APPENDIX B: CONSTRUCTING A CABLE

This appendix describes construction of the RS-422 cable and RS 232-C straight and crossed cables, and parallel printer and Storage Module Drive interface cables.

RS-422 CLUSTER COMMUNICATIONS CABLE

An RS-422 cluster communications cable connects a Programmable Terminal and other CONVERGENT TECHNOLOGIES workstations and terminals to the MegaFrame system. The cable connects to the MegaFrame system Cluster Processor ports marked "CLUSTER 1A," "CLUSTER 1B," "CLUSTER 2A," "CLUSTER 2B," and serially links the terminals via two connectors on the rear terminal panel marked "CLUSTER COMMUNICATIONS." The terminal at the end of a cluster requires a terminator plug. Figure B-1 shows cluster cabling.

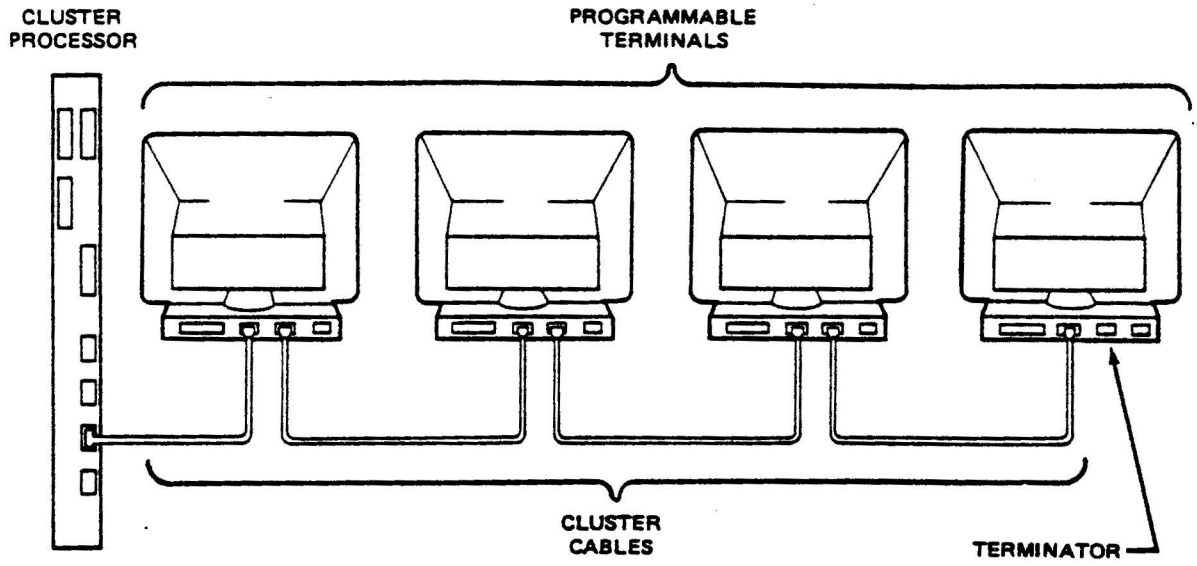


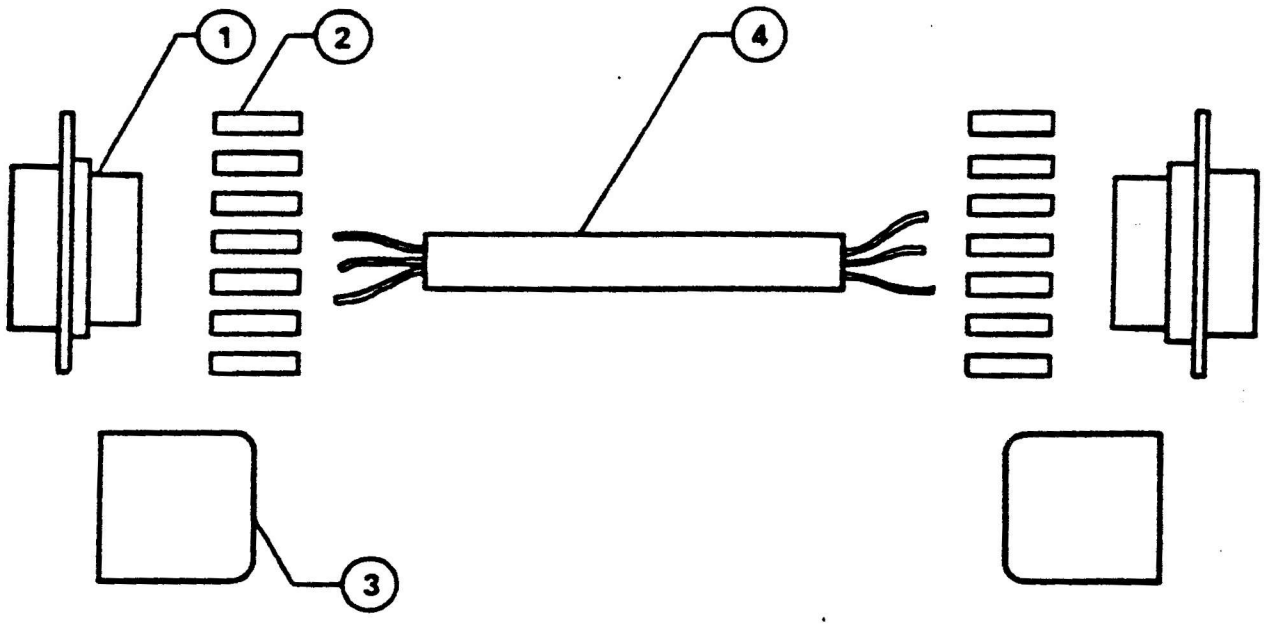
Figure B-1. RS-422 Cluster Cabling

This subsection contains *RS-422 cluster communications*

- Cable assembly
- Terminator assembly
- Cable splice assembly.

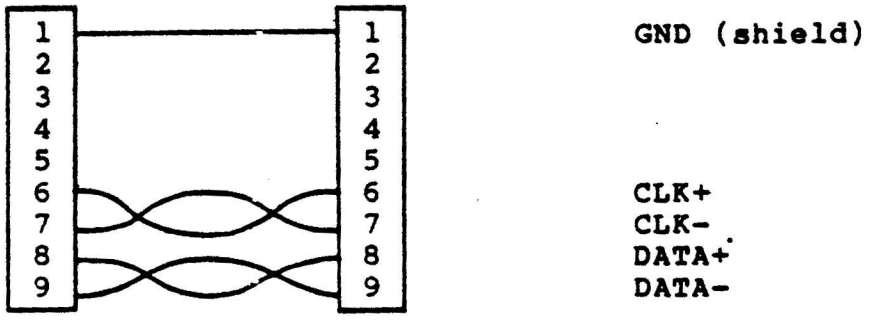
RS-422 Cable Assembly

This cable assembly connects the Programmable Terminal or other terminals to the MegaFrame system. The maximum total length of the cable is 1100 ft (345 m). The minimum cable length between terminals is 25 ft (7.62 m). Figure B-2 shows cable assembly and describes cable components. Figure B-3 shows connector pinouts.



Item	Quantity	Description
1.	2	9-pin D-type plug assemblies (male). Use Amp part number 205204-1 or the equivalent.
2.	10	Connector contacts. Use Amp part number 66507-3 or the equivalent.
3.	2	Connector shell/strain reliefs (hereafter referred to as Connector A and Connector B). Use Amp part number 207908-1 or the equivalent.
4.	50 ft (15.2 m)	4 conductor twisted pair shielded cable. Use Belden part number 9502 or the equivalent.

Figure B-2. RS-422 Cable Assembly and Components

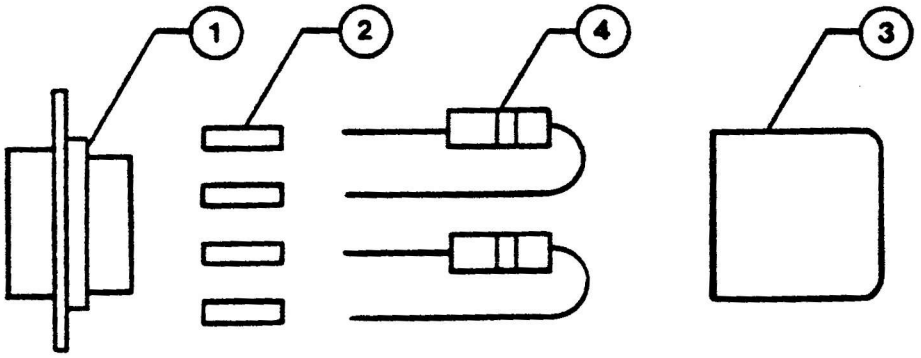


Notes: Pin 1 must be connected to the shield drain wire at both ends. Pins 6 and 7 are a twisted pair; pins 8 and 9 are also a twisted pair.

Figure B-3. RS-422 Connector Pinouts

RS-422 Terminator Assembly

This assembly terminates the cluster communications line and ends a cluster. Figure B-4 shows terminator assembly and describes components. Figure B-5 shows connector pinouts.



Item	Quantity	Description
1.	1	9-pin D-type plug assembly (male). Use Amp part number 205204-1 or the equivalent.
2.	4	Connector contacts. Use Amp part number 66507-3 or the equivalent.
3.	1	Connector shell. Use Amp part number 207908-1 or the equivalent.
4.	2	240-ohm, 1/4-W resistors.

Figure B-4. RS-422 Terminator Assembly and Components

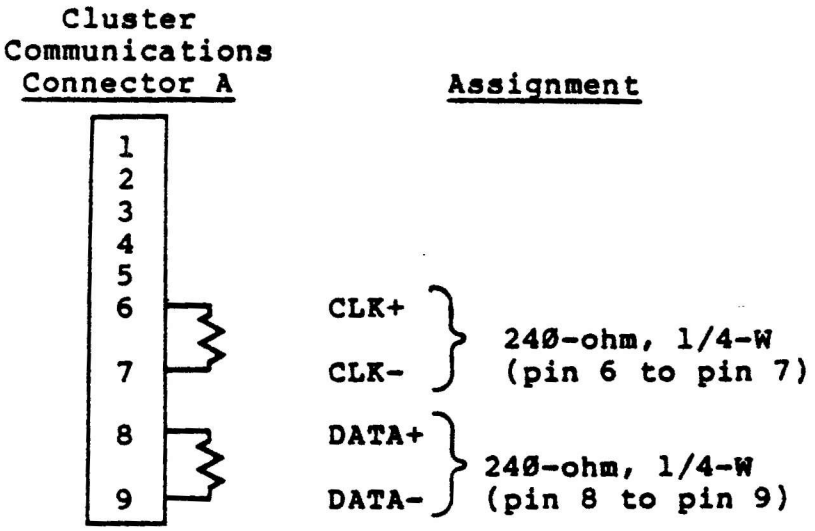
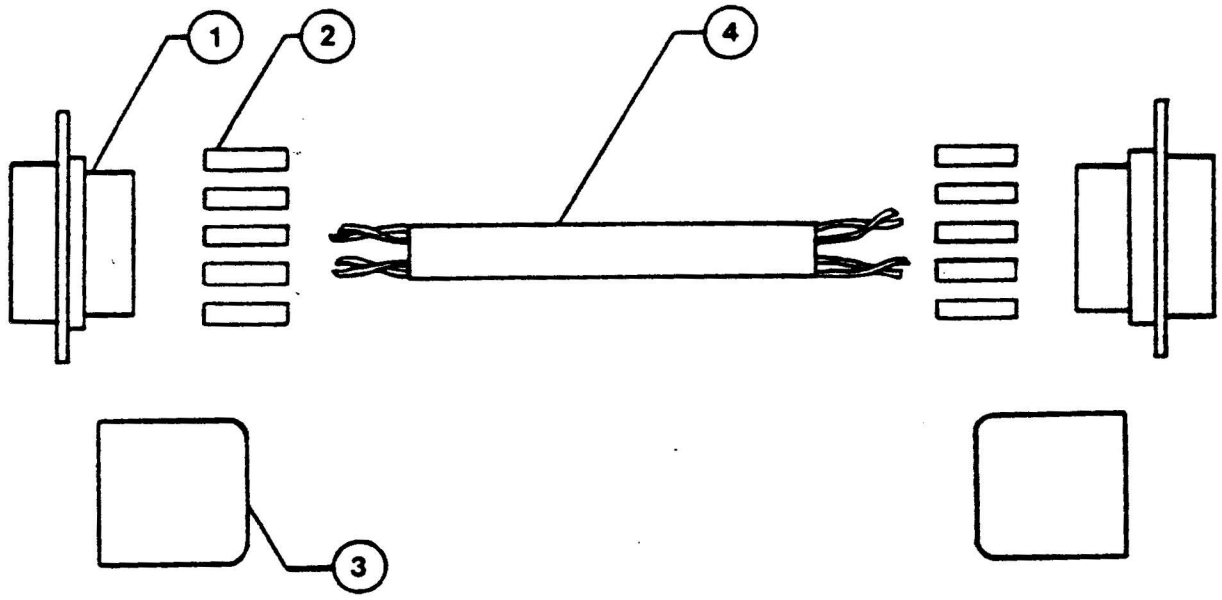


Figure B-5. RS-422 Terminator Connector Pinouts

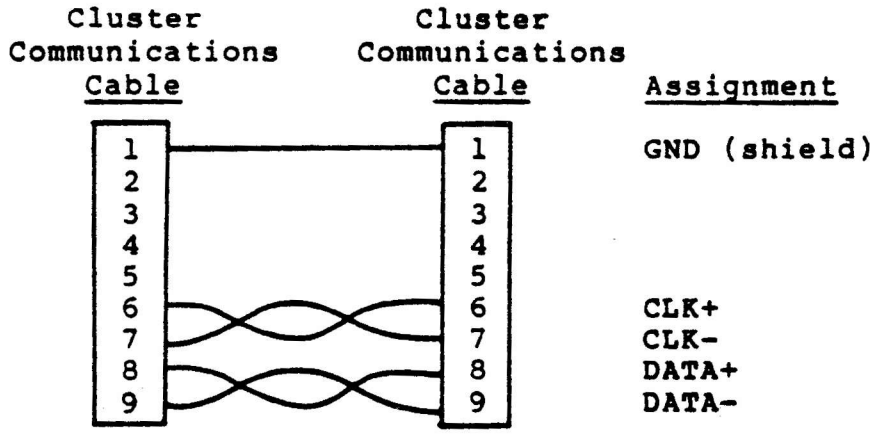
RS-422 Splice Assembly

This cable splice assembly joins two cluster communications cables. Figure B-6 shows splice assembly and describes components, and Figure B-7 shows splice connector pinouts.



Item	Quantity	Description
1.	2	9-pin D-type receptacle assemblies (female). Use Amp part number 205203 or the equivalent.
2.	10	Connector contacts. Use Amp part number 66505-9 or the equivalent.
3.	2	Connector shell/strain reliefs. Use Amp part number 207908-1 or the equivalent.
4.	0.5 ft (0.15 m)	4-conductor twisted pair shielded cable. Use Belden part number 9502 or the equivalent.

Figure B-6. RS-422 Splice Assembly and Components



Notes: Pin 1 must be connected to the shield drain wire at both ends. Pins 6 and 7 are a twisted pair; pins 8 and 9 are also a twisted pair.

Figure B-7. RS-422 Splice Connector Pinouts

RS-232-C SERIAL CABLE

An RS-232-C cable connects peripherials to the MegaFrame system. The cable connects to the MegaFrame system Cluster Processor ports CHANNEL 1-CHANNEL 3, or Terminal Processor ports marked CHANNEL 1-CHANNEL 10 and to a terminal, modem, serial printer, and plotter RS-232-C port. Figure B-8 shows cable connections.

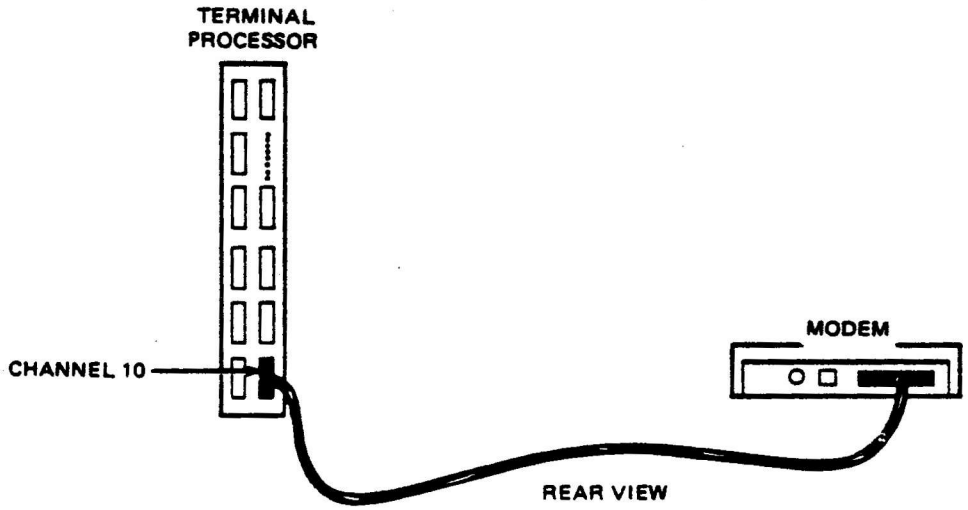


Figure B-8. RS-232-C Serial Cabling

An RS-232-C cable can either be "straight" or "crossed."

A straight cable connects data terminal equipment (DTE), such as the MegaFrame system to data communications equipment (DCE), such as a modem.

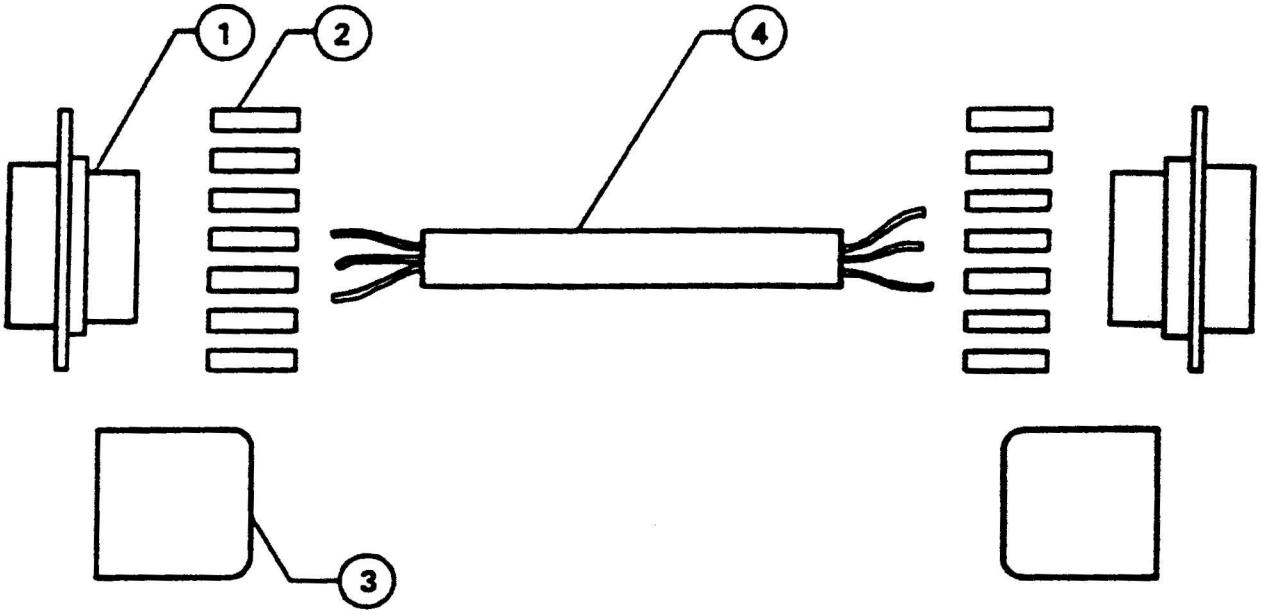
A crossed cable crosses the control and data lines, effectively presenting a "null modem" to each data terminal equipment (DTE). For example, this cable connects two DTEs, the MegaFrame system to a serial printer, terminal, or plotter.

This subsection contains serial communications

- Straight RS-232-C cable assembly
- Crossed RS-232-C cable assembly
- Plotter cable assembly
- Serial printer cable assembly
- RS-232-C communications diagnostic connector assembly.

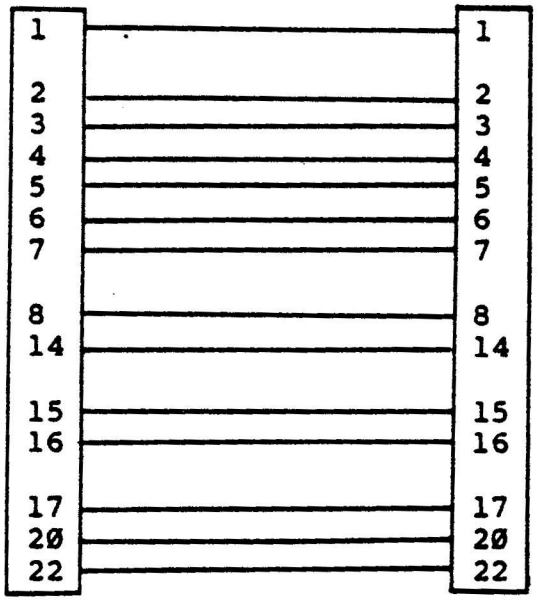
Straight RS-232-C Cable

This assembly connects the the MegaFrame system to data communications equipment (DCE), such as a modem. The maximum length of this cable is 50 ft (15.24 m). Figure B-9 shows cable assembly and describes components, and Figure B-10 shows connector pinouts.



Item	Quantity	Description
1.	2	25-pin D-type plug assemblies (male). Use Amp part number 205208 or the equivalent.
2.	30	Connector contacts. Use Amp part number 66507-3 or the equivalent.
3.	2	Connector shell/strain reliefs. Use Amp part number 207908 or the equivalent.
4.	25 ft (7.62 m)	15-conductor shielded cable. Use Belden part number 9541 or the equivalent.

Figure B-9. Straight RS-232-C Cable Assembly and Components



MegaFrame Connector A	DCE Connector B	Assignment
1	1	Protective Ground (shield)
2	2	Transmit Data
3	3	Receive Data
4	4	Request to Send
5	5	Clear to Send
6	6	Data Set Ready
7	7	Signal Ground (Spare Conductor)
8	8	Carrier Detect
14	14	Secondary Transmit* Data
15	15	Transmit Clock*
16	16	Secondary Receive* Data
17	17	Receive Clock*
20	20	Data Terminal Ready
22	22	Ring Indicator

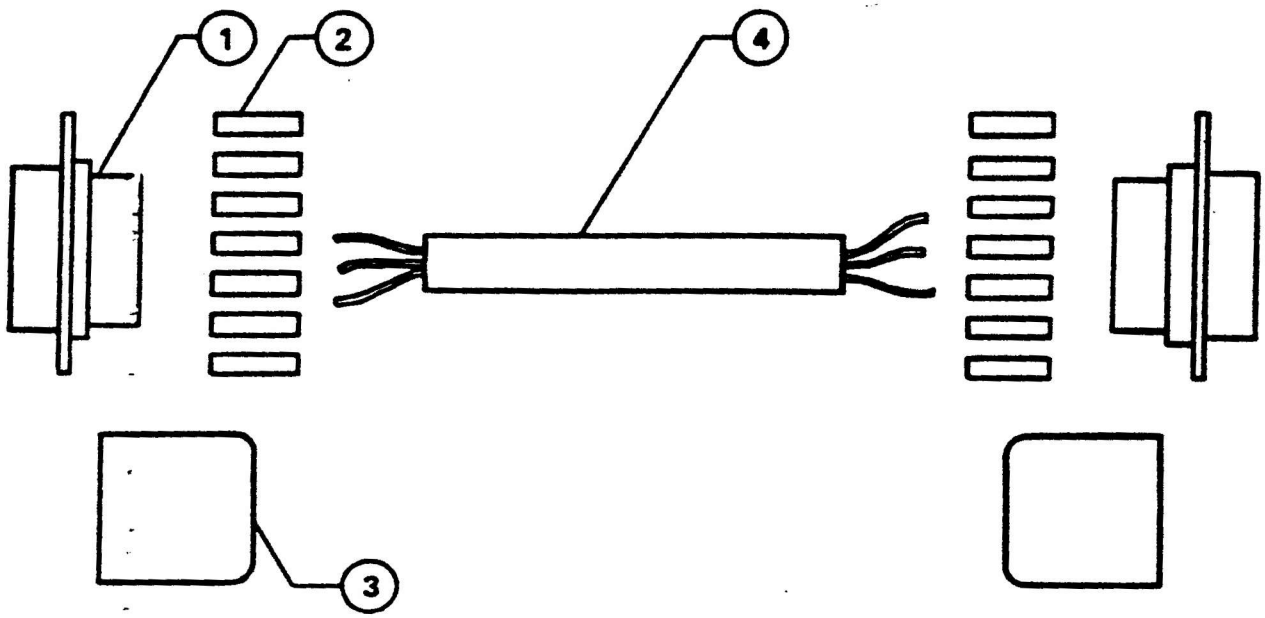
* Only needed for Sync modems

Notes: Pin 1 must be attached to the shield drain wire at both ends. The additional conductor in this cable must be terminated to signal ground (pin 7) at both ends.

Figure B-10. Straight RS-232-C Cable Connector Pinouts

Crossed RS-232-C Cable

This assembly connects the MegaFrame system to data terminal equipment (DTE) such as a serial printer, plotter, and terminal and is used for RS-232-C communications for no flow control or XON/XOFF flow control. The maximum length of this cable is 50 ft (15.24 m). Figure B-11 shows cable assembly and describes components and Figure B-12 shows connector pinouts.



Item	Quantity	Description
1.	2	25-pin D-type plug assemblies (male). Use Amp part number 205208-1 or the equivalent.
2.	18	Connector contacts. Use Amp part number 66507-3 or the equivalent.
3.	2	Connector shell/strain reliefs. Use Amp part number 207908-7 or the equivalent.
4.	25 ft (7.62 m)	3-conductor shielded cable. Use Belden part number 9533 or the equivalent.

Note: Pin 1 must be connected to the shield drain wire at both ends.

Figure B-11. Crossed RS-232-C Cable Assembly and Components

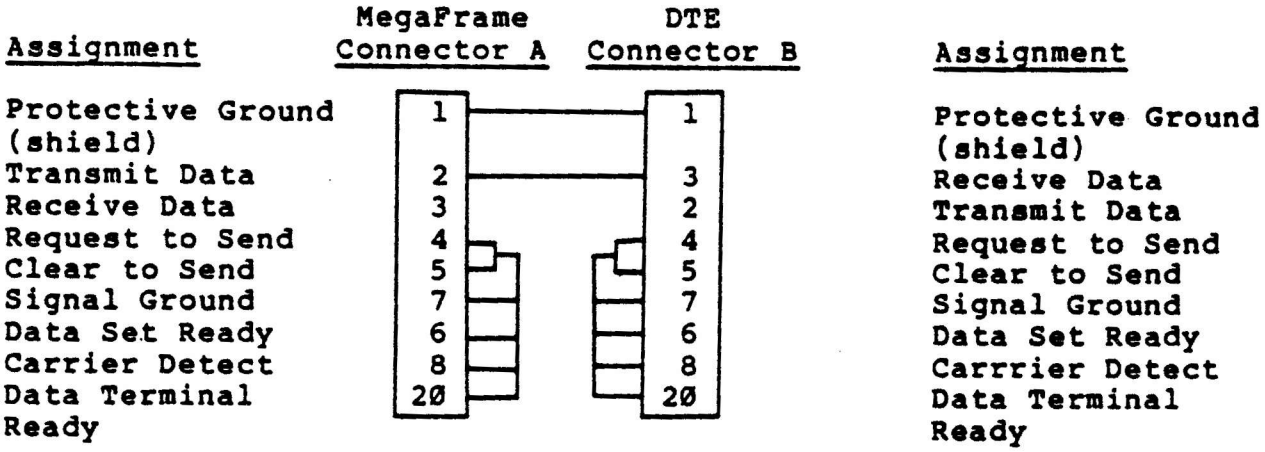


Figure B-12. Crossed RS-232-C Cable Connector Pinouts

Plotters

Use a crossed RS-232-C cable to connect the MegaFrame system to the following plotters:

- Hewlett-Packard Model HP7470A
- Hewlett-Packard Model HP7220C
- Strobe Model 100. This plotter also requires a Strobe Model RS-232-C interface attachment.

Serial Printers

Use a crossed RS-232-C cable to connect the MegaFrame System to a serial printer.

Caution

Connect an RS-232-C serial printer only to a MegaFrame port configured for RS-232-C. Never connect a serial printer to the parallel printer port marked "PRINTER" on the MegaFrame system.

Qume Sprint 5 Serial Printer Cable

The Qume Sprint 5 serial printer does not provide the standard female 25-pin D-type cable connector mounted on the back of the printer. (This connection is, however, standard on the Qume Sprint 9 serial printer, the Diablo 630 HPRO5 printer, and the Diablo 630 SPI printer.)

The Qume Sprint 5 has a 10-conductor cable that is hard-wired to the printer. Figure B-13 shows pin and wire color connections to a male 25-pin D-type connector, which can then be connected to the MegaFrame system.

Connector Pin	Wire Color
1	Black
2	Red
3	Brown
7	Blue
5	Orange
6	
8	
N/C	Yellow
N/C	Green
N/C	Violet
N/C	Grey
N/C	White

Figure B-13. Modified Cable for the Qume Sprint 5 Serial Printer

Diablo 630 HPRØ5 Serial Printer

In certain configurations, the Diablo 630 HPRO5 serial printer has the Printer Ready signal at pin 11 rather than at pin 2Ø of the RS-232-C connector. If the Printer Ready signal is at pin 11, the signal never reaches the system and data is not transmitted to the printer.

If the Printer Ready signal appears at pin 11 of the RS-232-C connector, you can install a jumper between pins 5 and 6 of plug A6Ø on the HPRO5 logic board so the Printer Ready signal appears on pin 2Ø of the RS-232-C connector.

If no jumper is installed, you can modify the printer end of the printer cable so pin 11 has the Printer Ready signal. Figure B-14 shows the original cable connection and the modified cable connection.

When you modify the printer cable, it becomes asymmetric; therefore, you must plug the proper end into the proper device. Since the modified cable may not work for all printer configurations, you may need both types of cables.

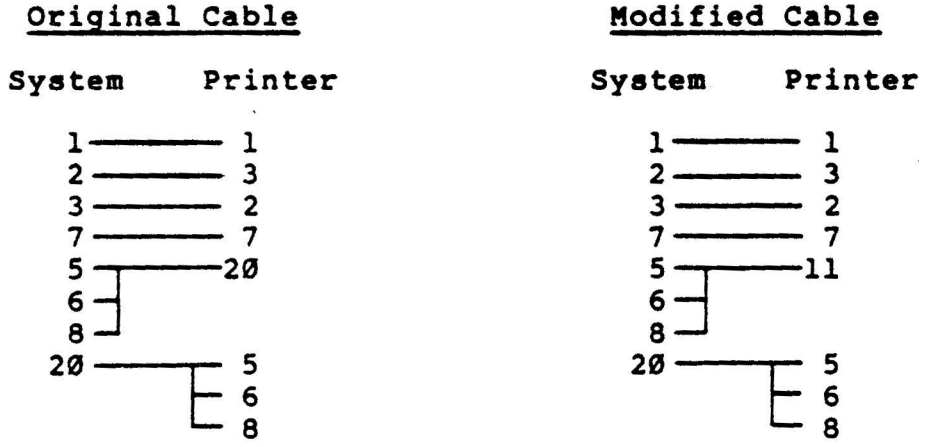
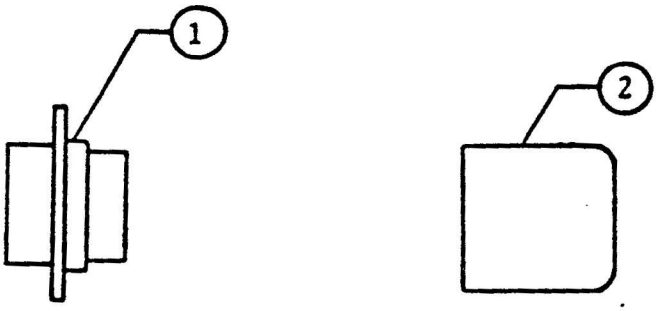


Figure B-14. Modified Cable for the Diablo 630 HPRO5 Serial Printer

RS-232-C Communications Diagnostic Connector

The communications diagnostic connector, when connected to an RS-232-C port on the MegaFrame system, provides simple loopback for running standalone communications diagnostics for RS-232-C configurations. Figure B-15 shows connector assembly and describes components and Figure B-16 shows connector pinouts.

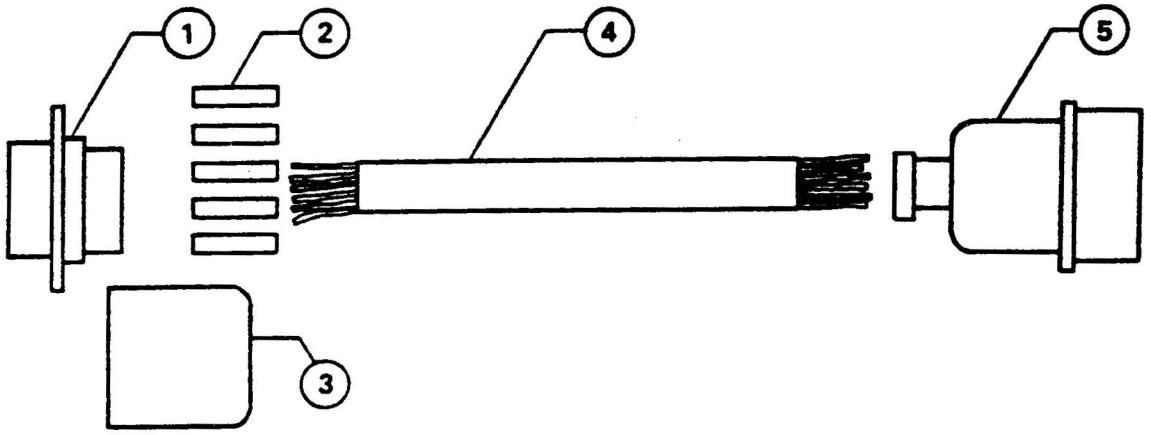


Item	Quantity	Description
1.	1	25-pin D-type plug assembly (male). Use Cannon part number 8Ø26-25P or the equivalent.
2.	1	Connector shell. Use Cannon part number D13-11Ø963-3 or the equivalent.

Figure B-15. Diagnostic Connector Assembly and Components

PARALLEL PRINTER CABLE

A Centronics-type parallel cable connects a parallel printer to the MegaFrame system Cluster Processor and Terminal Processor ports marked "PRINTER." This cable must be 10 ft (3.0 m) minimum length. Longer lengths must be approved by the printer manufacturer. Figure B-17 shows cable assembly and describes components and Figure B-18 shows connector pinouts.



Item	Quantity	Description
1.	1	25-pin D-type plug assembly (male). Use Amp part number 205208-1 or the equivalent.
2.	25	Connector contacts. Use Amp part number 66507-3 or the equivalent.
3.	1	Connector shell/strain relief. Use Amp part number 207908-7 or the equivalent.
4.	10 ft (3.0 m)	30-conductor shielded cable. Use Belden part number 9515 or the equivalent.
5.	1	36-pin "Blue Ribbon" type connector assembly (male). Use Amp part number 57-30360 or the equivalent.

Figure B-17. Parallel Printer Cable Assembly and Components

MegaFrame Connector A	Line Printer	Assignment
1	2	DATAØ+
1Ø	2	GND
2	3	DATA1+
1Ø	21	GND
3	4	DATA2+
1Ø	22	GND
4	5	DATA3+
11	23	GND
5	6	DATA4+
11	24	GND
6	7	DATA5+
11	25	GND
7	8	DATA6+
11	26	GND
8	9	DATA7+
12	27	GND
14	1	STROBE-
15	19	GND
16	1Ø	ACKNLG-
15	28	GND
17	11	BUSY+
15	29	GND
22	13	SLCT+
9	14	GND
21	12	PE+
9	16	GND
25	17	CHASSIS GND (shield)
12	14	GND (spare conductor)
12	14	GND (spare conductor)
9	16	GND (spare conductor)
9	16	GND (spare ocnductor)

Notes: Connect chassis ground to the shield drain wire at both ends.

A twisted pair consists of a signal and a ground i.e., DATAØ+ (connector A pin 1) and ground (connector A pin 1Ø).

All four unused conductors must connect to a ground at both ends.

Strip back the vinyl insulation at the 36-pin printer connector so that the metal strain relief clamps down on the conducting shield.

Figure B-18. Parallel Printer Cable Connector Pinouts

MegaFrame Connector A	Line Printer	Assignment
1	2	DATAØ+
10	20	GND
2	3	DATA1+
10	21	GND
3	4	DATA2+
10	22	GND
4	5	DATA3+
11	23	GND
5	6	DATA4+
11	24	GND
6	7	DATA5+
11	25	GND
7	8	DATA6+
11 12	26	GND
8	9	DATA7+
12	27	GND
14	1	STROBE-
15	19	GND
16	10	ACKNLG-
15	28	GND
17	11	BUSY+
15	29	GND
22	13	SLCT+
9	14	GND / AUTO FEED
21	12	PE+
9	16	GND
25	17	CHASSIS GND (shield)
12	14	GND (spare conductor)
12	14	GND (spare conductor)
9	16	GND (spare conductor)
9	16	GND (spare ocnductor)

Notes: Connect chassis ground to the shield drain wire at both ends.

A twisted pair consists of a signal and a ground i.e., DATAØ+ (connector A pin 1) and ground (connector A pin 1Ø).

All four unused conductors must connect to a ground at both ends.

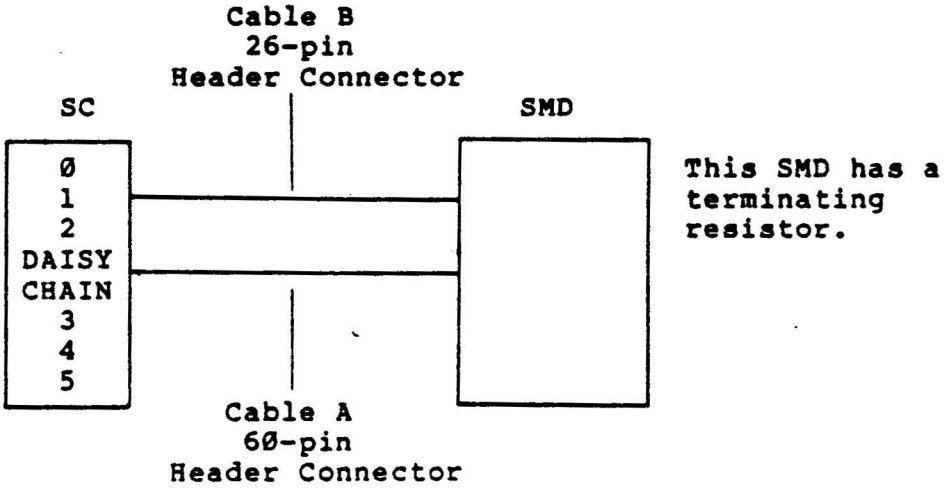
Strip back the vinyl insulation at the 36-pin printer connector so that the metal strain relief clamps down on the conducting shield.

Figure B-18. Parallel Printer Cable Connector Pinouts

STORAGE MODULE DRIVE CABLE

A storage module drive (SMD) cable connects a storage module drive to the MegaFrame system. You can connect up to six SMDs to the Storage Controller (SC) board. Figure B-19 shows cable connection. Figures B-20 and B-21 show assembly and components for cable A and cable B, respectively. Tables B-1 and B-2 show connector pinouts for cable A and cable B, respectively.

One SMD connected to the SC.



Four SMDs connected to ports 0-3 on the SC.

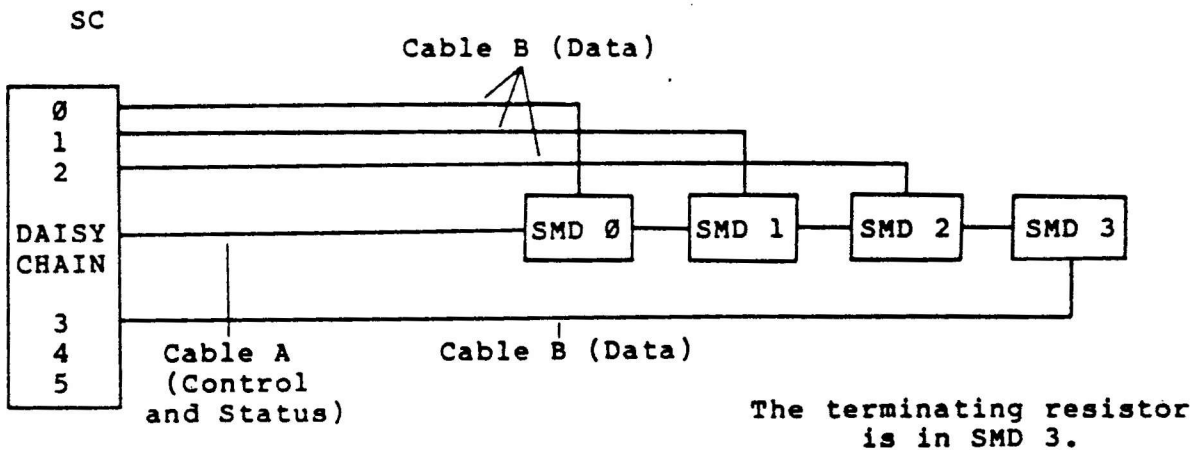
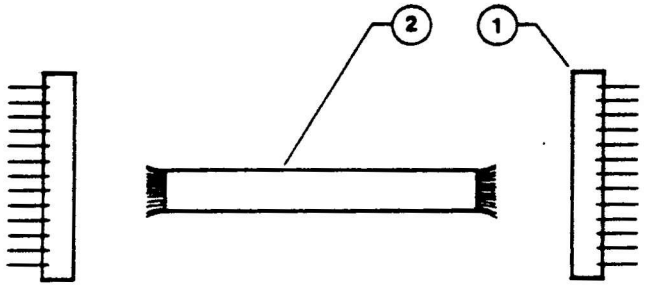


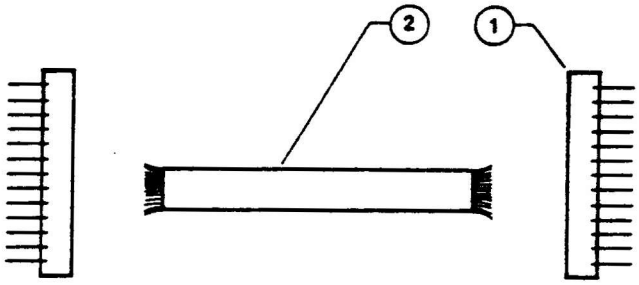
Figure B-19. SMD Cable Connection



Item	Quantity	Description
1.	2	60-pin socket connector. Use 3M part number 3334-6000.
2.		Non-grounded #28 AWG stranded flat cable. Use 3M part number 3365/60. OR Grounded #28 AWG stranded flat cable. Use 3M part number 3469/60. (Grounded cable is recommended for this connection.)

Note: The maximum length for this cable is 82 ft (25 m).

Figure B-20. SMD Cable A Assembly and Components



Item	Quantity	Description
1.	2	26-pin socket connector. Use 3M part number 3399-6000.
2.		Nongrounded #28 AWG stranded flat cable. Use 3M part number 3365/26. OR grounded #28 stranded flat cable. Use 3M part number 3469-26. (Grounded cable is recommended for this connection.)

Note: The maximum length for this cable is 49.2 ft (15 m).

Figure B-21. SMD Cable B Assembly and Components

Cable A and Cable B pinouts, listed below, are the same when connecting either one SMD or six SMDs to the SC Controller.

Table B-1. Cable A Pinouts

SMD Cable A (60-pin)	Signal
49	URDY+
19	URDY-
47	ONCYL+
17	ONCYL-
46	SKER+
16	SKER-
45	FLT+
15	FLT-
58	WPRT+
28	WPRT-
48	IDX+
18	IDX-
50	AMFND+
20	AMFND-
34	BUS0H
4	BUS0L
35	BUS1H
5	BUS1L
36	BUS2H
6	BUS2L
37	BUS3H
7	BUS3L
38	BUS4H
8	BUS4L
39	BUS5H
9	BUS5L
40	BUS6H
10	BUS6L
41	BUS7H
11	BUS7L
42	BUS8H
12	BUS8L
43	BUS9H
13	BUS9L
26, 27, 44	CHRDY+
14, 56, 57	CHRDY-
33	TAG3+
3	TAG3-
31	TAG1+
1	TAG1-
32	TAG2+
2	TAG2-

Table B-1. Cable A Pinouts, continued

SMD Cable A (60-pin)	Signal
53	USELØ+
23	USELØ-
52	USTAG+
22	USTAG-
55	SECTOR+
25	SECTOR-
51	BUSY+
21	BUSY-
24	USEL1-
54	USEL1+
29	GND

Table B-2. Cable B Pinouts

SMD Cable B (26-pin)	Signals
Drives Ø-5	
14	SKØ+
2	SKØ-
17	RKØ+
5	RKØ-
19	WKØ+
6	WKØ-
16	RDDØ+
3	RDDØ-
20	WDDØ+
8	WDDØ-
9	SØSEL+
22	SØSEL-