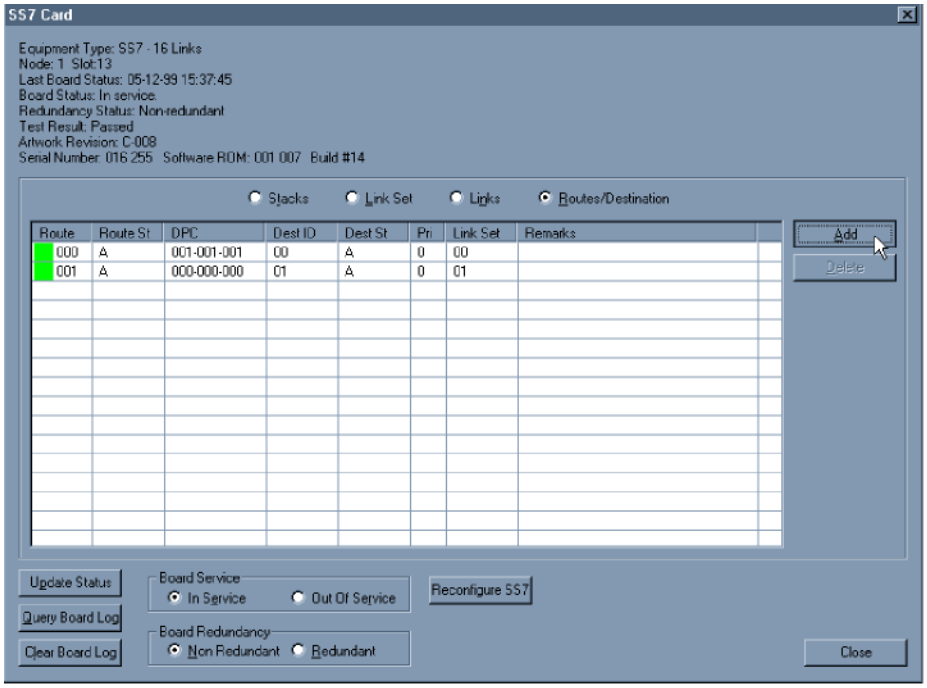


Figure 4-34
SS7 Route And Destination Attributes screen activation

*Note—The SS7 Card screen with Routes/Destinations selected shows a **green icon** in the leftmost column when an adjacent route is in service. A **red icon** displays when a route is not in service. An **"X" icon** displays when a route has been in service but its card has been taken out of service, or when the Host was not able to configure a route for some reason.*

The following information appears in the *SS7 Route and Destination Attributes* screen:

DPC fields

These fields indicate the unique three-part DPC (Destination Point Code) of a voice switch where this SS7 network route from your EXS Switch terminates to exchange SS7 messages for control of SS7 channels called CICs (see ***Creating CICs or SS7 Channels***) between that switch and your EXS Switch. Your ***required*** input is limited to the point code assigned this voice switch by your SS7 network provider.

Note—In SS7 networks subject to ANSI specification, the leftmost field designates a specific network (such as AT&T) numbered between 000 and 255; the center field designates a cluster of voice switches and packet-switching STPs (signal transfer points) numbered between 000 and 255; the rightmost field designates a specific voice switch or STP numbered between 000 and 255.

In SS7 networks subject to ITU specification, the leftmost field designates a world zone (such as Europe or Asia) numbered between 0 and 7; the center field designates an region, country, or network in the world zone numbered between 000 and 255; the rightmost field designates a specific SS7 network switch or STP numbered between 0 and 7.

Priority field

This field indicates the priority this SS7 network route has for SS7 message exchange in relation to other SS7 network routes terminating at the same voice switch channeled in the voice network to your EXS Switch. Your ***required*** input is limited to a number between 00 (lowest priority) and 35 (highest priority).

Link Set list

This list indicates the SS7 link set supplying this SS7 network route's SS7 link. Your required input is limited to the SS7 link sets in this list

Remarks field

This field indicates a reminder to your personnel regarding this SS7 network route. Your ***optional*** input is limited to 24 alphanumeric characters.

Viewing route/destination attributes

Once you click the *SS7 Route And Destination Attributes* screen's OK button, the SS7 network routes you have added or changed will display in the *SS7 Card* screen across the row of the Route identifying this SS7 link.

This row divides into columns that incorporate the meanings, if not the exact labels, of the *SS7 Routea and Destination Attributes* screen's parameters for the selected SS7 route.

In addition, this row includes a **Route St** column that indicates in real time the state of the route, and a **Dest St** column that indicates in real time the state of the destination.

The **Route St** column can show the following values:

- A. This value indicates the route is available for SS7 messaging.
- R. This value indicates that SS7 messaging on this route is restricted.
- U. This value indicates the route is not available for SS7 messaging.

The **Dest St** column can show the following values:

- A. This value indicates the destination is available for SS7 messaging.
- U. This value indicates the destination is not available for SS7 messaging.

If both the route and destination are available for SS7 messaging, the Route will show a green icon; any other combination of states will create a red icon both for the route and for the associated link set (see ***Viewing attributes of all SS7 link sets***).

Creating CICs for SS7 Channels

Having created SS7 stacks, SS7 link sets, SS7 links and, finally, SS7 network routes (see ***Creating SS7 Network Routes***), you must now create and group the SS7 channels called CICs that carry calls subject to SS7 control to a specific voice switch channeled in the voice network to your EXS Switch. So that SS7 control messages can relate to the channels they control, these channels are identified by their CICs (Circuit Identification Codes) and are therefore called CICs.

Creating CIC group

The *Create CIC Group* screen enables you to create a group of CICs.

Note—In an EXNET ring, SS7 CICs of one node's SS7 card cannot be associated with T1 or E1 spans on another node.

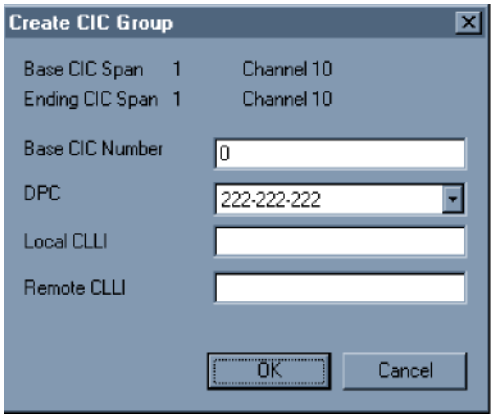


Figure 4-35
Create CIC Group screen layout

Selecting a CIC or a continuous range of CICs in the same span displaying in the *SS7 CICs* screen, then selecting Create CIC Group in the CICs menu of the *SS7 CICs* screen (itself activated either by clicking **CICs** in the SS7 menu in the Main Menu/Tool Bar, or by clicking the SS7 CICs button in the Main Menu/Tool Bar) will activate this screen.

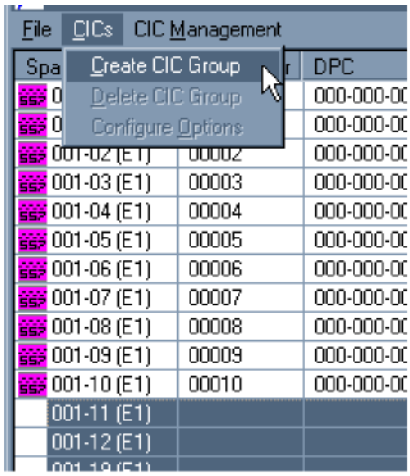


Figure 4-36 Create CIC Group screen activation

Note—Double-clicking a specific CIC will also activate the Create CIC Group screen.

Dragging a box around specific CICs will select all CICs within the box (that is, the range of CICs will be continuous). Start this box to the right of text in the window's leftmost column, then drag it leftward up or down, if the entire window is filled with columns; if the window does not have columns extending to the right side of the window, start this box beyond the rightmost column, then drag it leftward up or down.

Also, pressing SHIFT and clicking on specific CICs will select these CICs and all CICs in between (that is, the range of CICs will be continuous).

Right-clicking a selected CIC, then selecting Create CIC Group, will also activate the Create CIC Group screen.

The options you select in the SS7 CIC Options screen will apply to all CICs you selected in the SS7 CICs screen.

The following information appears in the *Create CIC Group* screen:

Base CIC Span line

This line indicates the span holding the channel that is the first CIC you selected in the *SS7CICs* screen for this CIC group.

(Base CIC) Channel line

This line indicates the channel that is the first CIC you selected in the *SS7 CICs* screen for this CIC group.

Ending CIC Span line

This line indicates the span holding the channel that is the last CIC you selected in the *SS7 CICs* screen for this CIC group.

(Ending CIC) Channel line

This line indicates the channel that is the last CIC you selected in the *SS7 CICs* screen for this CIC group.

Base CIC Number field

This field indicates the lowest CIC (Circuit Identification Code) number of the CIC(s) you have selected to be in this CIC group. Your ***required*** input is limited to a number that you and the owner of the voice switch terminating this CIC group's CICs have agreed to use.

Note—The following table shows how a CIC Offset (internally determined), combined with the Base CIC Number you set and CICs (that is, channels in spans) you select, generates CIC Numbers for those CICs.

Channel in Span	Base CIC Number		CIC Offset	Resulting CIC Number
5	000	+	0	00000
6	000	+	1	00001
7	000	+	2	00002
8	000	+	3	00003
9	000	+	4	00004

Figure 4-37
Calculation of CIC Numbers

DPC list

This list indicates the unique three-part Destination Point Code of a voice switch where this CIC from your EXS Switch terminates to carry voice traffic subject to SS7 control. Your ***required*** input is limited to a point code in this list.

Local CLLI field

This field indicates the CLLI (Common Language Location Identification) code of the location where your EXS Switch is installed. Your ***optional*** input, permitted only if this CIC is associated with an SS7 stack whose ISUP is ANSI-compliant (see ***Creating SS7 Stacks***), is limited to a Bellcore-defined code of 11 alphanumeric characters.

Note—This code's first four characters designate the location's city or town; its next two characters designate the location's state; its next two characters designate a specific building at this location; its final three characters designate a specific floor or room at this location. For example, HYANMA225TH designates a location in Hyannis, Massachusetts in Building 22 on the fifth floor.

Remote CLLI field

This field indicates the CLLI (Common Language Location Identification) code of the location of a voice switch where this CIC of your EXS Switch terminates. Your ***optional*** input, permitted only if this CIC is associated with an SS7 stack whose ISUP is ANSI-compliant (see ***Creating SS7 Stacks***), is limited to a Bellcore-defined code of 11 alphanumeric characters.

*Note—This code's format is the same as the format noted for the **Local CLLI** field.*

Setting CIC options

The CICs are now ready to be given attributes other than their defaults. The *SS7 CIC Options* screen enables you to make these assignments.

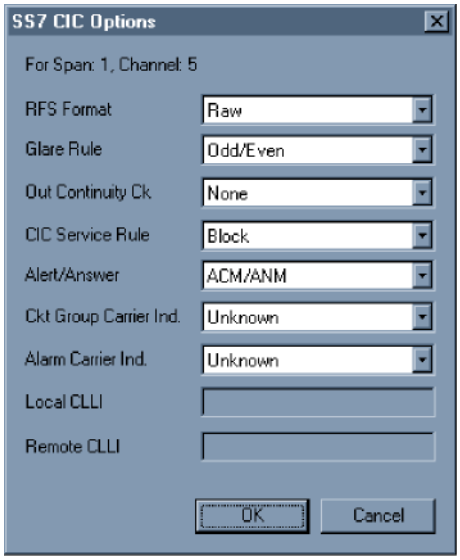


Figure 4-38
SS7 CIC Options screen layout

Selecting one or more CICs in the same span displaying in the *SS7 CICs* screen, then clicking **Configure Options** in this screen's CICs menu, will activate the *SS7 CIC Options* screen (the *SS7 CIC* screen itself is activated by clicking the SS7 CICs button in the Main Menu/Tool Bar).

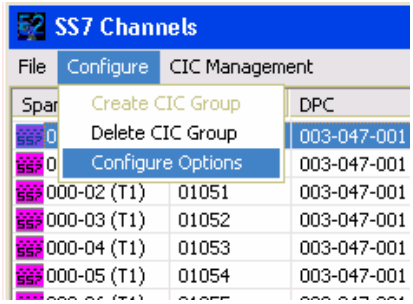


Figure 4-39
CIC Options screen activation

Note—Double-clicking a specific CIC will also activate the SS7 CIC Options screen.

Dragging a box around specific CICs will select all CICs within the box (that is, the range of CICs will be continuous). Start this box to the right of text in the window 's leftmost column, then drag it leftward up or down, if the entire window is filled with columns; if the window does not have columns extending to the right side of the window, start this box beyond the rightmost column, then drag it leftward up or down.

Also, pressing SHIFT and clicking on specific CICs will select these CICs and all CICs in between (that is, the range of CICs will be continuous). Alternatively, pressing CTRL and

clicking on specific CICs will select only these specific CICs (that is, the range of CICs will be discontinuous).

Right-clicking a selected CIC, then selecting Configure Options, will also activate the SS7 CIC Options screen.

The options you select in the SS7 CIC Options screen will apply to all CICs you selected in the SS7 CICs screen.

The following information appears in the *SS7 CIC Options* screen:

For Span: line

This line indicates the span holding the channel that is the CIC you selected in the *SS7 CICs* screen to be given attributes other than its defaults.

(For) Channel: line

This line indicates the channel that is the CIC you selected in the *SS7 CICs* screen for this CIC group to be given attributes other than its defaults.

Note—If you select more than one CIC in a span to be given attributes, the For Span: Channel: line will be replaced with the line "Multiple Routes".

RFS Format list

This list indicates the nature of the RFS (Request for Service) exchanged between the EXS Switch and the Host. Your ***required*** input is limited to the following choices:

- BCD. This value indicates that the RFS passed to the Host contains only SS7 message parameters for Called Party Number and Calling Party Number and that these parameters are BCD (Binary Coded Decimal)-encoded.

- Raw (default). This value indicates that the RFS passed to the Host contains all SS7 message parameters as received.

Glare Rule list

This list indicates how simultaneous incoming and outgoing seizures (that is, requests for service) of the same CIC are resolved. Your ***required*** input is limited to the following choices:

- Drop Incoming. This value indicates the incoming seizure is denied.

- Drop Outgoing (default). This value indicates the outgoing seizure is denied.

- Odd/Even. This value indicates the incoming seizure is denied if either the OPC value is less than the DPC value and the CIC number is odd, or the OPC value is greater than the DPC value and the CIC number is even (ITU-T Recommedation Q.767).

Out Continuity Ck list

This list indicates how frequently outgoing calls on this CIC undergo an automatic continuity check. Your ***required*** input is limited to the following choices:

- 1:1. This value indicates that every call undergoes an automatic continuity check.
- 1:10. This value indicates that one out of every 10 calls undergoes an automatic continuity check.
- 1:12. This value indicates that one out of every 12 calls undergoes an automatic continuity check.
- 1:16. This value indicates that one out of every 16 calls undergoes an automatic continuity check.
- 1:2. This value indicates that one out of every two calls undergoes an automatic continuity check.
- 1:4. This value indicates that one out of every four calls undergoes an automatic continuity check.
- 1:6. This value indicates that one out of every six calls undergoes an automatic continuity check.
- 1:8. This value indicates that one out of every eight calls undergoes an automatic continuity check.
- None (default). This value indicates that no calls undergo an automatic continuity check.

CIC Service Rule list

This list indicates what SS7 message, if any, the responsible SS7 stack sends when the Host takes this CIC is out-of-service. Your ***required*** input is limited to the following choices:

- Block (default). This value indicates the SS7 stack sends an SS7 Blocking (BLO) message.

  Note—This stack will send an SS7 Unblocking (UBL) message when the Host puts this CIC back in service.

- No Action. This value indicates the SS7 stack sends no SS7 message.

- No Block. This value indicates the SS7 stack sends no SS7 message.

Note—This stack will send an SS7 Reset Circuit (RSC) message when the Host puts this CIC back in service.

Alert/Answer. list

This list indicates what SS7 message the responsible SS7 stack must receive before establishing a voice path over this CIC (and generating ring to the calling party). Your ***required*** input, which must agree with the voice switch terminating this CIC, is limited to the following choices:

- ACM/ANM (default). This value indicates the SS7 stack whose ISUP is either ITU- or ANSI-compliant must receive an SS7 Address Complete Message (ACM), then an Answer Message (ANM) before establishing a voice path.
- CON. This value indicates the SS7 stack whose ISUP is only ITU-compliant must receive an SS7 Connect (CON) message before establishing a voice path.

Ckt Group Carrier Ind. list

This list indicates the nature of signaling on this CIC's physical medium. Your input, permitted only if this CIC is associated with an SS7 stack whose ISUP is ANSI-compliant (see ***Creating SS7 Stacks***), is limited to the following choices:

- A&D. This value indicates signaling is both analog and digital.
- Analog. This value indicates signaling is analog.
- Digital. This value indicates signaling is digital.
- Unknown (default). This value indicates the nature of signaling is unknown.

Alarm Carrier Ind. list

This list indicates the alarm carrier indicator. Your input, permitted only if this CIC is associated with an SS7 stack whose ISUP is ANSI-compliant (see ***Creating SS7 Stacks***), is limited to the following choices:

- HW Cxr.
- SW Cxr.
- Unknown (default).

Local Clli field

This field indicates the local CLLI (Common Language Location Identification) code for this CIC's CIC group.

Remote Clli field

This field indicates the remote CLLI (Common Language Location Identification) code for this CIC's CIC group.

Viewing CIC Options

Once you click the *SS7 CICs Options* screen's OK button, the CIC options you have added or changed will display in the *SS7 CICs* screen (scrollable if the screen is more than full) across the row of the Span-Chan identifying this CIC.

This row divides into columns that incorporate the meanings, if not the exact labels, of the *SS7 CICs Options* screen's parameters for the selected CIC.

In addition, this row includes a **Local Status** column and a **Remote Status** column that indicate what each switch (EXS Switch, or local switch, and the far-end switch, or remote switch) considers a CIC's state to be. You must click **Circuit Query** in the *SS7 CICs* screen's CIC Management menu to populate these columns with statuses. Pressing F5 (only once per five-second interval for effect) while the *SS7 CICs* screen is active, or scrolling the *SS7 CICs* screen or returning to the *SS7 CICs* screen from another screen refreshes these statuses.

The **Local Status** column and **Remote Status** column each can show the following values:

- Inc Busy, Active. This value indicates the CIC is busy inbound because it is active.
- Inc Busy, Loc Block. This value indicates the CIC is busy inbound because it is locally blocked.
- Inc Busy, Rem Block. This value indicates the CIC is busy inbound because it is remotely blocked.
- Inc Busy, Loc & Rem Block. This value indicates the CIC is busy inbound because it is both locally and remotely blocked.
- Idle. This value indicates the CIC is idle.
- Idle, Loc Block. This value indicates the CIC is idle because it is locally blocked.
- Idle, Loc & Rem Block. This value indicates the CIC is idle because it is locally and remotely blocked.
- Idle, Remote Block. This value indicates the CIC is idle because it is remotely blocked.
- Out Busy, Active. This value indicates the CIC is busy outbound because it is active.
- Out Busy, Loc Block. This value indicates the CIC is busy outbound because it is locally blocked.
- Out Busy, Rem Block. This value indicates the CIC is busy outbound because it is remotely blocked.
- Out Busy, Loc & Rem Block. This value indicates the CIC is busy outbound because it is both locally and remotely blocked.
- Transient. This value indicates the CIC was in a transition from one state to another at the refresh.
- Unequip. This value indicates the CIC is out-of-service.

Viewing CIC status

Selecting one or more CICs in the same span displaying in the *SS7 CICs* screen, then clicking **Show CIC Status** in this screen's CIC Management menu, will insert two additional columns in the *SS7 CICs* screen.

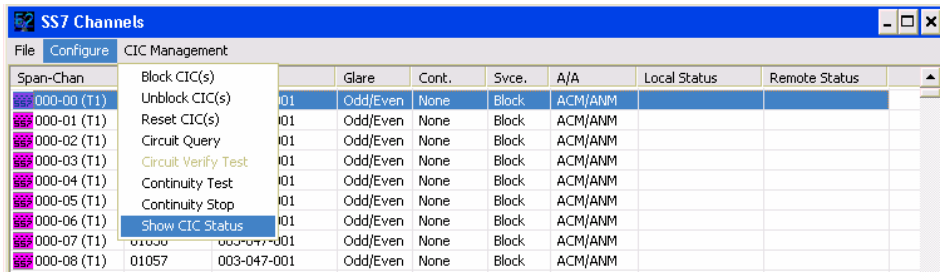


Figure 4-40
Status of CICs

These additional columns, **Status 1** and **Status 2,** indicate the actual state of the CIC:

The **Status 1** column can show the following values:

- Idle. This value indicates the CIC is not in use.
- Inc Busy. This value indicates the CIC is busy inbound.
- Out Busy. This value indicates the CIC is busy outbound.
- Loc Unequip. This value indicates the CIC is locally out-of-service.

The **Status 2** column can show the following values:

- Loc HW Block. This value indicates the CIC has a local hardware block.
- Rem HW Block. This value indicates the CIC has a remote hardware block.
- Loc Maint Bloc. This value indicates the CIC has a local maintenance block.

  *Note—You can block a CIC for maintenance by clicking **Block CIC(s)** in the CIC Management menu.*

- Rem Maint Bloc. This value indicates the CIC has a remote maintenance block.

Verifying Match of CIC Configurations

Selecting a CIC (conforming to ANSI-specification only) displayed in the *SS7 CICs* screen, then clicking **Circuit Verify Test** in this screen's CIC Management menu, will test whether this CIC's configurations are the same at both the near-end (or local) switch and the far-end (or remote) switch, then will display the results of this test in the *CVT Test* screen.

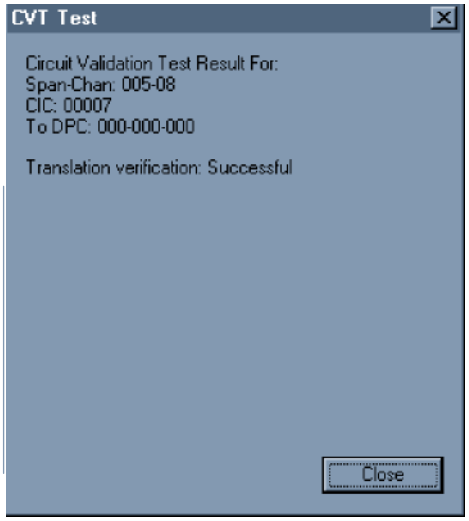


Figure 4-41
CVT Test screen layout

The following information appears in the *CVT Test* screen:

Span-Chan line

This line indicates the channel in the span that is the SS7 CIC being tested **CIC line.** This line indicates the number of the SS7 CIC being tested.

To DPC line

This line indicates the Destination Point Code of a voice switch where this SS7 CIC terminates to pass voice traffic.

Additionally, one of the following messages will appear in the *CVT Test* screen:

- Translations verification: Successful - This message indicates the translations test succeeded and the circuit has been verified.
- CIN comparison mismatch - This message indicates a Circuit Identification Name mismatch exists in this CIC's local and remote configurations and the circuit cannot be verified. This message also gives local and remote CIN numbers, as well as sequenced local and remote CLLI codes. You may need to confer with personnel controlling the remote switch to obtain the required matching configuration for this CIC.
- Circuit group characteristics mismatch - This message indicates a Circuit Group Characteristics mismatch exists in this CIC's local and remote configurations and the circuit cannot be verified. This message also gives characteristics of the carrier, glare control, carrier alarm and continuity check. You may need to confer with personnel controlling the remote switch to obtain the required matching configuration for this CIC.

- Translations verification: Failed - This message indicates the translations test failed, and the circuit cannot be verified. You may need to confer with personnel controlling the remote switch to obtain the required matching configuration for this CIC.
- Translations verification: Failed/Remote CLLI - This message indicates the translations test failed and the circuit cannot be verified but also gives the CLLI received from the remote switch. You may need to confer with personnel controlling the remote switch to obtain the required matching configuration for this CIC.
- CVR failed after reattempt - This message indicates a reattempted verification failed and the circuit cannot be verified. You may need to confer with personnel controlling the remote switch to obtain the required matching configuration for this CIC.
- Local translation data absent - This message indicates that this CIC lacks configuration data in the local switch and the circuit cannot be verified. You must configure this CIC.
- Data from received CVR/Circuit verification indicator value - This result message indicates the remote switch reattempted a verification that either succeeded or failed. If verification failed, this message also gives characteristics of the carrier, glare control, carrier alarm, and continuity check. You may need to confer with personnel controlling the remote switch to obtain the required matching configuration for this CIC.

Testing Continuity

Selecting a CIC displayed in the *SS7 CICs* screen, then clicking **Continuity Test** in this screen's CIC Management menu, will manually test whether a tone created in the local switch and looped back by the remote switch has been detected in the local switch, then will display the results of this test in the *SS7 CCR Results* screen.

*Note—This test requires you to configure at least one DSP in a node for CPG u (generates µ-law tone on outbound path for CICs on T1 spans), or CPG A (generates A-law tone on outbound for CICs on E1 spans) and at least one for CPA u (receives µ-law tone on inbound path for CICs on T1 spans) or CPA A (receives A-law tone on inbound path for CICs on E1 spans) (see **DSP Card**).*

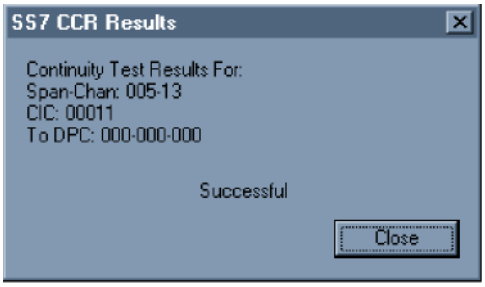


Figure 4-42
SS7 CCR Results screen layout

The following information appears in the *SS7 CCR Results* screen:

Span-Chan line

This line indicates the channel in the span that is the SS7 CIC being tested.

CIC line

This line indicates the number of the SS7 CIC being tested.

To DPC line

This line indicates the Destination Point Code of a voice switch where this SS7 CIC terminates to pass voice traffic.

Additionally, one of the following messages will appear in the *SS7 CCR Results* screen:

- Successful - This message indicates the continuity test succeeded.
- DSP Resource Allocation Failure - This message indicates the continuity test failed. You must configure your DSP resources to support this test (see note above).

Stopping Automatic Continuity Test

Selecting a CIC displayed in the *SS7 CICs* screen that is undergoing a continuity test, then clicking **Continuity Stop** in this screen's CIC Management menu, will stop the continuity test that an SS7 stack will automatically run (and endlessly repeat) on this CIC when an initial continuity test has failed. Stopping this automatic test preserves resources.

Creating SS7 Cause Code Routing

This capability allows for different SS7 call routing based on the out going channel's return SS7 cause code. The SS7 call routing based on the out going trunk return SS7 cause code is a two-part setup.

- Configure the SS7 Cause Code table (described below)
- Assign the table to the Route List. see ***Grouping Channels***

The SS7 Cause Code table will only be used on out going SS7 trunks that return a cause code. The SS7 Cause Code table can be displayed by selecting the sub menu "SS7 Cause Code" under the GUI's "Option" heading:

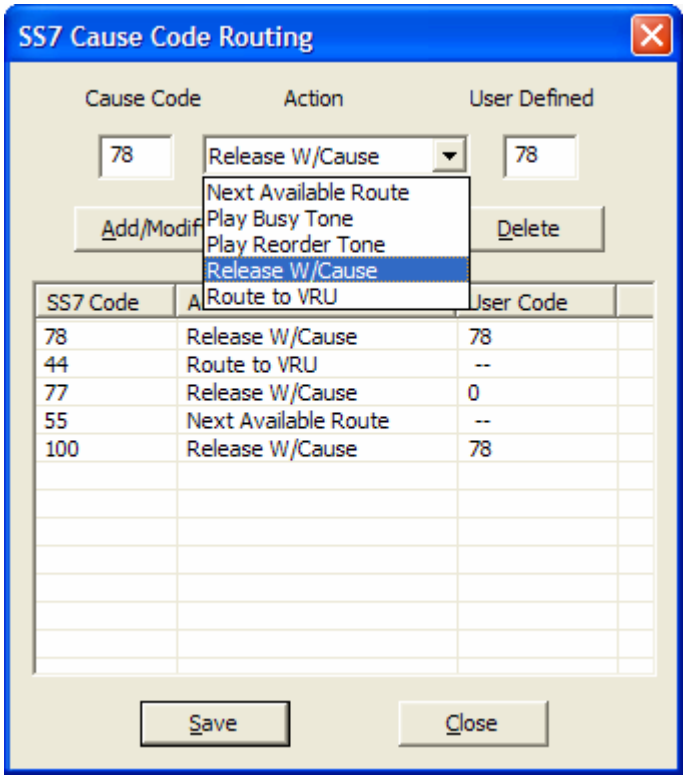


Figure 4-43 SS7
Cause Code Routing screen

When finished adding, changing, and/or deleting, press the Save button to save, to the Close button to exit without saving.

To activate SS7 Cause Code Routing from the ***Options*** menu, select ***SS7 Cause Code:***

Figure 4-44
SS7 Cause Code Activation

Add/Modify an SS7 Cause Code

Enter the cause code value, select a cause code action from the drop-down box, and if a return code is applicable, enter it in the User Defined field. Then press the Add/Modify button.

Delete an SS7 Cause Code

Select an SS7 code by clicking on it, then press the Delete button.

Find and SS7 Cause Code.

Enter the cause code value, and select the Find button.

SS7 Cause Code Values

The user will enter the SS7 cause code value between 1 and 200 in a decimal. The available action drop window will be enabled. If that cause code is returned, the following action descript below will happen:

- Next available route – The next Resource group will be used in the Route List. If the last Resource Group has been used, the incoming trunk is released with the Out Going trunk's return cause code.
- Play Busy Tone – The incoming trunk is play 10 cycles of busy tone before the trunk is released.
- Play Reorder Tone – The incoming trunk is play 10 cycles of reorder tone before the trunk is released.
- Release with Cause – The incoming trunk is release with the user define cause code, in the "User Code" field.
- Route to VRU – The incoming trunk is routed to associated VRU SS7 Branding Route List. If the SS7 VRU Branding is not configured, the incoming trunk is released with the Out Going trunk's return cause code.
- If the cause code number is not in the list, a second out going attempt is made. After the second out dial attempt is made, the incoming trunk is released with the Out Going trunk's return cause code.

VRU Cause Code Prompt

The SS7 VRU Branding is configured under the "Option" menu selection of "VRU Branding." The user configures the Route List and the digits to be sent to the VRU. The '&' character in the "Announcement Number" will cause the substitution of the Cause Code number into the digit string.

Resource Groups - Grouping Channels

Having put channels (namely T1 channels, E1 channels, ISDN D and B Channels, or SS7 channels (called CICs) into service, you should group those channels, or channels that share a destination, into “Resource Groups.” Grouping channels with a shared destination gives you a means to distribute calls across spans in a manner that will optimize their use and justify their cost. This grouping will also make it easier to assign certain attributes that channels to the same destination must share.

If outgoing channels you are grouping go to a carrier’s equipment (for example, AT&T or British Telecom), you should name their group in a manner that reminds you of this carrier (such as "AttRG" or "BtRG"; if channels you are grouping go to other elements in your Call Processing System such as a VRU or an operator, you should name their group in a manner that reminds you of their function (such as "VruRG" or "OperatorRG").

In addition to other resource groups, you should create a resource group named "BusyRG" (whose Completion Type is set to "Busy"), or "ReorderRG" (whose Completion Type is set to "Reorder"). Either of these two resource groups should then be placed last among the resource groups you associate in Route List (see ***Creating Alternate Routes for Calls***) to enable playing of a busy tone or reorder tone to a caller if the call cannot be completed.

New to Version 4.7 – Post Routing Translation - By assigning additional “post-routing” translations (after the digit table), to the resource group, the ANI, DNIS and Called number can be translated differently by destination carrier. Previously, the digit table could only translate by the primary and alternate carrier; now translations are virtually unlimited. Details are given below.

Note—*You can assign up to 4 times 80 T1s or up to 4 times 64 E1 channels or CICs to a group. The same channels or CICs can be assigned to different groups.*

Dragging & dropping channels/CICs into a resource group

To select the appropriate channels or CICs and assign them to a specific resource group, highlight the channels or CICs you want, then drag-and-drop them into the Span-Chan column of the highlighted resource group displaying in the Outgoing Resource Groups (named resource group) screen.

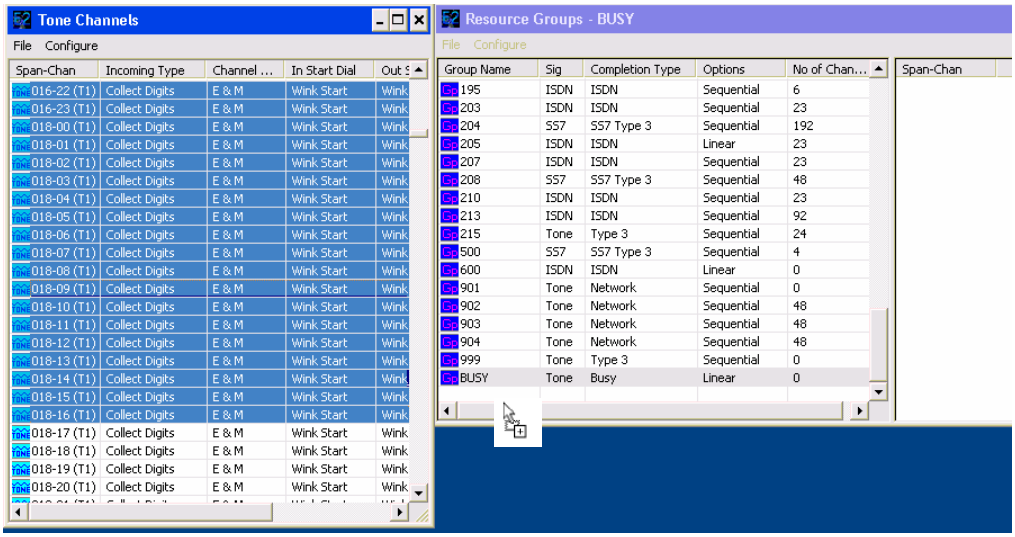


Figure 4-48
Drag-and-drop of channels into resource group (tone channels example)

Note—Dragging a box around specific channels will select all channels within the box (that is, the range of channels will be continuous). Start this box to the right of text in the window's leftmost column, then drag it leftward up or down, if the entire window is filled with columns; if the window does not have columns extending to the right side of the window, start this box beyond the rightmost column, then drag it leftward up or down.

Also, pressing SHIFT and clicking on specific channels will select these channels and all channels in between (that is, the range of channels will be continuous). Alternatively, pressing CTRL and clicking on specific channels will select only these specific channels (that is, the range of channels will be discontinuous).

Changing hunt order

Once you have dropped channels into a group, you can change their listed Span-Chan order by dragging and dropping them one or more than one at a time to a preferred position in the list. This change of order will alter the hunt for an available outgoing channel.

When you have the channels you want in the resource group and they are listed in the order you want, click **Save** in the File menu of the *Outgoing Resource Groups* screen.

Exporting and Importing Resource Group Configuration

New in version 4.7: In addition to exporting resource groups, one can now also import them. To import or export all resource group data, select ***File, Import/Export*** from the ***Resource Groups*** screen:

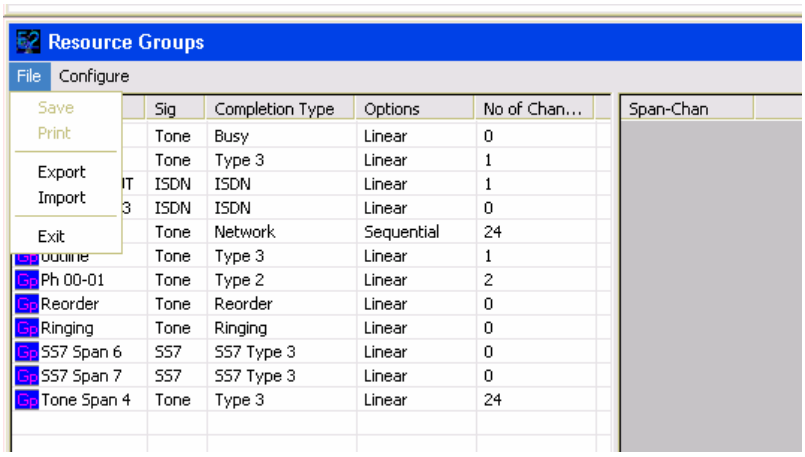


Figure 4-49
Import/Export Resource Groups

You will then be prompted for a location for the file. The default file name is "ResourceGroup.CSV." Below is an example of an exported resource group, displayed in Dynamis, corresponding to the above configuration:

```
GROUP NAME    SIGNALING TYPE   COMPLETION TYPE   OPTIONS      CHANNELS…
Busy          Tone             Busy              Linear
In Queue      Tone             Type 3            Linear       0000-06
ISDN Span 3   ISDN             ISDN              Linear
IVR Span 1    Tone             Network           Sequential   0010-00     0010-01
Ph 00-01      Tone             Type 2            Linear       0000-03     0000-05
Reorder       Tone             Reorder           Linear
Ringing       Tone             Ringing           Linear
SS7 Span 6    SS7              SS7 Type 3        Linear
SS7 Span 7    SS7              SS7 Type 3        Linear
Tone Span 4   Tone             Type 3            Linear       0008-00     0008-01
```

Figure 4-50
Exported Resource Group Data

Assigning attributes to a resource group

The *Outgoing Channel Attributes* screen enables you to create a group to which you add channels or CICs sharing attributes assigned to the group:

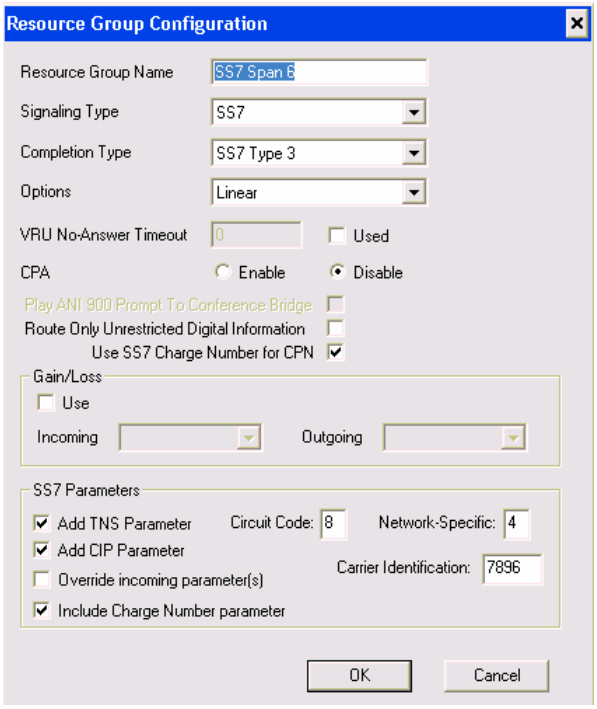


Figure 4-45
Resource Group's Outgoing Channel Attributes screen

Clicking **Add Group** in the Resource Groups menu of the *Outgoing Resource Groups* screen (itself is activated by clicking the **Resource Groups** button in the Main Menu/Tool Bar) will activate this screen.

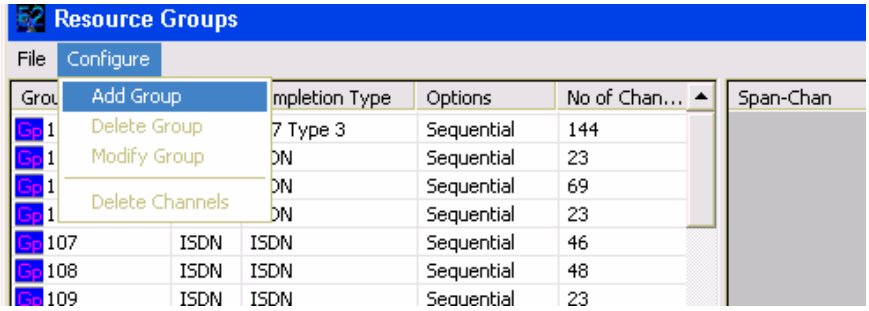


Figure 4-50
Outgoing Resource Group's screen activation

The following information appears in the *Outgoing Channel Attributes* screen:

Resource Group Name field

This field indicates the name of the resource group. Your ***required*** input is limited to 11 alphanumeric characters.

Signaling Type list

This list indicates the signaling type for all channels in the group. Your ***required*** input is limited to the following choices:

- Tone. This value indicates the signaling type for all channels in the group is tone.
- ISDN. This value indicates the signaling type for all channels in the group is ISDN.
- SS7. This value indicates the signaling type for all channels in the group is SS7.

Completion Type list

This list indicates how calls on channels in the group are completed. Your ***required*** input is limited to the following choices (see ***Completion Types*** in Appendix C for meanings of these choices):

- Auto Term (displays only when signaling type is tone).
- Busy (displays only when signaling type is tone).
- Conf-Bridge (displays only when signaling type is tone).
- CPA Type 1 (displays only when signaling type is tone).
- Dlay Type 1 (displays only when signaling type is tone).
- Dlay Type 3 (displays only when signaling type is tone).
- FGB AMA (displays only when signaling type is tone).
- Feat Grp D (displays only when signaling type is tone).
- ISDN (displays only when signaling type is ISDN)
- Music Hold (displays only when signaling type is tone).
- NA Type 3 (displays only when signaling type is tone).
- NA Type 4 (displays only when signaling type is tone).
- Network (displays only when signaling type is tone).
- Pre-dial (displays only when signaling type is tone).
- Reorder (displays only when signaling type is tone).
- Ringing (displays only when signaling type is tone).
- SS7 Type 3 (displays only when signaling type is SS7).
- Tandem FGD (displays only when signaling type is tone).
- Type 1 (displays only when signaling type is tone).
- Type 2 (displays only when signaling type is tone).
- Type 3 (displays only when signaling type is tone).
- Type 4 (displays only when signaling type is tone).

Options list

This list indicates either how hunting for an available outgoing channel occurs in this group, or how incoming calls hear announcements. Your ***optional*** input is limited to the following choices:

- **Linear** (default). This value indicates that the hunt for an available outgoing channel occurs linearly or directly through up to 48 T1 or up to 60 E1 channels or CICs in the group (that is, the hunt starts at the group's first channel and stops at the first available channel each time an outgoing channel must be found).
- **Announcement**. This value, which displays only when signaling type is Tone, indicates that calls on multiple incoming channels in the group will be queued,

then connected simultaneously to an announcement channel in the group when the channel's announcement is ready for play.

- **Barge In**. This value, which displays only when signaling type is Tone, indicates that calls on multiple incoming channels in the group will be connected at the time of connection to an announcement channel in the group even if the announcement is in progress.

  Note—*Each channel in the group must have "Brdcast" as its Release Mode (see **Assigning Features to Channels**).*

- **Paired**. This value indicates that incoming channels in the group are paired with outgoing channels in the same group (outgoing channels are numbered 12, if T1, or 15, if E1, channels away from incoming channels; for example, incoming span-channel 000-00 would be paired with span-channel 000-12 on T1 span 000).

- **Sequential**. This value indicates that the hunt for an available outgoing channel occurs sequentially through up to 48 T1 or up to 60 E1 channels in the group (that is, a channel one number greater than the channel previously assigned to a call will be assigned to the next call; if the previous channel is the last channel, the next channel will be the first channel).

- **Conf Bridge 4** - This value, which displays only when completion type is Conf-Bridge, indicates that only four connections to the conference can have both speaking and listening privileges.

- **Conf Bridge 7** - This value, which displays only when completion type is Conf-Bridge, indicates that only seven connections to the conference can have both speaking and listening privileges.

VRU No-Answer Timeout field and used checkbox

This field and box, when checked, indicates the number of seconds that must pass before a caller hears a VRU message saying the call cannot be completed. Your ***optional*** input is limited to a number between 18 and 120 (zero displays when this feature is not used).

Note—*This feature requires a Host-compatible VRU computer and applies only to channels having a Type 3 completion type.*

Note—*This feature requires a Host-compatible VRU computer and applies only to channels having a Conf-Bridge completion type.*

CPA buttons

These buttons indicate whether this resource group is subject to CPA (Call Progress Analysis). The CPA feature uses the VIC switch DSP CPA resource for call progress analysis. While many users have not had successful results with this resource, (and it is recommended that it is disabled), there may be instances where it is found useful. If it is used, perform extensive testing. Your ***required*** input is limited to one of the following choices:

- **Enable**. This value indicates this resource group is subject to CPA.
- **Disable** (default). This value indicates this resource group is not subject to CPA.

Play ANI 900 Prompt to Conference Bridge

This new feature gives you the capability of playing an announcement before entering a conference bridge. If this box is checked, and under Options, VRU Branding, the prompt configuration is set, the prompt will play.

Route Only Unrestricted Digital Information

The incoming SS7 call has in the AMI (SS7_USER_SERVICES_INFO_DETAILS) parameter, to only use an unrestricted digital channel for routing. The flag indicates the channels in this group can route this type of SS7 call

Use SS7 for charge number for CPN

If checked, the CPN (Calling Party Number) provided by the SS7 signal will be used, and not the ANI/CLI of the caller, for charging callers, when using the Smart Long Distance application. This must be flagged and used in conjunction with the Channel Features, Network List, SS7 Verify field.

Gain/Loss area

The following checkbox and lists occur in the Gain/Loss area of the *Outgoing Channel Attributes* screen:

"Use" checkbox

This box indicates, when checked, that amplification or attenuation is applied to audio paths of channels in this group.

Incoming Gain/Loss list

This list indicates how many decibels (db) to attenuate (negative value) or to amplify (positive value) the audio path of incoming channels in this group. Your ***optional*** input is limited to the following choices:

- +3 db.
- 0 db.
- -2 db.
- -3 db.
- -4 db.
- -6 db.

Outgoing Gain/Loss list

This list indicates how many decibels (db) to attenuate (negative value) or to amplify (positive value) the audio path of outgoing channels in this group. Your ***optional*** input is limited to the following choices:

- +3 db.
- 0 db.
- -2 db.
- -3 db.
- -4 db.
- -6 db.

Having specified a resource group's characteristics, you then select those channels in the *Tone Channels* screen or *ISDN B Chan's* screen you want grouped with these characteristics.

Note—A channel can be assigned to more than one resource group.

SS7 Parameters

CIP, TNS, Override & Carrier Identification Parameter

New Feature for 2005:

The user can now configure the Resource Group with the Carrier Identification Parameter (CIP) and Transit Network Selection (TNS).

The CIP and TNS parameters are only available if the signaling type is configured for SS7. Checking "Add TNS or CIP" will insert the Carrier Identification and/or Transit Network Selection parameter(s) in the outgoing dial message on an SS7 trunk.

If CIP and/or TNS parameters are received in the incoming tandem trunk application then they are passed back out on the SS7 trunk unchanged by E2. Checking the "Override" box will always cause the E2 Resource SS7 parameters to be used in the outgoing dial message regardless of the received parameters.

Note–*For the CIP or TNS to be inserted in the outgoing dial message, the Outgoing Type in the Channel Feature window must be configured for "SS7 Basic" or "SS7 FGD" (See below and also refer to* ***Assigning Features to Channels*** *in the later section).*

The codes shown in the following table are used in the Circuit Code field how does this fit in the tiny box:

	E2 Resource Group: Circuit Code Sub Field
0	Unspecified
1	international call, no operator requested
2	international call, operator requested
3	
to	to spare
99	
	E2 Resource Group: Network-Specific
8	
to	to reserved for Network-Specific use
9999	

Figure 4-51
Codes for Circuit Code Subfield

Include Charge Number parameter – Check to include this in the SS7 signal

Pre-Translation Tables

You may need to translate digits before they reach the digit table. This is performed by the Pre-Translation Table. Thus, a pre-translation table contains the information needed to translate digits in a call coming into the EXS Switch so the translated rather than the original digits determine how that call enters the associated digit table to obtain its route assignment. Pre-Translation table can also limit the number of calls that can use this translation at the same time.

Note—You can create one Pre-Translation table per inbound channel, as pre-translation tables are specified in the channel features. You can create up to 99 Pre-Translation tables

Creating a Pre-Translation Table

The *Pre-Translation Table Designation* screen enables you to create an Pre-Translation Table to which you add patterns of digits:

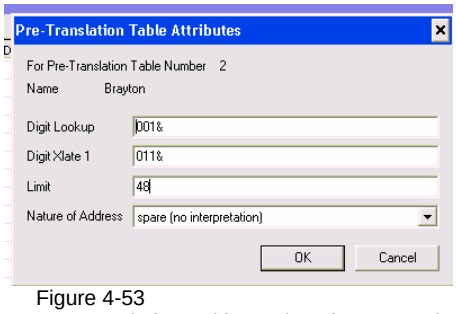


Figure 4-53
Pre-Translation Table Designation screen layout

Selecting Pre-Translation Table, then clicking **Add Table** in the Tables menu of the *Digit Tables* screen (itself activated by clicking the DIGIT TABLES button in the Main Menu/Tool Bar) will activate this screen.

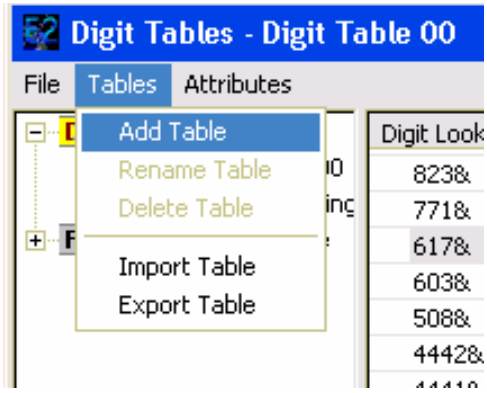


Figure 4-54
Pre-Translation Table designation screen activation

The following information appears in the *Pre-Translation Table Designation* screen:

Table Number list

This list indicates the Pre-Translation table's numerical identification.

Table Name field

Indicates the Pre-Translation Table's name. Your ***required*** input is limited to 19 alphanumeric characters. We recommend some meaningful name.

Adding digit lookup entries to a Pre-Translation Table

You must assign attributes to it. These attributes include the actual pattern of digits the Host will look for in the incoming call and will match in whole or in part with an appropriate route for that call. The *Pre-Translation Table Attributes* screen enables you to assign this and other attributes to an Pre-Translation table.

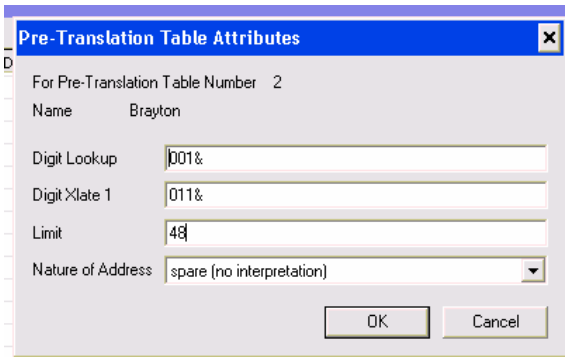


Figure 4-56
Pre-Translation Table Attributes screen layout

Selecting a specific Pre-Translation table (by double-clicking it, and first displaying all digit tables by clicking the Pre-Translation Table's "+" sign), then clicking **Add Table Attributes** in the *Digit Table* screen's Attributes menu, will activate the *Pre-Translation Table Attributes* screen.

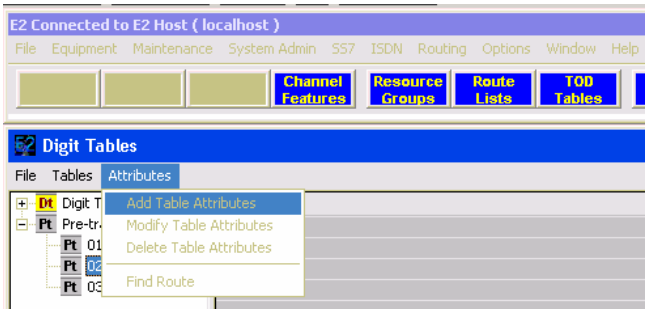


Figure 4-73 Pre-Translation Table Attributes screen activation

The following information appears in the *Pre-Translation Table Attributes* screen:

Name line

This line indicates the Pre-Translation Table's name.

Digit Lookup field

This field indicates a pattern of digits against which an incoming number (dialed by the calling party) is matched to determine the incoming number's translation for another digit lookup in the Pre-Translation table's associated digit table. Your ***required*** input is limited to 23 characters (including only digits 0-9, A,B,C,D and symbol "&" without quotes).

Note—Digit patterns are matched in a descending order of specificity within a descending order of magnitude. Regarding magnitude, the matching process for incoming number 6032553066 would pass over all digit patterns beginning with digits 9, 8, or 7 to start matching at digit patterns beginning with the digit 6. Regarding specificity, the matching process would treat incoming number 6032253066 as matched to digit pattern 6032253066 before it could consider this incoming number as matched to digit pattern 60322 or 6, which it could not do in any case without wildcard characters.

*Digit patterns can employ "&" (without quotes) as a wildcard character. For example, the matching process would treat incoming number 6032253066, lacking a more specific match, as matched to digit pattern 603& or to digit pattern 60322530&; in the first example, any incoming number whose first digits are 603 would be treated as a match regardless of the number or pattern of subsequent digits; in the second example, only incoming numbers whose first digits are 603225 would be treated as a match (for other examples of matching and wildcards, see **Dialed or Translated Incoming Numbers Translated to Destination Numbers**. If "&" is not used in a digit pattern, matching will occur only if the incoming number and the digit pattern are exactly the same.*

Digit Xlate 1 field

This field indicates an instruction that translates an incoming number (dialed by the calling party) into a different number; this translated number will be subjected to another digit lookup in the Pre-Translation table's associated digit table. Your ***required*** input is limited to 23 characters (including only digits 0-9, A,B,C,D and symbol "&" without quotes).

*Note—The same translation principles apply here as for a digit table's **Digit Xlate 1** field (see **Digit Xlate 1 field**).*

Limit field

This field indicates the maximum number of concurrent calls that can use the translation resulting from a match of their incoming numbers with this digit lookup entry. Your ***required*** input is limited to a number between zero (default; no limit) and 99.

Nature of Address field

The Nature of Address is used to change the nature of address to match the carrier's requirements. (Typically, do not use, or use Spare):

- Spare (no indications)
- 950+ call form LE Carrier public station or end office
- International number
- International number(operator requested)
- National number(operator requested)
- National(significant number)

- No number present(cut-through call to carrier)
- No number present(operator requested)
- Subscriber number
- Subscriber number (operator requested)
- Test line test code

Viewing all digit lookup entries in a Pre-Translation table

Once you click the *Pre-Translation Table Attributes* screen's OK button, the digit lookup entry you have added or changed will display in the *Digit Tables* screen (scrollable if the screen is more than full) across the row of the Digit Lookup representing that digit lookup entry. This row divides into columns that incorporate the meanings, if not the exact labels, of the *Digit Table Attributes* screen's attributes for the selected digit lookup entry.

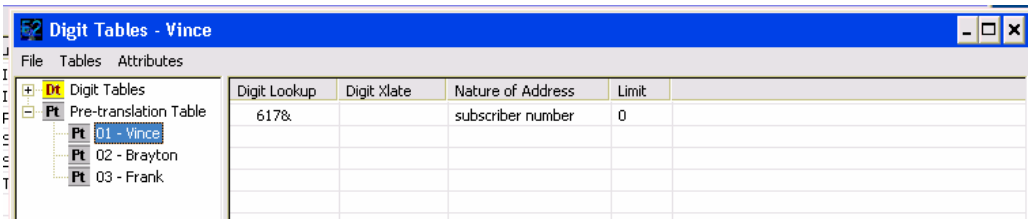


Figure 4-57
Digit Tables screen layout (for Pre-Translation table)

When you have added all the digit lookup entries you want to this Pre-Translation table, click **Save** in the File menu of the *Digit Tables* screen.

If you want an Pre-Translation table to become a feature of a particular channel (see ***Assigning Features to Channels*** below), you can drag that Pre-Translation table to the line(s) representing that channel in the *Channel Features* screen.

ANI Tables for ANI/Code Validation

ANI Tables are used to validate callers for postpaid billing, without requiring the Dynamis Server. If the ANI matches an entry in the ANI Table, then, based on configuration, the caller must enter a validated or non-validated billing code. Whether the ANI table is used, is specified in the "Channel Features" screen (see next section)

NOTE: If ANI matching is set up, and there is no matching ANI in the ANI table, the call will be processed requiring no validation.

If, in Channel features, If Network is set to ANI Account, then the ANI table is specifiedd, and it is used

Creating an ANI Table

The *ANI Table Designation* screen enables you to create an ANI Table to which you add patterns of digits for lookup and specify digits to enter for validation:

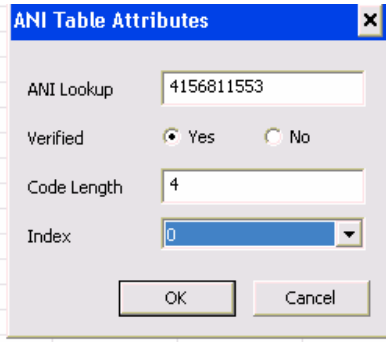


Figure 4-58
ANI Table Designation screen layout

Click on the ROUTE TABLES button, then click on the ANI Table icon on the left. Next, select Tables, and click on **Add Table.**

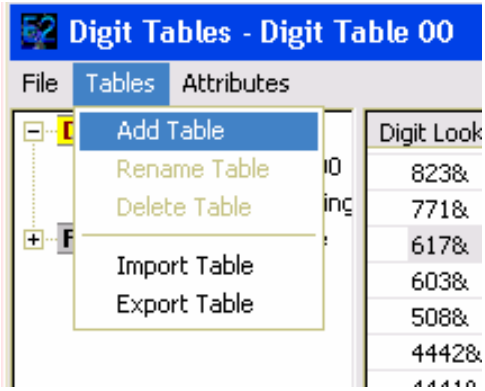


Figure 4-59
ANI Table designation screen activation

The following information appears in the *ANI Table Designation* screen:

ANI Lookup field

This field specifies the ANI to match Wild Cards are not supported.

Verified radio button

If Yes, the caller is required to enter digits that are in the index table specified.
If No, the caller can enter any digits, but they must be as long as the Code Length specified

Code Length field

Length of digits to manually enter. This can vary between 1 and 20

Index Table

Specifies the table to use to verify the digits entered, if the Verified radio button is selected

Adding digit lookup entries to an ANI Table

You can either add multiple entries though importing and exporting, or you can manually enter them by performing the following:

Select a specific ANI table (by double-clicking it, and first displaying all tables by clicking the ANI Table's "+" sign), then click **Add Table Attributes** in the *ANI Table* screen's Attributes menu, which will activate the *ANI Table Attributes* screen.

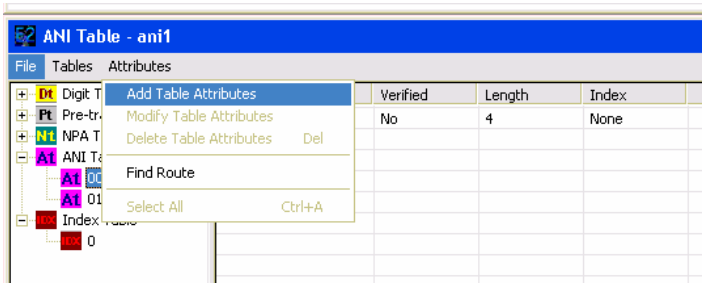


Figure 4-60
ANI Translation Table Attributes screen activation

Viewing all digit lookup entries in an ANI table

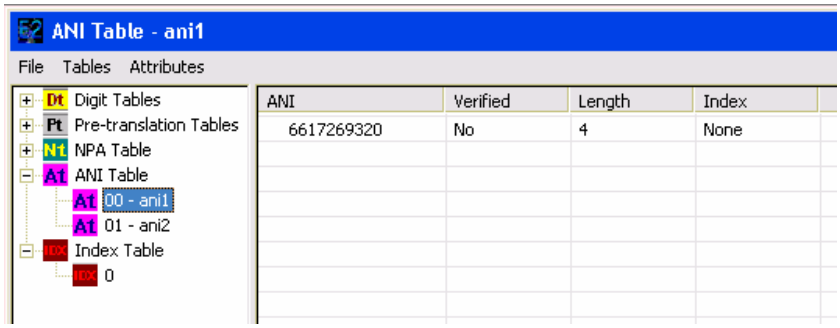


Figure 4-61
ANI Tables screen layout

Once you click the *ANI Table Attributes* screen's OK button, the entries you have added or changed will display in the *ANI Tables* screen (scrollable if the screen is more than full) across the row of the Digit Lookup representing that digit lookup entry. This row divides into columns that contain the data of the *ANI Table Attributes* screen's attributes for the selected digit lookup entry.

Index Tables for ANI/Code Validation

Index Tables are used to validate callers for postpaid billing, without requiring the Dynamis Server. If the ANI matches an entry in the ANI Table, and the ANI is specified as Verified, then the caller must enter a billing code corresponding to an entry in the Index Table. To determine whether the ANI table is used, is specified in the "Channel Features" screen (see next section)

Creating an Index Table

The *Index Table Designation* screen enables you to create an Index Table to which you add digits for validation:

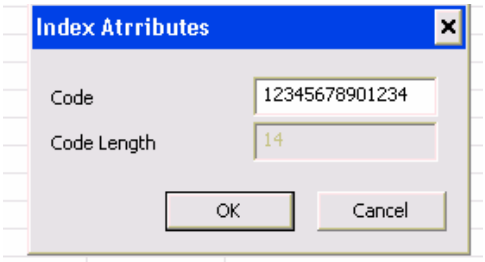


Figure 4-63
Index Table Designation screen layout

Click on the ROUTE TABLES button, then click on the Index Table icon on the left. Next, select Tables, and click on **Add Table.**

Note that you can also import and export Index tables

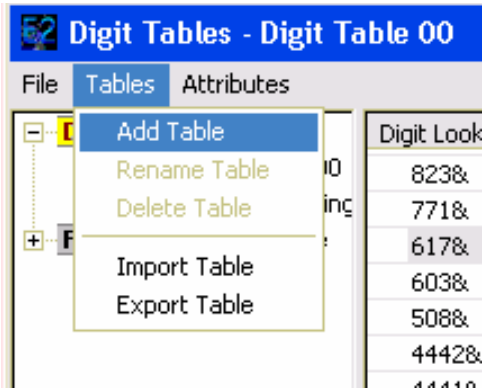


Figure 4-64
ANI Table designation screen activation

The following information appears in the *Index Table Designation* screen:

Code field

This field specifies the ANI and the digits to enter. For example, if the code field value is 12345678901234, and the ANI is 1234567890, then the caller must enter 1234.
specified

Code Length field

Length of digits to manually enter. This can vary between 1 and 20

Adding digit lookup entries to an Index Table

You can either add multiple entries though importing and exporting, or you can manually enter them by performing the following:

Select a specific Index table (by double-clicking it, and first displaying all tables by clicking the ANI Table's "+" sign), then click **Add Table Attributes** in the *Index Table* screen's Attributes menu, which will activate the *Index Table Attributes* screen.

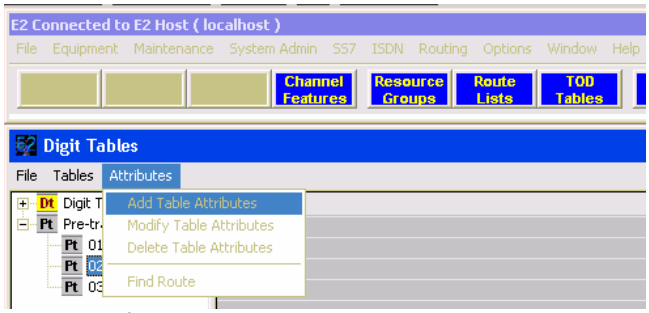


Figure 4-65
ANI Translation Table Attributes screen activation

Viewing all digit lookup entries in an Index table

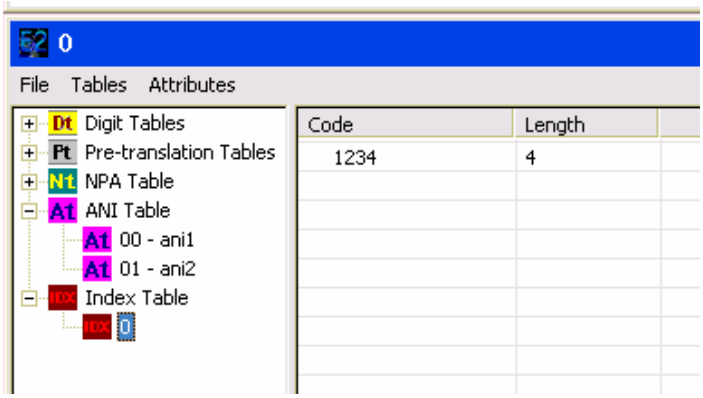


Figure 4-66
Index Tables screen layout

Once you click the *Index Table Attributes* screen's OK button, the entries you have added or changed will display in rows in the *Index Tables* screen (scrollable if the screen is more than full). Each row divides into columns that contain the data of the *Index Table Attributes* screen's attributes for the selected ANI lookup entry.

The NPA Table for Inter/Intra State Determination

The NPA table uses the NPA (area code) to compare the called number with either the ANI or DNIS (as specified in the Channel Features' "Lookup Type" field in the following section). Each NPA can have a state associated with it.

Editing the NPA Table

There is only one NPA table. In the Digit Tables screen, select the NPA and click on any NPA you wish to have entries for the state, then enter the 2 character abbreviation for the state. Note that, if there is no entry in the State field for an NPA, the call will ALWAYS be considered intERstate.

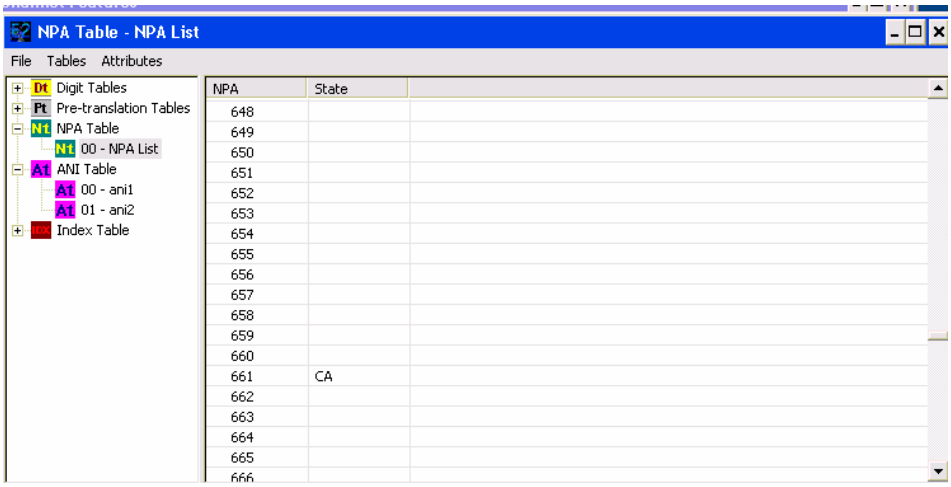


Figure 4-67
NPA Table screen layout

The Master Route Table for NPA/NXX Routing

Overview

New to 2007, the Master Route Table supports routing based on NPA/NXX and Inter/IntraState.

If a digit table is configured so the “Option” field is set to “Digit Table”, then in the “Route Table” field, in addition to any Digit Tables, is the Master Route Table. For example, in the digit table below, is “101 – Master Route Table”

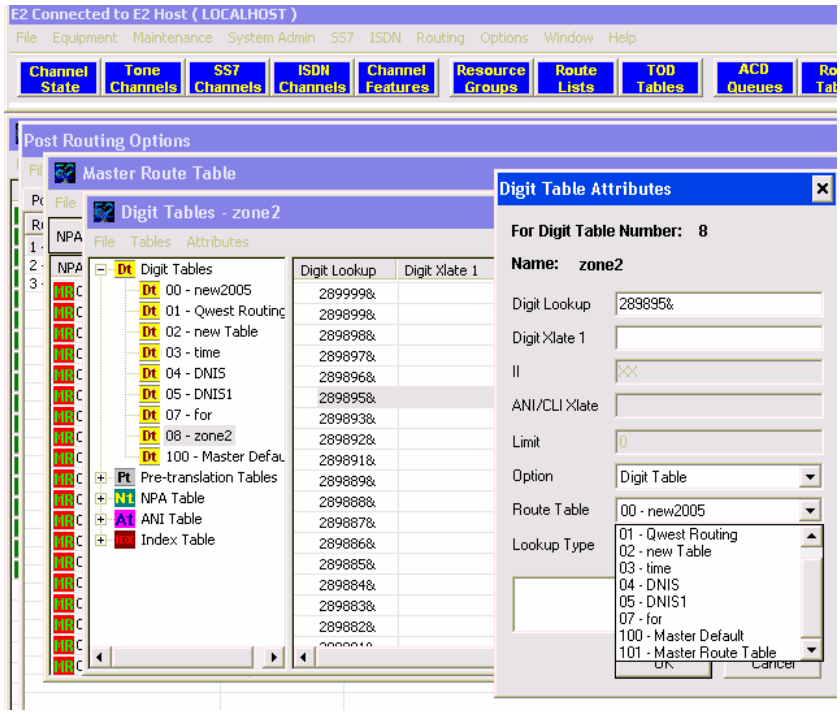


Figure 4-68
Selecting “101 – Master Route Table”

Configuration

To select Master Tables, click on the “Master Table” button at the top of the screen or:

The Master Table is loaded with all NPA/NXX combinations, set to default routing. Thus, the exceptions must either be manually or bulk loaded into the Master Table.

Bulk loading is performed by selecting File, then Import

To set the default routing, select the “Default Option” to “Digit Table”, and select the appropriate table from the “Option” list:

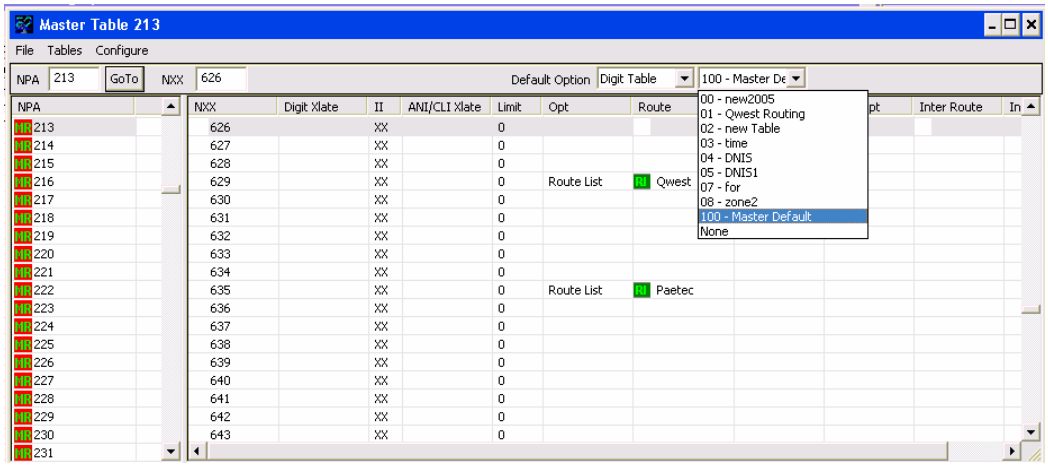


Figure 4-64
Select Default Routing

To select a specific NPA/NXX, enter them in the fields at the top left, and click on the “Go To” button. Note below the NPA 213 and NXX 626 are selected. The entry in the table is highlighted. One then can click on the “Configure” option at the top, or right-click and select one of the two options:

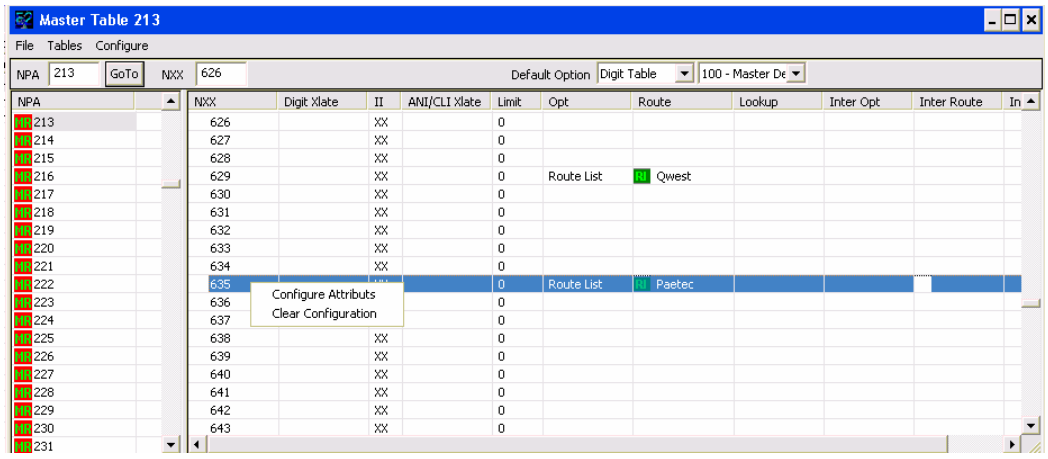


Figure 4-65
Master Route Attributes Selection

- “Clear Configuration” option clears all configuration for that entry, so the default is used
- “Configure Attributes” brings up the following screen:

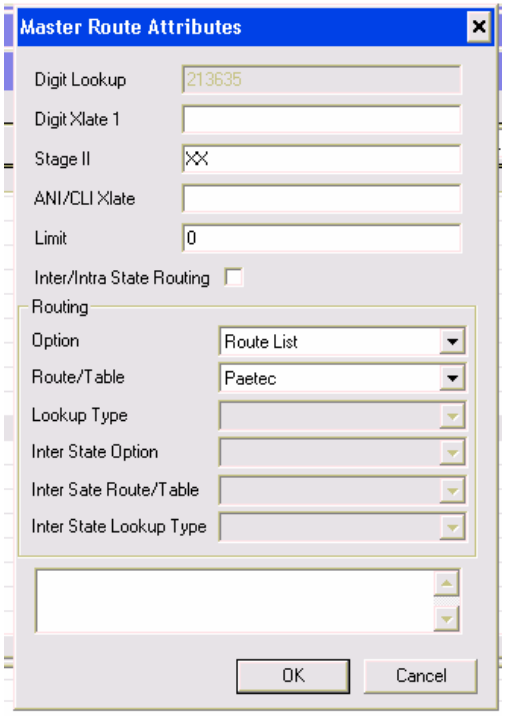


Figure 4-66
Master Route Attributes screen layout

Based upon which options are selected, different fields and drop-down lists will appear:

Digit Xlate 1, Stage II, ANI/CLI xlate and Limit fields function exactly the same as the fields defined in Digit Tables

Displaying only NPA/NXXs with entries

If you wish to only display NPAs that have values in them, from the File menu, select “Configured Only”. Clicking on the NPA will only display configured NXXs. Selecting File and Configured Only again will toggle this feature off.

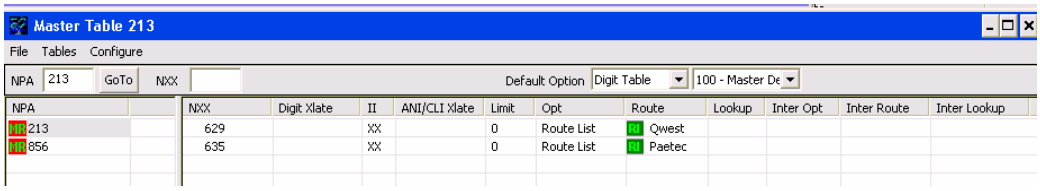


Figure 4-67
Display only NPA/NXXs that are configured

Inter/Intra State Routing Menu

If this box is NOT checked, then only the Routing Option (Digit Table or Route List) and Route/Table fields are displayed:

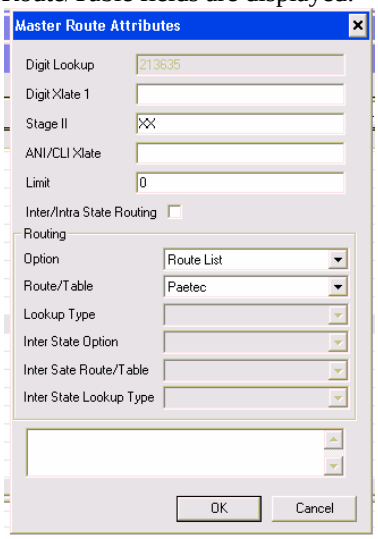


Figure 4-67
Master Route Attributes screen layout,
Intra/InterState Box NOT Checked

If the Inter/Intra State Routing Box IS checked, then the following fields are displayed:

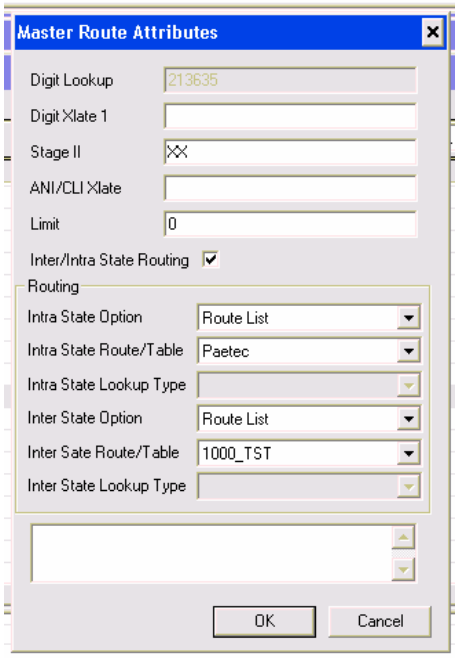


Figure 4-68
Master Route Attributes screen layout
Intra/InterState Box Checked

Note that NPA table determines whether the call is Intrastate or Interstate (see NPA Table).

Intra State Routing Fields

Intra State Option allows you to select any routing option, but it is recommended that you select”Route List” or “Digit Table”.
In either case the Intra State Route/Table provides a valid list of options.
If the Intra State Option field is set to “Digit Table”, then the Intra State Lookup Type (ANI or DNIS) field may be used to look up on the ANI or DNIS, respectively.

Inter State Routing Fields

Inter State Option allows you to select any routing option, but it is recommended that you select”Route List” or “Digit Table”.
In either case the Inter State Route/Table provides a valid list of options.
If the Inter State Option field is set to “Digit Table”, then the Inter State Lookup Type (ANI or DNIS) field may be used to look up on the ANI or DNIS, respectively.

Comment Field

A comment field supports up to 32 characters.

Channel Features - Assigning Features to Channels

Overview – New Features

Channel Features has been significantly upgraded to expand routing and translation capabilities. This includes:

- Translating dialed digits before presenting them to the digit table – Pre-Translation Table field
- Use the dialed digits, ANI or DNIS for lookup in the digit table, or use the ANI or DNIS to determine inter/intrastate routing – Lookup Type field

These capabilities, including the inter/intrastate routing, are described in detail below:

Configuration

Having put channels into service (see ***Putting Channels to/from Switch into Service***) or grouped channels (see ***Grouping Channels***), you must assign attributes to a particular channel or set of channels that enable routing of outbound calls.

Having created one or more digit tables (see ***Building Digit Tables***) and perhaps an Pre-Translation table for a particular digit table (see ***Building Pre-Translation Tables***), you must assign attributes to features of a particular channel or set of channels that support of inbound calls.

The *Channel Feature Attributes* screen enables you to specify attributes of channel's features:

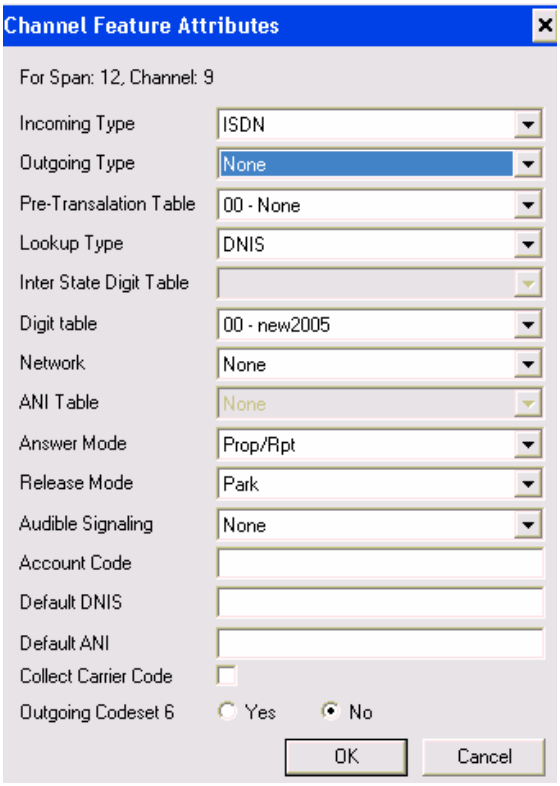


Figure 4-69
Channel Feature Attributes screen layout

Clicking **Configure Channel Attributes** in the *Channel Features* screen's Channel menu will activate the *Channel Feature Attributes* screen.

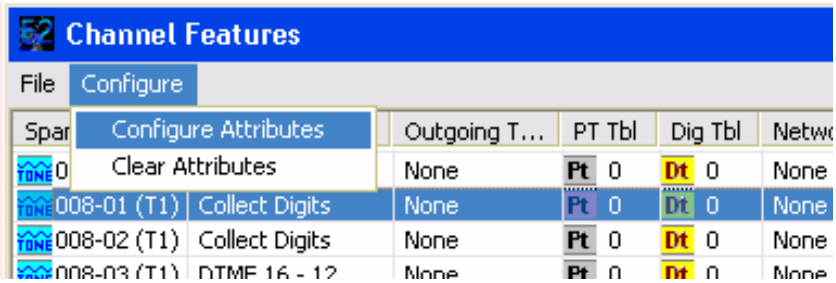


Figure 4-70
Channel Features Attributes screen activation

Note—Double-clicking a specific channel will also activate the Channel Feature Attributes screen.

Dragging a box around specific channels will select all channels within the box (that is, the range of channels will be continuous). Start this box to the right of text in the window's leftmost column, then drag it leftward up or down, if the entire window is filled with columns; if the window does not have columns extending to the right side of the window, start this box beyond the rightmost column, then drag it leftward up or down.

Also, pressing SHIFT and clicking on specific channels will select these channels and all channels in between (that is, the range of channels will be continuous). Alternatively, pressing CTRL and clicking on specific channels will select only these specific channels (that is, the range of channels will be discontinuous).

Right-clicking a selected channel, then clicking ***Configure Channels Attributes,*** *will also activate the Channel Feature Attributes screen.*

The following information appears in the *Channel Feature Attributes* screen:

Incoming Type list

This list indicates how an incoming call seizes a channel and how the call's digits are collected. Your ***required*** input is limited to the choices listed in ***Appendix A*** - **Incoming *Types.***

Outgoing Type list

This list indicates whether and how the Calling Party Number (that is, ANI or CLI) is added to this trunk's dialed number in a pattern that is compatible with the switch between the EXS Switch and the called party. Your ***required*** input is limited to the following choices (see ***Outgoing Types*** Appendix B for meanings of these choices):

-
- DTMF/FGD1.
- DTMF/FGD2
- DTMF-DN*ANI

- E1/R2-2.
- E1/R2-3.
- E1/R2-4.
- ISDN IEs.
- MF/ANI/DN.
- MF/DN..
- None.
- SS7 Basic.
- SS7/FGD.

Note: The Outgoing Type must be configured for "SS7 Basic" or "SS7 FGD" in order for the CIP or TNS to be inserted in the outgoing dial message. Refer to ***Assigning attributes to resource group, SS7 Parameters*** *for details.*

Pre-Translation Table list

This list indicates the pre-translation table this channel uses to translate incoming digits BEFORE sending them to the digit table associated with this channel. Your optional input is limited to the named pre-translation tables in this list

Lookup Type list (New for 2007)

The options include:

ANI – (New for 2007) if this is selected, when transferring to the specified digit table, that digit table will perform a lookup **based on the ANI of the caller**. (and NOT the DNIS) to perform routing and translation. Note that the looked up entry will translate the ANI and DNIS as usual, once looked up.

DNIS – if this is selected, lookup and routing will be based on the DNIS provided, with the digits submitted to the digit table. This is how lookup and routing was previously done.

DNIS Intrastate (1/0) – Use the NPA of the DNIS and Dialed Number for lookup in the NPA table. If the lookup contains the same values, then route using the Digit Table specified in the "IntraState Digit Table" field. If they are NOT the same values, then route using the Digit Table specified in the "Inter State Digit Table" field

ANI Intrastate (1/0) – Use the NPA of the ANI and Dialed Number for lookup in the NPA table. If the lookup contains the same values, then route using the Digit Table specified in the "IntraState Digit Table" field. If they are NOT the same values, then route using the Digit Table specified in the "Inter State Digit Table" field

Inter State Digit Table list

Only displays if Inter/Intra State was selected in the "Lookup Type" field. Refer to Lookup Type list above for details. Only valid digit tables will be displayed in the drop-down box.

Intra State Digit Table list

Only displays if Inter/Intra State was selected in the "Lookup Type" field Refer to Lookup Type list above for details. Only valid digit tables will be displayed in the drop-down box.

Digit Table list

Only displays if ”ANI” or DNIS” was selected in the “Lookup Type” field Refer to Lookup Type list above for details. Only valid digit tables will be displayed in the drop-down box.

Network list

This list indicates how call processing should be modified to meet requirements of particular Excel Switching applications. Your ***required*** input is limited to the following choices:

- None. This value indicates the Host does not send messages across the LAN to Dynamis’ Switching Server to alter call processing.
- OP Code. This value indicates the Host sends ANI/CLI, DNIS and other messages across the LAN to the Dynamis Application Server to meet requirements of the Smart Long Distance application.
- SS7 Verify – This is a new feature. This value indicates the Host sends the CPN (Calling Party Number) provided by the SS7 signaling), the DNIS and other messages across the LAN to E2 Application Server to meet requirements of the Smart Long Distance application.
- Trunk Account. This value indicates the Host sends ANI/CLI, DNIS and channel messages across the LAN to Dynamis Switching’s Server to alter call processing.
- Verify. This value indicates the Host sends ANI/CLI, DNIS and other messages across the LAN to Dynamis Switching’s Server to meet requirements of various applications.
- ANI Account. This is selected for ANI Validation. Refer to Step 4 in Chapter 3 for details

ANI Table

This specifies the ANI table to use for validation, if the Network Field above is set to “ANI Account”

Answer Mode list

This list indicates how the Host treats Answer Supervison on this channel (called Channel B for discussion) in relation to the channel originating the call (called Channel A for discussion) and to the Host itself. Your ***required*** input is limited to the following choices:

- PropAns (Propagate Answer). This value indicates the Host causes the EXS Switch to propagate Channel B’s answer to Channel A in order to trigger the billing clock of the switch(es) between the EXS Switch and the calling party.
- Prop/Rpt (Propagate and Report Answer). This value indicates the Host causes the EXS Switch to propagate Channel B’s answer to Channel A in order to trigger the billing clock of the switch(es) between the EXS Switch and the calling party, and causes the EXS Switch to report Channel B’s answer to the Host so the Host can trigger the EXS Switch’s billing clock.

Note—If this channel is connected to an VIC VRU, you must select "Prop/Rpt."

- Rpt Ans (Report Answer). This value indicates the Host causes the EXS Switch to report Channel B's answer to the Host so the Host can trigger the EXS Switch's billing clock.

Release Mode

This list indicates how the Host treats this channel (called Channel A for discussion) and another channel (called Channel B for discussion) on their disconnection. Your ***required*** input is limited to the following choices:

- Brdcast. This value indicates the Host will park Channel A if Channel B both terminates the connection and is set to "Brdcast," "Park," or "Release;" the Host will release Channel A if Channel A terminates the connection and will park Channel B whether Channel B is set to "Brdcast," "Park," or "Release."

  Note—Brdcast is typically used to support Dynamis Switching's Music on Hold feature. An incoming call on Channel A is connected to music on Channel B while waiting for an available voice channel to an operator. When the operator becomes available, Channel B will disconnect from Channel A and Channel A will be parked to wait for the operator. Channel B will be parked for another incoming call requiring music while waiting for an operator.

- Park. This value indicates the Host will release Channel A if Channel B both terminates the connection and is set to "Release", or will park Channel A if Channel B both terminates the connection and is set to "Brdcast" or "Park," the Host will release Channel A if Channel A terminates the connection and will park Channel B whether Channel B is set to "Brdcast," "Park," or "Release."

  Note—Park is often used in applications requiring reorigination or transfer of calls. Incoming and outgoing channels in Dynamis Switching's Smart Calling Card application, for example, are usually be set to "Park." Channels to VRUs are also usually set to "Park" so that channels connecting to them will await further action after being disconnected from them.

  If this channel is connected to a VIC VRU, you must select "Park."

- Release. This value indicates the Host will release Channel A if Channel B both terminates the connection and is set to "Release," or will park Channel A if Channel B both terminates the connection and is set to "Brdcast," or "Park," the Host will release Channel A if Channel A terminates the connection and will park Channel B if Channel B is set to "Brdcast," or will release Channel B if Channel B is set to "Park," or "Release."

Audible Signaling list

This list indicates how a caller on this channel is notified that the call could not be completed due to network congestion. Your ***required*** input is limited to the following choices:

- Annc. This value indicates the caller hears an announcement when the call cannot be completed.

- None. This value indicates the caller hears nothing when the call cannot be

completed.

- Tone. This value indicates the caller hears a tone signal (for example, a fast busy) when the call cannot be completed

Account Code field

This field indicates the "artificial" Calling Party Number the Host supplies this channel, if the network does not supply one, so an inbound call can be as having an account in that application. Your ***optional*** input is limited to a 10-digit Calling Party Number.

Default DNIS field

If the network does not provide a DNIS (for example, the port is used by an operator as an FXS line, or is connected to a VoIP device), then the value in this field will be used.

Default ANI field

If the network does not provide an ANI (for example, the port is used by an operator as an FXS line, or is connected to a VoIP device), then the value in this field will be used.

"Collect Carrier Code" Checkbox (New for 2007)

If checked, the rightmost 10 digits of the dialed number are passed on, which conforms to the latest ISDN standards. Any preceding digits are stripped. If not checked, all digits are passed on.

"Outgoing Codeset 6" Radio Button (New for 2007)

NOTE: This will be moved to Post Routing Table a future version. If yes, and info digits are in the ISDN data stream, pass them in the ISDN D stream. If no, II digits will NOT be included in the dialed number stream

Viewing features for all channels

Once you click the *Channel Feature Attributes* screen's OK button, the features you attributed to the channel will display in the *Channel Features* screen (scrollable if the screen is more than full) across the row of the Span-Chan representing that channel. This row divides into columns that incorporate the meanings, if not the exact labels, of the *Channel Feature Attributes* screen's attributes for the selected channel.

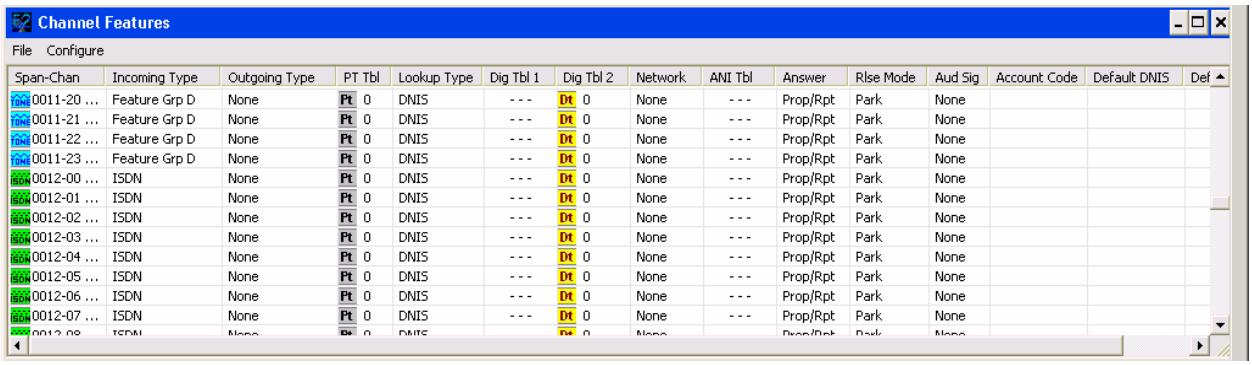


Figure 4-71
Channel Features screen layout

When you have added all the channel features you want, click **Save** in the File menu of the *Channel Features* screen.

If you want to a digit table or an Pre-Translation Table to become a feature of a particular channel, you can drag that digit table or Pre-Translation table from the *Digit Tables* screen to the line(s) representing that channel in the *Channel Features* screen.

Time of Day / Day of Week Routing

Having associated resource groups that can provide alternate routes to a destination specified by a call (see ***Creating Alternate Routes for Calls***), you may want to associate selected route lists with a Time-of-Day Table. A TOD table gives you a means to route calls to selected carriers at certain times of the day to incur the least cost.

Note—A TOD table must have at least one route list. You can assign up to 35 route lists to a TOD table.

Adding a time-of-day table

The *Add/Rename TOD Table* screen enables you to create a time-of-day table to which you add route lists and assign a starting day and time.

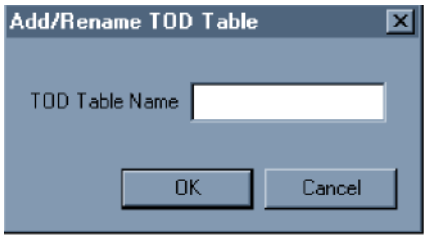


Figure 4-73
Add/Rename TOD Table screen layout

Clicking **Add** in the TOD menu of the *TOD Table* screen (itself is activated by clicking the TOD TABLES button in the Main Menu/Tool Bar) will activate this screen.

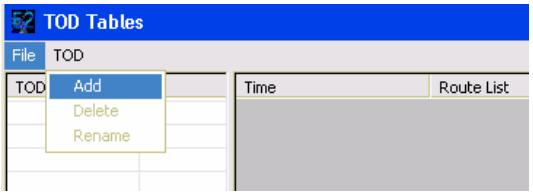


Figure -41-74
Add/Rename TOD Table screen activation

The following information occurs in the *Add/Rename TOD Table* screen:

TOD Table Name Field

This field indicates the name of the time-of-day table to which you will add route lists. Your ***required*** input is limited to 11 alphanumeric characters.

Dragging & Dropping route list into TOD table

To select the appropriate route list and to assign it to a specific TOD table, highlight the route list you want, then drag-and-drop it into the Time column of the named time-of-day table displaying in the *TOD Table – (name Time-of-Day Table)* screen.

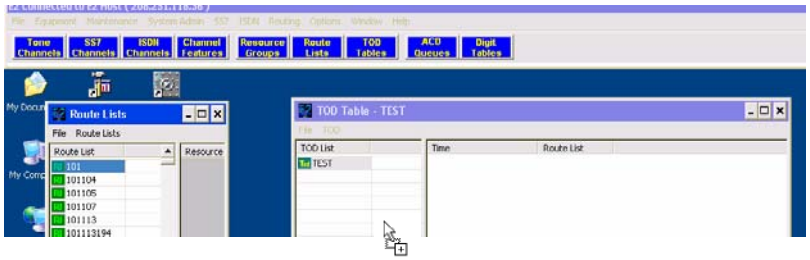


Figure 4-75
Drag-and-drop of route list into TOD table

After you drop the route list into the Time column, the following screen will display:

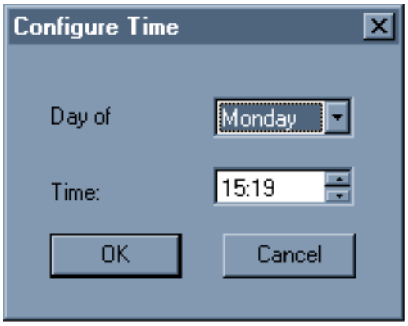


Figure 4-76 Configure Time screen layout

The following information occurs in the *Configure Time* screen:

Day of list

This list indicates the day of the week that this time-of-day table will begin controlling the route lists you have associated with it.

Time list

This list indicates the time of day that this time-of-day table will begin controlling the route lists you have associated with it.

Note—*Clicking the up (or down) arrow after selecting the hour or minute value will increase (or decrease) this value.*

When you have the route lists you want in the time-of-day table, click **Save** in the File menu of the *TOD Table* screen.

ACD Queues

Use this function to configure ACD (Automatic Call Distribution) conditional call routing. A queue is a “stack" for holding calls waiting to be handled when a trunk becomes available.

When an ACD queue is added to a route list in E2, new calls are automatically queued when all available trunks in that route list are busy (or logged off, if operator trunks). Calls in queue will be served in order (first in / first out) when any trunk in any trunk group of the route list becomes available (idle).

ACD queues are designed to provide automatic even call distribution between trunks in the trunk group(s) of a route list. The distribution of calls is based on the time each trunk has been busy. By assigning an ACD queue as a last choice group in a route list, all trunks in the route list change to even call distribution regardless of the hunting sequence for the trunk groups in the route list. ACD queues achieve even call distribution even when calls do not go into the holding queue.

The ACD queue feature in E2 has many attributes. Queue size limit, time to overflow, queue-full routing, and overflow routing are programmable parameters for each ACD queue.

ACD call processing event records are available as an output from E2. The event records are generated in real time as calls progress through the system. The records can be used to provide traffic analysis for fine tuning the queuing parameters, assigning operators, and for other management tasks.

The following diagram shows call flow decisions when an ACD queue has been placed on a route list.

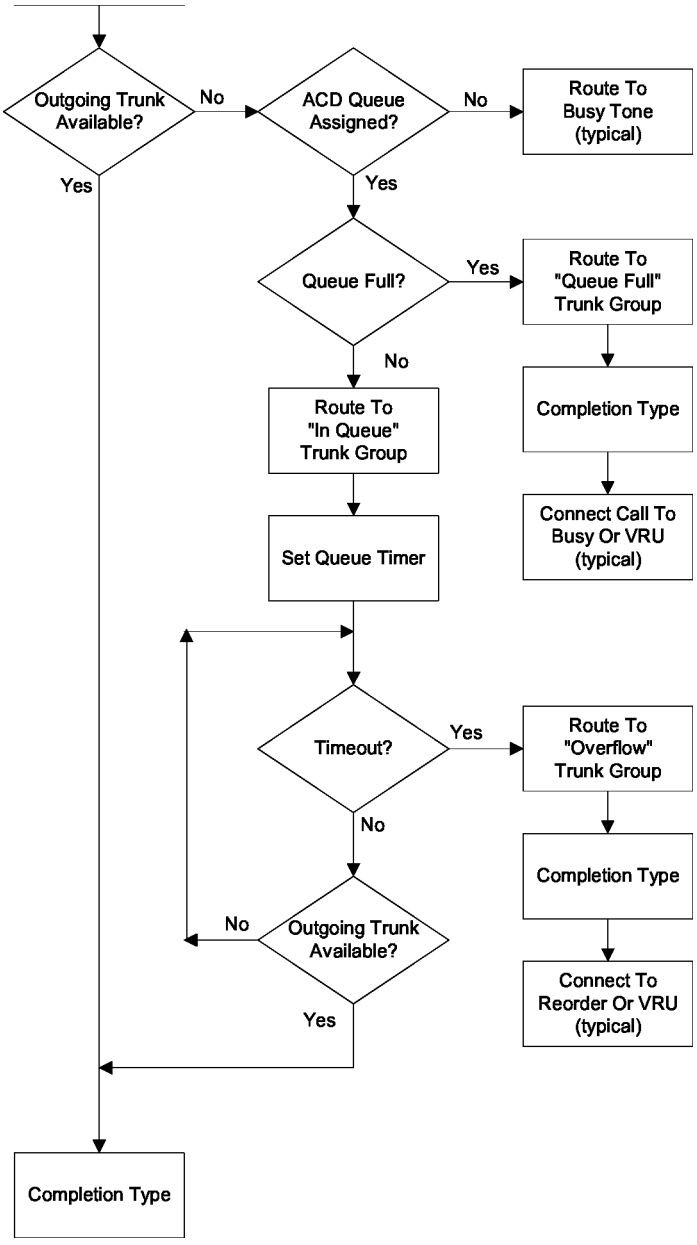


Figure 4-77
ACD Queue Call Flow Activity

To access ACD Queues, under Route List select ACD Queues. You will see the following:

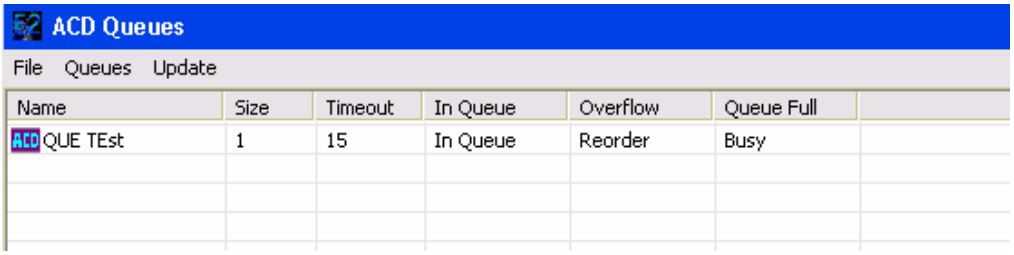


Figure 4-79
ACD Queue

Double-Click on the Queue you wish to edit, or follow the instructions below to add or delete an ACD queue.

ACD Queue attributes are displayed as shown below:

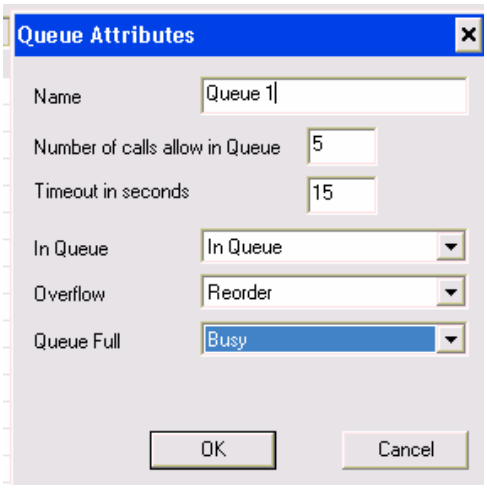


Figure 4-80
ACD Queue Attributes

The ACD queue attributes screen fields are described below:

Name

Name ACD queues to help you remember their function, or their terminating carrier, or their terminating equipment, etc. For example, you may choose department names like "OrderACD" or "ServiceACD." You may choose application types like "OperatorACD" or "CreditCardACD."

Number of calls allowed in Queue (Queue Size)

Size specifies how many calls will be queued before a Queue Full condition is triggered. Calls in queue are serviced first in / first out as trunks become available (idle).

Note: Queue size can range from 0 to 99. By using the number 0 in the size field, callers terminate to the Queue Full condition and no calls are queued.

Timeout in seconds

The time in seconds that a call will be held in queue before going to overflow. Once the time expires, a call is routed to the trunk group specified in the *Overflow* field. A *Timeout* duration of 0 seconds allows all calls to remain in queue until their callers hang up

In Queue

Specifies the trunk group to which calls are routed while in queue. The in queue trunk group may connect to a VRU for voice announcements, to ringback signal, to music, or any other arrangement that callers will hear while waiting in queue.

Overflow

Specifies the trunk group to which a call is routed when timeout occurs. The overflow trunk group may connect to a VRU for voice announcement or may be a tone trunk group (such as reorder tone or busy tone or some other call progress tone).

Queue Full

Specifies the trunk group to which a call is routed when the number of calls already in queue has reached the Size parameter. Once calls have overflowed, they are not re-routed back to the original route list that contains the ACD queue. The queue-full trunk group can connect to a VRU for announcement or may be a tone trunk group (such as reorder tone or busy tone).

Modify ACD Queue

To modify an existing ACD queue, double-click on the desired ACD queue. The information appears in the ACD queue attributes screen.

Add ACD queue

To add (create) a new ACD queue, press A. The system prompts for a queue name, size, and the time in seconds before overflow. Type in the information and press E. The new queue appears in the ACD queue screen.

To delete an ACD queue, select the desired ACD queue, and press D. A verification prompts appears. Press Y to continue with the deletion or N to cancel the deletion process.

Post Routing Options

Different carriers often require different number formats for the DNIS, ANI and/or called number. These formats can now be specified at the Resource Group level within each Route List, which often corresponds to the carrier, by assigning additional “post-routing” translations (after the digit table). Previously, the digit table could only translate by the primary and alternate route; now translations are virtually unlimited as the digit table can point to other digit tables or route lists, and finally, post routing is applied based on the resource group within a route list.

The post routing table can add a prefix or suffix to the DNIS, ANI and/or called number, and can present various ISDN and SS7 signaling types as specified below.

Adding/Changing Post Routing Tables

Click on the **Post Route** button at the top of the screen

Figure 4-81
Post Route Button

The Post Routing screen appears, listing each set of post routing rules:

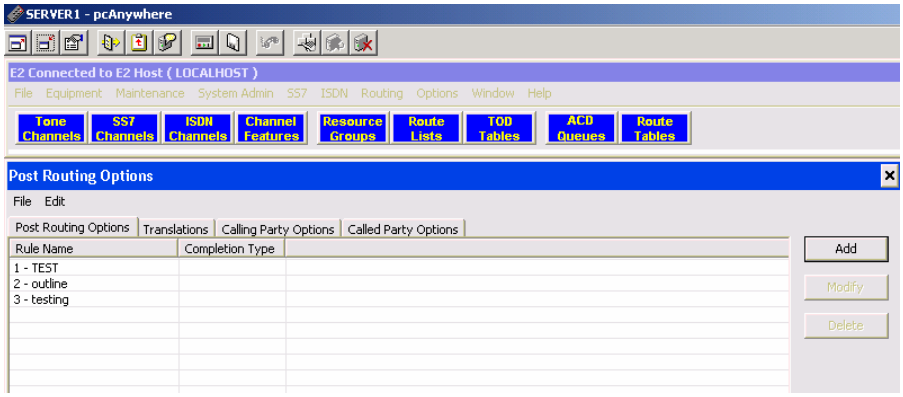


Figure 4-82
Post Routing Table screen layout

One can add a new set of rules by clicking on the **Add** button.

To modify existing rule, click on the Rule Name and either:

- Click on one of the 4 tabs (“Post Routing Options”, etc.) or
- Right click and select **Modify.**

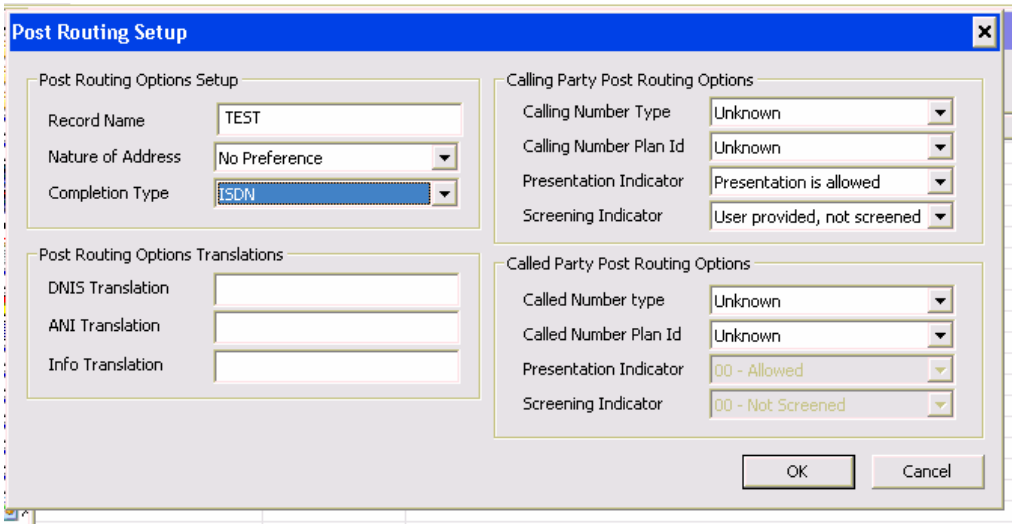


Figure 4-83
Post Routing Table screen layout

The fields are defined as follows:

Post Routing Options Setup

Record Name

The name of the Post Routing rules – each name must be unique

Nature of Address

Valid selections are:

- No Preference
- National number (operator requested)
- International number (operator requested
- No number present (operator requested)
- No number presnt (cut-though call to carrier)
- 950+ call from LE Carrier public station or end office
- Test line test code

Completion Type

Refer to Appendix C for valid Completion Types

Post Routing Options Translations

DNIS Translation

There is the option to add a prefix or suffix of digits to the DNIS, by using the & wild card. For example, if the DNIS is 8005551212 and the value of this field is 01&, then the DNIS presented will be 018005551212. If the DNIS is 8005551212 and the value of this field is &9 then the DNIS presented will be 80055512129.

ANI Translation

There is the option to add a prefix or suffix of digits to the ANI, by using the & wild card. For example, if the ANI is 8005551212 and the value of this field is 01&, then the ANI presented will be 018005551212. If the ANI is 8005551212 and the value of this field is &9 then the ANI presented will be 80055512129.

Info Translation

There is the option to add a prefix or suffix of digits to the Info Digits, by using the & wild card. For example, if the Info Digit is blank,and the value of this field is 27&, then the Info Digit presented will be 27.

Calling Party Post Routing Options

Calling Number Type

Valid selections are:

- Unknown
- International Number
- National Number
- Subscriber Number
- Abbreviated Number
- None

For additional details, contact your technical representative.

Calling Number Plan ID

Valid selections are:

- Unknown
- ISDN Number Plan/Recommendation E.164/E.163
- Telephony numbering plan
- Private numbering plan
- None

For additional details, contact your technical representative.

Presentation Indicator

Valid selections are:

- Presentation is allowed
- Presentation is restricted
- Number not available due to interworking
- None

For additional details, contact your technical representative.

Screening Indicator

Valid selections are:

- User provided, not screened
- User provided, verified and passed
- User provided, verified and failed
- Network Provided
- None

For additional details, contact your technical representative.

Called Party Post Routing Options

Called Number Type

Valid selections are:

- Unknown
- International Number
- National Number
- Subscriber Number
- Abbreviated Number
- None

For additional details, contact your technical representative.

Called Number Plan ID

Valid selections are:

- Unknown
- ISDN Number Plan/Recommendation E.164/E.163
- Telephony numbering plan
- Private numbering plan
- None

For additional details, contact your technical representative.

Presentation Indicator

For SS7, this field is displayed. Valid selections are:

- 00 – Allowed
- 01 – Restricted
- None

For additional details, contact your technical representative.

Screening Indicator

For SS7, this field is displayed. Valid selections are:

- 00 - Not screened
- 01 - Verified and passed
- 02 - Verified and failed
- 03 - Network Provided
- None

For additional details, contact your technical representative.

Assigning Post Routing to a Route List's Resource Group

To assign post routing, select the Route List where you wish it applied., then click on the Resource Group to select it, then right click to see the option to modify:

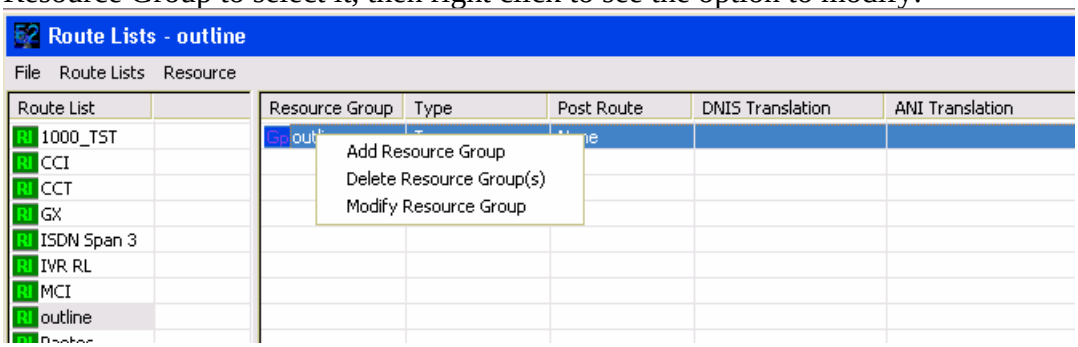


Figure 4-84
Modify Resource Group Within a Route List

The following dialog box appears

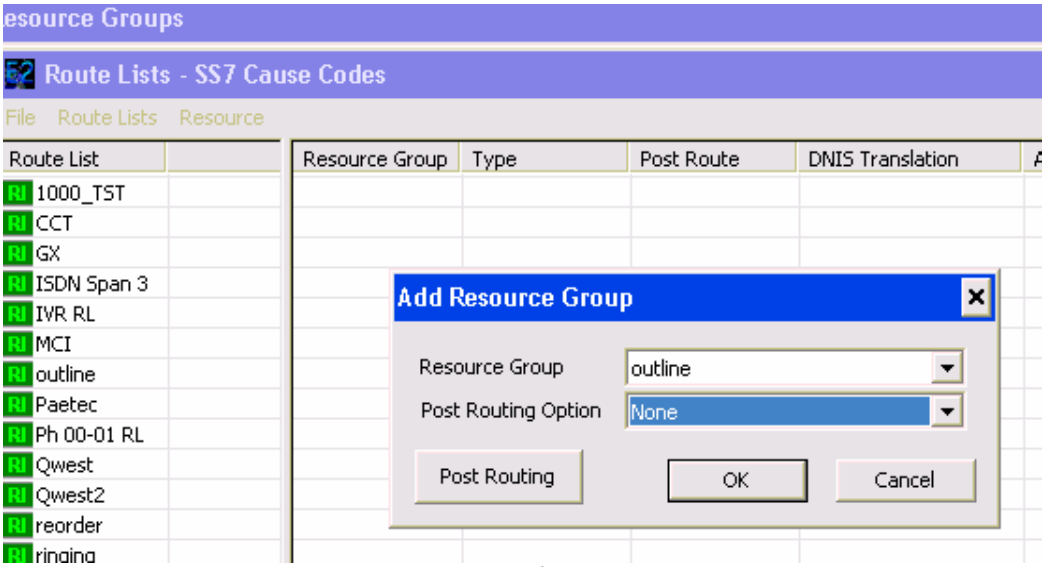


Figure 4-85
Select Post Routing for a Resource Group

All applicable post routing options are in listed in the drop-down box and can be selected.

NOTE: Once the Post Routing option is selected, the “Post Routing” button can be clicked to go directly to configuration for that option.

Route Lists to Create Alternate Routing for Calls

Having grouped channels that share a destination (and share the attributes required for that destination) (see ***Grouping Channels***), you must create a route list. This route list can associate resource groups providing alternate routes to a destination specified by a call. This association should include a resource group that can, if necessary, lead to the playing of a busy tone or a reorder tone to the caller.

Note—A route list must have at least one resource group. You can assign up to 1, 000 resource groups to a route list.

Assigning resource groups to route list

The *Route List* screen enables you to create a route list to which you add resource groups:

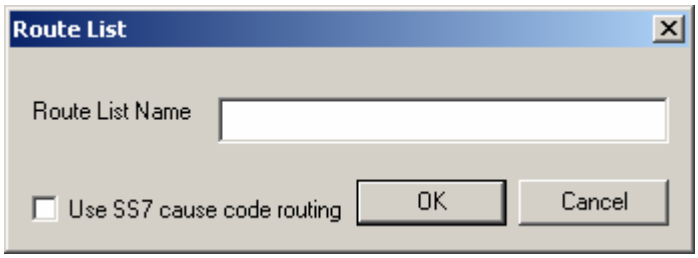


Figure 4-88
Route List screen layout

Clicking **Add List** in the Route Lists menu of the *Route Lists* screen (itself is activated by clicking the ROUTE LISTS button in the Main Menu/Tool Bar) will activate this screen.

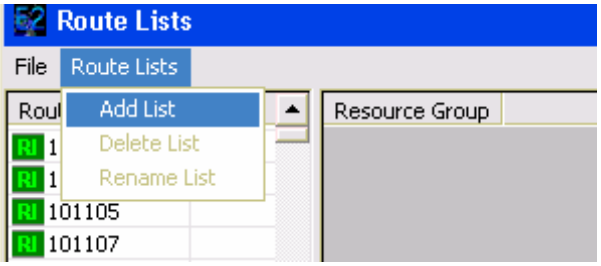


Figure 4-89
Route List screen activation

The following information appears in the *Route List* screen:

Route List name field

This field indicates the name of the route list. Your ***required*** input is limited to 11 alphanumeric characters.

Having named a route list, you then select those resource groups in the *Outgoing Resource Groups* screen that can provide access to the required destination if by different routes.

Note—A resource group can be assigned to more than one route list.

SS7 Cause Code Routing Checkbox

The SS7 call routing based on the out going trunk return SS7 cause code is a two-part setup. The first step is to configure the SS7 Cause Code table (See ***Creating SS7 Cause Code Routing***), and then assign the table to the Route List. The SS7 Cause Code table will only be used on out going SS7 trunks that return a cause code. The SS7 Cause Code table can be configured under the "Option" menu selection of "SS7 Cause Code."

Dragging-and-dropping resource groups into a route list

To select the appropriate resource groups and to assign them to a specific route list, highlight the channels groups you want, then drag-and-drop them into the Resource Group column of the named route list displaying in the *Route Lists – (named route list)* screen.

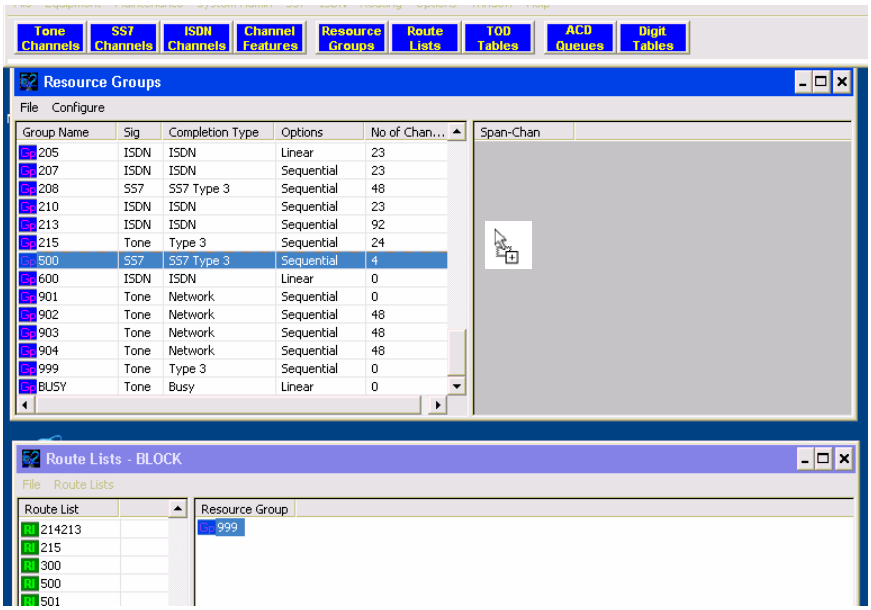


Figure 4-90
Drag-and-drop of resource groups into route list

Note—Dragging a box around specific channels will select all channels within the box (that is, the range of channels will be continuous). Start this box to the right of text in the window's leftmost column, then drag it leftward up or down, if the entire window is filled with columns; if the window does not have columns extending to the right side of the window, start this box beyond the rightmost column, then drag it leftward up or down.

Also, pressing SHIFT and clicking on specific channels will select these channels and all channels in between (that is, the range of channels will be continuous). Alternatively, pressing CTRL and clicking on specific channels will select only these specific channels (that is, the range of channels will be discontinuous).

Once you have dropped resource groups into a route list, you can change their listed order by dragging and dropping them one or more than one at a time to a preferred position in the list. This change of order will alter the hunt for a resource group having available outgoing channels.

When you have the resource groups you want in the route list and they are listed in the order you want, click **Save** in the File menu of the *Outgoing Resource Groups* screen.

Exporting Route List Configuration

It is possible to both export and import resource group configuration information for documentation, review, and sophisticated configuration purposes. To export all route list data, select ***File, Export*** from the ***Route Lists*** screen:

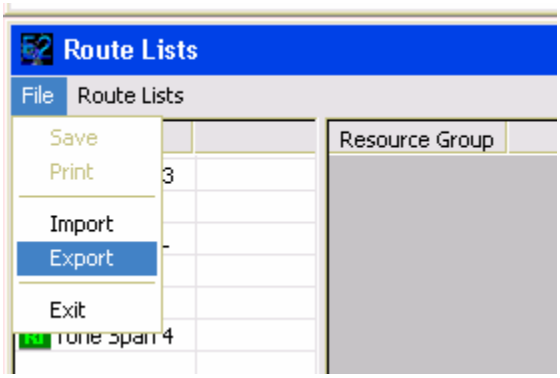


Figure 4-91
Export Route Lists Activation

You are then prompted for a location to export the file. The default file name is "RouteList.CSV," as it is in the CSV format, where the route list name is the first field, and the second and additional fields correspond to the resource group(s), separated by commas, below are an example of an exported route list file, with 3 route lists, and the IVR route list having 3 resource groups:

```
ISDN Span 3, ISDN Span 3

IVR RL, IVR Span 1, IVR Span 2, IVR Span 3

SS7 Span 7, SS7 Span 7
```

Importing Route List Configuration

It is recommended that you ***FIRST EXPORT YOUR PRESENT ROUTE LIST CONFIGURATION BEFORE IMPORTING***. Importing Route List Configuration will overwrite all the data ONLY if there are no errors. A typical error is having the import file specify a resource group that does not exist, all route list data, select ***File, Import*** from the ***Route Lists*** screen.

You are then prompted for a location to import the file from. The default file name is "RouteList.CSV."

Assigning Post Routing to a Route List's Resource Group

To assign post routing, select the Route List where you wish it applied., then click on the Resource Group to select it, then right click to see the option to modify:

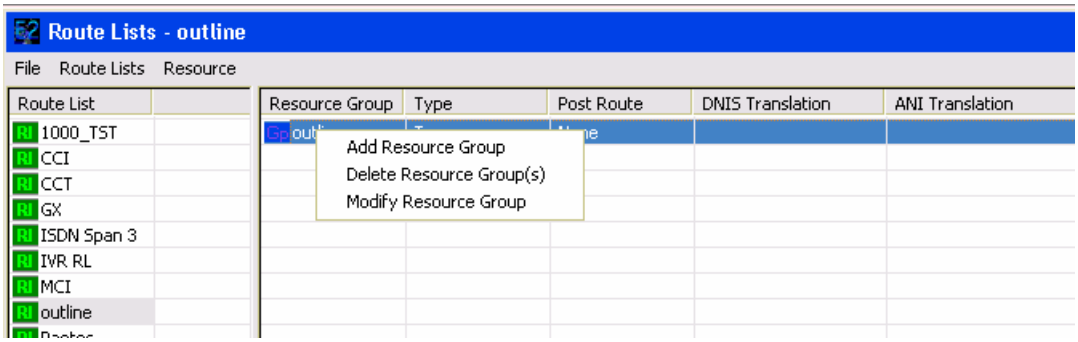


Figure 4-92
Modify Resource Group Within a Route List

The following dialog box appears

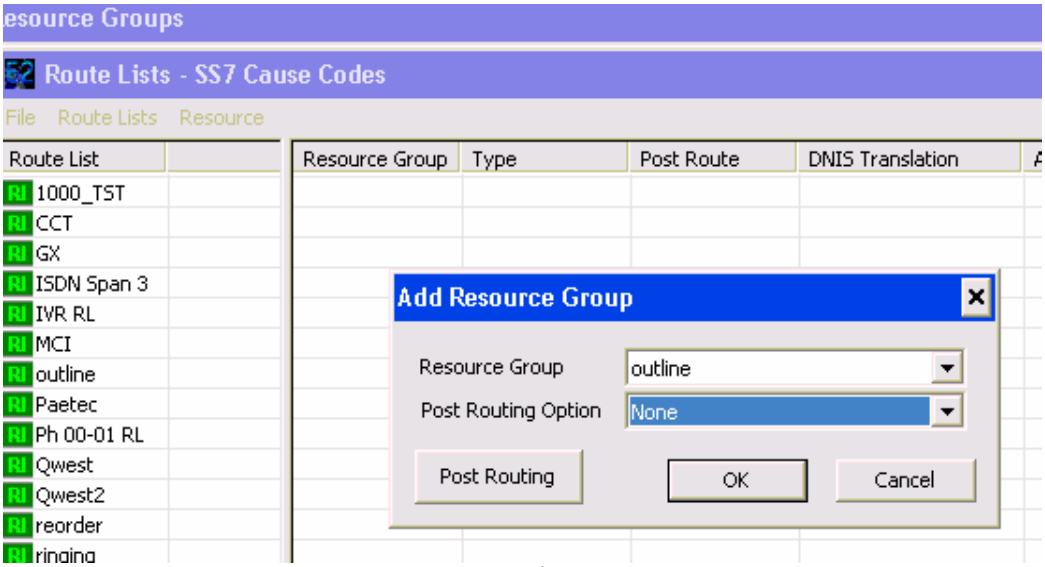


Figure 4-93
Select Post Routing for a Resource Group

All applicable post routing options are in listed in the drop-down box and can be selected.

NOTE: Once the Post Routing option is selected, the “Post Routing” button can be clicked to go directly to configuration for that option.

Digit Tables

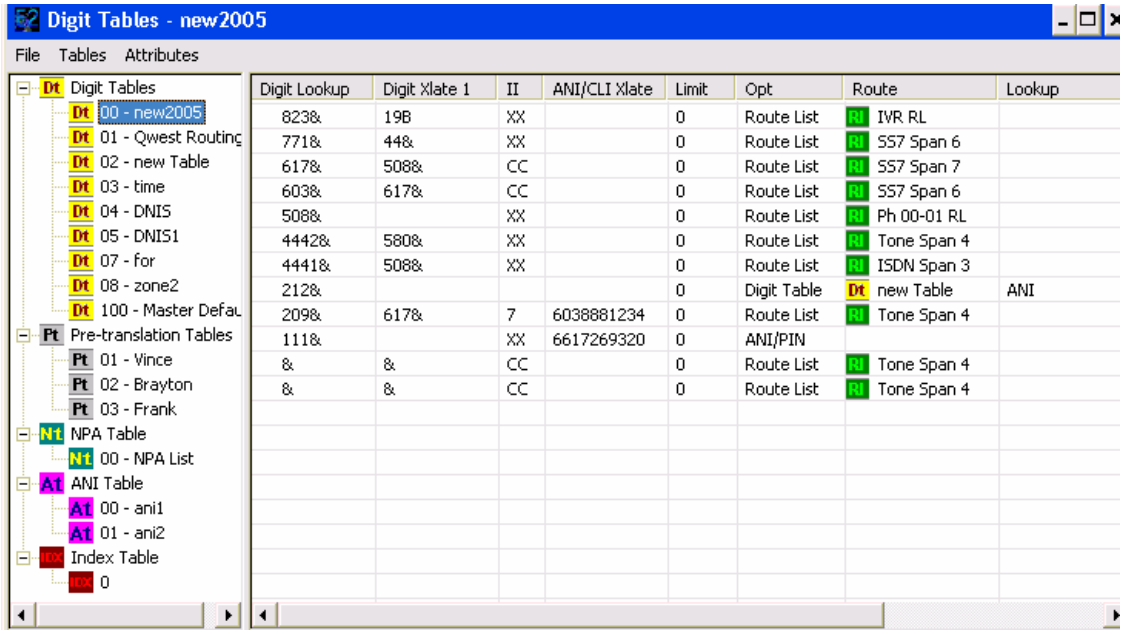


Figure 4-93
Sample Digit Table Layout

Overview – New for 2007

Digit tables perform the following based on the destination number provided, or by the DNIS or ANI provided (as specified in the new "Lookup Type" field):

- Translation of the Destination Number/DNIS/ANI
- Send the Destination Number, DNIS or ANI to another digit table for translation – NEW for 2007 Version 4.7+– This can be done up to 16 times, switching between ANI, DNIS and Destination Number translation for each table.
- Routing the call to a route list, to another digit table, or to the server-based application (TAC/Callback/Callback Menu/ANI PIN) based on Number, DNIS or ANI
- Routing the call to a conference group as either a listener or talker
- Routing the call, based on the Time of Day group

Having associated resource groups that can provide alternate routes to a destination specified by a call (see ***Creating Alternate Routes for Calls***), you must create one or more digit tables. A digit table contains the information needed to assign a route to a call coming into the EXS Switch, including manipulation of the call's digit stream.

Note—You can create up to 100 digit tables, numbered 0-99.

Creating a digit table

The *Digit Table Designation* screen enables you to create a digit table to which you add digit lookup entries:

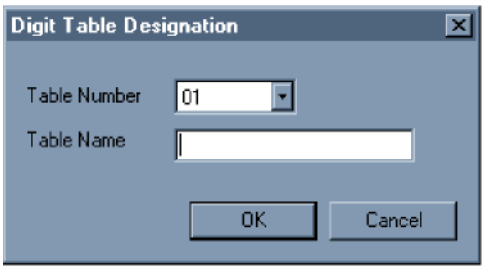


Figure 4-94
Digit Table Designation screen layout

Selecting Digit Table, then clicking **Add Table** in the Tables menu of the *Digit Tables* screen (itself activated by clicking the DIGIT TABLES button in the Main Menu/Tool Bar) will activate this screen.

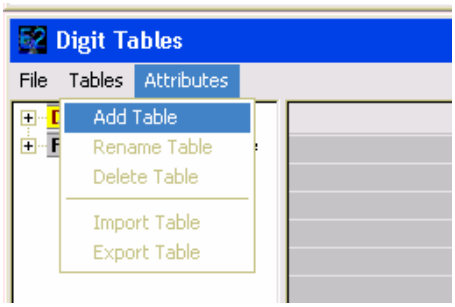


Figure 4-95
Digit Table Designation screen layout

The following information appears in the *Digit Table Designation* screen:

Table Number list

This list indicates the digit table's numerical identity.

Table Name field

This field indicates the digit table's name. Your ***required*** input is limited to 19 alphanumeric characters.

Adding digit lookup entries to a digit table

Once you have named a digit table, you must assign attributes to it. These attributes include the actual pattern of digits the Host will look for in the incoming call's destination number and will then associate with a route for that call. All of these attributes make up a digit lookup entry (each digit table is practically limited by RAM to about 7000 digit table entries per digit table). The *Digit Table Attributes* screen enables you to create digit lookup entries.

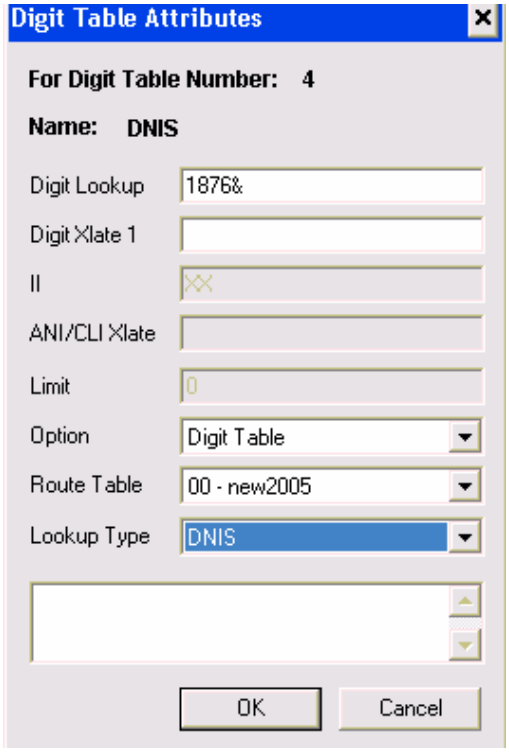


Figure 4-96
Digit Table Attributes screen layout

Selecting a specific digit table (by double-clicking it, and perhaps first displaying all digit tables by clicking the Digit Table's "+" sign), then clicking **Add Table**

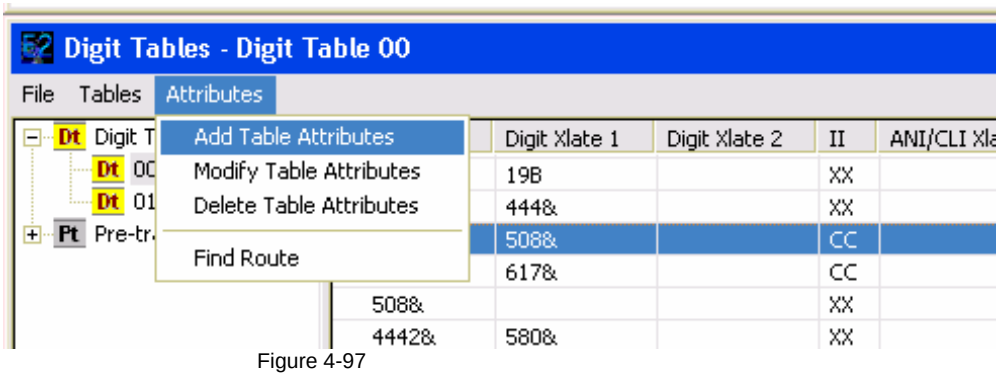


Figure 4-97
Digit Table Attributes screen activation

Attributes in the *Digit Tables* screen's Attributes menu, will activate the *Digit Table Attributes* screen.

The following information appears in the *Digit Table Attributes* screen:

Name line

This line indicates the digit table's name.

Digit Lookup field

This field indicates a pattern of digits against which the incoming number (either dialed by the calling party, or translated previously in the Pre-Translation table associated with this digit table) is matched to determine:

- the call's outgoing leg (specified in this digit lookup entry's **Route** list) from your EXS Switch to the next switch working to complete the call; and, if the incoming number is not directly sent over the outgoing leg as the destination number,
- the incoming number's translation (specified in this digit lookup entry's **Digit Xlate 1** or **Digit Xlate 2** fields) to be sent over the outgoing leg as the destination number.

Your ***required*** input is limited to 23 characters (including only digits 0-9 and symbols "&" and "-", without quotes).

Note—*The channel's Incoming Type determines the number of digits actually collected on this channel's seizure.*

Digit patterns are matched in a descending order of specificity within a descending order of magnitude. Regarding magnitude, the matching process for incoming number 6032553066 would pass over all digit patterns beginning with digits 9, 8, or 7 to start matching at digit patterns beginning with the digit 6. Regarding specificity, the matching process would treat incoming number 6032253066 as matched to digit pattern 6032253066 before it could consider this incoming number as matched to digit pattern 60322 or 6, which it could not do in any case without wildcard characters.

Digit patterns can employ "&" (without quotes) as wildcard characters. For example, the matching process would treat incoming number 6032253066, lacking a more specific match, as matched to digit pattern 603& or to digit pattern 60322530&; in the first example, any incoming number whose first digits are 603 would be treated as a match regardless of the number or pattern of subsequent digits; in the second example, only incoming numbers whose first digits are 603225 would be treated as a match (for other examples of matching and wildcards, see ***Dialed or Translated Incoming Numbers Translated to Destination Numbers****). If "&" is not used in a digit pattern, matching will occur only if the incoming number and the digit pattern are exactly the same.*

Digit Xlate 1 field

This field indicates an instruction that translates an incoming number (either dialed by the calling party, or translated by a previous Digit Table that called this table) into a different destination number; this destination number will be sent to either:

- Another digit table (based on Option Field Settings), or

- The *first* resource group with available outbound spans, specified in this digit lookup entry's **Route** list

Your ***optional*** input is limited to 23 characters (including only digits 0-9, letters A,B,C,D, and symbol "&" without quotes).

Note—*You can add digits to or remove digits from an incoming number so that it becomes partially or totally different destination number.*

*Translation occurs not only according to the instruction you enter in the **Digit Xlate 1** field, but also according to how the incoming number matches the value in the **Digit Lookup** field. The following table shows how a dialed or translated incoming number matches a **Digit Lookup** field value, and shows also how the **Digit Xlate 1** field value changes the incoming number into a different number that becomes the destination number to be sent over the call's outgoing leg.*

Incoming Number (Dialed or Translated)	Digit Lookup	Digit Xlate 1	Effect of Translation	Destination Number on Outgoing Leg
6032253066	6032253066	1&	1 inserted at beginning of incoming number	16032253066
6032253066	603&	011603&	011 inserted at beginning of incoming number	0116032253066
6032253066	603&	&	603 deleted	2253066
6032253066	603&	508&	603 changed	5082253066
6032253066	6&	6&	All calls beginning with 6 route to translated number	6032253066
92253066	9&	603&	9 deleted and 603 added	6032253066
6032253066	6032253066	6035551212	Last seven digits changed	6035551212
6032253066	603&	&11	603 deleted and 11 added to end	225306611
8005551212	800555&	&	First six digits deleted	1212

Figure 4-98
Dialed or Translated Incoming Numbers Translated to Destination Numbers

II field

This field indicates an instruction for this digit lookup entry to handle network-supplied Stage II information digits that North American telcos put in an incoming call's Feature Group D digit stream to characterize the call's origin or nature. Your ***required*** input is limited to the following choices:

- CC. This value indicates the Stage II information digits will be sent as received over the call's outgoing leg.
- XX. This value indicates the Stage II information digits will not be sent over the call's outgoing leg.
- XC. This value indicates only the second Stage II information digit will be sent over the call's outgoing leg.
- CX. This value indicates only the first Stage II information digit will be sent over the call's outgoing leg.
- 00. This value indicates the Stage II information digits will be sent over the call's outgoing leg only after being changed to characterize a regular line call.
- 01. This value indicates the Stage II information digits will be sent over the call's outgoing leg only after being changed to characterize four-party or eight-party call.
- 02. This value indicates the Stage II information digits will be sent over the call's outgoing leg only after being changed to characterize an ANI failure.
- 06. This value indicates the Stage II information digits will be sent over the call's outgoing leg only after being changed to characterize a hotel/motel call.
- 07. This value indicates the Stage II information digits will be sent over the call's outgoing leg only after being changed to characterize a coinless call (such as from a hospital or prison).
- 20. This value indicates the Stage II information digits will be sent over the call's outgoing leg only after being changed to characterize an AOID listed directory number is being sent.
- 23. This value indicates the Stage II information digits will be sent over the call's outgoing leg only after being changed to characterize a coinless or coin call of unknown character.
- 24. This value indicates the Stage II information digits will be sent over the call's outgoing leg only after being changed to characterize an 800/888 service.
- 27. This value indicates the Stage II information digits will be sent over the call's outgoing leg only after being changed to characterize a coin call.
- 30. This value indicates the Stage II information digits will be sent over the call's outgoing leg only after being changed to characterize an intercept of an unassigned number.
- 31. This value indicates the Stage II information digits will be sent over the call's outgoing leg only after being changed to characterize an intercept of number in trouble or in a busy state.
- 32. This value indicates the Stage II information digits will be sent over the call's outgoing leg only after being changed to characterize an intercept of a recently changed number.
- 34. This value indicates the Stage II information digits will be sent over the call's outgoing leg only after being changed to characterize an operator-handled call.

- 40-49. Any of these ten values indicates the Stage II information digits will be sent over the call's outgoing leg only after being changed to characterize a call as defined by the local carrier.
- 52. This value indicates the Stage II information digits will be sent over the call's outgoing leg only after being changed to characterize an outward WATS call.
- 61. This value indicates the Stage II information digits will be sent over the call's outgoing leg only after being changed to characterize a cell phone call in which its ANI identifies only the cellular system.
- 62. This value indicates the Stage II information digits will be sent over the call's outgoing leg only after being changed to characterize a cell phone call in which its ANI identifies the cell phone's directory number.
- 63. This value indicates the Stage II information digits will be sent over the call's outgoing leg only after being changed to characterize a roaming cell phone call.
- 70. This value indicates the Stage II information digits will be sent over the call's outgoing leg only after being changed to characterize a private paystation call.
- There are more Information Digit codes –contact your E2 Eagle technical representative for additional codes

Note—The Host validates incoming Stage I digits against the STAGE_I.DAT file. Received I digits determined to be invalid will not be sent over a call's outgoing leg; these digits are simply discarded. However, the Host does not validate Stage I digits you may change.

ANI/CLI Xlate

This field indicates an instruction for this digit lookup entry to translate network-supplied Calling Party Numbers (such as ANIs or CLIs) that telcos can put in an incoming call's digit stream to identify the caller's origin. Your ***optional*** input is to leave the field blank (default; Calling Party Number is sent as received over the call's outgoing leg), or to enter a wholly, or partially different Calling Party Number up to 20 digits to be sent over the call's outgoing leg.

Note—The following table shows how the network-supplied incoming number (Calling Party Number and/or Stage I digits) can be translated into a different number that will accompany the destination number over the call's outgoing leg.

Incoming Number (network-supplied)	II	ANI/CLI Xlate	Effect of Translation	Number Sent with Destination Number
006032246511	CC	{blank}	Number sent as received	006032246511
6032246511	CC	{blank}	Number sent as received	6032246511
556032246511	CC	{blank}	Invalid II digits removed from sent number (Host rejects invalid incoming II digits)	6032246511
006032246511	CC	6035551212	ANI/CLI replaced in sent number	006035551212
{none}	CC	6035551212	ANI/CLI supplied in sent number	6035551212
006032246511	XX	{blank}	Valid II digits removed from sent number	6032246511
6032246511	XX	{blank}	Number sent as received	6032246511
556032246511	XX	{blank}	Invalid II digits removed from sent number (Host rejects invalid incoming II digits)	6032246511
006032246511	XX	6035551212	Valid II digits removed from and ANI/CLI replaced in sent number	6035551212
556032246511	XX	6035551212	Invalid II digits removed from and ANI/CLI replaced in sent number (Host rejects invalid incoming II digits)	6035551212
6032246511	XX	6035551212	ANI/CLI replaced in sent number	6035551212
{none}	XX	6035551212	ANI/CLI supplied in sent number	6035551212
006032246511	27	{blank}	Valid II digits replaced in sent number	276032246511
006032246511	27	6035551212	Valid II digits and ANI/CLI replaced in sent number	276035551212
6032246511	27	6035551212	Valid II digits added to and ANI/CLI replaced in sent number	276035551212
{none}	27	6035551212	Valid II digits and ANI/CLI supplied in sent number	276035551212
006032246511	55	{blank}	Invalid II digits replaced in sent number (Host does not validate outgoing II digits)	556032246511

Incoming Number (network-supplied)	II	ANI/CLI Xlate	Effect of Translation	Number Sent with Destination Number
006032246511	55	6035551212	Invalid II digits added to and ANI/CLI replaced in sent number (Host does not validate outgoing II digits)	556035551212
446032246511	55	6035551212	Invalid II digits and ANI/CLI replaced in sent number (Host does not validate outgoing II digits)	556035551212

Figure 4-99
Network-supplied Incoming Numbers Translated to Numbers Accompanying Destination Numbers

Limit field

This field indicates the maximum number of concurrent calls that can find a route resulting from a match of their incoming numbers with this digit lookup entry. Your ***required*** input is limited to a number between zero (default; no limit) and 99.

Option list

This list indicates call processing or routing options for this digit lookup entry. Your ***required*** input is limited to one of the following choices:

- Digit Table – New for versions 4.7+. This incredibly powerful feature allows the system to, after translating, send the translation to ANOTHER digit table for further translation. This can occur for up to 15 levels before an error will occur.
- 108 Test Number. Used to perform loopback tests with telcos. This function sets up the incoming channel into a loop-back state by calling the cross connect channel command. This field may not be displayed in all versions.
- ANI/PIN. This value indicates the Host treats incoming numbers matching this digit lookup entry as Smart Long Distance calls and invokes processing logic to handle such calls (see ***Smart Long Distance User's Manual*** for further details).
- Callback. This value indicates the Host treats incoming numbers matching this digit lookup entry as Smart Callback calls and invokes processing logic to handle such calls.
- CB Menu. This value indicates the Host treats incoming numbers matching this digit lookup entry as calls from Smart Callback callers who want prompting to change options in their accounts.
- Listener. This value indicates the Host treats incoming numbers matching this digit lookup entry as requiring access to a conference bridge with listen-only privileges.
- Route List. This value indicates the Host treats incoming numbers matching this digit lookup entry as requiring access to the entry's associated route list which contains groups of outgoing channels that can be hunted for availability (see ***Creating Alternate Routes for Calls*** for further details).

- SMR. This function outpulses the SMR digits to the pager equipment, The desired functionality is that the caller dials the 7-digit access number, and E2 routes the call to the appropriate SMR. When the SMR responds (answers), E2 then outpulses the 4-digit PIN, at which point the caller is connected to the mobile subscriber. Location of the 4-digit PIN is presently in the Xlate2 field. Contact your E2 Eagle technical representative for details to determine if this is applicable to your system.
- TAC. This value indicates the Host treats incoming numbers matching this digit lookup entry as Smart Calling Card calls and invokes processing logic to handle such calls (see the ***Smart Calling Card User's Manual*** for further details).
- Time of Day. This value indicates the Host treats incoming numbers matching this digit lookup entry as requiring access to the entry's associated route list which contains groups of outgoing channels that can be hunted for availability at certain times of the day (see ***Making Routes Time-Sensitive*** for further details).

Route Table list

If the Option field is set to "Digit Table", then a list of digit tables will display. See above Option Field for details.

If the Option field is set to "Route List", then a list of valid route lists will display.

If the Option field is set to "Time of Day", or "Listener" then a list of valid route lists will display.

This list indicates groups of channels that can carry the call involved in this digit lookup (together with its digits, translated or not) from your Switch to another switch that can work to complete the call. Your ***required*** input is limited to the route lists displaying in this list.

Note: The only lists that are displayed are those compatible with the type selected in the **Option** list display in the Route list.

Lookup Type

This field determines what the digits are used for routing, IF the above Option field is set to "Digit Table":

- DNIS – routing is based on DNIS. Thus, the DNIS is used in the Digit Lookup field. Translation of the ANI, DNIS and II uses the corresponding ANI/CLI, XLATE1 and II XLATE fields
- ANI – The called digit table performs a lookup based on the ANI.. Thus, the ANI is used in the Digit Lookup field. Translation of the ANI, DNIS and II uses the corresponding ANI/CLI, XLATE1 and II XLATE fields

Comment

A comment of up to 64 characters is for each digit table entry is now supported

Viewing all digit lookup entries in a Digit Table

Once you click the *Digit Table Attributes* screen's OK button, the digit lookup entry you have added or changed will display in the *Digit Tables* screen (scrollable if the screen is more than full) across the row of the Digit Lookup representing that digit lookup entry.

This row divides into columns that incorporate the meanings, if not the exact labels, of the *Digit Table Attributes* screen's attributes for the selected digit lookup entry.

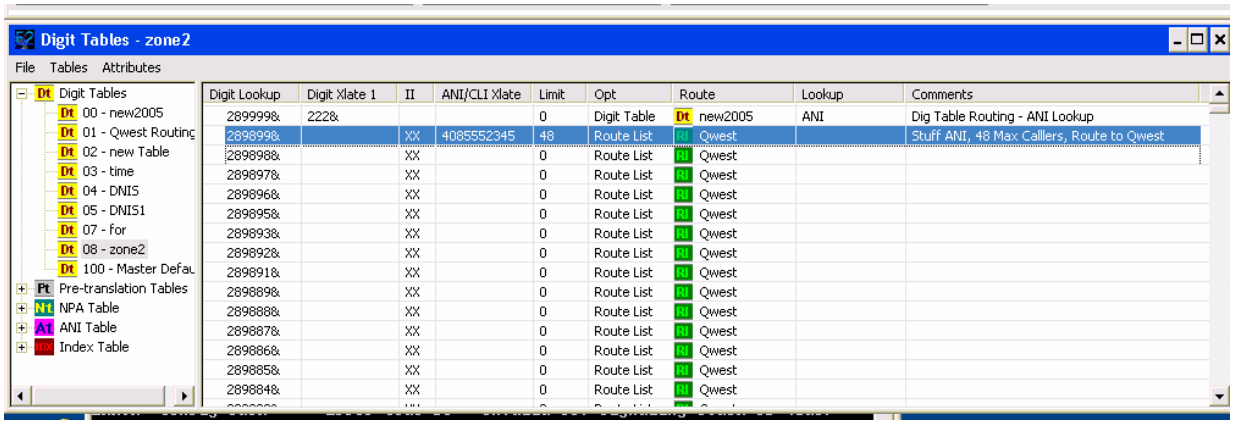


Figure 4-100
Digit Tables screen layout (for digit table)

When you have added all the digit lookup entries you want to this digit table, click **Save** in the File menu of the *Digit Tables* screen.

If you need to change the route list associated with a specific digit lookup entry, you can edit it in the *Digit Table Attributes* screen or you can drag the preferred route list from the *Route List* screen to the line(s) representing the digit lookup entry in the *Digit Tables* screen.

If you want a digit table to become a feature of a particular channel (see ***Assigning Features to Channels***), you can drag that digit table to the line(s) representing that channel in the *Channel Features* screen.

Find Route for a Specific Destination Number

As digit tables get larger, it can often be quite confusing predicting which route a certain number matches. To ease the problem, the Find Route feature was developed.

To find a route, open the appropriate digit table, then under ***Attributes,*** select ***Find Route:***

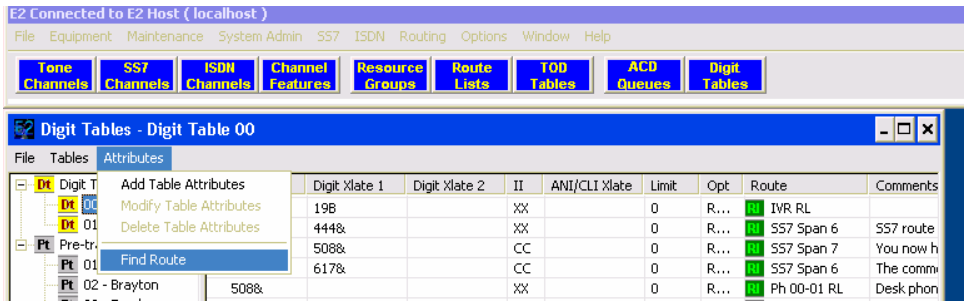


Figure 4-101
Digit Table Find Route Activation

Enter the ***entire*** number, (in this case 444233), and click on ***Find*** to highlight the matching route:

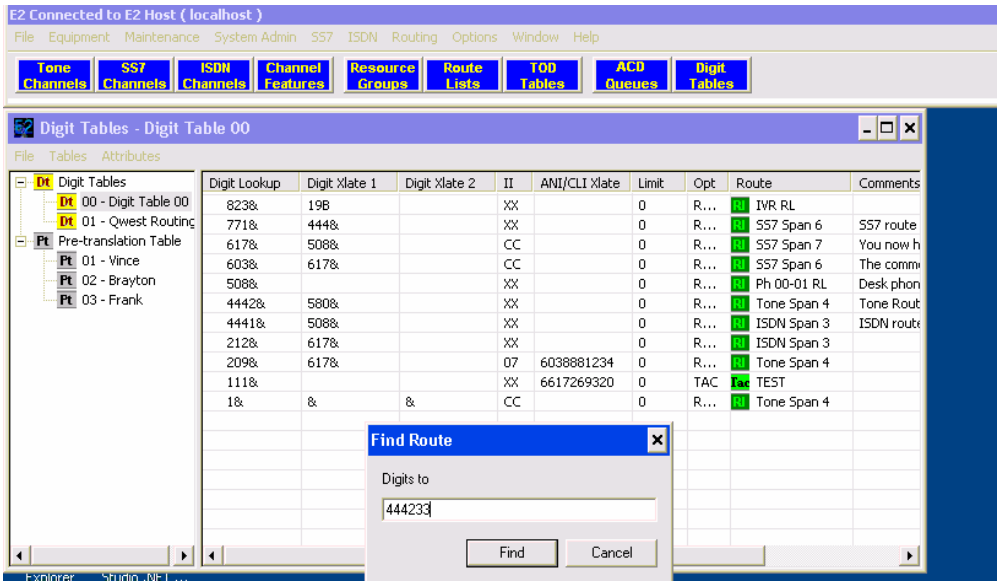


Figure 4-102
Entering entire number to find

In this example, note that Digit Lookup value 4442& is highlighted:

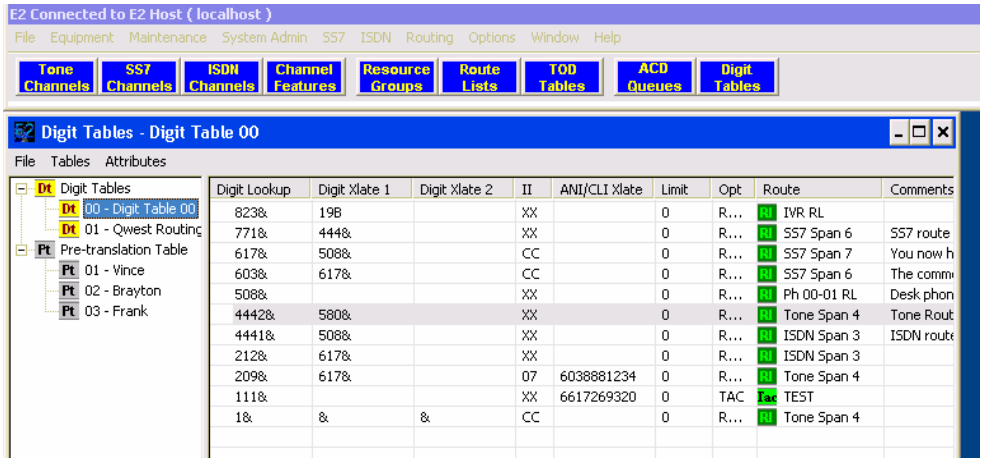


Figure 4-67
Route 4442& selected

If there is no matching route, the following will display:

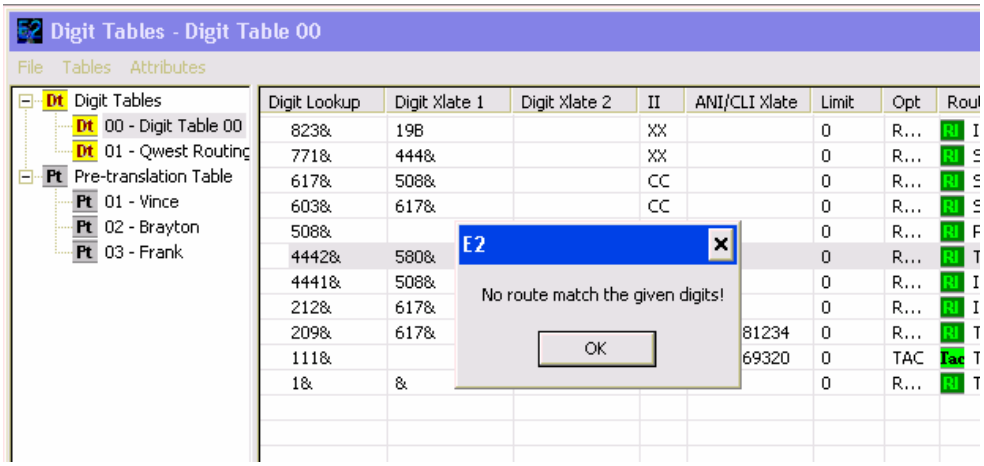


Figure 4-103
No matching route

Exporting Digit Table Configuration

It is possible to both export and import digit table configuration information for documentation, review, and sophisticated configuration purposes. To export ***a specific digit table's*** data, first select the digit table (as described above), then select ***Tables, Export Table*** from the ***specified Digit Table's*** screen. Note digit table 00 is specified below:

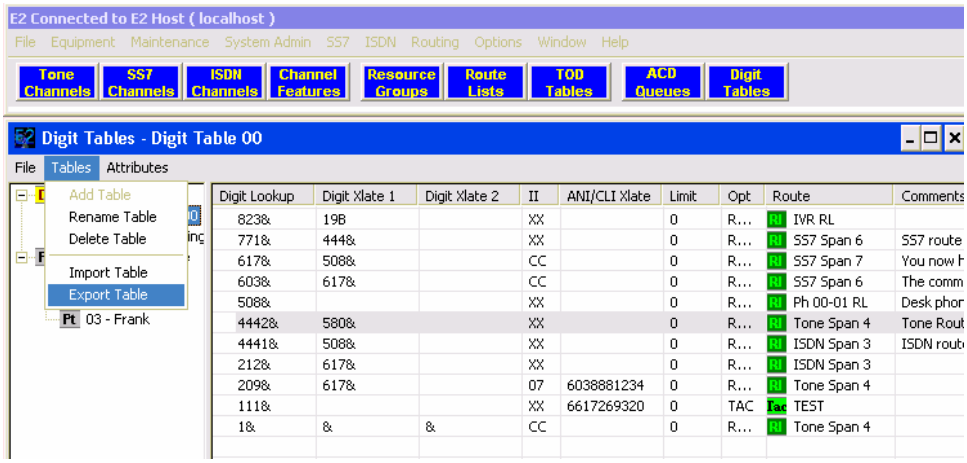


Figure 4-104
Export Digit Table 00

You are then prompted for a location to export the file. The default file name is "Digit Table ##.CSV", where the ## corresponds to the Digit Table Number. Below is an example of Digit Table 00, listed above:

```
823&,XX,,  ,19B,,R,IVR RL,
771&,XX,,  ,444&,,R,SS7 Span 6,SS7 route to and ISDN span or Tone trk
617&,CC,,  ,508&,,R,SS7 Span 7,You now have 64 character for comments.
603&,CC,,  ,617&,,R,SS7 Span 6,Comments can be /exported with the digit tables
508&,XX,,  ,,,R,Ph 00-01 RL,Desk phone
4442&,XX,,  ,580&,,R,Tone Span 4,Tone Route to Phone
4441&,XX,,  ,508&,,R,ISDN Span 3,ISDN route to Phone
212&,XX,,  ,617&,,R,ISDN Span 3,
209&,07,6038881234,  ,617&,,R,Tone Span 4,
111&,XX,6617269320,  ,,,D,TEST,
1&,CC,,  ,&,&,R,Tone Span 4,
```

Least Cost Routing

Digit Table List importing is a very powerful feature. For example, some people use a spreadsheet listing dozens of carriers and their rates, which runs a macro that creates a .CSV file that specifies least cost routing to the cheapest four carriers. As rates change or new carriers are added, they simply rerun the macro and import the new file. For more details, contact your E2 Eagle technical representative.

Importing Digit Table Configuration

It is recommended that you ***FIRST EXPORT YOUR PRESENT DIGIT TABLE CONFIGURATION BEFORE IMPORTING***. Importing Digit Table Configuration will overwrite all the data of the selected digit table ***EVEN IF THERE ARE ERRORS***. A typical error is having the import file specify a route list that does not exist. To import a digit table's data, first select the digit table, then, select ***File, Import Table from the specific digit table's*** screen.

You are then prompted for a location to import the file from. The default file name is "Digit Table ##.CSV".

New to version 4.7: The import process has been optimized, so importing a 20,000 record file now takes under 2 minutes, instead of over 90 minutes. During the import process, the status is displayed:

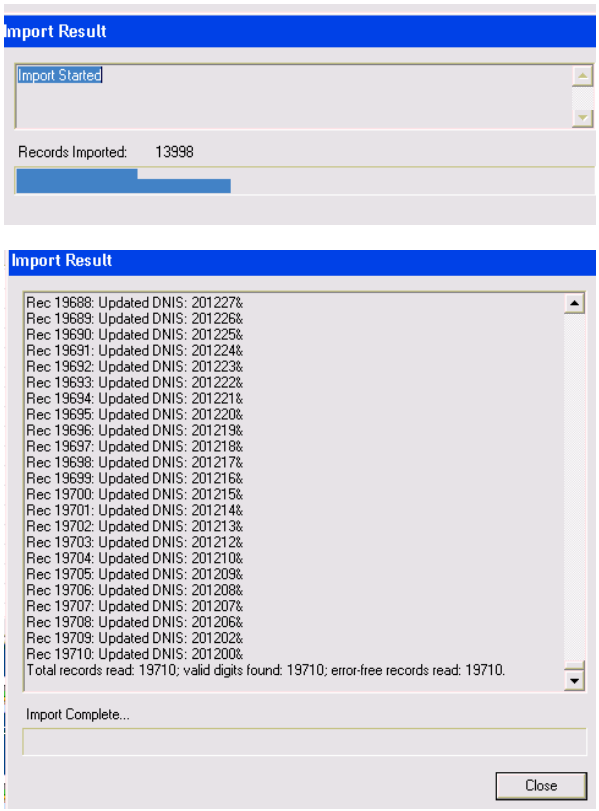


Figure 4-101
Digit Table Import status screens

VRU Branding

There are a number of situations where it is advantageous to play a voice prompt from the VRU. Prompt play is configured through the VRU Branding screen, in conjunction with other screens as applicable.

The following VRU Branding Screen is used to specify branding:

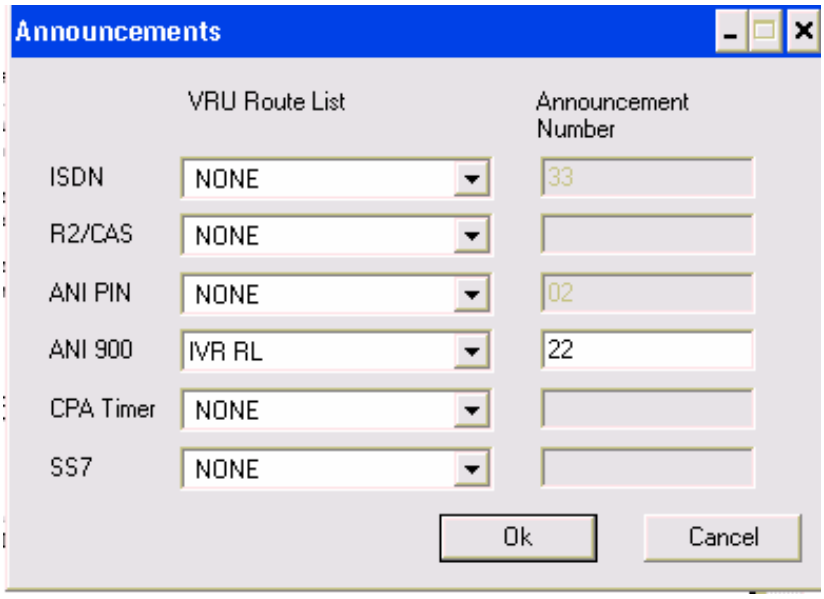


Figure 4-104
VRU Branding Configuration Screen

To activate VRU Branding, from the ***Options*** menu select ***VRU Branding:***

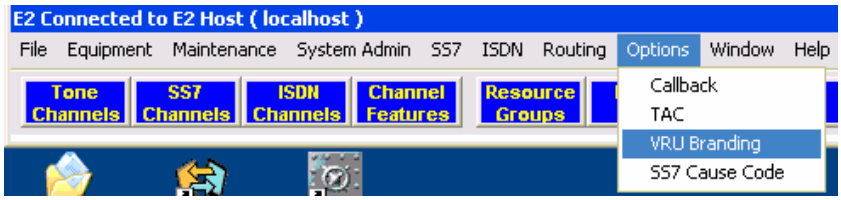


Figure 4-105
VRU Branding Activation

The following fields are displayed:

VRU Route List

All route lists are displayed in a drop-down box. If you wish to play a prompt on the VRU, select a route list that corresponds to your VRU. Otherwise, select "NONE"

Announcement Number

If "NONE" is selected in the VRU Route List, no entry can be made and no prompt will play.

Otherwise, enter a value in the format below to specify the prompt number to play:

The VRU announcements digits method works the same for all of the VRU options. If the VRU is involved with the call, the announcement digits are sent to the VRU route list. The digits are interpreted by the VRU as an incoming command. The command format used by the VRU is the following:

01 CCCC LL PP PP PP.

01 - Command to play prompts and hang-up.

CCCC - Company directory for the prompts.

LL - Language directory for the prompts.

PP - Prompt number to play,

PP - additional (optional) prompt to play before disconnecting the caller.

Note— *PP is either a 2 digit number or the value "&" (without the quotes). "&" acts as a digit substitute in the digit string. In the case of the ISDN and SS7 cause code announcements, the cause code digit will be inserted in to the VRU string sent to the VRU. This will allow the correct announcement to be played per the cause code returned by the far end switch.*

Examples:

Play prompt 25, in the 2002 directory (company), in the 03 subdirectory (language):

Announcement Number value: 0120020325

Prompt file used: VRU_MGR\2002\03\25

Play a prompt based on the SS7 cause code returned, in the 3333 company and 07 language

Announcement Number value: 0133307&

Prompt file used: Assuming the returned cause code is 44, prompt

VRU_MGR\3333\07\44 is played

ISDN

If, under Channel Features, if Audible Signaling is set to "Annc," then the specified message will play when the call cannot be completed.

R2/CAS

If, under Channel Features, if Audible Signaling is set to "Annc," then the specified message will play when the call cannot be completed.

ANI PIN

If the ANI/PIN record is configured to play voice messages (Refer to the "Smart Long Distance Manual"), then the specified prompt will greet the caller. Otherwise, the ANI/PIN caller will hear a dial tone or beep, as configured.

ANI 900

This gives you the capability of playing an announcement before entering a conference bridge (See ***Assigning attributes to resource group, Play ANI 900 Prompt to Conference***

Bridge).

CPA Timer

This feature is not supported at this time.

SS7

This prompt will play if the returned cause code is configured to do so. (See ***SS7 Cause Code Setup***)

.

5. Maintenance

Overview

This chapter explains how to

- view the status of errors, alarms, and span states in real time;
- capture and review call processing data;
- capture and review network data; and
- update the system.

Switch Status screen

The *Switch Status* screen enables you to view counts of Host link errors that have occurred between the Host computer and the EXS Switch. You can also view RAM (Switch Software) and ROM (firmware) versions of the EXS Switch, as well as view the primary and secondary clocks.

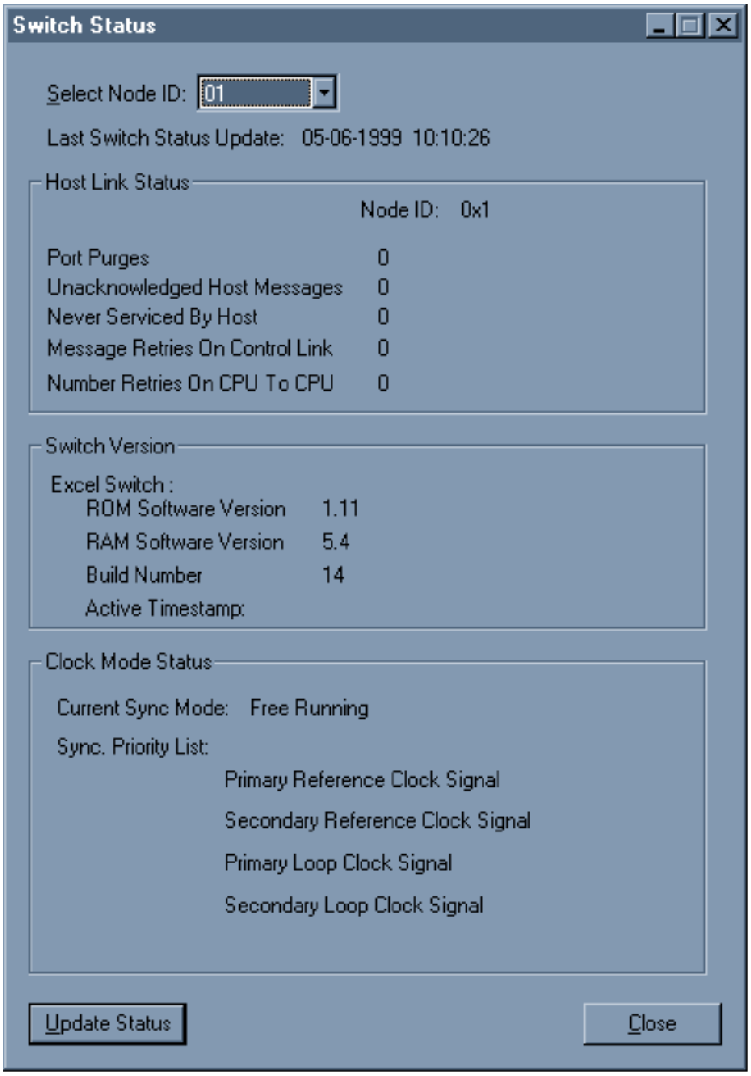


Figure 5-1
Switch Status screen layout

Clicking **Switch Status** in the Maintenance menu will activate this screen.

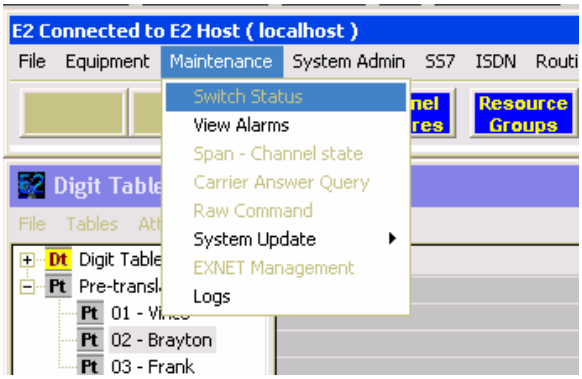


Figure 5-2
Switch Status screen activation

Updating Switch Status

Clicking the UPDATE STATUS button updates information in the *Switch Status* screen. The following information appears in the *Switch Status* screen:

Select Node ID list

This list indicates the node ID of each EXS Switch in an EXNET configuration. Select the node ID of the EXS Switch you want to view statistics. If your configuration is not EXNET, the default ID is **No Exnet**.

Last Switch Status Update line

This line displays the date and time of the last switch status update.

Host Link Status area

This area of the *Switch Status* screen enables you to view counts of errors that may have occurred between the Host computer and the EXS Switch.

The following lines appear in the **Host Link Status** area:

Port Purges line

This line indicates the number of channel purges recorded by the Host.

Unacknowledged Host Messages line

This line indicates the number of messages the Host sent to the EXS Switch without a return acknowledgment. Each time the Host sends a message to the EXS Switch, an cknowledgment is sent back to the Host to indicate that the EXS Switch received the message correctly and that the message is legitimate.

Never Serviced by Host line

This line indicates the number of messages acknowledged by the Host and never serviced by the EXS Switch. This indicates that a valid message was not processed by the EXS Switch.

Message Retries on Control Link line

This line indicates the number of times the Host had to re-transmit a message over the link.

Number Retries on CPU to CPU field

This line indicates the number of internal messages between EX/CPU cards in the EXS Switch.

Switch Versions area

This area of the *Switch Status* screen enables you to view the EXS Switch's most recent firmware and software versions.

The following lines appear in the **Switch Versions** area:

ROM Software Version line

This line indicates the most recent Read Only Memory (ROM) version of the firmware in the EXS Switch.

RAM Software Version line

This line indicates the most recent Random Access Memory (RAM) version of the Switch Software (Dynamis' operating system software).

Note—Certain versions of the Switch Software are only compatible with specific Excel hardware versions. To verify compatibility, contact Dynamis Customer Engineering.

Build Number line

This line indicates the version number of the Switch Software.

Active Timer Stamp

This line indicates the date and time of the last Switch Software download.

Clock Mode Status area

This area of the *Switch Status* screen enables you to view clock synchronization priorities as well as the status of the current clock synchronization in use. The EXS Switch continuously monitors all programmed clock sources and uses the highest priority clock source available to synchronize all digital network interfaces.

The following lines appear in the **Clock Mode Status** area:

Current Sync Mode line

This line indicates the clock synchronization currently in use.

*Note—If the clock is set to Free Running, you may experience slips on spans. To reset the primary timing source, (see **Chapter 4 Configuring Channels and Routes**). **Select** the desired span to use for timing, and type in the board offset for the primary loop timing source.*

Sync. Priority List line

This line indicates the order in which the EXS Switch hunts for available clock sources. The default synchronization priority list is as follows:

1. Primary Reference Clock Signal
2. Secondary Reference Clock Signal
3. Primary Loop Clock Signal
4. Secondary Loop Clock Signal
5. Free Running Clock Signal

Alarms screen

The *Alarms* screen enables you to view an internally-kept database that tracks whether elements in your single or multinode EXS Switch are or have been in alarm and, if in alarm, the degree to which they are or were in alarm.

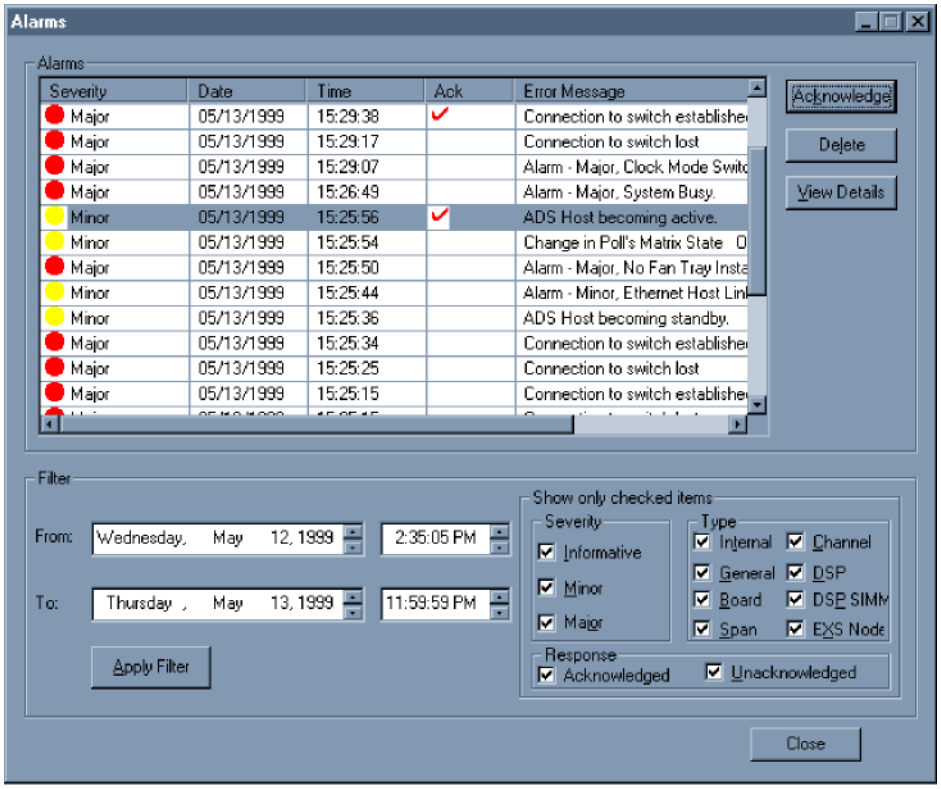


Figure 5-3
Alarms screen layout

Clicking **View Alarms** in the Main Menu/Tool Bar's Maintenance menu will activate this screen.

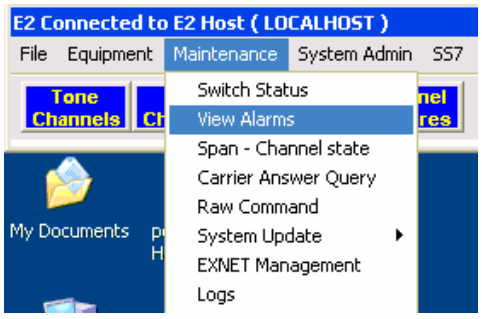


Figure 5-4
Alarms screen activation

Alarm Screen Activation

The following lists, fields and checkboxes appear in the *Alarms* screen:

Alarms area

This area provides a scrollable structure for listing alarms row by row. Alarms display only if they have occurred, only if they have happened during or after the timeframe you specify in the Filters area below, and only if they fit other criteria you have selected in the Filters area.

Severity field

This field indicates how worrisome the condition generating this alarm is for the smooth running of your service. Alarms can occur in three degrees of severity:

- Major (also depicted as red LED). This value indicates the condition generating the alarm is likely to affect service adversely if not corrected.
- Minor (also depicted as yellow LED). This value indicates the condition generating the alarm could worsen and become service-affecting if not corrected.
- Informative (also depicted as blue LED). This value indicates that a condition has occurred and the alarm it has generated is intended to inform you of this occurrence.

Date field

This field indicates the date this alarm was generated.

Time field

This field indicates the time of day this alarm was generated.

Ack field

This field indicates whether you have acknowledged this alarm.

Note—If you select this alarm, then click the ACKNOWLEDGE button, a red checkmark will appear in this field. If you have not acknowledged this alarm, this field will remain blank.

An unacknowledged alarm will cause the word "Alarm" to display rightward on the Main Menu/Tool Bar in red, yellow or blue letters, as appropriate to the most severe alarm that is unacknowledged.

Error Message field

The field indicates the nature of this alarm.

Filter area

This area provides you choices to restrict the listing of alarms you want to view. In order to change this listing, establish a viewing period and/or check or uncheck the pertinent boxes, then click the APPLY FILTER button.

From and to fields

These fields together indicate the period of time you want to consider for viewing alarms.

Note—Alarms conforming to other criteria you select in the Filters area will display if they occurred after the period of time you specify.

Severity checkboxes

These checkboxes indicate the severity of alarms you want to view. Your *optional* input is limited to:

- Informative. Checking this box indicates you want to view alarms generated to inform you of occurrences of conditions.
- Minor. Checking this box indicates you want to view alarms generated by conditions that could worsen and become service-affecting if not corrected.
- Major. Checking this box indicates you want to view alarms generated by conditions likely to affect service adversely if not corrected.

Note—You must check at least one of these Severity boxes or no alarms will display.

Type checkboxes

These checkboxes indicate the locations of conditions generating alarms you want to view. Your *optional* input is limited to:

- Internal. Checking this box indicates you want to view alarms generated within the Host and in its connection to the EXS Switch (for example, an internal alarm will result if the Host and EXS Switch lose their IPconnection).
- General. Checking this box indicates you want to view alarms generated anywhere in your Call Processing System and its connections to the outside world (for example, a general alarm will result from a reference clock lost, a DSP resource blocked, or an SS7 network congested).
- Board. Checking this box indicates you want to view alarms generated within processing and I/O cards of your EXS Switch (for example, a board alarm will result from a card reset, a card revision incompatibility with system software, or a Host ethernet link error).
- Span. Checking this box indicates you want to view alarms generated within spans to your carriers (for example, a span alarm will result from a span out of service or from an excessive burst of slips).
- Channel. Checking this box indicates you want to view alarms generated within channels of your spans (for example, a channel alarm will result from a PPL state machine error).
- DSP. Checking this box indicates you want to view alarms generated within the Digital Signal Processing cards of your EXS Switch (for example, a DSP alarm will result from DSP card taken out of service).
- DSP SIMM. Checking this box indicates you want to view alarms generated within memory modules on the Digital Signal Processing cards of your EXS Switch (for e

xample, a DSP SIMM alarm will result from an erased Voice Recorded Announcement System SIMM or from an inconsistent download of recorded announcements).

- EXS Node. Checking this box indicates you want to view alarms generated within an EXNET ring (for example, an EXS Node alarm will result from a changed timeslot count).

Note—You must check at least one of these Type checkboxes or no alarms will display.

Response checkboxes

These checkboxes indicate whether you want to view alarms you have or have not acknowledged, or both.

Note—You must check at least one of these Response checkboxes or no alarms will display.

Clicking the VIEW DETAILS button in the *Alarms* screen will display details of the alarm you select in the Alarms area.

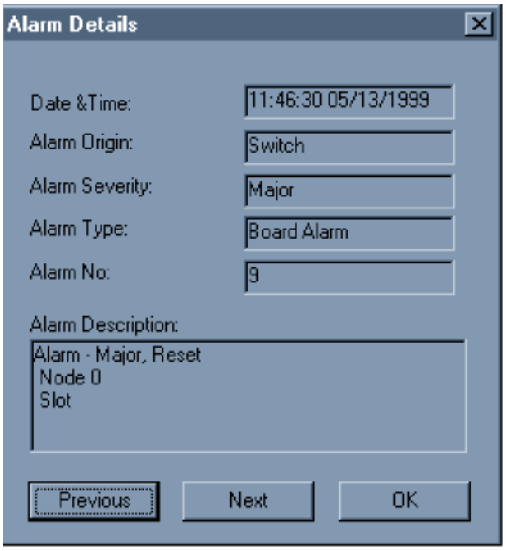


Figure 5-5
Alarm Details screen layout

The following fields appear in the *Alarm Details* screen:

Date & Time: field

This field indicates when the alarm you are viewing was generated.

Alarm Origin: field

This field indicates the component in your Call Processing System that has generated the alarm you are viewing.

Alarm Severity: field

This field indicates how worrisome the condition generating this alarm is for the smooth running of your service (see the Severity field above for additional information).

Alarm Type: field

This field indicates the type of alarm you are viewing (see the Type checkboxes above for additional information).

Alarm No: field

This field indicates the hexadecimal value of the alarm within the alarm type you are viewing (for details, see General API Messages in Dynamis Switching's ***Software Reference Manual).***

Alarm Description:

This field indicates the nature of the alarm. **field**

Span and Channel Status screen

The *Span and Channel Status* screen enables you to view the status of each span and channel as well as troubleshoot errors pertaining to the Host. You can also place channels in or out of service.

*Note—The Span And Channel Status screen does not display span states in real time, however, the Host, by default, updates the status every two seconds. To change the default setting,(**see Refresh Rate screen**).*

New feature: Note that the full Carrier ID and Cable ID is now displayed in the upper left corner of the screen

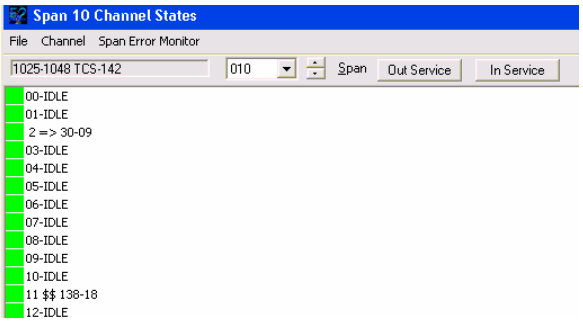


Figure 5-6
Span and Channel Status screen layout

Clicking **Span-Channel States** in the Maintenance menu will activate this screen.

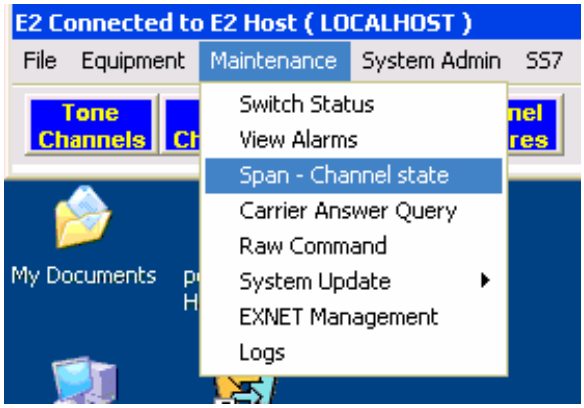


Figure 5-7
Span and Channel Status screen activation

Viewing Span and Channel Status

To view span and channel status, click a span ID in the **Span** list.

The *Span and Channel Status* screen displays status messages for each channel, as well as a color-coded icon indicating the service status of each channel. A green icon indicates the channel is in service and a red icon indicates the channel is out of service.

The following channel status messages may appear in the *Span and Channel Status* screen:

- `. (period).` Channel is out of service by the EXS Switch.
- **`00 => 1-05`**. Channel 00 (in displayed span) is connected to outseized channel 05 in span 1.
- **`00 $$ 1-05`**. Channel 00 (in displayed span) is connected to answered channel 05 in span 1.
- **`Alarm`**. Channel is in an alarm state caused by either an alarm or signaling failure on the span.
- **`Bridge ID xxxx`**. Channel is bridged onto conference ID xxxx (hex).
- **`Broadcast`**. Channel is in one-way use (completion type of Broadcast).
- **`Busy`**. Channel is connected to internal busy tone.
- **`Conf => xxxx`**. Channel is part of conference ID xxxx (hex).
- **`Dialing`**. Channel is dialing.
- **`Disabled`**. Channel is acknowledged out of service by the user.
- **`Error`**. Channel is experiencing an error condition and is non-functional.
- **`Far End Alarm`**. Span is out of service and is receiving alarm from the far end.
- **`On Hold`**. Channel is on hold from a hook flash.
- **`IDLE`**. Channel is available for use.
- **`In-Queue.`** Channel is waiting in an ACD queue for an available channel.
- **`In-Seizure`**. Channel has just been seized.
- **`Listen ID xxxx`**. Channel is listen-only to a conference ID xxxx (hex).
- **`Log off`**. Channel is associated with an ACD queue and is currently logged out.
- **`Message`**. Channel is playing an announcement.
- **`Out of Service`**. Channel is out of service by user, but not yet acknowledged by the EXS Switch.
- **`Releasing`**. Channel is being released by the EXS Switch.
- **`Reorder`**. Channel is connected to internal reorder tone.
- **`Ringing`**. Channel is connected to internal ringback tone.
- **`VRU Out of Service`**. Channel is unable to receive service from the VRU assigned to it.
- **`Waiting`**. Channel is waiting for connection to an announcement.

Selecting Channels

You can select channels, or groups of channels for the purpose of placing them in or out of service.

Note—Clicking a specific channel will select the channel.

Dragging a box around specific channels will select all channels within the box (that is, the range of channels will be continuous). Start this box to the right of text in the window's leftmost column, then drag it leftward up or down, if the entire window is filled with columns; if the window does not have columns extending to the right side of the window, start this box beyond the rightmost column, then drag it leftward up or down.

Also, pressing SHIFT and clicking on specific channels will select these channels and all channels in between (that is, the range of channels will be continuous). Alternatively, pressing CTRL and clicking on specific channels will select only these specific channels (that is, the range of channels will be discontinuous).

Placing Channels in Service

Clicking **In Service** in the *Span and Channel Status* screen's **Channel** menu places the channels you select in service.

New feature – By clicking on the "In Service" or "Out Service" button, you can now place all the channels in the span in/out of service with one click.

Note—You must place channels out of service when configuring the channel information. Once the configuration is complete, the channels may be restored to service. Any channel taken out of service will not be used in its respective resource group. It will, however, become available once the channel is restored to service.

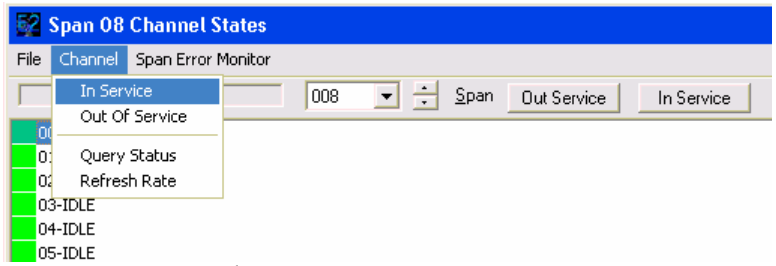


Figure 5-8
In Service activation

Placing Channels Out of Service

Clicking **Out of Service** in the *Span and Channel Status* screen's **Channel** menu places the channels you select out of service.

Note—You must place channels out of service when configuring the channel information. Once the configuration is complete, the channels may be restored to service. Any channel taken out of service will not be used in its respective resource group. It will, however, become available once the channel is restored to service.

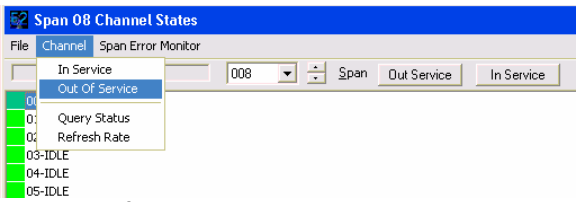


Figure 5-9
Out of Service activation

Placing Entire Span in Service

Clicking the **In Service button** in the *Span and Channel Status* screen will place the entire span in service

Figure 5-10
Place entire span in service button

Placing Entire Span Out of Service

Clicking the **Out Service button** in the *Span and Channel Status* screen will place the entire span in service.

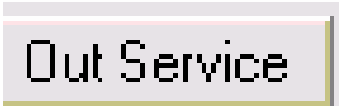


Figure 5-11
Place entire span out of service button

Query Channel Status screen

The *Query Channel Status* screen enables you to retrieve configuration information for a specific channel from the EXS Switch. This can be useful in verifying configuration settings. This information helps isolate problems that may occur with call processing.

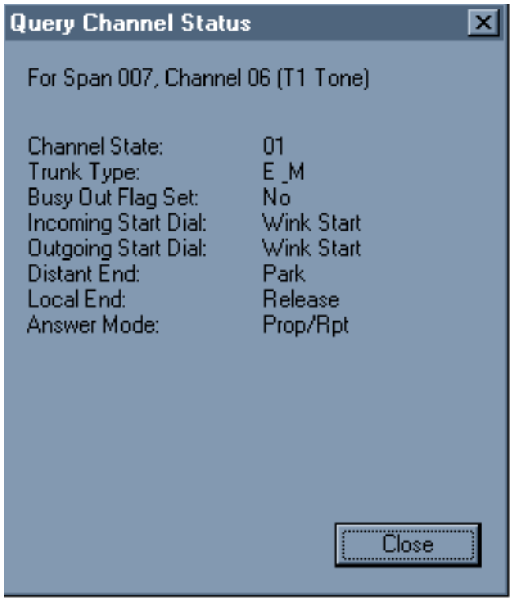


Figure 5-12
Query Channel Status screen layout

In the *Span and Channel Status* screen, click the channel you want to query; then click **Query Status** on the Channel menu to activate this screen.

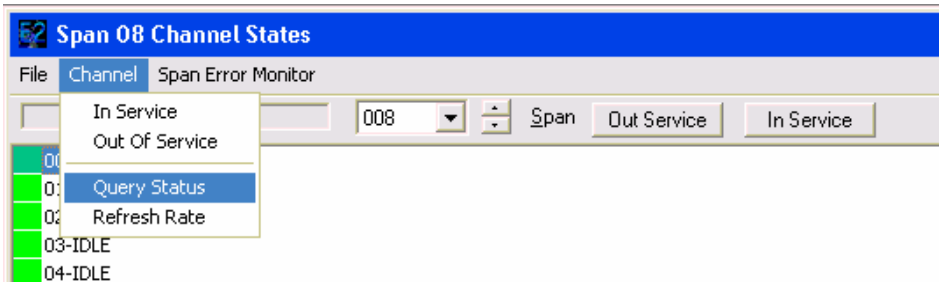


Figure 5-13
Query Channel Status screen activation

The following lines appear in the *Query Channel Status* screen:

Span line

This line indicates the span you select in the *Span and Channel Status* screen.

Channel line

This line indicates the channel you select in the *Span and Channel Status* screen.

Channel State line

This line indicates the state of the channel you have selected.

Channel Type line

This line indicates how the specified channel is set up. Set up the channel type in the Routing Tables/Channel Assignments function (see ***Chapter 4 Configuring Channels and Routes***).

Busy Out Flag Set line

This line indicates whether or not the channel can be busied out. Not all channels can be busied out at this time. If the flag is set to NO, the channel cannot be busied out. If the flag is set to YES, the channel can be busied out.

Incoming Start Dial line

This line indicates how the incoming start dial is configured for this channel. Set up the Incoming Start Dial in the Routing Tables/Channel Assignments function (see ***Chapter 4 Configuring Channels and Routes***).

Outgoing Start Dial line

This line indicates the type of start dial used for outgoing call processing. The Outgoing Start Dial type is determined by the channel type set for the channel. Set up the Outgoing Start Dial in the Routing Tables/Channel Assignments function (see ***Chapter 4 Configuring Channels and Routes***),

Distant End line

This line indicates whether the distant end is in Park or Release mode. Set up the Distant End in the Routing Tables/Channel Features function (see ***Chapter 4 Configuring Channels and Routes***).

Local End line

This line indicates whether the local end is in Park or Release mode. Set up the Local End in the Routing Tables/Channel Features function (see ***Chapter 4 Configuring Channels and Routes***).

Answer Mode line

This line indicates how each channel handles answer supervision. Set up the Answer Mode in the Routing Tables/Channel Features function (see ***Chapter 4 Configuring Channels and Routes***).

Refresh Rate screen

The *Refresh Rate* screen enables you to set the update time for the *Span and Channel Status* screen.

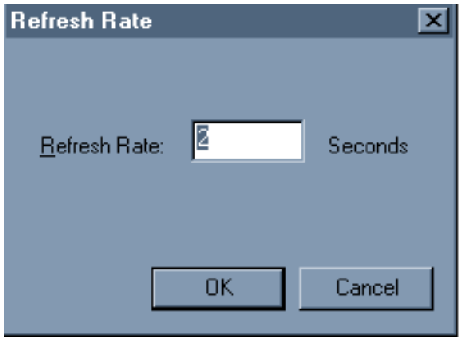
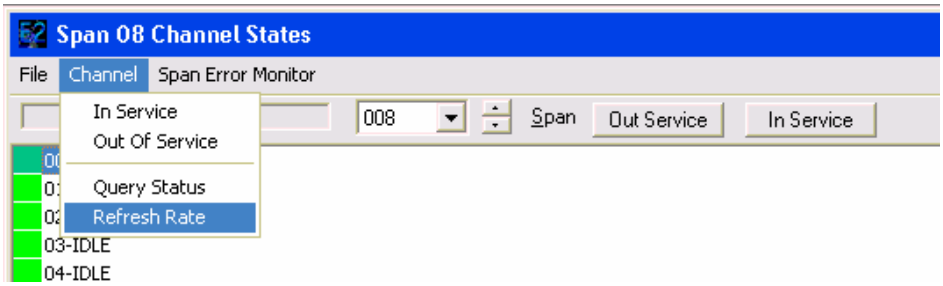


Figure 5-14
Refresh Rate screen layout

On the *Span and Channel Status* screen's Channel menu, click **Refresh Rate** to activate this screen.

Figure 5-15



Refresh Rate screen activation

Changing Default Refresh Rate

The Host refreshes span states, by default, every two seconds. The *Refresh Rate* screen enables you to change the default refresh time. Your ***optional*** input is limited to values, in seconds, of 2-40.

Span Error Monitor screen

The *Span Error Monitor* screen enables you to view error conditions that may occur on each span. The EXS Switch has internal counters for each error condition. The Host stores and accumulates error totals from the EXS Switch.

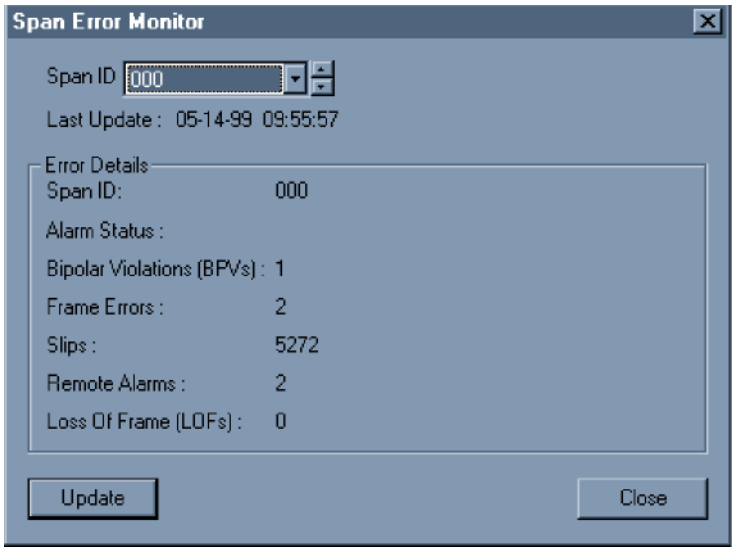


Figure 5-16
Span Error Monitor screen layout

On the *Span and Channel Status* screen's Span Error Monitor menu, click **Show Error Count** to activate this screen.

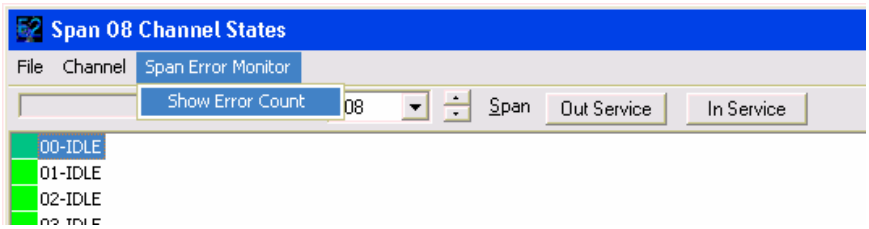


Figure 5-17
Span Error Monitor screen activation

Updating Span Error Monitor

Clicking the UPDATE button clears the error totals and resets the counters to zero.

The following fields appear in the *Span and Channel Status* screen

Span ID list

This list indicates the logical identity of the selected physical span you want to monitor. Your ***required*** input is limited to the span IDs in this list.

Last Update line

This list indicates the date and time of the last time you clicked the UPDATE button for the selected span.

Span ID line

This line indicates the Span ID you selected from the **Span ID** list.

Alarm Status line

This line indicates alarm types currently on the selected span.

Bipolar Violations (BPVs) line

This line indicates the number of Bipolar Violations on the selected span. A Bipolar Violation is two consecutive "one" bits sharing the same polarity.

Frame Errors line

This line indicates the number of Frame Errors on the selected span. A Frame Error does not conform to the standard 12-bit frame word pattern.

Slips line

This line indicates the number of slips on the selected span. A slip indicates the loss of a data bit on a span caused by a frame misalignment between the timing of a transmitting node and a receiving node.

Remote Alarms line

This line indicates the number of Remote Alarms on the selected span. A Remote Alarm indicates the receipt of an alarm from a remote location.

Loss of Frame (LOFs) line

This line indicates the number of Loss of Frame errors on the selected span.

Carrier Answer Query

The *Carrier Answer Query* screen enables you determine the number of calls answered after a specified period of time. By using this tool, one can investigate possible issues where there is no traffic.

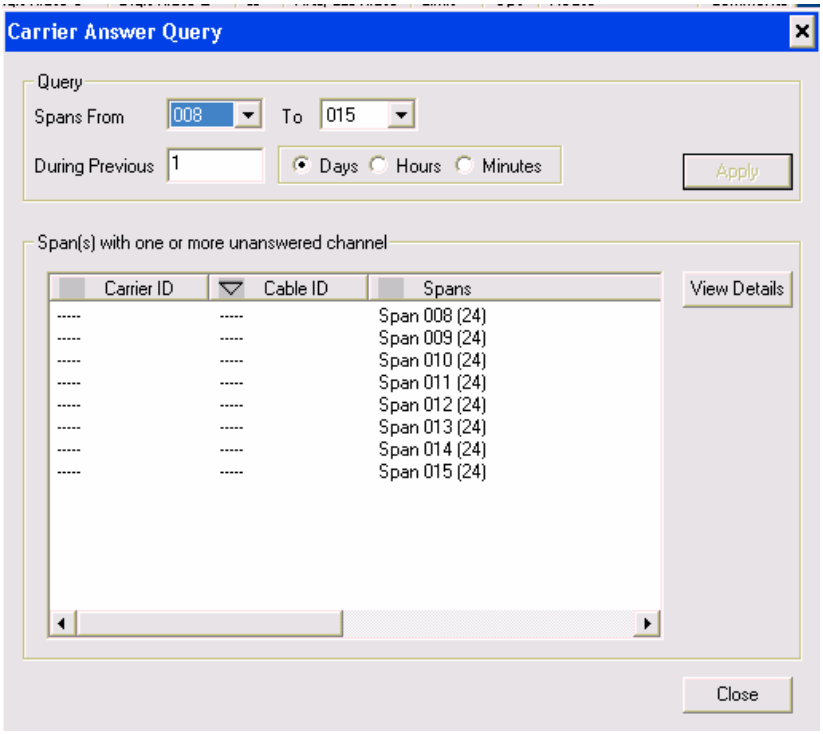


Figure 5-18
Carrier Answer Query Screen

Under **Maintenance**, click **Carrier Answer Query** to activate this screen.

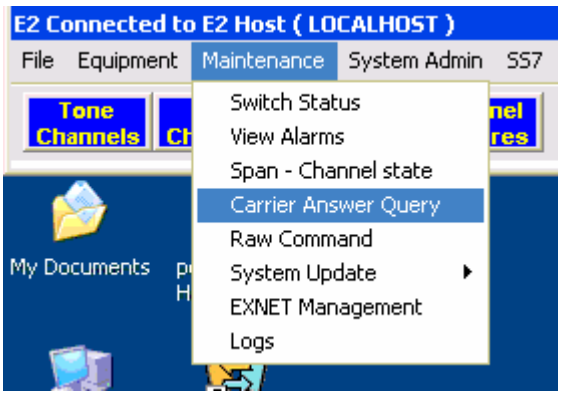


Figure 5-19
Carrier Answer Query screen activation

The following fields are displayed:

Spans From/To

All in service spans are displayed.

During Previous Days/Hours/Minutes

Valid values are 1-48 days, 1-24 hours, or 1-60 minutes.

Span(s) with one or more unanswered channels

All applicable channels are displayed.

View Details

By highlighting a span, then clicking on the View Details button, you will see the following screen:

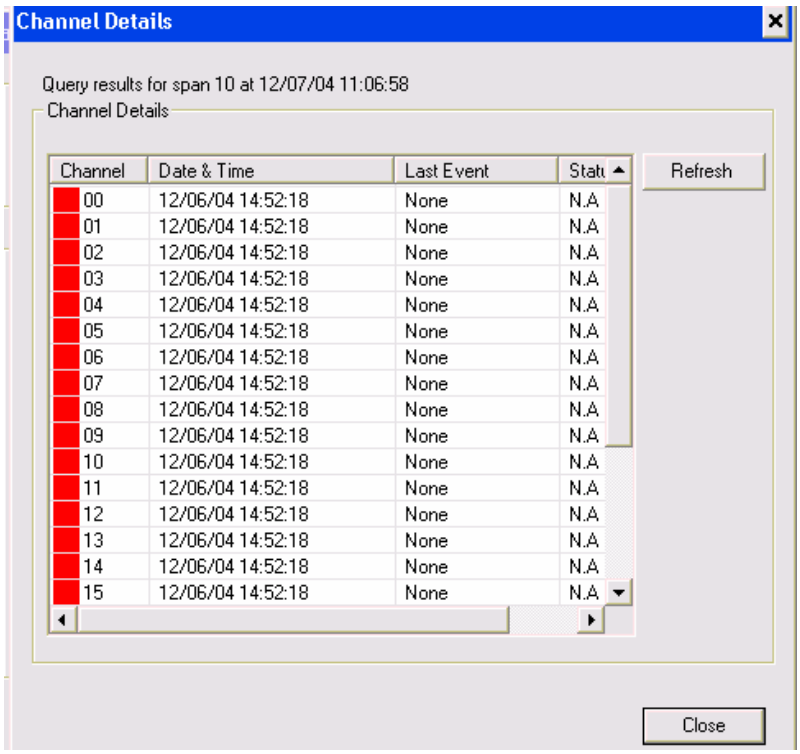


Figure 5-20
Channel Details screen layout

You may click on the Refresh key to refresh the display, or press close to exit.

Raw Command screen

The *Raw Command* screen enables you to send an individual raw command to the Excel switch that may not be included in the Host. This function should be used only under the supervision of Dynamis' Customer Engineering.

Warning

Anyone using the Raw Commands function should be familiar with the Dynamis switching platform and software programming. This function should only be used under the supervision of the Dynamis' Customer Engineering staff. Certain commands will render the switch or a specific application non-functional.

Figure 5-21
Raw Command screen layout

On the Maintenance menu, click **Raw Command** to activate this screen.

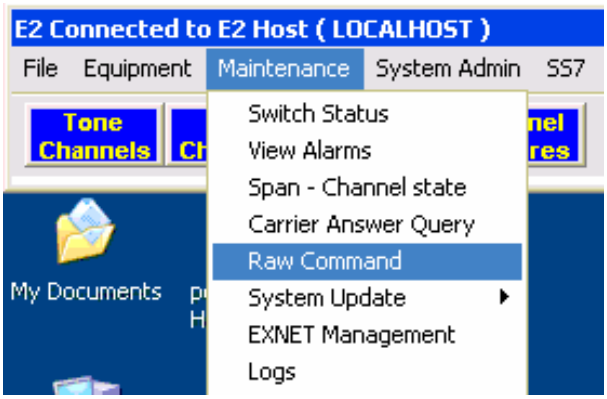


Figure 5-22
Raw Command screen activation

Sending Raw Commands

In the *Raw Command* screen's **Raw Command** field, enter the raw command you want to send to the Excel Switch; then click the SEND button.

Raw Command field

This field indicates the raw command you want to send to the switch. When entering the raw command, it is not necessary to enter the framing character. Begin with the actual command to be sent. In the command string, use 00 for the sequence number. DO NOT enter the checksum. The Host calculates the checksum for the command being sent.

Status field

This field indicates the EXS Switch's status response to the raw command.

Reply field

This field indicates the EXS Switch's reply to the raw command. Refer to Dynamis' User Manual for the commands and associated responses when using raw commands.

Switch Debug Log menu

The Switch Debug Log menu enables you to start and stop logging, as well as capture, view, and delete Switch.log files that contain call processing information.

The Switch.log file holds a maximum of 500K of data. Once the Switch.log file reaches the limit, the file is renamed to Switch1.log and saved. When the new Switch.log reaches the limit, the file again is renamed to Switch1.log and the data on the first Switch1.log file is overwritten. Therefore, it is important when capturing Switch.log files to back up on a regular basis to prevent loss of data.

Opening Switch Log

On the Maintenance menu, point to Switch Debug Log, then click **Open** to start logging information in the Switch.log file.

Each time you open a Switch.log file, the Host generates a time/date stamp, revision number, and open/close status. Each time a file is closed, the Host generates a time/ date stamp and channel status.

Warning

Close the Switch.log file before accessing either the Delete or Screen On options. Close the file at the end of the Debug session or the file may grow to fill up your hard disk. Leaving the log file in an open state could result in a loss of data or a slowdown in call processing.

Closing Switch Log

On the Maintenance menu, point to Switch Debug Log, then click **Close** to stop logging information in the Switch.log file.

Deleting Switch Log

On the Maintenance menu, point to Switch Debug Log, then click **Delete** to delete Switch.log file.

Note—Make sure the Switch.log file is closed before deleting.

Viewing Switch Log

On the Maintenance menu, point to Switch Debug Log, then click **Screen ON** to view call processing information on the screen.

If the Switch.log file is open, all information displayed on the screen is captured in the Switch.log file. If the Switch.log file is closed, information displays only on the screen and does not get captured in the Switch.log file.

Note—You can only view the Switch.log file. The Switch1.log cannot be viewed.

Network Debug Log menu

The Network Debug Log menu enables you to start and stop logging, as well as capture, view, and delete network (LAN) debugging messages. LAN messages may be messages sent to the Excel Server or messages sent to a VRU.

The Network.log file holds a maximum of 500K of data. Once the Network.log file reaches the limit, the file is renamed to Network1.log and saved. When the new Network.log reaches the limit, the file again is renamed to Network1.log and the data on the first Network1.log file is overwritten. Therefore, it is important when capturing Network.log files to back up on a regular basis to prevent loss of data.

On the Maintenance menu, point to Network Debug Log, then click **View** to activate this screen.

Opening Network Debug Log

On the Maintenance menu, point to Network Debug Log, then click **Open** to start logging information in a Network.log file.

Each time you open a Network.log file, the Host generates a time/date stamp, revision number, and open/close status. Each time the file is closed, the Host generates a time/date stamp and channel status.

Warning **Close the Network.log file before accessing either the Delete or Screen On options. Close the file at the end of the Debug session or the file may grow to fill up the Host computer's hard disk. Leaving the log file in an open state could result in a loss of data or a slowdown in call processing.**

Closing Network Debug Log

On the Maintenance menu, point to Network Debug Log, then click **Close** to stop logging information in the Network.log file.

Deleting Network Debug Log

On the Maintenance menu, point to Network Debug Log, then click **Delete.**

Note—Make sure you close the Network.log file before deleting.

Viewing Network Debug Log

On the Maintenance menu, point to Network Debug Log, then click **Screen ON** to view call processing information on the screen.

If the Network.log file is open, all information displayed on the screen is captured in the Network.log file. If the Network.log file is closed, information displays only on the screen and does not get captured in the Network.log file.

Note—Make sure you close the Network.log file before viewing. You can only view the Network.log file. The Network1.log cannot be viewed.

System Update menu

The System Update menu options enable you to run the startup procedure to ensure that the switch configuration is current, manually switch over from one redundant Host to another, and transfer files from an active Host computer.

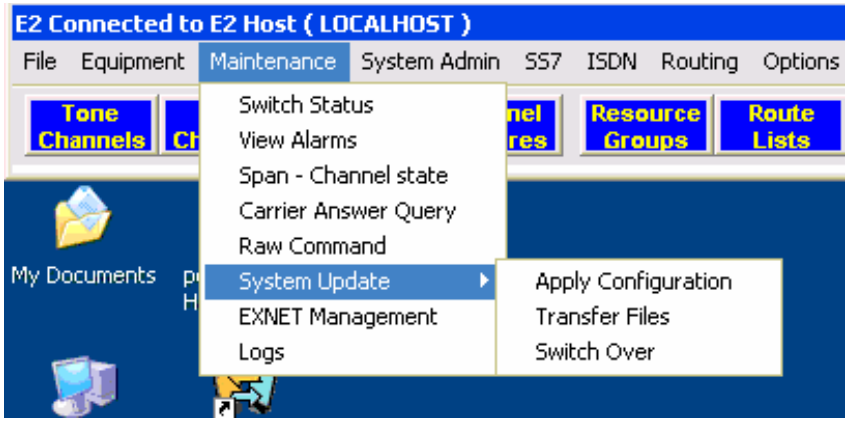


Figure 5-23
System Update actvation

Apply Configuration

In the Maintenance menu, point to System Update, then click **Apply Configuration.**

This will apply all configurations set up by all other screens.

Warning

Running startup stops call processing for the period that startup is running. All equipment will be removed from service, configured, and then returned to service.

Transferring files

In the Maintenance menu, point to System Update, then click **Transfer Files.**

This menu option transfers the latest file configuration (.SYS and .DAT files) from the active Host to the standby Host so that both systems contain duplicate information. For example, when a transfer is requested, the system compares the date/time of each file. The files that contain the most recent date/time are transferred to the Host with the older date/time. The older file is overwritten with the new data.

Forcing Switchover

In the Maintenance menu, point to System Update, then click **Switch Over.**

Forcing switchover manually switches the active Host to the standby Host in a redundant configuration. This may be necessary when one Host computer is functioning improperly or when a new Host is brought on line. You can only switchover from the standby Host to the active Host, not vice versa.

Warning

It is crucial that you read this entire section prior to performing a Force switchover.

Performing this command forces the standby Matrix card in the EXS Switch to become active. When the switchover occurs, board status messages are sent from the EXS Switch to the new active Host.

After the board status messages have been received from the Matrix card, the Host will delay approximately one minute prior to running the startup routine. This can be easily monitored by watching the debug screen. When a system is first brought on line (Host systems active), a forced switchover should be performed.

Warning

If you use Force switchover to manually switch over from the active Host to the standby Host, you will lose all calls being set up.

To verify that the switchover was successful, do the following:

1. Query a channel from the now active Host. Verify that the Host can communicate with the EXS Switch.
2. Query a channel from the now standby Host. An "invalid matrix state" message should appear on the screen.

Appendix A: Incoming Types

Overview

An incoming type is the signaling protocol used by the telco to send digits/signals to the EXS Switch. Before configuring channels in the Host, you must request an incoming type from the telco. The incoming type you configure in the Host must match the incoming type from the telco.

Signals arriving from the telco to the EXS Switch are either MF (Multi Frequency), DTMF (Dual Tone Multi Frequency), or ISDN. MF uses 10 tones that represent KP and 5 tones that represent ST. DTMF uses the keys on the telephone pad, including * and #. ISDN uses computer data type messages rather than tones.

Incoming types consist of incoming rules defining how the EXS Switch collects digits, and inseize control instructions defining the signaling used between the telco and EXS Switch.

Each incoming type contains at least one stage. Each stage can contain up to two strings. A "stage" represents all incoming address digits contained in the digit stream. A stage of address data can contain one or several digit strings, such as an identification string (ANI) along with an address string.

The following list identifies the acronyms/characters shown in the String field:

- * (Star Character). In DTMF signaling, the star character separates the destination number and ANI. There are no 'II' digits when using DTMF.
- KP/ST (Key Pulse/Start Signal). The standard Feature Group D method of collecting MF signals used by AT&T and Northern Telecom.
- KP (Key Pulse). In MF tone signaling, a signal preparing the EXS Switch to collect digits.
- ST (STart Signal). In MF tone signaling, a signal indicating the end of collecting digits.
- STIIP. An "ST" with a different frequency.
- Wink (On-hook / Off-hook). A digital pulse that changes the condition on the A and B leads on a T1.
- II (Informational or "Info" Digits). The 'II' digits describe from where the calls are coming.

Valid T1 Incoming Types

The following Incoming types are only valid when the signaling type is T1 Tone. Note that the list of incoming types displayed by the software may differ – if a type listed below is missing, there may need to be additional development to support that type:

- ANI 10 - DNIS 7.
- ANI 10-DNIS 7TL.
- Auto Terminating.
- Collect Digits.
- DNIS 7 - ANI 10.
- DNIS OP Code.
- DTMF 3 - 2 Sec.
- DTMF 4 - 2 Sec (default).
- DTMF 4 - 10 Sec.
- Note—If this channel is connected to a VRU, you must select "DTMF 4 - 10 Sec".
- DTMF 7 - 3 Sec.
- DTMF X - # Term.
- DTMF 10 - 3 Sec.
- DTMF 16 - 12 Sec.
- DTMF 20 - 20 Sec.
- DTMF 21 - 12 Sec.
- Feature Grp B.
- Feature Grp B1.
- Feature Grp D.
- Feature Grp D2.
- Feature Grp D3-.
- FGB AMA.
- Intl Ftr Grp D.
- Intl Ftr Grp D+.
- INC Tandem
- ISDN
- MID Tandem
- MF/Lucent
- Network Agent
- Operator
- Sprint
- TERM Tandem.

Valid E1 Incoming Types

The following Incoming types are only valid when the signaling type is T1 Tone. Note that the list of incoming types displayed by the software may differ – if a type listed below is missing, there may need to be additional development to support that type:

- ANI 10-DNIS 7TL (default).
- Auto Terminating.
- DID 4 - 10 Sec.
- DNIS 7 - ANI 10.
- DTMF 3 - 2 Sec.
- DTMF 4 - 2 Sec.
- DTMF 4 - 10 Sec.
- DTMF 7 - 3 Sec.
- DTMF X - # Term.
- DTMF 10 - 3 Sec.
- DTMF 16 - 12 Sec.
- DTMF 20 - 20 Sec.
- DTMF 21 - 12 Sec.
- E1/R2-1.
- E1/R2-2.
- E1/R2-3.
- E1/R2-4.
- ISDN
- Network Agent.
- Operator.

Incoming Types not presently supported

The following incoming types are not presently supported, but can be developed as an enhancement if needed. Contact your E2 Eagle technical representative for details:

- Attendant.
- Cell/Tandem/In.
- DB Agent.
- LAN Agent.
- LAN Supervisor.
- Ercsn/Cell

Tandem Switching Incoming Types

The three "tandem" Incoming Types (Inc Tandem, Mid Tandem, Term Tandem) must be used in conjunction with each other and other Hosts. These Incoming Types were developed to decrease call setup time between several tandem offices that have technical discrepancies with standard Feature Group D interfaces. The following figure shows how each Incoming Type is used and its relationship to the network.

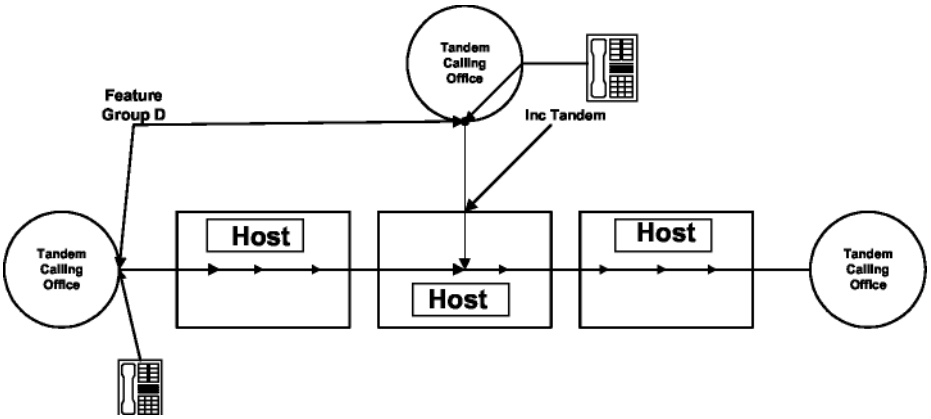


Figure A-1
Tandem Group

Incoming Types List

The incoming types detailed in this appendix are listed in alphabetical order. Most of the incoming types listed include a brief description of the actual type, followed by the Incoming Digit (or String) Format.

ACD Agent

Contact your E2 technical representative if you wish to use this type.

ACD Monitor

This incoming type logs in with an assigned log-in code. The ACD Monitor (supervisor) accepts calls from an attendant when the attendant dials *0#. The ACD monitor is able to take an incoming call and perform all functions of the attendant.

ANI 10 - DNIS 7

This incoming type supports Feature Group D channels from MCI. ANI 10-DNIS 7 also supports several PBXs not designed to handle standard MF type dialing.

Incoming Digit Format * ANI * DNIS *

Inseize Control Instructions

- Generates inseize acknowledgment.
- Receives stage *N* address data.
- Reports incoming call with digits.
- Waits for host control message.

Incoming Rule

- strings = 2
- digit type = DTMF
- method = FIXED
- number of digits = 9
- method = TERM_DIGIT
- terminator = STAR_KEY

ANI 10 - DNIS 7TL

This incoming type supports Feature Group D channels from MCI. Similar to ANI 10 - DNIS 7 except that when a 7-digit dialed number is received, the 3-digit area code from the ANI is added to the dialed number.

Incoming Digit Format * ANI * DNIS *

Attendant

This incoming type is the same as Operator except the Attendant logs in with an assigned log in code. The attendant can perform blind transfers, as can the operator, or hotline transfer in which the attendant remains on the line.

Auto Terminating

This incoming type automatically steers all calls incoming on a channel to a predetermined route list regardless of whether or not any digits are incoming on the calls. Therefore, this incoming type is useful when no dialed number or ANI digits are expected on a channel because the digit table is bypassed and calls are sent directly to a specific route list.

When Auto Terminating is specified as incoming type during channel configuration, the system automatically prompts for entry of a resource group. The prompt is a selection window that shows all route lists known to the system. Select one resource group and click on OK associate that resource group with the channel being configured.

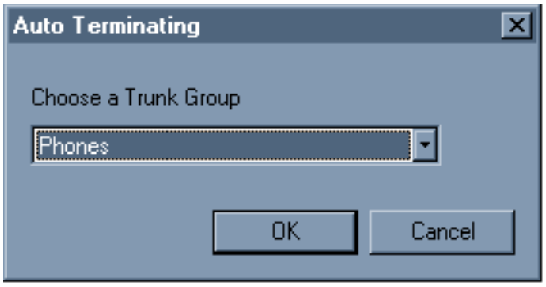


Figure A-2
Auto Terminating screen layout

CAMA - ANI

This incoming type terminates a standard Centralized Automatic Message Accounting (CAMA) channel.

Incoming Digit Format

Stage 1 contains the following:

- String 1. KP X CC Dialed Number ST
- String 2. KP II ANI ST

First String: X is a steering code or routing digit. CC is the dialed number country code. All of the digits are sent to the digit table for a match.

Note—The steering code should be stripped using the Digit Table.

Second String: Contains the II digits and 7-digit ANI. There may be either one or two digits in the II field, therefore, the Host counts back from the last digit to determine what the II digits are.

Overview: Collects the initial stage of one (1) string. After the first string is received, the Host generates wink 2 and receives the second string.

Incoming Rule

- stages = 1
- strings = 2
- digit type = MFR1
- method = use KP and ST

Inseize Control

- Generate inseize acknowledgment.

Instructions

- Receive stage n address data (string 1).
- Generate call processing event (wink).
- Receive string n address data (string 2).
- Report incoming call with digits.
- Wait for host control message.

Cell/Tandem/In

This incoming type is used as a Feature Group D from an AT&T Cellular switch. There is a single string of MF digits followed by the return of a confirmation wink.

Incoming String Format

KP I ANI/10 CIC 3/4 3/7/10 Dialed Number ST

Incoming Rule

- stages = 1
- strings = 1
- digit type = MFR1
- method = KP and ST

Inseize Control Instructions

- Generate inseize acknowledgment.
- Receive stage n address data.
- Report incoming call with digits.
- Wait for host control message.

There are six different scenarios in which the digits of an incoming call, using the CELL/TANDEM/IN incoming type, can be recognized by the Host. This is due to the fact that while the "I" digit is hard-coded as 1 and the ANI is hard-coded as 10, the CIC and dialed number can contain a various number of digits. The CIC can be either 3 or 4 digits. The dialed number can be 3, 7, or 10 digits. Therefore, the following figure shows the valid combinations used by the Host to collect digits.

I + ANI	CIC	Dialed Number	Total Digits Collected
11	3	3	17
11	4	3	18
11	3	7	21
11	4	7	22
11	3	10	24
11	4	10	24

Figure A-3
CELL/TANDEM/IN digits

If the Host receives any number of digits other than those shown in the **Total Digits**

Collected column in the table above, all digits collected appear in the ANI field of the CDR. The DN field in the CDR contains a zero and the call is sent to reorder via the Digit Table. A zero in the DN field of the CDR file indicates that the local telephone company may not be sending enough digits.

Coll Digits Anw

This incoming type is similar to Collect Digits except the system goes off hook after collecting digits.

Note—Selecting Coll Digits Anw activates the Collect Digit Parameters screen, in which you specify the number of digits you want to collect on this channel, how these digits should be signaled, and how long (between 4 and 20 seconds) your EXS Switch will wait for digits on this channel before disconnecting.

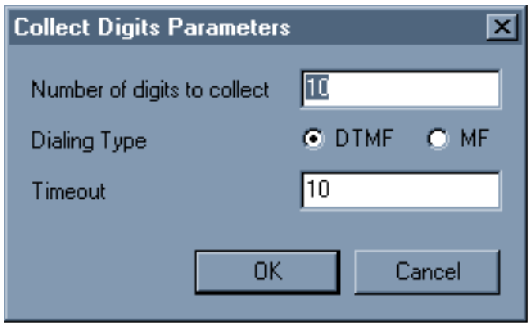


Figure A-4 Collect Digits Parameters screen layout

Collect Digits

This incoming type prompts for the number of digits to collect (up to 23), the digit collection (DTMF or MF), and the number of seconds to wait before time out.

DB Agent

Contact your E2 technical representative if you wish to use this type

DID 4 - 10 SEC

This incoming type indicates the Excel Switch collects only 4 digits of DTMF. If the Excel Switch receives 4 digits in 10 seconds or less, call processing is started. If 4 digits are not received within 10 seconds, the incoming call is connected to Reorder.

DNIS 7 – ANI 10

This incoming type supports Feature Group D channels from MCI. Also supports several PBXs not designed to handle standard MF type dialing. (The same as ANI 10 - DNIS 7 except the ANI and DNIS are reversed.)

Incoming Digit Format * DNIS * ANI *

DNIS OP Code

This incoming type allows you to assign a 1- or 2-digit number to a channel. The number serves as an artificial dialed number for incoming calls on that channel when no real dialed number digits are received. By tagging the artificial number onto a call that call can be routed via entries in the Digit Table.

When DNIS OP Code is specified as the incoming type during channel configuration, the system automatically prompts for entry of the artificial DNIS, up to two digits long.

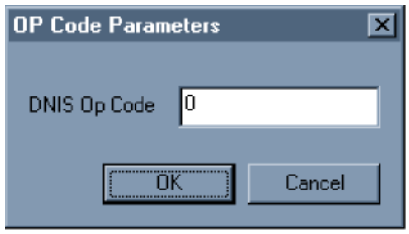


Figure A-5
DNIS Op Code screen

For routing of calls on channels having DNIS OP Code incoming type, the artificial digits must be present on the Digit Table(s) associated with those channels.

DTMF 10 – 3 Sec

This incoming type indicates that the Excel Switch collects only 10 digits of DTMF. If the Excel Switch receives 10 digits in 3 seconds or less, call processing is started. If 10 digits are not received within 3 seconds, the incoming call is connected to Reorder.

DTMF 16 – 12 Sec

This incoming type indicates that the Excel Switch collects only 16 digits of DTMF. If the Excel Switch receives 16 digits in 12 seconds or less, call processing is started. If 16 digits are not received within 12 seconds, the incoming call is connected to Reorder.

DTMF 20 – 20 Sec

This incoming type indicates that the Excel Switch collects only 20 digits of DTMF. If the Excel Switch receives 20 digits in 20 seconds or less, call processing is started. If 20 digits are not received within 20 seconds, the incoming call is connected to Reorder.

DTMF 21 – 12 Sec

This incoming type indicates that the Excel Switch collects only 21 digits of DTMF. If the Excel Switch receives 21 digits in 12 seconds or less, call processing is started. If 21 digits are not received within 12 seconds, the incoming call is connected to Reorder.

DTMF 21 – 21 Sec

This incoming type indicates that the Excel Switch collects only 21 digits of DTMF. If the Excel Switch receives 21 digits in 21 seconds or less, call processing is started. If 21 digits are not received within 21 seconds, the incoming call is connected to Reorder.

DTMF 3 – 2 Sec

This incoming type indicates that the Excel Switch collects only 3 digits of DTMF. If the Excel Switch receives 3 digits in 2 seconds or less, call processing is started. If 3 digits are not received within 2 seconds, the incoming call is connected to Reorder.

DTMF 4 – 2 Sec

This incoming type indicates that the Excel Switch collects only 4 digits of DTMF. If the switch receives 4 digits in 2 seconds or less, call processing is started. If 4 digits are not received within 2 seconds, the incoming call is connected to Reorder.

DTMF 4 – 10 Sec

This incoming type indicates that the Excel Switch collects only 4 digits of DTMF. If the Excel Switch receives 4 digits in 10 seconds or less, call processing is started. If 4 digits are not received within 10 seconds, the incoming call is connected to Reorder.

DTMF 7 – 3 Sec

This incoming type indicates that the Excel Switch collects only 7 digits of DTMF. If the Excel Switch receives 7 digits in 3 seconds or less, call processing is started. If 7 digits are not received within 3 seconds, the incoming call is connected to Reorder.

DTMF X - # Term

This incoming type indicates that the Excel Switch collects up to 24 digits of DTMF. The DTMF # key signals the incoming channel that the digit string is complete. If the DTMF # key is not detected in 20 seconds and no digits were dialed, the incoming caller hears reorder tone. If digits were dialed and the # key was not pressed, the system waits 20 seconds and then processes the call on the digits received.

E1 /R2-1

This incoming type may be supported in countries outside North America.

Incoming Digit Format

- Stage 1: Collects up to 6 digits.
- Stage 2: Collects up to 9 digits.
- Stage 3 (conditional): Collects up to *N* digits.
- First String: Contains up to 6 digits.
- Second String: Contains up to 9 digits.
- Third String: Contains as many digits as sent.

Incoming digits of Stage 1 will be displayed in String 1 of the Host's debugging screen; incoming digits of Stage 2 will be displayed in String 2. If Stage 3 is reached, its incoming digits will be tacked onto Stage 1's digits in String 1. String 1 will be sent as the dialed number.

Incoming Rule

- stages = 2 (or 3)
- strings = 2 (or 3)
- digit type = MFR2
- method = compelled

Inseize Control Instructions

- Generate inseize acknowledgment.
- Receive stage 1 digits.
- Receive stage 2 digits.
- Generate backward A6 and wait for A6 acknowledgment (if stage 1 digits equal 1xx18, 0xx18, 1xx12, or 0xx12); or receive stage 3 digits until sender is done, then pulse backward A6 and proceed without A6 acknowledgment
- Report incoming call with digits.
- Wait for host control message.

E1 /R2-2

This Incoming type may be supported in countries outside North America.

Incoming Digit Format

- Stage 1: Collects dialed number.
- Stage 2: Collects up to 9 digits.
- First String: Contains up to 11 digits.
- Second String: Contains up to 9 digits

Incoming Rule

Incoming digits of Stage 1 will be displayed in String 1 of the Host's debugging screen; incoming digits of Stage 2 will be displayed in String 2. String 1 will be sent as the dialed number.

Inseize Control Instructions

- stages = 2
- strings = 2
- digit type = MFR2
- method = compelled

Inseize Control Instructions

- Generate inseize acknowledgment.
- Receive stage 1 digits.
- Receive stage 2 digits.
- Generate backward A6.
- Report incoming call with digits.
- Wait for host control message.

E1 /R2-3

This incoming type may be supported in countries outside North America.

Incoming Digit Format

- Stage 1: Collects up to 6 digits.
- Stage 2: Collects up to 30 digits.
- Stage 3: Collects up to *N* digits.
- First String: Contains up to 6 digits.
- Second String: Contains up to 30 digits
- Third String: Contains as many digits as sent.

Incoming digits of Stage 1 will be displayed in String 1 of the Host's debugging screen; incoming digits of Stage 2 will be displayed in String 2; incoming digits of Stage 3 will be tacked onto Stage 1's digits in String 1. String 1 will be sent as the dialed number.

Incoming Rule

- stages = 3
- strings = 3
- digit type = MFR2
- method = compelled

Inseize Control Instructions

- Generate inseize acknowledgment.
- Receive stage 1 digits.
- Receive stage 2 digits.
- Receive stage 3 digits.
- Generate backward A6.
- Report incoming call with digits.
- Wait for host control message.

E1 /R2-4

This incoming type may be supported in countries outside North America.

Incoming Digit Format

- Stage 1: Collects dialed number.
- First String: Contains up to 15 digits.

Incoming digits of Stage 1 will be displayed in String 1 of the Host's debugging screen. String 1 will be sent as the dialed number.

Incoming Rule

- stages = 1
- strings = 1
- digit type = MFR2
- method = compelled

Inseize Control Instructions

- Generate inseize acknowledgment.
- Receive stage 1 digits.
- Receive stage 2 digits.
- Receive stage 3 digits.
- Generate backward A6.
- Report incoming call with digits.
- Wait for host control message.

Ercsn/Cell

This incoming type terminates an Ericsson/ Cellular channel. The Feature Group D completion type must be used in order to conform to the Feature Group D specification. The Excel Switch outpulses the digits and scans for a confirmation wink before connecting the call.

Incoming Digit Format

- Stage 1
- String 1: KP II ANI ST
- String 2: KP DDDDDD XXXX ST

First String: Contains the II digits and 7 to 10 digit ANI.

Second String: Contains a "dummy" dialed number of DDDDDD, followed by a 4-digit CIC code. The Host strips off the CIC code and saves for later use if required by an ANI flag. The leading digits of DDDDDD are sent to the Digit Table for routing as normal.

Incoming Rule

- stages = 1
- strings = 2
- digit type = MFR1
- method = use KP and ST (String 1)
- method = use KP and ST (String 2)

Inseize Control Instructions

- Generate inseize acknowledgment.
- Receive stage *N* address data.
- Generate call processing event (wink).
- Report incoming call with digits.
- Wait for host control message.

Feature Grp B

This incoming type receives a single string of MF digits. No acknowledgment wink is required. The only difference between Feature Grp B and Feature Grp B1 is the term digit used to determine that all of the digits have been sent.

Incoming Digit Format

Stage 1

- String 1: KP Dialed Number ST

Incoming Rule

- strings = 1
- digit type = MFR1
- method = use term digit
- term digit = ST_III

Inseize Control Instructions

- Generate inseize acknowledgment.
- Receive stage *N* address data.
- Generate call processing event (wink).
- Report incoming call with digits.
- Wait for host control message.

Feature Grp B1

This incoming type receives a single string of MF digits. No acknowledgment wink is required.

Incoming Digit Format

Stage 1

- String 1: KP Dialed Number ST

Incoming Rule

- strings = 1
- digit type = MFR1
- method = use term digit
- term digit = ST

Inseize Control Instructions

- Generate inseize acknowledgment.
- Receive stage *N* address data.
- Generate call processing event (wink).
- Report incoming call with digits.
- Wait for host control message.

Feature Grp D

This incoming type indicates the North American Feature Group D terminating channel.

Incoming Digit Format

Stage 1

- String 1: KP II ANI ST
- String 2: KP Dialed Number ST
- First String: Contains the II digits and 7 to 10 digit ANI.
- Second String: Contains the dialed number.

Incoming Rule

- stages = 1
- strings = 2
- digit type = MFR1
- method = use KP and ST (string 1)
- method = use KP and ST (string 2)

Inseize Control Instructions

- Generate inseize acknowledgment (wink 1).
- Receive stage 1 digits.
- Generate wink 2.
- Report incoming call with address data.
- Wait for host control.

Feature Grp D2

This incoming type is similar to Feature Group D, except for the confirmation wink. Feature Group D2 uses a different wink timer enabling the user to change the duration of the wink without affecting the system flash and wink timers.

Incoming Digit Format

Stage 1

- String 1: KP II ANI ST
- String 2: KP Dialed Number ST

- First String: Contains the II digits and 7 to 10 digit ANI.
- Second String: Contains the dialed number.

Incoming Rule

- stages = 1
- strings = 2
- digit type = MFR1
- method = use KP and ST (string 1)
- method = use KP and ST (string 2)

Inseize Control Instructions

- Generate inseize acknowledgment (wink 1).
- Receive stage 1 digits.
- Generate wink 2.
- Report incoming call with address data.
- Wait for host control.

Feature Grp D3

This incoming type configures the incoming complete timeout at eight (8) seconds.

Incoming Digit Format

Stage 1

- String 1: KP Dialed Number ST
- String 2: KP II ANI ST

- First String: Contains the dialed number.
- Second String: Contains the II digits and 7 to 10 digit ANI.

Incoming Rule

- stages = 1
- strings = 2
- digit type = MFR1
- method = use KP and ST (string 1)
- method = use KP and ST (string 2)

Inseize Control Instructions

- Generate inseize acknowledgment (wink 1).
- Receive stage 1 digits.
- Generate wink 2.
- Report incoming call with address data.
- Wait for host control.

FGB AMA

This incoming type is used as an originating FGB call in an FGB access arrangement (Tandem connection). Calls can only be routed via the dialed number. No ANI digit routing is available. No confirmation wink after digits are received.

Switch type: NTX209AB

Incoming Digit Format

Stage 1

- String 1: KP 950WXXX ST
- String 2: KP ANI ST

- First String: Contains the 6-digit dialed number.
- Second String: Contains the 9-digit ANI.

Incoming Rule

- strings = 2
- digit type = MFR1
- method = use KP and ST (string 1)
- method = use KP and ST (string 2)
- terminator = ST

Inseize Control Instructions

- Generate inseize acknowledgment.
- Receive string 1 address data (dialed number).
- Generate call processing event 01.
- Receive string 2 address data (ANI).
- (ANI off hook) report incoming call with digits.
- Wait for host control message.

Outgoing Digit Format

Stage 1

- String 1: KP 7/10 D ST
- String 2: KP ANI ST

- First String: 7/10 D is derived from incoming dialed number, Xlate 1, or Xlate 2.
- Second String: ANI is derived from incoming ANI or ANI Xlate.

Outseize Control

- Seize
- Outpulse string 1 digits.
- Scan for ANI off hook (02.)
- Outpulse string 2 digits.
- Send Host ACK.
- Wait for host control message.

INC Tandem

This incoming type is used as incoming FGD that requires connection to another Host. The DTMF signaling type's default must be sent, not used. The incoming call is connected to the outgoing channel immediately. The Host monitors the digits during call processing. Once a valid FGD call is complete based on the standard protocol, the Host generates the confirmation wink towards the incoming calling office.

Incoming Rule

- digit type = DTMF
- method = fixed

Inseize Control Instructions

- Report incoming call.
- Wait for host control message.

Intl Ftr Grp D

This incoming type handles both North American and International FGD. Complies with Bellcore (Bell Communications Research) specification for EAIS terminating.

International Format

Stage 1

- String 1: KP 1nx xxx 01R ST
- String 2: KP Dialed Number ST

Stage 2

- String 1: KP II ANI ST
- String 2: KP Dialed Number ST

North American Format

Stage 1

- String 1: KP II ANI ST

First Stage International

First String: 1nx is the international routing code. xxx is the carrier identification code, and the 01R is the world zone (country code). If the third digit of the 1nx is a five (5), inserts "01" (operator request) in front of the dialed number. If the third digit is not a five (5), the Host inserts "011" in front of the dialed number.

Second Stage International - First Stage North American

First String: Contains the II digits and 7 to 10 digit ANI.
Second String: Contains the dialed number.

Incoming Rule

- stages = 2
- stage 1 strings = 1
- stage 2 strings = 2
- digit type = MFR1
- method = use KP and ST (string 1)
- method = use KP and ST (string 2)

International Call Inseize Control Instructions

- Generate inseize acknowledgment (wink 1).
- Receive stage 1 digits.
- Generate wink 2.
- Receive stage 2 digits.
- Generate wink 3.
- Report incoming call with digits.
- Wait for host control message.

North American Call Inseize Control Instructions

- Generate inseize acknowledgment (wink 1).
- Receive stage 1 digits.
- Generate wink 2.
- Report incoming call with digits
- Wait for host control message.

The Request for Service message contains 2 stages of digits if the call is International and 1 stage if the call is North American. The host determines what type of call was placed and sends the proper inseize control instructions to the EXS Switch to complete the digit collection and signaling required.

Intl Ftr Grp D+

This incoming type is similar to Feature Group D, but if the 7-digit DNIS is received, it takes the area code from the ANI and adds it to the DNIS to make 10 digits.

ISDN

This incoming type indicates the incoming Request for Service message from the ISDN D channel. Therefore, no incoming information is set up for the span and channel. The B Channel assignments and configuration set determines the Request for Service message format.

LAN Agent

Contact your E2 technical representative if you wish to use this type.

LAN Supervisor

Contact your E2 technical representative if you wish to use this type.

MF

This incoming type refers to Lucent (formally an Autoplex switch). The incoming parameters for a Feature Group D incoming type collects one digit string of MFR1. After the proper signaling is complete, depending on the channel type, the EXS Switch collects the proper amount of digits.

Incoming Digit Format

Stage 1

- String 1: KP II ANI CIC 10D ST
- First String: Contains the II digits, 10-digit ANI, 4-digit CIC code, and 10-digit dialed number.

Incoming Rule

- digit type = DTMF
- method = FIXED

Inseize Control Instructions

- Generate inseize acknowledgment (wink 1).
- Receive stage 1 digits.
- Report incoming call with digits.
- Wait for host control message.

MID Tandem

This incoming type is used as incoming FGD from one Host that requires a connection to another Host. The DTMF signaling type's default must be sent, not used. The incoming call is connected to the outgoing channel immediately. Answer supervision propagates towards the incoming call.

Incoming Rule

- digit type = DTMF
- method = FIXED

Inseize Control Instructions

- Report incoming call with digits.
- Wait for host control message.

Network Agent

This incoming type is similar to an Attendant except a separate computer is used to outdial numbers, place the Attendant in a "Not Available State", and outdial from his/her station. The user is required to have their own server application.

Not Assigned

This incoming type is used for reference, indicating that spans and channels have not been configured for a particular incoming type.

Operator

This incoming type is used when ACD calling is required. When the position goes off-hook, the operator is "Idle" and ready to receive calls. Three-way calling is not supported.

Sprint

This incoming type terminates a standard Sprint channel.

Incoming Digit Format

Stage

- String 1: KP Dialed Number
- String 2: KP ANI ST

Incoming Rule

- strings = 2
- digit type = MFRI
- method = use KP and ST (string 1)
- method = use KP and ST (string 2)
- term digit = STIIP

Instructions

- Receive stage *N* address data
- Answer
- Report incoming call with digits

Term Tandem

This incoming type is an incoming/terminating FGD resource group from a Host. The incoming call follows the basic FGD format, with the exception of the confirmation wink. The wink is not required in this mode. The Host routes the call through the normal routing methods. Answer supervision propagates towards the incoming call.

Incoming Rule

- strings = 2
- digit type = MFRI
- method = use KP and ST (string 1)
- method = use KP and ST (string 2)

. Inseize Control Instructions

- Generate inseize acknowledgment
- Receive stage *N* address data.
- Generate call processing event.
  - Report incoming call with digits.
  - Wait for host control message

Appendix B: Outgoing Types

Overview

The ANI/CLI (Automatic Number Identification/Calling Line Identifier) type configuration defines the outpulse digit configuration to be used on an outgoing call when ANI/CLI is required.

Outgoing Types List

The ANI/CLI types detailed in this appendix are listed in alphabetical order. Most of the AN/CLII types listed below include a brief description of the actual type, followed by the general format. A description of the stage(s) of that format follows.

Cell/Tdm

This ANI/CLI type uses MFR1 dialing for Cellular/Tandem routing.

Outgoing Digit Format

Stage 1

- String 1: KP ANI CIC Dialed Number ST

First String: Contains the 10-digit ANI, followed by the 3-digit CIC, then the 10-digit dialed number.

CIC

Contact your E2 technical representative if you wish to use this type

DTMF/FGD1

This ANI/CLI type provides in-band ANI to those customers not supporting MFR1 dialing. This type is commonly referred to as DTMF Feature Group D. Digits are outpulsed using DTMF only.

Outgoing Digit Format

Stage 1

- String 1: * Dialed Number * ANI *

First String: ANI and dialed number digits are retrieved from the Digit Table entries. Stage 1 or XlateStage1 generate the dialed number. ANI Xlate generates the ANI. If the ANI Xlate field is left blank, the system uses the same digits that are received.

Note—The resource group must have a completion type of FGD.

DTMF/FGD2

This ANI/CLI type provides in-band ANI to those customers not supporting MFR1 dialing. This type is commonly referred to as DTMF Feature Group D. Digits are outpulsed using DTMF only.

Outgoing Digit Format

Stage 1

- String 1: * ANI * Dialed Number * *Note—The resource group must have a completion type of FGD.*

E1/R2-2

This ANI/CLI type is E1 compelled two stages.

Outgoing Digit Format

Stage 1: Dialed Number

Stage 2: ANI

E1/R2-3

This ANI/CLI type is E1 compelled three stages.

Outgoing Digit Format

Stage 1: NPA

Stage 2: ANI

Stage 3: Dialed Number

E1/R2-4

This ANI/CLI type is E1 compelled four stages.

Outgoing Digit Format

Stage 1: 6 digits of dialed number

Stage 2: II digits + ANI

Stage 3: Remaining Dialed Number digits

Stage 4: The first II digit

Erksn/Cell

This ANI/CLI type provides ANI to customers with an Ericksson/Cellular channel. The ANI is the same as received in the incoming call log. The dialed number includes the 101 plus the incoming CIC code followed by a 1, then the number from the digit table Stage 1 or XlateStage1 field.

Outgoing Digit Format

Stage 1

- String 1: KP + II + ANI + ST
- String 2: KP + 101 + XXXX+1 + 7/10D + ST

First String: Contains the first string of the incoming ANI.

Second String: Contains the dialed number which includes a 101 plus the incoming CIC code, followed by a 1, then the 7- or 10-digit dialed number.

Routing

Incoming

- Strip off CIC code.
- Send balance of first string to Digit Table.

Outgoing

- Send incoming ANI (string 1).
- Send a 101 followed by the incoming CIC, followed by a 1, then the dialed number (string 2).

Note—Type 7 completion type should be used in order to conform with the Feature Group D specification. Type 7 outpulses the digits and scans for a confirmation wink before connecting the call.

FGD/EAIS

This ANI/CLI type conforms to the Bellcore TR-NPL-000258 Specification for Equal Access International Signaling - International Feature Group D. The international signaling is similar to the North American signaling except for a predial stage of digits.

The first stage to be outpulsed includes the international routing code. The code signals the distant end that the call is international. The distant end acknowledges the international routing with a wink. After the wink is detected by the switch, the last two strings are outpulsed. The switch again scans for a confirmation wink. Once the wink is detected, the call is connected through.

Outgoing Digit Format

Stage 1

- String 1: KP + 1NX + CIC + CCC + ST Stage 2
- String 1: KP + II + ANI(7/10D) + ST
- String 2: KP + Dialed Number(7/10D) + ST

First Stage: First String

- 1NX is the international routing code (011).
- CIC is the carrier identification code.
- CCC is the country code.

Second Stage

- String 1: Contains the information (II) digits and the 7 to10 digit ANI.
- String 2: Contains the 7 to 10 digit dialed number.

FGD/SS7 ISDN IEs

This ANI/CLI type is used only for ISDN controlled channels. The ANI and dialed number are inserted into the SETUP message as the calling party number and called party number, respectively. There are no MFDSP resources required for address signaling.

MF/ANI/CIC

This ANI/CLI type is the same as MF/ANI/DN, with the exception that, if a 3- or 4-digit CIC (Carrier Identification Code) is received as part of the dialed number field on the incoming digits, the CIC is propagated out with the outgoing digits. Digits are outpulsed using MFR1.

Outgoing Digit Format

Stage 1

- String 1: KP + II + ANI + CIC + 10D + ST

First String: Contains the information (II) digits, 10-digit ANI, 3- or 4-digit CIC code that came in from the incoming, and 10-digit dialed number.

MF/ANI/DN

This ANI/CLI type conforms to the Bellcore TR-NPL-000258 Specification for Exchange Access North American Signaling - Feature Group D. Digits are outpulsed using MFR1 only.

Outgoing Digit Format

Stage 1

- String 1: KP + II + ANI (7/10D) + ST
- String 2: KP + Dialed Number (7/10D) + ST

First String: Contains the information (II) digits and the 7 to10 digit ANI. Second String: Contains the 7 to 10 digit dialed number. (Reference Digit Table)

Note—The resource group must have a completion type of FGD.

MF/DN

This ANI/CLI type conforms to the Bellcore TR-NPL-000258 Specification for E&M wink - Terminating Protocol. The outpulse only contains 1 stage. Digits are outpulsed using MFR1 only.

Outgoing Digit Format

Stage 1

- String 1: KP + Dialed Number (7/10 D) + ST

MF

This ANI/CLI type completes calls to an Autoplex 1000 switch, using a non-standard Feature Group D. When the MF/Lucent type is selected for a particular channel, the incoming ANI or translated ANI is added to the dialed number on the outgoing call.

This ANI/CLI type determines the protocol of how the digits are arranged and what type of digits are sent.

Note—The resource group must have a completion type of Feature Group D.

Outgoing Digit Format

Stage 1

- String 1: KP II ANI CIC 10D ST

First String: Dialed number digits are retrieved from the digit table entries. The ANI and II digits should be what were received on the incoming call or the translated II

None

This ANI/CLI type is Not Assigned. Used for reference, this option provides a means to indicate that spans and channels have not been configured for a particular ANI type. When None is used, only the dialed number is outpulsed (DTMF only). If there is ANI on the incoming call, or data is present in the ANI Xlate field of the digit table, they are not outpulsed.

SS7 Basic

TOPS

This ANI/CLI type completes calls to a TOPS (Traffic Operator Position System) circuit. The incoming call is FGD with II, ANI, and dialed number. The II and ANI are used for the outgoing call.

Outgoing Digit Format

Stage 1

- String 1: KP Dialed Number ST2P
- String 2: KP II ANI ST2P

First String: Contains the 7 to 10 digit dialed number.

Second String: Contains the II digits and the 7-digit ANI.

Overview: The ANI is only seven digits and may be translated in the Digit Table. Only the last seven digits of the ANI is sent regardless of how many are received or translated

Appendix C: Completion Types

Overview

The Call Completion Type determines how a channel signals and outpulses to the far end on an outgoing call. The signaling is any combination of seizure, outpulsing, and connects methods.

Completion Type List

The following Completion types are listed in alphabetical order:

900 Attendant

This completion type is similar to the Attendant Completion type except a prompt message can be played prior to the attendant receiving the call. This completion type is used in conjunction with Excel Switching's ANI 900 Server Client.

ACD Logoff

This completion type logs off the channel. The station does not receive any calls from the ACD queue to which it is assigned. This completion type is used in conjunction with Excel Switching's ANI 900 Server Client.

ACD Logon

This completion type restores the station to service. The station can now receive ACD calls. This completion type is used in conjunction with Excel Switching's ANI 900 Server Client.

ACD Monitor

This completion type enables the span/channel assigned to bridge on to an Attendant. Must be used with the Supervisor Incoming type as described.

Atten Login

This completion type is similar to the Attendant Completion type except it allows for the attendant to log in first. Must be used with the Attendant Incoming type.

Attendant

This completion type is similar to the Operator Completion type, but when the attendant goes off hook, a dial tone is heard and a login code must be pulsed. This completion type must be used with the Attendant Incoming type.

Auto Term

This completion type is a ringdown or hotline circuit. This completion type is used in conjunction with the incoming type of Auto Term.

Busy

This completion type completes the call with a busy tone. It is automatically used as an overflow condition for all channels in a busy state. This Completion type plays the busy tone to the caller. Forward call processing does take place. The busy tone is generated by the MFDSP card (if at least one DSP is configured for Call Progress Generation) and requires no external hardware.

Conf-Bridge

This completion type provides a bridge for conference calls. Up to seven people can be connected to one call. For example, a call comes in to the DNIS Lookup field of the Digit Table. The call is routed to a resource group. If the Completion type is set to Conf-Bridge, the Host connects the call to the Conference Bridge. If a second caller dials the same number as the first, this call is connected to the same Conference Bridge. This can continue until seven calls are connected if set up as such. The number of calls connected is determined by the number of channels supported. The Host supports either two 4-channel or one 7-channel Conference Bridge per Digital Signal Processor (DSP). The DSPs are located, and are part of the MFDSP card in the EXS Switch.

CPA Type 1

This completion type is similar to Type 1, except that CPA (Call Progress Analysis) is attached to the outgoing channel. CPA identifies call progress signals through in-band frequency analysis. CPA is typically done when originating a call to the PSTN to determine whether there is a busy signal, a ringback, an answer, etc.

Dlay Type 1

This completion type is similar to Type 1 but connects the incoming to the outgoing after a delay before ringback. This delay is set by the Ring_Delay variable located in the E2.INI file. NOTE – In the future, these configurations will be set in a screen in the GUI

Dlay Type 3

This completion type is similar to Type 3 but connects the incoming to the outgoing after a delay before ringback. This delay is set by the Ring_Delay variable located in the E2.INI file. NOTE – In the future, these configurations will be set in a screen in the GUI

FGB AMA

This completion type is used with Tandem connections. After outseizure, and the receipt of a wink, the first of two stages of digits is sent. The first stage is comprised of the dialed or translated dialed number. An off-hook signal is then received after which the second stage of digits is outpulsed. These digits are derived from the ANI or its translation. The call is then cut through.

Feat Grp D

This completion type is the standard outgoing Feature Group D completion type which should be used in most applications. The system outseizes, looks for a wink, sends two strings of MFR1, and scans for a confirmation wink. The first string is derived from the incoming II and ANI digits or their translations. The second string is generated from the dialed number or its translation. After receipt of the confirmation wink, the incoming and outgoing are connected.

ISDN

Refer to the various sections of the manual to configure ISDN

Loud Bell

This completion type is used with a resource group for ACD queuing. The queue group needs to be set to this completion type and for FXS channels.

Music Hold

This completion type is required when building a Music On Hold route. An external music source is required. Contact Dynamis' Customer Engineering if considering this feature. Music On Hold does not work in all applications.

NA Type 3

This completion type is similar to Type 3 in call processing. The A flag in the CDRs are generated automatically with the call being answered. This completion type should be used on FXO channels that do not provide answer supervision.

NA Type 4

This completion type is similar to Type 4 in call processing. The A flag in the CDRs are generated automatically with the call being answered. This completion type should be used on FXO channels that do not provide answer supervision.

Network

This completion type allows for out-of-band signaling through a communications port on the Host. One application for this completion type would be with the use of a VRU.

Operator

This completion type is used with ACD and must be used with the Operator

Incoming type which is described in Appendix A. When the Operator port goes off-hook the span/channel immediately goes to an IDLE state making this span/channel available for calls from queue.

Pre-dial

This completion type indicates that the dialed number is set up in the resource group name.

Reorder

This completion type indicates that the call completes with a reorder tone. This Completion type plays the reorder tone to the caller. Forward call processing does take place. The reorder tone is generated by the MFDSP card (if at least one DSP is configured for Call Progress Generation) and requires no external hardware.

Ringing

This completion type indicates that the call completes with a ringback tone. It could be used as a completion type for calls held in queue for ACD features. This completion type plays the ringback to the caller. Forward call processing does take place. The ringback tone is generated by the MFDSP card (if at least one DSP is configured for Call Progress Generation) and requires no external hardware.

SS7 Type 3

Refer to the various sections of the manual to configure SS7

Tandem FGD

This Completion type must be used on outgoing channels that are used to complete calls from incoming channels using INC Tandem or MID Tandem as the Impulse type. Tandem FGD follows the Feature Group D format except the confirmation wink is not received. The call is cut through after the digits are outpulsed.

Type 1

This completion type seizes an outgoing channel. After a successful seizure, ringback tone is played to the incoming call. The received or translated digits are out-pulsed to the distant end. After outpulsing the digits, the channel looks for answer supervision. After answer supervision is detected from the distant end, the call is cut through. The calling party will not hear call progress tones. This completion type should not be used for FXO type ports because as a rule, FXO does not support answer supervision.

Type 2

This completion type seizes an outgoing channel. After a successful seizure, ringback tone is played to the incoming call. After answer supervision has been detected from the distant end, the call is cut through. The calling party will not hear call progress tones. No digits are outpulsed with this completion type.

Type 3

This completion type seizes an outgoing channel. After a successful seizure, the received or translated digits are outpulsed to the distant end. The incoming channel is then connected to the outgoing channel. The call progress tones generated by the distant end or outgoing channel are heard by the incoming. This completion type is designed to work with E&M channels that provide outseize acknowledgment. E&M channels acknowledge the seizure with a wink and FXS/FXO channels do not

Type 4

This completion type works in situations when digits need to be collected after a call is answered. Upon acceptance of the outseize command, ringback tone is played to the incoming call. After answer supervision is detected from the distance end, the outgoing digits are outpulsed. After outpulse, the call is cut through. The calling party will not hear call progress tones. This completion type should not be used for FXO trunks.

Appendix D: Automatic Call Distribution (ACD) Event Log Formats

This completion type works in situations where digits need to be collected after a call is answered. Upon acceptance of the outseize command, ringback tone is played to the incoming call. After answer supervision is detected from the distant end, the outgoing digits are outpulsed. After outpulse, the call is cut through. The calling party will not hear call progress tones. This completion type should not be used for FXO channels.

Sample ACD Event Log

A portion of a sample ACD event record is shown below, followed by a description of each record. Events are in ASCII format with comma delimiters.

Sample ACD Event

IC, 7B,	**00-01,**	**-1--1,**	**05-04-97**	**10:48:08,**	**6035551212,**	**6032251212,**	**N-A**
OS, 7B,	**00-01,**	**00-06**	**05-04-97**	**10:48:09,**	**6035551212,**	**6032251212,**	**OUT_06**
IC, 7B,	**00-01**	**00-06,**	**05-04-97**	**10:48:19,**	**6035551212,**	**6032251212,**	**OUT_06**
RL, 7B,	**00-01,**	**00-06,**	**05-04-97**	**10:48:26,**	**6035551212,**	**6032251212,**	**OUT_06**

Figure D-1
ACD Event Log Sample

ACD Event Log Descriptions

The following are the most comment ACD events:

IC, Event #, Span, Channel, Date, Time, Incoming DNIS, ANI, Route List Name - Incoming call (generated upon an incoming request for service)

OS, Event #, Trk 'A', Trk 'B', Date, Time, Dialed Number, ANI, Route List Name - Outseize Voice Mail (generated on outseize message to an agent position)

CT, Event #, Trk 'A', Trk 'B', Date and Time, Dialed Number, ANI, Route List Name - Connect In to VM (generated when connected call is answered)

Other Possible Events in an ACD Event Record

RL, Event #, Trk 'A', Trk 'B', Date, Time, Dialed Number, ANI, Route List Name - Voice Mail Release (generated when Trk 'B' releases)

IQ, Event #, Trk 'A', Trk 'B', Date and Time, Dialed Number, ANI, Route List Name - In Seizure from Operator (generated when call is routed to a queue port)
OQ, Event #, Trk 'A', Trk 'B', Date and Time, Dialed Number, ANI, Route List Name - Out of Queue (generated when call is released from a queue port and sent to an agent)

OV, Event #, Trk 'A', Trk 'B', Date and Time, Dialed Number, ANI, Route List Name - Overflow (generated when a call in queue has overflowed, i.e., timed overflow)

LI, Event #, Trk 'A', Trk 'B', Date and Time, Agent Login Number, Route List Name - Agent Login (generated when an agent logs in)

LO, Event #, Trk ‘A’, Trk ‘B’, Date and Time, Agent Login Number, Route List Name - Agent Logoff (generated when an agent logs off)