DIGITAL CLOCK DISTRIBUTOR

523

INSTALLATION

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1. GENERAL

1.01 This section provides instructions for installing the Digital Clock Distributor 523 (DCD-523) System.

1.02 This section has been reissued for the reasons listed below. Changes and additions are marked with change bars.

- Added TO-EAN card.
- Replaced master/expansion shelf ribbon cables p/n 060-40004-01 and p/n 060-40004-10 with master/expansion shelf ribbon cables p/n 060-40004-12 and p/n 060-40004-14, respectively.
- Updated Figures 21, 22, 23, 33, 34, 35, 36, 37, 38, and 39.
- Updated Tables B, D, E, and S.
- Added Figures 13 and 14, and Tables F, G, H, I, and J.
- Replaced standard MRC-EA card and standard MRC-T card with MRC-EA^{V5} card and MRC-T^{V5} card throughout document.
- Replaced standard MIS card with MIS^{V5} card throughout document.
- Replaced standard PSM-EA card and standard PSM-T card with PSM-EA^{V5} card and PSM-T^{V5} card throughout document.
- Added more MRC card part numbers.

1.03 All product names, service marks, trademarks, and registered trademarks used in this document are the property of their respective owners.

1.04 The DCD-523 System consists of a single universal shelf that can serve as either a master or an expansion shelf. For this reason, the term "expansion shelf" in this document will refer to the DCD-523 universal shelf used in an expansion shelf capacity, and the term "master shelf" refers to the DCD-523 universal shelf used in a master shelf capacity.

1.05 The following acronyms are used in this document:

ACO	alarm cutoff
AWG	American wire gauge
CAS	channel associated signaling
CC	composite clock
CCS	common channel signaling
CI	Clock Input
CRC	cyclic redundancy check
D4	D4 framing format
DCD	Digital Clock Distributor
DDF	Digital Distribution Frame
DS1	Digital service, level 1 (1.544 Mb/s)
DSX-1	Digital cross-connect, Level 1
E1	European Signal, Level 1 (2.048 Mb/s)
ESCIU	E1 Synchronous Clock Insertion Unit
ESD	electrostatic discharge
HS	hot spare card or slot
LNC	Local Node Clock
LOS	loss of signal
SCIU	Synchronous Clock Insertion Unit
T1	1.544 Mb/s pulse code modulation system (U.S.A.)
TL1	Transaction Language 1
TNC	Transit Node Clock
TO	Timing output card or slot

Notes:

1. Where information is common to the MRC-EA^{V5} (p/n 090-45010-56, -57), MRC-T^{V5} (p/n 090-45010-53, -54, -58), MRC-EA (p/n 090-45010-06, -07, -09), MRC-T (p/n 090-45010-03, -08), ACI, CI-EA, CI, DCIM-T, and DCIM-EA cards, these cards are collectively referred to as clock input cards.
2. Where information is common to the MRC-EA^{V5}, MRC-T^{V5}, MRC-EA, and MRC-T cards, these cards are collectively referred to as MRC cards.
3. Where information is common to the MIS^{V5} (p/n 090-45018-05) and MIS (p/n 090-45018-04 and 090-45018-14) cards, these cards are collectively referred to as MIS cards.
4. Where information is common to the PSM-E^{V5} (p/n 090-45025-52), PSM-EA^{V5} (p/n 090-45025-54), PSM-T^{V5} (090-45025-51), PSM-E (p/n 090-45025-02), and PSM-T (p/n 090-45025-01 and 090-45025-53) cards, these cards are collectively referred to as PSM cards.
5. Where information is common to the TNC-E, TNC, LNC, ST2E, and the ST3E cards, these cards are collectively referred to as clock cards.
6. Where information is common to the TNC-E and the ST2E cards, these cards are collectively referred to as rubidium clock cards.
7. Where information is common to the TNC, LNC, and ST3E cards, these cards are collectively referred to as quartz clock cards.
8. "Interface panel" is used when referring to either the input/output panel of the master shelf or the output panel of the expansion shelf.
9. The Enhanced Transit Node Clock (TNC-E) card and the Enhanced Stratum-2 (ST2E) clock card are identical in specifications, functions, controls and indicators, and acceptance test procedures. The TNC-E name uses ITU standard terminology; the ST2E name uses ANSI standard terminology. The TNC-E and ST2E are interchangeable.

1.06 Information regarding different revisions of DCD-523 backplanes are included in this document. Both revisions are almost identical, with the exception of the CLOCK STATUS A and B terminal sets, and the grounding of TB12 and TB13.

1.07 In Rev. D or earlier shelves, the CLOCK STATUS (A and B) RTN (SR) lead is common for each CLOCK STATUS (A and B) terminal set. The shield (S) terminals on TB12 and TB13 for input references 1 through 5 and CCK are directly connected to frame ground.

1.08 For this reason, because the input reference cable shield leads are connected to frame ground at the signal source end, i.e., at the DSX-1, the shield lead of the cable must not be connected to the S terminal at TB12 or TB13.

1.09 On Rev. E or later shelves, the shield (S) terminals on TB12 and TB13 are capacitively coupled to frame ground. It is recommended that the shield lead of the cable also be connected to the (S) lead on TB12 and TB13 on these shelves, and also connected to ground at the source end.

Note: Most procedures performed in this document apply to all revisions. In the event different procedures are required, these shall be noted accordingly.

2. SHELF INSTALLATION

A. Required Tools and Materials

2.01 The following items are needed for installing the DCD-523 System:

- Flat-blade screwdriver (small and medium)
- Phillips screwdriver (large and medium)
- Flat-nose pliers
- Cable cutting and stripping tools
- Wire-wrap/unwrap tool
- Multimeter with high-impedance inputs and clip-type probes
- Spade/ring-terminal crimp tool for 50.8 mils, 1.29 mm (16 AWG) stranded wire
- 25 W soldering iron (optional)
- Fine-grain sandpaper (for removing paint under ground stud)
- Conductive antioxidant (for all connections)
- Plastic tie-wrap tightening and cutting tool for miniature, intermediate, and standard size tie-wraps

B. Unpacking

2.02 This section provides guidelines and instructions for unpacking the equipment and returning damaged equipment.

Warning: When handling cards, use local office procedures regarding electrostatic discharge (ESD), including the following:

- Use grounded wrist straps connected to equipment frame ground when handling cards.
- Store cards only in antistatic packaging provided by the factory.

2.03 Save packing material. All equipment returned *must be packed in the original packing material*. *Returned equipment not packed in original packing material voids warranty*. Contact your local Symmetricom distributor, or call Symmetricom's Customer Service Department if additional packaging is needed at one of the following:

+44 1483 510300 (U.K.)

+1 408 428 7907 (U.S.A.)

Note: The following toll-free number is available in some countries to access the CTAC office in the U.S.A.:

+1 888 367 7966 (U.S.A.)

2.04 The DCD-523 System is shipped in several boxes. One box contains a bare shelf (card chassis), hardware kit, and manual; one box contains the interface panel and mounting hardware; one box contains the cards. Each card is packed in its own carton inside a large box. Other boxes, if any, contain TNC-E or ST2E clock cards, each packed in its own box.

1. Unpack equipment carefully; check for completeness against the purchase order. (Be sure to save the packing material.)
2. Notify your local Symmetricom distributor, or Symmetricom's Customer Service Department if any of the items are missing.
3. Inspect equipment for shipping damage, including bent or loose hardware, and broken connectors. Visually inspect the front and rear panels for damage; if extensive damage is found, remove the panels and inspect inside for damage
4. Notify your local Symmetricom distributor, or Symmetricom's Customer Service Department

and the carrier if equipment was damaged in transit.

C. Site Preparation

Caution: The DCD-523 System should not be installed near large motors, generators, transformers, or other equipment which radiate strong magnetic fields. Placing the DCD-523 near such equipment will not ensure proper operation.

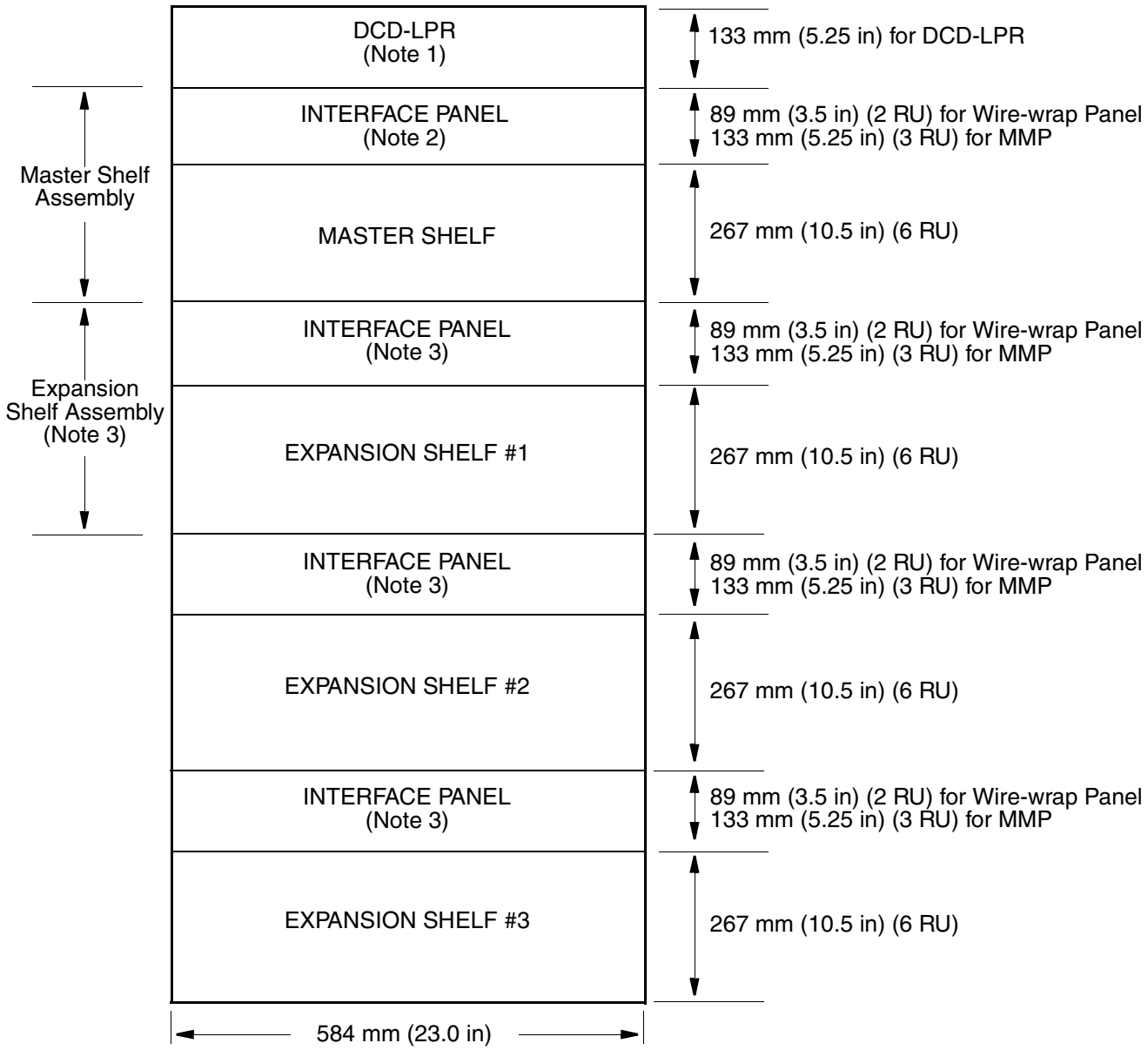
2.05 The DCD-523 is installed in a standard 584 mm (23 inch) rack with either 44.5 mm (1.75 inch) or 50.8 mm (2.0 inch) rack unit (RU) mounting screw holes.

2.06 This section assumes that a site survey was performed and Installation Job Specifications were developed by the local company as supplements to this section. The Installation Job Specifications should contain the following:

- The number of shelf assemblies to be installed
- The racks and rack positions where the shelf assemblies are to be installed
- Power and frame ground connections between the office and the shelves
- Cable routing lists for power, ground, inputs, and outputs
- Options for cards and placement of cards
- Which timing outputs will time which network elements (NE)
- Timing lines to be monitored, if any

2.07 Each system consists of a master shelf and up to three expansion shelves. Each shelf assembly (master and expansion) consists of a shelf and an interface panel (see Figure 1). Additional interface panels may be added to each shelf as required.

2.08 If two racks are required for mounting, the racks must be mounted adjacent and as close as possible to keep the cable length as short as possible. Refer to local company documents for ribbon cable runs between equipment bays, if permitted.



Notes:

1. The optional DCD-LPR is typically mounted at the top of the rack.
2. A fully equipped master shelf with TNC, LNC, or ST3E cards requires two interface panels.
3. A fully equipped unprotected expansion shelf requires two interface panels.
4. The rack need not be equipped with all the shelves shown in this figure.

Figure 1. DCD-523 Rack Layout

D. Shelf and Interface Panel Mounting

2.09 Mount a DCD-LPR at the top of the rack. If a DCD-LPR is not part of the installation, mount the mount the master shelf assembly at the top of the rack.

2.10 The DCD-523 shelves (master and expansion) and interface panel(s) can be positioned to the rear of the rack rail for flush mounting (Figure 2A) or to the front of the rack rail for offset mounting (Figure 2B). Perform mounting as specified in the local company Installation Job Specification as follows:

1. Refer to Figure 2, and position and install the mounting ears as required by local company Installation Job Specifications.

2. Mount the master shelf interface panel at the top of the rack using the screws provided. Mount to the rear rail of the rack if flush mounting is desired; to the front rail of the rack for offset mounting (127 mm [5 inches] from the front of the rack). The mounting holes should be aligned so that at least two screws on each side can be installed. (See Figures 3 through 7 for interface panels.)

   Note: If a second interface panel is required to increase output or monitored input capability, a second panel must be mounted. Mount the second interface panel below the first interface panel, ensuring there is 1 RU (44.5 mm [1.75 inch]) distance between the two interface panels.

3. Mount the master shelf below the interface panel(s), ensuring that there is 1 RU distance between the interface panel and the shelf. Attach the shelf to the rear rail of the rack if flush mounting is desired; to the front rail of the rack for offset mounting. The mounting holes should be aligned so that at least four screws on each side can be installed.

   Note: The interface panel and the shelf must both be mounted with the connectors facing the same direction (both front-mounted or both rear-mounted).

4. Repeat Steps 1 and 2 for the first expansion shelf (if applicable), mounting the interface panel for expansion shelf #1 under the master shelf, and then the expansion shelf. (Ensure that there is 1 RU distance between the interface panel and the shelf.)

   Note: At initial installation, if the number of timing outputs and monitored inputs for the expansion shelf only requires one interface panel, consider leaving an additional space *above* the interface panel for future installation of a second interface panel. (Leave approximately 4 RUs for a modular mounting panel (MMP), or 3 RUs for a wire-wrap panel; this includes 1 RU of space between the interface panels.)

5. Repeat for expansion shelves #2 and #3, if applicable.

6. Repeat Steps 1 through 5 for a remote system, if applicable.

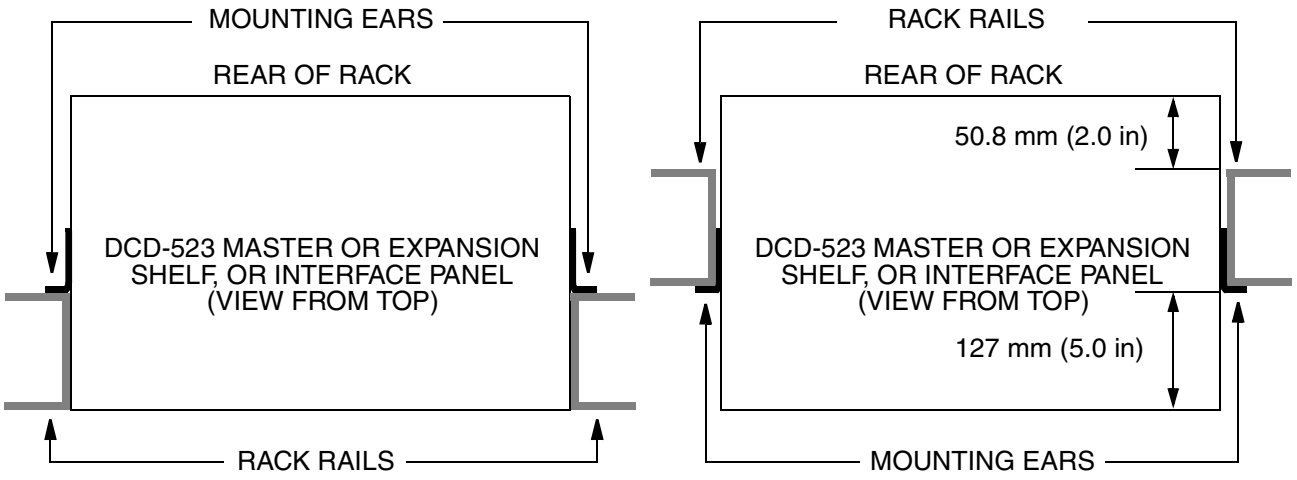


Figure 2. Mounting Positions

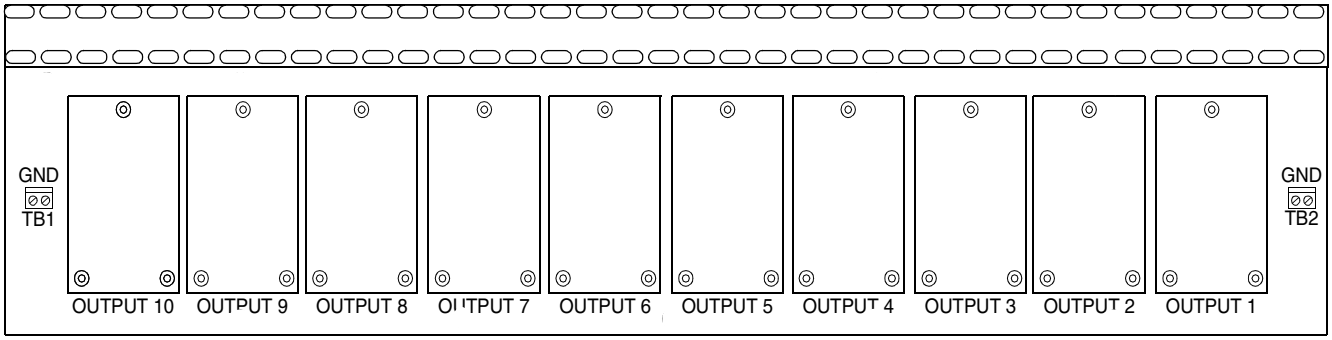


Figure 3. ANSI-Class MMP

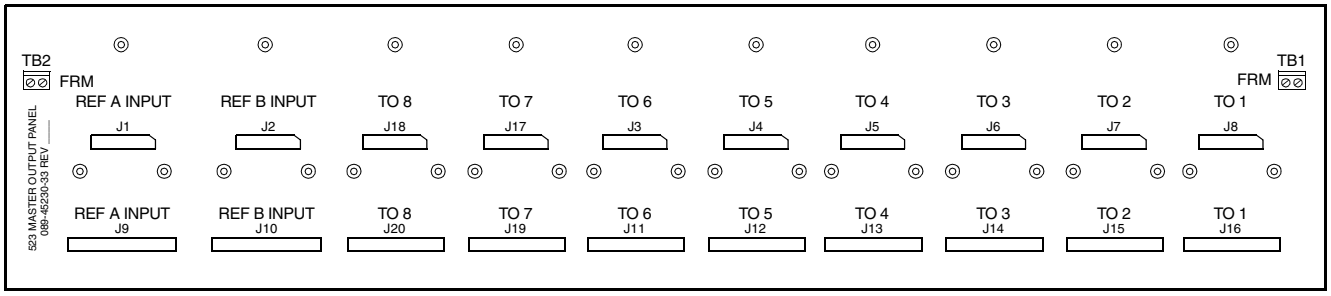


Figure 4. ITU-Class I/O MMP

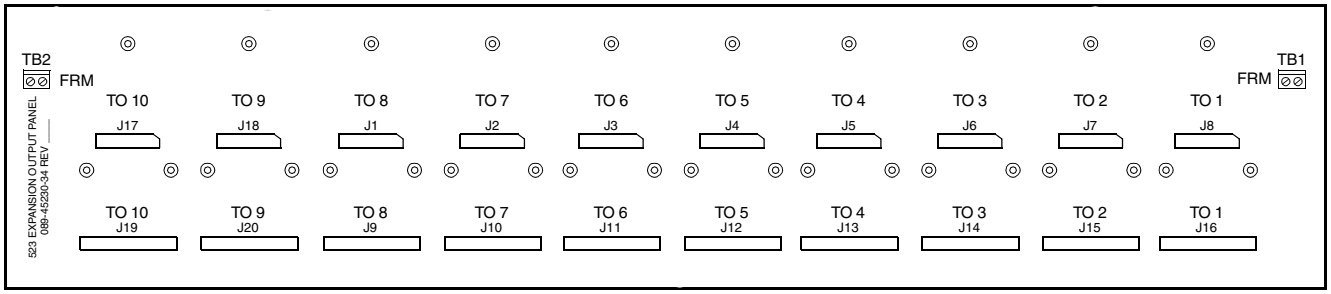


Figure 5. ITU-Class Output MMP

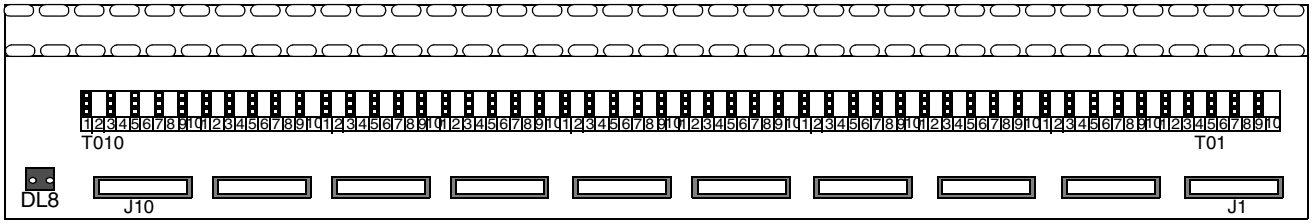


Figure 6. Wire-wrap Panel

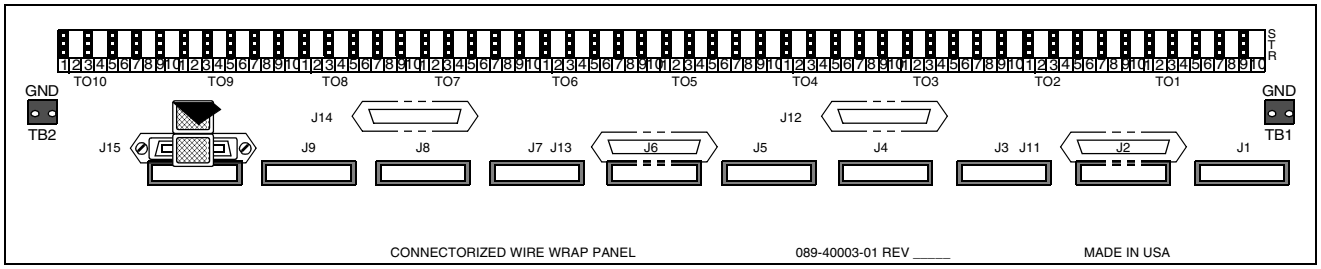


Figure 7. Remote Wire-wrap Panel

E. Shelf Switch Settings

2.11 Consult the local company Installation Job Specifications to set switches SW1 through SW5 on the master shelf backplane for setting up the system (Figure 8); the switches have no effect on the expansion shelves:

- SW1 selects the clock operation for the shelf. Set SW1 to the ST2 position if one or more ST2E, ST2, or TNC-E clock cards, or 090-45010-08, -09, -54, -57, and -58 MRC cards will be installed in the shelf. Set SW1 to the ST3 position if no ST2E, ST2, or TNC-E clock cards will be installed in the shelf (the default setting is ST2).

- SW2 is set to cause the system to generate a major or minor alarm in the event of a power (battery) loss (A or B). Set SW2 to MAJ if a major alarm is to be generated; set to MIN for a minor alarm (the default setting is MAJ).

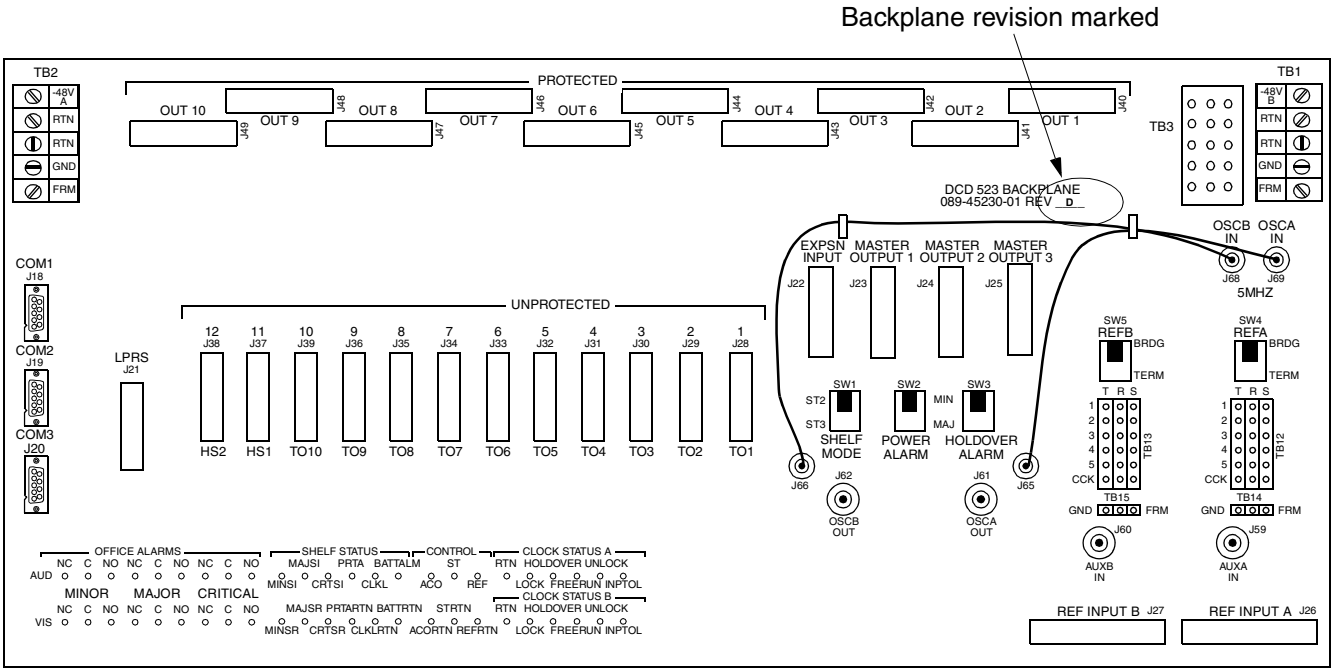
- SW3 is set to cause the system to generate a major or minor alarm in the event both clock cards enter holdover mode. Set to MAJ if a major alarm is to be generated; set to MIN for a minor alarm (the default setting is MAJ).

  Note: If the shelf is to be equipped with ST3E-01 clock cards, SW3 and the ST3E-01 cards must be set the same. If the shelf is to be equipped with ST3E-03 or ST3 clock cards, SW3 must be set to MAJ.

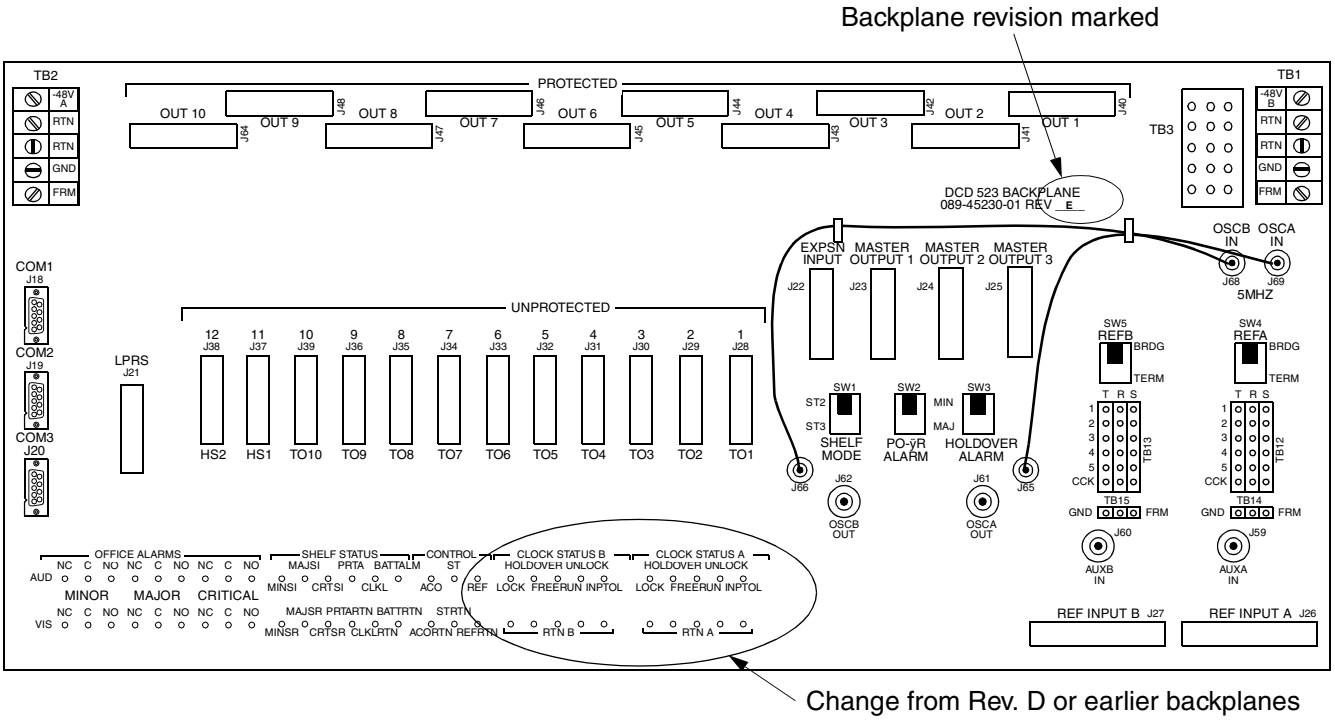
- SW4 and SW5 set the input at row 4 of terminal block REF A and REF B to accommodate a bridged or terminated input; SW4 is for REF A, SW5 is for REF B. Set to BRDG if using –20 dB DSX level reference input; set to TERM if using 0 dB DSX level reference input (the default setting is TERM).

1. Using Figure 8 and Table A as reference, set switches SW1 through SW5 on the backplane (of the master shelf assembly) per local company Installation Job Specifications.

2. Repeat Step 1 for each remote system master shelf in the building.



A. Rev. D or earlier backplane



B. Rev. E or later backplane

Figure 8. DCD-523 Shelves - Rear View

Table A. Master Shelf - System Setup

SWITCH	SET-TING	FUNCTION	FACTORY SETTING
SW1 (Note 1)	ST2	Clock option set for ST2E/ST2/TNC-E clock operation	X
	ST3	Clock option set for ST3E/ST3/TNC/LNC clock operation	—
SW2 (Note 2)	MAJ	Sets the system to generate a major alarm in the event of a power alarm (A or B)	X
	MIN	Sets the system to generate a minor alarm in the event of a power alarm (A or B)	—
SW3 (Note 2)	MAJ	Generates a major alarm if both clock cards go into holdover mode	X
	MIN	Generates a minor alarm if both clock cards go into holdover mode	—
SW4	BRDG	Identifies reference input signal at input 4 of REF A as bridged (–20 dB input level)	—
	TERM	Identifies reference input signal at input 4 of REF B as terminated (0 dB input level)	X
SW5	BRDG	Identifies reference input signal at input 4 of REF A as bridged (–20 dB input level)	—
	TERM	Identifies reference input signal at input 4 of REF B as terminated (0 dB input level)	X

Notes:

1. The factory setting for SW1 on the expansion shelf is ST3.
2. If the shelf is to be equipped with ST3E-01 clock cards, set the rear-panel switches and the ST3E-01 cards for the same alarm type (shelf and card switches set to generate a major alarm, or set to generate a minor alarm). If the shelf is to be equipped with ST3E-03 or ST3 clock cards, set the rear-panel switches to generate a major alarm.

F. Interface Module Installation

2.12 Interface modules (Tables B through E) must be installed on the MMP as an interface between the cards and external cabling. Each interface module provides a different type of connector for the DCD-523 Shelf input or output signals. Use an appropriate module for each card.

2.13 Install an interface module in the position corresponding to the slot the card is to be installed. For example, an EA10 card installed in slot TO1 requires an EA10-compatible interface module installed in the OUTPUT1 position on the MMP. Installation procedures for the master and expansion shelves are identical.

> ***Note:*** Reference input cables may be connected to the rear panel or to a module. Refer to the Installation Job Specifications to determine whether a module for the reference inputs is required.

2.14 The 2-port BNC interface module is shown in Figure 9. Figure 10 shows the reference input module. The 990-45105-11 module is shown in Figure 11. Figure 12 shows the ANSI-class MMP modules. The TOLA card DB9 modules are shown in Figures 13 and 14.

2.15 Table F shows the wire-wrap output connections. Table G lists the TOLA-03 output port connections for the wire-wrap interface module. Table H displays the PSM-T input port connections for the wire-wrap interface module. Table I lists the PSM-T input port connections for the 10-port BNC interface module. Table J shows the DB9 interface connections.

2.16 To install an interface module, perform the following:

1. Choose the appropriate interface module for each output card to be installed (refer to Tables B through E) on the master shelf.

   - 2-port BNC interface module (Figure 9): install the appropriate attenuation pads (2 dB, 3 dB, 3.5 dB, 6 dB, 30 dB, or 60 dB) on the interface module. (The pad values should be determined from the local company Installation Job Specifications.) To install the pads, line up the pins on the pad with U1 (with labeling on the pad right-side up) and insert until firmly seated. Repeat for U2.

   - 2-port BNC interface module (Figure 9): if required to isolate DC ground (SHIELD) from DCD equipment, remove jumper(s) (DC GND), J1 and/or J2.

   - Reference input modules (all) (Figure 10): The sections of SW1 determine whether the shield of the associated connector is connected to ground at the DCD shelf. The OPEN position holds the shield disconnected from ground.

   - PSM card input modules (all coaxial-connector models) (Figure 10): The sections of SW1 determine whether the shield of the associated connector is connected to ground at the DCD Shelf. The OPEN position holds the shield disconnected from ground.

   - 990-45105-11 module (Figure 11): determine which external equipment is to be connected by wire-wrap cable and which by Siemens 1.6/5.6 connections. When the jumper is connected (factory setting), the wire-wrap connectors are active. When the jumper is not connected, the coaxial connectors are active. Each port (OUT 1 through OUT10) can be set independently.

2. To install an interface module, line up the three spring-loaded screws on the modules to the holes on the panel.

3. Use a medium flat-blade screwdriver to lock each screw in place. Screw in evenly to prevent skewing the module. Also make sure that the top screw is securely in place; this is the FRM GND connection to the MMP.

4. Repeat Steps 1 through 3 for all interface modules for the shelf.

5. Repeat Steps 1 through 4 for each expansion shelf in the system, if applicable.

6. Repeat Steps 1 through 5 for the remote system, if applicable.

Table B. Clock Input Modules for ITU-Class MMPs

FOR INPUT CARD	USE INPUT MODULE				
	PART NUMBER	CONNECTOR TYPE	IMPEDANCE	INPUT SIGNAL LEVEL	NO. OF INPUTS
ACI (Connect input at AUX or A5 only) (SW4 and SW5 at BRDG only) (Note 1)	990-45107-02	SMB	75 Ω (unbalanced)	0.3 V to 1.5 V rms (AUX only)	4 + AUX (Use AUX)
	990-45107-03	Siemens 1.6/5.6	75 Ω (unbalanced)	0.3 V to 1.5 V rms (AUX only)	4 + AUX (Use AUX)
	990-45107-04	Siemens 1.0/2.3	75 Ω (unbalanced)	0.3 V to 1.5 V rms (A5 only)	5 (Use A5)
CI (Connect inputs at A3 only) (SW4 and SW5 at TERM or BRDG) (Note 1)	990-45107-06	Wire-wrap	T1: 100 Ω (balanced) CC: 133 Ω (balanced)	TERM: T1: 1.0 V to 3.5 V b-p (A3 only) BRDG: T1: 0.1V to 0.35 V b-p BRDG: CC: 1.5 V to 4.0 V p-p	4 (Use A3)
CI-EA (Connect inputs at A3, AUX, or A5 only) (SW4 and SW5 at TERM or BRDG) (Note 1)	990-45107-02	SMB	75 Ω (unbalanced)	TERM: E1: 1.0 V to 3.5 V b-p (A3 only) BRDG: E1: 0.1 V to 0.35 V b-p (A3 only) BRDG: Analog: 1.5 V to 3.0 V p-p (AUX only)	4 + AUX (Use inputs listed)
	990-45107-03	Siemens 1.6/5.6	75 Ω (unbalanced)	TERM: E1: 1.0 V to 3.5 V b-p (A3 only) BRDG: E1: 0.1 V to 0.35 V b-p (A3 only) BRDG: Analog: 1.5 V to 3.0 V p-p (AUX only)	4 + AUX (Use inputs listed)
	990-45107-04	Siemens 1.0/2.3	75 Ω (unbalanced)	TERM: E1: 1.0 V to 3.5 V b-p (A3 only) BRDG: E1: 0.1 V to 0.35 V b-p (A3 only) BRDG: Analog: 1.5 to 3.0 V p-p (A5 only)	5 (Use inputs listed)
	990-45107-06	Wire-wrap	120 Ω (balanced)	TERM: E1: 1.0 V to 3.5 V b-p (A3 only) BRDG: E1: 0.1 V to 0.35 V b-p (A3 only)	4 (Use inputs listed)

Table B. Clock Input Modules for ITU-Class MMPs (Contd)

FOR INPUT CARD	USE INPUT MODULE				
	PART NUMBER	CONNECTOR TYPE	IMPEDANCE	INPUT SIGNAL LEVEL	NO. OF INPUTS
MRC-EA MRC-EA*V5* DCIM-EA (Connect all inputs to A1 through A4) (SW4 and SW5 at BRDG only) (Notes 1 and 2)	990-45107-02	SMB	75 Ω (unbalanced)	E1 and analog: 0.1 V to 3.5 V b-p	4 + AUX (Do not use AUX)
	990-45107-03	Siemens 1.6/5.6	75 Ω (unbalanced)	E1 and analog: 0.1 V to 3.5 V b-p	4 + AUX (Do not use AUX)
	990-45107-04	Siemens 1.0/2.3	75 Ω (unbalanced)	E1 and analog: 0.1 V to 3.5 V b-p	5 (Do not use A5)
	990-45107-06	Wire-wrap	120 Ω (balanced)	E1 and analog: 0.1 V to 3.5 V b-p	4

Notes:
1. SW4 and SW5 are located on the DCD rear panel.
2. MRC-T and DCIM-T cards cannot use input modules. Connect inputs for all MRC-T and DCIM-T cards directly to TB12 and TB13, rows 2 through 5, on the DCD rear panel.
3. Part numbers shown are for ordering purposes; part numbers on modules start with 089 instead of 990.

Table C. PSM Modules for ITU-Class MMPs

FOR INPUT CARD	USE INPUT MODULE				
	PART NUMBER	CONNECTOR TYPE	IMPEDANCE	INPUT SIGNAL LEVEL	NO. OF INPUTS
PSM-T PSM-T*V5*	990-45106-11	Wire-wrap (Note 1)	100 Ω (balanced)	T1: 0.1V to 3.5 V b-p	4
PSM-E	990-45106-12	Siemens 1.6/5.6	75 Ω (unbalanced)	E1: 0.1 V to 3.5 V b-p	4
PSM-E (Issue A)	990-45106-11	Wire-wrap (Note 1)	120 Ω (balanced)	E1: 0.1 V to 3.5 V b-p	4
	990-45106-13	BNC	75 Ω (unbalanced)	E1: 0.1 V to 3.5 V b-p	4
	990-45106-14	Siemens 1.6/5.6	75 Ω (unbalanced)	E1: 0.1 V to 3.5 V b-p	4
PSM-E*V5* PSM-EA*V5*	990-45106-11	Wire-wrap (Note 1)	120 Ω (balanced)	E1: 0.1 V to 3.5 V b-p	4
	990-45106-12	Siemens 1.6/5.6	75 Ω (unbalanced)	E1 and analog: 0.1 V to 3.5 V b-p	4
	990-45106-13	BNC	75 Ω (unbalanced)	E1 and analog: 0.1 V to 3.5 V b-p	4
	990-45106-14	SMB	75 Ω (unbalanced)	E1 and analog: 0.1 V to 3.5 V b-p	4
	990-45106-15	Siemens 1.0/2.3	75 Ω (unbalanced)	E1 and analog: 0.1 V to 3.5 V b-p	4

Notes:
1. Use this module for E1 or T1 signals only.
2. DCD rear panel switches SW4 and SW5 must be in the BRDG position for all PSM modules.
3. Part numbers shown are for ordering purposes; part numbers on modules start with 089 instead of 990.

Table D. Timing Output Modules for ITU-Class MMPs

FOR OUTPUT CARD	USE MODULE				
	PROTECTION TYPE	USE PART NUMBER:	CONNECTOR TYPE	IMPEDANCE	NO. OF OUTPUTS
SCIU	Stand-alone	090-45021-10	Wire-wrap (Note 1)	100 Ω (balanced)	I/O for 2-way T1
ESCIU	Stand-alone	090-45021-11	SMB	75 Ω (unbalanced)	I/O for 2-way E1
		090-45021-12	Siemens 1.6/5.6	75 Ω (unbalanced)	I/O for 2-way E1
EA10 EA10M	Stand-alone	990-45105-06	Wire-wrap (Note 1)	E1: 120 Ω (balanced)	10
		990-45105-13	SMB	E1: 75 Ω Analog: 75 Ω (unbalanced)	10
		990-45105-14	Siemens 1.6/5.6	E1: 75 Ω Analog: 75 Ω (unbalanced)	10
		990-45105-15	Siemens 1.0/2.3	E1: 75 Ω Analog: 75 Ω (unbalanced)	10
		990-45108-01	Wire-wrap (Note 1)	E1: 120 Ω Analog: 75 Ω (balanced)	10 (11, 12, 13 not used)
	1:1, 1+1	990-45105-10 (double-wide)	Wire-wrap (Note 1)	E1: 120 Ω (balanced)	10
		990-45105-11 (double-wide)	Wire-wrap or Siemens 1.6/5.6	E1: 120 Ω (balanced) or E1: 75 Ω Analog: 75 Ω (unbalanced)	10
		990-45105-16 (double-wide)	SMB	E1: 75 Ω Analog: 75 Ω (unbalanced)	10
		990-45105-17 (double-wide)	Siemens 1.6/5.6	E1: 75 Ω Analog: 75 Ω (unbalanced)	10
		990-45105-18 (double-wide)	Siemens 1.0/2.3	E1: 75 Ω Analog: 75 Ω (unbalanced)	10

Table D. Timing Output Modules for ITU-Class MMPs (Contd)

FOR OUTPUT CARD	USE MODULE				
	PROTECTION TYPE	USE PART NUMBER:	CONNECTOR TYPE	IMPEDANCE	NO. OF OUTPUTS
TO-EA5	Stand-alone	990-45105-06	Wire-wrap (Note 1)	E1: 120 Ω (balanced)	10
		990-45105-12	Wire-wrap and Siemens 1.6/5.6	E1: 120 Ω (balanced) and E1: 75 Ω Analog: 75 Ω (unbalanced)	5 Wire-wrap and 5 Siemens 1.6/5.6
		990-45105-13	SMB	E1: 75 Ω Analog: 75 Ω (unbalanced)	10
		990-45105-14	Siemens 1.6/5.6	E1: 75 Ω Analog: 75 Ω (unbalanced)	10
		990-45105-15	Siemens 1.0/2.3	E1: 75 Ω Analog: 75 Ω (unbalanced)	10
		990-45108-01	Wire-wrap (Note 1)	E1: 120 Ω Analog: 75 Ω (balanced)	10 (Do not use 11, 12, 13)
	1:1, 1+1	990-45105-10 (double-wide)	Wire-wrap (Note 1)	E1: 120 Ω (balanced)	10
		990-45105-11 (double-wide)	Wire-wrap or Siemens 1.6/5.6	E1: 120 Ω (balanced) or E1: 75 Ω Analog: 75 Ω (unbalanced)	10 Wire-wrap or 10 Siemens 1.6/5.6 or combination
		990-45105-16 (double-wide)	SMB	E1: 75 Ω Analog: 75 Ω (unbalanced)	10
		990-45105-17 (double-wide)	Siemens 1.6/5.6	E1: 75 Ω Analog: 75 Ω (unbalanced)	10
		990-45105-18 (double-wide)	Siemens 1.0/2.3	E1: 75 Ω Analog: 75 Ω (unbalanced)	10

Table D. Timing Output Modules for ITU-Class MMPs (Contd)

FOR OUTPUT CARD	USE MODULE				
	PROTECTION TYPE	USE PART NUMBER:	CONNECTOR TYPE	IMPEDANCE	NO. OF OUTPUTS
TO-EA (Do not mix redundant and 1:N in the same shelf) TO-EAN (Do not mix 1+1 and 1:N in the same shelf)	Stand-alone, 1:N	990-45105-12	Wire-wrap and Siemens 1.6/5.6	E1: 120 Ω Analog: 75 Ω (balanced) and E1: 75 Ω Analog: 75 Ω (unbalanced)	5 Wire-wrap and 5 Siemens 1.6/5.6
		990-45105-13	SMB	E1: 75 Ω Analog: 75 Ω (unbalanced)	10
		990-45105-14	Siemens 1.6/5.6	E1: 75 Ω Analog: 75 Ω (unbalanced)	10
		990-45105-15	Siemens 1.0/2.3	E1: 75 Ω Analog: 75 Ω (unbalanced)	10
		990-45108-01	Wire-wrap (Note 1)	E1: 120 Ω (balanced)	10 (Do not use 11, 12, 13)
	1+1	990-45105-10 (double-wide)	Wire-wrap (Note 1)	E1: 120 Ω (balanced)	10
		990-45105-11 (double-wide)	Wire-wrap or Siemens 1.6/5.6	E1: 120 Ω (balanced) or E1: 75 Ω Analog: 75 Ω (unbalanced)	10 Wire-wrap or 10 Siemens 1.6/5.6 or combination
TOEA	1:N, Stand-alone	990-45105-12	Wire-wrap and Siemens 1.6/5.6	E1: 120 Ω (balanced) or E1: 75 Ω (unbalanced)	5 Wire-wrap and 5 Siemens 1.6/5.6
		990-45105-13	SMB	E1: 75 Ω (unbalanced)	10
		990-45105-14	Siemens 1.6/5.6	E1: 75 Ω (unbalanced)	10
		990-45105-15	Siemens 1.0/2.3	E1: 75 Ω (unbalanced)	10
		990-45108-01	Wire-wrap (Note 1)	E1: 120 Ω (balanced)	10 (Do not use 11, 12, 13)

Table D. Timing Output Modules for ITU-Class MMPs (Contd)

FOR OUTPUT CARD	USE MODULE				
	PROTECTION TYPE	USE PART NUMBER:	CONNECTOR TYPE	IMPEDANCE	NO. OF OUTPUTS
TOGA (Do not mix 1+1 and 1:N in the same shelf)	1:N, 1+1, Stand-alone	990-45105-12	Wire-wrap and Siemens 1.6/5.6	Analog: 75 Ω (unbalanced)	5 Wire-wrap and 5 Siemens 1.6/5.6
		990-45105-13	SMB	Analog: 75 Ω (unbalanced)	10
		990-45105-14	Siemens 1.6/5.6	Analog: 75 Ω (unbalanced)	10
		990-45105-15	Siemens 1.0/2.3	Analog: 75 Ω (unbalanced)	10
	1+1	990-45105-16 (double-wide)	SMB	Analog: 75 Ω (unbalanced)	10
TOCA	1:N, Stand-alone	990-45108-01	Wire-wrap (Note 1)	CC: 133 Ω (balanced)	10 (Do not use 11, 12, 13)
TOTA TOTL	1:N, Stand-alone	990-45105-06	Wire-wrap (Note 1)	T1: 100 Ω (balanced)	10
		990-45108-01	Wire-wrap (Note 1)	T1: 100 Ω (balanced)	10 (Do not use 11, 12, 13)
TOLA	1:N, Stand-alone	990-45108-01	Wire-wrap (Note 1)	RS-422: 100 Ω (balanced) RS-423 (TTL): 450 Ω (unbalanced)	10 (Do not use 11, 12, 13)
TOTA-5 TOTA-M (Do not mix redundant and 1:N in the same shelf)	Stand-alone	990-45105-06	Wire-wrap (Note 1)	T1: 100 Ω (balanced)	10
	1:N, Stand-alone	990-45108-01	Wire-wrap (Note 1)	T1: 100 Ω (balanced)	10 (Do not use 11, 12, 13)
TOAA (except 090-40028-10)	1:N, Stand-alone	990-45122-01	BNC	Analog: 75 Ω (unbalanced) (includes 0 dB, 3.0 dB, 3.5 dB, 30.0 dB, 60.0 dB pads)	2

Table D. Timing Output Modules for ITU-Class MMPs (Contd)

FOR OUTPUT CARD	USE MODULE				
	PROTECTION TYPE	USE PART NUMBER:	CONNECTOR TYPE	IMPEDANCE	NO. OF OUTPUTS
TOAA (090-40022-02)	1:N, Stand-alone	990-45122-01	BNC	Analog: 50 Ω (unbalanced) (includes 0 dB, 3.0 dB, 3.5 dB, 30.0 dB, 60.0 dB pads)	2

Notes:
1. Use this module for E1 or T1 signals only.
2. Part numbers shown are for ordering purposes; part numbers on modules start with 089 instead of 990.

Table E. Timing Output Modules for ANSI-Class MMPs

FOR OUTPUT CARD	USE MODULE				
	PROTECTION TYPE	USE PART NUMBER:	CONNECTOR TYPE	IMPEDANCE	NOOF OUTPUTS
TOAA (except 090-40028-10)	Stand-alone, 1:N	990-40022-10	BNC	Analog: 75 Ω (unbalanced) (includes 0, 3.0, 3.5, 30.0, 60.0 dB pads)	2
TOAA (090-40022-02)	Stand-alone, 1:N	990-40022-10	BNC	Analog: 50 Ω (unbalanced) (includes 0, 3.0, 3.5, 30.0, 60.0 dB pads)	2
TOCA	Stand-alone, 1:N	990-40023-10	DB9	CC: 133 Ω (balanced)	5
		990-40011-10	Wire-wrap (Note 1)	CC: 133 Ω (balanced)	10
TOEA TOGA	Stand-alone, 1:N	990-40022-11	BNC	E1 or Analog: 75 Ω (unbalanced)	10
TOLA	Stand-alone, 1:N	990-40023-10	DB9	TTL: 100 Ω (balanced)	5
		990-40011-10	Wire-wrap (Note 1)	RS-422: 100 Ω (balanced) RS-423 (TTL): 450 Ω (unbalanced)	10
TOTA TOTA-5 TOTA-M TOTL	Stand-alone, 1:N	990-40023-10	DB9	T1: 100 Ω (balanced)	5
		990-40011-10	Wire-wrap (Note 1)	T1: 100 Ω (balanced)	10
SCIU	Stand-alone	990-40021-10	Wire-wrap (Note 1)	T1: 100 Ω (balanced)	I/O for one SCIU card
ESCIU	Stand-alone	990-40021-10	Wire-wrap (Note 1)	E1: 120 Ω (balanced)	I/O for one ESCIU card

Notes:
1. Use this module for E1 or T1 signals only.
2. Part numbers shown are for ordering purposes; part numbers on modules start with 089 instead of 990.

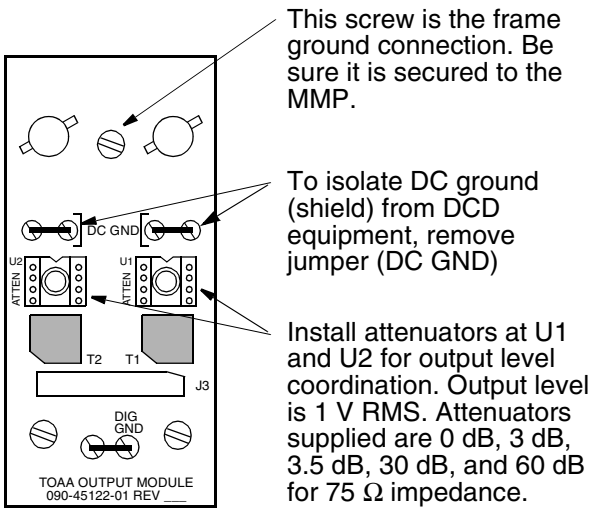


Figure 9. TOAA 2-port BNC Interface Module

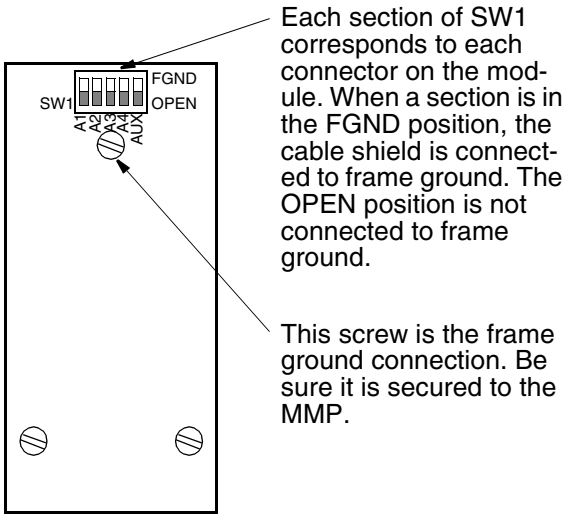


Figure 10. Reference and PSM Input Module Switches

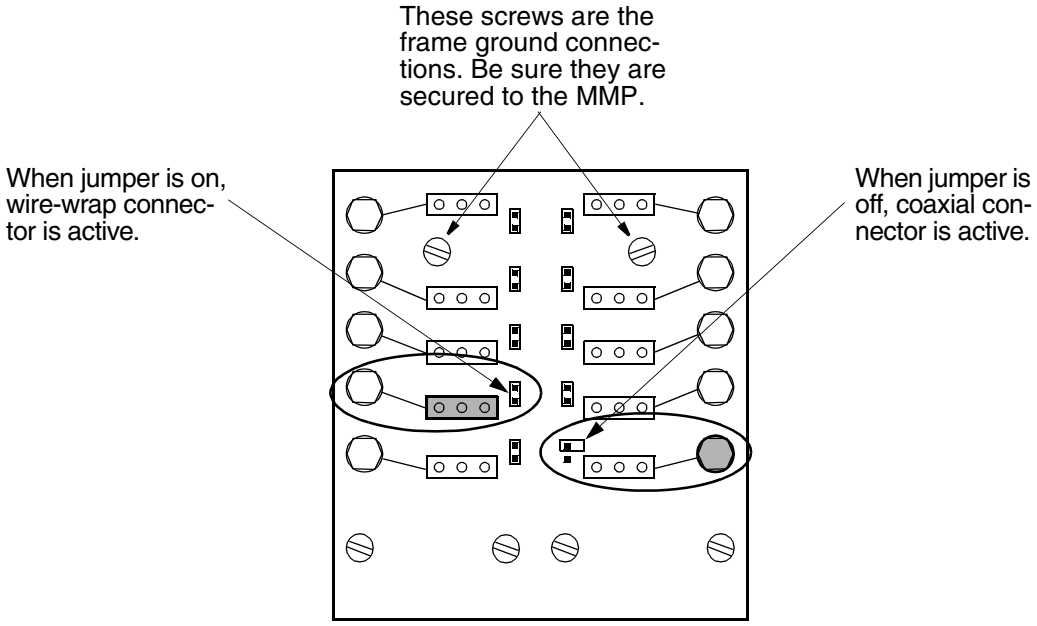
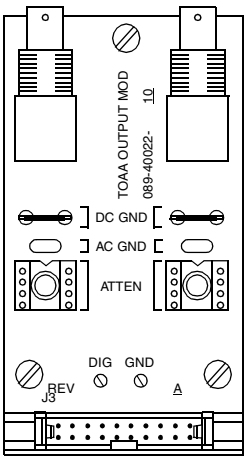
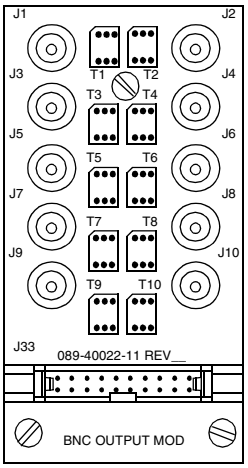


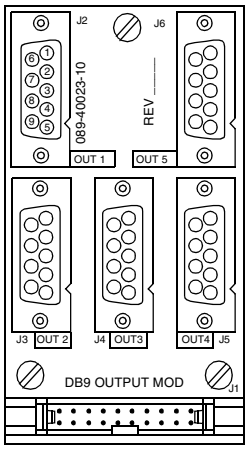
Figure 11. 990-45105-11 Module Jumpers



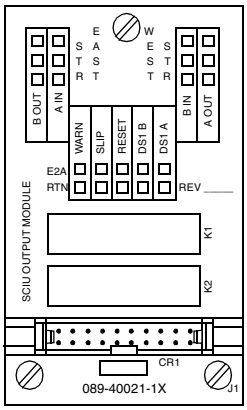
2-Port BNC Module
090-40022-10



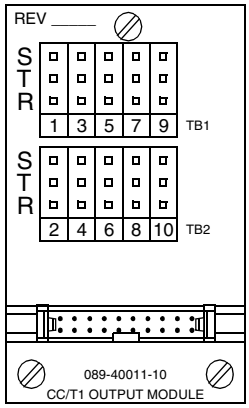
10-Port BNC Module
090-40022-11



DB9 Module
090-40023-10



SCIU Wire-wrap Module
090-40021-10



Wire-wrap Module
090-40011-10

Figure 12. Modules for the ANSI-Class MMP

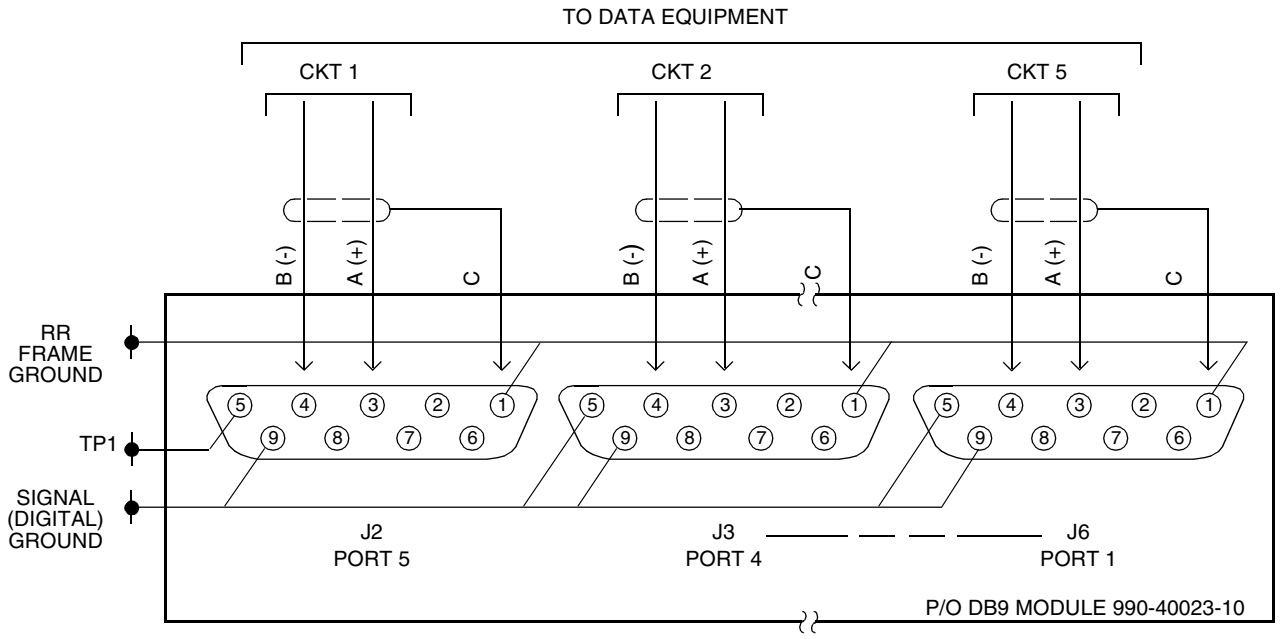


Figure 13. DB9 Module (RS-422) (For TOLA Card)

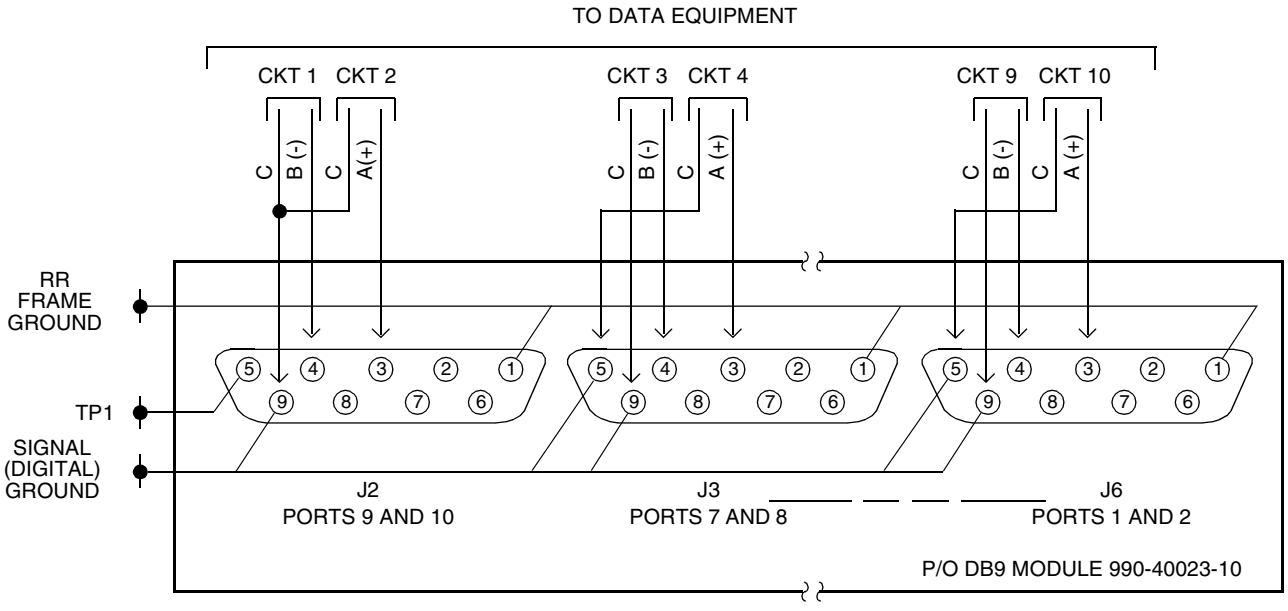


Figure 14. DB9 Module (RS-423) (For TOLA Card)

Table F. Wire-Wrap Output Connections

WIRE-WRAP LEADS *		TOTA, TOTA-2, TOCA (DS1 or CC) TOEA, TOGA (E1 or G.703)		TOLA (RS-422)**		TOLA (TTL)***		TOAA (ANALOG)	
OUTPUT	PIN	TIMING PORT	LEAD	TIMING PORT	LEAD	TIMING PORT	LEAD	TIMING PORT	LEAD
1	T R S	1	T R S	1	D+ D–	1 2	D1 D2		
2	T R S	2	T R S			— —	C1 C2		
3	T R S	3	T R S	2	D+ D–	3 4	D3 D4	2 (Note 1)	T S —
4	T R S	4	T R S			— —	C3 C4		
5	T R S	5	T R S	3	D+ D–	5 6	D5 D6		
6	T R S	6	T R S			—	C5 C6		
7	T R S	7	T R S	4	D+ D–	7 8	D7 D8		
8	T R S	8	T R S			— —	C7 C8	1 (Note 1)	T S —
9	T R S	9	T R S	5	D+ D–	9 10 —	D9 D10		
10	T R S	10	T R S			— —	TP1 C9 & C10		

Legend: T=Tip C=Digital Ground S=Shield Ground (Note 2) D+=Data, +422 R=Ring D=Data, TTL D–=Data, –422

* In the wire-wrap leads column, the paired outputs of 1 and 2, 3 and 4, 5 and 6, 7 and 8, 9 and 10, use the Tip (T) of the odd-numbered output and the Tip of even-numbered output as one TTL output. Use the paired outputs of 1 and 2, 3 and 4, 5 and 6, 7 and 8, 9 and 10, use the Ring of the odd-numbered output and the Ring of even-numbered output as the other TTL output.

** When using TOLA RS-422, connect the output cable T and R leads to the odd-numbered wire-wrap T and R leads, respectively. The T lead connects internally to the TOLA RS-422 driver D+ and the R lead to the driver D- lead. The RS-422 output is across the T (D+) and R (D-) leads.

*** For TOLA TTL operation, two outputs are derived from each RS-422 driver. One output across T (Dn) and T (Cn) leads, and the other output is across R (D-) and R (Cn) leads (e.g., D2 and C2 are output 2, D1 and C1 are output 1).

1. When using TOAA, connect the shield lead of the coax cable to the Ring (R) pin of the wire-wrap panel.
2. It is preferable to ground the shield at the timing source end only, but certain vendor applications may require grounding at the receive end. However, under no circumstances should the shield be connected to frame ground at both ends unless one end is capacitor coupled to ground.

Table G. Wire-Wrap Interface Module Output Port Connections for TOLA-03 Only

WIRE-WRAP MODULE		TIMING PORT	LEAD
TERMINAL SET	PIN		
1	T R S	1	CLOCK GND —
2	T R S	—	—
3	T R S	2	CLOCK GND —
4	T R S	—	—
5	T R S	3	CLOCK GND —
6	T R S	4	CLOCK GND —
7	T R S	—	—
8	T R S	5	CLOCK GND —
9	T R S	—	—
10	T R S	—	TEST GND —

Note: When connecting the TOLA-03 output ports to NEs for external timing reference, the Tip (T) terminal is the clock lead, and the Ring (R) terminal is the ground lead of the interface panel. The Shield (S) terminal is not used. The output ports are on T and R terminal sets 1, 3, 5, 7, and 9.

Table H. Wire-Wrap Interface Module Input Port Connections for PSM-T Only

WIRE-WRAP MODULE		PSM-T PORT	LEAD
TERMINAL SET	PIN		
1	T R S	1	T R S
3	T R S	2	T R S
5	T R S	3	T R S
7	T R S	4	T R S

Table I. 10-Port BNC Interface Module Input Port Connections for PSM-T Only

10-PORT BNC MODULE CONNECTOR	PSM-T PORT
1	1
3	2
5	3
7	4

Table J. DB9 Interface Connections

DB9 CONNECTOR		TOTA, TOTA-2, TOCA, TOEA, TOGA		TOLA (RS-422)		TOLA (TTL)		TOAA (ANALOG)	
LABEL	PIN	TIMING PORT	LEAD	TIMING PORT	LEAD	TIMING PORT	LEAD	TIMING PORT	LEAD
J2	9 5 1	1	T R S	5	— — —	—	C9 and C10 — —		
	4 3 1	2	T R S		D+ D- S	9 10	D9 D10		
J3	9 5 1	3	T R S	4	— — —	C7 C8 —	C7 C8	2	T S —
	4 3 1	4	T R S		D+ D- S	6 7 —	D7 D8		
J4	9 5 1	5	T R S	3	— — —	5 6	C5 C6 —		
	4 3 1	6	T R S		D+ D- S	3 4	D5 D6		
J5	9 5 1	7	T R S	2	— — —	1 2	C3 C4 —		
	4 3 1	8	T R S		D+ D- S	—	D3 D4 —	1	T S —
J6	9 5 1	9	T R S	1	— — —	C — —	C1 C2 —		
	4 3 1	10	T R S		D+ D- S	—	D1 D2		

Legend: T=Tip C=Digital Ground S=Shield Ground* D+=Data, +422 R=Ring D=Data, TTL D–=Data, –422

* It is preferable to ground the shield at the timing source end only, but certain vendor applications may require grounding at the receive end. However, under no circumstances should the shield be connected to frame ground at both ends unless one end is capacitor coupled to ground.

G. Ground Connections

2.17 Connect terminal blocks on the rear panel of the shelf and on the interface panels to frame ground. Frame ground is a #6 ground rod connected to the rack, or the rack itself.

2.18 Connect the following terminals to frame ground:

- Shelf rear panel TB1 & TB2
- Wire-wrap Interface Panel TB1
- Modular Mounting Panel TB1

2.19 At the rear panel of the shelf, apply –48 V B power to TB1, and –48 V A power to TB2. Both terminal blocks are screw terminal type for spade lug office battery connections. Figure 15 illustrates the DCD-523 ground connections.

Note: To prevent battery return to frame ground fault, do not connect digital GND or battery RTN on either the master or the expansion shelves to frame ground.

Note: Use 50.8 mils, 1.29 mm (16 AWG) stranded insulated wire for grounding connections; these wires are supplied by the user.

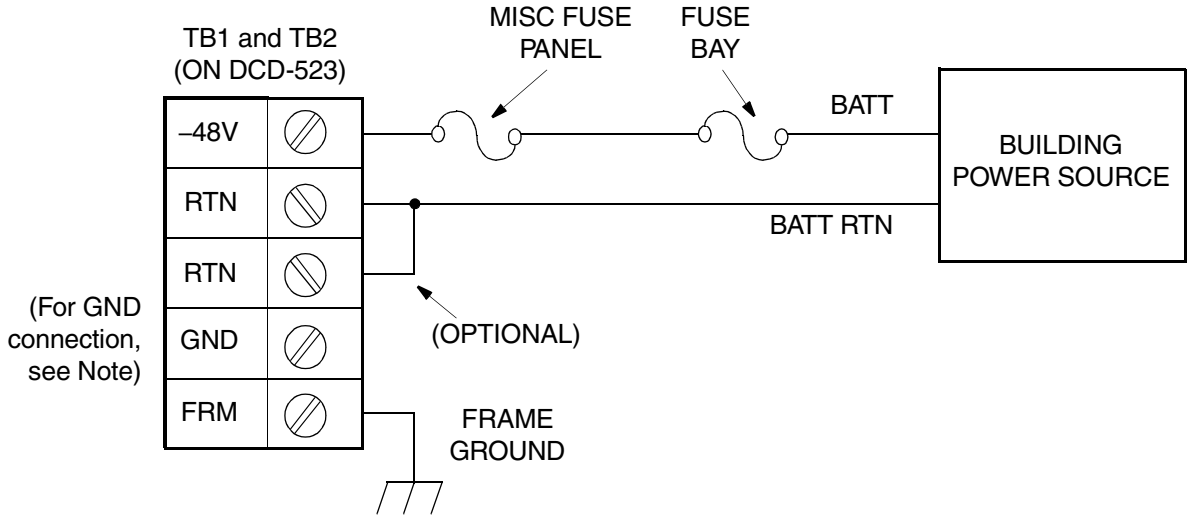
Note: Ensure the ground source is low noise.

2.20 Use one of the two methods following to connect to frame ground.

Using a #6 Ground Rod as Frame Ground

Note: Use a 25 W soldering iron to heat sufficiently the #6 rod.

1. Strip enough insulation from the wire to allow three complete turns around the #6 rod.
2. Crimp an appropriate size spade lug to the ground wire, bend the lug around the #6 rod, and solder the lug.
3. Turn the wire around the rod and solder the wire to the rod.
4. Strip approximately 5 mm (0.2 inch) of insulation from the other end of the wire, and crimp a spade lug or ring-terminal lug to the wire.
5. Screw the lug to FRM on the terminal block.
6. Repeat Steps 1 to 5 for each shelf and interface panel in the system that uses a #6 ground rod as a frame ground.
7. Repeat Steps 1 to 6 for remote systems if applicable.



Note: To prevent battery return to frame ground fault, do not connect digital GND or battery RTN to FRM ground on either the master or the expansion shelves, or on any shelf in a remote system.

Figure 15. Ground and Power Connections

Using a Rack as Frame Ground

1. Find an unused screw hole on the rack and sand the paint from around the hole to ensure good contact.

2. Prepare the 50.8 mils, 1.29 mm (16 AWG) wire and crimp a spade lug to it. Screw the lug to the rack.

3. Strip approximately 5 mm (0.2 inch) of insulation from the other end of the wire, and crimp a spade lug or ring-terminal lug to the wire.

4. Screw the lug to FRM on the terminal block.

5. Repeat Steps 1 through 4 for each shelf and interface panel in the system that uses a rack as a frame ground.

6. Repeat Steps 1 through 5 for remote systems if applicable.

H. Power Connections (Battery and Return Leads)

2.21 Connect power to TB1 and TB2 (Figure 8 and Figure 15) of the shelf rear panel. The DCD-523 master and expansion shelves require 5 A fuses. The fuse requirement at the fuse bay or miscellaneous fuse panel is 150% of the shelf rating, or the nearest larger size (7.5 A to 10 A).

Note: Ensure that the power load sources (A and B) are fully diverse and cable runs are as diverse as possible. Do not install any type of redundant lead lying parallel and adjacent in the same cable rack. Leads A and B must be run down separate sides of each shelf. If the site only has one power source, run both A and B feeds from that single source, diversely routed.

Note: Two 50.8 mils, 1.29 mm (16 AWG) stranded wires are used for power connections, one with red insulation (–48 V) and the other with black insulation (RTN); these wires are user-supplied.

–48 Volt Connections

2.22 Use the stranded wire to connect office battery supply leads from the power source to the terminals on the DCD-523 rear panel (Figure 8 and Figure 15). The –48 V dc A and –48 V dc B input voltage supplies can be either filtered or unfiltered.

Note: A and B power inputs must come from two separate sources (leads). The power sources should be specified in the local company Installation Job Specifications. These may be from a battery distribution fuse board (BDFB), a miscellaneous fuse bay, or a miscellaneous fuse panel in the same rack as the DCD-523.

Note: Be sure the –48 V dc source is electrically isolated from any ac source and reliably connected to earth ground.

1. Remove shelf fuses from the front panel.

2. Remove battery source fuses from the rack fuse bay.

3. Run the power wires from the power sources to the DCD-523 Shelf.

4. Crimp a spade or ring-terminal lug (user-provided) to the shelf end of the power wires.

5. Connect A power source lugs to –48V (red wire) and RTN (black wire) terminals on TB2.

6. Connect B power source lugs to –48V (red wire) and RTN (black wire) terminals on TB1.

7. Verify with a volt-ohmmeter that there are no foreign battery, grounds, or shorts at the power source end of the wires

8. Connect the leads to the power source terminals with the appropriate type of connectors or lugs as specified in the local company Installation Job Specifications.

Note: If power sources are direct from the BDFB, a separate, detailed Method of Procedure (MOP) to cut leads into the BDFB should be developed and cut during non-busy hours.

9. Reinstall battery source fuses in the rack fuse bay.

10. Using a multimeter, verify that the input voltage level is between –42 V dc and –56 V dc at the following terminals:

    • –48V B and RTN terminals of TB1 (if used)

    • –48V A and RTN terminals of TB2 (if used)

11. Reinstall shelf fuses in the front panel and repeat Step 1 through Step 10 for each shelf in the system (master and expansion shelves in both master and remote systems, if applicable).

RTN Connections

2.23 The user may select whether to connect the battery return wiring to one or both RTN terminals. Use 50.8 mils, 1.29 mm (16 AWG) stranded wire (black insulation) to connect RTN leads from the fuse panel to the terminals on the DCD-523 rear panel.

3. PRE-TEST CONNECTIONS

A. Shelf to Interface Panel Connections

3.01 Make connections between interface panel connectors (or interface module connectors if ANSI-class MMP) and either PROTECTED or UNPROTECTED shelf connectors (Figure 8) as specified in the local company Installation Job Specifications.

3.02 The local company Installation Job Specifications should specify the type of reference input cards to use, as well as which timing output slots are to be configured as protected or unprotected. Typically, protected output connections are used for TO cards with 1:N protection. Unprotected outputs are for TO cards with redundant protection, ESCIU or SCIU cards, and unprotected TO cards.

3.03 Each interface module provides a different type of connector for the DCD-523 Shelf input or output signals. Follow the Wire-wrap Panel procedure or the Modular Mounting Panel procedure as appropriate.

> ***Note:*** Ensure that the cables are not twisted and the key on the cable connector aligns with the key slot on the shelf connectors and interface panel connectors. Be sure to lock the cables in place.

Wire-wrap Panel

3.04 Refer to the following steps and Figure 16 for instructions for cabling the DCD-523 shelf to a wire-wrap panel; these instructions apply to both master and expansion shelves. The wire-wrap panel may be used for TO and PSM cards.

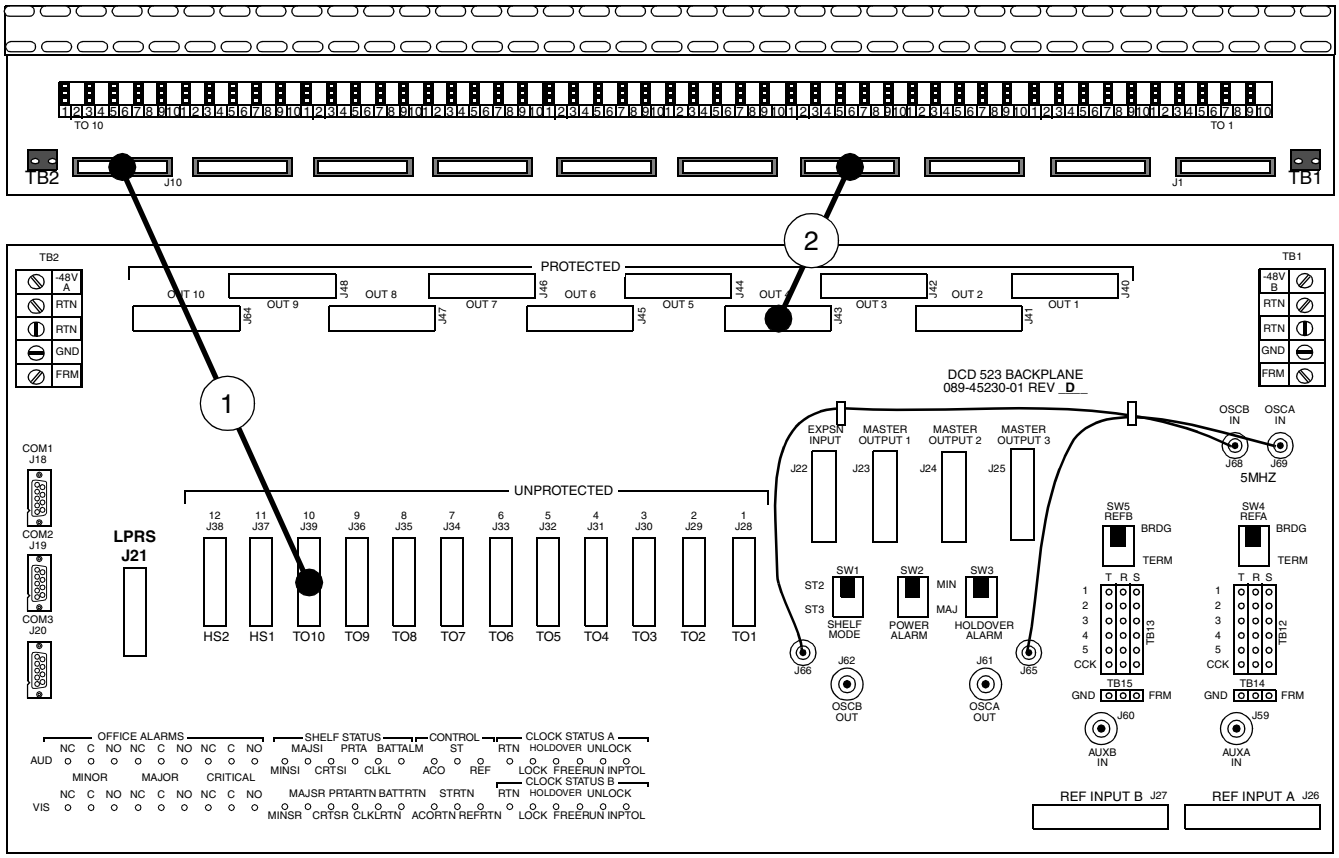
1. Connect the 20-pin locking timing output connectors (PROTECTED outputs J40-J48 and J64; UNPROTECTED outputs J28-J38) on the shelf backplane to the corresponding connectors on the wire-wrap panel (J1 through J10, respectively); refer to Figure 16 and Table K for connections.

   > ***Note:*** Ensure that the cables are not twisted and the key on the cable connector aligns with the key slot on the shelf and MMP connectors. Be sure to lock the cables in place.

   > ***Note:*** For protected output slots, 16.5 cm (6.5 inch) ribbon cables (p/n 060-40001-01) are supplied with the wire-wrap panel. For each unprotected slot with a TO card, one 102 cm (40 inch) ribbon cable (p/n 060-40001-11) must be ordered from Symmetricom.

2. Dress the cable per local company practice.

3. Repeat Steps 1 and 2 for each expansion shelf in the system (refer to Figure 16 and Table K).



1 Outputs of slot TO10 connected for unprotected operation, also SCIU or ESCIU connection, and PSM card connection

2 Outputs of slot TO4 connected for 1:N protection

Note: The connections indicate the end points of the wiring only – cable routing is not shown.

Figure 16. Shelf to Wire-wrap Interface Panel Connections

Table K. Shelf to Wire-wrap Panel Connections

CARD SLOT	SHELF CONNECTOR	INTERFACE PANEL	
		BOTTOM	TOP
PROTECTED OUTPUT			
TO1	J40	J1	—
TO2	J41	J2	—
TO3	J42	J3	—
TO4	J43	J4	—
TO5	J44	J5	—
TO6	J45	J6	—
TO7	J46	J7	—
TO8	J47	J8	—
TO9	J48	J9	—
TO10	J64	J10	—
UNPROTECTED OUTPUT			
TO1	J28	J1	—
TO2	J29	J2	—
TO3	J30	J3	—
TO4	J31	J4	—
TO5	J32	J5	—
TO6	J33	J6	—
TO7	J34	J7	—
TO8	J35	J8	—
TO9	J36	J9	—
TO10	J39	J10	—
HS1	J37	—	J1
HS2	J38	—	J2

Note: If a shelf assembly is equipped with two wire-wrap panels, the bottom panel connectors (J1 through J10) are for slots TO1 through TO10, respectively. The top panel right-side connectors J1 and J2 are used for signals from the unprotected cards in the HS1 and HS2 slots, respectively; J3 through J10 are not used. The two-panel arrangement is only required when *all* TO slots are filled in a shelf that does not use 1:N protection.

Modular Mounting Panel

3.05 Refer to the following steps and Figure 17 for instructions for cabling the DCD-523 shelf to a modular mounting panel (MMP); these instructions apply to both master and expansion shelves.

Note: Ensure that the cables are not twisted and the key on the cable connector aligns with the key slot on the shelf and MMP connectors. Be sure to lock the cables in place.

Note: 16.5 cm (6.5 inch) (p/n 060-40001-01) and 102 cm (40 inch) ribbon cables (p/n 060-40001-11) are shipped with each MMP.

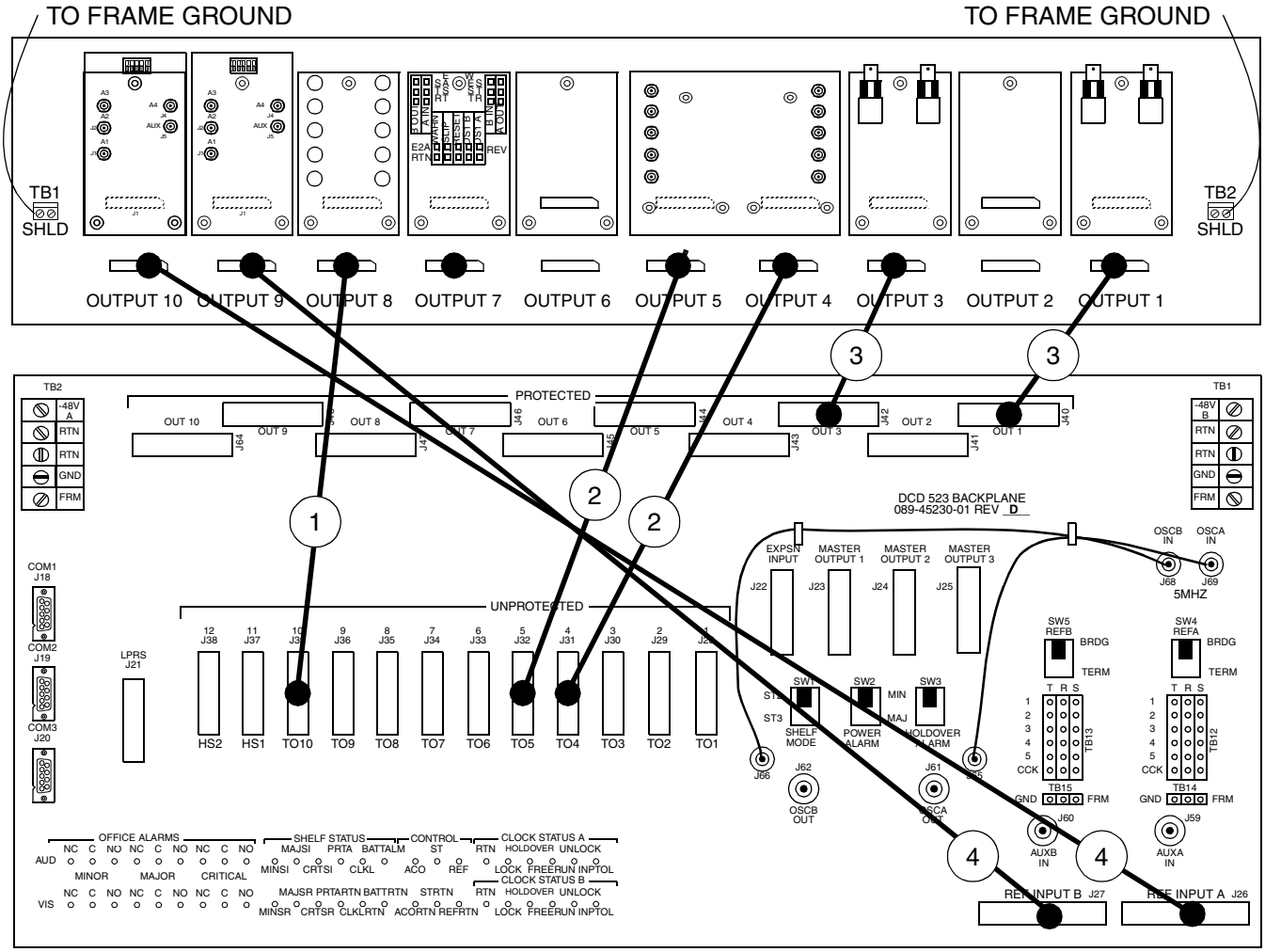
1. Connect the 20-pin locking connectors (PROTECTED outputs J40 through J48 and J64; UNPROTECTED outputs J28 through J38) on the rear panel of the shelf to the corresponding connectors on the MMP. Figure 17 shows sample connections for unprotected cards, cards in a 1:1 protection mode, and cards in a 1+1 protection mode.

2. If modules are used for reference inputs, connect the REF INPUT A and REF INPUT B 20-pin locking connectors on the rear panel of the shelf to the corresponding connectors on the MMP.

3. Dress the cables per local company practice.

4. Repeat Steps 1 and 2 for each expansion shelf in the system (refer to Figure 17).

Note: If a shelf assembly is equipped with two MMPs, the bottom panel module mounting positions are for slots TO1 through TO10, respectively. The two positions on the right side of the top panel are used for signals from the unprotected cards in the HS1 and HS2 slots, respectively; the other positions are not used. The two-panel arrangement is only required when all TO slots are filled in a shelf that does not use 1:N protection.



(1) Outputs of slot TO10 connected for unprotected operation, also SCIU or ESCIU connection, and PSM card connection

(2) Outputs of slots TO4 and TO5 connected for redundant protection

(3) Output of slots TO1 and TO3 connected for 1:N protection

(4) Reference input connections

Notes:

1. The connections indicate the end points of the wiring only – cable routing is not shown.
2. **1:N protection cannot be used in the same shelf at the same time as 1:1 or 1+1 protection; these connections are shown for illustration only.**
3. The backplane shown applies to Rev. D or earlier backplanes, but the connections shown apply to all backplane revisions.

Figure 17. Shelf to MMP Connections

B. Master to Expansion Shelf Interconnections

Note: If a remote system will be attached to the master system, *do not* connect the expansion shelves at this point. Proceed to Part 3C.

3.06 Refer to Figures 18, 19, and 20, and connect the ribbon cables between the master shelf and any expansion shelves as follows:

1. If more than one rack is required, place the two racks as close as possible to each other. Follow local company practice for running ribbon cables between racks.

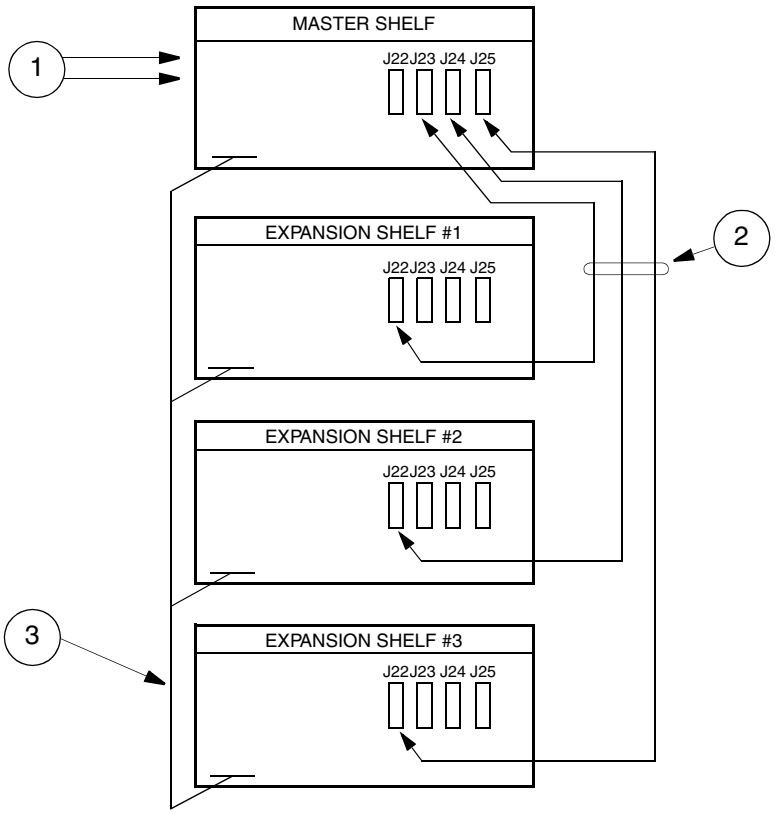
2. To connect a DCD-523 master shelf to a DCD-523 expansion shelf, use the provided 1.8 meter (60 inch) master/expansion shelf ribbon cable labeled 060-40004-12. Connect the master shelf to each expansion shelf according to the instructions in Figure 18.

3. To connect a DCD-523 master shelf to a DCD-400, DCD-ST2, or DCD-CIM expansion shelf, use the provided 1.8 meter (60 inch) master/expansion shelf ribbon cable labeled 060-40004-14. Connect the master shelf to each expansion shelf according to the instructions in Figure 19.

4. To connect a DCD-400, DCD-ST2, or DCD-CIM master shelf to a DCD-523 expansion shelf, use the provided 1.8 meter (60 inch) master/expansion shelf ribbon cable labeled 060-40004-14. Connect the master shelf to each expansion shelf according to the instructions in Figure 20.

Note: Cable routings shown in Figures 18, 19, and 20 are for reference only, and are not to be considered as recommended cable placement. Cable runs should be as short and straight as possible.

5. Route expansion cables per local company practice. If required, secure cables using stick-on ribbon cable clamps as appropriate, exercising care not to damage the ribbon cables.



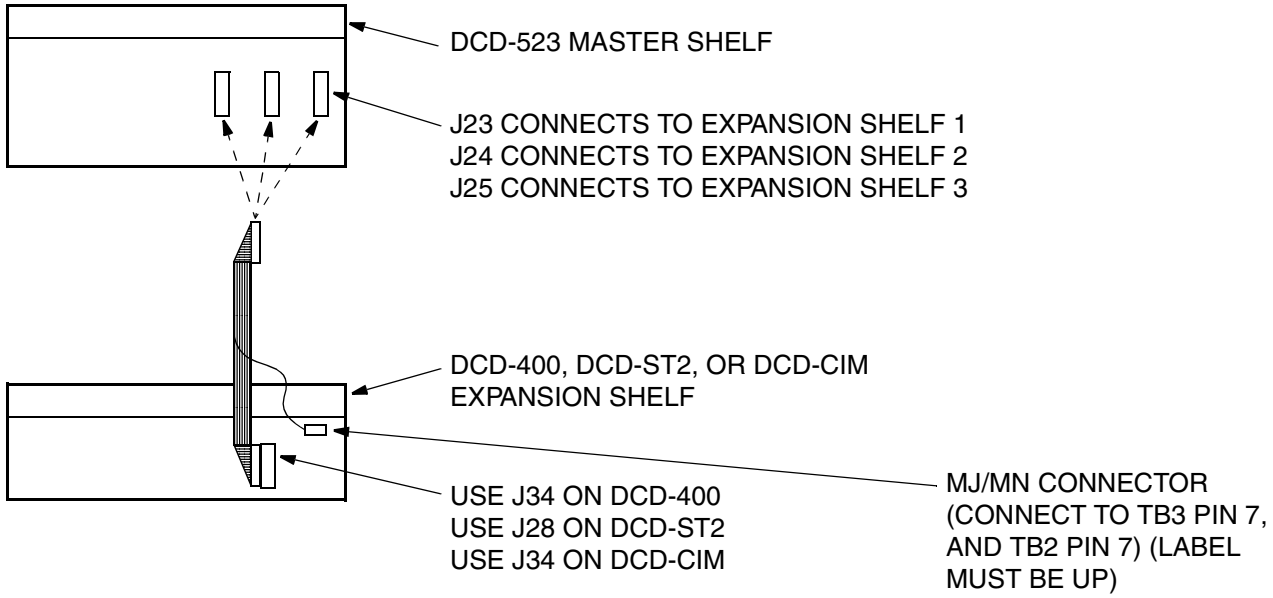
1. Upstream DS1 reference
2. Expansion ribbon cables
3. Daisy-chain major and minor alarms

Note: **Cabling is shown for connection only, not recommended placement.** Cables should be run as short and straight as possible. If two racks are required, follow standard company procedures for running ribbon cables between racks, if permitted.

Master to Expansion Shelf Cable Connections

FROM MASTER SHELF		TO EXPANSION SHELVES	
MASTER OUTPUT 1	J23	EXPANSION SHELF 1: EXPSN INPUT	J22
MASTER OUTPUT 2	J24	EXPANSION SHELF 2: EXPSN INPUT	J22
MASTER OUTPUT 3	J25	EXPANSION SHELF 3: EXPSN INPUT	J22

Figure 18. Master to Expansion Shelf Connections



Note: Connect the expansion shelf alarm ground pins together (TB3 pin 8 to TB2 pin 8 to TB2 pin 14). Use 0.643 mm (22 AWG) or 0.511 mm (24 AWG) green insulated wire.

Figure 19. Cabling a DCD-523 Master Shelf to a DCD-400, DCD-ST2, or DCD-CIM Expansion Shelf

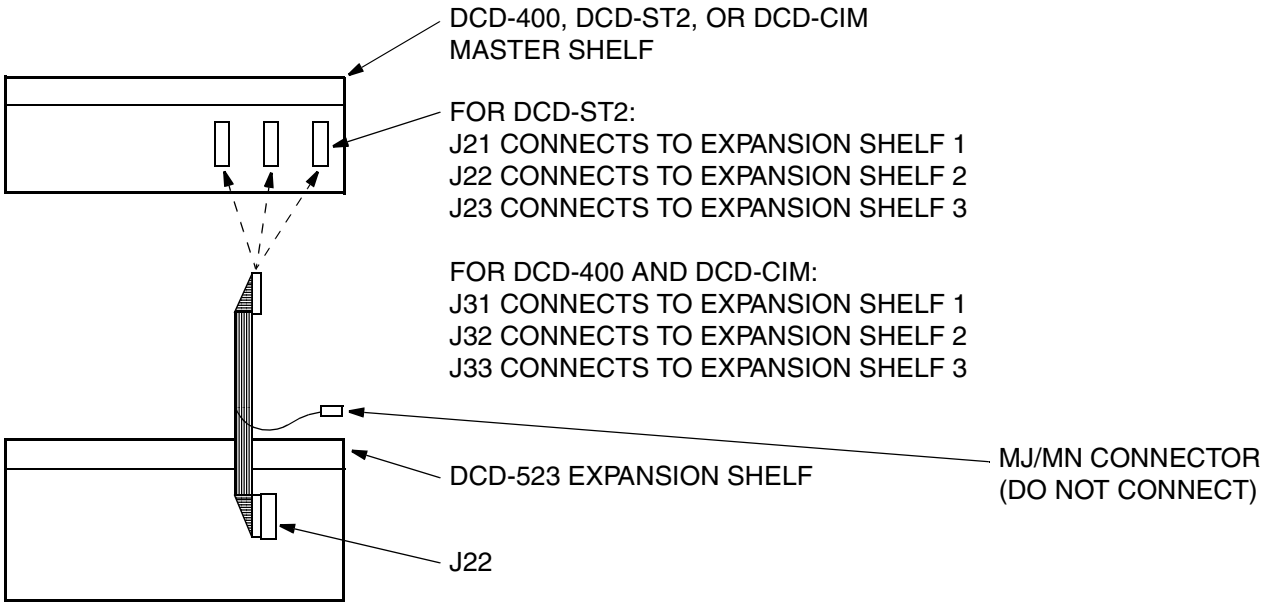


Figure 20. Cabling a DCD-400, DCD-ST2, or DCD-CIM Master Shelf to a DCD-523 Expansion Shelf

C. Master System to Remote System Connections

3.07 The DCD-523 master and expansion shelf outputs can drive inputs to remote shelf systems within the building. A remote shelf system can consist of a remote master shelf and up to three remote expansion shelves.

3.08 Cable distance between phase-aligned systems can be up to 455 meters (1500 feet) in length, allowing the remote system to be in a different part of the building.

> ***Note:*** The maximum distance may be increased to approximately 910 meters (3000 feet) by special cable compensation option settings on the TOCA cards (see TOCA option settings in the Test and Acceptance section of this manual).

3.09 Refer to Figure 21 and the following paragraphs to connect a master system to a remote system. The master and remote systems can be equipped for phase-aligned timing signals (via two TOCA card outputs) or G.703 timing signals (via two TOEA, TO-EA, TO-EAN, or TOGA card outputs).

Requirements for Phase-aligned Systems

3.10 If phase-aligned timing signals (64 kb/s messaging using CC signals) are required by the switching office, equip the systems as follows:

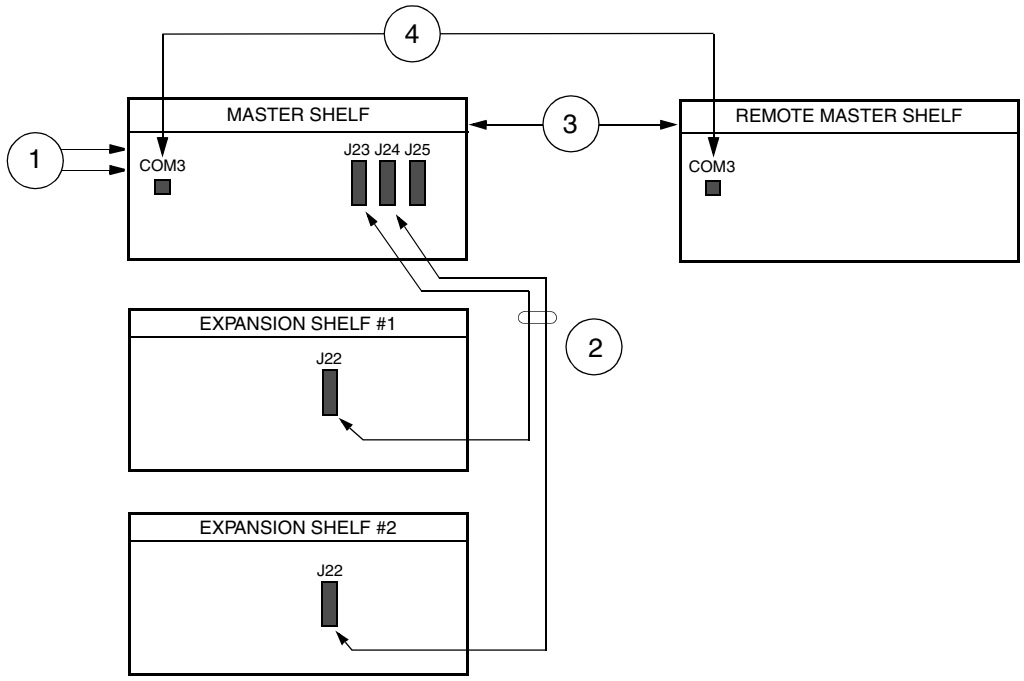
- Master system: requires two TOCA cards, one in any slot of the master shelf and the other in any slot of the expansion shelf. If no expansion shelf is installed, both TOCA cards may be installed in the master shelf.
- Remote system: master shelf requires two CI cards set for CC inputs. One or two LNC or ST3E clock cards provide holdover during any timing interruptions.

Requirements for G.703 Systems

3.11 If 2.048 Mb/s (G.703), or 2.048 MHz (G.703) signals are used, phase alignment is not required. Equip the system as follows:

- Master system: use one output from a TOGA, TOEA, TO-EA5, TO-EA, or TO-EAN card in one shelf, and another output from another TOGA, TOEA, TO-EA5, TO-EA or TO-EAN card in a different shelf.
- Remote system: master shelf requires a CI-EA clock input card for TOEA, TO-EA or TO-EAN inputs from the master system, or an ACI clock input card for TOGA inputs. One or two LNC or ST3E clock cards provide holdover during any timing interruptions.

> ***Note:*** If other frequencies supported by the DCD are used, consult the switching or transmission elements guide to determine if phase alignment is critical.



(1) Upstream reference

(2) Expansion ribbon cables: Make connections from MASTER OUTPUT 1 and 2 on the master shelf to "EXPANSION INPUT" on the corresponding expansion shelf with the provided cable (p/n 060-40004-12). If the MIS^{V5} card is used, do not connect before MIS^{V5} card is installed.

(3) For phase-aligned systems, connect from two TOCA card outputs on the master system to two CI cards on the remote system. For G.703 systems, connect two TOEA, TO-EA5, TO-EA, or TO-EAN card outputs from the master system to CI-EA cards on the remote system, or two TOGA outputs from the master system to ACI cards on the remote system. The cables must be diversely routed. Use 25.3 mils, 0.643 mm (22 AWG), tinned solid copper, shielded twisted pair cable.

(4) RS-232 communications between MIS cards in master shelves (COM3 of master system connects to COM3 of remote system). If the MIS^{V5} card is used, do not connect before MIS^{V5} card is installed.

Notes:
1. The remote system master shelf can be equipped with one or two LNC or ST3 clock cards to provide holdover timing if both timing inputs fail.
2. Cabling is shown to illustrate connections only. Follow local company practice for cable runs.
3. If communications are not required, up to 3 expansion shelves may be used on both the master system and remote system.

Figure 21. Remote System and Shelf Connections

Connecting the Systems

3.12 Refer to Figures 8 and 21 to connect the master system to the remote shelf system as follows:

Note: If the installation uses an MIS^{V5} in the remote system, the MIS^{V5} is installed in the Test and Acceptance procedures. Do not connect RS-232 cable and expansion shelves at this time.

1. Set up and mount a DCD-523 System in the same manner as a master system (Parts 2A through 3B) at a remote site in the building.

2. Use 25.3 mils, 0.643 mm (22 AWG) tinned solid copper, shielded twisted pair cable, to connect an output port from any pair of TOCA cards (can be located in different shelves) in the master system to the CCK inputs (TB12 and TB13) on the remote master shelf (see Figure 21).

   Or, connect from two TOGA or TOEA outputs on the master system to CCK inputs on the remote system. The cables must be diversely routed. Use 25.3 mils, 0.643 mm (22 AWG), tinned solid copper, shielded twisted pair cable.

   Note: When installing Rev. D or earlier shelves, the TOCA card output shield (S) terminals on the DCD master system shelf, and the S terminals on TB12 and TB13 for input references 1 through 5 and CCK of the remote system master shelf are all connected to frame ground internally to their respective shelves. Therefore, the input reference cable shield leads *must not be connected* at both ends. It is strongly recommended that the cable shield be connected to the S terminal at the TOCA output wire-wrap panel and left open (not connected) to the S terminal of TB12 and TB13.

   Note: When installing Rev. E or later shelves, the shield (S) terminals on TB12 and TB13 for input references 1 through 5 and CCK are capacitively coupled to frame ground, and the cable shield lead must be connected to frame ground at the signal source end, i.e., at the DSX-1 or TOCA output port. It is recommended that the shield lead of the cable also be connected to the (S) lead on TB12 and TB13.

   Note: It is recommended that outputs from two different TOCA, TOGA, or TOEA cards in the master system be used for diversity.

D. Master System to Remote Wire-wrap Panel

3.13 The remote wire-wrap panel, p/n 090-40003-01, is designed to be mounted remotely in network element (NE) bays. It is cabled to the DCD shelf wire-wrap panel using 25-pair ABAM cable with a 50-pin ISD connector, with metal hood on the remote wire-wrap panel end. Each cable transfers up to 20 DCD outputs to the remote panel location.

Note: Different types of timing outputs from the DCD shelf should not be mixed in the same ABAM cable.

3.14 The overall distance between the DCD shelf, the remote wire-wrap panel, and the NEs being timed, should not exceed 457 meters (1500 feet) for TOCA, and 200 meters (655 feet) for TOTA and TOTA5 outputs.

3.15 The remote wire-wrap panel is capable of transferring up to 100 DCD remote outputs. However, it is recommended that no more than 40 outputs be transferred from any one shelf. If more than 40 outputs are required, a remote system should be installed. Refer to Section C, Master System to Remote System Connections, for information regarding remote systems.

3.16 There are three ways of connecting the DCD shelf interface panel to the remote panel:

- Wire-wrap at both ends. Requires an unconnectorized cable to be wire-wrapped at both ends (the DCD shelf wire-wrap panel and a non-Symmetricom manufactured wire-wrap panel is used remotely).

- Wire-wrap locally, and connectorized remotely. This configuration requires the cable to be wire-wrapped to a local DCD shelf wire-wrap panel and plugged into a remote wire-wrap panel.

- Connectorized at both ends. Requires a remote wire-wrap panel at both ends.

Caution: Using two remote wire-wrap panels is not a recommended configuration as it is possible to double-tap the local wire-wrap terminal, thereby adversely affecting the output signal.

3.17 Perform the following to connect the master system to a remote wire-wrap panel:

1. Mount the remote wire-wrap panel in the NE equipment bay as per local company practice.

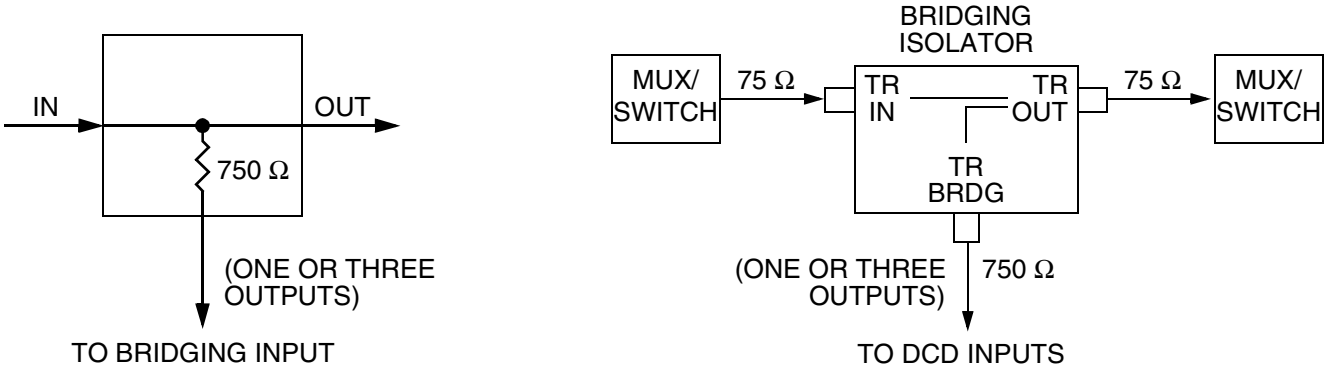
2. Using one of the three methods noted, connect the remote panel to the DCD shelf interface panel.

E. Bridging Isolator Installation

3.18 The bridging isolator (Figure 22) is inserted in a cable to bridge a reference input signal or traffic-carrying E1/CEPT to the DCD Shelf. A connection from the bridging isolator may be used as a reference input for a clock input card, or as an input for a PSM card.

3.19 Figure 22A shows a block diagram of the bridging isolator. The bridging isolator provides one or three 750 Ω high-impedance bridged connections which have 20.8 dB isolation from the through signal. The signal grounds are carried through the bridging isolator for both the through signal and the bridged signal. This prevents the bridging cable or equipment from loading or distorting the signal.

3.20 Install the bridging isolator in series with the E1 signal coax at any point between the multiplexer output and the receiver input as shown in Figure 22B. The bridging isolator may be connected to the rack, located in a cable tray, or supported by the cable in a vertical cable run. A cable from the bridging output to the DCD-523 Shelf input must be <100 meters (<328 feet).



A. Bridging Isolator Block Diagram

B. Interconnect Diagram

Figure 22. Bridging Isolator

F. Reference Input Connections

Installation Considerations

3.21 If the local company Installation Job Specifications do not specify the DCD Shelf timing input assignments, a local assignment plan must be developed before proceeding with the connections. The following information is provided to assist in developing a plan:

- Do not run reference input cables near inductive devices (large motors, generators, transformers, etc.) or other equipment which radiates strong magnetic fields.

- If a cable shield is to be connected to the DCD-523 Shelf, connect the cable shield first. Use CCK only for composite clock input applications.

- Ensure that reference input cables are run as diverse as possible. Do not install any type of redundant lead lying parallel and adjacent in the same cable rack.

- Assign redundant timing input cables to different clock input cards.

- Keep all reference input cables unbroken. Do not use tie cables or otherwise break the shield between the DCD-523 System and the device delivering the clock input. If broken, the shield leads must be bonded.

- When mixing rubidium clocks with quartz clocks in the same shelf, the shelf mode switch (SW1) must be in the ST2 position, and the rubidium clock card switch SW1, section 2, must be in the ON position.

- When a shelf is to contain both a TNC-E clock and an ST3E clock, see Table L for information.

- When a shelf is to contain both an ST2E clock and an ST3E clock, see Table M for information.

Table L. Acceptable Reference Inputs for a Shelf with Both TNC-E and ST3E Clock Cards

TNC-E ISSUE	ACCEPTABLE INPUTS
A	LPR
B	(Replace with TNC-E Issue C)
C	LPR, network reference

Table M. Acceptable Reference Inputs for a Shelf with Both ST2E and ST3E Clock Cards

ST2E ISSUE	ACCEPTABLE INPUTS
A	(Cannot share shelf with ST3E)
B	LPR
C	(Replace with ST2E Issue D)
D	LPR, network reference

- Reference input connections to the DCD Shelf are made at the terminal sets of TB12 and TB13, J59 (AUX A IN) and J60 (AUX B IN) (see Table N), or at an interface module. There are six sets of T, R, and S wire-wrap terminals on TB12 and TB13; the terminal sets are labeled 1 through 5 and CCK.

Reference Input Signal Cable Shield Grounding Considerations

3.22 The cables for reference input connections are user-supplied 25.3 mils, 0.643 mm (22 AWG), tinned solid copper, shielded twisted pair cable for E1, DS1, and CC, and coaxial cable for E1 and analog inputs.

Note: On Rev. D or earlier shelves, the input reference cable shield leads *must not be connected* at both ends. It is strongly recommended that the cable shield be connected to the S terminal at the interface panel and left open (not connected) to the S terminal of TB12 and TB13.

Note: On Rev. E or later shelves, the shield (S) terminals on TB12 and TB13 are capacitively coupled to frame ground. It is recommended that the shield lead of the cable also be connected to the (S) lead on TB12 and TB13 on these shelves, and also connected to ground at the source end.

3.23 The following items pertain to grounding the reference input signal cable shields:

Note: It is preferable to ground the shield at the timing source end only, but certain vendor applications may require grounding at the receive end. However, under no circumstances should the shield be connected to frame ground at both ends unless one end is capacitor coupled to ground.

3.24 The SW1 switch on input and PSM modules is used to determine whether or not to tie the shield to frame ground. Tying the shield to ground is ordinarily not required, but may be used in noisy environments to reduce noise. Set the switch for each input as follows:

1. Set the switch to FGND to tie the cable shield to frame ground.

2. Set the switch to OPEN to leave the cable shield open (floating).

3.25 As shown in Figure 1, the interface panel is located above each master and each expansion shelf. The interface panel provides connection to the backplane via reference input modules.

Rear Panel Reference Input Connections

3.26 Use these instructions to connect reference inputs to the REF A and REF B section of the rear panel (Figure 23). Input references for the MRC-T and DCIM-T cards must be connected at the REF A and REF B connectors. The next section provides instructions for connecting reference inputs to interface modules.

Caution: Connect CC inputs only to CCK connectors. Improper connection may result in improper operation.

Caution: Connect analog inputs only to AUX A and AUX B connectors. Improper connection may result in improper operation.

Caution: Do not connect a signal to the Row 4 connectors and the AUX connector simultaneously. The connectors are connected inside the DCD Shelf. Improper operation may result.

3.27 Connect wire-wrap input signals to the connectors on the rear panel according to Table N.

Note: TB14 and TB15 below the wire-wrap connections are grounding option straps used to ground the shield of the AUX input (analog) to either frame ground or digital ground. This is ordinarily not required, but may be used in noisy environments to reduce noise. Contact Symmetricom's Field Service Engineering if this option needs to be exercised.

Reference Input Connections at an Input Module

3.28 Connect reference input signals to interface modules according to Figure 24 or Figure 25.

3.29 Connect only one input to a module for an ACI, CI-EA, or CI card as shown.

Note: Ensure that SW4 and SW5 on the shelf rear panel are set to the appropriate termination for reference inputs A4. These switches only affect the termination for port A3 (CI-EA or CI clock input cards.

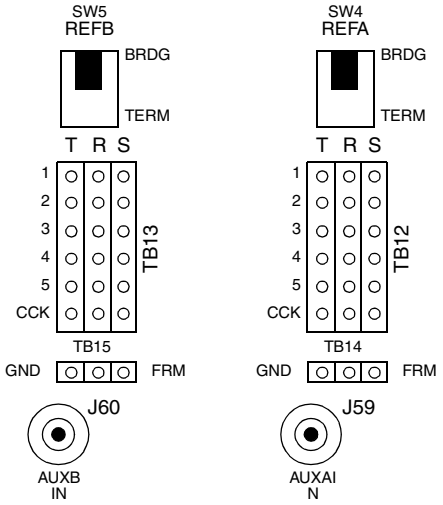


Figure 23. Rear Panel Reference Input Connectors

Table N. Reference Input Signal Connections and Relationship to Card Ports

Reference Input Connections		Card Input Ports		
Rear Panel Connector (Ref. A and Ref. B) (Note 1)	**Input Module Connector (Note 1)**	**MRC (all)**	**DCIM (all)**	**CI, CI-EA, ACI**
1 (Note 2)	—	—	—	—
2	A1	Port 1	—	—
3	A2	Port 2	Port 1	—
4 (Note 3)	A3 (Note 3)	Port 3	Port 2	Port 1
5	A4	Port 4	—	—
CCK	—	—	—	—
AUX (Note 4)	AUX (Notes 4, 5)	Port 3	Port 2	Port 1

Notes:

1. Connectors listed in the same row in this table are connected to the same port (Row 2 and A1, Row 3 and A2, etc.). Do not connect an input to the rear panel and a module simultaneously.
2. Row 1 carries signals for an MRE card (obsolete).
3. SW4 affects only rear-panel connector 4 and module connector A3 of input reference A (REF A). SW5 affects only rear-panel connector 4 and module connector A3 of input reference B (REF B).
4. Rear-panel connector 4 and module connector A3 are connected to the AUX connectors. Do not use AUX and rear-panel connector 4 or module connector A3 simultaneously.
5. The same connector is labeled A5 on 097-45107-04.

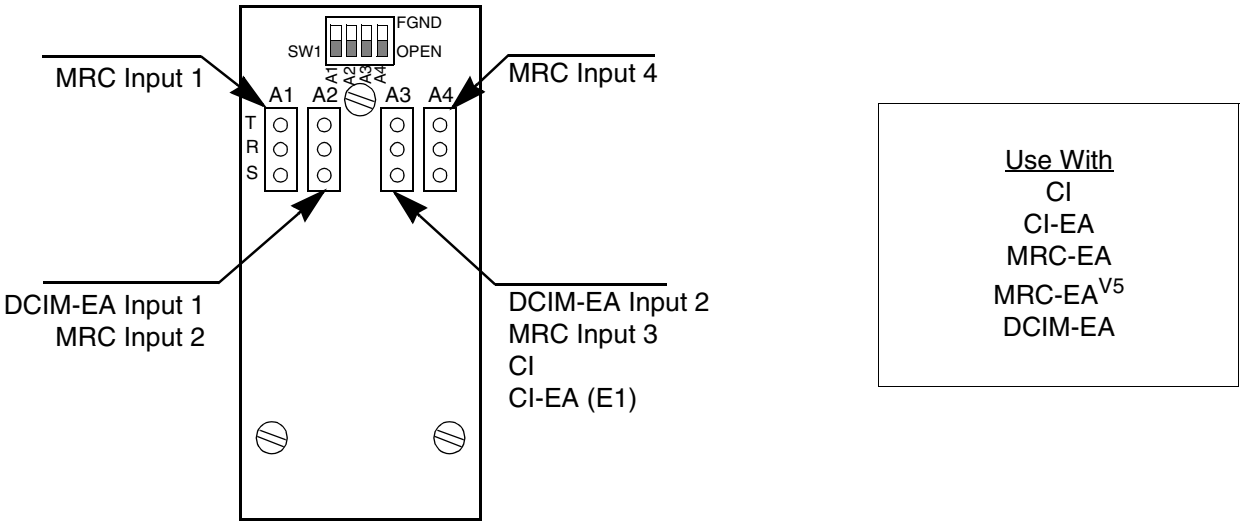
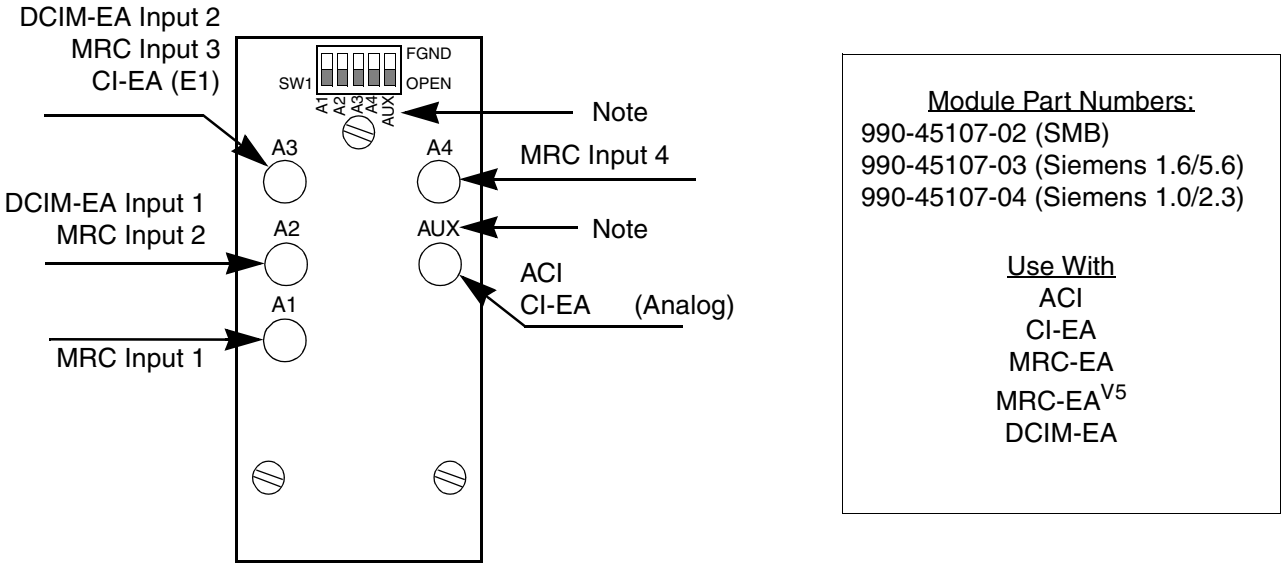


Figure 24. 990-45107-06 Module



Note: “AUX” is replaced by “A5” on 990-45107-04 modules.

Figure 25. Coaxial Clock Input Module

G. 5 MHz Stratum Connections

3.30 Two SMB connectors on the master shelf backplane (OSCA IN [J69] and OSCB IN [J68]) carry 5 MHz signals. These connectors are factory-installed and not user-selectable. (J69 is cabled to J65, and J68 is cabled to J66.)

3.31 Two BNC connectors, J61 (OSC A OUT) and J62 (OSC B OUT) (Figure 26), are for connecting to the DCD-LPR Shelf. They provide the necessary 5 MHz stratum signal source for the DCD-LPR.

H. Communications Port Connections

3.32 The MIS card sends serial alarm and status data and accepts control commands in the TL1 language via either the RS-232 DB9 DCE connectors (COM1, COM2, and COM3) on the shelf backplane, or the RJ45 LOCAL COMM connector on the faceplate of the MIS card.

> ***Note:*** COM2 is recommended for connection to a centralized surveillance and control center. It is recommended that the front panel LOCAL COMM connector be used for front-of-bay terminal connection only. The LOCAL COMM and COM2 ports are switch-selectable, and cannot be used simultaneously.

3.33 The company Installation Job Specifications should specify a modem circuit, packet switch circuit, or a dedicated private line circuit from the centralized alarm surveillance and control center for connection to the data-communication connector when an MIS card is provided.

3.34 Use an 8-lead Telco cable (user-supplied) with an RJ-45 connector from the MIS card front panel LOCAL COMM jack (refer to Table O and Figure 27 for the RJ45 pin assignments) to the local communication device.

> ***Note:*** It is recommended that the RJ45 modular jack on the MIS card front panel be used for front-of-bay terminal connection only.

3.35 Use a DCE-to-DCE cable (Black Box Corporation p/n B1BA22722) or equivalent cable to connect from the COM connector on the backplane to the communications device (refer to Table P and Figure 28). The DCE-to-DCE cable is a 1.8 meter (6 feet) cable with male DB9 and DB25 connectors.

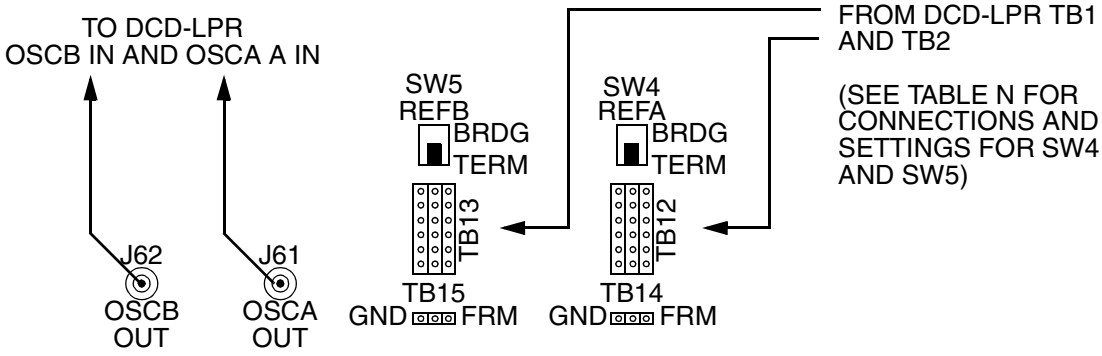


Figure 26. DCD-LPR Connections to DCD-523 Rear Shelf

Table O. RJ45 Modular Jack Pin Assignments (MIS Card)

PIN	DIRECTION (FROM MIS)	FUNCTION
1	N/A	NC (No Connection)
2	Out	Tx (Transmit Data)
3	In	Rx (Receive Data)
4	In	DSR (Data Set Ready)
5	In/Out	GND (Ground)
6	Out	DTR (Data Terminal Ready)
7	In	CTS (Clear To Send)
8	Out	RTS (Request To Send)

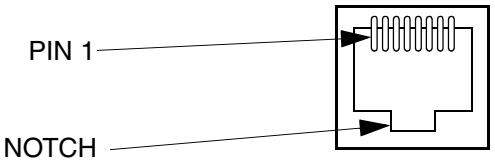
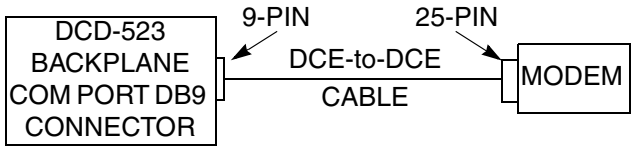


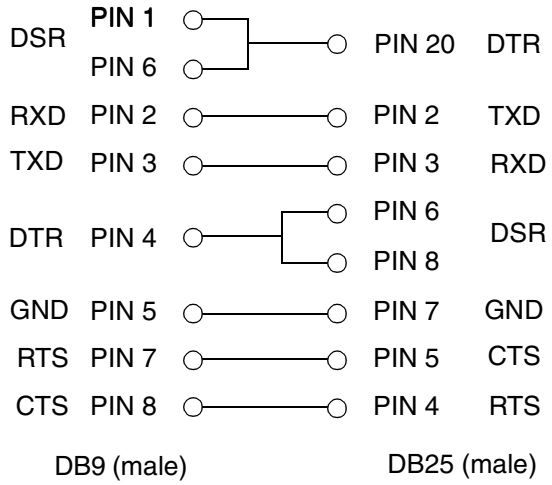
Figure 27. RJ45 Modular Jack

Table P. DB9 COMM Connector Pin Assignments

PIN	DIRECTION (FROM MIS)	FUNCTION
1	N/A	NC (No Connection)
2	In	Rx (Receive Data)
3	Out	Tx (Transmit Data)
4	Out	DTR (Data Terminal Ready)
5	In/Out	GND (Ground)
6	In	DSR (Data Set Ready)
7	Out	RTS (Request To Send)
8	In	CTS (Clear To Send)
9	N/A	NC (No Connection)



Note: Use a DCE-to-DCE cable with DB9 and DB25 male connectors between the backplane and the 25-pin connector on a modem.



DCE-to-DCE cable wiring

Figure 28. Data Communications Connection

4. TEST AND ACCEPTANCE

4.01 Refer to the Test and Acceptance section of this manual for instructions on installing and testing the DCD-523 cards, as well as instructions for performing a test and acceptance of the system.

4.02 After the test and acceptance has been completed (as instructed), proceed to the next section.

Caution: Ensure that the procedures in the Test and Acceptance section of this manual have been completed before making the connections in the remainder of this section. Failure to observe this caution may result in a service interruption

if the alarm or timing outputs have to be removed to complete the testing.

5. POST-TEST CONNECTIONS

A. MIS^{V5} Card in Remote System

5.01 Connect the RS-232 cable between COM3 on each master shelf and expansion shelves.

B. Alarm, Status, and Control Terminations

5.02 The DCD-523 Shelf has wire-wrap terminals for Office Alarms and Shelf Status indications, Clock Status (A and B) indications, and Control functions. The Office Alarm, Shelf Status, and Clock Status provide loop closures on DCD System alarms for the central office (CO) audible and visual alarm system, and telemetry interface to transport remote alarms via remote telemetry equipment scan-point inputs to a centralized alarm surveillance and control center. The Control terminals connect to remote telemetry equipment control-point outputs for controlling certain control functions on the DCD System, such as operating the alarm cutoff (ACO) on the DCD Shelf to silence the CO audible alarm.

5.03 Connect the Office Alarm, Shelf Status, Clock Status A and B, and Control terminals to the CO Audible/Visual Alarm System and remote telemetry equipment per the following sections.

Office Alarm Connections

5.04 The OFFICE ALARMS terminals on every shelf's backplane provide relay contact closures for connection to the CO audible/visual alarm system. These alarms indicate critical, major, and minor levels for both the audible and visual alarms. Either normally open (NO) or normally closed (NC) contacts referenced to a common (C) contact are used, depending on the type of connection required by the CO alarm system.

5.05 The alarm relays in the shelf are in an operated (latched) state when power is applied to the shelf. In an alarm condition or loss of dc power to the shelf, the normally open contact closes between the NO and C terminals, and opens the normally closed contact between the NC and C terminals. If the C terminal is used as a common between critical, major and minor in a daisy-chain, tip-ring (T-R) polarity must be observed. The NC terminals cannot be daisy-chained.

5.06 The DCD shelf provides critical, major, and minor levels of alarms. If the CO alarm system accepts only major and minor alarms levels, strap the shelf CRITICAL terminals (Audible and Visual NO and C contacts) to the MAJOR terminals (Audible and Visual NO and C contacts) before cabling to the CO alarm system major terminals.

5.07 Refer to Figure 29 and perform the following to connect the OFFICE ALARM terminals to the CO audible/visual alarm system:

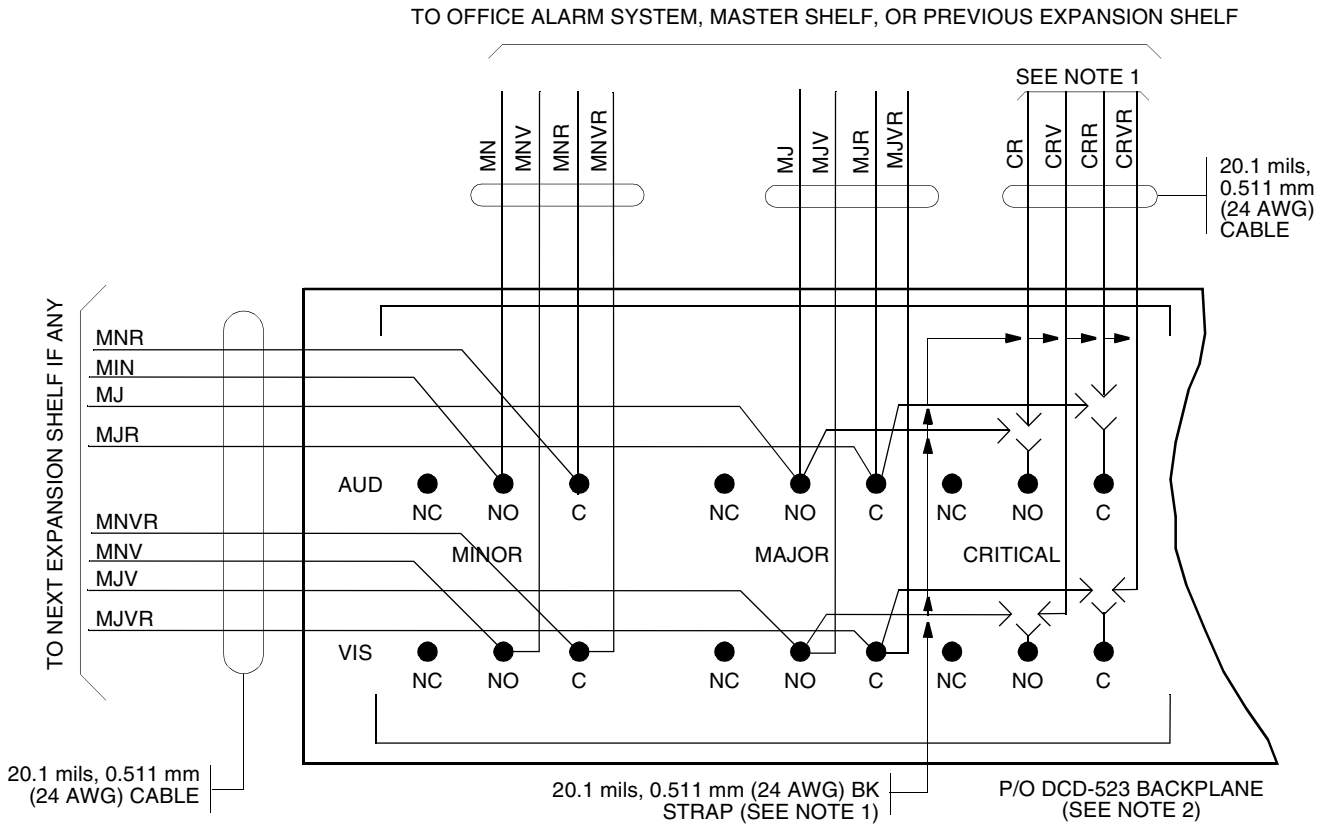
1. Use 20.1 mils, 0.511 mm (24 AWG) tinned solid copper wire and prepare the cable ends for wire wrapping, using local company practice.

2. Connect the master shelf OFFICE ALARMS terminals to the CO alarm audible/visual alarm system per the local company Installation Job Specifications.

3. Bridge together (daisy-chain) the OFFICE ALARMS terminals of the expansion shelves and then connect to the master shelf OFFICE ALARMS terminals. The NC terminals cannot be daisy-chained.

4. When alarm wiring has been completed, test the alarms per the local company Installation Job Specifications. The easiest way to verify the cabling is to put a short across each NO and C terminal pair and verify that the appropriate sound or light occurs.

   Note: When installed, two wires are on each OFFICE ALARMS terminal of each shelf, except the terminals of the last expansion shelf. One wire leads to the next shelf, and the other wire leads to the previous shelf or the CO alarm system.



Notes:
1. If office alarm system is not provisioned for critical alarms, strap NO and C contacts of CRITICAL to NO and C contacts of MAJOR (AUD and VIS).
2. The connections shown apply to all revisions of backplanes.

Figure 29. Office Alarms

Shelf Status and Clock Status (A and B) Connections

5.08 The DCD Shelf provides SHELF STATUS and CLOCK STATUS A and B closures for connection to remote telemetry equipment for transport to a centralized alarm surveillance and control center. The CRITICAL, MAJOR, and MINOR terminals indicate the severity of the disabling or potentially disabling conditions. The CLKL (clock loss), PRTA (port alarm), BATTALM (battery alarm), and CLOCK STATUS indicators indicate of the type of conditions associated with the alarms.

Note: In Rev. D or earlier shelves, each set of CLOCK STATUS A and CLOCK STATUS B terminals has a common return (RTN) terminal.

Note: In Rev. E or later shelves, each CLOCK STATUS A and CLOCK STATUS B terminal has its own return (RTN) (SR) terminal.

Note: CLOCK STATUS A and B HOLDOVER SI terminals have –48 V dc on them through relay windings.

Note: SHELF STATUS CLKLRTN (clock loss return), PRTARTN (port alarm return) and BATTRTN (battery alarm return) are internally connected to battery return (TB1 and TB2 RTN terminals).

5.09 The CRITICAL, MAJOR, MINOR, and BATTALM terminals are relay contact closures. All other terminals are open collector type (PNP Open Collector, –60 V, 500 mA maximum). Open collector terminals are designated SI for the status indicator terminals and SR for the status return terminals.

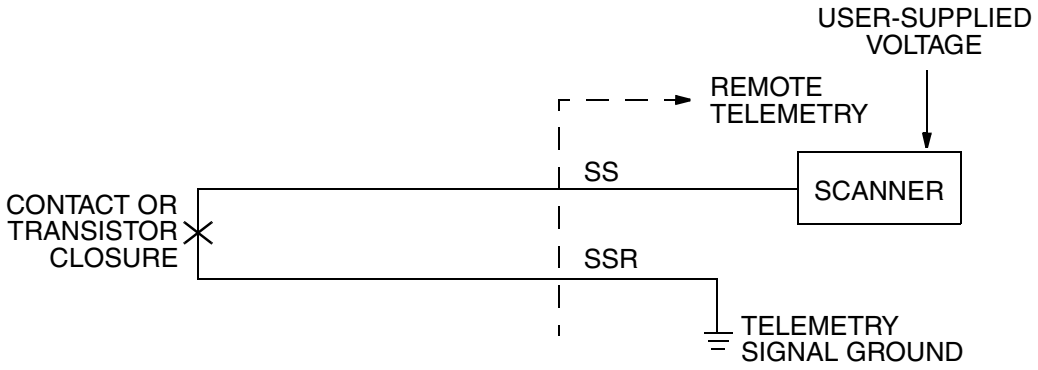
5.010 Some alarm terminals and SI terminals are "dry" (–48 V dc not present on the terminal) and others are "wet" (–48 V dc present on terminal), regardless of the type of alarm card (SAI or MIS) used in the DCD Shelf. Other alarm and SI terminals are "dry" if the DCD Shelf is equipped with an SAI card, and become "wet" when the shelf is equipped with an MIS card.

5.11 Wet alarm and SI terminals on the DCD Shelf must be assigned to remote telemetry equipment scan-point cards that accept "wet alarms and statuses." Likewise, dry alarm and SI terminals on the DCD Shelf must be assigned to scan-point cards that accept "dry alarms and statuses." Table Q and Figure 30 provide information as to when alarm and SI terminals conditions (wet or dry) and SS type connection configuration.

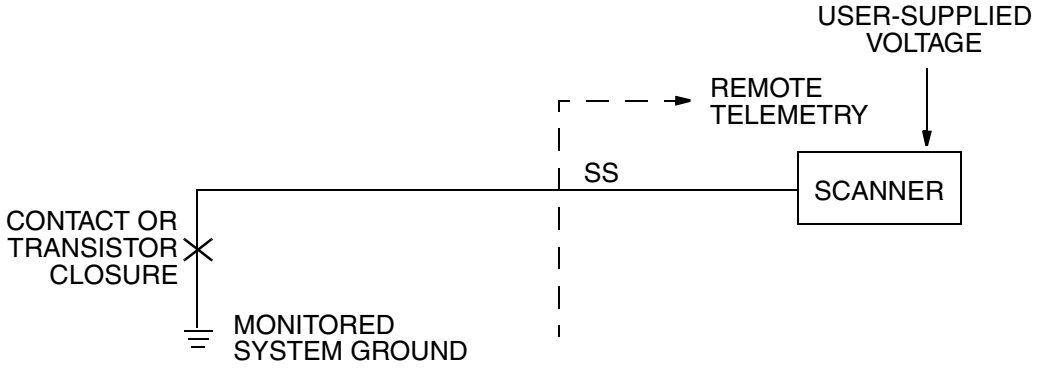
Table Q. Alarm and SI Terminals, and SS Types

ALARM/SI	MIS CARD INSTALLED	SAI CARD INSTALLED	WET/DRY	SS TYPE*	REFER TO
SHELF STATUS					
CRITICAL	YES	YES	DRY	1	Figure 30A
MAJOR	YES	YES	DRY	1	Figure 30A
MINOR	YES	YES	DRY	1	Figure 30A
PRTA	YES	YES	DRY	2	Figure 30B
CLKL	YES	YES	DRY	2	Figure 30B
BATTALM	NO	YES	DRY	2	Figure 30B
BATTALM	YES	NO	WET	3	Figure 30C
CLOCK STATUS A AND B					
LOCK	NO	YES	DRY	2	Figure 30B
LOCK	YES	NO	WET	3	Figure 30C
HOLDOVER	YES	YES	WET	3	Figure 30C
FREERUN	NO	YES	DRY	2	Figure 30B
FREERUN	YES	NO	WET	3	Figure 30C
UNLOCK	NO	YES	DRY	2	Figure 30B
UNLOCK	YES	NO	WET	3	Figure 30C
INPTOL	NO	YES	DRY	2	Figure 30B
INPTOL	YES	NO	WET	3	Figure 30C

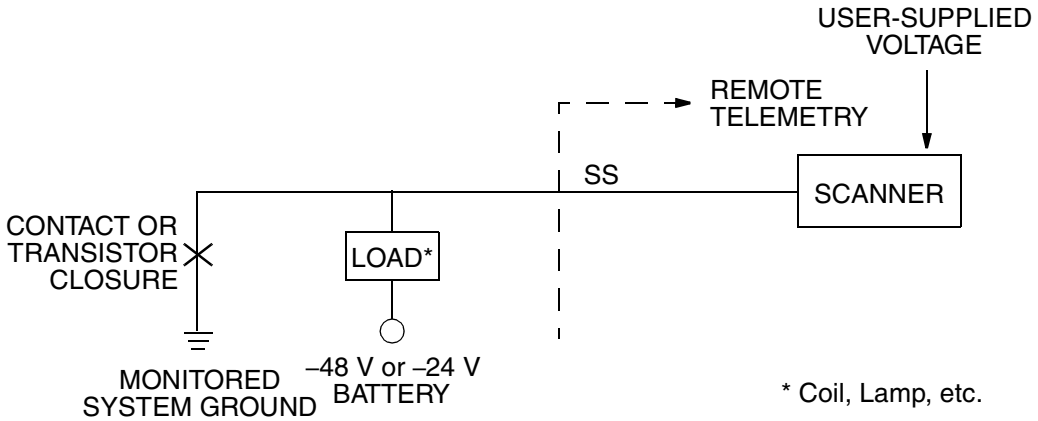
* Refer to Bellcore Technical Reference PUB 43804 - Network Terminal Equipment Operations Interface Specifications for additional information regarding SS Type 1, 2 and 3 connections.



A. SS Type 1 - Isolated Loop Closure Inside Building



B. SS Type 2 - Isolated Closure to Ground



C. SS Type 3 - Closure to Ground with Load

Note: Refer to Bellcore Technical Reference PUB 43804 - Network Terminal Equipment Operations Interface Specifications for additional information regarding SS Type 1, 2, and 3 connections.

Figure 30. SS Type Connection Configurations

5.12 Refer to Figure 31, Figure 32, and Figure 33 for the SHELF STATUS and CLOCK STATUS indicator terminal connections to remote telemetry equipment scan-point input terminals, and perform the following:

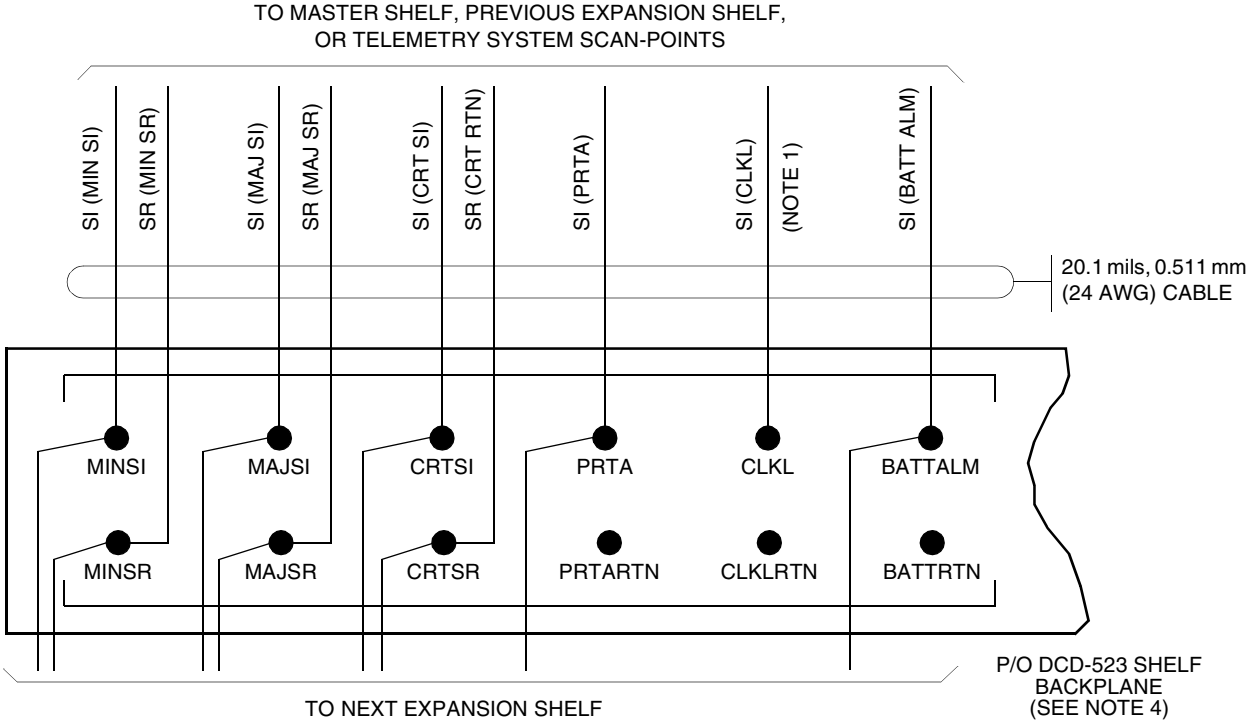
1. Use 20.1 mils, 0.511 mm (24 AWG) tinned solid copper wire and prepare the cable ends for wire-wrapping using local company practice.

2. Connect the master shelf SHELF STATUS and CLOCK STATUS A and B terminals to the remote telemetry equipment scan-point terminals per the local company Installation Job Specifications. Refer to Figure 31 for SHELF STATUS connections, and Figures 32 and 33 for CLOCK STATUS A and B connections.

3. Bridge together (daisy-chain) the SHELF STATUS CRITICAL, MAJOR, MINOR, PRTA and BATTALM terminals on the expansion shelves together, then connect to the master shelf SHELF STATUS terminals (see Figure 31).

   Note: When installed, two wires are on each SHELF STATUS terminal (except CLKL) of each shelf, except the terminals of the last expansion shelf. One wire leads to the next shelf, and the other wire leads to the previous shelf or the CO alarm system.

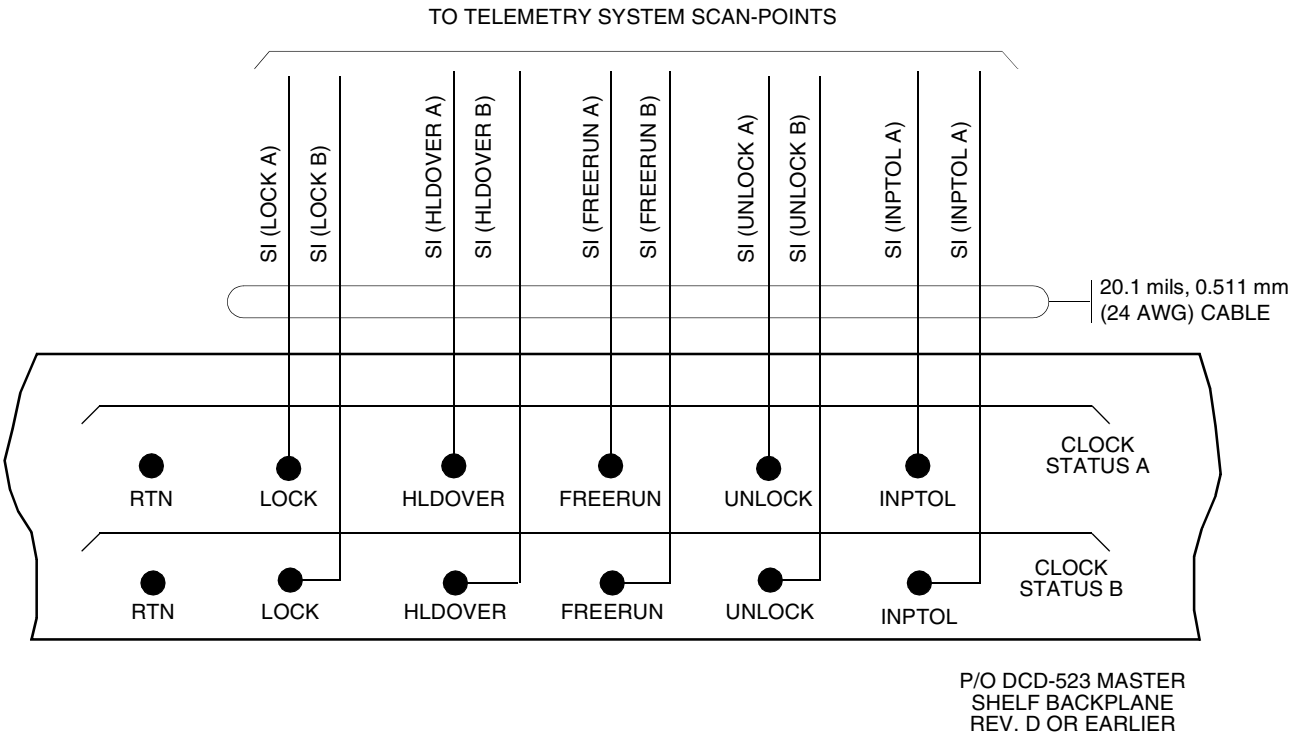
4. After the alarm wiring has been completed, test the alarms per the local company Installation Job Specifications. Each scan-point in the operations system (OS) computer should be programmed with a message that identifies the alarm or status state. Since the available field length may vary between different OS computers, Table R contains suggested OS messages.



Notes:

1. Connect multiple status/control leads only at the MINSI, MAJSI, CRTSI, PRTA, and BATTALM between master and expansion shelves. Connect the CLKL terminal at the master shelf only.
2. Status/control leads are office assignable at telemetry end by Central Office Engineer.
3. PRTA, CLKL, and BATTALM return (RTN) terminals are connected internally to the shelf's battery return, therefore, RTN connections between the RTN terminals and the remote telemetry equipment scan-points are not required.
4. The connections shown apply to all revisions of backplanes.

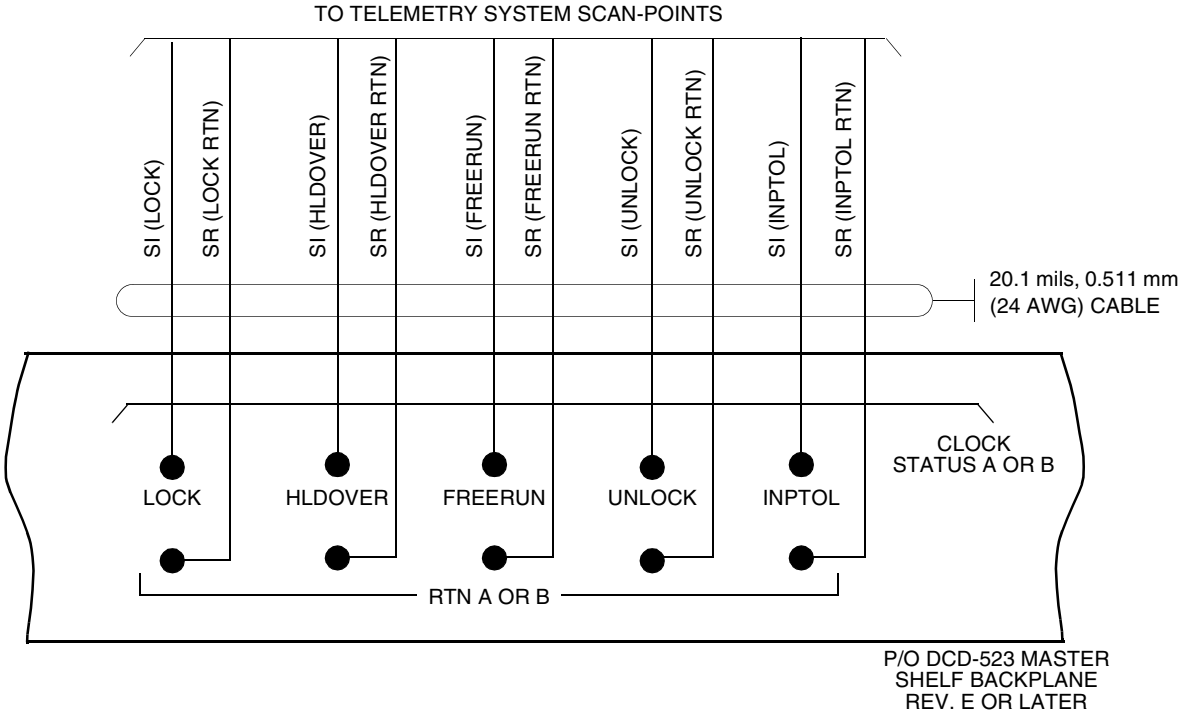
Figure 31. Shelf Status



Notes:

1. The clock status A and B RTN terminals are connected internally to the shelf's battery return, therefore, RTN connections between the DCD-523 shelf and the telemetry equipment scan-points are not required.
2. CLOCK STATUS terminals function only on the master shelf. Do not connect these terminals on expansion shelves.
3. Status/control leads are office assignable at telemetry end by Central Office Engineer.

Figure 32. Clock Status (Shelf Rev. D or Earlier)



Notes:

1. The clock status A and B RTN terminals are connected internally to the shelf's battery return, therefore, RTN connections between the DCD-523 shelf and the telemetry equipment scan-points are not required.
2. CLOCK STATUS terminals function only on the master shelf. Do not connect these terminals on expansion shelves.
3. Status/control leads are office assignable at telemetry end by Central Office Engineer.

Figure 33. Clock Status (Shelf Rev. E or Later)

Table R. OS Alarm and Status Messages (Suggested)

ALARM/STATUS TERMINAL	OS MESSAGE
SHELF STATUS	
CRITICAL	CRITICAL - All Sync Output Failed
MAJOR	MAJOR - Sync Potentially Service Affecting
MINOR	MINOR - Sync Non-service Affecting
PRTA	Sync - Timing Output Port Failed
CLKL	Sync - Input Reference Failed
BATTALM	Sync - Blown Fuse A or B/Loss BATT A or B
CLOCK STATUS A	
LOCK	Sync - Clock A Lost Lock With Reference
HOLDOVER	Sync - Clock A in Holdover Mode
FREERUN	Sync - Clock A in Freerun Mode
UNLOCK	Sync - Input Ref A to Ref B has Freq Offset
INPTOL	Sync - Input Ref A to Clk A has Freq Offset
CLOCK STATUS B	
LOCK	Sync - Clock B Lost Lock With Reference
HOLDOVER	Sync - Clock B in Holdover Mode
FREERUN	Sync - Clock B in Freerun Mode
UNLOCK	Sync - Input Ref A to Ref B has Freq Offset
INPTOL	Sync - Input Ref B to Clk B has Freq Offset

CONTROL Terminal Connections

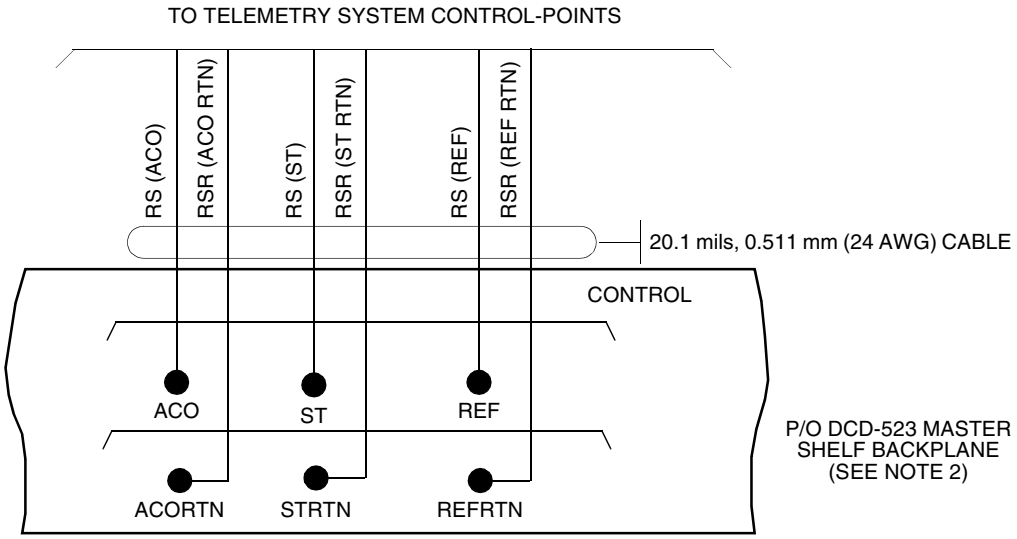
5.13 The CONTROL terminals on the shelf backplane are used for:

- ACO and ACO RTN - Used to remotely operate the ACO function on the SAI/MIS card
- ST and STRTN - Used to remotely transfer active status from one rubidium clock card to the other (ST2 mode only)
- REF and REFRTN - Used to remotely transfer the source (SRC) active status from one clock input card to the other (ST3 mode only)

Caution: If CONTROL function terminals are cabled to E2A equipment scan-points, they will cause erroneous alarms on the E2A and the CONTROL functions will not operate.

5.14 To connect the CONTROL terminals, on backplane of the DCD-523 master shelf c (Figure 8):

1. Use 20.1 mils, 0.511 mm (24 AWG) tinned s copper wire and prepare cable ends for w wrapping using local company practice.
2. Cable the CONTROL terminals to remote lemetry equipment control-points per the l company Installation Job Specifications (refe Figure 34).



Notes:
1. Status/control leads are office assignable at telemetry end by Central Office Engineer.
2. The connections shown apply to all revisions of backplanes.

Figure 34. Control Connections

C. Timing Output Module Connections

Caution: Read all of this section BEFORE attempting to connect the DCD-523 System to any timed equipment. Fully understand the principles behind the procedure. These procedures minimize interruptions to service.

5.15 This section provides guidelines and instructions for connecting network elements (NE) to the timing output (TO) modules for the output cards listed in Table S. The local company Installation Job Specifications should specify which timing output port connects to which NEs, the type of cable and connectors to use, and the routing of the cables. If not, this information must be developed before proceeding. Consult the network element manufacturer's documentation for proper connection, termination, and cutover procedures at the network element.

Table S. Timing Output Card Connections

CARD	CARD CONNECTIONS FIGURE
EA10, EA10M	35, 36, 37, 39, 40, 41
TOAA	44
TOCA	35, 41
TO-EA5	35, 36, 37, 38, 39, 40, 41
TO-EA	36, 37, 38, 39, 41
TO-EAN	33, 34, 35, 36, 37, 38, 39
TOEA	38, 39, 41
TOGA	38, 39, 40
TOLA	42, 43
TOTA	35, 41
TOTA-5, TOTA-M	35, 41
TOTL	35, 41

Initial Considerations

5.16 All timing output connections on the DCD Shelf are made at the interface panel. If the local company Installation Job Specifications do not specify the DCD Shelf timing output assignments, a local assignment plan must be developed before proceeding with the connections. The following information assists in developing the local output assignment plan.

5.17 Consult the NE manufacturer's equipment manuals to determine the external timing signal type required by the NE, the type of cable needed to make the connection, and the type of connectors required for the NE end of the cable. Some timing requirements are:

- D4 and SLC channel banks (and AT&T 1A ESS switch DTC) require 1 TOCA port per bay (DTC requires 2 per frame).
- Digital Loop Carrier (DLC) systems, e.g., NTI DMS-1 Urban, and AT&T SLC Series 5, require 2 TOCA ports per system.
- Some digital switch machines, e.g., AT&T 4ESS and 5ESS switches, require 2 or 4 TOTA or TOTA5 ports per machine.
- Some digital switch machines, e.g., NTI DMS-10/100/200, SC DCO, GTD-5, etc., use 2 traffic DS1 system for external timing extraction and require 1 SCIU per DS1 system.
- SDH terminals require 2 TOGA, 2 TOEA, 2 TO-EA, or 2 TO-EAN ports per terminal. Two ports per terminal are recommended for diversity.
- Digital Loop Carrier (DLC) systems, e.g., NTI DMS-1 Urban and AT&T SLC Series 5, require 2 TOCA ports per system.
- Some digital switch machines require 2 or 4 TOEA, 2 or 4 TO-EA or 2 or 4 TO-EAN^{V5} ports per machine.
- If an NE requires analog sine wave signals, use 1 or 2 TOAA ports per NE.

- SONET OC-n terminals require 2 TOTA ports per terminal or per 6 terminals (vendor specific). Two ports per terminal are recommended for diversity.

- Some digital switch machines and subscriber premise NEs require RS-422 or RS-423 square wave signals, and generally require 2 TOLA ports per switch/NE.

5.18 For NEs that require two timing references (primary and secondary), assign output ports from two separate TO cards of the same type for diversity, i.e., assign the primary reference to port 1 on the TOEA, TO-EA or TO-EAN card in slot TO1, and the secondary reference to port 1 on the TOEA, TO-EA or TO-EAN card in slot TO2.

5.19 Assign each NE to an appropriate TO port/slot. Refer to the Interconnect Drawings section of this manual for assignment sheet tables; use the tables to aid in assigning NEs to TO port/slot.

5.20 The Description and Specifications section of this manual contains information about such things as the number of outputs available from an output card, the length of cable a card can drive, and the type and frequency or bit rate of the outputs.

5.21 The Test and Acceptance section of this manual contains information about option switch settings for the output cards. These switches set the length of the cable between the DCD-523 and the NE, frequency or bit rate choices, and other options.

Connections

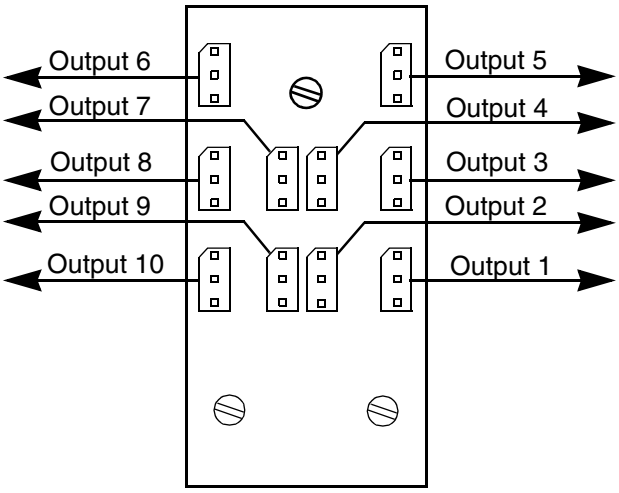
5.22 Refer to Figures 35 through 44 and the following to connect to a TO module.

1. Guide the cable ends into the cable duct from either (or both) side(s) of the equipment rack.

2. Route the cables to the interface modules of the appropriate TO group on the MMP. Tag the cables for identification.

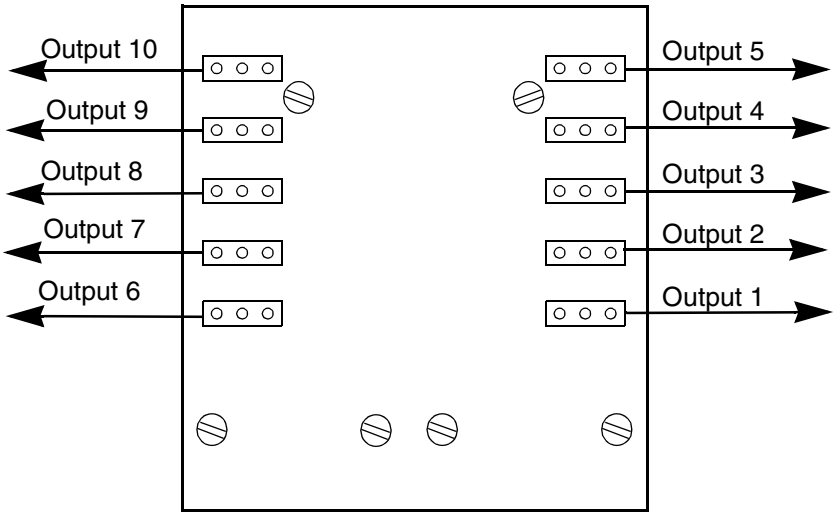
3. If connecting to a wire-wrap interface module, follow local company documents and use 25.3 mils, 0.643 mm (22 AWG) or 20.1 mils, 0.511 mm (24 AWG) tinned solid copper, shielded twisted pair cable. Prepare cable ends for wire-wrapping. Ensure that no bare wire ends are exposed, and no wires are nicked.

4. Repeat Steps 1 through 3 for each shelf with TO cards and an MMP.



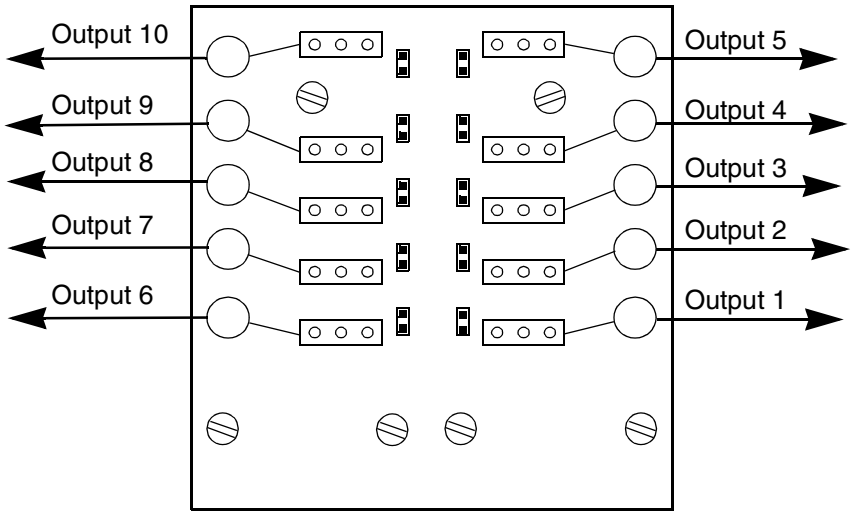
Use With
EA10
EA10M
TO-EA5
TO-EAN
TOTA
TOTA-5
TOTA-M
TOTL

Figure 35. 990-45105-06 Module



Use With
EA10
EA10M
TO-EA5
TO-EA
TO-EAN
(for redundant pairs)

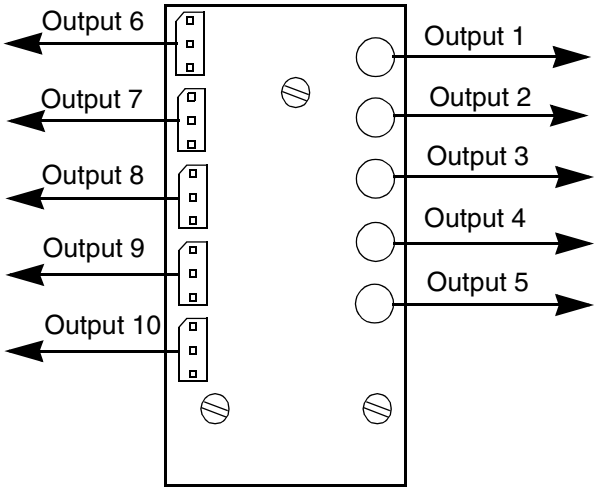
Figure 36. 990-45105-10 Module



Note: Each output may be wire-wrap (jumper on) or Siemens 1.6/5.6 (jumper off).

Use With
EA10
EA10M
TO-EA5
TO-EA
TO-EAN
(for redundant pairs)

Figure 37. 990-45105-11 Module



Note: Outputs 1 through 5 are Siemens 1.6/5.6, outputs 6 through 10 are wire-wrap.

Use With
TO-EA5
TO-EA
TO-EAN
TOEA
TOGA

Figure 38. 990-45105-12 Module

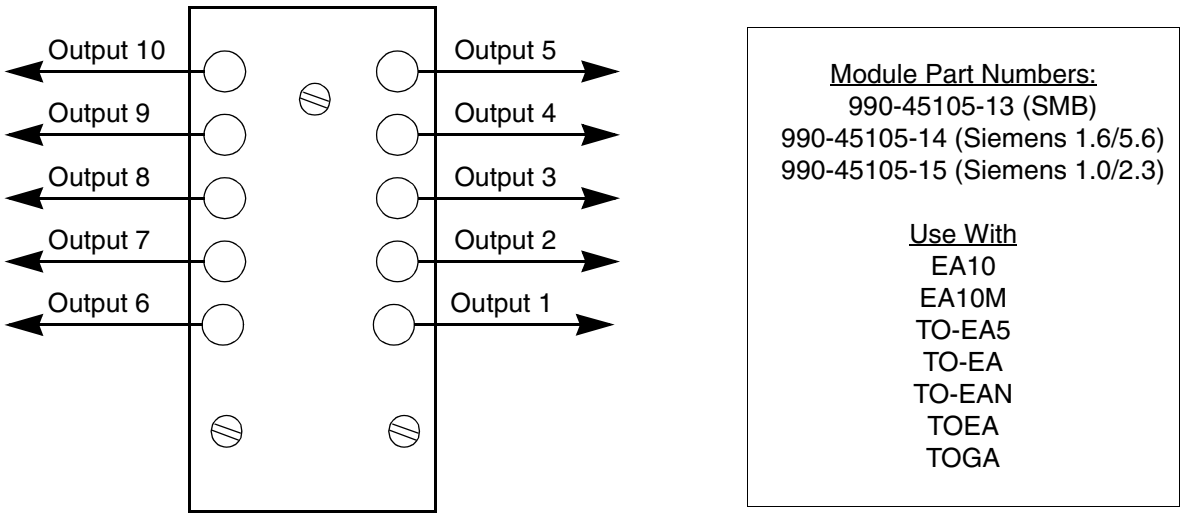


Figure 39. 990-45105-13, -14, -15 Module

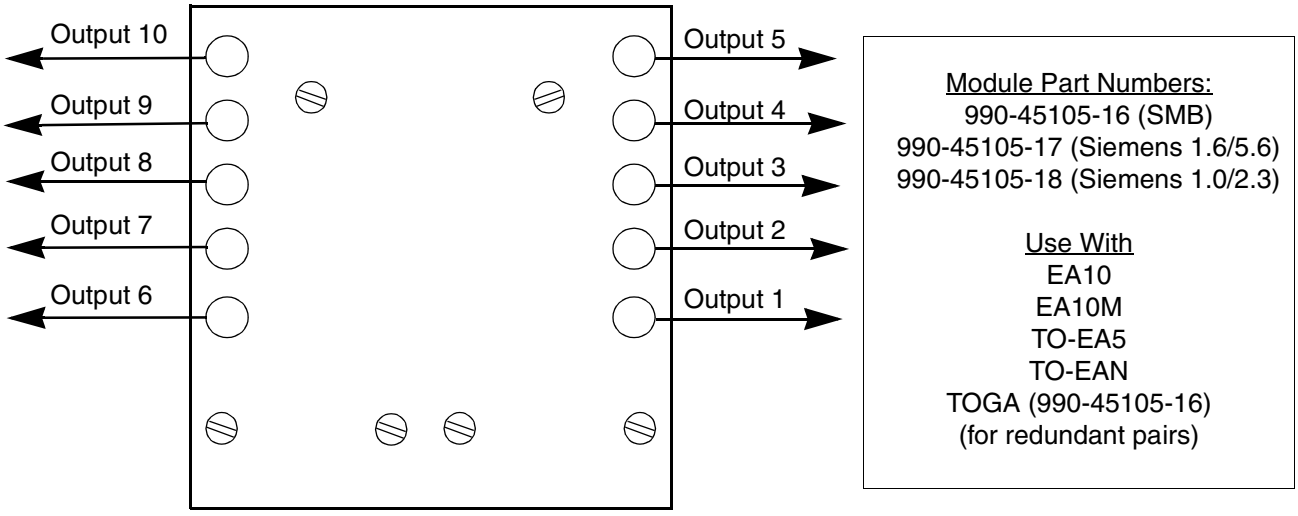
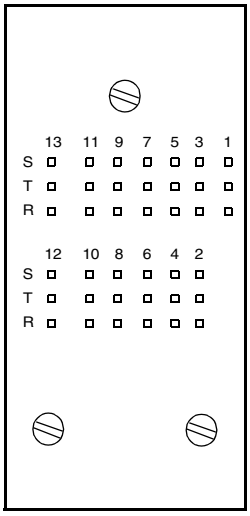


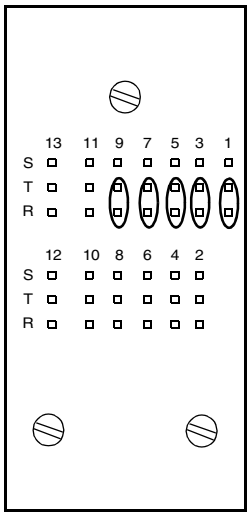
Figure 40. 990-45105-16, -17, -18 Module



Note: The terminal set number is the timing output card port number.

Use With
EA10
EA10M
TOCA
TO-EA5
TO-EA
TO-EAN
TOEA
TOTA
TOTA-5
TOTA-M
TOTL

Figure 41. 990-45108-01 Module

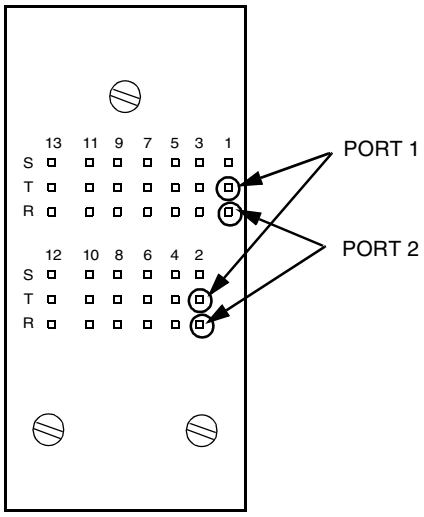


NOTE: Outputs 1 through 5 are available at the wire wrap terminal sets 1, 3, 5, 7, and 9. The RS-422 (+) driver connects to T and the RS-422 (–) driver connects to R.

Use With
TOLA (RS-422 signals)
TOLA (RS-232 signal, 090-40023-03 card only)

Note: For a 090-40023-03 (RS-232) card, the T pin is the clock, and the R pin is the ground. Terminal set 10 is a test port.

Figure 42. 990-45108-01 Module for TOLA Card with RS-422 and RS-232 Signals

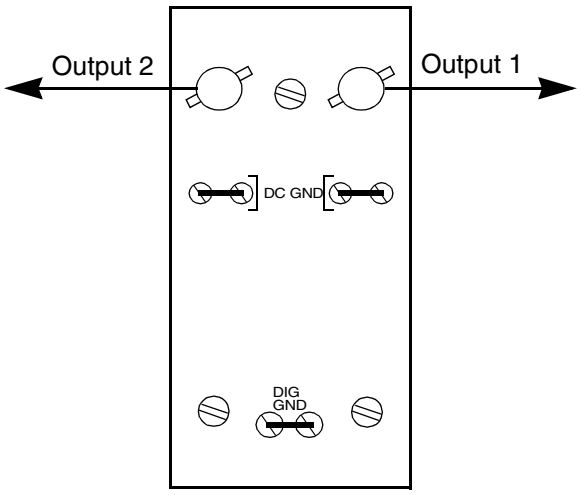


Note: Port 1 and port 2 are identified to show examples of the pin arrangement of the ports. The list on the right identifies the pins associated with the ports.

Use With
TOLA (RS-423 signal)

Output Port	Signal Lead		Ground Lead	
	Terminal Set	Pin	Terminal Set	Pin
1	1	T	2	T
2	1	R	2	R
3	3	T	4	T
4	3	R	4	R
5	5	T	6	T
6	5	R	6	R
7	7	T	8	T
8	7	R	8	R
9	9	T	10	R
10	9	R	10	R

Figure 43. 990-45108-01 Module for TOLA Card with RS-423 Signals



Note: To isolate DC ground (shield) from DCD equipment, remove jumper (DC GND)

Use With
TOAA

Figure 44. 990-45122-01 Module

D. PSM Module Connections

5.23 Refer to Figure 45 or Figure 46 and the following to connect to a PSM module.

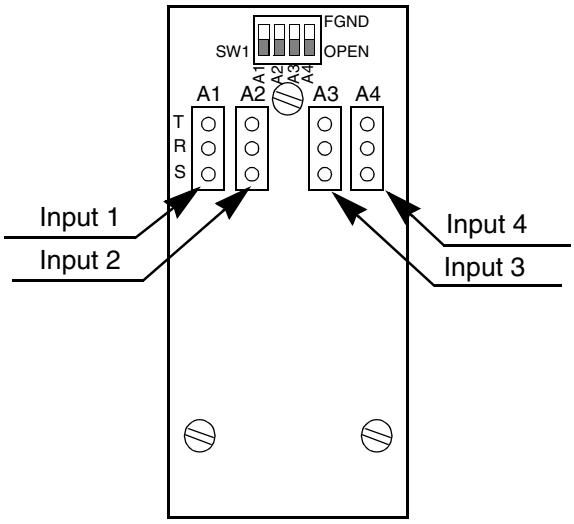
1. Guide the cable ends into the cable duct from either (or both) side(s) of the equipment rack.

2. Route the cables to the interface modules of the appropriate PSM group on the MMP. Tag the cables for identification.

   Note: If connecting to a wire-wrap interface module, follow local company documents, and use 25.3 mils, 0.643 mm (22 AWG) or 20.1 mils, 0.511 mm (24 AWG) tinned solid copper, shielded twisted pair cable. Prepare cable ends for wire-wrapping. Ensure that no bare wire ends are exposed, and no wires are nicked.

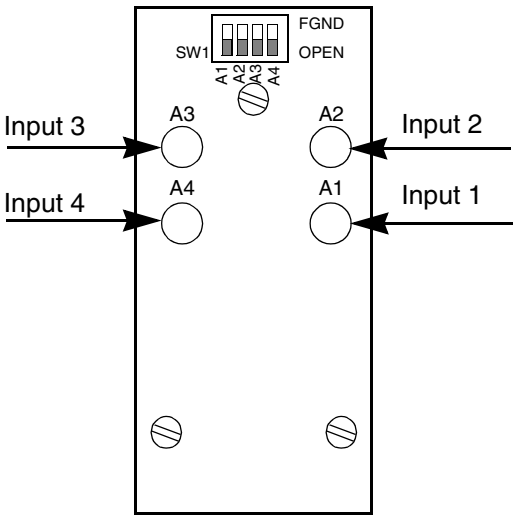
3. Connect the cables to the PSM/C module.

4. Repeat Steps 1 through 3 for each shelf with PSM cards and an MMP.



Use With
PSM-T
PSM-E
PSM-EA

Figure 45. 990-45106-11 PSM Input Module



Module Part Numbers:
990-45106-12 (Siemens 1.6/5.6)
990-45106-13 (BNC)
990-45106-14 (SMB)
990-45106-15 (Siemens 1.0/2.3)

Use With
PSM-E
PSM-EA

Figure 46. Coaxial PSM Input Module

E. Wire-wrap Panel Connections

5.24 The panel has 10 groups of 10 wire-wrap T, R, S terminal sets. Each T, R, S terminal set is a timing port for connecting to a network element. The panel may be used to connect any TO card or PSM card to network elements. To connect the output cables to the wire-wrap panel, use Figure 47, and Figure 48. Refer to Figure 48 to determine which T, R, S terminal sets to use.

Note: Each group of 10 T, R, S terminal sets on the wire-wrap panel is numbered the same as a single interface module. For example, the illustration shows terminal set 9 of the eighth group of 10 terminal sets. This is the same signal as terminal set 9 on interface module 8.

5.25 Perform wire-wrap connections as follows:

1. Ensure that the MCA card has been removed (to prevent unwanted protection switching during connection), then, using 25.3 mils, 0.643 mm (22 AWG) or 20.1 mils, 0.511 mm (24 AWG) tinned solid copper, shielded twisted pair cable, make wire-wrap connections as required.

   Note: Use local company practice for preparing cable ends for wire-wrap.

2. Repeat Step 1 for each network element to be timed from the master and expansion shelves; use Figure 48 as reference.

NE Connections Test

5.26 After connecting the timing output signals to the NE, verify the integrity of the timing signal from the DCD-523 System at the NE. Refer to the NE manufacturer's document for procedures about installing and verifying input timing signals.

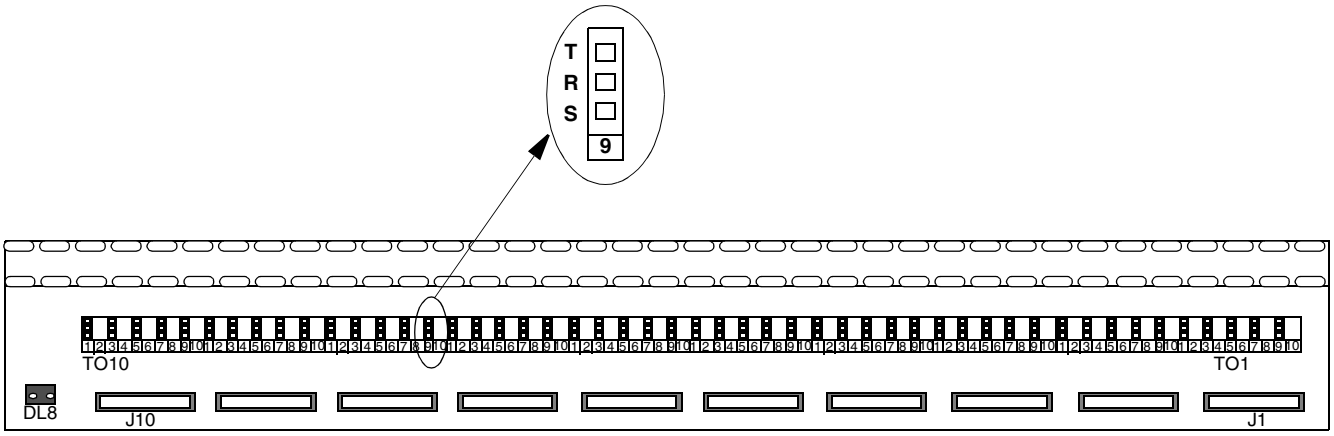
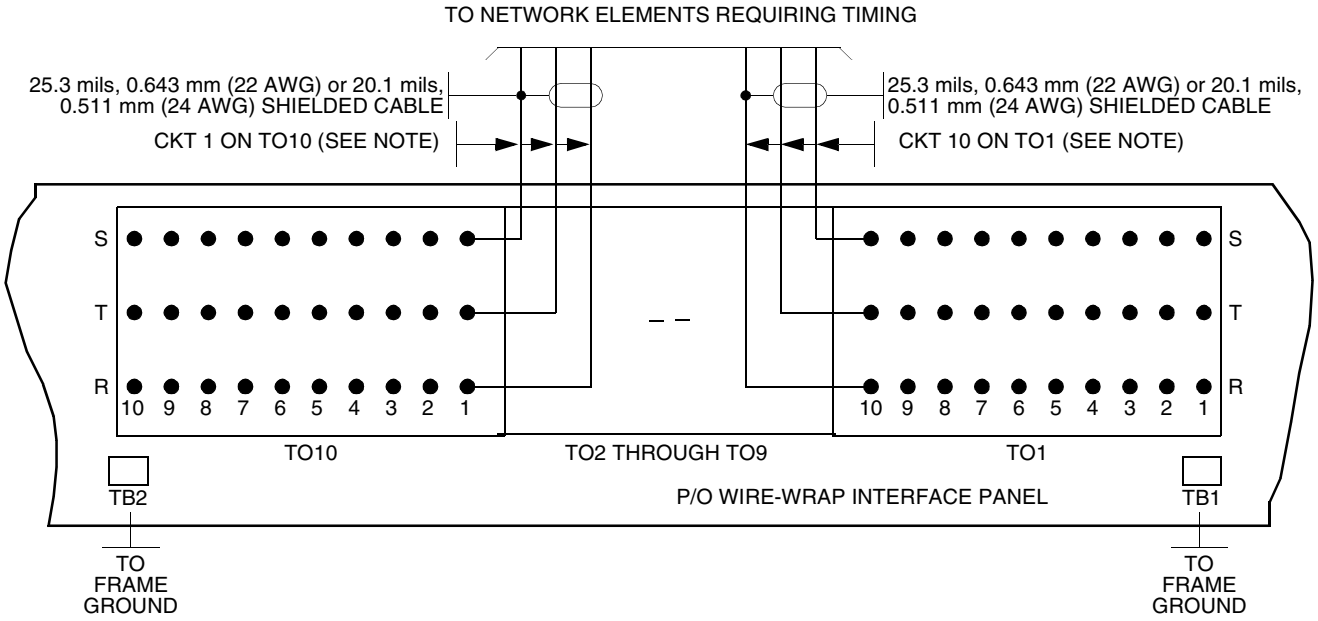
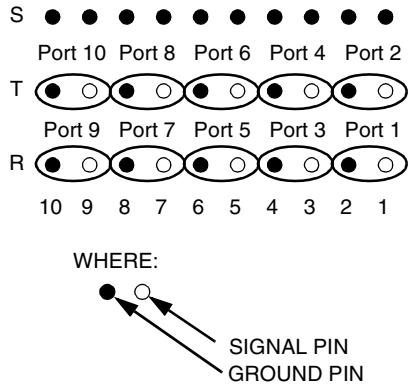


Figure 47. Wire-wrap Interface Panel

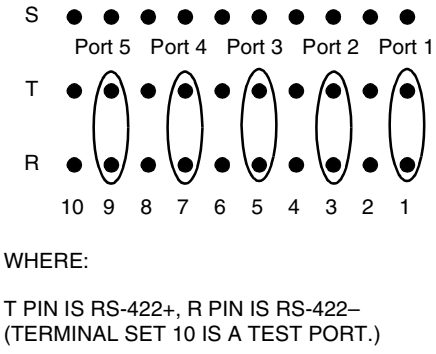


Notes:

1. This figure illustrates the use of only 1 connection per TO position; a maximum of 10 connections per TO position are possible.
2. When there are 10 output ports in a TO position, the port numbers are the same as the terminal set numbers (port 1 is terminal set 1, port 2 is terminal set 2, etc.).
3. TOLA cards use configurations of the terminal sets within a TO position as shown below.



TOLA Card RS-423 and RS-232 Connections



TOLA Card RS-422 Connections

Figure 48. Wire-Wrap Interface Panel Connections

F. ESCIU and SCIU Connections

5.27 The ESCIU and SCIU cards are different from the TO cards. TO ports provide external reference clock signals for network elements. The ESCIU and SCIU cards insert the DCD clock directly into E1 or DS1 traffic-carrying links.

5.28 The ESCIU and SCIU cards cannot be used in a redundant pair. The ESCIU and SCIU output modules maintain continuity on the traffic spans if the ESCIU or SCIU card fails, or is removed from the shelf by a bypass relay which releases and closes contacts for the traffic. Connections for an ESCIU or SCIU card must be at an ESCIU or SCIU module.

5.29 The "A" direction (East to West) of transmission inserts the DCD clock signal into the received traffic span's bitstream. The "B" direction (West to East) is passed through the ESCIU and SCIU without clock insertion.

5.30 The ESCIU and SCIU cards' A and B direction output signals conform to CCITT G.703 paragraph 6 specifications, and are designed for connection into the E1 or DS1 bitstream at the digital distribution frame (DDF). The network elements receiving the ESCIU or SCIU output signal must be able to receive signals that conform to CCITT G.703 paragraph 6 specifications.

Connecting at the DDF

5.31 If a standard level DDF (cross-connect point) is available, connect the ESCIU or SCIU module as follows:

1. For 75 Ω impedance, use BT 3002 or equivalent cable (user-supplied), to connect the ESCIU or SCIU module EAST and WEST terminals to the two network elements on the spans; refer to Table T and Figure 49, or Figure 50 and Table U.

2. Repeat Step 1 for each ESCIU or SCIU module installed.

Connecting without a DDF

5.32 If a standard level DDF (cross-connect point) is not available, the ESCIU or SCIU must be connected directly to the line and office network elements' transmit and receive terminals of the traffic-carrying E1 or DS1 facility as follows:

1. For 75 Ω impedance, use BT 3002 or equivalent cable (user-supplied) to connect the ESCIU or SCIU module EAST and WEST terminals to the two network elements on the spans; refer to Table V.

2. Repeat Step 1 for each ESCIU or SCIU module installed.

Connecting the Alarms

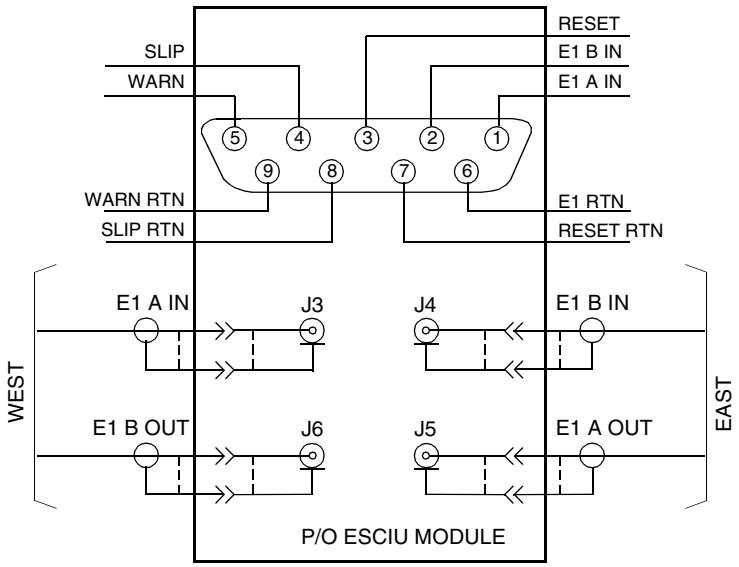
5.33 If the ESCIU or SCIU module is to be cabled to alarm monitoring equipment (consult local company Installation Job Specifications), perform the following:

1. Use the appropriate cable to connect from the DB9 connector (J2) on the ESCIU or SCIU module to alarm monitoring equipment; refer to Figure 49 or Figure 50 and Table W.

2. Repeat Step 1 for each ESCIU or SCIU module installed.

Table T. ESCIU and SCIU Module to Access Jack Connections

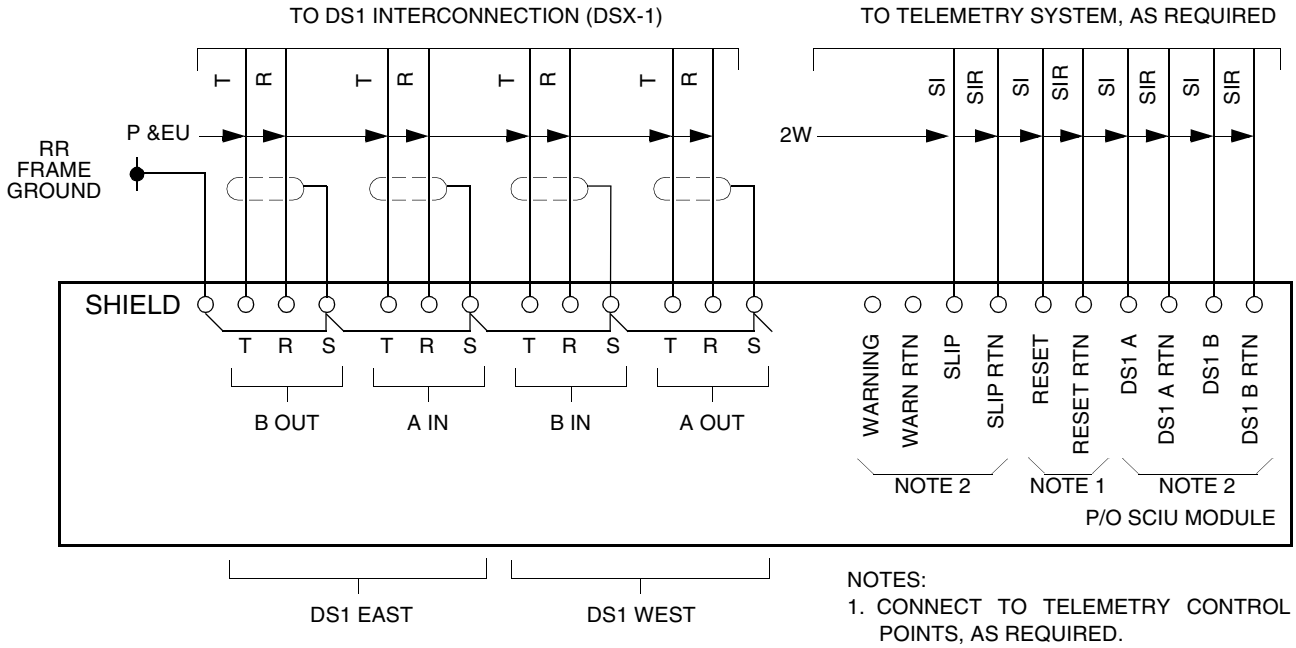
MODULE	ACCESS JACK*
WEST A IN (J3)	IN Jack #1 (Jack normal side)
WEST B OUT (J6)	OUT Jack #1 (Jack normal side)
EAST B IN (J4)	IN Jack #2 (Jack normal side)
EAST A OUT (J5)	OUT Jack #2 (Jack normal side)
* Jack numbers are for reference only.	



ESCIU Module Pin Assignments

PIN	SIGNAL	PIN	SIGNAL
J2-1	E1 A LOS	J2-8	SLIP RTN
J2-2	E1 B LOS	J2-9	WARN RTN
J2-3	RESET	J3	E1 A INPUT
J2-4	SLIP	J4	E1 B INPUT
J2-5	WARN	J5	E1 B OUTPUT
J2-6	E1 A/B RTN	J6	E1 A OUTPUT
J2-7	RESET RTN	—	—

Figure 49. ESCIU Interface Module



NOTES:
1. CONNECT TO TELEMETRY CONTROL POINTS, AS REQUIRED.
2. CONNECT TO TELEMETRY SCAN POINT, AS REQUIRED.

Figure 50. SCIU Interface Module

Table U. SCIU Wire-wrap Connections

WIRE-WRAP LEADS			
OUTPUT	PIN	CONNECTION	LEAD
1	T R S	B OUT	T R S
2	T R S	A IN	T R S
3	T R S	WARNING	SI RTN
4	T R S	SLIP	SI RTN
5	T R S	—	—
6	T R S	UNIT FAIL	SI RTN
7	T R S	DS1B FAIL	SI RTN
8	T R S	DS1A FAIL	SI RTN
9	T R S	B IN	T R S
10	T R S	A OUT	T R S

Legend: T Tip R Ring S Shield*
SI Status Indicator RTN Return

* It is preferable to ground the shield at the timing source end only, but certain vendor applications may require grounding at the receive end. However, under no circumstances should the shield be connected to frame ground at both ends unless one end is capacitor coupled to ground.

Table V. ESCIU and SCIU Module to NE Connections

MODULE	NETWORK ELEMENT (NE)*
WEST A IN (J3)	Transmit or OUT side of the NE link to be retimed from the DCD
WEST B OUT (J6)	Receive or IN side of the NE being retimed from the DCD
EAST B IN (J4)	Transmit or OUT side of the NE that has been retimed from the DCD
EAST A OUT (J5)	Receive or IN side of the NE connected to EAST A IN.

* Transmit or OUT is transmission toward the output module.

Receive or IN is transmission from the output module.

Table W. ESCIU and SCIU Alarm and Control Connections

TERMINAL SETS	COMMENTS
WARN (Alarm)	Do not cable
SLIP (Alarm)	Cable to E2A telemetry equipment scan-point
RESET (Control)	Cable to E2A telemetry equipment control-point
E1 or DS1 A (Alarm)	Cable to E2A telemetry equipment scan-point
E1 or DS1 B (Alarm)	Cable to E2A telemetry equipment scan-point

G. ESCIU and SCIU Cutover Procedures

5.34 The ESCIU and SCIU card must be cabled into the bitstream of a traffic-carrying E1 or DS1 system. This procedure assumes that the installation cabling was completed according to instructions in this section, and the test and acceptance was completed per the Test and Acceptance section of this manual.

Out-of-Service Equipment

5.35 If DDF access jack sets *are not* cabled to the ESCIU or SCIU module, the following out-of-service cutover procedure must be used. Consult the local company Installation Job Specifications to ensure that the network element to be retimed from the DCD-523 Shelf clock will be connected to the ESCIU or SCIU module correctly. Refer to Figure 51 or Figure 52 for the following procedure:

1. Remove from service (turn down) the traffic trunks on the E1 or DS1 system to be cutover to the ESCIU or SCIU module.

2. Remove the existing cabling between the line NE and office NE transmit (OUT) and receive (IN) terminals, including:

   - Transmit (OUT) on the line NE terminals to receive (IN) on the office NE terminals
   - Receive (IN) on the line NE terminals to transmit (OUT) on the office NE terminals

3. Connect the new ESCIU or SCIU module cables as follows:

   - WEST IN terminals on the module to transmit (OUT) terminals on the NE not being timed from the DCD-523 Shelf
   - WEST B OUT terminals on the module to receive (IN) terminals on the NE not being timed from the DCD-523 Shelf
   - EAST A IN terminals on the module to transmit (OUT) terminals on the NE being timed from the DCD-523 Shelf
   - EAST B OUT terminals on the module to receive (IN) terminals on the NE being timed from the DCD-523 Shelf

4. Verify that there are no alarms on the NEs on the E1 or DS1 system. If there are alarms, recheck the new cabling between the NEs and the ESCIU or SCIU module.

5. Restore (turn up) the traffic trunks to service.

6. Repeat Steps 1 through 5 for each ESCIU or SCIU installed in the DCD-523 Shelf.

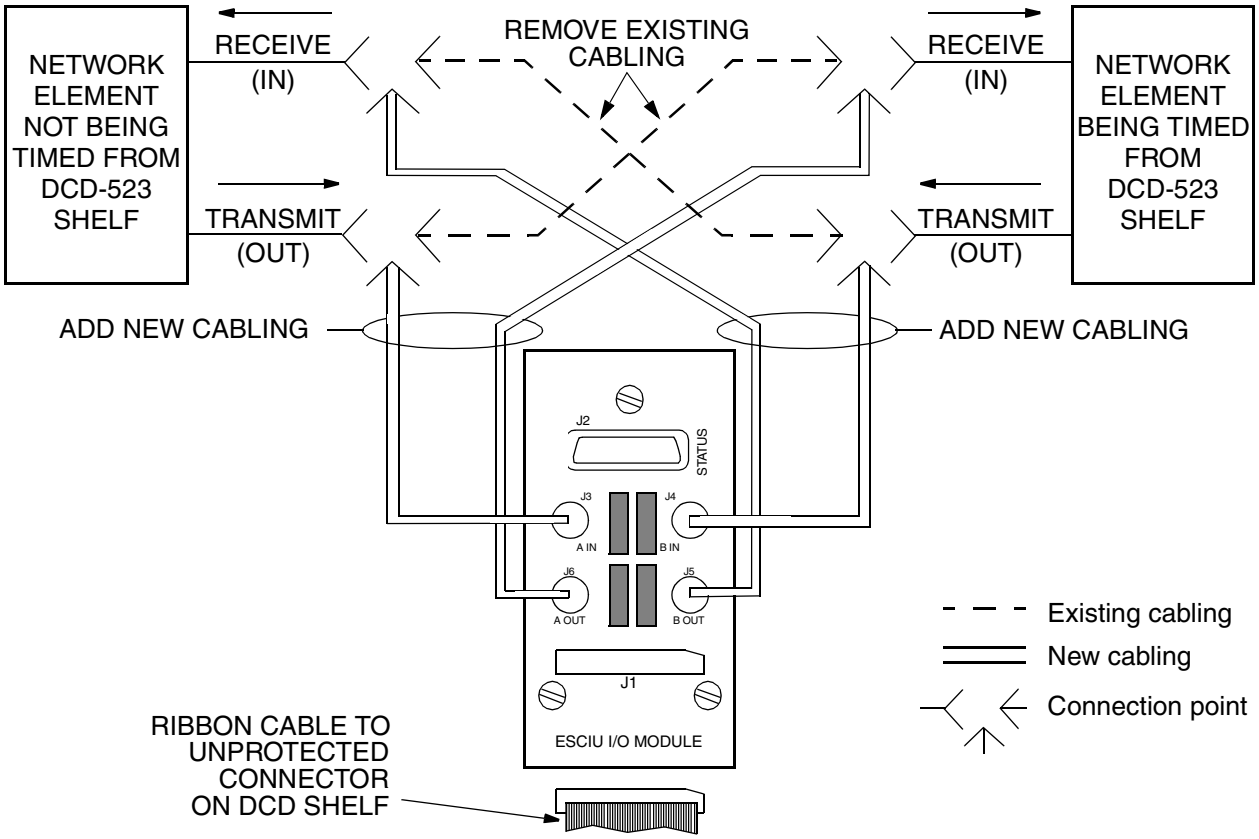


Figure 51. ESCIU Cutover without Jacks (Out-of-Service)

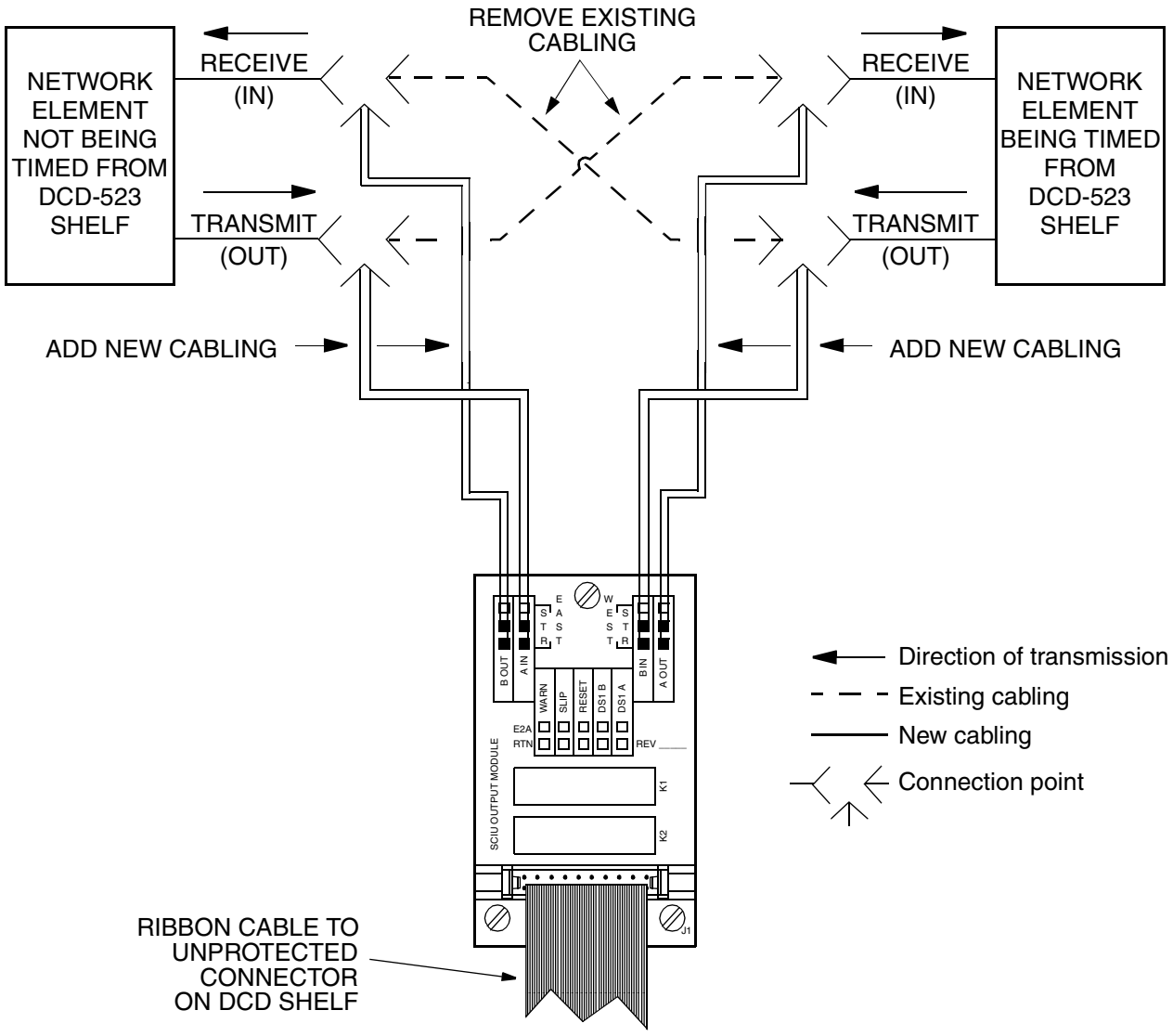


Figure 52. SCIU Cutover without Jacks (Out-of-Service)

In-Service Equipment

5.36 If standard digital signal level access jack sets, such as DSX-1 jacks, were cabled to the ESCIU module, the following in-service cutover procedure must be used. Consult the local company Installation Job Specifications to ensure that the network element to be retimed from the DCD-523 Shelf clock (BITS) will be connected to the ESCIU or SCIU module WEST A OUT terminals (see Figure 49). Refer to Figure 53 or Figure 54 for the following procedure:

1. Patch a bridging repeater from the MON jack of one NE to the IN jack of the other NE in both directions of transmission on the E1 or DS1 system to be cutover. Place a 75 Ω (E1) or 50 Ω (DS1) termination plug in the OUT jack in each direction.

2. Remove the cross-connect wiring from the OUT to IN jacks (off-normal side of jacks) in both directions of transmission.

3. Install new cross-connect wiring from the ESCIU or SCIU jack sets to the NEs as follows:

   - EAST A IN jack on the module to OUT jack on the NE not being timed from the DCD-523 Shelf
   - EAST B OUT jack on the module to IN jack on the NE not being timed from the DCD-523 Shelf
   - WEST B IN jack on the module to OUT jack on the NE being timed from the DCD-523 Shelf
   - WEST A OUT jack on the module to IN jack on the NE being timed from the DCD-523 Shelf

4. Remove the 75 Ω (E1) or 50 Ω (DS1) termination plug from the OUT jack and patch cords from the NE IN jack. The E1 or DS1 system bitstream is now going through the ESCIU or SCIU card.

5. Verify that there are no alarms on the NEs on the E1 or DS1 system. If there are alarms, reinsert patch cords in the IN jack and the termination plugs in the OUT jack. Recheck the cross-connect wiring just installed, and repeat Step 4.

6. Remove the remaining patch cords from the NE MON jack.

7. Repeat Steps 1 through 6 for each ESCIU and SCIU card installed in the DCD-523 Shelf.

Note: Consult Symmetricom CTAC for additional information regarding system cutovers.

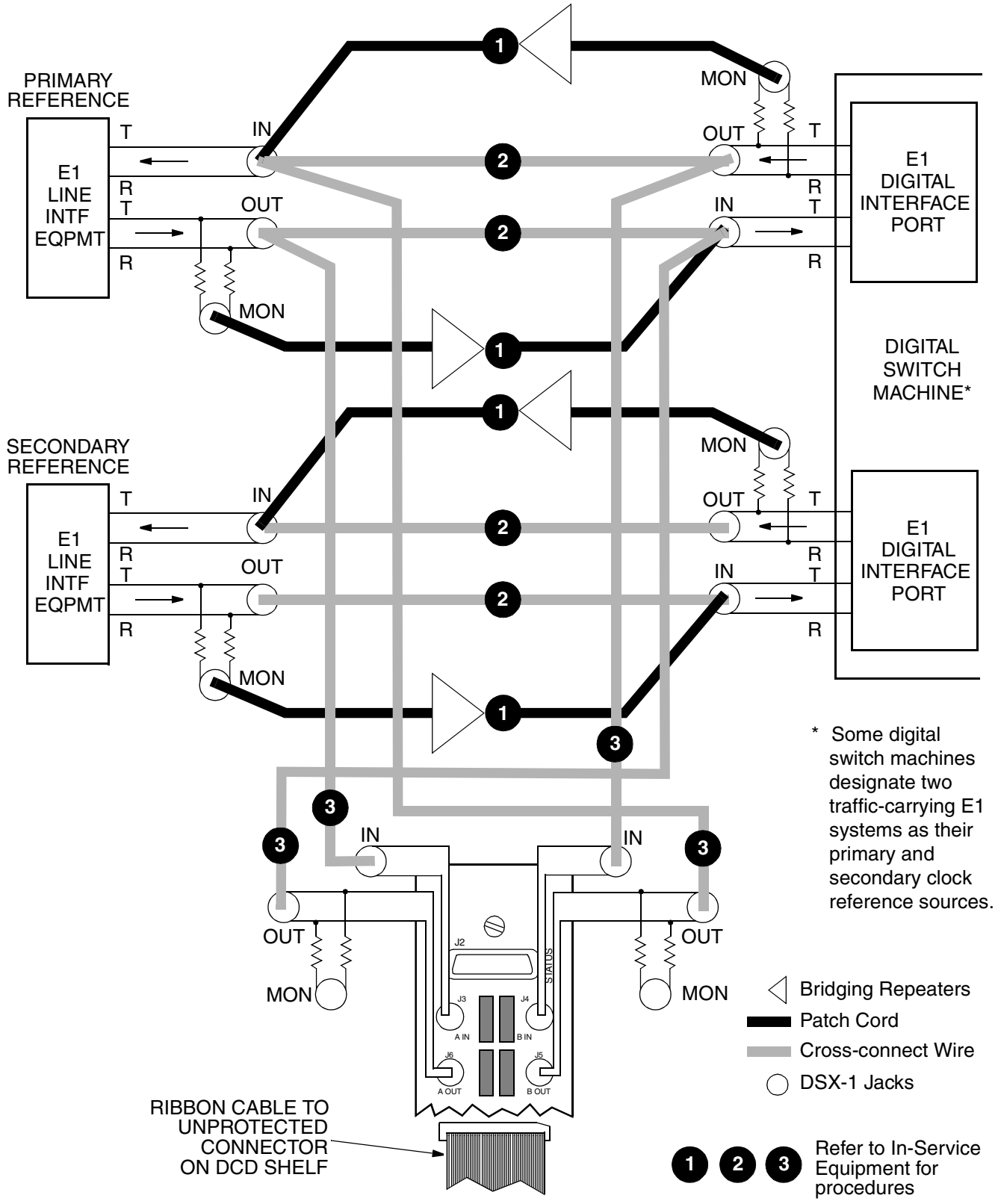


Figure 53. ESCIU Cutover with Jacks (In-Service)

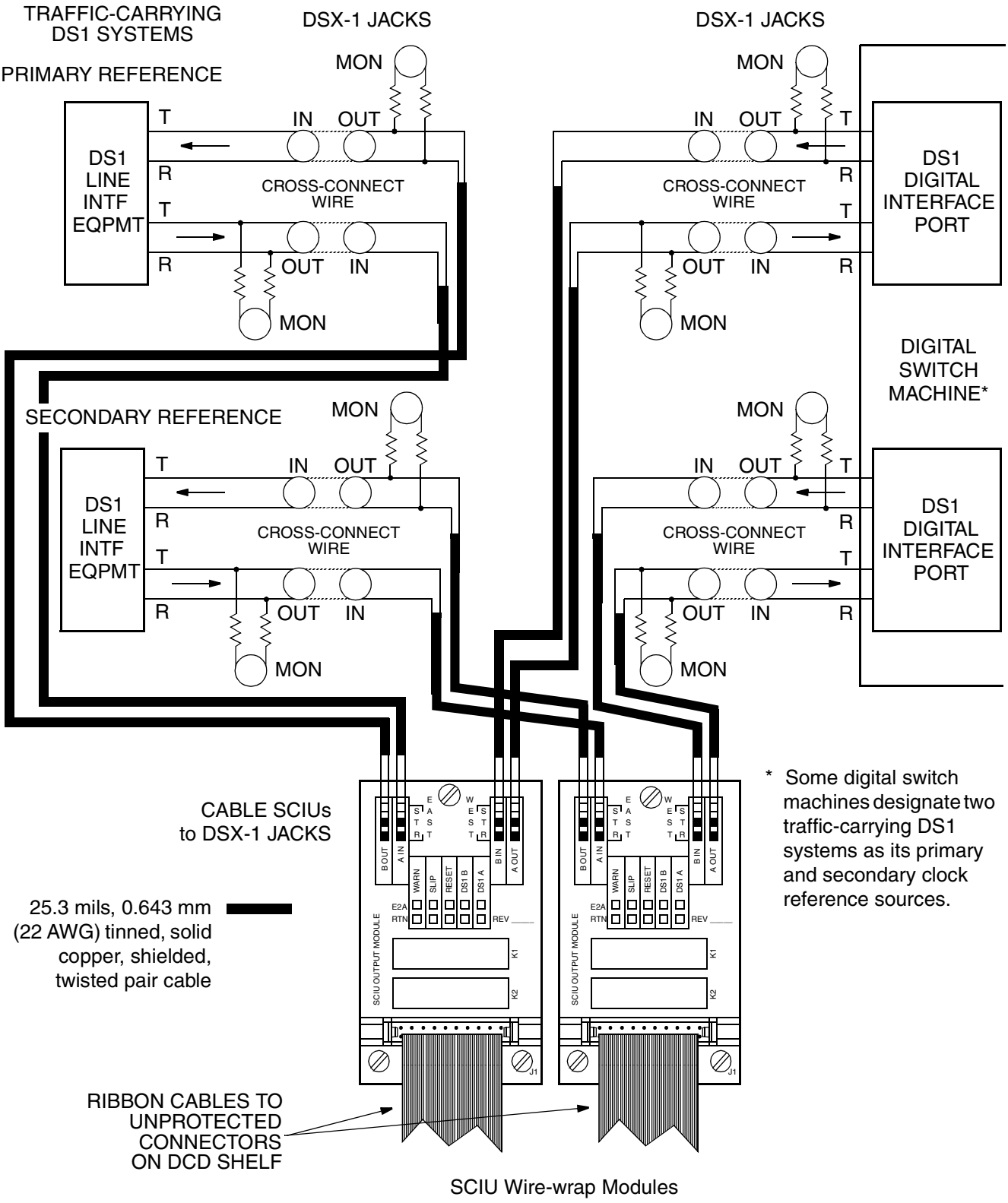


Figure 54. SCIU Cutover with Jacks (In-Service)