IBM

8-Port Asynchronous ISA Adapter Installation and User's Guide

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IBM

8-Port Asynchronous ISA Adapter Installation and User's Guide

> **Note**
>
> Before using this information and the product it supports, be sure to read the general information under "Product Warranties and Notices" included with your system unit.

Third Edition (November 1996)

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Contents

Safety Information

DANGER

> An electrical outlet that is not correctly wired could place hazardous voltage on metal parts of the system or the devices that attach to the system. It is the responsibility of the customer to ensure that the outlet is correctly wired and grounded to prevent an electrical shock.
>
> Before installing or removing signal cables, ensure that the power cables for the system unit and all attached devices are unplugged.
>
> When adding or removing any additional devices to or from the system, ensure that the power cables for those devices are unplugged before the signal cables are connected. If possible, disconnect all power cables from the existing system before you add a device.
>
> Use one hand, when possible, to connect or disconnect signal cables to prevent a possible shock from touching two surfaces with different electrical potentials.
>
> During an electrical storm, do not connect cables for display stations, printers, telephones, or station protectors for communication lines.

About This Book

This book, when used with your system unit documentation, helps you install either of the 8-Port Asynchronous ISA Adapters. It also provides information needed for installing and configuring the necessary software device drivers and for verifying that installation and configuration were successfully completed.

Related Publications

This book refers to the documentation that came with your system unit.

ISO 9000

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Chapter 1. Overview

The 8-Port Asynchronous ISA Adapters are multi-channel intelligent serial communications adapters.

The adapters contain 128KB (kilobytes) of dual-ported high-speed RAM used for program code and data buffering. The ISA adapters support speeds of up to 115Kbps (kilobits per second) for each asynchronous port and is run by a 32-bit 16 MHz IDT 3041 processor.

The dual-ported RAM memory is accessible for read and write operations by both the adapter and the system unit. The system unit sees the dual-ported RAM as its own memory and accesses it by the same high-speed memory referencing commands it uses for its internal memory.

Installation Requirements

- 8-Port Asynchronous Adapter Package
- AIX CD (if no diskette is furnished with the 8-Port Adapter Package)
- The User's Guide that came with your system
- Flat blade screw driver.

8-Port Asynchronous Adapter Package

The 8-Port Asynchronous ISA Adapter package contains the following items:

- 8-Port asynchronous adapter
- 8-Port Asynchronous Cable with Fan-out Box or Connector assembly
- Optional media containing device driver or diagnostic software for the 8-Port Asynchronous ISA Adapter
- 8-port Asynchronous Adapter Installation and User's Guide (this manual).

Handling the Adapter

Attention: Static electricity can damage your equipment. Leave the adapter in the static-protective bag until you are ready to configure or install it.

Chapter 2. Hardware Configuration and Installation

This section provides instructions for configuring and installing the 8-Port Asynchronous EIA-232E ISA adapter or the 8-Port Asynchronous EIA-232E/RS-422A ISA adapter.

These adapters contain static-sensitive components. Always touch a grounded surface to discharge static electricity before handling the adapter.

Configuring the Adapter

Before you install the adapter in your system, you must assign it a unique bus I/O address.

If the 8-Port Asynchronous ISA Adapter is the first ISA adapter installed into your system, you may use the default bus I/O address of `0x324`.

Important: Each ISA adapter in your system must have an unique bus I/O address. This is true whether the adapters are of the same type (for example, all 8-Port Asynchronous ISA Adapters) or a mixture of different types. If two or more ISA adapters in a system are given the same bus I/O address, the system behaves in an unpredictable manner.

Choosing the Bus I/O Address

If one or more ISA adapters are already installed in your system, refer to Appendix D, "Using the AIX lsresource Command" on page D-1 for information on using the AIX **lsresource** command to determine what bus I/O addresses are in use on your system.

Important: Record the I/O address you select in Table 2-1 on page 2-2. You need this information to configure the software device driver for this adapter as well as to avoid bus I/O address conflicts with other ISA adapters you may install in the future.

Table 2-1. ISA Bus I/O Addresses	
ISA Adapter Description	**Bus I/O Address**
8-Port Async	0x_____
	0x_____
	0x_____
	0x_____
	0x_____

Setting the Bus I/O Address

Configure the bus I/O address you select by setting the switches on the rear of the adapter as shown in Figure 2-1. A switch is ON when it points towards the numbers labeled on the switch.

If you are using the default address for the first ISA adapter (0x324), all four switches are set to ON.

You may set the switches to the address you select before or after you install the adapter into your system.

```
Bus  I/O                    Address
Address                     Switch

             1      2      3      4
0x104      OFF    OFF     ON     ON      OFF    ON
0x114      OFF     ON    OFF     ON                   1
0x124      OFF     ON     ON     ON                   2
0x204       ON    OFF    OFF     ON                   3
0x224       ON    OFF     ON     ON                   4
0x304       ON     ON    OFF     ON
0x324       ON     ON     ON     ON
```

Figure 2-1. Bus I/O Address Switch Settings

Note:

- Address 0x324 is the default address set at the factory.

- The maximum of seven adapters is defined as any combination of seven 8-Port Asynchronous EIA-232E and 8-Port Asynchronous EIA-232E/RS-422A adapters together. This is because the two adapter types use the same seven Bus I/O Address ranges.

Installing the Adapter

To install the 8-Port Asynchronous ISA adapter, follow these steps:

1. Refer to your system unit documentation for instructions on shutting down the system, removing the covers, and installing ISA adapters. Shutdown your system unit, turn off its power, and remove the covers.

2. Locate an available ISA slot in your system unit and remove the slot plate.

3. Plug the 8-Port Asynchronous ISA adapter into the slot, and screw the endplate to the system unit chassis using the screw you removed from the slot plate. The adapter endplate must be screwed to the system unit chassis for the system to remain in compliance with Part 15 of the FCC rules.

4. Replace your system unit's covers according to your system unit documentation.

5. Connect the 8-Port Asynchronous cable with fan-out box to the adapter.
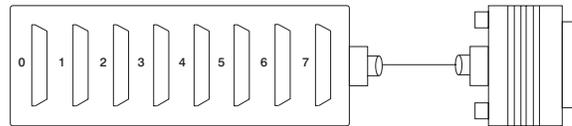
Figure 2-2. 8-Port Asynchronous cable with fan-out Box
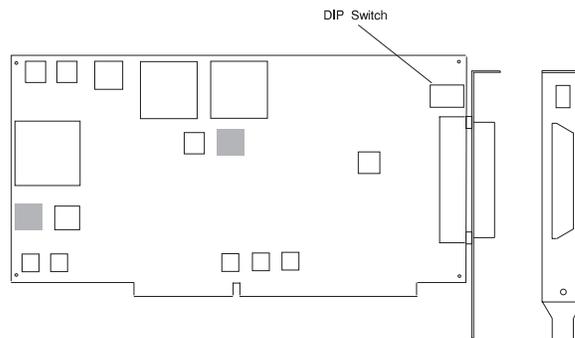
Figure 2-3. 8-Port Asynchronous EIA-232E Adapter
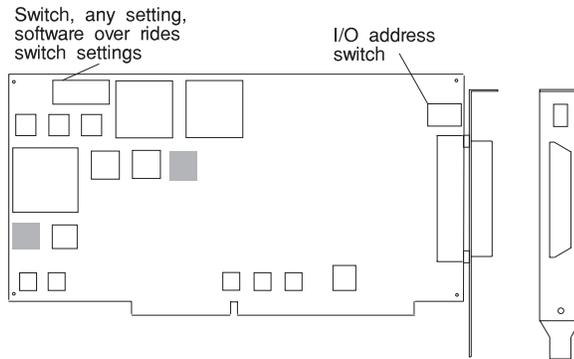
Figure   2-4. 8-Port Asynchronous EIA-232E/RS-422A Adapter

Note: There are componenets on the back side of the 8-Port Asynchronous
EIA-232E/RS-422A Adapter.

Refer to the following sections for cabling, handshaking, and specifications for the
8-Port Asynchronous ISA Adapters:

- Appendix A, "Connectors and Cables" on page A-1

- Appendix B, "Handshaking" on page B-1

- Appendix C, "Specifications for the 8-Port Asynchronous ISA Adapters" on
  page C-1.

You are now ready to install the software and can proceed to Chapter 3, " Installing,
Configuring, and Verifying Software" on page 3-1.

Chapter 3. Installing, Configuring, and Verifying Software

Once you have completed installing the hardware, you must next install and configure the device software. You may also want to verify that your software installation and configuration were successfully completed. Software installation, configuration, and verification procedures are shown below.

AIX Software Installation

1. Turn the system unit on.

2. Log in as root.

3. Insert the media containing the device driver software (diskette or CD-ROM) into the appropriate media device, for example, CD-ROM drive.

4. Enter:

   ```
   smit devinst
   ```

   and press Enter.

5. The **Install Additional Device Software** screen is displayed. The "INPUT device/directory for software" option is highlighted.

6. You can either:

   • Press F4 to display a list of input devices from which you can select the appropriate device and press Enter.

   • Enter the input device you are using in the entry field where the cursor is positioned.

7. The **Install Additional Device Software** is displayed. The device you selected is now displayed in the "INPUT" device/directory for software entry field.

   The "SOFTWARE to install" option is highlighted.

8. Press F4 to display a list of software you can install.

9. Enter:

   ```
   /
   ```

   and press Enter to display a Find dialog.

10. Enter the appropriate Device Driver for your adapter type:

    ```
    devices.isa.cxia - For 8-Port EIA-232E Adapters
    devices.isa.pc8s - For 8-Port EIA-232E/RS422A Adapters
    ```

    and press Enter.

11. Press F7 to select the highlighted software and press Enter.

12. The **Install Additional Device Software** screen is displayed with the required fields filled in. Press Enter.

13. The **ARE YOU SURE** list is displayed. Press Enter.

14. The following occurs when the **COMMAND STATUS** screen is displayed:

    - The term RUNNING is highlighted to indicate that the install and configure command is in progress.

    - When RUNNING changes into OK, scroll down to the bottom of the page and locate the Installation Summary.

    - At the bottom of the page, if the installation was successful, SUCCESS appears in the Result column of this summary.

15. Remove the installation media from the drive.

16. Press F10 to exit SMIT.

Proceed with the next section.

AIX Software Configuration

1. Enter:

    smit isa

2. On the ISA Adapters screen, select "Add an ISA Adapter" and press Enter. The **Add an ISA Adapter** screen displays.

3. Select "8-Port Async, EIA-232E or EIA-232E/RS-422A
    (ISA)" and press Enter. The Parent Device screen displays.

4. Select "bus1" and press Enter. The **Add an 8-Port Async, EIA-232E or EIA-232E/RS-422A (ISA) Adapter** screen displays.

    You can use the default values for all information required for this screen *except* Bus I/O Address.

5. Press F4 for a list of available Bus I/O Addresses. Select the bus I/O address to match the switch settings on the adapter recorded in Table 2-1 on page 2-2.

    Important: If you select a different address while configuring the software without changing the bus I/O address switches on the adapter, your system will not function correctly.

6. All required information is now entered on this screen. Press Enter.

7. The **COMMAND STATUS** screen displays while the software installation command is being run. When command status changes from `RUNNING` to `OK`, the software configuration procedure is complete.

   If an error message displays on the **COMMAND STATUS** screen, refer to Appendix D, "Using the AIX lsresource Command" on page D-1 as a trouble shooting aid.

8. Press F10 to exit smit.

   You may now proceed with verifying your newly installed ISA device. There is no need to shutdown or reboot your system.

Verifying Device Driver Installation

To verify that your newly installed 8-Port Asynchronous ISA Adapter is available for use, follow the steps below:

1. At the prompt, type the following and press Enter.

   `lsdev -Cs isa`

2. A list of ISA devices displays. Verify that the 8-Port Asynchronous ISA Adapter is in `Available` mode.

If the 8-Port Asynchronous ISA Adapter registers `Available`, your installation is ready to use.

Diagnostics

Diagnostics may be supplied with your device driver, or may be found in a separate package. Refer to your system unit documentation for more information about running diagnostics.

Windows NT (PowerPC Edition) Device Driver Installation - Version 3.51

1. Log on to Windows NT (PowerPC Edition) as an Administrator.

2. Double-click on the Main program group icon.

3. Double-click on the Control Panel icon.

   If the Control Panel icon is missing, type `control` on a command line to initiate the program directly. To get to a command line prompt, select the MS DOS command prompt icon.

4. Double-click on the Network icon.

   On this window there is a Network Software and Adapter Cards area that contains an INSTALLED NETWORK SOFTWARE list and an INSTALLED ADAPTER CARDS list. When you have finished the installation, this bottom list should contain entries for the adapter you have installed.

5. Click on **Add Adapter** (not **Add Software**).

   The message `Setup is preparing network card choices` displays in a window. This may take 10 to 30 seconds, depending on your configuration.

6. Select **IBM 8-Port Async EIA-232, ISA adapter**. Click on **Continue**.

7. When asked for a path for the driver software, enter the letter of the drive from which you installed the &wnt. software. Click on **Continue**.

8. Fill in the information requested in the dialog boxes. Refer to the help screens in the configuration dialog boxes, and the information in the adapter's installation guide for switch settings and supported interrupt levels. For memory window size and starting addresses, refer to "Memory Window Size and Starting Address" on page 3-5.

9. Click on **OK**.

   The NETWORK SETTINGS panel displays again. This time an entry for the adapter you have just added appears in the INSTALLED ADAPTER CARDS list box.

   Click on the OK button at the top right of this window to complete the installation.

10. A message displays indicating that you need to shutdown and reboot. Click on **Restart now**.

Windows NT (PowerPC Edition) Device Driver Installation - Version 4.0

1. Log on to Windows NT (PowerPC Edition) as an Administrator.

2. Double-click on the My Computer icon.

3. Double-click on the Control Panel icon.

4. Double-click on the Network icon.

5. Select **Adapters**.

6. Select **Add**.

7. Insert the Windows NT (PowerPC Edition) CD-ROM into the CD-ROM drive and select **Have Disk**.

8. Enter the path for the CD-ROM drive and press OK.

9. Scroll through the adapter list, select **IBM 8-Port Async, EIA-232 (ISA) Adapter**.

10. Press OK.

The driver now installs and the changes are saved. Upon completion, you must shutdown and restart your system unit before the new settings take effect.

Memory Window Size and Starting Address

The memory window size and starting address are programmed into the board by the device driver. No switches or jumpers are required to change these parameters.

The 8-port adapter requires 32K bytes of unused memory address space in your system unit. This is usually allocated from the area between 0C0000h and 0EFFFFh in your system unit's memory map. Before deciding on a memory start address, remember that the 8-port adapter may have to coexist with a number of other devices that also require memory address space. You may have to try a number of different starting addresses before you find a free area. The starting addresses for 32K windows between 0C0000h and 0EFFFFh are 0C0000h, 0C8000h, 0D0000h, 0D8000h, 0E0000h and 0E8000h. You can also run the **WINMSD** program to help find open memory address ranges.

Note: If you are installing more than one 8-port adapter, they can all share the same starting address.

Appendix A. Connectors and Cables

There are two types of 8-Port Asynchronous ISA adapters. There is the 8-Port Asynchronous EIA-232E adapter and the 8-Port Asynchronous EIA-232E/RS-422A adapter. The 8-Port Asynchronous EIA-232E adapter supports only the EIA-232E communications devices. The 8-Port Asynchronous EIA-232E/RS-422A adapter supports both EIA-232E communications devices and the RS-422A communications devices. Each port on the 8-Port Asynchronous EIA-232E/RS-422A adapter can be set by software to support either EIA-232E or RS-422A. The connectors on these adapters look the same but have different signals on the pins when the RS-422A interface is being used.

Connectors for the 8-Port Asynchronous EIA-232E adapter

The 8-Port Asynchronous EIA-232E adapter is shipped with a cable and attached fan-out box or connector box that provides eight DB-25 standard connectors. The pin assignments for the male DB-25 connectors follow the EIA-232E DTE interface standard. The following table shows the DB-25 connector pin assignments for EIA-232E Applications.

Table A-1. DB-25 Connectors for EIA-232E Applications			
Signal	**Description**	**Use**	**Pin Number**
GND	Chassis Ground	N/A	Shell
TxD	Transmitted Data	Output	2
RxD	Received Data	Input	3
RTS	Request to Send	Output	4
CTS	Clear to Send	Input	5
DSR	Data Set Ready	Input	6
SG	Signal Ground	Reference	7
DCD	Data Carrier Detect	Input	8
DTR	Data Terminal Ready	Output	20
RI	Ring Indicator	Input	22

Connectors for the 8-Port Asynchronous EIA-232E/RS-422A Adapter

The 8-Port Asynchronous EIA-232E/RS-422A adapter is shipped with a cable and attached fan-out box or connector box that provides eight DB-25 standard connectors. The pin assignments for the male DB-25 connectors for the EIA-232E interface follow the EIA-232E DTE interface standard. The pin assignments for the male DB-25 connectors for the EIA-232E applications are shown in Table A-1 on page A-1. The following table shows the DB-25 connector pin assignments for RS-422A applications.

Table A-2. DB-25 Connectors for RS-422A Applications			
Signal	**Description**	**Use**	**Pin Number**
GND	Chassis Ground	N/A	Shell
TxDb	Transmitted Data b	Output	2
RxDb	Received Data b	Input	3
TxDa	Transmitted Data a	Output	4
RxDa	Received Data a	Input	5
DSR	Data Set Ready	Input	6
SG	Signal Ground	Reference	7
DCD	Data Carrier Detect	Input	8
DTR	Data Terminal Ready	Output	20

Cables

EIA-232E and RS-422A serial interface cables should be shielded, low-capacitance cables. Ideally, they should be designed specifically for serial data transmission.

Grounding

The shield should be grounded at both ends of the cable. Chassis Ground, available on the shell of the DB-25 connector, is ideal for this purpose.

Environment

While good shielding provides reasonable protection against noise (electromagnetic interference, or EMI), cables should still be routed away from noise sources wherever possible. Avoid laying cables in close proximity to transformers, generators, motors, fluorescent lights, or other electrical noise-producing equipment.

Capacitance vs. Length of Run

The total capacitance of a cable affects the integrity of transmitted data. As a general rule, the total capacitance of a cable (including the connectors) should not exceed 2500 pF for baud rates of up to 57,600 (1200 pF for 115K baud and 600 pF for 230K baud). Serial interface cable is usually rated in picofarads per foot (pF/ft). Therefore, if a cable has a capacitance of 50 pF/ft, and the connectors are 100 pF each, the maximum recommended cable length is 46 feet for baud rates of up to 57,600. If the cable is rated at 12.5 pF/ft, the maximum recommended cable length is 184 feet, and 5 pF/ft cable can be run up to 460 feet.

Asynchronous Cable Connectors

All of the asynchronous cables described below have the same connectors. In each case the end that goes to the system has a 25 pin D shell with sockets (female). The end that goes to the device has a 25 pin D shell with pins (male). The figure below shows the ends of the 25 pin connectors. The system end is on the left and the device end is on the right.
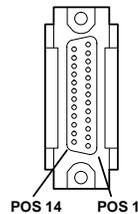
System End (Female)   Device End (Male)
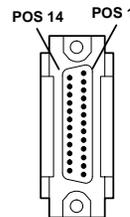
Figure   A-1. Asynchronous Cable Connectors

Connecting to a Modem (EIA-232E Application)

```
System  End                                    Device  End

Signal          Pin                        Pin          Signal

GND            Shell    ▭▭▭▭▭▭▭     1           GND

TxD             2      ─────────────      2           TxD

RxD             3      ─────────────      3           RxD

RTS             4      ─────────────      4           RTS

CTS             5      ─────────────      5           CTS

DSR             6      ─────────────      6           DSR

SG              7      ─────────────      7           SG

DCD             8      ─────────────      8           DCD

DTR            20      ─────────────     20           DTR

RI             22      ─────────────     22           RI

( ▭▭▭ Cable  Shield)
```
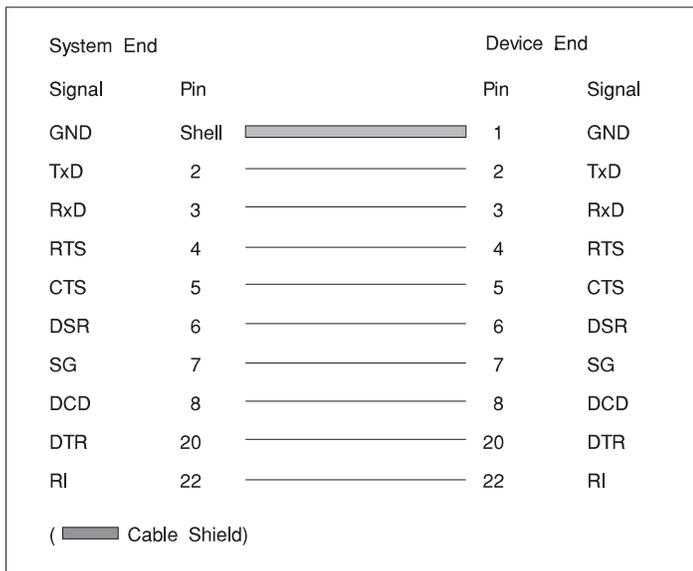
Figure   A-2. Modem Cable

To connect the 8-Port Asynchronous EIA-232E or EIA-232E/RS-422A ISA adapter to
a modem, use a standard straight-through cable (see Figure A-2) to connect the
modem to one of the DB-25 connectors on the connector box.

Connecting to a DTE Device

A DTE device can be such things as a terminal, serial printer, or another system
unit's serial port. To connect the 8-Port Asynchronous EIA-232E or
EIA-232E/RS-422A ISA adapter (which is also a DTE device) to another DTE device,
you need a null modem cable or adapter.

Appendix B. Handshaking

Software Handshaking (XON/XOFF)

In most cases, serial terminals and printers need only a three-signal connection to either 8-Port Asynchronous ISA Adapter. For device drivers that support XON/XOFF (software) handshaking, the only required signal lines are transmitted data (TxD), received data (RxD), and signal ground (SG). Cables must be shielded to remain in compliance with FCC certification requirements, and the shield must be connected to chassis ground (GND) at both ends of the cable run. It can be used for a null modem cable (for example, transmitted data on one end of the cable is connected to received data at the other end, and vice versa). A cable of this type is shown in Figure B-1 for EIA-232E applications.

```
System  End                              Device  End

Signal       Pin                   Pin         Signal

GND          Shell  �▬          1           GND

TxD          2          ╲    ╱      2           TxD

RxD          3          ╱    ╲      3           RxD

RTS          4                      4           RTS

CTS          5                      5           CTS

DSR          6                      6           DSR

SG           7      ───────────     7           SG

DCD          8                      8           DCD

DTR          20                     20          DTR

RI           22                     22          RI

( ▬▬▬  Cable  Shield)
```
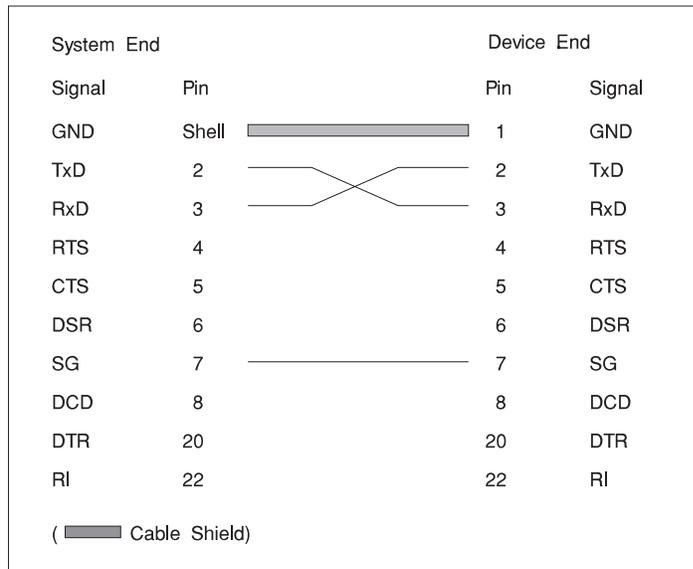
Figure   B-1. Simple Terminal/Printer Cable for EIA-232E Applications

```
 ┌──────────────────────────────────────────────────────────────┐
 │                                                              │
 │   System End                         Device End              │
 │                                                              │
 │   Signal        Pin                  Pin        Signal       │
 │                                                              │
 │   GND           Shell  ▭▭▭▭▭▭▭▭▭▭▭▭▭  1          GND          │
 │                                                              │
 │   TxDb          2        ╲      ╱     2          TxDb         │
 │                           ╲    ╱                             │
 │   RxDb          3          ╳         3          RxDb         │
 │                                                              │
 │   TxDa          4        ╲      ╱     4          TxDa         │
 │                           ╲    ╱                             │
 │   RxDa          5          ╳         5          RxDa         │
 │                                                              │
 │   DSR           6                    6          DSR          │
 │                                                              │
 │   SG            7     ──────────────  7          SG           │
 │                                                              │
 │   DCD           8                    8          DCD          │
 │                                                              │
 │   DTR           20                   20         DTR          │
 │                                                              │
 │                                                              │
 │   ( ▭▭▭  Cable  Shield)                                      │
 │                                                              │
 └──────────────────────────────────────────────────────────────┘
```

Figure   B-2. Simple Terminal/Printer Cable for RS-422A Applications

The cable shown in Figure B-2 is a terminal/printer cable. It shows the RS-422A
signal names for the 8-Port Asynchronous EIA-232E/RS-422A adapter when a port is
used in RS-422A mode. It can be used for a null modem cable (for example,
transmitted data on one end of the cable is connected to received data at the other
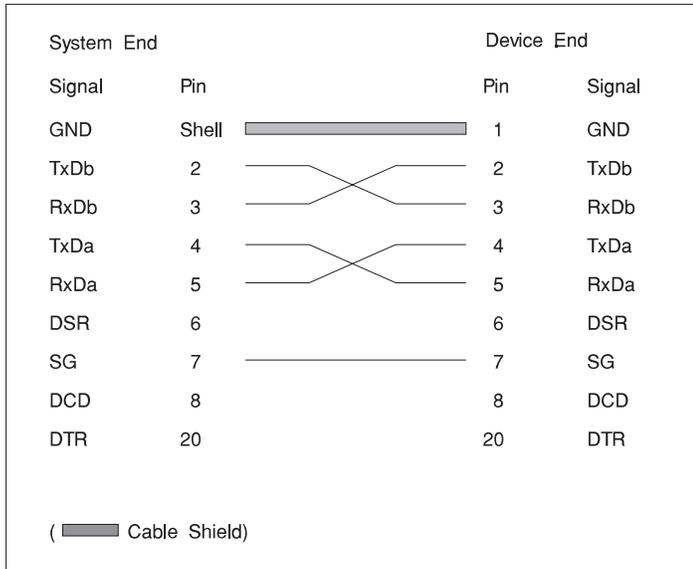end, and vice versa). The male DB-25 end can be plugged directly into most serial
terminals and printers without any adapters. The female DB-25 end plugs directly
into one of the DB-25 connectors on the connector box assembly.

```
System End                              Device End

Signal        Pin                       Pin        Signal

GND           Shell  ▭▭▭▭▭▭▭  1          GND

TxD           2              ╲╱          2          TxD

RxD           3              ╱╲          3          RxD

RTS           4              ╲╱          4          RTS

CTS           5              ╱╲          5          CTS

DSR           6                          6          DSR

SG            7                          7          SG

DCD           8                          8          DCD

DTR           20                         20         DTR

RI            22                         22         RI

(  ▭▭▭  Cable Shield)
```

Figure   B-3. Terminal/Printer Cable for EIA-232E Applications

The cable shown in Figure B-3 is a terminal/printer cable that can be used for various hardware and software protocols. It can be used for a null modem cable (for example, transmitted data on one end of the cable is connected to received data at the other end, and vice versa). The male DB-25 end can be plugged directly into most serial terminals and printers without any adapters. The female DB-25 end plugs directly into one of the DB-25 connectors on the connector box assembly.
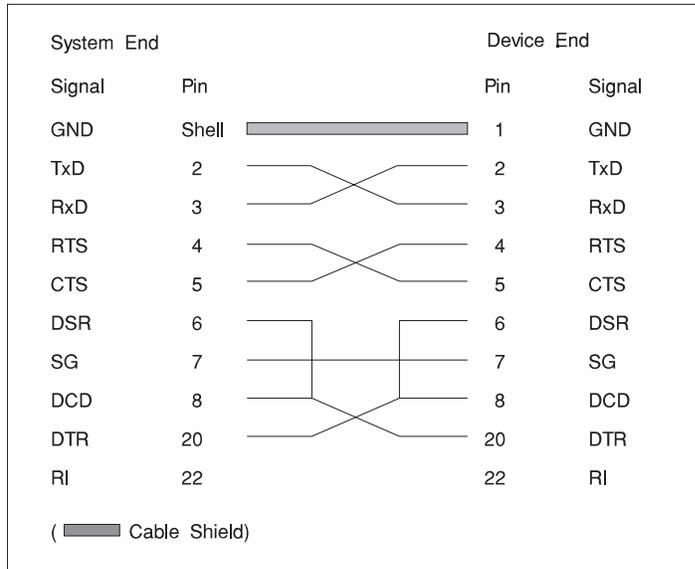
Figure   B-4. Terminal/Printer Cable for RS-422A Applications

The cable shown in Figure B-4 is a terminal/printer cable. It shows the RS-422A
signal names for the 8-Port Asynchronous EIA-232E/RS-422A adapter when a port is
used in RS-422A mode. It can be used for a null modem cable (for example,
transmitted data on one end of the cable is connected to received data at the other
end, and vice versa). The male DB-25 end can be plugged directly into most serial
terminals and printers without any adapters. The female DB-25 end plugs directly
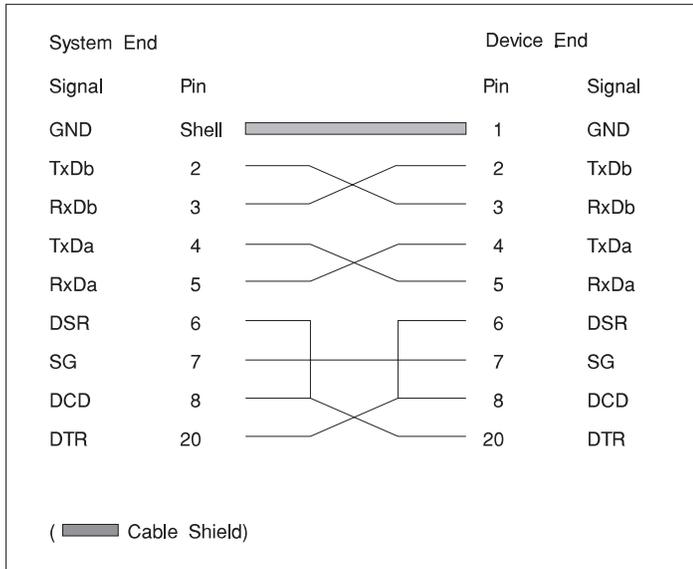into one of the DB-25 connectors on the connector box assembly.
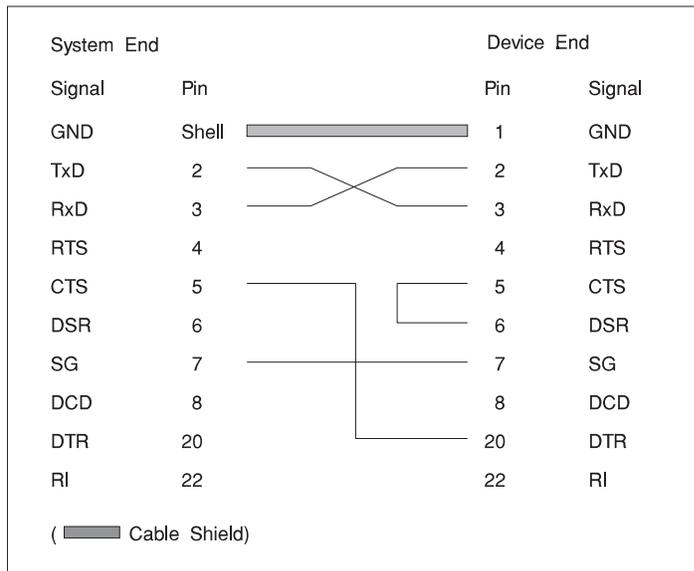
Hardware Handshaking (Ready/Busy)

```
System End                              Device End

Signal        Pin                  Pin        Signal
GND          Shell  ▭▭▭▭    1          GND
TxD            2                    2          TxD
RxD            3                    3          RxD
RTS            4                    4          RTS
CTS            5                    5          CTS
DSR            6                    6          DSR
SG             7                    7          SG
DCD            8                    8          DCD
DTR           20                   20          DTR
RI            22                   22          RI

(  ▭▭▭▭  Cable Shield)
```

Figure   B-5. Terminal/Printer Cable with DTR Handshaking EIA-232E Applications

Most terminals and printers use data terminal ready (DTR) for ready/busy hardware handshaking. The cable shown in Figure B-5 supports this method and can be custom built.

Some printers use a control signal on pin 11, called supervisory send data (SSD) instead of DTR. In this case, simply connect CTS on the female DB-25 side to pin 11 of the male DB-25, instead of pin 20. Other printer manufacturers may use different methods of flow control. Consult your printers documentation for specific wiring requirements.

Appendix C. Specifications for the 8-Port Asynchronous ISA Adapters

Specifications for the 8-Port Asynchronous EIA-232E

Item	Status
FRU Number	Adapter part number 11H5969, Cable number 11H5967
I/O addresses	Set via DIP switches 0x104, 0x114, 0x124, 0x204, 0x224, 0x304, 0x324
I/O Bus	ISA
Interrupt levels	3, 5, 7, 10, 11, 12, 15, or disabled (set by the program)
Bit rate	50 - 115200 (set by the program)
Bits per character	5, 6, 7, 8 (set by the program)
Busmaster	No
Maximum Number	7*
Connector	78-position, D-shell
Wrap plug	EIA-232E 25-position, part number 6298964
Cable	8-Port DB-25 connector box FRU part number 11H5967 included with adapter.
Modem Cable	EIA-232E modem cable part number 6323741, feature code 2936, length 3 meters or 10 feet long.
Terminal/Printer Cable	EIA-232E terminal/printer cable part number 12H1204, feature code 2934, length 3 meters or 10 feet long.

Note: The maximum of seven adapters is defined as any combination of seven 8-Port Asynchronous EIA-232E and 8-Port Asynchronous EIA-232E/RS-422A adapters together.

Specifications for the 8-Port Asynchronous EIA-232E/RS-422A

Item	Status
FRU Number	Adapter FRU part number 40H6632, Cable number 11H5967
I/O addresses	Set via DIP switches 0x104, 0x114, 0x124, 0x204, 0x224, 0x304, 0x324
I/O Bus	ISA
Interrupt levels	3, 5, 7, 10, 11, 12, 15, or disabled (set by the program)
Bit rate	50 - 115200 (set by the program)
Bits per character	5, 6, 7, 8 (set by the program)
Busmaster	No
Maximum Number	7
Connector	78-position, D-shell
Wrap plug	EIA-232E 25-position, part number 6298964
Cable	8-Port DB-25 connector box FRU part number 11H5967 included with adapter.
Modem Cable	EIA-232E modem cable part number 6323741, feature code 2936, length 3 meters or 10 feet long.
Terminal/Printer Cable	EIA-232E terminal/printer cable part number 30F8966, feature code 2945, length 20 meters or 65.5 feet long.

Note: The maximum of seven adapters is defined as any combination of seven 8-Port Asynchronous EIA-232E and 8-Port Asynchronous EIA-232E/RS-422A adapters together.

Appendix D. Using the AIX lsresource Command

This section aids you in determining what hardware resources are available prior to installing an 8-Port Asynchronous ISA Adapter, or after a configuration failure due to a resource conflict.

Using the AIX lsresource Command for Bus I/O Addresses

1. Login as root

2. Enter:

   ```
   lsresource -l bus0 -a | grep bus_io
   ```

   This command generates a list of adapters installed on your system that use Bus I/O Addresses. The following is a sample of what appears on your screen:

   ```
   TYPE    ADAPTER  ATTRIBUTE     S G  CURRENT VALUE (bus I/O address)
     0     fda0     bus_io_addr        0x000003f0 - 0x000003f5
     0     fda0     bus_io_addr2            0x000003f7
     0     sa0      bus_io_addr        0x000003f8 - 0x000003ff
     0     sa1      bus_io_addr        0x000002f8 - 0x000002ff
     0     sioka0   bus_io_addr   1         0x00000060
     0     sioma0   bus_io_addr   1         0x00000060
     0     ppa0     bus_io_addr        0x000003bc - 0x000003be
     0     ampx0    bus_io_addr        0x000002a0 - 0x000002a6
     0     apm0     bus_io_addr        0x000006a0 - 0x000006a6
     0     scsi0    bus_io_addr        0x0000f000 - 0x0000f0ff
     0     scsi1    bus_io_addr        0x01000000 - 0x010000ff
   ```

   The example shows 0x2a0 (0x000002a0) bus I/O address is in use by ampx0 and just below that 0x6a0 is in use by apm0.

3. The 8-Port Asynchronous ISA Adapter requires a unique bus I/O address for each adapter installed. Check the list on your screen to see if any of the following address locations are in use: 0x104, 0x114, 0x124, 0x204, 0x224, 0x304, and 0x324. If 0x324 is not in use, you may install the adapter without change. Otherwise choose an unused address location.

4. Return to Table 2-1 on page 2-2 to record the bus I/O address you have selected.

Appendix E. Communications Statements

The following statement applies to this product. The statement for other products intended for use with this product appears in their accompanying documentation.

Federal Communications Commission (FCC) Statement

Note: The &typemod. been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult an authorized dealer or service representative for help.

Properly shielded and grounded cables and connectors must be used in order to meet FCC emission limits. Proper cables and connectors are available from authorized dealers. Neither the provider nor the manufacturer are responsible for any radio or television interference caused by using other than recommended cables and connectors or by unauthorized changes or modifications to this equipment. Unauthorized changes or modifications could void the user's authority to operate the equipment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Responsible Party:

> International Business Machines Corporation
> New Orchard Road
> Armonk, New York 10504
> Telephone: (919) 543-2193

FC Tested to Comply
With FCC Standards

FOR HOME OR OFFICE USE

European Union (EU) Statement

This product is in conformity with the protection requirements of EU Council Directive 89/336/EEC on the approximation of the laws of the Member States relating to electromagnetic compatibility. The manufacturer cannot accept responsibility for any failure to satisfy the protection requirements resulting from a non-recommended modification of the product, including the fitting of option cards supplied by third parties. Consult with your dealer or sales representative for details on your specific hardware.

This product has been tested and found to comply with the limits for Class B Information Technology Equipment according to CISPR 22 / European Standard EN 55022. The limits for Class B equipment were derived for typical residential environments to provide reasonable protection against interference with licensed communication devices.

International Electrotechnical Commission (IEC) Statement

This product has been designed and built to comply with IEC Standard 950.

United Kingdom Telecommunications Safety Requirements

This equipment is manufactured to the International Safety Standard EN60950 and as such is approved in the UK under the General Approval Number NS/G/1234/J/100003 for indirect connection to the public telecommunication network.

The network adapter interfaces housed within this equipment are approved separately, each one having its own independent approval number. These interface adapters, supplied by the manufacturer, do not use or contain excessive voltages. An excessive voltage is one which exceeds 70.7 V peak ac or 120 V dc. They interface with this equipment using Safe Extra Low Voltages only. In order to

maintain the separate (independent) approval of the manufacturer's adapters, it is essential that other optional cards, not supplied by the manufacturer, do not use main voltages or any other excessive voltages. Seek advice from a competent engineer before installing other adapters not supplied by the manufacturer.

Avis de conformité aux normes du ministère des Communications du Canada

Cet appareil numérique de la classe B est conform à la norme NMB-003 du Canada.

Canadian Department of Communications Compliance Statement

This Class B digital apparatus complies with Canadian ICES-003.

VCCI Statement

```
　　この装置は、情報処理装置等電波障害自主規制協議会（ＶＣＣＩ）の基準に
基づくクラスＢ情報技術装置です。この装置は、家庭環境で使用することを目的
としていますが、この装置がラジオやテレビジョン受信機に近接して使用される
と、受信障害を引き起こすことがあります。
　　取扱説明書に従って正しい取り扱いをして下さい。
```

The following is a summary of the VCCI Japanese statement in the box above.

This product is a Class B Information Technology Equipment and conforms to the standards set by the Voluntary Control Council for Interference by Information Technology Equipment (VCCI). This product is aimed to be used in a domestic environment. When used near a radio or TV receiver, it may become the cause of radio interference. Read the instructions for correct handling.

Radio Protection for Germany

Dieses Gerät ist berechtigt in Übereinstimmung mit dem deutschen EMVG vom 9.Nov.92 das EG–Konformitätszeichen zu führen.

Der Aussteller der Konformitätserklärung ist die IBM Germany.

Dieses Gerät erfüllt die Bedingungen der EN 55022 Klasse B.

IBM ®

Part Number: 93H3471

93H3471