Vanguard Managed Solutions

Vanguard Applications Ware
BSC 3270-to-SNA Conversion

Vanguard 6455 and 7300 Series

Notice

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Part No. T0101-08, Rev F
Publication Code: CC
Technical Writer: Denise Skinner
First Printing: March, 2001

Manual is current for Release 6.4 of Vanguard Applications Ware.

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Introduction

This manual describes the IBM Binary Synchronous Communication (BSC) 3270-to-SNA conversion feature for the Vanguard 6455 and 7300 Series platform.

BSC 3270-to- SNA Conversion

The BSC 3270-to-SNA conversion is designed specifically for Automated Teller Machine (ATM) service providers and bank networks. The BSC 3270-to-SNA conversion allows banks and ATM network providers to retain BSC 3270-attached ATMs when providing a LAN attachment at the host.

The LAN interface:

- Provides a streamlined host-site connection
- Eliminates numerous leased lines at the host location
- Improves performance by increasing LAN bandwidth
- Reduces ATM operating costs

Limitations

Total number of devices supported for BSC 3270-to-SNA conversion:

- Vanguard 7300 - 2,000
- Vanguard 6455 - 256

Maximum number of SLAC Stations supported for BSC/LU Devices:

- Vanguard 7300 - 100
- Vanguard 6455 - 20

Note
DTR connection type does not work as configured in the BSC3270 port record.

Automated Teller Machine (ATM)

The acronym (ATM) in this manual refers to Automatic Teller Machine.

Note
Do not confuse Automated Teller Machine with Asynchronous Transfer Mode, a cell-switching and multiplexing protocol.

Before Using This Manual

Before using this manual you should have experience using IBM or IBM-compatible equipment. You should be familiar with Display System Protocol (DSP) and the IBM Binary Synchronous Communications (BSC) protocol.

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Related Vanguard Information

Refer to these related Vanguard Applications Ware documents for additional information:

- *Vanguard Basic Protocols Manual* (Part No. T0106)
  - Includes *Vanguard Configuration Basics Manual* (Part No. T0113)
- *Vanguard SNA Feature Protocols Manual* (Part No. T0101)
  - Includes *Vanguard IBM BSC 3270 Manual* (Part No. T0101-03)
  - Includes *Vanguard SDLC Option Manual* (Part No. T0101-05)
- *Vanguard Alarms and Reports Manual* (Part No. T0005) for details on alarms and reports generated by this feature
- *Vanguard 7300 Series Installation Manual* (Part No. T0185)
- *Vanguard 6435/6455 Installation Manual* (Part No. T0166)

Related IBM Documentation

Before using the BSC 3270-to-SNA conversion feature, you should be familiar with IBM networking technology.

Below is a list of IBM documentation for additional sources of information.

- *IBM Systems Network Architecture, Formats*
  (IBM Part No. GA27-3136-12)
- *IBM 3174 Establishment Controller, Functional Specification*
  (IBM Part No. GA23-0218-11)
- *IBM Structure Overview for BSC Line Controls*
  (IBM Part No. SC30-3113-0)
- *IBM 3270 Information Display System Reference Summary Manual*
  (IBM Part No. GX20-1878-x)

Features

Features

BSC 3270-to-SNA conversion supports:

- Data Connections Limited (DCL) protocol stack
  SNA Physical Unit (PU) TYPE 2
- Conversion of LU 0 (zero) Diebold, Interbold, NCR, Fujitsu ATMs to SNA Tandem Internet Communications for the Enterprise (ICE) applications
- LU 2 Support
- Single LU to ATM mapping
- Logical Units (LUs) per node
  - Vanguard 6455 -256 LUs
  - Vanguard 7300 Series - 2,000 LUs
- Cessation - prevents the Terminal PAD (TPAD) from polling the ATM when the SVC is down
- General or Specific polling
- Configurable Timers
- BSC 3270 TPAD running version 5.3 or later Vanguard Application Ware

Cessation

Cessation must be configured in the port options parameter of the TPAD Vanguard. Cessation prevents the TPAD from polling the ATM when the Switched Virtual Circuit (SVC) is down. When you stop polling the ATM an “Out of Service” message appears.

Note

Continuing to poll the ATM could cause a customer to lose his ATM card.

CESS+CESS3

A new configuration for Cessation is CESS+CESS3. When the TPAD is receiving a call, the TPAD cannot send a call accept until it receives an End Of Transmission (EOT) response to a general or specific poll.

Theory of Operation

Introduction

The theory of operation presented in the following subsection provides a basic description of how the BSC 3270-to-SNA conversion feature is implemented in Vanguard products.

System Network Architecture Overview

SNA

Systems Network Architecture (SNA) is an IBM-defined data communications architecture that is widely used in networks. SNA specifies how hardware and software entities are connected to each other, and how they communicate with each other. SNA supports both hierarchical (top-to-bottom) and peer-to-peer network topologies.

SNA contains seven different layers that specify the formats and protocols used for communication. These layers range from the highest application layer to the lowest physical layer:

- Transaction Services (applications such as data base access and document interchange)
- Presentation Services (network resource management, session presentation and application management)
- Data Flow Control (data flow synchronization and exchange)
- Transmission Control (data exchange pacing and encryption tasks)
- Path Control (data routing between source and destination and network data traffic control)
- Data Link Control (data transmission between adjacent nodes, using Channel Connect, SDLC, or Token Ring protocols)
- Physical Control (physical and electrical connections between adjacent nodes)

SNA has evolved into an Advanced Peer-to-Peer Networking (APPN) design, where multiple APPN nodes with attached peripheral nodes can interact with each other.

SNA Terminology

The key SNA terms are:

- End User
- Logical Unit (LU)
- Physical Unit (PU)
- System Service Control Point (SSCP)
- Network Addressable Unit
- Session
- SNA Data Formats

Each of these terms is briefly described in the following subsections.

End User

End users typically interact with the SNA architecture through I/O devices such as printers and display stations. End users generally work with applications and application data and are the final source and destination of such data.

Logical Unit (LU)

SNA defines a set of LU (logical unit) types, ranging from 1 through 7. Each LU type has certain characteristics and features that are associated with the SNA stack. The common LU types are:

- LU4 = Printer
- LU7 = Display
- LU0 or LU2 = LU-to-LU communication

Logical Units are “ports” through which end users communicate with each other and the host computer. They are defined as network-addressable software units. Data packet structures are associated with the LU types that support the SNA communications protocols. The LU0 or LU2 type of logical unit supports the most advanced communications interface between two network nodes.

Physical Unit (PU)

SNA defines a set of (PU) physical unit types that characterize attributes and network functionality of devices. PUs in the SNA world are defined as the software controlling the physical devices. PUs have the following features:

- Are network-addressable nodes
- Control the physical interface
- Support and control the Link Level Protocols (such as SDLC or LLC2)
- Provide network access for end users

The primary PU types are:

- Host Node (PU Type 5)
- Communication Controller node or Front End Processor (FEP) node (PU Type 4)
- Cluster Controller node (PU Type 2)
- Advanced Cluster Controller node (PU Type 2.1)
- Terminal Node (PU Type 1)

System Service Control Point (SSCP)

The System Service Control Point (SSCP) is the central control point within an SNA network that manages and allocates the various network resources. The SSCP “domain” defines all the components (network addressable units) controlled by that SSCP. Each host system has one or more SSCPs, each with its own domain.

Local Service Control Points (LSCP) control the resources within the local node and can be within the domain of an SSCP.

Network Addressable Unit (NAU)

Network addressable Units (NAUs) are entities that are recognized and controlled by the network. These include:

- Logical Units (LUs)
- Physical Units (PUs)
- System Services Control Points (SSCPs)

Each NAU has a unique address and is the source or destination of data through the Path Control Network (defined as the bottom three of the seven SNA levels). The Path Control Network includes the Data Link Control and the physical layer.

Session

A session is the logical connection between two NAUs that uses specified SNA protocols and allocates the resources required. These resources include the network paths, buffers, and protocols required for the session. Common session types are LU-to-LU, SSCP-to-PU, and SSCP-to-LU.

SNA Data Formats

SNA has a number of different data formats which are used by the NAUs, Path Control layer, and Data Link Control layer to exchange information. These data formats consist of one or more headers, with accompanying messages. Each layer sets bits in specific headers.

IBM BSC 3270 Overview

IBM BSC 3270

The IBM BSC 3270 feature lets you connect multiple remote BSC devices to multiple hosts. This connection provides the interface to the host Front End Processor (FEP) and can be accomplished using either native BSC or X.25 to an FEP supporting IBM BSC 3270. Support is provided for up to 32 devices per port and up to 256 devices per Vanguard node. The number of Cluster Control Units (CCUs) depends on the number of devices configured for each cluster controller. Speeds for BSC lines from 1.2 kbps to 19.2 kbps are supported. Host PAD (HPAD) or Terminal PAD (TPAD) functionality can be supported on different nodes or on different ports on the same node to provide configuration flexibility. Refer to the *Vanguard IBM BSC 3270 Manual* (Part No. T0101-03) for more information.

How the BSC 3270-to-SNA Conversion Works

Introduction

BSC 3270-to-SNA conversion is used in the financial, banking and network provider-environments where ATM's are networked into:

- Tandem K Series host computers
- Tandem S Series host computers
- Central-site IBM 3745 communications controllers
- Stratus Hosts
- IBM S/390 Servers

Purpose

The BSC 3270-to-SNA conversion allows banks and ATM network providers to retain BSC 3270-attached ATMs while providing a LAN attachment at the host.

Defined

The BSC 3270-to-SNA converts the upper layers of SNA and the LLC2 data link control (layer two) protocol in the host Vanguard node to Display System Protocol (DSP) for transport within Frame Relay (Annex G) or X.25.

Central Site Application

Central Site application support is recommended for the Vanguard 6455 and 7300 Series. Central site application reduces costs and simplifies host configuration requirements by minimizing the number of SNA Physical Units (PUs) defined in the host. This is accomplished by mapping data streams from individual ATMs to SNA Logical Units (LUs). This method is efficient and maximizes performance.

Typical Application

Figure 1-1 shows a typical application of BSC 3270-to-SNA conversion. The network consists of these elements:

- Tandem Host
- Ethernet
- Vanguard 7310
- Frame Relay WAN
- Remote Vanguard Node (Vanguard 340s) which function as a TPAD node
- ATMs

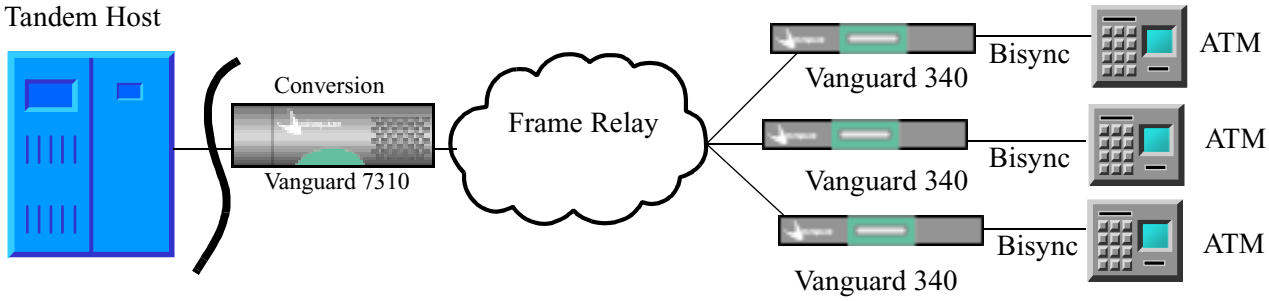


Figure 1-1. The Network

Data Conversion

Figure 1-2 shows the changes in the data formats as the packets pass through the network. Conversion is done in the Central Site through the Vanguard 7310.

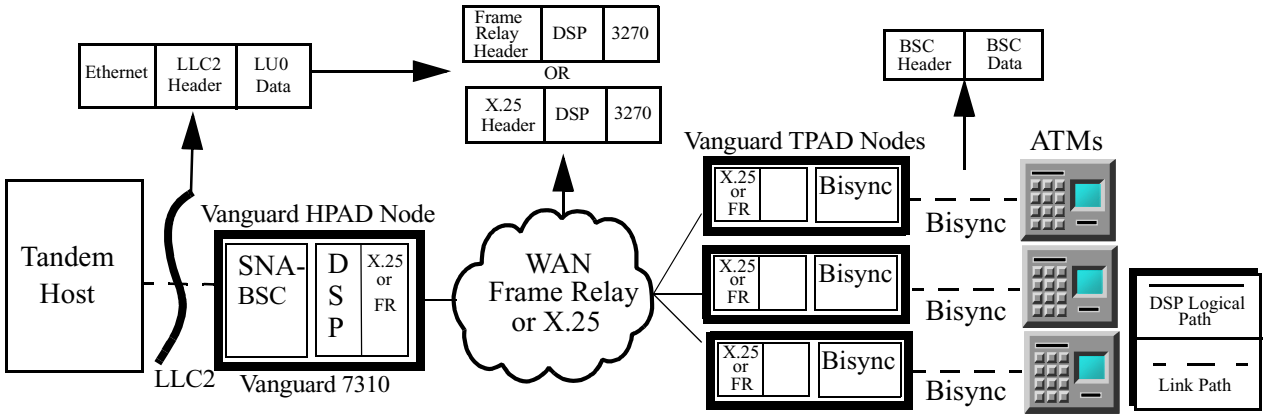


Figure 1-2. Data Conversion

Network Expansion

Flexibility to add data, voice and video to the network to accommodate your growing business requirements.

ICE Application Support

ACI Worldwide Incorporated provides an application, Internet Communications for the Enterprise (ICE) that runs serial-based ATMs over an LLC2 (SNA) Ethernet connection. BSC 3270-to-SNA conversion enables the BSC ATMs to communicate with Tandem hosts over an Ethernet LAN Interface.

SNA Screen Terms

The Systems Network Architecture Screen Terms used in the following examples are defined:

Term	Description
+RSP	*Plus Response*
ACTLU	*Activate Logical Unit*
ACTPU	*Activate Physical Unit*
BIND	*To tie (indicates that a session is established between two logical units.)*
EOT	*End of Transmission*
GPOLL	*General Poll*
NOTIFY	*SNA Command - To Notify*
SABME	*Set Asynchronous Balance Mode Extended*
SDT	*Start Data Traffic*
SPOLL	*Specific Poll*
TEST	*SNA Command - To Test*
TH	*SNA Transmission Header*
RH	*SNA Request or Response Header*
RU	*SNA Response Unit*
UNBIND	*To untie*
XID	*Exchange Identifier*

Start-up Sequence

Figure 1-3 shows an example of the start-up sequence of a typical BSC 3270-to-SNA conversion. This start-up sequence establishes an SNA session between the Tandem host and the Vanguard 7310.

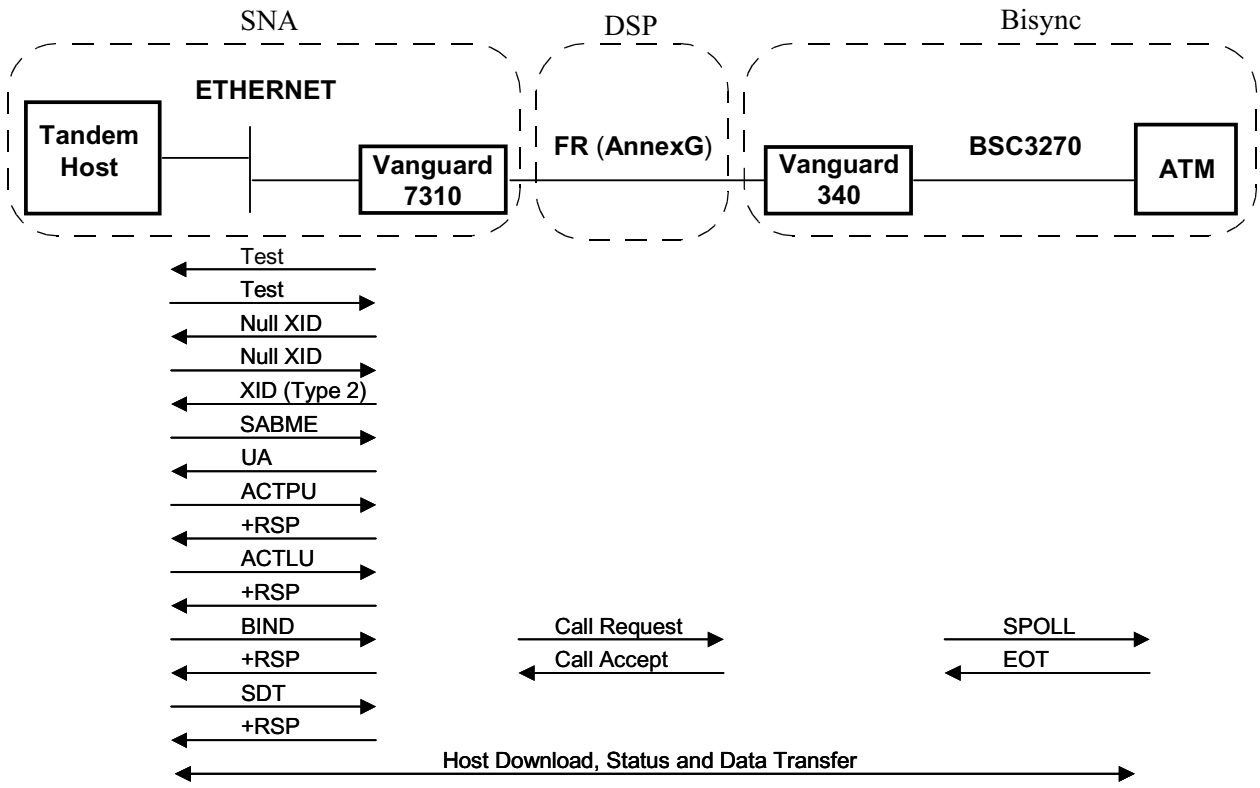


Figure 1-3. BSC 3270-to-SNA Conversion (Start-up)

Fail/Recovery

Figure 1-4 shows an example of the BSC 3270-to-SNA conversion Fail/Recovery:

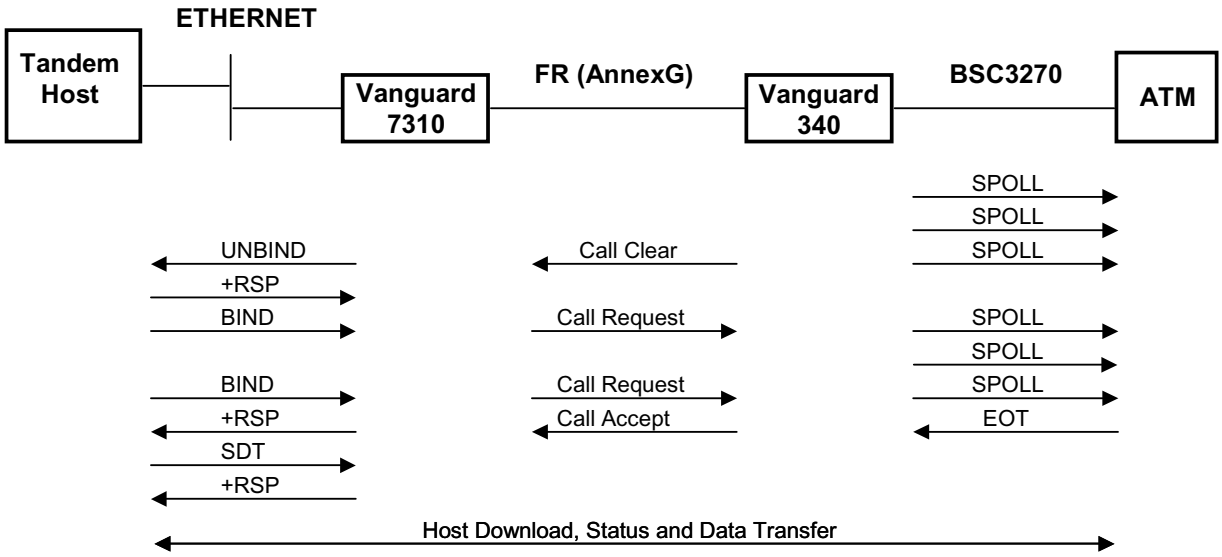


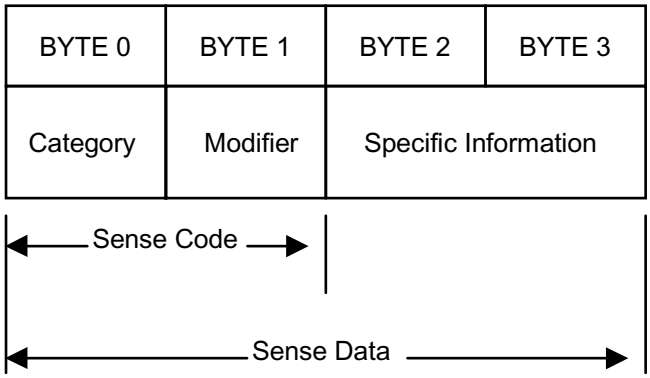
Figure 1-4. BSC-to-SNA Conversion (Fail/Recovery)

Note

The BSC 3270 TPAD node (the Vanguard 340) must have the port configured with the Cessation option. Cessation prevents the TPAD from polling the ATM when the SVC is down.

SNA Sense Codes

Sense data refers to four bytes of hex data sent between SNA Conversion and the SNA host. Variations of sense data can be used in problem determination and diagnosis. Sense data can be included in a negative response, an UNBIND request, or an LUSTAT request. See Figure 1-5 Sense Data Format.



Category Field

'00'	**User Sense Data**
'08'	Request Reject
'10'	Request Error
'20'	State Error
'40'	Request Header (RH) Usage Error
'80'	Path Error

Modifier Field

'XX'	Reserved

Specific Information Field

'YY, ZZ'	**3270**	**Conditions**

Figure 1-5. Sense Data Format

In the case of BSC 3270 or BSC 2780/3780 to SNA Conversion, a unique set of sense codes is mapped to unusual conditions occurring with the networks or the remote devices. These unique Sense Codes are presented to the host as an inbound UNBIND command.

Note

Reference Appendix A of this manual for detailed Sense Code information.

Error Code and Alarms from Networks or Remote Devices

Reference Appendix A of this manual for detailed Error Code information from networks or remote devices through alarms or sense codes.

SNA-to-BSC Device Enable (ATM)

Follow These Steps...

Follow these steps to configure SNA-to-BSC 3270 Device Enable or Disable:

Step	Action	Result
1	Select **Port/Station/Channel Control** from the Control Terminal Port (CTP) Main menu.	The **Port/Station/Channel Control** menu Displays.
2	Select **SNA Features Control** from the Port/Station/Channel Control menu.	The **SNA Features Control** menu displays, with a prompt to select the feature to configure.
3	Select the feature to configure: • SNA to BSC Device Enable • SNA to BSC Device Disable	Your choice is displayed.

Device Enable

Figure 1-6 shows an SNA-to-BSC 3270 Device Enable (ATM) example:

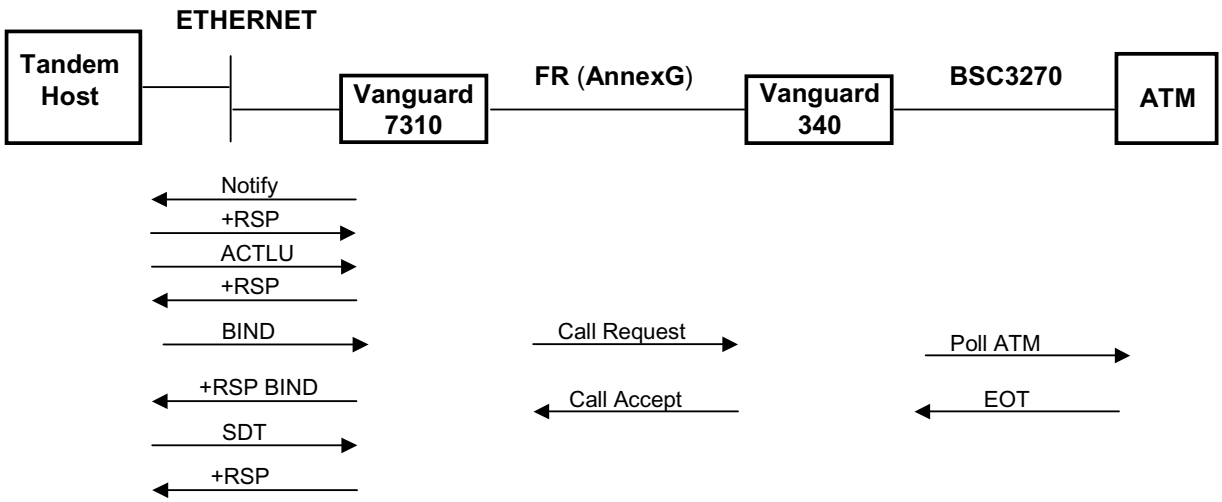


Figure 1-6. SNA-to-BSC 3270 Device Enable (ATM) Example

SNA-to-BSC 3270 Device Disable

Device Disable

Figure 1-7 shows an SNA-to-BSC 3270 Device Disable example.

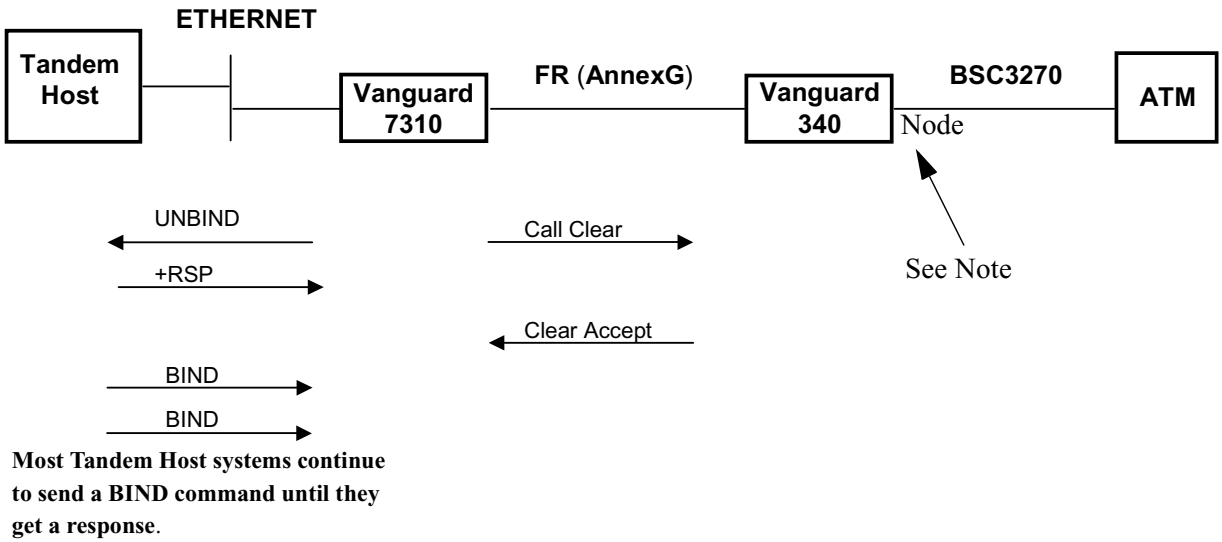


Figure 1-7. SNA-to-BSC 3270 Device Disable Example

Once disabled, the device unconditionally terminates the session. The system operator is responsible to ensure that an ATM customer is not in the middle of a bank transaction.

Note

The Cessation Option (CESS+CESS3) must be enabled so that the TPAD does not send the poll to the ATM when the call is cleared.

Device Boot

Follow These Steps...

Device boot is needed for new parameters to take effect. Follow these steps to configure a Device Boot:

Step	Action	Result
1	Select **Boot** from the Control Terminal Port (CTP) Main menu.	The **Boot** menu Displays.
2	Select **SNA Features Records Boot** from the Boot menu.	The **SNA Features Record Boot** menu displays, with a prompt for the selection.
3	Select the feature to configure: • SNA to BSC Conversion Device	The feature displays.

Device Boot

The device unconditionally terminates to an LU session when booting. The system operator is responsible to ensure that an ATM customer is not in the middle of a bank transaction. Figure 1-8 shows a Device Boot example:

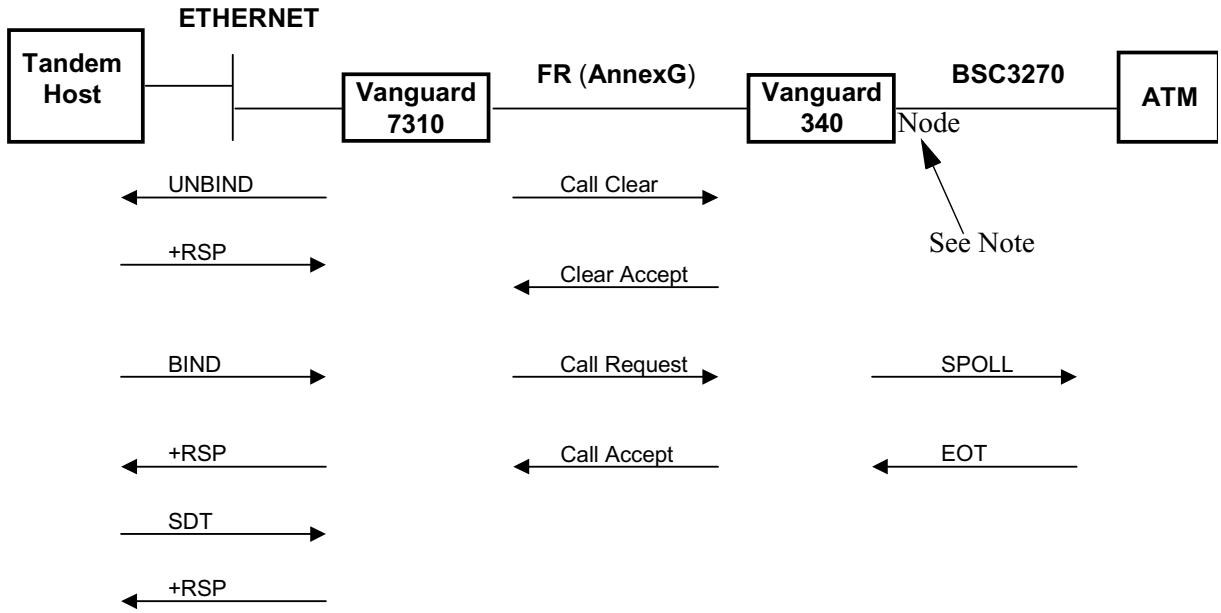


Figure 1-8. Device Boot Example

Note

The Cessation Option (CESS+CESS3) must be enabled so that the TPAD does not send the poll to the ATM when the call is cleared.

When the TPAD is receiving a call, the TPAD cannot send a call accept until it receives an End Of Transmission (EOT) response to a general or specific poll.

Caution

When adding a new device, an LLC-SDLC station boot is required.

LLC-SDLC Station Boot

LLC-SDLC Station Boot

An LLC-SDLC Station Boot is required for new LLC-SDLC station parameters to take effect. Modifying device Parameters; LU Name, link station name, and LU address require that the LLC-SDLC Station is booted.

Once booted, the device unconditionally terminates the session. The system operator is responsible to ensure that an ATM customer is not in the middle of a bank transaction.

Note

The device unconditionally terminates to an LU session when booting an LLC-SDLC Station.

Caution

A SLAC station boot is needed to make a new device active.

Chapter 2
Configuration

Overview

Introduction

This chapter provides configuration examples and procedures for BSC 3270-to-SNA conversion.

Configuration Information and Examples

Remote Site Configuration Information (TPAD)

When configuring the Remote Site (TPAD) you must configure the Port Options to CESS+CESS3 and configure the BSC/DSP3270 Device Table's Device Control to SPEOT. Refer to "Remote Site Configuration (TPAD)" section on page 2-32 for parameter configurations.

Central Site Configuration Examples (HPAD)

The configuration examples show diagrams of possible network applications for the BSC 3270-to-SNA conversion. An SNA Tandem host is utilized in an Ethernet configuration. Figure 2-1 shows the HPAD placing a call. Figure 2-2 shows the TPAD placing a call.

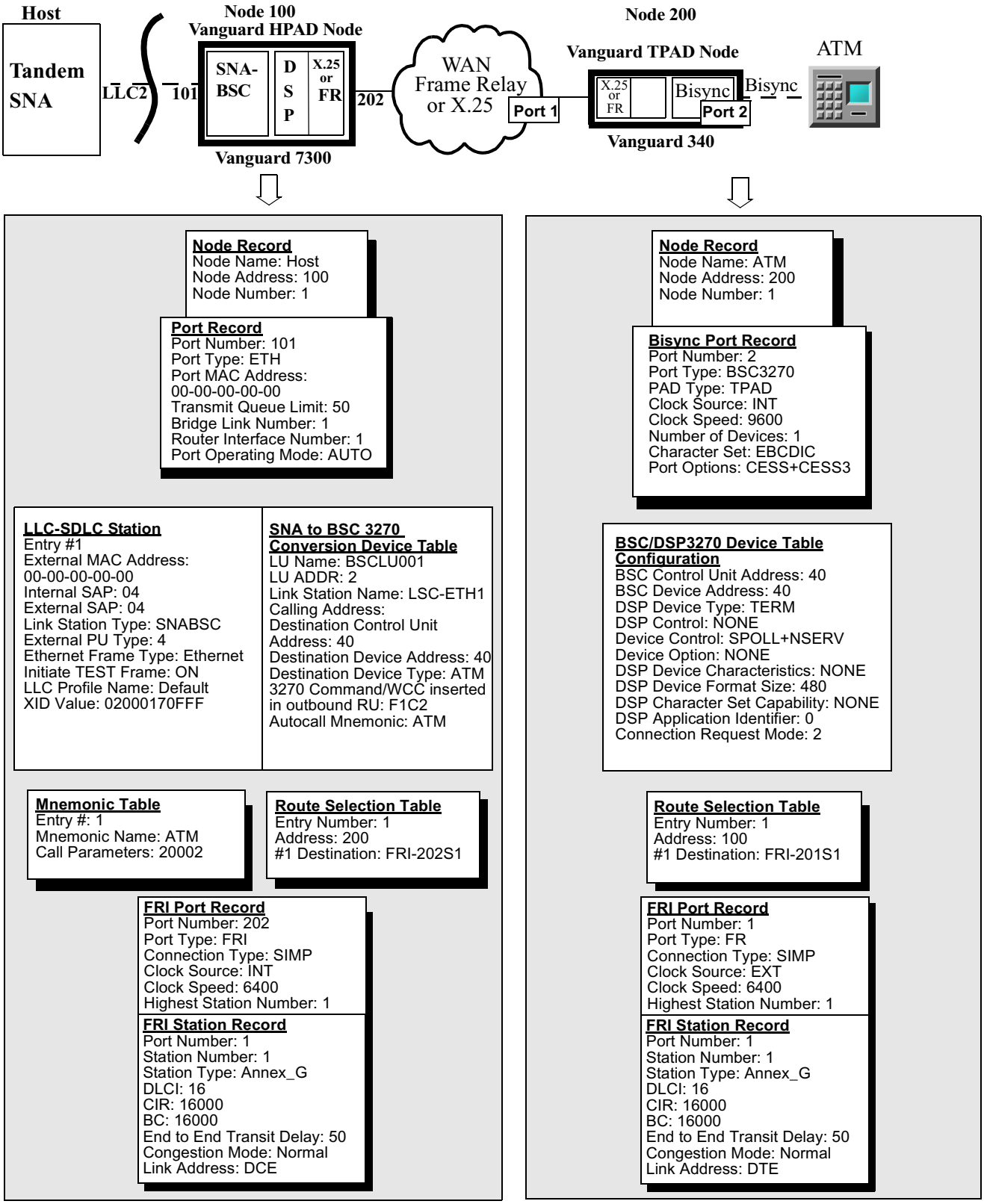


Figure 2-1. Example of HPAD Placing A Call

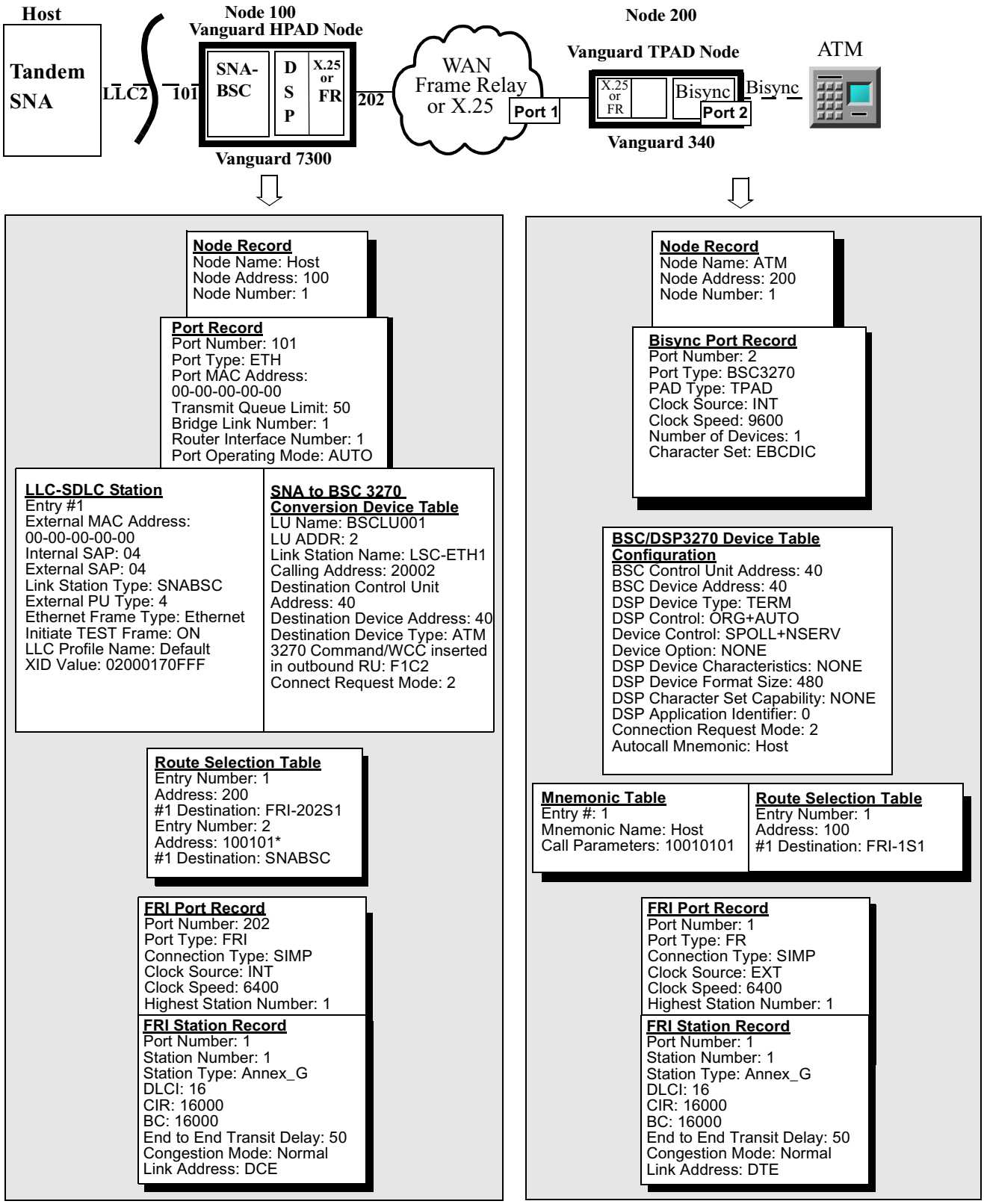


Figure 2-2. Example of TPAD Placing A Call

Before You Start

Online Help	Entering a **?** displays online Help for the current parameter option on the screen.
Ease of Configuration	With Ease of Configuration enabled, you only need to boot the port to make changes to the parameters marked with an asterisk. For more information on Ease of Configuration, refer to the introductory portion of the *SNA Feature Protocols Manual,* (Part Number T0101).
Parameters with an asterisk (*)	Parameters identified by an asterisk require a node boot for changes to the parameter to take effect.

Vanguard 6455 Requirements for Bisync

Vanguard 6455 Requirements for BSC 3270-to-SNA Conversion

The guidelines below are required when using the BSC 3270-to-SNA feature:

- 32 Meg SIMM Memory Module
- Local Dynamic Port Creation Heap Size needs to be configured Bisync and AS/400

Note

When setting the Local Dynamic Port Creation Heap Size, refer to the Ease of Configuration information located in the About The Vanguard Applications Ware SNA Feature Protocols Manual section of the *SNA Feature Protocols Binder* (Part Number T0101). A copy of your current configuration files should be saved before changing the Local Dynamic Port Create Heap Size.

Increase Parameters to Maximum Value

The following Node Record Parameters need to be increased in order to accommodate increasing the number of SNA to Bisync 3270 Devices to 256:

- Mnemonic Table Size
- Quantity of DSP Devices
- Maximum Simultaneous Calls

The Frame Relay Station or X.25 Port parameter; Number of Two Way Simultaneous Calls, needs to be increased in order to accommodate increasing the number of SNA to Bisync 3270 Devices to 256.

Configuring a Node

Introduction

To set up a Vanguard for BSC 3270-to-SNA operation, configure the following:

- Node Record
- Ethernet, Token Ring or Frame Relay Port Record
- Ethernet or Frame Relay Station Table
- LLC-SDLC Profile Table
- SNA-to-BSC Conversion Device Table

Note

This assumes your Vanguard node is already configured for normal LAN/WAN operation. For details on configuring your node for LAN/WAN operation, refer to the *Vanguard Configuration Basics Manual*, (Part Number T0113).

Configuration

Follow the steps in the table below to configure the Node Record parameters:

Step	*Action*	*Result*
1	Select **Configure** from the CTP Main menu.	The Configure menu displays.
2	Select **Node** from the Configure menu.	The Node Record Configuration screen displays, showing the Node Name: parameter.
3	Enter the **Node Name:** parameter.	The parameters for the Node Record appear in sequence. **Note** An asterisk beside a parameter indicates that a Node Boot is needed for any changes to that parameter to take effect.

Configure Menu

Figure 2-3 is a sample Configure Menu for Central Site (HPAD):

```
Node:              Address:         Date:              Time:
Menu: Configure                                        Path: (Main.6)

  1. Node                            19. PPP Profiles
  2. Port                            20. ToW Table
  3. Configure Network Services      21. AT Dialer Profile
  4. Inbound Call Translation Table  22. SoTCP
  5. Outbound Call Translation Table 23. SNA Features Configure
  6. Calling Addr Translation Table  24. (reserved)
  7. CUD based Addr Translation Table 25. (reserved)
  8. SDLC Port Stations              26. (reserved)
  9. NUI/Password Table              27. (reserved)
  10. FRI Stations                   28. (reserved)
  11. Configure Bridge               29. (reserved)
  12. Configure LAN Connections      30. Configure SNMP
  13. Software Key Table
  14. Congifure Router
  15. LLC to SDLC Tables
  16. DORA Record
  17. TCP
  18. PPP

-Enter Selection:
```

Figure 2-3. Configure Menu Example

Configuring Port Records

Introduction

Port Records store the port configuration parameters, with each active port having a separate record. Active port number (location) and port type must be defined before you configure the remaining Port Record parameters.

Configuration

Follow these steps to configure the Port Records:

Step	*Action*	*Result*
1	Select **Configure** from the CTP Main menu.	The Configure menu displays.
2	Select **Port** from the Configure menu.	The Port Number parameter displays.
3	At the prompt, enter the number of the port you want to configure and press Return.	The parameters are successively displayed. **Note** When an asterisk appears beside a parameter in a record, a Node Boot is needed for any changes to that parameter to take effect.

Configuring the Ethernet Port Record

Ethernet Port Record Parameters

The Ethernet Port record contains these parameters:

Port Number

Range:	101 to 599, 2000 to 3999
Default:	101
Description:	Enter the number of the port to configure. This number is the Port Record reference number and represents both physical and virtual ports. Physical ports are located at the front and rear of the hardware chassis.

*Port Type

Range:	NULL, ETH
Default:	ETH
Description:	Specify the type of port you are configuring: • NULL - NULL port type • ETH - Ethernet port type **Note** A change to this parameter requires a node boot to take effect.

*Port MAC Address

Range:	00-00-00-00-00-00 to FE-FF-FF-FF-FF-FF
Default:	00-00-00-00-00-00
Description:	Specifies the MAC address of the LAN port. The entered value of 00-00-00-00-00-00 is replaced by the Burned in Address (BIA) if the LAN hardware is present. **Note** A change to this parameter requires a node boot to take effect.

Transmit Queue Limit

Range:	20 to 500
Default:	50
Description:	Specifies the maximum number of frames that can be queued on the LAN transmitter before any frames are dropped.

*Bridge Link Number

Range:	1 to 5
Default:	1
Description:	Specifies the bridge link number associated with the LAN port. The corresponding bridge link record must be configured under the bridge configuration menu.

*Router Interface Number

Range:	1 to 50
Default:	1
Description:	Specifies the router interface number associated with this LAN port.

Port Operating Mode

Range:	AUTO, 1000FD, 100FD, 100HD, 10FD, 10HD
Default:	AUTO
Description:	Specifies whether this LAN port runs in 1000Mbit Full-Duplex, 100Mbit Full-Duplex, 100Mbit Half-Duplex, 10Mbit Full-Duplex, 10Mbit Half-Duplex, or Auto-Negotiation mode. **Note** Vanguard 7300 Series - Release 6.4 and greater software supports 1000FD on ports 101 and 103 using the IBM750FX CPU card. ETH1 is port 101, ETH2 is port 103. Port 102 is the COM port.

Configuring Station Records

Introduction

Station records store the station configuration parameters, with each station assigned a separate record. The ports must be defined before you can configure the station record parameters.

Station records are configured through the various sets of LLC-to-SDLC Station Table parameters. The four types of station tables are:

- LLC Profile Table
- Frame Relay Station Table
- Ethernet Station Table
- Token Ring

LLC-to-SDLC Table Menu

Figure 2-4 shows the LLC-to-SDLC Tables Menu:

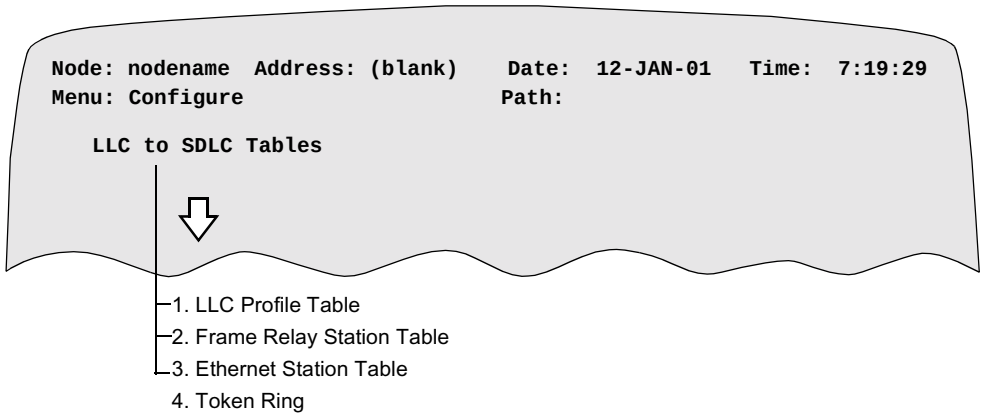


Figure 2-4. LLC to SDLC Tables Menu

Configuring the LLC-to-SDLC Tables

The LLC-to-SDLC Tables must be configured for each active station and conversion type. Follow these steps to access the tables:

Step	Action	Result
1	Select **Configure** from the CTP Main menu.	The **Configure** menu displays.
2	Select **LLC to SDLC Tables** from the Configure menu.	The **LLC to SDLC Tables** menu displays, with a prompt for the selection.
3	Select the station type to configure: • LLC Profile Table • Frame Relay Station Table • Ethernet Station Table • Token Ring	The corresponding Station Table Configuration displays, with the prompt for the entry number. **Note** The station type is listed only if the interface card is inserted and the port is configured.
4	Select the first entry number.	The prompt for the first station parameter displays. As you enter each parameter, the next parameter choice is displayed.

Ethernet Station Table Parameters

Parameter Numbers

The LLC-SDLC Conversion Ethernet Station Configuration contains these parameters:

Entry Number

Range:	1 to 1000
Default:	1
Description:	Entry number used to refer to this table record.

External MAC Address

Range:	00-00-00-00-00-00 to FF-FF-FF-FF-FF-FF (hexadecimal digits)
Default:	00-00-00-00-00-00
Description:	The MAC Address of the External LAN device associated with this station. For MAC Address Auto-Learn, enter 00-00-00-00-00-00. **Note** There are two forms commonly used for displaying the address: Canonical and non-Canonical.

*Internal MAC Address

Range:	00-00-00-00-00-00 to FF-FF-FF-FF-FF-FF (hexadecimal digits)
Default:	10-00-7C-54-29-77
Description:	The default internal MAC address is the MAC address of the LAN port. If this default internal MAC address is not to be used for this station, the configured Internal MAC address should be of the following form: nn:nn:nn:nn:ss:ss 1) nn:nn:nn:nn must be the same for all stations associated with this LAN port and not using the default MAC Address. nn:nn:nn:nn must also be unique to this node, and must not be zero's. 2) ss:ss must be different for each station associated with this LAN port and does not use the default MAC address, unless Service Access Point (SAP) multiplexing is being used to uniquely differentiate the stations. **Note** A change to this parameter requires a node boot to take effect.

Internal SAP

Range:	01-FE (hexadecimal digits)
Default:	04
Description:	The local Service Access Point (SAP) of this station. This should be 04, or a multiple of 04.

External SAP

Range:	01-FE (hexadecimal digits)
Default:	04
Description:	The Service Access Point (SAP) for the device associated with this station. This should be 04, or a multiple of 04.

*Link Station Type

Range:	SLAC, 5494, SNABSC
Default:	SLAC
Description:	• SLAC - LLC-SDLC Conversion (via QLLC) • 5494 - APPN LEN Link Station for support of 5394 type downstream controllers • SNABSC - SNA PU type 2.0 Link Station for support of SNA to Bisync Conversion **Note** You must perform a node boot for changes to 5494 to take effect.

External PU Type

Range:	2, 2.1, 4
Default:	4
Description:	The Physical Unit (PU) Type of the device associated with this station. For MAC Address Autolearn, use Type 2 and 2.1 only.

Ethernet Frame Type

Range:	802.3, Ethernet
Default:	802.3
Description:	This indicates whether 802.3 or Ethernet Version 2 frame format is to be transmitted onto the Ethernet for this station.

Initiate TEST Frame

Range:	OFF, ON
Default:	ON
Description:	Controls whether TEST poll frames are initiated locally during link setup. • OFF - The other side should initiate TEST frames • ON - This side generates TEST poll frames

LLC Profile Name

Range:	0 to 8 (alphanumeric characters)
Default:	DEFAULT
Description:	The name of the LLC-SDLC Conversion Profile Table entry that provides the LLC operating parameters for this station. To blank this field press the space bar.

XID Value

Range:	0 to 14 (hexadecimal digits)
Default:	(blank)
Description:	This is the identification sent by an HPAD station when External Physical Unit (PU) Type is set to 4, or by a TPAD station in the form of a QXID response when External PU Type is set to 2. To blank this field press the space bar.

LLC Options

Range:	NONE, NOCALLXID, 1490APPC, SAVELEARNED, BACKUP
Default:	NONE
Description:	Select LLC options on this stations follows: • NONE - No special LLC station option (recommended for Link Station Type = SNABSC). • NOCALLXID - an XID is not sent from this LLC station to the external PU upon the LLC Station call establishment. • 1490APPC - Enables the Frame Relay LLC station to send the APPC NLPID when configured as a Type 2.1 External PU Type. • SAVELEARNED - Save the learned External MAC Address into the CMEM record for this LAN-attached LLC Station. Only applies if the external MAC Address is set to 00-00-00-00-00-00. • BACKUP - Used for two identical stations on one LAN. This station becomes active when a call is placed to it. Must be used with the WAIT initiate test frame option. **Note** Where applicable, the options can be combined. Example: NOCALLXID+SAVELEARNED.

Frame Relay Station Table Parameters

Parameters

The Frame Relay LLC-SDLC station records are used when attaching to a host or front-end processor (when Ethernet is not used). The LLC-SDLC Conversion Frame Relay Station table contains these following parameters:

Entry Number

Range:	1 to 1000
Default:	1
Description:	Entry number used to refer to this table record.

*Frame Relay Port Number

Range:	1 to 3699
Default:	201
Description:	The port number of the Frame Relay port that the LLC-SDLC Conversion station is connected to. **Note** You must perform a node boot for changes to this parameter to take effect.

*Frame Relay Station Number

Range:	1 to 254
Default:	1
Description:	The Frame Relay station number on the Frame Relay port to which this LLC-SDLC Conversion station is connected. To obtain the corresponding DLCI number, refer to the configuration for that Frame Relay Station. **Note** You must perform a node boot for changes to this parameter to take effect.

1490 Encapsulation

Range:	LLC, BAN
Default:	LLC
Description:	Frame Relay 1490 frame format used to encapsulate LLC frames sent and received by this station. • LLC - LLC Frame is encapsulated in 1490 with the NLPID for 802.2. • BAN - LLC Frame is encapsulated in 1490 with the BAN and BNI MACs, and the NLPID for 802.5.

Internal SAP

Range:	01-FE (hexadecimal digits)
Default:	04
Description:	The local Service Access Point (SAP) of this station. This should be 04, or a multiple of 04.

External SAP

Range:	01-FE (hexadecimal digits)
Default:	04
Description:	The Service Access Point (SAP) at the device associated with this station. This should be 04, or a multiple of 04.

*Link Station Type

Range:	SLAC, 5494, SNABSC
Default:	SLAC
Description:	• SLAC - LLC-SDLC Conversion (through QLLC) • 5494 - APPN LEN link station for support of 5394-type downstream controllers. • SNABSC - SNA PU type 2.0 link station for support of SNA-to-Bisync Conversion. **Note** You must perform a node boot for changes to 5494 to take effect

External PU Type

Range:	2, 2.1, 4
Default:	4
Description:	The Physical Unit (PU) Type of the device associated with this station. For MAC Address Autolearn use Type 2 and 2.1, only.

Initiate Test Frame

Range:	ON, OFF
Default:	ON
Description:	Controls whether TEST poll frames are initiated locally during link setup. • ON - This side generates TEST poll frames. • OFF - The other side should initiate TEST frames. This is the only mode supported for MAC Address Autolearn.

LLC Profile Table

Introduction

The LLC Profile Table is used to provide information about the stations attached to an SDLC Port.

LLC Profile Table

Figure 2-5 shows the LLC to SDLC Tables Menu and the LLC Profile Table selection.

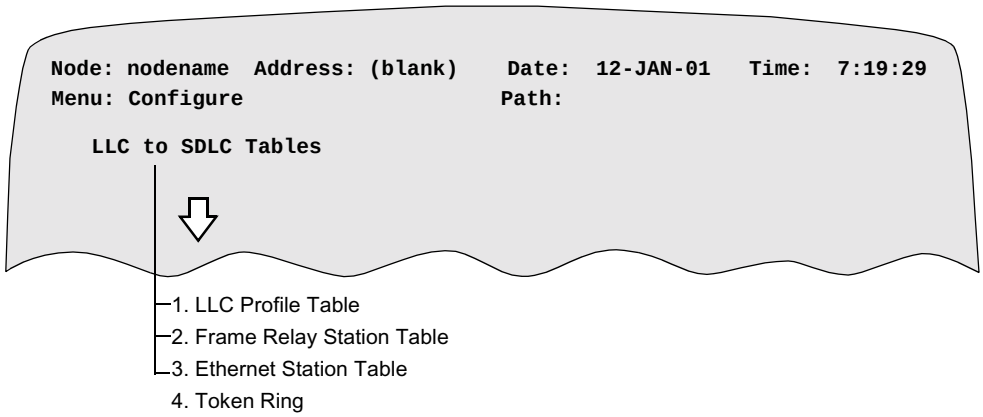


Figure 2-5. LLC Profile Table

Parameters

The LLC Profile Table configuration contains these parameters:

Entry Number

Range:	1 to 8
Default:	1
Description:	Entry number used to refer to this table record.

Profile Name

Range:	0 to 8 (alphanumeric characters)
Default:	DEFAULT
Description:	The name of this profile entry, referenced by LLC-SDLC conversion stations for their LLC operating parameters. To blank this field press the space bar.

T1 Reply Timer

Range:	1 to 25 seconds
Default:	3
Description:	This Ack Timer is used by a station to detect the remote station's failure to acknowledge an outstanding I-frame or supervisory frame with poll bit set to one.

T2 RX Ack Timer

Range:	1 to 255 tenths of seconds
Default:	3
Description:	The Receive Ack Timer is used by a station to determine how long it withholds acknowledgment of a frame(s) from the remote station that requires acknowledgment. This method reduces the number of acknowledgements generated by a link station. When this timer expires, the link station should immediately send an acknowledgment for all received frames not yet acknowledged. **Note** Time is in tenths of seconds.

T1 Inactivity Timer

Range:	2 to 255 seconds
Default:	30
Description:	The Idle Timer is used by a station to detect an inoperative condition of the logical link. This timer is started when the link becomes idle (no data to pass and no outstanding acknowledgments) and if the timer expires, the station sends a supervisory frame with the poll bit set to one.

N2 Retry Count

Range:	1 to 20
Default:	8
Description:	This count defines the number of times an I-frame or supervisory frame with poll bit set to one is transmitted, due to T1 acknowledgment time-out, before the logical link is declared down (inoperative).

N3 Ack Delay Count

Range:	1 to 15
Default:	3
Description:	The receive count is used in conjunction with T2 to reduce the number of acknowledgments a station generates. The receive count is used by a station to determine how many frames are received from the remote station while withholding acknowledgment of these frames. This method reduces the number of acknowledgements generated by a link station. When this count expires, the link station should immediately send an acknowledgment for all received frames not yet acknowledged.

TX Window Size

Range:	1 to 15
Default:	7
Description:	The transmit window size parameter defines the maximum number of I-frames a station can transmit without acknowledgment.

TA Startup Timer

Range:	1 to 255 seconds
Default:	10
Description:	The TA Startup Timer is used by a station as the retry timer when establishing a logical link.

SLAC Ring Number

Range:	0000-0FFF (hexadecimal digits)
Default:	0000
Description:	This is the hexadecimal ring number used by Frame Relay 1490 SLAC stations using 802.5 (BAN) encapsulation. If a value of 0 (zero, the default) is entered, this ring number is not inserted into the Route Indicator field.

SLAC Bridge ID

Range:	0 to 15
Default:	1
Description:	This is the bridge ID used by SLAC stations that use 802.5 encapsulation.

SNA Features Configure Tables

Follow These Steps...

Follow these steps to configure the SNA Features Table record:

Step	Action	Result
1	Select **Configure** from the Control Terminal Port (CTP) Main menu.	The Configure Menu Displays.
2	Select **SNA Features Configure** from the Configure menu.	The **SNA Features Configure** menu displays, with a prompt for the selection.
3	Select the feature to configure: • APPN Node Table • SNA to BSC Conversion Device Table	At the prompt, enter the number of the feature you are configuring.

SNA Features Configure Menu

Figure 2-6 shows the SNA Features Configure Menu.

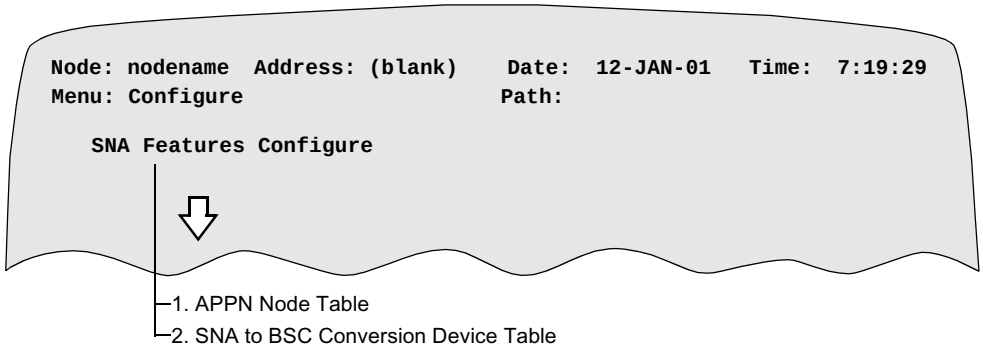


Figure 2-6. SNA Features Configure

Advanced Peer-to-Peer Networking (APPN) Node Table

Default Setting

For BSC 3270-to-SNA conversion use the default setting for the APPN Node Table parameter.

*APPN Node Table

Range:	0 to 8 (alphanumeric characters)
Default:	APPN
Description:	The Local Network Identifier associated with this Vanguard. **Note** The Adjacent AS/400 must have this Network Identifier defined in its Network Attributes or defined in its definition of the APPC and RWS Controller used to attach to this Vanguard. To blank this field press the space bar.

SNA to BSC Conversion Device Tables (3270)

Entry Number

Range:	1 to 256 or 1 to 2000
Default:	1
Description:	Entry number used to refer to this table record. **Note** Maximum range for the Vanguard 6455 is 256. Maximum range for the Vanguard 7300 Series is 2,000.

LU Name

Range:	1 to 8 (alphanumeric characters)
Default:	(blank)
Description:	This is the name of the Logical Unit (LU). To blank this field press the space bar. **Note** You must perform a node boot for changes to this parameter to take effect.

LU ADDR

Range:	1 to 255
Default:	1
Description:	This is the Logical Unit (LU) identification number.

Link Station Name:

Range:	1 to 16 (alphanumeric characters)
Default:	LSC-ETH1
Description:	This is the name of the SNA Station that the specific Logical Unit (LU) or the LU group is being defined for. To blank this field press the space bar.

Calling Address

Range:	0 to 15 (decimal digits)
Default:	(blank)
Description:	Calls placed from this node have this address in the X.25 calling address. For calls received by this node, this field is compared to the X.25 calling address and a match must be made in order for the call to accepted. To blank this field press the space bar.

Destination Control Unit Address

Range:	00-D9 (hexadecimal digits)
Default:	40
Description:	Specifies control unit address on remote PAD. Used with Connection Request Mode = 2 or 3. The address consists of two hexadecimal digits. Valid ranges depend on the device. Character Set as follows: • EBCDIC: 40, C1, C2, C3, C4, C5, C6, C7, C8, C9, 4A, 4B, 4C, 4D, 4E, 4F, 50, D1, D2, D3, D4, D5, D6, D7, D8, D9, 5A, 5B, 5C, 5D, 5E, 5F • ASCII: 20, 41, 42, 43, 44, 45, 46, 47, 48, 49, 5B, 2E, 3C, 28, 2B, 21, 26, 4A, 4B, 4C, 4D, 4E, 4F, 50, 51, 52, 5D, 24, 2A, 29, 3B, 5E

Destination Device Address

Range:	00-D9 (hexadecimal digits)
Default:	40
Description:	Specifies the device address on remote PAD. Used with Connection Request Mode = 2 or 3. This address consists of two hexadecimal digits. Valid ranges depend on the device. Character Set as follows: • EBCDIC: 40, C1, C2, C3, C4, C5, C6, C7, C8, C9, 4A, 4B, 4C, 4D, 4E, 4F, 50, D1, D2, D3, D4, D5, D6, D7, D8, D9, 5A, 5B, 5C, 5D, 5E, 5F • ASCII: 20, 41, 42, 43, 44, 45, 46, 47, 48, 49, 5B, 2E, 3C, 28, 2B, 21, 26, 4A, 4B, 4C, 4D, 4E, 4F, 50, 51, 52, 5D, 24, 2A, 29, 3B, 5E

Destination Device Type

Range:	TERM, ATM, PRTR, T2780INT, TD2780INT
Default:	ATM
Description:	• TERM - Device is a terminal - 3270 display • ATM - Device is an ATM • PRTR - Device is a 3270 printer • T2780INT Device is a 2780 (Interactive)* • TD2780INT Device is a 2780 (Interactive with 3270 display capability)*
* When using BSC 2780, T2780INT must be specified as the Destination Device Type. When T2780INT is configured, “Destination Control Unit Address” and “Destination Device Address” parameters are not displayed.	

3270 Command/WCC inserted in outbound RU

Range:	0000-FFFF (hexadecimal)
Default:	F1C2
Description:	Use only for data containing no 3270 command and Write Control Code (WCC) on outbound LU type 0. Specifies the 3270 write command and the WCC to be inserted at the beginning of each outbound Response Unit (RU). The two hexadecimal or ASCII digits for the 3270 command are as follows: - 'F1' or '31' - Write - 'F5' or '35' - Erase Write - '6F' or '3F' - Erase All Unprotected The two hexadecimal digits for the WCC are as follows: - 'C2' - Restore input key operation - 'C5' - Restore key operation and reset MDT bits in device buffer - '0000' - Nothing is inserted in RU Example: - 'F1C2' - Write on screen and restore input keys operation - 'F5C5' - Erase and Write on screen, restore input keys operation, and reset MDT bits in device buffer. **Note** To simulate an SNA host attached to BSC 3270 ATMs, the BSC 3270 order and commands must be inserted in front of the data sent to the ATM. The first byte is the IBM BSC 3270 local and remote commands code. The second byte is the Write Control Code (WCC). The default parameter 'F1C2' supports the most current installed bisync ATMs. Refer to the *IBM 3270 Information Display System Reference Summary Manual* (IBM Part Number GX20-1878-x) for more information.

Connect Timer

Range:	5 to 1000 seconds
Default:	200
Description	The Connect Timer specifies the maximum length of time in seconds to wait for the Terminal PAD (TPAD) to connect. This is the maximum amount of time the response to initial request from host would be delayed while attempting to connect to TPAD. **Note** If TPAD is the call originator, this value must be greater than Service Timer configured for the BSC 3270 port in TPAD.

SNA Options

Range:	NONE, UBNSHC, BINDCR, RENOTIFY, LUADBG, DSPDBG, SESDBG
Default:	NONE
Description:	• NONE - No User's SNA Option • UBNSHC - Send UNBIND to PLU after SHUTC • BINDCR - When configured, Call Request is always sent when Bind is received. • RENOTIFY -When configured, sends Notify down or up to initiate re-logon after a device disconnection or reconnection. • LUADBG - Print LUA Debug Information • DSPDBG - Print DSP Debug Information • SESDBG - Print SES Debug Information

DSP Device Characteristics

Range:	NONE, XPAR, COLOR, PRINa
Default:	NONE
Description:	• NONE - No Options • XPAR - Device supports transparency • COLOR - Device supports color • PRINa - Printer is attached to a terminal device **Note** Any combination of the above can be specified by summing. Example: COLOR+PRINa

Character Set

Range:	ASCII, EBCDIC
Default:	EBCDIC
Description:	Indicates whether Terminal/ATM devices on this port support an ASCII or EBCDIC character set.

DSP Device Format Size

Range:	480, 960, 1920, 2560, 3440, 3564
Default:	480
Description:	Specifies the maximum size of the terminal or printer message.

DSP Character Set Capability

Range:	NONE, APL, TEXT
Default:	NONE
Description:	Indicates device capability: • NONE - no indication of capability • APL - APL capability • TEXT - Text capability **Note** Any combination of the above can be specified by summing. Example: APL+TEXT

DSP Application Identifier

Range:	0 to 255
Default:	0
Description:	Specifies the target application to which this device would be connected. This should match with the application ID of the Host DSP device.

Connection Request Mode

Range:	2 to 3
Default:	2
Description:	Specifies which Display System Protocol (DSP) Connection Request Mode (CRM) to use. There are two modes of connection as follows: • 2 - Specific class CRM-connects to a specific device as indicated in the destination control unit and device address. • 3 - Non-specific class CRM-connects to any device as indicated in the destination control unit address.

Autocall Mnemonic

Range:	0 to 8 (alphanumeric characters)
Default:	(blank)
Description:	This mnemonic references the remote X.25 address which is autocalled. If blank, then autocalling is disabled and the other end should initiate the call. To blank this field press the space bar.

DSP Compatibility

Range:	YES, NO
Default:	NO
Description:	Select YES if the device connects to a DSP host or if the device connects to a 6507/6525 node with 2.13 or higher software revision. Select NO if the device connects to 6507/6525 with pre-2.13 release software.

Billing Records

Range:	OFF, ON
Default:	OFF
Description:	This controls whether billing (accounting) records are created for calls on this station. • OFF: No billing records are created • ON: Billing records are created

Remote Site Configuration (TPAD)

Remote Site Configuration Port Options

To configure the Remote Site (TPAD) CESS+CESS3 must be selected. Figure 2-7 shows the parameters in the Configuration record.

Configure->Port->Port Options: CESS+CESS3

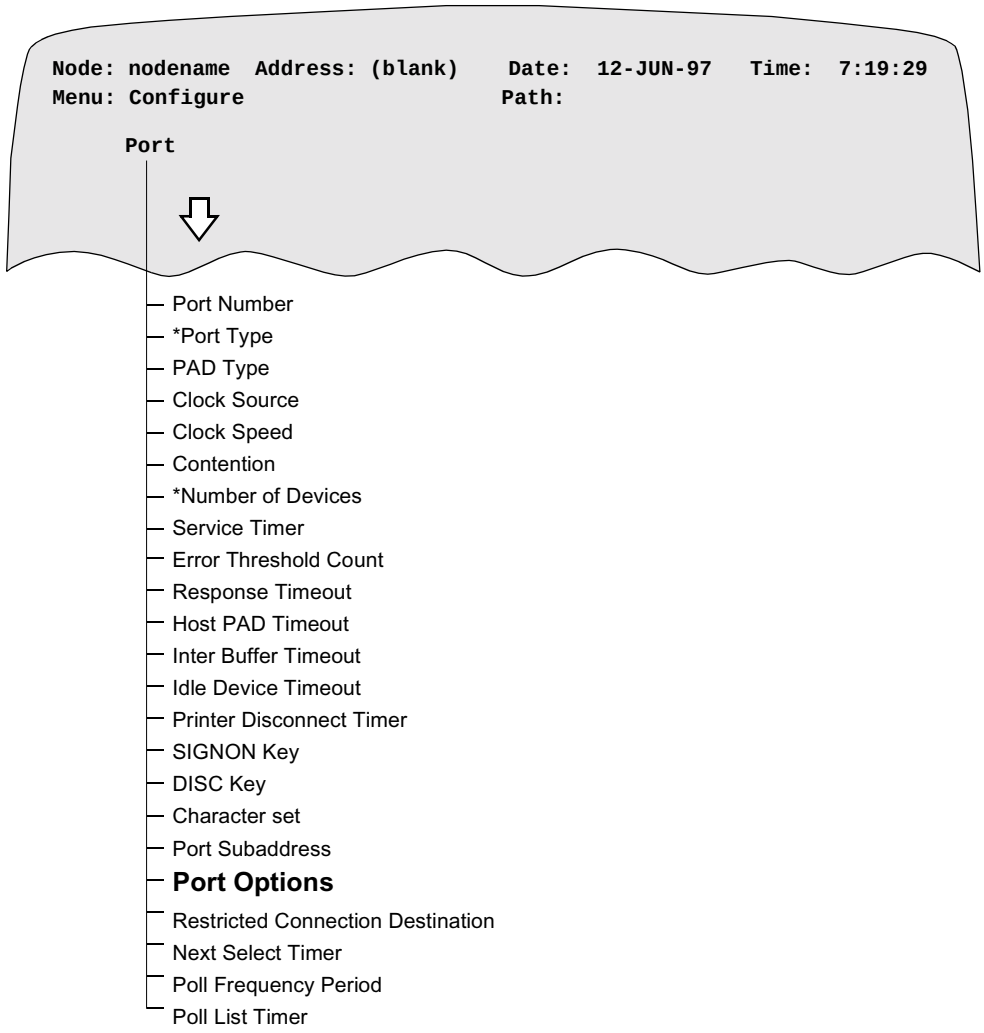


Figure 2-7. Configure Port Options

Port Options Parameter

Select the option CESS+CESS3 from the Port Options parameter.

Port Options

Range:	NONE, CESS, SINGLE, EPAD, CESS2, CESS3
Default:	NONE
Description:	Specifies the port type you are configuring: • NONE: No option is specified. • CESS: This option turns the polling cessation ON. • In the HPAD, a G–POLL is not responded to if none of the terminals configured on that controller are in a connected state (that is, no SVC in place) and there are no printers configured on that controller. An S–POLL or SELECT or a data message to a terminal is not responded to if that device is not in a connected state. In the TPAD, devices that are configured for AUTO+ORG are not polled until the connection (SVC) to the remote HPAD is established. • CESS2: On the HPAD, a GPOLL (General Poll) response is not generated if all devices configured on a controller are in a disconnected state (that is, no SVC in place) and it does not receive a Device End status message. A SPOLL (specific poll), select or a data message response is not generated if the device is in a disconnected state and it does not receive a Device End status message. (Remote Device or TPAD must send a Device End status message.) • CESS3: On the TPAD, when the call request is received, a SPOLL is sent to the device. If an EOT is received from the device, the call accept is sent to the HPAD immediately. Otherwise, if the device does not respond with an EOT, a call reject is sent to the HPAD. CESS3 must be configured in conjunction with CESS, for use with HPAD SNABSC Conversion, and the call must originate from the HPAD. • SINGLE: The HPAD transmits only one complete message (single or multiple block message) when responding to a SPOLL or GPOLL. This option only applies to HPAD ports. • EPAD: This option pertains to the ASCII character set only. The message terminating EPAD character is hex 7F and FF when this option is enabled, otherwise hex FF is used. Any combination of the above can be specified by summing. For example, CESS+SINGLE.

Remote Site Configuration BSC/DSP3270 Device Table

Figure 2-8 is a sample Remote Site (TPAD) Configure Menu. SPEOT must be selected in the Device Control parameter.

Configure->BSC/DSP3270 Device Table->Device Control: SPEOT

```
Node:              Address:         Date:              Time:
Menu: Configure                                        Path: (Main.6)

  1. Node                            19. Software Key Table
  2. Port                            20. Configure Router
  3. Configure Network Services      21. LLC to SDLC Tables
  4. Inbound Call Translation Table  22. DORA Record
  5. Outbound Call Translation Table 23. TCP
  6. PAD Prompt Table                24. PPP Parameters
  7. Calling Addr Translation Table  25. PPP Profiles
  8. CUD based Addr Translation Table 26. Configure SPFM Connection Table
  9. NUI/Password Table              27. ToW Table
  10. PAD Profile Table              28. (reserved)
  11. Remote PAD Parameter Table     29. (reserved)
  12. BSC/DSP3270 Device Table       30. Configure SNMP
  13. Node to Node Download
  14. SDLC Port Stations
  15. FRI Stations
  16. XDLC Port Stations
  17. Configure Bridge
  18. Configure LAN Connections

-Enter Selection:
```

Figure 2-8. Configure Menu Example

Device Option Parameter

Select SPEOT from the Device Option parameter in the BSC/DSP3270 Device Table.

Device Control

Range:	NONE, GPOLL, PSPOLL, SPOLL, MSPOLL, NSERV, NSTAT, RVI, SPEOT, SPEND, NCMD
Default:	NONE
Description:	Specifies device control: • NONE: No device control parameter set. • GPOLL: Device is only polled by General Polls (TPAD only). • PSPOLL: Periodic specific polling of a device (TPAD only). • SPOLL: Forced specific polling of a device (TPAD only). • MSPOLL: Forced specific polling of a device, except when the controller is down (TPAD only). • NSERV: No service messages are sent to the device (TPAD only). • NSTAT: Disables the generation of dummy DEVICE END status messages. • RVI: Forces TPAD to send RVI as an ACK for terminal text/status messages terminated with ETB or ETX (TPAD only). • SPEOT: SEL-ACK-TEXT-EOT-POLL-EOT or SEL-RVI-POLL-EOT message exchanges between the TPAD and the controller disconnects the device's session to prevent a lockup condition due to a faulty controller (TPAD only). • SPEND: SPOLL is sent to every Service Timer Interval when the TPAD is flow controlled, that is, TPAD received WACK. • NCMD: Prevents the HPAD from checking for ESC and CMD codes in messages from the host. Consequently, the LCM flag is never sent in DSP messages to the TPAD. Printer devices are not supported. **Note** Any combination of the above may be specified by summing, for example, GPOLL+SPOLL. GPOLL overrides SPOLL if both are selected; this situation is not recommended. Devices under a COMMON CU ADDRESS must have identical Polling methods. For example, if CU40 has 4 devices, all devices must be GPOLL, SPOLL, or neither.

Chapter 3
Statistics

Introduction

This chapter describes how to generate SNA Feature Statistics.

Types of SNA Feature Statistics

You can generate these SNA Feature Statistics:

- SNABSC Device Summary
- SNABSC Device Summary for LLC Station
- Detailed SNABSC Device Statistics by:
  - LU Name
  - Entry Number
- Reset SNA-DSP/SES Device Statistics by:
  - LU Name
  - Entry Number

Generate and Reset Statistics

Follow these steps to generate and reset statistics:

Step	*Action*	*Result*
1	Select **Status/statistics** for the Control Terminal Port (CTP) Main Menu.	The menu for **Status/statistics** displays.
2	Select **SNA Feature Statistics** from the **Status/statistics** Menu	The **SNA Feature Statistics** menu displays.

SNA Features Statistics Menu

Figure 3-1 shows the SNA Feature Statistics Menu.

```
Node: nodename  Address: (blank)    Date:  12-JAN-01   Time:  7:19:29
Menu: SNA Feature Statistics       Path:

  1. SNABSC Device Summary
  2. SNABSC Device Summary for LLC Station
  3. Detailed SNABSC Device Statistics by LU Name
  4. Detailed SNABSC Device Statistics by Entry Number
  5. Reset SNA-DSP/SES Device Statistics by LU Name
  6. Reset SNA-DSP/SES Device Statistics by Entry Number
```

Figure 3-1. SNA Feature Statistics Menu

SNABSC Device Summay

Figure 3-2 shows selection number 1, the SNABSC Device Summary.

```
Node: Nodename  Address: 102                Date: 26-DEC-2002  Time: 13:23:50
SNABSC Device Summary Statistics                              Page:  1 of  8

                           PU   LU  Remote CU/   MNEMONIC SSCP APPL LULU
Ent# LU Name  Link Station  SESS ADR Type     DEV CALL ADR SESS CONN SESS SVC
==== ======== ============= ==== === ====== ===== ======== ==== ==== ==== ====
   1 MMCLU001 lsc-eth4      down   1 TERM   40/40 cntrl1   down DIS  down down
   2 MMCLU002 lsc-eth1      up     2 TERM   40/C1 cntrl2   up   up   down up
   3 MMCLU003 lsc-eth1      up     3 TERM   40/C2 cntrl2   up   up   up   up
   4 MMCLU004 lsc-eth1      up     4 TERM   40/C3 cntrl2   up   up   up   up
   5 MMCLU005 lsc-eth1      up     5 TERM   40/C4 cntrl2   up   up   down up
   6 MMCLU006 lsc-eth1      up     6 TERM   40/C5 cntrl2   down DIS  down down
   7 MMCLU011 lsc-eth2      up     1 ATM    40/40 atm1     up   up   up   up
   8 MMCLU012 lsc-eth2      up     2 ATM    40/40 atm2     up   up   up   up
   9 MMCLU013 lsc-eth2      up     3 ATM    40/40 atm3     up   up   up   up
  10 MMCLU014 lsc-eth2      up     4 ATM    40/40 atm4     up   up   down down
  11 MMCLU015 lsc-eth2      up     5 ATM    40/40 atm5     down DIS  down down
  12 MMCLU016 lsc-eth2      up     6 ATM    40/40 atm6     down DIS  down down
  13 MMCLU101 lsc-eth3      up     1 T2780  ----- t27801   up   up   up   up
  14 MMCLU102 lsc-eth3      up     1 T2780  ----- t27802   up   up   up   up
  15 MMCLU103 lsc-eth3      up     2 T2780  ----- t27803   up   up   down down
  16 MMCLU104 lsc-eth3      up     3 T2780  ----- t27804   down DIS  down down

 Press any key to continue ( ESC to exit ) ...
```

Figure 3-2. SNABSC Device Summary Statistics

Detailed SNA Device Statistics

Detailed Device Statistics can be viewed by:

- LU Name
- Entry Number

LU Name

Figure 3-3 shows the SNA Features Statistics Menu. To view the SNABSC Device Statistics by LU Name, enter selection number 3. You are prompted to type in the SNABSC LU Name.

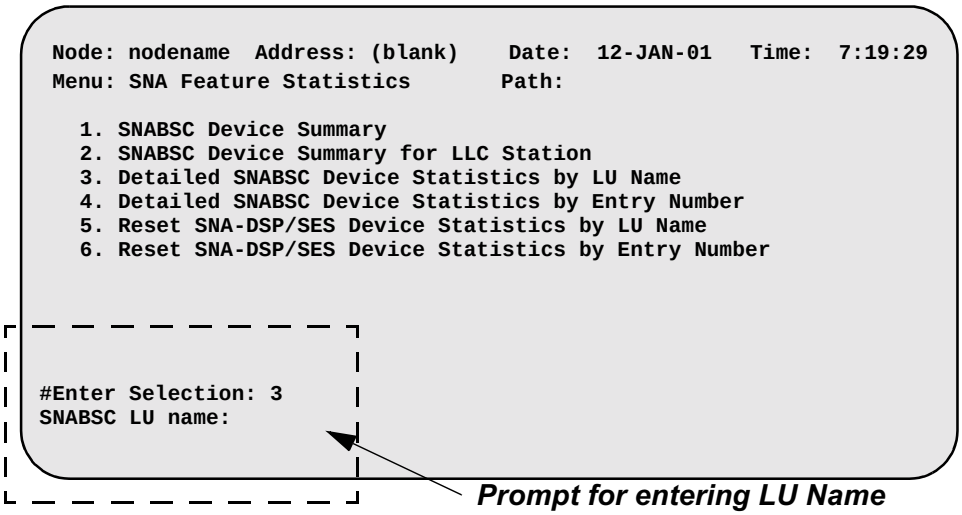


Figure 3-3. Detailed SNABSC Device Statistics by LU Name

Detailed SNABSC Device Statistics - Page 1

Figure 3-4 shows page 1 of the Detailed SNABSC Device Statistics. Enter selection number 4 to view the statistics by entry number. SNA can have two parallel sessions running at the same time, as shown on this page.

```
 Node: Nodename  Address: 102                Date: 26-DEC-2002  Time: 16:20:40
Detailed SNABSC Device Statistics                            Page:  1 of  2

LU Name: MMCLU004              LU Address: 4
LinkStn: lsc-eth1              Device Entry is ENABLED

SSCP-PU Session State : Active   SSCP-LU Session State : Active
                                 LU-LU Session State   : Active

SSCP-LU Detailed Session Statistics:
 RU Summary:          Send   Receive  Data Summary: IN       OUT
            RU  Size: 0      0        Data Frames:  8        8
       Max  BTU Size: 1033   1033      FMD Frames:  8        8
 Current Window Size: 0      0         Data Bytes:  254      62
     Max Window Size: 0      0          FMD Bytes:  0        0

LU-LU Detailed Session Statistics:
 RU Summary:          Send   Receive  Data Summary: IN       OUT
            RU  Size: 1024   3840     Data Frames:  5        0
       Max  BTU Size: 1033   1033      FMD Frames:  5        0
 Current Window Size: 0      0         Data Bytes:  979      0
     Max Window Size: 0      0          FMD Bytes:  0        0

Press any key to continue ( ESC to exit ) ...
```

Figure 3-4. Page 1 of the Detailed SNABSC Device Statistics viewed by Entry Number

Detailed SNABSC Device Statistics - Page 2

Figure 3-5 shows Page 2 of the Detailed SNABSC Device Statistics viewed by entry number:

```
Node: Nodename  Address: 102                Date: 26-DEC-2002  Time: 16:22:25
Detailed SNABSC Device Statistics                            Page:  2 of  2

 LU Name: MMCLU004              LU Address: 4
 LinkStn: lsc-eth1              Device Entry is ENABLED

 Remote Device Type: TERM       Calling Address Configured: (None)
 Destination CU Addr/Dev Addr: C1 40

 LUA-SNABSC State: LU-LU Session         SNABSC-DSP State: Connected

 BIND Receive: 2        BIND Accept: 2        BIND Parameter Rej: 0
 FM Profile: 3   TS Profile: 3   LU Type: 2
 Outb FC: OFF  Inb FC: OFF     Last Outb LU-LU Seq # Rcv (Hex): 0001

 SNABSC-DSP Detailed Statistics:
                      IN     OUT                          IN       OUT
       Call Request: 0      7      Turbo Data Packets: 0        0
        Call Accept: 1      0            Data Packets: 2        4
        Call Reject: 6      0              Data Bytes: 35       1177
 Session Disconnect: 0      0         Terminal Status: 1        0
  Msg Seq# Resynced: 0      0           Cmd/Rsp Abort: 0        0
 Circuit Disconnect: 0      0       Cmd/Rsp Fwd Abort: 0        0
    Invite to Clear: 0      0      Unknown Disconnect: 0        0
Press any key to continue ( ESC to exit ) ...
```

Figure 3-5. Page 2 of the Detailed SNABSC Device Statistics

Note

When "SNABSC-DSP/SES State:" shows Connection Pending, or when attemping a connection, the detailed Call Summary shows a blank time stamp for that device.

```
Node: Node100   Address: 100                Date: 18-JUL-2002  Time: 15:07:34
 Detailed Call Summary                                        Page:  1 of  1

                                          Facilities
Calling Channel        Called Channel      R F N C        Connection Time
-------------------------------------------------------------------------------
FRI-204s3(16)          SDLC-202s1          0 0 0 0      18-JUL-2002 14:05:51
MTCIP-3                ControlPort         0 0 0 0      18-JUL-2002 14:55:05
SNABSC-MMLU0003        FRI-204s3(2)        0 0 0 0       0-   -   0  0:00:00
SNABSC-MMLU0002        FRI-204s3(3)        0 0 0 0       0-   -   0  0:00:00
SNABSC-MMLU001         FRI-204s3(4)        0 0 0 0       0-   -   0  0:00:00
SNABSC-MMLU0008        FRI-204s3(5)        0 0 0 0       0-   -   0  0:00:00
```

Figure 3-6. Blank Time Stamp

Reset SNA-DSP/ SES Device Statistics

You can reset the SNA-DSP/SES Device statistics by:

- LU Name
- Entry Number

LU Name

Figure 3-7 shows the SNA Features Statistics Menu. If you would like to Reset SNA-DSP/SES Device Statistics by LU Name, enter selection number 5. You are prompted to type in the SNABSC LU Name.

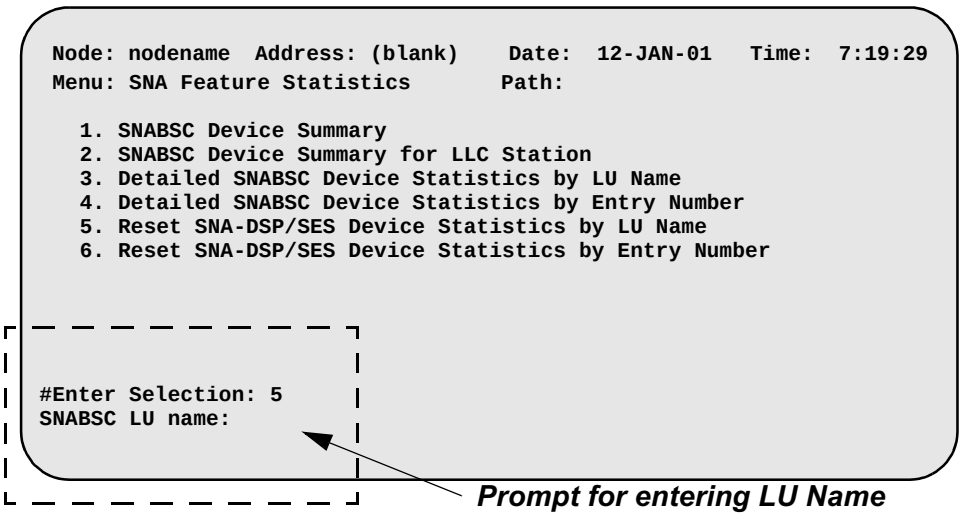


Figure 3-7. Reset SNA-DSP/SES Device Statistics by LU Name

Reset SNA-DSP/ SES Device Statistics - Page 2

Figure 3-8 shows Page 2 of the Reset SNA-DSP/SES Device Statistics viewed by entry number. Under the DSP Detailed Statistics on this page, all IN/OUT numbers under the Control Summary and Data Summary have been reset to zero.

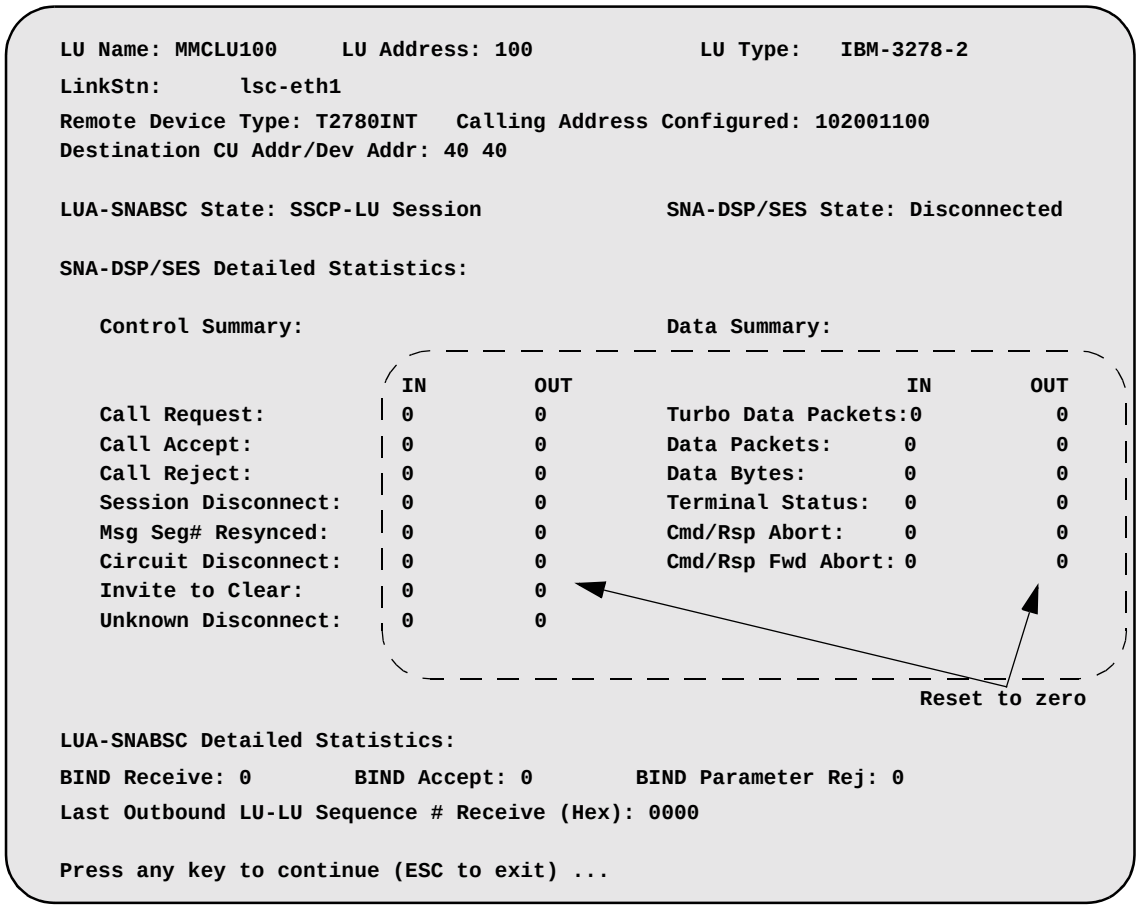


Figure 3-8. Page 2 of the Reset SNA-DSP/SES Device Statistics

Screen Terms

The screen terms are described in this table:

Term	*Description*
APPL Connected	Indicates the current status: • up: User Enabled connection • down: User Disabled connection
BIND Accept	Number of BINDs accepted
BIND Parameter Rej	Total number of BINDs rejected due to invalid parameters
BIND Receive	Total number of BINDs received from SNA Host
Call Request	Makes call connection
Call Accept	Accepts call
Call Reject	Rejects call
Circuit Disconnect	Logical Disconnect
Cmd/Rsp Abort	Abort command being received from or sent to DSP
Cmd/Rsp Fwd Abort	Abort command being received from or sent to DSP
Data Bytes	Total number of characters received from or sent to DSP
Invite to Clear	Request to clear
Link Station	Link Station type
Last Outbound LU-LU Sequence # Receive	Sequence number of the last RU received from the SNA Host
LU Address	This is the Logical Unit (LU) identification number
LU-LU Session	Indicates the current status: • up: Device is connected to the host application • down: Device is not connected to the host application
LU Model	Logical Unit Model number
LU Name	This is the name of the Logical Unit (LU)
Msg Seg# Resynced	Command to resync numbers
SSCP-LU Session	Indicates the current status: • up: Node is connected to the SSCP host • down: Node is not connected to the SSCP host
RU Summary	Request Unit Summary
RU	Request Unit
Session Disconnect	Disconnects from the network
Unknown Disconnect	Disconnects from the network

Appendix A
SNA Sense Codes

Overview

Introduction

This appendix provides descriptions for the SNA Sense Codes.

Error Codes from Networks and Remote Devices

Introduction

Error codes received by SNA/BSC Conversion from X.25 network or remote devices are displayed through alarms or sense codes sent to the SNA host in UNBIND command. There are four types of codes, three already implemented for X.25, and one from BSC3270-to-BSC2780 to SNABSC Conversion. Below are the codes (symbols):

- EE - Event Code (X.25)
- DD - Diagnostic Code (X.25)
- CC - Cause Code (X.25)
- SS - Specific Reason Code (BSC3270/BSC2780-to-SNABSC Conversion)

Alarms

The alarm displays the error code in the following format when there is disconnection from remote device:

Disconnection from DSP:

Nodename 27-JUN-2002 17:04 LU MMCLU002 DISC FROM DSP DEV (EE, DD, CC, SS)

Disconnection from SES:

Nodename 27-JUN-2002 17:04 LU MMCLU002 DISC FROM SES DEV (EE, DD, CC, SS)

Note

If SS's value is non-zero, then it has greater significance than DD and CC. Otherwise, DD and CC are the more significant code (even if either or both are 00).

SNA Sense Code in Inbound UNBIND

The following table describes SNA UNBIND command format with the sense code:

Code	*Description*
TH0 - TH5	Transmission Header
RH0 - RH2	Request/Response Header
RU0- x'32'	UNBIND Command
RU1- x'FD'	UNBIND Type ■ **Note** 'FD' is unique to Vanguard Managed Solutions. 'FD' is not documented in IBM's format manual.
RU2 - RU5	Sense Code

UNBIND Sense Code Format

The UNBIND can only be sent after a LU-LU session is established and where UNBIND (instead of LUSTAT, for example) is used to inform SNA Host of disconnection. Where UNBIND is not used, alarms (described above) must be used to determine the cause of disconnection or unsuccessful Call Request.

The sense code is formatted in inbound (to SNA Host) UNBIND command to indicate DSP or SES and any possible reason for disconnect from device.

Byte 0 (RU2)

- bits 0-3: always '0000'
- bits 4-7: always '1000'

Byte 1 (RU3)

- bits 0-3: always '1111'
- bits 0-1: '00' - from DSP
  '01' - from SES
- bits 2-3: '00' - Bytes 2-3 contain Specific Code
  '01' - Event is SASD*; byte 2 contains Diagnostic Code and byte 3 contains the Cause Code
  '10' - Event is SASCBB*; bytes 2 contains Diagnostic Code and bytes 3contains the Cause Code
  '11' - Event is SACD*; bytes 2 and bytes 3 are reserved

Bytes 2 - 3 (RU4 - RU5)

Specific Code or Diagnostic/Cause Code

Sense Code Summary

The following tables list the Sense Code Summary by DSP, SES and Event:

Code	*From*	*Event Description*
x'08F0 00SS'	DSP	SS = Specific Code
x'08F1 DDCC'	DSP	Event is SASD*; DD = Diagnostic Code; CC = Cause Code

Code	From	Event Description
x'08F2 DDCC'	DSP	Event is SASCBB*; DD = Diagnostic Code; CC = Cause Code
x'08F3 DDCC'	DSP	Event is SACD*
x'08F4 00SS'	SES	SS = Specific Code
x'08F5 DDCC	SES	Event is SASD*; DD = Diagnostic Code; CC= Cause Code
x'08F6 DDCC'	SES	Event is SASCBB*; DD = Diagnostic Code; CC = Cause Code

* Event Codes are described in the next section.

EE - Event Codes

Event Codes

The following table lists the Event Codes:

Code	*Description*
X'05' - SASD	Session Disconnect
X'06' - SASCBB	SASCBB- Session Reject
X'07' - SACD	Circuit Disconnect (DSP only)

Note

Details of Diagnostic, Cause, and Specific Reason code are described in this section.

DD - Diagnostic Code

Diagnostic Codes

The table below lists the Diagnostic Codes that are X.25 or network specific.

Code	*Description*
X'00'	Generic code; no additional information
X'01'	Invalid P(S)
X'02'	Invalid P(R)
X'10'	Generic code; packet type invalid
X'11'	Packet invalid in state R1
X'14'	Packet invalid in state P1
X'15'	Packet invalid in state P2
X'16'	Packet invalid in state P3
X'17'	Packet invalid in state P4
X'18'	Packet invalid in state P5
X'1B	Packet invalid in state D1
X'1D'	Packet invalid in state D3
X'20'	Generic code; packet not allowed
X'21'	Unidentifiable packet
X'22'	Call on logical one way channel
X'23'	Invalid packet on PVC
X'26'	Packet too short
X'27'	Packet too long
X'29'	Invalid bits in packet
X'2B'	Unauthorized interrupt conf
X'2C'	Unauthorized interrupt
X'30'	Generic code; timer expired
X'31'	Timer expired for incoming call
X'32'	Timer expired for clear
X'33'	Timer expired for reset
X'34'	Timer expired for restart
X'40'	Generic code; call set-up problem
X'41'	Facilities/region code not allowed
X'42'	Facilities/region parameter not allowed
X'43'	Bad called address
X'44'	Bad calling address
X'45'	Invalid facilities length

Code	Description
X'46'	Incoming call barred
X'47'	No logical channel available
X'48'	A call collision occurred
X'49'	Duplicate facility requested
X'4A'	Non-zero address length
X'4B'	Non-zero facility length
X'4C'	Facility not found when expected
X'51'	Improper cause code from DTE
X'53'	Inconsistent Q Bit setting
X'54'	NUI Problem (e.g. invalid NUI)
X'78'	Temporary routing problem

Network Specific

The table below lists the Diagnostic Codes that are network specific:

Code	Description
X'80'	Call limit reached on node that was not the destination
X'81'	Call limit reached on destination node
X'82'	No LCN's available on node that was not the call destination
X'83'	Call disconnected by the CTP
X'84'	Link failure in intermediate node
X'85'	Call passed through same node twice
X'86'	Call passed through too many nodes
X'9A'	(#) received a Restart at level 3
X'9C'	(#) Rx DISC at level 2.
X'9D'	(#) Rx DM at level 2.
X'9E'	(#) Rx SABM at level 2.
X'9F'	(#) Rx FRMR at level 2.
X'A0'	(#) Rx invalid N(r). Tx FRMR.
X'A1'	(#) Rx unsolicited F bit. Tx FRMR.
X'A2'	(#) Rx unknown command. Tx FRMR.
X'A3'	(#) Rx unknown response. Tx FRMR.
X'A4'	(#) Rx I field too long for L1. Tx FRMR.
X'A5'	(#) No response after N2 tries. Tx SABM.
X'AE'	(#) Rx frame of incorrect size. Tx FRMR.
X'AF'	(#) Address error, sent FRMR.

Code	Description
X'B0'	(#) Source port is in BusyOut state.
X'B1'	(#) Destination port is in BusyOut state.
X'B2'	(#) DCP reconnection attempt rejected. Do not retry
X'B3'	/* */
X'B4'	Cannot bring up a call when configuration is changing
X'B5'	NS Feature invalid configuration - during table boot.
X'B6'	(#) Call Request specified unacceptable resources
X'B8'	(#) NUI Database problem (busy, timeout, congestion)
X'B9'	Invalid Quality Of Service (QoS)
X'BA'	Clear Request from a Voice end-point
X'BB'	Call cleared by port configured for Redirection

CC - Cause Codes

Cause Codes

The table below lists the Cause Codes that are X.25 or network specific:

For Clear Indication

Code	*Description*
X'01'	Number busy
X'03'	Invalid facility request
X'05'	Network congestion
X'09'	Out of order
X'0B'	Access barred
X'0D'	Not obtainable
X'11'	Remote procedure error
X'13'	Local procedure error
X'15'	RPOA out of order
X'19'	Reverse charging acceptance not subscribed
X'21'	Incompatible destination
X'29'	Ship absent
X'3A'	(#) control port intervention

For Reset Indication

Code	*Description*
X'01'	Out of order (P)
X'03'	Remote procedure error
X'05'	Local procedure error
X'07'	Network congestion
X'09'	Remote DTE operational (P)
X'0F'	Network operational (P)
X'11'	Incompatible destination
X'1D'	Network out of order (P) / (P) -- may only be sent on PVCs

For Restart Indication

Code	Description
X'01'	Local procedure error
X'03'	Network congestion
X'07'	Network operational
X'7F'	Registration/cancellation confirmed

SS - Specific Code

DSP Specific Codes

The tables below show the SS - Specific Codes from DSP:

Device Status Error Received

Code	*Description*
x'01'	Received Device Status error

Poll Responses

Code	*Description*
x'10'	Invalid poll response
x'11'	Received ENQ in response to poll to term
x'12'	Received WACK to a poll

Timed Out or Disabled

Code	*Description*
x'20'	Timed out - no response from term to message
x'21'	Idle Device Timeout
x'22'	Device disabled
x'23'	Received RVI in response to Select
x'24'	Received EOT in response to text
x'25'	No response to Call Request
x'26'	No Call Request from TPAD

Receive Error

Code	*Description*
x'30'	Response error from term to message
x'31'	Receive error on first text from term
x'32'	Receive error on partial text from term
x'33'	Error on partial text from term
x'34'	Receive error on term response to message

Send Error

Code	Description
x'40'	Received NAK to message to term
x'41'	Received ENQ in response to message to term

Bad Acknowledgment

Code	Description
x'50'	Invalid ack0 from term to message
x'51'	Invalid ack1 from term to message
x'52'	Invalid response to message
x'53'	Invalid response to select

Disconnect Key Received

Code	Description
x'60'	Disconnect key in response to poll
x'61'	Disconnect key in response to select
x'62'	Disconnect key in response to message
x'63'	Disconnect key in response to ENQ

Disconnect from SNABSC

Code	Description
x'70'	Wrong SNA state
x'71'	Retry Call Request due to no packet
x'72'	Shutdown by Applications
x'73'	Cannot Call Request due to no socket connection

SES Specific Code

The tables below show the SS - Specific Codes from SES:

Timed Out - Waiting for ACK to Line Bid

Code	Description
x'01'	Timed out - no line bid ACK from local

Timed Out - Waiting for Something from Local

Code	*Description*
x'10'	Timed out - no partial text from local
x'11'	Timed out - no expected NAK from local due to bad BCC
x'12'	Timed out - no expected ACK from local
x'13'	Timed out - no expected ACK w/TID from local
x'14'	Timed out - no text from local
x'15'	Timed out - no ENQ (HID) from local
x'16'	Timed out - no response to Call Request
x'17'	Timed out - no Call Request from TPAD

Bad ACK0/ACK1 or NAK Sequence from Local

Code	*Description*
x'20'	Bad ACK0/ACK1 or NAK sequence from local

Unexpected EOT from Local

Code	*Description*
x'30'	Unexpected EOT from local
x'31'	Unexpected EOT from local
x'32'	Unexpected EOT received from local (EIA)
x'33'	Unexpected EOT from local

Received Error on Text from Local

Code	*Description*
x'40'	Received error on first text from local
x'41'	Received error on partial text from local

Disconnect from SNABSC

Code	*Description*
x'50'	Wrong SNA state
x'51'	Retry Call Request due to no packet
x'52'	Shutdown by Applications

Disconnect from SNABSC

Code	Description
x'53'	Cannot Call Request due to no socket connection

2780 PAD is Re-Initialized

Code	Description
x'60'	2780 PAD is re-initialized

Software Errors

Code	Description
x'C0'	Timed out - no expected NAK from local due to time out waiting for remote text
x'C1'	Unexpected DISC from remote (EIA)
x'C2'	Timed out - no text from remote
x'C3'	Timed out - no flow control clear from remote side
x'C4'	Timed out - no text ACK from remote
x'C5'	Excessive WACK ENQs from local; due to no text ACK from remote
x'C6'	Timed out - nothing from either direction
x'C7'	Received Session Bound from remote but local issued a disconnect request
x'C8'	Unexpected event waiting for ACK from remote
x'C9'	Timed out - no ACK (TID) from remote
x'CA'	Timed out - no ENQ (HID) from remote
x'CB'	Bad event - no ENQ (HID) from remote

Unknown Reason

Code	Description
x'FF'	Unknown reason

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