



Serial I/O SST128P Expandable Adapter

Hardware Installation Guide

SuperSerial™ Technology

OPTIONS

by IBM

37L1461
PN 560156/A
October, 1998

Manual Organization

This manual is comprised of five chapters and two appendices.

- Chapter 1** **Overview**
Chapter 1 describes the IBM Serial I/O Expandable Subsystem components and their various configurations.
- Chapter 2** **Adapter Installation & Setup**
Chapter 2 describes the installation of the Serial I/O Adapters and use of the host power "Y" cable.
- Chapter 3** **Serial I/O Port Module Installation**
Chapter 3 describes how to install the Expansion Modules, the Expansion Bus Cabling, installing the PS-4 Power Supply and defines the module LEDs.
- Chapter 4** **Serial I/O Multiplexer Installation**
Chapter 4 describes the installation of the Cluster Multiplexers, component wall mounting, Power Adapters and the Multiplexer Link Cable.
- Chapter 5** **Serial I/O Port to Device Cabling**
Chapter 5 describes the cabling options that work with the Serial I/O Expandable Subsystem.
- Appendix A** **Power Defaults & Options**
Appendix A provides a description of the Power Strap default and optional Power Strap configurations for Serial I/O Adapters.
- Appendix B** **Help and Service Information**
Appendix B describes the steps you would follow to receive technical support and to report problems with this documentation.

Index

| | |
|--|------------|
| Hardware Installation Guide | i |
| Manual Organization | ii |
| Contents | iii |
| Overview | 1-1 |
| PCI Adapters | 1-1 |
| Expansion Modules | 1-3 |
| Expansion Bus Cables | 1-6 |
| Power Options | 1-8 |
| Serial I/O Adapter Installation & Setup | 2-1 |
| PCI System Setup | 2-1 |
| Software Installation | 2-1 |
| Adapter Installation | 2-1 |
| Host Power “Y” Cable | 2-2 |
| Serial I/O Port Module Installation | 3-1 |
| Installing Expansion Modules | 3-2 |
| Expansion Bus Cabling | 3-4 |
| Installing the PS-4 Power Supply | 3-7 |
| Module LEDs | 3-8 |
| Serial I/O Multiplexer Installation | 4-1 |
| Cluster Multiplexers | 4-2 |
| Wall Mounting | 4-2 |
| Power Adapters | 4-2 |
| Multiplexer Link Cable | 4-3 |

| | |
|--|----------------|
| Serial I/O Port To Device Cabling | 5-1 |
| PM16-DB and CMX16-DB Port Pinouts | 5-1 |
| Device Wiring | 5-2 |
| Four Wire Connection | 5-3 |
| Seven Wire Connection | 5-4 |
| Personal Computer Serial Port | 5-5 |
| PM16-RJ and CMX16-RJ Port Pinouts | 5-6 |
| Modular Cables | 5-9 |
| Modular Adapters | 5-10 |
| Power Defaults & Options | A-1 |
| Optional Power Configuration | A-2 |
| Default Power Configuration | A-2 |
| Help and Service Information | B-1 |
| Preparing To Call Technical Support | B-1 |
| Placing the Call to IBM | B-2 |
| Product Warranty | B-3 |
| The IBM Warranty for Machines | B-3 |
| Statement of Limited Warranty | B-3 |
| Production Status | B-3 |
| Warranty Service | B-4 |
| Extent of Warranty | B-5 |
| Trademarks | B-6 |
| Limitation of Liability | B-6 |
| Electronic Emission Notices | B-7 |
| Index | Index-1 |

The **IBM Serial I/O Expandable I/O Subsystem** is a *High-speed Serial Communications Multiple Port* product. It consists of several different modular components configured in a variety of combinations to satisfy most applications. The various components are:

- *Adapter*
- *Expansion Modules*

PCI Adapters

The *Serial I/O Adapter* (see Figure 1-1) occupies a slot in the host computer and provides the intelligent communications functions to "off-load" the CPU serial communications processing tasks. Adapters can support up to 128 ports using external *Expansion Modules*.

All *Serial I/O Adapters* consist of two *SuperSerial Processors (SSPs)* for controlling the flow of data through multiple communication ports. Figure 1-1 illustrates a *Serial I/O Adapter* containing two SSPs. This adapter is capable of controlling the operation of up to 128 Serial I/O Ports.

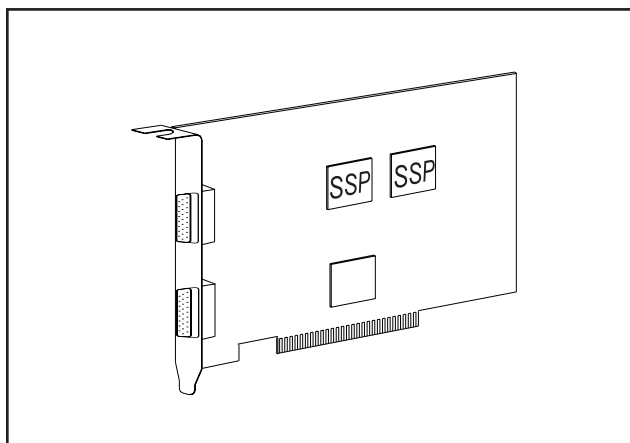


Figure 1-1. Serial I/O Adapter (128-port)

Table 1.1 below shows the various models of Expandable Host Controllers available from IBM. Non-Expandable Host Controllers are not discussed in this manual.

| IBM Part Number | IBM Options - PCI Serial I/O Adapters |
|-----------------|---------------------------------------|
| 37L1414 | Serial I/O SST8P DB Adapter |
| 37L1415 | Serial I/O SST16P RJ Adapter |
| 37L1423 | Serial I/O SST16P DB Adapter |
| 37L1416 | Serial I/O SST128 Expandable Adapter |
| 37L1417 | Serial I/O PM16RJ Port Module |
| 37L1418 | Serial I/O PM16DB Port Module |
| 37L1421 | Serial I/O PS4 Power Supply |
| 37L1422 | Serial I/O WT PS4 Power Supply |
| 37L1419 | Serial I/O 16RJ Multiplexer Set |
| 37L1420 | Serial I/O 16DB Multiplexer Set |
| 37L1424 | Serial I/O 16RJ WT Multiplexer Set |
| 37L1425 | Serial I/O 16DB WT Multiplexer Set |

Table 1-1 Serial I/O Products

Each *Serial I/O Adapter* includes software drivers and installation manuals for Microsoft Windows, Novell, DOS and UNIX operating systems on a CD ROM. When booted, PCI bus systems automatically identify and configure all PCI devices connected in the system.

Please refer to www.equinox.com for cabling alternatives.

Expansion Modules

Peripheral devices (Such As Terminals, Printers, Modems, Bar Code Readers, Cash Registers, etc.) are connected to *Expansion Modules* located outside of the computer system. Expansion Modules are connected to the Serial I/O Adapter residing in the system via an *Expansion Bus*. The Expansion Bus provides signals from the Serial I/O Adapter to the Expansion Modules. The 128-port Adapters have dual Expansion Buses, accommodating from one to four Expansion Modules on each bus, for a total of up to eight Expansion Modules. A basic 16-port configuration is shown in Figure 1-2.

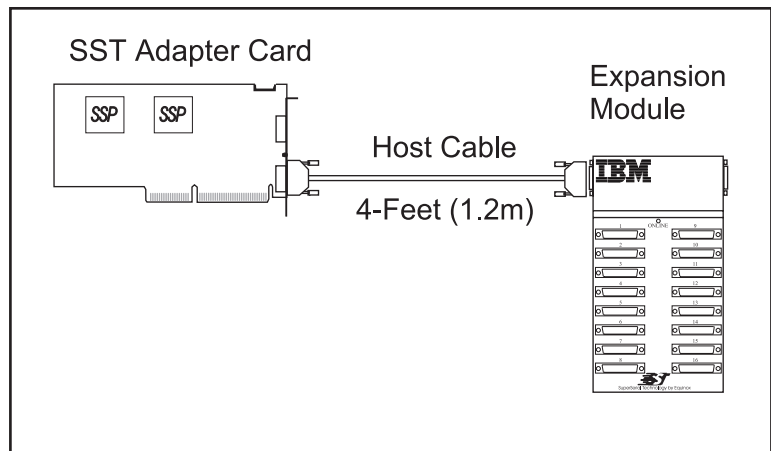


Figure 1-2. Adapter - Host Cable - Expansion Module

A 4-foot (1.2m) Host Cable is supplied for connecting the Expansion Module(s) to the Adapter Card. Two Host Cables are supplied with each 128-port Adapter Card. Multiple Expansion Modules mate together to permit simple expansion of the entire system without disassembling the computer.

A variety of Expansion Modules are available. Any choice of Expansion Modules may be freely intermixed on an Expansion Bus with a maximum of four Expansion Modules per bus (see Figure 1-3).

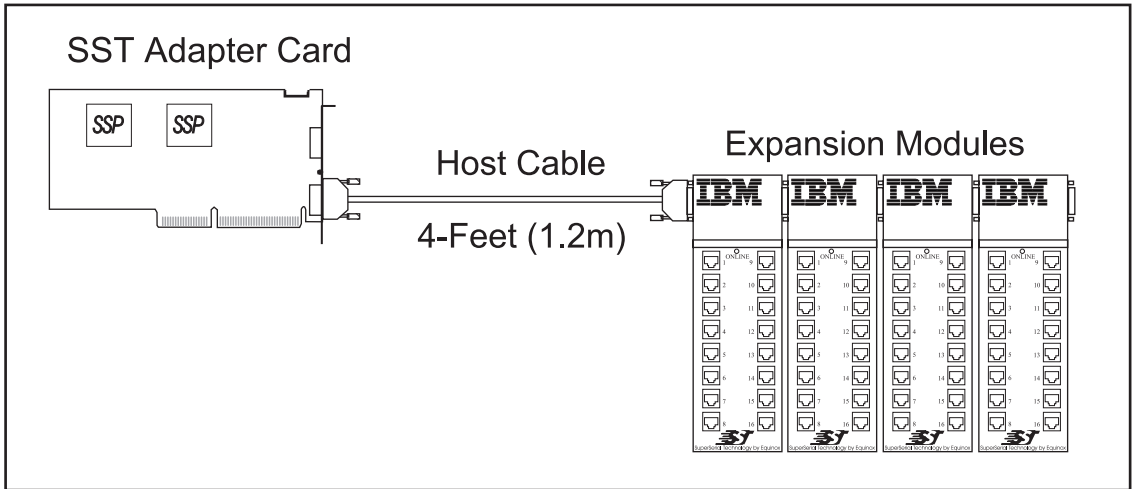


Figure 1-3. Adapter - Host Cable - Four Expansion Modules

Expansion Modules

Expansion Modules are used to connect peripheral devices directly to the Expansion Bus. 16-port Expansion Modules are available with a choice of DB-25 or RJ-45 connectors for RS-232 interfaces.

Multiplexer Interface Modules

Clusters of devices may be connected within a radius of 3,500 feet (1Km) to the Adapter using *Multiplexer Set* which includes *Multiplexer Interface Modules (MIM)*, *Cluster Multiplexers (CMX)* and *Power Supply*. (see Figure 1-4). In this application a 16-port Cluster Multiplexer is located near the user devices and a low-cost two-twisted-pair link (category 2 or above UTP) cable is run back to the Multiplexer Interface Module. Cluster Multiplexers are ideal for distributing devices in, as an example, a multi-building campus facility.

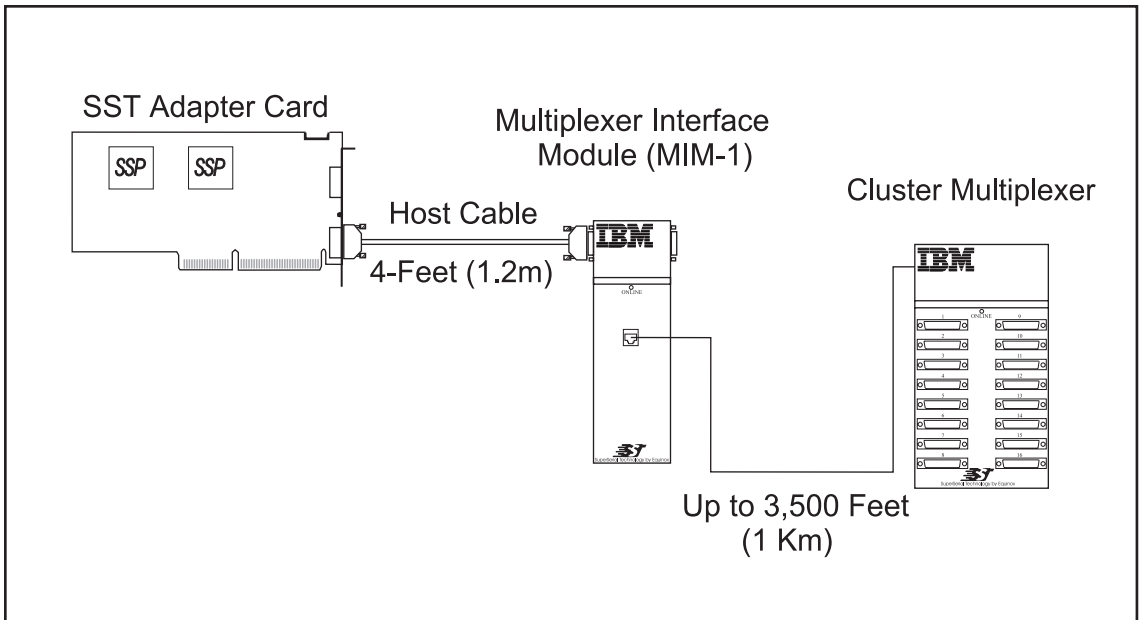


Figure 1-4. MIM-1 - Cluster Multiplexer

16-port Cluster Multiplexers are available with either DB-25 or RJ-45 Connectors. Additional Multiplexer Sets may be added for additional ports. One MIM can support only one CMX.

Expansion Bus Cables

Expansion Modules (i.e. Port Modules and Multiplexer Interface Modules) may be located further than the supplied 4-foot (1.2m) Host Cable permits by using *Expansion Bus Cables (EBCs)*. An EBC is used in place of the Host Cable. As shown in Figure 1-5, a group of four Expansion Modules are located 200 feet (61m) from the host computer using an EBC. A typical application using EBCs is when the host computer is located some distance away from the wiring closet where all the peripheral cabling exists

EBCs are available in 25-foot (7.6m) (Equinox PN 690302) and 100-foot (30.5m) (Equinox PN 690306) lengths.

Please refer to www.equinox.com for cabling alternatives.

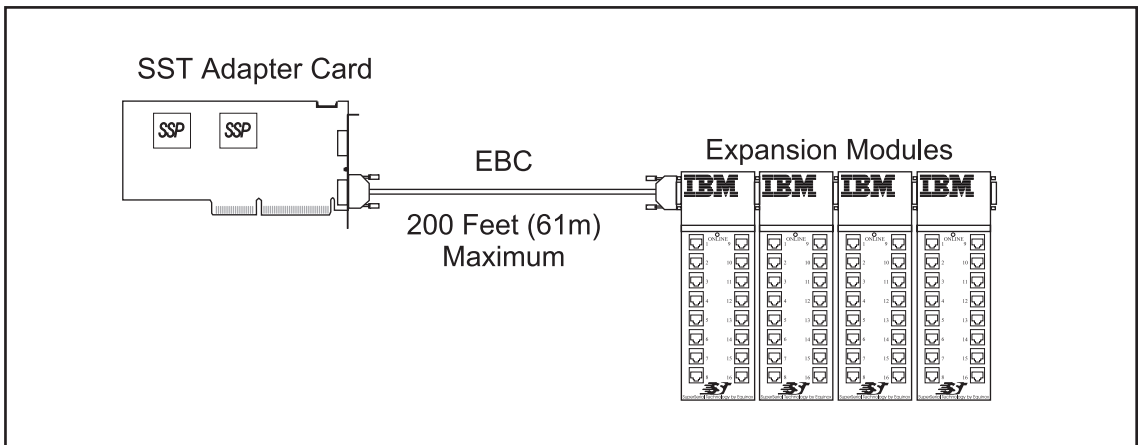


Figure 1-5. 200 Feet (61 m) EBC

In addition to extending the distance between the SST Adapter and the Expansion Modules, EBCs may be used to extend the distance between adjacent Expansion Modules as shown in Figure 1-6.

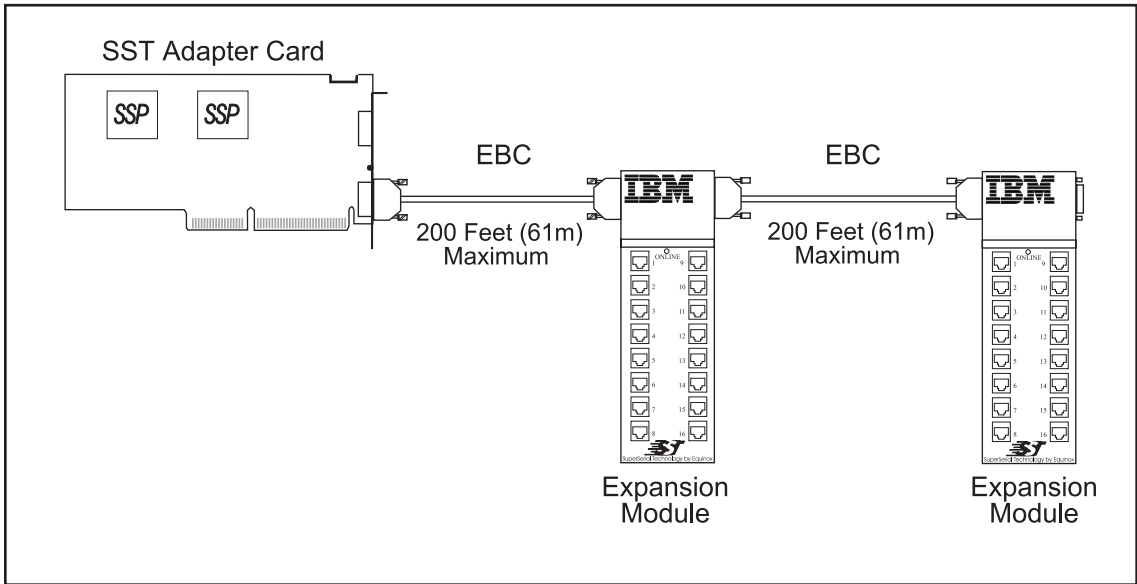


Figure 1-6. Expansion Modules Extended Distance Using EBCs



The maximum distance between the Serial I/O Adapter and the first Expansion Module is 200 feet (61m). The maximum distance between Expansion Modules is also 200 feet (61m).

Power Options

In simple configurations, the host Adapter supplies power to all Port Expansion Modules and Multiplexer Interface Expansion Modules attached to the Expansion Bus via the supplied 4-foot (1.2m) Host Cable (see Figure 1-7). Power is provided by the Adapter and is passed from the left to right through each directly mated module.

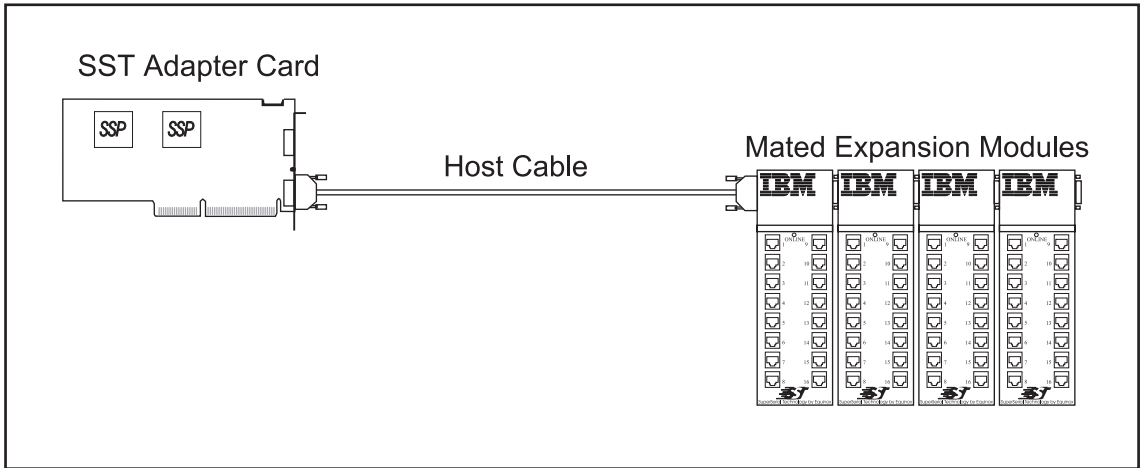


Figure 1-7. Mated Expansion Modules Draw Power from Host



Expansion Modules may draw power from the host computer through the 4-foot (1.2m) Host Cable.



Host power is available to the Expansion Modules only when the 4-foot (1.2m) Host Cable is installed and Expansion Modules are mated directly together.

The Expansion Modules attached to the Expansion Bus (**not** host bus) Cables must be externally powered using a separate power supply. If an EBC is installed, this optional power supply is purchased separately and must be connected to the first (left most) module on the Expansion Bus (see Figure 1-8).

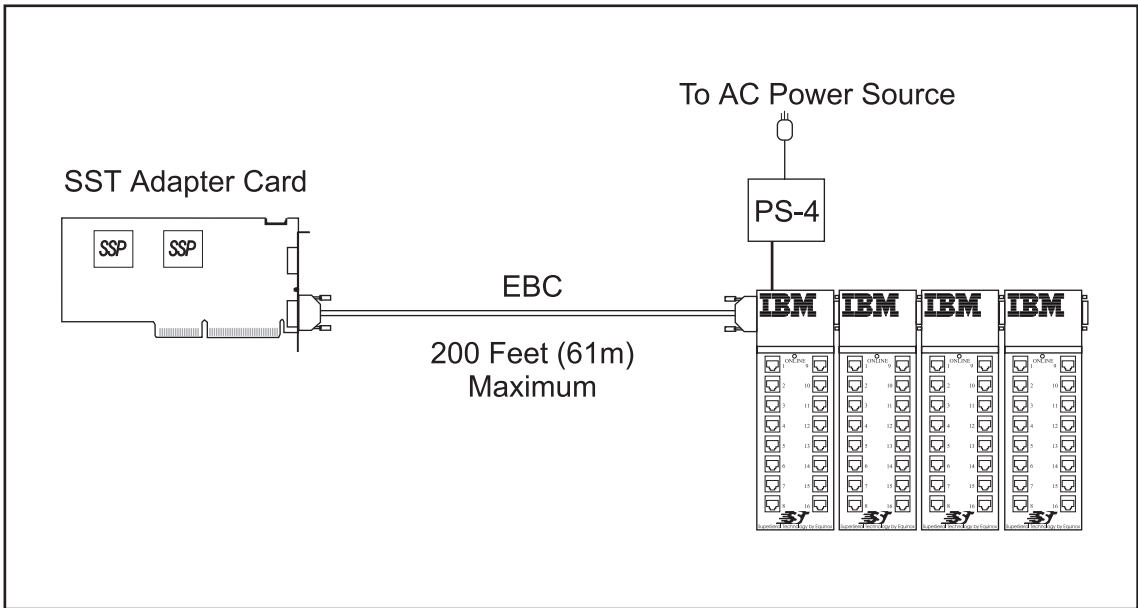


Figure 1-8. PS-4 Supplying Power to Expansion Modules

By connecting the PS-4 Power Supply to the first Module, power is no longer drawn from the host computer. All Expansion Modules directly mated to one another from the first Module are supplied power from the PS-4. The PS-4 can supply power for up to four Expansion Modules.

When Expansion Bus Cables are used between Expansion Modules, a PS-4 Power Supply is required for each Module as shown in Figure 1-9.

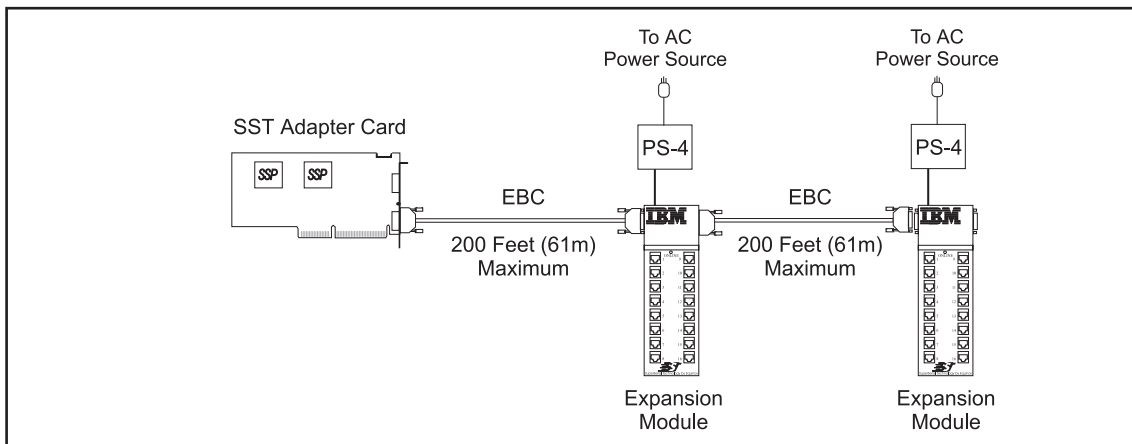


Figure 1-9. Individual PS-4s Provide Power to Modules Separated by EBCs

Cluster Multiplexers draw power from a Power Adapter supplied in the Multiplexer Set, which plugs directly into any convenient wall outlet (see Figure 1-10).

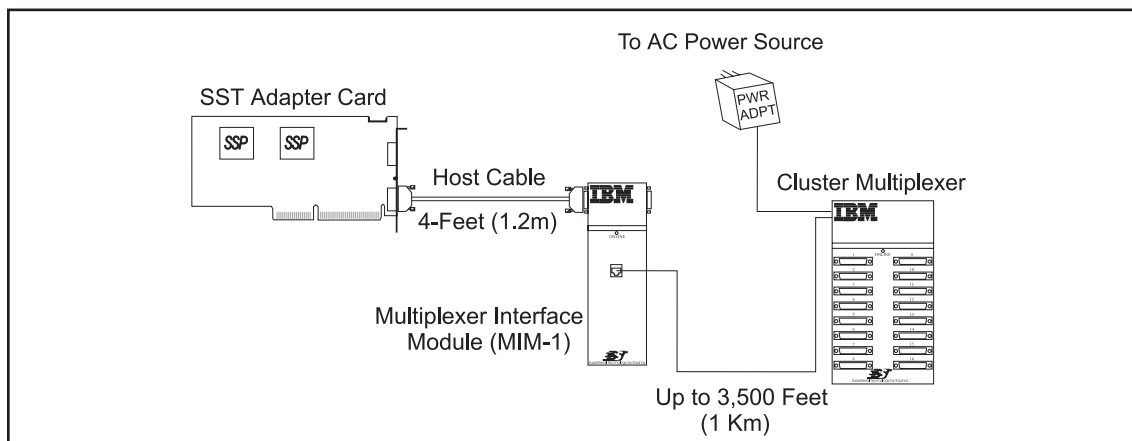


Figure 1-10. Cluster Multiplexer Draws Power From Power Adapter

Figure 1-11 illustrates a *Serial I/O Subsystem* using the maximum number of ports (128) for an Adapter.

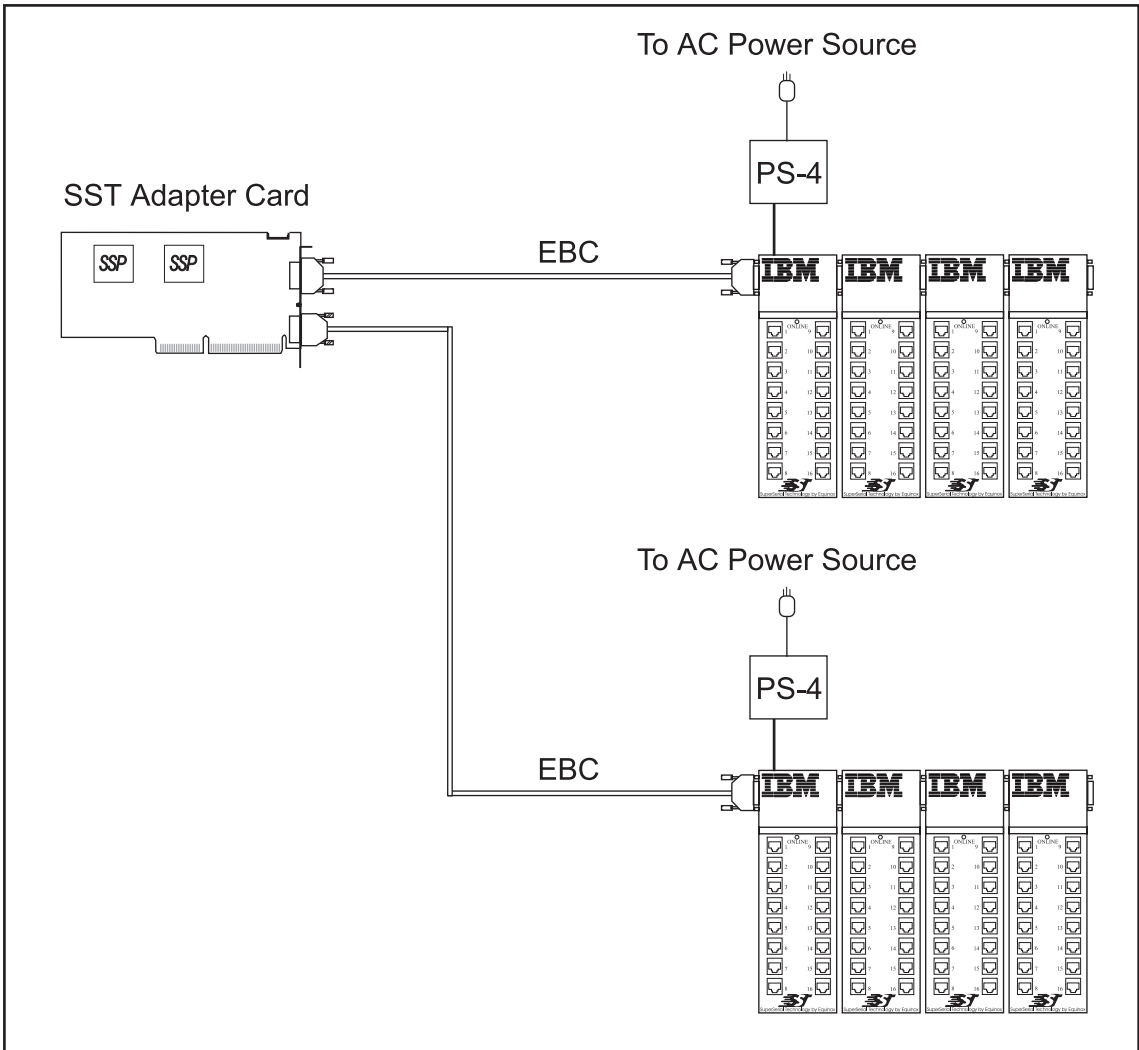


Figure 1-11. Maximum Number of Ports Per Adapter (128)



MIM-1 Module draws power from the Serial I/O Adapter, or a PS-4 Power Supply.

Figure 1-12 illustrates a mixture of *Serial I/O* components configured into a maximum of 64 ports on each Expansion Bus.

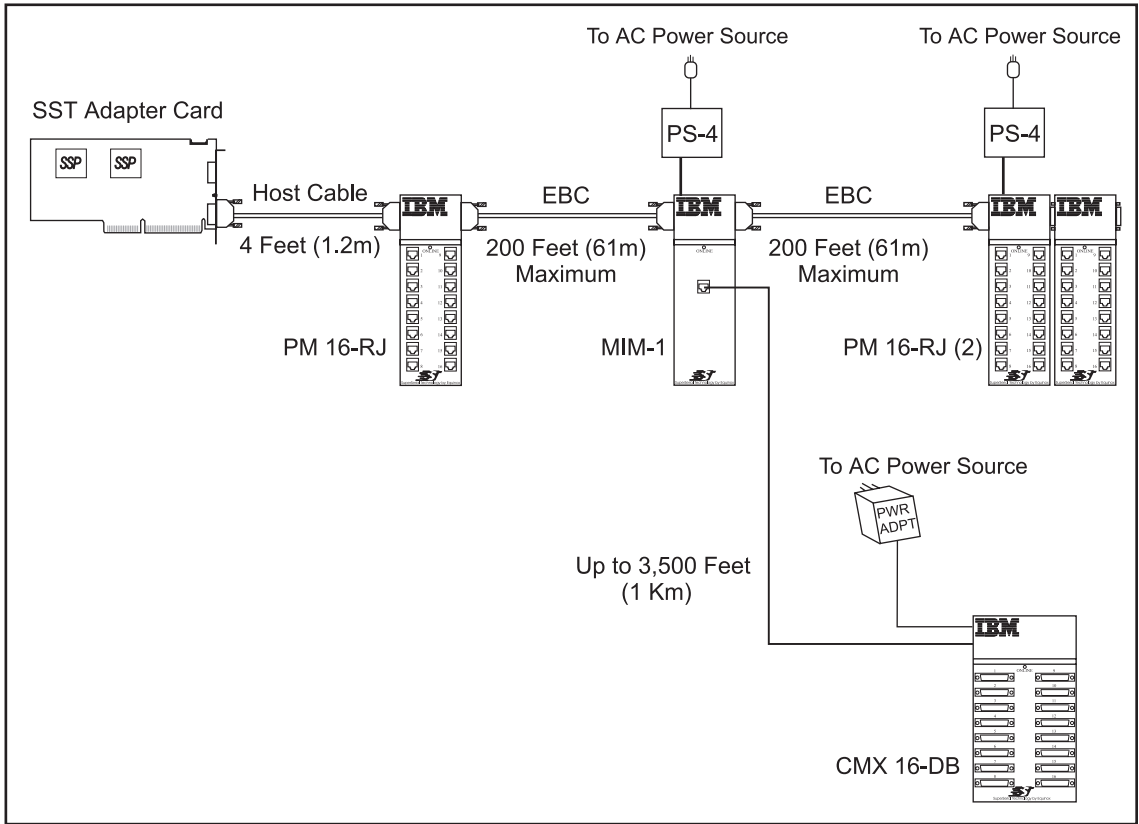


Figure 1-12. Mixed Serial I/O Hardware Configuration - Up to 64 Ports



Host Cables cannot be used between Expansion Modules.

The *Adapter* appears to the system host processor as memory. That is, it is a memory mapped device. All *SST Adapters* are **automatically** mapped into system memory at the time the device driver is installed. The device driver soft-configures all adapters each time the system is initialized (booted).

Adapter Installation

Note: Please refer to the user manual that came with your personal computer for detailed installation instructions.

Use the following procedure to install your Serial I/O Adapter:

1. Set the host computer system power switch to OFF and disconnect the power cord.
2. Locate a free PCI expansion slot.
3. Insert and secure the board firmly into the expansion slot.
4. Replace the power cord and turn the host computer system ON.
5. Follow the information detailed in chapters 3, 4 and 5 to complete your installation.

PCI System Setup

Peripheral Component Interconnect (PCI) system architecture has a design feature termed *Plug and Play*. This feature automatically detects, identifies and configures the **currently** installed devices each time the system is booted. Therefore, whenever an Adapter is installed (or removed) in a PCI system, the card is recognized and configured immediately upon restart.

Software Installation

Refer to the Quick Start Card that came with the CD ROM for detailed instructions on loading the Software.

Host Power “Y” Cable

The *Host Power “Y” Cable* is included with *all 128 port Expandable Adapters*. This cable provides power from the host power supply for Modules connected to the second Expansion Bus. Connect the host power “Y” cable as described below:

- If necessary, remove all power from the computer. (Turn power switch OFF and unplug main power cord.)
- If necessary, remove (or lift up) the host computer system chassis cover.
- Locate a power supply cable connected to a component (e.g. floppy disk drive) in your host computer system. If possible, select the component nearest the location of the power connector on the adapter.
- Remove the host power supply cable connector plug from the selected host computer system component power connector socket.
- Connect the removed host power supply cable connector plug to a mating connector socket on the host power “Y” cable supplied by IBM.
- Connect the host power “Y” cable connector plug to the host computer system component where the power supply cable connector plug was removed.
- Connect the other host power “Y” cable connector plug to the power connector socket on the *128-port Adapter*.
- Replace the chassis cover (or close) and restore power to the host computer system.

Serial I/O Port Modules are used to connect peripheral devices directly to the *Expansion Bus*. Port Modules are available with a choice of DB-25 or RJ-45 connectors. Figure 3-1 illustrates two types of *Serial I/O Port Modules* and the *MIM-1*. The *MIM-1* is used to connect the *Cluster Multiplexer (CMX)* to the *Expansion Bus*.

In the following paragraphs, references to *Expansion Modules* includes the *Serial I/O Port Modules* and *MIM-1*.

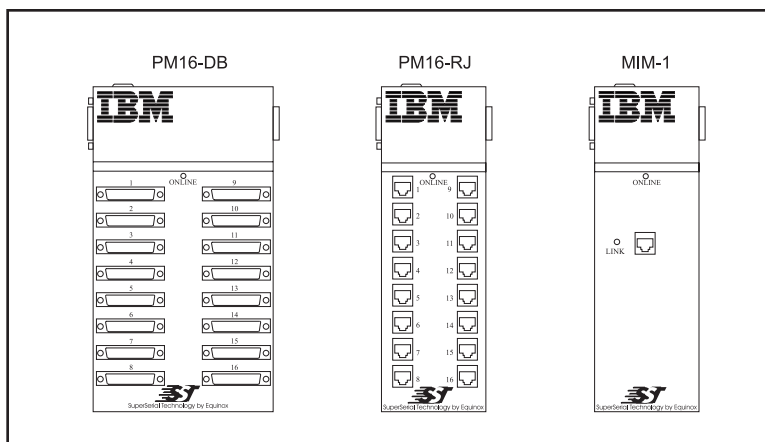


Figure 3-1. Serial I/O Expansion Modules

Installing Expansion Modules

Up to four *SST Expansion Modules* may be grouped together and connected to an adapter card via an *Expansion Bus*. The Expansion Bus connector may be either a 4-foot (1.2m) *Host Cable* or an *EBC*.

Included with each *Expansion Module* are two L-shaped coupler brackets and twelve screws (8 black-anodized and 4 nickel-plated). Group the Modules by mating them together as shown in Figure 3-2.

Attach the coupler brackets as indicated in Figure 3-3.

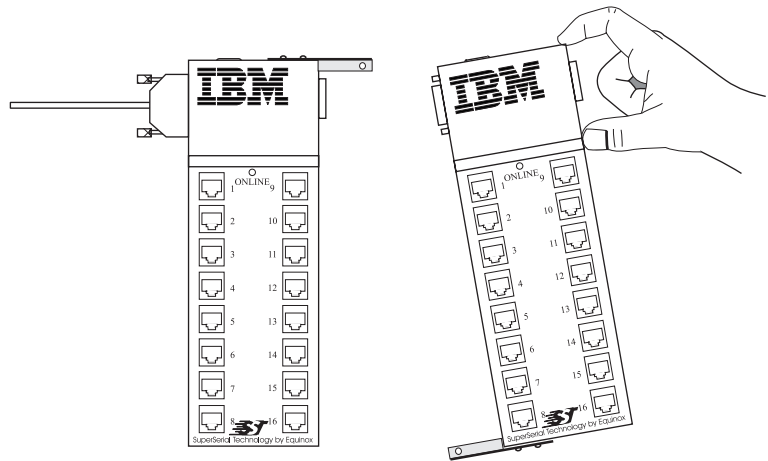


Figure 3-2. Mating Two Expansion Modules



Use the nickel-plated screws to secure the coupler brackets to the back of the *Expansion Modules* and the black-anodized screws to secure the coupler brackets to the top and bottom of the expansion modules.

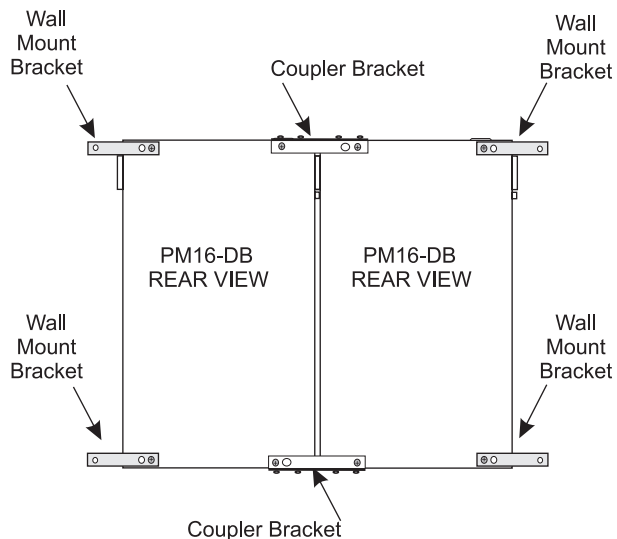


Figure 3-3. Coupling and Surface Mounting Two PM16-DB Port Modules

Also included with each Expansion Module are two wall mounting brackets and four screws. Attach the mounting brackets to the appropriate modules and secure them to a wall as shown in Figure 3-3.



Attach one bracket on the top and one bracket on the bottom at the opposite side of the Module when mounting a single Module to a wall

Expansion Bus Cabling

Connect Modules to the host computer using the supplied host cable or optional Expansion Bus cables provided by Equinox. Referring to Figure 3-4, connect the cable for ports **1 through 64** to the lower connector of the adapter card and the cable for ports **65 through 128** to the upper connector.

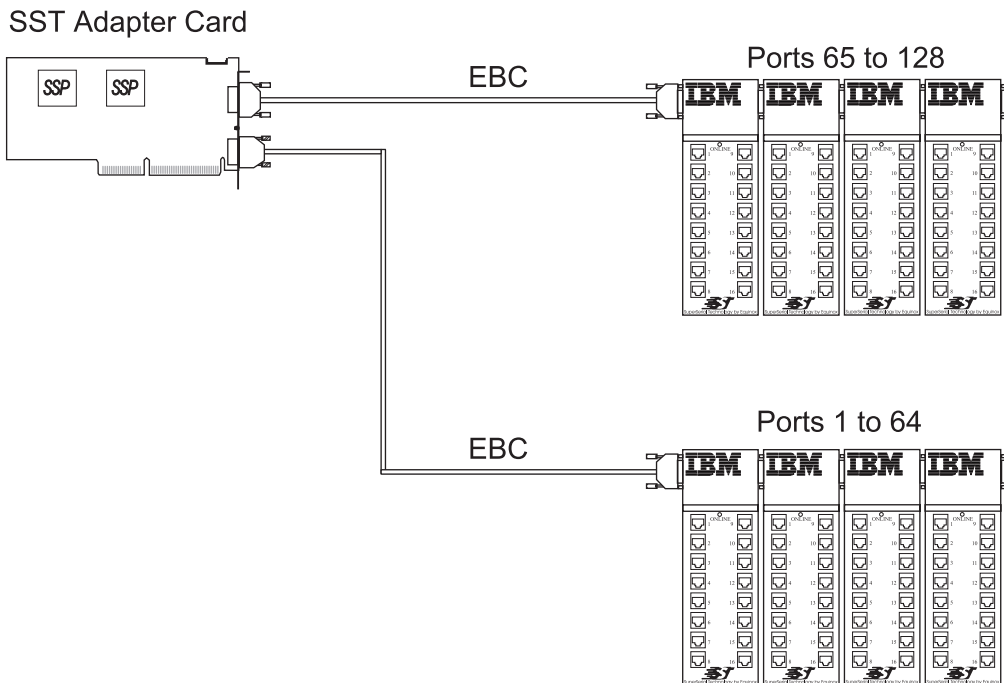


Figure 3-4. EBC Port Assignments

Before connecting an EBC to the right side female connector on an Expansion Module, two studs (contained in each Module hardware accessory packet) for securing the Cable jackscrews must be attached to the Module connector. Insert the two studs into the holes as shown in Figure 3-5.

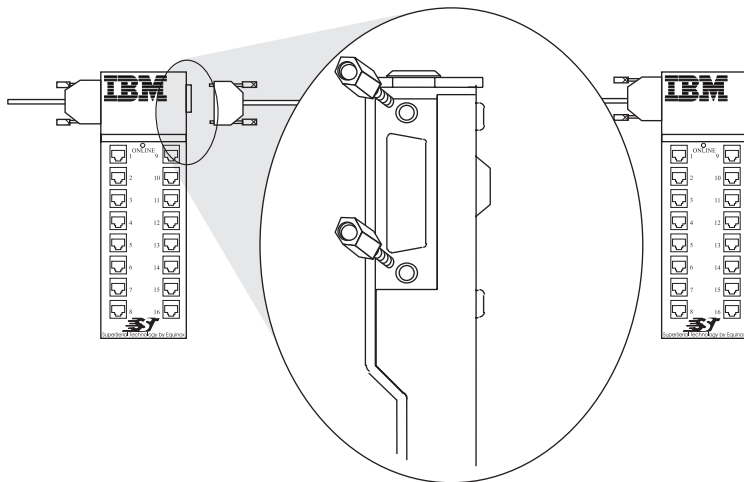


Figure 3-5. Expansion Module HD-26 Female Connector

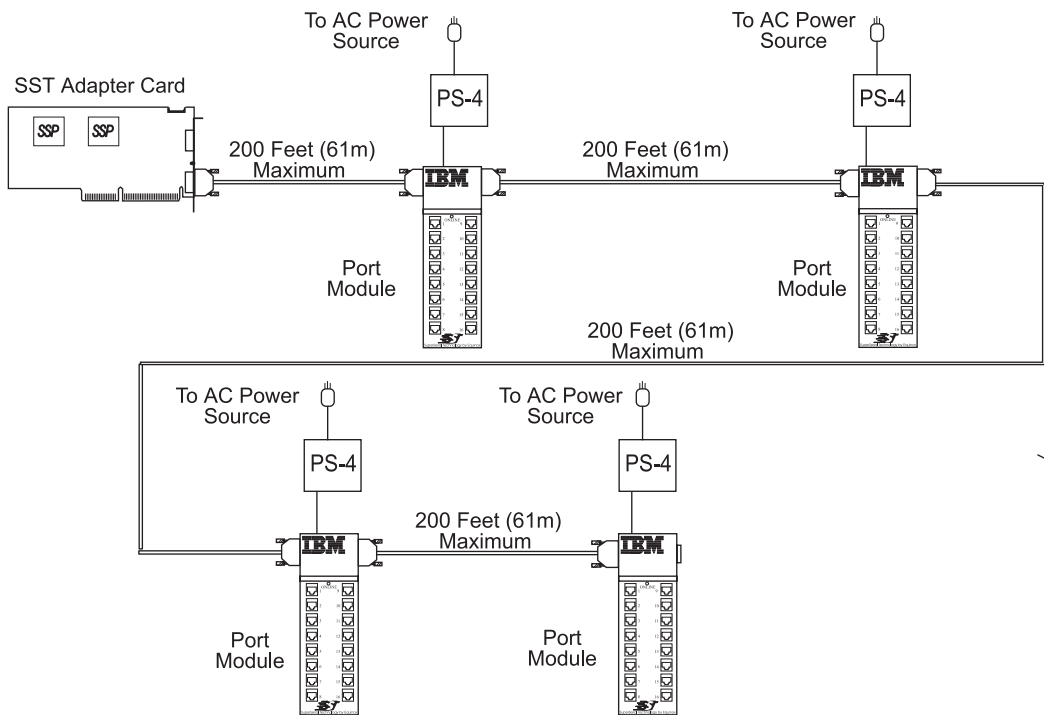


Figure 3-6. Hardware Configuration Illustrating Maximum Distance Permitted Between Expansion Modules

Up to four Expansion Modules can be interconnected at distances of up to 200 feet (61 m) between one another as shown in Figure 3-6. When distances between Expansion Modules exceed 200 feet (61m) or when the peripheral devices are located in a different building, a *Multiplexer Set* should be used. Refer to the *Serial I/O Multiplexer Installation* section (Chapter 4) for this information.

Installing the PS-4 Power Supply

The *PS-4* (see Figure 3-7), is a universal power supply and automatically adapts to the input power voltage (100 - 250 VAC, 50/60 Hz).

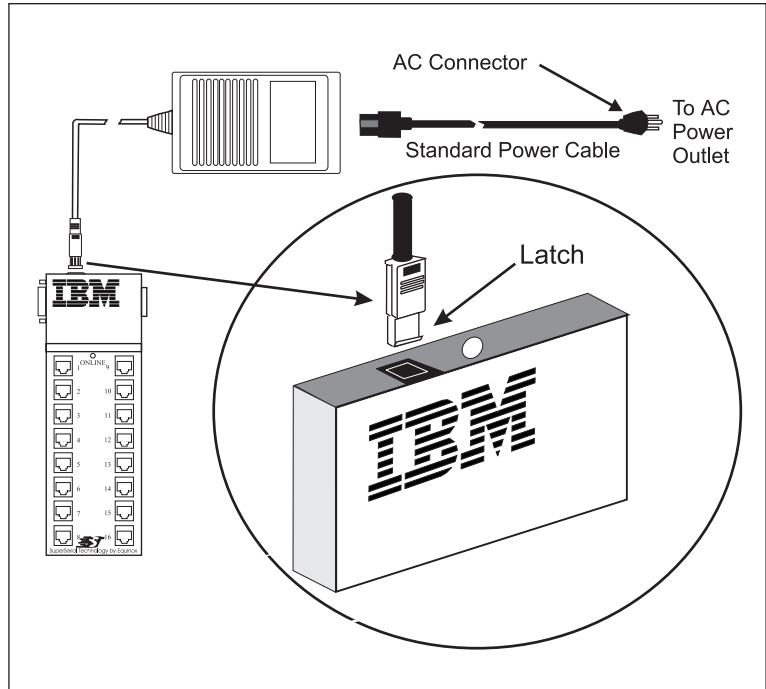


Figure 3-7. Model PS-4 Power Supply.

Install the *Model PS-4 Power Supply* using the following procedure:

1. Remove the power plug cover (use a small flat screwdriver) protecting the power connector on the Expansion Modules.
2. Insert the DC output cable plug into the Expansion Module connector with the latch of the plug facing the front of the Module (see Figure 3-7 insert). Press down firmly until a snapping sound is heard.
3. Connect the *PS-4* power cable to an AC power outlet.

Module LEDs

Once the PS-4 is installed, any power source to the left of the Expansion Module is automatically disconnected.

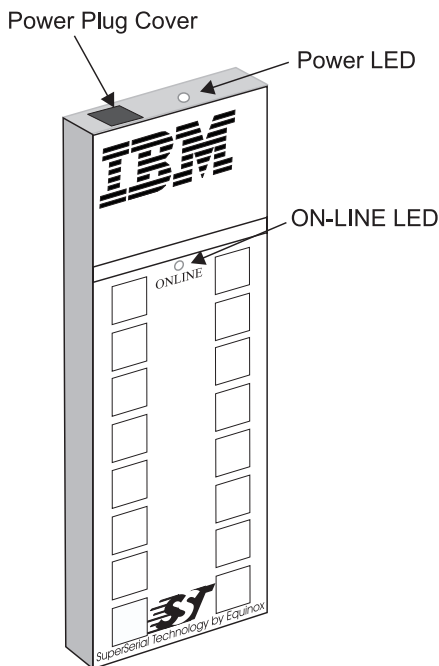


Figure 3-8. Power Plug Cover & LEDs on Port Module

Each Port Module contains an ON-LINE LED and Power LED indicator (see Figure 3-8). The ON-LINE LED is not functional until the driver software is installed.

In addition to the ON-LINE and Power LEDs, the *MIM-1* also contains a LINK LED. The LINK LED is not lit until the software driver is installed, a *CMX* is connected and power is present.

The Power LED is lit when power is present in the Expansion Modules. Refer to the appropriate driver software manual for details concerning all other LEDs.

4 Serial I/O Multiplexer Installation

The IBM Multiplexer Set includes the *MIM-1* unit, a *CMX16-DB* or *CMX16-RJ* and *Power Supply*.

CMXs are used when peripheral devices are located more than 200 feet (61m) from the host computer system or when they are located in a separate building. The *CMX* is installed near the peripheral devices and is connected to the *Adapter* via a *MIM-1*. The *MIM-1* is usually installed near the host computer. A *CMX* is connected to the *MIM-1* via an unshielded two-twisted pair (UTP) link cable. Both DB-25 and RJ-45 connectors are available in 16-port clusters as shown in Figure 4-1.

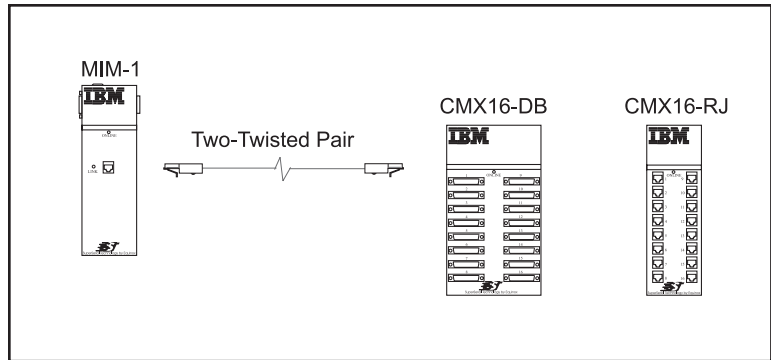


Figure 4-1. MIM-1 to CMX 16-DB or CMX 16-RJ

Cluster Multiplexers

CMXs are used to connect the peripheral devices to the *Expansion Bus* via a link cable and a *MIM-1*. The *CMX* is usually located in the immediate area of the devices to be connected. Figure 4-1 shows the link cable connection between the *MIM-1* and the *CMX*.

Wall Mounting

Included with each *CMX* are two wall mounting brackets and four screws. Attach one mounting bracket to the top right side of the unit and attach the other bracket to the bottom left side of the unit. Refer to Figure 3-3 for the approximate location of the mounting bracket screw holes. Note: *CMXs* are wall mounted the same as port modules. See Chapter 3 for details.

Power Adapters

Each *Multiplexer Set* is supplied with one of the following external power adapters:

- *Power Adapter PN 37L1482* for 120 VAC power source
- *Power Adapter PN 37L1491* for 230 VAC power source

Figure 4-2 shows the location of the *Power Adapter Jack*.

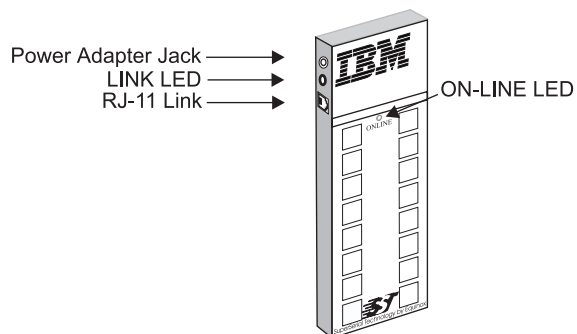


Figure 4-2. CMX16-RJ CMX

Multiplexer Link Cable

Connect the *MIM-1* to the *CMX* (see Figure 4-3) using a UTP Link Cable (Belden 1227A or equivalent) not to exceed 3,500 feet (1Km). A 10-foot (3.48m) link cable is supplied with the *MIM-1* for diagnostic purposes.

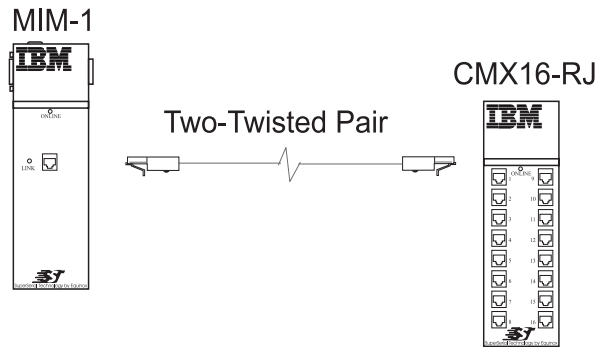


Figure 4-3. MIM-1 to CMX Link Cable



The link LEDs on the *MIM-1* and *CMX* are lit after connecting the link cable, applying power and installing the software driver.

Figure 4-4 shows a schematic of the two-twisted-pair cable.

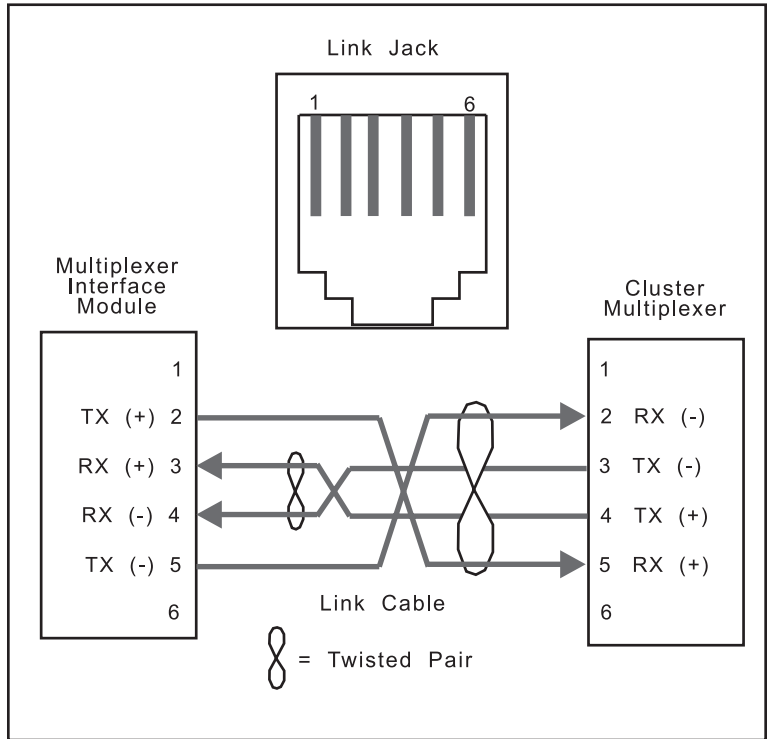


Figure 4-4. Multiplexer Link Cable Wiring

The *Serial I/O Expandable Subsystem* supports a wide variety of devices (both DCE and DTE), a range of cables from 4-wire RJ-11 to 10-wire RJ-45 and several different types of end connectors (DB-25, DB-9, RJ-11 and RJ-45).

All *Serial I/O* ports provide a standard RS-232 interface with full modem control signals.

To assist in wiring the I/O ports, *Equinox* sells a complete set of cabling accessories. See www.equinox.com for more information.

PM16-DB and CMX16-DB Port Pinouts

The PM16-DB and CMX16-DB ports provide standard RS-232 DTE signals on all DB-25 female connectors, one for each connected device (see Figure 5-1).

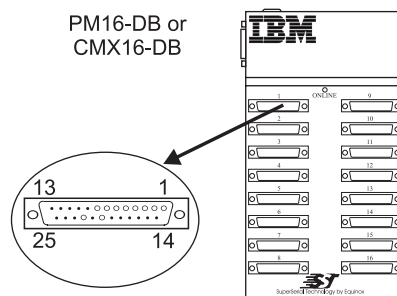


Figure 5-1. PM16-DB and CMX16-DB Port Connector Orientation

The pinouts for all female DB-25 connectors are identical (Figure 5-2).

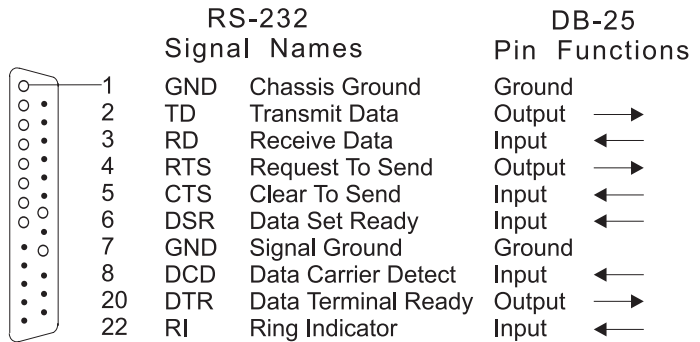


Figure 5-2. Female DB-25 Connector Pinouts

Device Wiring

Device wiring is dependent on the specific signal requirements of the system peripheral devices. Cable connectors plugged into the PM16-DB or CMX16-DB ports must have a male DB-25 connector. The connector on the opposite end of each cable should mate to the peripheral device port (terminal, printer, personal computer or modem).

Depending on the specific signal requirements of the system peripheral devices, 3-, 4-, or 7-wire connections can be made.

Figures 5-3 through 5-5 show the cable configurations for these connections.

Figures 5-6 and 5-7 illustrates a modem cable.

Three Wire Connection

For terminals and printers using XON/XOFF flow control.

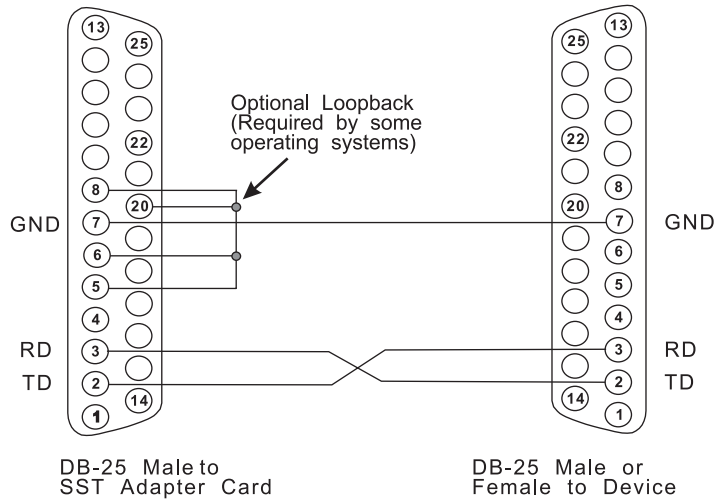


Figure 5-3. Pinouts for a Terminal or Printer Cable

Four Wire Connection

For terminals and printers using pin 20 hardware flow control.

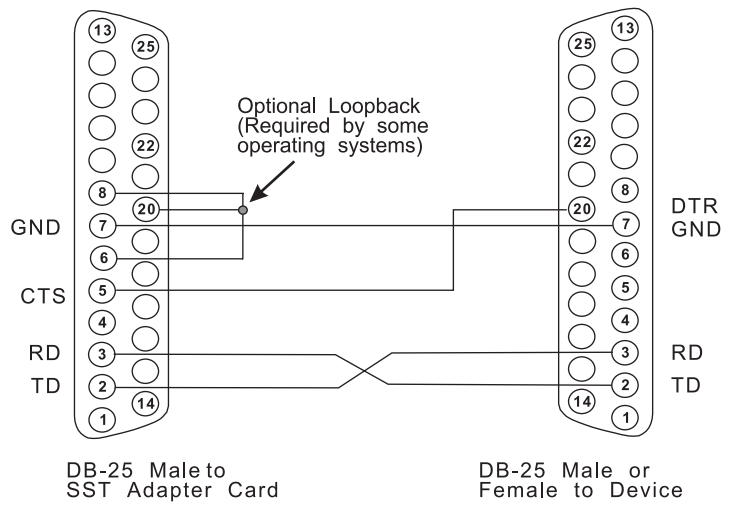


Figure 5-4. Cable for a Terminal or Printer Using DTR Flow Control

Seven Wire Connection

For full modem control signals to a terminal or printer.

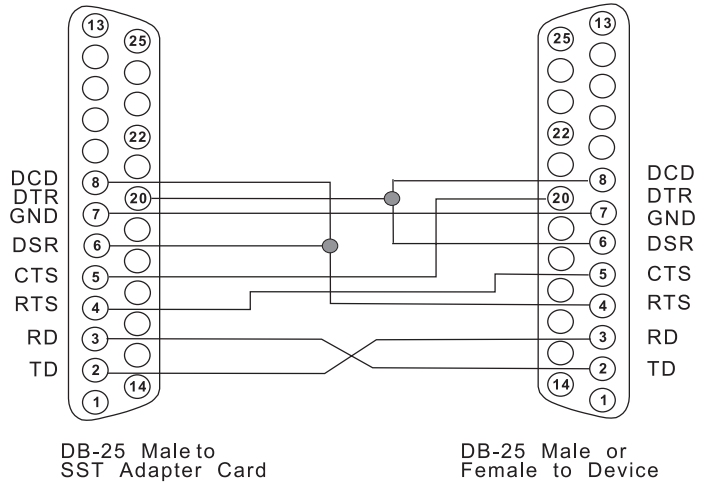


Figure 5-5. Cable for a Terminal or Printer Using DTR Flow Control

Modem Connection

For full modem control signals to a modem.

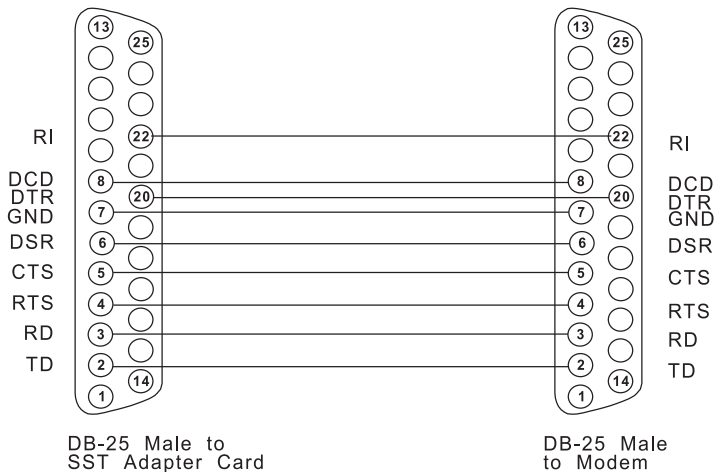


Figure 5-6. Pinouts for a Modem Cable

Personal Computer Serial Port

For personal computer serial port using DB-9 connector.

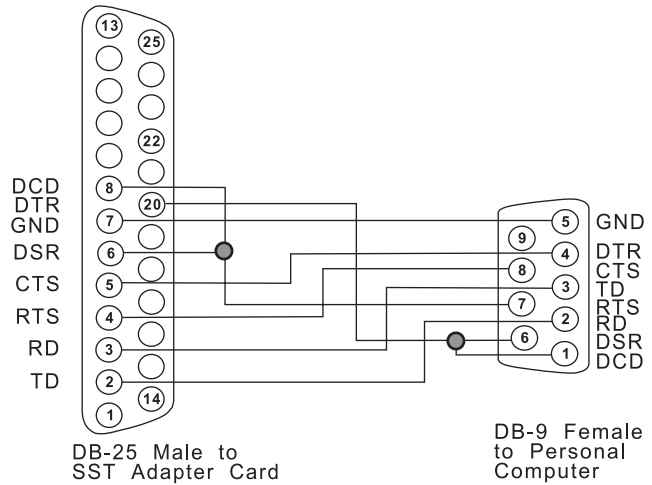


Figure 5-7. Cable to a Personal Computer Serial Port

PM16-RJ and CMX16-RJ Port Pinouts

The PM16-RJ and CMX16-RJ ports provide standard RS-232 DTE signals on all RJ-45 modular jacks (10-pin), one for each device to be connected as shown in Figure 5-8.

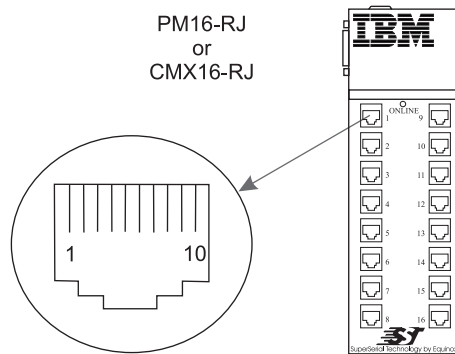


Figure 5-8. PM16-RJ and CMX16-RJ Port Connector Orientation

The pinouts for all RJ-45 jacks are identical (see Figure 5-9).

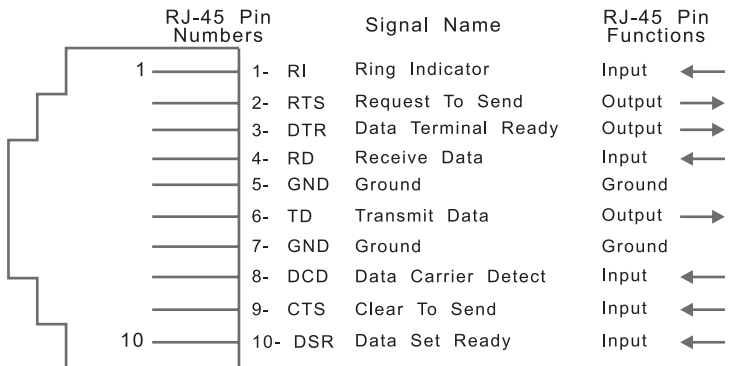


Figure 5-9. RJ-45 Jack Pinouts

Please note the following cabling considerations:

- All jacks on the PM16-RJ and CMX16-RJ units face the front of the product with the key pointed down. Refer to Figure 5-8 for the modular jack wiring orientation.
- Although the port modules use 10-pin modular jacks, the signal pinouts have been arranged such that 4-, 6- or 8-wire modular plugs may be used. Since the receive and transmit signals (and ground) are on the inner four wires, a 4-wire connection may be made to data-only devices.
- Either twisted-pair or flat modular cable may be used as a signal path from PM16-RJ and CMX16-RJ SuperSerial ports to peripheral devices. However, twisted-pair cables will greatly increase the operating distance.



Twisted-pair cables significantly increase the operating distance between SuperSerial ports and peripheral devices.

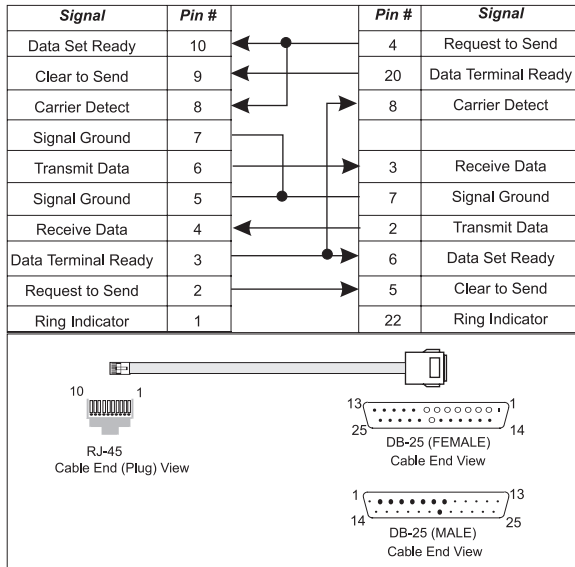


Figure 5-10. Cable pin- outs for RJ-45 to terminal/printer DB-25

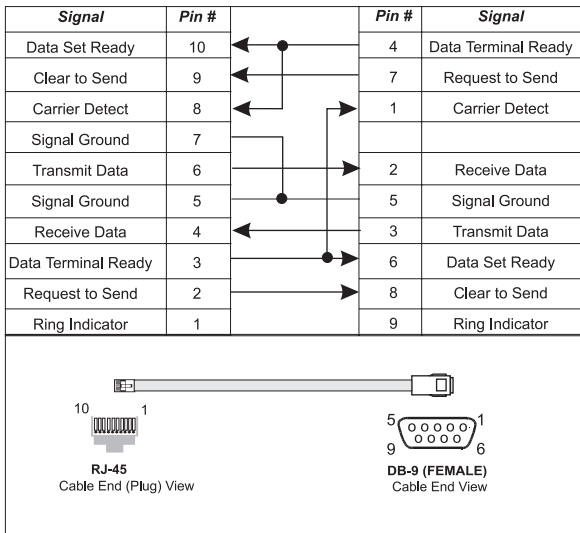


Figure 5-11. Cable pin- outs for RJ-45 to PC DB-9

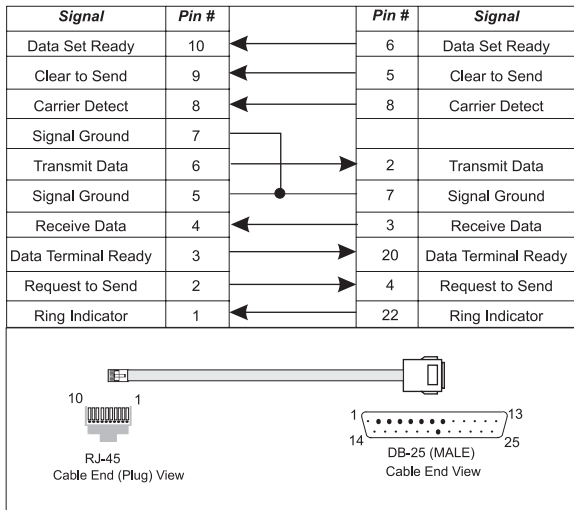


Figure 5-12. Cable Pin-outs for RJ-45 to Modem DB-25

Modular Cables

Following are cable diagrams detailing how to build your own cables to go between a RJ port module and your terminals, printers, PCs, modems, etc.

RJ-45 modular cable is the flat cable used for wiring telephones inside of buildings. The cable is terminated at each end with a RJ-45 modular plug (connector) which is inserted into the modular jack of an appropriate wiring module. Standard modular cables available from Equinox (see www.equinox.com) are reversing. That is, the pins are reversed on each end so that pin 1 on one end is connected to pin 8 or 10 on the opposite end, etc. Figure 5-13 illustrates the signals passed through modular cables when connected to a PM16-RJ or CMX16-RJ Serial I/O port.

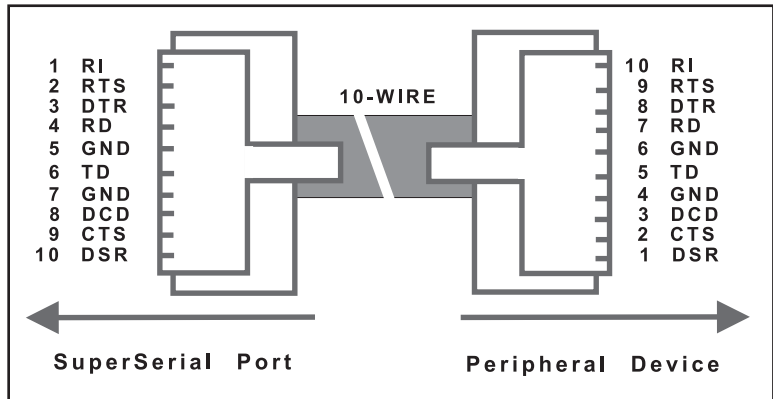


Figure 5-13. RJ-45 Modular Cable Signals



If your operating system does not require RI or DSR, an 8-wire cable may be used.

Modular Adapters

Ten wire modular adapters convert modular jacks to DB-25 (RS-232) connectors. Use Figure 5-14 as a guide in conjunction with the documentation provided with the host computer equipment to select the correct modular wiring accessories.

Figure 5-14 shows the internal wiring for the 10-wire Modular Adapters (available from www.equinox.com).

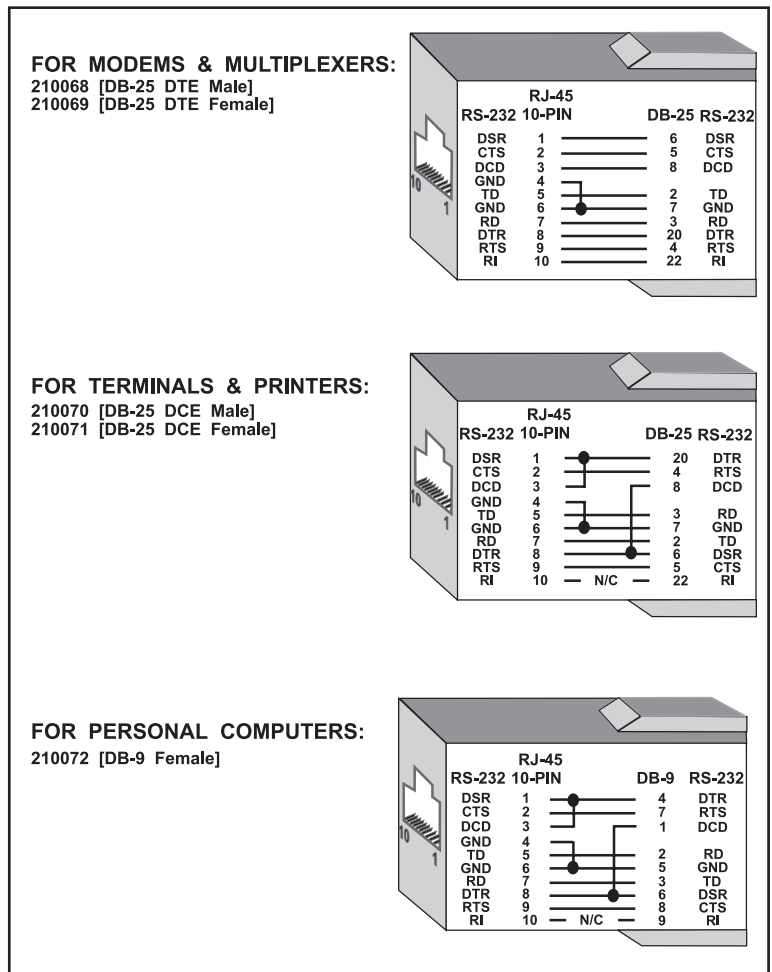


Figure 5-14. Ten-wire Modular Adapters

This appendix describes the following power defaults and optional configurations for *PCI Adapters*:

- The default (factory configured) power straps are set to obtain power for *Port Modules 1-4 (ports 1-64)* from the host computer backplane(i.e. the PCI Bus) and to obtain power for *Port Modules 5-8 (Ports 65-128)* from the computer power supply via J1.
- The power strap connections can be configured to optionally obtain power for *Port Modules 1-8 (Ports 1-128)* from the host computer backplane (i.e. the PCI bus).



IBM Serial I/O Expandable Adapters ship from the factory with the power straps configured to provide power to the *Port Modules* via the *Host Bus Cable(s)*. Normally there is no need to reconfigure any of the power straps.

If a PS-4 power supply is used, no power is drawn from the host system for the port modules.

Default Power Configuration

All *Serial I/O Adapters* are initially setup to draw power for the host cables from both the host computer PCI bus and host computer power supply. The power straps (default) shown in Figure A-1 are configured to select these power sources.

The top *Host Cable Bus (Modules 5-8)* receives power from the host computer power supply via the host "Y" cable (J1-see Figure A-1). The bottom *Host Cable Bus (Modules 1-4)* receives power from the host computer motherboard PCI bus.

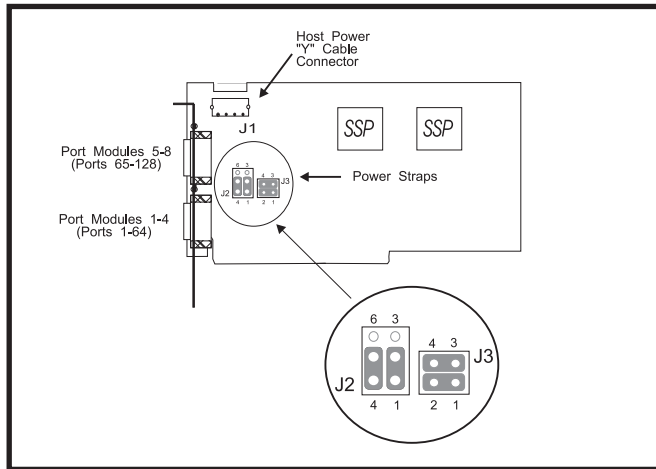


Figure A-1. Serial I/O Adapter Power Strap Default Connections

Optional Power Configuration

Power for the top *Host Cable (Port Modules 5-8)* can be drawn from the host computer PCI bus (instead of J1). To draw all port module power from the host computer motherboard, remove and set aside the host power "Y" cable connected to J1 and configure the power straps as shown in Figure A-2

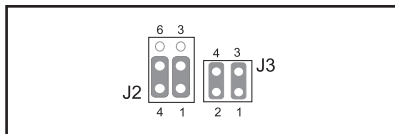


Figure A-2. Optional Adapter Power Strap Connections To Obtain Power For Port Modules 1-8 From The Host Computer PCI bus

Preparing To Call Technical Support

Before calling for Technical Support, please prepare for your call by following these steps:

To assist the technical support representative, have available as much of the following information as possible:

- Computer manufacturer and computer model.
- Options Part Name and Number (from the table below).
- Serial number (if available).
- Proof of purchase (including date and place).
- Exact wording of the error message (if any)
- Description of the problem
- Hardware and software configuration information for your system

If possible, be at your computer. Your technical support representative might want to walk you through the problem during the call.

| IBM Part Number | IBM Options - PCI Serial I/O Adapters |
|-----------------|---------------------------------------|
| 37L1414 | Serial I/O SST8P DB Adapter |
| 37L1415 | Serial I/O SST16P RJ Adapter |
| 37L1423 | Serial I/O SST16P DB Adapter |
| 37L1416 | Serial I/O SST128 Expandable Adapter |
| 37L1417 | Serial I/O PM16RJ Port Module |
| 37L1418 | Serial I/O PM16DB Port Module |
| 37L1421 | Serial I/O PS4 Power Supply |
| 37L1422 | Serial I/O WT PS4 Power Supply |
| 37L1419 | Serial I/O 16RJ Multiplexer Set |
| 37L1420 | Serial I/O 16DB Multiplexer Set |
| 37L1424 | Serial I/O 16RJ WT Multiplexer Set |
| 37L1425 | Serial I/O 16DB WT Multiplexer Set |

Placing the Call to IBM

Technical support is available during the warranty period to answer any questions about your new IBM OPTION. Support response time will vary depending on the number and nature of calls received.

Marketing, installation, and configuration support will be withdrawn from the PC Company HelpCenter 90 days after the option has been withdrawn from marketing.

If you call 90 days after the date of withdrawal or after your warranty has expired, you might be charged a fee. Additional support is available through the IBM PC Company automated Fax system, the PC Company Web Page, the PC Company Electronic Bulletin Board System and HelpWare offerings.

- The IBM web site at “<http://www.pc.ibm.com>”
- The IBM Fax system at (800) 426-3395 or (919) 517-0011
- The IBM BBS system at (919) 517-0001

For the support telephone and support hours by country, refer to the following table or to an optional enclosed technical support insert. If the number is not provided in the table or insert, contact your IBM reseller or IBM marketing representative.

| Support 24 hours a day, 7 days a week | |
|--|----------------|
| Canada | 1-800-426-7378 |
| United States/ Puerto Rico | 1-800-426-7378 |

Product Warranty

The following warranty information applies to products purchased in the United States, Canada, and Puerto Rico. For warranty terms and conditions for products purchased in other countries, see the enclosed Warranty insert, or contact your IBM reseller or IBM marketing representative. International Business Machines Corporation Armonk, New York, 10504

Statement of Limited Warranty

The warranties provided by IBM in this Statement of Limited Warranty apply only to Machines you originally purchase for your use, and not for resale, from IBM or your reseller. The term “Machine” means an IBM machine, its features, conversions, upgrades, elements, or accessories, or any combination of them.

Unless IBM specifies otherwise, the following warranties apply only in the country where you acquire the Machine. If you have any questions, contact IBM or your reseller.

Production Status

Each Machine is manufactured from new parts, or new and used parts. In some cases, the Machine may not be new and may have been previously installed. Regardless of the Machine’s production status, IBM’s warranty terms apply.

The IBM Warranty for Machines

IBM warrants that each Machine

- 1) is free from defects in materials and workmanship and
- 2) conforms to IBM’s Official Published Specifications.

The warranty period for a Machine is a specified, fixed period commencing on its Date of Installation. The date on your receipt is the Date of Installation, unless IBM or your reseller informs you otherwise. During the warranty period IBM or your reseller, if authorized by IBM, will provide warranty service under the type of service designated for the Machine and will manage and install engineering changes that apply to the Machine.

For IBM or your reseller to provide warranty service for a feature, conversion, or upgrade, IBM or your reseller may require that the

Machine on which it is installed be:

- 1) for certain Machines, the designated, serial-numbered Machine and
- 2) at an engineering-change level compatible with the feature, conversion, or upgrade.

Many of these transactions involve the removal of parts and their return to IBM.

You represent that all removed parts are genuine and unaltered. A part that replaces a removed part will assume the warranty service status of the replaced part.

If a Machine does not function as warranted during the warranty period, IBM or your reseller will repair it or replace it with one that is at least functionally equivalent, without charge. The replacement may not be new, but will be in good working order. If IBM or your reseller is unable to repair or replace the Machine, you may return it to your place of purchase and your money will be refunded.

If you transfer a Machine to another user, warranty service is available to that user for the remainder of the warranty period. You should give your proof of purchase and this Statement to that user. However, for Machines which have a life-time warranty, this warranty is not transferable.

Warranty Service

To obtain warranty service for the Machine, you should contact your reseller or call IBM.

| | |
|---|-----------------------|
| In the United States call IBM at | 1-800-426-7378 |
| In Canada, call IBM at | 1-800-426-7378 |
| <i>You may be required to present proof of purchase</i> | |

IBM or your reseller will provide certain types of repair and exchange service, either at your location or at IBM's or your reseller's service center, to restore a Machine to good working order.

When a type of service involves the exchange of a Machine or part, the item IBM or your reseller replaces becomes its property and the replacement becomes yours.

You represent that all removed items are genuine and unaltered. The replacement may not be new, but will be in good working order and at least functionally equivalent to the item replaced. The replacement

assumes the warranty service status of the replaced item. Before IBM or your reseller exchanges a Machine or part, you agree to remove all features, parts, options, alterations, and attachments not under warranty service. You also agree to ensure that the Machine is free of any legal obligations or restrictions that prevent its exchange.

You agree to:

1. obtain authorization from the owner to have IBM or your reseller service a Machine that you do not own; and
2. where applicable, before service is provided —
 - a) follow the problem determination, problem analysis, and service request procedures that IBM or your reseller provide,
 - b) secure all programs, data, and funds contained in a Machine, and
 - c) inform IBM or your reseller of changes in a Machine's location.

IBM is responsible for loss of, or damage to, your Machine while it is

- 1) in IBM's possession or
- 2) in transit in those cases where IBM is responsible for the transportation charges.

Extent of Warranty

IBM does not warrant uninterrupted or error-free operation of a Machine. The warranties may be voided by misuse, accident, modification, unsuitable physical or operating environment, improper maintenance by you, removal or alteration of Machine or parts identification labels, or failure caused by a product for which IBM is not responsible.

THESE WARRANTIES REPLACE ALL OTHER WARRANTIES OR CONDITIONS, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OR CONDITIONS OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THESE WARRANTIES GIVE YOU SPECIFIC LEGAL RIGHTS AND YOU MAY ALSO HAVE OTHER RIGHTS WHICH VARY FROM JURISDICTION TO JURISDICTION. SOME JURISDICTIONS DO NOT ALLOW THE EXCLUSION OR LIMITATION OF EXPRESS OR IMPLIED WARRANTIES, SO THE ABOVE EXCLUSION OR LIMITATION MAY NOT APPLY TO YOU. IN THAT EVENT SUCH WARRANTIES ARE LIMITED IN DURATION TO THE WARRANTY

Limitation of Liability

PERIOD. NO WARRANTIES APPLY AFTER THAT PERIOD.

Circumstances may arise where, because of a default on IBM's part or other liability you are entitled to recover damages from IBM. In each such instance, regardless of the basis on which you are entitled to claim damages from IBM (including fundamental breach, negligence, misrepresentation, or other contract or tort claim), IBM is liable only for:

1. damages for bodily injury (including death) and damage to real property and tangible personal property; and
2. the amount of any other actual direct damages or loss, up to the greater of U.S. \$100,000 or the charges (if recurring, 12 months' charges apply) for the Machine that is the subject of the claim.

UNDER NO CIRCUMSTANCES IS IBM LIABLE FOR ANY OF THE FOLLOWING:

- 1) THIRD-PARTY CLAIMS AGAINST YOU FOR LOSSES OR DAMAGES (OTHER THAN THOSE UNDER THE FIRST ITEM LISTED ABOVE);
- 2) LOSS OF, OR DAMAGE TO, YOUR RECORDS OR DATA;
- 3) SPECIAL, INCIDENTAL, OR INDIRECT DAMAGES OR FOR ANY ECONOMIC CONSEQUENTIAL DAMAGES (INCLUDING LOST PROFITS OR SAVINGS), EVEN IF IBM OR YOUR RESELLER IS INFORMED OF THEIR POSSIBILITY. SOME JURISDICTIONS DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE EXCLUSION OR LIMITATION MAY NOT APPLY TO YOU.

Trademarks

The following terms used in this publication, are Trademarks of the IBM Corporation in the United States or other countries:

IBM HelpCenter

Windows NT, Windows95 and Windows98 are Trademarks or Registered Trademarks of Microsoft Corporation.

Equinox is a Registered Trademark of Equinox Systems, Inc.

Other company, product, and service names, which may be denoted by a double asterisk (**), may be trademarks or service marks of others.

Electronic Emission Notices

Federal Communications Commission (FCC) Statement

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

Properly shielded and grounded cables and connectors must be used in order to meet FCC emission limits. IBM is not 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.

Industry Canada Class A Emission Compliance Statement

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

Avis de conformité B la réglementation d'Industrie Canada

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

Deutsche EMV-Direktive (electromagnetische Verträglichkeit)

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 UK, Greenock.

Dieses Gerät erfüllt die Bedingungen der EN 55022 Klasse A. Für diese Klasse von Geräten gilt folgende Bestimmung nach dem EMVG:

Geräte dürfen an Orten, für die sie nicht ausreichend entstört sind, nur mit besonderer Genehmigung des Bundesministers für Post und Telekommunikation oder des Bundesamtes für Post und Telekommunikation betrieben werden. Die Genehmigung wird erteilt, wenn keine elektromagnetischen Störungen zu erwarten sind.

(Auszug aus dem EMVG vom 9.Nov.92, Para.3. Abs.4)

Hinweis: Dieses Genehmigungsverfahren ist von der Deutschen Bundespost noch nicht veröffentlicht worden.

European Union - EMC Directive

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.

IBM cannot accept responsibility for any failure to satisfy the protection requirements resulting from a non-recommended modification of the product, including the fitting of non-IBM option cards.

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

Warning: This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Union Européenne - Directive Conformité électromagnétique

Ce produit est conforme aux exigences de protection de la Directive 89/336/EEC du Conseil de l'UE sur le rapprochement des lois des États membres en matière de compatibilité électromagnétique.

IBM ne peut accepter aucune responsabilité pour le manquement aux exigences de protection résultant d'une modification non recommandée du produit, y compris l'installation de cartes autres que les cartes IBM.

Ce produit a été testé et il satisfait les conditions de l'équipement informatique de Classe A en vertu de CISPR22 / Standard européen EN 55022. Les conditions pour l'équipement de Classe A ont été définies en fonction d'un contexte d'utilisation commercial et industriel afin de fournir une protection raisonnable contre l'interférence d'appareils de communication autorisés.

Avvertissement : Ceci est un produit de Classe A. Dans un contexte résidentiel, ce produit peut causer une interférence radio exigeant que l'utilisateur prenne des mesures adéquates.

Union Europea - Normativa EMC

Questo prodotto è conforme alle normative di protezione ai sensi della Direttiva del Consiglio dell'Unione Europea 89/336/CEE sull'armonizzazione legislativa degli stati membri in materia di compatibilità elettromagnetica.

IBM non accetta responsabilità alcuna per la mancata conformità alle normative di protezione dovuta a modifiche non consigliate al prodotto, compresa l'installazione di schede e componenti di marca diversa da IBM.

Le prove effettuate sul presente prodotto hanno accertato che esso rientra nei limiti stabiliti per le apparecchiature di informatica Classe A ai sensi del CISPR 22 / Norma Europea EN 55022. I limiti delle apparecchiature della Classe A sono stati stabiliti al fine di fornire ragionevole protezione da interferenze mediante dispositivi di comunicazione in concessione in ambienti commerciali ed industriali.

Avvertimento: Questo è un prodotto appartenente alla Classe A. In ambiente domestico, tale prodotto può essere causa di interferenze radio, nel qual caso l'utente deve prendere misure adeguate.

Unione Europea - Directiva EMC (Conformidad electromagnética)

Este producto satisface los requisitos de protección del Consejo de la UE, Directiva 89/336/CEE en lo que a la legislación de los Estados Miembros sobre compatibilidad electromagnética se refiere.

IBM no puede aceptar responsabilidad alguna si este producto deja de satisfacer dichos requisitos de protección como resultado de una modificación no recomendada del producto, incluyendo el ajuste de tarjetas de opción que no sean IBM.

Este producto ha sido probado y satisface los límites para Equipos Informáticos Clase A de conformidad con el Estándar CISPR22 y el Estándar Europeo EN 55022. Los límites para los equipos de Clase A se han establecido para entornos comerciales e industriales a fin de proporcionar una protección razonable contra las interferencias con dispositivos de comunicación licenciados.

Advertencia: Este es un producto de Clase A. En un entorno doméstico este producto podría causar radiointerferencias en cuyo caso el usuario deberá tomar las medidas adecuadas.

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A情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

警告使用者： 這是甲類的資訊產品，在居住的環境中使用時，可能會造成射頻干擾，在這種情況下，使用者會被要求採取某些適當的對策。

© 1998 IBM. All rights reserved. Reproduction without permission prohibited.

IBM makes no representations or warranties with respect to the contents hereof and specifically disclaims any implied warranties of merchantability or fitness for any particular purpose. Information is subject to change without notice and does not represent a commitment on the part of IBM.

Symbols

| | |
|-----------------------------------|-----|
| 128-port Adapter | 2-2 |
| 16-port Cluster Multiplexer | 1-4 |

A

| | |
|--------------------|----------------|
| Adapter, | 1-7, 1-11, 2-1 |
| Installation | 2-1 |

B

| | |
|--------------------------------------|-----|
| Bar Code Readers | 1-3 |
| Belden 1227A | 4-3 |
| Black-anodized Mounting Screws | 3-2 |
| Brackets | |
| Coupler | 3-2 |

C

| | |
|----------------------------------|--------------------------------|
| Cable | 1-3, 1-4, 1-6, 1-9, 1-10, 1-12 |
| host expansion bus | 1-6 |
| host power “Y” | 2-2 |
| jackscrew studs | 3-5 |
| Cable Pin-outs | |
| RJ-45 to Modem | 5-8 |
| RJ-45 to PC | 5-8 |
| RJ-45 to Terminal/Printer | 5-7 |
| Cash Registers | 1-3 |
| Cluster Multiplexer (CMX) | 3-1, 4-1, 4-2 |
| Cluster Multiplexers (CMX) | 1-4 |
| CMX | 1-5 |
| CMX16-DB | 5-1 |
| Connector Orientation | |
| CMX16-DB | 5-1 |
| CMX16-RJ | 5-6 |
| PM16-DB | 5-1 |
| PM16-RJ | 5-6 |
| Coupler Brackets | 3-2 |

D

| | |
|---------------------|-----|
| DCE | 5-1 |
| Device Wiring | 5-2 |
| DOS | 1-2 |
| DTE | 5-1 |

E

| | |
|--|-----------------|
| EBC | 3-5 |
| EBCs | 1-7 |
| Expansion Bus 1-3, 1-4, 1-6, 1-8, 1-9, 1-10, 1-12 | |
| Cable | 1-6, 3-2 |
| Installation | 3-4 |
| Expansion Module 1-1, 1-3, 1-4, 1-6, 1-7, 1-8, | 1-9, 1-10, 1-12 |
| Installation | 3-1, 5-1 |
| Power Plug Cover | 3-7 |
| Expansion Module Installation | 3-1 |
| Expansion Modules | 1-4 |
| External Power | |
| Adapter | 4-2 |

F

| | |
|----------------------------------|-----|
| Flat Modular Cable | 5-7 |
| Four Wire Connection | 5-3 |
| Four-wire Connection | 5-3 |
| Full Modem Control Signals | 5-1 |

H

| | |
|--------------------------------|---------------|
| Host Cable | 1-3, 3-2, 3-4 |
| Connecting to Controller | 3-4 |
| Host Power “Y” Cable | 2-2 |

I

| | |
|-------------------------|-----|
| Installing | |
| Expansion Modules | 3-2 |

PS-4 Power Supply 3-7

J

Jack-screw Studs
 Installing 3-5

L

Link Cable 4-1
 Belden 1227A 4-3
LINK LED 3-8

M

MIM 1-5, 4-1, 4-2
MIM-1 3-1
Modem Connection 5-4
Modems 1-3
Modular Adapters 5-10
Modular Cables 5-9
Modular Jacks
 10-pin 5-7
Modular Plugs
 4-wire 5-7
 6-wire 5-7
 8-wire 5-7
Module LEDs 3-8
Mounting Single Module 3-3
Multi-building Facility 1-4
Multiplexer
 Installation 4-1
 Interface Module 4-1
 Link Cable Wiring 4-4
 Types 1-5
Multiplexer Interface Modules 1-4
Multiplexer Interface Modules (MIM), 1-4
Multiplexer Link Cable 4-3
Multiplexer Set 1-4

N

Nickel-Plated
 Mounting Screws 3-2
Novell 1-2

O

ON-LINE LED 3-8
Overview 1-1

P

PCI 1-2, 2-1
Personal Computer Serial Port 5-5
Pin 20 Hardware Flow Control
 Terminals 5-3
Pin-outs
 DB-25 5-2
 Full Modem Applications 5-4
 Full Modem Control 5-4, 5-5
 Printer Using Hardware Flow Control 5-3
 Terminal 5-3
 Terminal Using Hardware Flow Control 5-3
Plug and play 2-1
PM16-DB 5-1
PM16-DB and CMX16-DB Port Pinouts 5-1
Port Connector Orientation
 CMX16-RJ 5-6
 PM16-RJ 5-6
Port Pin-outs 5-1
 CMX16-RJ 5-6
 PM16-RJ 5-1, 5-6
Port To Device Cabling 5-1
Power
 Adapter 1-10
 Adapter Jack. 4-2
 External 1-9
 LED 3-8
 Options 1-8

| | | | |
|-----------------------------------|-----------------|-----------------------------------|-----|
| Plug Cover | 3-7 | Twisted-pair Cable | 5-7 |
| Strap Connections | A-1 | Two-twisted-pair link | 1-4 |
| Power Adapter | 1-10, 4-2 | U | |
| Power Defaults & Options | A-1 | UNIX | 1-2 |
| Power Options | 1-8 | Unshielded Two-twisted Pair | 4-1 |
| Power Supply | 1-4 | UTP | 4-3 |
| Printers | 1-3 | UTP Link Cable | 4-1 |
| PS-4 | 1-9, 3-7 | W | |
| Installing Power Supply | 3-7 | Wall Mounting | 4-2 |
| Power Cable | 3-7 | X | |
| PS-4 Power Supply | 1-9 | XON/XOFF flow control | 5-3 |
| R | | Y | |
| RJ-45 Jack Pin-outs | 5-6 | “Y” cable | 2-2 |
| RJ-45 Modular Cable Signals | 5-9 | | |
| RJ-45 Modular Plug | 5-9 | | |
| RS-232 Interface | 5-1 | | |
| S | | | |
| Serial I/O | | | |
| 128-port Host Controller | 1-3 | | |
| Adapter | 1-1, 1-7, 2-1 | | |
| Installation & Setup | 2-1 | | |
| CMX | 4-2 | | |
| Expanded I/O Subsystem | 5-1 | | |
| Multiplexer Installation | 3-6, 4-1 | | |
| Port Modules | 3-1 | | |
| Seven-wire Connection | 5-4 | | |
| Studs | | | |
| installing | 3-5 | | |
| SuperSerial | 1-11, 1-12, 5-1 | | |
| System Setup | | | |
| PCI | 2-1 | | |
| T | | | |
| Ten-wire Modular Adapters | 5-10 | | |
| Terminals | 1-3 | | |
| Three Wire Connection | 5-3 | | |

