

# 4

## Cabling the ERX System

This chapter describes how to cable the ERX system. Before you cable the system, ensure that you have completed all installation instructions identified in previous chapters.

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### Before You Begin

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Before you cable the ERX system, read *Cabling Recommendations* in *Appendix D, Preparing Your Site*.

## Cabling Your ERX System

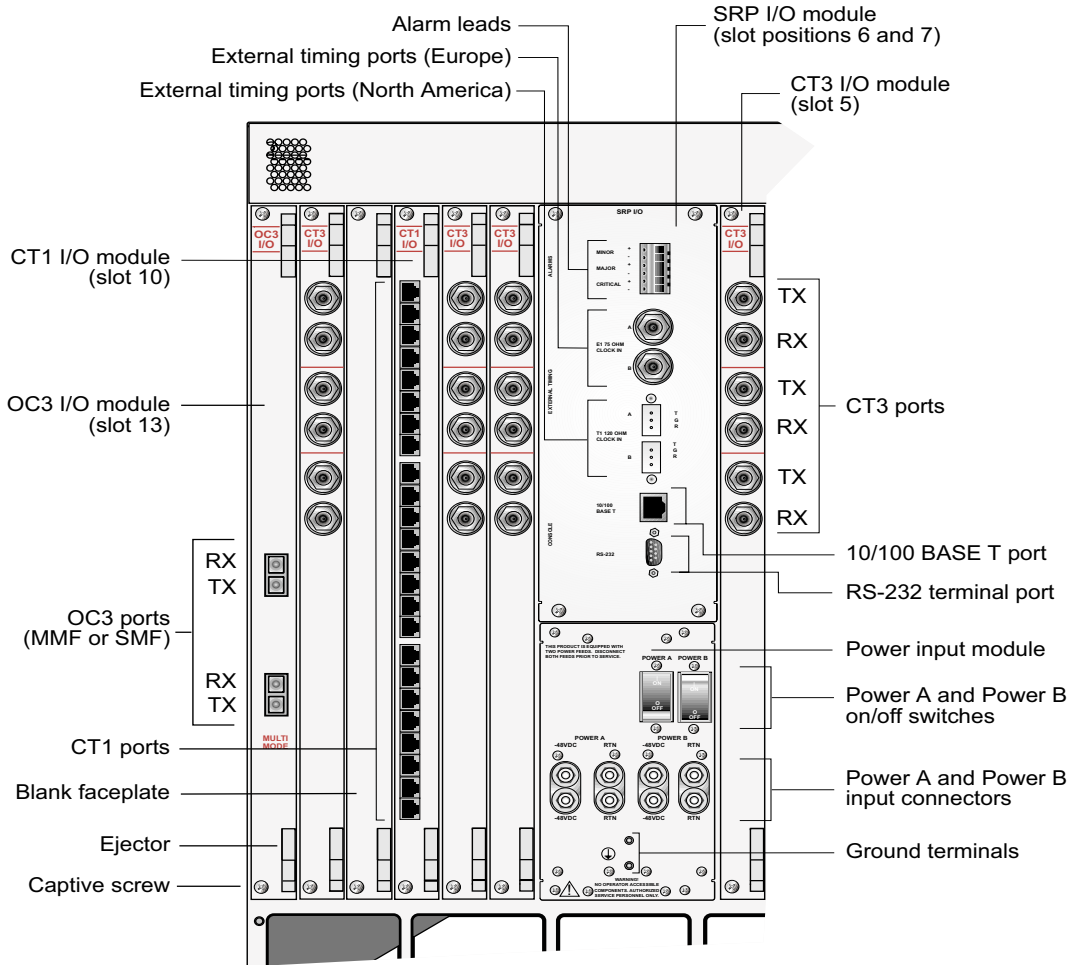
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Cabling the system takes only a few minutes. You need these items:

- A 1/8" flathead screwdriver – to connect the alarm leads
- A 3/8" wrench or 3/8" nut-driver – to loosen and tighten hex nuts on Power A and Power B leads
- A No. 2 Phillips screwdriver – to remove the power input module cover
- Two ground wires – we recommend a minimum of 10-AWG ground wire with a ring-style terminal.
- A #10 kep nut to connect the ground (earth) wire to the ground terminal.

We recommend that you use shielded cables where appropriate and perform the cabling tasks in this order:

- 1 Familiarize yourself with the module ports. See Figure 4-1.
- 2 Ensure that you have the cables and wires needed to complete each cabling procedure.
- 3 Read and understand all safety warnings.
- 4 Connect the power cables from the power source to the power input module.
- 5 Connect cables to the SRP I/O module.
- 6 Connect cables to the line I/O modules.



ERX-1400 rear view

Figure 4-1 Cabling your ERX system

## Safety Guidelines

Observe the following guidelines when cabling your ERX system.



**Ground (Earth) Warning:** Connect either the freestanding ERX system or the rack to ground (earth), and ensure that a reliable grounding path is maintained in the rack.



**Lightning Activity Warning:** Do not work on the system or connect or disconnect cables during lightning activity.



**DC Power Disconnection Warning:** Before powering on the ERX system, remove power from the DC circuit by deactivating the circuit breaker on the panel board that services the DC circuit.



**Servicing Unit Warning:** Before servicing the ERX system, turn off the power.



**Jewelry Removal Warning:** Remove jewelry (including rings, necklaces, and watches) before working on equipment that is connected to power lines. Metal objects heat up when connected to power and ground and can cause serious burns or weld the metal object to the terminals.



**Metal Objects Warning:** Do not insert any metal object, such as a screwdriver, into an open slot or the backplane. Doing so may cause electric shock and serious burns.



**Note:** If you plan on using a cable-management bracket, install it before you begin cabling your ERX system. Cable-management brackets are helpful to keep network interface cables untangled and orderly and to prevent cables from hindering access to other slots.

## Cabling the Power Input Module

Input power is supplied to the system by two redundant and independent –48 VDC line feeds. If one line fails, the other can carry the full load of the system. See *Appendix A, System Specifications* for the power requirements for the ERX system.

Table 4-1 identifies the power input module cabling requirements.

**Table 4-1** Power input module cables/wires needed

Cable/Wire	From	To
One 10-AWG ground wire	Power input module ground terminal	Termination ground
Two 10-AWG wire leads	Power input module Power A –48 VDC and RTN leads	Appropriate leads on power source No. 1
Two 10-AWG wire leads	Power input module Power B –48 VDC and RTN leads	Appropriate leads on power source No. 2

Follow the procedure in this section to connect power cables to the system. Refer to Figure 4-2 as needed.



**Caution:** Before you begin this procedure, ensure that both Power A and Power B switches are in the OFF position.

- 1 Loosen the four screws from the clear power input module cover.
- 2 Remove the cover by sliding it upward so that the screw heads line up with the holes in the cover.
- 3 Set the cover and screws aside for later use.
- 4 Connect the ground wire to the ground terminal on the lower portion of the power input module, and secure it with a #10 kee nut.



**Note:** We recommend a minimum of 10-AWG ground wire with a ring-style terminal.

- 5 Connect the other end of the ground wire to the appropriate ground termination lead.



**Warning:** Be sure the power source is turned off and the ERX system is turned off before continuing with this procedure.

- 6 With the wrench or nut driver, loosen the 3/8" hex nuts from the bottom -48 VDC and RTN leads of Power A, and connect a 10-AWG wire to each.
- 7 With the wrench or nut driver, tighten the hex nuts on both leads.
- 8 Attach the opposite end of Power A's wire leads to the appropriate leads on your power source.



**Note:** To provide redundancy, Power A and Power B leads should not terminate at the same power source.

- 9 Repeat Steps 6–8 for Power B.
- 10 Reattach the clear power input module cover that you removed in step 1 by securing the four screws.

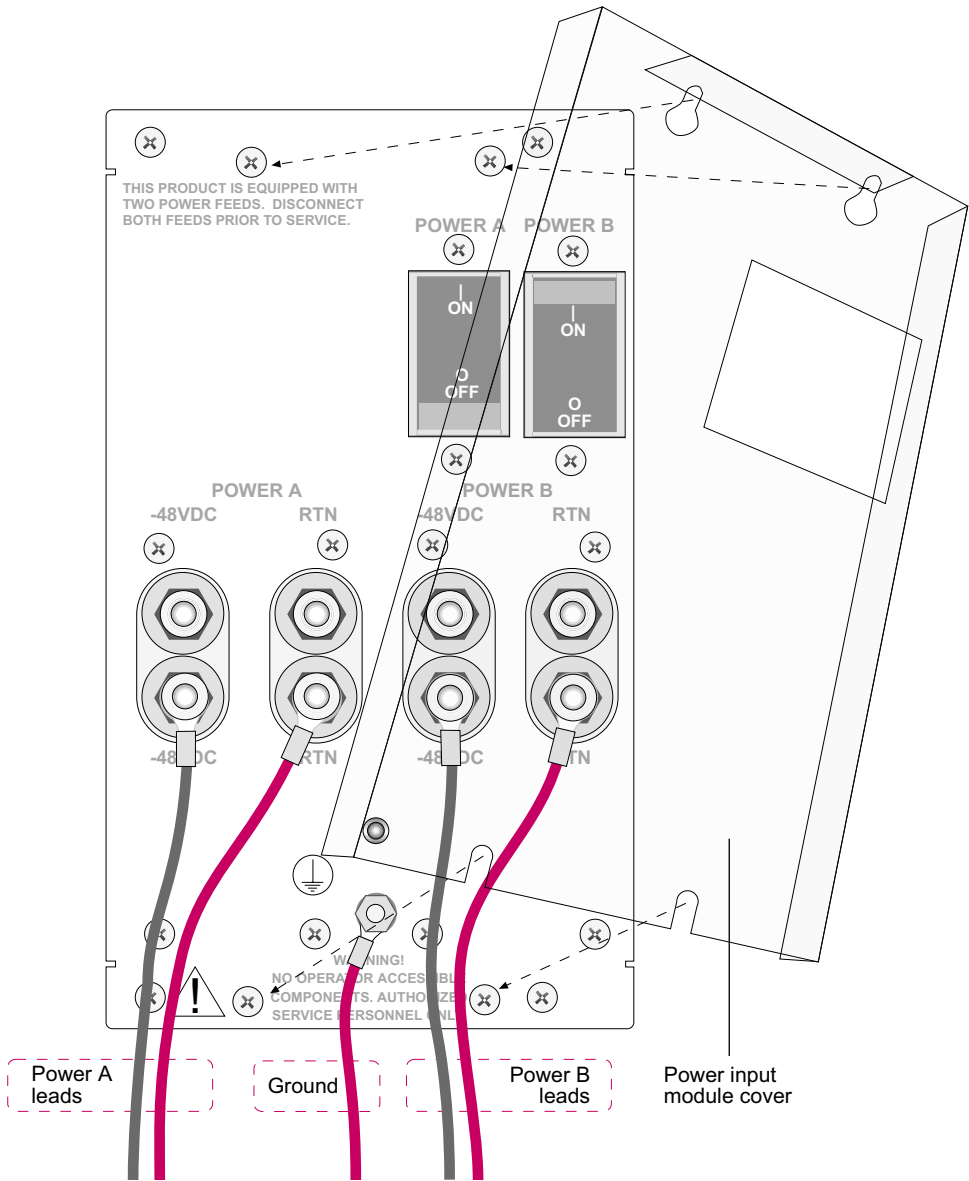


Figure 4-2 Power input module

## Cabling the SRP I/O Module

The next step in cabling the system is to connect cables to your SRP I/O module. See Figure 4-3.



**Note:** The alarm function on the SRP I/O module is currently not implemented.

Cable connections to your SRP I/O module are divided into two sections: external timing ports and console ports. Table 4-2 shows the specifications for each section.

**Table 4-2** SRP I/O ports

Port	Description
External Timing Ports	<ul style="list-style-type: none"><li>Two 3-pin wire-wrap posts for US external clock sources; primary (A) and secondary (B)</li><li>Two BNC connectors for E1 clock sources; primary (A) and secondary (B)</li></ul>
Console Ports	<ul style="list-style-type: none"><li>One 10/100Base-T Ethernet management port with an RJ-48C connector</li><li>One RS-232 port with a DB-9 connector for VT100 management access</li></ul>

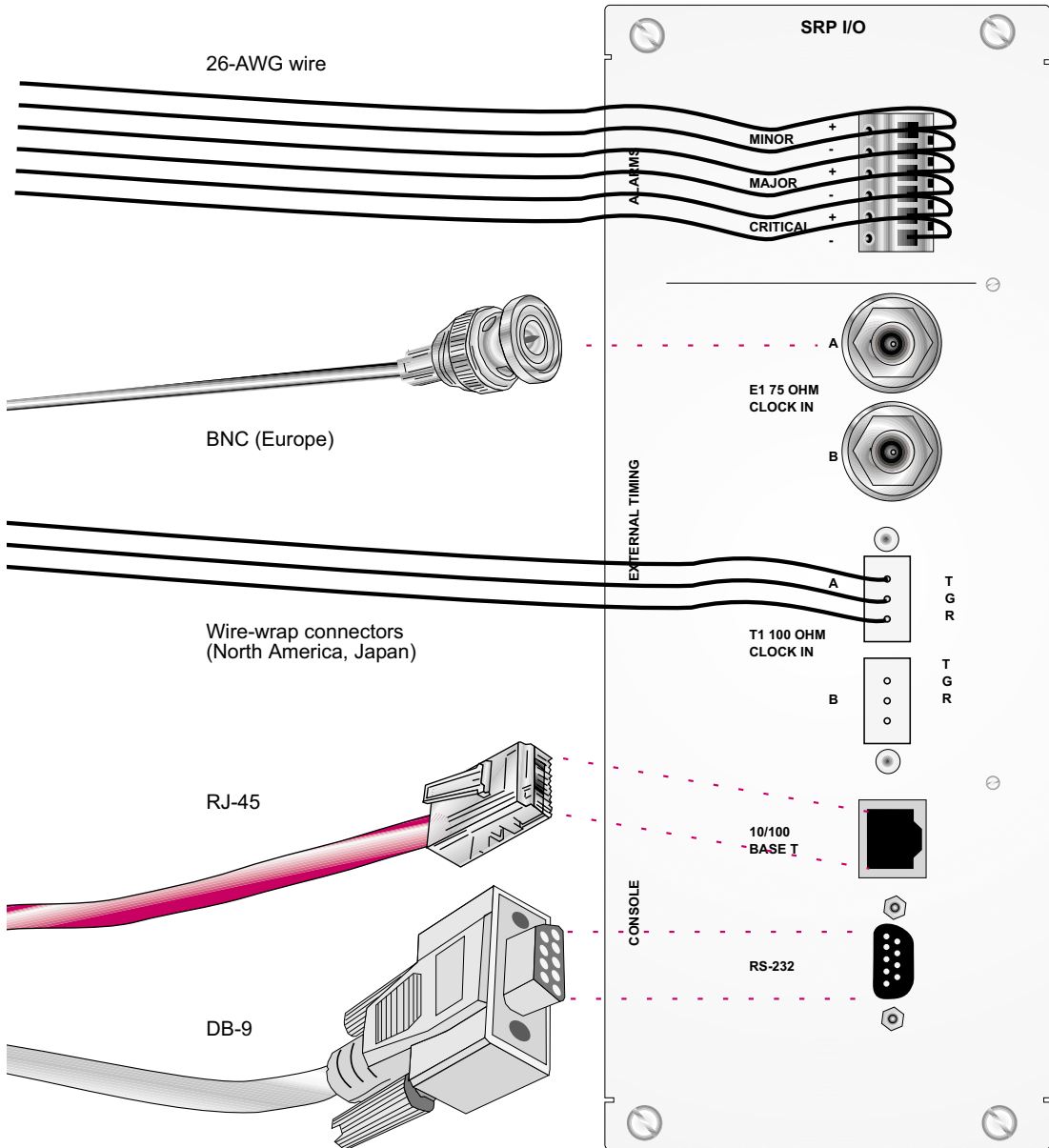
### External Timing Ports

Two external clock source input ports provide a method of ensuring that the system's clock timing remains synchronized with the network's system clock. The primary clock is labeled A; the secondary, redundant clock is labeled B. Use the connector type appropriate for your location:

- Two 75-ohm E1 2.048-Mbps inputs with BNC connectors
- Two 100-ohm T1 inputs with three pin wire-wrap connectors. Pins are labeled T (Tip), G (Ground), and R (Ring). We recommend using 26-AWG wire minimum.



**Note:** Use shielded cables to connect the external clock sources to the clock source input ports.



**Figure 4-3** SRP I/O module

To connect the clock source input ports:

- 1 Depending on the connector type, complete one of the following tasks:
  - E1: Attach the BNC connector to Clock A's External Timing port.

- T1: Wrap the “Tip” wire on pin marked T of Clock A’s External Timing port, the “Ground” wire on G pin, and the “Ring” wire on R pin.



**Note:** You can use a wire-wrap gun to attach wires to pins.

- 2 Attach the opposite end of the External Timing cable or wires into your network’s clock source A.
- 3 Repeat steps 1 and 2 for the Clock B connections.

### Console Ports

There are two ports located in the Console section (as shown in Figure 4-3) that allow management access.

- The 10/100Base-T Ethernet port accepts an RJ-45 (male) connector. This port provides an out-of-band connection. (We ship an Ethernet cable with the system.)
- The RS-232 port accepts a DB-9 (female) connector. This port allows direct CLI access.

Follow this procedure to connect the Console ports. Refer to Figure 4-3 as needed.

- 1 Insert the male RJ-45 connector into the 10/100Base-T port until it clicks into place.
- 2 Attach the opposite end of the cable to your appropriate network device.
- 3 Insert the female DB-9 connector into the RS-232 port until it is secure.
- 4 Hand-tighten the DB-9 connector screws.
- 5 Attach the opposite end of the cable to your terminal (VT100/ANSI).

See *Chapter 5, Accessing the ERX System*, for more information about management access.

## Cabling I/O Modules

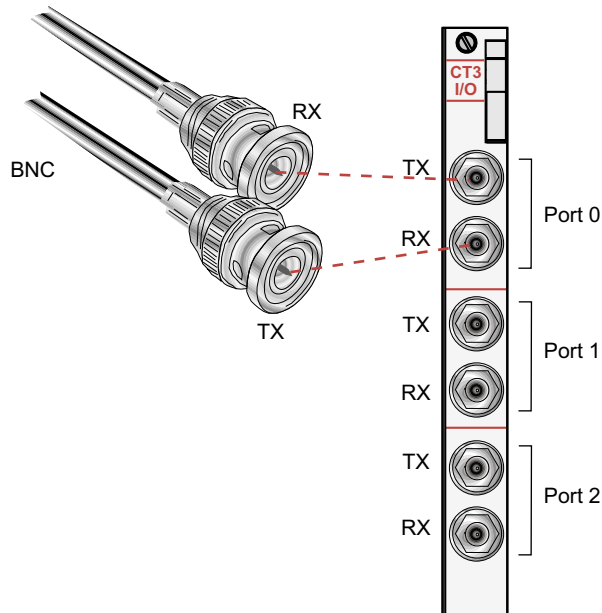
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The following sections describe how to cable I/O modules with different types of connectors. For information about the connectors on the different line modules, see *Appendix B, Module Specifications*.

### Cabling BNC Connectors

To cable I/O modules with BNC connectors:

- 1 Insert the RX male BNC connector into the selected port.
- 2 Terminate the other end in the appropriate network interface, such as a multiplexer (MUX) device.
- 3 Repeat steps 1 and 2 for the TX connector.
- 4 Repeat steps 1–3 for all ports.



**Figure 4-4** I/O module with BNCs

### Cabling HSSI Connectors

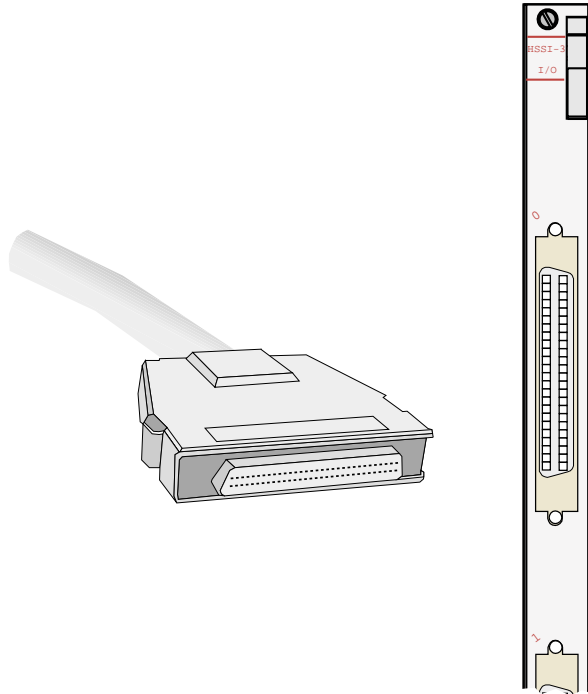
The HSSI I/O module uses a standard 50-pin HSSI connector.



**Caution:** Do not terminate HSSI connections with SCSI connectors. Although SCSI connectors look very similar to HSSI connectors, using SCSI connectors on HSSI connections may lead to data loss.

To cable I/O modules with HSSI connectors:

- 1 Insert the HSSI connector into the selected port.
- 2 Terminate the other end in the appropriate network connection.
- 3 Repeat steps 1 and 2 for the other ports.

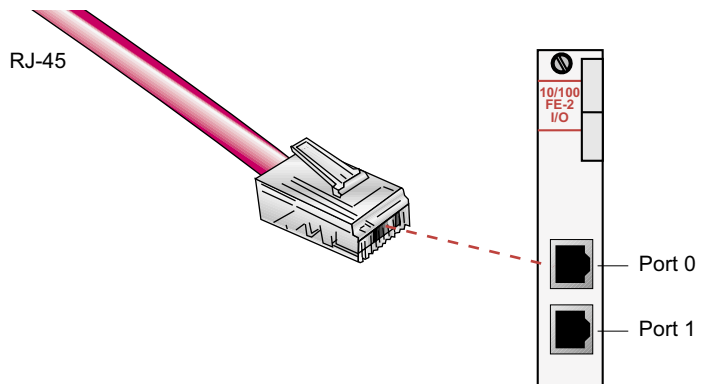


**Figure 4-5** HSSI I/O module with 50-pin HSSI connector

*Cabling RJ-45 Connectors*

To cable I/O modules with RJ-45 connectors:

- 1 Insert the RJ-45 connector into the selected port.
- 2 Terminate the other end in the appropriate network connection.
- 3 Repeat steps 1 and 2 for the other ports.

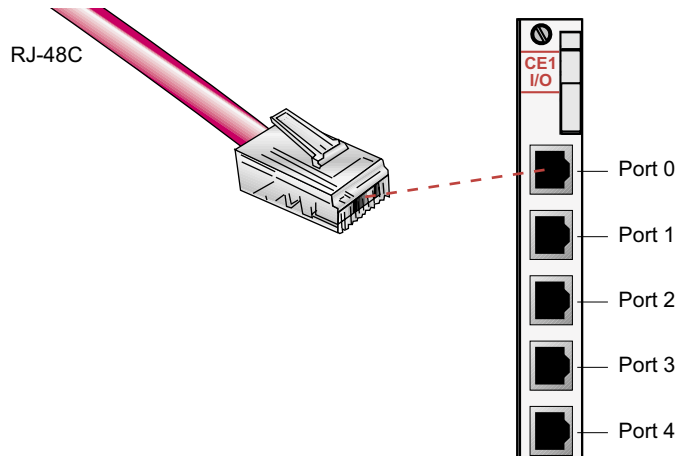


**Figure 4-6** I/O module with RJ-45 connector

*Cabling RJ-48C Connectors*

To cable I/O modules with RJ-48C connectors:

- 1 Insert the RJ-48C connector into the selected port.
- 2 Terminate the other end in the appropriate network interface, such as a multiplexer (MUX) device.
- 3 Repeat steps 1 and 2 for all ports.



**Figure 4-7** I/O module with RJ-48C connectors

### *Cabling LC Duplex Connectors*

In accordance with EN60825-1, Safety of Laser Products - Part 1: Equipment Class, Requirements, and User's Guide (2001), multimode I/O modules with LC connectors are defined as follows:

#### CLASS 1 LED PRODUCT.

In accordance with EN60825-1, Safety of Laser Products - Part 1: Equipment Class, Requirements, and User's Guide (2001), single-mode I/O modules with LC connectors are defined as follows:

#### CLASS 1 LASER PRODUCT.

To cable I/O modules with LC duplex connectors:

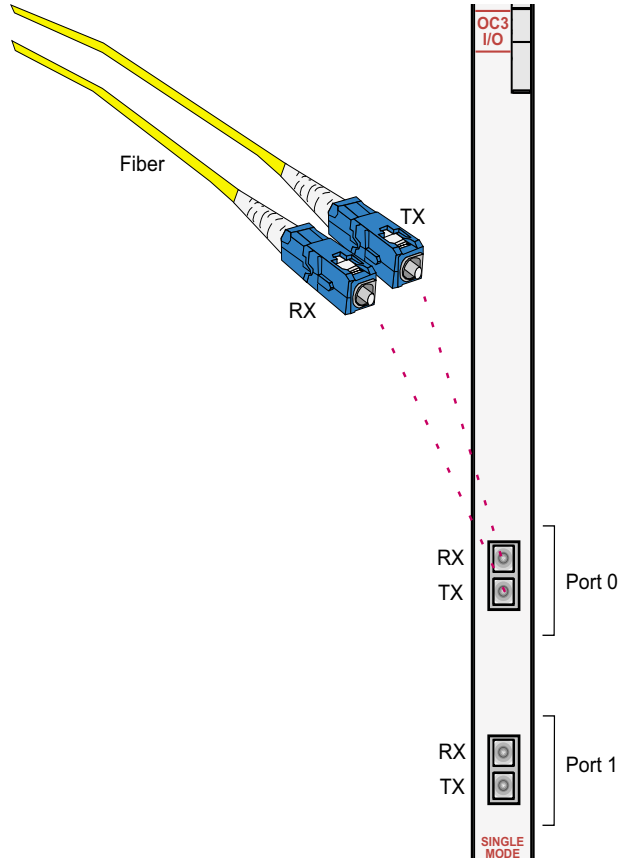


**Warning:** Do not look directly into LC-style fiber connectors. The fiber-optic laser used in single-mode fiber (SMF) meets the regulatory requirements for casual exposure to the eye; however, looking directly into a laser can cause eye damage.



**Warning:** IEC 825, Class 1 laser fiber connectors are for connection only to Class 1 laser devices.

- 1 Insert the TX male fiber connector into the selected port.
- 2 Terminate the other end in the appropriate network connection.
- 3 Repeat steps 1 and 2 for the RX fiber connector.
- 4 Repeat steps 1–3 for the remaining ports.



**Figure 4-8** I/O module with LC full duplex connectors

### *Cabling SC Duplex Connectors*

In accordance with EN60825-1, Safety of Laser Products - Part 1: Equipment Class, Requirements, and User's Guide (2001), multimode I/O modules with SC connectors are defined as follows:

#### **CLASS 1 LED PRODUCT.**

In accordance with EN60825-1, Safety of Laser Products - Part 1: Equipment Class, Requirements, and User's Guide (2001), single-mode I/O modules with SC connectors are defined as follows:

#### **CLASS 1 LASER PRODUCT.**

To cable I/O modules with SC duplex connectors:

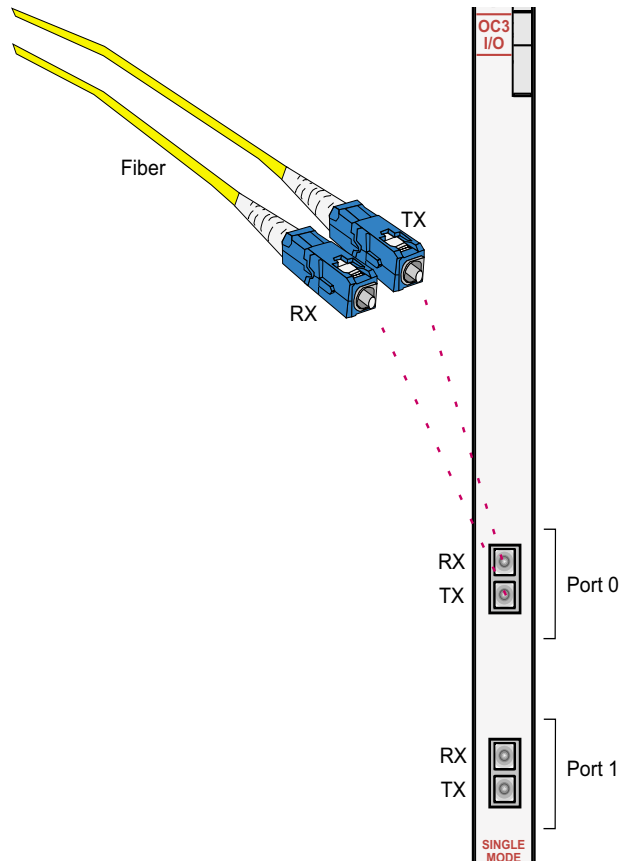


**Warning:** Do not look directly into SC-style fiber connectors. The fiber-optic laser used in single-mode fiber (SMF) meets the regulatory requirements for casual exposure to the eye; however, looking directly into a laser can cause eye damage.



**Warning:** IEC 825, Class 1 laser fiber connectors are for connection only to Class 1 laser devices.

- 1 Insert the TX male fiber connector into the selected port.
- 2 Terminate the other end in the appropriate network connection.
- 3 Repeat steps 1 and 2 for the RX fiber connector.
- 4 Repeat steps 1–3 for the remaining ports.



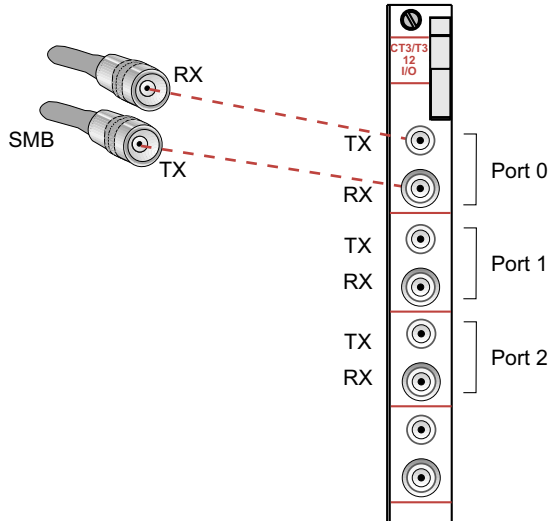
**Figure 4-9** I/O module with SC full duplex connectors

### Cabling SMB Connectors

To cable I/O modules with SMB connectors:

- 1 Pull back the metal sheath on the TX cable's SMB connector.
- 2 Insert the TX cable's SMB connector into the selected port.
- 3 Release the metal sheath on the TX cable's SMB connector.

- 4 Terminate the other end in the appropriate network connection.
- 5 Repeat steps 1–4 for the RX cable’s SMB connector.
- 6 Repeat steps 1–5 for the remaining ports.



**Figure 4-10** I/O module with SMB connectors

### *Cabling X.21/V.35 Connectors*

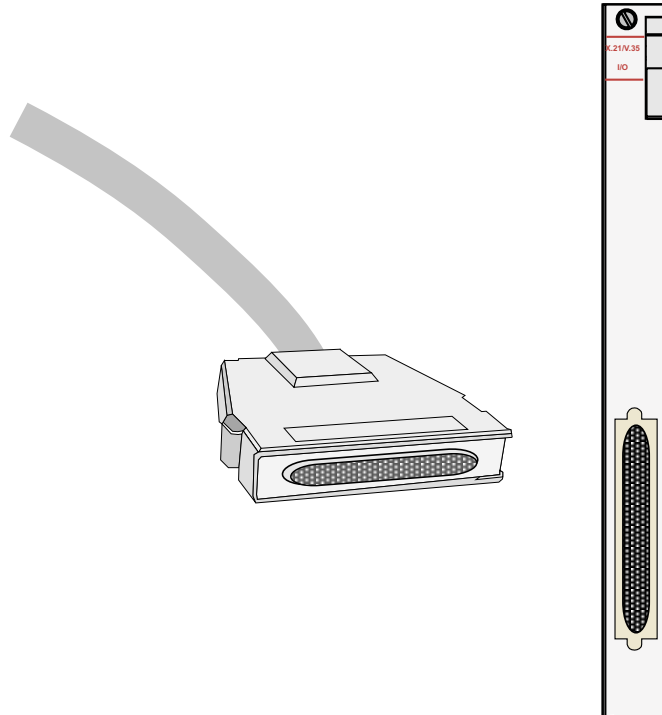
Four cables are available for the X.21/V.35 I/O modules:

- X.21 DCE cable (terminated with 8 female X.21 connectors)
- X.21 DTE cable (terminated with 8 male X.21 connectors)
- V.35 DCE cable (terminated with 8 female V.35 connectors)
- V.35 DTE cable (terminated with 8 male V.35 connectors)

Each 200-pin proprietary socket on the I/O module provides connections to 8 V.35 or X.21 ports. The remote end of the cable is terminated with either 8 X.21 connectors or 8 V.35 connectors. The cable you attach to the port on the I/O module determines whether the connection is X.21 or V.35 and DCE or DTE.

To cable I/O modules with X.21/V.35 connectors:

- 1 Insert the X.21/V.35 connector into the selected socket.
- 2 Terminate the other end in the appropriate network connection.
- 3 Repeat steps 1 and 2 for the other socket.



**Figure 4-11** X.21/V.35 module with 50-pin X.21/V.35 connector

### *Cabling Redundant Ports*

Some modules have redundant ports. See *Appendix B, Module Specifications* for specifications. Cabling both ports provides a redundant path to the ERX module.



**Caution:** For port redundancy to operate correctly on a GE I/O module that supports SFPs, both the primary and redundant ports on an ERX GE I/O module must use the same type of SFP.

### The Next Step

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After you have cabled the system, check that all connections go the right places and are secure. Then proceed as follows:

- If you need to set up a console to communicate with the system, go to *Chapter 5, Accessing the ERX System*.
- If you have already set up your console, go to *Chapter 6, Powering Up the System*.

