

**CP22 DISTRIBUTION PANEL**  
**(RS-423-A/RS-232-C COMPATIBLE)**  
**TECHNICAL MANUAL**



**EMULEX**

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CP2251001 Rev B  
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### **WARNING**

This equipment generates, uses and can radiate radio frequency energy, and if not installed and used in accordance with the technical manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of Federal Communications Commission (FCC) Rules, which are designed to provide reasonable protection against such interference when operating in a commercial environment. Operation of this equipment in a residential area is likely to cause interference in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.

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## EMULEX PRODUCT WARRANTY

**DISTRIBUTION PANEL WARRANTY:** Emulex warrants for a period of twelve (12) months from the date of shipment that each Emulex controller product supplied shall be free from defects in material and workmanship.

**CABLE WARRANTY:** All Emulex provided cables are warranted for ninety (90) days from the time of shipment.

The above warranties shall not apply to expendable components such as fuses, bulbs, and the like, nor to connectors, adapters, and other items not a part of the basic product. Emulex shall have no obligation to make repairs or to cause replacement required through normal wear and tear or necessitated in whole or in part by catastrophe, fault or negligence of the user, improper or unauthorized use of the product, or use of the product in a manner for which it was not designed, or by causes external to the product, such as but not limited to, power failure or air conditioning. Emulex's sole obligation hereunder shall be to repair or replace any defective product, and, unless otherwise stated, pay return transportation cost for such replacement. Purchaser shall provide labor for removal of the defective product, shipping charges for return to Emulex and installation of its replacement.

THE EXPRESSED WARRANTIES SET FORTH IN THIS AGREEMENT ARE IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, AND ALL OTHER WARRANTIES ARE HEREBY DISCLAIMED AND EXCLUDED BY EMULEX. THE STATED EXPRESS WARRANTIES ARE IN LIEU OF ALL OBLIGATIONS OR LIABILITIES ON THE PART OF EMULEX FOR DAMAGES, INCLUDING BUT NOT LIMITED TO SPECIAL, INDIRECT, OR CONSEQUENTIAL DAMAGES ARISING OUT OF OR IN CONNECTION WITH THE USE OR PERFORMANCE OF THE PRODUCT.

**RETURNED MATERIAL:** Warranty claims must be received by Emulex within the applicable warranty period. A replaced product, or part thereof, shall become the property of Emulex and shall be returned to Emulex at Purchaser's expense. All returned material must be accompanied by a RETURN MATERIALS AUTHORIZATION (RMA) number assigned by Emulex.

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**SECTION ONE  
GENERAL DESCRIPTION**

**1.1 INTRODUCTION**

This manual contains installation and applications data for the CP22 Distribution Panel. It need be used only for setup, installation, and cabling of the distribution panel itself. Setup and installation instructions for any other components are included in the controller module technical manual that you received with your communications subsystem. The contents of this manual are as follows:

- Section 1 **General Description:** This section contains an overview of the CP22 Distribution Panel and CP22 specifications.
- Section 2 **Preliminary Considerations:** This section contains information necessary to plan the installation.
- Section 3 **Setup:** This section contains the information necessary to set up the distribution panel and choose options.
- Section 4 **Installation:** This section contains the information necessary to physically install the Distribution Panel.

**1.2 OVERVIEW**

The CP22 is the same size as the DEC DMF32 distribution panel and can be either directly mounted in its place or rack mounted in a special chassis. It is a passive panel and provides an RS-232-C interface with full-duplex modem controls at all 16 ports. Revision B CP22's, which have three connectors on the back rather than two, have two additional features. First, channels 0-3 can be individually reconfigured to provide support for RS-423-A signals on received inputs. Second, channels 0-3 provide the additional modem controls necessary for half-duplex operation when used with the CS02/H controller.

The CP22 can be used with the Emulex products shown in Table 1-1.

Table 1-1. Emulex Products Used With the CP22

Product Name	Part Number
CS02/H1	CS0210201-H1
CS21/H2	CS2102-H2
CS21/U2	CS2102-U2
CS21/F1	CS2102-F1
CS21/Z1	CS2102-Z1
CS21/MH	CS2102-MH
CS21/MU	CS2102-MU
CS21/MZ	CS2102-MZ
CS23/E1	CS2310202

### 1.2.1 EMULEX PART NUMBERS

The Emulex part numbers of the CP22 Distribution Panel are shown in Table 1-2. Revision A CP22's have two 50-pin connectors on the back; revision B CP22's can be identified by a third, 16-pin connector. Part numbers for cables and other options are given in Table 1-3.

Table 1-2. Emulex Part Numbers

Subassembly	Emulex Part #
CP22/A Distribution Panel With EMI Filters	CP2210201-01
Without EMI Filters	CP2210201-02
CP22/B Distribution Panel With EMI Filters	CP2210202-01
Without EMI Filters	CP2210202-02

Table 1-3. Cables and Mounting Hardware

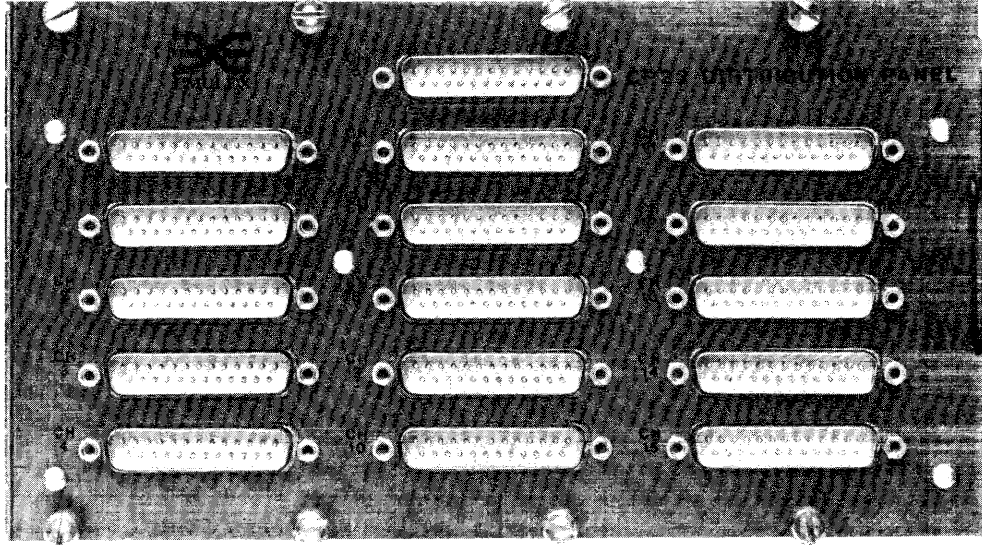
Item	Part Number	Description
1.	CU2111201-01 CU2111201-02 CU2111201-03 CU2111201-04 CU2111201-05 CU2111201-06	Non-FCC cable, 4 ft Non-FCC cable, 8 ft Non-FCC cable, 15 ft Non-FCC cable, 25 ft Non-FCC cable, 35 ft Non-FCC cable, 50 ft
2.	CU2111202-02 CU2111202-03 CU2111202-04 CU2111202-05	FCC Shielded Cable, 8 ft FCC Shielded Cable, 15 ft FCC Shielded Cable, 25 ft FCC Shielded Cable, 35 ft
3.	CU2111203-04	Extension Cable, 8 ft
4.	CU0211201-01 CU0211201-02 CU0211201-03	16-pin cable, 1.5 ft 16-pin cable, 4 ft 16-pin cable, 8 ft
5.	CU2213002	Rack Mount Chassis (including dress panel)
6.	CU3210202	I/O Cable Connector Panel
7.	CU1110201 CU1110202 CU0411203 CU0411202	DH11/DMF32 Wrap-around DZ11 Wrap-around DHU11 Wrap-around DHU11 Staggered Loopback



# General Specifications

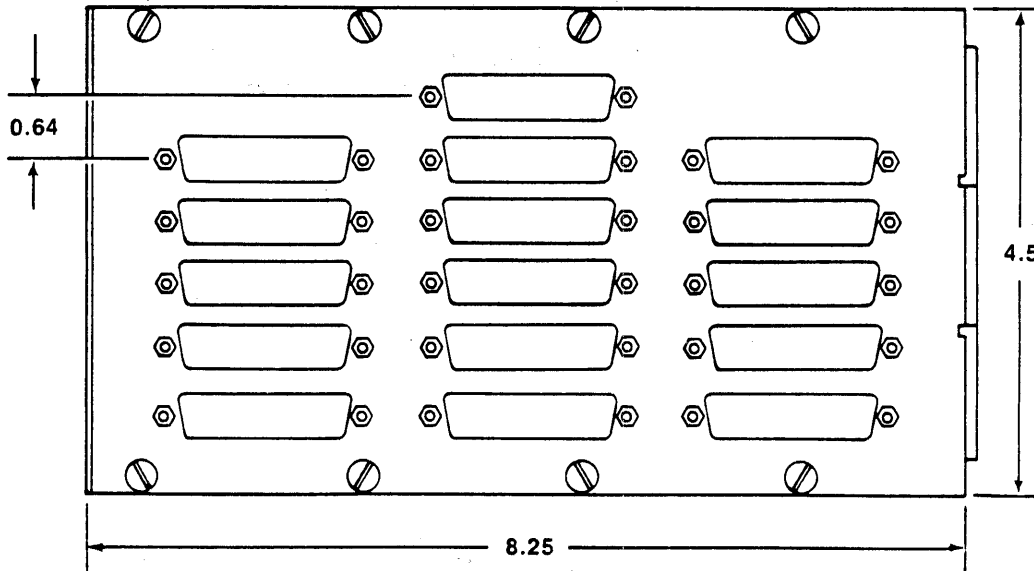
## 1.3 GENERAL SPECIFICATIONS

The CP22 Distribution Panel consists of a mechanical assembly that contains 16 25-pin connectors. The 16 channels on the CP22 are numbered sequentially from 0 to 15. The channel numbers are silkscreened on the dress panel (faceplate) of the CP22. Figure 1-1 shows the CP22. Figures 1-2 and 1-3 show the physical dimensions of the CP22. Table 1-4 lists general and physical specifications for the CP22.



CP2201-0474

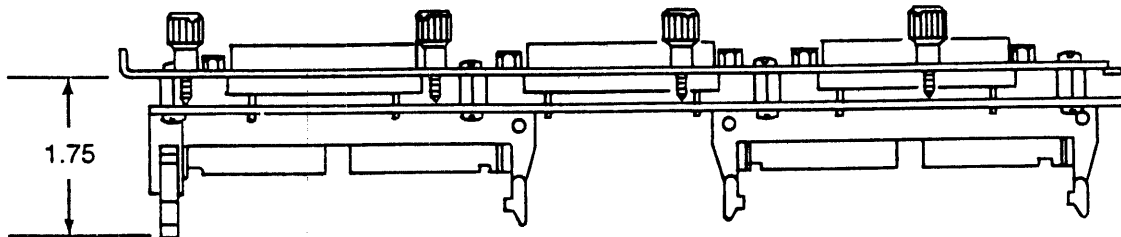
Figure 1-1. CP22 Distribution Panel



CP2201-0414

Figure 1-2. CP22 Distribution Panel Dimensions, Front View

## 1-3 General Description



CP2201-0419

Figure 1-3. CP22 Distribution Panel Dimensions, Side View

Table 1-4. CP22 Distribution Panel Specifications

Parameter	Description
<b>Connectors</b>	25-pin male subminiature D-type EIA RS-232-C
<b>Operating Temperature</b>	10°C (50°F) to 40°C (104°F)  Maximum temperature is reduced 1.8°C per 1000 meters altitude (1°F per 1000 feet)
<b>Relative Humidity</b>	10% to 90% with a maximum wet bulb of 28°C (82°F) and minimum dewpoint of 2°C (3.6°F)
<b>Dimensions</b>	
With filters	8.4 in. wide x 4.7 in. high x 2 in deep
Without filters	8.4 in. wide x 4.7 in. high x 1.5 in deep
<b>Shipping Weight</b>	2 pounds

#### 1.4 INTERFACE SPECIFICATIONS

Electrical signal levels conform to EIA RS-232-C specifications. Modem control signals are available on all 16 ports. Table 1-5 lists RS-232-C interface specifications. Table 1-6 lists the RS-232-C pinning assignments.

## Interface Specifications

Table 1-5. RS-232-C Interface Specifications

Characteristic	Specification
<b>Configuration</b>	Data Terminal Equipment (DTE)
<b>Transmission Modes</b>	
CH.0 - CH.3	Full-Duplex (Revision B CP22's support half duplex operation with CS02 controllers)
CH.4 - CH.15	Full-Duplex
<b>Transmission Speeds</b>	0 to 20,000 bits per second
<b>Modem Control Signals</b>	
CH.0 - CH.3	DTR, CAR, Ring (Revision B CP22's support DSR, CTS, RTS with CS02 controllers)
CH.4 - CH.15	DTR, CAR, Ring
<b>Modems Supported</b>	
Bell Compatible CCITT	103, 113, 212 V.22

Table 1-6. RS-232-C Pin/Signal Assignments

Pin #	Function
Pin 1	- Chassis Ground
Pin 2	- Transmit Data
Pin 3	- Receive Data
Pin 4*	- Request To Send
Pin 5*	- Clear To Send
Pin 6*	- Data Set Ready
Pin 7	- Logic Ground
Pin 8	- Carrier Detector
Pin 20	- Data Terminal Ready
Pin 22	- Ring Indicator

\*These signals are supported on CH.0-3 only by Revision B CP22's used with CS02 controllers. These signals are not supported by the CS23 controller.

1.5 WRAP-AROUND CONNECTOR

Some diagnostic tests require a special wrap-around connector. The type of wrap-around connector needed depends on the controller emulation, as shown in the schematics in Figures 1-4, 1-5, and 1-6. One connector or a full set of 16 connectors may be ordered from Emulex (see Table 1-3 for part numbers).

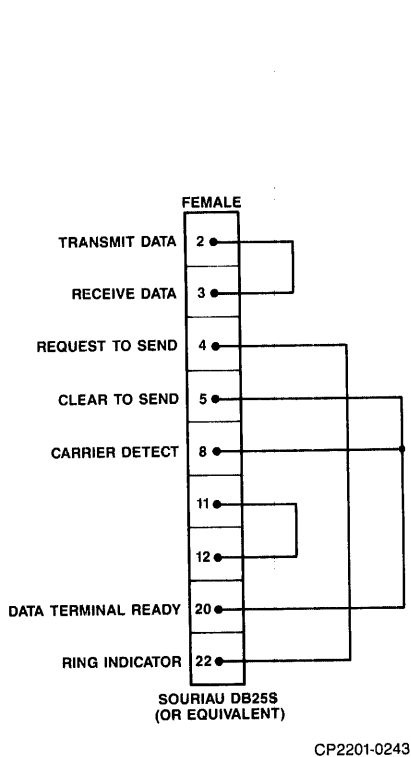


Figure 1-4. DH11/DMF32 Wrap-Around Connector

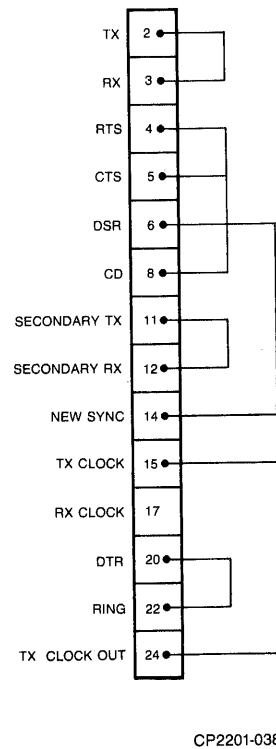
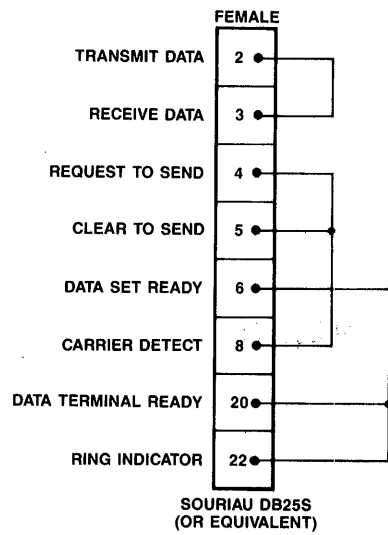


Figure 1-5. DZ11 Wrap-Around Connector

# Test Connector



CP2201-0177

Figure 1-6. DHU11  
Wrap-Around Connector

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**SECTION TWO  
PRELIMINARY CONSIDERATIONS**

**2.1 OVERVIEW**

This section describes some items that need to be considered before you configure and set up your communications subsystem. Including this overview, the section is divided into four main subsections:

Subsection	Title
2.1	Overview
2.2	Maintaining FCC Class A Compliance
2.3	RS-232-C Cable Lengths
2.4	Connector Hoods

**2.2 MAINTAINING FCC CLASS A COMPLIANCE**

The CP22 Distribution Panel has been tested with DEC computers that comply with FCC Class A limits for radiated and conducted interference. The CP22 is FCC compliant and is designed to be installed in the same cabinet as the controller. This method of installation is described in subsections 4.2 and 4.3.1.

If the CP22 is installed in a separate cabinet from the controller, shielded cables must be used for the installation in order to maintain FCC compliance. See subsections 4.2 and 4.3.2 for a description of installation in a separate cabinet.

**2.2.1 EMI FILTERS**

The CP22 may be purchased with or without 25-pin filtered connector adapters, commonly called electromagnetic interference (EMI) filters. These filters are connected to the distribution panel and are designed to limit EMI radiation. Table 1-2 lists the part numbers of the CP22 with and without EMI filters.

**2.3 RS-232-C CABLE LENGTHS**

The EIA RS-232-C interface standard guarantees error-free transmission over cables no longer than fifty feet. Because the line drivers are on the controller module, this length includes the cable between the controller and the CP22. **Emulex does not warranty operation over cable lengths greater than 50 feet in any circumstances.** However, satisfactory performance over cables several thousand feet in length can be obtained, depending on the speed of data transmission required and the environment in which the cable is placed. Table 2-1 is a guide to the practical application of RS-232-C cable lengths.

## RS-232-C Cable Lengths

### NOTE

The ground potential difference between the controller and terminal must not exceed 2V. This requirement will generally limit operation without modems to a single building served by one AC power service.

Table 2-1. RS-232-C Cable Lengths

Baud	Shielded <sup>1</sup> (in feet)	Unshielded <sup>2</sup> (in feet)
110	5000	3000
300	5000	3000
1200	3000	3000
2400	1000	500
4800	1000	250
9600	250	250

<sup>1</sup>Cable is two, 22 AWG twisted pairs shielded in Belden 8777 (three pairs). Shields tied to ground.

<sup>2</sup>Cable is 22 AWG 4-conductor (quad) inside station wire.

### 2.4 CONNECTOR HOODS

Before purchasing cables for user-supplied devices, be sure to check the dimensions of the connector hoods. As Figure 1-2 shows, the maximum dimension for a CP22 connector hood is 0.64 inches.



## SECTION THREE SETUP

### 3.1 OVERVIEW

This section describes how to configure and set up the CP22 Distribution Panel. Including this overview, the section is divided into four main subsections:

Subsection	Title
3.1	Overview
3.2	CP22 Distribution Panel Setup
3.3	CC21 Controller Module Setup
3.4	CC23 Controller Module Setup

### 3.2 CP22 DISTRIBUTION PANEL SETUP

#### 3.2.1 JUMPER CONFIGURATION

Pin assignment, interface, and grounding options are selected by installing a jumper or by cutting an etch between certain jumpers on the solder side of the CP22 PCBA. Each channel has the set of jumpers A through F; channels 0-3 also have a set of jumpers G-H. There is one set of jumpers J-K and L-M for the entire panel. Figure 3-1 shows a simplified CP22 channel schematic. The grounding options are shown in Figure 3-2. Table 3-1 defines the functions and factory configuration of the jumpers located on the CP22 Distribution Panel.

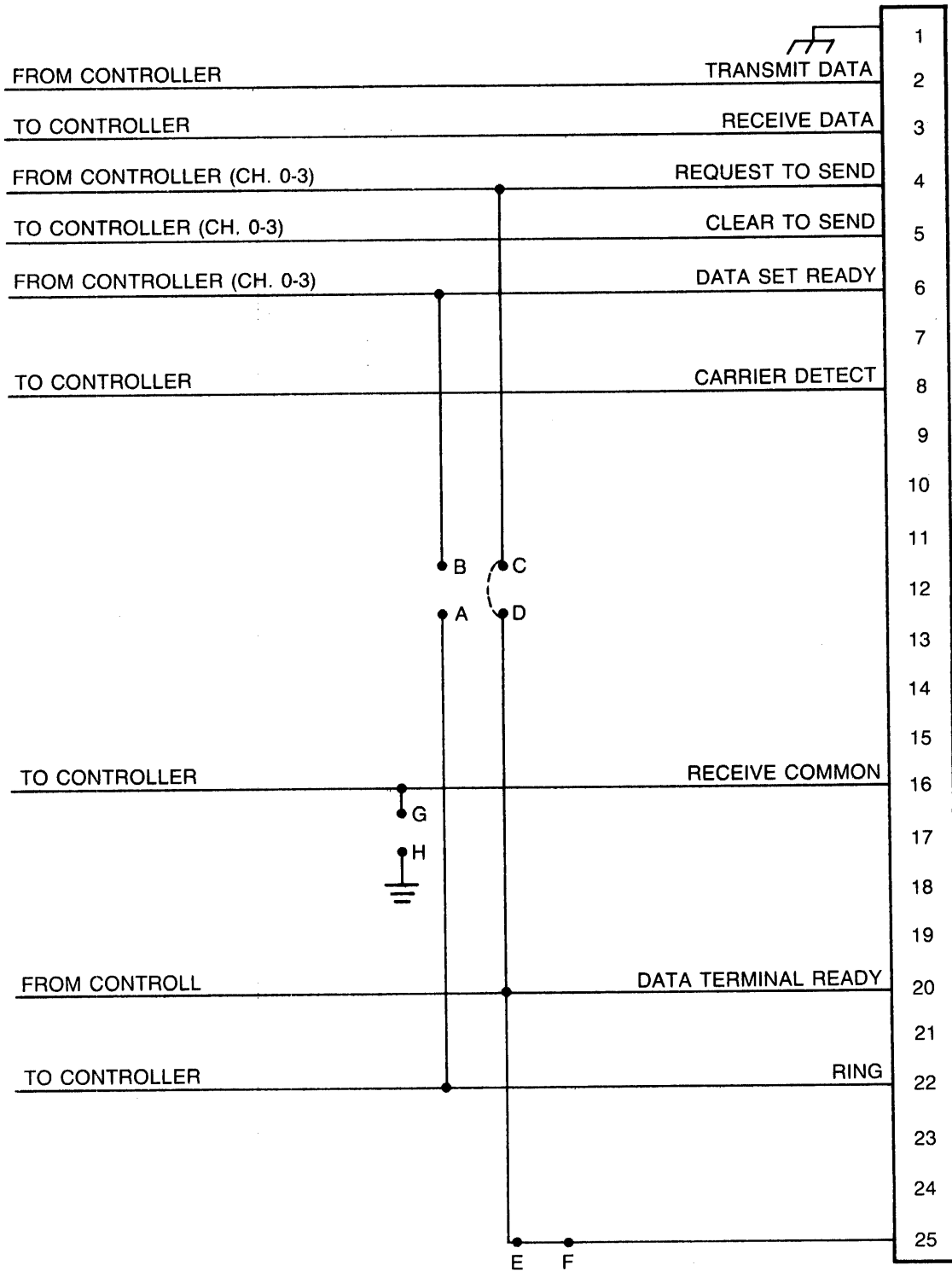
Table 3-1. CP22 Jumper Function/Factory Configuration

Jumper	Factory	Function	Comments
A to B	Removed	When installed, connects RING to pin 6, DSR. <b>Not for use with 212 modems.</b>	One set per channel
C to D	Removed <sup>1</sup>	When installed, connects DTR to pin 4, RTS.	One set per channel
E to F	Connection in etch	When etch cut, DTR doesn't drive pin 25, MAKE BUSY. For 103 and 113 modems.	One set per channel
G to H	Connection in etch	When etch cut, changes that channel's receive data input interface to RS-423-A.	One set per channel on CH.0 to CH.3

<sup>1</sup>Installed for CS21/Z1 and CSM21/MZ emulations only.

continued on page 3-3

# CP22 Distribution Panel Setup

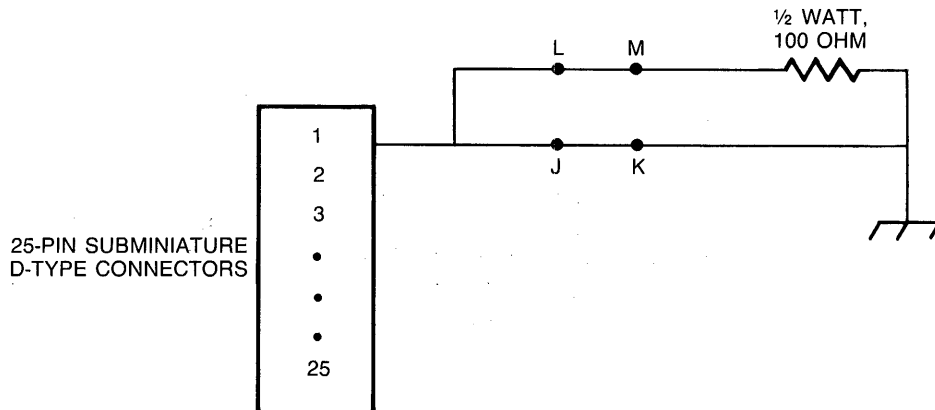


CP2201-0473

Figure 3-1. CP22 Channel Schematic

Table 3-1. CP22 Jumper Function/Factory Configuration (continued)

Jumper	Factory	Function	Comments
J to K	Connection in etch	When etch cut in conjunction with cut between L-M, protective ground isolated from chassis ground. These etches should be cut if a separate ground strap is used between the CP22 and the external device.	One set for entire CP22
L to M	Connection in etch	When etch cut, signal from each Pin 1 passes through a 0.5 Watt, 100 ohm resistor prior to chassis ground. This helps reduce line noise in noisy environments.	One set for entire CP22



CP2201-0141

Figure 3-2. CP22 Protective Ground Option

### 3.2.2 CONFIGURING CHANNELS 0-3 FOR RS-423-A

Channels 0 through 3 on the CP22 may be individually reconfigured for RS-423-A operation, except with the CS23 Controller. When shipped from the factory, the CP22 is set up to be compatible with the industry standard RS-232-C interface. RS-423-A interface circuits will transmit reliably over longer distances than RS-232-C circuits. Of course, the benefits of RS-423-A cannot be achieved unless **both ends** of the cable are RS-423-A. Since most terminals do not have RS-423-A interface circuits, this option has limited application.

## CC02 Controller Module Setup

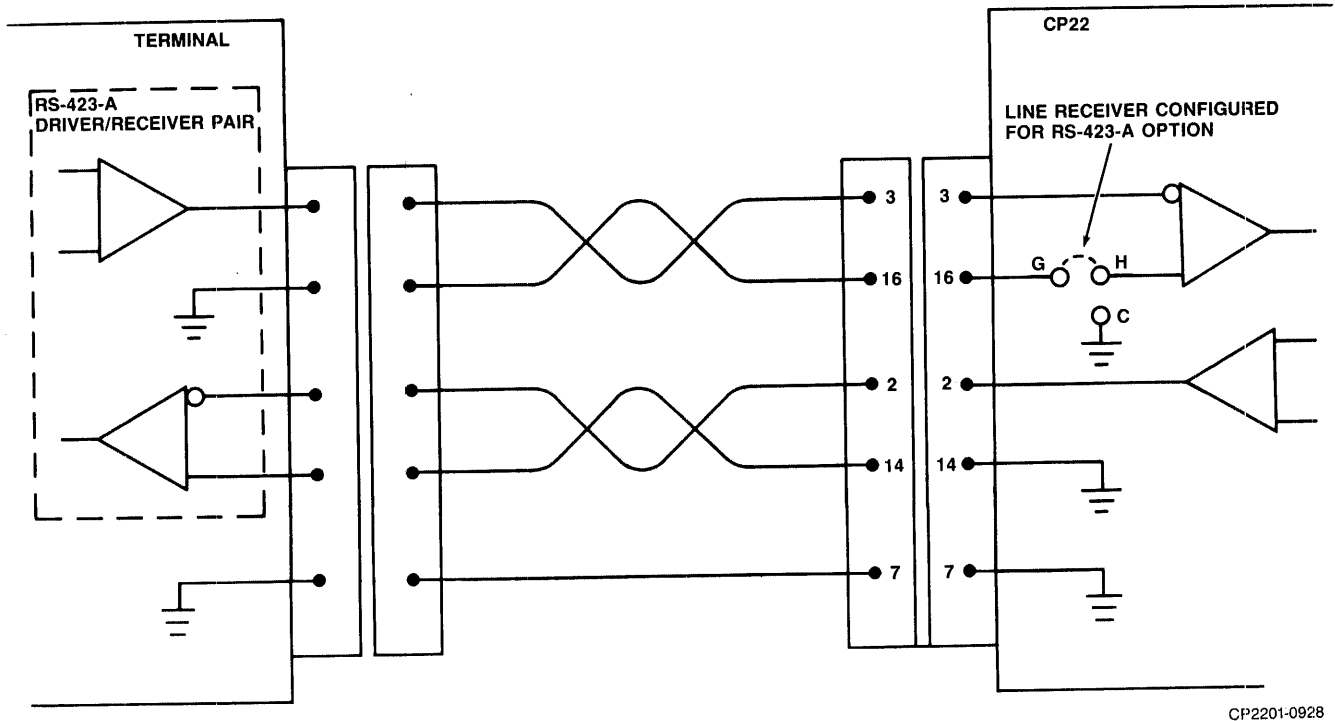


Figure 3-3. RS-423-A Cabling

To configure a channel for RS-423-A, cut the etch between jumper pads G and H on the solder side of the board. Once this etch has been cut, the connections between jumpers G and H must be hardwired to return the channel to an RS-232-C interface. Figure 3-2 illustrates the jumper connection and the RS-423-A cabling.

### 3.3 CC02 CONTROLLER MODULE SETUP

A DIP header, which is inserted in the socket located at U81, is shipped with the CC02 Controller Module.

The orientation of the header in the socket determines whether or not power (+5V and -15V) is available at CC02 connectors J1 and J2 (distribution panel interface). Power is not required to operate the CP22 Distribution Panel. Inserting the header as shown in Figure 3-4 provides proper grounding for the CP22, but does not connect power to the interface.

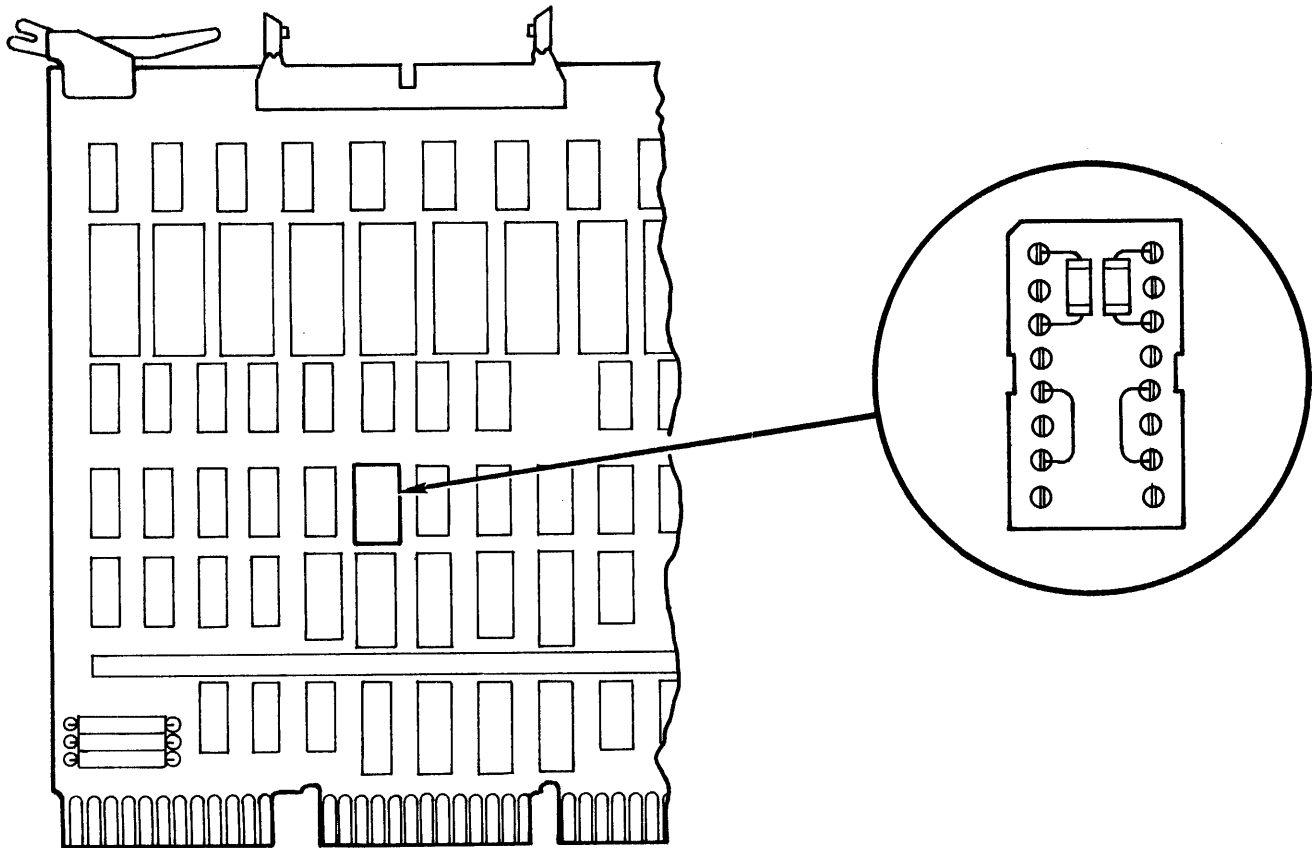
If the header is accidentally reversed (rotated 180°) and power is applied to the CC21 with the CP22 attached, the fuses on the DIP header blow. If this happens, replace the header with the spare supplied. Additional DIP headers can be ordered from Emulex, using part number CU2113001.

## 3.4 CC21 CONTROLLER MODULE SETUP

A DIP header, which is inserted in the socket located at U82, is shipped with CC21 Controller Module PCBAs that have Emulex part number CU2110405. Neither the header nor the socket is installed on PCBAs with numerically lower part numbers. (The part number is located in the upper left-hand corner of the PCBA's component side when the board is viewed with the UNIBUS connectors down.)

The orientation of the header in the socket determines whether or not power (+5V and -15V) is available at CC21 connectors J1 and J2 (distribution panel interface). Power is not required to operate the CP22 Distribution Panel. Inserting the header as shown in Figure 3-4 provides proper grounding for the CP22, but does not connect power to the interface.

If the header is accidentally reversed (rotated 180°) and power is applied to the CC21 with the CP22 attached, the fuses on the DIP header blow. If this happens, replace the header with the spare supplied. Additional DIP headers can be ordered from Emulex, using part number CU2113001.



CP2201-0460

Figure 3-4. DIP Header Orientation

## CC23 Controller Module Setup

### 3.5 CC23 CONTROLLER MODULE SETUP

The CC23 Controller is shipped with conductor modules installed at locations U49 and U65, which corresponds to the two distribution panels that can be used with the controller. When using the CC23 Controller with the CP22 Distribution Panel, **do not remove the conductor module from the location that corresponds to the CP22.** (Connectors J1 and J2 correspond to socket U65; connectors J3 and J4 correspond to socket U49.) If the conductor module has already been replaced with a DIP header for use with some other panel, ensure that the DIP header is oriented in the direction shown in Figure 3-4. If it is not, unplug the DIP header, rotate it 180°, and plug it back in.

## SECTION FOUR INSTALLATION

### 4.1 OVERVIEW

This section describes how to mount and cable the CP22 Distribution Panel. Including this overview, the section is divided into four main subsections:

Subsection	Title
4.1	Overview
4.2	CP22 Distribution Panel Mounting
4.3	Cabling the CP22 to the Controller Module
4.4	Attaching External Devices to the CP22 Distribution Panel

### 4.2 CP22 DISTRIBUTION PANEL MOUNTING

The CP22 Distribution Panel has the same dimensions as the DEC DMF32 Distribution Panel and may be mounted in its place in the rear bulkhead of DEC cabinets that are FCC compliant. The procedure for mounting the CP22 in a DEC FCC cabinet is equally simple and requires no additional hardware.

#### 4.2.1 CP22 MOUNTING IN A RETMA RACK

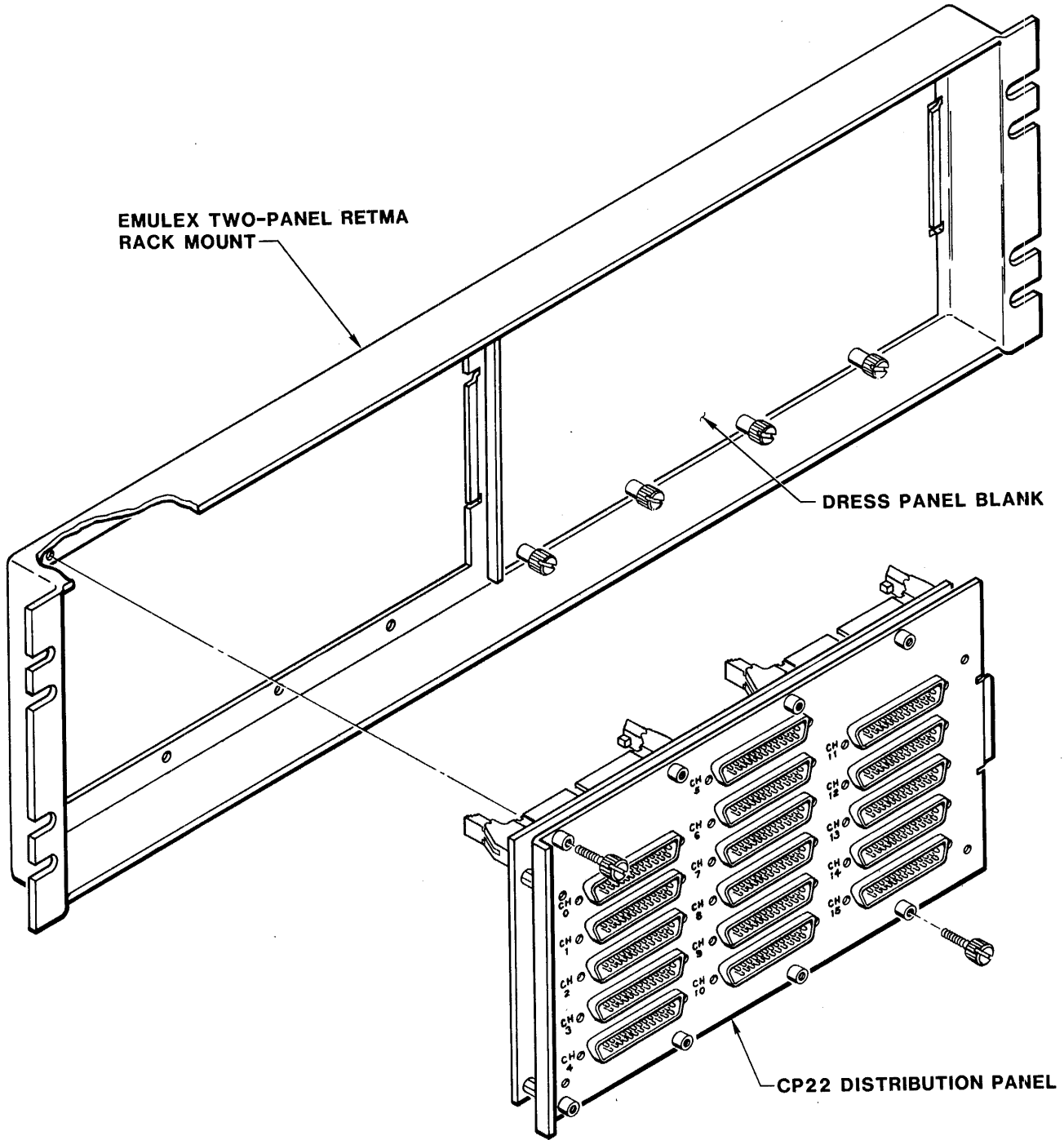
If your CPU does not have a DMF32-compatible rear panel, or if you are mounting the CP22 in a separate cabinet, you may order a rack mount chassis kit that will allow you to mount the distribution panel on the rear RETMA rails of the CPU or an expansion cabinet (as shown in Figure 4-1). The part number for the chassis mount is given in Table 1-3.

#### 4.2.2 CP22 MOUNTING IN A DEC FCC CABINET

When mounted in a hardened DEC FCC cabinet, the panel is designed to replace four of the eight portions of a DEC I/O panel. Figure 4-2 shows the CP22 in a hardened DEC FCC cabinet.

The CP22 is designed to be mounted **within** an I/O panel (a shielded bulkhead type panel). The I/O panel mounts on the rear RETMA rails of the DEC FCC CPU cabinet.

# Cabling the CP22 to the Controller

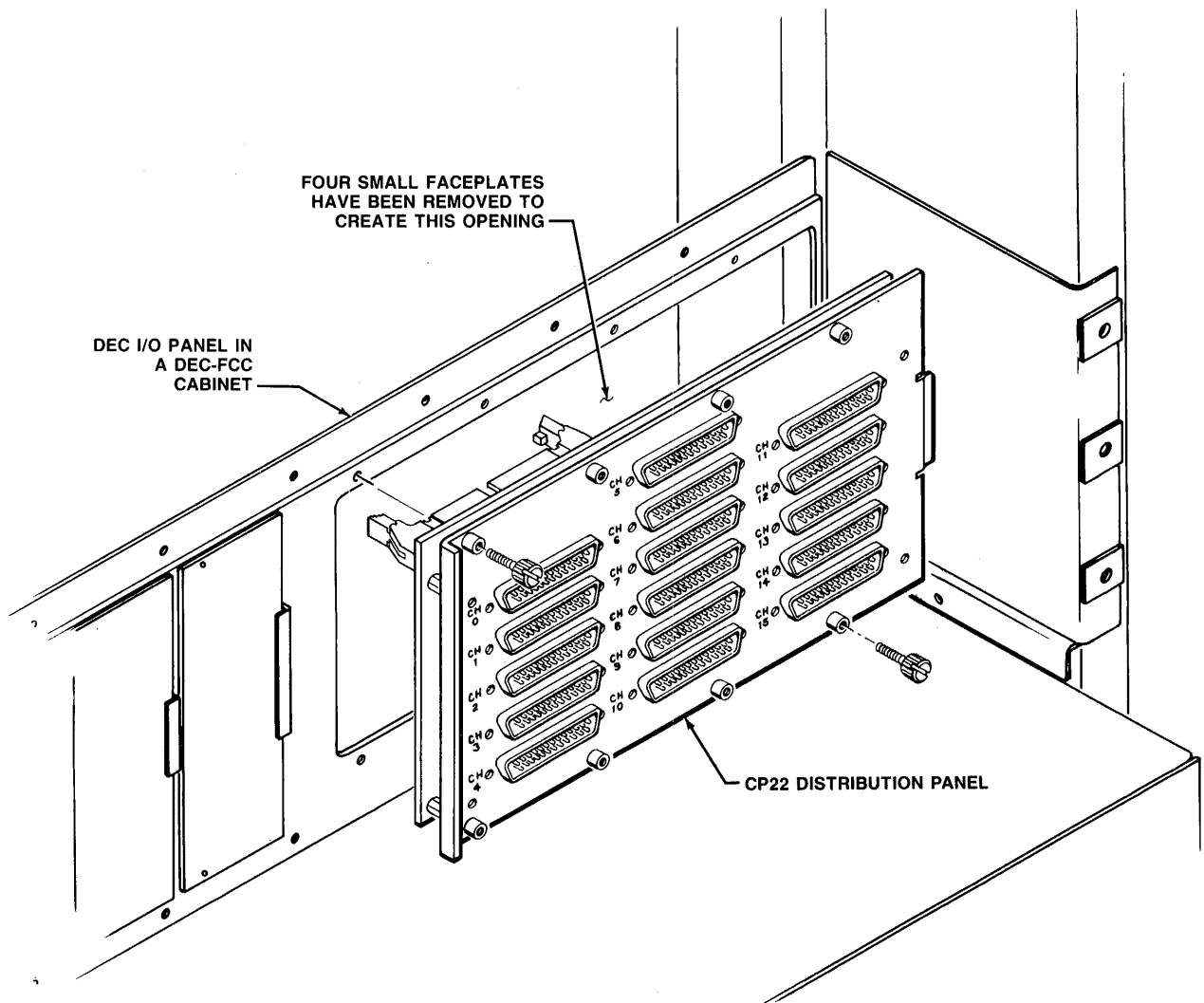


CP2201-0140

Figure 4-1. CP22 Distribution Panel Mounting in Rack-Mount Chassis



# Cabling the CP22 to the Controller



CP2201-0877

Figure 4-2. CP22 Mounting in a DEC FCC Cabinet

## Cabling the CP22 to the Controller

Conducted interference should be prevented by the line filters that are installed by DEC in the CPU cabinets power distribution panel.

The following steps outline the mounting procedure.

1. Choose the location where the CP22 will be mounted.
2. Using a Phillips screwdriver, remove the four blank panels from the I/O panel where the CP22 will be mounted.
3. Align the eight captive thumbscrews with the holes in the I/O panel to properly position the CP22.
4. Tighten the captive thumbscrews.

### 4.3 CABLING THE CP22 TO THE CONTROLLER MODULE

Several different types of cables are required to connect the CP22 to the controller. Subsection 4.3.1 describes cabling from the CP22 to the controller if the CP22 is installed in the same cabinet as the controller. Subsection 4.3.2 describes CP22-to-controller cabling for installation in a separate cabinet. Figure 4-3 shows a simplified diagram of CP22-to-controller cabling for CS02 and CS21 Controllers.

There are three ways in which the CP22 can be cabled to the controller:

1. **CS21 controllers:** Two 50-pin cables are required. One cable runs from J1 on the CP22 to J1 on the controller and the other cable runs from J2 on the CP22 to J2 on the controller. J19 on the CP22 is not used.
2. **CS02 controllers:** Two 50-pin cables and one 16-pin cable are required. One 50-pin cable runs from J1 on the CP22 to J2 on the controller, and the other 50-pin cable runs from J2 on the CP22 to J3 on the controller. The 16-pin cable runs from J19 on the CP22 to J1 on the controller.
3. **CS23 controller:** Two 50-pin cables are required. The CS23 can be used with two distribution panels. Panel #1 connects to J1 and J2 on the controller, while panel #2 connects to J3 and J4 on the controller. Therefore, one cable runs from J1 on the CP22 to either J1 or J3 on the controller, and the other cable runs from J2 on the CP22 to either J2 or J4 on the controller. J19 on the CP22 is not used. See Figure 4-4 for a CS23 cabling illustration.

Tables 4-1 and 4-2 show the list of parts required to run one or two panels with the CC23 Controller.

## Cabling the CP22 to the Controller

Table 4-1 shows a list of the parts needed when one distribution panel is used. Table 4-2 shows a list of the parts needed when two distribution panels are used.

Table 4-1. Parts List for Using One Distribution Panel  
with the CC23 Controller

Qty	Description	Emulex Part Number	Comments
2	Rack Mount Chassis	CU2213002	One in CPU cabinet, one in expansion cabinet
2	I/O Cable Connector Panel	CU3210202	One in each rack mount chassis
4	Extension Cable	CU2111203-04	CC23 to I/O panel (in CPU cabinet), and distribution panel to I/O panel (in expansion cabinet)
2	FCC Shielded Cable	CU2111202	CPU cabinet to expansion cabinet

Table 4-2. Parts List for Using Two Distribution Panels  
with the CC23 Controller

Qty	Description	Emulex Part Number	Comments
3	Rack Mount Chassis	CU2213002	One in CPU cabinet, two in expansion cabinet
4	I/O Cable Connector Panel	CU3210202	Two in rack mount chassis installed in CPU cabinet, one each in the other two rack mount chassis
8	Extension Cable	CU2111203-04	Four from CC23 to I/O panel (in CPU cabinet), four from distribution panels to I/O panel (in expansion cabinet)
4	FCC Shielded Cable	CU2111202	CPU cabinet to expansion cabinet

## Cabling the CP22 to the Controller

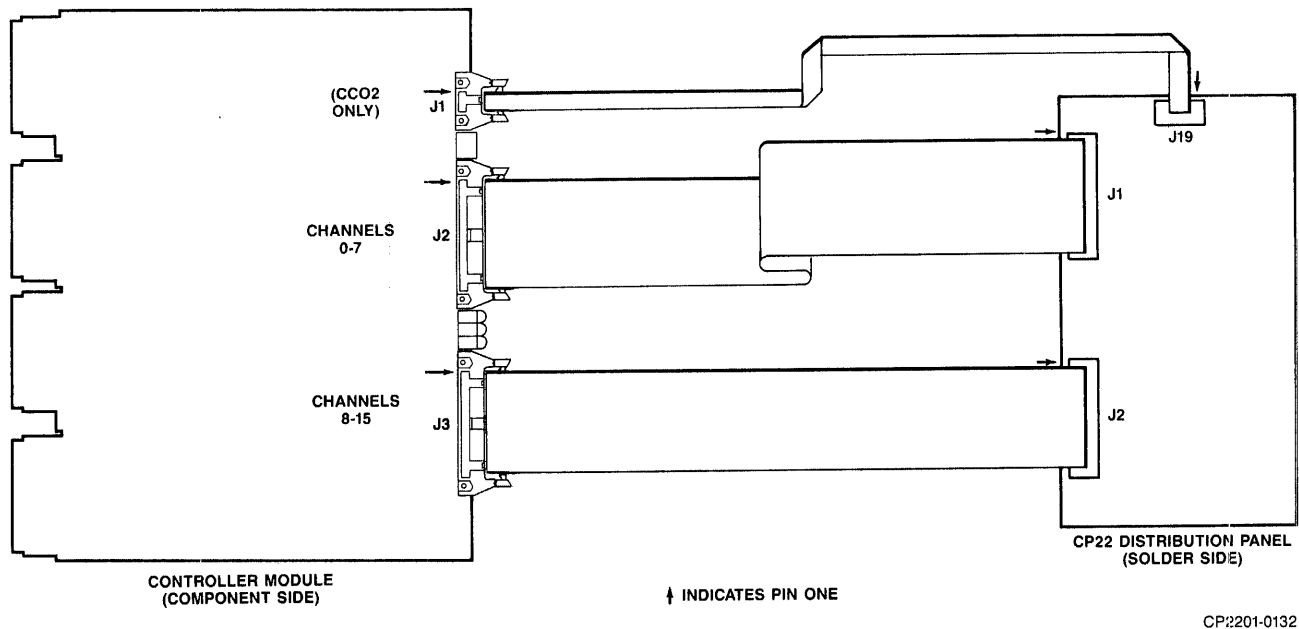


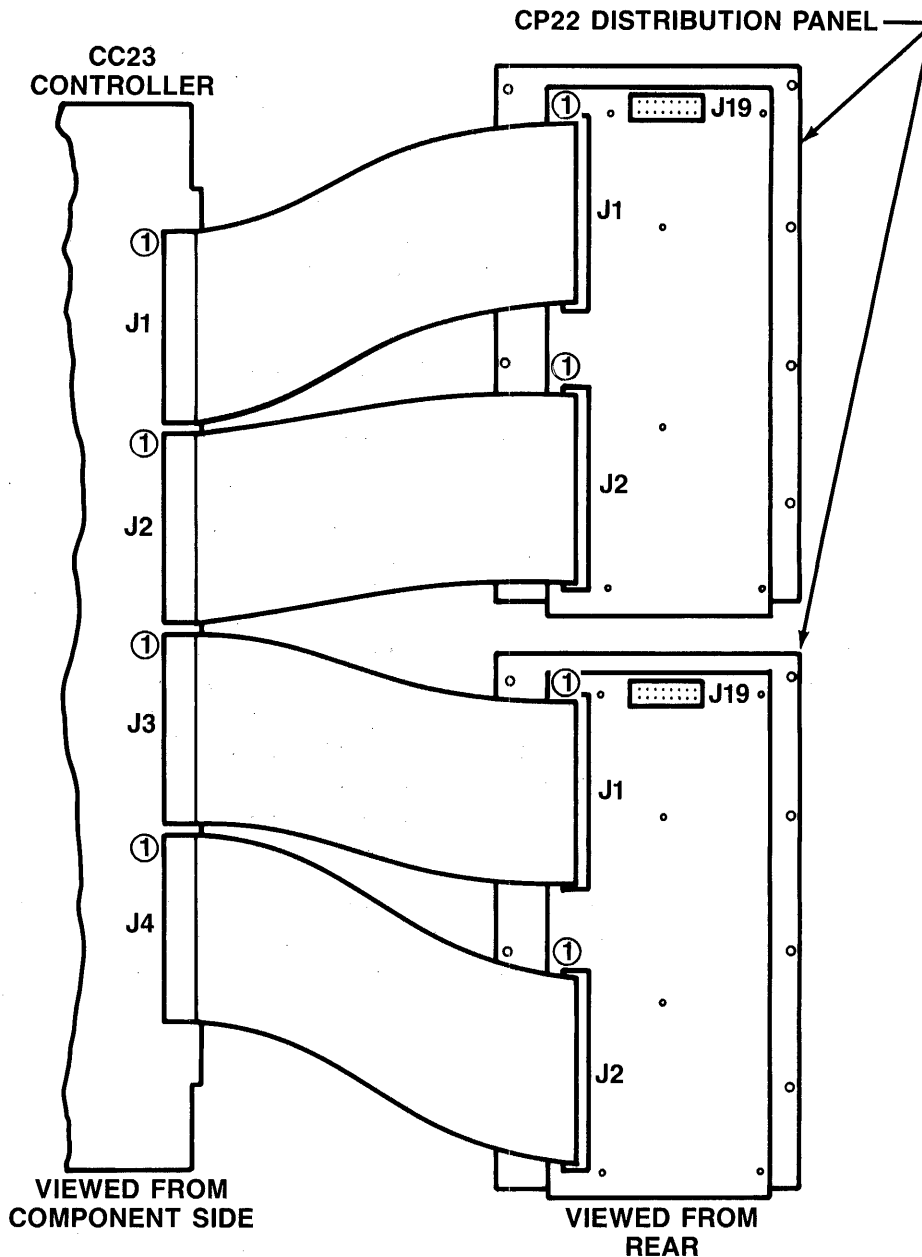
Figure 4-3. CP22 Subsystem Cabling Overview for CS02 and CS21 Controllers

### 4.3.1 CONTROLLER TO CP22 (SAME CABINET)

The flat cables are sold in various lengths, as shown in Item 1 of Table 1-3. The cables are connected as shown in Figure 4-3 and described in the following steps:

1. Find the arrow at either end of one of the cables. The arrow identifies pin 1 of the cable header.
2. Find the corresponding arrow on CP22 connector J1.
3. Align the arrow on the cable header with the arrow on connector J1 and plug the cable connector into J1.

## Cabling the CP22 to the Controller



CP2201-0925

Figure 4-4. CS23 Cabling Diagram

4. With one end of the cable plugged into connector J1 of the CP22, find the arrow on the cable header at the other end of the cable. Align this arrow with the corresponding arrow on connector J1 of the controller (J2 on CS02 controllers, J1 or J3 on CS23 controllers) and plug the connectors together.

## Cabling the CP22 to the Controller

5. In VAX-11/750 systems, the cables come off the board and run in the cable-way on top of the chassis and then through the strain-relief at the back of the chassis.
6. Repeat steps 1 through 4 for cabling between connector J2 on the CP22 and connector J2 on the controller (J3 on CS02 controllers, J2 or J4 on CS23 controllers) with the second cable.
7. On CS02 controllers, align the arrows on the cable headers as described above and connect the 16-pin cable from J19 on the CP22 to J1 on the controller.

### 4.3.2 CONTROLLER TO CP22 (SEPARATE CABINETS)

When it is necessary to run the 50-conductor cables that connect the controller and the CP22 Distribution Panel between two cabinets, the cable must be shielded to prevent excessive RFI. In such cases, each 50-conductor cable is replaced with three separate cables. The first cable is an extension cable which runs from the controller module to the bottom of the CPU cabinet. The second cable is FCC compliant and runs outside the cabinets, connecting the first cable (at the CPU cabinet) to the third (at the expansion cabinet). The third cable is the same as the first, and runs from the end of the second cable to the CP22. The external cable is stripped at each end to expose the shield, which is grounded to the cabinet by an I/O cable connector panel which fits into the rack mount chassis kit. An overview of this installation is shown in Figure 4-5 and part numbers for the cables and mounting hardware are given in Table 1-3.

In summary, to install the CP22 in a separate cabinet you will need four extension cables (item 3 in Table 1-3), two FCC-compliant cables (item 2), two rack mount chassis (item 5), and two I/O cable connector panels (item 6). With the CC23 Controller, since two panels can be used, consult Tables 4-1 and 4-2 for a parts list.

#### NOTE

**CS02/H controllers only:** Emulex does not provide the mounting hardware for an FCC-compliant separate cabinet installation of the CP22 with the CS02/H controller. Installation in a separate cabinet is possible, however, if only the two 50-pin cables are used. Because the 16-pin cable provides the half-duplex modem control signals on CH. 0-3, installation in this manner will eliminate these signals. If they are not necessary, cabling in a separate cabinet may be done as described below.

## Cabling the CP22 to the Controller.

The 50-conductor cables that connect the controller to the CP22 run from J1 on the CP22 to J1 on the controller (J2 on the CS02 controller; J1 or J3 on the CS23 controller) and from J2 on the CP22 to J2 on the controller (J3 on the CS02 controller; J2 or J4 on the CS23 controller). The cables are connected as shown in Figure 4-5 and described below.

1. Select two extension cables to run from the controller to the proposed location of the I/O cable connector panel in the CPU cabinet.
2. Find the arrows molded into the female headers of the cables. The arrows identify pin 1 of the cable headers.
3. Find the corresponding arrows on the controller connectors.
4. Align the arrows on the cable headers with the arrows on the controller connectors and plug the cables into the connectors.
5. Select two extension cables to run from the distribution panel to the proposed location of the I/O cable connector panel in the expansion cabinet.
6. Find the arrows molded into the female headers of the cables. The arrows identify pin 1 of the cable headers.
7. Find the corresponding arrows on the distribution panel connectors.
8. Align the arrows on the cable headers with the arrows on the distribution panel connectors and plug the cables into the connectors.
9. Install the rack mount chassis kits in the CPU and expansion cabinet racks. Make sure that no gap is left between the rack mount chassis and the bulkhead above it or below it. Remove the blank dress panel and pull the extension cables from both the controller and the panel through the rack mount chassis.
10. Select two shielded cables of appropriate length and route them between the two cabinets.
11. Route the cables through the I/O cable connector panels and clamp the exposed shielding securely in the I/O cable connector panel. Repeat this process at the other end of the cables.
12. Find the arrows molded into the female headers of the shielded cables at the CPU end.

## Cabling the CP22 to the Controller

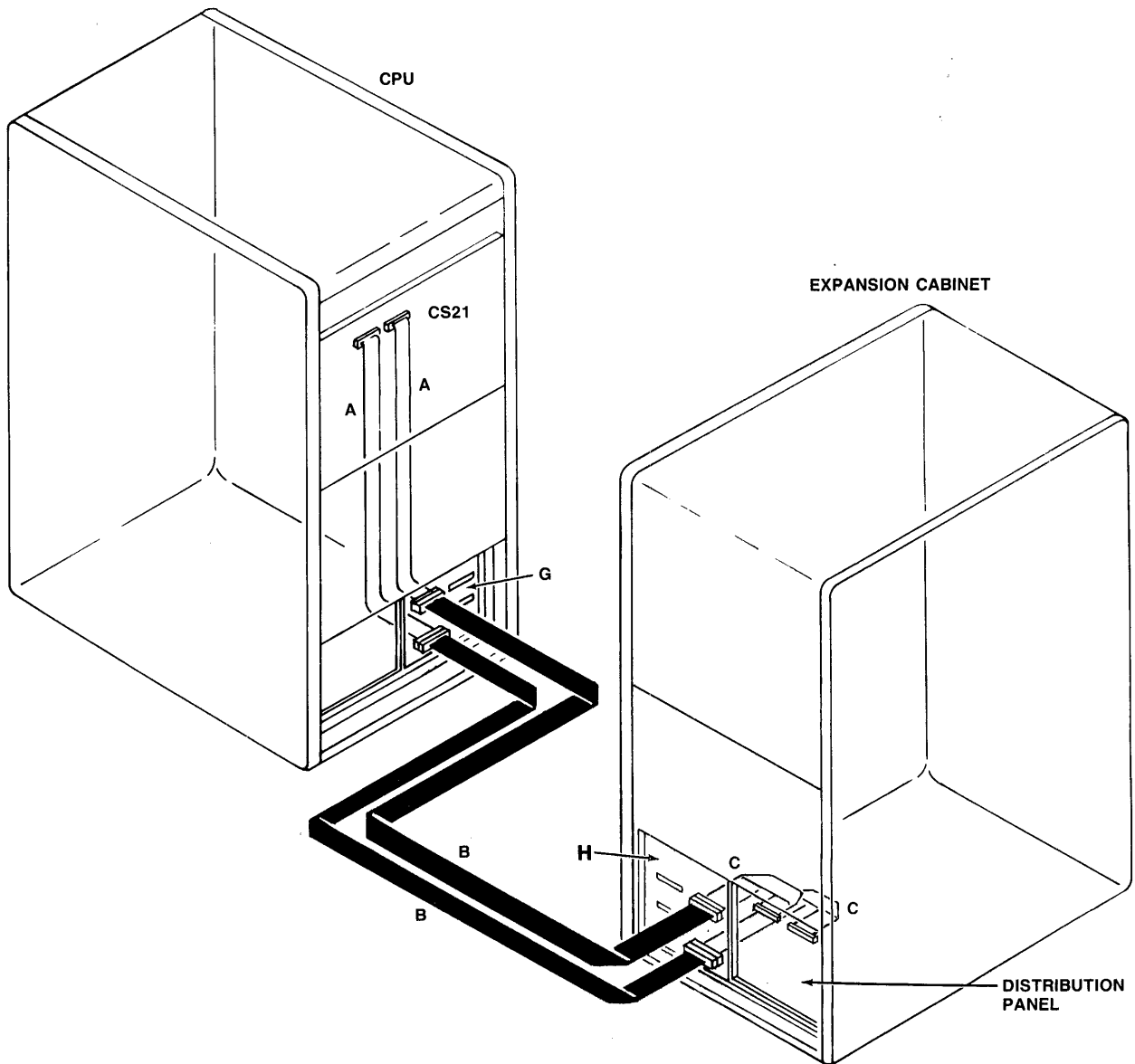
13. Find the corresponding arrows on the loose ends of the extension cables. Align the arrows and plug the cables together. Repeat this process at the expansion cabinet end of the cable. Be sure that J1 on the CP22 is mated to J1 on the controller (J2 on CS02 controllers; J1 or J3 on CS23 controllers) and J2 on the CP22 to J2 on the controller (J3 on CS02 controllers; J2 or J4 on CS23 controllers).
14. At the CPU cabinet, insert the I/O cable connector panel in its place and finger-tighten the eight captive screws. Repeat at the expansion cabinet.



## Cabling the CP22 to the Controller

The letters in Figure 4-5 denote the following equipment:

- A The extension cable inside the cabinet with the CPU
- B The external cable
- C The extension cable inside the expansion cabinet
- G The I/O cable connector panel mounted in the rack mount chassis, installed in the cabinet with the CPU
- H The I/O cable connector panel mounted in the rack mount chassis, installed in the expansion cabinet



CP2201-0463

Figure 4-5. Separate Cabinet Installation

## Cabling the CP22 to the Controller

### 4.4 ATTACHING EXTERNAL DEVICES TO THE CP22 DISTRIBUTION PANEL

The following sections describe the types of cables required to connect various user-supplied devices, such as terminals, printers, and modems, to the CP22 Distribution Panel.

#### 4.4.1 MODEMS

Modems require cables that can carry the modem control signals. Figure 4-6 shows a schematic of a modem cable.

#### 4.4.2 TERMINALS AND PRINTERS

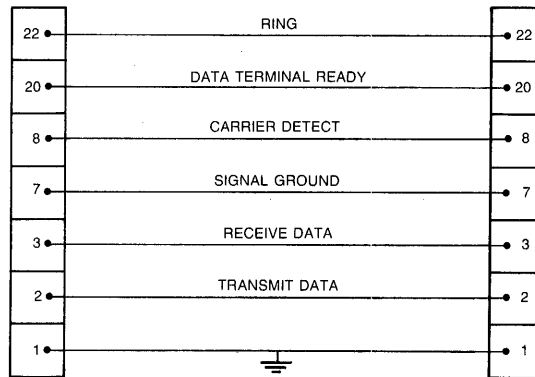
Devices such as terminals and printers which do not require modem control signals for flow control can be connected to a CP22 port using a simple four-wire cable called a terminal cable. Figure 4-7 shows a schematic of a terminal cable.

The controller module hardware is unable to make the distinction between ports that are not connected to modems and ports that are. Thus, the host operating system must be configured for modem or modemless operation on a line-by-line basis. If this is impractical because modems are constantly being moved from one line to another, then the host can be configured for modems on all lines. However, in such cases, the four-wire cable described for local devices will not work because the software will expect to receive modem control signals and will not transmit data until the proper signals are received. Nearly all terminals keep DTR and RTS asserted at all times, and a null-modem cable these constant signals to drive various inputs on the CP22. This gives the illusion that a modem has generated these signals, and the software will feel free to transmit at any time. Figure 4-8 shows a null-modem cable for full-duplex operation. Figure 4-9 shows a null-modem cable for use on channels configured for half-duplex operation. A null-modem cable must be used whenever a device that is normally in the non-modem class is connected to a channel that has been configured for modem operation.

#### 4.4.3 RS-423-A CABLING

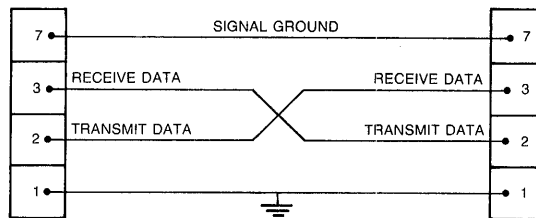
Channels 0 through 3 can be configured as an RS-423-A interface (as described in subsection 3.2.2). The RS-423-A standard allows much greater distances and higher transmission speeds on received inputs. For practical purposes, cable lengths up to 4000 feet can be used with data rates as high as 100,000 baud. (Note, however, that the maximum transmission speed may be restricted by the controller.) The cabling schematic in Figure 4-10 shows how to cable an RS-423-A compatible device to the CP22. A standard RS-232-C configuration is used for the transmission of data.

# Cabling the CP22 to the Controller



CP2201-0464

Figure 4-6. Modem Cable



CP2201-0466

Figure 4-7. Terminal Cable

# Cabling the CP22 to the Controller

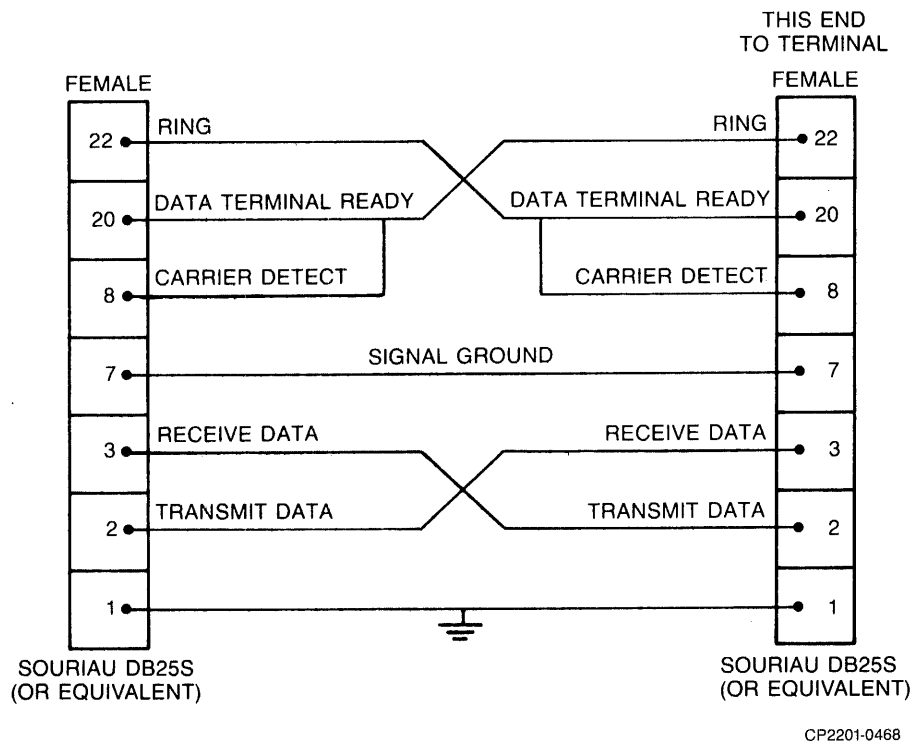


Figure 4-8. Full-Duplex Null-Modem Cable

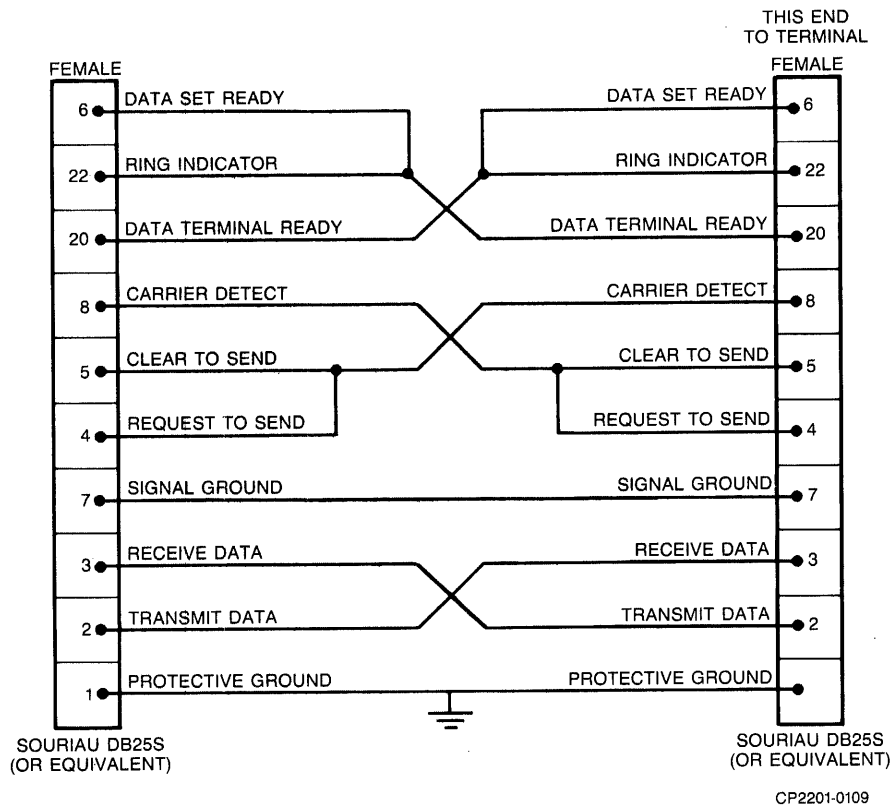
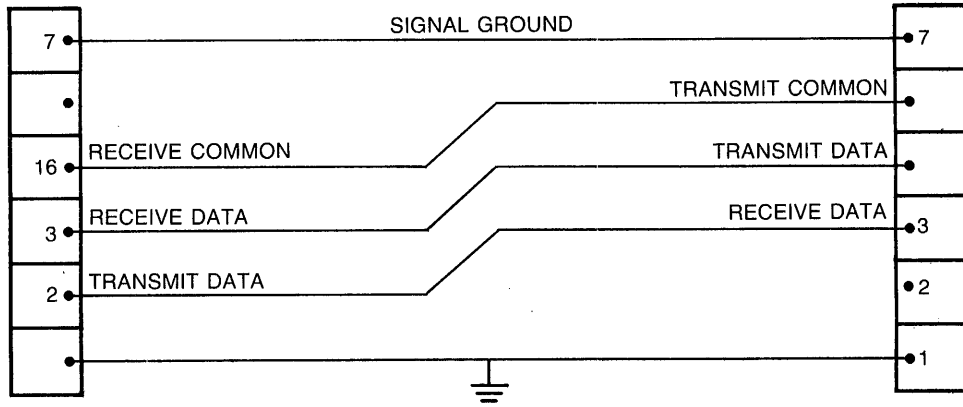


Figure 4-9. Half-Duplex Null-Modem Cable

# Cabling the CP22 to the Controller



CP2201-0472

Figure 4-10. Terminal Cable with RS-423-A

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