



HP DTC Cabling and Racking Guide

June 1993

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Overview

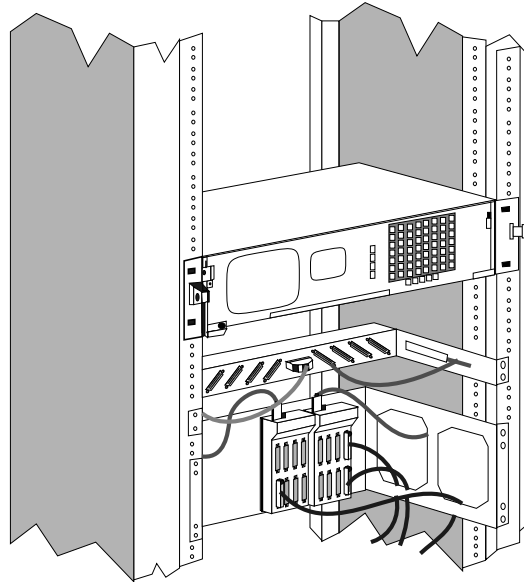
Use this section if you have not ordered the DTC 16xx or the DTC 72MX with the RJ45 19" Distribution Panel as a factory-racked product (product numbers J2062AZ or J2070AZ).

Chapter 1 of the HP DTC Cabling and Racking Guide includes information about HP computer racks and describes how to rack the DTC 72MX and the DTC 16xx family, which includes the DTC 16TN, DTC 16iX and DTC 16MX.

It also shows how to rack the connection kits, including the 8-port Modem Distribution Panel, the 8-port Direct Distribution Panel and the 24-port RJ45 Distribution panel.

1 DTC 72MX with example connections

DTC 72MX with example connections



This figure shows a DTC 72MX mounted in a system rack, with distribution panels for multiple connections to modems and asynchronous devices.

The front panel of the DTC 72MX has been removed.

HP System Racks

The HP System Racks conform to the IEC and EIA standards for 19" (482.6 mm) racks. Any HP, or non-HP, equipment that conforms to these standards can be installed in one of these racks.

The 1.1 meter and 1.6 meter system racks are measured in EIA (Electronic Industries Association) units. One EIA unit equals 44.45 mm (1.75 inches). The 1.1 meter rack provides 21 EIA units of usable rack height and the 1.6 meter rack provides 32 EIA units of rack space. All racks are 905 mm deep with 851 mm of usable depth.

When ordering a stand-alone computer rack, order rack-mount kits for each component that you plan to install in the rack. You may also need to order filler panels for the empty space remaining in the computer rack.

The 1.1 meter stand-alone computer rack comes with 3 filler panels and the 1.6 meter stand-alone computer rack comes with 2 filler panels.

When ordering a stand-alone computer rack, you have options for 120 V to 240 V power distribution in North America and 230 V in Europe.

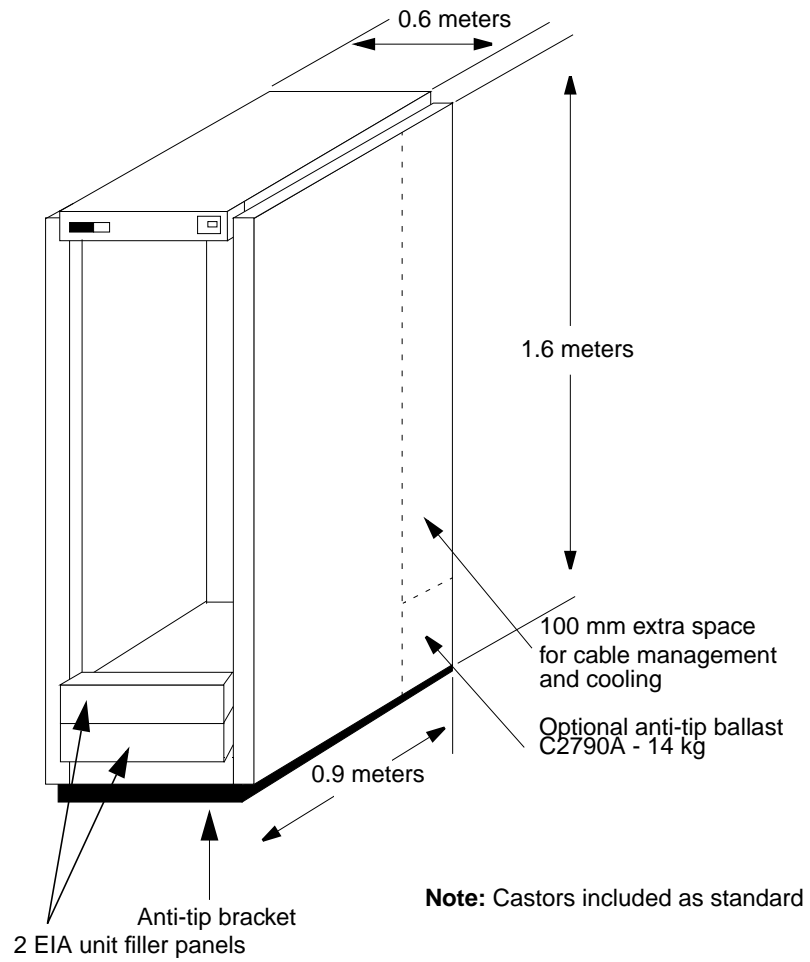
The 240 V option is recommended in the US for the 1.6 meter computer rack to prevent current overloads. This is based on the common 20 amp limit of most US building codes. Equipment uses half the current at 240 V that it would use at 120 V, so a 240 V Power Distribution Unit (PDU) allows more equipment to be run off a single PDU and off a single wiring circuit in your building.

European computer racks all have 230 V power distribution units.

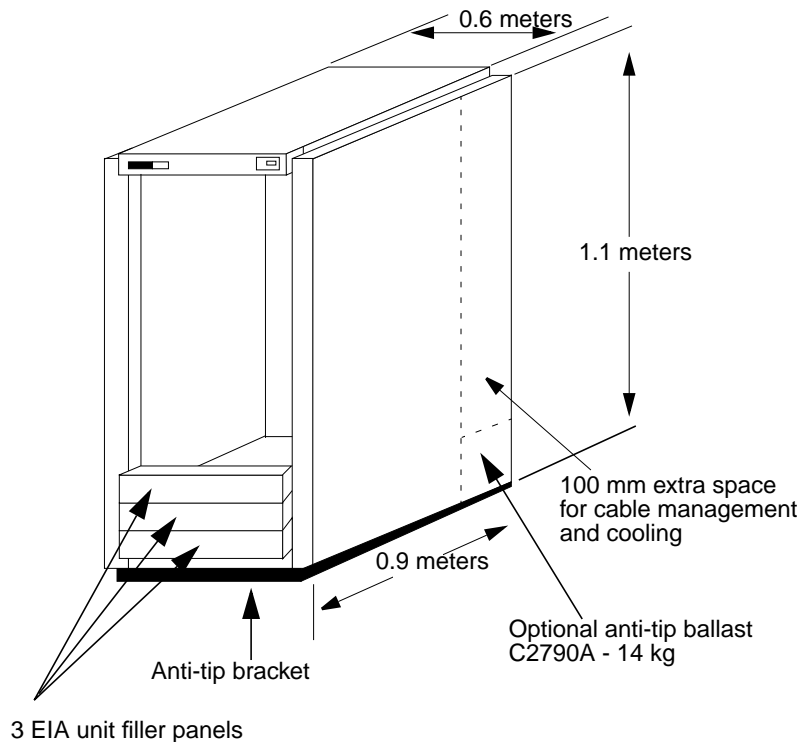
Users in Asia Pacific and South America should order the power option appropriate for the power supply in their country.

2 1.6 meter System Rack (HP C2786A)

1.6 meter System Rack (HP C2786A)



1.1 meter System Rack (HP C2785A)



Note: Castors included as standard

The 1.6 meter system rack incorporates a ventilation path through the top cover. This enables removal of system-generated heat through natural convection. For greater heat dissipation, an optional extractor fan unit is available. The unit mounts in the top of the rack. The standard 1.1 meter rack is provided with a non-vented top (unless the extractor fan option is specified).

A vented rear door is standard. A lockable latch is provided to prevent unauthorized removal of system components. The rear door is symmetrical, so that it can be mounted to open from left or right.

2 Guidelines for Racking Systems

The vertical mounting columns have a slot feature to help position and secure support rails. This makes installation of rails easier as they do not have to be held in position when they are bolted to a vertical column. It also ensures that rails can only be located in proper EIA unit increments. Straight-through mounting holes are provided on vertical columns for use in conjunction with sheet metal nuts. Either standard or metric mounting hardware can be used.

Guidelines for Racking Systems

These guidelines should be considered when racking systems. Following these guidelines will allow for the safest and most thermally-efficient configurations possible.

DTC Racking Order

DTC units should be racked from the top of the system rack. This racking order allows the distribution panels to be racked at the bottom. When cables are attached to the distribution panels, they become the heaviest components in the system rack. By racking the distribution panels at the bottom of the system rack, the center of gravity remains low, minimizing risk.

Cooling Efficiency

For maximum cooling and optimum rack thermal efficiency, place the products with the greatest power output towards the top of the racked components. This promotes efficient cooling since heat generated by components rises. When placed nearer the top, high power output components will not unnecessarily heat other components.

Rails

Rails are used to install equipment in the rack. Rails sit in rectangular slots so that screws can be inserted easily. There are four rail kits available for the HP system racks. These rails can accommodate almost any kind of system unit that you will install into the rack.

System Rack Product Numbers

HP 1.1 meter system rack - C2785A

HP 1.6 meter system rack - C2786A

2 Guidelines for Racking Systems

Rail Types	Description	Product Number
Computer	Used with all HP computers and peripherals	C2788A
Non-HP	Used with equipment conforming to EIA spec	E3664A
System II	Used with HP System II instruments	E3663A
VXI	Used with HP VXI mainframe equipment	E3665A

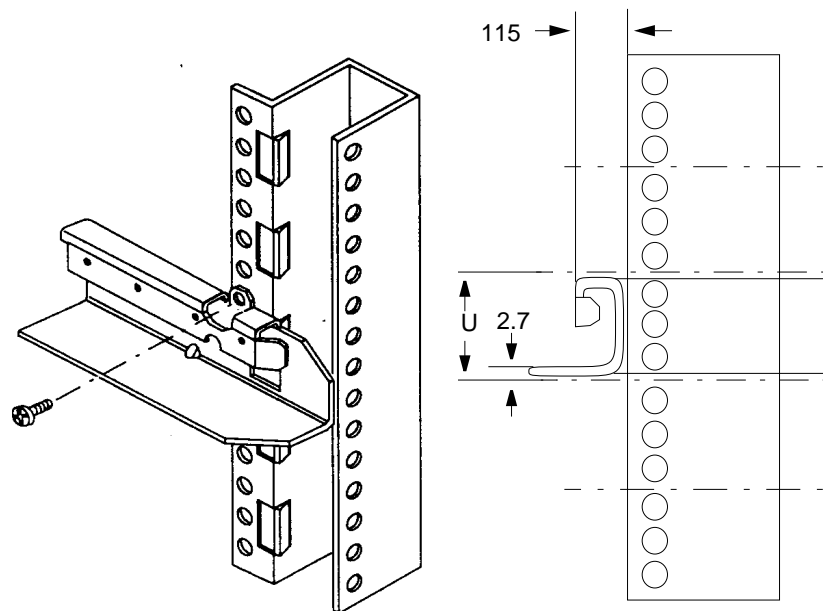
Note

Refer to the *Instrument Rack User's Guide* (part number *E3660-90001*) for further information about HP racks.

Racking Considerations and Methods

Guidelines for populating a Rack

One EIA unit is equal to 44.45mm of vertical height in a rack. The envelope boundary marks this limit. Align the lower edge of a racked unit to coincide with an envelope boundary mark.

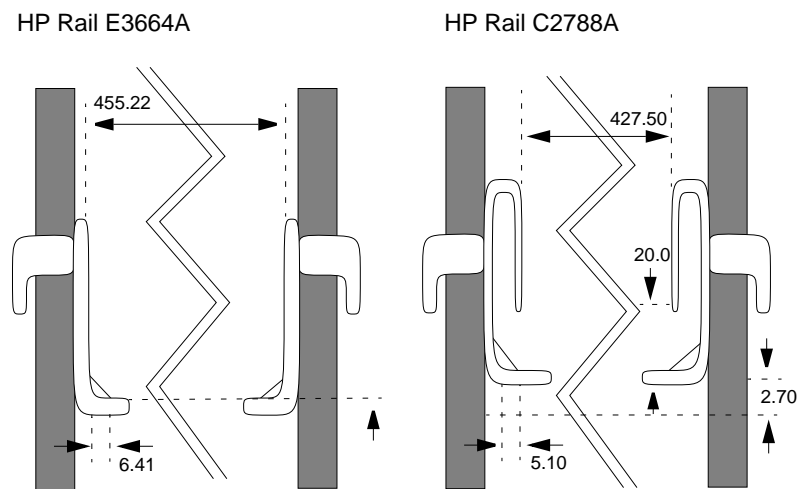


3 Guidelines for populating a Rack

To accommodate slight variations in height and width of rackable devices, different types of rails are available. Some rails allow devices which do not use a complete EIA unit, to be centered within an EIA unit envelope boundary.

The DTC 72MX should be racked with rail type C2788A. The DTC 16xx family should be racked with rail type E3664A.

These rail types are shown below:

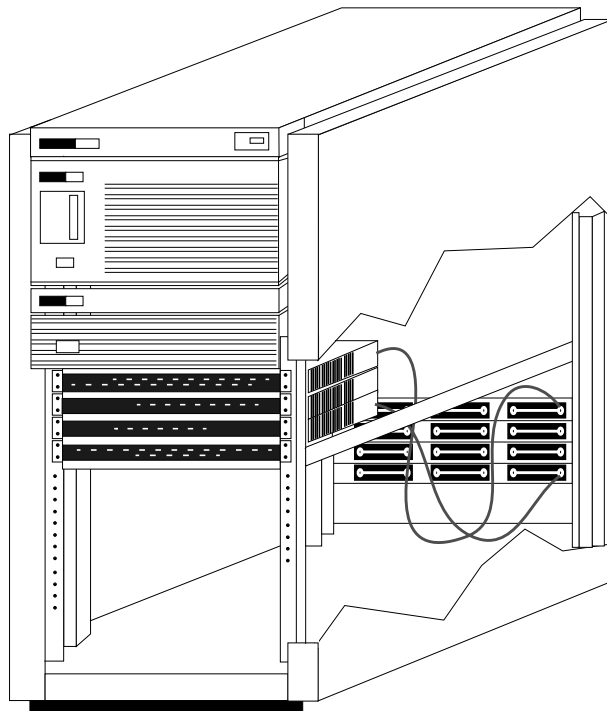


Populating a Rack

The maximum number of DTC 72MX in a 1.6 m rack is 4

The maximum number of DTC 72MX in a 1.1 m rack is 2

HP recommends that members of the DTC 16xx family be racked as illustrated below; rails are recommended for the lowest racked DTC.



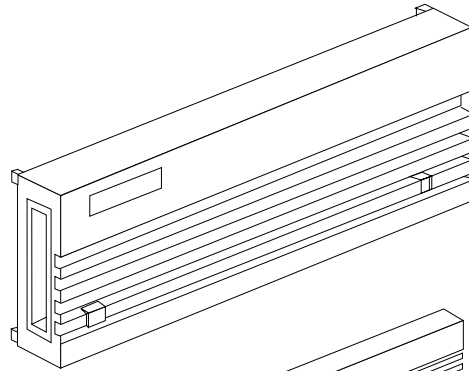
3 Guidelines for populating a Rack

Racking DTC Units and Connection Kits

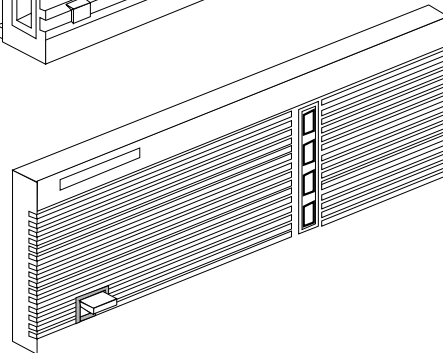
This chapter explains how to install the DTC 16xx family and DTC 72MX in an HP system rack, together with how to install DTC distribution panels.

The DTC 72MX cannot be racked in non-HP racks with the system rack front panel. For this reason, you will find instructions in this chapter for racking the DTC 72MX with the desktop front panel. To aid identification, these different front panels are illustrated below:

DTC 72MX System
Rack Front Panel



DTC 72MX Desktop
Front Panel



4 Racking a DTC 72MX with a system rack front panel

Racking a DTC 72MX with a system rack front panel

The DTC 72MX can be racked in standard 19" EIA racks, including HP system racks. Each DTC 72MX occupies three EIA units. (DDPs and MDPs will occupy additional EIA units).

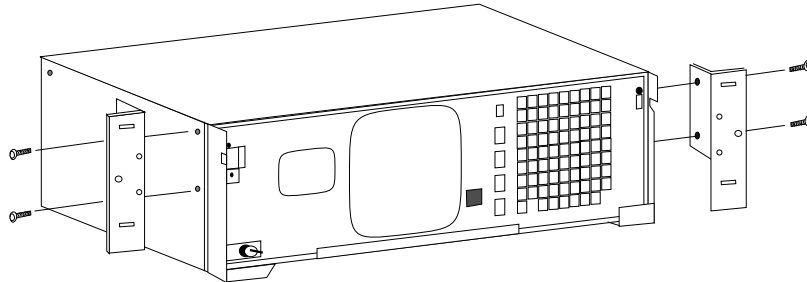
The DTC 72MX is delivered with brackets attached for mounting in a rack. The system rack front panel fits onto the "snaps" attached to these brackets.

To simplify cable management, the DTC 72MX should be racked at the front of the system rack, with the front facing outwards. This also ensures that you can see the diagnostic LED displays on the front of the DTC when you need to test the DTC or interpret faults.

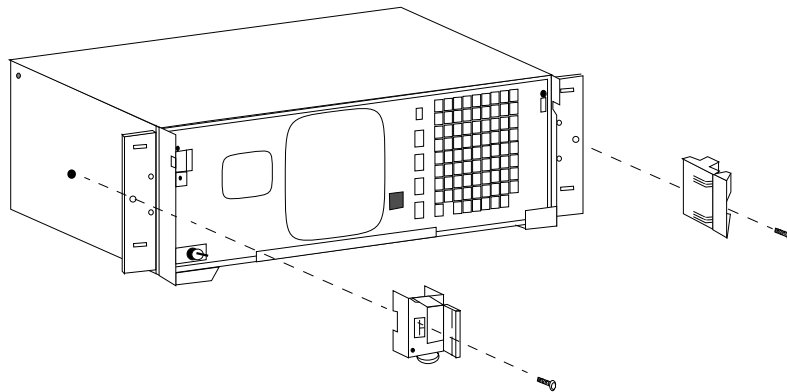
Note

If you want to rack your DTC 72MX in an HP cabinet, you must use the HP C2788A rail kit.

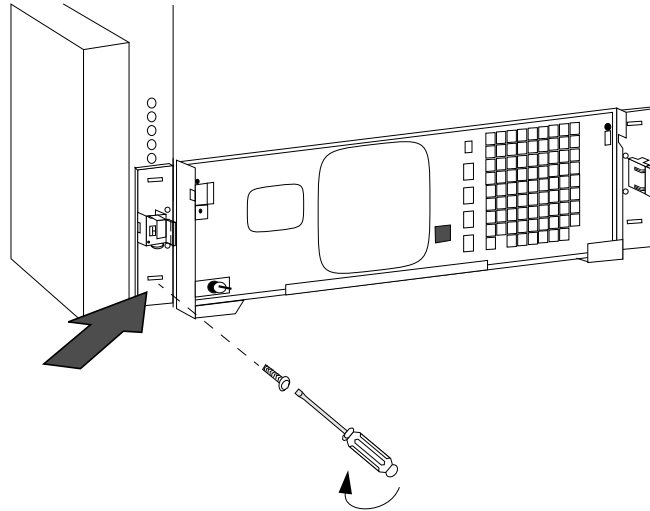
- 1 Mount the side brackets on the DTC (if they are not already attached).



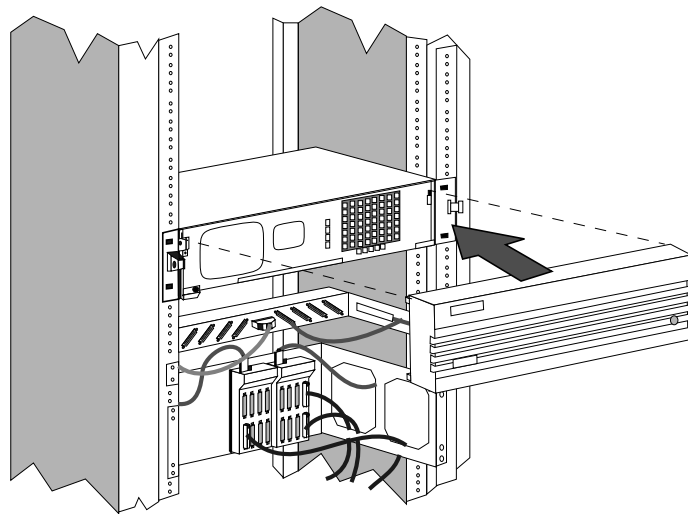
- 2 Attach the front-panel snaps to the brackets.



- 3 Slide the DTC into the rack, along the previously installed rails. Fix the brackets on the DTC to the rack using four screws from your rack assembly kit.



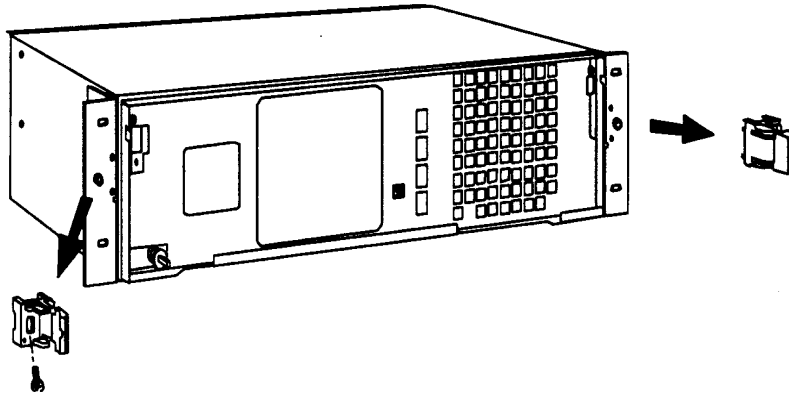
- 4 Push the system rack front panel into place. The snaps are attached to the brackets.



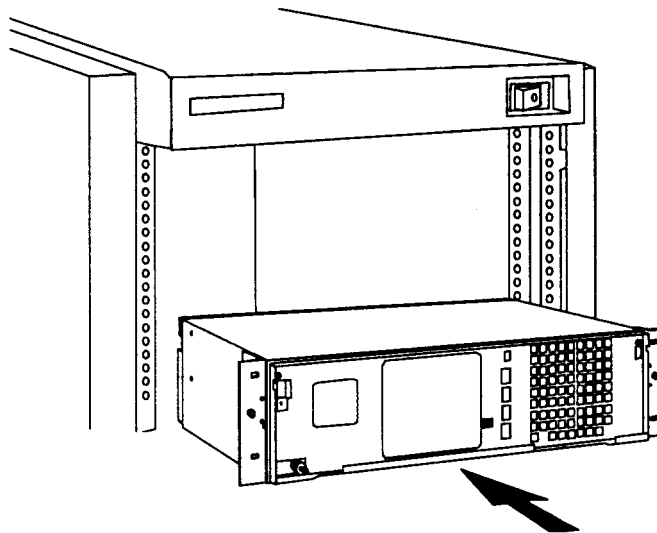
4 Racking a DTC 72MX with a desktop front panel

Racking a DTC 72MX with a desktop front panel

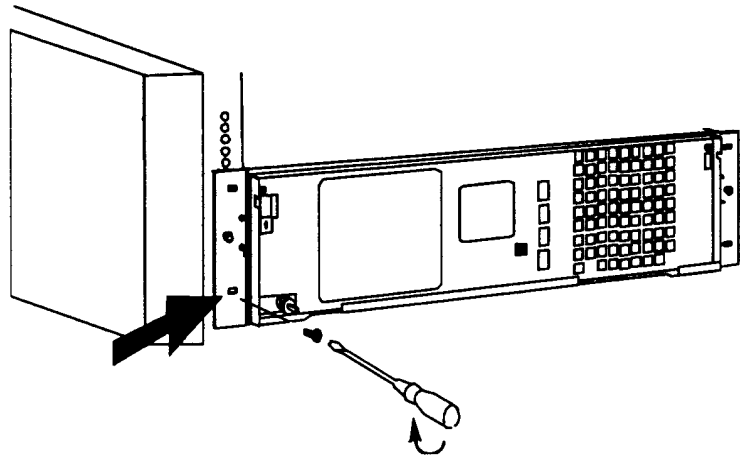
- 1 Remove the front panel and unscrew the plastic snaps from the side brackets.



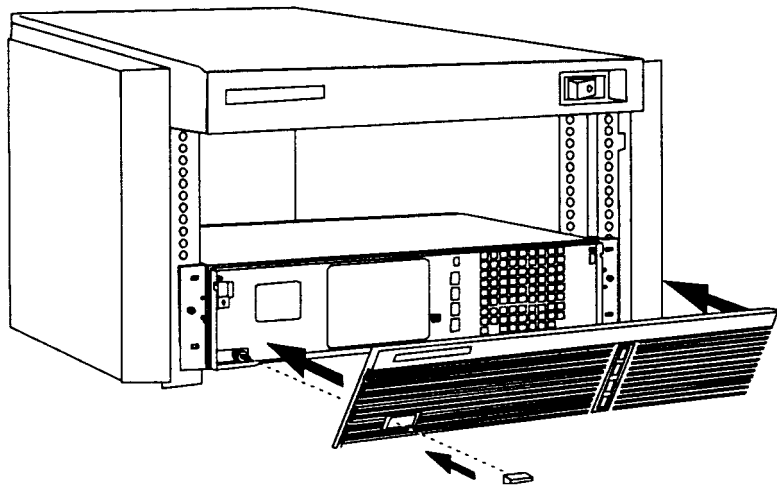
- 2 Slide the DTC into the rack, along the previously installed rails.



- 3 Screw the side brackets to the rack using four screws and washers supplied with your mounting kit.



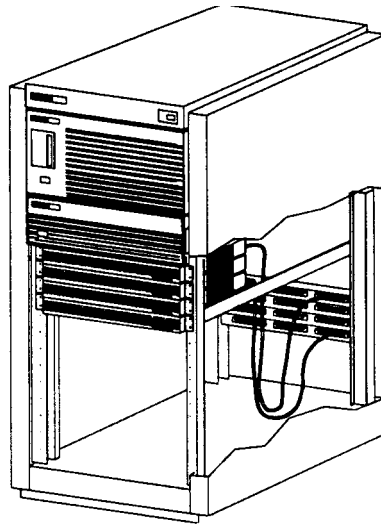
- 4 The desktop panel is attached by slotting it into the lower edge of the DTC and pushing it in at the top. Put the power button from the accessories kit in place. Push it onto the power switch through the DTC front panel.



4 Racking the DTC 16xx family

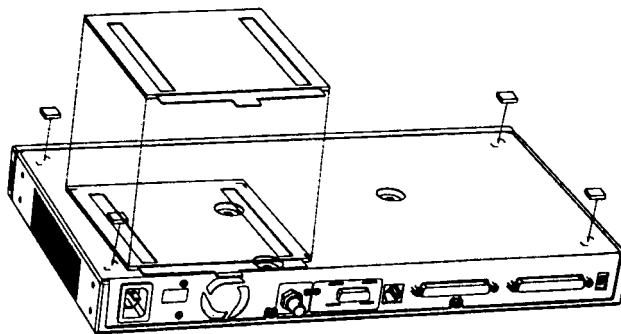
Racking the DTC 16xx family

Included with your DTC is an accessories kit which contains the parts necessary for mounting the DTC 16xx in a rack. HP recommends that members of the DTC 16xx family are racked as illustrated below. Each DTC 16xx occupies one EIA unit. (DDPs and MDPs will occupy additional EIA units.)



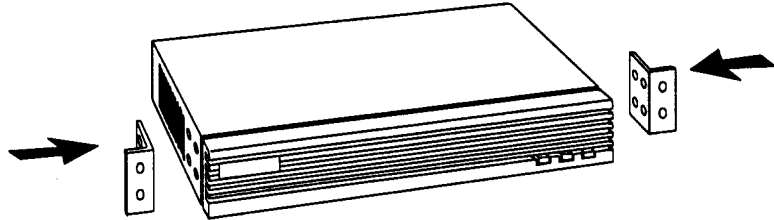
Note

If your DTC 16xx is not to be installed in a rack, attach the four rubber feet and the display code label to the underside of your DTC 16xx as shown below.

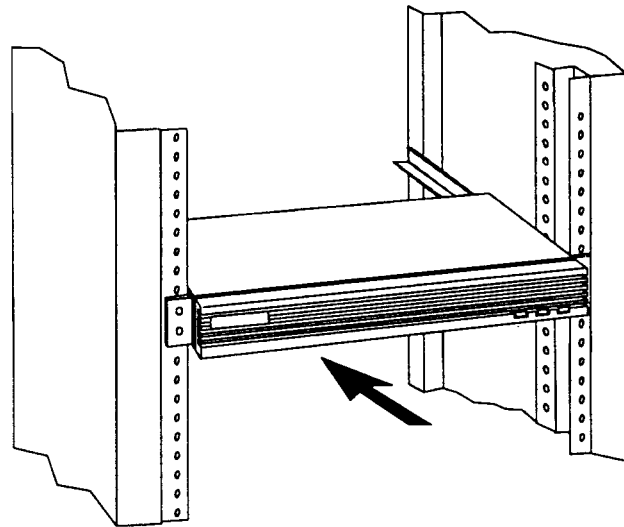


Mount the DTC 16xx at the front of a rack with the front panel facing out.

- 1 Use the four small cross-head screws supplied to fix the two brackets onto the sides of the DTC.



- 2 Slide the DTC 16xx into the rack along the previously installed rails. Use the screws supplied with the rack mounting kit to fix the side (accessories kit) in a visible position inside the rack.

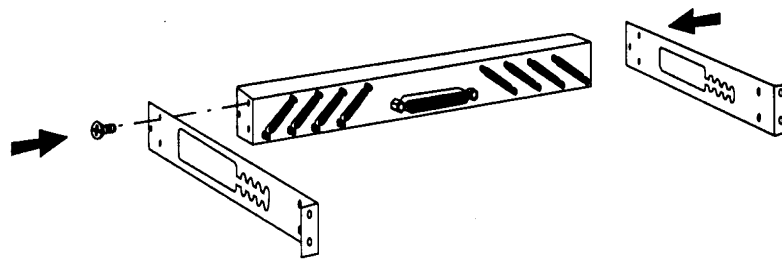


4 Racking the Direct Distribution Panel 8-port DDP HP J2085A #102

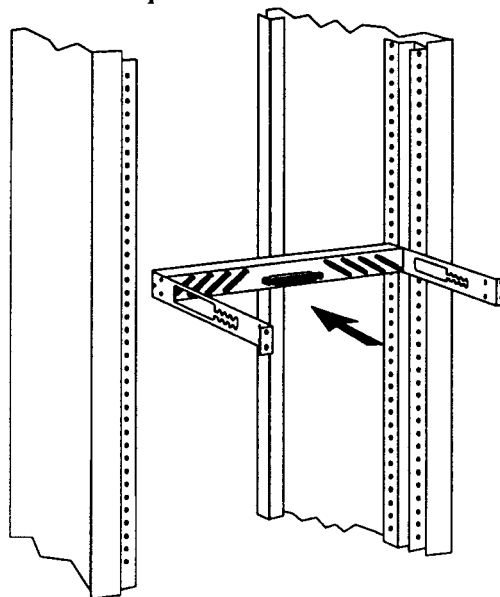
Racking the Direct Distribution Panel 8-port DDP HP J2085A #102

This product is supplied with brackets, and screws, for attaching the panel to the brackets. Use the screws from your rack kit to attach the panel to the rack.

- 1 Attach the DDP to the side brackets, with the screws supplied, as shown below.



- 2 Use four screws from your rack kit to fix the brackets to the first column of the rack (as illustrated). Fix the brackets to the second column if a filler panel is to be attached.



- 3 To connect the cables: push each device cable connector through the large slot in the bracket. Secure the connector to a port on the DDP. Position the cable in one of the circular holes in the bracket to support and protect the connection.

Note

This task is easier if you remove the side panel from your system rack. Re-fit the panel after connecting your cables.

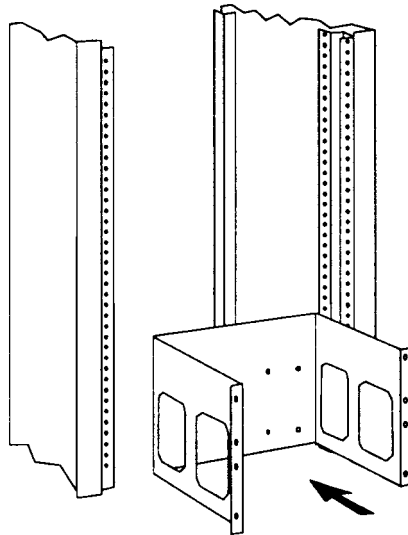
4 Racking the Modem Distribution Panel HP J2085 #101

Racking the Modem Distribution Panel HP J2085 #101

Front Mounting

Accessories are available for mounting MDPs in the system rack. Illustrated below is product HP J2084A, which uses 7 EIA units. It is a metal mounting panel, with a filler panel, which enables front mounting of up to five Modem Distribution Panels in the system rack. An alternative product, HP J2087A, enables front or rear mounting of up to 5MDPs (with no filler panel).

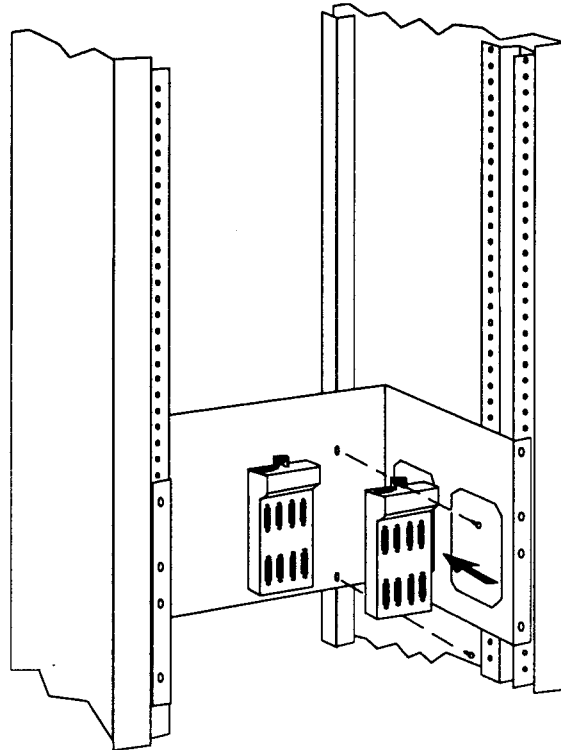
- 1 Attach the mounting panel to the rack using 4 screws from your rack kit.



Note

The panel is correctly oriented when the cable-access slots are towards the bottom of the panel.

- 2 Fix the MDP to the mounting panel by screws at top and bottom. There are mounting holes in the MDP, and on the mounting panel. You will need 2 screws metric size M4, 10mm long, for the MDP.



- 3 To connect cables, pull the device cables up through the cable-access slots in the mounting panel and connect them to ports on the MDP. This supports and protects your cable connections.
- 4 Fix the frame supplied with the HP J2084A mounting kit to the mounting panel with the screws supplied. The front panel clips onto this frame.

Note

This task is easier if you remove the side panel from your system rack. Re-fit the panel after connecting your cables.

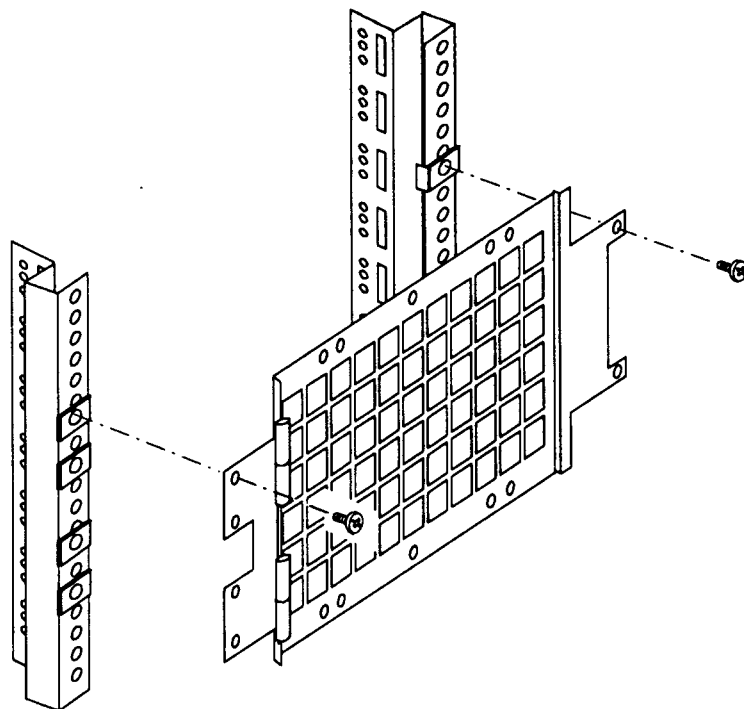
4 Racking the Modem Distribution Panel HP J2085 #101

Rear Mounting MDP Units

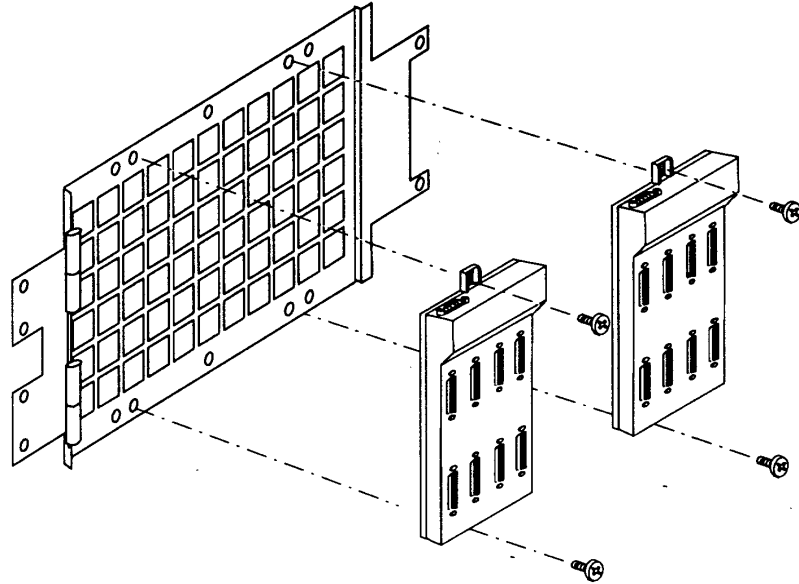
A mounting bracket is available for rear mounting MDPs in an HP system rack. This is product HP C2792A. The mounting bracket and hinge attach to the rear columns of the rack, occupying 6EIA units. Depending upon which rear column the hinge is fixed to, it can be installed to swing open to the left or to the right.

The mounting bracket can accommodate up to five MDP units (three on the inner side and two on the outer side of the bracket).

- 1 Determine the position in the rack for the mounting kit to be installed. Install the mounting kit as low as possible in the rack.
- 2 Fix the six tinnerman nuts onto the rear columns of the rack. Use the mounting hinge and mounting bracket as a template to determine which holes to use.



- 3 Install the mounting hinge using four screws.
- 4 Attach each MDP to the bracket using two of the 8mm long screws provided.

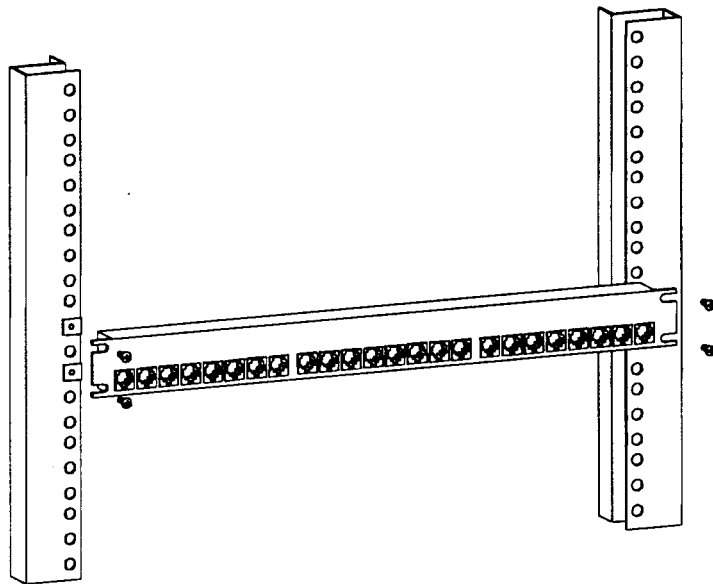


4 Racking the 24-port RJ45 Direct Distribution Panel HP J2085A #103 and the 16-port RJ45 DDP HP J2085A #105

Racking the 24-port RJ45 Direct Distribution Panel HP J2085A #103 and the 16-port RJ45 DDP HP J2085A #105

For safety, and to ensure the integrity of connections to the RJ45 DDP, the panel should be attached to the rear columns of the system rack.

Use four screws from your HP rack kit to fix the panel to the rack.



This illustration shows the 24-port RJ45 DDP. HP numbers the ports from 0-23 on the 24-port RJ45 DDP and from 0-15 on the 16-port RJ45 DDP. A label and label-holder are provided to affix to RJ45 DDPs that number the ports from 1-24 or from 1-16.

The nuts and screws needed to attach the DDP are dependent upon the type of system rack. They are not provided with the DDP.

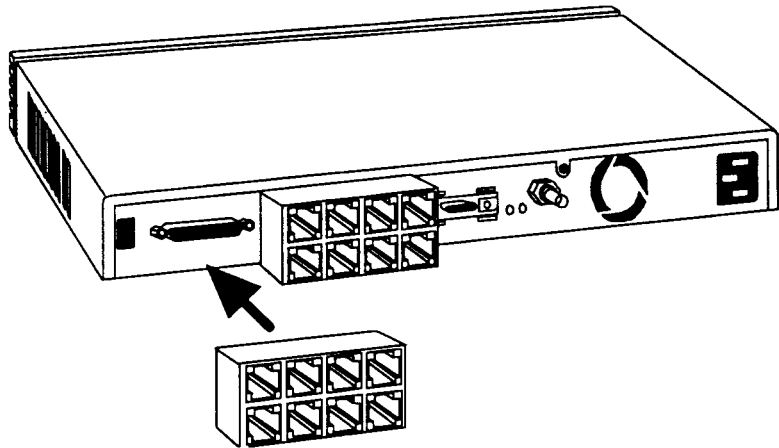
Note

Do not rack a DDP on the same level as a DTC 72MX or DTC 16xx, as doing so will restrict access to the rear of the DTC unit.

Attaching an 8-port RJ45 break-out panel to a desktop DTC 16xx

An 8-port RJ45 break-out panel is available for direct connections to the DTC 16xx. This break-out panel is recommended for desktop configurations only.

Two 8-port RJ45 break-out panels are supplied with the DTC 16xx. They connect directly to the two 62-pin connectors at the rear of the DTC 16xx.



Caution These connectors should not be used with a rack-mounted DTC 16xx.

4 Attaching an 8-port RJ45 break-out panel to a desktop DTC 16xx

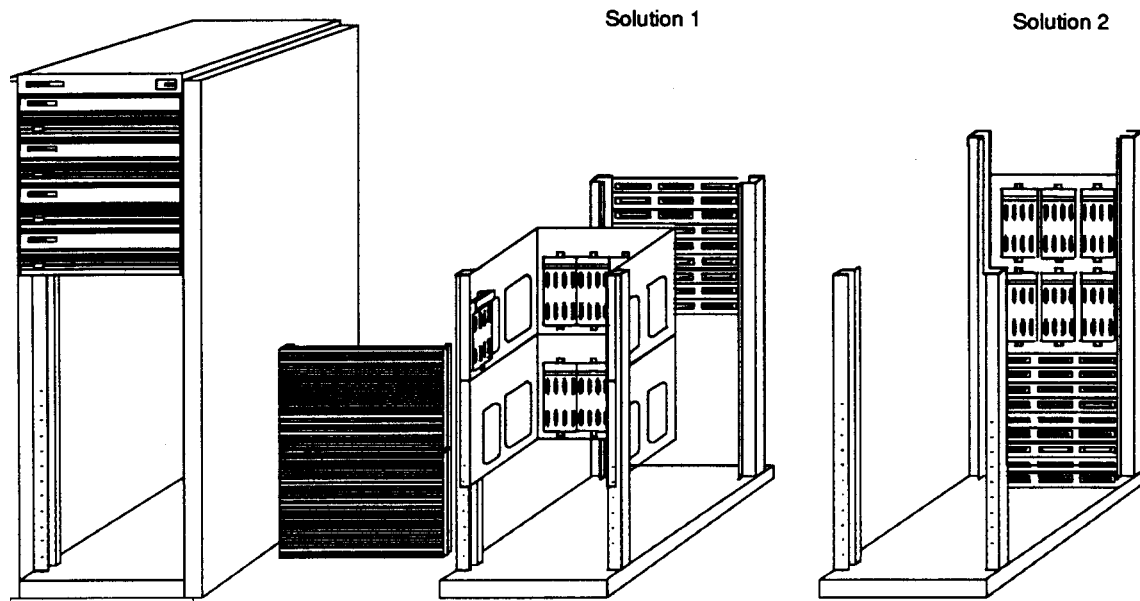
Typical Configurations

This chapter contains five examples of large and small system racking configurations.

All the examples show DTC 72MX devices, but are equally applicable to the DTC 16xx family.

5 Four DTC 72MX with 272 ports in a 1.6m rack

Four DTC 72MX with 272 ports in a 1.6m rack



Solution 1

Front: 2 x J209A MDP Mounting Kits
7 x Modem Distribution Panels

Rear: 9 x RJ45 Direct Distribution Panels

Solution 2

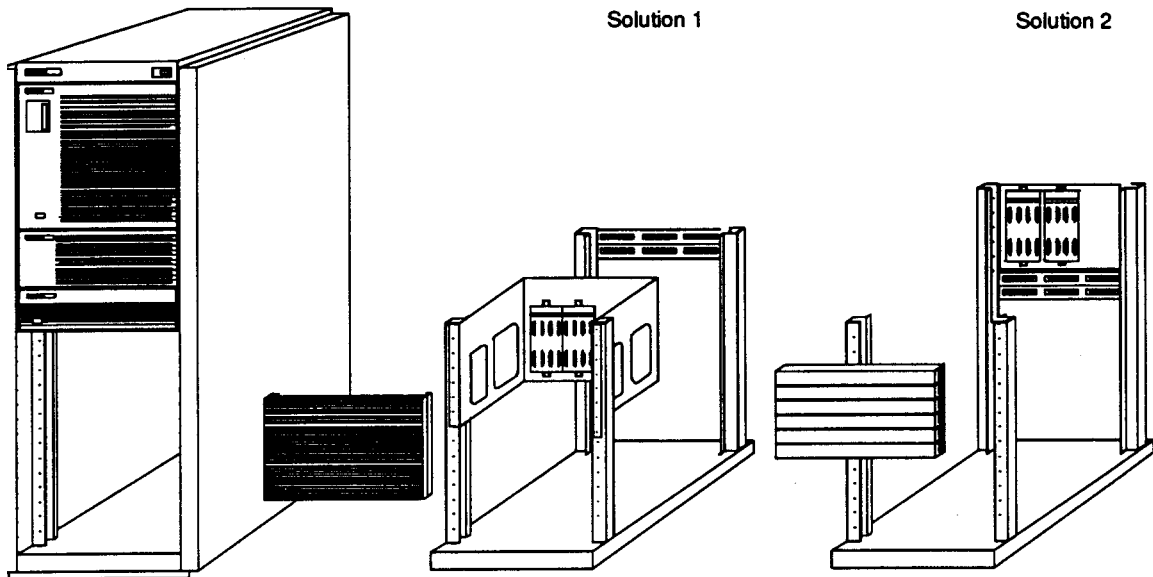
Front: 20 x Filler Panels

Rear: 2 x C2792A MDP Mounting Kits

7 x Modem Distribution Panels

9 x RJ45 Direct Distribution Panels

System and DTC 72MX with 64 ports in 1.6m rack



Solution 1

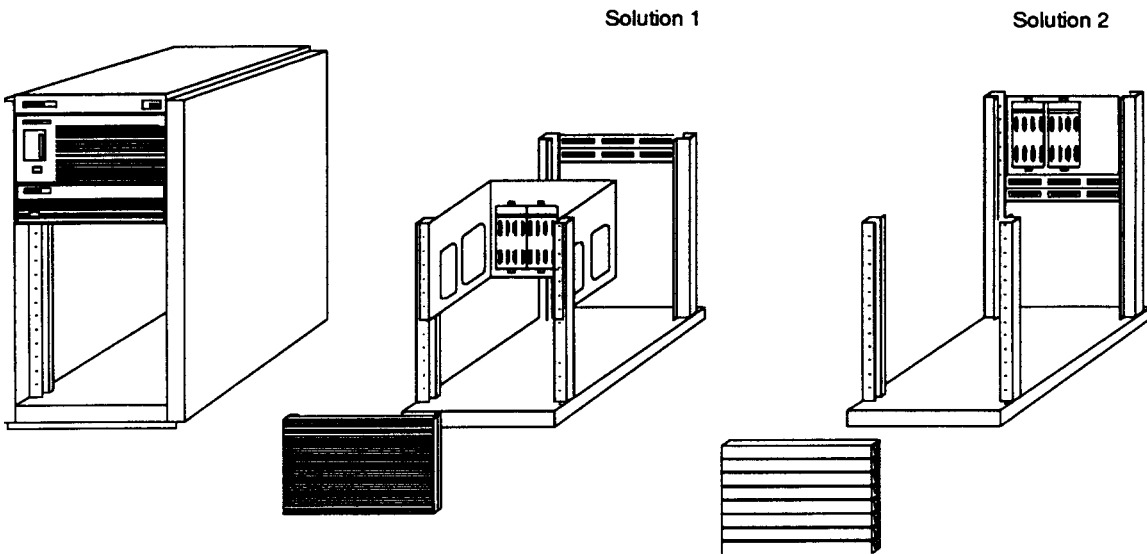
Front: 2 x J2084A MDP Mounting Kits
2x Modem Distribution Panels
Rear: 2x RJ45 Direct Distribution Panels

Solution 2

Front: 8 x Filler Panels
Rear: 1 x C2792A MDP Mounting Kits
2x Modem Distribution Panels
2x RJ45 Direct Distribution Panels

5 System and DTC 72MX with 64 ports in 1.1m rack

System and DTC 72MX with 64 ports in 1.1m rack



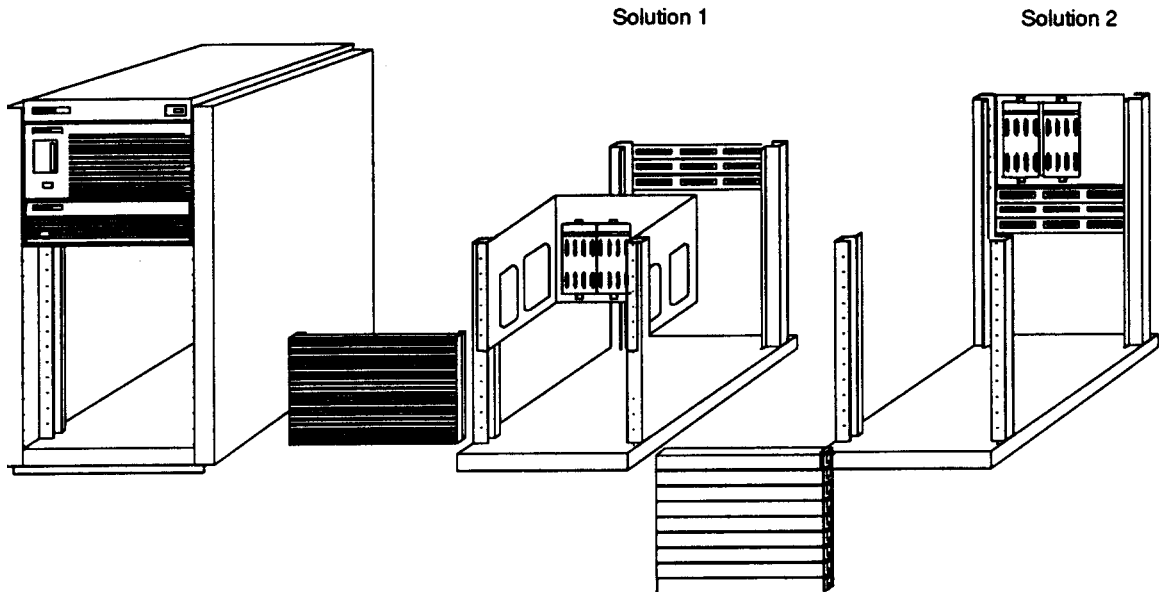
Solution 1

Front: 1 x J2084A MDP Mounting Kits
2 x Modem Distribution Panels
Rear: 2 x RJ45 Direct Distribution Panels

Solution 2

Front: 8 x Filler Panels
Rear: 1 x C2792A MDP Mounting Kits
2 x Modem Distribution Panels
2 x RJ45 Direct Distribution Panels

System and DTC 72MX with 88 ports in 1.1m rack



Solution 1

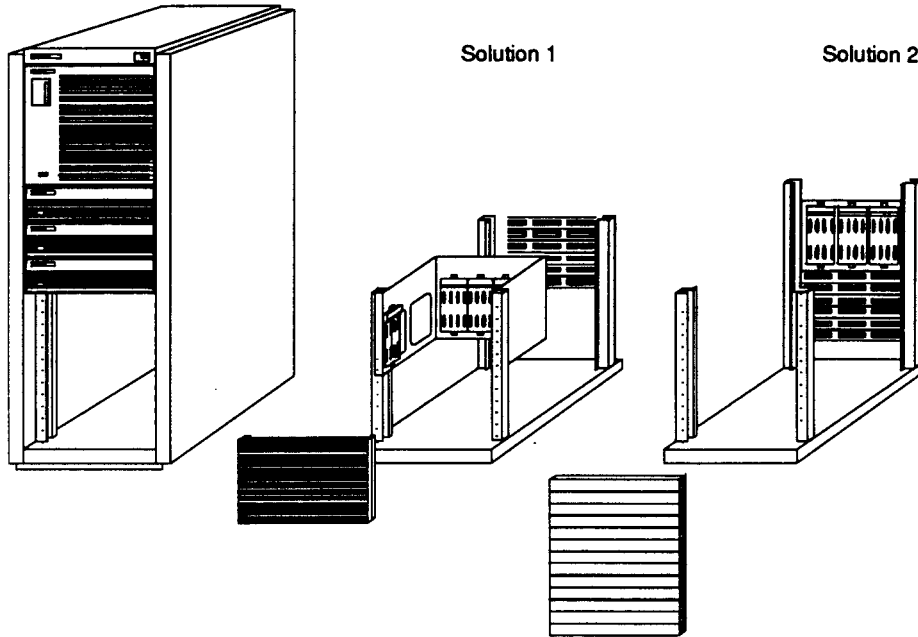
Front: 1 x J2084A MDP Mounting Kits
2 x Modem Distribution Panels
Rear: 3 x RJ45 Direct Distribution Panels

Solution 2

Front: 9 x Filler Panels
Rear: 1 x C2792A MDP Mounting Kits
2 x Modem Distribution Panels
3 x RJ45 Direct Distribution Panels

5 System and DTC 72MX with 184 ports in 1.6m rack

System and DTC 72MX with 184 ports in 1.6m rack



Solution 1

Front: 1 x J2084A MDP Mounting Kits
5 x Modem Distribution Panels
Rear: 6 x RJ45 Direct Distribution Panels

Solution 2

Front: 12x Filler Panels
Rear: 1 x C2792A MDP Mounting Kits
5x Modem Distribution Panels
6x RJ45 Direct Distribution Panels

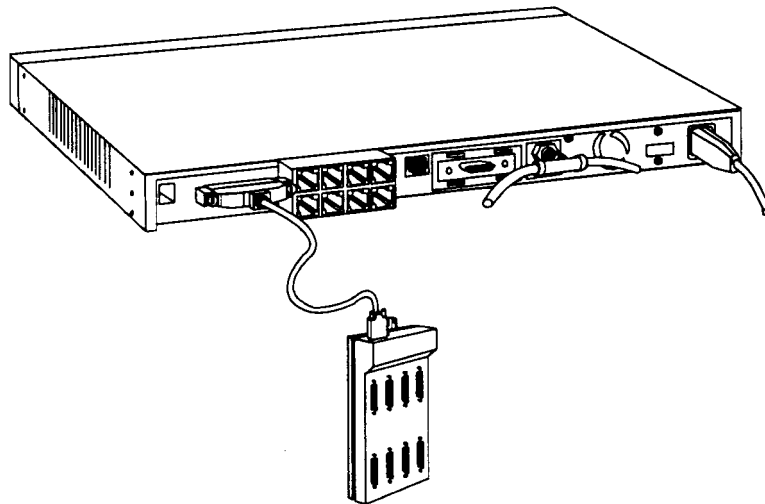
Connecting Asynchronous Devices

Overview

This section explains how to connect a DTC to asynchronous devices, gives a list of recommended cables, explains how to make your own cables, lists the cables you should use to connect to the most common devices, and gives useful advice for adapting to popular cabling systems. You will also find descriptions of the cables necessary for connecting to an X.25 network, plus product numbers for supported LAN cables and transceivers.

Rear view of a DTC 16xx with example connections

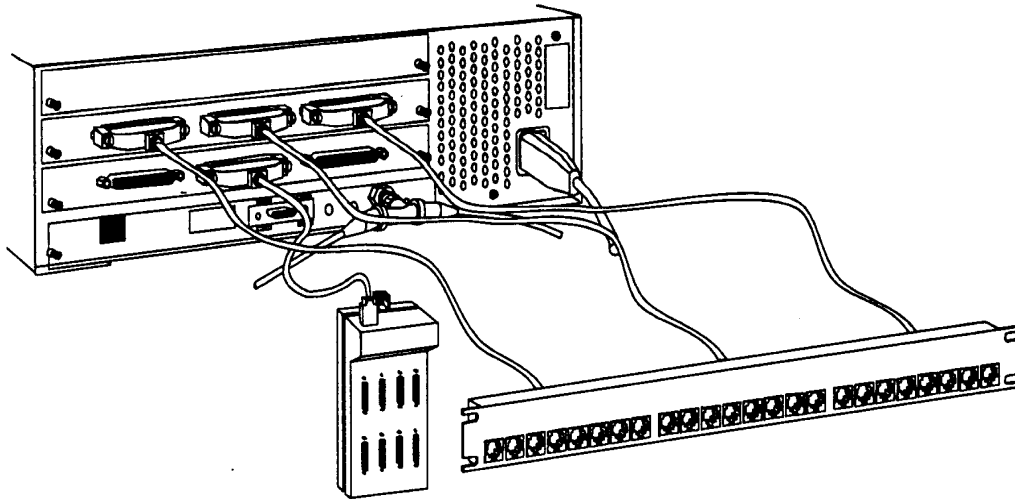
This example illustrates a ThinLAN connection (AUI port unused). The option to have a combination of one 8-port RJ45 panel and one Modem Distribution Panel is shown. The standard product (HP J2060A, J2062A) is supplied with two 8-port RJ45 panels.



6 Overview

Rear View of a DTC 72MX with example connections

In this example, a DTC 72MX is illustrated with a ThinLAN connection. An 8-port Modem Distribution Panel and a 24-port Direct Distribution Panel are shown connected.



Connecting Asynchronous Devices

The number of terminals and other asynchronous devices you can connect to a DTC depends upon the number and type of boards you have installed.

The DTC 16xx family is available with RS-232 as standard or with RS-423 as an option. Two 62-pin connectors are provided, each of which provides eight ports.

Two types of asynchronous processor boards are available for the DTC 72MX:

- HP J2076A for RS-232-C devices
- HP J2077A for RS-423A devices

Each asynchronous processor board has three 62-pin connectors, each of which can be used for up to eight ports (called a port group in the network management software). Therefore each board offers connections for up to 24 ports.

The port connectors on a DTC 16xx RS-232 board are identical, but you may use the network management software to configure each port for direct connections or for modem connections.

With an RS-423 board, modem connections are not possible.

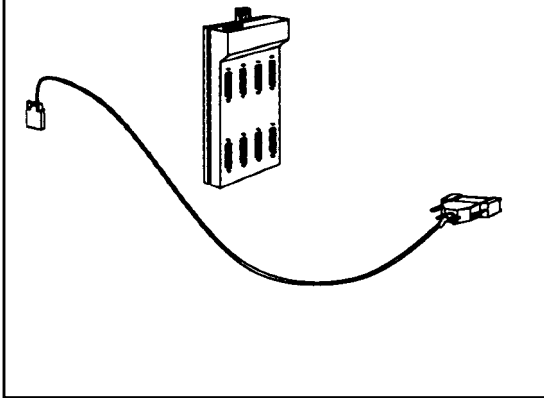
Note

RS-423 devices can be connected to a DTC containing an RS-423 board.

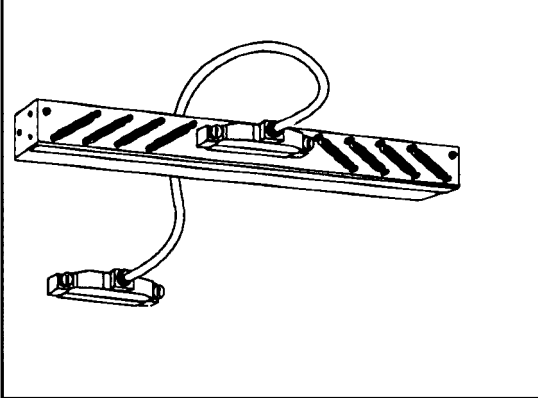
6 Connecting Asynchronous Devices

The accessories available for making connections with a DTC are illustrated below:

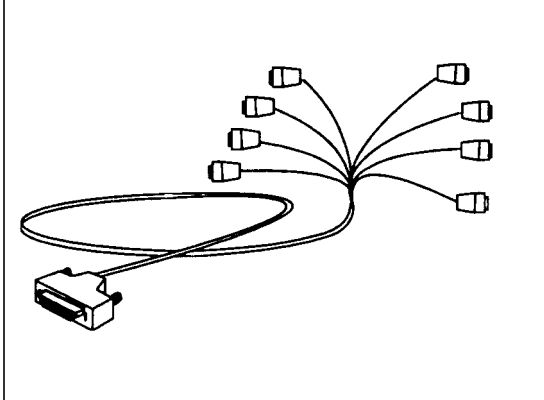
8-port MDP and cable for Modem (RS-232-C only). HP- J2085 option 101.



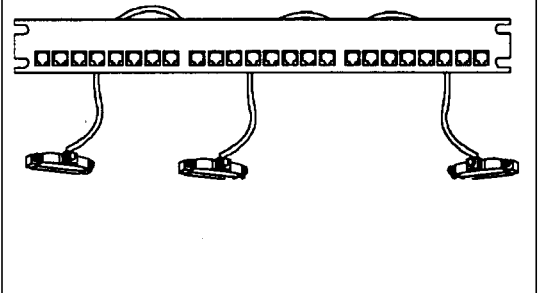
8-port DDP and cable for Direct Asynchronous Connections. HP J2085 option 102.



3-pin fan-out cable. (RS-232-C only)
HP J2085A option 104.

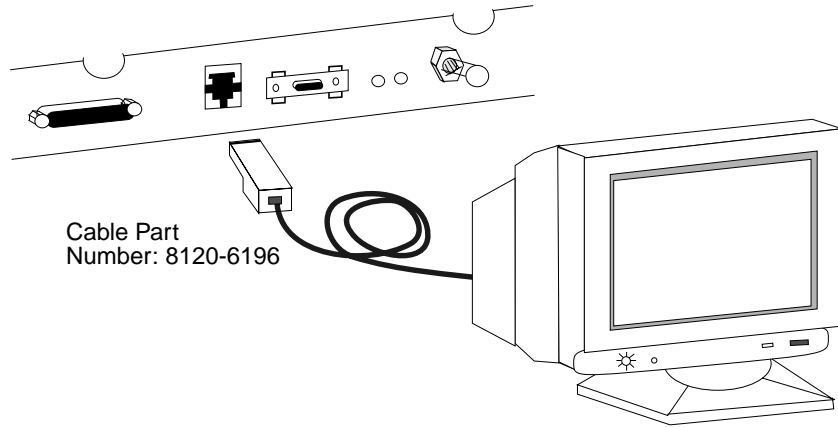


Direct Connect Distribution Panel providing
16 or 24 RJ45 connectors for 19" rack
installation. HP J2085A option 103 (24 ports)
or HP J2085A option 105 (16 ports).

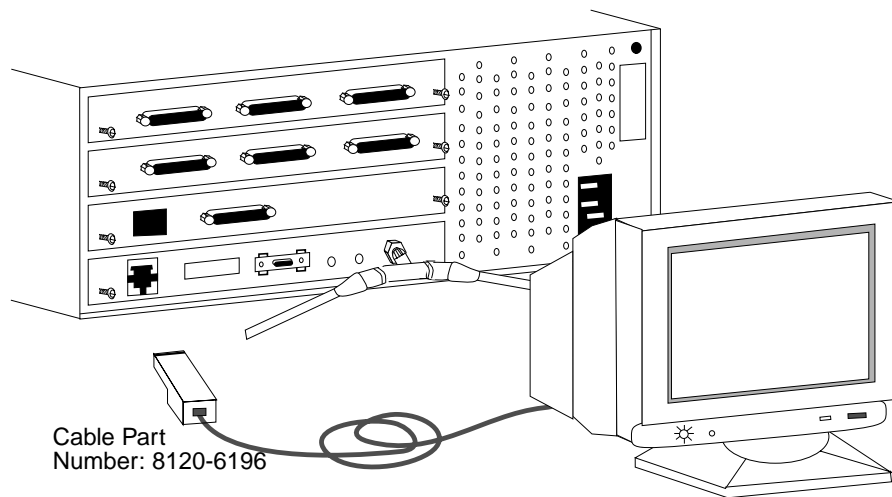


RJ45 Diagnostic Port to Terminal

DTC 16xx family diagnostic port

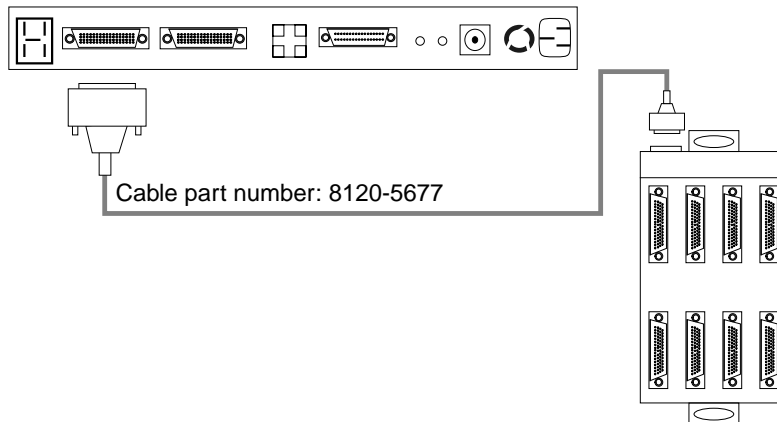
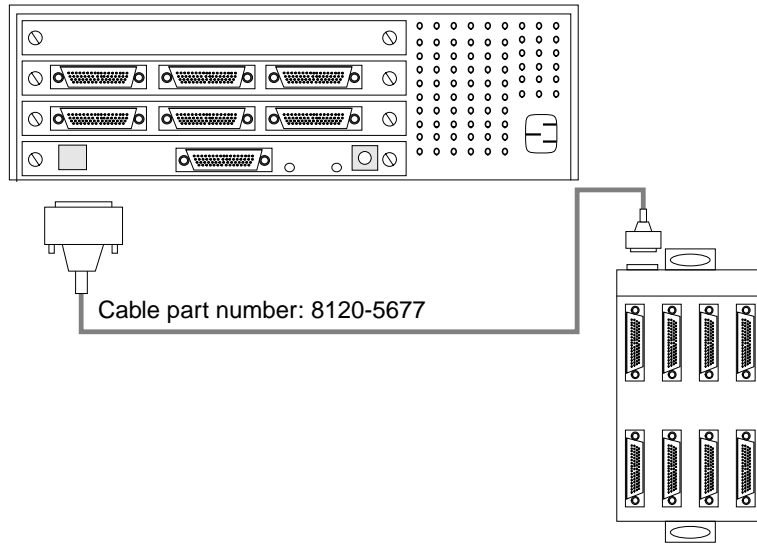


DTC 72MX diagnostic port

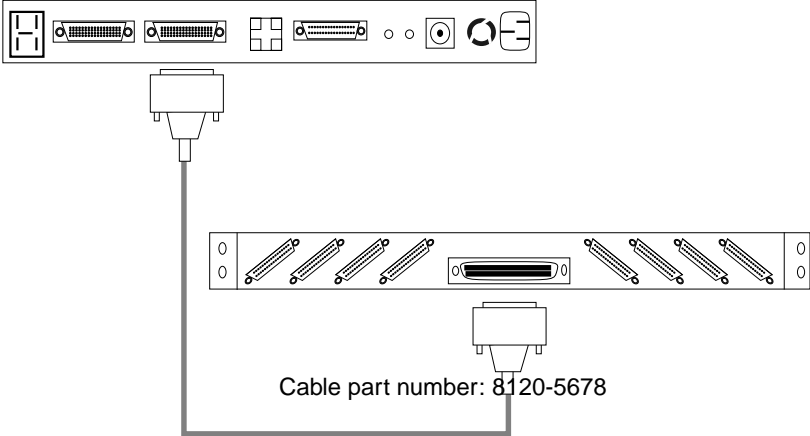
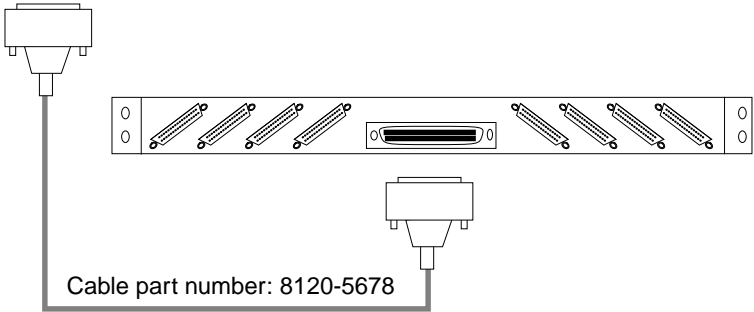
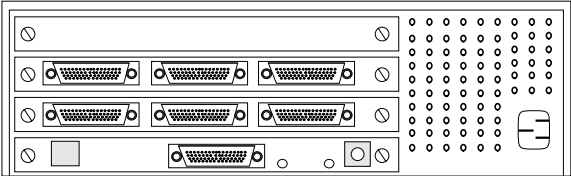


6 DTC 16xx and DTC 72MX to 8-port MDP

DTC 16xx and DTC 72MX to 8-port MDP

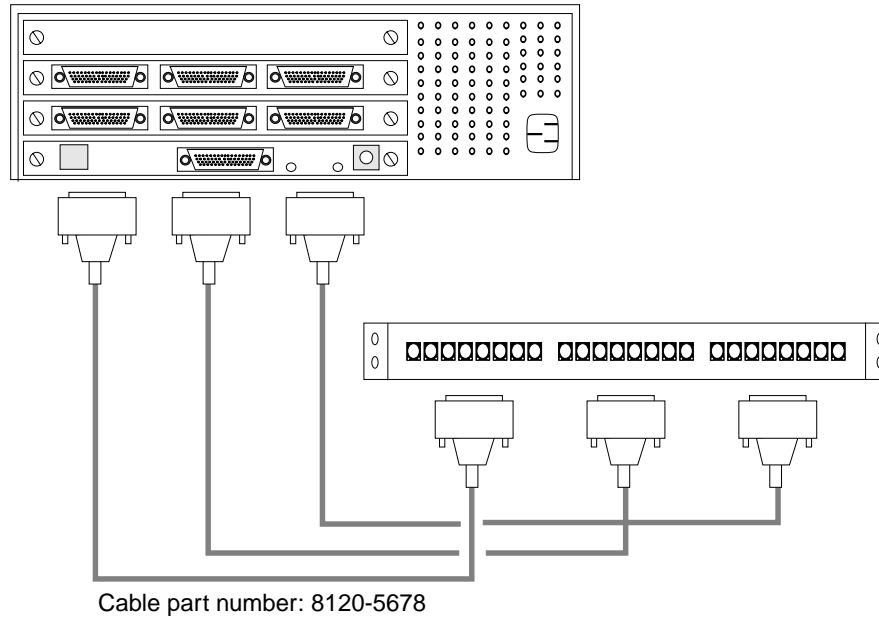


DTC 16xx and DTC 72MX to 8-port DDP

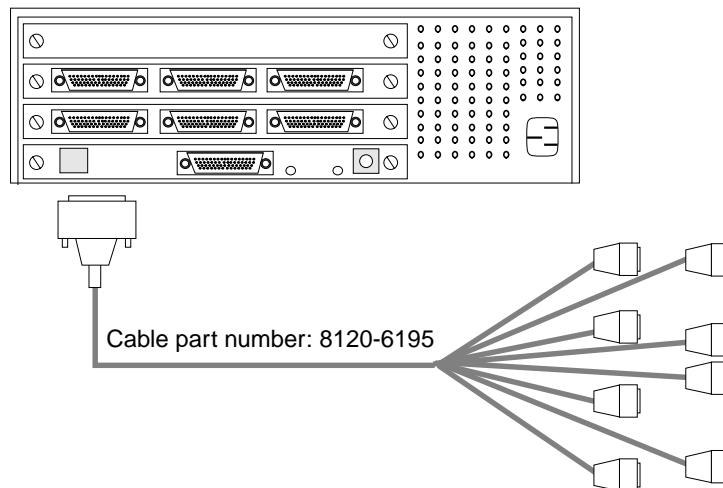


6 DTC 72MX to 24-port RJ45 panel

DTC 72MX to 24-port RJ45 panel



DTC 72MX to 3-pin fan-out cable



Connection Accessories

The following accessories may be used with the asynchronous processor board:

Accessory	Product /Option	Interface	Direct Connection	Modem Connection
8-port MDP	J2085A #101	RS-232	✓	✓
8-port DDP	J2085A #102	RS-232 or RS-423	✓	
16-port DDP	J2085A #105	RS-232 or RS-423	✓	
24-port DDP	J2085A #103	RS-232 or RS-423	✓	
8-port ATP cable	J2085A #104	RS-232	✓	

Note Only 16 of the 24 ports on a 24-port DDP can be used with a DTC 16xx. The remaining 8 ports are not used.

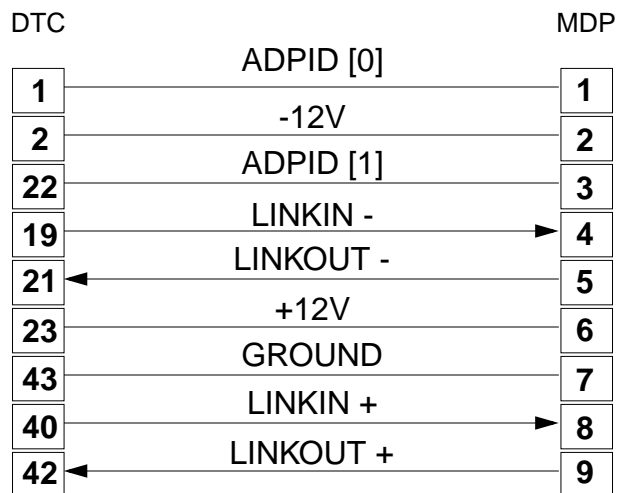
6 DTC to Distribution Panel Cables

DTC to Distribution Panel Cables

DTC to MDP cable pin out

The MDP is connected to the DTC via a multiplexed serial link. The four link wires make an RS-422 two-way balanced high-speed link.

The twisted pairs are: 2/3, 4/8, 5/9, and 6/7. The maximum length for the cable is two meters.



Part number 8120-5677

DTC to DDP (DB25 and RJ-45) cable pin out

The 8-port DDP and the 24-port RJ45 DDP use this cable to connect to the DTC.

DTC		DDP		DTC		DDP	
24	RTS	26	} Port 0	32	RTS	38	} Port 4
3	CTS	1		11	CTS	13	
25	RXA	27		33	RXA	39	
44	RXB	2		52	RXB	14	
4	TXA	28		12	TXA	40	
45	TXB	3	53	TXB	15	} Port 5	
26	RTS	29	34	RTS	41		
5	CTS	4	13	CTS	16		
27	RXA	30	35	RXA	42		
46	RXB	5	54	RXB	17		
6	TXA	31	6	TXA	43	} Port 6	
47	TXB	6	55	TXB	18		
28	RTS	32	36	RTS	44		
7	CTS	7	15	CTS	19		
29	RXA	33	37	RXA	45		
48	RXB	8	8	RXB	20	} Port 7	
8	TXA	34	16	TXA	46		
49	TXB	9	57	TXB	21		
30	RTS	35	38	RTS	47		
9	CTS	10	17	CTS	22		
31	RXA	36	9	RXA	48	} Port 3	
50	RXB	11	39	RXB	23		
10	TXA	37	58	TXA	49		
51	TXB	12	18	TXA	49		
				59	TXB	24	

Part number 8120-5678

Cables for connecting a Distribution Panel to a Device

It is important to use appropriate cables when connecting terminals, printers and other serial devices to a DTC distribution panel. This is because certain signals are present for test purposes on otherwise unused pins of the 25-pin connectors of the distribution panels.

In particular, for RS-232 direct connections (no modem signals) to direct-connect or modem ports, use cables with these connections only:

Pin1: Shield

Pin2: Receive Data (input)

Pin3: Transmit Data (output)

Pin7: Signal Ground

Using cables which have other pins connected can cause the DTC to fail its selftest and may damage the line driver.

Recommended cables

The cables listed below (DB25 to DB25) are recommended for connecting the DDP and the MDP to devices.

DDP to device (direct connection) cable

Product number 40242Y

Product number 13242Y

MDP to DTE device (direct connection) cable

Product number 40242Y

Product number 13242Y

MDP to DCE device (modem) cable

Product number 40233A

MDP to DTE device (modem) cable

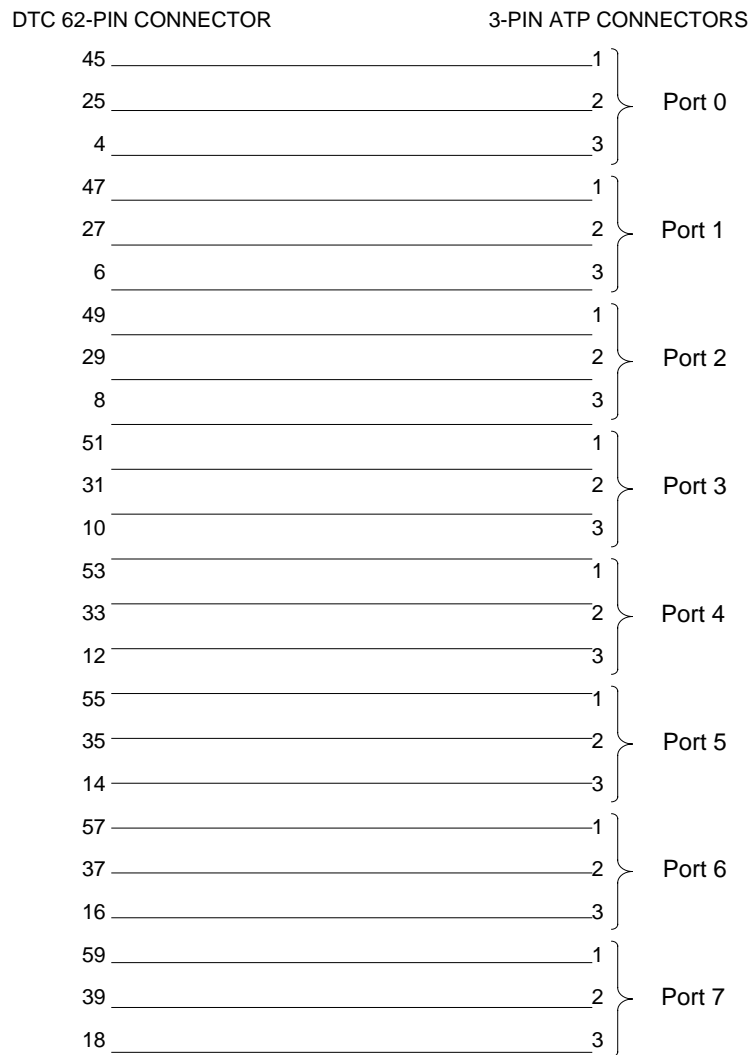
Product number 40234A

DTC 72 to device 3-pin fan-out cable pin out

In order to maintain compatibility with previous DTC units and with terminals using the ATP-type connector, a 3-pin fan-out cable is available.

Product number HP J2085A #104

Part number 8120-6195



6 Cables that should not be used

Cables that should not be used

Some terminals, such as the HP 2392A and older terminals, output a signal on pin 23 of the 25-pin DB25 connector. The MDP also outputs a signal on this pin. Using any of the cables listed below will connect these pins together, which may result in hardware damage to the pin 23 drivers on the terminal or the MDP.

Caution

Do not use any of the cables listed below with the Modem Distribution Panel:

Product number HP 40242M

Product number HP 92219Q

Product Number HP 13242M

Product number HP 13242N

Product number HP 30062B

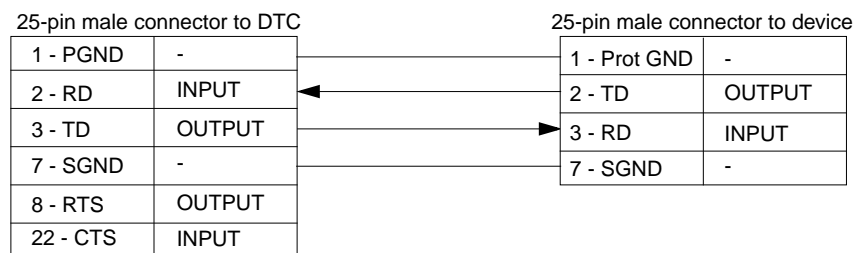
Most Common Cabling Schemes

RS-232 connection

RS-232 DB25 Direct connection to HP terminals, HP Vectra PC's and HP printers

This cabling scheme is recommended for connecting the following devices:

HP Terminals	HP239xA, HP700/22/32/43/45/9x
HP Vectra	C2401A, C2402A, C1010J, C1010T
HP Printers	HP2227A, 28A, 76A, 77A, HP256x, HP293x, HP2684A/P, 86A/D, HP33440A/F, 47A/F, 49A, 59A, 41063A, C1200A, C1202A
Existing HP cable	HP40242Y

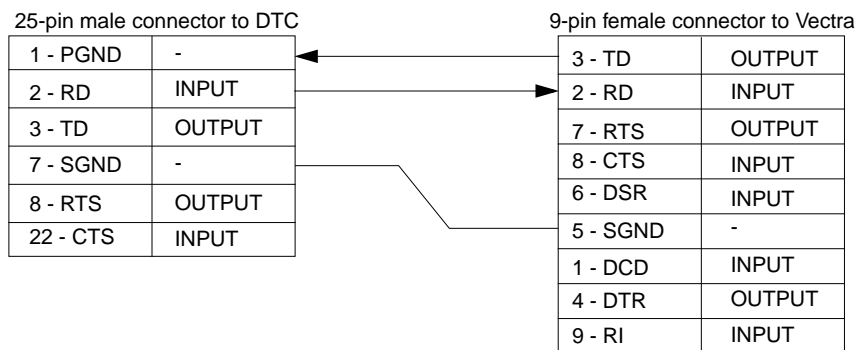


7 RS-232 connection

DB25 Direct connection to HP Vectra PC's (9-pin connector)

This cabling scheme is recommended for connecting to the following HP Vectra interfaces:

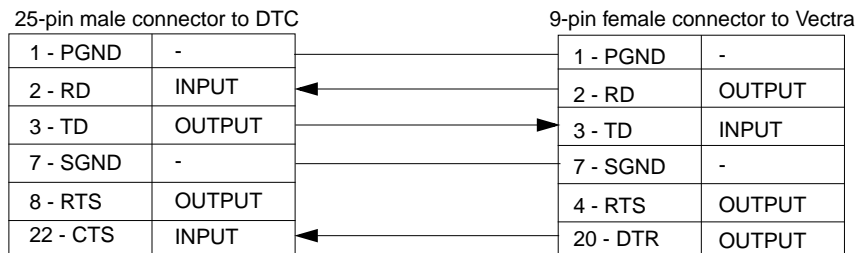
HP Vectra with 9-pin connector:	386/XX,486/XX
HP Vectra interfaces:	24540B port A, 24541B port A



RS-232 DB25 Direct connection to HP printer with hardware handshake

This cabling scheme is recommended for connecting the following devices when a hardware handshake is necessary:

HP Laserjet	HP648A/P, 86A/D, HP33440A/F, 47A/F, 49A, 59A, 41063A, C1200A, C1202A
HP Ruggedwriter	Hp 2235

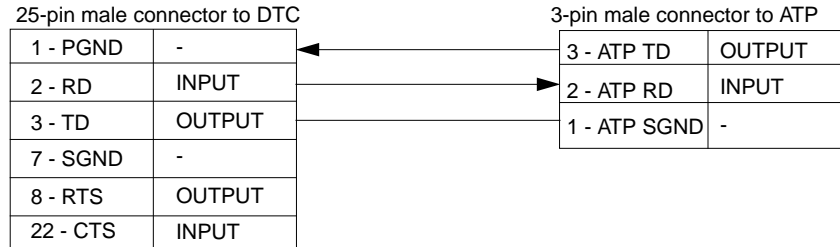


Note

HP Laser printers provide hardware flow control of host ports using DTR on pin 20. The HP DTC family provide hardware flow control of devices using RTS/CTS on pins 8 and 22.

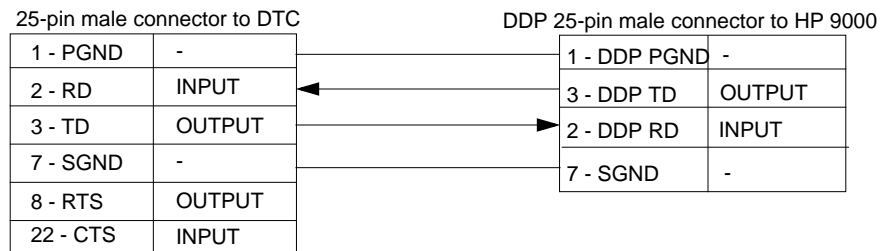
RS-232 DB25 Direct connection to HP 3000 ATP ports (3-pin connector)

This cabling scheme is recommended for connecting to HP 3000 ATP ports with 3-pin connectors.



RS-232 DB25 Direct connection to HP 9000 with a DDP DB25

This cabling scheme is recommended for connecting to HP 9000 with sub-D25-pin connectors.

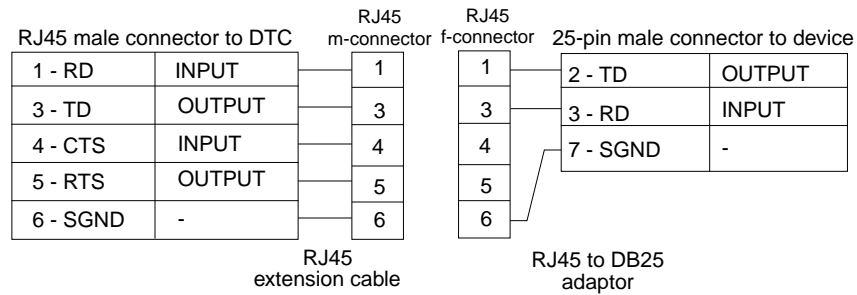


7 RS-232 connection

RS-232 RJ45 connection to HP terminals, HP Vectra PC's (DB25 connector) and HP Printers

This cabling scheme is recommended for connecting the following devices:

HP Terminals	HP239xA, HP700/22/32/43/45/9x
HP Vectra	C2401A, C2402A, C1010J, C1010T
HP Printers	HP2227A, 28A, 76A, 77A, HP256x, HP293x, HP2684A/P, 86A/D, HP33440A/F, 47A/F, 49A, 59A, 41063A, C1200A, C1202A
Cable type	RJ45 extension (male-male) RJ45 (female) to DB25 (male) adapter (Note: The above cable is a straight-through extension cable.)

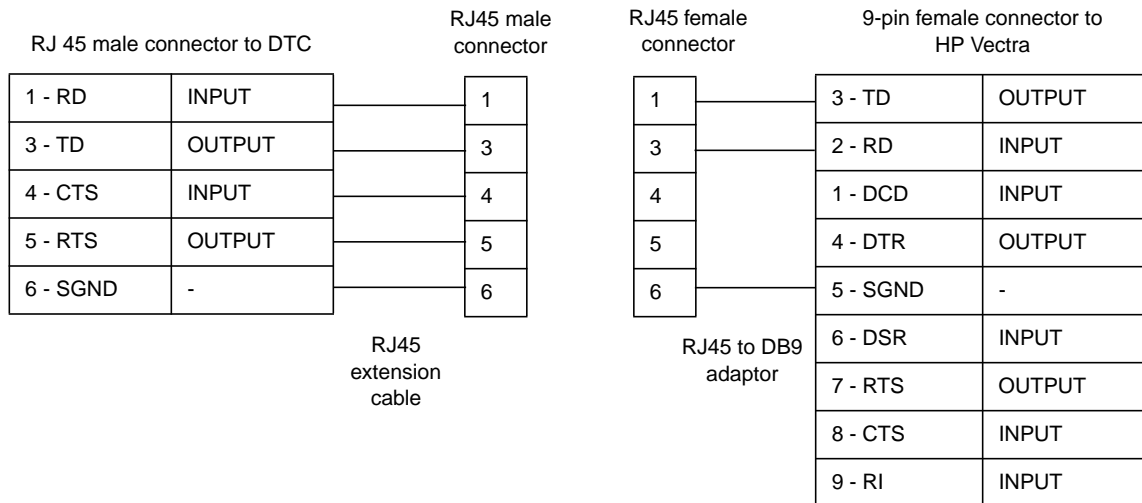


Note The RJ45 to DB25 adaptor is not an HP part.

RS-232 RJ45 connection to HP Vectra PC (9-pin connector)

This cabling scheme is recommended for connecting to the following:

HP Vectra with 9-pin connector:	386/XX,486/XX
HP Vectra interfaces:	24540B port A, 24541B port A



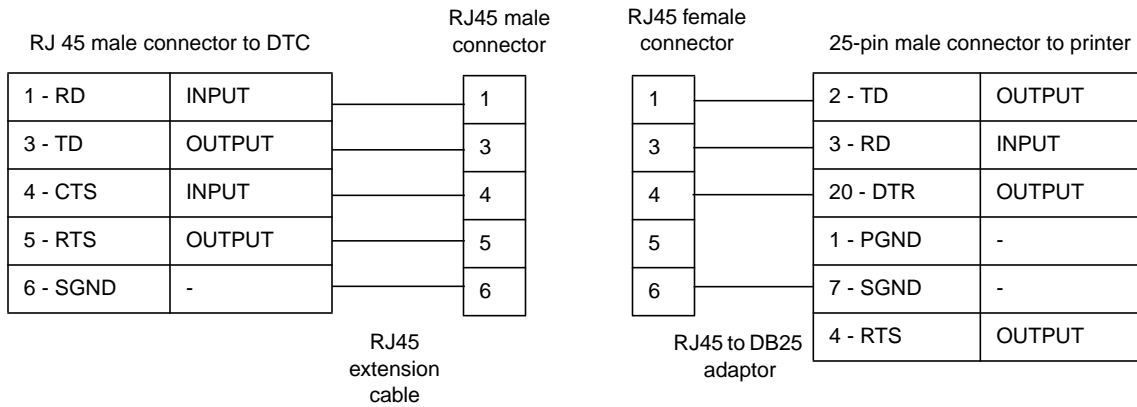
Note The RJ45 to DB9 adaptor is not an HP part.

7 RS-232 connection

RS-232 RJ45 Direct connection to HP printer with hardware handshake

This cabling scheme is recommended for connecting to the following devices when a hardware handshake is necessary:

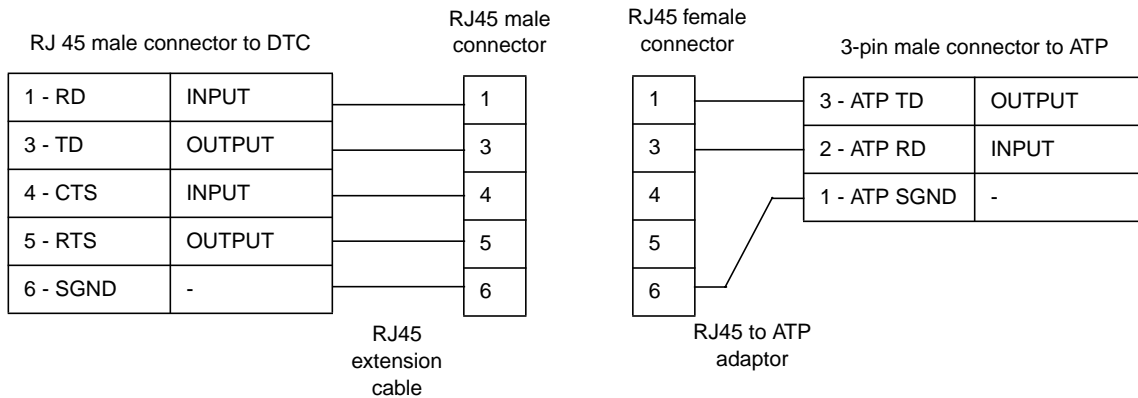
HP Laserjet:	HP 2684A/P, 86A/D, HP33440A/F, 47A/F, 49A, 59A, 41063A, C1200A, C1202A
HP Ruggedwriter:	HP 2235



Note HP Laser printers provide hardware flow control of host ports using DTR on pin 20. The HP DTC family provide hardware flow control of devices using RTS/CTS on pins 8 and 22.

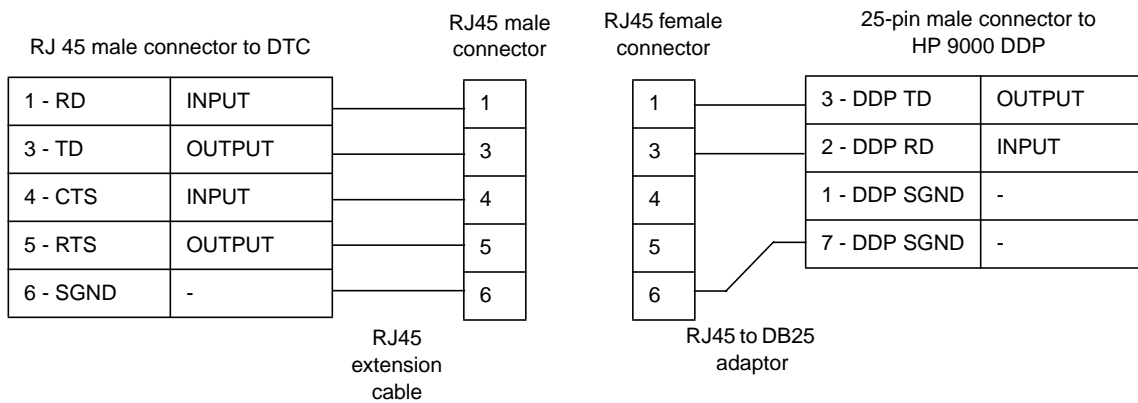
RS-232 RJ45 connection to HP ATP 3-pin connectors

This cabling scheme is recommended for connecting to HP 3000ATP Ports with 3-pin connectors.



RS-232 RJ45 Direct connection to HP 9000 with a DDP DB25

This cabling scheme is recommended for connecting to HP 9000 with a DDP DB25.

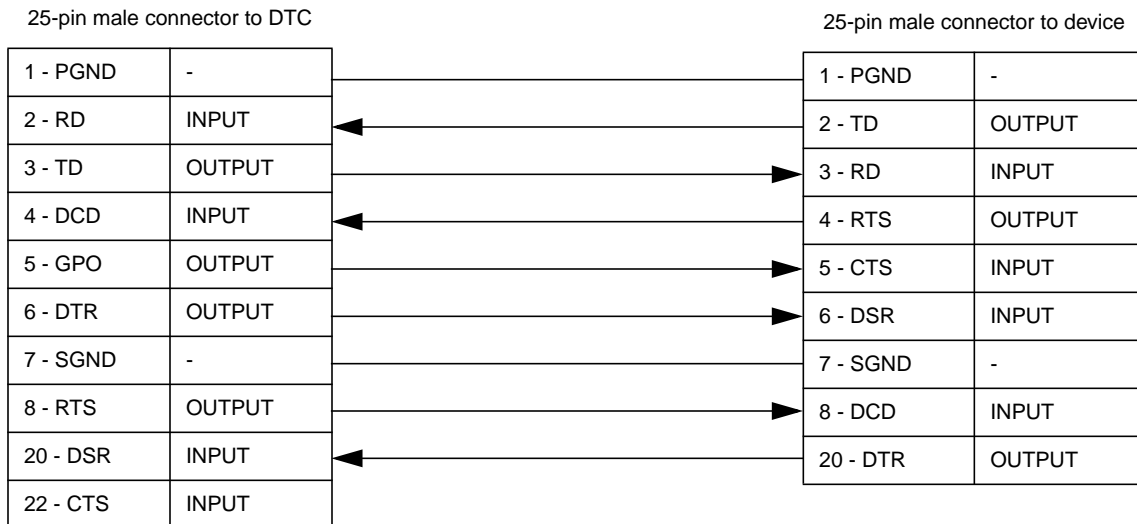


7 RS-232 connection

RS-232 Modem connection to HP terminals, HP Vectra PC's and HP printers

This cabling scheme is recommended for connecting the following devices:

HP terminals:	HP239xA, HP700/22/32/43/45/9x
HP Vectra:	C2401A, C2402A, C1010J, C1010T,
HP Vectra interfaces:	24541B port B
HP printers:	HP2227A, 28A, 76A, HP256x, HP293x, HP2684A/P, 86A/D, HP33440A/F, 47A/F, 49A, 59A, 41063A, C1200A, C1202A
Existing HP cable:	HP 40234A

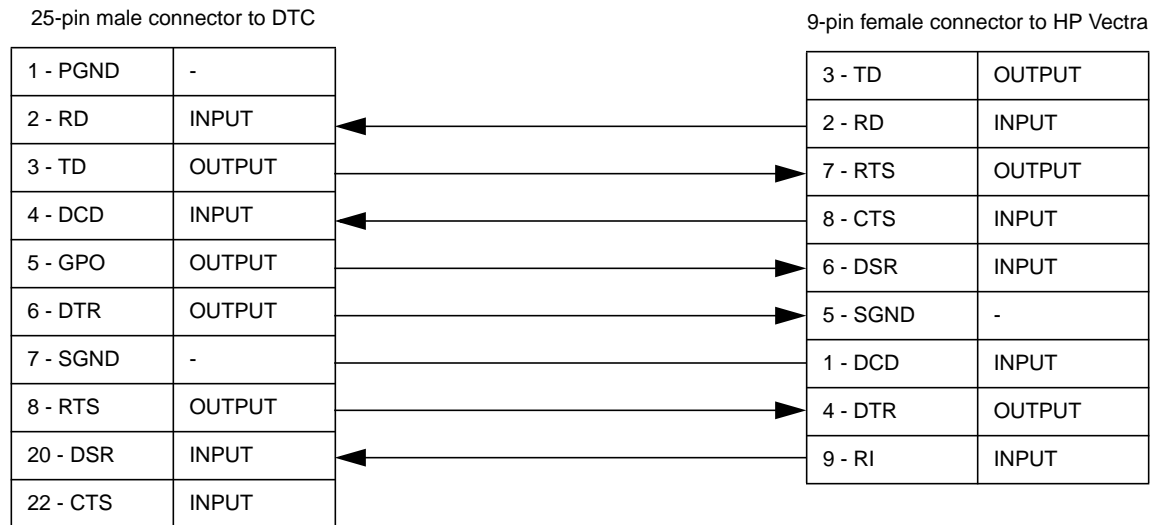


Note To be used with US modem behavior only.

RS-232 Modem connection to HP Vectra PC (9-pin connector)

This cabling scheme is recommended for connecting the following:

HP Vectra with 9-pin connector:	386/XX, 486/XX
HP Vectra interfaces:	24540B port A, 24541B port B
Existing HP cable:	HP 24542M



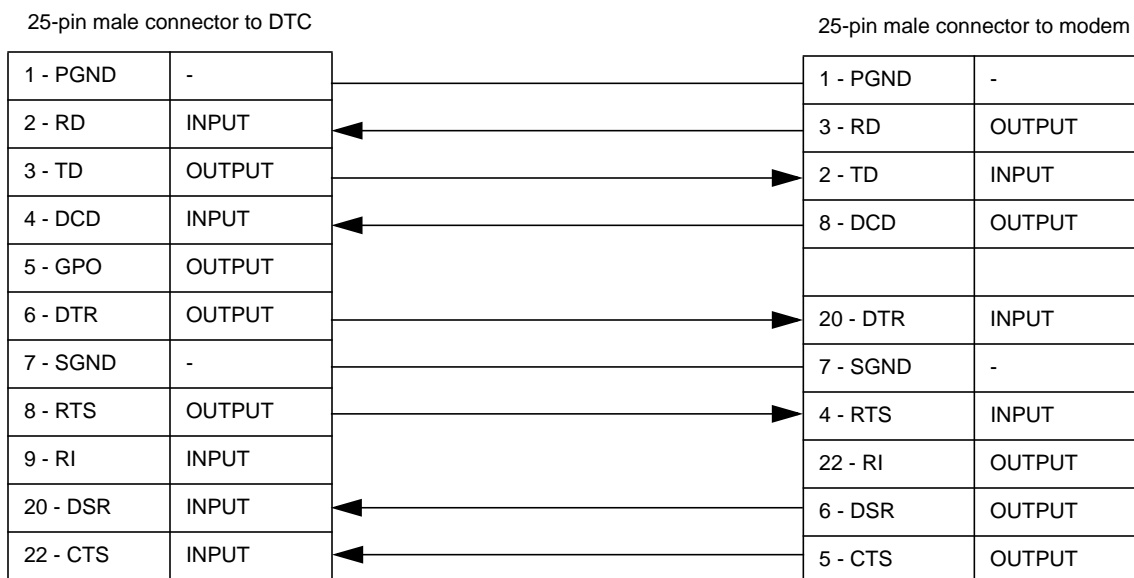
Note To be used with US modem behavior only. The HP24542M cable connects pin 9 of the HP Vectra to pin 22 of the DDP. This is not recommended when making your own cables.

7 RS-232 connection

RS-232 Connection to modems

This cabling scheme is recommended for connecting modems to a DTC.

Existing HP cable:	HP 40233A
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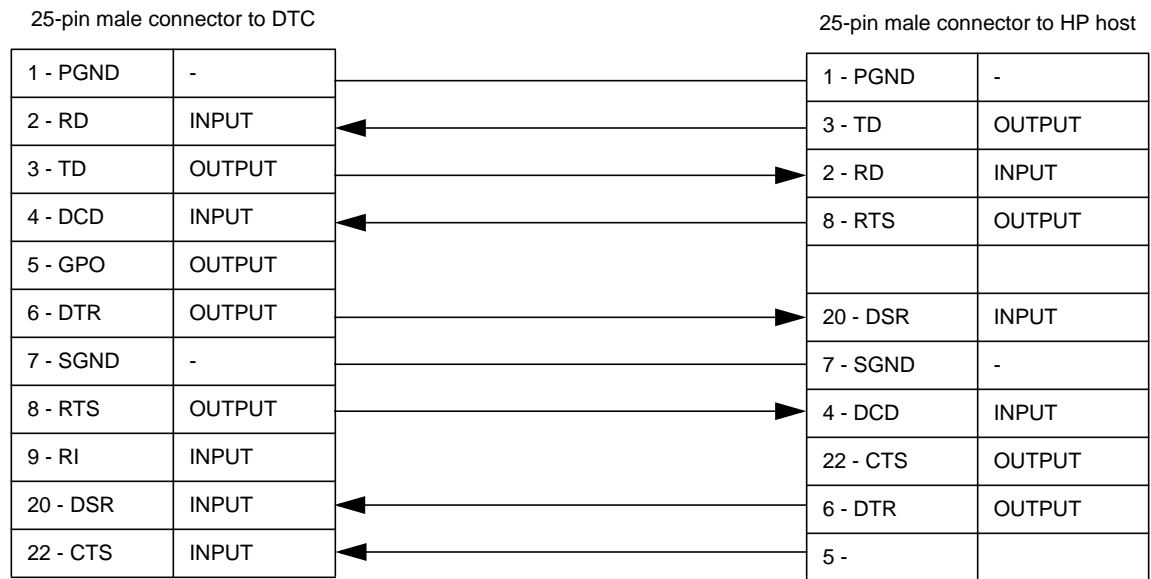


Note The DTC does not monitor the RI signal from the modem.

RS-232 Modem connection to HP 9000 with MDP or HP 3000 ATP modem ports

This cabling scheme is recommended for connecting to HP 9000 with MDP, or HP 3000 ATP modem ports to the DTC.

Existing HP cable:	HP 40233A
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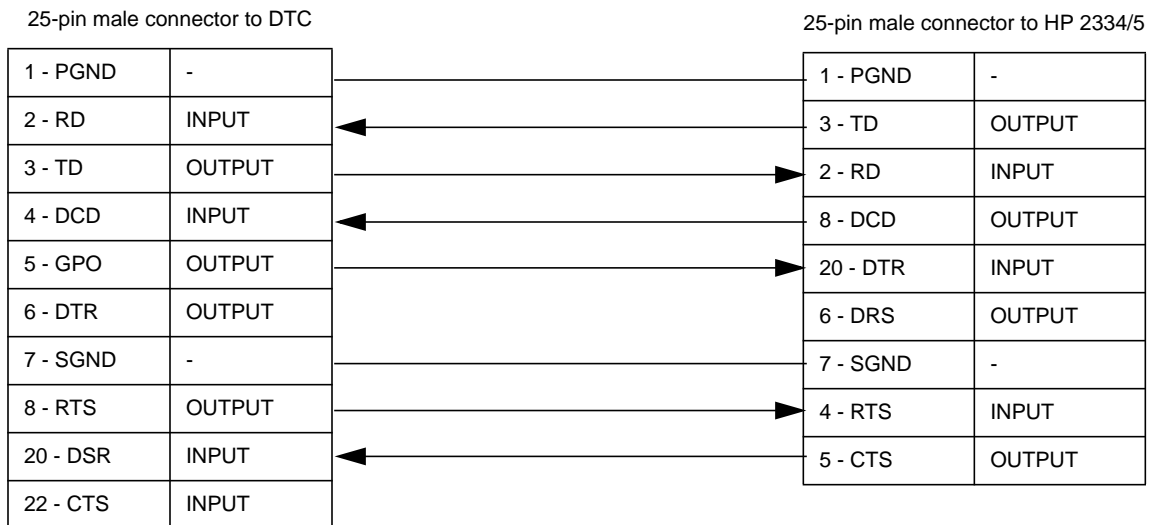
Note To be used with US modem behavior only.

7 RS-232 connection

RS-232 Modem connection to HP 2334/5 modem ports

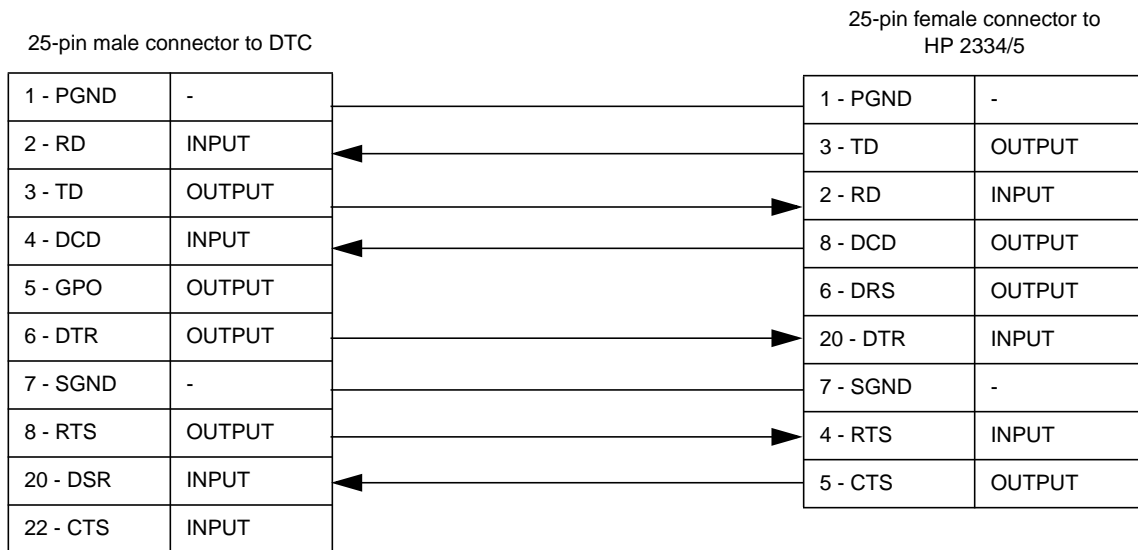
This cabling scheme is recommended for connecting HP 2334/5 modem ports to a DTC.

Recommended HP cable:	HP 40220 to HP2334/5 for printer access (depends upon termtype used HP3000 and upon type of printer).
-----------------------	---



To be used with US modem behavior only. DTC pin 5 (GPO) is a loopback of pin 4 (DCD).

Recommended HP cable:	HP 40220 to HP2334/5 for printer access (depends upon termtype used HP3000 and upon type of printer).
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Note To be used with US modem behavior only.

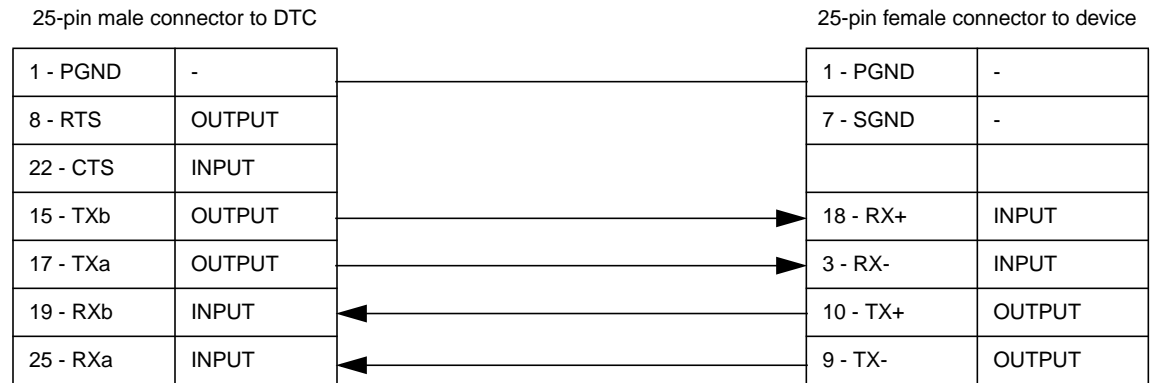
7 RS-423 Connection

RS-423 Connection

RS-423 DB25 Direct connection to RS-423/RS-422 HP terminals, HP Vectra PC's and HP printers

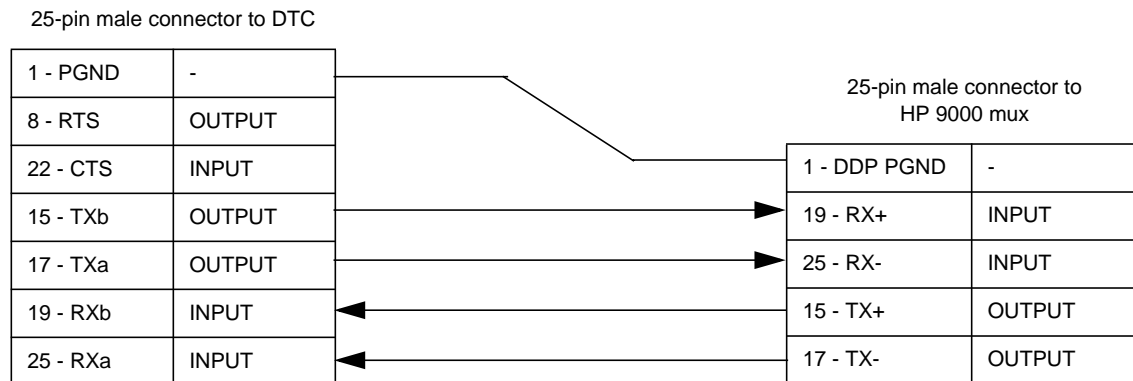
This cabling scheme is recommended for connecting the following devices:

HP terminals:	HP2392A, HP700/92, HP700/60
HP Vectra interface:	24541B port B
HP printers:	HP2684A/P, 86A/D, HP33440A/F, 47A/F, 49A, 59A, 41063A, C1200A, C1202A



RS-423 DB25 Direct connection to RS-423/RS-422 HP 9000 with a DDP DB25

This cabling scheme is recommended for connecting to HP 9000 RS-422 or RS-423 ports.



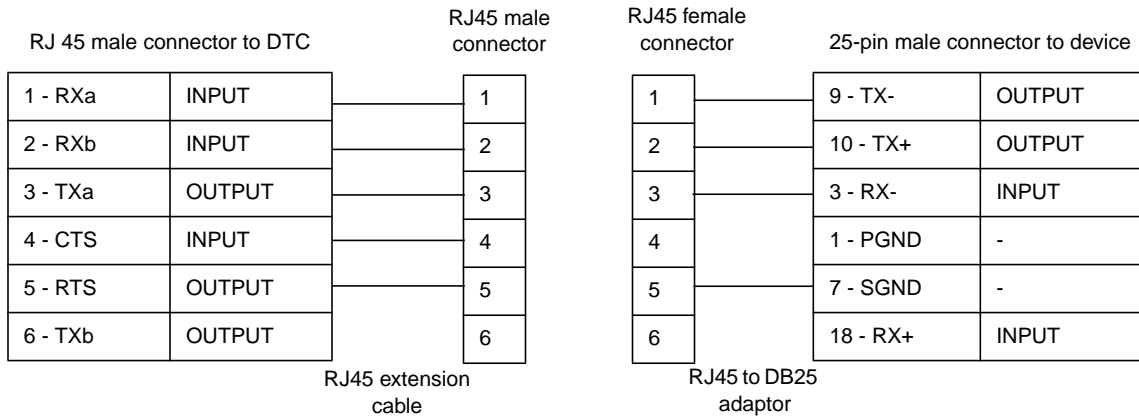
RS-423 RJ45 connection to RS-423/RS-422 HP terminals, HP Vectra PC's (DB25 connector) and HP printers

This cabling scheme is recommended for connecting the following devices:

HP terminals:	HP2392A, HP700/92, HP700/60
HP Vectra interface:	24541B port B
HP printers:	HP2684A/P, 86A/D, HP33440A/F, 47A/F, 49A, 59A, 41063A, C1200A, C1202A

7 RS-423 Connection

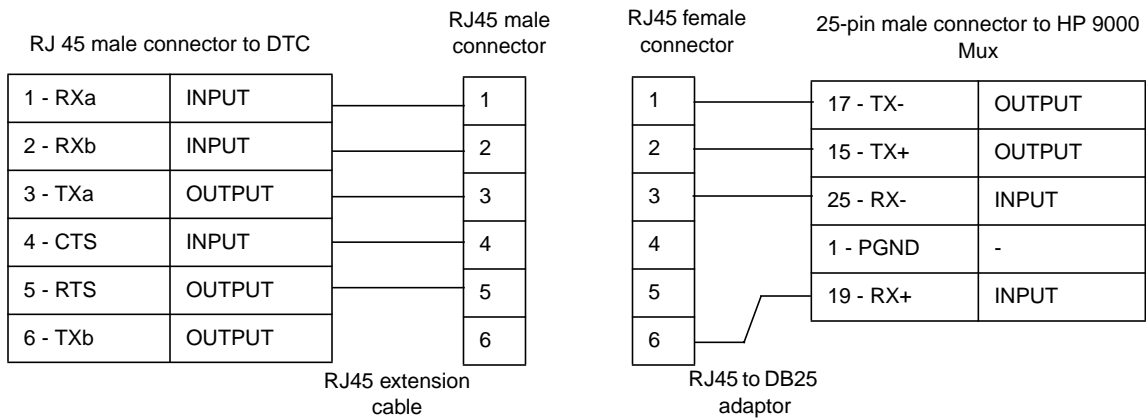
DTC - RJ45 DDP<---RJ45 extension--->RJ45 to DB25 adaptor--->Device



RS-423 RJ45 connection to RS-423/RS-422 HP 9000 with a DDP DB25

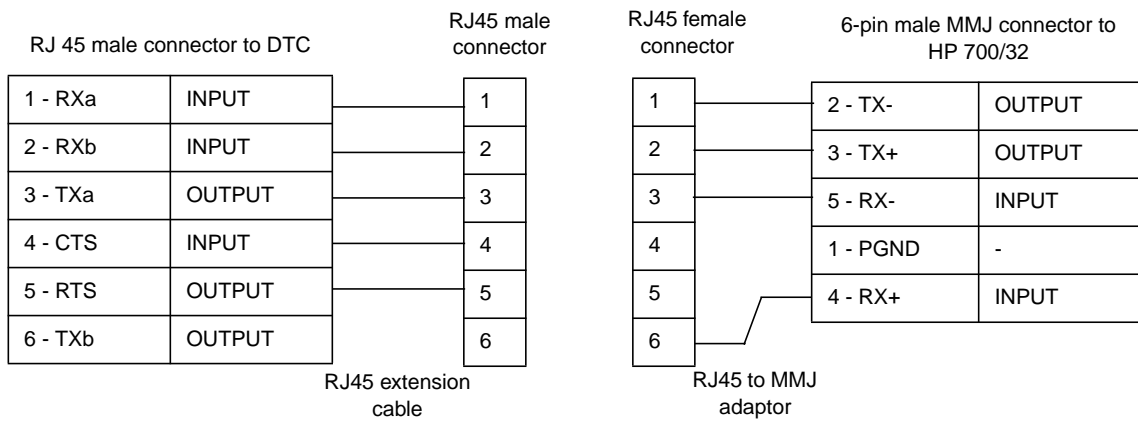
This cabling scheme is recommended for connecting to HP 9000 RS-422 or RS-423 ports.

DTC-RJ45 DDP<---RJ45 extension--->RJ45 to DB25 adaptor--->DDP DB25-HP 9000 Mux



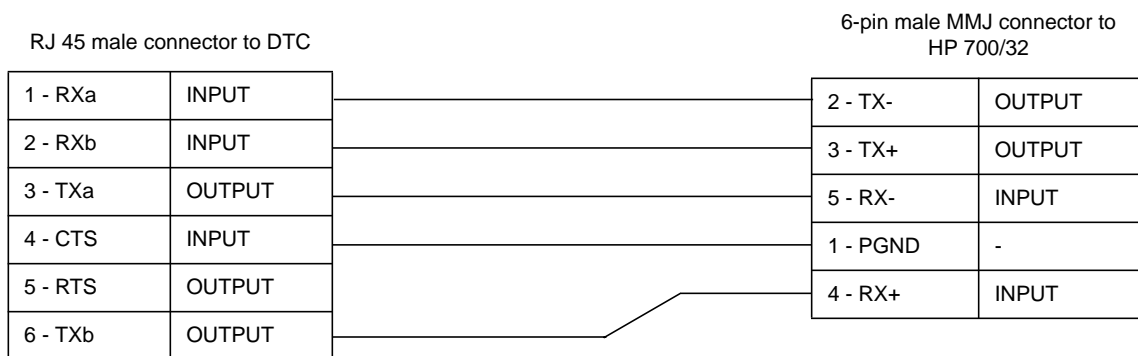
RS-423 RJ45 connection to RS-422 HP 700/32 terminal

This cabling scheme is recommended for connecting to HP 700/32 terminals via RS-422 ports.



RS-423 DB25 direct connection to RS-422 HP 700/32 terminal

This cabling scheme is recommended for connecting to HP 700/32 terminals via RS-422 ports.

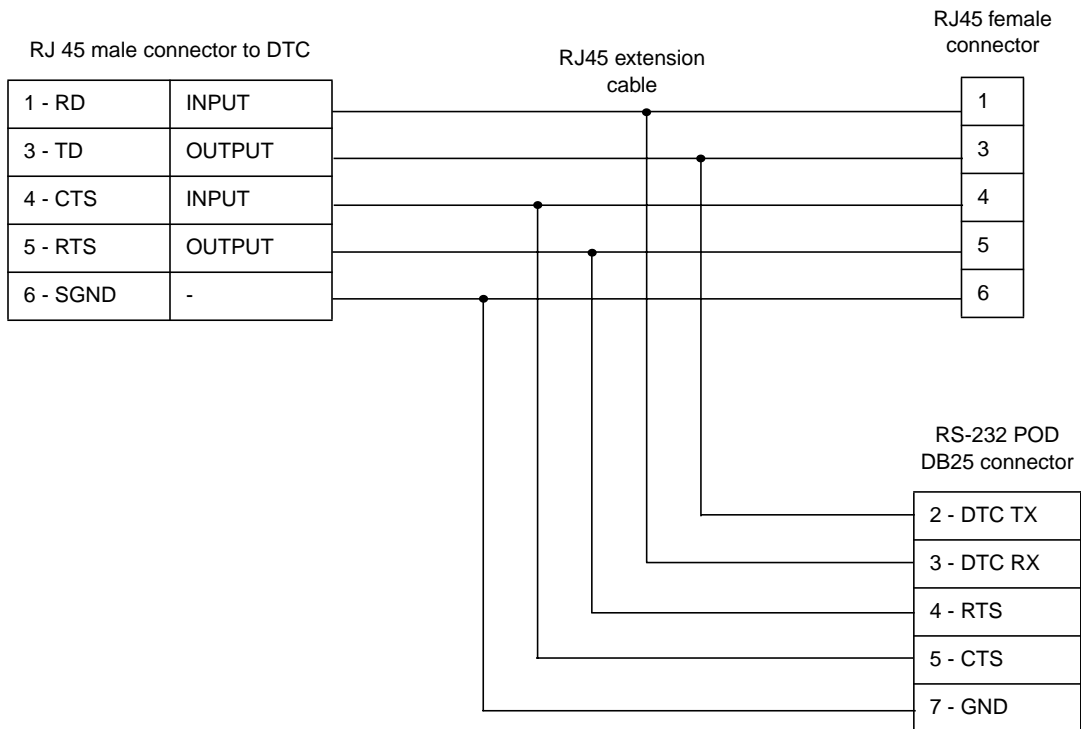


7 Protocol Analyzer connection

Protocol Analyzer connection

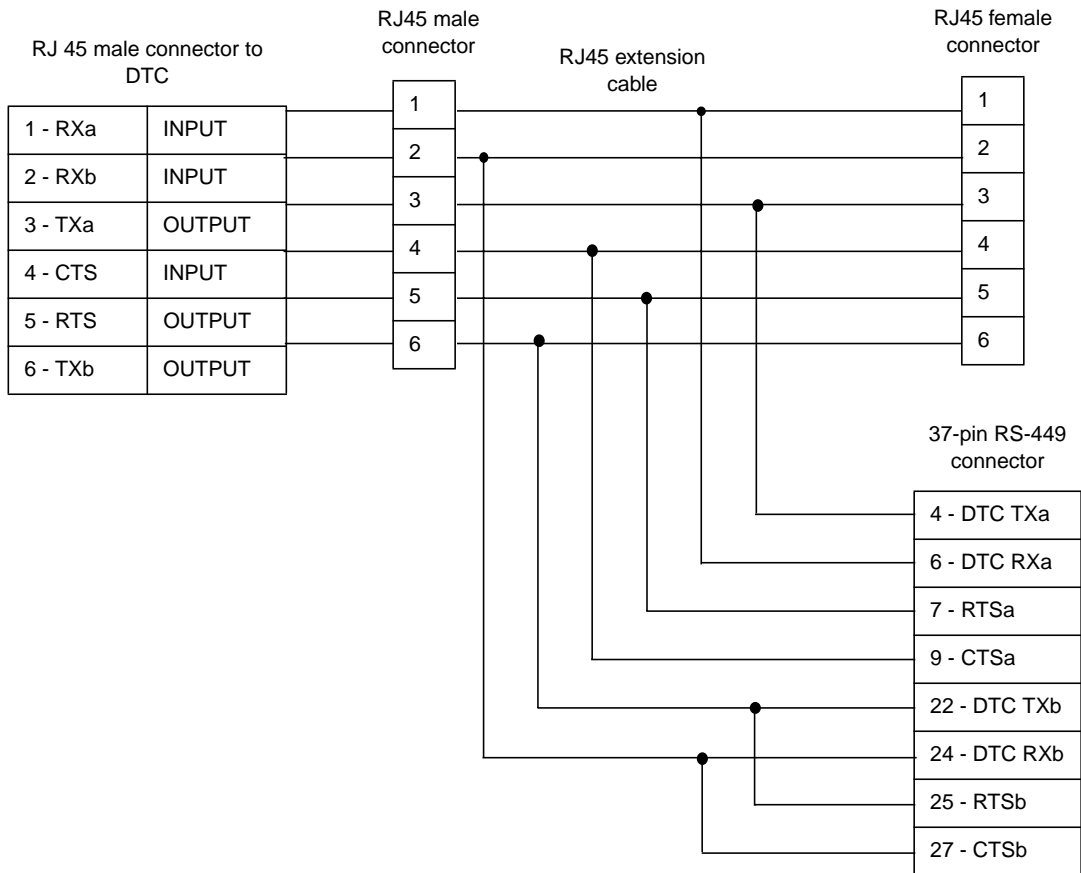
RS-232 POD connection

This cable is placed between the DDP RJ45 port and the device.



RS-449 POD connection for RS-423 signals

This cable is placed between the DDP RJ45 port and the device.



7 Protocol Analyzer connection

Making your own cables

This chapter includes advice which you may find useful when making your own cables to connect devices to ports on the Modem Distribution Panel, the Direct Distribution Panel, and the 24-port RJ45 Direct Distribution Panel.

You will also find some background information concerning the RS-232, RS-422, and RS-423 standards.

A note on standards

As demand grows for terminal-to-system connections supporting higher baud rates over greater distances, the use of RS-422 and RS-423 is becoming more prevalent. This section gives an overview of these standards.

The RS-422 and RS-423 standards are electrical standards. They specify the electrical characteristics of the digital interface circuit.

The RS-232 standard specifies the electrical, physical, and logical characteristics of the interface circuit.

Consequently, a comparison of RS-232 with RS-422 and RS-423 can only be a comparison of electrical standards.

8 A note on standards

Guidelines for application

The RS-422 and RS-423 standards do not specify maximum distances or maximum data rates for connecting cables. These standards do, however, include “Guidelines for application” which give conservative values for maximum cable length and data rates based upon the following cable type:

- twisted pair, copper
- 52.5pF/meter shunt capacitance
- 24 AWG

The following information is based upon these guidelines. The performance achievable in a real configuration will differ from that suggested by the guidelines, as performance is also determined by the environment and the configuration itself.

Single-ended versus Differential Transmission

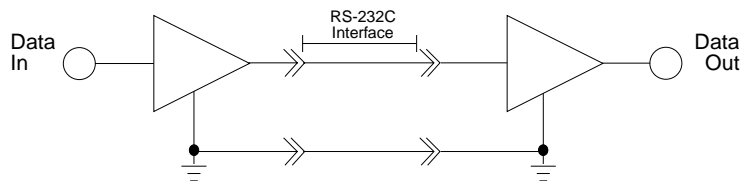
Two methods are used for sending digital signals between components (such as a system and a terminal). The first method, single-ended data transmission, is based upon the use of one signal line. The second method, differential data transmission, uses two signal lines.

Single-ended data transmission is used by equipment which conforms to the RS-232 or RS-423 standards. Differential data transmission is used by the RS-422 standard.

RS-232

The RS-232 standard, though widely used, has a maximum data rate of 20kBaud and cannot be used over long distances (maximum of 50 feet/15 meters). However, it has the advantage of being commonly used and understood. It can also operate with just three conductors, if necessary, for direct terminal connection.

RS-232C Application



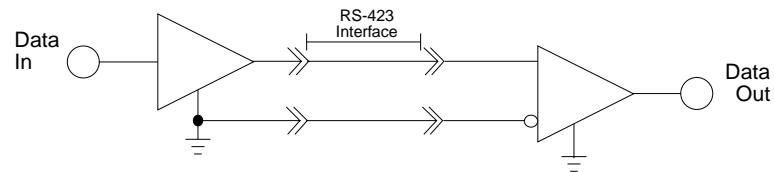
RS-423

The RS-423 standard (also known as CCITT V.10) has a maximum data transmission rate of 100 kBaud at distances up to 250 feet/80 meters. It can be used at a maximum distance of 4000 feet/1200 meters at data rates less than or equal to 5 kBaud.

The maximum cable length and data rate are dependent upon the rise time of the signal carrying the digital data. A fast rise time allows higher baud rates, whilst a slow rise time allows for longer cable lengths. The rise time is determined by the hardware used. It is not usually possible to change it. Consequently, an RS-423 driver can be tuned to support high data rates or long cable lengths, but not both.

RS-423 is a recent standard is not yet as commonly used as RS-232. However, high baud rates and long distance capabilities are increasing the popularity of the RS-423 electrical standard.

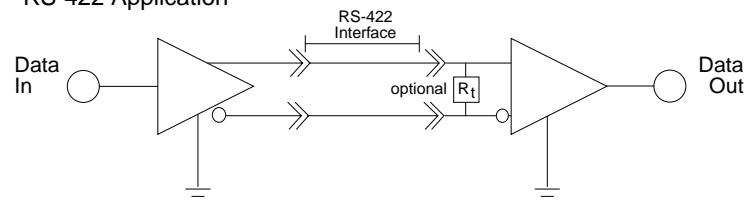
RS-423 Application

**RS-422**

Single-ended data transmission is unreliable at very high data rates, over very long distances, or in noisy environments. For these applications, differential data transmission can provide superior performance. It can eliminate the effects of ground shifts and induced noise. On a differential transmission line, ground shifts and induced noise become common mode noise.

By using differential data transmission, the RS-422 standard (also known as CCITT V.11) supports data rates of up to 10MBaud at distances equal to, or less than, 30 feet/10 meters. It supports cable lengths of up to 4000 feet/1200 meters at data rates up to 100 kBaud.

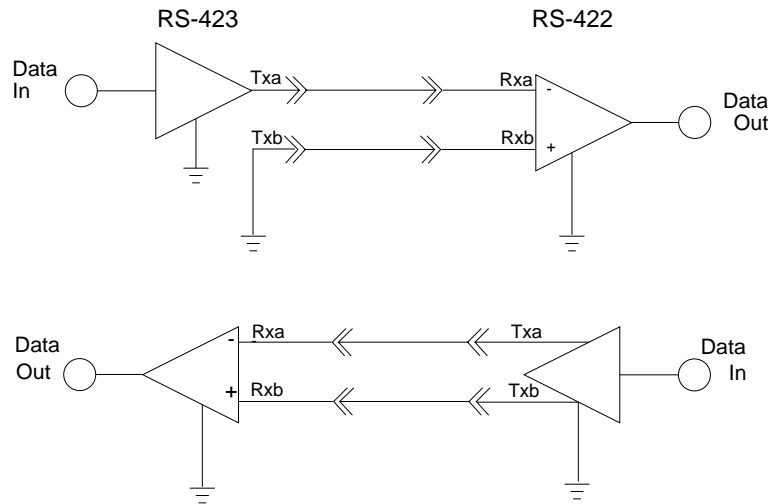
RS-422 Application



8 A note on standards

RS-422/RS-423 compatibility

RS-422 and RS-423 are both compatible since they specify the same electrical characteristics for the receiver. However, when connecting devices with different baud rate and distance capabilities, the connection is limited to the baud rate and distance supported by the device with the slower/shorter distance specification.



Terminal connections

Direct terminal connections can be made using either the RS-232, RS-423, or RS-422 standards. The table below gives details for each. The distance, data rate, and distance/data rate ratio given here are all maximum values. The conductors column gives the number of conductors necessary for a full-duplex direct connection.

	Transmission	Conductors	Dist	Data Rate	Dist x Data Rate
RS-232	Single-ended	3	50ft	20 kBaud	100kBaud-ft
RS-423	Single-ended	4	4000ft	100 kBaud	4 MBaud-ft
RS-422	Differential	4	4000ft	10 MBaud	400 MBaud-ft

Wiring

The higher data rates and longer cable lengths supported by the RS-422 and RS-423 standards allow the component wavelengths of the digital signals to be shorter than the electrical length of the cable. Consequently, the connection should be treated as a transmission line.

The characteristic impedance of the cable connection should be around 100 ohms for frequencies greater than 100kHz. Additionally, the DC series loop resistance of the cable should be less than 240 ohms. The cable can be twisted pair or untwisted pair (flat cable) with these characteristics.

The conductors should be 24 AWG or larger with a resistance not exceeding 30 Ohms per 1000 feet for each conductor.

Mutual pair capacitance between 2 conductors in a pair should not exceed 20 pF per foot.

Stray capacitance between 1 conductor of a pair with all other conductors connected to ground should not exceed 40 pF per foot.

A single driver and a single receiver are utilised when a terminal or printer is directly connected to a system, via an RS-422 or RS-423 interface. As a two-conductor pair is needed to connect a driver to a receiver, four conductors are necessary to make a direct connection.

RS-423 connections using more than one signal driver can benefit from its single-ended nature by using a common ground return line for all signals. This is common for connections using hardware flow control, where each device has a data signal, a flow control signal and a shared ground return.

RS-422 and RS-423 are intended for long-distance connections in datacommunications applications. These long distances make the use of prefabricated cables difficult and uneconomical. Consequently, there are presently no RS-422 or RS-423 datacommunication cables available from Hewlett-Packard. Instead, cables must be made using the advice provided in this document.

Environmental effects

Environmental effects, such as device-to-device ground shifts and conducted emissions can affect the reliable operation of RS-422 and RS-423 interfaces. The best measure of these effects is the common-mode voltage. Common mode voltage is defined differently for RS-422 and RS-423.

According to the RS-422 standard, the common mode voltage at the receiver must be less than 7 volts to ensure reliable operation. The common mode voltage is defined by the sum of ground potential difference between the driver and receiver ground points, common mode noise, and the common mode offset (the drivers common mode voltage).

The RS-423 standard specifies a common mode voltage of 4 volts. In this case, the common mode voltage is defined by the sum of the ground potential difference between the driver and receiver ground points and common mode noise.

Shielded cables

Shielded cables increase the immunity of data communications cables to electromagnetic energy and reduce common mode noise seen by the receiver. They also decrease emissions from the data communications cable.

When using shielded cables, it is advisable to connect the shield to the chassis on the system side only.

Shielded cables are not required by the RS-422 or RS-423 standards.

Limiting the difference between the ground points at the system and the peripheral is important to ensure that the common mode range of the receiver is not exceeded. This is more difficult as distance sbecome greater between the system and the peripheral, and is highly dependent on the environment. It is often necessary to connect the system and peripheral to the same ground point. Otherwise, a large difference in ground potential may develop.

A large ground potential difference may cause permanent damage to a system or to peripherals. Whilst Hewlett-Packard equipment is protected against this kind of damage, no such protection can be one hundred percent effective.

DTC and standard cables

The DTC 72MX and DTC 16xx family provide RS-232-D or RS-423 ports with RJ45, DB25 or Telco 50-pin connectors. The DTC units support the distances provided by the RS-232/RS-423 standards, given in the table below. Additionally, HP has tested, in favourable environmental conditions, the distances given in the final column of the table below. Depending upon your environment, the maximum usable distance will fall between these two figures.

	Conductors	Maximum distance defined by standard	Maximum tested distance
RS-232	3 to 5	15m or 50ft	70m or 230ft
RS-423	4 to 6	200m or 650ft	200m or 650ft

Shielded cables You can use shielded cables to connect the 8-port MDP, or 8-port DDP, to a DTC unit via the 62-pin DTC connector or the Telco 50-pin connector.

Note You cannot use shielded cables to connect the 24-port RJ45 DDP, the 16-port RJ45 DDP, or the 8-port RJ45 breakout panel, to a DTC unit.

Combining different signal types in the same cable bundle

RS-232 and 10BaseT

10BaseT and RS-232 signals can run on twisted pairs enclosed in the same cable bundle without interference to either signal type. Combining 10BaseT and RS-232 signals is supported at the specified maximum distance of RS-232.

RS-232 and RS-423 and telephone cables

RS-232 and RS-423 cannot share the same cable bundle with telephone cables.

RS-423 and 10BaseT

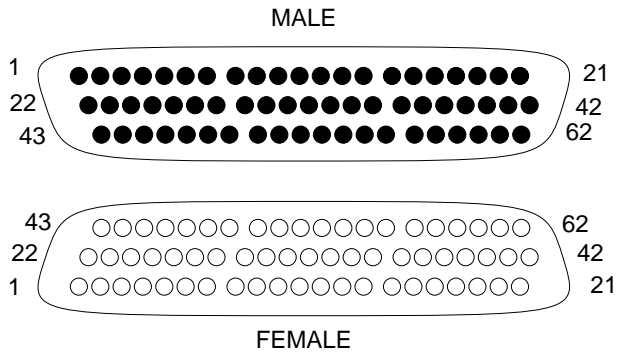
10BaseT and RS-423 signals can run on twisted pairs enclosed in the same cable bundle without interference to either signal type. Combining 10BaseT and RS-423 signals is supported at the lowest value of the specified maximum distance of RS-423 or 10BaseT.

DTC Connectors

DTC 62-pin connector

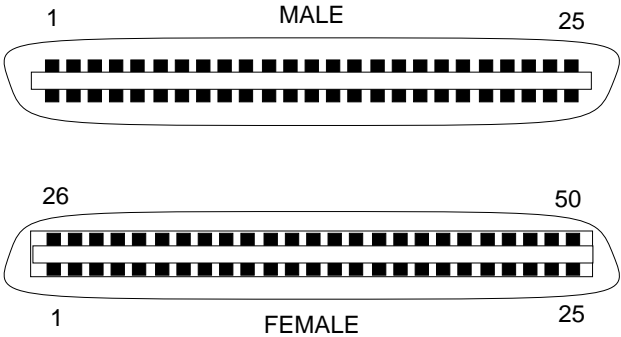
This connector can be purchased from AMP.

HDP-22 Plug Connector	
Plug Enclosure Kit Number	748476-1
Pin Contact Number	748333-2
AMP Insertion/Extraction Tool	91285-1
AMP Hand Crimping Tool	543344-1
AMP Shielding Enclosure Expansion Tools	58241-1,2

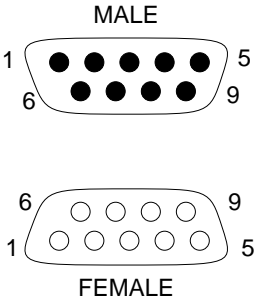


Note The maximum cable diameter is determined by the ferrule used. It is 14.27 mm or .562 inches.

DDP 50-pin Telco connector

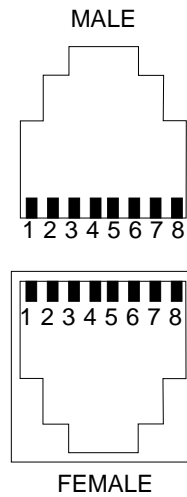


MDP 9-pin connector

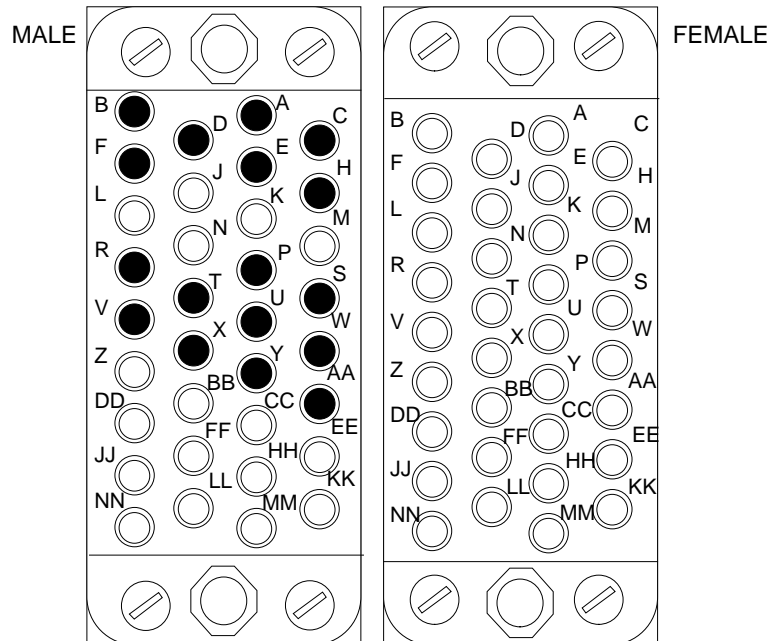


8 DTC Connectors

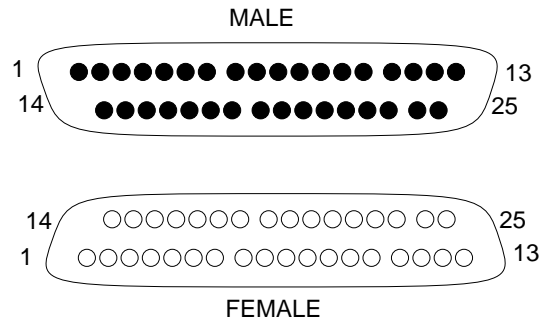
DDP RJ45 connector



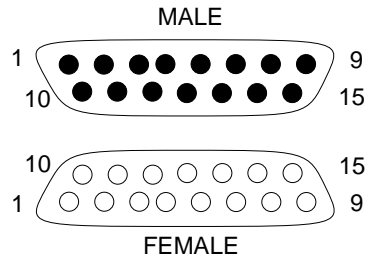
34-pin V.35 connector



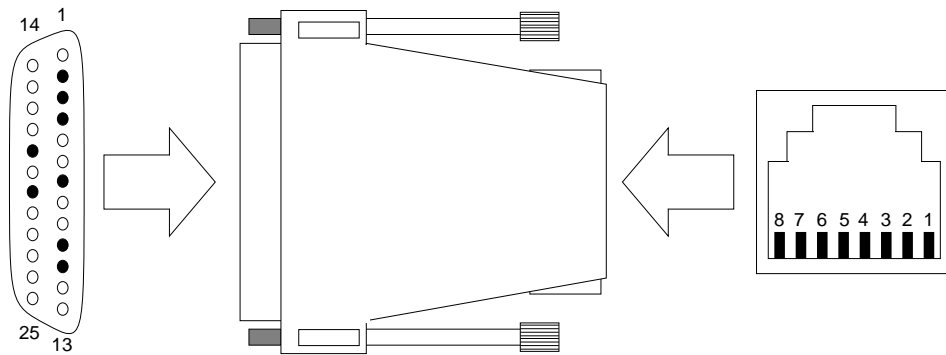
DTC MDP and DDP DB25 connector



15-pin AUI connector



DB25 to RJ45 adaptor



8 DTC Connector Pinouts

DTC Connector Pinouts

DTC 25-pin direct connect RS-232

1 - PGND	-
2 - RD	INPUT
3 - TD	OUTPUT
7 - SGND	-
8 - RTS	OUTPUT
22 - CTS	INPUT

DTC 25-pin modem connect RS-232

1 - PGND	-
2 - RD	INPUT
3 - TD	OUTPUT
4 - DCD	INPUT
5 - GPO	OUTPUT
6 - DTR	OUTPUT
7 - SGND	-
8 - RTS	OUTPUT
20 - DSR	INPUT
22 - CTS	INPUT

DTC 25-pin direct connect RS-423

1 - PGND	-
8 - RTS	OUTPUT
22 - CTS	INPUT
15 - TXb	OUTPUT
17 - TXa	OUTPUT
19 - RXb	INPUT
25 - RXa	INPUT

DTC RJ-45 direct connect RS-232

1 - RD	INPUT
3 - TD	OUTPUT
4 - CTS	INPUT
5 - RTS	OUTPUT
6 - SGND	-

DTC RJ-45 direct connect RS-423

1 - RXa	INPUT
2 - RXb	INPUT
3 - TXa	OUTPUT
4 - CTS	INPUT
5 - RTS	OUTPUT
6 - TXb	OUTPUT

8 DTC Connector Pinouts

V.35 X.25 interface

103a TXA	21
103b TXb	42
104a RXa	20
104b RXb	41
113a TSEb/DTE	61
113b TSEb/DTE	62
114a TSEa/DCE	19
114b TSEb/DCE	40
115a RSEa/DCE	18
115b RSEb/DCE	39
105 RTS	57
106 CTS	4
109 DCD	6
108 DTR	58
107 DSR	46
125 RI	48
102 SG	9
102b RC	47
-	50
-	52
-	22
-	23
-	24
-	25
-	26
-	27
- CA	30
- CB	31
- CC	32
- CD	60
- PG	SHIELD

RS-232-D X.25 interface

103 TX	2
104 RX	3
113 TSE/DTE	24
114 TSE/DCE	15
115 RSE	17
105 RTS	4
106 CTS	5
109 DCD	8
108 DTR	20
107 DSR	6
125 RI	22
102 SG	7
101 SHIELD	1

Cabling Tips

You may find the advice in this section useful when making your own cables, planning a cabling scheme and making cable connections.

Twisted pair cables

When connecting twisted pair cables to cross-connect blocks, keep each pair twisted all the way up to the connecting pins of the cross-connect block. Pairs not kept twisted in this way are susceptible to crosstalk.

When making twisted pair connections, keep conductors of a pair together. Do not form a pair by taking a conductor of one pair and twisting it with a conductor of another pair.

If shielded twisted pair cable is used, it is recommended that the shield is grounded. When the cable is stripped to expose the shield for grounding, any exposed wire pairs should be twisted more tightly to reduce their susceptibility to magnetic interference.

When transmitting RS-232 signals over twisted pair cables, form a pair with TD and SGND, RD and a duplicated SGND or with a modem signal (e.g. RTS for DTC hardware control). Do not form a pair with TD and RD.

Adapting to Cabling Systems

This chapter provides information for using a HP DTC unit with the following cabling systems:

- ATT356A
- 10BaseT
- ATT258A

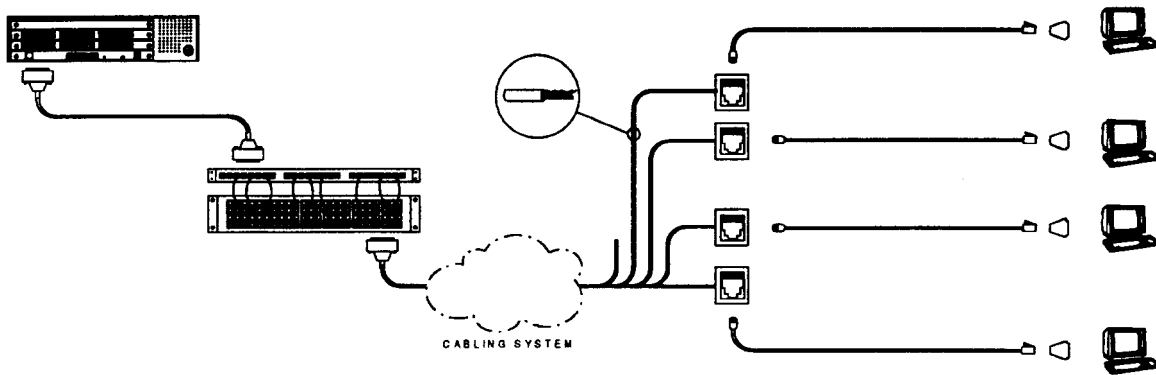
A DTC unit can be linked to devices, such as terminals or printers, using any of the cabling systems listed above. To do this, the DTC can be connected to the cabling system via cross-connect blocks or via an RJ45 patch panel.

On the following pages you will find detailed tables, describing the cross-connect block connections for each of these cabling systems. Information is also provided for the connection to these cabling systems via RJ45 patch panels.

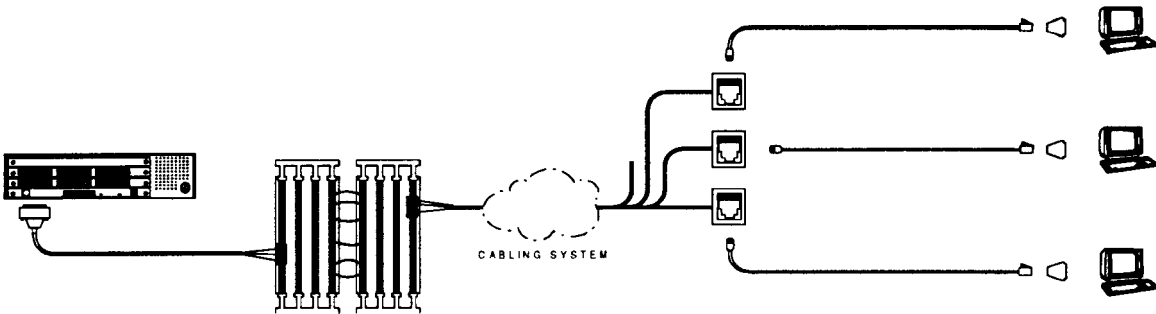
9 DTC-to-Work Area using Cross-Connect Blocks and RJ45 Patch Panels

DTC-to-Work Area using Cross-Connect Blocks and RJ45 Patch Panels

DTC to Work Area using RJ45 Patch Panels



DTC to Work Area using Cross-Connect Blocks



Adapting to ATT356A cabling system

ATT356A is a cabling system using 6 wires per port and provides 8 ports per 25 pair cables (or 50-pin telco-like connectors).

The DTC is directly compatible with the ATT356A cabling system, providing 8 direct connect RS-232 or RS-423 ports on a 50-pin connector. The following table shows a cabling conversion using cross connect blocks (punch down blocks).

DTC Pin # on 50-pin connector	Port number - RS-423/RS232 signal	Jumpers	ATT356A Pin # on 50-pin connector	Port number - RS-423/RS-232 signal	Pin # on RJ45 connector
26	P0 - RTS	<----->	26	P0 - RTS	5
1	P0 - CTS	<----->	1	P0 - CTS	4
27	P0 - RXa/RD	<----->	27	P0 - RXa/RD	1
2	P0 - RXb/-	<----->	2	P0 - RXb/-	2
28	P0 - TXa/TD	<----->	28	P0 - TXa/TD	3
3	P0 - TXb/SGND	<----->	3	P0 - TXb/SGND	6
29	P1 - RTS	<----->	29	P1 - RTS	5
4	P1 - CTS	<----->	4	P1 - CTS	4
30	P1 - RXa/RD	<----->	30	P1 - RXa/RD	1
5	P1 - RXb/-	<----->	5	P1 - RXb/-	2
31	P1 - TXa/TD	<----->	31	P1 - TXa/TD	3
6	P1 - TXb/SGND	<----->	6	P1 - TXb/SGND	6
32	P2 - RTS	<----->	32	P2 - RTS	5
7	P2 - CTS	<----->	7	P2 - CTS	4
33	P2 - RXa/RD	<----->	33	P2 - RXa/RD	1
8	P2 - RXb/-	<----->	8	P2 - RXb/-	2
34	P2 - TXa/TD	<----->	34	P2 - TXa/TD	3
9	P2 - TXb/SGND	<----->	9	P2 - TXb/SGND	6
35	P3 - RTS	<----->	35	P3 - RTS	5
10	P3 - CTS	<----->	10	P3 - CTS	4
36	P3 - RXa/RD	<----->	36	P3 - RXa/RD	1
11	P3 - RXb/-	<----->	11	P3 - RXb/-	2
37	P3 - TXa/TD	<----->	37	P3 - TXa/TD	3
12	P3 - TXb/SGND	<----->	12	P3 - TXb/SGND	6
38	P4 - RTS	<----->	38	P4 - RTS	5

9 Adapting to ATT356A cabling system

DTC Pin # on 50-pin connector	Port number - RS-423/RS232 signal	Jumpers	ATT356A Pin # on 50-pin connector	Port number - RS-423/RS-232 signal	Pin # on RJ45 connector
13	P4 - CTS	<----->	13	P4 - CTS	4
39	P4 - RXa/RD	<----->	39	P4 - RXa/RD	1
14	P4 - RXb/-	<----->	14	P4 - RXb/-	2
40	P4 - TXa/TD	<----->	40	P4 - TXa/TD	3
15	P4 - TXb/SGND	<----->	15	P4 - TXb/SGND	6
41	P5 - RTS	<----->	41	P5 - RTS	
16	P5 - CTS	<----->	16	P5 - CTS	
42	P5 - RXa/RD	<----->	42	P5 - RXa/RD	
17	P5 - RXb/-	<----->	17	P5 - RXb/-	
43	P5 - TXa/TD	<----->	43	P5 - TXa/TD	
18	P5 - TXb/SGND	<----->	18	P5 - TXb/SGND	
44	P6 - RTS	<----->	44	P6 - RTS	
19	P6 - CTS	<----->	19	P6 - CTS	
45	P6 - RXa/RD	<----->	45	P6 - RXa/RD	
20	P6 - RXb/-	<----->	20	P6 - RXb/-	
46	P6 - TXa/TD	<----->	46	P6 - TXa/TD	
21	P6 - TXb/SGND	<----->	21	P6 - TXb/SGND	
47	P7 - RTS	<----->	47	P7 - RTS	
22	P7 - CTS	<----->	22	P7 - CTS	
48	P7 - RXa/RD	<----->	48	P7 - RXa/RD	
23	P7 - RXb/-	<----->	23	P7 - RXb/-	
49	P7 - TXa/TD	<----->	49	P7 - TXa/TD	
24	P7 - TXb/SGND	<----->	24	P7 - TXb/SGND	
50	Not Used	<----->	50	Not Used	
25	Not Used	<----->	25	Not Used	

This conversion can also be achieved using RJ45 patch panels:

DTC Pin # on RJ45 connector	RS-423/RS-232 signal	6-wire ATT356A cable jumpers	ATT356A Pin # on RJ45 connector	RS-423/RS-232 signal	Pair
1	RXa/RD	<----->	1	RXa/RD	2
2	RXb/-	<----->	2	RXb/-	2
3	TXa/TD	<----->	3	TXa/TD	3
4	RTS	<----->	4	RTS	1
5	CTS	<----->	5	CTS	1
6	TXb/SGND	<----->	6	TXb/SGND	3
7	Not Used		7	Not Used	4
8	Not Used		8	Not Used	4

9 Adapting to a 10BaseT cabling system

Adapting to a 10BaseT cabling system

The 10BaseT cabling system uses 4 wires per port and provides 12 ports on a 25 pair cable (or on a 50-pin telco-like connector).

The DTC provides 8 direct connect RS-232 or RS-423 ports on a 50-pin connector. The following table provides a cabling conversion using cross-connect blocks (punch down blocks) from ATT356A to 10BaseT.

DTC Pin # on 50-pin connector	Port number - RS-423/RS232 signal	Jumpers	10BaseT Pin # on 50-pin connector	Port number - RS-423/RS-232 signal	Pin # on RJ45 connector
26	P0 - RTS				
1	P0 - CTS				
27	P0 - RXa/RD	<----->	26	P0 - RXa/RD	1
2	P0 - RXb/-	<----->	1	P0 - RXb/-	2
28	P0 - TXa/TD	<----->	27	P0 - TXa/TD	3
3	P0 - TXb/SGND	<----->	2	P0 - TXb/SGND	6
29	P1 - RTS				
4	P1 - CTS				
30	P1 - RXa/RD	<----->	28	P1 - RXa/RD	1
5	P1 - RXb/-	<----->	3	P1 - RXb/-	2
31	P1 - TXa/TD	<----->	29	P1 - TXa/TD	3
6	P1 - TXb/SGND	<----->	4	P1 - TXb/SGND	6
32	P2 - RTS				
7	P2 - CTS				
33	P2 - RXa/RD	<----->	30	P2 - RXa/RD	1
8	P2 - RXb/-	<----->	5	P2 - RXb/-	2
34	P2 - TXa/TD	<----->	31	P2 - TXa/TD	3
9	P2 - TXb/SGND	<----->	6	P2 - TXb/SGND	6
35	P3 - RTS				
10	P3 - CTS				
36	P3 - RXa/RD	<----->	32	P3 - RXa/RD	1
11	P3 - RXb/-	<----->	7	P3 - RXb/-	2
37	P3 - TXa/TD	<----->	33	P3 - TXa/TD	3
12	P3 - TXb/SGND	<----->	8	P3 - TXb/SGND	6

DTC Pin # on 50-pin connector	Port number - RS-423/RS232 signal	Jumpers	10BaseT Pin # on 50-pin connector	Port number - RS-423/RS-232 signal	Pin # on RJ45 connector
38	P4 - RTS				
13	P4 - CTS				
39	P4 - RXa/RD	<----->	34	P4 - RXa/RD	1
14	P4 - RXb/-	<----->	9	P4 - RXb/-	2
40	P4 - TXa/TD	<----->	35	P4 - TXa/TD	3
15	P4 - TXb/SGND	<----->	10	P4 - TXb/SGND	6
41	P5 - RTS				
16	P5 - CTS				
42	P5 - RXa/RD	<----->	36	P5 - RXa/RD	1
17	P5 - RXb/-	<----->	11	P5 - RXb/-	2
43	P5 - TXa/TD	<----->	37	P5 - TXa/TD	3
18	P5 - TXb/SGND	<----->	12	P5 - TXb/SGND	6
44	P6 - RTS				
19	P6 - CTS				
45	P6 - RXa/RD	<----->	38	P6 - RXa/RD	1
20	P6 - RXb/-	<----->	13	P6 - RXb/-	2
46	P6 - TXa/TD	<----->	39	P6 - TXa/TD	3
21	P6 - TXb/SGND	<----->	14	P6 - TXb/SGND	6
47	P7 - RTS				
22	P7 - CTS				
48	P7 - RXa/RD	<----->	40	P7 - RXa/RD	1
23	P7 - RXb/-	<----->	15	P7 - RXb/-	2
49	P7 - TXa/TD	<----->	41	P7 - TXa/TD	3
24	P7 - TXb/SGND	<----->	16	P7 - TXb/SGND	6
50	Not Used				
25	Not Used				
			42	P7 - RXa/RD	1
			17	P7 - RXb/-	2
			43	P7 - TXa/TD	3
			18	P7 - TXb/SGND	6
			44	P7 - RXa/RD	1
			19	P7 - RXb/-	2

9 Adapting to a 10BaseT cabling system

DTC Pin # on 50-pin connector	Port number - RS-423/RS232 signal	Jumpers	10BaseT Pin # on 50-pin connector	Port number - RS-423/RS-232 signal	Pin # on RJ45 connector
			45	P7 - TXa/TD	3
			20	P7 - TXb/SGND	6
			46	P7 - RXa/RD	1
			21	P7 - RXb/-	2
			47	P7 - TXa/TD	3
			22	P7 - TXb/SGND	6
			48	P7 - RXa/RD	1
			23	P7 - RXb/-	2
			49	P7 - TXa/TD	3
			24	P7 - TXb/SGND	6
			50	P7 - RXa/RD	1
			25	P7 - RXb/-	2

This conversion can also be achieved using RJ45 patch panels:

DTC Pin # on RJ45 connector	RS-423/RS-232 signal	10BaseT cable jumpers (4 wires)	10BaseT Pin # on RJ45 connector	RS-423/RS-232 signal	Pair
1	RXa/RD	<----->	1	RXa/RD	2
2	RXb/-	<----->	2	RXb/-	2
3	TXa/TD	<----->	3	TXa/TD	3
4	CTS		4	Not Used	1
5	RTS		5	Not Used	1
6	TXb/SGND	<----->	6	TXb/SGND	3
7	Not Used		7	Not Used	4
8	Not Used		8	Not Used	4

Adapting to an ATT258A cabling system

The ATT258A cabling system uses 8 wires per port and provides 6 ports per 25 pair cables (or 50-pin telco-like connectors).

The following table provides a cabling conversion using cross connect blocks (punch down blocks) from ATT356A to ATT258A.

DTC Pin # on 50-pin connector	Port number - RS-423/RS232 signal	Jumpers	ATT258A Pin # on 50-pin connector	Port number - RS-423/RS-232 signal	Pin # on RJ45 connector
26	P0 - RTS	<----->	26	P0 - RTS	5
1	P0 - CTS	<----->	1	P0 - CTS	4
27	P0 - RXa/RD	<----->	27	P0 - RXa/RD	1
2	P0 - RXb/-	<----->	2	P0 - RXb/-	2
28	P0 - TXa/TD	<----->	28	P0 - TXa/TD	3
3	P0 - TXb/SGND	<----->	3	P0 - TXb/SGND	6
			29	P0 - Not Used	7
			4	P0 - Not Used	8
29	P1 - RTS	<----->	30	P1 - RTS	5
4	P1 - CTS	<----->	5	P1 - CTS	4
30	P1 - RXa/RD	<----->	31	P1 - RXa/RD	1
5	P1 - RXb/-	<----->	6	P1 - RXb/-	2
31	P1 - TXa/TD	<----->	32	P1 - TXa/TD	3
6	P1 - TXb/SGND	<----->	7	P1 - TXb/SGND	6
			33	P1 - Not Used	7
			8	P1 - Not Used	8
32	P2 - RTS	<----->	34	P2 - RTS	5
7	P2 - CTS	<----->	9	P2 - CTS	4
33	P2 - RXa/RD	<----->	35	P2 - RXa/RD	1
8	P2 - RXb/-	<----->	10	P2 - RXb/-	2
34	P2 - TXa/TD	<----->	36	P2 - TXa/TD	3
9	P2 - TXb/SGND	<----->	11	P2 - TXb/SGND	6
			37	P2 - Not Used	7
			12	P2 - Not Used	8
35	P3 - RTS	<----->	38	P3 - RTS	5
10	P3 - CTS	<----->	13	P3 - CTS	4
36	P3 - RXa/RD	<----->	39	P3 - RXa/RD	1
11	P3 - RXb/-	<----->	14	P3 - RXb/-	2
37	P3 - TXa/TD	<----->	40	P3 - TXa/TD	3

9 Adapting to an ATT258A cabling system

DTC Pin # on 50-pin connector	Port number - RS-423/RS232 signal	Jumpers	ATT258A Pin # on 50-pin connector	Port number - RS-423/RS-232 signal	Pin # on RJ45 connector
12	P3 - TXb/SGND	<----->	15	P3 - TXb/SGND	6
			41	P3 - Not Used	7
			16	P3 - Not Used	8
38	P4 - RTS	<----->	42	P4 - RTS	5
13	P4 - CTS	<----->	17	P4 - CTS	4
39	P4 - RXa/RD	<----->	43	P4 - RXa/RD	1
14	P4 - RXb/-	<----->	18	P4 - RXb/-	2
40	P4 - TXa/TD	<----->	44	P4 - TXa/TD	3
15	P4 - TXb/SGND	<----->	19	P4 - TXb/SGND	6
			45	P4 - Not Used	7
			20	P4 - Not Used	8
41	P5 - RTS	<----->	46	P5 - RTS	5
16	P5 - CTS	<----->	21	P5 - CTS	4
42	P5 - RXa/RD	<----->	47	P5 - RXa/RD	1
17	P5 - RXb/-	<----->	22	P5 - RXb/-	2
43	P5 - TXa/TD	<----->	48	P5 - TXa/TD	3
18	P5 - TXb/SGND	<----->	23	P5 - TXb/SGND	6
44	P6 - RTS		49	P5 - Not Used	7
19	P6 - CTS		24	P5 - Not Used	8
45	P6 - RXa/RD		50	Not Used	
20	P6 - RXb/-		25	Not Used	
46	P6 - TXa/TD				
21	P6 - TXb/SGND				
47	P7 - RTS				
22	P7 - CTS				
48	P7 - RXa/RD				
23	P7 - RXb/-				
49	P7 - TXa/TD				
24	P7 - TXb/SGND				
50	Not Used				
25	Not Used				

This conversion can also be achieved using RJ45 patch panels:

DTC Pin # on RJ45 connector	RS-423/RS-232 signal	ATT258A 8 wire cable jumper	ATT258A Pin # on RJ45 connector	RS-423/RS-232 signal	Pair
1	RXa/RD	<----->	1	RXa/RD	2
2	RXb/-	<----->	2	RXb/-	2
3	TXa/TD	<----->	3	TXa/TD	3
4	CTS	<----->	4	CTS	1
5	RTS	<----->	5	RTS	1
6	TXb/SGND	<----->	6	TXb/SGND	3
7	Not Used		7	Not Used	4
8	Not Used		8	Not Used	4

9 Adapting to an ATT258A cabling system

Connecting to an X.25 Network

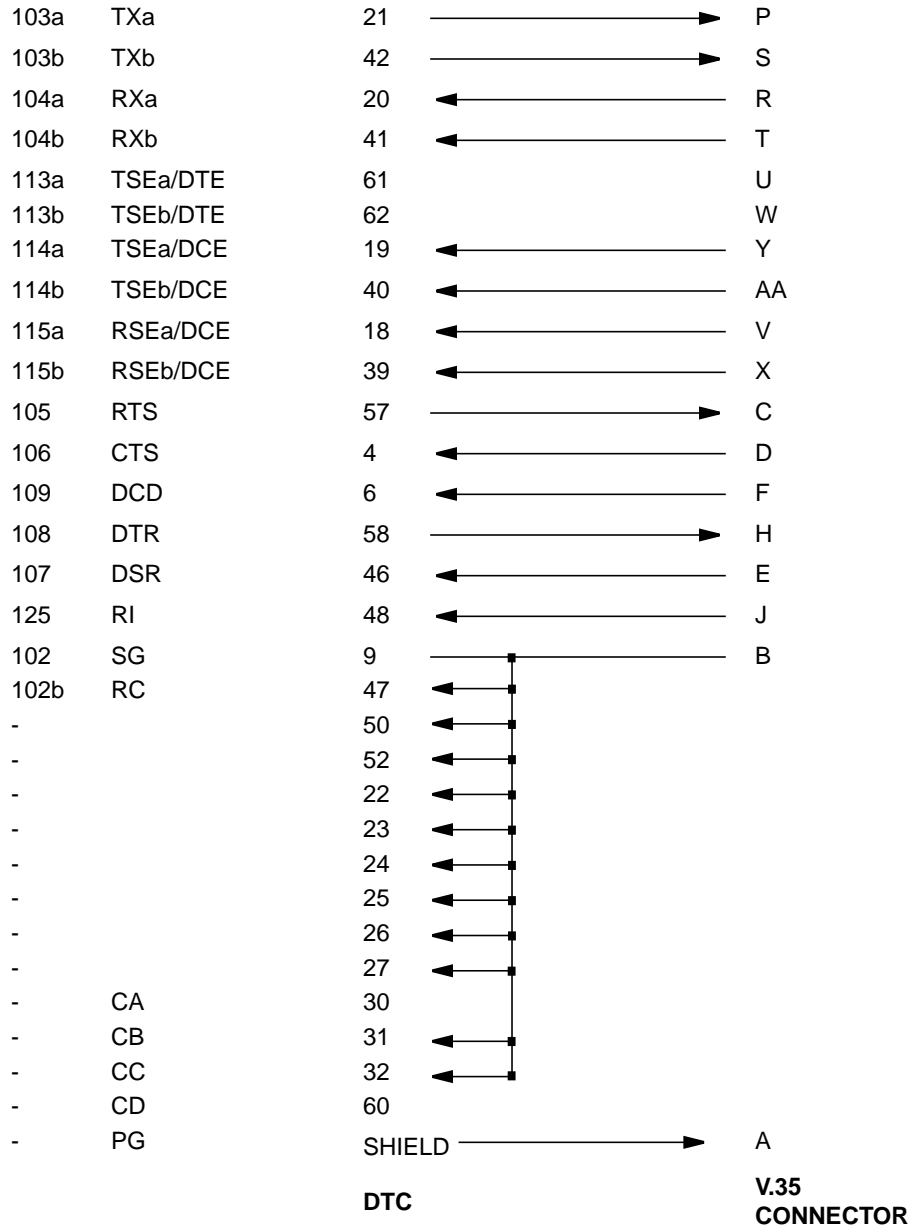
There are two types of X.25 boards available for installation in the DTC 72MX. Each is supplied with an appropriate cable.

Interface	Product/Option	Cable supplied	Max. length
RS-232-D	HP J2079A #1CW	HP 5061-4958	15 meters
V.35	HP J2079A #1CX	HP 28606-63003 (male to male, 6 meters)	15 meters

System to system connections (RS-232-D) require a modem eliminator between systems.

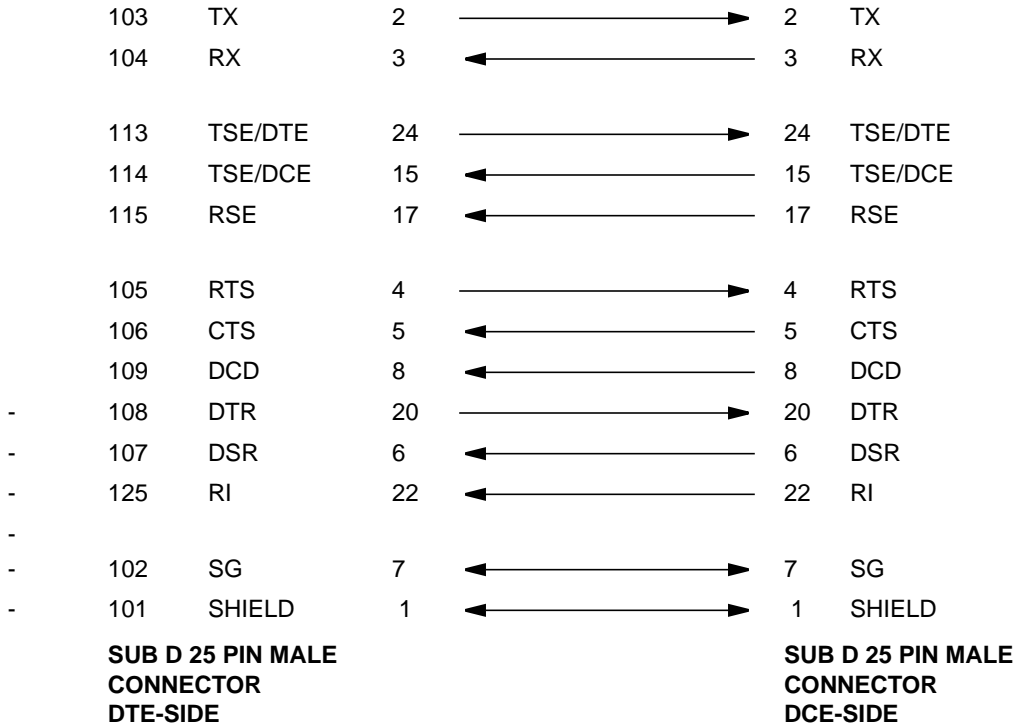
V.35 Cable

Part Number 28606-63003



RS-232-D Cable

Part number 5061-4958



10 RS-232-D Cable

Supported LAN Cables and Transceivers

The DTC can be connected to a Local Area Network via the BNC connector or via the 15-pin Attachment Unit Interface connector. The BNC connector supports connection to ThinLAN networks. The AUI connector can be used to connect via transceivers to ThickLAN, EtherTwist 10BaseT, or Fiber-Optic networks.

Caution

Prior to LAN cable installation, check that the building's power installation complies with the IEC 364 or equivalent local code.

LAN cable runs should not coincide with the path of lightning conductors, and they should preferably be insulated from the outside surfaces of buildings, especially roofing.

No maintenance work should be undertaken while there is a likelihood of an outdoor section of the cable being struck by lightning.

Supported Transceivers

The following transceiver units are recommended:

HP 30241A ThickLAN Medium Attachment Unit

- compatible with IEEE 802.3 Type 10Base5 networks

HP 28685A EtherTwist Medium Attachment Unit

- compatible with IEEE 802.3 Type 10BaseT networks

HP 28683A Fiber-Optic Transceiver

- provides compatibility with IEEE 802.3 FOIRL standard

Supported LAN cables

LAN cables conforming to the IEEE 802.3 Type 10Base2 standard are approved for connection to the ThinLAN BNC connector.

Two cables are supported for the AUI to transceiver (MAU) connection:

HP 92254E

- Thick AUI cable, terminated, 6 meters long. Outer jacket material made of PVC.

HP 92254A

- Thick AUI cable, terminated, 6 meters long. Outer jacket material made of FEP Teflon.

Glossary

asynchronous processor board	A board to which asynchronous devices are connected.
asynchronous device	A terminal, PC in terminal emulation, printer, plotter, modem, etc.
AUI	Attachment Unit Interface, the interface for a ThickLAN connection.
DDP	Direct Distribution Panel. HP product number J2085A #102 or #103 (RJ45), for direct connections only. You connect the devices to the DDP, and the DDF to the DTC.
DTC	Datacommunications and Terminal Controller, HP's family of LAN-based terminal servers.
DTC 16xx family	This family of products includes the DTC 16TN, DTC 16iX and DTC 16MX.
LAN board	The board which carries out the main processing for the DTC and provides the LAN connection.
MDP	Modem Distribution Panel. HP product number J2085A #101, for modem or direct connections. You connect the devices to the MDP, and the MDP to the DTC 72MX.
ThickLAN	A LAN based on a thick coaxial cable and using a variant of the IEEE 802.3 standard known as 10Base5.
ThinLAN	A LAN based on a thin flexible cable and using a variant of the IEEE 802.3 standard known as 10Base2.
X.25 board	The board which provides X.25 and PAD facilities for connecting the DTC to PSNs.

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Documentation Map for HP DTC 72MX and HP DTC 16xx family

Hardware Installation

HP DTC 72MX Communication
Server Installation Guide
(J2070-90001)

DTC 16TN TelnetTerminal Server,
DTC 16iX LAN Multiplexer & DTC
16MX Communications Server
Installation Guide
(5959-4986)

For PC-based Management

HP OpenView DTC Manager 14.1
Software Installation and Upgrade
Guide
(D2355-95016)

HP DTC Network Planning Guide
(D2355-95017)

Using HP OpenView DTC Manager
(D2355-95018)

HP DTC Technical Reference Guide
(D2355-95019)

For HP-UX-based Management

Using the HP DTC
Manager/UX
(J2120-62000)

DTC Device File Access Utilities
and Telnet Port Identification
(B1014-90012)

For MPE-based Management

Configuring Systems for Terminals,
Printers, and other Serial Devices
(inc. NMMGR)
(32022-61000)

Troubleshooting Terminal, Printer,
and other Serial Device
Connections
(32022-61002)

Asynchronous Serial
Communications Programmer's
Reference Manual
(32022-61001)



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