TOTAL CONTROL™

X.25 Packet Assembler/ Disassembler

HARDWARE INSTALL GUIDE

Table of Contents

About this Guide

The purpose of this guide is to cover the hardware aspects of the X.25 information, refer to the *X.25 PAD Reference Manual*. This manual is part of the Total Control Reference Library. Contact your Sales Representative for more information.

The following topics are covered in this guide:

- NIC / NAC Overview: a brief functional description of the components.
- NIC and NAC hardware: descriptions of how to configure hardware switches on the cards, as well as cabling instructions.
- Installation: description of NIC and NAC installation in a U.S. Robotics chassis.
- Quick Configuration: some quick hints for setting up your PAD.
- Troubleshooting: some troubleshooting steps you can take if you have any problems.
- Technical Specifications: details about the interfaces and mechanicals of the cards.

We Welcome Your Suggestions

Every effort has been made to provide useful, accurate information. If you have any comments or suggestions, please let us know.

By voice mail: (847) 933-5200

Email: sysdocs@usr.com

X.25 NIC/NAC Overview

The Total Control Enterprise Network uses the X.25 application and V.35/RS-232 interface cards to route packet-switched data on Packet Switched Networks (PSNs). Together, these cards perform the same functions as external X.25 PADs.

V.35/RS-232 Network Interface Card (NIC)

The V.35/RS-232 NIC supports one EIA RS-232 interface port (for management and software download) and two V.35/RS-232 ports (for an interface to an X.25 PSN). The V.35/RS-232 ports are independently software configurable for either V.35 or EIA RS-232. Both ports communicate with the PSN synchronously at maximum port speeds of 256 Kbps for an EIA RS-232 port, and 256 Kbps for V.35.

X.25 PAD Network Application Card (NAC)

The X.25 application card emulates a true X.25 PAD. With this application, users can dial in through the public network asynchronously and treat the X.25 PAD card as a packet mode DTE. This allows access to a PSN via the X.25 DTE interface.

In a typical application, a user dials into the Total Control system through the public network. The call is routed to the X.25 PAD card based on the dialed number (DNIS) or the calling number (ANI). These features enable the card to determine if the dial-in user is requesting an interactive or non-interactive service. The X.25 PAD card configures a modem appropriately to answer the call, and the V.35/RS-232 NIC then provides the physical interface to the PSN .

Note on Shipping

NACs and NICs are shipped in one of two ways, depending on the ordering specification:

- As a *separate component* that you'll install in a TC chassis, or in an upgraded chassis.
- As part of a *pre-assembled rack*—a TC chassis with all of its cards factory-installed.

V.35/RS-232 Network Interface Card

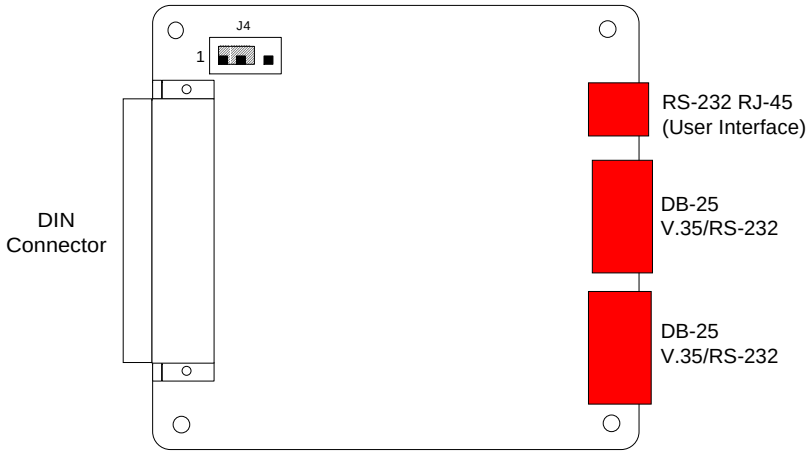
The X.25 PAD Card is paired with the V.35/RS-232 Network Interface Card (NIC).

The following components are provided with the V.35/RS-232 NIC:

- Two DB-25 to V.35/RS-232 adapters
- One null modem adapter
- One 12-foot RJ45 to DB-25 EIA RS-232 adapter cable

NOTE: We recommend using a 25-pin cable straight through to the DCE to ensure passing the RX/TX clock timing.

The following diagram shows the V.35/RS-232 NIC and the components you may be concerned with during installation.

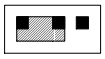


V.35/RS-232 Network Interface Card (NIC)

NOTE: Connector pin-outs and factory settings are provided in *Technical Specifications*, later in this guide.

Jumper

Confirm the jumper shunt position before installation. See the figure on the previous page for the location of the jumper on the board.

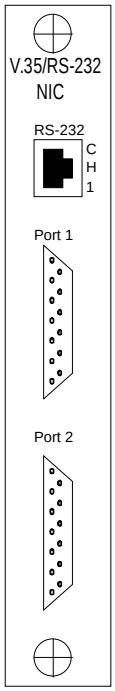


Shunt connects pins 1 and 2 when V.35/RS-232 NIC is behind an X.25 PAD, which allows the NMC to reset the NIC via Management Bus Reset.

Interfaces

There are three jacks on the V.35/RS-232 NIC rear panel:

- One EIA RS-232 User Interface Port
- Two V.35/RS-232 Interface Ports

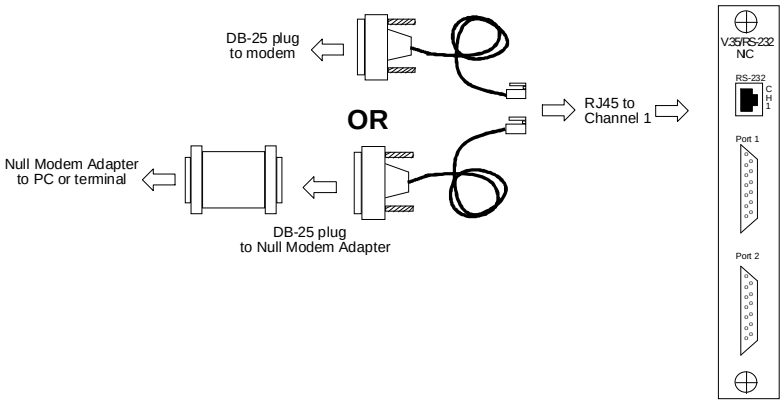


V.35/RS-232 Rear Panel

EIA RS-232 User Interface Port

The EIA RS-232 User Interface Port can be used to cable the NIC to a dumb terminal or PC running terminal emulation for an EIA RS-232 operator interface. This serial port can also be used to cable the NIC to a PC for a software download operation.

The CH1 port consists of an 8-position, RJ45 modular jack, and is a standard EIA RS-232 DTE port. This means that you can use the supplied 12-foot EIA RS-232 cable to connect this port directly to a modem. To connect to a terminal or PC (also DTE ports), place the null modem adapter (provided) between the terminal or PC and the EIA RS-232 cable.



Connecting to the NIC Port

The default speed at this port is 9600 bps, configurable to 57.6 Kbps by setting DIP switches on the X.25 PAD Card.

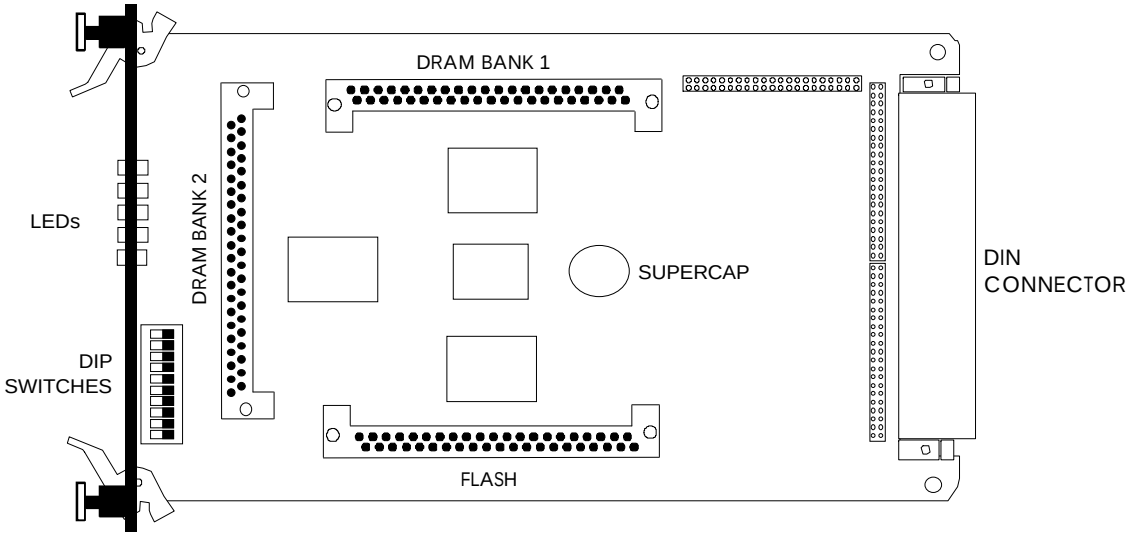
V.35/RS-232 Interface Ports

The two lower ports on the V.35/RS-232 NIC rear panel are designed for connection to a packet-switched network via EIA RS-232 or V.35. The option of using EIA RS-232 or V.35 at the port is software programmable.

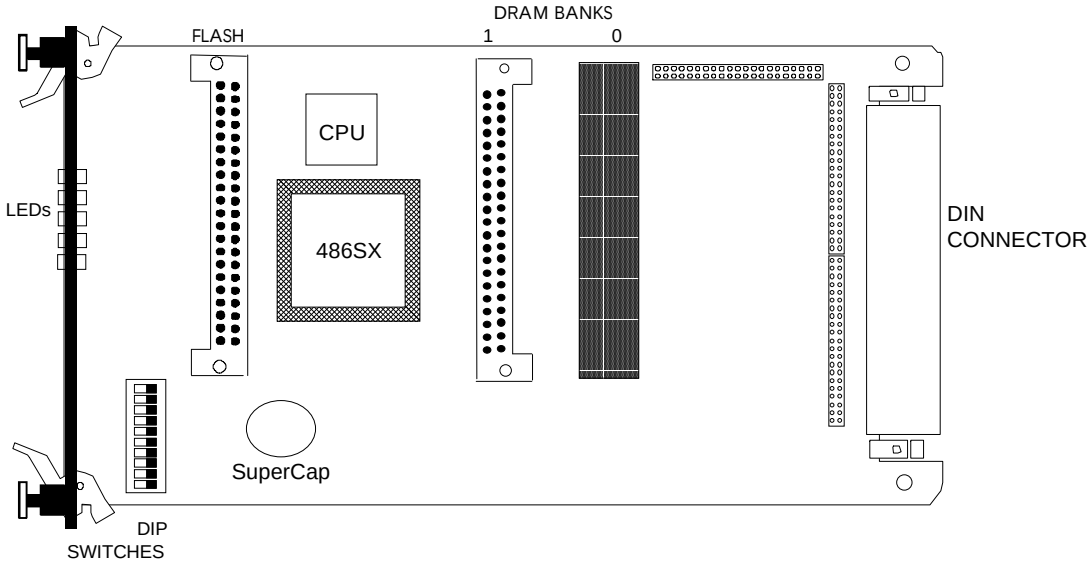
When using the EIA RS-232 interface, connect the NIC to the network with any suitable EIA RS-232 cable. The cable must have connections for pins 1–8, 15, 17, and 20.

When using the V.35 interface, you must use the DB-25 to M.34 adapter cable provided. Attach the DB-25 connector to the appropriate NIC port and screw in the posts for a secure connection. Any standard V.35 cable can be attached to the M.34 end of the adapter cable for connection to the network.

X.25 PAD Card



X.25 Network Application Card (386 Model)



X.25 Network Application Card (486 Model)

DIP Switches

There are ten DIP switches located on the X.25 PAD board (see the previous figures). Of these, DIP switches 1 and 2 are functional at this time, and are used to set the user interface serial port rate on the V.35/RS-232 NIC.

NOTE: The DIP switches are numbered from one at the top to ten at the bottom. The switches are marked to indicate the ON/OFF positions. All switches are factory set to the OFF position.

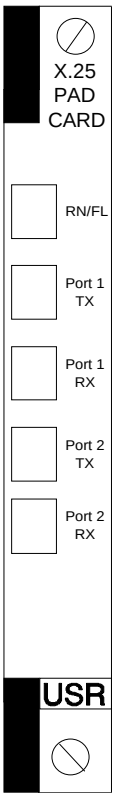
X.25 PAD DIP Switch Settings

Switch	Factory Setting	Function
1,2	OFF,OFF	User Interface Serial Port Rate (on the V.35/RS-232 NIC) **DIP 1 DIP 2 Selects** OFF OFF 9600 bps OFF ON 19200 bps ON OFF 38400 bps ON ON 57600 bps
3–10	OFF	Reserved*

* Do not change the setting of these switches.

Front Panel LEDs

As shown in the figure below, the X.25 PAD Card has 5 LEDs:



Front Panel LEDs

LED	Status	Meaning
RN/FL	Solid Green Flashing Green Solid Red	Normal Initialization/Software Download Critical Failure
Port 1 TX	Solid Green Solid Red Off	Transmitting Data Critical Failure No Data Transmission
Port 1 RX	Solid Green Solid Red Off	Receiving Data Critical Failure No Data Receipt
Port 2 TX	Solid Green Solid Red Off	Transmitting Data Critical Failure No Data Transmission
Port 2 RX	Solid Green Solid Red Off	Receiving Data Critical Failure No Data Receipt

Installation

CAUTION: The X.25 PAD contains VLSI CMOS devices, and is sensitive to static and electric shock. We recommend that you wear a *grounded anti-static strap* when handling the X.25 PAD.

It does not matter whether the Total Control chassis is powered on or off during installation. If you have a pre-assembled chassis, skip to the next section, *Diagnostics*.

NIC Installation

1. If the V.35/RS-232 NIC was not part of a pre-assembled rack, use the USRobotics screwdriver supplied with the chassis to unscrew and remove the safety panel covering the appropriate slot at the rear of the rack, behind the X.25 PAD Card to be installed. Store the safety panel and screws for future use.

   NOTE: Depending on the configuration of the system, safety panels may cover one or several slots on the rear of the chassis.

2. Insert the V.35/RS-232 NIC in the upper and lower plastic card guides of the slot, DIN connector first. Slide the board inward until its connector is firmly plugged into the midplane and its rear panel is flush with the rack.

3. Tighten the captive screws that are attached to the board's rear panel until the NIC is secure.

NAC Installation

4. Power on the rack if it isn't already on.

5. Make sure all DIP switches on the NAC are set to your specifications.

6. Remove the plexiglass door from the front of the chassis.

7 Unscrew and remove the safety panel covering the slot corresponding to the slot in the rear where you installed the NIC). Keep the screws and save the safety panel in case you need them in the future.

8 With the high density connector (DIN) facing the rear of the chassis and the LEDs facing the front, insert the X.25 PAD in the upper and lower plastic card guides of the slot. Slide the board towards the rear until its connector is firmly plugged into the midplane. The front panel with the PAD's LEDs should be flush with the front face of the chassis.

   Once the connector is plugged in and the PAD has power, it begins running some self-diagnostic tests. See the next section for more information.

9 Use the captive screws on the card's front panel to screw the board in place. Pay careful attention to the alignment of the screws before tightening them. Problems could arise if the screws are not threaded properly.

Diagnostics

Once the X.25 PAD is installed in a powered-on chassis, the BIOS code performs various initializations and power-on self-tests specific to the chip set. The Run / Fail LED turns red for about 20 seconds, then flashes green while downloading the operational code.

You can also run these diagnostic tests via the EIA RS-232 User Interface or *Total Control Manager/SNMP*.

DMA Controller Presence

The NAC writes bits to the DMA controller on the NIC via the ISA bus. Then the NAC reads the bytes back, one byte at a time.

DMA and ESCC, Interrupts, and Internal Loopback

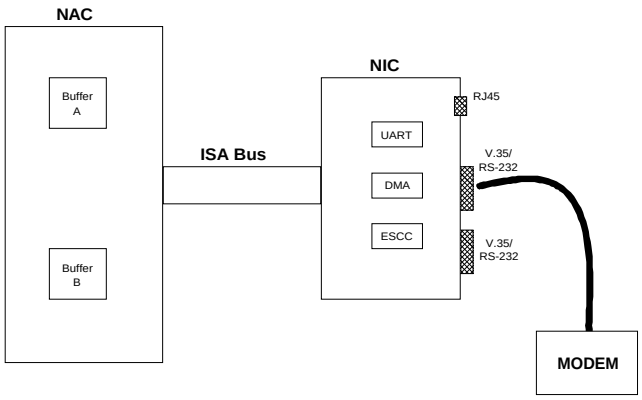
The NAC writes bits to the DMA on the NIC via the ISA bus. Then the bits are transmitted through the ESCC and the NAC reads the bytes back, one byte at a time. The NAC registers all interrupts in the connection.

DMA and ESCC, Interrupts, and External Loopback

Unlike the other diagnostic tests, this test is not run at power up. You must request this test via the EIA RS-232 Operator Interface or *Total Control Manager/SNMP*.

If you want to run this test, you must connect a modem to the port with echo on or tie Transmit and Receive pins on the V.35/RS-232 port you want to test (V.35 = pins 2, 3, 14, and 16; EIA RS-232 = pins 2 and 3).

The NAC sends bits to the DMA on the NIC, then out through the port. The bytes are routed from the port through the ESCC and the NAC reads them back, one byte at a time. The NAC registers all interrupts.



DMA and ESCC, Interrupts, and External Loopback

ESCC Controller Presence

The NAC writes bits to the ESCC controller on the NIC via the ISA bus. Then the NAC reads the bytes back, one byte at a time.

UART Presence

The NAC writes bits to the 16550 UART on the NIC via the ISA bus. Then the NAC reads the bytes back, one byte at a time.

Results

No Failures

Once all tests are performed, if no failures are found, the Run / Fail LED turns solid green.

Critical Failures

If a critical failure is detected, the Run / Fail LED turns solid red and the NAC reboots. A failure is considered critical if it affects execution. Any critical failure is likely to be a hardware problem. If one occurs, contact Technical Support.

Debug Procedure

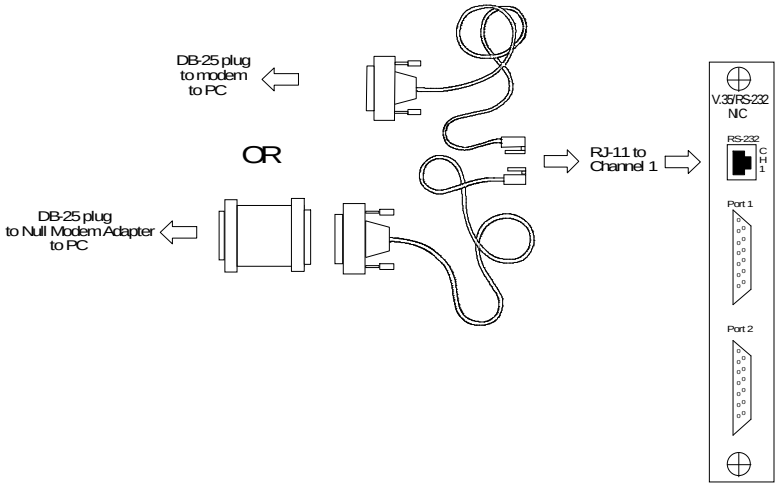
Take these steps in the event of a critical failure.

1. Pull the card forward to unplug it from the midplane, and then reseat it. This may resolve the problem.
2. If reseating the card in the midplane doesn't resolve the critical failure, contact U.S. Robotics Systems Product Support.

Quick Configuration

Initial Setup

Attach your PC or terminal to the User Interface Port, placing the null modem adapter (provided) between the terminal or PC and the EIA RS-232 cable.



Connecting to the NIC Port

Press Enter to display the Main Menu.

If you use a PC, you can use any communications software that provides TTY dumb terminal emulation. Communications settings should be:

- 9600 baud (default NAC DIP switch setting)
- 8 data bits
- 1 stop bit
- no parity
- no flow control
- The COM port that you have cabled to the NIC

The following sections offer a quick guide to configuration when using the EIA RS-232 User Interface, but more detailed information is available in chapters 5 through 9 in the *X.25 PAD Reference Manual.*

Minimal Configuration

The X.25 PAD comes with a default configuration that should bring the network connection up immediately, once a few adjustments are made. If you want to check your network status, simply adjust the following, then save the database, and reset the card:

- logical channel numbers
- port ranges
- clock source

Troubleshooting ideas are provided in a later section of this guide.

To Bring Up the X.25 Link

1 Configure the WAN parameters in the protocol stack.

Field	Options
1. Options	—
2. Maximum Frame Size	133 to 519
3. Baud Rate of Internal Clock Source	0 to 384000
4. Interface Type (RS232 or V.35)	RS232 or V.35
5. Interface Monitoring Using DCD	Yes or No
6. Clock Source	DCERXTX, DCERXONLY, or INTERNAL

2 Configure the virtual circuit ranges in the packet layer.

Field	Options
1. Lowest PVC	0 to 4095
2. Highest PVC	0 to 4095
3. Lowest Incoming Logical Channel	0 to 4095
4. Highest Incoming Logical Channel	0 to 4095
5. Lowest Two-Way Logical Channel	0 to 4095
6. Highest Two-Way Logical Channel	0 to 4095
7. Lowest Outgoing Logical Channel	0 to 4095
8. Highest Outgoing Logical Channel	0 to 4095

3 Save these records to the database and reset the card.

To Bring Up the PAD Prompt

1. Configure at least one Modem Port template and link it to the default Subscriber template.
2. Save these records to the database and reset the card.
3. Make a call to that modem and the PAD prompt should display.

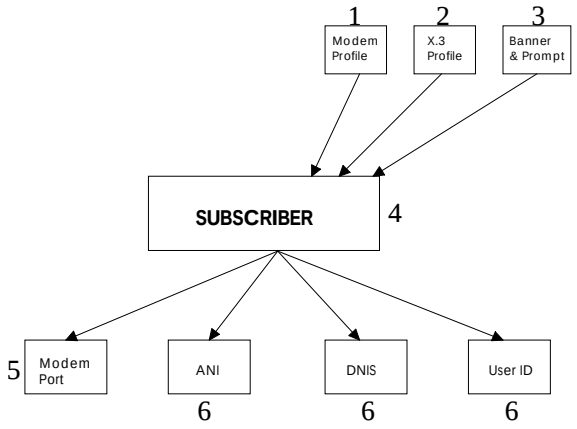
Subscriber Configuration

The following information is intended as a quick reference for the most common configurations. You should be familiar with the information presented in Chapters 6–9 in the *X.25 PAD Reference Manual.*

Interactive Environment

Configure the following templates to set up a Subscriber configuration for an interactive call. See the sequence steps in the diagram.

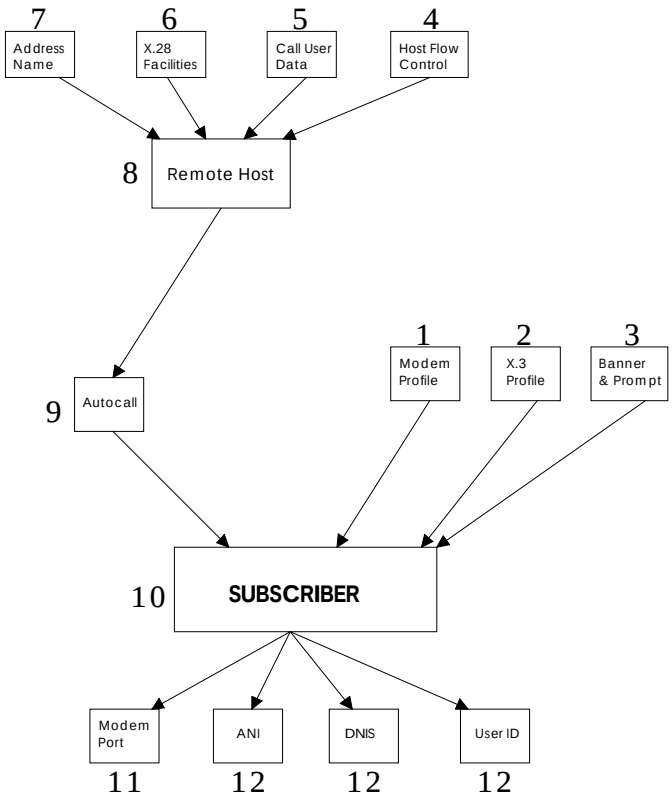
- X.3 Profile
- Modem Profile
- Banner & Prompt
- Subscriber
- Modem Port
- DNIS, ANI, or User ID (optional)



Autocall Noninteractive Environment

Configure the following templates to set up a Subscriber configuration for an autocall. See the sequence steps in the diagram.

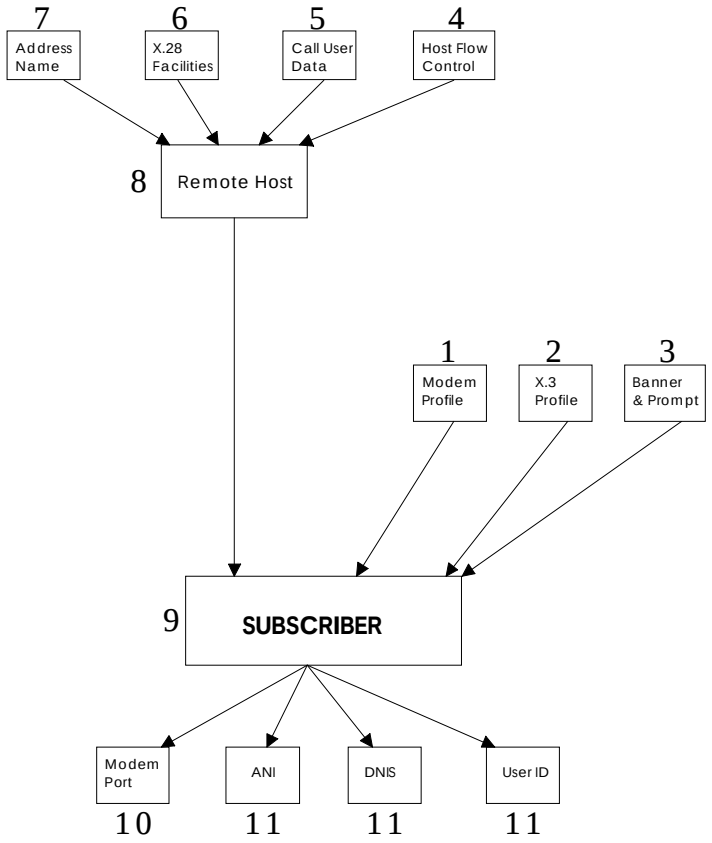
- X.3 Profile
- Modem Profile
- Banner & Prompt
- Host Flow Control
- CUD
- X.28 Facility
- Address
- Remote Host
- Autocall
- Subscriber (enable Autocall, disable Security, and configure for a non-interactive terminal)
- Modem Port
- ANI, DNIS, or User ID (optional)



Interactive Call by Alias

Configure the following templates to set up a Subscriber configuration for a call by alias. See the sequence steps in the diagram.

- X.3 Profile
- Modem Profile
- Banner & Prompt
- Host Flow Control
- CUD
- X.28 Facility
- Address
- Remote Host
- Subscriber (enable Autocall, disable Security, and configure for a non-interactive terminal)
- Modem Port
- ANI, DNIS, or User ID (optional)



To Set Up Autoconnect

Configure the following templates:

- X.3 Profile
- Modem Profile
- Banner & Prompt
- Autoconnect (PLP PVCs must be configured; the Logical Channel Identifier must be the same here as was configured previously in the PLP PVC)
- Subscriber (enable Autoconnect)
- Modem port
- ANI, DNIS, or user ID (optional)

To Set Up Security

Configure the following templates:

- X.3 Profile
- Modem Profile
- Banner & Prompt
- Host Flow Control
- X.28 Facility
- Address
- CUD
- Remote Host
- Subscriber (enable Security)
- User ID

To Configure a PVC

Configure menu option 2 (Virtual Circuit Ranges) from the PLP Groups in the X.25 Protocol stack.

Field	Options
1. Lowest PVC	0 to 4095
2. Highest PVC	0 to 4095
3. Lowest Incoming Logical Channel	0 to 4095
4. Highest Incoming Logical Channel	0 to 4095
5. Lowest Two-Way Logical Channel	0 to 4095
6. Highest Two-Way Logical Channel	0 to 4095
7. Lowest Outgoing Logical Channel	0 to 4095
8. Highest Outgoing Logical Channel	0 to 4095

To Bar Incoming/Outgoing Calls

Configure menu option 8 (Subscription Options) from the PLP Groups in the X.25 Protocol stack.

Field	Options
1. Subscribe to Extended Call Packets	Yes or No
2. Bar Incoming Extended Call Packets	Yes or No
3. Fast Select No Restriction	Yes or No
4. Fast Select With Restriction	Yes or No
5. Reverse Charging	Yes or No
6. Local Charging Prevention	Yes or No
7. Subscribe to TOA/NPI Address Formats	Yes or No
8. Bar Incoming TOA/NPI Address Formats	Yes or No
9. NUI Override	Yes or No
10. Bar Incoming Calls	Yes or No
11. Bar Outgoing Calls	Yes or No

Because you are revising X.25 protocols, you must reset after saving your changes.

To Modify X.25 Timers

Configure menu option 4 (Timers and Retransmission Values) from the PLP Groups in the X.25 Protocol stack.

Field	Options
1. Acknowledgment Delay—Withheld Pending RR	0 to 32000
2. T20—Restart Request Response Timer	0 to 32000
3. T21—Call Request Response Timer	0 to 32000
4. T22—Reset Request Response Timer	0 to 32000
5. T23—Clear Request Response Timer	0 to 32000
6. Tvalue—Status Transmission Timer	0 to 32000
7. T25—Window Rotation Timer	0 to 32000
8. T26—Interrupt Request Response Timer	0 to 32000
9. Idlevalue—Link-Level Hold Time	0 to 32000
10. Connectvalue—DTE/DCE Resolution Timer	0 to 32000
11. R20—DTE Restart Request Retransmission Count	1 to 255
12. R22—DTE Reset Request Retransmission Count	1 to 255
13. R23—DTE Clear Request Retransmisssion Count	1 to 255

Troubleshooting Tips

The *X.25 PAD Reference Manual* provides detailed information about the parameter configurations listed in this section.

The X.25 Link Doesn't Come Up?

1. Look at the WAN Statistics screen. This screen should indicate that DSR, CTS, and DCD are on. If these signals are not on, check the physical cable.

2. If the cable is correctly attached, double-check the interface and clock source configurations.

Field	Options
1. Options	—
2. Maximum Frame Size	133 to 519
3. Baud Rate of Internal Clock Source	0 to 384000
4. Interface Type (RS232 or V.35)	RS232 or V.35
5. Interface Monitoring Using DCD	Yes or No
6. Clock Source	DCERXTX, DCERXONLY, or INTERNAL

3. Next, double-check the PLP mode and version settings in the X.25 stack configuration.

Field	Options
1. Network Protocol Mode	ACCUNET, AUSTPAC, etc.
2. X.25 Version	80, 84, or 88
3. Packet Level Protocol Mode	DCE, DTE, or DXE

4 Double-check to be sure the ports are enabled. Refer to the X.25 Subnetwork Configuration.

Field	Options
Subnetwork (A or B)	A or B
1. Subnetwork ID in Use	Yes or No
2. Address NAME	----------

You Called the Remote Host and Received a Diagnostic Packet?

Check the virtual circuit ranges you configured.

NOTE: If you have a protocol analyzer, use it to determine the cause of the diagnostic packet.

Calls Don't Go Through (Terminal Doesn't Get the PAD Prompt)?

Check the modem's port state in the Modem Port configuration. It should be "inservice."

Calls Are Not Being Routed Per DNIS?

Check the Subscriber NAME entered in the Modem Port configuration. DNIS-based routing will only be done if the Subscriber NAME points to the DEFAULT subscriber.

Technical Specifications

X.25 PAD

Certification

Complies with FCC Part 15, UL-listed, CSA-approved

Processor

80386DX at 33 Mhz or 80486SX at 50 Mhz

Operational Memory—DRAM (Dynamic Random Access Memory)

8 Mbytes

Flash ROM

2 Mbytes standard, upgradeable to 8 Mbytes

Data Retention Method

Clock, CMOS and chassis configuration values retained

Type:	Supercap 5.5V .47 Farad
Retention:	3 days
Service life:	MTBF of 100,000 hours

Midplane Connector

180-position, 4-row, high-density connector

NAC Management Bus

512 KHz (Data Clock)

ISA Bus

8 MHz

X.25 NAC Physical Dimensions

Length:	12.95"	32.89 cm
Width:	.79"	2.0 cm
Height:	6.9"	17.53 cm

Environment

Shipping and Storage

Temperature:	-25 ° to +75 ° Celsius, -13 ° to +167 ° Fahrenheit
Relative Humidity:	0 to 100% non-condensing

Operating

Temperature:	0 ° to +40 ° Celsius, 32 ° to +104 ° Fahrenheit
Relative Humidity:	0 to 95% non-condensing

X.25 NAC Power Requirements

	Typical	Maximum
+5VDC	2.8 A	3.5 A
-5VDC	8 mA	20 mA
12VDC	29 mA	50 mA
-12VDC	16 mA	50 mA

V.35/RS-232 NIC

Certification

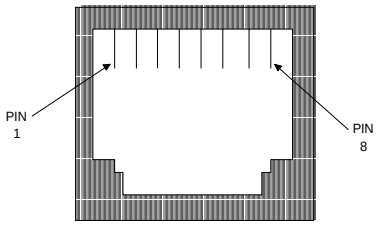
Complies with FCC Part 15 Class A, FCC Part 68, UL-listed, CSA-approved, and DOC-certified

Midplane Connector

180-pin DIN connector (90 pins are used)

Serial Ports (applies to EIA RS-232 CH1)

8-Pin Modular Jack Serial Port (DTE)



8-Position Modular Jack	Circuit	Function	DTE←→DCE
1	CC	Data Set Ready	←
2	CF	Carrier Detect	←
3	CD	Data Terminal Ready	→
4	AB	Signal Ground	—
5	BB	Receive Data	←
6	BA	Transmit Data	→
7	CB	Clear to Send	←
8	CA	Request to Send	→

Electrical specification: EIA RS-232, 8-position modular jack

Connectors:

8-position modular jack: Stewart 88-360808 or equivalent

Configuration: DTE

Transmission method: Unbalanced EIA RS-232

Transmission rate: 57.6 Kbps maximum

Cable Specifications

Wire type: Belden 9538 or equivalent, 8 conductor, shielded

Maximum cable distance: 50 feet, 15 meters

Cabling: 8-position modular jack to DB-25 (IBM AT pin-out)

Nominal direct current resistance:

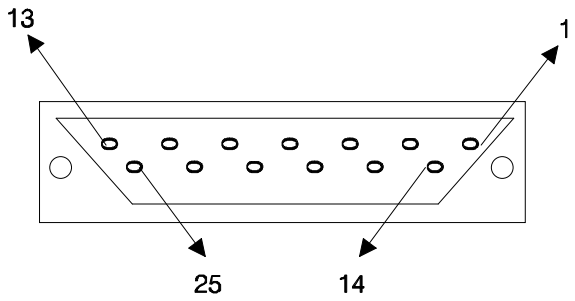
- *Center conductor:* 24 gage (7 strands 32 gage); .61 millimeter diameter; 23.7 ohms / 1000 feet; 77.8 ohms / kilometer
- *Shield:* 15.5 ohms / 1000 feet; 50.9 ohms / kilometer

Nominal outside diameter: .265 inch; 6.73 millimeters

Nominal capacitance between conductors: 30 picofarads / foot; 98 picofarads / meter

V.35/RS-232 Connector (Applies to Ports 1 and 2)

V.35/RS-232 Port (DTE)



BOLD indicates Required Signals

DB-25	Function	DTE←→DCE
1	Chassis Ground	—
2	Transmit Data (A)*	→
3	Receive Data (A)*	←
4	Request to Send	→
5	Clear to Send	←
6	Data Set Ready	←
7	Signal Ground	—
8	Data Carrier Detect	←
9	Receive Clock (B)*	←

DB-25	Function	DTE←→DCE
10	—	—
11	External Clock (B)*	→
12	Transmit Clock (B)*	←
13	—	—
14	Transmit Data (B)*	→
15	Transmit Clock (A)*	←
16	Receive Data (B)*	←
17	Receive Clock (A)*	←
18	Local Loopback	→
19	—	—
20	Data Terminal Ready	→
21	Remote Loopback	→
22	Ring Indicator	←
23	—	—
24	External Clock (A)*	→
25	Test Indicator	←

* A, B make up differential pairs used for V.35 interface.

NOTE: We recommend using a 25-pin cable straight through to the DCE to ensure passing the RX/TX clock timing.

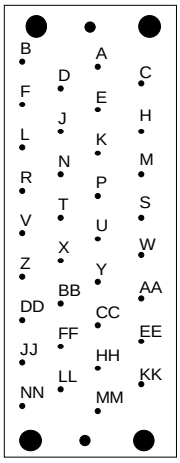
Data Transfer Rate: Balanced V.35 up to 256 Kbps, Unbalanced EIA RS-232 up to 57.6 Kbps

Topology: Point to Point

EIA RS-232 Connector: DB-25, AMP 748877-2 or equivalent

V.35 Connector: USR 1 foot DB-25 to 34-pin conversion cable assembly (USR# 1.009.686-B), which consists of one male DB-25 AMP 747547-2 or equivalent and one M.34 AMP 213300-1 or equivalent

DB-25 to M.34 Conversion Cable (DCE)



Two adapters (DB-25 to M.34) are supplied for V.35/RS-232 NIC cabling. The table indicates the pin-outs for cables and adapters.

(EIA RS-232) DB-25 Adapter	(Using Adapter*) M.34 (V.35)
1	A
2	P
3	R
4	C
5	D
6	E
7	B
8	F
9	X
10	—
11	W
12	AA
13	—
14	S
15	Y
16	T
17	V
18	J
19	—
20	H
21	BB
22	—
23	—
24	U
25	K

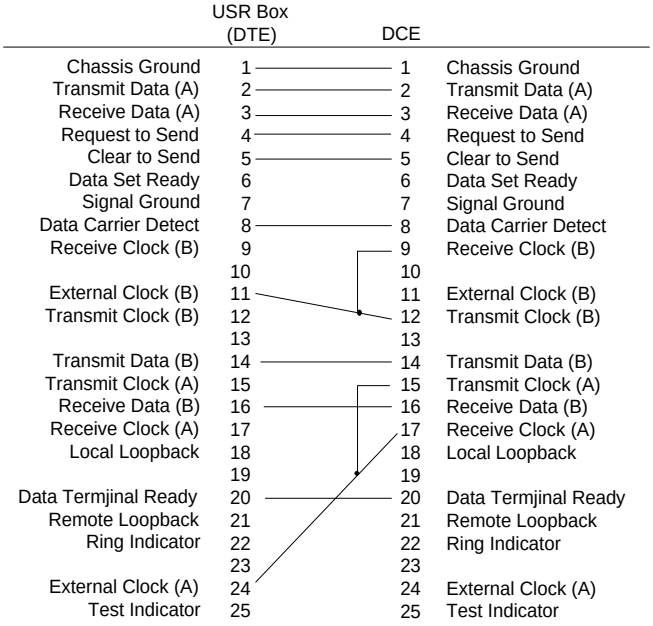
* Pins 10, 13, 19, 22, and 23 are not connected on the DB-25 connector.

Cable Specifications

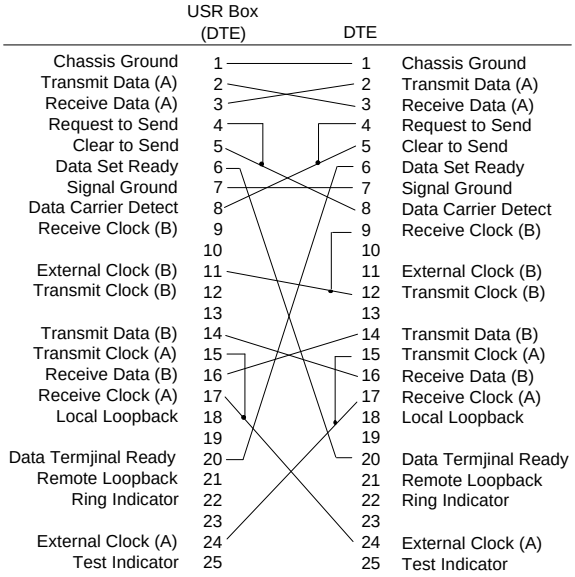
Wire type:	Stranded, 22/26 AWG Rated @ 80° C/300V
Cable length:	1 foot
Insulation Resistance:	Greater than 5000 Megaohms
Dielectric strength:	100 V RMS for 1 minute min.
Contact resistance:	300 Milliohms max.
Current rating:	1 amp min.
Contact plating:	15 microinches gold over 50 microinches nickel

Clock Source Cables

V.35/RS-232
Clock Source Cable



V.35/RS-232 Null Modem
Clock Source Loopback Cable



V.35/RS-232 NIC Physical Dimensions

Length:	5.3"	13.46 cm
Width:	.79"	2.0 cm
Height:	6.90"	17.53 cm

Environment

Shipping and Storage

Temperature: -25 ° to +75 ° Celsius, -13 ° to +167 ° Fahrenheit

Relative Humidity: 0 to 100% non-condensing

Operating

Temperature: 0 ° to +40 ° Celsius, +32 ° to +104 ° Fahrenheit

Relative Humidity: 0 to 95% non-condensing

V.35/RS-232 NIC Power Requirements

	Typical	Maximum
+5VDC	.98 A	1.2 A
+12VDC	14 mA	50 mA
-12VDC	15 mA	50 mA
-5VDC	57mA	70mA