TOTAL CONTROL™

X.25 Packet Assembler/ Disassembler

Version 3.0

RELEASE NOTES

Table of Contents

What's New in this Release

This document briefly describes the new features supported by version 3.0 of the X.25 PAD Gateway Card. More detailed information may be found in the *X.25 PAD Reference Manual.*

New Features

- Management over X.25, or MOX, allows you to configure remote chassis over an X.25 link.
- New configuration methods have been devised for a Windows environment. The protocol stack is now configurable via *Total Control Manager/SNMP*, and a new program, launched from *TCM*, was developed to make Subscriber record configuration and tracking very easy.
- Via new TFTP upload / download operations, you may now save your configured Subscriber records to disk and restore your PAD database from that saved file.
- New parameters for Subscriber configuration templates have been developed.
- Banner syntax has been improved to allow you to give the dial-in user more information about the call in progress.
- Additional X.28 commands have been added.

For More Information

The information listed below is available in the Total Control directory (#15) on the U.S. Robotics BBS (847-982-5092) and at the U.S. Robotics Internet ftp site (ftp.usr.com / dl15). You may use anonymous ftp to download the files. All the files are available in Adobe Acrobat Portable Data Format (*.PDF).

- Regularly updated MIBs
  This information is provided in ASCII text (*.MIB).
- Application Notes
- Technical Bulletins
- Reference Manuals
- Release Notes

Files in Adobe Acrobat *.PDF format may be downloaded easily. You will, however, require the Acrobat Reader program in order to view the Acrobat files. Adobe provides free Reader software (DOS, Windows, Macintosh, and UNIX versions are available) at both an Internet ftp site (under the directory ftp.adobe.com / pub / adobe / Applications / Acrobat) and their World Wide Web Home Page (http: / / www.adobe.com /).

U.S. Robotics also provides Acrobat Reader software on its BBS in the MISC directory. Simply download the Reader software and install it on your computer, launch the program, and open the *.PDF document file.

Management Over X.25 (MOX)

A special application has been developed so system administrators may manage remote chassis using the *Total Control Manager/SNMP* software as usual, but over the X.25 Packet Switched Network.

Application Overview

A MOX call requires that a Network Management Card reside in the remote chassis. The NMC performs the management functions; the X.25 PADs merely act as routers for the SNMP commands sent to the NMC from your local Management Station running *Total Control Manager/SNMP*.

Your local Management Station uses *Total Control Manager/SNMP* to send SNMP configuration commands to the NMC in a remote chassis. The local PAD encapsulates SLIP information in X.25 packets and places a call request directed to the remote X.25 PAD. The remote PAD will recognize the call request as a MOX call. Upon receiving the call request, the remote PAD recognizes the MOX request, strips the SLIP information from the X.25 packets, signals the NMC, and begins the data transfer over a null modem cable between the two cards (described later).

NOTE: Never perform a software download to the X.25 PAD during a MOX session.

Call Routing with MOX

When a call comes into the remote PAD, the PAD's current configuration determines the application to be invoked. If the remote PAD is configured for management only operations, all incoming X.25 calls will be routed to the NMC.

If the remote PAD is configured to read the Call User Data (CUD), it will be examined when the call request packet arrives. If the CUD in the call request matches with the MOX CUD stored in the remote PAD's database, the call will be routed to the NMC on the remote chassis.

The X.121 address of an X.25 call contains routing information. Most networks set aside the National Terminal Number's last two digits as an optional subaddress. Generally, this subaddress is assigned by the network administrator, rather than being processed by the Packet Data Network (PDN). The remote PAD compares the subaddress of the incoming call packet with the subaddress stored in its database for routing to the NMC. If there is a match, the call is passed on to the NMC.

Configuring MOX

Software and / or hardware must be configured at both ends of the MOX connection before MOX will function.

Software Configuration for the Remote PAD

The PAD software at the answering side of the connection (remote PAD) must be configured appropriately to recognize and accept a MOX call. This may be done either using the Management Station with *Total Control Manager/SNMP*, or using the local RS-232 User Interface.

MOX Configuration Using *Total Control Manager/SNMP*

To configure your X.25 PAD for MOX using *Total Control Manager/SNMP*, complete the steps below.

1. Connect to the chassis as described in the *Total Control Installation Roadmap*.
2. Select the X.25 PAD from the *TCM* chassis display window, then click on the Programmed Settings icon. The Configuration window appears.
3. Click on the **Parameter Group** drop-down box and select the **Management Over X.25** configuration group.

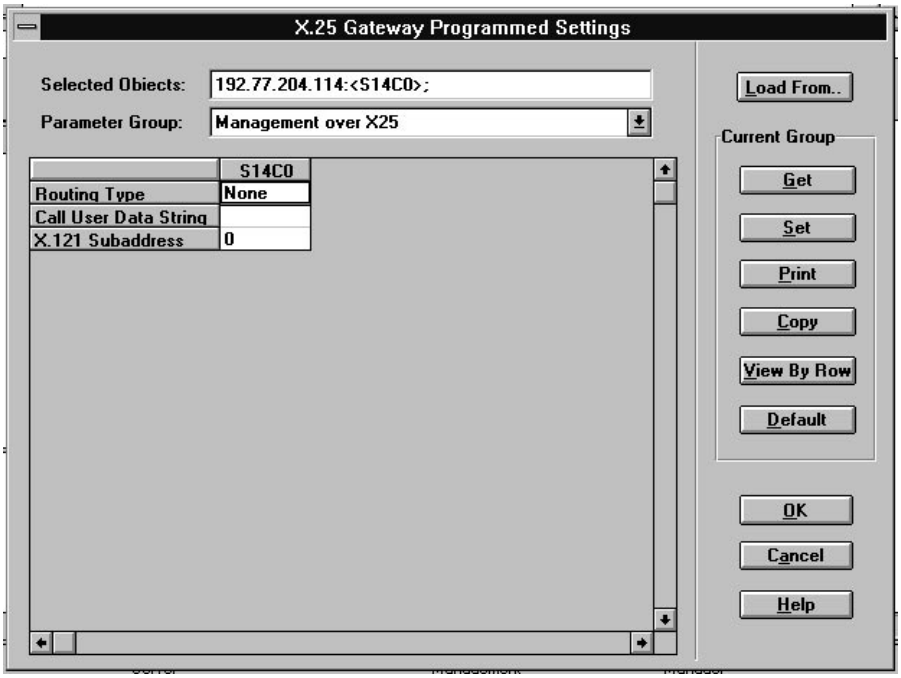

Figure 1—Management Over X.25 Configuration Group

4. Configure the Routing Type parameter according to your intended use of the MOX feature.

none	If you set the parameter to this value, all calls will be treated as regular X.25 calls. A MOX call will not be recognized and may be rejected altogether.
subAddr	If you set the parameter to this value, the PAD will look at all X.25 calls for network subaddressing (last two digits of the X.121 called address) before routing the call. If the digits match those configured by the X.121 Subaddress parameter, the call is routed to the NMC as a MOX call.
callUserData	If you set the parameter to this value, the remote (answering) PAD will look at the call user data in every call request packet before routing the call. If the CUD begins with "at" and there is a CUD match in the remote PAD's database, the call is treated like a MOX call and is routed to the NMC.
Mgt Only	If you set the parameter to this value, the PAD will treat all calls like MOX calls.
both	If you set the parameter to this value, the PAD will look at both the subaddress and the CUD to determine the call type and route it appropriately.

5. Configure the Call User Data String parameter according to your intended use of the MOX feature.

   This 12 character alphanumeric string is compared to the incoming X.25 call request CUD. If they match, the call is routed to the NMC. If the Routing Type parameter is configured for Mgt Only, configuring the Call User Data is unnecessary.

   NOTE: The CUD string must begin with an "at" followed by the actual CUD. For instance, if the actual CUD is "NSaxTomO" the Call User Data String configured here would be "atNSaxTomO."

6. Configure the X.121 Subaddress parameter according to your intended use of the MOX feature.

   This two-digit number is compared to the subaddress identifier (digits 14 and 15) in the incoming X.25 call address. If they match, the call is routed to the NMC. If the Routing Type parameter for the PAD is configured for Mgt Only, configuring the X.121 Subaddress parameter is unnecessary.

7. Click on the **Set** button. Your configuration settings are now saved.
8. Exit the Configuration window.

9. With the X.25 PAD selected on the chassis display, select **Actions/Commands** from the Configure Menu or click on the Actions/Commands icon. The Commands window appears.
10. Make sure the window is set up for **Software** commands, select **Save to NVRAM** from the command option list and press the **Execute** button.

The PAD intended to be the remote PAD during a Management Over X.25 session is now configured to pass on management commands to the NMC.

MOX Configuration Using the RS-232 User Interface

To configure the remote PAD for MOX using the RS-232 User Interface, complete the steps below.

1. Attach your PC or terminal to the User Interface port (see *Getting Started* in Chapter 5 of the *X.25 PAD Reference Manual*). Press Enter to display the Main Menu.

```
U.S. Robotics

X.25 Gateway Card -- Rel. 3.0.0
Boot Code Linked Date:  10/23/95
Operation Code Linked Date:  10/23/95

Main Menu

1 Configuration
2 Status
3 Commands

Enter menu selection and press Enter.

Menu Selection (1-3):
```

Figure 2—Main Menu

2. Select option 1—Configuration from the Main Menu and press Enter. The Configuration Menu appears.

```
Configuration

1 PAD Template Types
2 X.25 Protocol
3 PSN Banner
4 Management Over X.25

Enter menu selection and press Enter or press Esc to exit.

Menu Selection (1-3):
```

Figure 3—Configuration Menu

3. Select option 4—Management Over X.25 from the Configuration Menu and press Enter. The Management Over X.25 screen appears.

```
Management Over X.25

FIELD                                          DATA

1: Routing Type                                NONE
2: Call User Data Routing String
3: X.121 Subaddress Routing Digits             00

Esc when done, Ctrl-R to abort
Data Entry Syntax:  field_number:value

Enter Modifications:
```

Figure 4—Management Over X.25 Screen

4. Configure the Routing Type parameter according to your intended use of the MOX feature. Use the field_number:value syntax.

NONE	If you set the parameter to this value, all calls will be treated as regular X.25 calls. A MOX call will not be recognized and may be rejected altogether.
SUBADDR	If you set the parameter to this value, the PAD will look at all X.25 calls for network subaddressing (last two digits of the X.121 called address) before routing the call. If the digits match those configured by the X.121 Subaddress parameter, the call is routed to the NMC as a MOX call.
CALLUSERDATA	If you set the parameter to this value, the PAD will look at the call user data in every call request packet before routing the call. If the CUD begins with “at” and there is a CUD match in the remote PAD’s database, the call is treated like a MOX call and is routed to the NMC.
MANAGEMENT ONLY	If you set the parameter to this value, the PAD will treat all calls like MOX calls.
BOTH	If you set the parameter to this value, the PAD will look at both the subaddress and the CUD to determine the call type and route it appropriately.

5. Configure the Call User Data String parameter according to your intended use of the MOX feature. Use the field_number:value syntax.

   This 12 character alphanumeric string is compared to the incoming X.25 call request CUD. If they match, the call is routed to the NMC. If the Routing Type parameter is configured for Mgt Only, configuring the Call User Data is unnecessary.

   NOTE: The CUD string must begin with an "at" followed by the actual CUD. For instance, if the actual CUD is "NSaxTomO" the Call User Data String configured here would be "atNSaxTomO."

6. Configure the X.121 Subaddress parameter according to your intended use of the MOX feature. Use the field_number:value syntax.

   This two-digit number is compared to the subaddress identifier (digits 14 and 15) in the incoming X.25 call address. If they match, the call is routed to the NMC. If the Routing Type parameter for the PAD is configured for Mgt Only, configuring the X.121 Subaddress parameter is unnecessary.

7. Press Esc twice and exit back to the Main Menu.

8. Type **3** at the Main Menu to select the Commands option. The Commands Menu appears.

9. Select option 2—Nonvolatile Storage and press Enter. The Nonvolatile Storage command menu appears.

```
Nonvolatile Storage

21% Available

1) Save Configuration to Nonvolatile Memory
2) Erase Configuration in Nonvolatile Memory

Enter menu selection and press Enter or press Esc to exit.

Menu Selection (1-2):
```

Figure 5—Nonvolatile Storage Command Menu

10. Type **1** and press Enter. Wait for the message "Database successfully saved," then press Esc to back out to the Main Menu.

The PAD intended to be the remote PAD during a Management Over X.25 session is now configured to pass on management commands to the NMC.

Hardware Configuration

Both the originating and the answering sides of the connection require specific hardware configurations.

Originating PAD Hardware Configuration

Once the software configuration is complete at the local PAD, complete the steps below:

1. Remove the PAD from the chassis and set DIP switch 5 to the ON position.

   NOTE: Some users may try to set the DIP switch without removing the PAD from the chassis. If you do so, you must perform a hardware reset on the card before proceeding.

2. Re-insert the card in the chassis.
3. Cable the Management Station (with *TCM*) to the UI port (Channel 1) on the NIC behind the X.25 card (for a SLIP connection).
4. Cable the V.35/RS-232 NIC to the X.25 network.

Answering PAD Hardware Configuration

Once the software configuration is complete at the remote PAD, complete the steps below:

1. Remove the PAD from the chassis and set DIP switch 5 to the ON position.

   NOTE: Some users may try to set the DIP switch without removing the PAD from the chassis. If you do so, you must perform a hardware reset on the card before proceeding.

2. Re-insert the card in the chassis.
3. Using the console cables and null modem adapter provided by U.S. Robotics, cable the UI port (Channel 1) on the V.35/RS-232 NIC behind the X.25 card to the NMC NIC's WAN port (Channel 2) with a Null Modem cable. See Figures 6 and 7.

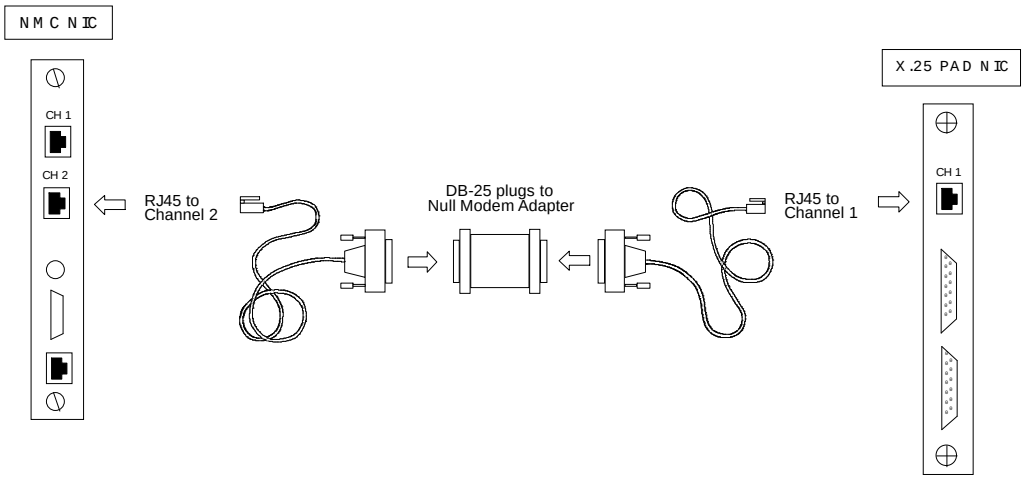

Figure 6—Remote (answering) PAD Mox Cabling

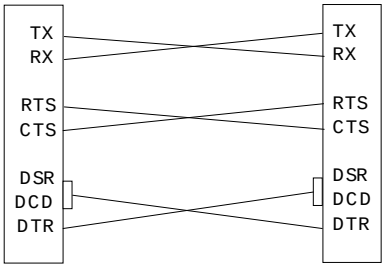

Figure 7—Null Pinout

4. Cable the V.35/RS-232 NIC to the X.25 network.

Quick Local MOX Configuration

The easiest way to configure a MOX session is to simply set DIP switch 5 ON. The result depends on how (or if) you have configured your X.25 database for MOX operations.

NOTE: Some users may try to set DIP switch 5 without removing the PAD from the chassis. If you do so, you must perform a hardware reset on the card before proceeding.

New card or database erased

Set DIP switch 5 ON and insert the card in the chassis. The Routing Type is automatically set to Management Only.

NOTE: The Routing Type defaults to a setting of NONE when DIP switch 5 is set to the OFF position.

Database configured and Routing Type saved as NONE

Set DIP switch 5 ON and insert the card in the chassis. The Routing Type is automatically set to Management Only.

NOTE: The Routing Type defaults to a setting of NONE when DIP switch 5 is set to the OFF position.

Database configured and Routing Type saved as CUD or X.121 Subaddressing

If you saved the database with the Routing Type parameter defined as something other than NONE, set DIP switch 5 ON and insert the card in the chassis. The Routing Type parameter will not change, but a MOX session is now possible.

Placing a MOX Call

The following actions are performed at the Originating side of the connection.

1. Launch *TCM*. Select **New** from the File Menu. The New Device window appears.
2. Click on the **Options** button. The New Device window expands.

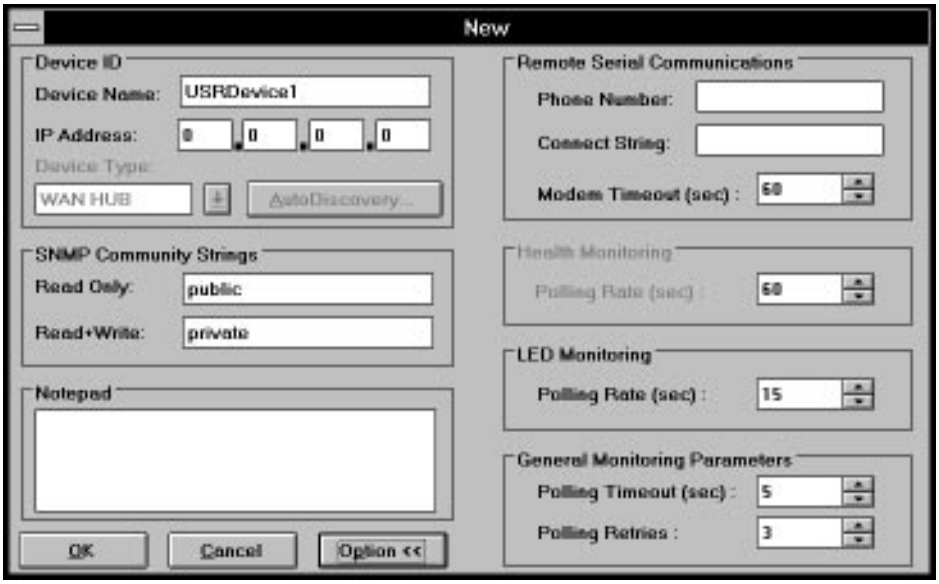

Figure 8—Expanded New Device Window

3. Enter the relevant information about the chassis NMC you will be calling, including its IP address, on the left side of the window.
4. Enter a customized dial string for MOX operations in the Connect String field. The string syntax depends on the Routing Type configured at the remote PAD.

Subaddress
If the Routing Type parameter at the remote PAD is set for Subaddress, the syntax is:

at\r*Port ID.Address (digits 14 and 15 indicate MOX)*

Example: You are connected to the X.25 network through port A of the NIC. The X.121 Subaddress parameter at the remote PAD is configured to recognize "11" as indicating a MOX call.

at\rA.999999999999911

Management Only
If the Routing Type parameter at the remote PAD is set for Management Only, the syntax is:

at\r*Port ID.*

Example: You are connected to the X.25 network through port A of the NIC.

at\rA.

CUD Routing
If the Routing Type parameter at the remote PAD is set for Call User Data, the syntax is:

at*CUD*\r*Port ID*.

Example: You are connected to the X.25 network through port A of the local NIC. The Call User Data String parameter at the remote PAD is configured to recognize "atNSaxTomO" in the CUD as indicating a MOX call.

atNSaxTomO\rA.

Both
If the Routing Type parameter at the remote PAD is set for Both (Subaddress and Call User Data), the syntax is:

at*CUD*\r*Port ID.Address (digits 14 and 15 indicate MOX)*

Example: You are connected to the X.25 network through port A. The Call User Data String parameter at the remote PAD is configured to recognize the CUD "atNSaxTomO" as indicating a MOX call. The X.121 Subaddress parameter at the remote PAD is configured to recognize "11" as indicating a MOX call.

atNSaxTomO\rA.999999999999911

5. Click on **OK** to initiate the call.

MOX Application: Trap Reporting

One MOX application is to use the remote PAD to route chassis trap information to the Management Station. When configured appropriately, the NMC will simply send trap information to the X.25 PAD to be routed to the trap destination (your local Management Station) over the X.25 network. This application requires the following:

1. Configure for MOX on both ends of the connection per your requirements.
2. Using *TCM*, configure the remote Network Management Card's **Dial-Out Configuration** group.
   - The **AT Init String** parameter value should match the Connect String required for your MOX configuration.

     Example: The remote PAD is connected to the X.25 network through port A of the NIC. The Call User Data String parameter at the local PAD (where your Management Station / trap destination is located) is configured to recognize "NSaxTomO" in the CUD as indicating a MOX call. The value for the AT Init String should be:

     NSaxTomO

   - The **WAN Connect Number** parameter value should be the previously configured MOX X.121 subaddress.

     Example: The remote PAD is connected to the X.25 network through port A of the NIC. The X.121 Subaddress parameter at the remote PAD is configured to recognize "11" as indicating a MOX call. The value for the WAN Connect Number should be:

     A.999999999999911
3. Configure the remote NMC to recognize your local Management Station as the trap destination. See the *Total Control Manager/SNMP Software Guide* for detailed instructions.

Total Control Management of X.25

With the X.25 3.0 release and the Total Control Management Release 4.0, you may now configure the X.25 PAD via a remote Management Station running the *Total Control Manager/SNMP*.

X.25 Protocol Stack and *Total Control Manager/SNMP*

The first step in configuring your PAD is to configure the protocol stack, making it compatible with the Packet Switched Network (PSN) requirements. With X.25 release 3.0 and Total Control management (*TCM* and NMC) release 4.0, the X.25 protocol stack may now be configured via *Total Control Manager/SNMP* software.

NOTE: Although it may appear both the X.25 PAD's RS-232 User Interface and a *TCM* session are concurrently available at your local site, do not attempt to configure any parameters in *TCM* unless you have completely backed out of the RS-232 User Interface (back to the Main Menu).

When you click on the X.25 PAD card (or a port on the card) on the chassis display in *TCM* and click on the Programmed Settings icon, X.25 parameter groups display. For descriptions of each configurable parameter within the parameter group, just select a parameter and click on your right mouse button or refer to the *NMC 4.0 Release Notes.*

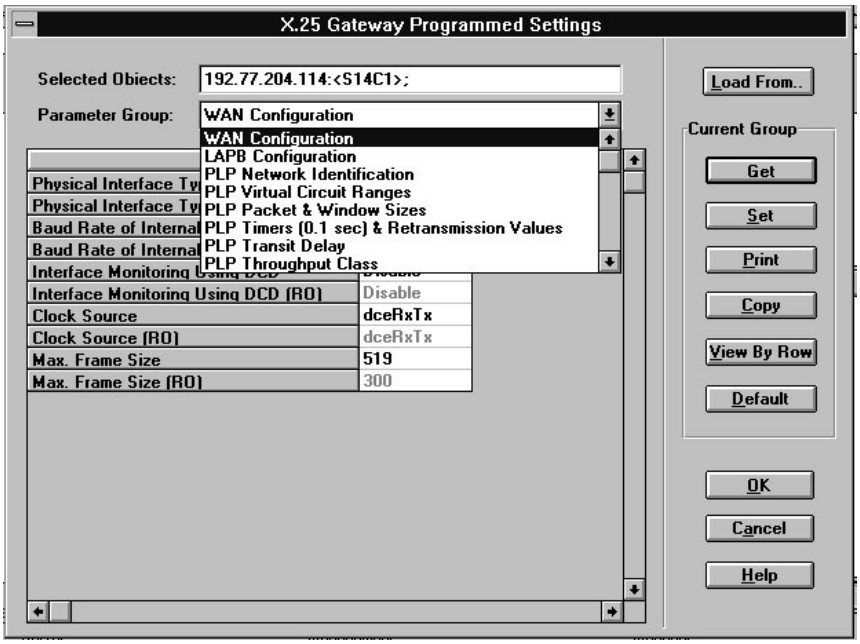

Figure 9—X.25 Groups in the *TCM* Configuration Window

NOTE: X.25 protocol stack parameter values are provided for both read-write and read-only parameters. Read-write parameters may be altered in the interface, but they will not take effect until the card has been reset. Once the card has been reset, the read-write values become the read-only values, as well. The read-only value is the value currently operating in the Gateway's database.

READ-ONLY is called **Operational**; READ-WRITE is called **Administrative**.

X.25 Configurable Parameters in TCM

This section contains a list of the groups and parameters configurable via the *TCM* interface. These parameters pertain to the card-level management and identification, as well as the X.25 Protocol Stack configuration. Refer to the *NMC 4.0 Release Notes* for detailed parameter descriptions.

Programmed Settings

Card Level

X.25 Gateway Identification
This configuration group contains parameters that identify the X.25 PAD in the chassis, including:

- Serial Number
- Hardware Revision
- Software Version
- CPU Type
- RAM Installed
- FLASH Installed
- X.25 Database Status
- User Interface Status
- DIP Switch Settings
- DRAM Installed
- ROM Installed

Configuration Group
This group contains parameters that provide information specific to the X.25 PAD in the chassis.

- User Interface Port
- System Date
- System Time

Management Over X.25
This configuration group contains parameters used specifically for the MOX operations, including:

- Routing Type
- Call User Data String
- X.121 Subaddress

X.25 Tests
This configuration group contains pass/fail results for tests, including:

- EEPROM CRC Test
- Management Bus UART Test
- NMI Test
- RAM Test
- ROM Test
- User Interface Test
- Watchdog Test
- NIC Diagnostic Self Test

Packet Bus Sessions
The Packet Bus Sessions configuration group contains parameter that assist the network administrator in configuring dynamic packet bus sessions, including:

- Slot Session Assignment
- Channel Session Assignment
- Availability for Packet Bus Session
- Session Request Status
- Session Assignment between Entities
- Session Status
- Session Request Status
- Last Packet Communication Type
- Session Tx Packet Count
- Session Rx Packet Count
- Session Packet Size
- Session Packet Timeout Count
- Session Error Status

X25 PAD Configuration
When you select this group from the *TCM* Configuration window, the *X.25 PAD Configurator* program is launched.

Channel-Level

WAN Parameters

The parameters in this configuration group define the interface between the PAD and the X.25 PSN. Parameters include:

- Physical Interface Type
- Baud Rate of Internal Clock Source
- Interface Monitoring Using DCD
- Clock Source
- Max. Frame Size

LAPB Configuration

The parameters in this group set up the link so both the DTE and DCE can send frames. It defines frame transfer parameters, and defines rules for timing and frame formatting. Parameters include:

- N2—Max. Number of PDU Transmissions
- T1—Acknowledgment Timer
- P-Bit Response Timer
- Reject Response Timer
- Busy-State Timer
- Link Idle Timer
- Max. Delay before Sending RR
- Max. Number of Unacknowledged IPDUs
- Transmit Window Size
- Transmit Probe
- Maximum Size of LAPB I Frame
- Ignore any UA Frames Received
- Retransmit Frame Reject
- Transmit Frame Reject
- Reject S-Frame without P-Bit Set
- Send DM on Entry to ADM State

Packet Level Protocol (PLP)

PLP Network Identification

The parameters in this configuration group specify the network protocol, X.25 version, and packet-level protocol to be used by the PAD and the connected PSN. Parameters include:

- Network Protocol Mode
- X.25 Version
- Packet Level Protocol Mode

PLP Virtual Circuit Ranges

The parameters in this configuration group specify the allowable ranges of logical channels assigned to a particular type of virtual circuit. Parameters include:

- Lowest PVC
- Highest PVC
- Lowest Incoming Logical Channel
- Highest Incoming Logical Channel
- Lowest Two-Way Logical Channel
- Highest Two-Way Logical Channel
- Lowest Outgoing Logical Channel
- Highest Outgoing Logical Channel

PLP Packet & Window Sizes

The parameters in this configuration group specify allowable packet and window sizes, as well as the sequence numbering method on the PSN. Parameters include:

- Sequence Numbering Option
- Max. Local Packet Size
- Max. Remote Packet Size
- Default Local Packet Size
- Default Remote Packet Size
- Max. Local Window Size
- Max. Remote Window Size
- Default Local Window Size
- Default Remote Window Size
- Max. NSDU Length

PLP Timers (0.1 sec) & Retransmission Values

The parameters in this configuration group specify allowable timer and retransmission values. Parameters include:

- Acknowledgment Delay—Withhold Pending RR
- T20—Restart Request Response Timer
- T21—Call Request Response Timer
- T22—Reset Request Response Timer
- T23—Clear Request Response Timer
- Status Transmission Timer
- T25—Window Rotation Timer
- T26—Interrupt Response Timer
- Link-Level Hold Time
- DTE / DCE Resolution Timer
- R20—DTE Restart Request Retransmit Count
- R22—DTE Reset Request Retransmit Count
- R23—DTE Clear Request Retransmit Count

PLP Transit Delay

The parameters in this configuration group specify the allowable attributable delays. Parameters include:

- Local Delay (msecs)
- Access Delay (msecs)

PLP Throughput Class

The parameters in this group specify allowable local and remote throughput. Parameters include:

- Max. Local Throughput Class
- Max. Remote Throughput Class
- Default Local Throughput Class
- Default Remote Throughput Class
- Min. Local Throughput Class
- Min. Remote Throughput Class

PLP Throughput Class Windows & Packets

The parameters in this configuration group specify window and packet negotiation and throughput. Parameters include:

- Throughput Negotiation
- Type
- Window Mapping
- Packet Mapping

PLP Closed User Groups

The parameters in this configuration group specify the PAD response to closed user groups. Parameters include:

- With Incoming and Outgoing Access
- Preferential
- With Outgoing Access
- With Incoming Access
- Basic or Extended Format
- Reject Incoming Calls

PLP Subscription Options

The parameters in this configuration group specify any additional features are supplied by the X.25 PSN. Parameters include:

- Subscribe to Extended Call Packets
- Bar Incoming Extended Call Packets
- Fast Select No Restriction
- Fast Select with Restriction
- Reverse Charging
- Local Charging Prevention
- Subscribe to TOA / NPI Address Format
- Bar Incoming TOA / NPI Address Format
- NUI Override
- Bar Incoming Calls
- Bar Outgoing Calls

PLP Localization Information

The parameters in this configuration group specify how the PAD responds to diagnostic packets, international calls, hexadecimal network addresses, and priority packets. Parameters include:

- Allow Omission of Diagnostic Byte
- Use Diagnostic Packets
- ITU-T Clear Length Restriction
- Allow Incoming Diagnostic Packets
- Discard Diagnostic Packets on Non-Zero LCN
- Allow Hex Digits in DTE Address
- Bar Non-Privileged Listen
- International Call Recognition
- Data Network Identification Code
- International Call Priority
- Priority Encode Control
- Priority Packet Forced Value
- Source Address Control

PLP D-Bit Control

The parameters in this configuration group specify the PAD response to delivery information flags. Parameters include:

- D-Bit Accept In
- D-Bit Accept Out
- D-Bit Data In
- D-Bit Data Out

Faults

Card-Level

Packet Bus Traps

- Packet Bus Active Session Trap
- Packet Bus Congestion Trap
- Packet Bus Session Lost Trap
- Packet Bus Session Inactive Trap
- Packet Bus Session Error Trap

X.25 Traps

- Report NAC Resets

X.25 Subnet Traps

- WAN status change to out of service
- WAN status change to link active

Subscribers and the *X.25 PAD Configurator*

Once the stack is configured, you have a basis from which to configure Subscriber records. *Subscriber* is the term we use to describe the basic record of the X.25 PAD database. A Subscriber is a custom configuration, in that it enables certain features and acts as a repository for other configured templates (such as modem profiles).

The X.25 PAD database is made up of configured template information. You set up a template that configures the PAD for a certain type of call (interactive / non-interactive), a call that comes into the PAD from a certain address (terminal), or is directed to a certain address (remote host). Your configured templates are then linked to a Subscriber record. When a call comes into the PAD, it searches its database for a match with a Subscriber record. When a match is found, the modem is configured accordingly and the call is routed.

U.S. Robotics has developed an offline graphical user interface configuration program, the *X.25 PAD Configurator*, with which you can configure your Subscriber records. The *Configurator* can be launched as a stand-alone application, or from *TCM*.

The *Configurator* is composed of 20 windows, 19 displaying templates ready for configuration or those you have already configured, and the first screen you will see: *X.25 PAD Configurator* Main Level window.

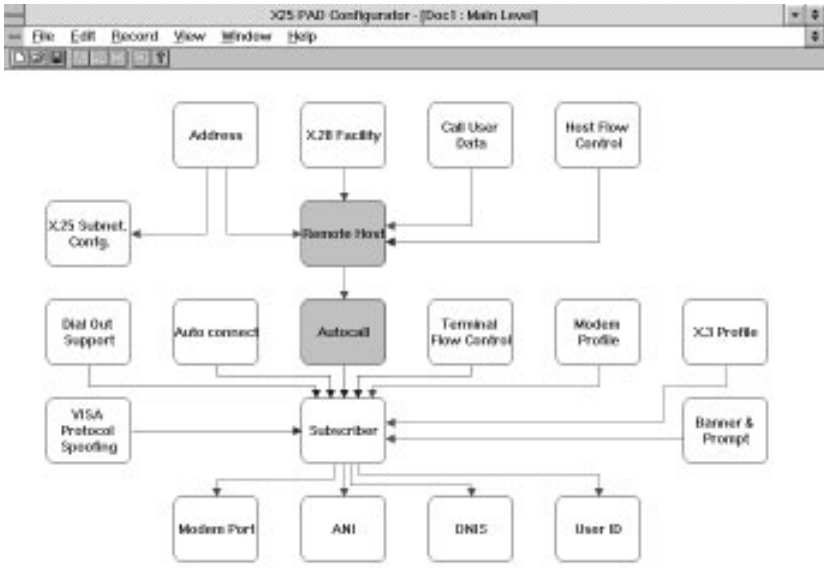

Figure 10—Main Level Window of the *X.25 PAD Configurator*

This window is always displayed when

- a *Configurator* file is opened from an Upload or Download operation.
- a new *Configurator* file is created.

This screen provides several key indicators designed to help you navigate through the PAD's Subscriber configurations.

Red Line	Indicates required preconfiguration. For instance, Modem Profile, X.3 Profile, and Banner and Prompt templates must be configured before a Subscriber can be configured.
Blue Line	Indicates additional configuration options. For instance, making a Subscriber record specific to Autocalls is an option; however, if you decide to do so, you must first configure a Remote Host record (which, in turn, requires configured Address, X.28 Facility, and Call User Data records).
Shaded box	Indicates that none of the required records have been configured and no "Default" or "NONAME" records were included when the software was shipped (see boxes with red lines pointing to the shaded boxes).

The Main Level window presents all the configurable tables, displays relationships, and provides access to configurable/configured tables. When you click your mouse button on one of the 19 boxes displayed, the template table displays, providing a means to configure settings and create configured records for that template type.

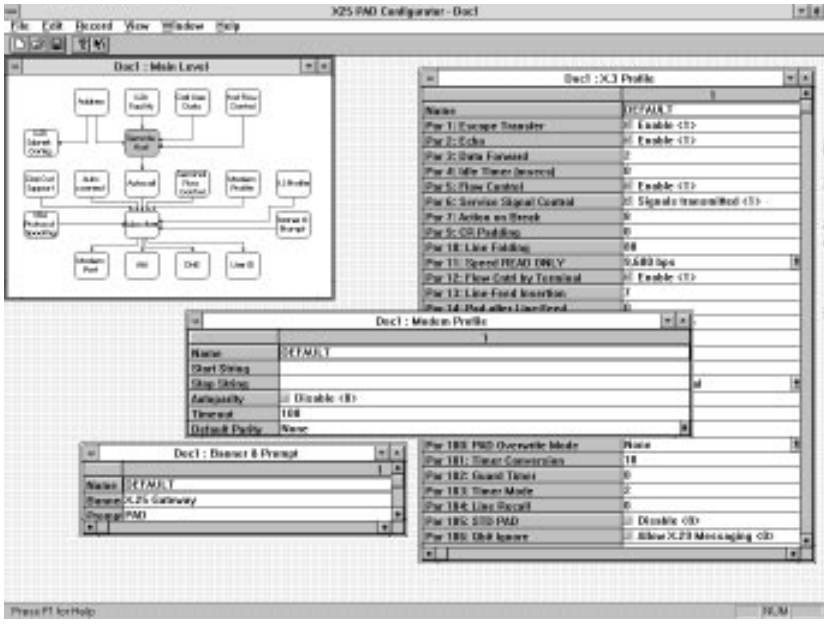

Figure 11—Template Tables

Refer to the *X.25 Reference Manual* for descriptions of each configurable parameter, or just select a parameter and click on your right mouse button.

To learn how to configure a Subscriber, select **Contents** from the Help Menu to open the Help program. We have provided some background information to help you plan your configurations and some example configuration applications. Click on the application type most closely resembling yours. In each example, there is a sample Main Level screen with numbers indicating the order in which you should configure the templates. If no number is present, you need not configure that template for your application. If you want to know more about the template and its parameters, click on the number.

See Appendix E in the *X.25 PAD Reference Manual* for more quick configuration tips.

Saving and Restoring PAD Configurations

With X.25 3.0 and NMC 4.0, the configured records you created as part of the X.25 PAD database (configured records of Subscribers, including X.3 Profiles, Banners & Prompts, *etc.*) may now be backed up via an Upload operation. When PAD configuration files are uploaded, they are copied from the PAD's RAM to the management station PC, where a backup can be safely stored. The backup file of the configured database is named with an .x25 filename extension. This file can be copied from the management station to diskette for further backup.

Additionally, Management Release 4.0 and X.25 Release 3.0 provide a Download operation. This operation may be used to restore the configuration in the PAD's RAM. It may also be used as an easy method of configuring an additional PAD with an identical configuration.

Each uploaded / downloaded file represents a complete X.25 PAD Subscriber configuration set with all 19 tables. Each table may have multiple configured records.

NOTE: Never perform a Download operation when calls are active. The download request will be rejected. Although an Upload request will not be rejected (unless there is heavy NMC traffic), we recommend against performing an Upload operation when calls are active.

Upload Operation

The X.25 PAD NAC contains two versions of its configuration: in RAM and in NVRAM. At any given time, the RAM copy reflects the current configuration values. When an Upload operation is performed, it is the RAM version of the configuration that is uploaded to the Management Station.

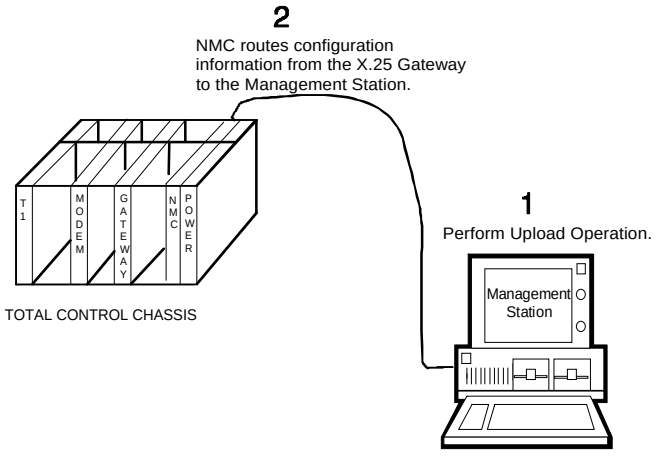

Figure 12—X.25 Configuration Upload (to the Management Station)

1. Establish a connection with the NMC in the chassis where the X.25 PAD Gateway card resides. See the *Total Control Installation Roadmap* for procedures for establishing a session.
2. To Upload a configuration from the PAD to the Management Station, open the *X.25 PAD Configurator* and select **Upload** from the File menu. An address window appears.

Figure 13—X.25 PAD Address

3. Enter (or accept) the IP address of the Management Station and the slot number of the PAD in the chassis.
4. Click on **OK**. The Upload is performed.
5. The current configuration of the card you just queried appears within the *X.25 PAD Configurator* program and a file called "UPLD#.x25" is created on the Management Station's C:\ drive. It is a good safety measure to rename the *.x25 file.

Download Operation

As previously stated, there are two versions of the PAD's configuration at all times: in RAM and in NVRAM. When a Download operation is performed, the RAM version of the configuration is overwritten. We suggest you perform a Save to Nonvolatile RAM operation before Downloading a new configuration to the card (via the RS-232 User Interface or *TCM*). If you want to return to the previous configuration for any reason, you can then do so by resetting the card. Once you are content with the current configuration in RAM, perform another Save to Nonvolatile RAM operation, thus protecting the configuration, should the card reset for any reason.

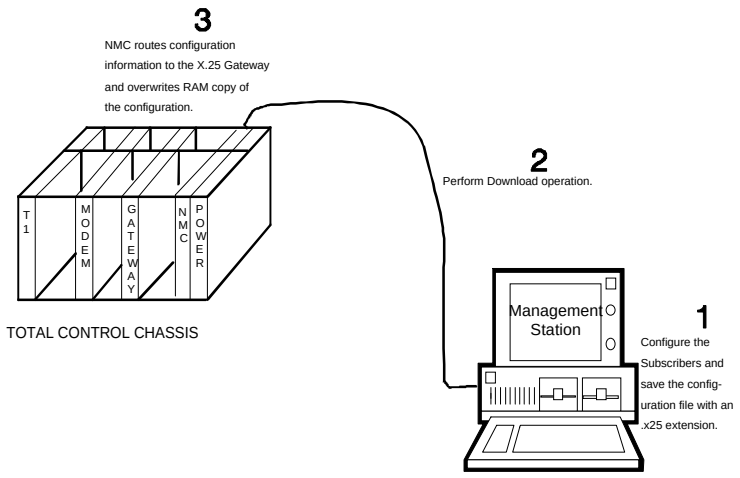

Figure 14—X.25 Configuration Download (from the Management Station)

There are two ways to download a configuration from the *X.25 PAD Configurator*. You may either send the configuration currently displayed on the Main Level screen, or you may download a previously configured configuration file.

Displayed Configuration

1. Launch the *X.25 PAD Configurator* program.
2. Create a configuration file for your PAD, configure the appropriate records, and save it with an .x25 filename extension.
3. Establish a connection with the NMC in the chassis where the X.25 PAD Gateway card resides. See the *Total Control Installation Roadmap* for procedures for establishing a session.
4. Open the *X.25 PAD Configurator* and select **Download** from the File menu. An address window appears.

Figure 15—X.25 PAD Address

5. Enter the IP address of the NMC in the chassis where the PAD resides and the slot number of the PAD in the chassis.
6. Click on **OK**. The Download is performed.

Saved Configuration File

1. Launch the *X.25 PAD Configurator* program.
2. Create a configuration file for your PAD, configure the appropriate records, and save it with an .x25 filename extension.
3. Establish a connection with the NMC in the chassis where the X.25 PAD Gateway card resides. See the *Total Control Installation Roadmap* for procedures for establishing a session.
4. Open the *X.25 PAD Configurator* and select **File Download** from the File menu.
5. A Windows file browse window appears. Locate the configuration file you want to download to the PAD. Click on **OK** to select it. An address window appears.

Figure 16—X.25 PAD Address

6. Enter the IP address of the NMC in the chassis where the PAD resides and the slot number of the PAD in the chassis.
7. Click on **OK**. The Download is performed.

Enhancements to X.25

Several enhancements have been made to the X.25 PAD software that don't involve new features such as Upload / Download or Management Over X.25.

Additional X.3 Template Parameters

The parameters described in this section are new. They are to be configured in addition to the parameters described in Chapter 7 of the *X.25 Reference Manual*.

(107) Max X25 Call Attempts

This parameter sets the number of allowable call attempts to the PAD. Once the user exceeds the number of call attempts allowed, the call immediately takes down the modem-PAD link by dropping DTR.

NOTE: This parameter may only be set via the RS-232 User Interface and the *X.25 PAD Configurator* programs (it may not be set at the PAD prompt).

Options: 1 to 127

Default: 0

(108) Inactivity Timer

This parameter functions as an inter-call inactivity timer. When a user connects to the PAD, this timer begins counting up to the value configured. If the user makes no call attempt to the host during the allotted time, the modem-terminal link is dropped. If the user makes a successful call to the host, this timer is reset and disabled for the remainder of the connection. When the call to the host is cleared, the timer is once again enabled and it begins counting again. A setting of 0 disables this timer.

NOTE: This parameter may only be set via the RS-232 User Interface and the *X.25 PAD Configurator* programs (it may not be set at the PAD prompt).

Options: 0 to 255 seconds

Default: 0

(109) Pass XON/XOFF

This parameter determines whether or not XON / XOFF characters will be passed on from the terminal through the PAD to the remote host.

Options: 0 = No
1 = Yes

Default: 0

(110) Help Enable/Disable

This parameter enables or disables Help at the PAD prompt.

Options: 0 = No
1 = Yes

Default: 0

Improved Banner Syntax

You may now include information in the PAD banner that lets the terminal user know what modem (1-48) and channel (1-4) in the chassis is being used, what slot the modem card inhabits in the chassis (2-13), and the slot the PAD inhabits in the chassis (2-13).

The banner message allows up to 80 characters. You may now include the following switches in the configured banner for the noted results. The switches are not case sensitive (#g and #G result in the same information display).

#m	Modem Number (1-48)
#c	Channel Number (1-4)
#s	Slot Number (2-13)
#g	PAD Slot Number (2-13)

Example:

Welcome! You are using Channel #c of Modem #m in Slot #s.

Subscriber Template Accounting Parameter Enabled

The Accounting parameter (6) in the Subscriber template has been disabled in previous versions of the X.25 PAD. This parameter has now been enabled to provide additional address options.

(6) Accounting (Pass ANI)

This parameter value determines if ANI (Automatic Number Indication String)—the phone number calling into the PAD—is placed in the call request packet *as* the calling address.

Options: 0 = No
1 = Yes

Default: 0

New and Revised X.28 Commands

HOST Command Removed

The HOST command, previously used to list configured host names and aliases available to the user, has been removed for security reasons.

New VERSION Command

VERSION

Alias: none

Syntax: VER[SION]

Description: Displays the software version of the X.25 PAD.

Example: VER

Notes: none

See Also: not applicable

X.3 Effects: not applicable

New CALLSTATS Command

CALLSTATS

Alias: CSTATS

Syntax: CALLSTATS or CSTATS

Description: Displays the Modem, Modem Slot, and Chassis currently in use by the terminal user, as well as the PAD slot in the chassis.

Example: CSTATS

Notes: none

See Also: not applicable

X.3 Effects: not applicable