

Vanguard Managed Solutions

**Vanguard Applications Ware
Multi-Service Feature Protocols**

Multipoint X.25 Protocol

Notice

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Part No. T0103-03, Rev G
Publication Code: DS
First Printing: November 1998

Manual is current for Release 6.2 of Vanguard Applications Ware.

To comment on this manual, please send e-mail to LGEN031@vanguardms.com

Overview

This manual describes the Multipoint X.25 Protocol option for the Vanguard Products. It describes only those features relevant to the Multipoint X.25 option. For other parameters, refer to the *Vanguard Configuration Basics Manual*, which targets system application engineers, system managers, and those who require application and ordering information.

This manual provides application, configuration and administration information, and worksheets in which you can write configuration details for specific nodes. It targets users who have experience with IBM or IBM-compatible equipment.

If you are unfamiliar with the installation, configuration, and operation of the Vanguard Products network, consult the *Vanguard Configuration Basics Manual*.

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About the Multipoint (MX25) Protocol Option

Overview

Multipoint X.25 (MX25) is an optional feature in Vanguard Products. It is supported by all Vanguard products and is available as part of the Multi-Service Software License.

Up to 256 stations per node can be appended to a Vanguard Product, with a maximum of 32 on any single MX25 link. The devices can be used as master or slave.

Operation

In MX25 operation, a physical full-duplex circuit exists between the master and slave stations on a link. The slave can only send when explicitly polled by the master. Traffic from the master to the slave is referred to as outbound; the reverse direction is inbound. The master can send to one slave while receiving from another, allowing efficient link utilization.

The master polls the slaves in a cyclic sequence specified by a nonconfigurable, internal polling table. Only one poll can be outstanding at a time. Polls carry the sequence number of the next frame expected by the master. Information frames from the slave to the master are called Response Frames, and those to the slave from the master are called Command Frames. If the polled slave has Response Frames to send, it can send only a certain number of them (equal to the window size). The polled slave, even if it does not send Response Frames, signals the end of its turn by sending a frame with the F (final) bit set to 1.

The master delivers responses from the slaves to a host computer and queues command messages generated by the host. The master services the queue cyclically, using the same polling table used to poll the slaves. Commands are framed into High-level Data Link Control (HDLC) Information Frames which may include piggy-backed acknowledgments to responses from slaves. At most, a window of unacknowledged command frames can exist between the master and a slave at any given time.

While the master is sending command frames, it continues to send polls. If a slave sends a Final Frame which arrives in the middle of an outbound transmission from the master, the master will poll the next slave, after sending the current HDLC frame.

Related Documentation

For details on basic configuration of Vanguard, refer to the *Vanguard Configuration Basics Manual* and the other Feature Protocol Manuals supporting the Vanguard Applications Ware.

Applications Information

Introduction

Multipoint allows transmission of data to/from a number of points on a single link. MX25 ports can be configured on a Vanguard PAD. If the associated nest contains the appropriate 65xx cards, up to 4 ports on the 6507, 19 ports on the Vanguard 6520, or 54 ports on the Vanguard 6525 can be configured in any mix.

Configuration Limits

The maximum configuration for a node with this feature is illustrated in Figure 1.

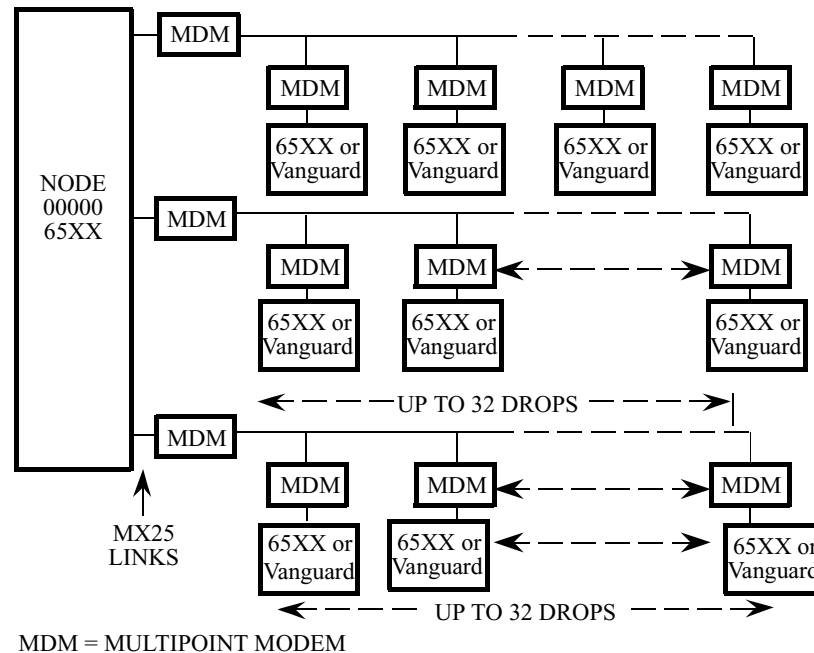


Figure 1. Maximum Configuration

Multipoint X.25 (MX25) is a synchronous, bit-oriented protocol. Up to 256 stations can be defined, with a maximum of 32 stations per MX25 port. All drops on an MX25 port must be full-duplex. Some possible configurations are:

- 16 ports of 16 stations each
- 8 ports with 9 stations each, 1 port with 32 stations, 12 ports with 12 stations, 1 port with 8 stations
- 32 ports with 8 stations each
- Any combination of ports/stations, totaling not more than 256 stations, with 32 or less stations per port

MX25 can operate at transmission speeds from 1200 bps through 80 kbps. Clocking can be internal or external. MX25 ports support accounting and billing information, as well as Closed User Groups (CUGs).

All stations on an MX25 port must be members of the Vanguard. Multipoint modems (MDMs) or line drivers, such as the 2300, 2500, or 2600 Series, are required.

Both a master and a slave MX25 port can be configured on the same 6525 Packet Switch node. Only one MX25 port is allowed on a 6505 PAD or 6507 Multi-Function PAD.

A typical Vanguard node using MX25 connected to an X.25 network is shown in Figure 2.

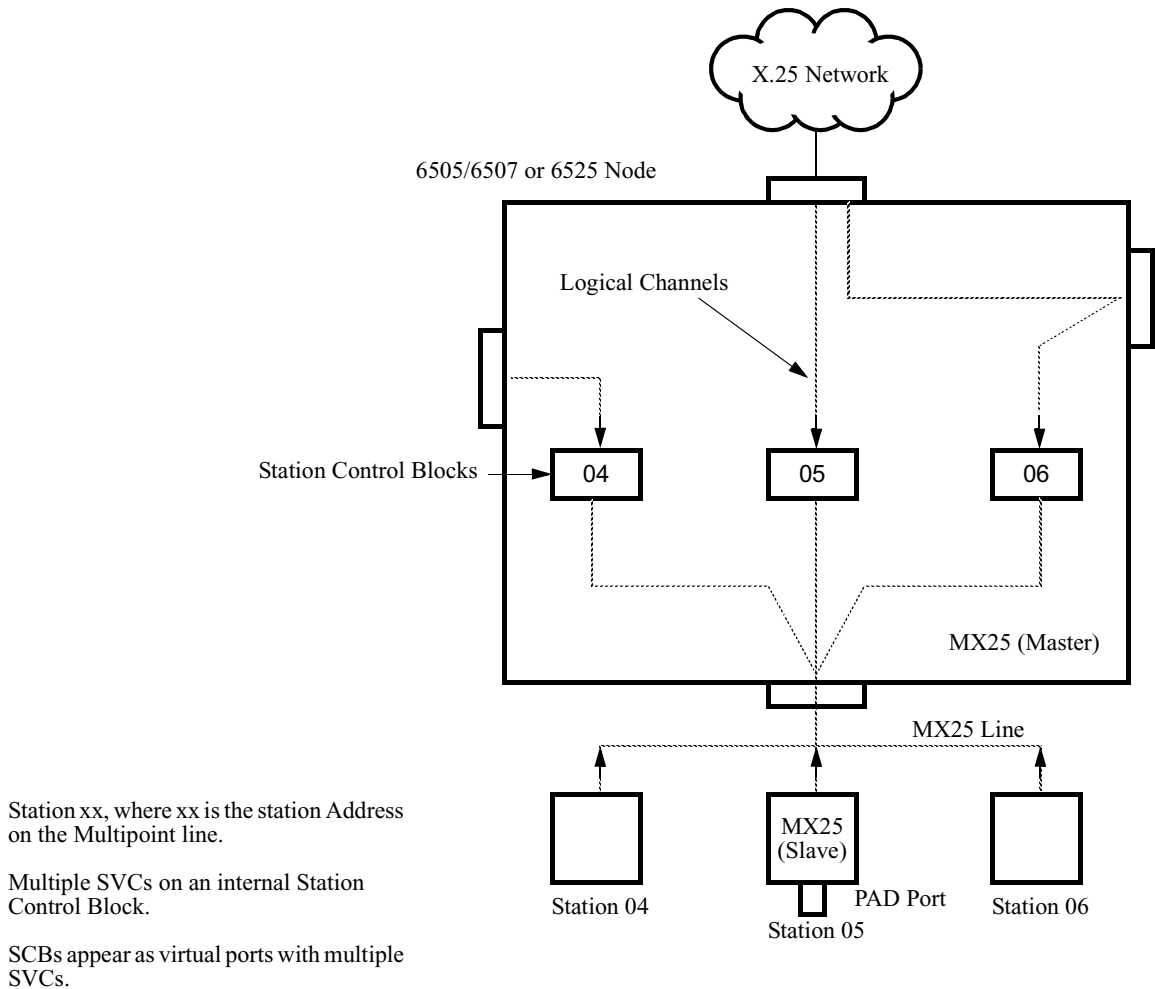


Figure 2. Typical Vanguard Node Using MX25

In such a node, calls from the X.25 network, Muxports, or PAD ports can all be connected to channels on the MX25 link. A logical channel on an MX25 link behaves in the same manner as one on an X.25 link. For example, SNA traffic can pass through an MX25 channel. The bandwidth available to each station is approximately equal to the link bandwidth divided by the number of stations on the link.

Users can configure Port Type: MX25 (Multipoint X.25), through the Configuration Menu of the Control Terminal Port (CTP). MX25 ports can be configured in a mix of all other port types available.

Configuration and Administration

Introduction

Basic configuration and administration procedures for a Vanguard node are covered in detail in the *Vanguard Configuration Basics Manual*. Only information pertinent to Multipoint X.25 (MX25) is covered in this manual.

Configuration Procedure

Configuration for Multipoint X.25 consists of these basic steps:

Step	Action
1	Change Port Records to reflect Multipoint X.25 options.
2	Complete the Station Table to provide information about the stations attached to a Multipoint X.25 port.
3	Adjust the Route Selection Table to reflect individual stations on a Multipoint X.25 link.
4	Perform a Node Boot operation to implement configuration changes.

In addition, a variety of changes has been introduced to the Vanguard Products to allow efficient administration and troubleshooting of Multipoint X.25 ports. Where applicable to Multipoint X.25, these changes are also covered in this manual.

Port Record Configuration

Introduction

Two port records deal with MX25:

- MX25mas (master)
- MX25slav (slave)

To configure these ports, use the Control Terminal Port (CTP) as you would with other Vanguard product ports. (Access the CTP Main Menu, select Configure; then, from the Port selection of the Configure Menu, enter the number of the port to be configured as Multipoint X.25.)

MX25 Master Port

These are the parameters that must be configured for a Master MX25 port. To configure a port as a master, you must set the Port Subtype parameter to MASTER.

■Note

When an asterisk appears beside a parameter, a Node Boot is needed for any changes to that particular parameter to take effect.

Port Number

Range:	Device dependent
Default:	1
Description	Specifies the port number to be configured. This corresponds to the physical port position at the rear of the unit and is the Port Record reference number.

*Port Type

Range:	NULL, PAD, MUX, X.25, MX.25
Default:	PAD
Description	Specifies the desired port type. <ul style="list-style-type: none"> • NULL port • PAD port • MUX port. This is not selectable on 65xx PAD cards. • X.25 port. This is not selectable on 65xx PAD cards. • MX.25 port. This is not selectable on 65xx PAD cards.

Port Control

Range:	MB, NONE
Default:	NONE
Description	<ul style="list-style-type: none"> • MB- Enables the Make-busy feature. Pin 22 is raised when the port is disabled. • NONE- Disables this feature.

Transmission Encoding

Range:	NRZ, NRZI
Default:	NRZ
Description	<ul style="list-style-type: none"> • NRZ- Non return to zero encoding. • NRZI- No return to zero inverted encoding. (This parameter must be the same for all drops on the link.)

***Port Subtype**

Range:	MASTER, SLAVE
Default:	MASTER
Description	<ul style="list-style-type: none"> • MASTER - Specifies the Master MX25 port. • SLAVE -Specifies the Slave MX25 port.

***Clock Source**

Range:	INT, EXT
Default:	INT
Description	<ul style="list-style-type: none"> • INT - Internal Clock Source. Select this option if the port device does not provide clocking. • EXT - External Clock Source. Select this option if the port device generates clock signal.

Clock Speed

Range:	1200 to 80000
Default:	9600
Description	Specifies the port speed in bits per second when using internal clocking.

***Number of Stations**

Range:	1 to 32
Default:	4
Description	Specifies the number of slave stations on this MX25 line.

Port Control

Range:	1 to 32
Default:	4
Description	Specifies the number of slave stations on this MX25 line.

MX25 Slave Ports

These are the parameters you must configure for a Slave MX25 port. To configure a port as a slave, you must set the Port Subtype parameter to SLAVE.

■ Note

A Node Boot must be performed for changes to these parameters to take effect.

Port Number

Range:	Device dependent
Default:	1
Description	Specifies the port number to be configured. This corresponds to the physical port position at the rear of the unit and is the Port Record reference number.

*Port Type

Range:	NULL, PAD, MUX, X.25, MX.25
Default:	PAD
Description	Specifies the desired port type. <ul style="list-style-type: none"> • NULL port • PAD port • MUX port. This is not selectable on 65xx PAD cards. • X.25 port. This is not selectable on 65xx PAD cards. • MX.25 port. This is not selectable on 65xx PAD cards.

Port Control

Range:	MB, NONE
Default:	NONE
Description	<ul style="list-style-type: none"> • MB- Enables the Make-busy feature. Pin 22 is raised when the port is disabled. • NONE- Disables this feature.

Transmission Encoding

Range:	NRZ, NRZI
Default:	NRZ
Description	<ul style="list-style-type: none"> • NRZ- Non return to zero encoding. • NRZI- No return to zero inverted encoding. (This parameter must be the same for all drops on the link.)

***Port Subtype**

Range:	MASTER, SLAVE
Default:	MASTER
Description	<ul style="list-style-type: none"> • MASTER - Specifies the Master MX25 port. • SLAVE -Specifies the Slave MX25 port.

***Clock Source**

Range:	INT, EXT
Default:	INT
Description	<ul style="list-style-type: none"> • INT - Internal Clock Source. Select this option if the port device does not provide clocking. • EXT - External Clock Source. Select this option if the port device generates clock signal.

Clock Speed

Range:	1200 to 80000
Default:	9600
Description	Specifies the port speed in bits per second when using internal clocking.

Station Address

Range:	04 to FE (hex)
Default:	4
Description	Specifies the station address on the multidrop line.

***Number of PVC Channels**

Range:	0 to 128
Default:	0
Description	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 as small as possible and consistent with needs. PVC connections must be configured in the PVC table.

***Starting PVC Channel Number**

Range:	0 to 255
Default:	1
Description	Specifies the starting logical channel number for the Permanent Virtual Circuits on this link. <div style="margin-left: 20px;"> <p>■ Note This parameter is not used if the number of PVCs is set to 0.</p> </div>

***Number of SVC Channels**

Range:	0 to 255
Default:	16
Description	Specifies the number of logical channels used in Switched Virtual Circuits (SVCs). The total number of PVC and SVC channels on a link should be kept as small as possible and consistent with needs.

***Starting SVC Channel Number**

Range:	0 to 255
Default:	1
Description	Specifies the starting logical channel number for the Switched Virtual Circuits (SVCs) on this link. Please note that this parameter is not used if the number of SVCs is set to 0.

Poll Timer

Range:	0 to 255
Default:	30
Description	Specifies the amount of time that the master will wait for a slave to respond to a poll frame sent by the master. This includes modem turnaround time. The value is in 1/10 per second (for example, 30 = 3.0 seconds).

Tries

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

K Frame Window

Range:	1 to 7
Default:	7
Description	Specifies the frame level window size. This parameter value must equal the number of devices entered for each end of the link.

W Packet Window

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

Restart Timer

Range:	5 to 255
Default:	180
Description	Specifies the time, in seconds, of the restart timer. If this timer expires, the request for restart will be sent again.

Reset Timer

Range:	5 to 255
Default:	180
Description	Specifies the time, in seconds, of the restart timer. If this timer expires, the request for restart will be sent again.

Call Timer

Range:	5 to 200
Default:	200
Description	Specifies the time, in seconds, of the call timer. If this timer expires, the call request will be cleared.

Clear Timer

Range:	5 to 255
Default:	180
Description	Specifies the time, in seconds, of the clear timer. If this timer expires, the clear request is sent again.

MX25 options

Range:	NONE, HOLD, CUG, INL
Default:	NONE
Description	<ul style="list-style-type: none"> • NONE - No option specified. • HOLD - Hold calls over link restart. • CUG - Check Closed User Group (CUG); otherwise, pass calls transparently. • INL - Inter-node Link (INL) specifies that the link goes to another Vanguard device. <p>■ Note Specify combinations of the above by summing (for example, HOLD+CUG+INL).</p>

Restricted Connection Destination

Range:	0 to 32 (alphanumeric characters)
Default:	(blank)
Description	<p>Specifies that calls originating from this port will be 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>■ Note Press the space bar for blank field. A (blank) disables this function.</p>

CUG Membership

Range:	0 to 2 digit number
Default:	00,00,00,00,00,00,00,00
Description	<p>Specifies that a port may be a member of up to 8 different Closed User Groups (CUGs). Each CUG membership must be a two-digit number (except –). Separate each two-digit number with a comma (for example, 12,35,56, etc.).</p> <p>■ Note Spaces are not permitted.</p>

Billing Records

Range:	ON, OFF
Default:	OFF
Description	<p>Specifies whether billing (accounting) records will be created for calls on this port.</p> <ul style="list-style-type: none"> • ON - Billing records are created. • OFF - Billing records are not created.

Master MX25 Stations

The Multipoint X.25 Master Stations is used to provide information on the stations attached to an MX25 Port that has been configured as the master. The Master MX25 Stations table is accessed from the Configure Menu and these parameters can be configured.

Port Number

Range:	Device dependent
Default:	1
Description	Specifies the port number to be configured. This corresponds to the physical port position at the rear of the unit and is the Port Record reference number.

Station Number

Range:	1 to 4
Default:	1
Description	Specifies the number of the controller on the multidrop line. This parameter is also used for routing purposes.

Station Address

Range:	04 to FE (hex characters)
Default:	1
Description	Specifies the Station Address on the multidrop line.

***Starting PVC Channel Number**

Range:	0 to 255
Default:	1
Description	Specifies the starting logical channel number for the Permanent Virtual Circuits (PVCs) on this link. Please note that this parameter is not used if the number of SVCs is set to 0.

***Number of SVC Channels**

Range:	0 to 255
Default:	16
Description	Specifies the number of logical channels used in Switched Virtual Circuits (SVCs). The total number of PVC and SVC channels on a link should be kept as small as possible and consistent with needs.

***Starting SVC Channel Number**

Range:	0 to 255
Default:	1
Description	Specifies the starting logical channel number for the Switched Virtual Circuits (SVCs) on this link. Please note that this parameter is not used if the number of SVCs is set to 0.

K Frame Window

Range:	1 to 7
Default:	7
Description	Specifies the frame level window size. This parameter value must equal the number of devices entered for each end of the link.

W Packet Window

Range:	1 to 7
Default:	2
Description	Specifies 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 options

Range:	NONE, HOLD, CUG, INL
Default:	NONE
Description	<ul style="list-style-type: none"> • NONE - No option specified. • HOLD - Hold calls over link restart. • CUG - Check Closed User Group (CUG); otherwise, pass calls transparently. • INL - Inter-node Link (INL) specifies that the link goes to another Vanguard device. <p>■ Note Specify combinations of the above by summing (for example, HOLD+CUG+INL).</p>

Restricted Connection Destination

Range:	0 to 32 (alphanumeric characters)
Default:	(blank)
Description	<p>Specifies that calls originating from this port will be 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>■ Note Press the space bar for blank field. A (blank) disables this function.</p>

CUG Membership

Range:	0 to 2 digit number
Default:	00,00,00,00,00,00,00,00
Description	<p>Specifies that a port may be a member of up to 8 different Closed User Groups (CUGs). Each CUG membership must be a two-digit number (except –). Separate each two-digit number with a comma (for example, 12,35,56, etc.).</p> <p>■ Note Spaces are not permitted.</p>

Billing Records

Range:	ON, OFF
Default:	OFF
Description	Specifies whether billing (accounting) records will be created for calls on this port. <ul style="list-style-type: none">• ON - Billing records are created.• OFF - Billing records are not created.

Route Selection Table

Introduction

The Route Selection Table permits the Station Number for MX25 ports to be added. The Route Selection Table is accessed via the Configure Menu.

Network Access

For example, to have a call with Network Address 55500123 route to Port 7 (an MX25 Port) and Station number 5, the following entry would be entered in the Route Selection Table:

Address	Port	Station	Priority
55500123	7	5	1

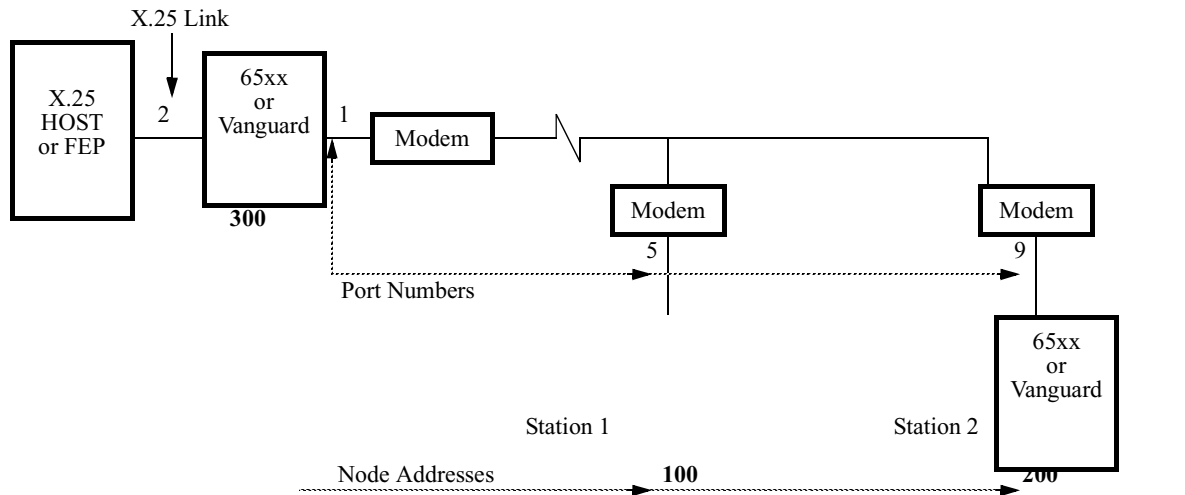
MX25 ports are not node resources, and calls will not be routed to a Node Address plus Subaddress as with asynchronous PAD ports.

The called address must be in the routing table, along with a port that is to take calls for that address. The stations on the port will be connected on the basis of the route selection table station number attached to the port number.

Configuration Example

Introduction

A typical example of configuration for an MX25 application is shown in Figure 3.



Node 300 MX25 Configuration Details	Node 100 MX25 Configuration Details	Node 200 MX25 Configuration Details
PORT RECORD Port 1, Type=MX25mas No. Station=2 All other parameters in Port Record =default values	PORT RECORD Port 5 Type=MX25slav Station Address=04 PVC, SVC, K Window, W Window parameters must match those for Address 300, Station 1, Port 1	PORT RECORD Port 9 Type=MX25slav Station Address=05 PVC, SVC, K Window, W Window parameters must match those for Address 300, Station 2, Port 1
STATION RECORD Port 1 Station 1 Station Address=04 PVC, SVC, K Window, W Window parameters must match those for Node Address 100		STATION RECORD Port 1 Station 2 Station Address=05 PVC, SVC, K Window, W Window parameters must match those for Node Address 200

Routing Table				Routing Table				Routing Table			
Entry	Addr	Port	Station	Entry	Addr	Port	Station	Entry	Addr	Port	Station
1	302	2	0	1	3*	5	0	1	3*	9	0
2	1*	1	1	2	2	5		2	1*	9	0
3	2*	1	2								

* = Wildcard (match anything) character

Figure 3. Typical MX25 Configuration

Configuration Example

In this example, a user on Node 100 who wishes to reach PAD Port 6 on Node 300, would enter “c 30006”. Similarly, a user on node 200 wishing to access the CTP on Node 100, would enter “c 10098”. Users wishing to reach the X.25 host on Port 2 of Node 300, would enter “c 302”, from any node in the network.

Status and Statistics

Detailed Port Statistics (Master)

Statistics presentation for MX25 Ports are shown in Figure 4:

```

Node: Nodename Address: (blank)      Date: 10-APR-1999 Time: 4:53:39
Detailed MX25 Port Statistics: Port 1      Page: 1 of 2

Port Number: 1      Port Type: MX25(MASTER) Port Status: Down
Port Speed: 0      Port State: Normal
Port Utilization In: 0% Port Utilization Out: 0%

Data Summary:      Last Statistics Reset: 10-APR-1999 4:53:27
  IN  OUT          IN  OUT
Frames: 0  1      Frames/sec: 0  0

Station Status Summary:
Station Status:  Up    Down    Busy-Out  Disabled
Number of Stations: 0    4      0        0

Interface Summary: EIA-232-D DTE      INPUT      OUTPUT
                   DSR DCD RI CTS   DTR RTS P14
State: Connected (SIMPLE)      L L L L   H H H

Physical Summary:
Overrun: 0  Underrun: 0  CRC: 0  Non-Octet Aligned: 0
    
```

```

Node: Nodename Address: (blank)      Date: 10-APR-1999 Time: 4:53:41
Detailed MX25 Port Statistics: Port 1      Page: 2 of 2

Debug Information from MX25-1:

pcbptr: 8EED80, ctl_sock: 8EED84, bop_up_sock: 8EE138, bop_eia_sock:
8EE184
bopcb: 8EE134
pl2cbptr: 8EDECC, down_sock: 8EDEF2, eia_sock: 8EDF18
    
```

Figure 4. Detailed Port Statistics (Master) Page 1 and 2

Detailed Port Statistics (Slave)

Statistics presentation for MX25 Ports (Slave) are shown in Figure 5 and Figure 6:

```

Node: Nodename Address: (blank)      Date: 10-APR-1999 Time: 4:53:44
Detailed MX25 Port Statistics: Port 2      Page: 1 of 5

Port Number: 2      Port Type: MX25(SLAVE ) Port Status: Down
Port Speed: 0      Port State: Link Setup  Station Address: 04
Port Utilization In: 0% Port Utilization Out: 0%

Call Summary:
  SVC  PVC
Maximum: 0  0
Current: 0  0

Data Summary:      Last Statistics Reset: 10-APR-1999 4:53:27
  IN  OUT          IN  OUT
Characters: 0  0      Characters/sec: 0  0
Packets: 0  0      Packets/sec: 0  0
Frames: 0  0      Frames/sec: 0  0
Number of Packets Queued: 0

Interface Summary: EIA-232-D DCE      INPUT      OUTPUT
                   DTR RTS MB P14  DSR DCD RI CTS
State: Connected (SIMPLE)      L L L L   H L L H
    
```

```

Node: Nodename Address: (blank)      Date: 10-APR-1999 Time: 4:53:48
Detailed MX25 Port Statistics: Port 2      Page: 2 of 5

Physical Summary:
Overrun: 0  Underrun: 0  CRC: 0  Non-Octet Aligned: 0

Frame Summary:
  IN  OUT          IN  OUT
Info  0  0      RR  0  0
RNR   0  0      REJ 0  0
SNRM  0  0      UA  0  0
FRMR  0  0      Aborts 0  0

Packet Summary:
  IN  OUT          IN  OUT
Data  0  0      Receiver Ready 0  0
Receiver Not Ready 0  0      Reject Packet 0  0
Call Request 0  0      Call Accept 0  0
Clear Request 0  0      Clear Confirm 0  0
Interrupt Request 0  0      Interrupt Conf. 0  0
Reset Request 0  0      Reset Confirm 0  0
Restart Request 0  0      Restart Confirm 0  0
    
```

Figure 5. Detailed Port Statistics (Slave) Page 1 and 2 of 5

Status and Statistics

Node: Nodename Address: (blank) Date: 10-APR-1999 Time: 4:53:50
Detailed MX25 Port Statistics: Port 2 Page: 3 of 5
Last inbound LCN: 0 <none>
Inbound processing status: Processed OK, call passed to ROUT

Last Inbound Call, before processing:
Called Address:
Calling Address:
Facilities:
CUD:

Last Inbound Call, after processing:
Called Address:
Calling Address:
Facilities:
CUD:

Node: Nodename Address: (blank) Date: 10-APR-1999 Time: 4:53:52
Detailed MX25 Port Statistics: Port 2 Page: 4 of 5
Last Outbound LCN: 0 <none>
Outbound processing status: Processed OK, call transmitted

Last Outbound Call, before processing:
Called Address:
Calling Address:
Facilities:
CUD:

Last Outbound Call, after processing:
Called Address:
Calling Address:
Facilities:
CUD:

Node: Nodename Address: (blank) Date: 10-APR-1999 Time: 4:53:53
Detailed MX25 Port Statistics: Port 2 Page: 5 of 5

Debug Information from MX25-2:
pcbptr: 8E2D40, ctl_sock: 8E2D44, bop_up_sock: 8E22C8, bop_eia_sock:
8E2314
bopcb: 8E22C4
pl2cbptr: 8E205C, down_sock: 8E2082, eia_sock: 8E20A8
scbptr: 8E2C0C, ctl_sock: 8E2C10, sl2cbptr: 8E1E68, up_sock: 8E1E8E

Figure 6. Detailed Port Statistics (Slave) Page 3, 4 and 5

Detailed Station Statistics

Statistics for stations on a master MX25 Port can be viewed by invoking the proper entry in the Statistics Menu, as shown in Figure 7.

```
Detailed Station Stats

Port Number:                2
Port Type:                  MX25mas
Station Number(Address):    03 (C2)
Station Status:             up
Data In:                    2323
Data Out:                   3443
Data Frames In:             23
Data Frames Out:            43
Data In Per Sec:            23
Data Out Per Sec:           34
Data Frames In Per Sec:     2
Data Frames Out Per Sec:    10
```

Figure 7. Detailed Station Statistics

Link Statistics

Selecting Link on the Status/Statistics Menu brings up information related to each configured link on the system. This includes: the interface/protocol type each port is configured for, the transmission speed of each, the current date and time, the number of CRC errors, Link down status (count of outages), and the number of data frames in/out. Figure 8 displays the link statistics screen.

Link Statistics									
Node:		Address:		Date:		Time:		Page: 1 of 1	
Data									
Port	State	CRC	Link	Frames	#				
Type		State	Speed	Date/Time					
Error		Down	In/Out						
01		MX25	9600	13-APR-1994	9955				
				14:00:25	2	898			
s01		up		13-APR-1994	102				
				15:00:15	467				
s02		dn		13-APR-1994	456				
				14:00:25	3167				
s03		up		102					

Figure 8. Link Statistics

Information in the Type column may be for either the MX25 master or MX25 slave. Pressing any key returns you to the Status/Statistics Menu.

Packet Statistics

The Packet Stat selection on the Status/Statistics Menu provides information about packet transmission in general: number of current calls, maximum number of calls, calls blocked, data in/out, and packets in/out. Figure 9 displays the Packet Statistics screen.

Packet Statistics									
Node:		Address:		Date:		Time:		Page: 1 of 1	
##	Port	Current	Max.	Calls	Data	Data			
	Type	Number	Number	Blocked	In/Out	Packets			
01	MX25	of Calls	of Calls		In/Out	In/Out			
		50	80	5	3000	1000			
					6000	2000			
s01		up	20	30	2	1000	300		
			10			3000	1000		
s02		dn		20	2	1500	600		
						2000	800		

Figure 9. Packet Statistics

Port level statistics is the sum of the Station level statistics.

Call Summary

Introduction

The Status/Statistics Menu permits access to the Call Summary. This summarizes calls by caller port and station, called port, facility used, and the length of time connections were made. Figure 10 displays the call summary screen.

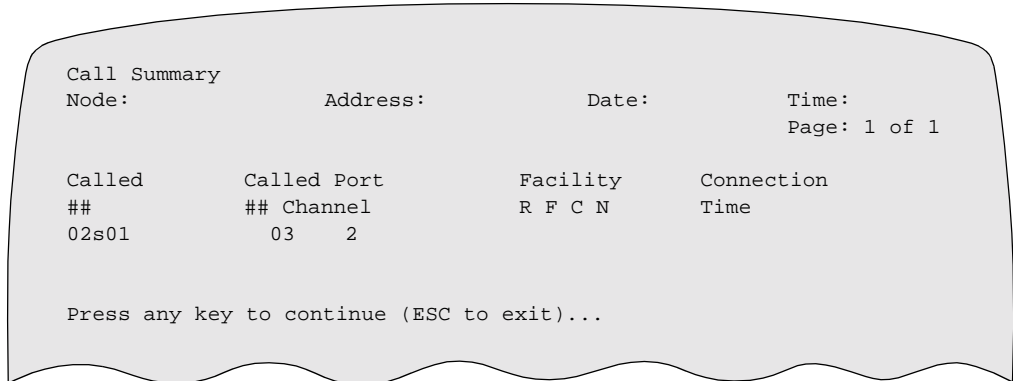


Figure 10. Call Summary

Facility Codes

Facility codes, as shown below, are displayed if the billing option in the port or station record is enabled.

Code	Description
R	Reverse Charging
F	Fast Select
N	Network User Identification (NUI)
C	Closed User Group (CUG)

Boot

Introduction

Selecting Boot from the Main Menu calls up the menu displayed in Figure 11.

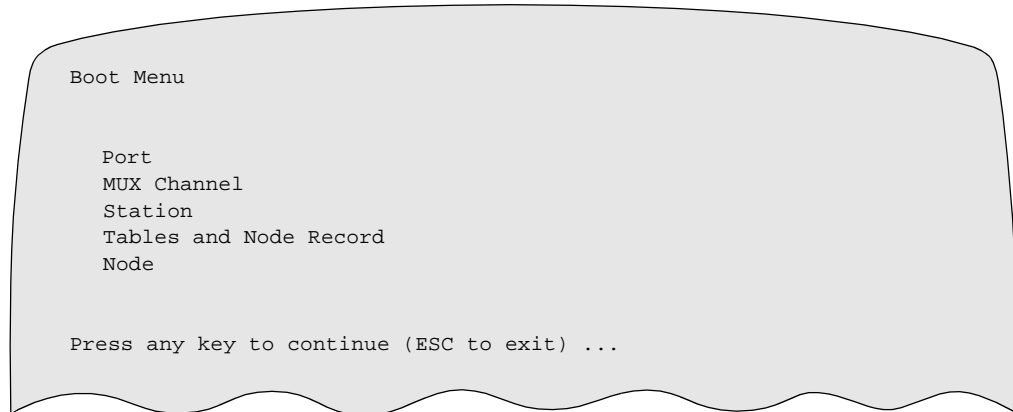


Figure 11. Boot Menu

Boot Procedures

Booting updates node operation with the current version of configuration memory. When a node is booted, configuration records are examined and relevant information is copied into working memory for the ports, tables, and channels in the node. While the node is running, the CTP can change the value of parameters in the records, or add and delete records in configuration memory. However, changes do not take effect until the node is booted and configuration memory is copied into working memory.

The following applies to Boot Commands:

- Booting disrupts communications on the section of the node being booted; for example, a Port Boot clears all calls on that port.
- Changes to working configurations do not occur until a boot is completed.
- Changes to parameters in any table or port, which change working memory, require a Node Boot, for example, altering the number of logical channels on an X.25 link.

Changing parameters in a record will, in most cases, require that only the table or port record be booted, not the entire node. Where a Node Boot is needed, parameters are prefaced by an asterisk (*) when it is displayed by the CTP. For example, changing the number of SVCs on a link requires a Node Boot, so the Port Record parameter is displayed with an asterisk in front of the line.

■ Note

A Port Boot is required after configuring an MX25 Port.

Copy/Insert Record

Introduction

Selecting Copy/Insert Record from the Main Menu calls up the menu displayed in Figure 12.

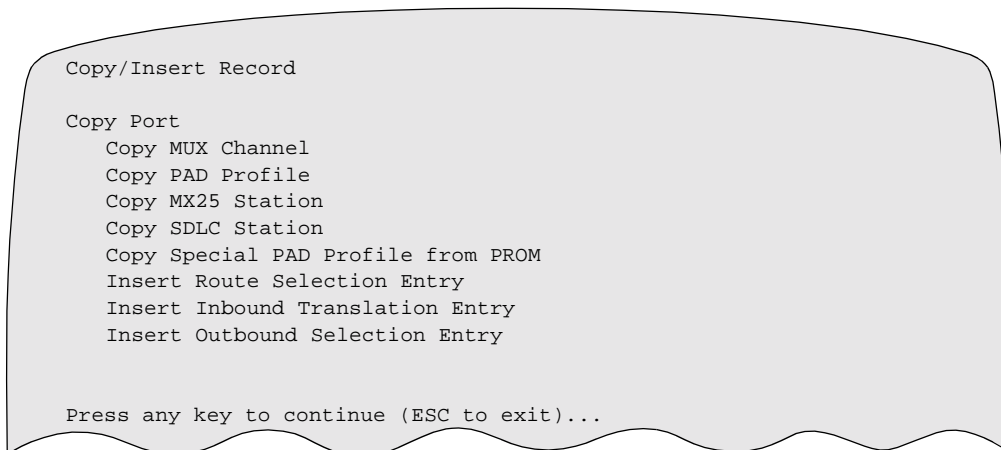


Figure 12. Copy/Insert Record

The Copy/Insert Menu eliminates the need to individually enter all data for similar ports, stations, channels, and PAD profiles, for each new record. The copy command is useful for:

- Configuring many ports which are the same, or nearly the same. In the later case, simply edit small changes as required after the copy has been made.
- Configuring identical records. The copy command removes the chance of error in repeatedly entered data.

The insert command is used for tables where the order in which the records occur is important. For example, in the Route Selection Table, if the addresses are arranged in the following way, the scan of the table will produce two different matches for the same called address.

Arrangement #1 Address Port/Station/ Priority	Arrangement #2 Address	Port/Station/Priority	
8*	1/0/1	*89	2/0/1
89*	2/0/1	8*	1/0/1

If the called address is 89333, then arrangement #1 will route the call out port 1, but arrangement #2 will route it to port 2, even though the individual records are identical.

There are two ways to insert a new record into an existing table:

- Enter the new record at the desired position and reenter succeeding records one position further along.
 - Insert a new default record at the desired position using the insert command. All records from this position on are automatically moved one position further. The new record will have blank addresses and port entries will be set to zero in the Route Selection Table. You can then edit to the desired values with the Configure command.
-

Port/Station/Channel Control

Introduction

Selecting Port/Station/Channel Control on the Main menu will call up the menu displayed in Figure 13.

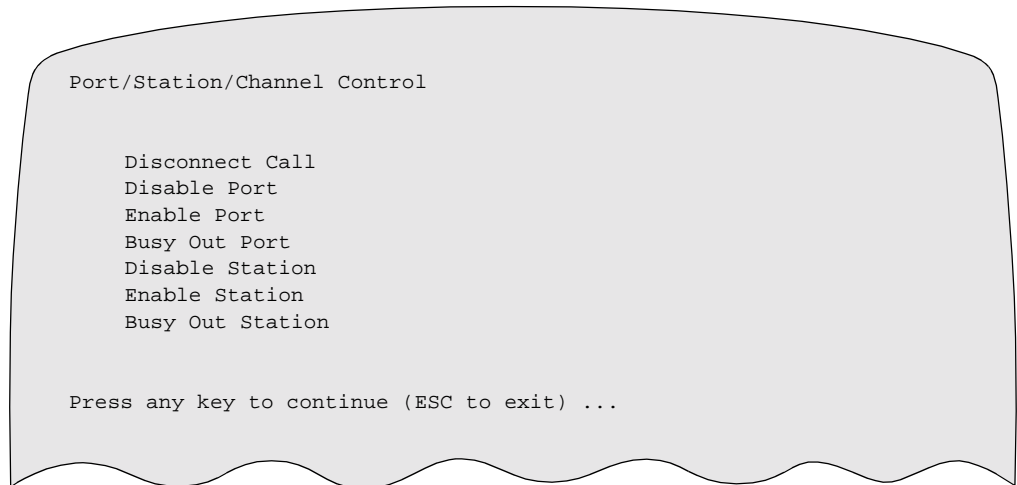


Figure 13. Port/Station/Channel Control

Disable Station

The Disable Station selection on the Port/Channel Control Menu allows selected stations to be disabled, preventing access from all sources.

Entering a valid station number causes the request to be executed following display of a warning message telling you that loss of data may occur. If you continue, the request will be acted on immediately.

Enable Station

The Enable Station selection on the Port/Channel Control Menu allows you to enable a selected station, allowing access from all sources.

Entering a valid station number will cause the request to be executed.

Node Worksheets

Before you Begin... Before you attempt online configuration of your network, we strongly recommend that it first be planned on paper. Properly completed Node Worksheets are a useful configuration tool and also provide a permanent record of the operating characteristics and configuration of your network.

Enter the characteristics for your configuration onto the appropriate Node Worksheets before attempting online configuration of your network. Should you require extra copies of any node worksheet to record the operating characteristics and configuration of your network, photocopy additional blank node worksheets, as required, before you record any information. These worksheets may be used with Firmware Revision 3.10 or greater.

■Note

When an asterisk appears beside a parameter, a Node Boot is needed for any changes to that particular parameter to take effect.

Port Record MX25 Master

Port Number					
*Port Type					
Port Control					
Transmission Encoding					
Port Subtype					
Clock Source					
Clock Speed					
*Number of Stations					
*Number of Devices					
Poll Timer					
Poll Frequency Period					
Tries					
Restart Timer					
Reset Timer					
Call Timer					
Clear Timer					

**Port Record; MX25
Slave**

Port Number					
*Port Type					
Port Control					
Transmission Encoding					
Port Subtype					
Clock Source					
Clock Speed					
Station Address					
*Number of PVC Channels					
*Starting PVC Channel Number					
*Number of SVC Channels					
*Starting SVC Channel Number					
Tries					
K Frame Window					
W Packet Window					
Restart Timer					
Reset Timer					
Call Timer					
Clear Timer					
MX 25 Options					
Restricted Connection Destination					
CUG Membership					
Billing Records					

**MX25 Station
Record
Configuration**

Port Number					
Station Number					
Station Address					
*Number of PVC Channels					
*Starting PVC Channel Number					
*Number of SVC Channels					
*Starting SVC Channel Number					
K Frame Window					
W Packet Window					
MX25 Options					
Restricted Connection Destination					
CUG Membership					
Billing Records					

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