

## DIGITAL CLOCK DISTRIBUTOR

### 523

## INTERCONNECT DRAWINGS

### 1. GENERAL

**1.01** This section provides interconnect wiring diagrams of Symmetricom's Digital Clock Distributor 523 (DCD-523) System. For more installation information, refer to TMSL 097-45230-03, DCD-523 Installation.

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

- Replaced 1-1 with 1:1 (redundant protection) throughout document. (Changes not marked.)
- Engineering Note #72 was replaced by Engineering Note #73.
- Table K was replaced by Table O.
- Table M was replaced by Table P.
- Table N was replaced by Table Q.
- Figure 44 was replaced by Figure 56.
- Figure 46 was replaced by Figure 57.
- Figure 47 was replaced by Figure 58.
- Figure 48 was replaced by Figure 59.
- Figure 50 was replaced by Figure 60.
- Figure 51 was replaced by Figure 61.
- Figure 52 was replaced by Figure 62.

TABLE A.  
FEATURE TABLE

FIGURE	REMARKS
1	FURNISH 1 PER SHELF FOR A AND/OR LOADS, EITHER BACKPLANE REVISION.
2	FURNISH 1 PER 4-SHELF ARRANGEMENT, EITHER BACKPLANE REVISION.
3	FURNISH 1 PER SHELF, EITHER BACKPLANE REVISION.
4	FURNISH 1 PER SHELF, EITHER BACKPLANE REVISION.
5	FURNISH 1 PER SHELF, REV. D OR EARLIER.
6	FURNISH 1 PER SHELF, REV. E OR LATER.
7	FURNISH 1 PER SHELF, EITHER BACKPLANE REVISION.
8	FURNISH 1 PER 4-SHELF ARRANGEMENT TO MASTER SHELF, REV. D OR EARLIER.
9	FURNISH 1 PER 4-SHELF ARRANGEMENT TO MASTER SHELF, REV. E OR LATER.
10, 11	FURNISH 1 PER 4-SHELF ARRANGEMENT TO MASTER SHELF, AS REQUIRED, EITHER BACKPLANE REVISION.
12	FURNISH 1 PER 4-SHELF ARRANGEMENT WHEN MULTIPLE REFERENCE INPUTS ARE REQUIRED (INPUT A).
13	FURNISH 1 PER 4-SHELF ARRANGEMENT WHEN MULTIPLE REFERENCE INPUTS ARE REQUIRED (INPUT B).
14	FURNISH 1 PER 4-SHELF ARRANGEMENT WHEN SINGLE REFERENCE DS1 OR COMPOSITE CLOCK INPUT IS REQUIRED FOR INPUT A.
15	FURNISH 1 PER 4-SHELF ARRANGEMENT WHEN ANALOG CLOCK INPUT IS REFERENCE SOURCE (INPUT A).
16	FURNISH 1 PER 4-SHELF ARRANGEMENT WHEN SINGLE REFERENCE DS1 OR COMPOSITE CLOCK INPUT IS REQUIRED FOR INPUT B.
17	FURNISH 1 PER 4-SHELF ARRANGEMENT WHEN ANALOG CLOCK INPUT IS REFERENCE SOURCE (INPUT B).
18	FURNISH 1 PER 4-SHELF ARRANGEMENT WHEN DCD-LPR SHELF IS PROVIDED, EITHER BACKPLANE REVISION.
19	FURNISH 1 PER SHELF WHEN WIRE-WRAP TO NETWORK ELEMENTS.  FURNISH 2 PER SHELF WHEN WIRE-WRAP TO NETWORK ELEMENTS <u>AND</u> ALL OUTPUTS ARE UNPROTECTED.
20, 21, 22, 23, 24, 25, 26	FURNISH 1 PER OUTPUT CARD PROVIDED WHEN MODULAR MOUNTING PANEL IS PROVIDED.

TABLE A.  
FEATURE TABLE (CONTD)

FIGURE	REMARKS
27	FURNISH 1 WHEN WIRE-WRAP PANEL IS PROVIDED.
28	PROVIDED WITH DCD-523 SHELF, P/N 990-45230-02, EITHER BACKPLANE REVISION.
29	PROVIDED WITH DCD-523 SHELF, P/N 990-45230-01, EITHER BACKPLANE REVISION.
30	PROVIDED WITH DCD-523 SHELF, EITHER BACKPLANE REVISION.
31	PROVIDED WITH DCD-523 SHELF, REV. D OR EARLIER.
32	PROVIDED WITH DCD-523 SHELF, REV. E OR LATER.
33	FURNISH 1 PER 4-SHELF ARRANGEMENT, EITHER BACKPLANE REVISION.

## ENGINEERING NOTES:

51. CONNECTIONS TO TB1 AND TB2 SHOULD BE MADE USING SPADE TERMINALS OR RING TERMINALS TO FIT THE #6 SCREW.
52. MULTIPLE ONLY STATUS/CONTROL LEADS MINSI, MAJSI, CRTSI, PRTA, AND BATTALM FROM FIGURE 5 TO OTHER SHELVES.
53. STATUS/CONTROL LEADS ARE OFFICE ASSIGNABLE AT TELEMETRY END BY CENTRAL OFFICE ENGINEER.
54. SET SW4 AND SW5 (BRIDGE/TERM) TO BRIDGE WHEN CONNECTING -20 dB DSX DS1 REFERENCE SIGNALS TO TB12 AND TB13. SET SW4 AND SW5 TO TERM WHEN CONNECTING -0 dB DSX DS1 REFERENCE SIGNALS.
- 54A. ALL INPUT SIGNALS TO EITHER TB12 OR TB13 MUST BE AT THE SAME LEVEL (AMPLITUDE).
55. WHEN INSTALLING REV. D OR EARLIER SHELVES, THE SHIELD (S) TERMINALS ON TB12 AND TB13 FOR INPUT REFERENCES 1 THROUGH 5 AND CCK ARE CONNECTED TO FRAME GROUND INTERNALLY TO THE SHELF. IF 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 AND TB13, OR VICE VERSA. THE SHIELD LEAD OF THE CABLE MUST NEVER BE CONNECTED TO FRAME GROUND ON BOTH ENDS.

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.

56. PROVIDE MODEM CIRCUIT, PACKET SWITCH CIRCUIT, OR PRIVATE LINE CIRCUIT FROM THE CENTRALIZED ALARM AND SURVEILLANCE CENTER FOR CONNECTION TO COM2 DB9 FEMALE CONNECTOR WHEN MIS CARD IS PROVIDED.
57. TWO COAXIAL CABLES WITH BNC CONNECTORS AT BOTH ENDS ARE PROVIDED BY SYMMETRICOM WHEN DCD-LPR SHELF IS PROVIDED. THESE CABLES CONNECT COLLOCATED DCD-LPR AND DCD SHELVES (IF LOCATED WITHIN 1.8 m [6 ft] OF EACH OTHER). IF SHELVES ARE LOCATED AT A DISTANCE GREATER THAN 1.8 m (6 ft), LONGER CABLES ARE REQUIRED (USER-SUPPLIED). CONNECT J61 TO J11 (AT DCD-LPR) AND J62 TO J12 (AT DCD-LPR).
58. E1/DS1 REFERENCE SHOULD BE TRACEABLE TO A G8.11 CLOCK (STRATUM-1) PRIMARY REFERENCE SOURCE (PRS).
59. THE 422  $\frac{3}{4}$  1/4 W RESISTORS PROVIDED BY SYMMETRICOM MAY BE USED FOR THE 432  $\frac{3}{4}$  SHOWN IN FIGURES.
60. IF SHIELD IS GROUNDED AT THE NETWORK ELEMENT (NE) END, E.G., SWITCH OR DACS, DO NOT CONNECT THE "S" LEAD (DC FRAME GROUND). CONNECT SHIELD TO DC FRAME GROUND ON ONE END OF CABLE ONLY. NORMALLY, GROUND AT THE SIGNAL SOURCE (DCD S LEAD).
61. WARN AND WARN RTN SHOULD NOT BE CONNECTED. THERE IS NO WAY TO RESET OR CLEAR THIS ALARM.

ENGINEERING NOTES (CONTD):

- 62. THE MODULAR MOUNTING PANEL (MMP) MAY BE EQUIPPED WITH UP TO 10 MODULES OF WIRE-WRAP, SCIU, BNC, OR DB9. EACH MODULE CORRESPONDS TO A TIMING OUTPUT SLOT (TOx) IN THE DCD SHELF. (Manufacturing Discontinued – See Engineering Note 71.)

MODULE	USED WITH
WIRE-WRAP	TOCA, TOTA, TOTL, TOLA
SCIU WIRE-WRAP	SCIU/ESCIU
2-PORT BNC	TOAA
DB9	TOLA
10-PORT BNC	TOGA, TOEA (OPTIONAL TOTA)

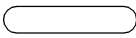

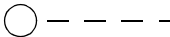





- 63. PROVIDE ONE FIG. 19 FOR EACH TOCA, TOTA, OR TOTL (OPTIONALLY, EACH TOLA). PROVIDE ONE FIG. 20 FOR EACH SCIU/ESCIU. PROVIDE ONE FIG. 21 FOR EACH TOAA. PROVIDE ONE FIG. 22 FOR EACH TOGA OR TOEA (OPTIONALLY, EACH TOTA). PROVIDE ONE FIG. 23 FOR EACH TOLA WITH RS-422 TERMINATIONS. PROVIDE ONE FIG. 24 FOR EACH TOLA WITH TTL (RS-423) TERMINATIONS. (Manufacturing Discontinued – See Engineering Note 72.)
- 64. ALL CONNECTORS ON THE MODULES ARE EITHER WIRE-WRAP PINS OR FEMALE CONNECTORS.
- 65. BLANK PANELS ARE RECOMMENDED FOR UNUSED EQUIPMENT SLOTS. PROVIDE THREE P/N 090-45098-01, INSTALLED BETWEEN ST A AND ST B SLOTS WHEN ST3E, ST3, TNC, OR LNC CLOCK CARDS ARE USED. PROVIDE ONE P/N 090-45098-01 BLANK PLUG-IN FOR EACH UNUSED OUTPUT SLOT.
- 66. IF THE SHELF IS EQUIPPED WITH TWO ST2E, ST2, OR TNC-E CLOCK CARDS, OUTPUT SLOTS TO1, TO2, AND TO3 ARE OCCUPIED BY THE ST2E B, ST2 B, OR TNC-E B CLOCK CARD AND CANNOT BE USED BY OUTPUT CARDS.
- 67. CONNECT FRAME GROUND TO TB1 AND TB2, USING 1.29 mm (16 AWG) STRANDED WIRE.
- 68. THE MODULAR MOUNTING PANEL IS DESIGNED TO MOUNT ABOVE A STANDARD WIRE-WRAP PANEL, OR REPLACE THE STANDARD WIRE-WRAP PANEL WHEN A MIX OF TIMING OUTPUT CARDS ARE INSTALLED IN THE DCD SHELF.
- 69. THE REMOTE WIRE-WRAP PANEL IS DESIGNED TO BE MOUNTED IN NETWORK ELEMENT BAYS AT A REMOTE LOCATION. IT IS CABLED TO THE DCD SHELF WIRE-WRAP PANEL USING 25-PAIR ABAM CABLE WITH A 50-PIN CONNECTOR, AND WITH METAL HOOD AT THE REMOTE WIRE-WRAP PANEL END. EACH CABLE REMOTES UP TO 20 DCD OUTPUTS TO THE REMOTE PANEL. DIFFERENT TYPES OF TIMING OUTPUTS FROM THE DCD SHELF SHOULD NOT BE MIXED IN THE SAME ABAM CABLE.

## ENGINEERING NOTES (CONTD):

70. FOR MONITORING APPLICATIONS, THE SCIU A-IN MAY BE CONNECTED VIA A HIGH-IMPEDANCE INTERFACE ( $432\Omega$ ) TO THE FACILITY TO BE MONITORED AT THE DSX-1. THE SCIU MAY BE UP TO 200 m (655 ft) FROM THE DSX-1.
71. THE MASTER SHELF INTERFACE PANEL MAY BE EQUIPPED WITH UP TO 8 OUTPUT MODULES AND 2 INPUT MODULES. THE EXPANSION SHELF INTERFACE PANEL MAY BE EQUIPPED WITH UP TO 10 OUTPUT MODULES. EACH INPUT MODULE CORRESPONDS TO A CLOCK INPUT SLOT (MRA AND MRB) IN THE DCD SHELF. EACH OUTPUT MODULE CORRESPONDS TO A TIMING OUTPUT SLOT (TO<sub>x</sub>) IN THE DCD SHELF. SEE TABLES K, L, M, AND N.
72. PROVIDE ONE FIG. 20 FOR EACH TOCA, TOTA, TOTA-5, OR TOTL (OPTIONALLY, EACH TOLA).  
PROVIDE ONE FIG. 21 FOR EACH SCIU/ESCIU.  
PROVIDE ONE FIG. 22 FOR EACH TOAA.  
PROVIDE ONE FIG. 23 FOR EACH TOGA OR TOEA.  
PROVIDE ONE FIG. 24 FOR EACH TOLA WITH RS-422 TERMINATIONS.  
PROVIDE ONE FIG. 25 FOR EACH TOLA WITH TTL (RS-423) TERMINATIONS. (Manufacturing Discontinued—See Engineering Note 73.)
73. PROVIDE ONE FIG. 20 FOR EACH TOCA, TOTA, TOTA-5, TOTA-M, OR TOTL (OPTIONALLY, EACH TOLA).  
PROVIDE ONE FIG. 21 FOR EACH SCIU/ESCIU.  
PROVIDE ONE FIG. 22 FOR EACH TOAA.  
PROVIDE ONE FIG. 23 FOR EACH TOGA OR TOEA.  
PROVIDE ONE FIG. 24 FOR EACH TOLA WITH RS-422 TERMINATIONS.  
PROVIDE ONE FIG. 25 FOR EACH TOLA WITH TTL (RS-423) TERMINATIONS.

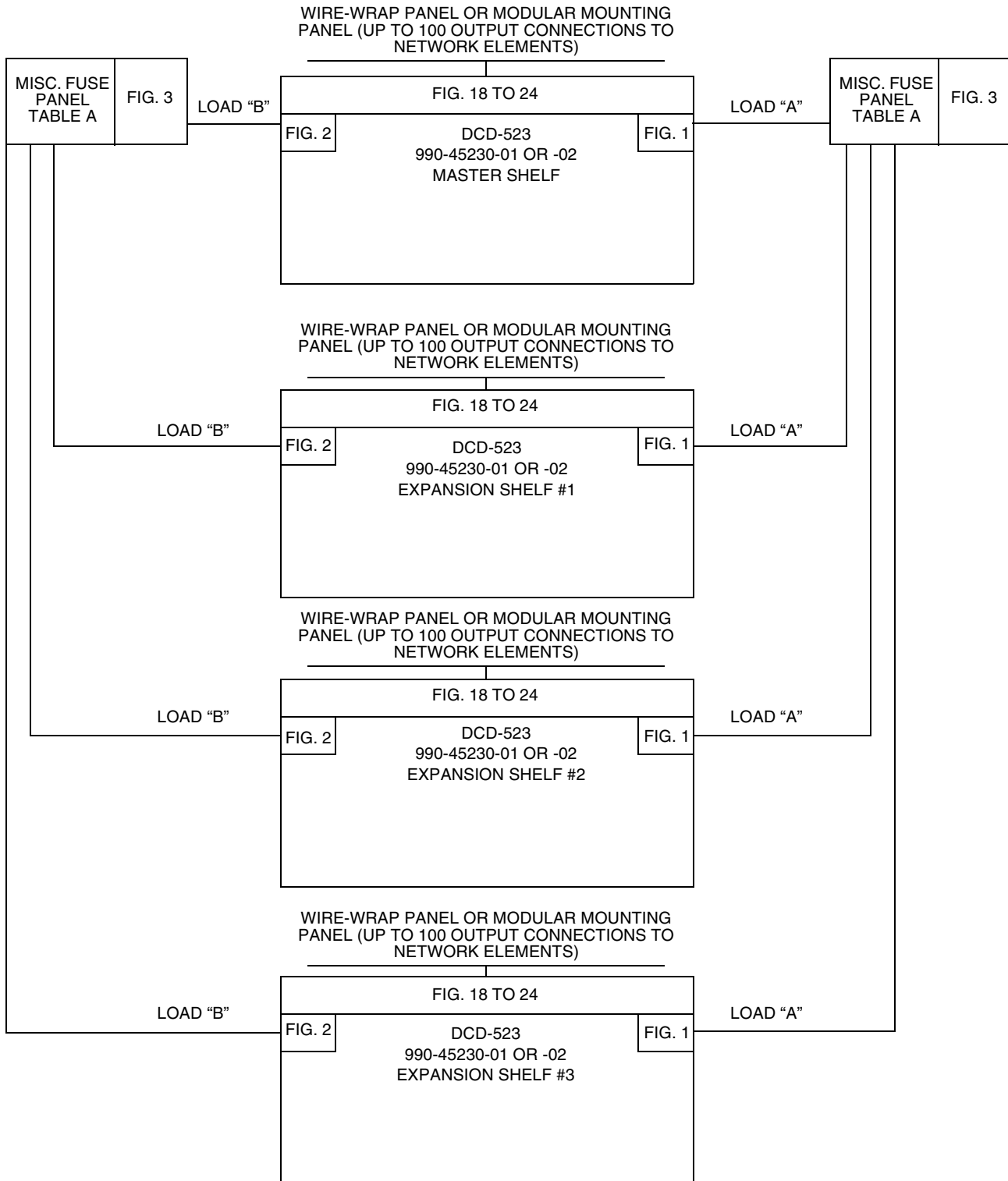
NOTES:

1. DRAWING CONVENTIONS

	CABLE
	SHIELD CONNECTION
	COAX SHIELD CONNECTION
	OPTIONS
	SCREW CONNECTION
	SPLICE OR BRIDGE POINT
0	WIRE-WRAP CONNECTION
P	PAIR
B	BASE OF TERMINAL BLOCK
E	ADJACENT ROWS OF TERMINAL BLOCK
K	FRONT OF TERMINAL BLOCK
2W	2W CROSS-CONNECTION
EU	22 BF TYPE SHIELDED WIRE OR CABLE
	THROUGH INTERMEDIATE APPEARANCES
	H TAP REDUCER (CHANGE GAUGES OF WIRE)

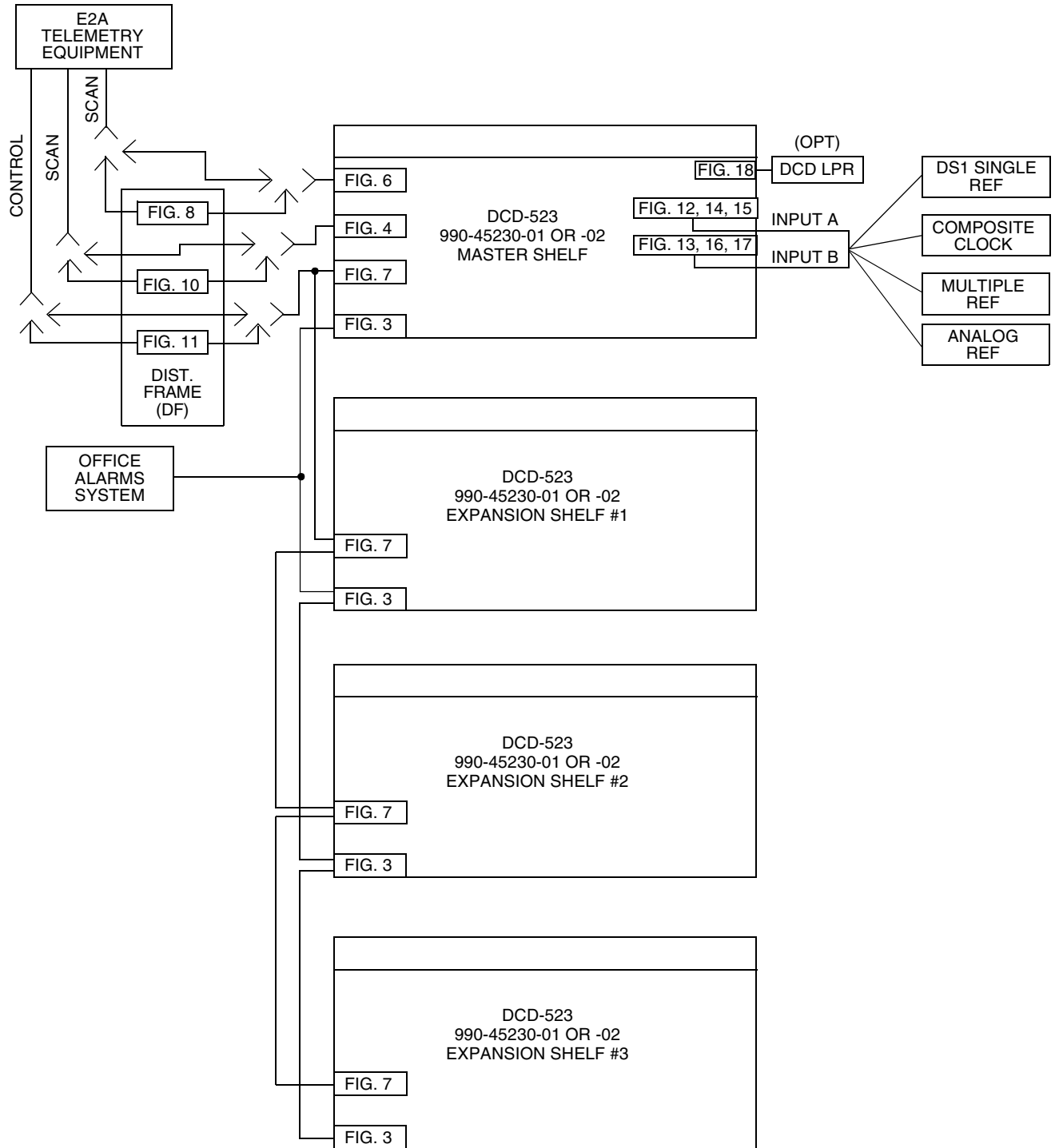
2. ALL WIRE INCLUDING WIRES IN SWITCHBOARD CABLES SHALL BE 0.511 mm (24 AWG) UNLESS OTHERWISE SPECIFIED.

3. 0.644 mm (22 AWG) SHIELDED TWISTED PAIR CABLE:  
 BELDEN 8450  
 GENERAL CABLE CM22  
 AT&T 22BF

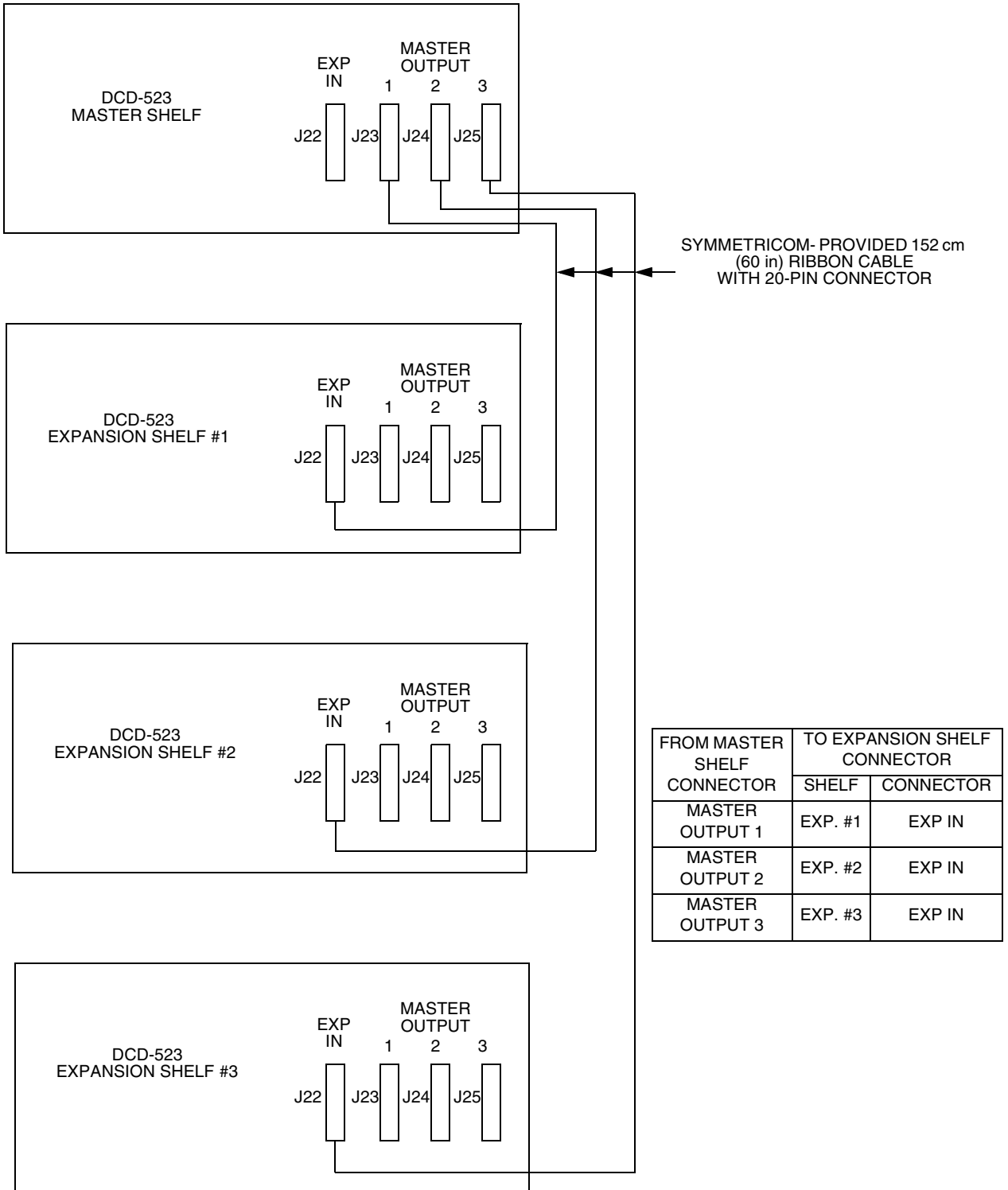


**APPLICATION SCHEMATIC #1**  
**DCD-523 SYSTEM**  
**(EXTERNAL OUTPUT AND POWER CABLING)**

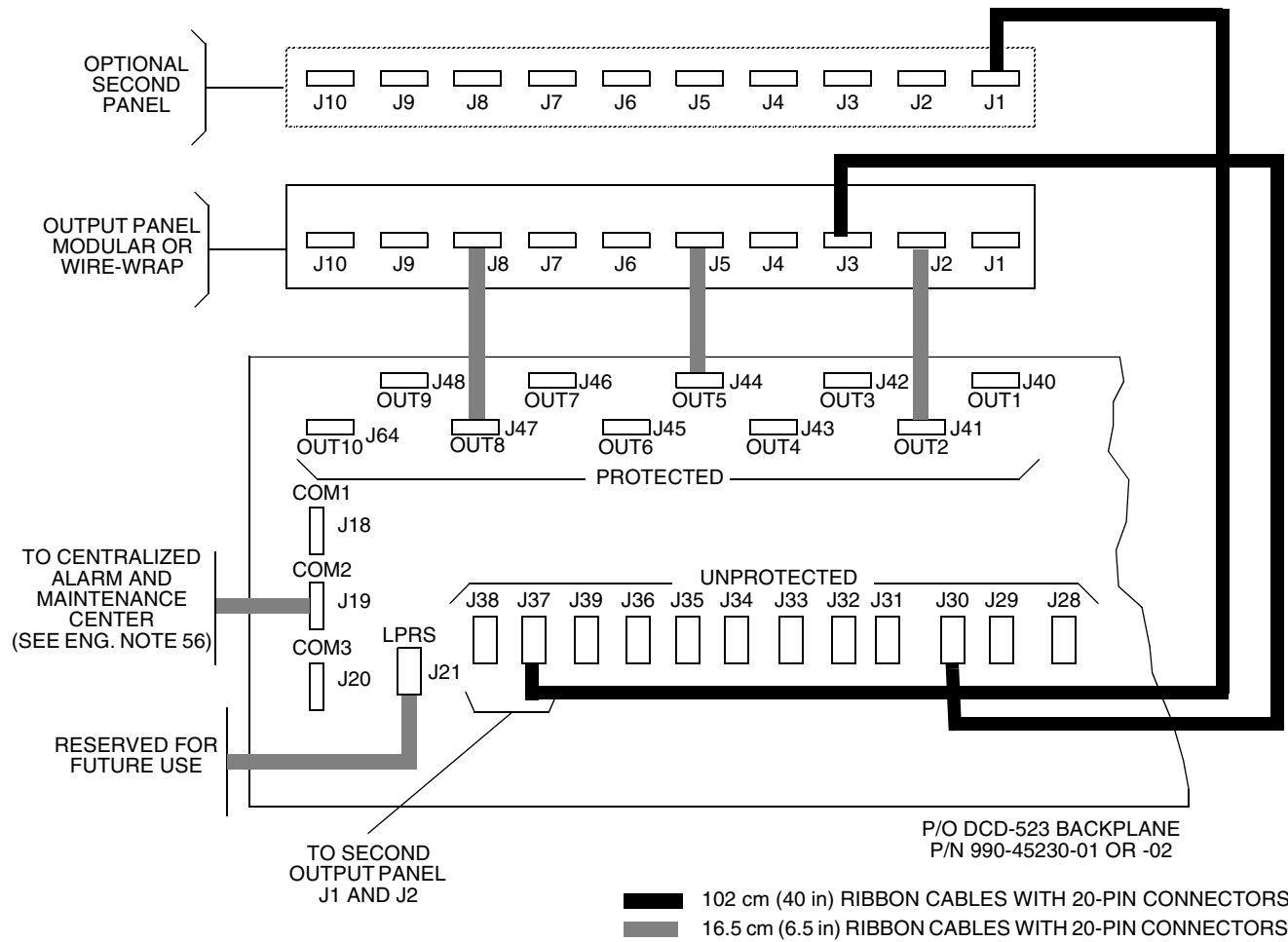




**APPLICATION SCHEMATIC #2**  
**DCD-523 SYSTEM**  
 (EXTERNAL INPUT, ALARM, STATUS, AND CONTROL CABLING)



**APPLICATION SCHEMATIC #3**  
**MASTER TO EXPANSION INTER-BAY CABLING**



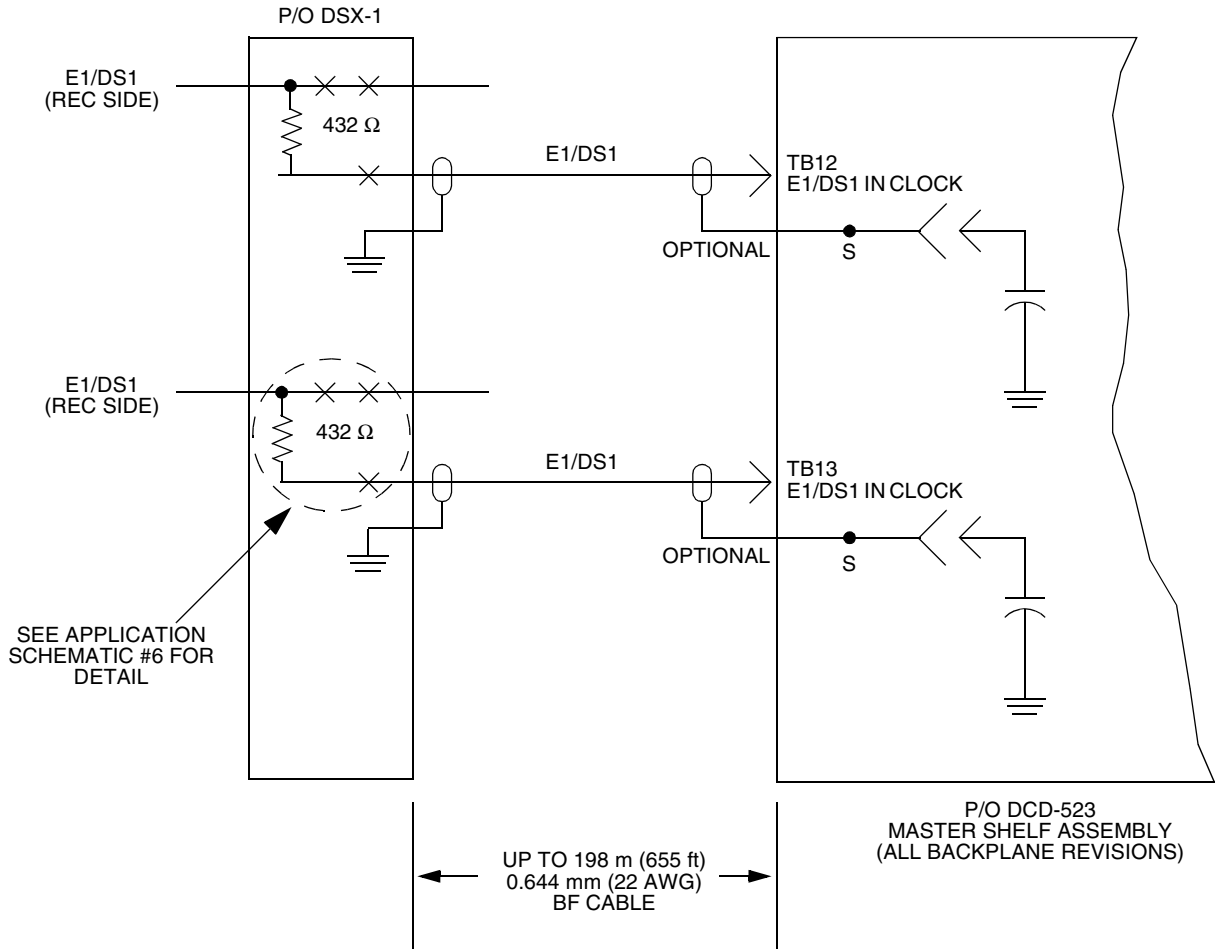
Notes:

1. If using a modular mounting panel, a 16.5 cm (6.5 in) ribbon cable is provided with each output module, except for the SCIU output module which comes with a 102 cm (40 in) ribbon cable. 102 cm (40 in) ribbon cables (p/n 060-40001-11) may be purchased from Symmetricom. If using a wire-wrap panel, 16.5 cm (6.5 in) ribbon cables for connection to protected outputs are provided. If additional outputs are required, a second I/O panel may be required, 102 cm (40 in) ribbon cables (p/n 060-40001-11) for connection to the second panel will be needed; these may be ordered.
2. Protected connectors OUT1 through OUT10 are to be cabled to output connectors J1 through J10.
3. Unprotected connectors J28 through J36 (typically used for SCIU/ESCIU connections) are to be cabled to output connectors J1 through J9. Connector J39 is to be cabled to output connector J10. If shelf is provisioned for all unprotected outputs, connectors J37 and J38 will be connected to J1 and J2 of an optional second panel.
4. Any combination of protected and unprotected outputs may be provisioned, however, only one output (either protected or unprotected) may be used from the DCD Shelf to any one output port, i.e., if J28 is connected to J1, J40 (which also connects to J1) cannot be connected.
5. The connections shown apply to all backplane revisions.

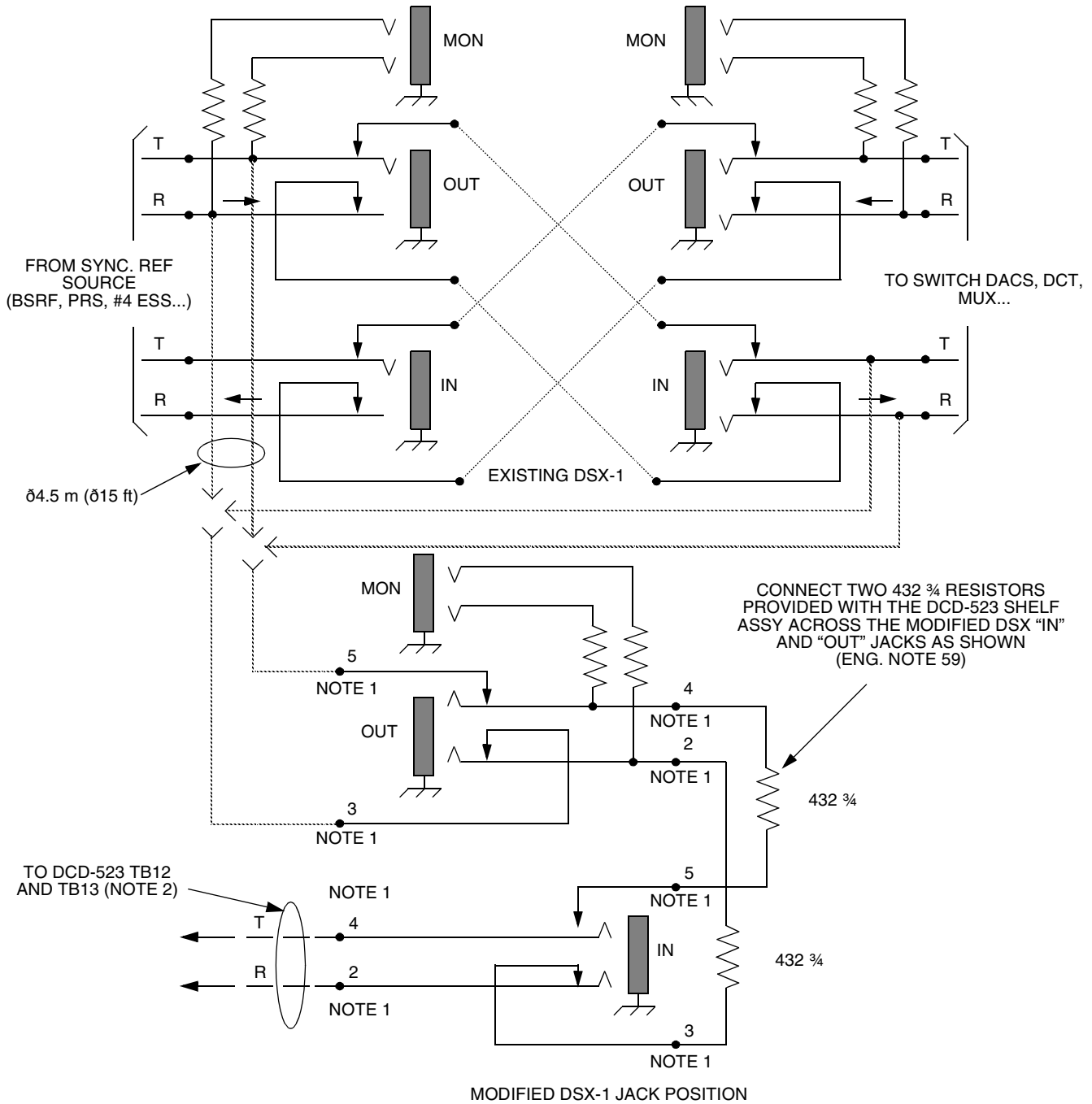
**APPLICATION SCHEMATIC #4**  
 EXAMPLE OF INTERSHELF CABLING FROM SHELF TO OUTPUT PANEL  
 (SEE TABLE B)

TABLE B.  
MASTER OR EXPANSION SHELF TO OUTPUT PANEL CABLING

FROM MASTER OR EXPANSION SHELF CONNECTOR	TO OUTPUT PANEL CONNECTOR	PROTECTED	UNPROTECTED	OUTPUT PANEL
J28	J1	—	X	LOWER
J29	J2	—	X	LOWER
J30	J3	—	X	LOWER
J31	J4	—	X	LOWER
J32	J5	—	X	LOWER
J33	J6	—	X	LOWER
J34	J7	—	X	LOWER
J35	J8	—	X	LOWER
J36	J9	—	X	LOWER
J39	J10	—	X	LOWER
J37 (HS1)	J1	—	X	UPPER
J38 (HS2)	J2	—	X	UPPER
OUT1 (J40)	J1	X	—	LOWER
OUT2 (J41)	J2	X	—	LOWER
OUT3 (J42)	J3	X	—	LOWER
OUT4 (J43)	J4	X	—	LOWER
OUT5 (J44)	J5	X	—	LOWER
OUT6 (J45)	J6	X	—	LOWER
OUT7 (J46)	J7	X	—	LOWER
OUT8 (J47)	J8	X	—	LOWER
OUT9 (J48)	J9	X	—	LOWER
OUT10 (J64)	J10	X	—	LOWER



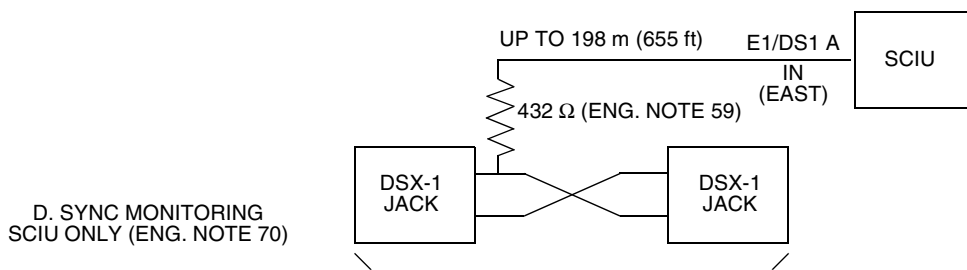
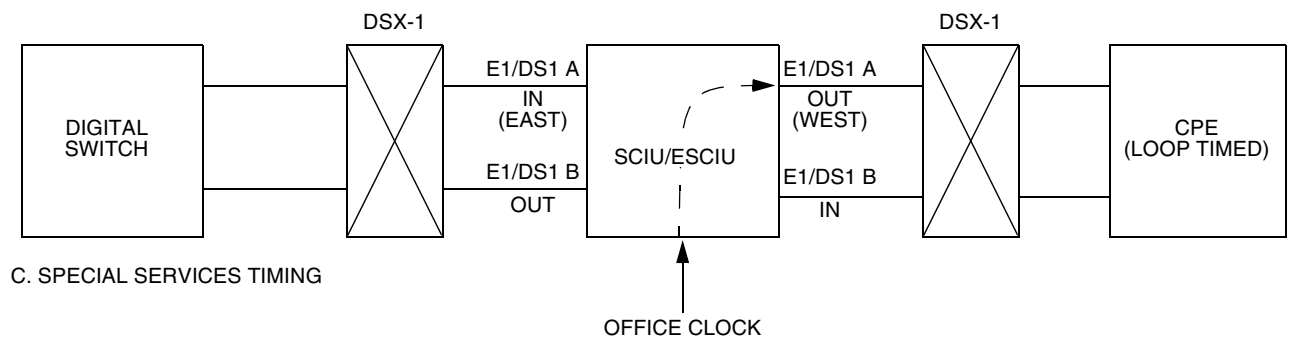
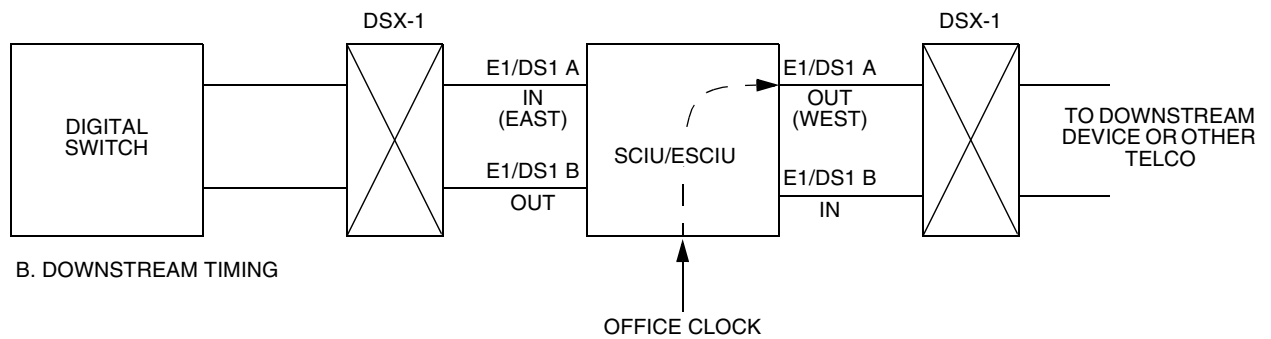
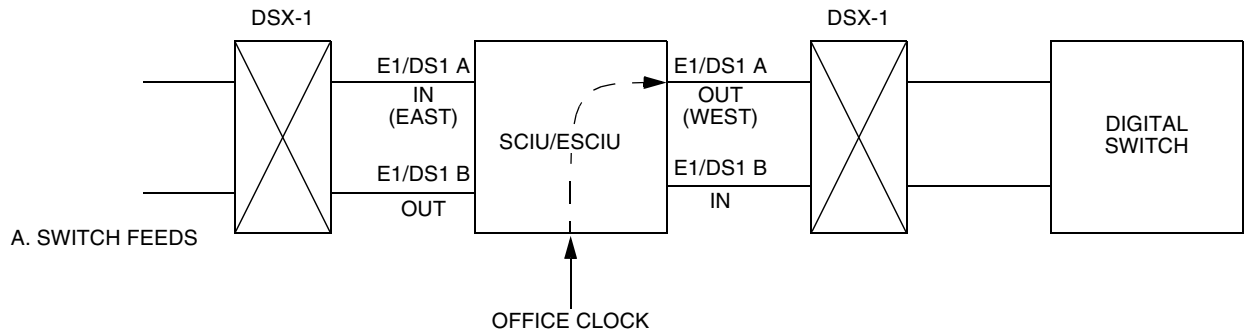
APPLICATION SCHEMATIC #5  
TYPICAL E1/DS1 BRIDGING CONNECTIONS  
(SEE ENG. NOTES 54, 55, 58, AND 59)



Notes:

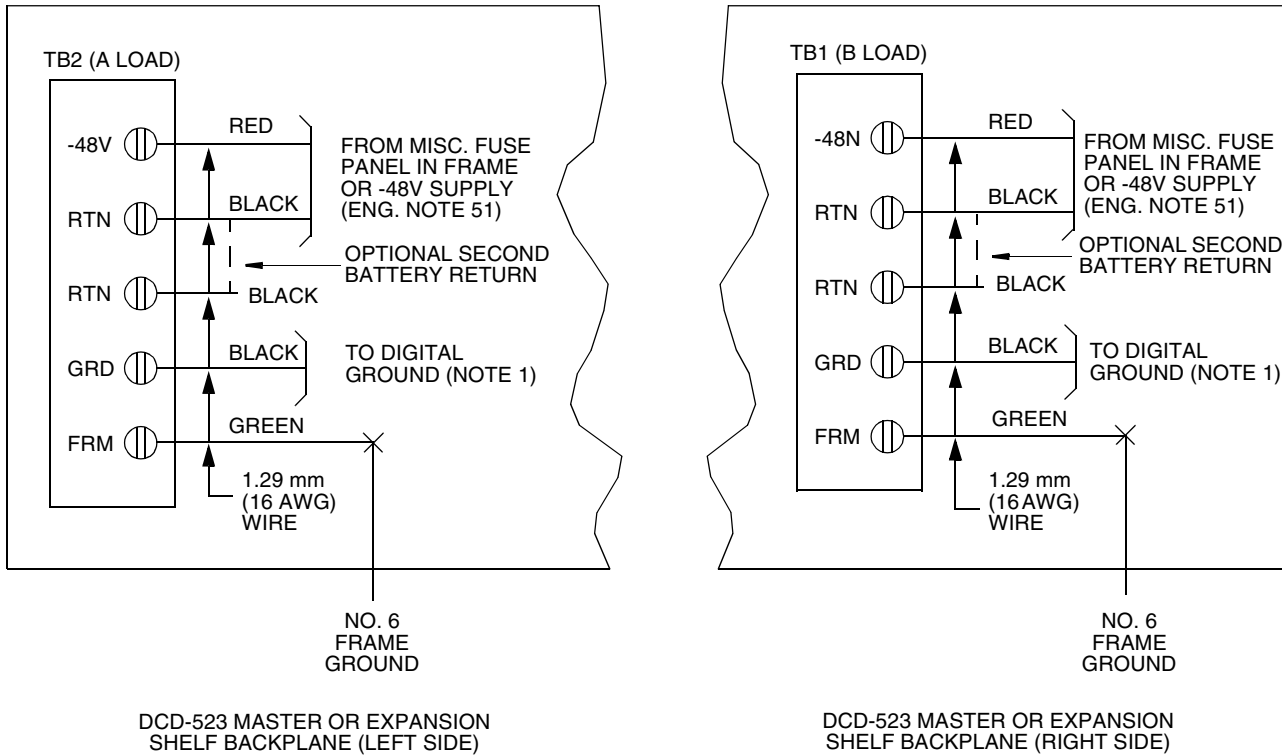
1. Terminal number for jack set shown for reference only.
2. Single E1/DS1 input connects to Position #4 of TB12 or TB13; multiple E1/DS1 inputs connect to Positions 2, 3, 4, and 5 of TB12 or TB13. Up to 198 m (655 ft) using 0.643 mm (22 AWG) shielded twisted pair cable.

**APPLICATION SCHEMATIC #6**  
**BRIDGING CONNECTION FROM TRAFFIC-CARRYING DS1**  
 (ENG. NOTES 54, 54A, 55, 58, AND 59)



TRAFFIC CARRYING E1/DS1  
(432 Ω BRIDGE MAY BE CONNECTED TO EITHER  
TRANSMIT OR RECEIVE TRANSMISSION PATH)

**APPLICATION SCHEMATIC #7**  
**SCIU/ESCIU TIMING APPLICATIONS**



Notes:

1. Do not connect digital ground (GND) to frame ground (FRM).
2. The connections shown apply to all backplane revisions.

FIGURE 1.  
POWER CONNECTIONS (A AND B LOADS)  
(SEE TABLE C)

TABLE C.  
MISC. FUSE PANEL FUSE ASSIGNMENTS

PANEL FUSE	TERMINAL BLOCK	SHELF	LOAD	SIZE
1A	TB2	MASTER	A	7.5 A - 10 A
1B	TB1	MASTER	B	7.5 A - 10 A
2A	TB2	EXPAN. 1	A	7.5 A - 10 A
2B	TB1	EXPAN. 1	B	7.5 A - 10 A
3A	TB2	EXPAN. 2	A	7.5 A - 10 A
3B	TB1	EXPAN. 2	B	7.5 A - 10 A
4A	TB2	EXPAN. 3	A	7.5 A - 10 A
4B	TB1	EXPAN. 3	B	7.5 A - 10 A

MAXIMUM FULLY EQUIPPED SHELF CURRENT DRAIN  
 -48V (A)      -48V (B)  
 1.5 A MAXIMUM\*      1.5 A MAXIMUM\*

\* WARM UP CURRENT WITH RUBIDIUM CLOCK CARDS IS 4 A MAXIMUM.

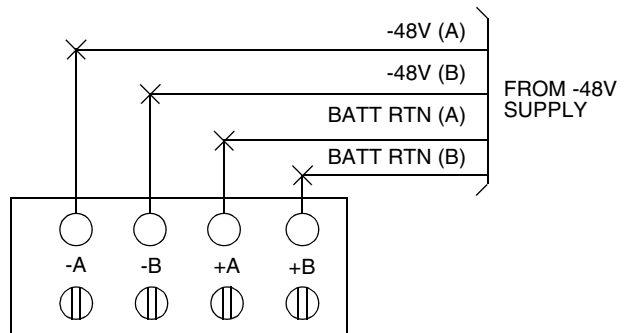
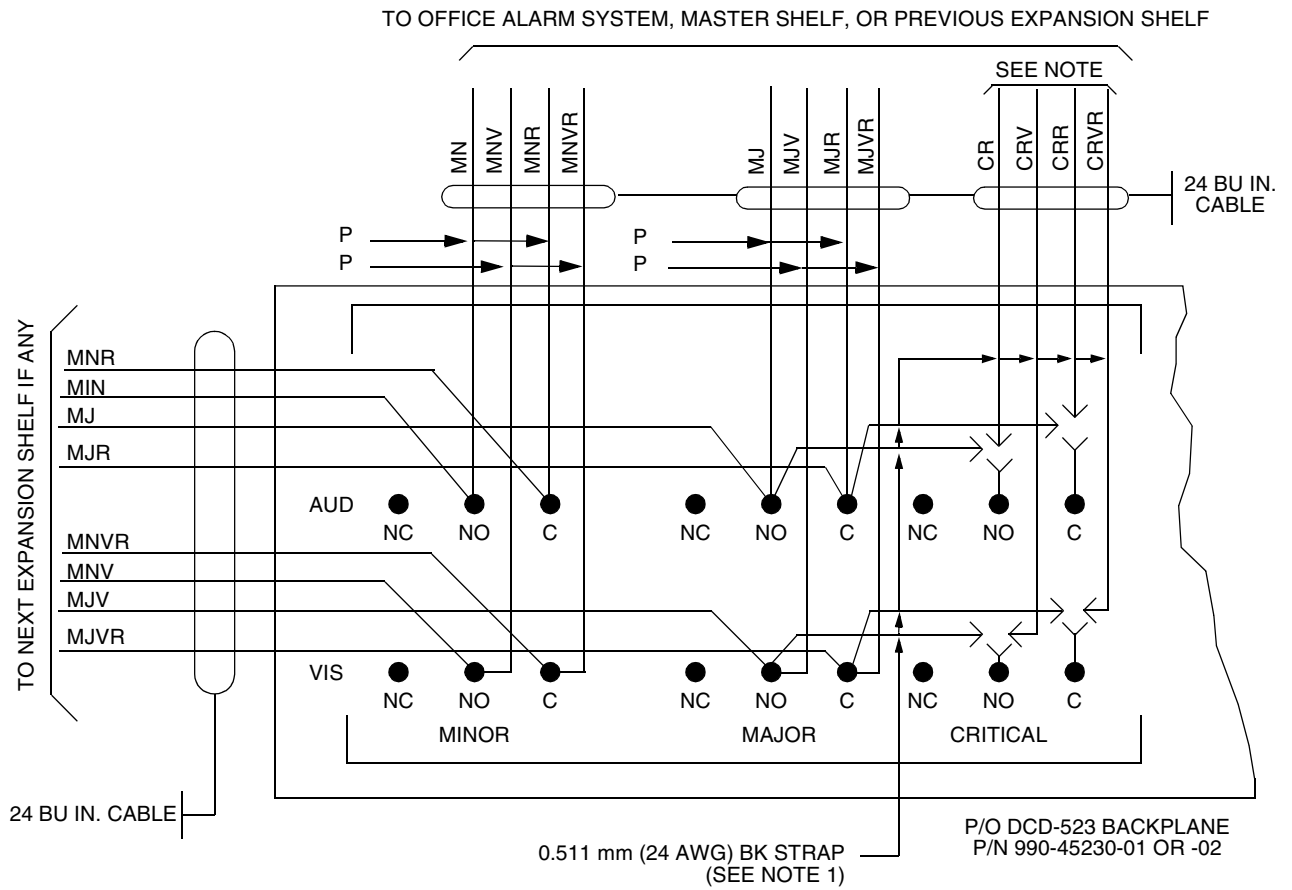


FIGURE 2.  
MISC. FUSE PANEL IN FRAME

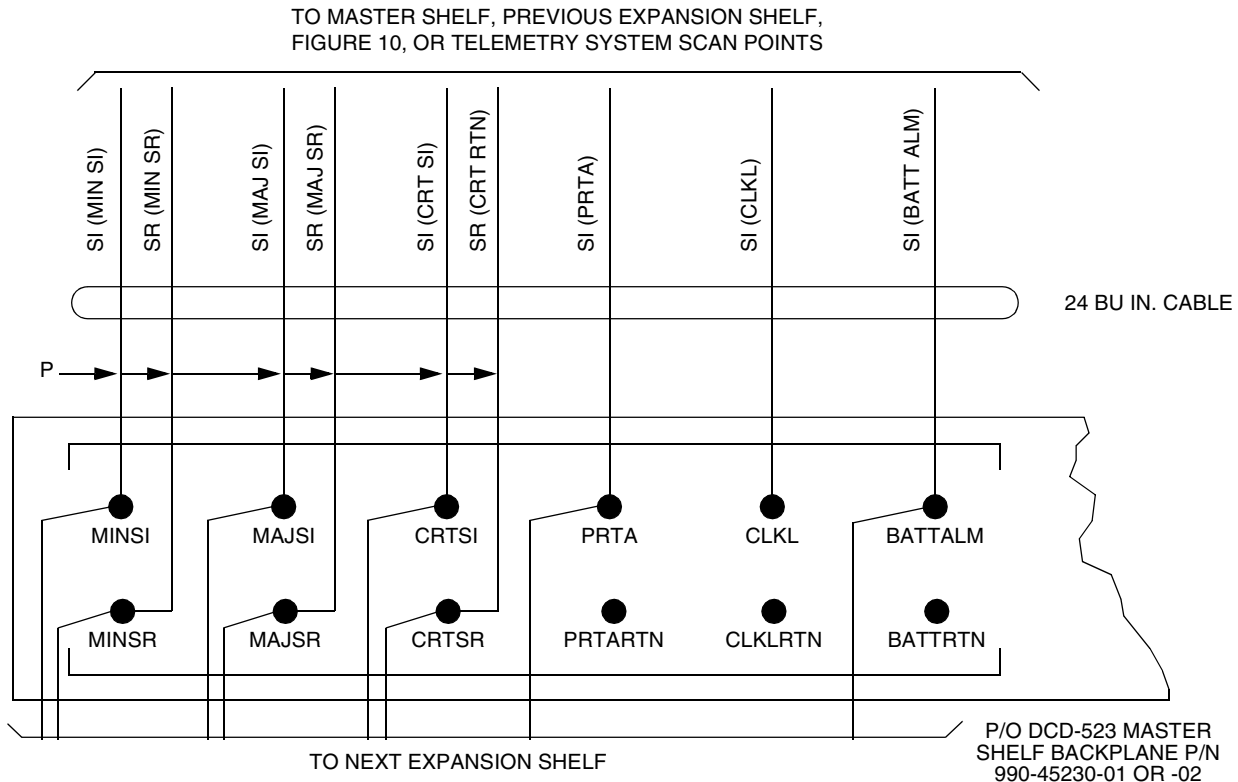




Notes:

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 backplane revisions.

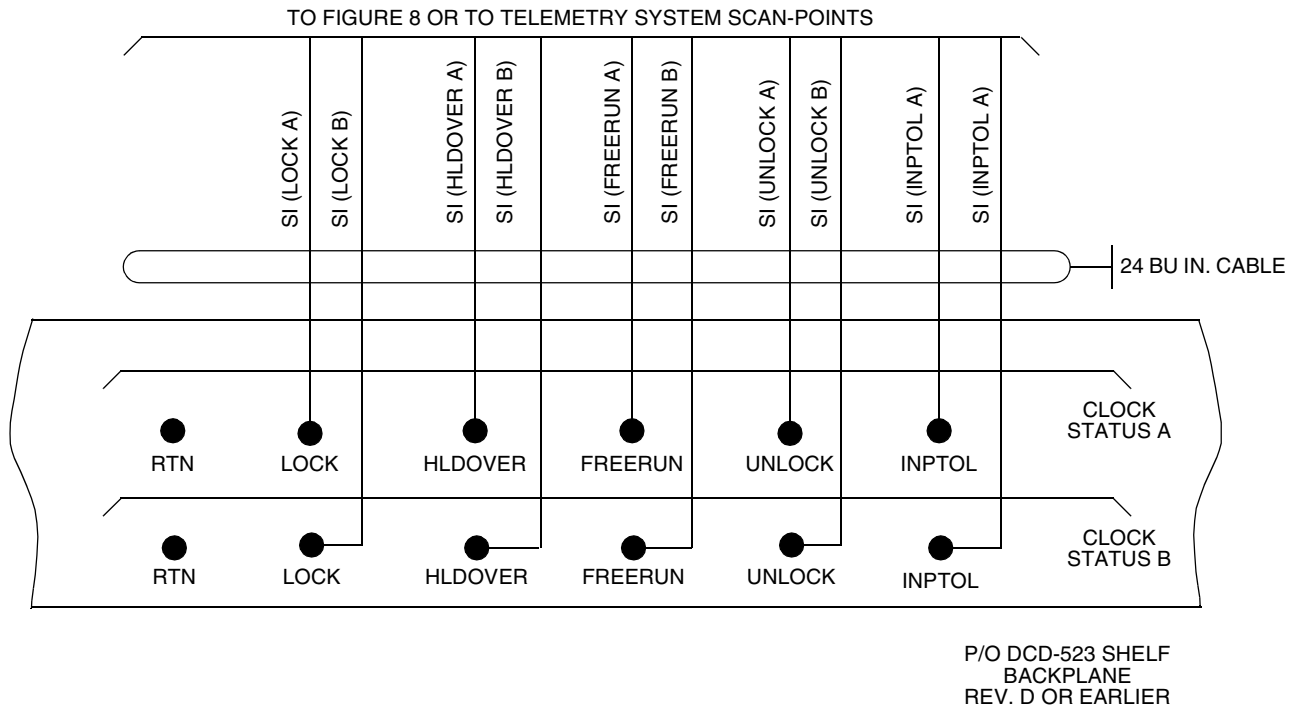
FIGURE 3.  
OFFICE ALARMS



Notes:

1. Multiple only status/control leads MINSI, MAJSI, CRTSI, PRTA, and BATTALM between master and expansion shelves.
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 backplane revisions.

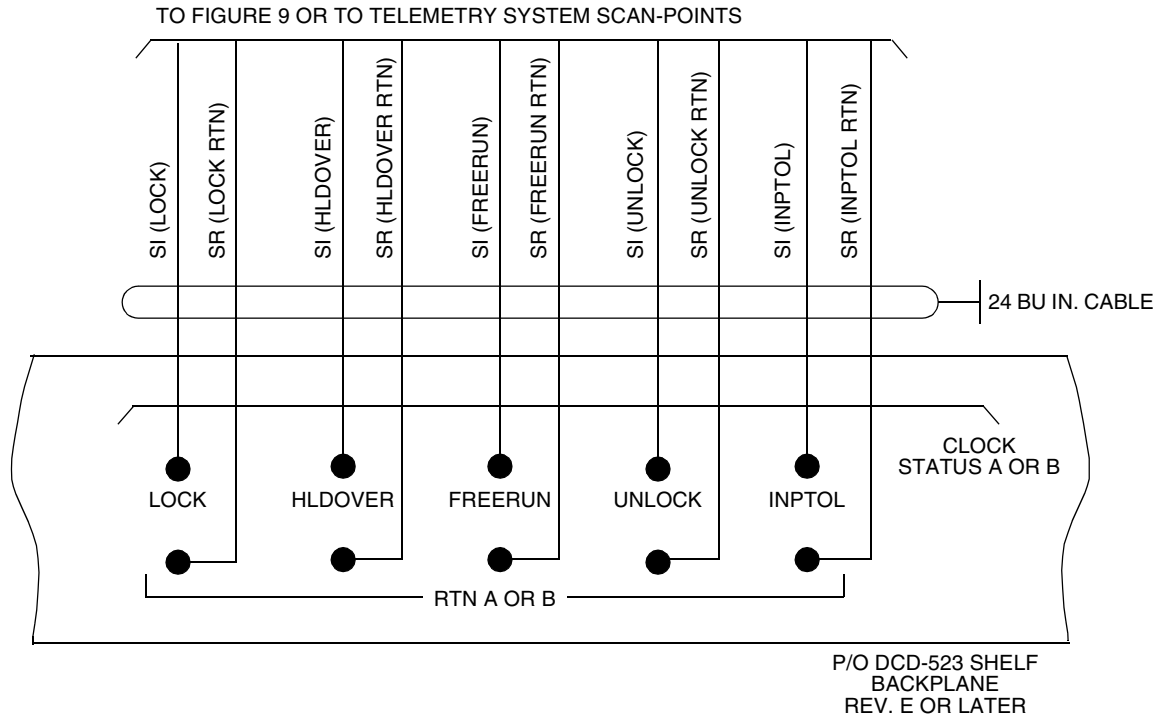
FIGURE 4.  
SHELF STATUS  
(Manufacturing Discontinued—See FIGURE 34)



Notes:

1. The return (RTN A and B) (SR) leads are common for all status indicator (SI) leads for each CLOCK STATUS (A and B) terminal set.
2. The CLOCK STATUS A and B RTN terminal is 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.
3. Multiple only status/control leads MINSI, MAJSI, CRTSI, PRTA, and BATTALM between master and expansion shelves.
4. Status/control leads are office assignable at telemetry end by central office engineer.

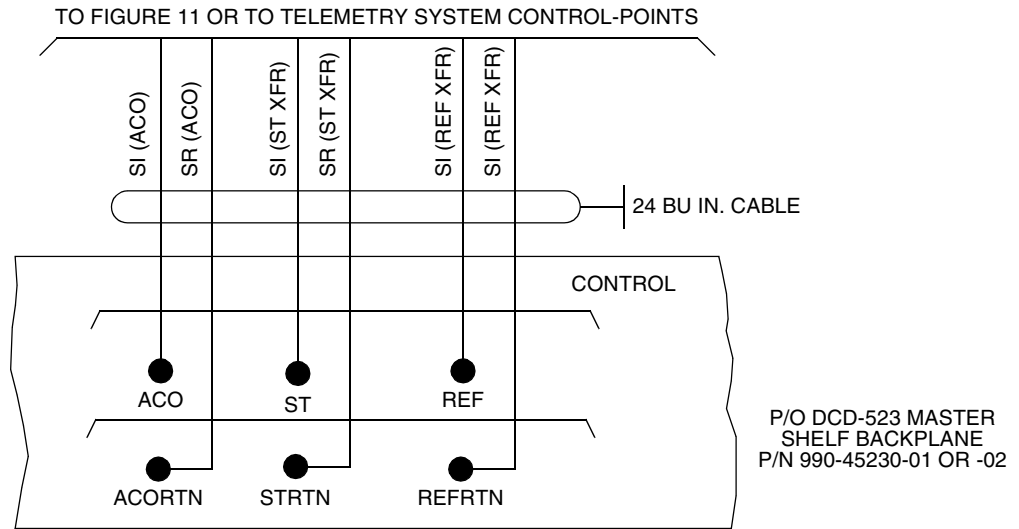
FIGURE 5.  
CLOCK STATUS (SHELF REV. D OR EARLIER)  
(Manufacturing Discontinued—See FIGURE 35)



Notes:

1. 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.
2. Multiple only status/control leads MINSI, MAJSI, CRTSI, PRSTA, and BATTALM between master and expansion shelves.
3. Status/control leads are office assignable at telemetry end by central office engineer.

FIGURE 6.  
CLOCK STATUS (SHELF REV. E OR LATER)

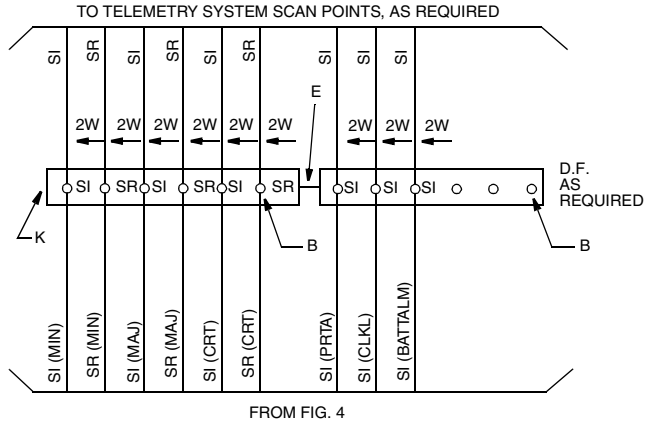


Notes:

1. Multiple only status/control leads MINSI, MAJSI, CRTSI, PRSTA, and BATTALM between master and expansion shelves.
2. Status/control leads are office assignable at telemetry end by central office engineer.
3. The connections shown apply to all backplane revisions.

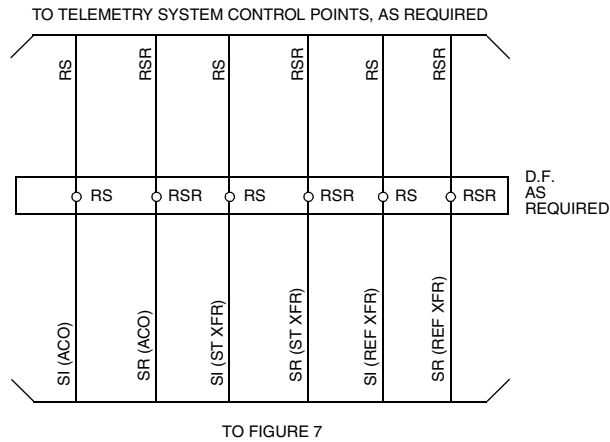
FIGURE 7.  
CONTROL LEADS





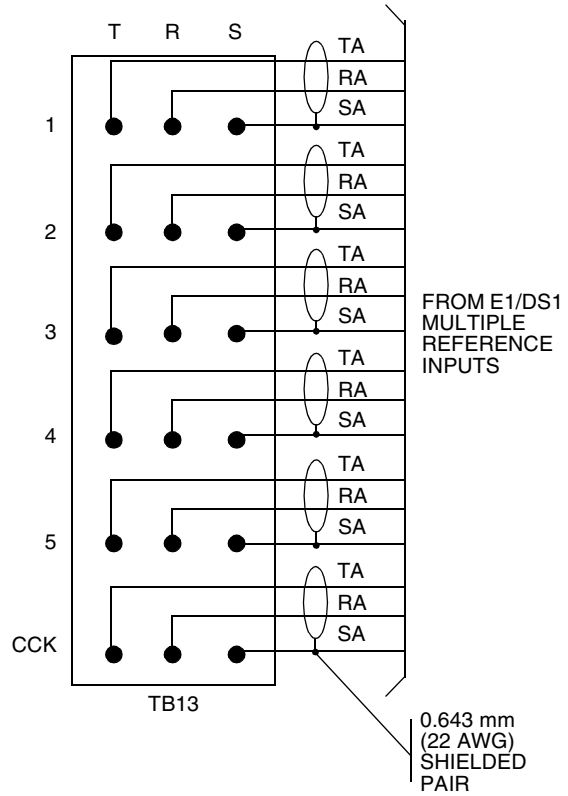
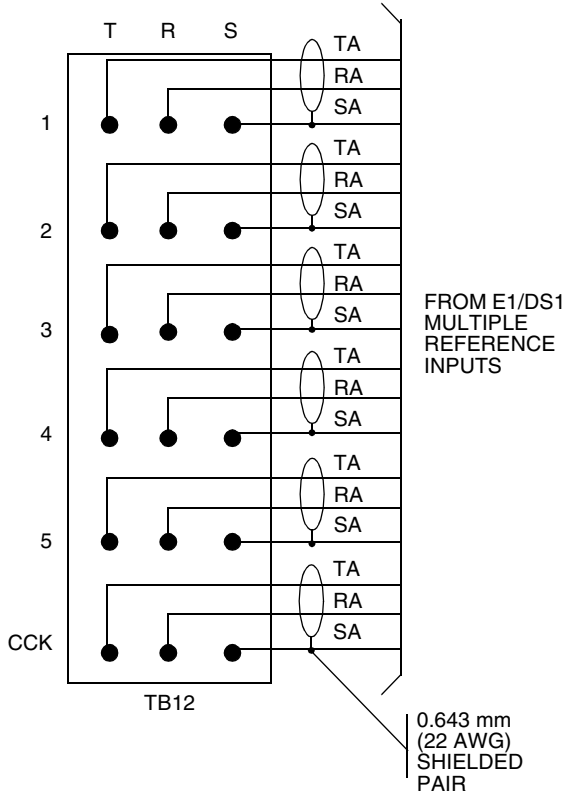
Note: The connections shown apply to all backplane revisions.

**FIGURE 10.**  
**FRAME TERMINATION SHELF STATUS LEADS**  
 (Manufacturing Discontinued—See FIGURE 36)



Note: The connections shown apply to all backplane revisions.

**FIGURE 11.**  
**FRAME TERMINATION SHELF CONTROL LEADS**



Notes:

1. Clock Input 1 terminal set is not used.
2. Provide connection only when an MRC-T card is installed in the shelf.
3. The connections shown apply to all backplane revisions.

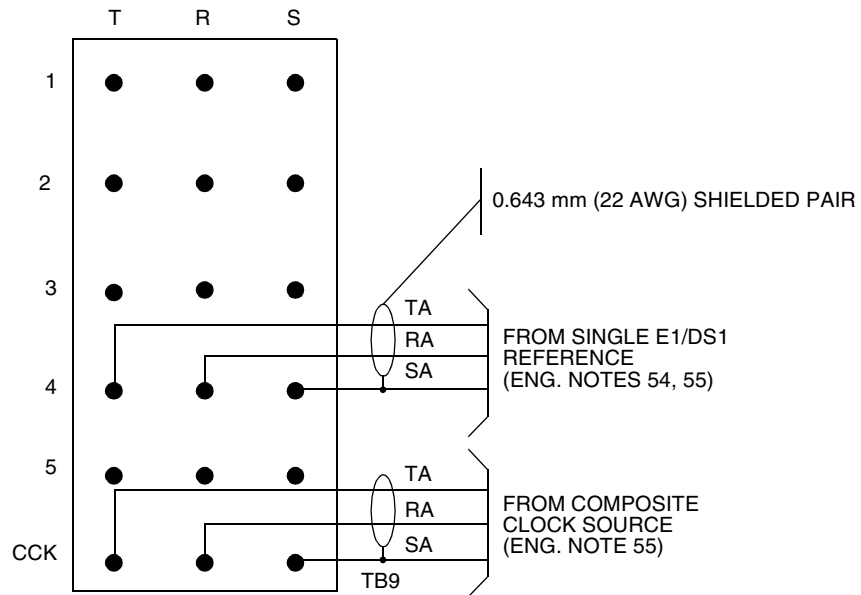
FIGURE 12.  
INPUT A FOR MULTIPLE REF. DS1 SOURCE  
(ENG. NOTES 53, 54, 54A, AND 55)

Notes:

1. Clock Input 1 terminal set is not used.
2. Provide connection only when an MRC-T card is installed in the shelf.
3. The connections shown apply to all backplane revisions.

FIGURE 13.  
INPUT B FOR MULTIPLE REF. DS1 SOURCE  
(ENG. NOTES 53, 54, 54A, AND 55)

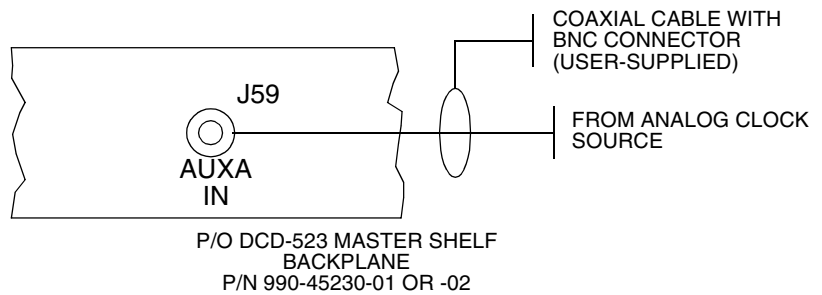




Notes:

1. Use Terminal Set 4 for single DS1 reference. Sets 1, 2, 3, and 5 are not used for single reference.
2. Composite clock reference is from TOCA card output on master DCD system in the same building.
3. The connections shown apply to all backplane revisions.

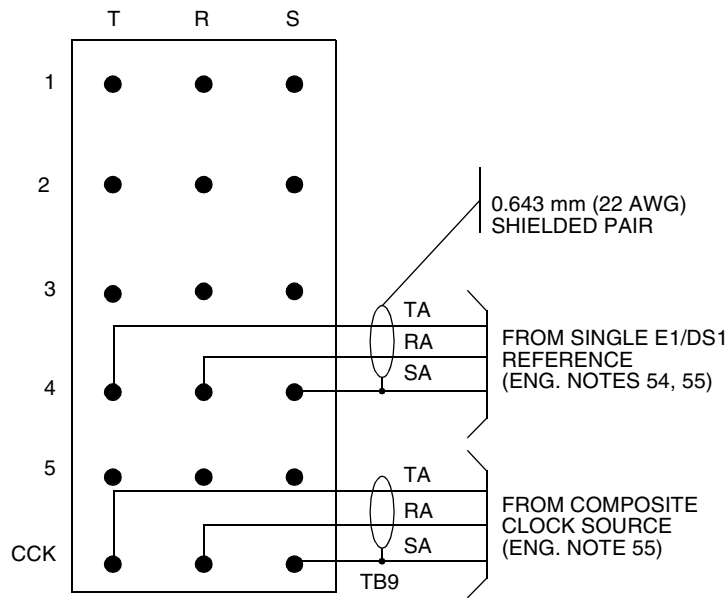
FIGURE 14.  
INPUT A FOR E1/DS1 OR COMPOSITE CLOCK



Notes:

1. The connection shown applies to all backplane revisions.
2. Provide connection only when an ACI card is installed in the shelf.

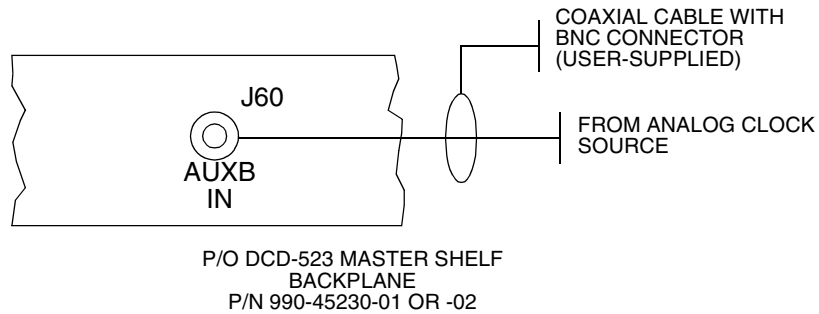
FIGURE 15.  
INPUT A ANALOG CLOCK



Notes:

1. Use Terminal Set 4 for single DS1 reference. Sets 1, 2, 3, and 5 are not used for single reference.
2. Composite clock reference is from TOCA card output on master DCD system in the same building.
3. The connections shown apply to all backplane revisions.

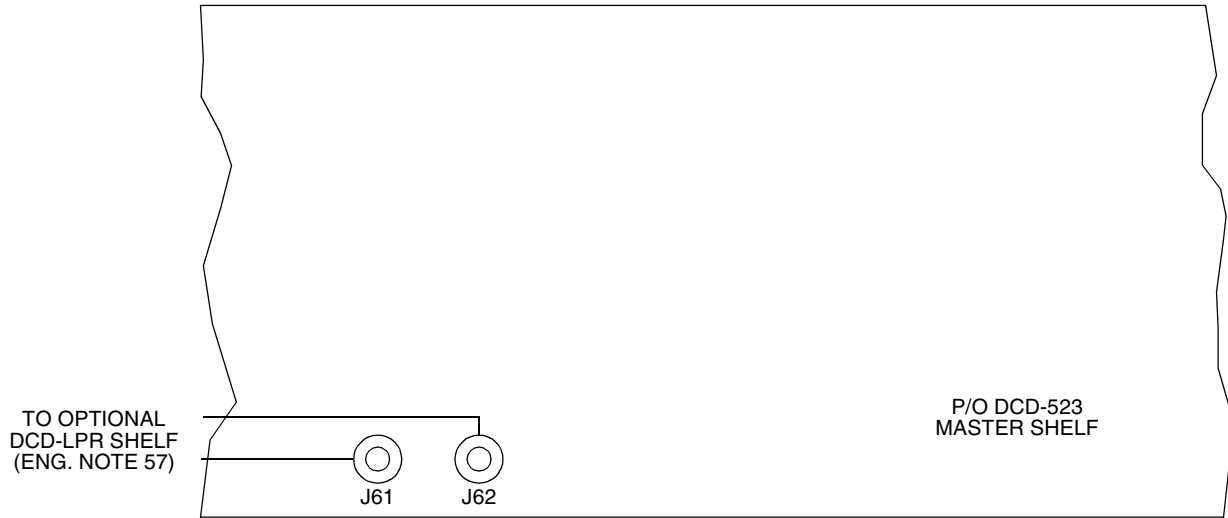
FIGURE 16.  
INPUT B FOR E1/DS1 OR COMPOSITE CLOCK



Notes:

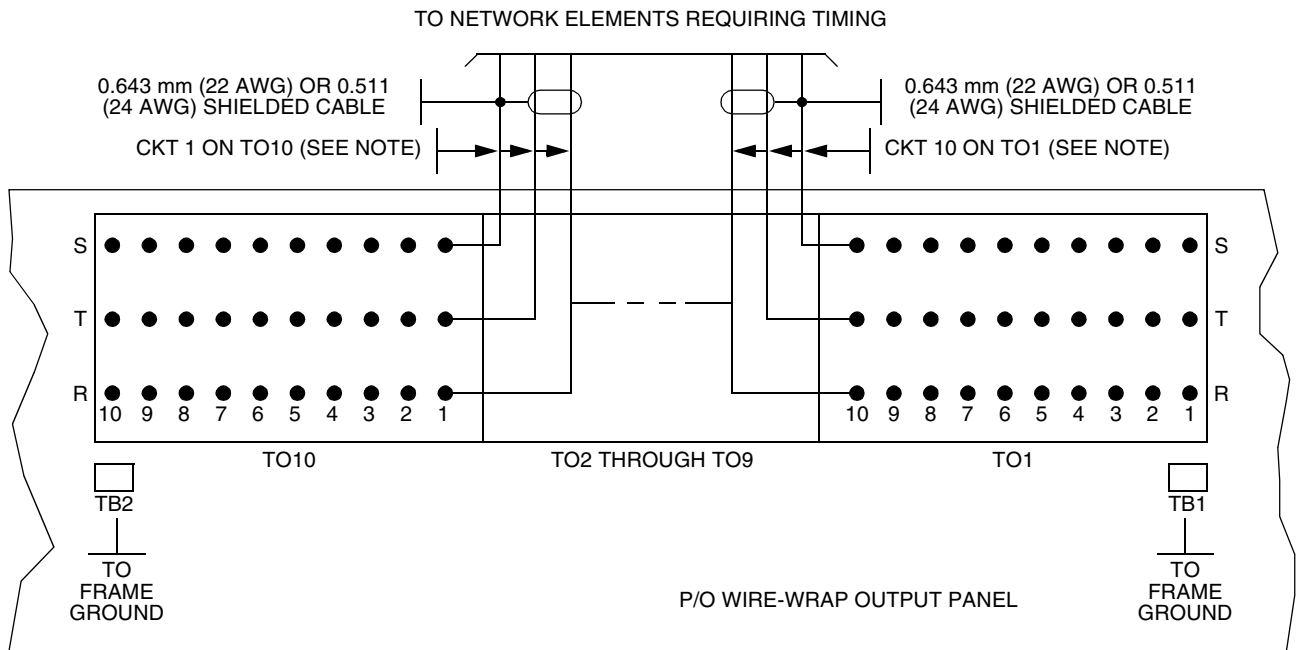
1. The connection shown applies to all backplane revisions.
2. Provide connection only when an ACI card is installed in the shelf.

FIGURE 17.  
INPUT B ANALOG CLOCK



Note: The connections shown apply to all backplane revisions.

FIGURE 18.  
RUBIDIUM 5 MHz OUTPUTS



Note: This figure illustrates the use of only 1 connection per TOx slot; a maximum of 10 connections per TOx slot are possible.

FIGURE 19.  
WIRE-WRAP OUTPUT PANEL  
(ENG. NOTE 60)

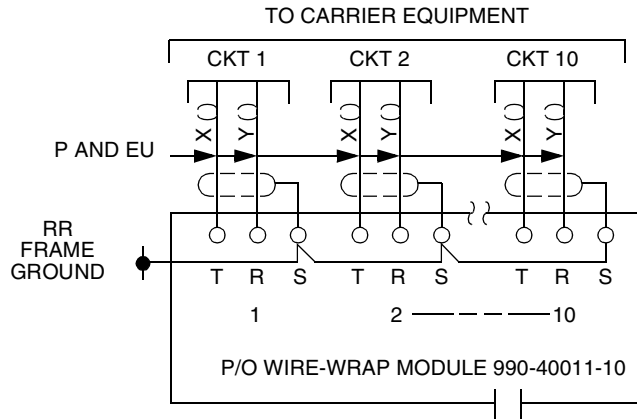
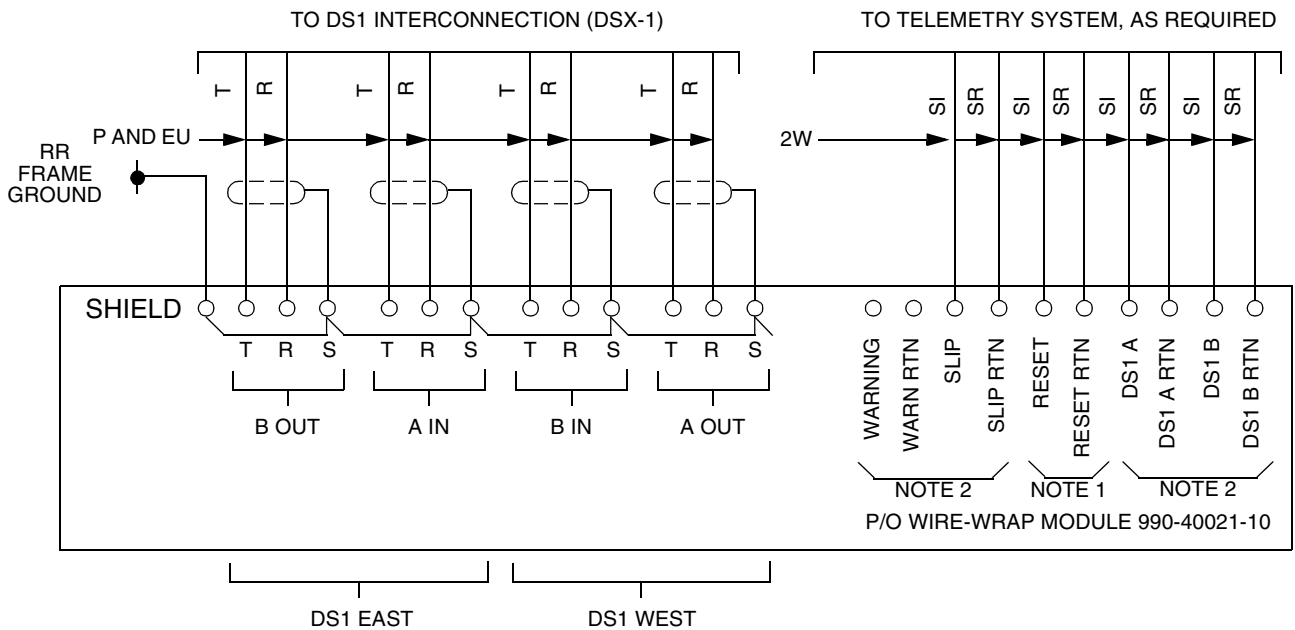


FIGURE 20.  
TIMING OUTPUT INTERCONNECTIONS (MMP)  
WIRE-WRAP MODULE  
(SEE ENG. NOTES 60, 61, 62, 63, AND 64)



- Notes:
1. Connect to telemetry control-points, as required.
  2. Connect to telemetry scan-points, as required.

FIGURE 21.  
TIMING OUTPUT INTERCONNECTIONS (MMP)  
SCIU/ESCIU WIRE-WRAP MODULE  
(SEE ENG. NOTES 60, 61, 62, 63, AND 64)

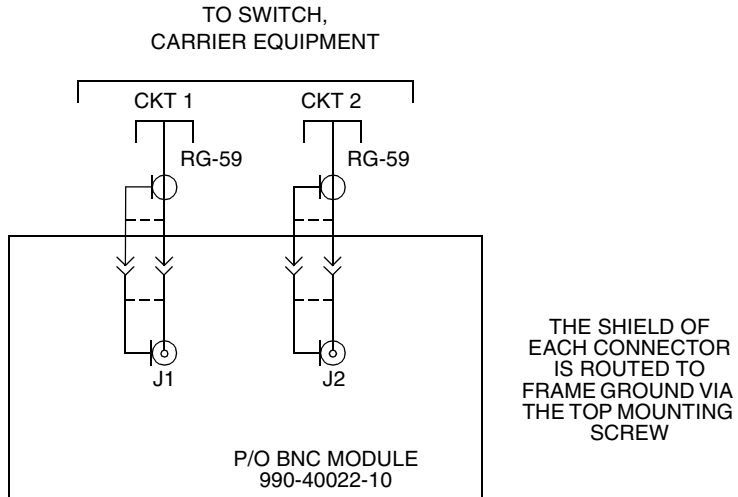


FIGURE 22.  
TIMING OUTPUT INTERCONNECTIONS (MMP)  
2-PORT BNC MODULE  
(SEE ENG. NOTES 60, 61, 62, 63, AND 64)

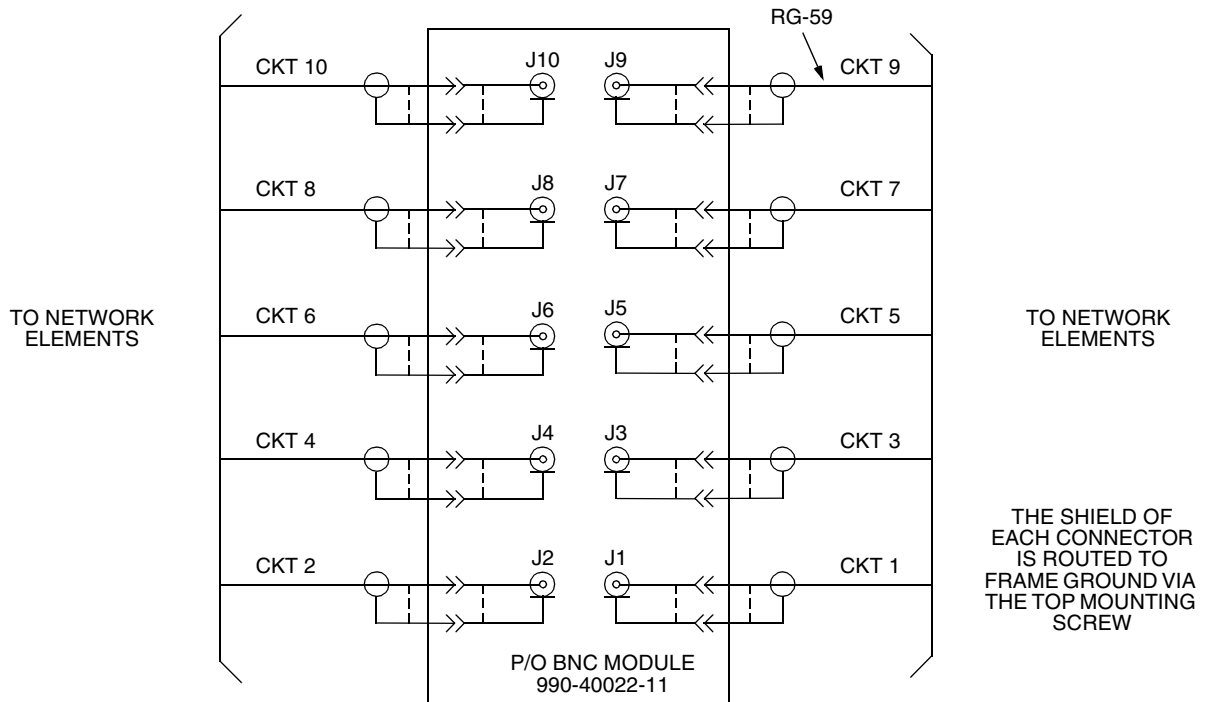


FIGURE 23.  
TIMING OUTPUT INTERCONNECTIONS (MMP)  
10-PORT BNC MODULE  
(SEE ENG. NOTES 60, 61, 62, 63, AND 64)

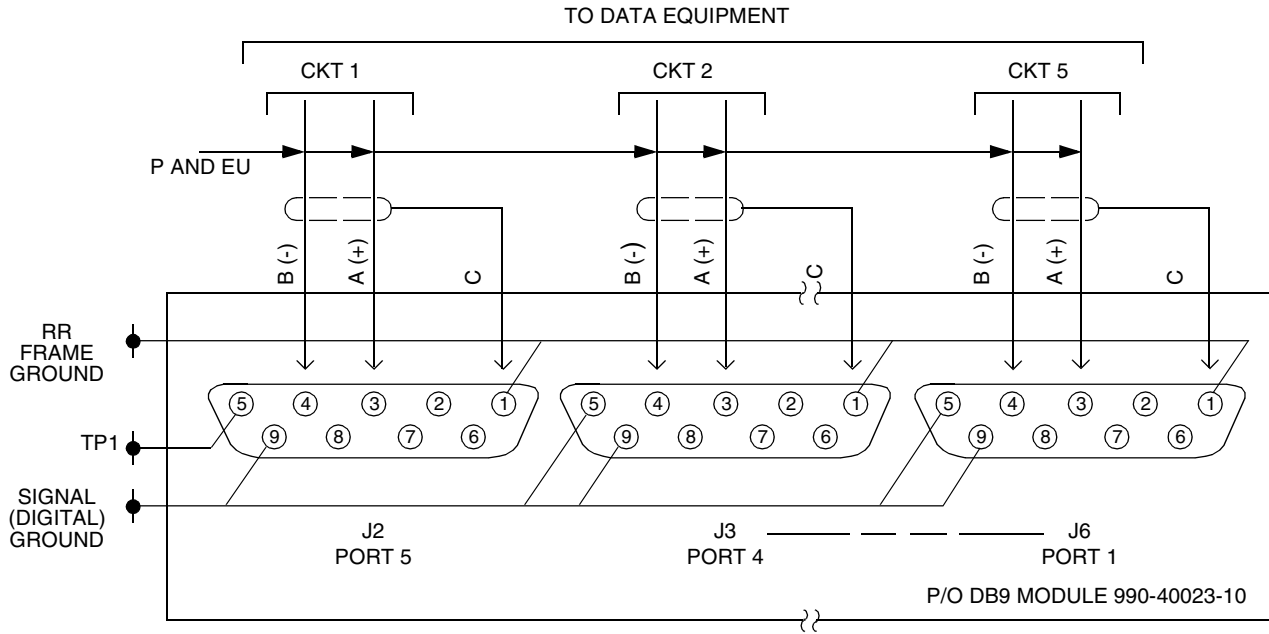


FIGURE 24.  
TIMING OUTPUT INTERCONNECTIONS (MMP)  
DB9 MODULE (RS-422)  
(SEE ENG. NOTES 62, 63, AND 64)

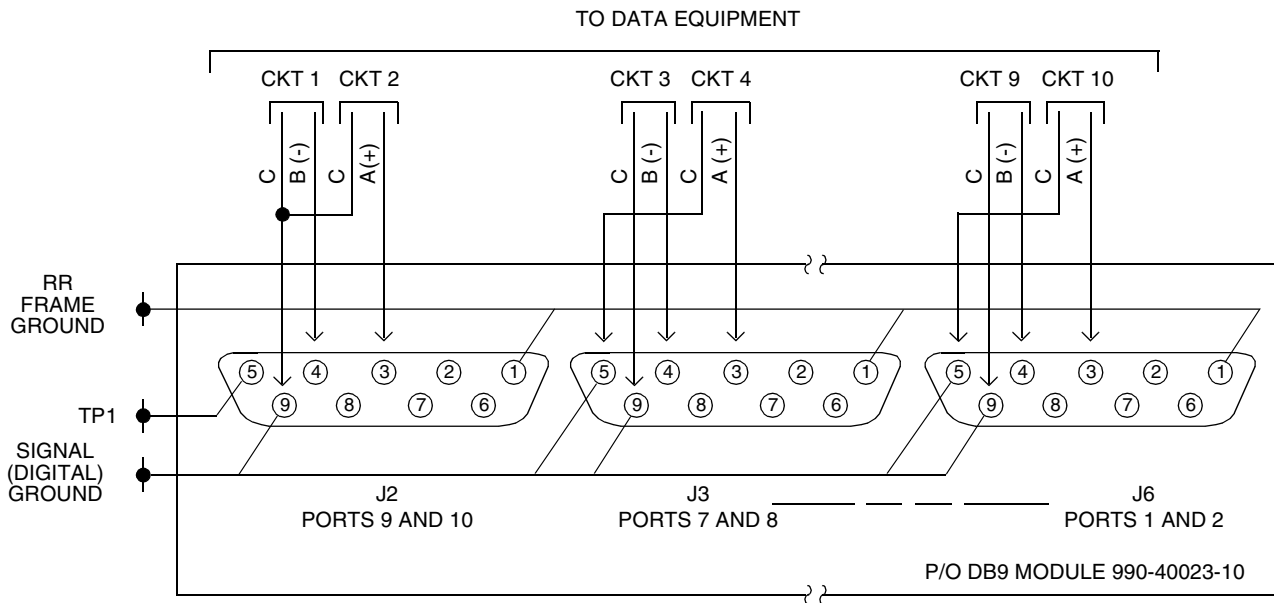


FIGURE 25.  
TIMING OUTPUT INTERCONNECTIONS (MMP)  
DB9 MODULE (TTL)  
(SEE ENG. NOTES 62, 63, AND 64)

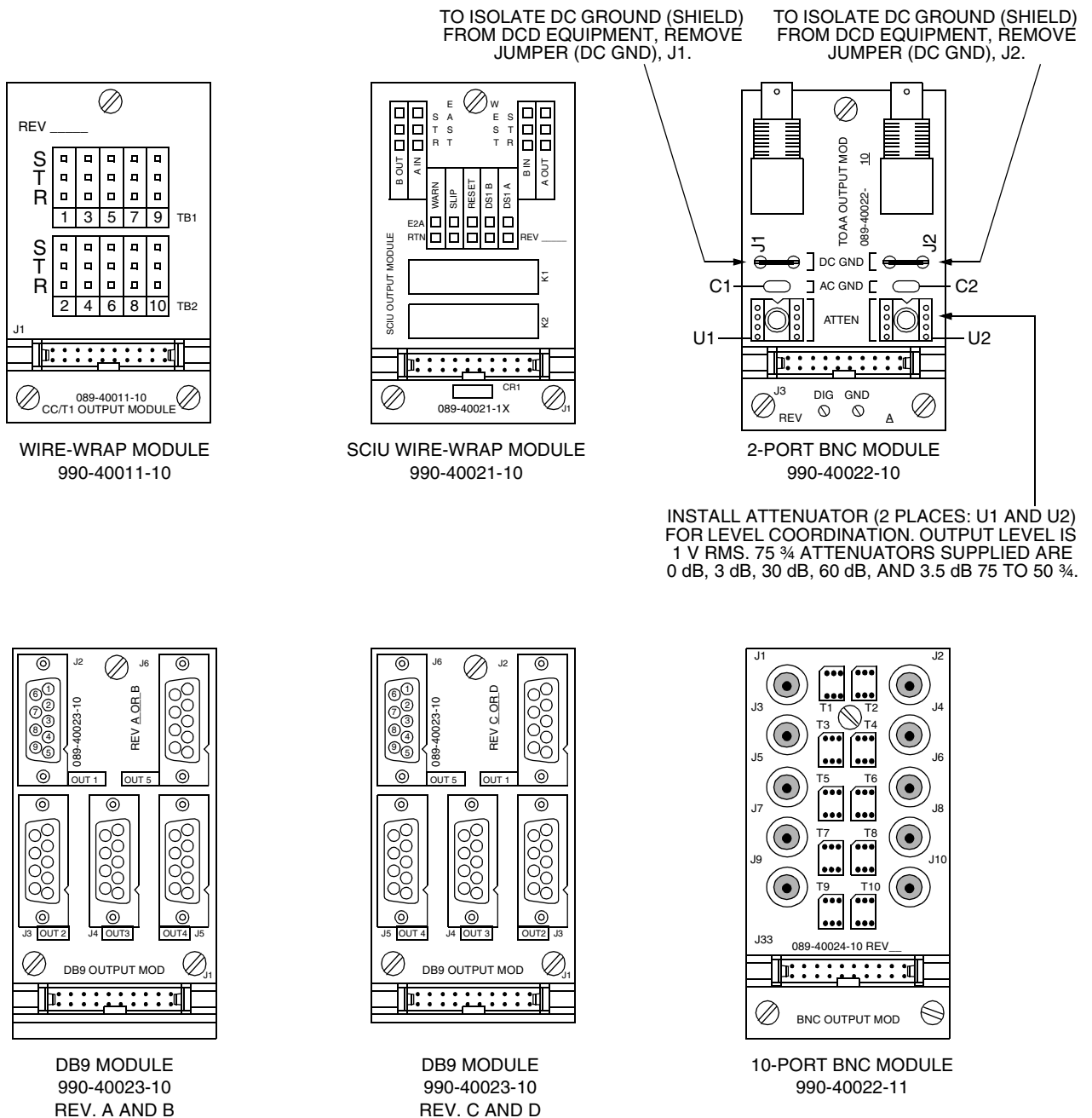


FIGURE 26.  
OUTPUT MODULES (SEE ENG. NOTE 64)  
(Manufacturing Discontinued—See FIGURES 37, 38, 39, 41, and 42)

TIMING CLOCK OUTPUT RECORDS (MMP)  
(SEE ENG. NOTES 62 AND 63)

TABLE D.  
WIRE-WRAP MODULE CONNECTIONS  
(TOCA, TOTA)

TOCA/TOTA OUTPUTS		DESTINATION	
PORT	LEAD	EQUIPMENT	LEAD
1	T		X ( )
	R		Y ( )
2	T		X ( )
	R		Y ( )
3	T		X ( )
	R		Y ( )
4	T		X ( )
	R		Y ( )
5	T		X ( )
	R		Y ( )
6	T		X ( )
	R		Y ( )
7	T		X ( )
	R		Y ( )
8	T		X ( )
	R		Y ( )
9	T		X ( )
	R		Y ( )
10	T		X ( )
	R		Y ( )

TABLE E.  
ESCIU/SCIU WIRE-WRAP MODULE CONNECTIONS  
(ENG. NOTE 61)

ESCIU/SCIU OUTPUTS		DESTINATION	
FUNCTION	LEAD	EQUIPMENT	LEAD
EAST B OUT	T		X ( )
	R		Y ( )
EAST A IN	T		X ( )
	R		Y ( )
WEST B IN	T		X ( )
	R		Y ( )
WEST A OUT	T		X ( )
	R		Y ( )
WARN	SI		X ( )
	SR		Y ( )
SLIP	SI		X ( )
	SR		Y ( )
RESET	RS		X ( )
	RSR		Y ( )
DS1 A	SI		X ( )
	SR		Y ( )

TABLE E. (CONTD)  
ESCIU/SCIU WIRE-WRAP MODULE CONNECTIONS  
(ENG. NOTE 61)

ESCIU/SCIU OUTPUTS		DESTINATION	
FUNCTION	LEAD	EQUIPMENT	LEAD
DS1 B	SI		X ( )
	SR		Y ( )

TABLE F.  
2-PORT BNC MODULE CONNECTIONS (TOAA)

TOAA OUTPUTS		DESTINATION
ANALOG PORT	CONNECTOR	EQUIPMENT
PORT 1	J1	
PORT 2	J2	

TABLE G.  
10-PORT BNC MODULE CONNECTIONS  
(TOGA, TOEA)

TOGA, TOEA OUTPUTS		DESTINATION
PORT	CONNECTOR	EQUIPMENT
PORT 1	J1	
PORT 2	J2	
PORT 3	J3	
PORT 4	J4	
PORT 5	J5	
PORT 6	J6	
PORT 7	J7	
PORT 8	J8	
PORT 9	J9	
PORT 10	J10	

TABLE H.  
DB9 MODULE CONNECTIONS (TOLA) RS-422  
OUTPUT

TOLA (RS-422) OUTPUT			DESTINATION	
PORT	CONNECTOR AND PIN	LEAD	EQUIPMENT	LEAD
1	J2-3	A		A
	J2-4	B		B
	J2-1	C		C
2	J3-3	A		A
	J3-4	B		B
	J3-1	C		C



TABLE H. (CONTD)  
DB9 MODULE CONNECTIONS (TOLA) RS-422  
OUTPUT

TOLA (RS-422) OUTPUT			DESTINATION	
PORT	CONNECTOR AND PIN	LEAD	EQUIPMENT	LEAD
3	J4-3	A		A
	J3-4	B		B
	J3-1	C		C
4	J4-3	A		A
	J4-4	B		B
	J4-1	C		C
5	J6-3	A		A
	J6-4	B		B
	J6-1	C		C

TABLE I.  
DB9 MODULE CONNECTIONS (TOLA) TTL OUTPUT

TOLA (TTL) OUTPUTS			DESTINATION	
OUTPUT	CONNECTOR AND PIN	LEAD	EQUIPMENT	LEAD
1	J2-4	A		A
	J2-9	C		C
2	J2-3	A		A
	J2-9	C		C
3	J3-4	A		A
	J3-9	C		C
4	J3-3	A		A
	J3-5	C		C
5	J4-4	A		A
	J4-9	C		C
6	J4-3	A		A
	J4-5	C		C
7	J5-4	A		A
	J5-9	C		C
8	J5-3	A		A
	J5-5	C		C
9	J6-4	A		A
	J6-9	C		C
10	J6-3	A		A
	J6-5	C		C

TABLE J.  
DCD-523 MASTER OR EXPANSION SHELF WIRE-  
WRAP PANEL TIMING OUTPUT RECORD

DCD OUTPUTS			DESTINATION	
TIMING OUTPUT UNIT	OUTPUT	LEAD	EQUIPMENT	LEAD
TO1	1	T		X ( )
		R		Y ( )
	2	T		X ( )
		R		Y ( )
	3	T		X ( )
		R		Y ( )
	4	T		X ( )
		R		Y ( )
	5	T		X ( )
		R		Y ( )
	6	T		X ( )
		R		Y ( )
	7	T		X ( )
		R		Y ( )
	8	T		X ( )
		R		Y ( )
	9	T		X ( )
		R		Y ( )
	10	T		X ( )
		R		Y ( )
TO2	1	T		X ( )
		R		Y ( )
	2	T		X ( )
		R		Y ( )
	3	T		X ( )
		R		Y ( )
	4	T		X ( )
		R		Y ( )
	5	T		X ( )
		R		Y ( )
	6	T		X ( )
		R		Y ( )
	7	T		X ( )
		R		Y ( )
	8	T		X ( )
		R		Y ( )
	9	T		X ( )
		R		Y ( )
	10	T		X ( )
		R		Y ( )

TABLE J. (CONTD)  
DCD-523 MASTER OR EXPANSION SHELF WIRE-  
WRAP PANEL TIMING OUTPUT RECORD

DCD OUTPUTS			DESTINATION	
TIMING OUTPUT UNIT	OUTPUT	LEAD	EQUIPMENT	LEAD
TO3	1	T		X ( )
		R		Y ( )
	2	T		X ( )
		R		Y ( )
	3	T		X ( )
		R		Y ( )
	4	T		X ( )
		R		Y ( )
	5	T		X ( )
		R		Y ( )
	6	T		X ( )
		R		Y ( )
	7	T		X ( )
		R		Y ( )
	8	T		X ( )
		R		Y ( )
	9	T		X ( )
		R		Y ( )
	10	T		X ( )
		R		Y ( )
TO4	1	T		X ( )
		R		Y ( )
	2	T		X ( )
		R		Y ( )
	3	T		X ( )
		R		Y ( )
	4	T		X ( )
		R		Y ( )
	5	T		X ( )
		R		Y ( )
	6	T		X ( )
		R		Y ( )
	7	T		X ( )
		R		Y ( )
	8	T		X ( )
		R		Y ( )
	9	T		X ( )
		R		Y ( )
	10	T		X ( )
		R		Y ( )

TABLE J. (CONTD)  
DCD-523 MASTER OR EXPANSION SHELF WIRE-  
WRAP PANEL TIMING OUTPUT RECORD

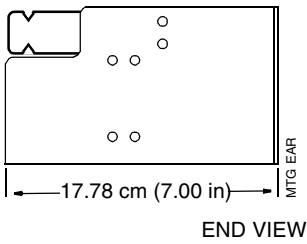
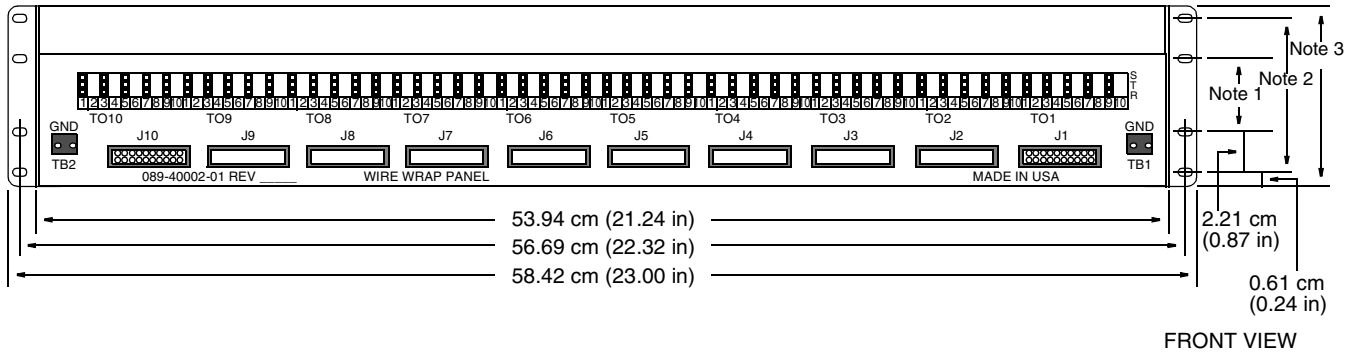
DCD OUTPUTS			DESTINATION	
TIMING OUTPUT UNIT	OUTPUT	LEAD	EQUIPMENT	LEAD
TO5	1	T		X -y )
		R		Y ( )
	2	T		X ( )
		R		Y ( )
	3	T		X ( )
		R		Y ( )
	4	T		X ( )
		R		Y ( )
	5	T		X ( )
		R		Y ( )
	6	T		X ( )
		R		Y ( )
	7	T		X ( )
		R		Y ( )
	8	T		X ( )
		R		Y ( )
	9	T		X ( )
		R		Y ( )
	10	T		X ( )
		R		Y ( )
TO6	1	T		X ( )
		R		Y ( )
	2	T		X ( )
		R		Y ( )
	3	T		X ( )
		R		Y ( )
	4	T		X ( )
		R		Y ( )
	5	T		X ( )
		R		Y ( )
	6	T		X ( )
		R		Y ( )
	7	T		X ( )
		R		Y ( )
	8	T		X ( )
		R		Y ( )
	9	T		X ( )
		R		Y ( )
	10	T		X ( )
		R		Y ( )

TABLE J. (CONTD)  
DCD-523 MASTER OR EXPANSION SHELF WIRE-  
WRAP PANEL TIMING OUTPUT RECORD

DCD OUTPUTS			DESTINATION	
TIMING OUTPUT UNIT	OUTPUT	LEAD	EQUIPMENT	LEAD
TO7	1	T		X ( )
		R		Y ( )
	2	T		X ( )
		R		Y ( )
	3	T		X ( )
		R		Y ( )
	4	T		X ( )
		R		Y ( )
	5	T		X ( )
		R		Y ( )
	6	T		X ( )
		R		Y ( )
	7	T		X ( )
		R		Y ( )
	8	T		X ( )
		R		Y ( )
	9	T		X ( )
		R		Y ( )
	10	T		X ( )
		R		Y ( )
TO8	1	T		X ( )
		R		Y ( )
	2	T		X ( )
		R		Y ( )
	3	T		X ( )
		R		Y ( )
	4	T		X ( )
		R		Y ( )
	5	T		X ( )
		R		Y ( )
	6	T		X ( )
		R		Y ( )
	7	T		X ( )
		R		Y ( )
	8	T		X ( )
		R		Y ( )
	9	T		X ( )
		R		Y ( )
	10	T		X ( )
		R		Y ( )

TABLE J. (CONTD)  
DCD-523 MASTER OR EXPANSION SHELF WIRE-  
WRAP PANEL TIMING OUTPUT RECORD

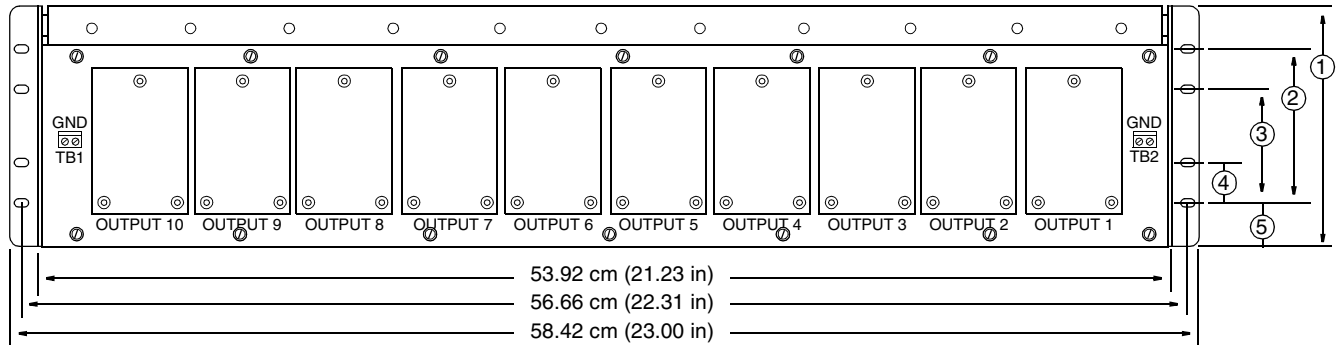
DCD OUTPUTS			DESTINATION	
TIMING OUTPUT UNIT	OUTPUT	LEAD	EQUIPMENT	LEAD
TO9	1	T		X ( )
		R		Y ( )
	2	T		X ( )
		R		Y ( )
	3	T		X ( )
		R		Y ( )
	4	T		X ( )
		R		Y ( )
	5	T		X ( )
		R		Y ( )
	6	T		X ( )
		R		Y ( )
	7	T		X ( )
		R		Y ( )
	8	T		X ( )
		R		Y ( )
	9	T		X ( )
		R		Y ( )
	10	T		X ( )
		R		Y ( )
TO10	1	T		X ( )
		R		Y ( )
	2	T		X ( )
		R		Y ( )
	3	T		X ( )
		R		Y ( )
	4	T		X ( )
		R		Y ( )
	5	T		X ( )
		R		Y ( )
	6	T		X ( )
		R		Y ( )
	7	T		X ( )
		R		Y ( )
	8	T		X ( )
		R		Y ( )
	9	T		X ( )
		R		Y ( )
	10	T		X ( )
		R		Y ( )



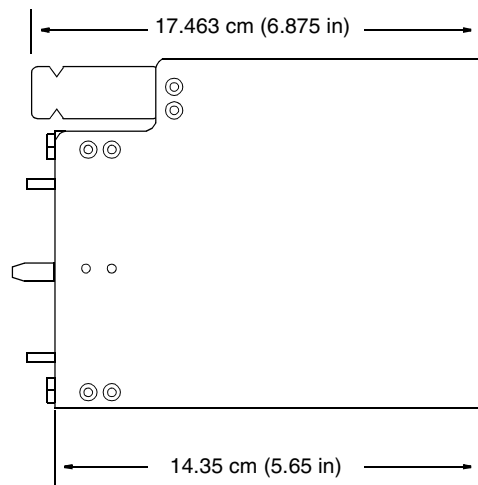
Notes:

1. 3.175 cm (1.25 in)
2. 7.62 cm (3.00 in)
3. 8.81 cm (3.47 in)

FIGURE 27.  
WIRE-WRAP PANEL (FOR MASTER AND EXPANSION SHELVES)  
OUTLINE DIMENSIONS  
(SEE ENG. NOTE 67)



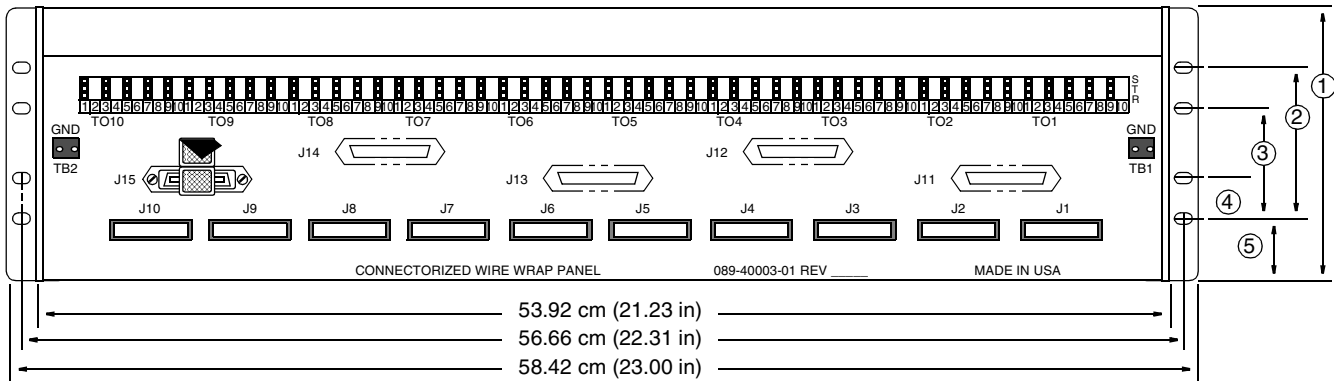
FRONT VIEW



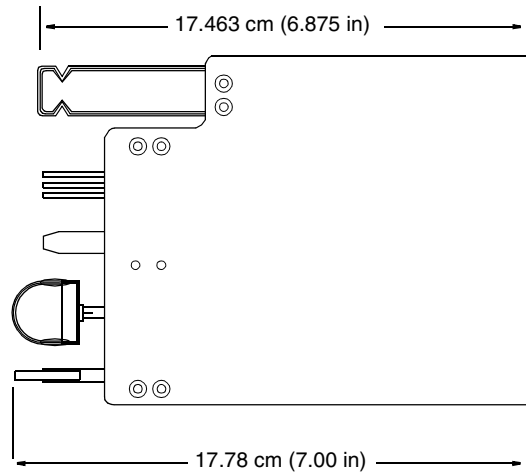
END VIEW

- ① 13.26 cm (5.22 in)
- ② 7.62 cm (3.00 in)
- ③ 5.398 cm (2.125 in)
- ④ 2.223 cm (0.875 in)
- ⑤ 2.82 cm (1.11 in)

FIGURE 28.  
 MODULAR MOUNTING PANEL (FOR MASTER AND EXPANSION SHELVES)  
 OUTLINE DIMENSIONS  
 (SEE ENG. NOTES 62, 67, AND 68)



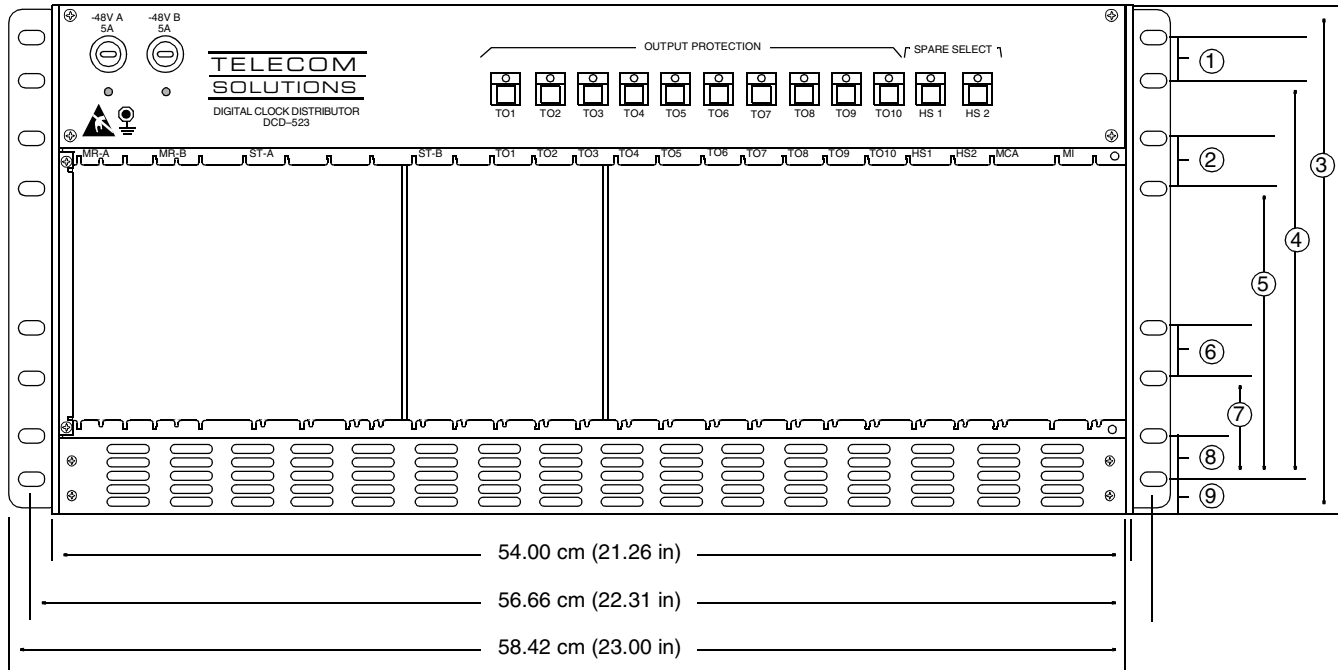
FRONT VIEW



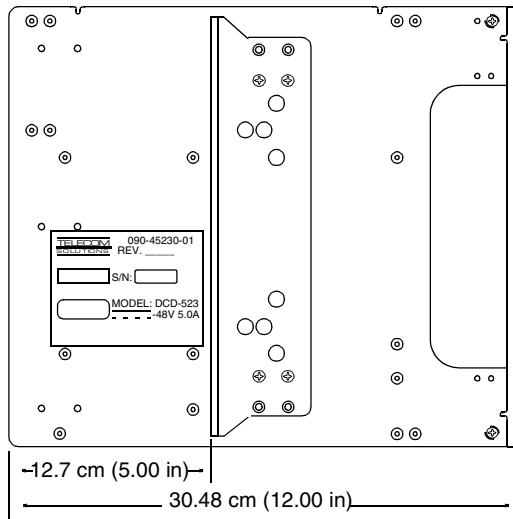
END VIEW

- ① 13.26 cm (5.22 in)
- ② 7.62 cm (3.00 in)
- ③ 5.398 cm (2.125 in)
- ④ 2.223 cm (0.875 in)
- ⑤ 2.82 cm (1.11 in)

FIGURE 29.  
 REMOTE WIRE-WRAP PANEL (FOR MASTER AND EXPANSION SHELF)  
 OUTLINE DIMENSIONS  
 (SEE ENG. NOTES 67 AND 69)



FRONT VIEW



SIDE VIEW

- ① 1.91 cm (0.75 in)
- ② 2.54 cm (1.00 in)
- ③ 26.29 cm (10.35 in)
- ④ 20.96 cm (8.25 in)
- ⑤ 15.24 cm (6.00 in)
- ⑥ 2.54 cm (1.00 in)
- ⑦ 5.08 cm (2.00 in)
- ⑧ 1.91 cm (0.75 in)
- ⑨ 4.39 cm (0.68 in)

FIGURE 30.  
DCD-523 MASTER OR EXPANSION SHELF ASSEMBLY OUTLINE DIMENSIONS  
(SEE ENG. NOTE 65)





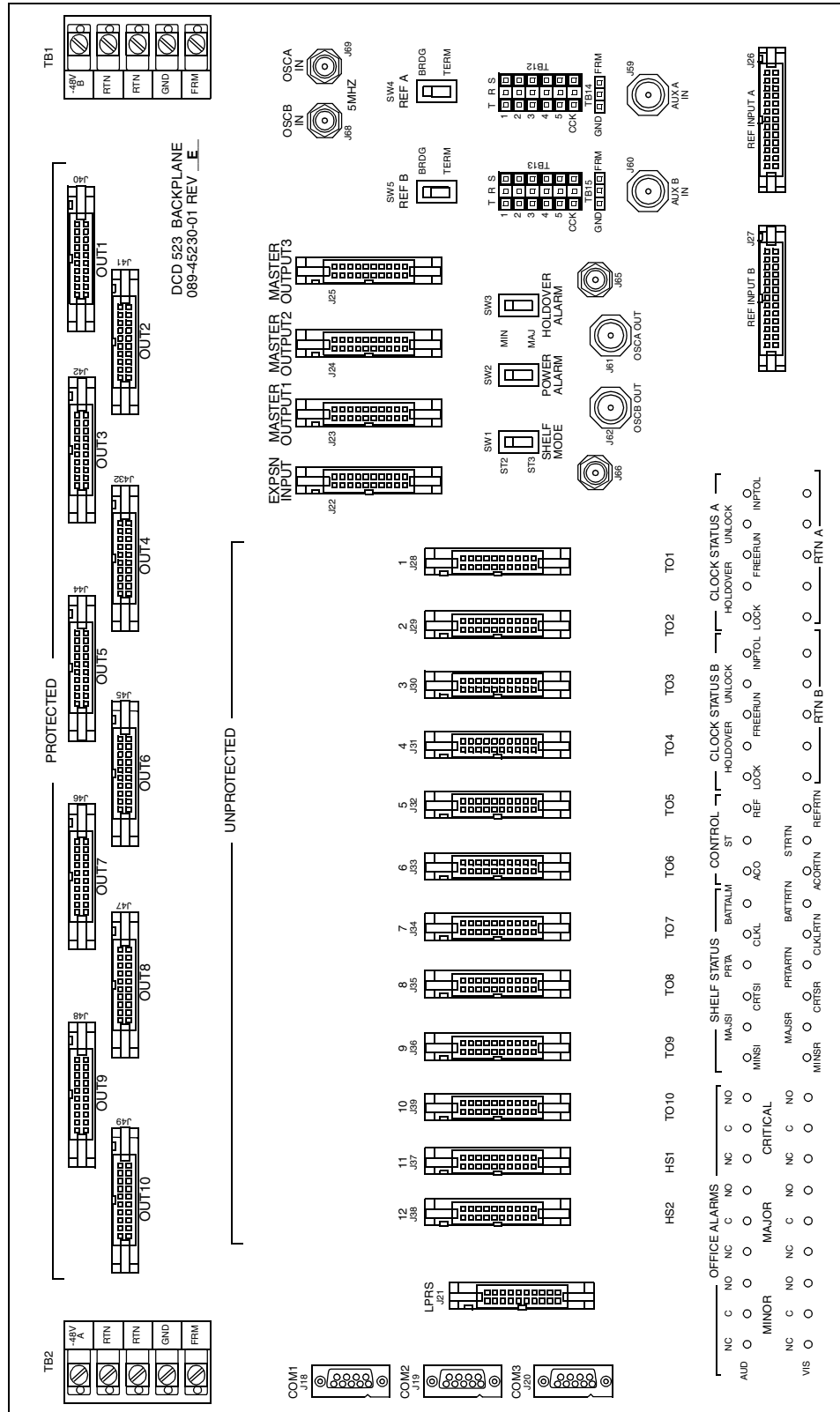


FIGURE 32.  
DCD-523 MASTER OR EXPANSION SHELF BACKPLANE (REV. E OR LATER)

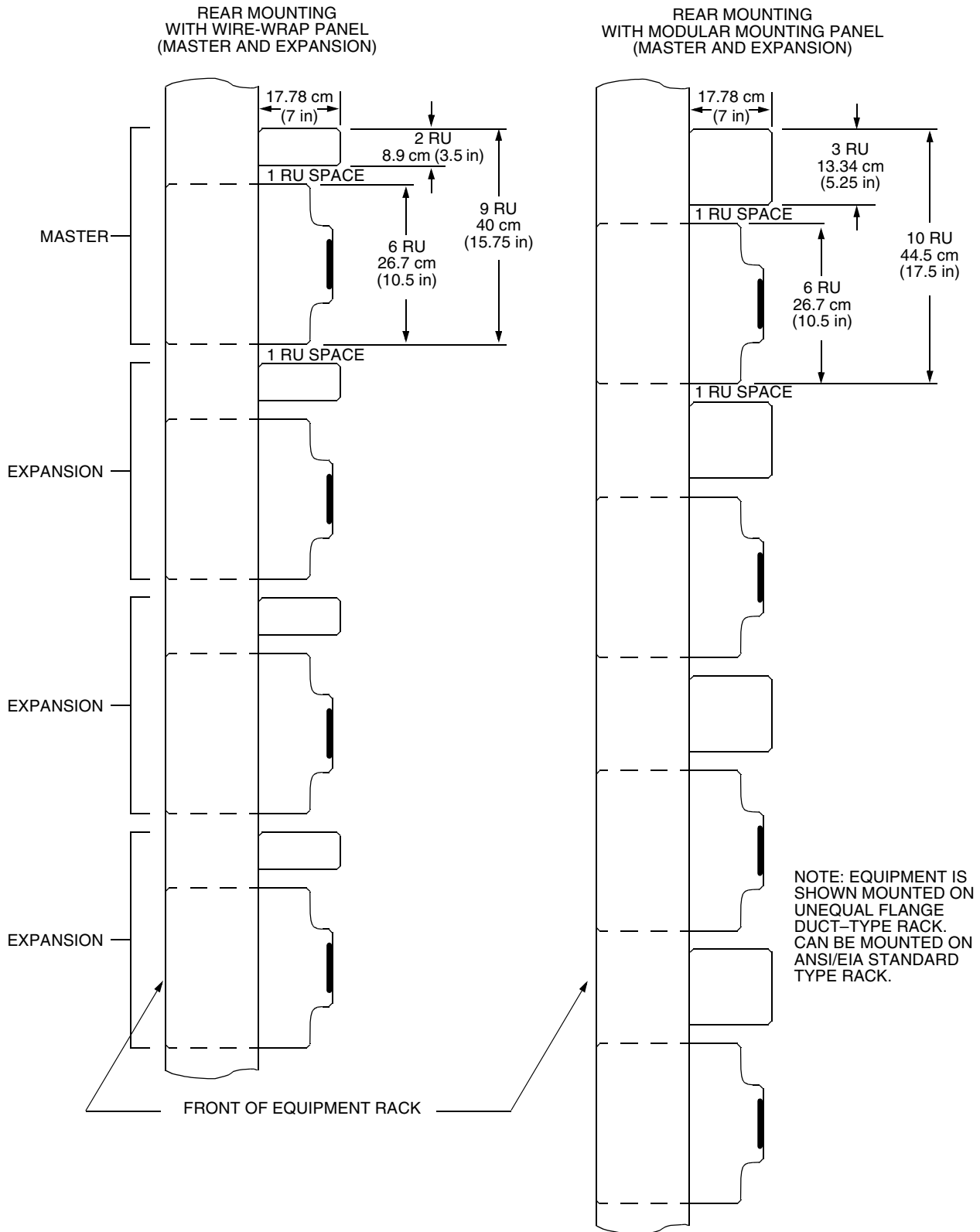
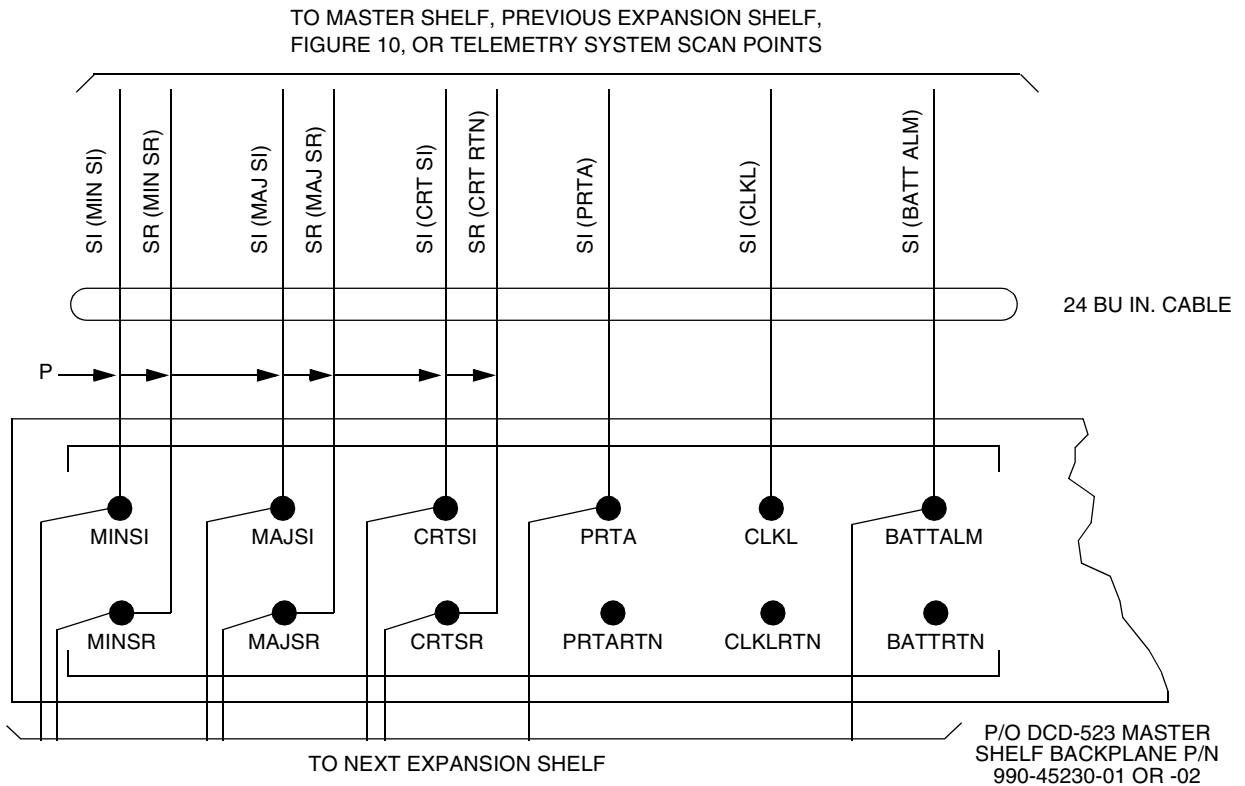


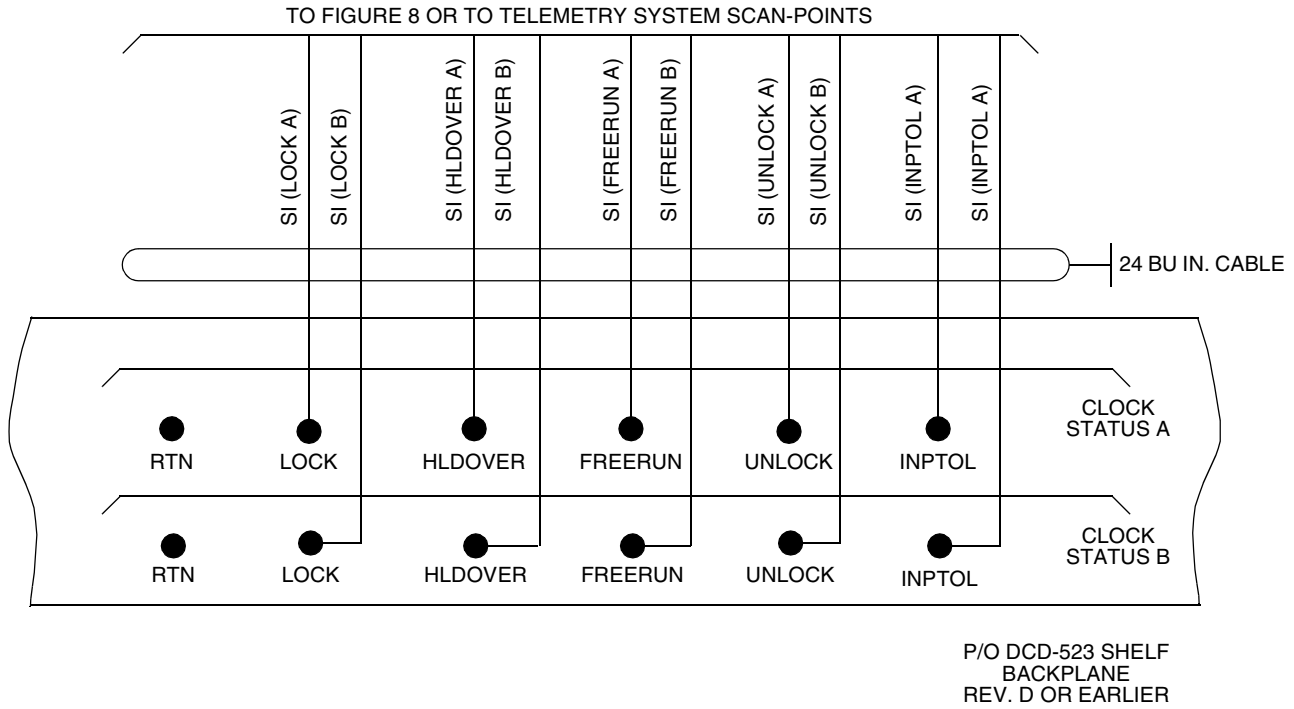
FIGURE 33.  
RECOMMENDED RACK MOUNTING CONFIGURATIONS



Notes:

1. Multiple connections allowed only at MINSI, MINSR, MAJSI, MAJSR, CRTSI, CRTSR, PRTA, and BATTALM terminals when connecting DCD shelves and telemetry scan points.
2. Status/control leads are office assignable at telemetry end by central office engineer.
3. PRTARTN, CLKLRTN, and BATTRTN (RTN) terminals are connected internally to the shelf battery return, therefore, connections between the RTN terminals and the remote telemetry equipment scan points are not required.
4. The connections shown apply to all backplane revisions.

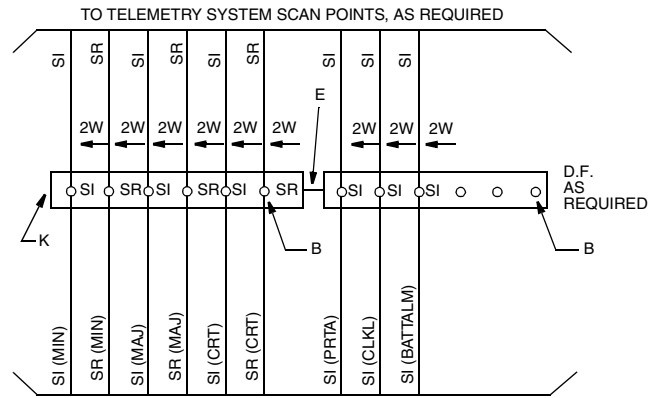
FIGURE 34.  
SHELF STATUS



Notes:

1. The RTN terminal in each set of clock status terminals is a common status return (SR) for all status indicator (SI) terminals in the terminal set.
2. Both RTN terminals are connected internally to the shelf battery return, therefore, connections between the RTN terminals and the telemetry system scan-points are not required.
3. Status/control leads are office assignable at telemetry end by central office engineer.

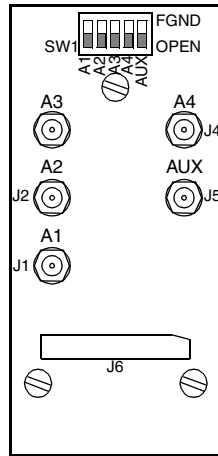
FIGURE 35.  
CLOCK STATUS (SHELF REV. D OR EARLIER)



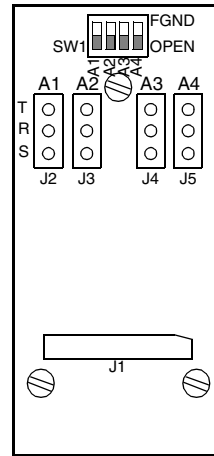
FROM FIG. 4

Note: The connections shown apply to all backplane revisions.

FIGURE 36.  
FRAME TERMINATION SHELF STATUS LEADS



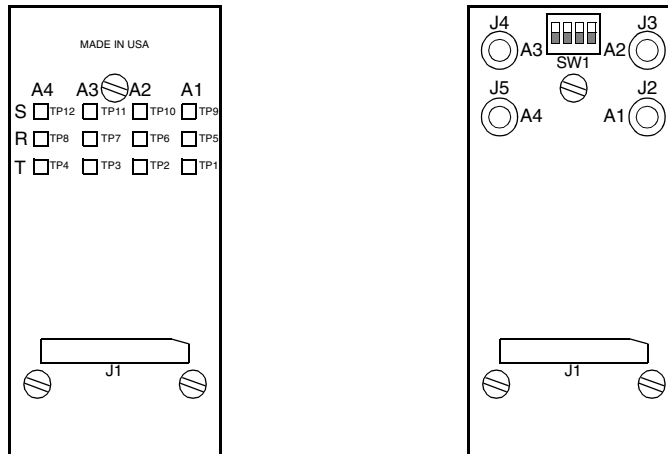
SAMPLE COAXIAL REFERENCE  
INPUT MODULE



SAMPLE WIRE-WRAP  
REFERENCE INPUT MODULE

NOTE: PART NUMBERS FOR REFERENCE INPUT MODULES ARE  
990-45104-05, -08, -09, -11, -12, 990-45107-02, -03, -04, -06.

FIGURE 37.  
REFERENCE INPUT MODULES FOR THE I/O MMP  
(SEE ENG. NOTE 64)  
(Manufacturing Discontinued – See FIGURE 44)

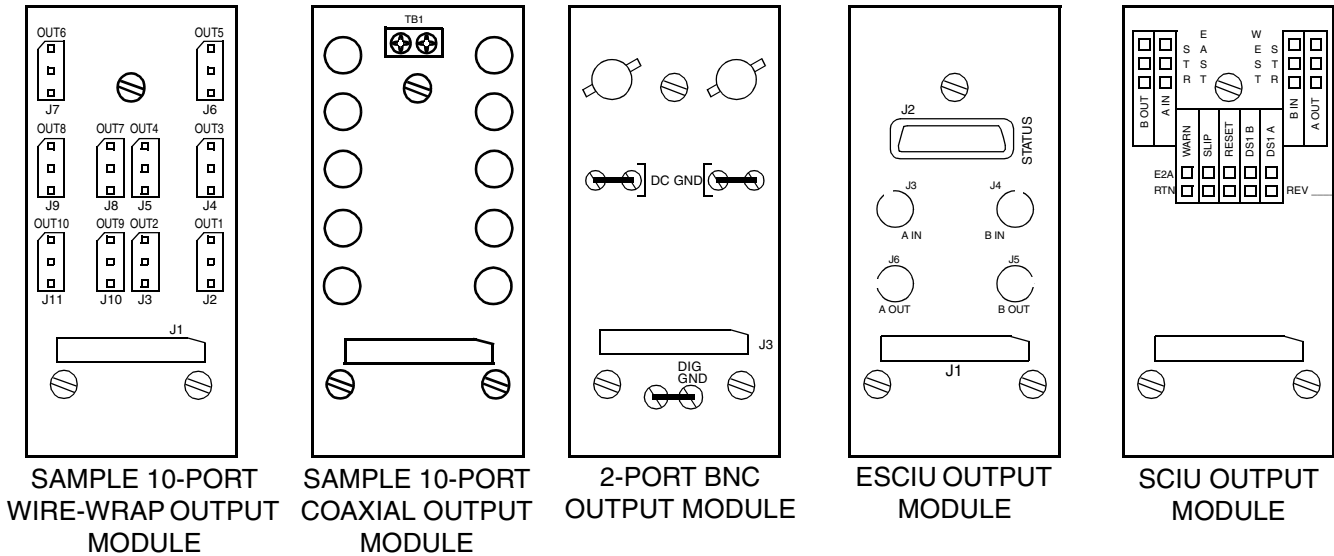


SAMPLE WIRE-WRAP PSM  
CARD INPUT MODULE

SAMPLE COAXIAL PSM  
CARD INPUT MODULE

Note: Part numbers for PSM input modules are 990-45106-01, -02, -03, -04, -11, -12, -13, -14, -15.

FIGURE 38.  
PSM CARD INPUT MODULES FOR THE I/O AND OUTPUT MMPS  
(SEE ENG. NOTE 64)  
(Manufacturing Discontinued – See FIGURE 45)



SAMPLE 10-PORT  
WIRE-WRAP OUTPUT  
MODULE

SAMPLE 10-PORT  
COAXIAL OUTPUT  
MODULE

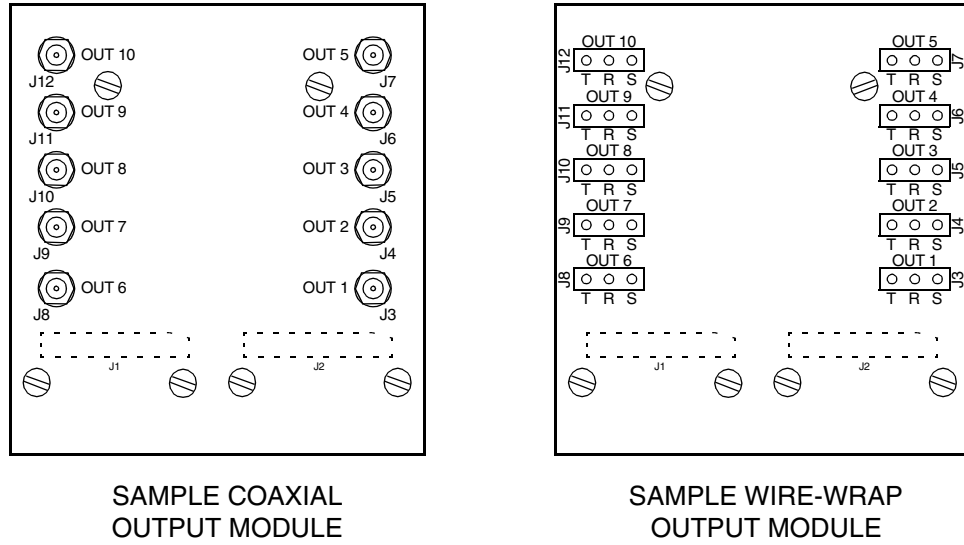
2-PORT BNC  
OUTPUT MODULE

ESCIU OUTPUT  
MODULE

SCIU OUTPUT  
MODULE

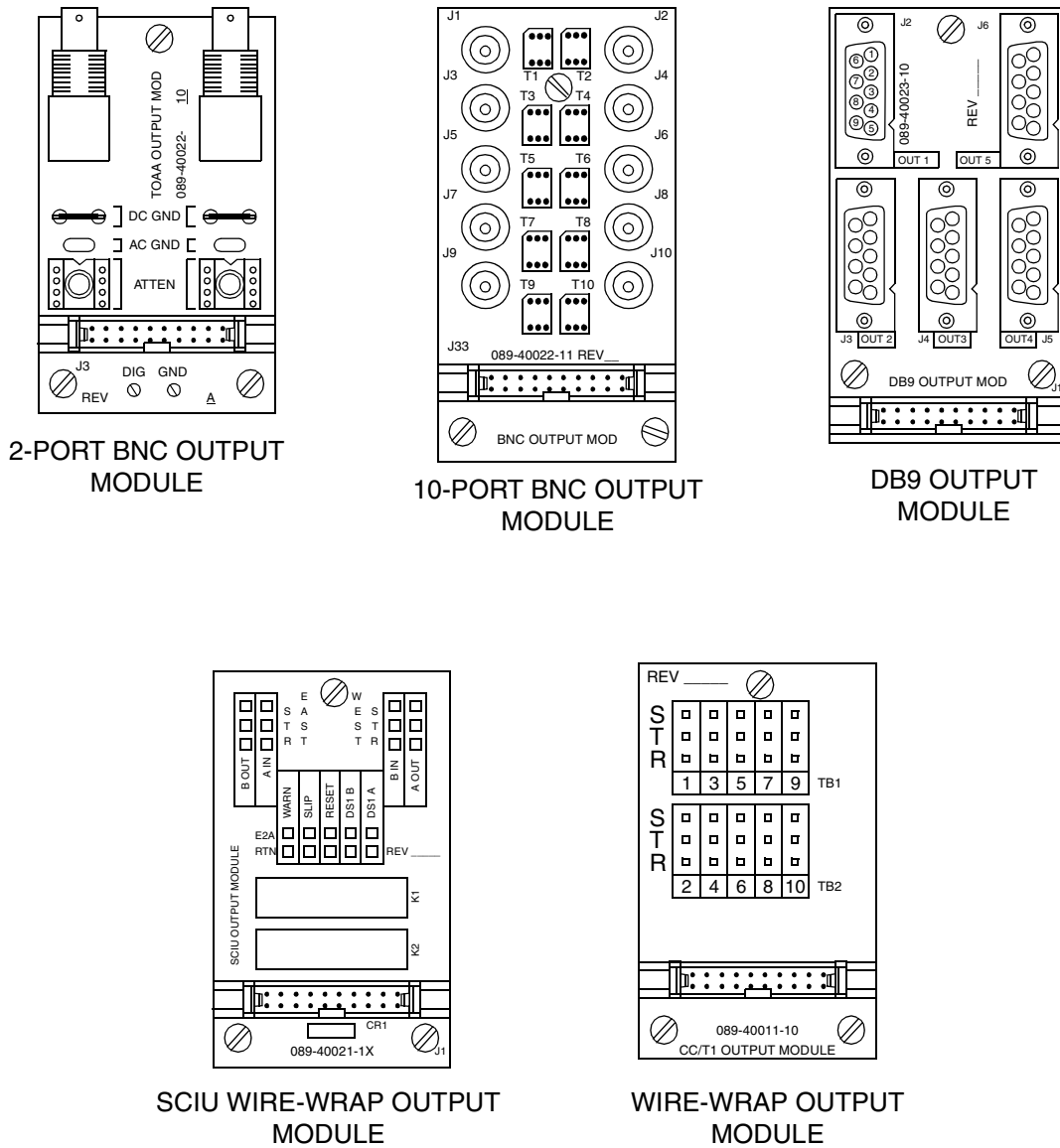
Note: Part numbers for single wide output modules are 990-40021-10, 990-45021-10, -11, 990-45105-02, -03, -04, -06, -12, -13, -14, -15, 990-45122-01.

FIGURE 39.  
OUTPUT MODULES FOR THE I/O AND OUTPUT MMPS  
(SEE ENG. NOTE 64)  
(Manufacturing Discontinued – See FIGURES 46 through 55)



Note: Part numbers for double wide output modules are 990-45107-07, -08, -09, -10, -11, -16, -17, -18.

FIGURE 41.  
DOUBLE-WIDE OUTPUT MODULES FOR THE I/O AND OUTPUT MMPS  
(SEE ENG. NOTE 64)  
(Manufacturing Discontinued – See FIGURES 46 through 55)



Note: Part numbers for connectorless MMP output modules are 990-40011-10, 990-40021-10, 990-40022-10, -11, 990-40023-10.

FIGURE 42.  
OUTPUT MODULES FOR THE CONNECTORLESS MMP  
(SEE ENG. NOTE 64)



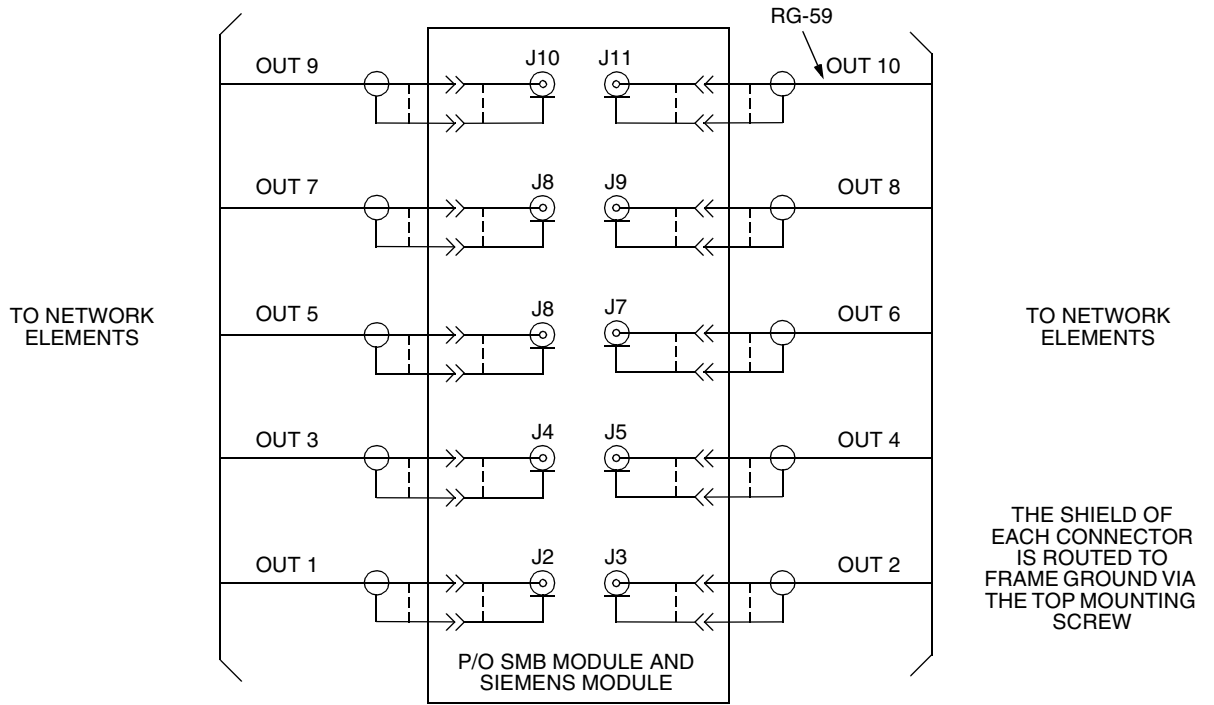


FIGURE 43.  
TIMING OUTPUT INTERCONNECTIONS  
SMB AND SIEMENS OUTPUT MODULES  
(SEE ENG. NOTES 60, 61, 62, 63, AND 64)

TABLE K.  
 MODULES FOR CLOCK INPUT CARDS  
 (Manufacturing Discontinued—See Table O)

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)	990-45107-02	SMB	75 $\frac{3}{4}$ (unbalanced)	0.3 V to 1.5 V rms	4 + AUX
	990-45107-03	Siemens 1.6/5.6	75 $\frac{3}{4}$ (unbalanced)	0.3 V to 1.5 V rms	4 + AUX
	990-45107-04	Siemens 1.0/2.3	75 $\frac{3}{4}$ (unbalanced)	0.3 V to 1.5 V rms	5
CI (Connect inputs at A3 only) (SW4 and SW5 at TERM or BRDG)	990-45107-06	Wire-wrap	T1: 100 $\frac{3}{4}$ (balanced)  CC: 133 $\frac{3}{4}$ (balanced)	TERM: T1: 1.0 to 3.5 V b-p  BRDG: T1: 0.1 to 0.35 V b-p  BRDG: CC: 1.5 to 4.0 V p-p	4
CI-EA (Connect inputs at A3 only) (SW4 and SW5 at TERM or BRDG)	990-45107-02	SMB	75 $\frac{3}{4}$ (unbalanced)	TERM: E1: 1.0 to 3.5 V b-p  BRDG: E1: 0.1 to 0.35 V b-p  BRDG: Analog: 1.5 to 3.0 V p-p	4 + AUX
	990-45107-03	Siemens 1.6/5.6	75 $\frac{3}{4}$ (unbalanced)	TERM: E1: 1.0 to 3.5 V b-p  BRDG: E1: 0.1 to 0.35 V b-p  BRDG: Analog: 1.5 to 3.0 V p-p	4 + AUX
	990-45107-04	Siemens 1.0/2.3	75 $\frac{3}{4}$ (unbalanced)	TERM: E1: 1.0 to 3.5 V b-p  BRDG: E1: 0.1 to 0.35 V b-p  BRDG: Analog: 1.5 to 3.0 V p-p	5
	990-45107-06	Wire-wrap	120 $\frac{3}{4}$ (balanced)	TERM: E1: 1.0 to 3.5 V b-p  BRDG: E1: 0.1 to 0.35 V b-p	4

TABLE K.  
 MODULES FOR CLOCK INPUT CARDS (CONTD)  
 (Manufacturing Discontinued—See Table O)

FOR INPUT CARD	USE INPUT MODULE				
	PART NUMBER	CONNECTOR TYPE	IMPEDANCE	INPUT SIGNAL LEVEL	NO. OF INPUTS
MRC-E MRC-EA Standard MRC-EA (Connect all inputs to A1 through A4) (SW4 and SW5 at BRDG only)	990-45107-02	SMB	75 $\frac{3}{4}$ (unbalanced)	E1 and analog: 0.1 to 3.5 V b-p	4 + AUX
	990-45107-03	Siemens 1.6/5.6	75 $\frac{3}{4}$ (unbalanced)	E1 and analog: 0.1 to 3.5 V b-p	4 + AUX
	990-45107-04	Siemens 1.0/2.3	75 $\frac{3}{4}$ (unbalanced)	E1 and analog: 0.1 to 3.5 V b-p	5
	990-45107-06	Wire-wrap	120 $\frac{3}{4}$ (balanced)	E1 and analog: 0.1 to 3.5 V b-p	4
Notes: 1. Part numbers shown are for ordering purposes; part numbers on modules start with 089 instead of 990. 2. MRC-T cards cannot use input modules. Connect inputs for all MRC-T cards directly to TB12 and TB13, rows 2 through 5, on the DCD rear panel.					

TABLE L.  
MODULES FOR PSM CARDS

FOR INPUT CARD	USE INPUT MODULE				
	PART NUMBER	CONNECTOR TYPE	IMPEDANCE	INPUT SIGNAL LEVEL	NO. OF INPUTS
PSM-T Standard PSM-T	990-45106-11	Wire-wrap (Note 2)	120 $\frac{3}{4}$ (balanced)	T1: 0.1 to 3.5 V b-p	4
PSM-E	990-45106-12	Siemens 1.6/5.6	75 $\frac{3}{4}$ (unbalanced)	E1: 0.1 to 3.5 V b-p	4
PSM-E (Issue A)	990-45106-11	Wire-wrap (Note 2)	120 $\frac{3}{4}$ (balanced)	E1: 0.1 to 3.5 V b-p	4
	990-45106-13	BNC	75 $\frac{3}{4}$ (unbalanced)	E1: 0.1 to 3.5 V b-p	4
	990-45106-14	Siemens 1.6/5.6	75 $\frac{3}{4}$ (unbalanced)	E1: 0.1 to 3.5 V b-p	4
Standard PSM-E Standard PSM-EA	990-45106-11	Wire-wrap (Note 2)	120 $\frac{3}{4}$ (balanced)	E1: 0.1 to 3.5 V b-p	4
	990-45106-12	Siemens 1.6/5.6	75 $\frac{3}{4}$ (unbalanced)	E1 and analog: 0.1 to 3.5 V b-p	4
	990-45106-13	BNC	75 $\frac{3}{4}$ (unbalanced)	E1 and analog: 0.1 to 3.5 V b-p	4
	990-45106-14	SMB	75 $\frac{3}{4}$ (unbalanced)	E1 and analog: 0.1 to 3.5 V b-p	4
	990-45106-15	Siemens 1.0/2.3	75 $\frac{3}{4}$ (unbalanced)	E1 and analog: 0.1 to 3.5 V b-p	4
<p>Notes:</p> <ol style="list-style-type: none"> <li>DCD rear panel switches SW4 and SW5 must be in the BRDG position.</li> <li>Use this module for E1 or T1 signals only.</li> <li>Part numbers shown are for ordering purposes; part numbers on modules start with 089 instead of 990.</li> </ol>					

TABLE M.  
 MODULES FOR TIMING OUTPUT CARDS  
 (Manufacturing Discontinued—See Table P)

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 $\frac{3}{4}$ (balanced)	I/O for 2-way T1
ESCIU	Stand-alone	090-45021-11	SMB	75 $\frac{3}{4}$ (unbalanced)	I/O for 2-way E1
		090-45021-12	Siemens 1.6/5.6	75 $\frac{3}{4}$ (unbalanced)	I/O for 2-way E1
EA10	Stand-alone	990-45105-06	Wire-wrap (Note 1)	E1: 120 $\frac{3}{4}$ (balanced)	10
		990-45105-13	SMB	E1: 75 $\frac{3}{4}$ Analog: 75 $\frac{3}{4}$ (unbalanced)	10
		990-45105-14	Siemens 1.6/5.6	E1: 75 $\frac{3}{4}$ Analog: 75 $\frac{3}{4}$ (unbalanced)	10
		990-45105-15	Siemens 1.0/2.3	E1: 75 $\frac{3}{4}$ Analog: 75 $\frac{3}{4}$ (unbalanced)	10
		990-45108-01	Wire-wrap (Note 1)	E1: 120 $\frac{3}{4}$ Analog: 75 $\frac{3}{4}$ (balanced)	10 (11, 12, 13 not used)
	1:1, 1+1	990-45105-10 (double-wide)	Wire-wrap (Note 1)	E1: 120 $\frac{3}{4}$ (balanced)	10
		990-45105-11 (double-wide)	Wire-wrap or Siemens 1.6/5.6	E1: 120 $\frac{3}{4}$ (balanced) or E1: 75 $\frac{3}{4}$ (unbalanced) Analog: 75 $\frac{3}{4}$ (unbalanced)	10
		990-45105-16 (double-wide)	SMB	E1: 75 $\frac{3}{4}$ Analog: 75 $\frac{3}{4}$ (unbalanced)	10
		990-45105-17 (double-wide)	Siemens 1.6/5.6	E1: 75 $\frac{3}{4}$ Analog: 75 $\frac{3}{4}$ (unbalanced)	10
		990-45105-18 (double-wide)	Siemens 1.0/2.3	E1: 75 $\frac{3}{4}$ Analog: 75 $\frac{3}{4}$ (unbalanced)	10

TABLE M.  
 MODULES FOR TIMING OUTPUT CARDS (CONTD)  
 (Manufacturing Discontinued—See Table P)

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 $\frac{3}{4}$ (balanced)	10
		990-45105-12	Wire-wrap and Siemens 1.6/5.6	E1: 120 $\frac{3}{4}$ (balanced) and E1: 75 $\frac{3}{4}$ (unbalanced) Analog: 75 $\frac{3}{4}$ (unbalanced)	5 Wire-wrap and 5 Siemens 1.6/5.6
		990-45105-13	SMB	E1: 75 $\frac{3}{4}$ (unbalanced) Analog: 75 $\frac{3}{4}$ (unbalanced)	10
		990-45105-14	Siemens 1.6/5.6	E1: 75 $\frac{3}{4}$ (unbalanced) Analog: 75 $\frac{3}{4}$ (unbalanced)	10
		990-45105-15	Siemens 1.0/2.3	E1: 75 $\frac{3}{4}$ (unbalanced) Analog: 75 $\frac{3}{4}$ (unbalanced)	10
		990-45108-01	Wire-wrap (Note 1)	E1: 120 $\frac{3}{4}$ (balanced) Analog: 75 $\frac{3}{4}$ (balanced)	10 (Do not use 11, 12, 13)
	1:1, 1+1	990-45105-10 (double-wide)	Wire-wrap (Note 1)	E1: 120 $\frac{3}{4}$ (balanced)	10
		990-45105-11 (double-wide)	Wire-wrap or Siemens 1.6/5.6	E1: 120 $\frac{3}{4}$ (balanced) or E1: 75 $\frac{3}{4}$ (unbalanced) Analog: 75 $\frac{3}{4}$ (unbalanced)	10 Wire-wrap or 10 Siemens 1.6/5.6 or combination
		990-45105-16 (double-wide)	SMB	E1: 75 $\frac{3}{4}$ (unbalanced) Analog: 75 $\frac{3}{4}$ (unbalanced)	10
		990-45105-17 (double-wide)	Siemens 1.6/5.6	E1: 75 $\frac{3}{4}$ (unbalanced) Analog: 75 $\frac{3}{4}$ (unbalanced)	10
		990-45105-18 (double-wide)	Siemens 1.0/2.3	E1: 75 $\frac{3}{4}$ (unbalanced) Analog: 75 $\frac{3}{4}$ (unbalanced)	10

TABLE M.  
MODULES FOR TIMING OUTPUT CARDS (CONTD)  
(Manufacturing Discontinued—See Table P)

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)	Stand-alone, 1:N	990-45105-12	Wire-wrap and Siemens 1.6/5.6	E1: 120 $\frac{3}{4}$ Analog: 75 $\frac{3}{4}$ (balanced) and E1: 75 $\frac{3}{4}$ Analog: 75 $\frac{3}{4}$ (unbalanced)	5 Wire-wrap and 5 Siemens 1.6/5.6
		990-45105-13	SMB	E1: 75 $\frac{3}{4}$ Analog: 75 $\frac{3}{4}$ (unbalanced)	10
		990-45105-14	Siemens 1.6/5.6	E1: 75 $\frac{3}{4}$ Analog: 75 $\frac{3}{4}$ (unbalanced)	10
		990-45105-15	Siemens 1.0/2.3	E1: 75 $\frac{3}{4}$ Analog: 75 $\frac{3}{4}$ (unbalanced)	10
		990-45108-01	Wire-wrap (Note 1)	E1: 120 $\frac{3}{4}$ (balanced)	10 (Do not use 11, 12, 13)
	1+1	990-45105-10 (double-wide)	Wire-wrap (Note 1)	E1: 120 $\frac{3}{4}$ (balanced)	10
		990-45105-11 (double-wide)	Wire-wrap or Siemens 1.6/5.6	E1: 120 $\frac{3}{4}$ (balanced) or E1: 75 $\frac{3}{4}$ Analog: 75 $\frac{3}{4}$ (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	120 $\frac{3}{4}$ (balanced) or 75 $\frac{3}{4}$ (unbalanced)	5 Wire-wrap and 5 Siemens 1.6/5.6
		990-45105-13	SMB	E1: 75 $\frac{3}{4}$ (unbalanced)	10
		990-45105-14	Siemens 1.6/5.6	E1: 75 $\frac{3}{4}$ (unbalanced)	10
		990-45105-15	Siemens 1.0/2.3	E1: 75 $\frac{3}{4}$ (unbalanced)	10
		990-45108-01	Wire-wrap (Note 1)	E1: 120 $\frac{3}{4}$ (balanced)	10 (Do not use 11, 12, 13)

TABLE M.  
 MODULES FOR TIMING OUTPUT CARDS (CONTD)  
 (Manufacturing Discontinued—See Table P)

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 $\frac{3}{4}$ (unbalanced)	5 Wire-wrap and 5 Siemens 1.6/5.6
		990-45105-13	SMB	Analog: 75 $\frac{3}{4}$ (unbalanced)	10
		990-45105-14	Siemens 1.6/5.6	Analog: 75 $\frac{3}{4}$ (unbalanced)	10
		990-45105-15	Siemens 1.0/2.3	Analog: 75 $\frac{3}{4}$ (unbalanced)	10
	1+1	990-45105-16 (double-wide)	SMB	Analog: 75 $\frac{3}{4}$ (unbalanced)	10
TOCA	1:N, Stand-alone	990-45105-06	Wire-wrap (Note 1)	CC: 133 $\frac{3}{4}$ (balanced)	10
		990-45108-01	Wire-wrap (Note 1)	CC: 133 $\frac{3}{4}$ (balanced)	10 (Do not use 11, 12, 13)
TOTA TOTL	1:N, Stand-alone	990-45105-06	Wire-wrap (Note 1)	T1: 100 $\frac{3}{4}$ (balanced)	10
		990-45108-01	Wire-wrap (Note 1)	T1: 100 $\frac{3}{4}$ (balanced)	10 (Do not use 11, 12, 13)
TOLA	1:N, Stand-alone	990-45108-01	Wire-wrap (Note 1)	TTL: 100 $\frac{3}{4}$ (balanced)	10 (Do not use 11, 12, 13)
TOTA-5 (Do not mix redundant and 1:N in the same shelf)	Stand-alone	990-45105-06	Wire-wrap (Note 1)	T1: 100 $\frac{3}{4}$ (balanced)	10
	1:N, Stand-alone	990-45108-01	Wire-wrap (Note 1)	T1: 100 $\frac{3}{4}$ (balanced)	10 (Do not use 11, 12, 13)



TABLE M.  
 MODULES FOR TIMING OUTPUT CARDS (CONTD)  
 (Manufacturing Discontinued—See Table P)

FOR OUTPUT CARD	USE MODULE				
	PROTECTION TYPE	USE PART NUMBER:	CONNECTOR TYPE	IMPEDANCE	NO. OF OUTPUTS
TOAA (except 090-40028-10)	1:N, Stand-alone	990-45122-01	BNC	Analog: 75 $\frac{3}{4}$ (unbalanced) (includes 0, 3.0, 3.5, 30.0, 60.0 dB pads)	2
TOAA (090-40022-02)	1:N, Stand-alone	990-45122-01	BNC	Analog: 50 $\frac{3}{4}$ (unbalanced) (includes 0, 3.0, 3.5, 30.0, 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 N.  
TIMING OUTPUT MODULES FOR CONNECTORLESS MODULAR MOUNTING PANELS  
(Manufacturing Discontinued—See Table Q)

FOR OUTPUT CARD	USE MODULE				
	PROTECTION TYPE	USE PART NUMBER:	CONNECTOR TYPE	IMPEDANCE	NO. OF OUTPUTS
TOAA (except 090-40028-10)	1:N, Stand-alone	990-40022-10	BNC	Analog: 75 $\frac{3}{4}$ (unbalanced) (includes 0, 3.0, 3.5, 30.0, 60.0 dB pads)	2
TOAA (090-40022-02)	1:N, Stand-alone	990-40022-10	BNC	Analog: 50 $\frac{3}{4}$ (unbalanced) (includes 0, 3.0, 3.5, 30.0, 60.0 dB pads)	2
TOCA	1:N, Stand-alone	990-40023-10	DB9	CC: 133 $\frac{3}{4}$ (balanced)	5
		990-40011-10	Wire-wrap (Note 1)	CC: 133 $\frac{3}{4}$ (balanced)	10
TOEA TOGA	1:N, Stand-alone	990-40022-11	BNC	E1 or Analog: 75 $\frac{3}{4}$ (unbalanced)	10
TOLA	1:N, Stand-alone	990-40023-10	DB9	TTL: 100 $\frac{3}{4}$ (balanced)	5
		990-40011-10	Wire-wrap (Note 1)	TTL: 100 $\frac{3}{4}$ (balanced)	10
TOTA TOTA-5 TOTL	1:N, Stand-alone	990-40023-10	DB9	T1: 100 $\frac{3}{4}$ (balanced)	5
		990-40011-10	Wire-wrap (Note 1)	T1: 100 $\frac{3}{4}$ (balanced)	10
SCIU	Stand-alone	990-40021-10	Wire-wrap (Note 1)	T1: 100 $\frac{3}{4}$ (balanced)	I/O for one SCIU card
ESCIU	Stand-alone	990-40021-10	Wire-wrap (Note 1)	E1: 120 $\frac{3}{4}$ (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.					

TABLE O.  
MODULES FOR CLOCK INPUT CARDS

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 $\frac{3}{4}$ (unbalanced)	0.3 V to 1.5 V rms (AUX only)	4 + AUX
	990-45107-03	Siemens 1.6/5.6	75 $\frac{3}{4}$ (unbalanced)	0.3 V to 1.5 V rms (AUX only)	4 + AUX
	990-45107-04	Siemens 1.0/2.3	75 $\frac{3}{4}$ (unbalanced)	0.3 V to 1.5 V rms (A5 only)	5
CI (Connect inputs at A3 only) (SW4 and SW5 at TERM or BRDG) (Note 1)	990-45107-06	Wire-wrap	T1: 100 $\frac{3}{4}$ (balanced)  CC: 133 $\frac{3}{4}$ (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
CI-EA (Connect inputs at A3, AUX, or A5 only) (SW4 and SW5 at TERM or BRDG) (Note 1)	990-45107-02	SMB	75 $\frac{3}{4}$ (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
	990-45107-03	Siemens 1.6/5.6	75 $\frac{3}{4}$ (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
	990-45107-04	Siemens 1.0/2.3	75 $\frac{3}{4}$ (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
	990-45107-06	Wire-wrap	120 $\frac{3}{4}$ (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

TABLE O.  
MODULES FOR CLOCK INPUT CARDS (CONTD)

FOR INPUT CARD	USE INPUT MODULE				
	PART NUMBER	CONNECTOR TYPE	IMPEDANCE	INPUT SIGNAL LEVEL	NO. OF INPUTS
MRC-E MRC-EA Standard MRC-EA DCIM-EA (Connect all inputs to A1 through A4) (SW4 and SW5 at BRDG only) (Notes 1 and 2)	990-45107-02	SMB	75 $\frac{3}{4}$ (unbalanced)	E1 and analog: 0.1 V to 3.5 V b-p	4 + AUX
	990-45107-03	Siemens 1.6/5.6	75 $\frac{3}{4}$ (unbalanced)	E1 and analog: 0.1 V to 3.5 V b-p	4 + AUX
	990-45107-04	Siemens 1.0/2.3	75 $\frac{3}{4}$ (unbalanced)	E1 and analog: 0.1 V to 3.5 V b-p	5
	990-45107-06	Wire-wrap	120 $\frac{3}{4}$ (balanced)	E1 and analog: 0.1 V to 3.5 V b-p	4
<p>Notes:</p> <ol style="list-style-type: none"> <li>SW4 and SW5 are located on the DCD rear panel.</li> <li>MRC-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.</li> <li>Part numbers shown are for ordering purposes; part numbers on modules start with 089 instead of 990.</li> </ol>					

TABLE P.  
MODULES FOR TIMING OUTPUT CARDS

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 $\frac{3}{4}$ (balanced)	I/O for 2-way T1
ESCIU	Stand-alone	090-45021-11	SMB	75 $\frac{3}{4}$ (unbalanced)	I/O for 2-way E1
		090-45021-12	Siemens 1.6/5.6	75 $\frac{3}{4}$ (unbalanced)	I/O for 2-way E1
EA10 EA10M	Stand-alone	990-45105-06	Wire-wrap (Note 1)	E1: 120 $\frac{3}{4}$ (balanced)	10
		990-45105-13	SMB	E1: 75 $\frac{3}{4}$ Analog: 75 $\frac{3}{4}$ (unbalanced)	10
		990-45105-14	Siemens 1.6/5.6	E1: 75 $\frac{3}{4}$ Analog: 75 $\frac{3}{4}$ (unbalanced)	10
		990-45105-15	Siemens 1.0/2.3	E1: 75 $\frac{3}{4}$ Analog: 75 $\frac{3}{4}$ (unbalanced)	10
		990-45108-01	Wire-wrap (Note 1)	E1: 120 $\frac{3}{4}$ Analog: 75 $\frac{3}{4}$ (balanced)	10 (11, 12, 13 not used)
	1:1, 1+1	990-45105-10 (double-wide)	Wire-wrap (Note 1)	E1: 120 $\frac{3}{4}$ (balanced)	10
		990-45105-11 (double-wide)	Wire-wrap or Siemens 1.6/5.6	E1: 120 $\frac{3}{4}$ (balanced) or E1: 75 $\frac{3}{4}$ (unbalanced) Analog: 75 $\frac{3}{4}$ (unbalanced)	10
		990-45105-16 (double-wide)	SMB	E1: 75 $\frac{3}{4}$ Analog: 75 $\frac{3}{4}$ (unbalanced)	10
		990-45105-17 (double-wide)	Siemens 1.6/5.6	E1: 75 $\frac{3}{4}$ Analog: 75 $\frac{3}{4}$ (unbalanced)	10
		990-45105-18 (double-wide)	Siemens 1.0/2.3	E1: 75 $\frac{3}{4}$ Analog: 75 $\frac{3}{4}$ (unbalanced)	10

TABLE P.  
MODULES FOR TIMING OUTPUT CARDS (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 $\frac{3}{4}$ (balanced)	10
		990-45105-12	Wire-wrap and Siemens 1.6/5.6	E1: 120 $\frac{3}{4}$ (balanced) and E1: 75 $\frac{3}{4}$ Analog: 75 $\frac{3}{4}$ (unbalanced)	5 Wire-wrap and 5 Siemens 1.6/5.6
		990-45105-13	SMB	E1: 75 $\frac{3}{4}$ Analog: 75 $\frac{3}{4}$ (unbalanced)	10
		990-45105-14	Siemens 1.6/5.6	E1: 75 $\frac{3}{4}$ Analog: 75 $\frac{3}{4}$ (unbalanced)	10
		990-45105-15	Siemens 1.0/2.3	E1: 75 $\frac{3}{4}$ Analog: 75 $\frac{3}{4}$ (unbalanced)	10
		990-45108-01	Wire-wrap (Note 1)	E1: 120 $\frac{3}{4}$ Analog: 75 $\frac{3}{4}$ (balanced)	10 (Do not use 11, 12, 13)
	1:1, 1+1	990-45105-10 (double-wide)	Wire-wrap (Note 1)	E1: 120 $\frac{3}{4}$ (balanced)	10
		990-45105-11 (double-wide)	Wire-wrap or Siemens 1.6/5.6	E1: 120 $\frac{3}{4}$ (balanced) or E1: 75 $\frac{3}{4}$ Analog: 75 $\frac{3}{4}$ (unbalanced)	10 Wire-wrap or 10 Siemens 1.6/5.6 or combination
		990-45105-16 (double-wide)	SMB	E1: 75 $\frac{3}{4}$ Analog: 75 $\frac{3}{4}$ (unbalanced)	10
		990-45105-17 (double-wide)	Siemens 1.6/5.6	E1: 75 $\frac{3}{4}$ Analog: 75 $\frac{3}{4}$ (unbalanced)	10
		990-45105-18 (double-wide)	Siemens 1.0/2.3	E1: 75 $\frac{3}{4}$ Analog: 75 $\frac{3}{4}$ (unbalanced)	10

TABLE P.  
MODULES FOR TIMING OUTPUT CARDS (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)	Stand-alone, 1:N	990-45105-12	Wire-wrap and Siemens 1.6/5.6	E1: 120 $\frac{3}{4}$ (balanced) and E1: 75 $\frac{3}{4}$ (unbalanced) Analog: 75 $\frac{3}{4}$ (unbalanced)	5 Wire-wrap and 5 Siemens 1.6/5.6	
		990-45105-13	SMB	E1: 75 $\frac{3}{4}$ (unbalanced) Analog: 75 $\frac{3}{4}$ (unbalanced)	10	
		990-45105-14	Siemens 1.6/5.6	E1: 75 $\frac{3}{4}$ (unbalanced) Analog: 75 $\frac{3}{4}$ (unbalanced)	10	
		990-45105-15	Siemens 1.0/2.3	E1: 75 $\frac{3}{4}$ (unbalanced) Analog: 75 $\frac{3}{4}$ (unbalanced)	10	
		990-45108-01	Wire-wrap (Note 1)	E1: 120 $\frac{3}{4}$ (balanced)	10 (Do not use 11, 12, 13)	
	1+1	990-45105-10 (double-wide)	Wire-wrap (Note 1)	E1: 120 $\frac{3}{4}$ (balanced)	10	
		990-45105-11 (double-wide)	Wire-wrap or Siemens 1.6/5.6	E1: 120 $\frac{3}{4}$ (balanced) or E1: 75 $\frac{3}{4}$ (unbalanced) Analog: 75 $\frac{3}{4}$ (unbalanced)	10 Wire-wrap or 10 Siemens 1.6/5.6 or combination	
	TOEA	Stand-alone, 1:N	990-45105-12	Wire-wrap and Siemens 1.6/5.6	E1: 120 $\frac{3}{4}$ (balanced) or E1: 75 $\frac{3}{4}$ (unbalanced)	5 Wire-wrap and 5 Siemens 1.6/5.6
			990-45105-13	SMB	E1: 75 $\frac{3}{4}$ (unbalanced)	10
			990-45105-14	Siemens 1.6/5.6	E1: 75 $\frac{3}{4}$ (unbalanced)	10
990-45105-15			Siemens 1.0/2.3	E1: 75 $\frac{3}{4}$ (unbalanced)	10	
990-45108-01			Wire-wrap (Note 1)	E1: 120 $\frac{3}{4}$ (balanced)	10 (Do not use 11, 12, 13)	

TABLE P.  
MODULES FOR TIMING OUTPUT CARDS (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 $\frac{3}{4}$ (unbalanced)	5 Wire-wrap and 5 Siemens 1.6/5.6
		990-45105-13	SMB	Analog: 75 $\frac{3}{4}$ (unbalanced)	10
		990-45105-14	Siemens 1.6/5.6	Analog: 75 $\frac{3}{4}$ (unbalanced)	10
		990-45105-15	Siemens 1.0/2.3	Analog: 75 $\frac{3}{4}$ (unbalanced)	10
	1+1	990-45105-16 (double-wide)	SMB	Analog: 75 $\frac{3}{4}$ (unbalanced)	10
TOCA	1:N, Stand-alone	990-45105-06	Wire-wrap (Note 1)	CC: 133 $\frac{3}{4}$ (balanced)	10
		990-45108-01	Wire-wrap (Note 1)	CC: 133 $\frac{3}{4}$ (balanced)	10 (Do not use 11, 12, 13)
TOTA TOTL	1:N, Stand-alone	990-45105-06	Wire-wrap (Note 1)	T1: 100 $\frac{3}{4}$ (balanced)	10
		990-45108-01	Wire-wrap (Note 1)	T1: 100 $\frac{3}{4}$ (balanced)	10 (Do not use 11, 12, 13)
TOLA	1:N, Stand-alone	990-45108-01	Wire-wrap (Note 1)	RS-422: 100 $\frac{3}{4}$ (balanced) RS-423 (TTL): 450 $\frac{3}{4}$ (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 $\frac{3}{4}$ (balanced)	10
	1:N, Stand-alone	990-45108-01	Wire-wrap (Note 1)	T1: 100 $\frac{3}{4}$ (balanced)	10 (Do not use 11, 12, 13)
TOAA (except 090-40028-10)	1:N, Stand-alone	990-45122-01	BNC	Analog: 75 $\frac{3}{4}$ (unbalanced) (includes 0 dB, 3.0 dB, 3.5 dB, 30.0 dB, 60.0 dB pads)	2



TABLE P.  
MODULES FOR TIMING OUTPUT CARDS (CONTD)

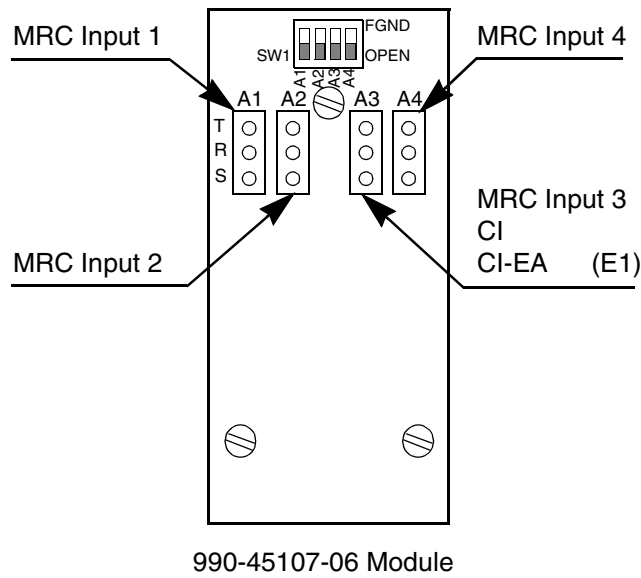
FOR OUTPUT CARD	USE MODULE				
	PROTECTION TYPE	USE PART NUMBER:	CONNECTOR TYPE	IMPEDANCE	NO. OF OUTPUTS
TOAA (090-40022-02)	1:N, Stand-alone	990-45122-01	BNC	Analog: 50 Ω (unbalanced) (includes 0 dB, 3.0 dB, 3.5 dB, 30.0 dB, 60.0 dB pads)	2
<p>Notes:</p> <ol style="list-style-type: none"> <li>1. Use this module for E1 or T1 signals only.</li> <li>2. Part numbers shown are for ordering purposes; part numbers on modules start with 089 instead of 990.</li> </ol>					

TABLE Q.  
TIMING OUTPUT MODULES FOR CONNECTORLESS MODULAR MOUNTING PANELS

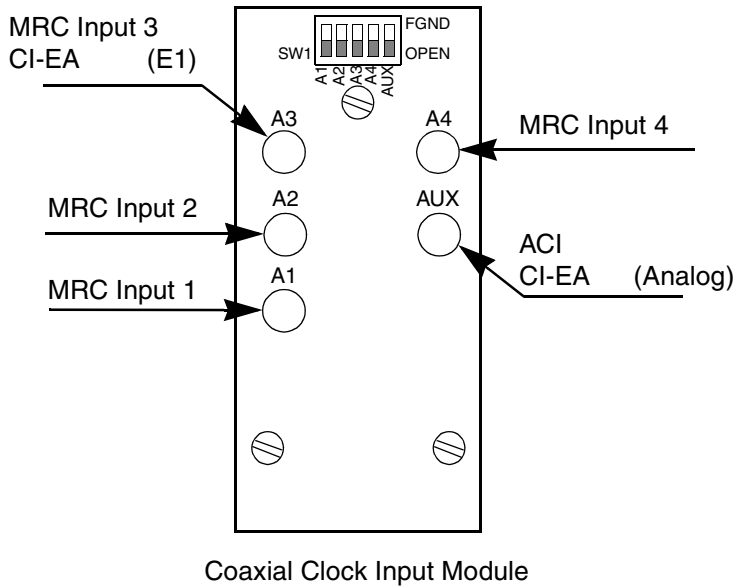
FOR OUTPUT CARD	USE MODULE				
	PROTECTION TYPE	USE PART NUMBER:	CONNECTOR TYPE	IMPEDANCE	NO. OF OUTPUTS
TOAA (except 090-40028-10)	1:N, Stand-alone	990-40022-10	BNC	Analog: 75 $\frac{3}{4}$ (unbalanced) (includes 0, 3.0, 3.5, 30.0, 60.0 dB pads)	2
TOAA (090-40022-02)	1:N, Stand-alone	990-40022-10	BNC	Analog: 50 $\frac{3}{4}$ (unbalanced) (includes 0, 3.0, 3.5, 30.0, 60.0 dB pads)	2
TOCA	1:N, Stand-alone	990-40023-10	DB9	CC: 133 $\frac{3}{4}$ (balanced)	5
		990-40011-10	Wire-wrap (Note 1)	CC: 133 $\frac{3}{4}$ (balanced)	10
TOEA TOGA	1:N, Stand-alone	990-40022-11	BNC	E1 or Analog: 75 $\frac{3}{4}$ (unbalanced)	10
TOLA	1:N, Stand-alone	990-40023-10	DB9	TTL: 100 $\frac{3}{4}$ (balanced)	5
		990-40011-10	Wire-wrap (Note 1)	RS-422: 100 $\frac{3}{4}$ (balanced) RS-423 (TTL): 450 $\frac{3}{4}$ (unbalanced)	10
TOTA TOTA-5 TOTL TOTA-M	1:N, Stand-alone	990-40023-10	DB9	T1: 100 $\frac{3}{4}$ (balanced)	5
		990-40011-10	Wire-wrap (Note 1)	T1: 100 $\frac{3}{4}$ (balanced)	10
SCIU	Stand-alone	990-40021-10	Wire-wrap (Note 1)	T1: 100 $\frac{3}{4}$ (balanced)	I/O for one SCIU card
ESCIU	Stand-alone	990-40021-10	Wire-wrap (Note 1)	E1: 120 $\frac{3}{4}$ (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.



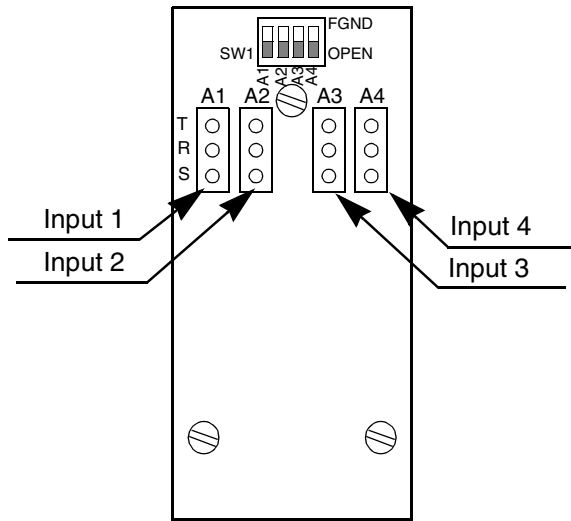
Use With  
 CI  
 CI-EA  
 MRC-E  
 MRC-EA  
 MRC-EA5



Module Part Numbers:  
 990-45107-02 (SMB)  
 990-45107-03 (Siemens 1.6/5.6)  
 990-45107-04 (Siemens 1.0/2.3)

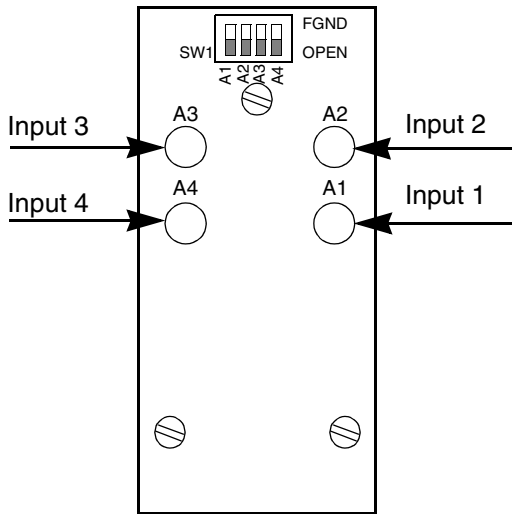
Use With  
 ACI  
 CI-EA  
 MRC-E  
 MRC-EA  
 MRC-EA5

FIGURE 44.  
 REFERENCE INPUT MODULES  
 (ENG. NOTE 71)  
 (Manufacturing Discontinued – See FIGURE 56)



990-45106-11 PSM Input Module

Use With  
 PSM-T  
 PSM-E  
 PSM-EA

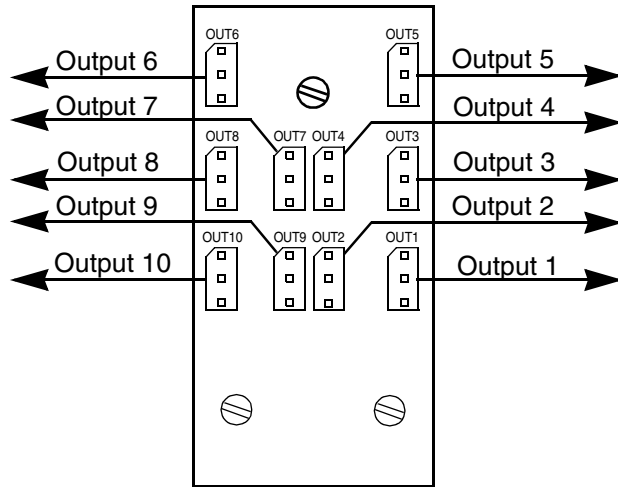


Coaxial PSM Input Module

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)

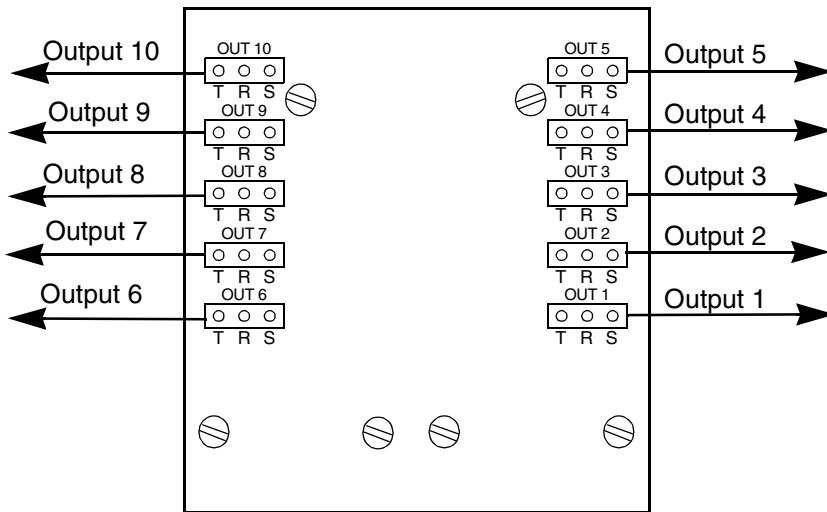
Use With  
 PSM-E  
 PSM-EA

FIGURE 45.  
 PSM CARD INPUT MODULES  
 (ENG. NOTE 71)



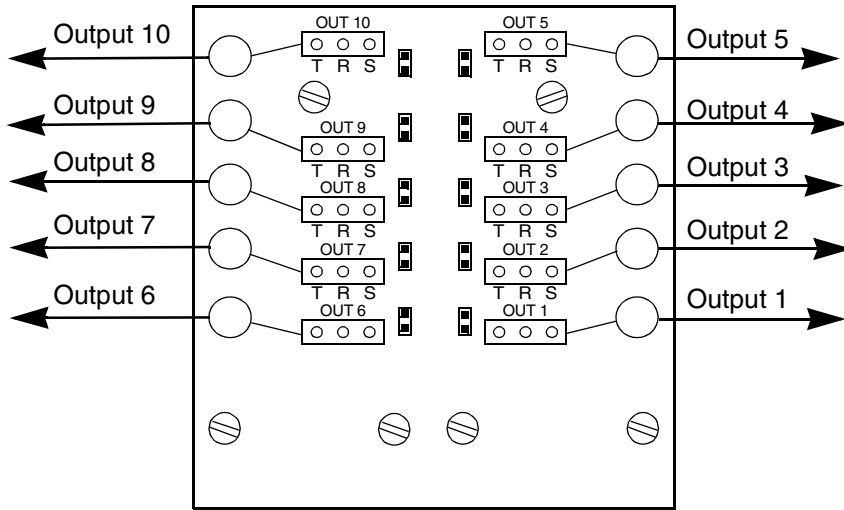
Use With  
 EA10  
 TOCA  
 TO-EA5  
 TOTA  
 TOTA-5  
 TOTL

FIGURE 46.  
 990-45105-06 MODULE  
 (ENG. NOTES 71 AND 72)  
 (Manufacturing Discontinued – See FIGURE 57)



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

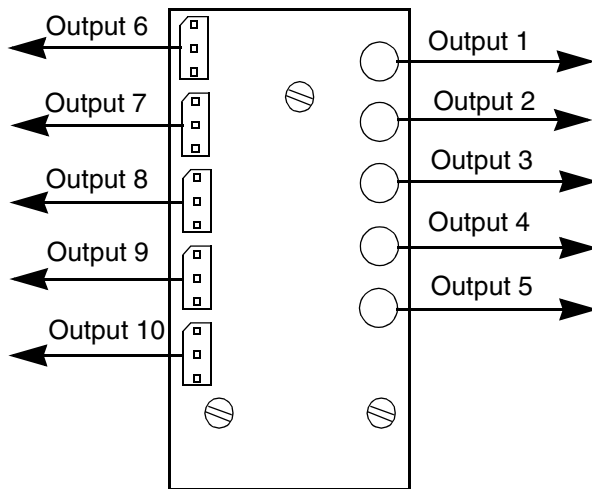
FIGURE 47.  
 990-45105-10 MODULE  
 (ENG. NOTES 71 AND 72)  
 (Manufacturing Discontinued – See FIGURE 58)



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

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

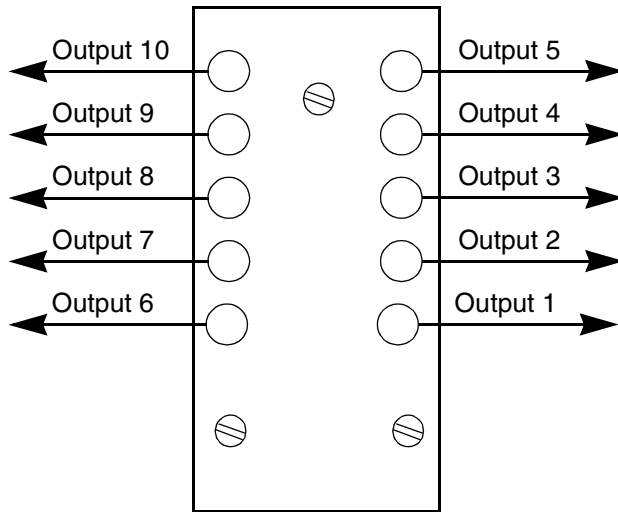
FIGURE 48.  
990-45105-11 MODULE  
(ENG. NOTES 71 AND 72)  
(Manufacturing Discontinued – See FIGURE 59)



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

Use With  
TO-EA5  
TO-EA  
TOEA  
TOGA

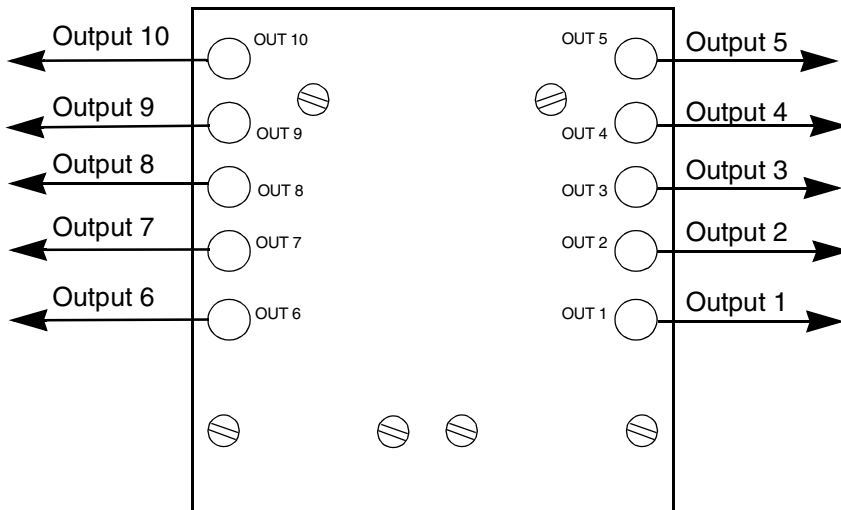
FIGURE 49.  
990-45105-12 MODULE  
(ENG. NOTES 71 AND 72)



Module Part Numbers:  
 990-45105-13 (SMB)  
 990-45105-14 (Siemens 1.6/5.6)  
 990-45105-15 (Siemens 1.0/2.3)

Use With  
 EA10  
 TO-EA5  
 TO-EA  
 TOEA  
 TOGA

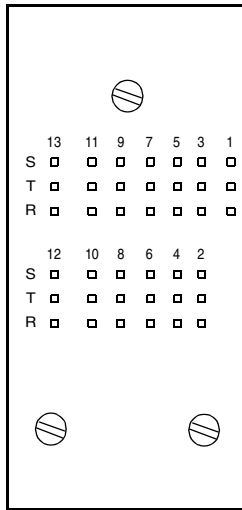
FIGURE 50.  
 990-45105-13, -14, -15 MODULE  
 (ENG. NOTES 71 AND 72)  
 (Manufacturing Discontinued – See FIGURE 60)



Module Part Numbers:  
 990-45105-16 (SMB)  
 990-45105-17 (Siemens 1.06/5.6)  
 990-45105-18 (Siemens 1.0/2.3)

Use With  
 EA10  
 TO-EA5  
 TOGA (990-45105-16)  
 (for redundant pairs)

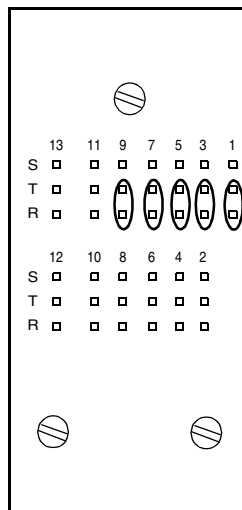
FIGURE 51.  
 990-45105-16, -17, -18 MODULE  
 (ENG. NOTES 71 AND 72)  
 (Manufacturing Discontinued – See FIGURE 61)



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

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

FIGURE 52.  
 990-45108-01 MODULE  
 (ENG. NOTES 71 AND 72)  
 (Manufacturing Discontinued – See FIGURE 62)



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 53.  
 990-45108-01 MODULE FOR TOLA CARD WITH RS-422 AND RS-232 SIGNALS  
 (ENG. NOTES 71 AND 72)



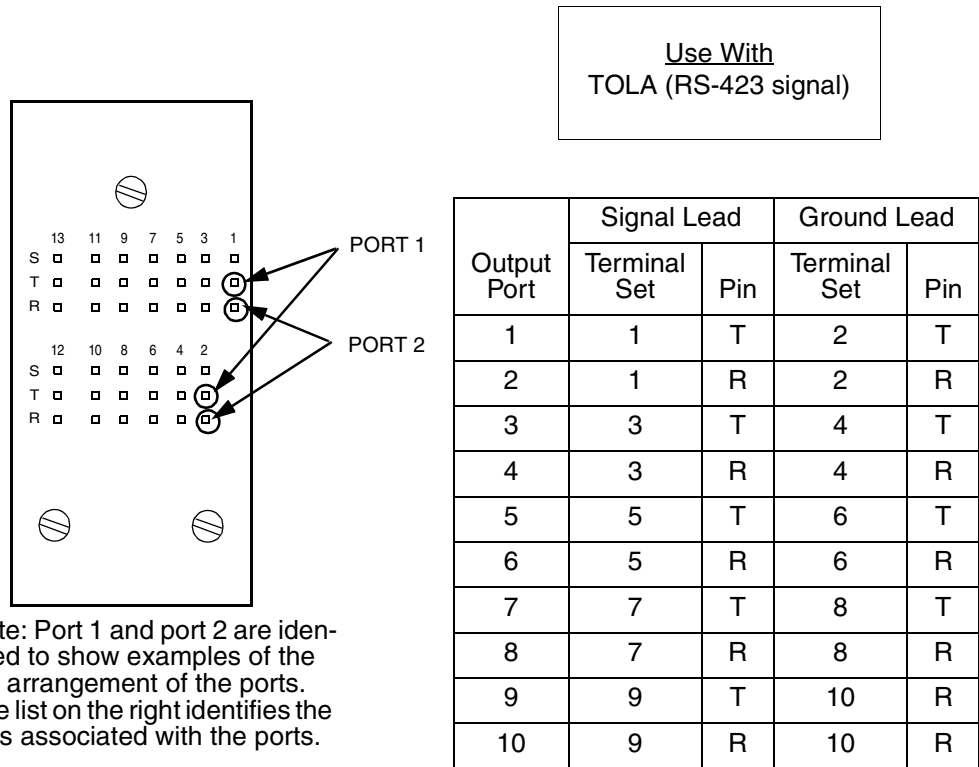


FIGURE 54.  
990-45108-01 MODULE FOR TOLA CARD WITH RS-423 SIGNALS  
(ENG. NOTES 71 AND 72)

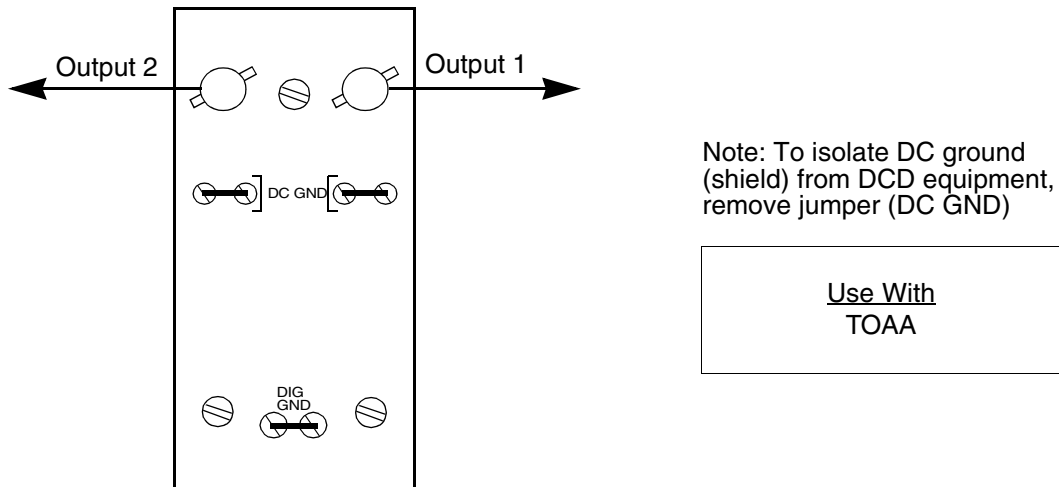
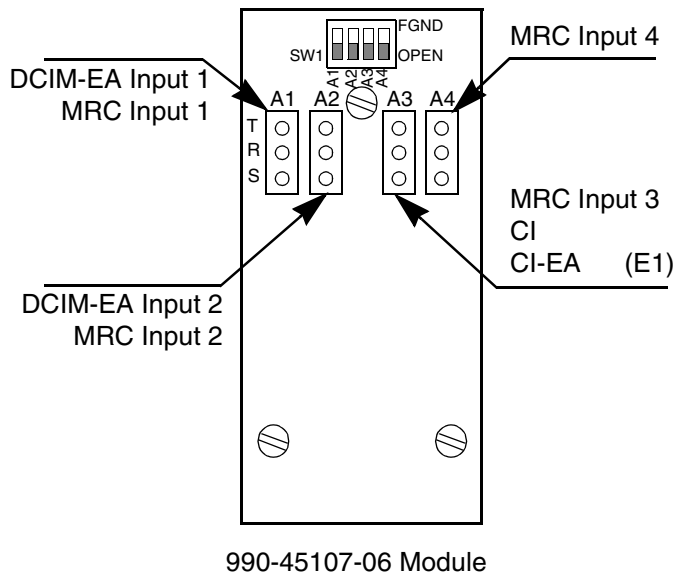
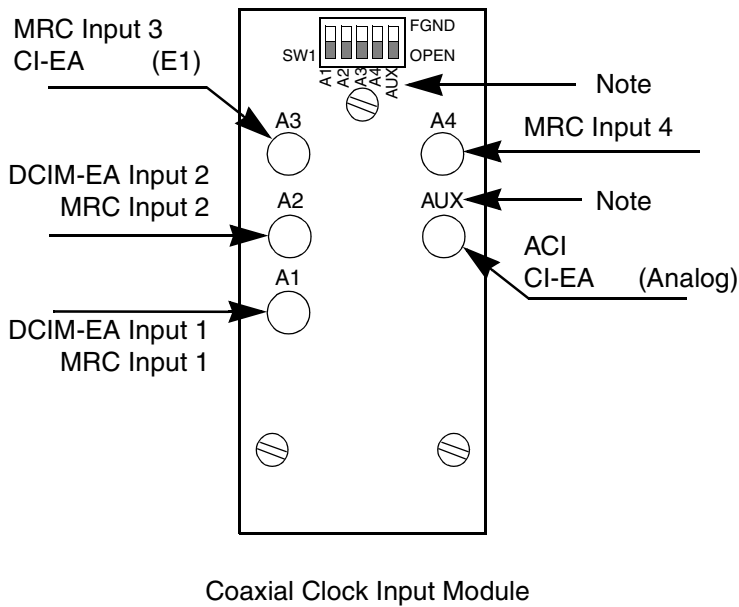


FIGURE 55.  
990-45122-01 MODULE  
(ENG. NOTES 71 AND 72)



Use With  
 CI  
 CI-EA  
 MRC-E  
 MRC-EA  
 DCIM-EA

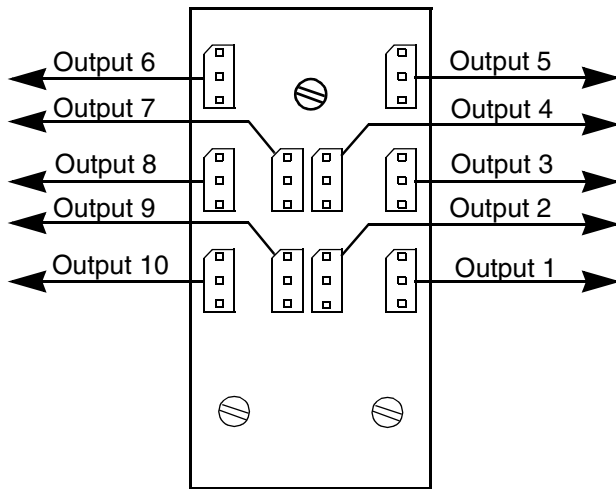


Module Part Numbers:  
 990-45107-02 (SMB)  
 990-45107-03 (Siemens 1.6/5.6)  
 990-45107-04 (Siemens 1.0/2.3)

Use With  
 ACI  
 CI-EA  
 MRC-E  
 MRC-EA  
 MRC-EA5  
 DCIM-EA

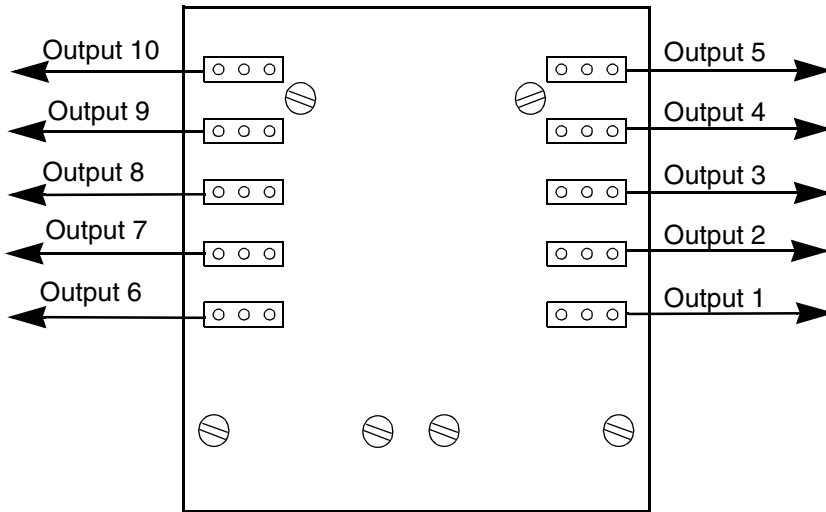
Note: "AUX" is replaced by "A5" on 990-45107-04 modules.

FIGURE 56.  
 REFERENCE INPUT MODULES  
 (ENG. NOTE 71)



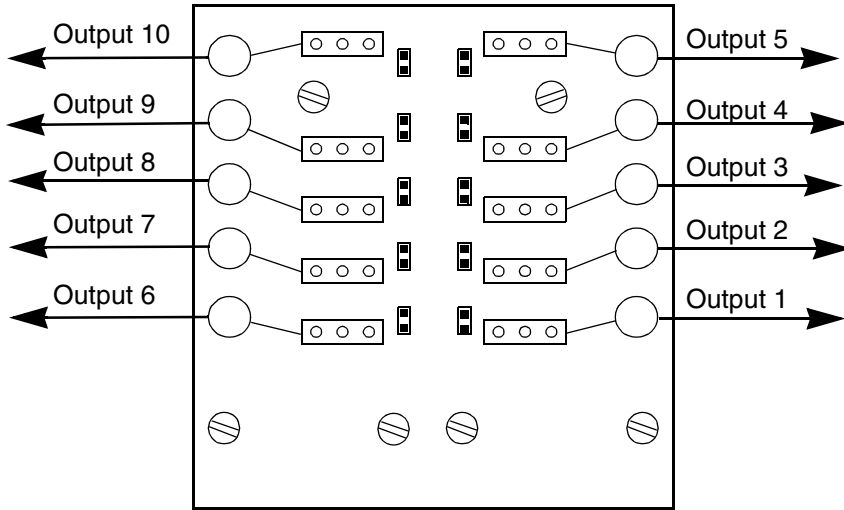
Use With  
 EA10  
 EA10M  
 TOCA  
 TO-EA5  
 TOTA  
 TOTA-5  
 TOTA-M  
 TOTL

FIGURE 57.  
 990-45105-06 MODULE  
 (ENG. NOTES 71 AND 73)



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

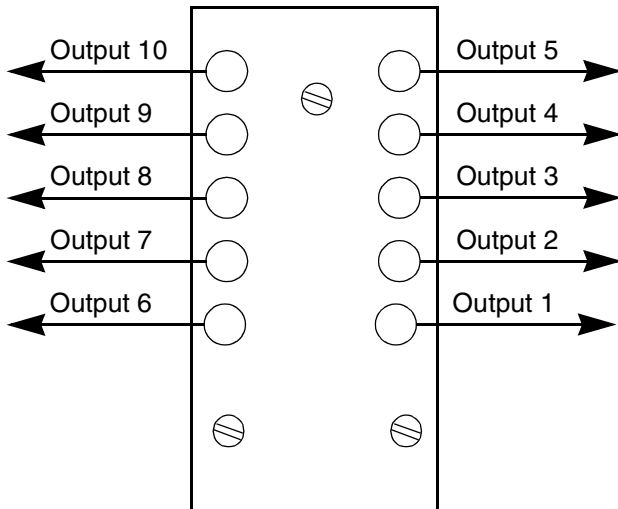
FIGURE 58.  
 990-45105-10 MODULE  
 (ENG. NOTES 71 AND 73)



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  
 (for redundant pairs)

FIGURE 59.  
 990-45105-11 MODULE  
 (ENG. NOTES 71 AND 73)



Module Part Numbers:  
 990-45105-13 (SMB)  
 990-45105-14 (Siemens 1.6/5.6)  
 990-45105-15 (Siemens 1.0/2.3)

Use With  
 EA10  
 EA10M  
 TO-EA5  
 TO-EA  
 TOEA  
 TOGA

FIGURE 60.  
 990-45105-13, -14, -15 MODULE  
 (ENG. NOTES 71 AND 73)

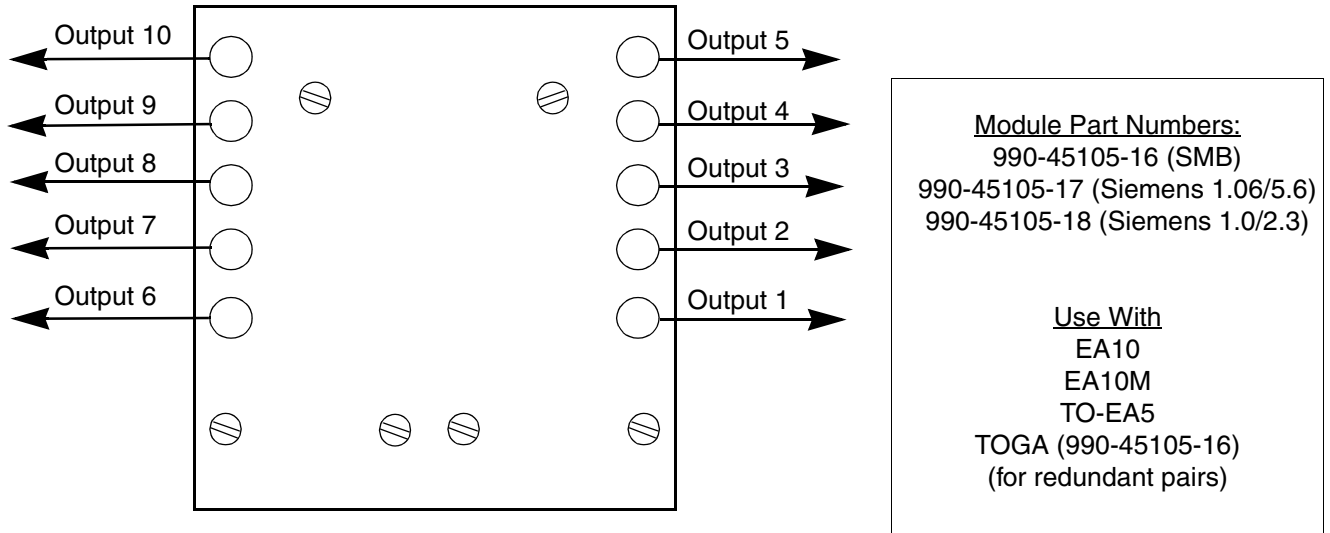


FIGURE 61.  
 990-45105-16, -17, -18 MODULE  
 (ENG. NOTES 71 AND 73)

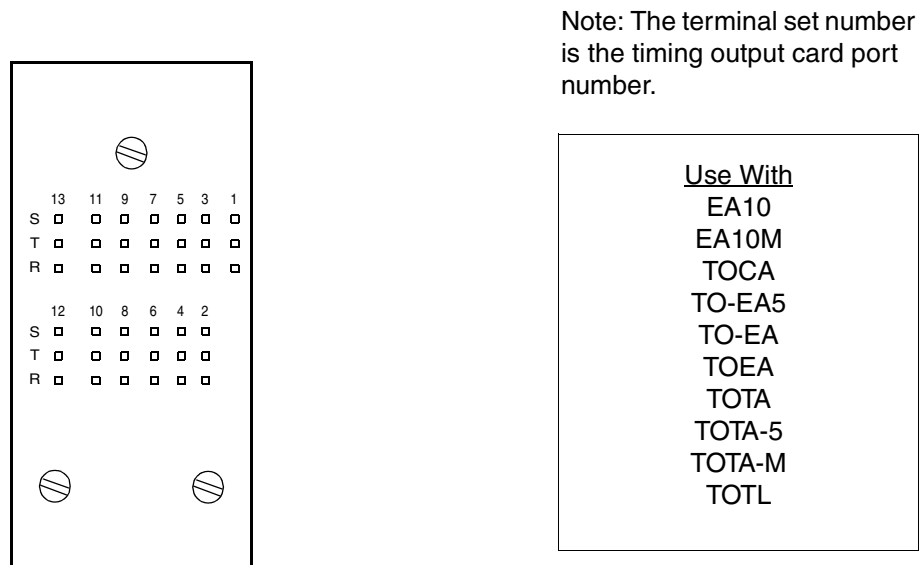


FIGURE 62.  
 990-45108-01 MODULE  
 (ENG. NOTES 71 AND 73)