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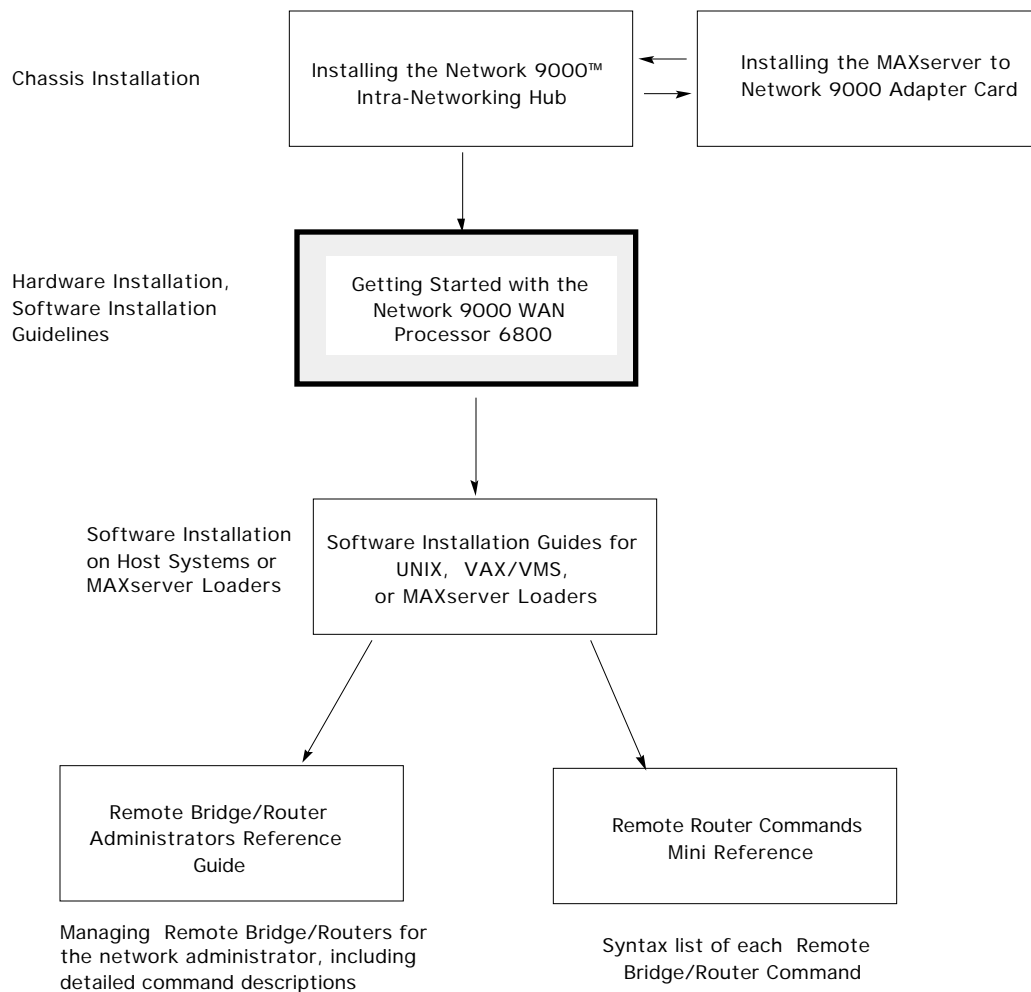
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Preface

How to Use this Guide

Use this guide in conjunction with other Xyplex documents to install and configure a WAN Processor 6800 in a Network 9000 chassis. The following documentation map shows the order in which you should use the related Xyplex documents. The shaded block indicates where this guide fits in the installation process.

Documentation Map



What this Guide Covers

The guide is organized as follows:

Chapter 1 -- Introduction

This chapter provides a basic description of the WAN Processor 6800, its functions and capabilities. The chapter describes the controls and indicator lights on the module, and the product's software prerequisites.

Chapter 2 -- Installation Notes

This chapter covers basic WAN Processor 6800 installation.

Chapter 3 -- Cabling

This chapter covers basic cabling of WAN ports and the user interface port.

Chapter 4 -- Installation Troubleshooting

This chapter explains the steps to take if WAN Processor 6800 fails to initialize and load the Xyplex Bridge/Router software. The chapter provides problem descriptions and suggests possible solutions for each problem.

Appendix A -- Technical Specifications

Lists technical specifications for the 6800 module and the WAN I/O module.

Appendix B -- Order Codes

Lists Xyplex order codes for the WAN Processor 6800 modules and associated cables.

Chapter 1

Introduction

1.1 About the WAN Processor 6800

The WAN Processor 6800 is a Network 9000 Type 1 module. You can install the module into any chassis slot. However, the module requires an adaptor card for installation into any slot other than Slot 1. The Xyplex Hardware Type for the module is 81.

A WAN Processor 6800 connects Ethernet/802.3 Local Area Networks (LANs), and forwards packets between them. You connect the 6800 module to one or more partner bridges or routers over a WAN link, and to Ethernet Segment A in the Network 9000 chassis. In discussions of bridging and routing operations, the WAN link is referred to as link **W 1** and the LAN link to Segment A is referred to as link **E1**.

A WAN Processor 6800 functions as a self-loading partner to any of the following Xyplex Bridges and Routers, or to another 6800 module:

- MX-6510 Remote Bridge card
- MX-6710 Remote Router card
- MX-6020 Remote Bridge unit
- MX-6220 Remote Router unit
- Network 9000 WAN Processor 401

WAN Processor 6800 modules provide the following routing and bridging services:

Routing -- 6800 WAN Processors are designed to route packets of these network types¹:

- Internet (IP)
- Novell IPX
- DECnet™ Phase IV

When you turn on (enable) IP, IPX, or DECnet Phase IV routing at a 6800, the 6800 builds tables of paths to accessible IP, Novell Netware®, or DECnet IV networks. When forwarding packets to these networks, the 6800 uses a *routing process* to choose the least cost (preferred) path.

¹ For information concerning support for additional network types, such as Appletalk™, contact your Xyplex sales representative.

Bridging -- 6800 modules can use a *bridging process* to pass packets of communication protocols other than IP, IPX, and DECnet from one physical network to another². When you enable bridging at a 6800 module, the bridging process transparently links remote LAN segments, to effectively form a single extended network.

Unlike the routing process, the bridging process cannot always choose a preferred path to a destination. However, the bridging process enables the 6800 module to forward protocols that are not routable, such as the DEC Local Area Transport (LAT).

1.1.1 Routing Features

Some of the key routing features of the 6800 module include:

- **Support for IP routing, including**
 - **Support for Open Shortest Path First (OSPF) as an Interior Gateway Protocol (IGP)³**
 - **Support for the Routing Information Protocol (RIP) as an IGP⁴**
 - **Support for the Exterior Gateway Protocol (EGP)⁵**
 - **Support for Route Import and Export filters**
 - **Support for IP Traffic filters**
 - **Support for User Datagram Protocol (UDP) Broadcast routing**
 - **Support for IP protocol prioritization**
 - **Support for the Promiscuous (Proxy) Address Resolution Protocol (Proxy ARP)**
- **Reverse Address Resolution Protocol (RARP) server capability**
- **Support for Novell IPX routing, including:**
 - **Support for NetBIOS forwarding**
 - **Support for Router Information Protocol (RIP) broadcasting**
 - **Support for IPX protocol prioritization**
 - **Support for Service Advertisement Protocol (SAP) broadcasting**
- **Support for DECnet Phase IV routing, including:**
 - **Support for DECnet Import and Export filters, and traffic filters**
 - **Support for Level 1 and Level 2 routing**
 - **Support for DECnet protocol prioritization**

² If IP, IPX, or DECnet routing is turned off (disabled), the 6800 will use the bridging process to handle packets of these protocols, too.

³ 6800 Bridge/Routers support OSPF, Version 2, as defined in IETF Request for Comment (RFC) 1247.

⁴ 6800 Bridge/Routers support RIP, as described by RFC 1058.

⁵ 6800 Bridge/Routers support EGP, as defined by RFC 904.

1.1.2 Using the 6800 as a Remote Bridge

If you want the 6800 to perform bridging -- but not routing -- you enable bridging but do not enable IP, IPX, or DECnet Phase IV routing. Following are some of the key features of the bridging software. (These features are provided concurrently with the routing functions when IP, IPX, or DECnet IV routing is enabled.)

- Support for the IEEE 802.1D/draft 9 Spanning Tree Algorithm and Protocol (STP).
- Support for filtering and forwarding of all Ethernet protocol types, including:
 - Non-routable DEC protocols such as LAT and MOP
 - Xyplex proprietary protocols

The 6800 can filter packets based on source address, destination address, and/or Ethernet/802.3 protocol type. It can also filter packets by searching for a specific byte pattern at a specific location.

- Fully Distributed Redundant Bridging (FDRB).
- Xyplex Bridge/Routers provide a feature called Interactive Protocol Optimization (IPO™), which can reduce congestion on WAN links that are used for bridging. IPO provides these functions:
 - Protocol prioritization
 - Throughput enhancement

1.1.3 WAN Connectivity

WAN Processor 6800 modules support:

- The Point-to-Point Protocol (PPP), and the Xyplex proprietary WAN protocol (XCP)⁶.
- Connections to multi-vendor Frame Relay networks.

Refer to the *Remote Bridge/Router Administrator's Guide* for background information about WAN connectivity.

⁶ 6800 Bridge/Routers support PPP, as defined by the Internet Requests for Comment (RFCs) 1171, 1172 (Initial Configuration Options for IP), and 1220 (Extensions for Bridging).

1.1.4 SNMP Support

WAN Processor 6800 modules accept Simple Network Management Protocol (SNMP) SET, GET, and GET_NEXT instructions, and generate SNMP Trap messages. Refer to the *Remote Bridge/Router Administrator's Guide* for background information about SNMP support.

1.1.5 Other 6800 Features

Other features of the 6800 Bridge/Router include:

- A memory card slot. The 6800 module can load its operating software from an optional flash memory card. Flash memory cards are readable/writeable and can be upgraded to a newer software version, and load/store operational parameters

Additionally, a 6800 can load software and parameters from a flash memory card to other bridge/router units. Also, if the appropriate software image has been installed on the flash memory card, the 6800 can load other Xyplex unit types (e.g., repeaters). Refer to the *Software Installation Guide for Xyplex Loaders* for background information about this option.

- Can obtain software from network load servers over a WAN or LAN link.⁷
- Five megabytes of memory.
- Choice of V.35, RS-423, RS-232, RS-422, EIA-530, or X.21 WAN link interface.
- Allows user interface access via local serial port (MGMT port), or from remote terminals through a network-accessible console port, via the DEC Remote Console Protocol™ (RCP) or TCP/IP Telnet.

⁷ A 6800 cannot load bridge/router software over a WAN link that has been assigned the Frame Relay or PPP Link Protocol.

1.2 WAN Ports (On the WAN I/O Module)

The 6800 module provides a WAN port, to which you connect a communication device that supports one of the following interfaces. The WAN interface type is determined by the WAN I/O module that you install into the rear of the chassis.

RS-423 -- Used for low speed connections. Typically, you use an RS-423 interface for connections through low speed synchronous modems; for example, a modem operating at a speed under 19.2 Kbps.

V.35 -- Used with higher speed connections; typically used for 56 Kbps leased-line service, or a 64 Kbps link. The V.35 interface can support synchronous line speeds up to 2.048 Mbps.

RS-232 -- Used for low speed connections. Uses same physical connector as RS-423, but has different electrical interface, and supports shorter links than RS-423.

RS-422 -- Typically used for high speed connections, such as subchannels of a T1 link. The RS-422 interface can support synchronous line speeds up to 2.048 Mbps.

EIA-530 -- Typically used for high-speed connections; this interface type is similar to RS-422, but uses a different connector. The EIA-530 interface can support synchronous line speeds up to 2.048 Mbps.

X.21 -- An International standard that supports synchronous line speeds up to 2.048 Mbps.

Refer to Chapter 3 for specific cabling information.

1.3 The MGMT Port and Console Port

A WAN I/O module provides a MGMT port (Port 1), to which you can connect a terminal, personal computer, or other asynchronous ASCII serial device. The MGMT port provides local access to the bridge/router user interface. A serial cable and RJ-45-to-DB-25 adaptor are shipped with each Network 9000 chassis. Chapter 3 describes other serial cabling options.

The 6800 module supports connections to the user interface from remote workstations, through the DEC Remote Console Protocol and TCP/IP Telnet. The 6800 module's *console port* (Port 0) is a logical port, which provides remote access to the bridge/router user interface from any network device that supports RCP or Telnet. For example, from a Xyplex terminal server running TCP/IP-LAT software, you can access the console port by issuing the TELNET CONSOLE command.

Additionally, you can use the NETWORK CONSOLE command to access the 6800 console port from another Xyplex Bridge/Router or Network 9000 Repeater. The NETWORK CONSOLE command is described in the *Remote Bridge/Router Administrator's Guide*.

1.3.1 Making Outbound Connections from the MGMT/Console Port

At an MX-6800 Remote Bridge/Router, you can use the NETWORK CONSOLE, TELNET, and TELNET CONSOLE commands to make outbound connections. These commands are described in the *Remote Bridge/Router Administrator's Guide*.

1.4 Product Prerequisites

A 6800 WAN Processor requires Xyplex Bridge/Router software, Version 3.0 or greater (image name RR1.SYS). **The 6800 is self-loading;** it is initially configured to load its software from a memory card, if one is inserted in its memory card slot.

If a memory card is not present, the 6800 will broadcast requests for software from a network host called a *load server*, which can be:

- A Xyplex MAXserver Manager (MAXMAN) card
- Another 6800 or a Network 9000 processor module that is equipped with a flash memory card, which contains the software image "RR1.SYS"
- A VAX/VMS host system, from which the 6800 can load via the DEC Maintenance Operations Protocol (MOP)
- A UNIX host system running:
 - Bootstrap protocol (BOOTP) and Trivial File Transfer Protocol (TFTP), or:
 - Reverse Address Resolution Protocol (RARP) and TFTP, or
 - Trivial File Transfer Protocol (for "Directed" TFTP)

The load server transmits a software image to the 6800, over the network, whenever the module is powered on or re-initialized. By default, the 6800 requests software from each type of load server, until a server responds with a software load offer. If you need to install software on a network load server, refer to the *Software Installation Guide* for the type of load server you plan to use.

You can configure a 6800 to load software from its flash memory card to other Xyplex units. The *Software Installation Guide* for Xyplex loaders explains how to configure Xyplex units with flash memory cards to do this.

1.4.1 Storing and Loading Operational Parameters

Operational parameters affect the operation of the software after it has been loaded. They are modified whenever you issue a **DEFINE** command. For example, if you issue the **DEFINE INTERNET ADDRESS** command, the 6800 will update its operational parameter database.

The 6800 is initially configured to store its operational parameters locally on a flash memory card, if one is inserted in its memory card slot, and remotely at any properly configured *parameter servers*. A parameter server can be a MAXserver Manager card (MAXman), another 6800, or a Network 9000 processor module that is equipped with a flash memory card. The parameter server can also be a VAX/VMS or UNIX host system. For information about parameter service through a VAX/VMS or UNIX system, refer to the *Software Installation Guide* for the appropriate host system.

You can configure a 6800 to load parameters for other Xyplex units. The *Software Installation Guide for Xyplex Loaders* explains how to configure Xyplex units with flash memory cards to do this.

1.5 Controls and Indicator Lights

Figure 1-1 shows the location and function of all indicator lights on the 6800 module:

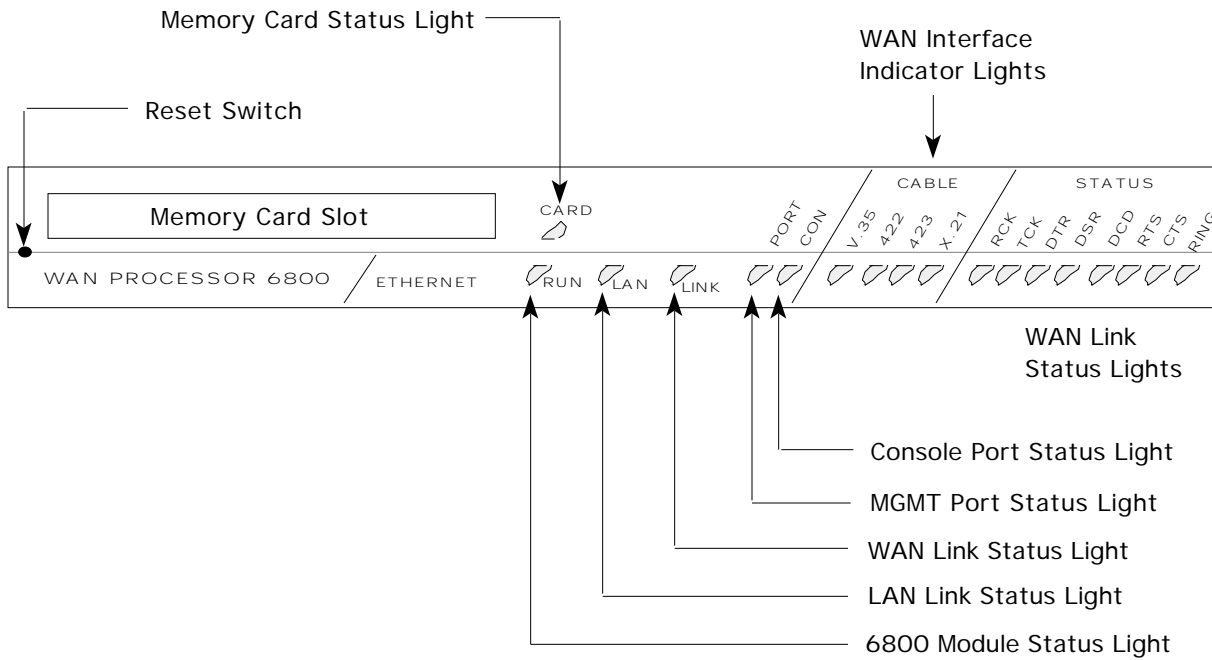


Figure 1-1. WAN Processor 6800 Module, Front View

Reset Switch

Use a straightened paper clip, or similar tool, to press this switch. Press once to place the module into the reset state. Press again to re-initialize the module (reload software and parameters).

Status Lights

RUN	Indicates whether the 6800 module is operating. While the module performs self-test diagnostics, this light is OFF. While the module loads software, this light flashes rapidly (once per second). During normal operation, this light flashes slowly (once every two seconds).
CARD	ON when the memory card is being accessed. Do not remove the memory card or power off the chassis while this light is ON, or the data on the card might become corrupted.
LAN	Flashes when the 6800 module is transmitting and receiving packets over its LAN link.
LINK	Flashes when the 6800 module is transmitting and receiving packets over the WAN link.
PORT	ON when a communication speed has been selected by the MGMT port (i.e., when the MGMT port has been "autobauded").
CON	ON when a connection has been made to the console port.

Interface Selection Lights

V35	ON when the V.35 interface has been selected (i.e., the V.35 WAN I/O module and cable have been installed with the 6800).
422	ON when the RS-422 or EIA-530 interface has been selected (i.e., the RS-422 or EIA-530 WAN I/O module has been installed with the 6800).
423	ON when the RS-423 or RS-232 interface has been selected (i.e., the RS-423 or RS-232 I/O Interface card has been installed with the 6800).
X.21	ON when the X.21 interface has been selected (i.e., the X.21 WAN I/O module has been installed with the 6800).

Link Signal Lights

RCK	ON when the 6800 senses a receive clock (RCK) signal.
TCK	ON when the 6800 senses a transmit clock (TCK) signal.
DTR	ON when the 6800 asserts the Data Terminal Ready (DTR) signal.
DSR	ON when the 6800 observes the Data Set Ready (DSR) signal.
DCD	ON when the 6800 observes the Data Carrier Detect (DCD) signal.
RTS	ON when the 6800 asserts the Request to Send (RTS) signal.
CTS	ON when the 6800 observes the Clear to Send (CTS) signal.
RING	ON when the 6800 observes the Ring (RNG) signal. This light is currently not used.

Chapter 2

Installation Notes

2.1 Prepare for the Installation



Before you begin the 6800 installation, you must have completed the Network 9000 chassis installation. If you have not done so, refer to *Installing the Network 9000 Intra-Networking Hub*.

Make sure that you have the following items:

Memory card, or software at a load server -- The 6800 module can load software locally from a memory card, or remotely from a network load server. If you plan to use a load server, make sure that the Xyplex Bridge/Router software, V3.0, has been installed at the load server (image name RR1.SYS"). Follow the installation instructions in the *Software Installation Guide* provided with your software kit. Refer to the *Kit Information Sheet* provided with the kit for software image names.

Also, if the 6800 module will be loading from a network load host, a network parameter server must be available to load and store the module's operational parameters. Parameter storage is described in Section 1.4.

Terminal or Workstation/PC -- If you plan to configure the Xyplex Bridge/Router software, you will need a terminal or workstation/PC with terminal emulation to access the bridge/router user interface.

Tools -- You will need a small phillips-head screwdriver to secure the modules into the Network 9000 chassis.

2.2 Basic Installation Procedure

The basic procedure for installing a 6800 module is as follows:

1. Unpack the 6800 module and WAN I/O module. Check the shipping carton contents against the packing list, and inspect for possible damage during shipment.
2. Install the modules in the Network 9000 chassis, following the basic instructions in *Installing the Network 9000 Chassis* and *Installing the MAXserver-to-Network 9000 Adapter Card*. Install the WAN I/O module in the slot directly behind the 6800 module.



Modules must be securely seated to ensure proper operation. Make sure that the two front panel and two rear panel screws are completely tightened.

3. Complete the Configuration Worksheets that are included with the 6800 module.
4. If the 6800 module is equipped with a memory card, insert the memory card into the card slot on the module's front panel. The memory card is sensitive to static electricity. You should take normal precautions to avoid damaging the data on the card. For example, you can discharge static from your body by touching the side of the chassis before handling the memory card. Section 2.4 describes the activity of the 6800 module's front panel lights during the software loading process.

If you are installing a 6800 module that is equipped with a flash memory card, as well as other 6800 modules that are not, install the module with the flash memory card first. That module can then serve as a load server for the other bridge/router modules.

5. (Optional) Initialize the terminal you will use to access the bridge/router user interface, following the instructions in Section 2.5. Terminal cable connections are described in Chapter 3.
6. Run the Bridge/Router Configuration Script to configure basic bridging and routing settings, using the Configuration Worksheets as guidelines. (You are prompted to start the script when you power up the 6800 module for the first time.)
7. Connect cables to the WAN I/O module ports, following the instructions in Chapter 3.

2.3 Loading Software/Parameters from a Network Host (Optional)

Refer to this section if you plan to load software from a network load server, rather than from a memory card or other Network 9000 module.



A 6800 module cannot load over a WAN link that has been configured for PPP or Frame Relay.

A 6800 module can load software from a network host over its LAN link or WAN link. When you configure a network host to load a 6800 module, you must identify the link(s) that the module uses to load its software with an Internet address or Ethernet address. You use the 6800 module's base Ethernet address to determine the link Ethernet addresses.

Determining the Base Ethernet Address

To determine the 6800 module's base Ethernet address, look for a label on the Network 9000 chassis that indicates the Ethernet address of the chassis. Add the slot number of the 6800 module to the last digit of the chassis Ethernet address. For example, if the chassis Ethernet address is 08-00-87-01-27-C0, the address of a module in Slot 2 is 08-00-87-01-27-C2.

Determining the Link Ethernet Addresses

You determine the LAN link (E1) Ethernet address by changing the leftmost digit of the fourth byte of the base Ethernet address from '0' to '1'. You derive the WAN link (W1) address by changing this digit from '0' to '2'. For example, if the base Ethernet address is 08-00-87-01-D5-76, the Ethernet address of the LAN link is 08-00-87-11-D5-76; the Ethernet address of the WAN link is 08-00-87-21-D5-76.

2.3.1 Examples

Loading from UNIX Host

To configure a 6800 module to load over link W1, via BOOTP/TFTP, you must map the Ethernet address of link W1 to a 6800 Internet address in the "bootptab" file of the UNIX load host. Similarly, to configure a 6800 module to load over link W1 via RARP/TFTP, you must map the Ethernet address of link W1 to a host name in the load host's "ethers" file. The host name is an arbitrary designation that represents the 6800 link; it is mapped to a 6800 Internet address in the "hosts" file on the load host.

Loading from VAX/VMS Host

To configure a 6800 module to load over link E1, from a VAX/VMS host, you must add the Ethernet address of link E1 to the NCP and XYP_MANAGER databases on the host. (Chapter 3 of the *Software Installation Guide for VMS Kits* explains how to configure these databases.)

2.4 Initializing the 6800 Module

When you apply power to the Network 9000 chassis, all the modules in the chassis initialize. When you install a module into the chassis, the module initializes. To initialize an installed module, follow these steps:

1. Make a simple "tool" from an ordinary paper clip by bending one end outward. You need this tool to press the module's RESET button.
2. Find the module's reset switch. (Figure 1-1 shows its location.)
3. Use the paper clip tool to press the RESET switch once. The module enters RESET state; all front panel lights go ON.
4. Press the reset switch again. The module performs diagnostic self tests and begins loading the Xyplex Bridge/Router software. This process is described in the following section.

After the software load image and parameter files have been loaded, the RUN light should flash once per second, and the repeater port status lights should flash as packets are being received. If the lights do not behave this way, proceed to Chapter 4 "Installation Troubleshooting".

2.4.1 Self Test, Software Load Process

When you power on the Network 9000 chassis, or initialize the 6800 module, the module performs self tests to verify the operation of its circuitry. Upon successful completion of the self tests, the 6800 module loads Xyplex Bridge/Router software and operational parameters. The RUN light flashes rapidly during the loading process. If the 6800 module is equipped with a memory card, the module will load its software and parameters from the memory card. The CARD light goes on while the memory card is being accessed.



Do not remove the memory card, or power off the Network 9000 chassis, while the CARD light is ON.

If the 6800 module is not equipped with a memory card, the module will attempt to load software from another 6800 or other Network 9000 processor module, or from a network load host.

Loading from another module or a load host typically requires more time than loading from a local memory card. (For information about loading from a network host, refer to Section 2.3).

The RUN light flashes slowly -- at 1-second intervals -- after the software has been loaded. If the RUN light does not do this after several minutes, refer to Chapter 4, Installation Troubleshooting.

2.5 Accessing the User Interface (Optional)

The following sections explain how to access the bridge/router user interface two ways.

2.5.1 Using a Directly Connected Terminal

Refer to this section if you plan to access the user interface from a terminal or workstation/PC, which is physically connected to the MGMT port on the WAN I/O card.

Turn the terminal's power ON. Then, press <RETURN> a few times -- until the 6800 recognizes the device. The 6800 automatically adjusts to the communication speed (75 bps - 38.4K bps) of a connected terminal that is set up as follows:

- 8 bits, No Parity
- or --
- 7 bits, Even Parity

If the 6800 does not respond with a welcome message, press the <BREAK> key, then press <RETURN> a few more times.

When the module responds, it generates the following message, which appears on your screen:

```
Welcome to the Xyplex Router.
```

```
Enter username>
```

Type your name, your initials, or a nickname -- whatever you want to be known as while you are connected, then press <RETURN> again. You can type up to 16 characters (numbers or letters); however, do not leave any spaces between the characters.

The username is your identifier during this session. You can enter a different username each time you log on to the WAN Processor user interface. The username is shown whenever you or any other person on the network requests information about who is connected to the Bridge/Router user interface.

If you are powering up the 6800 for the first time, you will see the following messages. You also see these messages anytime you power up the 6800 with default operational parameters.

```
Xyplex - 901 - Default Parameters in Use.  
Do you want to configure this unit (Yes/No) ?
```

If you enter 'Y', the bridge/router will run a configuration script. This script is described in Section 2.6. If you enter 'N', the 6800 will return the command prompt:

```
Xyplex>
```

When you see this prompt, the 6800 is ready to accept commands. You can obtain on-screen information about Bridge/Router commands by typing HELP and pressing <RETURN>:

```
Xyplex>HELP
```

2.5.2 Remote (Console Port) Access

Refer to this section if you plan to access the 6800 user interface from a remote terminal or workstation/PC, using RCP, Telnet, NETWORK CONSOLE, or CHASSIS CONSOLE.

When you connect to the console port of the 6800, you must press <RETURN> until the module responds with the login password prompt. The default prompt is #. Enter the login password at this prompt and press <RETURN>. The default login password is ACCESS.

When the module responds, it generates the following message which appears on your screen:

```
Welcome to the Xyplex Router.
```

```
Enter username>
```

Type your name, your initials, or a nickname -- whatever you want to be known as while you are connected, then press <RETURN> again. You can type up to 16 characters (numbers or letters); however, do not leave any spaces between the characters.

The username is your identifier during this session. You can enter a different username each time you log on to the bridge/router user interface. The username is shown whenever you or any other person on the network requests information about who is connected to the bridge/router user interface.

If you have powered up the 6800 for the first time, you will see the following messages. You also see these messages anytime you power up the 6800 with default operational parameters.

```
Xyplex - 901 - Default Parameters in Use.  
Do you want to configure this unit (Yes/No) ?
```

If you enter 'Y', the bridge/router will run a configuration script. This script is described in Section 2.6. If you enter 'N', the bridge/router will return the command prompt:

```
Xyplex>
```

When you see this prompt, the 6800 is ready to accept commands. You can obtain on-screen information about Bridge/Router commands by typing HELP and pressing <RETURN>:

```
Xyplex>HELP
```

2.6 The Bridge/Router Configuration Script

You are prompted to run the configuration script anytime you start up the bridge/router with default operational parameters. In addition, you can start the script anytime by issuing the DEFINE CONFIGURATION command. The script guides you through a basic bridge/router configuration by asking you a series of questions. Configuration settings that you define through the the configuration script take effect immediately. (You do not have to re-initialize the bridge/router for the settings to take effect.)

The default values displayed by the configuration script are initial defaults. If you have previously assigned a value for a characteristic, the bridge/router will use the assigned value -- rather than the initial default -- for that characteristic.

2.6.1 Configuration Worksheets

The 6800 module is shipped with configuration worksheets that help you plan your bridge/router setup. Use the worksheets in conjunction with the bridge/router configuration script. After you configure the bridge/router, the worksheets provide a record of how the 6800 is being used in your network. (Make copies of the worksheets that you plan to use, and save the originals.)

Chapter 3

Cabling

3.1 Cabling Overview

This section describes cabling and signal distribution considerations for the WAN port and the MGMT port of the 6800. A serial cable and RJ-12-to-DB-25 adaptor are supplied with each 6800 module. Other serial cabling items are available from Xyplex or other suppliers.

Depending on your application, there are different cabling schemes that you can use. Figure 3-1 shows an overview of the cabling and distribution options for the WAN port.

Both the MGMT port and WAN port interfaces are brought out to connectors on the rear of the Network 9000 chassis. The connectors are part of the WAN I/O module that you install in the chassis. In this section, for each interface/cable type, a signal listing is included to help you understand how to wire/connect the devices.

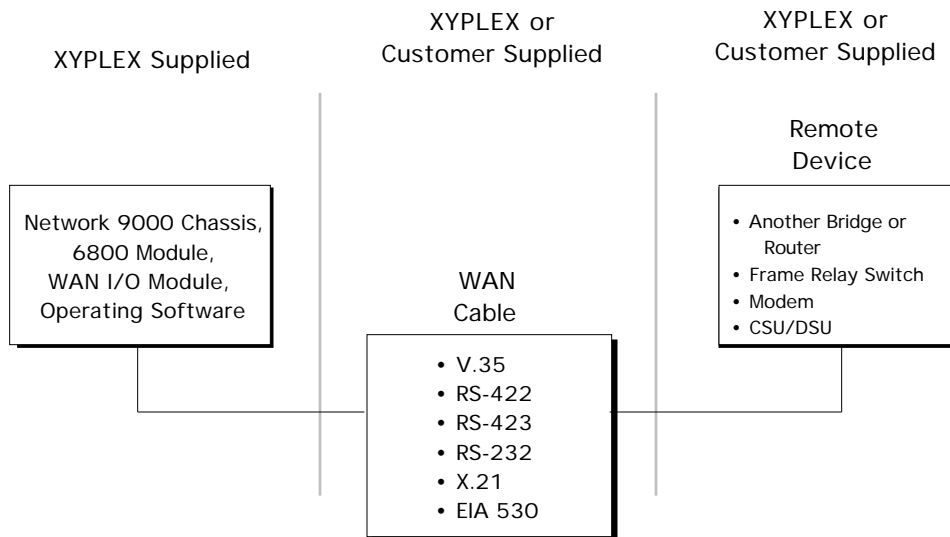


Figure 3-1. 6800 Cabling Overview

Note

To comply with the FCC rules for Class A computing devices, all cables must be fully shielded. Xyplex recommends that cabling with foil and braided shield be used where possible. Appropriate cabling can be ordered directly from Xyplex or from your supplier. Xyplex encourages you to call your account manager if you have any questions regarding cabling.

3.2 WAN Link Cabling

Cables for the 6800 card are designed for easy connections. The WAN link cabling options available from Xyplex include:

- **V.35 cable, 36-pin male TELCO connector to 34-pin male Winchester connector, 4.57 m (15 ft).** This cable is included with the V.35 I/O module. The 36-pin TELCO connector attaches to the V.35 I/O module, and the Winchester connector attaches to the device. Figure 3-2 shows this cable. Table 3-1 describes the signalling scheme for this cable. Figure 3-3 shows the V.35 I/O module.
- **RS-422 cable, male DB-37 (37-pin) connector to female DB-37 connector, 4.57 m (15 ft).** The female DB-37 connector attaches to the RS-422 I/O module, and the male DB-37 connector attaches to the device. The Xyplex-supplied cable consists of 10 twisted pairs, a foil shield and a drain wire. Figure 3-4 shows the cable and the location of the pins in the connectors at each end of the cable. Table 3-2 describes the signalling scheme for this cable. Figure 3-5 shows the RS-422 I/O module.
- **RS-423/RS-232 cable, male DB-25 (25-pin) connector to female DB-25 (25-pin) connector, 4.57 m (15 ft).** The female DB-25 connector attaches to the RS-423 I/O Interface card, and the male DB-25 connector attaches to the device. The Xyplex-supplied cable consists of 15-wire cable and DB-25 connectors. Figure 3-6 shows the cable and the location of the pins in the connectors at each end of the cable. Table 3-3 describes the signalling scheme for the cable. Figure 3-7 shows the RS-423/RS-232 I/O Interface card.
- **EIA-530 cable, male DB-25 (25-pin) connector to female DB-25 (25-pin) connector, 4.57 m (15 ft).** The female DB-25 connector attaches to the EIA-530 I/O Interface card, and the male DB-25 connector attaches to the device. Figure 3-6 shows the cable and the location of the pins in the connectors at each end of the cable. Table 3-4 describes the signalling scheme for the cable. Figure 3-7 shows the EIA-530 I/O Interface card (which looks identical to the RS-423/RS-232 I/O Interface card).
- **X.21 straight-through cable, female DB-15 (15-pin) to male DB-15.** The female DB-15 connector attaches to the X.21 I/O module. The male DB-15 connector attaches to a modem, CSU/DSU, packet switch, or other device. Figure 3-8 shows the cable and the location of the pins in the connectors at the end of each cable. Table 3-4 describes the signalling scheme for the cable. Figure 3-9 shows the X.21 I/O module.

Refer to Appendix B for order codes.

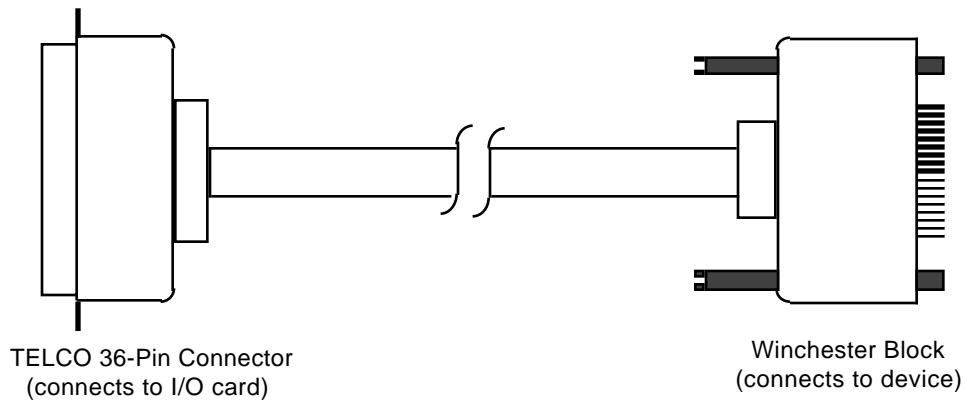


Figure 3-2. Xyplex-Supplied V.35 Cable

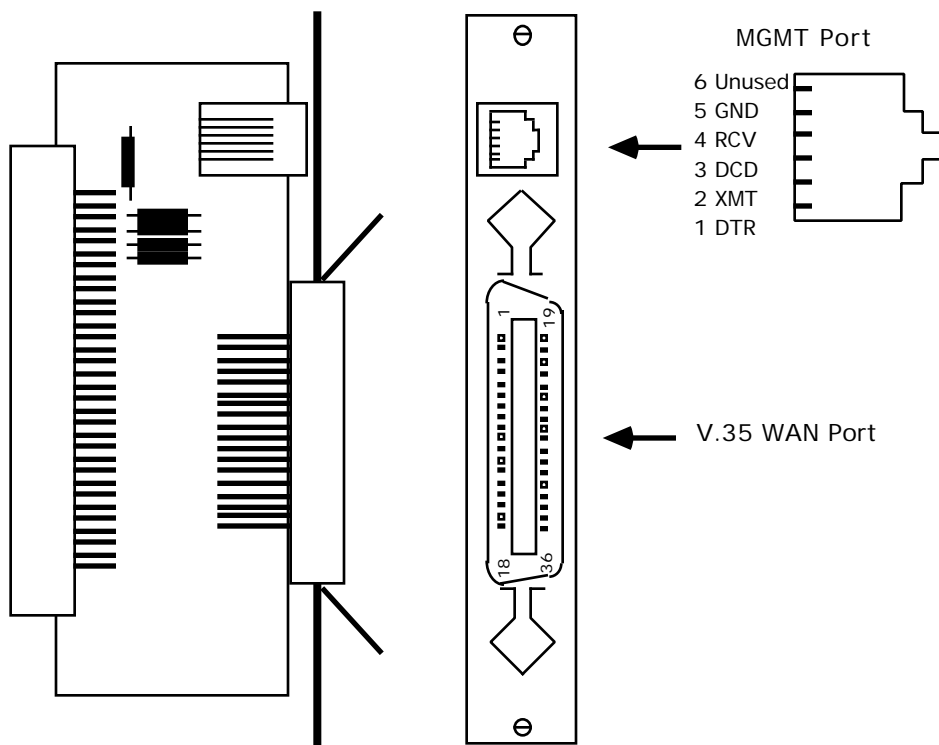


Figure 3-3. V.35 I/O Module

Table 3-1. Signal List for V.35 Cable

I/O Module Pin	Signal Name	V.35 Device (Winchester) Pin
3	Transmit Data +	P
4	Clear to Send	D
5	Receive Data+	R
10	Data Set Ready +	E
11	Receive Clock -	X
13	Data Carrier Detect	F
15	Data Terminal Ready	H
16	Transmit Clock -	a (AA)
17	Request to Send	C
19	Cable Select B	Jumper
20	Logic Ground B	Jumper
21	Transmit Data -	S
23	Receive Data -	T
Drain	Protective Ground (shield)	A
29	Receive Clock +	V
34	Transmit Clock +	Y
25	Signal Ground	B

Table 3-2. Signal List for RS-422 Cable

I/O Module (DB-37) Pin	Signal Name	RS-422 Device (DB-37) Pin	Pair with
1	Protective Ground	1	--
4	Transmit Data +	4	22
5	Transmit Clock +	5	23
6	Receive Data +	6	24
7	Request to Send +	7	25
8	Receive Clock +	8	26
9	Clear to Send +	9	27
11	Data Set Ready +	11	29
12	Data Terminal Ready +	12	30
13	Data Carrier Detect +	13	31
15	Ring	15	--
19	Signal Ground	19	--
22	Transmit Data -	22	4
23	Transmit Clock -	23	5
24	Receive Data -	24	6
25	Request to Send -	25	7
26	Receive Clock -	26	8
27	Clear to Send -	27	9
29	Data Set Ready -	29	11
30	Data Terminal Ready -	30	12
31	Data Carrier Detect -	31	13

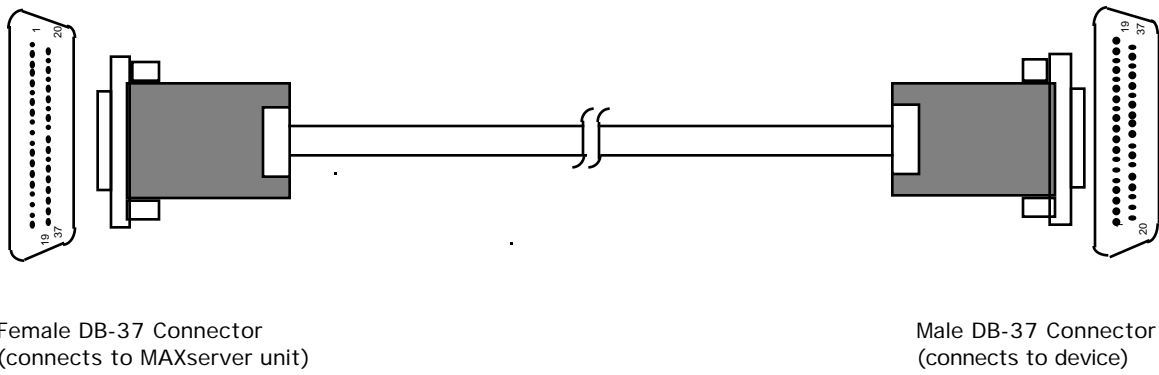


Figure 3-4. Xyplex-Supplied RS-422 Cable

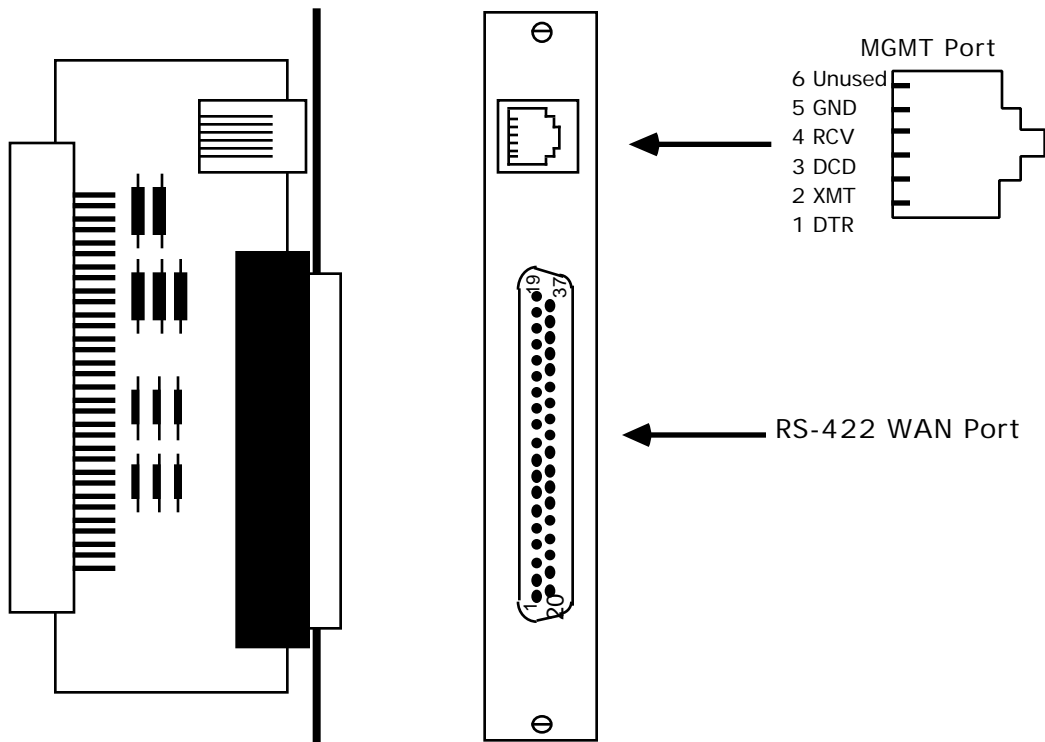


Figure 3-5. RS-422 I/O Module

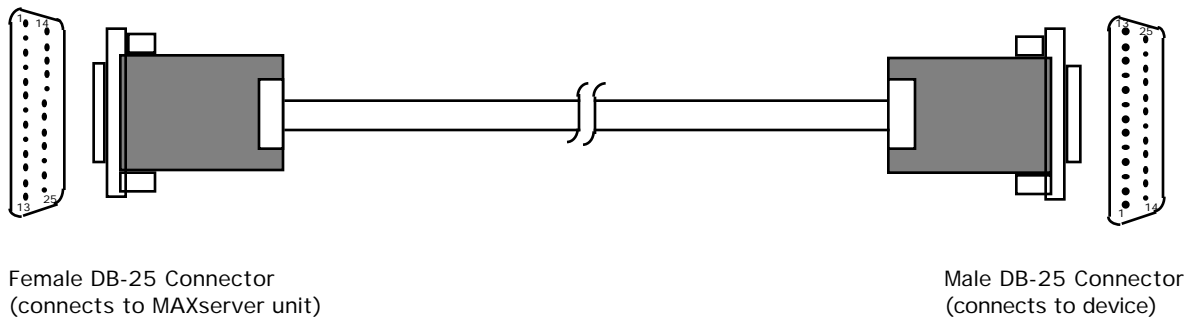


Figure 3-6. Xyplex-Supplied RS-423, RS-232, EIA-530 Cable

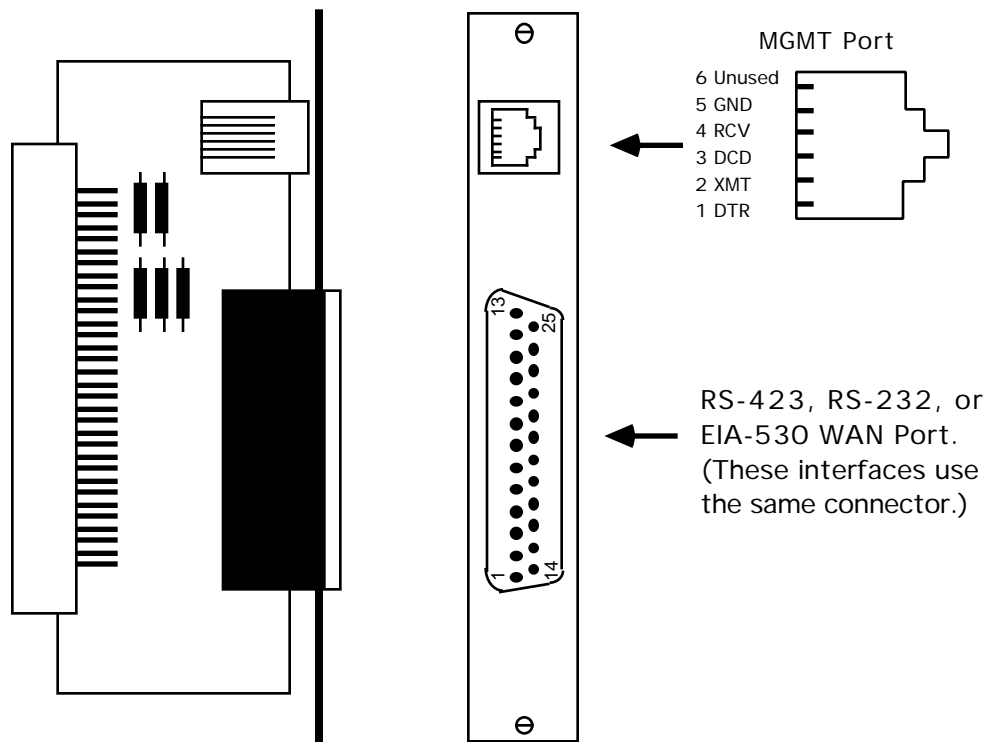


Figure 3-7. RS-423, RS232, EIA-530 I/O Module

Table 3-3. Signal List for RS-423 or RS232 Cable

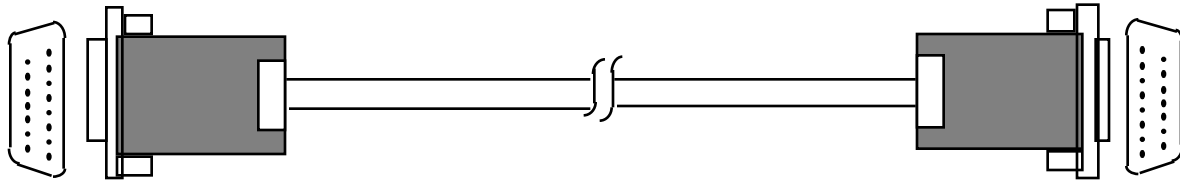
Connector (DB-25) Pin	Signal Name	Device Pin
1	Protective Ground	1
2	Transmit Data	2
3	Receive Data	3
4	Request to Send	4
5	Clear to Send	5
6	Data Set Ready	6
7	Signal Ground	7
8	Data Carrier Detect	8
15	Send Clock	15
17	Receive Clock	17
20	Data Terminal Ready	20
22	Ring	22
24	Null clock	24

Table 3-4. Signal List for EIA-530 Cable

Connector (DB-25) Pin	Signal Name	Device Pin
1	Shield	1
2	Transmit Data (+)	2
3	Receive Data (+)	3
4	Request to Send (+)	4
5	Clear to Send (+)	5
6	Data Set Ready (+)	6
7	Signal Ground	7
8	Data Carrier Detect (+)	8
9	Receive Clock (-)	9
10	Data Carrier Detect (-)	10
11	Transfer Timing (-)	11
12	Send Clock (-)	12
13	Clear to Send (-)	13
14	Send Data (-)	14
15	Send Clock (+)	15
16	Receive Data (-)	16
17	Receive Clock (+)	17
19	Request to Send (-)	19
20	Data Terminal Ready (+)	20
22	Data Set Ready (-)	22
23	Data Terminal Ready (-)	23
24	Transfer Timing (+)	24

Table 3-5. Signal List for X.21 Cables

Connector (DB-15) Pin	Signal Name	X.21 Device (DB-15) Pin	Pair with
1	Shield, Chassis Ground	1	--
2	Transmit Data A+	2	9
3	Control A +	3	10
4	Receive Data A +	4	11
5	Indication A +	5	12
6	Signal Timing A +	6	13
8	Signal Ground	8	--
9	Transmit Data B -	9	2
10	Control B -	10	3
11	Receive Data B -	11	4
12	Indication B -	12	5
13	Signal Timing B-	13	6



Female DB-15 Connector
(connects to MAXserver unit)

Male DB-15 Connector
(connects to device)

Figure 3-8. X.21 Cable

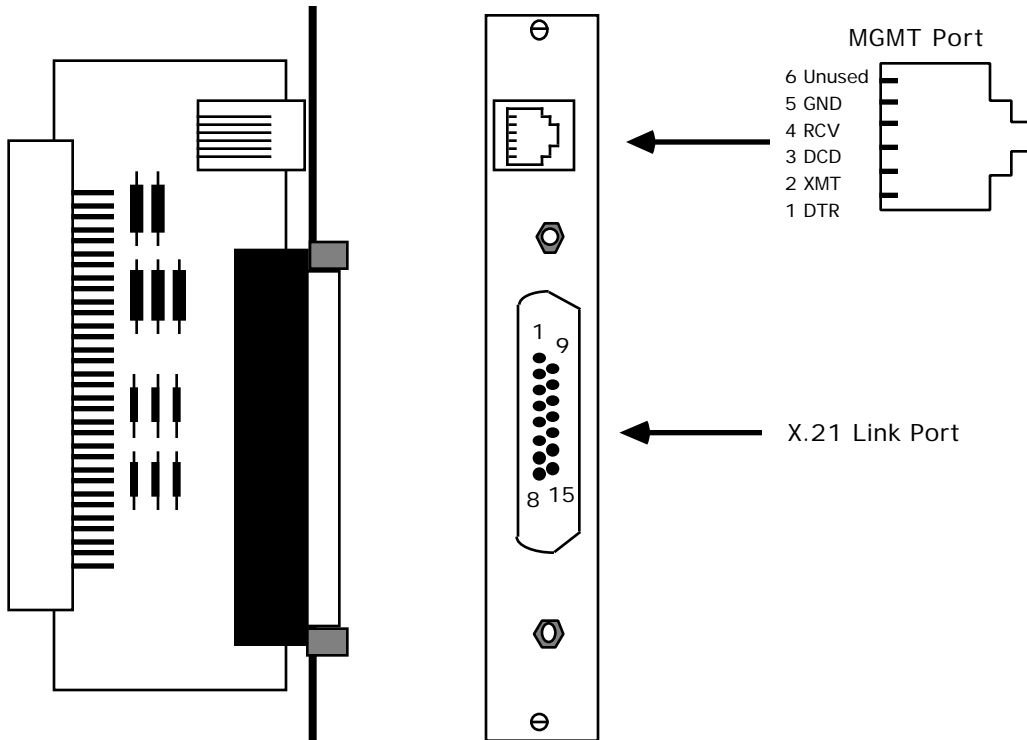


Figure 3-9. X.21 I/O Module

3.3 MGMT Port Cabling

The MGMT port supports these signals:

DTR	Output	Data Terminal Ready
XMT	Output	Transmit Data
GND	-	Receive Ground
RCV	Input	Receive Data
DCD	Input	Data Carrier Detect

A serial cable and RJ-12 to DB-25 adaptor are shipped with each 6800 module. Other serial cabling options available from Xyplex include:

- 6-wire straight-through cable 7.62 m (25'), male RJ-12 to male RJ-12 (MX-350-0156)
- SYS Adaptor, female RJ-12 to female DB-25 (MX-350-0157)
- DROP Adaptor, female RJ-12 to female DB-25 (MX-350-0158)

Cabling options available from other suppliers include:

- SYS Adaptor, female RJ-12 to male DB-25 (MOD-TAP #06-888-523-30)
- DROP Adaptor, female RJ-12 to male DB-25 (MOD-TAP #06-888-260-20)

Standard Xyplex-supplied cabling items enable you to connect to any serial device that uses a male or female DB-25 connector. All that is required is a modular cable and the correct modular adaptor (a male or female DB-25 connector), which is essentially an RJ-12-to-DB25 adaptor. The DROP adaptors are used in 6800-to-DTE (crossover) connections. The SYS adaptors are used for 6800-to-DCE (straight-through) connections.

You must consider the wiring scheme when you plan to connect a device such as a terminal or serial printer to the MGMT port. The serial port of the 6800 card is considered a DTE device. To connect the port to another DTE device (such as a VT200 terminal), you need a crossover wiring scheme somewhere in the cabling. (DTE-to-DTE device communication requires a crossover.)

To connect the port to a DCE device -- such as a modem -- straight-through wiring is required. In the standard Xyplex-supplied cabling options, signals are directed to the correct pins in the adaptor. (For example, the crossover is made in the DROP adaptor, so that only one type of 6-wire cable is required.) If you make your own cables, you must construct the cable with the appropriate wiring scheme.

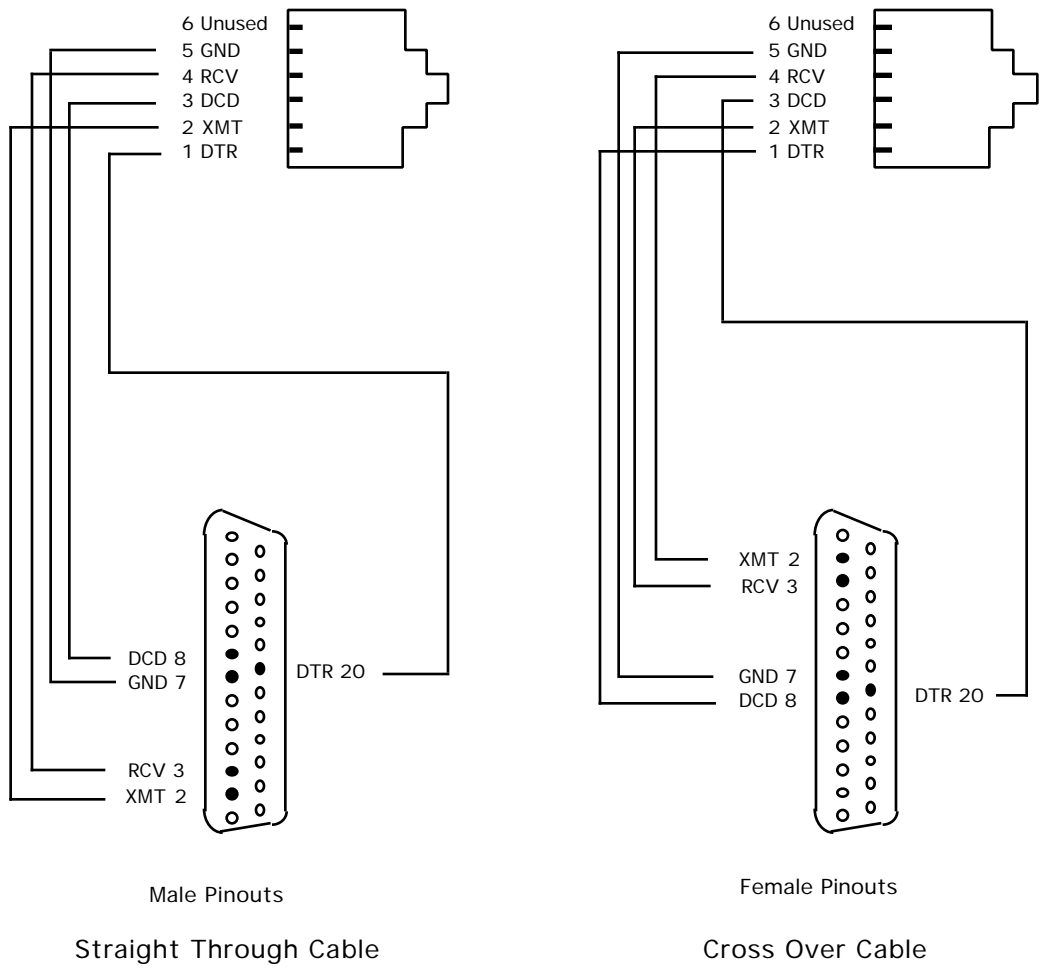


Figure 3-10. Crossover and Straight-Through Serial Wiring

The crossover cable connects the serial port transmit data (XMT) line to the receive data (RCV) line of the DTE device. Similarly, the receive data (RCV) line crosses over to the XMT line of the DTE device.

Chapter 4

Installation Troubleshooting

4.1 About this Chapter

This chapter explains the steps to take if a 6800 module fails to initialize and load its software successfully. Each section includes a problem statement and suggests possible solutions for the problem. If you need telephone support in resolving a problem, call your Xyplex Customer Support representative. (Inside the U.S. and Canada, call 1-800-435-7997. For international calls, the number is 508-264-9903.)



Modules must be securely seated to ensure proper operation. Make sure that the two front panel screws and two rear panel screws are completely tightened.

Problem:

The front panel lights on the 6800 module are flashing after power up, or after you re-initialize the module.

Indication:

The lights are indicating an initialization self-test failure. If the self tests fail, the 6800 status lights will initially flash 8 times very quickly. Then, one or more lights go on. All lights then flash sequentially and additional lights go on. This entire light flashing sequence repeats continuously. Record the numbers of the flashing lights, as shown in Figure 4-1. Note that the light numbers (1 through 8) are not shown on the front panel of the 6800 module; rather the light numbers correspond to lights on the panel.

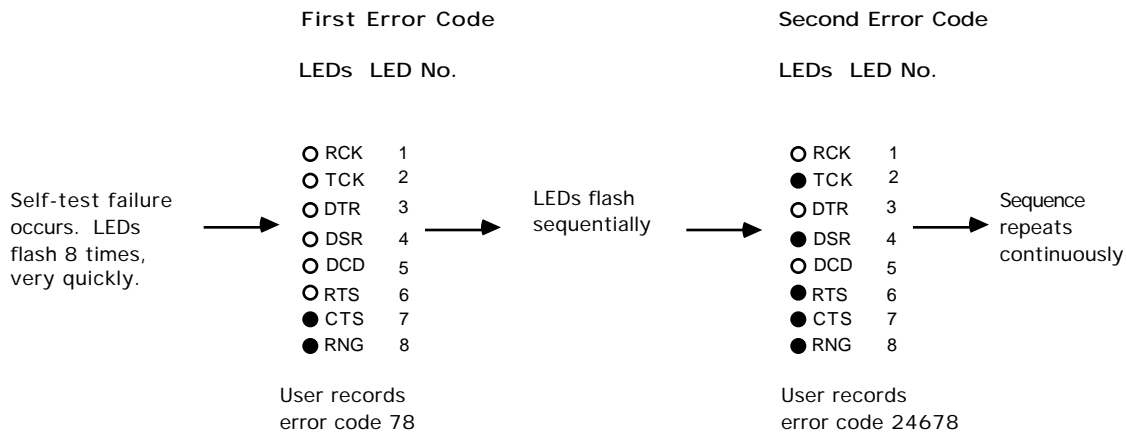


Figure 4-1. Sample Self Test Failure Indication

Possible Solution:

If you see an error code, remove the 6800 module and check whether any of the pins are bent in the slot. Then, reseal the card in the slot. It is helpful to back off on the captive screws until they are straight. Slide the card in gently, but firmly. It is best to press the card in the center. Make sure that the card is flush against the other cards and not held back by a misaligned screw. Tighten the screws firmly. If the same failure occurs, call your service representative and report the error code. (In the U.S., call Xyplex Customer Support at 1-800-435-7997. For international calls, the number is 508-264-9903.)

4.2 Network Software Loading Problems

Problem:

The 6800 module does not appear to load *from a network load server*, or is slow to load.

Correct Operation:

The 6800 module should load within several minutes after power up if it is properly configured at a load server. (The actual time depends on network congestion, host utilization, and similar factors.) The RUN light flashes rapidly after successful completion of the initialization self tests. During the software loading process, the 6800 module sends load status messages to a terminal connected to the MGMT port. You must press <RETURN> continuously -- first to autobaud the terminal speed, and then to receive an updated message with each <RETURN> you enter.

If you type <CTRL><T> now, the 6800 module will display the load server offer table when it receives load offers. (You only need to type <CTRL><T> once.)

After the software load image and parameter files have been loaded from the load server, the RUN light should flash once per second. Then, if you press <RETURN> several times, the following message should appear on the display:

```
Welcome to the Xyplex Router.
```

```
Enter username>_
```

Possible Solutions:

If you are loading via Internet protocols such as RARP, BOOTP, and TFTP, these protocols might not be running at the UNIX load server. Refer to the *Software Installation Guide for UNIX Load Hosts* for information about troubleshooting this problem.

Several messages can be displayed by the 6800 module during the load process. These messages might help you resolve the problem. Record the displayed messages and refer to the following descriptions for assistance in correcting the problem. Note that for each time you press <RETURN>, the software displays only one message. You must press <RETURN> continuously -- first to autobaud the terminal speed -- and subsequently to receive an updated message with each <RETURN> you enter.

If you type <CTRL><L> following any status message, the 6800 module will generate a WAN link status display, which indicates the transmit/receive clock speeds, cable type, and the status of the DTR, DSR, DCD, RTS, CTS, and RNG signals for each WAN link.

```
Bridge/Router, Type 81, Rev x.xx.xx
Ethernet address 08-00-87-xx-xx-xx
Initializing...
```

A message similar to this one appears for approximately 10 seconds after the self tests complete. (Your addresses will be unique.) If the next message does not appear after you press <RETURN> several times, the 6800 module could be at fault. If you have a spare module available, swap modules.

```
Bridge/Router, Type 81, Rev x.xx.xx
Ethernet address 08-00-87-xx-xx-xx
Requesting network load service
```

A message similar to this one is displayed while the module is waiting for a response to the load request. If this message remains displayed for more than 20 seconds after you press <RETURN> several times, either the 6800 module is not configured on a load server, or the module cannot communicate with a load server. Refer to the *Software Installation Guide* for the appropriate load server host.

```
Bridge/Router, Type 81, Rev x.xx.xx
Ethernet address 08-00-87-xx-xx-xx
Evaluating service offers
```

A message similar to this one is displayed if the 6800 module has received a load offer from a load server.

If you typed <CTRL><T> after the port speed had been selected, the following messages appear:

```
Received load service offers:

Host Address      protocol  merit    filename
xxx.xxx.xxx.xxx   0800     F000000F  xxxxxxxx.img
```

One to ten load server addresses are displayed (typically, just one).

After the load server has been chosen, the following messages appear:

```
Bridge/Router, Type 81, Rev x.xx.xx
Ethernet address 08-00-87-xx-xx-xx
Loading over Link (Link ID) from server xx-xx-xx-xx-xx-xx, message 0
```

If the message count remains at zero after you press <RETURN> continuously, the load server was configured to load the 6800 module, but encountered a problem with the load file or directory. Check the file name and directory at the load server. Additionally, at a VAX/VMS installation, the logical name "MOM\$LOAD" might not be defined properly.

After the 6800 module loads a file, it checks the contents of the file for proper identification and size. One of the following messages can appear if a file problem is encountered:

```
Server xx-xx-xx-xx-xx-xx File error: not a load file.
```

This message type appears if the load server attempted to load a file image that is incompatible with the 6800 module. (The load file did not have a Xyplex ASCII identification string header.)

```
Server xx-xx-xx-xx-xx-xx File error: corrupted data.
```

This message type indicates that the load server attempted to load a file that is compatible with the 6800 module, but the file has been corrupted. Correct this problem by installing a new file in the load server. Refer to the *Software Installation Guide* that you received with your software for instructions.

```
Server xx-xx-xx-xx-xx-xx File error: not executable.
```

The load file is a Xyplex file, but it cannot be executed by the 6800 module. Resolve this problem by installing the proper file at the load server. Refer to the *Software Installation Guide* for the appropriate load server host, for instructions.

```
Server xx-xx-xx-xx-xx-xx Timed out, will retry.
```

This message type indicates that the 6800 module has quit waiting for the load server to send a load file image, and restarted the load request process. If the message count was not zero, and the "timed out" message was displayed, it is possible that your network experienced communication problems. Note that if there is no progress of the message count number beyond zero, a server problem probably exists. If the message count remains stuck at a number other than zero, a network problem probably exists.

If a failure occurs during the load process, the 6800 module will abort the load process and send a small dump file (approximately 60 bytes) to a server that is configured for a file dump. The dump file can be analyzed by your service representative to assist you in resolving the fault. (In the U.S., call Xyplex Customer Support at 1-800-435-7997. For international calls, the number is 508-264-9903.)

The 6800 module uses the same algorithm for selecting a dump server as for selecting a load server. Normally, the following messages appear:

```
Bridge/Router, Type 81, Rev x.xx.xx
Ethernet address 08-00-87-xx-xx-xx
Requesting dump service
```

This type of message is displayed while the 6800 module waits for a response to its dump request. If this message remains displayed for more than 32 seconds after you press <RETURN> several times, the module is not configured on a dump server, or the module cannot communicate to a dump server. Refer to the *Software Installation Guide* that you received with your software, for information about specifying the proper dump configuration.

```
Bridge/Router, Type 81, Rev x.xx.xx
Ethernet address 08-00-87-xx-xx-xx
Evaluating dump service offers
```

A message similar to this one is displayed if the 6800 module received a dump offer from a server. Note that you must type a <CTRL><T> before the following messages appear:

```
Received dump service offers:

Host Address      protocol  merit      filename
xxx.xxx.xxx.xxx  0800     F000000F  xxxxxxxx.img
```

The 6800 selects the dump server with the highest merit value. If two or more dump servers have the same merit value, the Network 9000 will select the first dump server listed.

```
Bridge/Router, Type 81, Rev x.xx.xx
Ethernet address 08-00-87-xx-xx-xx
Maintenance dump to xx-xx-xx-xx-xx-xx, message 0
```

If a failure occurs during the dump process, the 6800 module aborts the dump and attempts to dump to the next dump server. This process occurs until the dump is successful or until the dump server list is exhausted. After the dump process completes, the module selects the load server with the next highest merit value on the load offer list. If the load list is exhausted, the 6800 module will restart the load process.

Once the load image file is accepted by the 6800 module, the module's software requests a parameter file from the load server. If a parameter file is not sent from the server, the 6800 module will wait indefinitely for a parameter file. The following types of messages can be generated during the parameter file load sequence. The process is similar to the load process.

```
Bridge/Router, Type 81, Rev x.xx.xx
```

```
Ethernet address 08-00-87-xx-xx-xx  
Requesting parameter load service
```

A message similar to this one is displayed while the 6800 module waits for a response to the parameter load request. If this message remains displayed for more than five seconds after you press <RETURN> several times, the 6800 module is not configured on a load server for parameter load service. Refer to the *Software Installation Guide* for the appropriate load server host.

```
Bridge/Router, Type 81, Rev x.xx.xx  
Ethernet address 08-00-87-xx-xx-xx  
Loading parameters over Link (Link ID) from server xx-xx-xx-xx-xx-xx,  
message 0
```

If the message count remains at zero after you press <RETURN> several times, the load server is properly configured, but does not have a parameter file defined.

4.3 MGMT Port Communication Problems

Problem:

No messages appear after you press <RETURN> several times at a terminal connected to the MGMT (serial) port.

Correct Operation:

While the 6800 module loads its software, it can automatically adjust to the communication speed (75 bps - 38.4K bps) of a connected terminal that is set up as follows:

- 8 bits, No Parity, or:
- 7 bits, Even Parity

The 6800 module can also adjust automatically after it has loaded the software, provided the PORT AUTOBAUD characteristic is set to ENABLED. The MGMT port selects the correct port speed ("autobauds" to the correct baud rate) when you press <RETURN> several times. In the first 20 seconds after power up, the module runs the self tests and does not respond to a <RETURN>. However, 20 seconds after power up, the port displays a message in response to a <RETURN>.

Possible Solutions:

- The MGMT port might have autobauded to the wrong speed, or the wrong speed setting might be assigned (when the port is not configured for autobaud). Press the <BREAK> key to re-initialize the autobaud sequence, then enter several <RETURN>s.
- If the port is not receiving characters, a cable or device problem probably exists, or the device baud rate might be too low (the MGMT port can operate between 75 and 38.4K baud). Try swapping the cable transmit (XMT) and receive (RCV) pins. Note that a DTE-to-DTE device configuration requires a crossover cable connection. Also, verify that the cable is securely connected to both the I/O Interface module and the device. Check to verify that the WAN I/O module is secured firmly in place.
- Make sure that the device (terminal) is on. Reset the terminal and check its settings. Refer to the manufacturer's instructions.
- Check whether a device fault has occurred. Service device problems according to the manufacturer's instructions.

- **The 6800 module might still be performing initialization self tests. Wait until 20 seconds after power up, at which time the self tests will have completed. Then, press <RETURN> and you should be able to autobaud the port and observe messages.**
- **A load server problem exists. Refer to the *Software Installation Guide* that you received with your software, and verify that the Xyplex Bridge/Router software, V3.0, has been installed properly.**
- **The 6800 module or WAN I/O module is malfunctioning or defective. Check the RUN light. If it is not flashing, try to re-initialize the module. Refer to the sections describing self test and loading problems for additional troubleshooting information. If you have spare modules available, try swapping the 6800 module, then the WAN I/O module.**

Appendix A

Technical Specifications

Signaling

WAN Port: V.35, RS-422, RS-423, RS-232, EIA-530, or X.21.

Serial Port: Complies with RS-423C asynchronous specification for single terminal drop Transmit, Receive, Ground, Data Carrier Detect (DCD), and Data Terminal Ready (DTR).

Cabling:

Cable Length

Serial Port:	Speed	Length
	9.6K	305 m (1000 ft)
	19.2K	305 m (1000 ft)
	38.4K	152 m (500 ft)

Speed WAN Port: 9600 bps (baud) to 2.048 Mbps
Serial Port: 300 bps to 38.4K bps

Display lights Run, LAN, Link, Console port, Serial Port (Port 1) status, Interface Selection lights, Link Signal lights

Controls Run/Reset push button switch

Dimensions One Network 9000 front slot; one rear slot

Height: 9.2 in (23.4 cm)
Depth: 6.3 in (16.0 cm)
Width: 0.8 in (2.1 cm)

Weight 1 pounds (0.45 kg)

Environment 32 to 113 degrees F (0 to 45 degrees C)
5 to 90% humidity, noncondensing

Power Requirements +5 V at 1.8 A
+12 V at 0.13 A
-12 V at 0.13 A
12 W, 35 BTU

MTTR 0.1 hours

Software Support Xyplex Bridge/Router software,
Release 3.0 or greater (image name RR1.SYS)

Appendix B

Order Codes

Description	Order Code
Cards	
WAN Processor 6800 with RS-422 I/O Interface Card	N9-6800-001
WAN Processor 6800 with RS-423 I/O Interface Card	N9-6800-002
WAN Processor 6800 with V.35 I/O Interface Card	N9-6800-003
WAN Processor 6800 with X.21 I/O Interface Card	N9-6800-004
WAN Processor 6800 with RS-232 I/O Interface Card	N9-6800-005
WAN Processor 6800 with EIA-530 I/O Interface Card	N9-6800-006
RS-422 I/O Interface Card	MX-500-5727
RS-423 I/O Interface Card	MX-500-5729
RS-232 I/O Interface Card	MX-500-5918
EIA-530 I/O Interface Card	MX-500-5924
V.35 I/O Interface Card	MX-500-5730
X.21 I/O Interface Card	MX-500-5853
WAN Link Cables	
V.35 cable, 36-pin male TELCO connector to 34-pin male Winchester connector, 4.57 m (15 ft)	MX-151-3045
RS-422 cable, male DB-37 (37-pin) connector to female DB-37 (37-pin) connector, 4.57 m (15 ft)	MX-151-3030
RS-423/RS-232 cable, male DB-25 (25-pin) connector to female DB-25 (25-pin) connector, 4.57 m (15 ft)	MX-151-3074
EIA-530 cable, male DB-25 (25-pin) connector to female DB-25 (25-pin) connector, 4.57 m (15 ft)	MX-151- 3144
X.21 cable, male DB-15 (15-pin) connector to female DB-15 connector, 4.57 m (15 ft)	MX-151-3137

Order Codes

Serial Cables

Cable, 6-wire straight-through, 7.62 m (25 ft), male RJ-12 connector to male RJ-12 connector	MX-350-0156
SYS Adaptor, female RJ-12 connector to female DB-25 connector (MOD-TAP #06-988-523-30), for straight-through connections	MX-350-0157
DROP Adaptor, female RJ-12 connector to female DB-25 connector (MOD-TAP #06-986-260-20), for cross-over connections	MX-350-0158