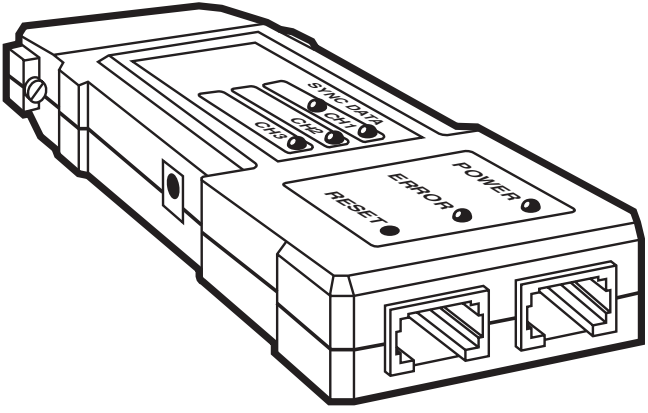
BLACK BOX®
NETWORK SERVICES

NOVEMBER 2000

MX320A-HS MX320AE-HS
MX325A-HS MX325AE-HS

X.25 PAD-2



CUSTOMER SUPPORT INFORMATION

Order **toll-free** in the U.S.: Call **877-877-BBOX** (outside U.S. call **724-746-5500**)
FREE technical support 24 hours a day, 7 days a week: Call **724-746-5500** or fax **724-746-0746**
Mailing address: **Black Box Corporation**, 1000 Park Drive, Lawrence, PA 15055-1018
Web site: **www.blackbox.com** • E-mail: **info@blackbox.com**

FEDERAL COMMUNICATIONS COMMISSION AND INDUSTRY CANADA RADIO-FREQUENCY INTERFERENCE STATEMENTS

This equipment generates, uses, and can radiate radio frequency energy and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio communication. It has been tested and found to comply with the limits for a Class A computing device in accordance with the specifications in Subpart J of Part 15 of FCC rules, which are designed to provide reasonable protection against such interference when the equipment is operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user at his own expense will be required to take whatever measures may be necessary to correct the interference.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This digital apparatus does not exceed the Class A limits for radio noise emission from digital apparatus set out in the Radio Interference Regulation of Industry Canada.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de classe A prescrites dans le Règlement sur le brouillage radioélectrique publié par Industrie Canada.

EN 55022 warning: This is a Class A product. In a domestic environment, it might cause radio interference. If it does, the user might be required to take adequate measures to correct the interference.

TRADEMARKS USED IN THIS MANUAL

BLACK BOX and the ◆ logo are registered trademarks of Black Box Corporation.

Any other trademarks mentioned in this manual are acknowledged to be the property of the trademark owners.

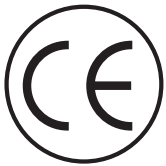
EUROPEAN UNION DECLARATION OF CONFORMITY

The manufacturer declares that the X.25 PAD-2 conforms to the following EMC and safety standards:

- EN55022 (1994): "Limits and methods of measurement of radio disturbance characteristics of information technology equipment."
- EN50082-1 (1992): "Electromagnetic compatibility: Generic immunity standard for residential, commercial, and light industry."
- EN 60950 (1992/3): "Safety of information technology equipment, including electrical business equipment."

The X.25 PAD-2 herewith complies with the requirements of the EMC Directive 89/336/EEC. The product was tested in a typical configuration.

Also, in accordance with EN 41003, the safety status of all ports on the X.25 PAD-2 is declared to be SELV (Safety Extra Low Voltage).



UL Listing Requirements

IMPORTANT SAFETY INSTRUCTIONS

For North American Users

The X.25 PAD-2 is powered by an external power supply. To reduce the risk of shock, fire, and injury, use it only with a UL® listed and CSA Certified Class 2 power supply rated 12 VDC, 400 (or more) mA.

Exigences UL

INSTRUCTIONS IMPORTANTS DE SÉCURITÉ

Pour les utilisateurs Nord Americains

Le X.25 PAD-2 est renforcé par un transformateur extérieur. Afin de réduire le risque d'électrocution, de feux ou de blessure, utiliser seulement avec le UL listé et le CSA Certifié classe 2 le transformateur de 12 VDC, 400 mA ou plus.

Safety Warning

Always observe standard safety precautions when you install, operate, and maintain the X.25 PAD-2. Only qualified and authorized service personnel should attempt to adjust, maintain, or repair it; this should never be done by untrained or unauthorized persons.

NORMAS OFICIALES MEXICANAS (NOM)
ELECTRICAL SAFETY STATEMENT

INSTRUCCIONES DE SEGURIDAD

1. Todas las instrucciones de seguridad y operación deberán ser leídas antes de que el aparato eléctrico sea operado.
2. Las instrucciones de seguridad y operación deberán ser guardadas para referencia futura.
3. Todas las advertencias en el aparato eléctrico y en sus instrucciones de operación deben ser respetadas.
4. Todas las instrucciones de operación y uso deben ser seguidas.
5. El aparato eléctrico no deberá ser usado cerca del agua—por ejemplo, cerca de la tina de baño, lavabo, sótano mojado o cerca de una alberca, etc..
6. El aparato eléctrico debe ser usado únicamente con carritos o pedestales que sean recomendados por el fabricante.
7. El aparato eléctrico debe ser montado a la pared o al techo sólo como sea recomendado por el fabricante.
8. Servicio—El usuario no debe intentar dar servicio al equipo eléctrico más allá a lo descrito en las instrucciones de operación. Todo otro servicio deberá ser referido a personal de servicio calificado.
9. El aparato eléctrico debe ser situado de tal manera que su posición no interfiera su uso. La colocación del aparato eléctrico sobre una cama, sofá, alfombra o superficie similar puede bloquea la ventilación, no se debe colocar en libreros o gabinetes que impidan el flujo de aire por los orificios de ventilación.

10. El equipo eléctrico deber ser situado fuera del alcance de fuentes de calor como radiadores, registros de calor, estufas u otros aparatos (incluyendo amplificadores) que producen calor.

11. El aparato eléctrico deberá ser connectado a una fuente de poder sólo del tipo descrito en el instructivo de operación, o como se indique en el aparato.

12. Precaución debe ser tomada de tal manera que la tierra fisica y la polarización del equipo no sea eliminada.

13. Los cables de la fuente de poder deben ser guiados de tal manera que no sean pisados ni pellizcados por objetos colocados sobre o contra ellos, poniendo particular atención a los contactos y receptáculos donde salen del aparato.

14. El equipo eléctrico debe ser limpiado únicamente de acuerdo a las recomendaciones del fabricante.

15. En caso de existir, una antena externa deberá ser localizada lejos de las lineas de energia.

16. El cable de corriente deberá ser desconectado del cuando el equipo no sea usado por un largo periodo de tiempo.

17. Cuidado debe ser tomado de tal manera que objectos liquidos no sean derramados sobre la cubierta u orificios de ventilación.

18. Servicio por personal calificado deberá ser provisto cuando:

    A: El cable de poder o el contacto ha sido dañado; u

    B: Objectos han caído o líquido ha sido derramado dentro del aparato; o

    C: El aparato ha sido expuesto a la lluvia; o

    D: El aparato parece no operar normalmente o muestra un cambio en su desempeño; o

    E: El aparato ha sido tirado o su cubierta ha sido dañada.

Contents

1. Specifications

Compliance — CE (EN55022, EN 50082-1, EN 60950) Class A; FCC Class A, IC Class/classe A

Interfaces —

Channel 1 (to packet-switched synchronous link):

MX320 models: ITU V.35 proprietarily pinned on DB25, DTE;

MX325 models: EIA/TIA RS-232/ITU V.24/V.28, DTE;

Channels 2 and 3 (to local async devices): EIA/TIA RS-232/ITU V.24/V.28 proprietarily pinned on RJ-45, DCE

Protocols —

Channel 1: Synchronous 1988 ITU X.25 LAP-B or Frame Relay; for Frame Relay, supports CCLM, LMI, and ANSI PVC management protocols, as well as ANSI T1.606, T1.617 Annex D, T1.618, and ITU Q.922 Annex A;

Channels 2 and 3: Asynchronous SLIP or X.28 (user-selectable)

Clock Source — Channel 1: Internal or external for receive and transmit paths, user-selectable

Data Rate —
Channel 1:
MX320 models: Up to 2 Mbps, user-selectable;
MX325 models: Up to 128 kbps, user-selectable;
Channels 2 and 3: 75 bps to 115.2 kbps, user-selectable

Data Format — Channels 2 and 3: 5, 6, 7, or 8 data bits; even, odd, mark, space, or no parity; 1, 1.5, or 2 stop bits; user-selectable

Flow Control — Channels 2 and 3: Hardware (DTR/CTS) or software (X-ON/X-OFF), user-selectable

Other Characteristics for Channels 2 and 3 —
Log-on messages: Herald and bulletin, user-definable;
Command modes: ITU X.28 (with proprietary extensions) and X.29;
Terminal handling: Enhanced, beyond the requirements of ITU X.3

Packet Size — Up to 4 KB for X.25 or 8 KB for Frame Relay

Maximum Distance —
Up to 50 ft. (15.2 m) to attached devices;
MX320 models: If unbalanced control leads aren't required, transmission across 500 ft. (152.4 m) or more might be possible *to/from Channel 1 only*

Memory — 512 KB RAM

User Controls —

Top-mounted reset button;

(1) Internal board-mounted jumper for power-up settings

Indicators — (6) Top-mounted LEDs:

(1) POWER (lights green while unit is powered);

(1) ERROR (lights red if a hardware malfunction is detected);

(1) SYNC (lights or flashes green to show status of synchronization between linked PAD-2s);

(3) DATA (one for each channel—these light or flash yellow in response to data activity on the corresponding ports)

Connectors —

(1) Left-side-mounted DB25 female for channel 1 (patch cable provided to M/34 female on MX320 models);

(2) Right-side-mounted RJ-45 female for channels 2 and 3;

(1) Front-mounted barrel jack for power

Temperature Tolerance — 32 to 122˚F (0 to 50˚C)

Humidity Tolerance — Up to 90% noncondensing

Power —

Through desktop power supply:

Input: 100 to 250 VAC, 47 to 63 Hz (autosensing), at approximately 300 mA;

Output: 5 VDC at up to 1.5 A;

Consumption: 3.5 watts maximum

NOTE

Although the "-A" and "-AE" models of the PAD-2 formerly used different 115-VAC and 230-VAC power supplies, they now use the same universal power supply.

Size — 0.9"H x 2.1"W x 4.3"D (2.3 x 5.4 x 11 cm);

Weight — 3.3 oz. (90 g)

2. Introduction

The X.25 PAD-2 provides easy, cost-effective access to a packet-switching network or device in a wide range of applications. For example, it can serve as:

- A PAD (Packet Assembler/Disassembler);
- An access unit for private or public X.25 networks;
- An access server for a mainframe's X.25 ports;
- An async switch and contention manager; or
- A FRAD (Frame Relay Access Device).

It can also be used to run asynchronous data over Frame Relay, either in X.25 packets or directly (in SLIP protocol).

Two versions are available, in "-A" (115-VAC) and "-AE" (230-VAC) models: The MX320A-HS and MX320AE-HS models use V.35 for their channel-1 (sync packet-switched) interface, while the MX325A-HS and MX325AE-HS models use RS-232. On all models, channel 1 is a DB25 female connector, while local async channels 2 and 3 are RJ-45 female connectors, but the MX320 models come with a short cable you can attach to the WAN port to patch it to a V.35-standard M/34 female connector. The X.25 PAD-2's maximum data rate

on channel 1 is 128 kbps for the MX325 models or 2 Mbps for the MX320 models.

Channel 1 is always DTE, but can be configured for either X.25 or Frame Relay. Channels 2 and 3 are always DCE but can be configured for SLIP or X.28.

The rest of this manual describes the procedures for installation and basic operation of the X.25 PAD-2. For detailed information about configuring, operating, and testing the unit, please refer to our *Packet Switching Guide*.

3. Installation

3.1 The Complete Package

The X.25 PAD-2 ships from the factory completely assembled. It comes with its power supply, an RJ-45 to DB25 patch cable for configuration, and this manual. MX320 models should also come with a DB25 to M/34 patch cable for the WAN-link port. If anything is missing or arrived damaged, please call Black Box right away.

3.2 Site Requirements

To install the X.25 PAD-2, you'll need to place it within 5 feet (1.5 meters) of an easily accessible grounded AC outlet capable of furnishing 115 VAC ("-A" models) or 230 VAC ("-AE" models). Any power supply you use with the PAD-2 should provide 5 VDC at at least 700 mA and should be regulated (+10%, –2%).

The location where you place the X.25 PAD-2 should always have an ambient temperature between 32 and 122˚F (0 and 50˚C). The relative humidity at that location should never exceed 90%, and condensation should never occur there.

3.3 Setting the NOR/INI Jumper

Most of the X.25 PAD-2's configuration settings are handled through its command facility (refer to the *Packet Switching Guide*). There is, however, one jumper inside the unit that you might want to set differently. As shown in Figure 3-1 on the next page, the jumper is labeled JP2 and has two possible settings: NOR (normal operation) and INI (initialize).

If JP2 is set to NOR (the default setting, suitable for most applications), the X.25 PAD-2 will begin operating normally when you power it up, using the same configuration settings that it was using when it was last powered down.

If JP2 is set to INI, the X.25 PAD-2 will initialize itself, restoring all of its configuration settings to their factory-default values, every time you power it up.

To access this jumper, *make sure* the PAD-2 is unplugged, then unscrew and remove the four screws at the corners of the bottom of the unit. You should then be able to lift off the top half of the X.25 PAD-2's case. When you're finished, put the top half of the case back on and refasten the screws (do *not* overtighten them).

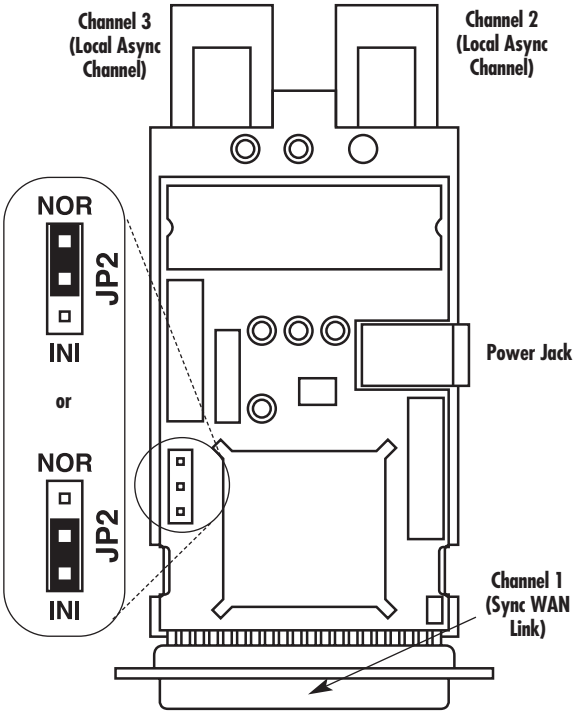


Figure 3-1. Setting NOR/INI jumper JP2.

3.4 Connecting Cables and Power

The X.25 PAD-2 has three ports designated as channels 1, 2, and 3. When you hold the PAD-2 so you can read the labeling on its top panel, channel 1 (the DB25 female connector) is on the left-hand side of the unit and channels 2 and 3 (the RJ-45 female connectors) are on the right.

NOTES

For pinouts of these connectors, refer to the *Packet Switching Guide*.

All cables attached to the X.25 PAD-2 should be shielded in order to comply with FCC rules. The X.25 PAD-2 and its data interfaces will work well even if the cables are not shielded, but some radio interference might occur.

3.4.1 Channel 1

Channel 1 is the "main link" connector that supports synchronous packet-switched data. On MX325 models, its DB25 connector is pinned as an RS-232 DTE, like a terminal or the larger COM ports on a PC. To attach it to a sync RS-232 DCE (sync modem, SME, etc.) with a DB25 female port, use a 25-pin straight-through-pinned shielded RS-232 cable such as product code EBN25C-MM. To connect to other types of sync RS-232 devices/ports, please call Black Box Technical Support.

On MX320 models, the DB25 connector is proprietarily pinned as a V.35 DTE. A DB25 male to M/34 female patch cable is included with the unit; attach this to channel 1 to give the X.25 PAD-2 a standard V.35 DTE port. To attach this to a V.35 DCE (CSU/DSU, etc.) with an M/34 female connector, use straight-through-pinned shielded V.35 cable such as product code EYN450-MM. To connect to other types of V.35 devices/ports, call Black Box Technical Support.

3.4.2 Channels 2 and 3

Channels 2 and 3 are the X.25 PAD-2's async local channels. Their RJ-45 female connectors are proprietarily pinned as RS-232 DCE.

The PAD-2 comes with a single RJ-45 male to DB25 female patch cable that you can use to attach one of these channels to the DB25 male serial port of a PC or terminal for easy configuration. After you configure the PAD-2, you can leave this cable on if this PC or terminal will be communicating across the packet-switched link; this cable can support data transmission as well. Call Black Box Tech Support if you'd like a second such cable, or if you need an adapter for this cable to attach a DB25 female DCE at this distance.

To hook up either of these channels to an RS-232 device or port that (a) is farther away or (b) has some other type of connector, you'll need to use shielded twisted-pair cable with RJ-45 connectors such as product code EVNSL60, plus a modular adapter that you can build yourself or have us build for you. Call Black Box Tech Support.

3.4.3 Power

All models of the X.25 PAD-2 now come with a universal power supply that can accept power at voltages from 100 to 250 VAC and frequencies from 47 to 63 Hz. (At one time, the "-A" and "-AE" models came with different 115-VAC and 230-VAC supplies, but this is not the case now.)

To plug in and power up the PAD-2, you'll need a power-input cord that has a plug suitable for your AC outlets on one end and an IEC 320 female outlet on the other; we carry several varieties of such cords. Run this input cord from a grounded AC outlet to the IEC 320 male inlet on the power-supply transformer. Then plug the power-supply's output cord into the barrel jack on the front of the PAD-2. The unit should power up immediately; it has no ON/OFF switch.

4. Operation

4.1 The External Components

Figure 4-1 shows the X.25 PAD-2's external components. For the function of each numbered component, see Table 4-1 on the next two pages.

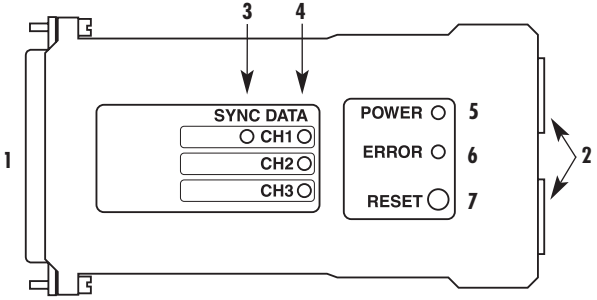


Figure 4-1. The X.25 PAD-2's top panel, showing the external indicators, connectors, and reset button.

Table 4-1. The X.25 PAD-2's External Components

No.	Component	Function
1	Channel 1 (DB25 female)	Synchronous port connected to packet-switched device or network.
2	Channels 2 & 3 (RJ-45 female)	Asynchronous ports connected to local devices.
3	SYNC LED	Indicates the X.25 PAD-2's synchronization status: OFF: PAD-2 is not powered; Steadily lit: PAD-2 is powered and channel 1's connection is synchronized; Coninuously flashing: PAD-2 is powered but channel 1's connection is not synchronized.
4	Channel LEDs CH1, CH2, and CH3	Light when the corresponding channel is active (receives or transmits data).
5	POWER LED	Lights when the X.25 PAD-2 is powered ON.

Table 4-1 (continued). The X.25 PAD-2's External Components

No.	Component	Function
6	ERROR LED	Lights if the X.25 PAD-2 detects a hardware malfunction during its self-test (performed when it powers up and after you press the RESET button)
7	RESET button	Press to reset the X.25 PAD-2's internal circuitry (including its data buffers) and start its power-up self-test

4.2 Operating Instructions

After you install and plug in the X.25 PAD-2 as described in **Chapter 3**, it normally operates unattended. Once you configure the unit for your application as described in the *Packet Switching Guide*, it will store its configuration settings in nonvolatile memory, so you shouldn't need to work with it again unless changes to your system require it to be reconfigured. (This assumes that you can keep jumper JP2 set to "NOR"; see **Section 3.3**.)

4.2.1 Power ON

Plug the power supply's output cord into the barrel jack on the front of the X.25 PAD-2. Then plug its input cord into a working AC outlet. The PAD-2 should start operating immediately—it doesn't have an ON/OFF switch—and the POWER LED on its top panel should light.

If the synchronous packet-switched link on channel 1 isn't yet operational, the SYNC LED on the PAD-2's top panel will flash. Wait until the link becomes operational (up to a few seconds for X.25 or a minute for Frame Relay); when it does, the SYNC LED will stop flashing and become steadily lit.

The X.25 PAD-2 will now perform a self-test. If it lights its ERROR LED, or if the SYNC LED doesn't stop flashing, check all cable and power connections and the connected equipment, then power the unit OFF and back ON again. If the problem persists, call Black Box Technical Support.

4.2.2 Normal Operation

During normal operation, the POWER and SYNC indicators should remain steadily lit, the ERROR indicator should stay dark, and the channel-activity LEDs CH1, CH2, and CH3 should either (a) be dark if the channel is idle or (b) flash at a rate that reflects the traffic load if the channel is sending or receiving data.

4.2.3 Power OFF

To power OFF the X.25 PAD-2, unplug its power supply from the AC outlet.

5. Troubleshooting

5.1 Things to Check First

If you have difficulty with your X.25 PAD-2, here are some things to try:

- Check the PAD-2's LED indicators. Compare their current states with the information in **Chapter 4**.
- Make sure the PAD-2 is powered. Is the POWER LED lit? If not, check the power-supply connections and make sure the AC outlet is working.
- Make sure that all of the cables are properly connected to the PAD-2.
- Make sure that all equipment connected to the PAD-2 is powered and operating normally.
- Make sure that the PAD-2 and the packet-switched device it's communicating with are configured properly for your application and for interaction with the local equipment attached to channels 2 and 3. Refer to the *Packet Switching Guide*.

If you can't determine what's causing the problem, power the PAD-2 OFF and back ON again. If the problem persists, call Black Box Technical Support.

5.2 Calling Black Box

If your X.25 PAD-2 seems to be malfunctioning, *do not attempt to alter or repair the unit.* It contains no user-serviceable parts. Call Black Box Technical Support at 724-746-5500; the problem might be solvable over the phone.

Before you call, make a record of the history of the problem. We will be able to provide more efficient and accurate assistance if you have a complete description, including:

- the nature and duration of the problem;
- when the problem occurs;
- the components involved in the problem;
- any particular application that, when used, appears to create the problem or make it worse; and
- the results of any testing you might have already done.

5.3 Shipping and Packaging

If you need to transport or ship your X.25 PAD-2:

- Package it carefully. We recommend that you use the original container.
- If the shipping is return- or repair-related, include everything you received with the PAD-2 when you pack it. Contact Black Box to get a Return Authorization (RA) number.

NOTES

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1000 Park Drive • Lawrence, PA 15055-1018 • 724-746-5500 • Fax 724-746-0746