

# Vanguard Managed Solutions

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Vanguard Applications Ware  
SNA Feature Protocols

XDLC

# Notice

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## Overview

### Introduction

This manual targets people with extensive data communications experience, who can effectively monitor the operation of Vanguard products and make configuration adjustments when required.

This documentation covers hardware requirements, configuration for the XDLC option, operation instructions, and administration information.

### Alarms

For details about the alarms and reports for XDLC PAD Protocol, refer to the Vanguard Applications Ware Alarms and Reports Manual (Part Number T0005).

### About the XDLC Option

The X.25 Data Link Control (XDLC) PAD Port supports Secondary Synchronous Data Link Control (SDLC) Stations and MX25 Slave Stations on a single multidrop line and can be configured to run on nodes contained in Vanguard products. Check the Software Release Notice for your version of operating software for more details on platform support for the XDLC option.

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## Introduction

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### What is the XDLC PAD Protocol?

XDLC is a multipoint enhancement to Vanguard concentrator support of IBM SNA/SDLC devices (such as 4700 cluster controllers) and Vanguard products on the same multidrop line. This provides a migration path for typical banking customers who plan to replace their current Automatic Banking Machines (ABMs) with new PCs.

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### XDLC Components

The XDLC PAD Port has three major components:

- SDLC
- MX25
- PAD Link Procedures

The XDLC PAD Link operates under the framework of the SDLC and MX25 protocols.

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### SDLC Protocol

The SDLC Protocol component operates as an SDLC TPAID port and provides the same basic features as a Vanguard SNA/SDLC TPAID port:

- NCP Packet Switching Interface Support (NPSI)
- IBM QLLC Protocol Support

In addition to providing the functionality of an SDLC TPAID port, the XDLC PAD supports both Two-Way Alternate (TWA) and Two-Way Simultaneous (TWS) transmission modes.

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### MX25 Protocol

The MX25 component of the XDLC PAD Port contains the same basic features as the MX25 Master PAD Port and acts as an MX25 Master. MX25 extends traditional X.25 point-to-point line configurations into multipoint line configurations, which are similar to IBM SDLC multipoint configurations. The XDLC PAD also supports Non-Return-to-Zero Inverted (NRZI) transmission encoding.

Operating as a Master MX25 device, the MX25 component can communicate with several MX25 Slave devices on a single line. It is responsible for establishing, controlling, and disconnecting the data link with the Slaves.

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### PAD Link Procedures

The PAD link manages two procedures: Polling and Frame Handling.

#### Polling

The link polling component of the XDLC PAD Port combines the polling functionality that already exists in the SDLC PAD Port and the MX25 PAD Port into a single polling manager.

#### Frame Handling

Frames are handled in the same way by the SDLC or MX25 components of the XDLC port. The MX25 component of the XDLC PAD Port contains the same basic features as the MX25 Master PAD Port and acts as an MX25 Master.

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## Typical Application

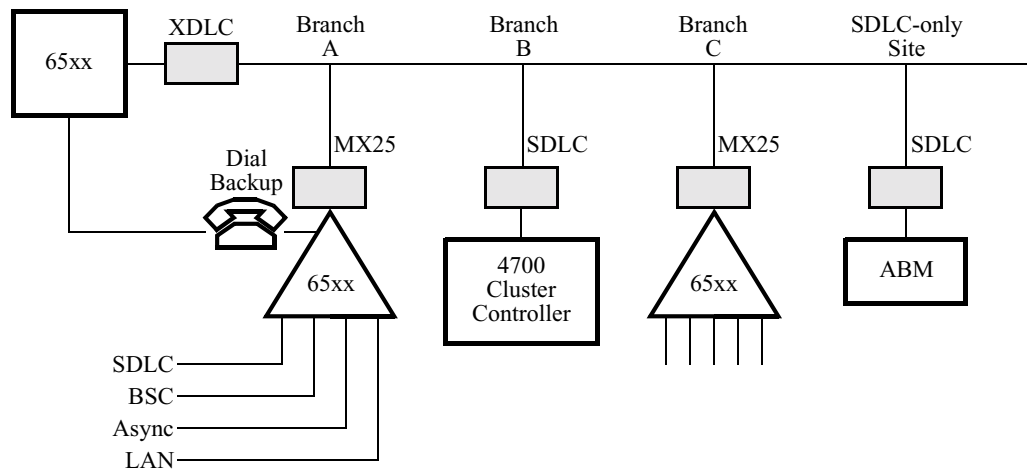
### Introduction

XDLC can be used with existing ABM equipment and also during the transition period if new PCs are added.

### Typical Configuration

Figure 1 illustrates a configuration that enables a Vanguard XDLC PAD to connect bank locations and stand-alone ABMs. Through a multipoint configuration, the ABMs connect their SDLC lines directly into the XDLC port. Using a similar setup, the bank locations connect their MX25 slave HDLC lines to the same XDLC port.

This configuration allows the XDLC port to act as an SDLC TPAD for the remote sites and as an MX25 Master for the bank locations. Both the ABMs and the SDLC devices that are connected to Vanguard SDLC TPAD ports at the bank location gain access to the host through the SDLC HPAD port at the host location.



**Figure 1. Typical Multipoint Configuration Using Vanguard XDLC PAD**

## Features

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### Introduction

XDLC PAD port features include:

- SDLC TPAD functionality
- MX25 Master PAD functionality
- IBM NPSI compatibility

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### Physical Line Characteristics

The physical line of the XDLC PAD Port has these characteristics:

- Clock speeds between 1200 bps and 80 kbps
- Internal or External Clock source
- Full-duplex physical line
- NRZ and NRZI transmission encoding
- TWA and TWS transmission mode

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### Hardware XDLC Supports

The XDLC PAD Port supports devices with secondary SDLC protocol interfaces and devices with MX25 Slave Station interfaces, including:

- IBM 4701 Finance Communication Controllers
- IBM 3274 or 3174 SNA/SDLC Controllers
- IBM 3276 SNA/SDLC Display Stations
- IBM 3767 Communication Terminals
- IBM Application System/400s
- IBM System 36
- Vanguard products

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### Software

The XDLC PAD Port has these software characteristics:

- Up to 32 drops per line and up to 256 drops per node
  - Non-Return to Zero (NRZ) and Non-Return to Zero Inverted (NRZI) transmission encoding
  - Two-Way Alternate (TWA) and Two-Way Simultaneous (TWS) transmission mode
  - Request Initialization Mode (RIM) and Set Initialization Mode (SIM) frames not supported
  - Modulo 8 sequencing
  - Primary-to-secondary Qualified Logical Link Control (QLLC) for SDLC devices
-

# Configuration Sequence

## Introduction

This section describes the records you must configure to implement XDLC.

## XDLC Configuration

You must configure the following to implement the XDLC protocol option:

- XDLC Port Record.
- XDLC Port Stations Record, with a station type of either SLDC or MX25.
- Transmission Encoding parameter in the MX25 Port Record for NRZI support.
- HPAD Poll Response Delay Parameter in the SDLC HPAD Port Record to compensate for possible performance limitations of the host.

## NRZI Support for MX25

This release combines the functions of the Multipoint X.25 Master Port and the SNA/SDLC TPAD into a single port (XDLC). To make the transmission encoding for the two protocols compatible, NRZI support is required for the existing MX25 software. As a result of this implementation, MX25 slave ports that are connected to the XDLC port must also support NRZI.

### Transmission Encoding Parameter in MX25 Port Record

This parameter appears on the screen following Port Control in the MX25 Port Record. Refer to the MX.25 Protocol document in the Multi-Service Feature Protocols Manual (T0103).

When you configure the MX25 port record, set the this parameter Transmission Encoding to specify the method of transmission encoding:

### Transmission Encoding

Range	NRZ, NRZI
Default	NRZ
Description	Indicates the data encoding used for this XDLC link. <ul style="list-style-type: none"> <li>• NRZ: Non-Return-to-Zero (encoding)</li> <li>• NRZI: Non-Return-to-Zero Inverted (encoding)</li> </ul>



**SDLC HPAD Poll  
Response Delay**

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To compensate for possible performance limitations of the host, the HPAD Response Delay parameter provides a 100 msec delay to the poll response from the SDLC HPAD, after the HPAD receives a poll from the host.

**HPAD Response Delay Parameter in the SDLC HPAD Port Record**

This parameter appears on the screen following Transmission Type in the SDLC HPAD Port Record. Refer to the SDLC Feature Protocols Manual (T0102-05).

When you are configuring the SDLC HPAD port, set the following parameter in order to specify the desired response delay:

**HPAD Response Delay**

Range	0, 50, 100, 150, 200 ms
Default	0
Description	Selecting the default value of zero eliminates the delay period and has no impact on performance.

## Configuring the XDLC Port Record

### Introduction

This section describes procedures used to configure the XDLC protocol option, including how to navigate through the Control Terminal Port (CTP) Main menu and access the XDLC port record.

#### ■ Note

For more detail about CTP procedures, refer to the Vanguard Configuration Basics Manual (T0113).

### Function

The XDLC Port Record defines information about the XDLC PAD Port.

### Access and Configure XDLC Port

Follow these steps to access and configure an XDLC Port Record.

<b>Step</b>	<b>Action</b>	<b>Result</b>
<b>1</b>	Select <b>Configure</b> , from the CTP Main menu.	The Configure menu appears.
<b>2</b>	Select <b>Port</b> , from the Configure menu, and enter a port number.	The Port Number first parameter appears.
<b>3</b>	Enter the number of the port and then <b>&lt;CR&gt;</b> .	The Port Type parameter appears.
<b>4</b>	Enter <b>XDLC</b> and then <b>&lt;CR&gt;</b> .	Parameters for an XDLC Port type appear, beginning with Port Control. For details on parameters, see “Description of XDLC Port Parameters” section on page 8.
<b>5</b>	Enter a semicolon <b>&lt;;&gt;</b> once you have entered values for all parameters.	The record is saved.

## Description of XDLC Port Parameters

### Introduction

This section details the XDLC Port parameters.

Parameters identified by an asterisk require that a Node boot be performed for changes to the parameter to take effect.

#### ■ Note

If you have enabled Ease of Configuration, you need to boot only the port to make changes to the parameters marked with an asterisk. For more information, refer to the Ease of Configuration section in the introductory portion of the binder (*SNA Feature Protocols Manual*, Part Number T0101).

### Port Number

Range	1 to 54
Default	1
Description	<p>The number of the port you are configuring. This number corresponds to the physical port position at the rear of the unit and is the Port Record reference number.</p> <p>■ Note In Vanguard software releases prior to Release 3.0, the Port Number parameter ranges from 1 to 48.</p>

### \*Port Type

Range	X.25, XDLC
Default	X.25
Description	<p>The type of port you are configuring.</p> <p>■ Note A Node Boot is required for any changes to this parameter to take effect.</p>

### Port Control

Range	NONE, MB
Default	NONE
Description	<p>Specifies one of the following port control options:</p> <ul style="list-style-type: none"> <li>• NONE: No option specified.</li> <li>• MB: Raises Pin 22 when the port becomes disabled.</li> <li>• RTS_MON: Increments the Frame Error statistics only when RTS is high.</li> </ul>

**Transmission Encoding**

Range	NRZ, NRZI
Default	NRZ
Description	Indicates the data encoding used for this XDLC link. <ul style="list-style-type: none"> <li>• NRZ: Non-return-to-zero (encoding)</li> <li>• NRZI: Non-return-to-zero Inverted (encoding)</li> </ul>

**Type of Line**

Range	FDX
Default	FDX
Description	Indicates that full-duplex signals are being generated.

**Transmission Type**

Range	TWS, TWA
Default	TWA
Description	The transmission mode that is used on the line. <ul style="list-style-type: none"> <li>• TWS: Two-Way Simultaneous</li> <li>• TWA: Two-Way Alternate</li> </ul>

**Clock Source**

Range	EXT, INT
Default	EXT
Description	<ul style="list-style-type: none"> <li>• EXT: External clock source is used.</li> <li>• INT: Internal clock source is used.</li> </ul>

**Clock Speed**

Range:	1200 to 38400
Default:	9600
Description:	When internal clocking is used, this parameter determines the port speed in bps.

**\*Number of Stations**

Range	1 to 64
Default	4
Description	<p>The number of XDLC stations on the line. This number includes MX25 slave stations and SDLC controllers (PU TYPE 1 or PU TYPE 2 devices). The maximum number of XDLC stations on a port is 32. This can be any combination of MX25 slave stations and SDLC stations, all MX25 stations, or all SDLC stations.</p> <p>■ <b>Note</b> A Node Boot is required for any changes to this parameter to take effect.</p>

**Poll Timer**

Range	1 to 255
Default	30
Description	Sets the amount of time, in 10ths of seconds (30 = 3.0 seconds), that the master waits for a slave to respond to a poll frame.

**Poll Frequency Period**

Range	50 to 250
Default	50
Description	Sets the maximum speed, (in milliseconds) at which the Vanguard polls the slaves when no data is being exchanged.

**Tries**

Range	1 to 16
Default	10
Description	Indicates the maximum number of attempts to complete a transmission.

**XDLC Port Options**

Range	NONE
Default	NONE
Description	NONE: There are currently no options available.

**Port Address**

Range	0 to 15 decimal digits
Default	(blank)
Description	This address is inserted into the calling address field when an XDLC port makes a call.

**Restart Timer**

Range	5 to 255
Default	180
Description	Sets the time, in seconds before the request for restart is sent again <b>■ Note</b> This parameter is for the MX25 protocol component only.

**Reset Timer**

Range	5 to 255
Default	180
Description	The time, in seconds, before the request for reset is sent again. <b>■ Note</b> This parameter is for the MX25 protocol component only.

**Call Timer**

Range	5 to 255
Default	200
Description	The amount of time, in seconds, before a call request is cleared. <b>■ Note</b> This parameter is for the MX25 protocol component only.

**Clear Timer**

Range	5 to 255
Default	180
Description	The time, in seconds, before the clear request is sent again. <b>■ Note</b> This parameter is for the MX25 protocol component only.

### Maximum Frame Size

Range:	1024, 4096
Default:	1024
Description:	<p>The maximum size (in bytes) of a frame, excluding the frame header and CRC for SDLC frames.</p> <p>■ <b>Note</b> This parameter is not effective on MX.25 type stations.</p>

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## Configuring the XDLC Port Stations Record

### Introduction

The XDLC Station Record is used to provide information about the Stations attached to an XDLC PAD Port.

### Access and Configure XDLC Port Station Record

Follow these steps to access and configure an XDLC Port Stations Record.

<b>Step</b>	<b>Action</b>	<b>Result</b>
<b>1</b>	Select <b>Configure</b> , from the CTP Main menu.	The Configure menu appears.
<b>2</b>	Select <b>XDLC Port Stations</b> , from the Configure menu.	The Port Number parameter appears.
<b>3</b>	Enter the number of the port to which the station is assigned and then <b>&lt;CR&gt;</b> .	The Station Number parameter appears.
<b>4</b>	Enter the number of the station you are configuring and then <b>&lt;CR&gt;</b> .	The Station Type parameter appears and you are prompted to enter MX25 or SDLC.
<b>5</b>	<b>IF...</b>	<b>THEN...</b>
	You want to use a station type of MX25, enter <b>MX25</b> .	Parameters for an MX25 station type appear, beginning with Station Address.
	You want to use a station type of SDLC, enter <b>SDLC</b> .	Parameters for an SDLC station type appear, beginning with Station Address.
<b>6</b>	Enter a semicolon <;> once you have entered values for all parameters.	The record is saved.



## Description of XDLC Port Stations Parameters

### Parameters

These are the XDLC Port Stations parameters.

#### Port Number

Range	1 to 54
Default	1
Description	The number of the XDLC port that you are connecting to.

#### Station Number

Range	1 to n (where n = the number of stations configured in the port record).
Default	1
Description	The Station Number of the station you are configuring on the multidrop line.

#### Station Type

Range	MX25, SDLC
Default	MX25
Description	The Station Type (MX25 slave station or SDLC controller).

### Parameters for an SDLC Station Type

If you select a station type of SDLC, the following configuration parameters appear that provide information about the stations attached to an XDLC PAD Port.

#### ■Note

The station type can be changed without booting the port or the node; however, a Station Boot must be performed to make the change come into effect. A Station Boot does not disrupt the operation of any other stations.

#### Station Address

Range	01 to FE hexadecimal
Default	01
Description	The Station Address of the station that you are configuring (e.g., Station #1 is 01, Station #2 is 02, etc.).

**K Frame Window**

Range	1 to 7
Default	7
Description	Enter the same value of Frame Level Window for devices at each end of the link.

**Autocall Mnemonic**

Range	0 to 8 alphanumeric characters
Default	blank (Use the space bar to blank the field.)
Description	Identifies the remote address that is called when polling activity for an SDLC station is detected on the XDLC line. You must configure Autocall Mnemonic on the node containing the XDLC port that is originating the call.

**Protocol ID**

Range	1 to 8 hexadecimal
Default	C3000000
Description	The first four bytes of the Call User Data comprise the protocol ID. If not configured, the PAD uses C3000000 as the protocol ID in the call.

**CUG Membership**

Range	0 to 8 two digit numbers
Default	--,--,--,--,--,--,--
Description	A station may be a member of up to 8 different Closed User Groups (CUGs). Each CUG membership must be a two-digit number. Separate each two-digit number with a comma (i.e., 12,35,56, etc.). No spaces are permitted between the comma and the next number. -- = no CUG membership; 00-99 = valid CUG membership

### QLLC Options

Range:	NONE, CUG, QRRs, XIDs, XID3, DISCs, RNRs
Default:	NONE
Description:	<p>The options, for this XDLC station, are:</p> <ul style="list-style-type: none"> <li>• NONE: No option specified.</li> <li>• CUG: This option (Check Closed User Group) filters incoming calls, and inserts the Closed User Group facility in outgoing calls.</li> <li>• QRRs:QLLC Primary (HPAD) sends QRR after QLLC link comes up.</li> <li>• XIDs: Causes the XID parameter defined below to be used for XID exchange. If this setting is not used, the XID parameter (next in sequence) is ignored. The TPAD transparently passes the XID supplied by the controller.</li> <li>• XID3: Pass XID transparently between HPAD and TPAD. Allows for PU2.1/XID exchange. This parameter should not be set if XID option is selected.</li> <li>• DISCs: TPAD sends a DISC frame when station goes down. The DISC may be retransmitted up to Tries times, if the Cluster Controller does not respond, before sending an SNRM.</li> <li>• RNRs: Receiver Not Ready option. In NRM, TPAD initially polls with RNR until a data packet or QRR is received by the QLLC station on the TPAD side.</li> </ul> <p>■ <b>Note</b> QRRs, XIDs, and XID3 are SDLC terms. Refer to your SDLC documentation for more information about these options.</p>

### XID

Range	0 to 14 hexadecimal
Default	(blank)
Description	With this option selected, the TPAD's response to a QXID contains the "XID" identification parameter value defined in this parameter. Selecting this option overrides the function of exchanging identifications with the cluster controller.

**Station Subaddress**

Range	0 to 3 decimal digits
Default	(blank)
Description	The station subaddress on the multidrop lines. This is used to build the calling address for the Call Packet. The calling subaddress is appended to the port address to create the calling address in the autocal generated.

**Billing Records**

Range	OFF, ON
Default	OFF
Description	<ul style="list-style-type: none"> <li>• OFF: Billing records are not created.</li> <li>• ON: Billing records are created.</li> </ul>

**MX25 Station Parameters**

If you select MX25 for the Station Record, you are prompted for the following parameters.

The MX25 Station Record provide information about the Slave Stations attached to an XDLC PAD Port:

**Station Address**

Range	04 to FE hexadecimal
Default	04
Description	The Station Address on the multidrop line. Begin with hexadecimal 04 when assigning station names (e.g., Station #1 is 04, Station #2 is 05, etc.).

**PVC Channels**

Range	0 to 128
Default	0
Description	<p>Specifies the number of logical channels used for Permanent Virtual Circuits (PVCs). The total number of PVC and SVC channels on a link should be kept to a minimum to conserve bandwidth and node resources. PVC connections must be configured in the PVC table.</p> <p><b>■ Note</b> A Node Boot is required for any changes to this parameter to take effect.</p>

### Starting PVC Channel Number

Range	1 to 255
Default	1
Description	<p>The starting logical channel number for the PVCs on this link. This parameter is not used if the number of PVCs is set to 0.</p> <p><b>■ Note</b> A Node Boot is required for any changes to this parameter to take effect.</p>

### Number of SVC Channels

Range	0 to 255
Default	16
Description	<p>Number of logical channels used in Switched Virtual Circuits (SVCs). The total number of PVC and SVC channels on a link should be kept to a minimum to conserve bandwidth and node resources.</p> <p><b>■ Note</b> A Node Boot is required for any changes to this parameter to take effect.</p>

### Starting SVC Channel Number

Range	0 to 255
Default	1
Description	<p>The starting logical channel number for the Switched Virtual Circuits (SVCs) on this link. Note that this number is not used if the number of SVCs is set to 0.</p> <p><b>■ Note</b> A Node Boot is required for any changes to this parameter to take effect.</p>

### K Frame Window

Range	1 to 7
Default	7
Description	<p>Enter the K frame level window size. This parameter value must be set to the same value for devices at each end of the link.</p>

**Packet Window**

Range	1 to 7
Default	2
Description	Enter the W packet level window size. This parameter value must be set to the same value for devices at each end of the link.

**MX25**

Range	NONE, INL, HOLD, CUG
Default	NONE
Description	<ul style="list-style-type: none"> <li>• NONE: No option specified.</li> <li>• INL: Inter-node Link specifies that the link goes to another Vanguard.</li> <li>• HOLD: Hold calls over link restart.</li> <li>• CUG: Check Closed User Group; otherwise, CUG passes transparently.</li> </ul> <p>■ <b>Note</b> Any combination of the above parameters may be specified by summing: HOLD + CUG +.....</p>

**Restricted Connection Destination**

Range	0 to 32 alphanumeric characters
Default	(blank)
Description	<p>All calls originating from this port are routed to the destination specified in this parameter, irrespective of route selection table entries. For example, to route calls to Port 1, use P1. To route calls to P1, Station 4, use P1S4.</p> <p>■ <b>Note</b> A blank disables this function.</p>

### CUG Membership

Range	--,--,--,--,--,--,--
Default	0 to 8 two-digit numbers
Description	A station may be a member of up to 8 different Closed User Groups (CUGs). Each CUG membership must be a two-digit number. Separate each two-digit number with a comma (i.e., 12,35,56, etc.). No spaces are permitted between the comma and the next number. -- = no CUG membership; 00-99 = valid CUG membership.

### Billing Records

Range	OFF, ON
Default	OFF
Description	<ul style="list-style-type: none"> <li>• OFF: Billing records are not created.</li> <li>• ON: Billing records are created</li> </ul>

### Data Queue Upper Threshold

Range	5 to 15
Default	5
Description	The maximum number of data packets a channel on this port queues for transmission before invoking flow control to the attached channel.

### Data Queue Lower Threshold

Range	0 to 4
Default	0
Description	The number of data packets a channel on this port has queued for transmission when it releases flow control to the attached channel.

## Statistics

### Introduction

This section describes the Vanguard statistics used with XDLC. Other Vanguard statistics are described the Vanguard Configuration Basics Manual. You can use the information displayed on the screen to monitor the operation of a node.

### Detailed Port Statistics

Detailed Port Statistics provide status reports about various operations of an XDLC port.

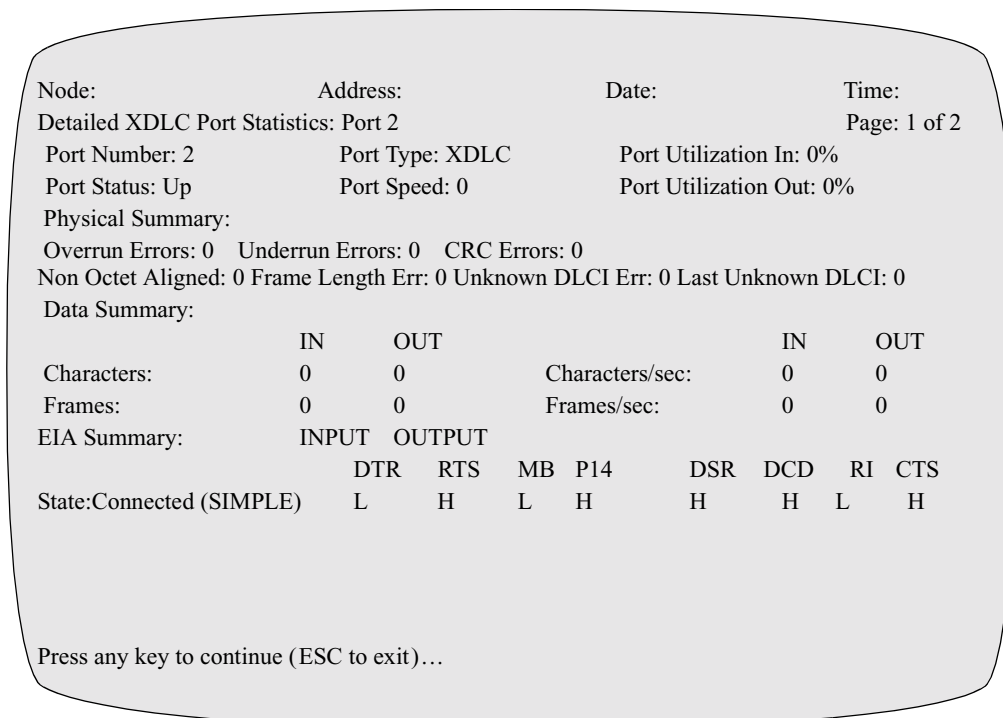
### Access Detailed Port Statistics

Perform this procedure to see the Detailed XDLC Port Statistics:

Step	Action	Result
1	Select Status/Statistics, from the CTP Main menu.	The Status/Statistics menu appears.
2	Select Detailed Port Stats.	You are prompted to specify a particular port type.
3	Specify a port type of XDLC.	A series of screens appears.
4	Scroll through a series of screens for one port.	You are prompted to display the detailed port statistics for the next port.

### Detailed XDLC Port Statistics

Figure 2 and Figure 3 shows pages 1 and 2 of Detailed XDLC port statistics screens.



**Figure 2. Detailed XDLC Port Statistics - Page 1 of 2**



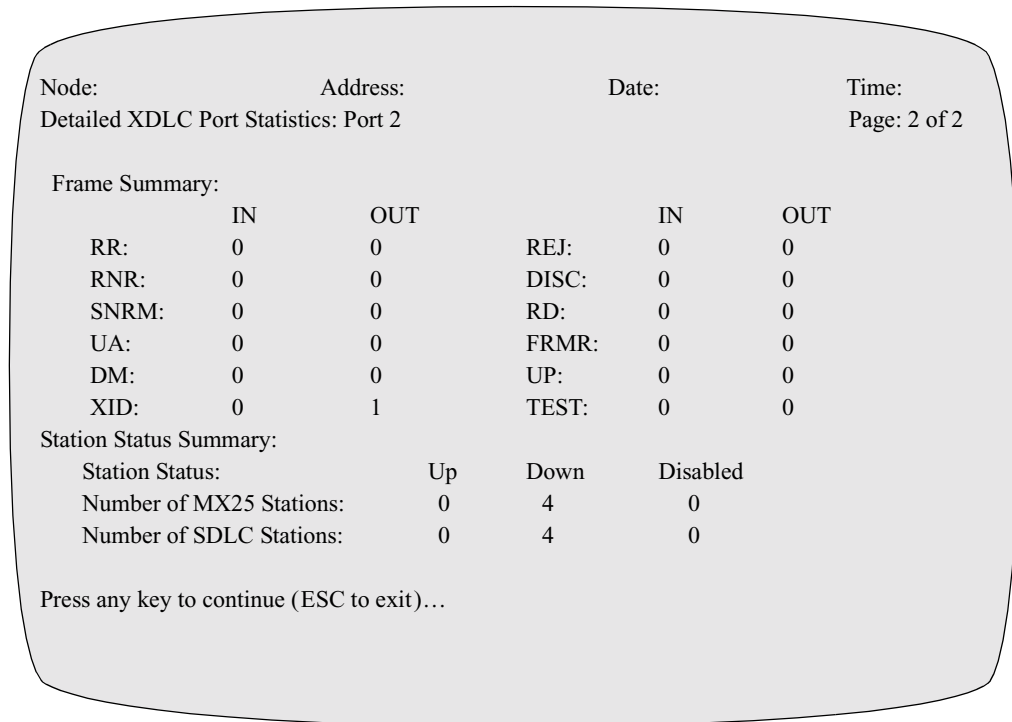


Figure 3. Detailed XDLC Port Statistics - Page 2 of 2

**Port Statistics Information**

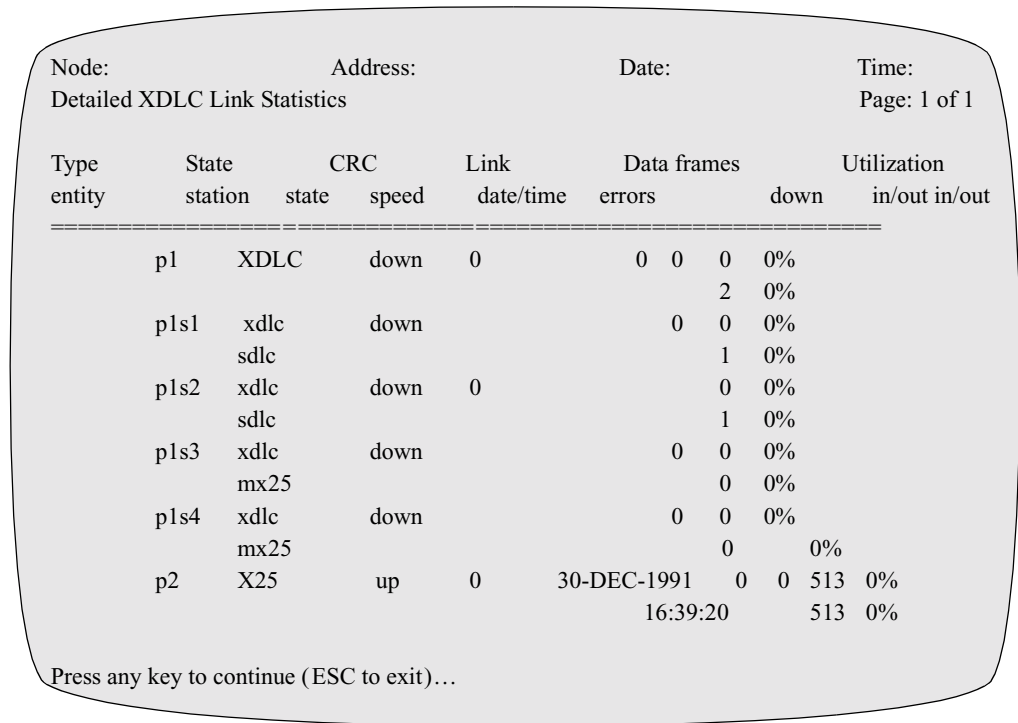
Detailed XDLC Port Statistics screens contain the following information:

Screen term	Description
Port Number	Specifies a specific port (physical port number) in the node.
Port Type	Indicates the type of access protocol for this port. The screen shown in Figure 2 displays XDLC, indicating that this port is accessed by SDLC and HDLC protocols.
Port Utilization	Indicates a percentage of the port resources that are currently in use in both the IN (from the line to the port) and OUT (from the port to the line) directions.
Port Status	Specifies the current port status. <ul style="list-style-type: none"> <li>Up: At least one station is responding to polls.</li> <li>Down: None of the stations are responding to polls.</li> <li>Disabled: The port is disabled by the user.</li> </ul>
Port Speed	The measured port speed in bits per second.

<b>Screen term</b>	<b>Description (continued)</b>
Physical Summary	<ul style="list-style-type: none"> <li>• Overrun Errors: Total number of overrun errors counted by the I/O driver.</li> <li>• Underrun Errors: Total number of underrun errors counted by the I/O driver.</li> <li>• CRC Errors: Indicates the number of errors detected by Cyclic Redundancy Check (CRC) since last node boot or reset of statistics. Indicates that a frame received contains one or more corrupted bits</li> <li>• Non-Octet Aligned: Indicates an invalid frame that is not divisible by eight.</li> <li>• Frame Length Errors: Indicates the number of frames received with length less than five characters.</li> <li>• Unknown DLCI Err: Indicates the number of frames received with DLCI for which no station is configured.</li> <li>• Last Unknown DLCI: Indicates the last unknown DLCI received in a frame.</li> </ul>
Data Summary	<ul style="list-style-type: none"> <li>• Characters: Total number of characters processed until now, not including header characters.</li> </ul> <p><b>■ Note</b> SDLC frames contain a frame header; MX25 frames contain a frame header and a packet header.</p> <ul style="list-style-type: none"> <li>• Frames: Total number of MX25 and SDLC frames processed until now.</li> <li>• Characters/sec: The average number of characters received or transmitted per second.</li> <li>• Frames/sec: The average number of frames received or transmitted per second.</li> </ul>
EIA Summary	<p>Indicates the current status of RS232 control leads. State: Always connected in the SIMPLE mode.</p>
Frame Summary	<p>Indicates the total number of each type of frame processed.</p>
Station Status Summary	<p>Station Status: Summary of the current status of the MX25 and SDLC stations. The number of stations in each category is displayed.</p>

**Link Statistics**

Statistics for communication links can be viewed by selecting Detailed Link Statistics from the statistics menu. See Figure 4.



**Figure 4. Detailed XDLC Link Statistics**

**Link Statistics Information**

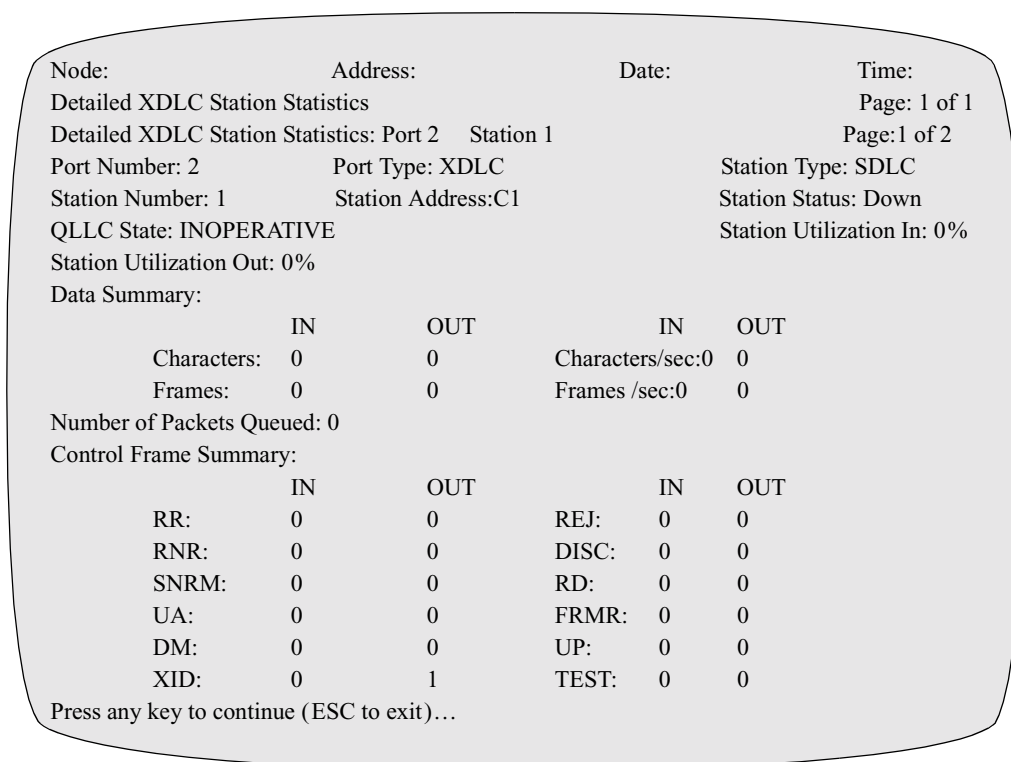
Detailed XDLC Link Statistics contain the following information:

Screen term	Description
Entity	Refers to the physical port and station number in the following format: p<port#>s<station#> where p = port and s = station.
Type/Station	Indicates XDLC port type and station type, which can be either MX25 or SDLC.
State	Specifies the current port status. <ul style="list-style-type: none"> <li>Up: At least one station is responding to polls.</li> <li>Down: None of the stations are responding to polls.</li> <li>Disabled: The port is disabled by the user.</li> </ul>
Speed	Measured port speed in bits per second.
Date/Time	The date and time when the link entered the current state. Blank space indicates that no state changes have occurred.

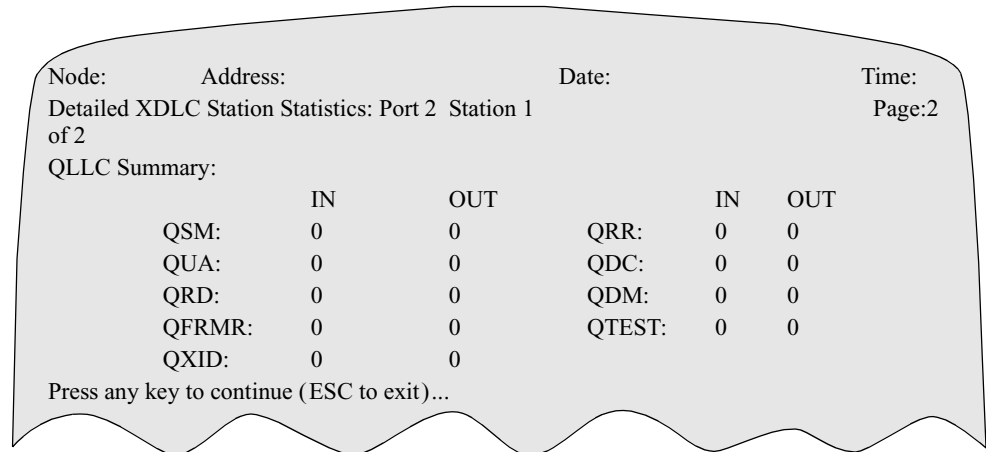
<b>Screen term</b>	<b>Description (continued)</b>
CRC Errors	Total number of CRC errors detected until now.
Link down	Total number of times the link has made a transition from the UP state to the DOWN state.
Data frames	Total number of data frames processed up to this time.
Utilization	Indicates a percentage of the link resources currently in use in both the IN (from the line to the port) and OUT (from the port to the line) directions.

**XDLC Station Statistics**

Statistics for XDLC Stations can be viewed by selecting Detailed XDLC Station Statistics from the Statistics menu. Refer to Figure 5 and Figure 6 for examples of the information that is displayed.



**Figure 5. Statistics - Page 1 of 2**



**Figure 6. Detailed XDLC Station Statistics - Page 2 of 2**

**XDLC Station Information**

Detailed XDLC Station Statistics contain this information:

<b>Screen term</b>	<b>Description</b>
Port Number	Refers to the physical port number.
Port Type	Always displays XDLC, indicating that this port is accessed by SDLC and HDLC protocols.
Station Type	Indicates SDLC for SDLC Station types.
Station Number	Station reference number.
Station Address	Configured Station address.
Station Status	Indicates the current operational status of the station: <ul style="list-style-type: none"> <li>• UP: Station is responding to polls.</li> <li>• DOWN: Station is not responding to polls.</li> <li>• Disabled: Station is disabled by the user.</li> </ul>
QLLC State	Indicates the status of the QLLC layer: <ul style="list-style-type: none"> <li>• INOPERATIVE: No connection exists with the station.</li> <li>• CLOSED: Call connected.</li> <li>• OPENING: Setting up session.</li> <li>• OPENED: Ready for operation.</li> <li>• CLOSING: Disconnect in process.</li> </ul>
Station Utilization	Indicates the percentage of station resources currently in use in both IN (from the line to the port) and OUT (from the port to the line) directions.

<b>Screen term</b>	<b>Description (continued)</b>
Data Summary	<ul style="list-style-type: none"> <li>• Characters: Total number of characters processed until now, not including frame characters.</li> <li>• Frames: Total number of frames processed.</li> <li>• Number of Packets Queued: Total number of packets queued at the SDLC protocol layer.</li> <li>• Characters/sec: The average number of characters received or transmitted per second during the previous minute.</li> <li>• Frames/sec: The average number of frames received or transmitted per second during the previous minute.</li> </ul>
Control Frame Summary	Total number of frames currently processed; listed by frame types.
QLLC Summary	Total number of QLLC packets processed until now, listed by packet type.

■ **Note**

All counters are 32 bits in size, and restart from 0 after the maximum count is reached. An alert message is generated to inform you of the overflow condition.

**MX25 Station Statistics**

Statistics for MX25 Stations can be viewed by selecting Detailed MX25 Station Statistics from the Statistics menu. Refer to Figures 7 to 10 for examples of the information that is displayed.

```

Node:                               Address:                               Date:                               Time:
Detailed XDLC Station Statistics: Port 2  Station 1                               Page:1 of 4
Port Number: 2                       Port Type: XDLC                               Station Type: MX25
Station Number: 1                     Station Address: 04                           Station Status: Down
Port Speed: 0                         Station State: Link Setup                     Station Utilization In: 0%
                                                    Station Utilization Out: 0%

Call Summary:

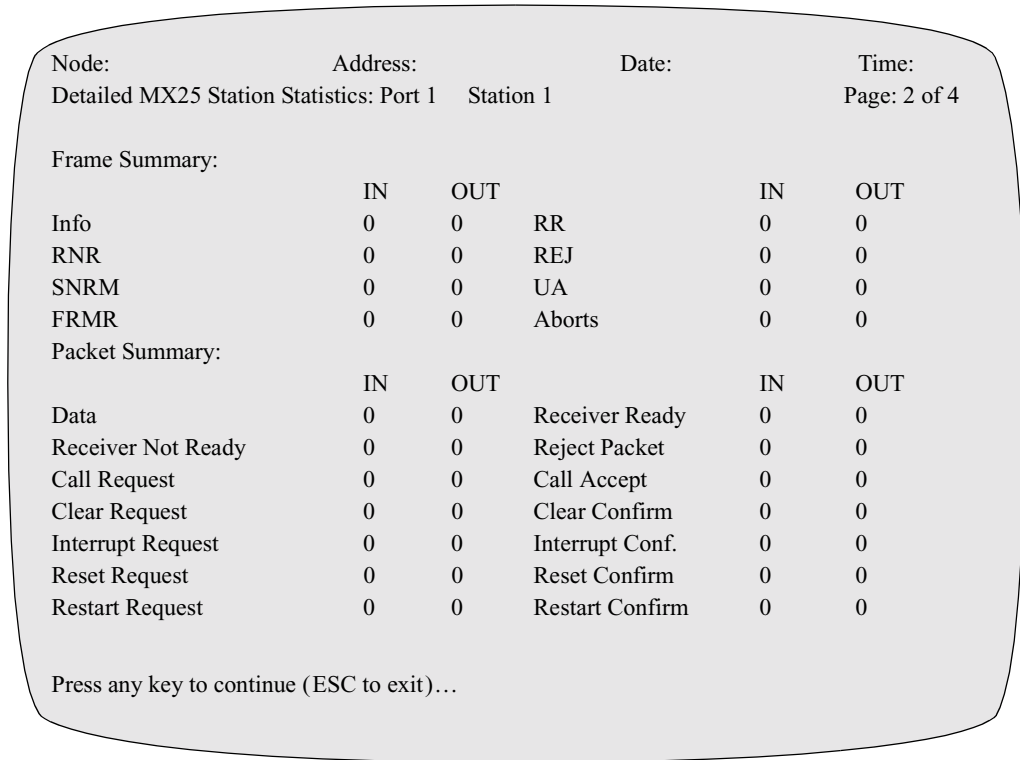
                SVC                PVC
Maximum:        0                   0
Current:        0                   0

Data Summary:

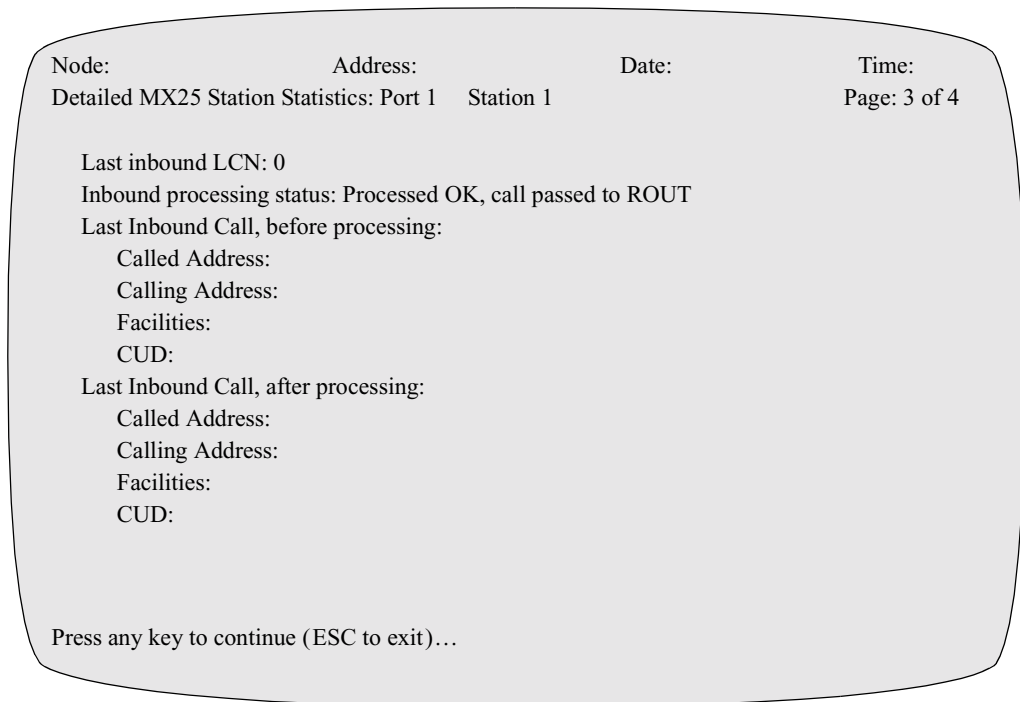
                IN                OUT                IN                OUT
Characters:    12713984           0                 Characters/sec:  0                 0
Packets:       0                  0                 Packets/sec:     0                 0
Frames:        0                  1                 Frames/sec:      0                 0
Number of Packets Queued: 0

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

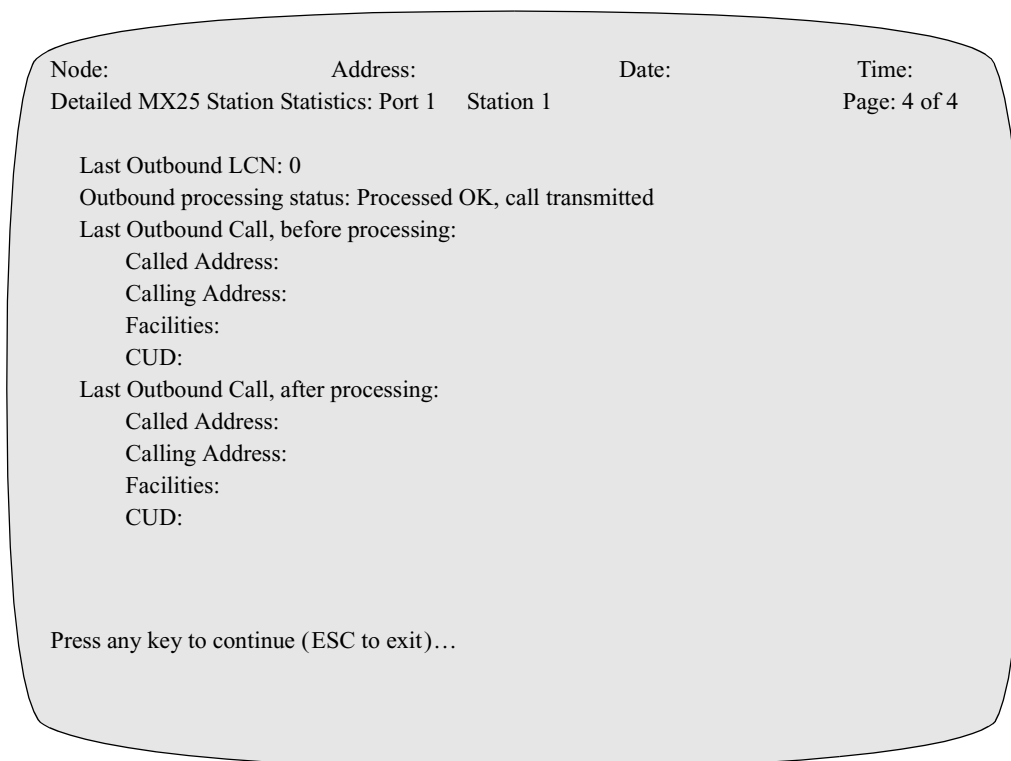
**Figure 7. MX25 Station Statistics Screen—Page 1 of 4**



**Figure 8. MX25 Station Statistics Screen—Page 2 of 4**



**Figure 9. MX25 Station Statistics Screen —Page 3 of 4**



**Figure 10. MX25 Station Statistics Screen —Page 4 of 4**

**X25 Station Information**

Detailed X25 Station Statistics contain this information:

<b>Screen term</b>	<b>Description</b>
Port Number	Refers to the physical port number.
Port Type:	Always displays XDLC indicating that this port is accessed by SDLC and HDLC protocols.
Station Type:	Indicates MX25 for MX25 station types.
Station Number	Station reference number.
Station Address	Configured station address.
Station Status	Indicates the current operational status of the station: <ul style="list-style-type: none"> <li>• Up: Station is responding to polls.</li> <li>• Down: Station is not responding to polls.</li> <li>• Disabled: Station is disabled by the user.</li> </ul>
Port Speed	Measured port speed.



<b>Screen term</b>	<b>Description (continued)</b>
Station State	Indicates the current link status of the station: <ul style="list-style-type: none"> <li>• Link Setup: Setting up the link.</li> <li>• NWake: Station has not responded to a poll but is still up.</li> <li>• Normal: Station is responding to polls.</li> <li>• Send Reject: Waiting for recovery after rejecting an invalid frame.</li> </ul>
Station Utilization	Indicates the percentage of current available station utilization in both IN (from the line to the port) and OUT (from the port to the line) directions.
Call Summary	<ul style="list-style-type: none"> <li>• Maximum: The maximum number SVC and PVC channels used by this station.</li> <li>• Current: Number of SVC and PVC channels currently in use.</li> </ul>
Data Summary	<ul style="list-style-type: none"> <li>• Characters: Total number of characters processed until now, not including frame and packet headers.</li> <li>• Frames: Total number of frames processed until now.</li> <li>• Packets: Total number of data packets passed through the station.</li> <li>• Number of Packets Queued: Total number of packets queued at the MX25 protocol layer.</li> <li>• Characters/sec: The average number of characters received or transmitted per second during the previous minute.</li> <li>• Frames/sec: The average number of frames received or transmitted per second during the previous minute.</li> <li>• Packets/sec: The average number of packets received or transmitted per second during the previous minute.</li> </ul>
Frame Summary	Total number of processed frames listed by frame type.
Packet Summary	Total number of processed packets listed by packet type.
Last inbound LCN	Channel number of last inbound call.
Inbound processing status	<ul style="list-style-type: none"> <li>• Success: Message has been sent through the network successfully.</li> <li>• Process OK, call passed to ROUTE: Inbound call has been processed and passed on to Route and is being processed.</li> <li>• Failed processing, call cleared: Inbound message was processed, but failed for some reason, and the call has been cleared.</li> </ul>
Last Inbound Call (before processing)	<ul style="list-style-type: none"> <li>• Called Address: The X.25 address that was called.</li> <li>• Calling Address: The X.25 address that initiated the call.</li> <li>• Facilities: The facilities that were requested in the most recent call request packet.</li> <li>• CUD: Call User Data contains end-user or routing information specific to the network.</li> </ul>

<b>Screen term</b>	<b>Description (continued)</b>
Last Inbound Call (after processing)	<ul style="list-style-type: none"> <li>• Called Address: The X.25 address that was called.</li> <li>• Calling Address: The X.25 address that initiated the call.</li> <li>• Facilities: The facilities that were requested in the most recent call request packet.</li> <li>• CUD: Call User Data contains end-user or routing information specific to the network.</li> </ul>
Last outbound LCN	Channel number of last outbound call.
Outbound processing status	<ul style="list-style-type: none"> <li>• Success: Message has been sent through the network successfully.</li> <li>• Process OK, call passed to ROUTE: Inbound call has been processed and passed on to Route and is being processed.</li> <li>• Failed processing, call cleared: Inbound message was processed, but failed for some reason, and the call has been cleared.</li> </ul>
Last outbound call (before processing)	<ul style="list-style-type: none"> <li>• Called Address: The X.25 address that was called.</li> <li>• Calling Address: The X.25 address that initiated the call.</li> <li>• Facilities: The facilities that were requested in the most recent call request packet.</li> <li>• CUD: Call User Data contains end-user or routing information specific to the network.</li> </ul>
Last outbound call (after processing)	<ul style="list-style-type: none"> <li>• Called Address: The X.25 address that was called.</li> <li>• Calling Address: The X.25 address that initiated the call.</li> <li>• Facilities: The facilities that were requested in the most recent call request packet.</li> <li>• CUD: Call User Data contains end-user or routing information specific to the network.</li> </ul>

**Note**

Counters restart from 0 after the maximum count is reached. The statistics values that are monitored for overflow condition are Detailed XDLC Frame Statistics.

## XDLC Port Record Worksheet

<b>Parameter</b>	<b>Range/ Option</b>	<b>Default</b>	<b>Operator Entries</b>		
Port Number	1 to 54	1			
Port Type <sup>[1]</sup>	X.25, XDLC	X.25			
Port Control	NONE, MB, RTS_MON	NONE			
Transmission Encoding	NRZ, NRZI	NRZ			
Type of Line	FDX	FDX			
Transmission Type	TWA, TWS	TWS			
Clock Source	EXT, INT	EXT			
Clock Speed	1200 - 80000	9600 bps			
Number of <sup>[1]</sup> XDLC Stations	1 to 32 <sup>[2]</sup>	4			
Poll Timer	1 to 255 seconds	30			
Poll Frequency Period	50 to 250 milliseconds	50			
Tries	1 to 16	10			
XDLC Port Options	MARKi, NONE	NONE			
Port Address	0 to 15 digits	blank			
Restart Timer <sup>[3]</sup>	5 to 255 seconds	180			
Reset Timer <sup>[3]</sup>	5 to 255 seconds	180			
Call Timer <sup>[3]</sup>	5 to 255 seconds	200			
Clear Timer <sup>[3]</sup>	5 to 255 seconds	180			
<p>[1] A Node boot is needed for any changes to this parameter to take effect. To avoid a Node boot while adding stations to the XDLC port, you can configure for the maximum anticipated stations for this port and disable the stations not in use. The XDLC PAD reserves space in its control blocks for all the configured stations. Although this results in some unused memory space, performance is not effected.</p> <p>[2] The total number of XDLC stations on a port can be up to a maximum of 32. This can be any combination of MX25 Slave stations and SDLC stations, including all MX25 stations or all SDLC stations. The user interface inhibits the user from configuring more than the allowable number of stations.</p> <p>[3] These parameters are for the MX25 protocol component only.</p>					

## **XDLC Station Record Worksheet**

<i><b>Parameter</b></i>	<i><b>Range/Options</b></i>	<i><b>Defaults</b></i>	<i><b>Operator Entries</b></i>		
Port Number	1 to 54	1			
Station Number	1 to 32	1			
Station Type <sup>[1]</sup>	MX25, SDLC	MX25			
<p>[1] Once the station type is selected, you are prompted to enter configuration parameters for the selected station type.</p> <p>The station type can be changed without booting the port or the node; however, a Station boot must be done to make the change take effect. A Station boot does not disrupt the operation of any other stations.</p>					

---

## SDLC Station Record Worksheet

<b>Parameter</b>	<b>Range/Options</b>	<b>Defaults</b>	<b>Operator Entries</b>		
Station Address	01 to FE, Hex digits	01			
Frame Window	1 to 7	7			
Autocall Mnemonic	0 to 8 alphanumeric characters	blank			
Protocol ID Digits	1 to 8 Hex	C3000000			
CUG Membership	0 to 8 two-digit numbers	--,--,--,--, --,--,--,--			
QLLC Options	NONE, CUG, QRRs, XIDs, XID3	NONE			
XID	0 to 14 Hex. Use space bar to blank field.	blank			
Station Subaddress	1 to 3 BCD digits	blank			
Billing Records	OFF, ON	OFF			

---

## MX25 Station Record Worksheet

<b>Parameter</b>	<b>Range/Options</b>	<b>Defaults</b>	<b>Operator Entries</b>		
Station Address	04 to FE Hex digits	04			
Number of <sup>[1]</sup> PVC Channels	0 to 128	0			
Starting <sup>[1]</sup> PVC Channel Number	1 to 255	1			
Number of <sup>[1]</sup> SVC Channels	0 to 255	16			
Starting <sup>[1]</sup> SVC Channel Number	0 to 255	1			
K Frame Window	1 to 7	7			
Packet Window	1 to 7	2			
MX25 Options	NONE, INL, HOLD, CUG	NONE			
Restricted Connection Destination	0 to 32 alphanumeric characters	blank			
CUG Membership	0 to 8 two-digit numbers	--,--,--,--, --,--,--,--			
Billing Records	OFF, ON	OFF			
Data Queue Upper Threshold	5 to 15 (data packets)	5			
Data Queue Lower Threshold	0 to 4 (data packets)	0			
[1]A Node Boot is needed for any changes to these parameters to take effect.					



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