

DIGITAL CLOCK DISTRIBUTOR

523

TEST AND ACCEPTANCE

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1. GENERAL

1.01 This section provides test and acceptance procedures for the Digital Clock Distributor-523 (DCD-523). When acceptance testing is completed, file the Sign-off sheet per local company practice.

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

- Changed Figures 4, 5, and 6 to show new location of SW1 for Rev. B or later MIS card.
- Changed Chart 21 to include information for all TOAA cards.
- Changed Chart 6 to correct a measurement type.
- Changed Figures 22 and 25 to include information for all TOAA cards.
- Changed Figures 35 and 36 to show SW1 as a 10-position switch.

1.03 Symmetricom is a registered trademark of Symmetricom, Inc. DCD and Version 5 are trademarks of Symmetricom, Inc. All other product names, service marks, trademarks, and registered trademarks used in this document are the property of their respective owners.

1.04 The following abbreviations are used in this section:

DCD	Digital Clock Distributor
GPS	global positioning system
LNC	Local Node Clock
TNC	Transit Node Clock
TO	Timing output card or slot

Notes:

1. Where information is common to the MRC-EA, MRC-EA^{V5}, MRC-T, MRC-T^{V5}, ACI, CI-EA, CI, DCIM-EA, and DCIM-T cards, these cards are collectively referred to as clock input cards.
2. Where information is common to the DCIM-EA and DCIM-T cards, these cards are collectively referred to as DCIM cards.
3. Where information is common to the MRC-EA, MRC-EA^{V5}, MRC-T, and MRC-T^{V5} cards, these cards are collectively referred to as MRC cards.
4. Where information is common to the PSM-EA, PSM-EA^{V5}, PSM-E, PSM-E^{V5}, PSM-T, and PSM-T^{V5} 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. Where information is common to the EA10 and EA10M cards, these cards are collectively referred to as EA cards.
9. Where information is common to the MCA-5 and MCA-5M cards, these cards are collectively referred to as MCA cards.
10. "Interface panel" is used when referring to either the input/output panel of the master shelf or the output panel of the expansion shelf.

11. 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 cards are interchangeable.

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

Note: Information regarding two nearly identical revisions of DCD-523 backplanes are included in this section. The CLOCK STATUS A and B terminal sets differ. Different procedures are included where required.

2. ACCEPTANCE TEST PROCEDURES

2.01 When performing any of the acceptance test procedures, if problems are encountered, or if requirements listed in a step are not met, contact your local Symmetricom distributor, or call Symmetricom's Customer Technical Assistance Center (CTAC) 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.)

2.02 Acceptance testing should be performed after installing and connecting the master and expansion shelves, applying power to each shelf, and connecting reference inputs to the master shelf. The cabling from the office alarm system, E2A telemetry equipment and timing outputs must not be terminated on the shelves prior to acceptance testing. After acceptance testing has been completed, return to the Installation section of this manual to make these connections.

2.03 The procedures listed in this section assume that this is an initial installation of a DCD-523 System. For procedures for an existing system, refer to the Maintenance section of this manual.

2.04 To test the DCD-523, perform the tests listed in Table A for the master shelf. Then perform the tests listed in Table B for each expansion shelf. If the shelf is not equipped with a particular card, skip that chart.

A. Power Test

2.05 Use this procedure to verify the power connections to shelf. This test assumes the DCD-523 Shelf has been physically and electrically installed per the Installation section of this manual. To perform the power test, refer to Chart 1.

Caution: This test cannot be performed on a DCD-523 Shelf supplying timing to network equipment. This test must be performed prior to using the DCD-523 Shelf to time network elements (NE). Failure to observe this caution will result in service interruption.

B. Amplitude Verification Test

2.06 Use this procedure for verifying that clock input signal(s) are within the specified input voltage range. This test assumes the DCD-523 Shelf has been physically and electrically installed per the Installation section of this manual. To perform the amplitude verification test, refer to Chart 2.

Table A. Master Shelf Test Flow

CHART	TITLE
Note: Perform the tests on the master shelf in the order shown. If not equipped with a particular card type, skip to the next chart.	
Chart 1	Power Test
Chart 2	Amplitude Verification Test (optional)
Chart 3	090-45018-05 MIS Card Test
Chart 4	090-45018-25 MIS Card Test
Chart 5	090-45018-04 or 090-45018-14 MIS Card Test
Chart 6	SAI Card Test
Chart 7	MRC Card Test
Chart 8	ACI Card Test
Chart 9	CI-EA Card Test
Chart 10	CI Card Test
Chart 11	DCIM-EA or DCIM-T Card Test

Table A. Master Shelf Test Flow (Contd)

CHART	TITLE
Chart 12	ST2E or TNC-E Card Test
Chart 13	ST2 Card Test
Chart 14	ST3E, TNC, or LNC Card Test
Chart 15	ST3E Card Test
Chart 16	ST2E or TNC-E with ST3E, TNC, or LNC Card Test
Chart 17	ST2E or TNC-E with ST3E Card Test
Chart 18	ST3 Card Test
Chart 19	MCA-5 or MCA-5M Card Test
Chart 20	EA10 or EA10M Card Test
Chart 21	TOAA, TOLA, or TOTL Card Test
Chart 22	TOCA, TOEA, or TOTA Card Test
Chart 23	TO-EA Card Test
Chart 24	TO-EAN Card Test
Chart 25	TO-EA5 Card Test
Chart 26	TOTA-5 or TOTA-M Card Test
Chart 27	TOGA Card Test
Chart 28	SCIU or ESCIU Card Test
Chart 29	PSM Card Test
Chart 30	MIS Card System Management Setup

Table B. Expansion Shelf Test Flow

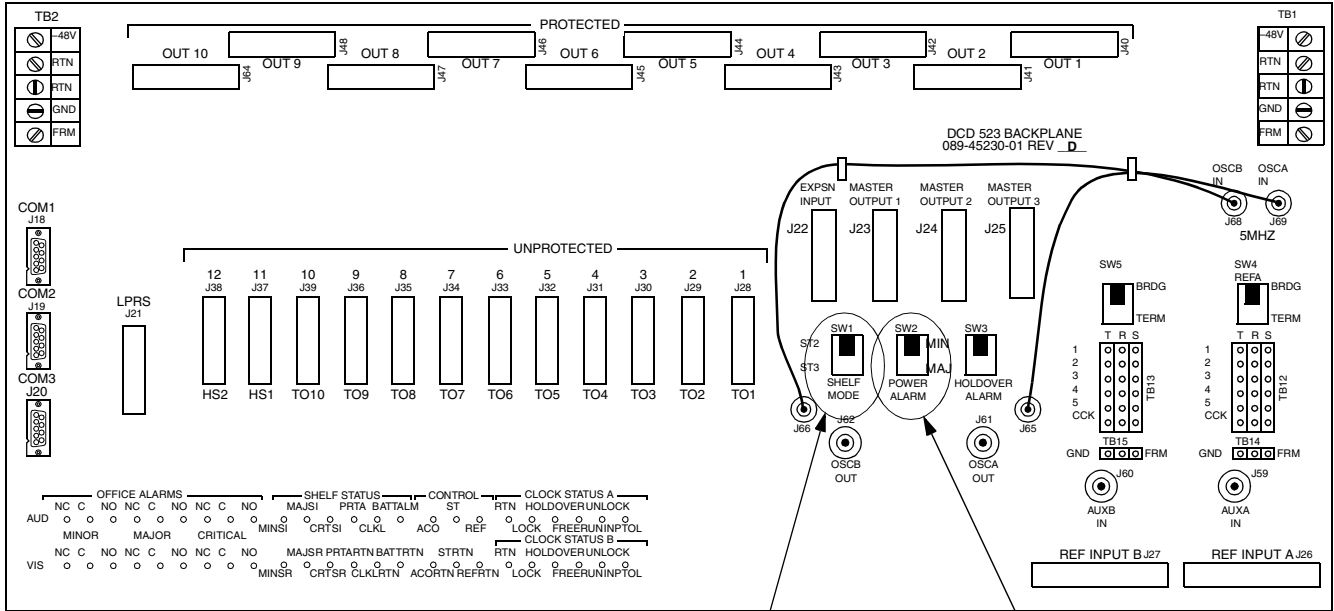
CHART	TITLE
Notes: Perform the tests on the expansion shelf in the order shown. If not equipped with a particular card type, skip to the next chart.	
Chart 1	Power Test
Chart 2	Amplitude Verification Test (optional)
Chart 3	090-45018-05 MIS Card Test
Chart 4	090-45018-25 MIS Card Test
Chart 5	090-45018-04 or 090-45018-14 MIS Card Test
Chart 6	SAI Card Test
Chart 19	MCA-5 and MCA-5M Card Test
Chart 20	EA10 or EA10M Card Test
Chart 21	TOAA, TOLA, or TOTL Card Test
Chart 22	TOCA, TOEA, or TOTA Card Test
Chart 23	TO-EA Card Test
Chart 24	TO-EAN Card Test
Chart 25	TO-EA5 Card Test
Chart 26	TOTA-5 or TOTA-M Card Test
Chart 27	TOGA Card Test
Chart 28	SCIU or ESCIU Card Test
Chart 29	PSM Card Test
Chart 30	MIS Card System Management Setup

Chart 1. Power Test

STEP	PROCEDURE																		
<p>Use this procedure for verifying the power connections to the shelf. The DCD-523 Shelf does not load share the A and B battery feeds. The alternate source becomes active only if the active source fails. This procedure assumes power to the shelf under test has been connected per the Installation section of this manual.</p> <p>Test Equipment: Digital Multimeter, Fluke 77 or equivalent</p> <p>Caution: Do not perform this procedure on DCD-523 Shelves that are supplying timing to network elements (in service). Failure to observe this caution will result in a service interruption.</p>																			
1	Ensure all plug-in cards are removed from the shelf under test.																		
2	Ensure all fuses are removed from the fuse panel that powers the shelf under test.																		
3	Disconnect the battery A and battery B leads from the shelf power terminal blocks TB1 (-48V A) and TB2 (-48V B) (Figure 1). (Leave the return battery leads (RTN) connected to the shelf.)																		
4	<p>At the shelf end of the battery leads, use the multimeter to measure the voltage between the following:</p> <table border="0"> <thead> <tr> <th><u>Test Point</u></th> <th><u>Test Point</u></th> <th><u>Measurement</u></th> </tr> </thead> <tbody> <tr> <td>Battery A lead</td> <td>Battery B lead</td> <td>0 V dc</td> </tr> <tr> <td>Battery A lead</td> <td>TB2: RTN</td> <td>0 V dc</td> </tr> <tr> <td>Battery A lead</td> <td>TB2: FRM</td> <td>0 V dc</td> </tr> <tr> <td>Battery B lead</td> <td>TB1:RTN</td> <td>0 V dc</td> </tr> <tr> <td>Battery B lead</td> <td>TB1: FRM</td> <td>0 V dc</td> </tr> </tbody> </table> <p>Requirement: The multimeter indicates the voltage shown above.</p>	<u>Test Point</u>	<u>Test Point</u>	<u>Measurement</u>	Battery A lead	Battery B lead	0 V dc	Battery A lead	TB2: RTN	0 V dc	Battery A lead	TB2: FRM	0 V dc	Battery B lead	TB1:RTN	0 V dc	Battery B lead	TB1: FRM	0 V dc
<u>Test Point</u>	<u>Test Point</u>	<u>Measurement</u>																	
Battery A lead	Battery B lead	0 V dc																	
Battery A lead	TB2: RTN	0 V dc																	
Battery A lead	TB2: FRM	0 V dc																	
Battery B lead	TB1:RTN	0 V dc																	
Battery B lead	TB1: FRM	0 V dc																	
5	<p>Connect the multimeter, set to resistance, across the SHELF STATUS BATTALM and BATTRTN terminal sets on the shelf rear panel (Figure 1).</p> <p>Requirement: The multimeter indicates <10 Ω.</p>																		
6	Reconnect the A and B battery leads to the power terminal block (TB1 and TB2) -48V A and -48V B terminal sets on the shelf under test.																		
7	<p>In the power source fuse panel, install the A fuse (7.5 A to 10 A size fuse) for the shelf under test.</p> <p>Requirement: On the front panel of the shelf, the -48V A lamp lights red.</p>																		
8	<p>Use the multimeter to measure the voltage between the -48V A and RTN terminals on the TB2 terminal block on the shelf under test.</p> <p>Requirement: The multimeter indicates -42 V dc to -56 V dc.</p>																		
9	<p>In the power source fuse panel, install the B fuse (7.5 A to 10 A size fuse) for the shelf under test.</p> <p>Requirement: On the front panel of the shelf, the -48V B lamp lights red.</p>																		

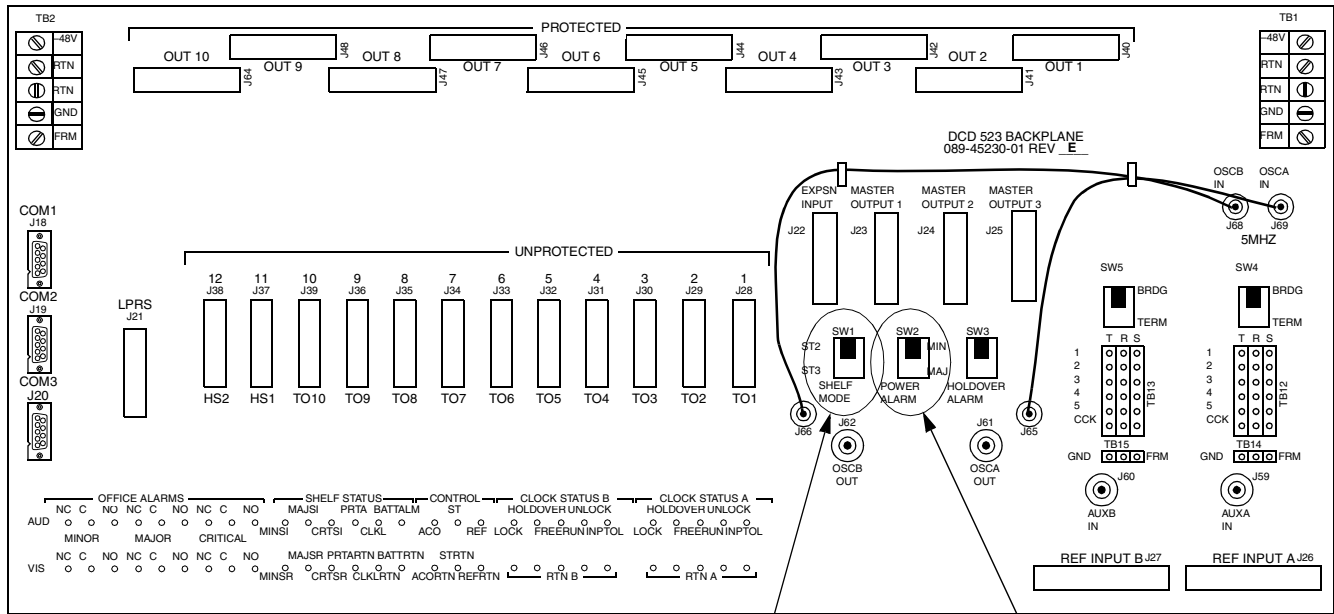
Chart 1. Power Test (Contd)

STEP	PROCEDURE
10	<p>Use the multimeter to measure the voltage between the –48V B and RTN terminal sets on the TB1 terminal block on the shelf under test.</p> <p>Requirement: The multimeter indicates –42 V dc to –56 V dc.</p>
11	<p>At the shelf front panel, install a 5 A fuse in the –48V A receptacle with a flat-blade screwdriver.</p> <p>Requirement: On the front panel of the shelf, the –48V A lamp goes off.</p>
12	<p>At the shelf front panel, install a 5 A fuse in the –48V B receptacle with a flat-blade screwdriver.</p> <p>Requirement: On the front panel of the shelf, the –48V B lamp goes off.</p>
13	<p>Connect the multimeter, set to maximum resistance, across the SHELF STATUS BATTALM and BATTRTN terminal sets on the shelf backplane (Figure 1).</p> <p>Requirement: The multimeter indicates >1 MΩ.</p>
14	<p>Repeat Steps 1 through 12 for any other shelves in the DCD-523 System.</p>
15	<p>This procedure is complete. Indicate completion of the Power Test on the Test Sign-off form.</p>



ST2/ST3 SWITCH POWER ALARM SWITCH

A. Rev. D or earlier backplane



ST2/ST3 SWITCH POWER ALARM SWITCH

B. Rev. E or later backplane

Figure 1. DCD-523 Shelves (Rear Views)

Chart 2. Amplitude Verification Test

STEP	PROCEDURE
	<p>Use this procedure to verify the clock input signal(s) is within the specified input voltage range.</p> <p>Test Equipment: Dual-channel oscilloscope with 100 MHz minimum bandwidth</p>
1	Obtain a dual-channel oscilloscope and preset the controls as listed in Table C.
2	Connect X10 probes to channel 1 and channel 2 oscilloscope inputs and install a terminating resistor across the probes. Connect channel 1 and 2 probe ground leads together. Connect channel 1 and 2 probes (with resistor) to T and R of each DCD Shelf input terminals (Figure 1).
3	<p>Verify that any clock input signal(s) is within the specified input voltage range and meets the prescribed template. Consult local company Installation Job Specifications for the type of input signals installed and on which DCD-523 input connectors.</p> <p>Requirement: Input signal ranges are as follows:</p> <ul style="list-style-type: none"> a. E1 Terminated: 2.37 V \pm10% base-to-peak, 120 Ω terminated b. E1 Bridged: 0.237 V \pm10% base-to-peak, 120 Ω terminated c. DS1 Terminated: 1.0 V to 3.5 V base-to-peak, 100 Ω terminated d. DS1 Bridged: 0.10 V to 0.35 V base-to-peak, 100 Ω terminated e. CC: 1.5 V to 4.0 V base-to-peak, 135 Ω terminated <p>Note: Although the voltage may appear within range, the pulses may be distorted. If this is the case, once installed, the clock input card will be overdriven, thereby causing its FAIL lamp to light or not go off after card insertion. If the clock input card fails, but the voltage is within range, check the transmitting terminal equipment cable equalization settings. If the voltage level is too high and cannot be adjusted, a solution may be to install a 100 Ω to 120 Ω, 1/4 W resistor across the Tip and Ring input terminal sets on the DCD-523 backplane. This provides a double termination and will usually lower the voltage to within the input card's bridging repeater range.</p>
4	This procedure is complete. Indicate completion of the Amplitude Verification Test on the Test Sign-off form.

Table C. Typical Oscilloscope Settings*

CONTROL	SETTING
Mode Trigger Switch	ADD
Invert Switch	INVERT
Ch1 and Ch2: Volts/Div Input Coupling Vert Position Control	See Note AC mid-range
"A" Sweep Mode	AUTO-TRIGGER
Horizontal Display Switch	"A"
Time/Div Switch: for CC (TOCA) for 1.544 Mb/s (TOTA, TOTA-5, TOTA-M, TOTL) for Analog (TOAA) for E1 (TOEA, TO-EA, TO-EAN) for G.703 (TOGA, TO-EA, TO-EAN) for Logic Level (TOLA)	20 ms 500 ns 60 kHz: 10 μ s 2.048 Mb/s: 0.1 μ s 2.048 Mb/s: 0.1 μ s 4 kb/s: 0.5 μ s 8 kb/s: 0.1 μ s 64 kb/s: 10 μ s 564 kb/s: 2 μ s 384 kb/s: 2 μ s 512 kb/s: 2 μ s 768 kb/s: 2 μ s 1.536 Mb/s: 0.5 μ s 1.544 Mb/s: 0.5 μ s 2.048 Mb/s: 0.1 μ s
"A" Sweep	FULL
Horizontal Position Control	mid-range
"A" Triggering: Slope Coupling Source	+ or - AC INT
<p>* Consult the oscilloscope manufacturer's manual for details and operating instructions.</p> <p>Note: Adjust the oscilloscope's volts-per-division scale to the appropriate level to get a measurable pulse amplitude on the screen; for example, to measure a 0 dB DSX (TERM) signal, set the volts-per-division scale to 1 V per division; to measure a -20 dB DSX (BRDG) signal, set the volts-per-division scale to 100 mV per division.</p>	

C. Card Tests

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.

2.07 System circuit cards are keyed, making it virtually impossible to fully insert a card into the wrong slot. If a card does not seat fully, make sure the card is sliding into the proper slot. Labels printed along the top lip of the shelves identify each slot. Use the following instructions whenever installing a card into a slot:

1. Hold the card by the locking lever on the faceplate with one hand, and support the card by the bottom edge of the printed circuit board with the other hand. Carefully align card with the shelf card edge guides. Gently seat the card in the connector on the shelf backplane.

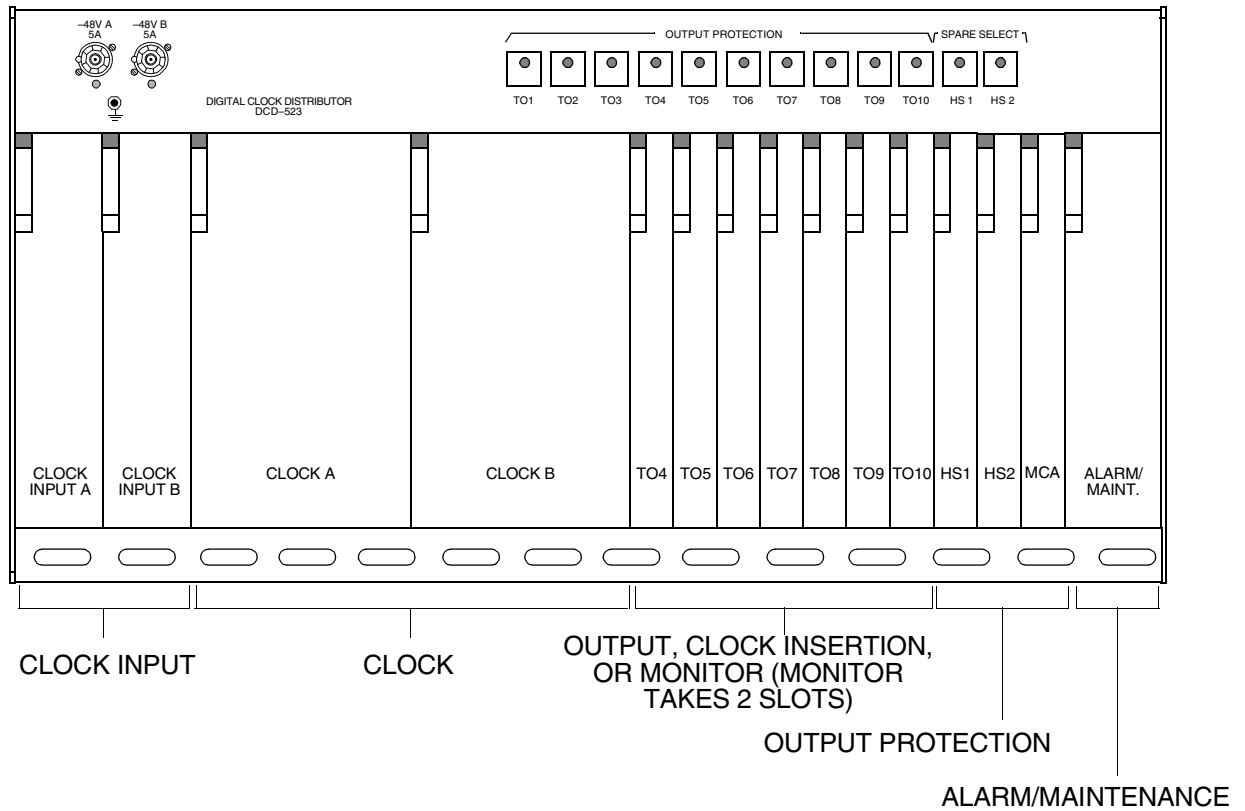
Note: Always use two hands to install cards, especially ST2E, TNC-E, and ST2 clock cards.

2. Secure the card into place by lowering the locking lever.

2.08 If a TimeScan product is used in the Test and Acceptance process, whenever a procedure refers to the User Guide or Operations section, use the appropriate action in the TimeScan product.

2.09 If the alarm and timing outputs have been connected, they must be disconnected to check the outputs of the timing output cards.

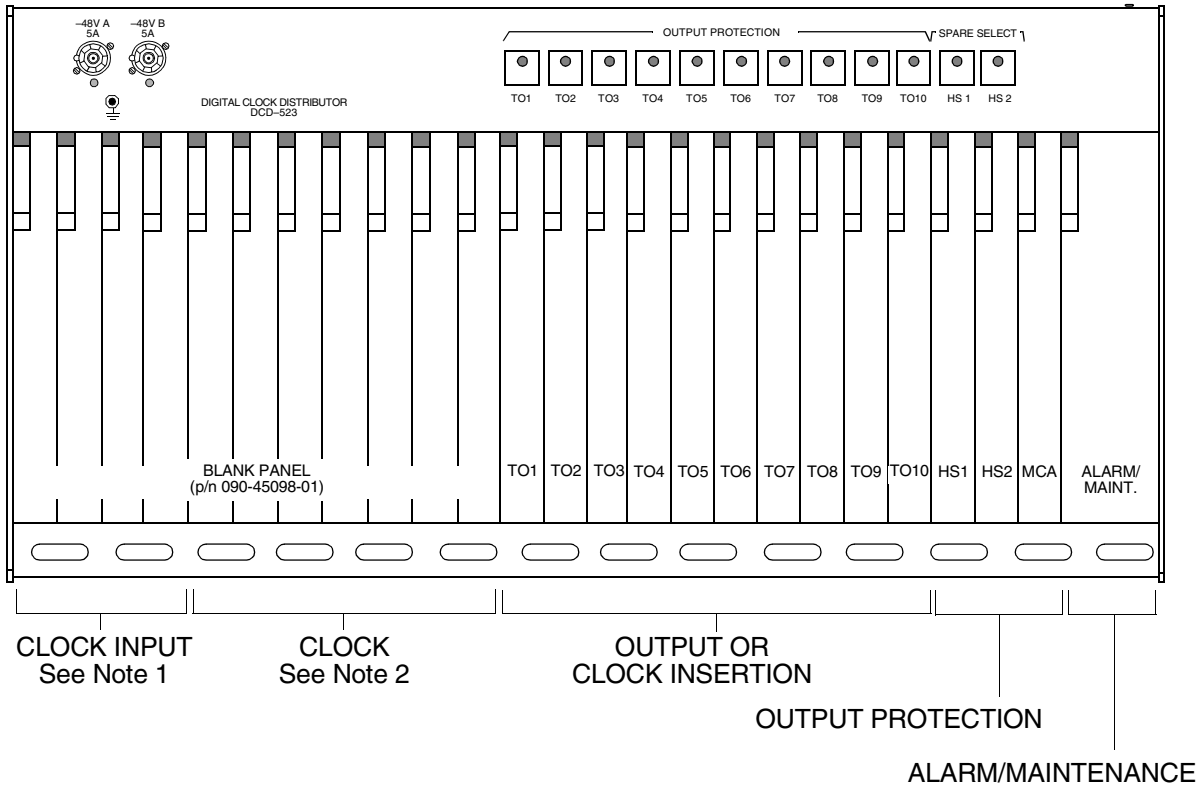
2.10 Refer to Figure 2 and Figure 3 for master and expansion shelf card slot positions. The procedures for the Test and Acceptance of the cards are described on Charts 3 to 30 of this section.



Notes:

1. Install timing output card pairs (using redundant protection) in the following two adjacent timing output slots: TO1/TO2, TO3/TO4, TO5/TO6, TO7/TO8, TO9/TO10, and HS1/HS2.
2. Output card pairs (1:1 or 1+1) and single output cards (1:N) cannot be intermixed on the shelf.
3. If two rubidium clock cards are installed, output slots TO1 through TO3 are occupied by the rubidium clock card in the ST B slot.
4. Install PSM cards in any two adjacent timing output slots (e.g., TO5/TO6, TO9/TO10, etc.).

Figure 2. Master Shelf Card Slot Positions (Front View)



Notes:

1. Install timing output card pairs (using redundant protection) in the following two adjacent timing output slots: TO1/TO2, TO3/TO4, TO5/TO6, TO7/TO8, TO9/TO10, and HS1/HS2.
2. Output card pairs (1:1 or 1+1) and single output cards (1:N) cannot be intermixed on the shelf.
3. Timing for the expansion shelf is provided by the master shelf via a cable so clock input cards are not required.
4. Clock cards should not be installed on the expansion shelf under normal operation. This feature is available only for maintenance purposes. Contact Symmetricom's CTAC if installation of clock card(s) in an expansion shelf is required.
5. PSM cards can be installed in any two adjacent TO slots, for example, TO1/TO2, TO7/TO8, etc.

Figure 3. Expansion Shelf Card Slot Positions (Front View)

Chart 3. 090-45018-05 MIS Card Test

STEP	PROCEDURE
	<p>Use this procedure to install a 090-45018-05 MIS card (MIS^{V5} card). After all of the cards in the shelf are installed, another procedure populates the 090-45018-05 MIS card's database and allows the card to be the network management node for the DCD Shelf.</p> <p>Notes:</p> <ol style="list-style-type: none"> 1. All MIS cards in a DCD-523 System must have the same software version. 2. See the TL1 User's Guide in the version 5.03.xx software package for instructions about commands indicated in this procedure. 3. The MIS card allows communication with all three COM ports on the rear panel as follows (all ports are set to 9600 baud at the factory, and function equally well if external equipment is set at even, odd, or no parity, 7 or 8 data bits, and 1 stop bit): <ul style="list-style-type: none"> COM1: Configurable for 1200 or 9600 baud via TL1 command only. COM2: Configurable for 1200 or 9600 baud, and even, odd, or no parity via switch setting only. COM3: Configurable for 1200 or 9600 baud via TL1 command only. LOCAL COMM (front): Same as COM2. Cannot function if COM2 is enabled. 4. If an MIS card is removed from the shelf, COM1 and COM3 retain the configuration that was set via TL1 command. 5. If the Office Alarm and Shelf Status terminal sets have been connected to the office alarm system and remote telemetry equipment, the ohmmeter tests cannot be performed because the alarm systems apply -48 V at the alarm leads and ground on the return leads. To adequately test the MIS card, perform one of the following: <ol style="list-style-type: none"> a. Disconnect the office alarm system and remote telemetry equipment from the DCD-523 Shelf to perform the ohmmeter tests, then reconnect the leads. b. Leave the office alarm system and remote telemetry equipment connections intact, and substitute the ohmmeter tests with audible and visual tests for appropriate condition responses from the office alarm system and verification of appropriate condition responses at the centralized alarm surveillance and control center. 6. After the INIT-SYS command is completed in this procedure, ignore any messages that may appear on the terminal until the last chart in this Test and Acceptance process. 7. Since no clock cards or clock input cards are installed, the CRITICAL alarm is active after the MIS card is installed. 8. The MINOR alarm lamp flashes when the MIS card checks the shelf and downloads the database. Wait for the lamp to stop flashing before continuing. 9. If the installation uses an MIS^{V5} card in a remote system, do the following: <ul style="list-style-type: none"> • Verify the communication ports on the remote MIS^{V5} are set to the factory default (term1 or term2). <p>Test Equipment: Digital volt/ohm meter</p>
1	Set switch SW1 on the MIS card (see Figure 4) according to the factory settings.
2	If COM1 or COM3 are used, skip this step. Check the MIS card RS-232 settings to assure communications with the external terminal or computer (see Figure 4).

Chart 3. 090-45018-05 MIS Card Test (Contd)

STEP	PROCEDURE
3	<p>When the RS-232 communications settings on the MIS card are correct, insert the MIS card into the slot labeled “MI” in the DCD-523 master shelf.</p> <p>Requirement: The MIS card performs a lamp test, and the MINOR lamp flashes for up to 1 minute. The CRITICAL and MINOR lamps remain lit.</p>
4	<p>Use the terminal to enter a semicolon and a carriage return.</p> <p>Requirement: The terminal displays a three-line message from the MIS as follows:</p> <pre style="margin-left: 40px;">TELECOM <date> <time> M <ctag> DENY ICNV ;</pre> <p>Where <date> and <time> are the date and time in the MIS card, <ctag> is a random number, and all uppercase letters are shown as they should appear. (See the appropriate TL1 User’s Guide for TL1 language definitions.)</p>
5	<p>Refer to the Software Release Document for the appropriate software version to install, and activate the software.</p>
6	<p>Use the INIT-SYS command with the appropriate <ph> value (see below and the TL1 User’s Guide).</p> <p><ph> 3:</p> <ul style="list-style-type: none"> • Deletes all card information from the database • Retains all security information as previously entered, including the users and passwords • Retains the source ID (SID) as previously entered • Retains all communication parameters as previously entered <p><ph> 9:</p> <ul style="list-style-type: none"> • Deletes all card information from the database • Resets all security information to the factory settings • Resets the source ID (SID) to the factory settings, including only one user named “super” with a password of “sparky” • Resets all communication parameters to factory settings <p>Requirement: The terminal indicates a completed command.</p>
7	<p>Set the POWER ALARM switch (SW2) on the shelf backplane to MAJ (see Figure 1).</p>
8	<p>Remove fuse “-48V A” from the Output Protection/Spare Select Panel on the DCD-523 Shelf with a flat-blade screwdriver.</p> <p>Requirement: The red lamp under the -48V A fuse on the Output Protection/Spare Select Panel front panel lights. On the MIS card, the MAJOR lamp lights red, the MINOR lamp lights yellow.</p>

Chart 3. 090-45018-05 MIS Card Test (Contd)

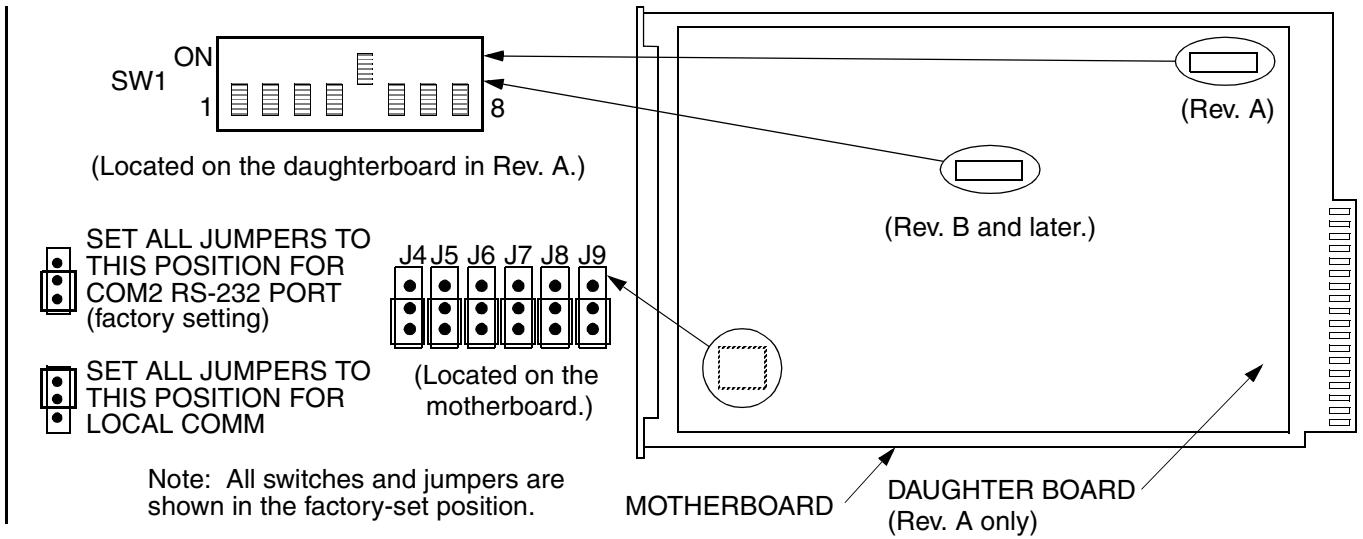
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12	<p>Replace the -48V A fuse, using a flat-blade screwdriver to lock in place.</p> <p>Requirement: The -48V A fuse lamp goes off. On the MIS card, the MAJOR and MINOR lamps go off after up to 12 s, and the ACO lamp stays lit (because the CRITICAL lamp is lit).</p>																																												

Chart 3. 090-45018-05 MIS Card Test (Contd)

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13	<p>Connect the multimeter, set to resistance (for the MINOR AUD, MINOR VIS, MINSI, MAJOR AUD, MAJOR VIS, and MAJSI tests) or to volts dc (for the BATT ALM test) as appropriate, across the following Office Alarm and Shelf Status terminal sets on the shelf backplane (see Figure 1);</p> <table border="1"> <thead> <tr> <th>Type</th> <th>Test Point</th> <th>Test Point</th> <th>Result</th> </tr> </thead> <tbody> <tr> <td>OFFICE ALARM</td> <td>MINOR AUD: NO</td> <td>MINOR AUD: C</td> <td>>1 MΩ</td> </tr> <tr> <td>OFFICE ALARM</td> <td>MINOR VIS: NO</td> <td>MINOR VIS: C</td> <td>>1 MΩ</td> </tr> <tr> <td>OFFICE ALARM</td> <td>MAJOR AUD: NO</td> <td>MAJOR AUD: C</td> <td>>1 MΩ</td> </tr> <tr> <td>OFFICE ALARM</td> <td>MAJOR VIS: NO</td> <td>MAJOR VIS: C</td> <td>>1 MΩ</td> </tr> <tr> <td>SHELF STATUS</td> <td>MINSI</td> <td>MINSR</td> <td>>1 MΩ</td> </tr> <tr> <td>SHELF STATUS</td> <td>MAJSI</td> <td>MAJSR</td> <td>>1 MΩ</td> </tr> <tr> <td>SHELF STATUS</td> <td>BATTALM</td> <td>BATTRTN</td> <td>-42 V to -56 V</td> </tr> </tbody> </table> <p>Requirement: The multimeter indicates the readings shown in the Result column.</p>	Type	Test Point	Test Point	Result	OFFICE ALARM	MINOR AUD: NO	MINOR AUD: C	>1 MΩ	OFFICE ALARM	MINOR VIS: NO	MINOR VIS: C	>1 MΩ	OFFICE ALARM	MAJOR AUD: NO	MAJOR AUD: C	>1 MΩ	OFFICE ALARM	MAJOR VIS: NO	MAJOR VIS: C	>1 MΩ	SHELF STATUS	MINSI	MINSR	>1 MΩ	SHELF STATUS	MAJSI	MAJSR	>1 MΩ	SHELF STATUS	BATTALM	BATTRTN	-42 V to -56 V
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14	<p>Remove fuse “-48V B” from the Output Protection/Spare Select Panel on the DCD-523 Shelf, using a flat-blade screwdriver.</p> <p>Requirement: The red lamp under the -48V A fuse on the Output Protection/Spare Select Panel front panel lights. On the MIS card, the MAJOR lamp lights red, the MINOR lamp lights yellow, and the ACO lamp goes off. The the new alarm condition resets the ACO.</p>																																
15	<p>Press the ACO pushbutton on the MIS card.</p> <p>Requirement: The audible office alarm silences (if connected). On the MIS card, the ACO lamp lights green.</p>																																
16	<p>Replace the -48V B fuse, using a flat-blade screwdriver to lock in place.</p> <p>Requirement: The -48V B fuse lamp, and the MIS MAJOR and MINOR lamps go off (after approximately 6 s to 12 s). The ACO lamp stays lit due to the lit CRITICAL lamp.</p>																																
17	<p>Remove both fuses from the Output Protection/Spare Select Panel on the DCD-523 Shelf, using a flat-blade screwdriver.</p> <p>Requirement: All lamps on the MIS card and shelf go out. The -48V A and -48V B lamps on the Output Protection/Spare Select panel light red.</p>																																
18	<p>Replace both fuses, using a flat-blade screwdriver to lock in place.</p> <p>Requirement: The CRITICAL, MAJOR, and MINOR lamps on the MIS light, then go off, one at a time (the CRITICAL lamp lights to indicate there are no input and clock cards in the shelf). The -48V A and -48V B lamps are off on the Output Protection/Spare Select panel.</p>																																
19	<p>Set the POWER ALARM switch (SW2) on the shelf backplane to MIN (see Figure 1).</p>																																

Chart 3. 090-45018-05 MIS Card Test (Contd)

STEP	PROCEDURE
20	<p>Remove fuse “-48V A” from the Output Protection/Spare Select Panel on the DCD-523 Shelf with a flat-blade screwdriver.</p> <p>Requirement: The red lamp under the -48V A fuse on the Output Protection/Spare Select Panel front panel lights, and the MINOR lamp on the MIS card lights yellow.</p>
21	<p>Press the ACO pushbutton on the MIS card.</p> <p>Requirement: The audible office alarm silences (if connected). On the MIS card, the ACO lamp lights green.</p>
22	<p>Replace the -48V A fuse, using a flat-blade screwdriver to lock in place.</p> <p>Requirement: The -48V A fuse lamp and MIS MINOR lamp go off, and the ACO lamp stays lit due to the lit CRITICAL lamp.</p>
23	<p>Remove fuse “-48V B” from the Output Protection/Spare Select Panel on the DCD-523 Shelf, using a flat-blade screwdriver.</p> <p>Requirement: The red lamp under the -48V B fuse on the Output Protection/Spare Select Panel front panel lights, and the MINOR lamp on the MIS card lights yellow. The ACO lamp on the MIS card goes off. The new alarm resets the ACO.</p>
24	<p>Press the ACO pushbutton on the MIS card.</p> <p>Requirement: The audible office alarm silences (if connected). On the MIS card, the ACO lamp lights green.</p>
25	<p>Replace the -48V B fuse, using a flat-blade screwdriver to lock in place.</p> <p>Requirement: The -48V B fuse lamp and MIS MINOR lamp go off. The ACO lamp stays lit due to the lit CRITICAL lamp.</p>
26	<p>Set the POWER ALARM switch (SW2) on the shelf backplane (see Figure 1) to the positions required for this installation.</p>
27	<p>Repeat the previous steps in this procedure on each shelf which requires a 090-45018-05 MIS card.</p>
28	<p>This procedure is complete. Indicate completion of the 090-45018-05 MIS Card Test on the Test Sign-off form.</p>



SW1 Switch Settings

SW1 Section	Position	Description	Factory Setting
1 (Note 1)	On	1200 Baud	—
	Off	9600 Baud	X
2 and 3 (Note 1)	2=on, 3=any	Odd Parity	—
	2=off, 3=on	Even Parity	—
	2=off, 3=off	No Parity	X
4	On	Password protection enabled	—
	Off	Password protection disabled	X
5	On	When power is applied (or recycled), the MIS card downloads its configuration database to the standard cards in the shelf. Only those standard cards in the same slot and with the same serial number as the configuration database receive the download.	X
	Off	The MIS card does not download its configuration database (not recommended).	—
6	Off	Factory set. Do not change.	X
7 (Notes 2, 3)	On	Installed in a remote system or expansion shelf	—
	Off	Installed in a master shelf	X
8	Off	Factory set. Do not change.	X

Notes:

- Sections 1, 2, and 3 set the RS-232 baud rate and parity for COM2 and the LOCAL COMM port only.
- If installing an MIS in a remote system, be sure the master-to-remote cable is not connected, and the expansion shelves are not connected.
- To transfer information between an MIS card in a master system and an MIS card in a remote system, connect the COM 3 ports between the two master shelves.

Figure 4. 090-45018-05 MIS Card Switch and Jumpers

Chart 4. 090-45018-25 MIS Card Test

STEP	PROCEDURE
	<p>Use this procedure to install a 090-45018-15 MIS card (MIS^{V5} card). After all of the cards in the shelf are installed, another procedure allows the 090-45018-25 MIS card to be the network management node for the DCD Shelf.</p> <p>Notes:</p> <ol style="list-style-type: none"> 1. See the TL1 User’s Guide for instructions about commands indicated in this procedure. 2. An MIS card allows communication with all three COM ports on the rear panel as follows (all ports are set to 9600 baud at the factory, and function equally well if external equipment is set at even, odd, or no parity, 7 or 8 data bits, and 1 stop bit): <ul style="list-style-type: none"> COM1: Configurable for 1200 or 9600 baud via TL1 command only. COM2: Configurable for 1200 or 9600 baud, and even, odd, or no parity via switch setting only. COM3: Configurable for 1200 or 9600 baud via TL1 command only. LOCAL COMM (front): Same as COM2, but cannot function if COM2 is enabled. 2. If an MIS card is removed from the shelf, COM1 and COM3 retain the configuration that was set via TL1 command. 3. If the Office Alarm and Shelf Status terminal sets have been connected to the office alarm system and remote telemetry equipment, the ohmmeter tests cannot be performed because the alarm systems apply –48V at the alarm leads and ground on the return leads. To adequately test the MIS card, perform one of the following: <ol style="list-style-type: none"> a. Disconnect the office alarm system and remote telemetry equipment from the DCD-523 Shelf to perform the ohmmeter tests, then reconnect the leads. b. Leave the office alarm system and remote telemetry equipment connections intact, and substitute the ohmmeter tests with audible and visual tests for appropriate condition responses from the office alarm system and verification of appropriate condition responses at the centralized alarm surveillance and control center. 4. After the INIT-SYS command is completed in this procedure, ignore any messages that may appear on the terminal until the last chart in this Test and Acceptance process. 5. Since no clock cards or clock input cards are installed, the CRITICAL alarm is active after the MIS card is installed. 6. The MINOR alarm lamp flashes when the standard MIS card checks the shelf and downloads the database. Wait for the lamp to stop flashing before continuing. 7. If the installation uses an MIS^{V5} card in a remote system, do the following: <ul style="list-style-type: none"> • Verify the communication ports on the remote MIS^{V5} are set to the factory default (term1 or term2). <p>Test Equipment: Digital volt/ohm meter</p>
1	Set section 6 of switch SW1 on the 090-45018-25 MIS card (see Figure 5) to the on position. Set all other sections of SW1 to the off position.
2	If COM1 or COM3 are used, skip this step. Check the standard MIS card RS-232 settings to assure communications with the external terminal or computer (see Figure 5).
3	<p>When the RS-232 communications settings on the standard MIS card are correct, insert the standard MIS card into the slot labeled “MI” in the DCD-523 master shelf.</p> <p>Requirement: The FAIL lamp on the standard MIS card lights and goes off, the CRITICAL lamp lights, and the MAJOR and MINOR lamps light and go off as a lamp test.</p>

Chart 4. 090-45018-25 MIS Card Test (Contd)

STEP	PROCEDURE
4	<p>Use the terminal to enter a semicolon and a carriage return.</p> <p>Requirement: The terminal displays a three-line message from the MIS as follows:</p> <pre style="margin-left: 40px;">TELECOM <date> <time> M <ctag> DENY ICNV i</pre> <p>Where <date> and <time> are the date and time in the MIS card, <ctag> is a random number, and all uppercase letters are shown as they should appear. (See the appropriate TL1 User's Guide for TL1 language definitions.)</p>
5	<p>Use the INIT-SYS command with the appropriate <ph> value (see below and the TL1 User's Guide).</p> <p><ph> 3:</p> <ul style="list-style-type: none"> • Deletes all card information from the database • Retains all security information as previously entered, including the users and passwords • Retains the source ID (SID) as previously entered • Retains all communication parameters as previously entered <p><ph> 9:</p> <ul style="list-style-type: none"> • Deletes all card information from the database • Resets all security information to the factory settings • Resets the source ID (SID) to the factory settings, including only one user named "super" with a password of "sparky" • Resets all communication parameters to factory settings <p>Requirement: The terminal indicates a completed command.</p>
6	<p>Set the POWER ALARM switch (SW2) on the shelf backplane to MAJ (see Figure 1).</p>
7	<p>Remove fuse "-48V A" from the Output Protection/Spare Select Panel on the DCD-523 Shelf with a flat-blade screwdriver.</p> <p>Requirement: The red lamp under the -48V A fuse on the Output Protection/Spare Select Panel front panel lights. On the MIS card, the MAJOR lamp lights red and the MINOR lamp lights yellow.</p>

Chart 4. 090-45018-25 MIS Card Test (Contd)

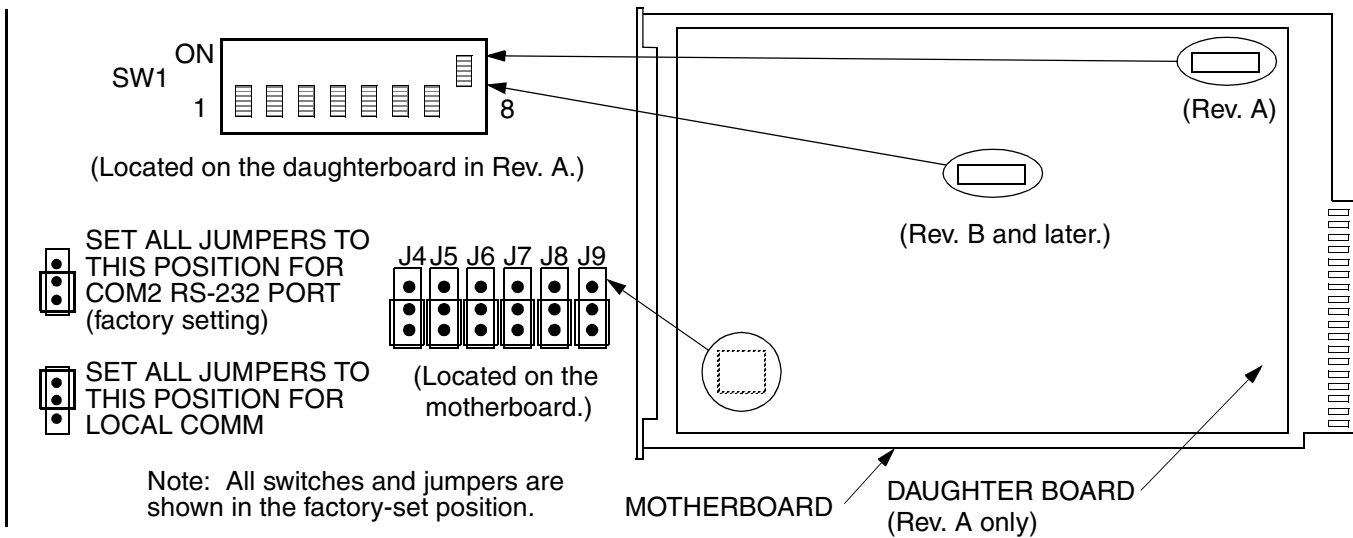
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8	<p>Connect the multimeter, set to resistance (for the MINOR AUD, MINOR VIS, MAJOR AUD, MAJOR VIS, CRITICAL VIS, CRITICAL AUD, MINSI, and MAJSI tests) or to volts dc (for the BATT ALM test) as appropriate, across the following Office Alarm and Shelf Status terminal sets on the shelf backplane (see Figure 1);</p> <table border="1"> <thead> <tr> <th><u>Type</u></th> <th><u>Test Point</u></th> <th><u>Test Point</u></th> <th><u>Result</u></th> </tr> </thead> <tbody> <tr> <td>OFFICE ALARM</td> <td>MINOR AUD: NO</td> <td>MINOR AUD: C</td> <td><10 Ω</td> </tr> <tr> <td>OFFICE ALARM</td> <td>MINOR VIS: NO</td> <td>MINOR VIS: C</td> <td><10 Ω</td> </tr> <tr> <td>OFFICE ALARM</td> <td>MAJOR AUD: NO</td> <td>MAJOR AUD: C</td> <td><10 Ω</td> </tr> <tr> <td>OFFICE ALARM</td> <td>MAJOR VIS: NO</td> <td>MAJOR VIS: C</td> <td><10 Ω</td> </tr> <tr> <td>OFFICE ALARM</td> <td>CRITICAL VIS: NO</td> <td>CRITICAL VIS: C</td> <td><10 Ω</td> </tr> <tr> <td>OFFICE ALARM</td> <td>CRITICAL VIS: NO</td> <td>CRITICAL VIS: C</td> <td><10 Ω</td> </tr> <tr> <td>SHELF STATUS</td> <td>MINSI</td> <td>MINSR</td> <td><10 Ω</td> </tr> <tr> <td>SHELF STATUS</td> <td>MAJSI</td> <td>MAJSR</td> <td><10 Ω</td> </tr> <tr> <td>SHELF STATUS</td> <td>CRTSI</td> <td>CRTSR</td> <td><10 Ω</td> </tr> <tr> <td>SHELF STATUS</td> <td>BATTALM</td> <td>BATTRTN</td> <td><0.1 V</td> </tr> </tbody> </table> <p>Requirement: The multimeter indicates the readings shown in the Result column.</p>	<u>Type</u>	<u>Test Point</u>	<u>Test Point</u>	<u>Result</u>	OFFICE ALARM	MINOR AUD: NO	MINOR AUD: C	<10 Ω	OFFICE ALARM	MINOR VIS: NO	MINOR VIS: C	<10 Ω	OFFICE ALARM	MAJOR AUD: NO	MAJOR AUD: C	<10 Ω	OFFICE ALARM	MAJOR VIS: NO	MAJOR VIS: C	<10 Ω	OFFICE ALARM	CRITICAL VIS: NO	CRITICAL VIS: C	<10 Ω	OFFICE ALARM	CRITICAL VIS: NO	CRITICAL VIS: C	<10 Ω	SHELF STATUS	MINSI	MINSR	<10 Ω	SHELF STATUS	MAJSI	MAJSR	<10 Ω	SHELF STATUS	CRTSI	CRTSR	<10 Ω	SHELF STATUS	BATTALM	BATTRTN	<0.1 V
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Chart 4. 090-45018-25 MIS Card Test (Contd)

STEP	PROCEDURE																																
12	<p>Connect the multimeter, set to resistance (for the MINOR AUD, MINOR VIS, MINSI, MAJOR AUD, MAJOR VIS, and MAJSI tests) or to volts dc (for the BATT ALM test) as appropriate, across the following Office Alarm and Shelf Status terminal sets on the shelf backplane (see Figure 1);</p> <table border="1"> <thead> <tr> <th>Type</th> <th>Test Point</th> <th>Test Point</th> <th>Result</th> </tr> </thead> <tbody> <tr> <td>OFFICE ALARM</td> <td>MINOR AUD: NO</td> <td>MINOR AUD: C</td> <td>>1 MΩ</td> </tr> <tr> <td>OFFICE ALARM</td> <td>MINOR VIS: NO</td> <td>MINOR VIS: C</td> <td>>1 MΩ</td> </tr> <tr> <td>OFFICE ALARM</td> <td>MAJOR AUD: NO</td> <td>MAJOR AUD: C</td> <td>>1 MΩ</td> </tr> <tr> <td>OFFICE ALARM</td> <td>MAJOR VIS: NO</td> <td>MAJOR VIS: C</td> <td>>1 MΩ</td> </tr> <tr> <td>SHELF STATUS</td> <td>MINSI</td> <td>MINSR</td> <td>>1 MΩ</td> </tr> <tr> <td>SHELF STATUS</td> <td>MAJSI</td> <td>MAJSR</td> <td>>1 MΩ</td> </tr> <tr> <td>SHELF STATUS</td> <td>BATTALM</td> <td>BATTRTN</td> <td>-42 V to -56 V</td> </tr> </tbody> </table> <p>Requirement: The multimeter indicates the readings shown in the Result column.</p>	Type	Test Point	Test Point	Result	OFFICE ALARM	MINOR AUD: NO	MINOR AUD: C	>1 MΩ	OFFICE ALARM	MINOR VIS: NO	MINOR VIS: C	>1 MΩ	OFFICE ALARM	MAJOR AUD: NO	MAJOR AUD: C	>1 MΩ	OFFICE ALARM	MAJOR VIS: NO	MAJOR VIS: C	>1 MΩ	SHELF STATUS	MINSI	MINSR	>1 MΩ	SHELF STATUS	MAJSI	MAJSR	>1 MΩ	SHELF STATUS	BATTALM	BATTRTN	-42 V to -56 V
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13	<p>Remove fuse “-48V B” from the Output Protection/Spare Select Panel on the DCD-523 Shelf, using a flat-blade screwdriver.</p> <p>Requirement: The red lamp under the -48V A fuse on the Output Protection/Spare Select Panel front panel lights. On the MIS card, the MAJOR lamp lights red, the MINOR lamp lights yellow, and the ACO lamp goes off. The the new alarm condition resets the ACO.</p>																																
14	<p>Press the ACO pushbutton on the MIS card.</p> <p>Requirement: The audible office alarm silences (if connected). On the MIS card, the ACO lamp lights green.</p>																																
15	<p>Replace the -48V B fuse, using a flat-blade screwdriver to lock in place.</p> <p>Requirement: The -48V B fuse lamp, and the MIS MAJOR and MINOR lamps go off (after approximately 6 s to 12 s). The ACO lamp stays lit due to the lit CRITICAL lamp.</p>																																
16	<p>Remove both fuses from the Output Protection/Spare Select Panel on the DCD-523 Shelf, using a flat-blade screwdriver.</p> <p>Requirement: All lamps on the MIS card and shelf go out. The -48V A and -48V B lamps on the Output Protection/Spare Select panel light red.</p>																																
17	<p>Replace both fuses, using a flat-blade screwdriver to lock in place.</p> <p>Requirement: The CRITICAL, MAJOR, and MINOR lamps on the MIS light, then go off, one at a time (the CRITICAL lamp lights to indicate there are no input and clock cards in the shelf). The -48V A and -48V B lamps are off on the Output Protection/Spare Select panel. The ACO lamp stays lit (because the CRITICAL alarm is active).</p>																																
18	<p>Set the POWER ALARM switch (SW2) on the shelf backplane to MIN (see Figure 1).</p>																																

Chart 4. 090-45018-25 MIS Card Test (Contd)

STEP	PROCEDURE
19	<p>Remove fuse “-48V A” from the Output Protection/Spare Select Panel on the DCD-523 Shelf, with a flat-blade screwdriver.</p> <p>Requirement: The red lamp under the -48V A fuse on the Output Protection/Spare Select Panel front panel lights, and the MINOR lamp on the MIS card lights yellow.</p>
20	<p>Press the ACO pushbutton on the MIS card.</p> <p>Requirement: The audible office alarm silences (if connected). On the MIS card, the ACO lamp lights green.</p>
21	<p>Replace the -48V A fuse, using a flat-blade screwdriver to lock in place.</p> <p>Requirement: The -48V A fuse lamp and MIS MINOR lamp go off; the ACO lamp stays lit due to the lit CRITICAL lamp.</p>
22	<p>Remove fuse “-48V B” from the Output Protection/Spare Select Panel on the DCD-523 Shelf, using a flat-blade screwdriver.</p> <p>Requirement: The red lamp under the -48V B fuse on the Output Protection/Spare Select Panel front panel lights, and the MINOR lamp on the MIS card lights yellow. The ACO lamp on the MIS card goes off. The new alarm resets the ACO.</p>
23	<p>Press the ACO pushbutton on the MIS card.</p> <p>Requirement: The audible office alarm silences (if connected). On the MIS card, the ACO lamp lights green.</p>
24	<p>Replace the -48V B fuse, using a flat-blade screwdriver to lock in place.</p> <p>Requirement: The -48V B fuse lamp and MIS MINOR lamp go off. The ACO lamp stays lit due to the lit CRITICAL lamp.</p>
25	<p>Set the POWER ALARM switch (SW2) on the shelf backplane (see Figure 1) to the positions required for this installation.</p>
26	<p>Repeat the previous steps in this procedure on each shelf which requires a 090-45018-25 MIS card.</p>
27	<p>This procedure is complete. Indicate completion of the 090-45018-25 MIS Card Test on the Test Sign-off form.</p>



SW1 Switch Settings

SW1 Section	Position	Description	Factory Setting
1 (Note 1)	On	1200 Baud	—
	Off	9600 Baud	X
2 and 3 (Note 1)	2=on, 3=any	Odd Parity	—
	2=off, 3=on	Even Parity	—
	2=off, 3=off	No Parity	X
4	On	Password protection enabled	—
	Off	Password protection disabled	X
5	On	When power is applied (or recycled), the MIS card downloads its configuration database to the standard cards in the shelf. Only those standard cards in the same slot and with the same serial number as the configuration database receive the download.	—
	Off	The MIS card does not download its configuration database (not recommended).	X
6	Off	Factory set. Do not change.	X
7 (Notes 2, 3)	On	Installed in a remote system or expansion shelf	—
	Off	Installed in a master shelf	X
8	On	Factory set. Do not change.	X

Notes:

- Sections 1, 2, and 3 set the RS-232 baud rate and parity for COM2 and the LOCAL COMM port only.
- If installing an MIS in a remote system, be sure the master-to-remote cable is not connected, and the expansion shelves are not connected.
- To transfer information between an MIS card in a master system and an MIS card in a remote system, connect the COM 3 ports between the two master shelves.

Figure 5. 090-45018-25 MIS Card Switch and Jumpers

Chart 5. 090-45018-04 or 090-45018-14 MIS Card Test

STEP	PROCEDURE
	<p>Use this procedure to install an MIS (090-45018-04 or 090-45018-14) card and verify operation.</p> <p>Notes:</p> <ol style="list-style-type: none"> 1. The MIS card allows communication with all three COM ports on the rear panel as follows (all ports are set to 9600 baud at the factory, and function equally well if external equipment is set at even, odd, or no parity, 7 or 8 data bits, and 1 stop bit): <ul style="list-style-type: none"> COM1: Configurable for 1200 or 9600 baud via TL1 command only. COM2: Configurable for 1200 or 9600 baud, and even, odd, or no parity via switch setting only. COM3: Configurable for 1200 or 9600 baud via TL1 command only. LOCAL COMM (front): Same as COM2, but cannot function if COM2 is enabled. 2. If the MIS card is removed from the shelf, COM1 and COM3 do not retain a configuration that was set via TL1 command. 3. If the Office Alarm and Shelf Status terminal sets have been connected to the office alarm system and remote telemetry equipment, the ohmmeter tests cannot be performed because the alarm systems apply -48V on the alarm leads and ground on the return leads. To adequately test the MIS card, perform one of the following: <ol style="list-style-type: none"> a. Disconnect the office alarm system and remote telemetry equipment from the DCD-523 Shelf, and perform the ohmmeter tests, then reconnect the leads. b. Leave the office alarm system and remote telemetry equipment connections intact, and substitute the ohmmeter tests with audible and visual tests for appropriate condition responses from the office alarm system and verification of appropriate condition responses at the centralized alarm surveillance and control center. 4. Since no clock cards or clock input cards are installed, the CRITICAL alarm is active after the MIS card is installed. <p>Test Equipment: Digital volt/ohm meter</p>
1	Set the sections of switch SW1 on the MIS card (see Figure 6) per the Installation Job Specifications.
2	Check the MIS card RS-232 settings to assure communications with the external terminal or computer (see Figure 6).
3	If the baud rate and parity for the communication device are correct, or if COM1 or COM3 are used, skip this step. Set SW1 on the MIS card's daughter board to the appropriate baud rate and parity for the communication device used (see Figure 6).
4	<p>When the RS-232 communications settings on the MIS card are correct, insert the MIS card into the slot labeled "MI" in the DCD-523 master shelf.</p> <p>Requirement: The FAIL lamp on the MIS card lights and goes off, then the CRITICAL, MAJOR, and MINOR lamps light and go off one at a time as a lamp test.</p>

Chart 5. 090-45018-04 or 090-45018-14 MIS Card Test (Contd)

STEP	PROCEDURE																																
5	<p>Use the terminal to enter a semicolon and a carriage return.</p> <p>Requirement: The terminal displays a three-line message from the MIS as follows:</p> <pre style="margin-left: 40px;">TELECOMSOLUTIONS <date> <time> M <ctag> DENY ICNV ;</pre> <p>Where <date> and <time> are the date and time in the MIS card, <ctag> is a random string of characters, and all upper-case letters are shown as they should appear. (See the appropriate TL1 User's Guide for TL1 language definitions.)</p>																																
6	<p>Set the POWER ALARM switch (SW2) on the shelf backplane to MAJ (see Figure 1).</p>																																
7	<p>Remove fuse “-48V A” from the Output Protection/Spare Select Panel on the DCD-523 Shelf, with a flat-blade screwdriver.</p> <p>Requirement: The red lamp under the -48V A fuse on the Output Protection/Spare Select Panel front panel lights. On the MIS card, the MAJOR lamp lights red and the MINOR lamp lights yellow.</p>																																
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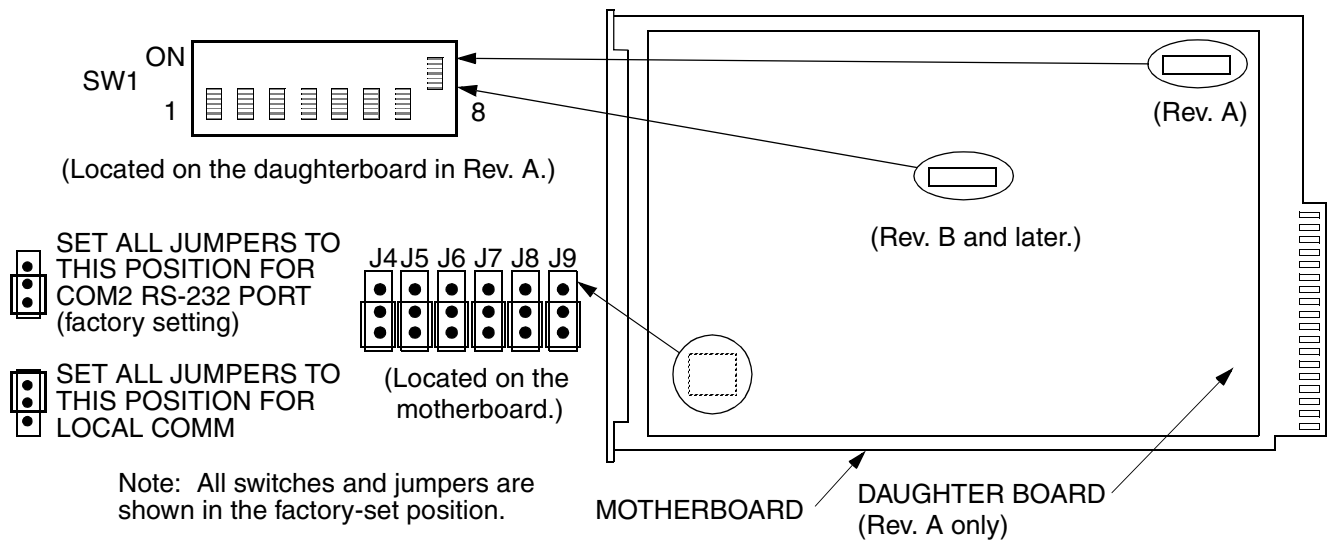
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Chart 5. 090-45018-04 or 090-45018-14 MIS Card Test (Contd)

STEP	PROCEDURE
15	<p>Replace the –48V B fuse, using a flat-blade screwdriver to lock in place.</p> <p>Requirement: The –48V B fuse lamp, and the MIS MAJOR and MINOR lamps go off (after approximately 6 s to 12 s). The ACO lamp stays lit due to the lit CRITICAL lamp.</p>
16	<p>Remove both fuses from the Output Protection/Spare Select Panel on the DCD-523 Shelf, using a flat-blade screwdriver.</p> <p>Requirement: All lamps on the MIS card and shelf go out. The –48V A and –48V B lamps on the Output Protection/Spare Select panel light red.</p>
17	<p>Replace both fuses, using a flat-blade screwdriver to lock in place.</p> <p>Requirement: The CRITICAL, MAJOR, and MINOR lamps on the MIS light, then go off, one at a time (the CRITICAL lamp lights to indicate there are no input and clock cards in the shelf). The –48V A and –48V B lamps are off on the Output Protection/Spare Select panel.</p>
18	<p>Set the POWER ALARM switch (SW2) on the shelf backplane to MIN (see Figure 1).</p>
19	<p>Remove fuse “–48V A” from the Output Protection/Spare Select Panel on the DCD-523 Shelf, with a flat-blade screwdriver.</p> <p>Requirement: The red lamp under the –48V A fuse on the Output Protection/Spare Select Panel front panel lights, and the MINOR lamp on the MIS card lights yellow.</p>
20	<p>Press the ACO pushbutton on the MIS card.</p> <p>Requirement: The audible office alarm silences (if connected). On the MIS card, the ACO lamp lights green.</p>
21	<p>Replace the –48V A fuse, using a flat-blade screwdriver to lock in place.</p> <p>Requirement: The –48V A fuse lamp and MIS MINOR lamp go off; the ACO lamp stays lit due to the lit CRITICAL lamp.</p>
22	<p>Remove fuse “–48V B” from the Output Protection/Spare Select Panel on the DCD-523 Shelf, using a flat-blade screwdriver.</p> <p>Requirement: The red lamp under the –48V B fuse on the Output Protection/Spare Select Panel front panel lights, and the MINOR lamp on the MIS card lights yellow. The ACO lamp on the MIS card goes off. The new alarm resets the ACO.</p>

Chart 5. 090-45018-04 or 090-45018-14 MIS Card Test (Contd)

STEP	PROCEDURE
23	<p>Press the ACO pushbutton on the MIS card.</p> <p>Requirement: The audible office alarm silences (if connected). On the MIS card, the ACO lamp lights green.</p>
24	<p>Replace the -48V B fuse, using a flat-blade screwdriver to lock in place.</p> <p>Requirement: The -48V B fuse lamp and MIS MINOR lamp go off. The ACO lamp stays lit due to the lit CRITICAL lamp.</p>
25	<p>Set the POWER ALARM switch (SW2) on the shelf backplane (see Figure 1) to conform to the requirements for this installation.</p>
26	<p>Repeat the previous steps in this procedure on each shelf which requires a 090-45018-04 or 090-45018-14 MIS card.</p>
27	<p>This procedure is complete. Indicate completion of the 090-45018-04 or 090-45018-14 MIS Card Test on the Test Sign-off form.</p>



SW1 Switch Settings

SW1 Section	Position	Description	Factory Setting
1	On	1200 baud	—
	Off	9600 baud	X
2 and 3	2=on, 3=any	Odd parity	—
	2=off, 3=on	Even parity	—
	2=off, 3=off	No parity	X
4	On	Password protection disabled	X
	Off	Password protection enabled	—
5 and 6	Off	Not used. Do not change.	X
7	On	Installed in a remote system or expansion shelf (Note 2)	—
	Off	Installed in a master shelf	X
8	Off	Not used. Do not change.	X

Notes:
 1. Sections 1, 2, and 3 set the RS-232 baud rate and parity for COM2 and front-panel RJ45 jack only.
 2. TL1 commands determine whether the MIS card is in a remote system or an expansion shelf.

Figure 6. 090-45018-04 or 090-45018-14 MIS Card Switch and Jumpers

Chart 6. SAI Card Test

STEP	PROCEDURE																																
	<p>Use this procedure to install the SAI card and verify operation.</p> <p>Notes:</p> <ol style="list-style-type: none"> 1. There are no switch or jumper settings for the SAI card. 2. When checking relay contact status, refer to Figure 1 for pin locations. 3. If the Office Alarm and Shelf Status terminal sets have been connected to the office alarm system and remote telemetry equipment, the ohmmeter tests cannot be performed because these systems apply -48 V on the alarm leads and ground on the return leads. To adequately test the SAI card, perform one of the following: <ol style="list-style-type: none"> a. Disconnect any office alarm system and remote telemetry equipment from the DCD-523 Shelf, perform the ohmmeter tests, then reconnect the leads. b. Leave the office alarm system and remote telemetry equipment connections intact, and substitute the ohmmeter tests with audible and visual tests for appropriate condition responses from the office alarm system and verification of appropriate condition responses at the alarm and surveillance center. <p>Test Equipment: Digital volt/ohm meter</p>																																
1	<p>Insert the SAI card into the slot labeled “MI” in the DCD-523 master shelf.</p> <p>Requirement: The FAIL, MAJOR, and MINOR lamps on the SAI card are off.</p>																																
2	<p>Set the POWER ALARM switch (SW2) on the shelf backplane to MAJ (see Figure 1).</p>																																
3	<p>Remove fuse “-48V A” from the Output Protection/Spare Select Panel on the DCD-523 Shelf with a flat-blade screwdriver.</p> <p>Requirement: The red lamp under the -48V A fuse on the Output Protection/Spare Select Panel front panel lights, the MAJOR lamp lights red, and the MINOR lamp lights yellow on the SAI card.</p>																																
4	<p>Connect the multimeter, set to resistance, across the following Office Alarm and Shelf Status terminal sets on the shelf backplane (see Figure 1);</p> <table border="1"> <thead> <tr> <th>Type</th> <th>Test Point</th> <th>Test Point</th> <th>Result</th> </tr> </thead> <tbody> <tr> <td>OFFICE ALARM</td> <td>MINOR AUD: NO</td> <td>MINOR AUD: C</td> <td><10 Ω</td> </tr> <tr> <td>OFFICE ALARM</td> <td>MINOR VIS: NO</td> <td>MINOR VIS: C</td> <td><10 Ω</td> </tr> <tr> <td>OFFICE ALARM</td> <td>MAJOR AUD: NO</td> <td>MAJOR AUD: C</td> <td><10 Ω</td> </tr> <tr> <td>OFFICE ALARM</td> <td>MAJOR VIS: NO</td> <td>MAJOR VIS: C</td> <td><10 Ω</td> </tr> <tr> <td>SHELF STATUS</td> <td>MINSI</td> <td>MINSR</td> <td><10 Ω</td> </tr> <tr> <td>SHELF STATUS</td> <td>MAJSI</td> <td>MAJSR</td> <td><10 Ω</td> </tr> <tr> <td>SHELF STATUS</td> <td>BATTALM</td> <td>BATTRTN</td> <td><10 Ω</td> </tr> </tbody> </table> <p>Requirement: The multimeter indicates the readings shown in the Result column.</p>	Type	Test Point	Test Point	Result	OFFICE ALARM	MINOR AUD: NO	MINOR AUD: C	<10 Ω	OFFICE ALARM	MINOR VIS: NO	MINOR VIS: C	<10 Ω	OFFICE ALARM	MAJOR AUD: NO	MAJOR AUD: C	<10 Ω	OFFICE ALARM	MAJOR VIS: NO	MAJOR VIS: C	<10 Ω	SHELF STATUS	MINSI	MINSR	<10 Ω	SHELF STATUS	MAJSI	MAJSR	<10 Ω	SHELF STATUS	BATTALM	BATTRTN	<10 Ω
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Chart 6. SAI Card Test (Contd)

STEP	PROCEDURE																																
5	<p>Press the ACO pushbutton on the SAI card.</p> <p>Requirement: The audible office alarm silences (if connected). On the SAI card, the ACO lamp lights green.</p>																																
6	<p>Connect the multimeter, set to resistance, across the following Office Alarm and Shelf Status terminal sets on the shelf backplane (see Figure 1);</p> <table border="1"> <thead> <tr> <th>Type</th> <th>Test Point</th> <th>Test Point</th> <th>Result</th> </tr> </thead> <tbody> <tr> <td>OFFICE ALARM</td> <td>MINOR AUD: NO</td> <td>MINOR AUD: C</td> <td>>1 MΩ</td> </tr> <tr> <td>OFFICE ALARM</td> <td>MINOR VIS: NO</td> <td>MINOR VIS: C</td> <td><10 Ω</td> </tr> <tr> <td>OFFICE ALARM</td> <td>MAJOR AUD: NO</td> <td>MAJOR AUD: C</td> <td>>1 MΩ</td> </tr> <tr> <td>OFFICE ALARM</td> <td>MAJOR VIS: NO</td> <td>MAJOR VIS: C</td> <td><10 Ω</td> </tr> <tr> <td>SHELF STATUS</td> <td>MINSI</td> <td>MINSR</td> <td><10 Ω</td> </tr> <tr> <td>SHELF STATUS</td> <td>MAJSI</td> <td>MAJSR</td> <td><10 Ω</td> </tr> <tr> <td>SHELF STATUS</td> <td>BATTALM</td> <td>BATTRTN</td> <td><10 Ω</td> </tr> </tbody> </table> <p>Requirement: The multimeter indicates the reading shown in the Result column.</p>	Type	Test Point	Test Point	Result	OFFICE ALARM	MINOR AUD: NO	MINOR AUD: C	>1 MΩ	OFFICE ALARM	MINOR VIS: NO	MINOR VIS: C	<10 Ω	OFFICE ALARM	MAJOR AUD: NO	MAJOR AUD: C	>1 MΩ	OFFICE ALARM	MAJOR VIS: NO	MAJOR VIS: C	<10 Ω	SHELF STATUS	MINSI	MINSR	<10 Ω	SHELF STATUS	MAJSI	MAJSR	<10 Ω	SHELF STATUS	BATTALM	BATTRTN	<10 Ω
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7	<p>Replace the -48V A fuse, using a flat-blade screwdriver to lock in place.</p> <p>Requirement: The -48V A fuse lamp and SAI MAJOR, MINOR, and ACO lamps go off after approximately 6 s to 12 s.</p>																																
8	<p>Connect the multimeter, set to resistance, across the following Office Alarm and Shelf Status terminal sets on the shelf backplane (see Figure 1);</p> <table border="1"> <thead> <tr> <th>Type</th> <th>Test Point</th> <th>Test Point</th> <th>Result</th> </tr> </thead> <tbody> <tr> <td>OFFICE ALARM</td> <td>MINOR AUD: NO</td> <td>MINOR AUD: C</td> <td>>1 MΩ</td> </tr> <tr> <td>OFFICE ALARM</td> <td>MINOR VIS: NO</td> <td>MINOR VIS: C</td> <td>>1 MΩ</td> </tr> <tr> <td>OFFICE ALARM</td> <td>MAJOR AUD: NO</td> <td>MAJOR AUD: C</td> <td>>1 MΩ</td> </tr> <tr> <td>OFFICE ALARM</td> <td>MAJOR VIS: NO</td> <td>MAJOR VIS: C</td> <td>>1 MΩ</td> </tr> <tr> <td>SHELF STATUS</td> <td>MINSI</td> <td>MINSR</td> <td>>1 MΩ</td> </tr> <tr> <td>SHELF STATUS</td> <td>MAJSI</td> <td>MAJSR</td> <td>>1 MΩ</td> </tr> <tr> <td>SHELF STATUS</td> <td>BATTALM</td> <td>BATTRTN</td> <td>>1 MΩ</td> </tr> </tbody> </table> <p>Requirement: The multimeter indicates the reading shown in the Result column.</p>	Type	Test Point	Test Point	Result	OFFICE ALARM	MINOR AUD: NO	MINOR AUD: C	>1 MΩ	OFFICE ALARM	MINOR VIS: NO	MINOR VIS: C	>1 MΩ	OFFICE ALARM	MAJOR AUD: NO	MAJOR AUD: C	>1 MΩ	OFFICE ALARM	MAJOR VIS: NO	MAJOR VIS: C	>1 MΩ	SHELF STATUS	MINSI	MINSR	>1 MΩ	SHELF STATUS	MAJSI	MAJSR	>1 MΩ	SHELF STATUS	BATTALM	BATTRTN	>1 MΩ
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9	<p>Remove fuse “-48V B” from the Output Protection/Spare Select Panel on the DCD-523 Shelf, using a flat-blade screwdriver.</p> <p>Requirement: The red lamp under the -48V B fuse on the Output Protection/Spare Select Panel front panel lights. The SAI MAJOR and MINOR lamps light red and yellow, respectively. The ACO lamp on the SAI card goes off. The new alarm resets the ACO.</p>																																
10	<p>Press the ACO pushbutton on the SAI card.</p> <p>Requirement: The audible office alarm silences (if connected). On the SAI card, the ACO lamp lights green.</p>																																

Chart 6. SAI Card Test (Contd)

STEP	PROCEDURE
11	<p>Replace the –48V B fuse, using a flat-blade screwdriver to lock in place.</p> <p>Requirement: The –48V B fuse lamp, SAI MAJOR, MINOR, and ACO lamps go off after approximately 6 s to 12 s.</p>
12	<p>Remove both fuses from the Output Protection/Spare Select Panel on the DCD-523 Shelf, using a flat-blade screwdriver.</p> <p>Requirement: All lamps on the shelf will go out, except the –48V A and –48V B lamps on the Output Protection/Spare Select panel, and the MAJOR and MINOR lamps on the SAI card.</p>
13	<p>Press the ACO switch on the SAI card.</p> <p>Requirement: The ACO lamp lights. All alarm contacts are closed (<10 Ω) except MAJOR AUD and MINOR AUD, which are open.</p>
14	<p>Replace both fuses, using a flat-blade screwdriver to lock in place.</p> <p>Requirement: The MAJOR, MINOR, and ACO lamps are off on the SAI card.</p>
15	<p>Set the POWER ALARM switch (SW2) on the shelf backplane to MIN (see Figure 1).</p>
16	<p>Remove fuse “–48V A” from the Output Protection/Spare Select Panel on the DCD-523 Shelf with a flat-blade screwdriver.</p> <p>Requirement: The red lamp under the –48V A fuse on the Output Protection/Spare Select Panel front panel lights, and the MINOR lamp on the SAI card lights.</p>
17	<p>Press the ACO pushbutton on the SAI card.</p> <p>Requirement: The audible office alarm silences (if connected). On the SAI card, the ACO lamp lights green.</p>
18	<p>Replace the –48V A fuse, using a flat-blade screwdriver to lock in place.</p> <p>Requirement: The –48V A fuse lamp, and SAI MINOR and ACO lamps go off.</p>
19	<p>Remove fuse “–48V B” from the Output Protection/Spare Select Panel on the DCD-523 Shelf, using a flat-blade screwdriver.</p> <p>Requirement: The red lamp under the –48V B fuse on the Output Protection/Spare Select Panel front panel lights, and the MINOR lamp on the SAI card lights yellow.</p>

Chart 6. SAI Card Test (Contd)

STEP	PROCEDURE
20	Press the ACO pushbutton on the SAI card. Requirement: The audible office alarm silences (if connected). On the SAI card, the ACO lamp lights green.
21	Replace the -48V B fuse, using a flat-blade screwdriver to lock in place. Requirement: The -48V B fuse lamp, and SAI MINOR and ACO lamps go off.
22	Set the POWER ALARM switch (SW2) on the shelf backplane (see Figure 1) to conform to the requirements for this installation.
23	Repeat Steps 1 through 22 to each shelf which requires an SAI card.
24	This procedure is complete. Indicate completion of the SAI Card Test on the Test Sign-off form.

Chart 7. MRC Card Test

STEP	PROCEDURE
	<p>Use this procedure to install and verify the operation of the following cards:</p> <ul style="list-style-type: none"> • MRC-EA (090-45010-06, -09) • MRC-EA^{V5} (090-45010-56, -57) • MRC-T (090-45010-03, -08) • MRC-T^{V5} (090-45010-53, -58) <p>This procedure assumes the clock input signals have been connected per the Installation section of this manual.</p> <p>Note: Clock cards are installed in Step 1 for testing the MRC cards. These clock cards will be tested in a separate chart later in this section.</p> <p>Test Equipment: None</p>
1	<p>For test purposes, install the appropriate clock cards (ST2, ST2E, ST3E, TNC-E, TNC, or LNC).</p> <p>Note: If installing an ST2E, ST2, or TNC-E clock card in combination with an ST3E, ST3, or TNC clock card, it is imperative that the ST2E, ST2, or TNC-E be installed first and allowed to stabilize before installing the other clock card. Failure to allow the ST2E, ST2, or TNC-E to stabilize results in incorrect timing from the clock cards.</p>
2	<p>Observe the clock lamps.</p> <p>Requirement: On the ST2, ST3E, TNC, or LNC cards: the FREE RUN lamp lights green (steady), and the ACTIVE lamp lights green after the warm-up (stabilization) period. On the ST2E or TNC-E cards: the HOLD OVER lamp lights green (steady), and the ACTIVE lamp lights green after the warm-up (stabilization) period.</p>
3	<p>On the rear of the master shelf, set the ST3/ST2 switch (SW1) (Figure 1) to the ST3 position.</p> <p>Note: Only those clock card lamps that are identified in the Requirements paragraphs of this procedure are applicable to this test.</p>
4	<p>On the DCD-523 master shelf backplane, set switches SW4 and SW5 (REF A and REF B) to the BRDG position.</p>

Chart 7. MRC Card Test (Contd)

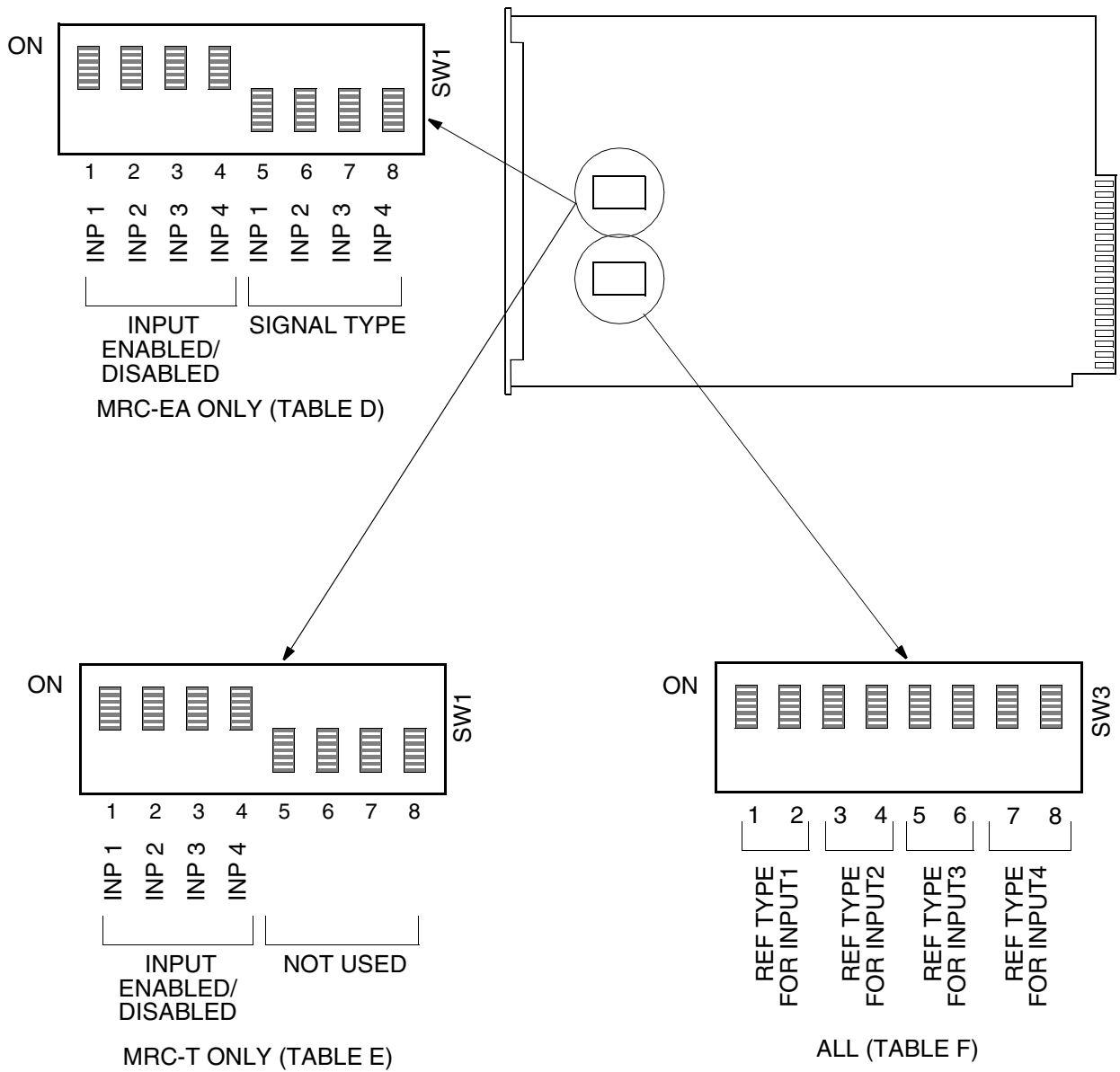
STEP	PROCEDURE												
5	<p>Set switches SW1 and SW3 on the MRC card (both MRC cards if using two) as required to enable the connected input source signals and set their reference types (refer to Figure 7).</p> <p>Notes:</p> <ol style="list-style-type: none"> SW1 sections 1 through 4 enable or disable each reference input. On the MRC-EA, SW1 sections 5 through 8 set inputs to accept E1 or analog input signals. SW3 sets the input type and priority level for each input. CRC4 framing for the MRC-EA cards are selectable via TL1 commands through the MIS card only; CRC4 framing is set by the software to be enabled. Refer to the appropriate TL1 User's Guide for instructions. The relationship between the input terminals on the rear of the DCD-523 master shelf and the inputs on the MRC card are as follows: <table style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="text-align: center;"><u>Shelf backplane input</u></th> <th style="text-align: center;"><u>Card input</u></th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">1 (not used)</td> <td></td> </tr> <tr> <td style="text-align: center;">2</td> <td style="text-align: center;">1</td> </tr> <tr> <td style="text-align: center;">3</td> <td style="text-align: center;">2</td> </tr> <tr> <td style="text-align: center;">4</td> <td style="text-align: center;">3</td> </tr> <tr> <td style="text-align: center;">5</td> <td style="text-align: center;">4</td> </tr> </tbody> </table>	<u>Shelf backplane input</u>	<u>Card input</u>	1 (not used)		2	1	3	2	4	3	5	4
<u>Shelf backplane input</u>	<u>Card input</u>												
1 (not used)													
2	1												
3	2												
4	3												
5	4												
6	If not equipped with a second MRC card, skip this step. Repeat the previous step for the second MRC card.												
7	If equipped with an SAI card or a standard MIS card, skip this step. Remove the nonstandard MIS card (this card will be replaced later in this procedure).												
8	<p>Insert the MRC card (insert both MRC cards if using two) into the MR A and MR B slots in the master shelf.</p> <p>Note: When first installed, the MRC performs a lamp test. The remainder of the time is spent qualifying equipped input signals. Disabled input lamps are off. Enabled input lamps are lit red when an input signal is not present, and green when a valid input signal is present.</p>												
9	If equipped with an SAI card or a standard MIS card, skip this step. Reinstall the nonstandard MIS card.												
10	<p>Ten minutes after inserting the MRC card(s) into the shelf, observe the MRC card lamps.</p> <p>Requirement: On the installed MRC cards, the FAIL lamp is off, the REF lamps for the enabled inputs are lit green, and the REF lamps for the disabled inputs are off; the SRC ACTIVE lamp is lit green on the active MRC A card and off on the MRC B card. Also, the STATUS lamps are all off except for the active (highest-priority) input, which is lit green. Do not proceed to the next step until these requirements are met.</p>												

Chart 7. MRC Card Test (Contd)

STEP	PROCEDURE
11	<p>Observe the lamps on the clock cards.</p> <p>Requirement: On both clock cards: the LKD lamp is lit green, the ACTIVE lamp is lit green, and the SRC A or SRC B lamp is lit green.</p>
12	<p>If not equipped with a second MRC card, go to Step 14.</p> <p>If the SRC ACTIVE lamp is lit on the MRC card in MR A only, press and hold the XFR pushbutton for approximately 2 s, and release.</p> <p>Requirement: The SRC ACTIVE lamp lights on the card in the MR B slot and goes off on the card in the MR A slot.</p>
13	<p>Press and hold the XFR pushbutton for approximately 2 s, and release.</p> <p>Requirement: The SRC ACTIVE lamp lights on the card in the MR A slot and goes off on the card in the MR B slot.</p>
14	<p>On the rear of the shelf, locate the highest-priority input to the MRC card in the MR A slot and perform one of the following:</p> <p>If using a wire-wrap module, short the T and R leads with a short clip lead (< 6 in). (Note the relationship of MRC card inputs and shelf inputs in Step 5.)</p> <p>If using a connectorized module, remove the coax connector from the input module to remove the signal. (Note the relationship of MRC card inputs and shelf inputs in Step 5.)</p> <p>Requirement: The REF lamp for the shorted or removed input is lit red, and the adjacent STATUS lamp is off. Also, the STATUS lamp for the second priority input is lit green. On the SAI or MIS card, the MINOR lamp is lit yellow.</p> <p>If the last valid input has been shorted or removed in this step, in addition, the SRC ACTIVE lamp on the MRC card in the MR A slot goes off, and the SRC ACTIVE lamp on the MRC card in the MR B slot lights. On the MIS card, the MAJOR lamp is lit red.</p> <p>Note: Do not remove shorting jumpers or reinstall coaxial connectors until directed.</p>
15	<p>Repeat the previous step for each remaining input in descending order of priority (refer to Figure 7) on the MRC card in the MR A slot.</p>
16	<p>Remove all shorting jumpers or replace the coax connector (positioned in Steps 14 and 15) on the shelf backplane for the card in the MR A slot, wait 3 minutes to 5 minutes, then observe the lamps.</p> <p>Requirement: On the installed MRC cards, the FAIL lamp is off, the REF lamps for the enabled inputs are lit green, and the REF lamps for the disabled inputs are off; the SRC ACTIVE lamp is lit green on the active MRC A card and off on the MRC B card. Also, the STATUS lamps are all off except for the active (highest-priority) input which is lit green. Do not proceed to the next step until these requirements are met.</p>

Chart 7. MRC Card Test (Contd)

STEP	PROCEDURE
17	If not equipped with a second MRC card, skip to the next step. If equipped with a second MRC card, repeat Steps 14, 15, and 16 for the MRC card in the MR B slot.
18	<p>Set the ST3/ST2 switch (SW1) on the rear panel (Figure 1) to the position required for this installation: Set SW1 to the ST2 position if one or more ST2E, ST2, or TNC-E clock cards, or 090-45010-08, -09, -54, and -57 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.</p> <p>Requirement: If equipped with a second MRC card and the switch is in the ST2 position, the SRC ACT lamps on both MRC cards are lit. The transfer (XFR) function between the MRC cards is disabled.</p>
19	<p>If an SAI card is installed in the shelf, skip this step. Use the INIT-REG command for every MRC card in the shelf. This initializes all registers on the shelf.</p> <p>Requirement: The response indicates the command was completed successfully.</p>
20	This procedure is complete. Indicate completion of the MRC Card Test on the Test Sign-off form.



Note: All switches are shown in the factory-set position.

Figure 7. MRC Card Switches

Table D. MRC-EA Card Switch SW1 Settings

SECTION	POSITION	MEANING	FACTORY SETTING
1	ON	Input 1 enabled	X
	OFF	Input 1 disabled	—
2	ON	Input 2 enabled	X
	OFF	Input 2 disabled	—
3	ON	Input 3 enabled	X
	OFF	Input 3 disabled	—
4	ON	Input 4 enabled	X
	OFF	Input 4 disabled	—
5	ON	Input 1 - Analog	—
	OFF	Input 1 - E1	X
6	ON	Input 2 - Analog	—
	OFF	Input 2 - E1	X
7	ON	Input 3 - Analog	—
	OFF	Input 3 - E1	X
8	ON	Input 4 - Analog	—
	OFF	Input 4 - E1	X

Table E. MRC-T Card Switch SW1 Settings

SECTION	POSITION	MEANING	FACTORY SETTING
1	ON	Input 1 enabled	X
	OFF	Input 1 disabled	—
2	ON	Input 2 enabled	X
	OFF	Input 2 disabled	—
3	ON	Input 3 enabled	X
	OFF	Input 3 disabled	—
4	ON	Input 4 enabled	X
	OFF	Input 4 disabled	—
5 to 8	ON	Not Used	—
	OFF		X

Table F. MRC Card Switch SW3 Settings

REFERENCE TYPE CONNECTED TO INPUT	SECTIONS 1 & 2 (FOR INPUT 1)		SECTIONS 3 & 4 (FOR INPUT 2)		SECTIONS 5 & 6 (FOR INPUT 3)		SECTIONS 7 & 8 (FOR INPUT 4)		FACTORY SETTING
	ON	OFF	ON	OFF	ON	OFF	ON	OFF	
Network	ON	ON	ON	ON	ON	ON	ON	ON	X
LORAN	ON	OFF	ON	OFF	ON	OFF	ON	OFF	—
GPS	OFF	ON	OFF	ON	OFF	ON	OFF	ON	—
Cesium	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	—

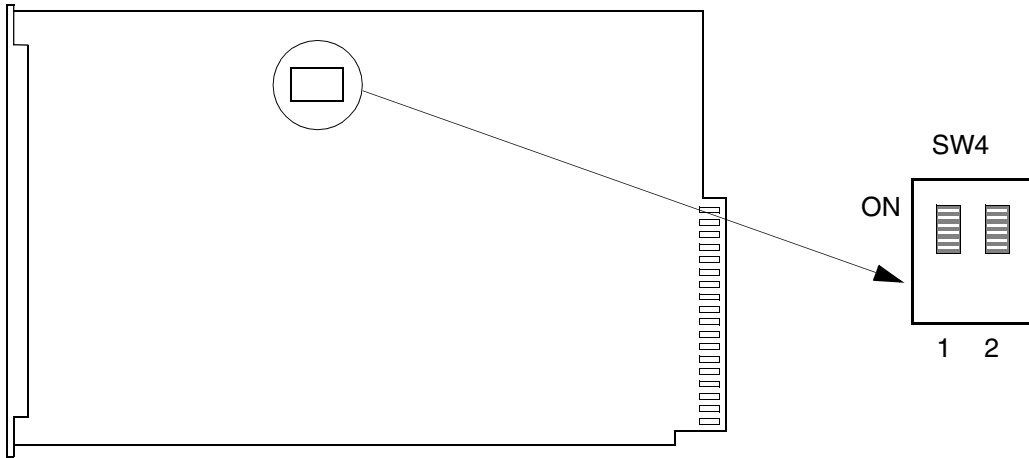
Note: The sections of SW3 are used to identify the reference type connected to each input.
 Example: If the reference type on input 1 is Cesium, set positions 1 and 2 of SW3 to OFF.

Chart 8. ACI Card Test

STEP	PROCEDURE
	<p>Use this procedure to install the ACI cards. This procedure assumes the input reference signals have been connected per the Installation section of this manual. Consult the local company Installation Job Specifications to determine the type of input card to be installed in the MRA and MRB slots in the shelf. The SW4 (REFA) and SW5 (REFB) switches should have been set during installation for the level of signals (BRDG or TERM) connected to the shelf.</p> <p>Note: If installing an ACI card in a remote system, contact your local Symmetricom distributor or Symmetricom's CTAC.</p> <p>Test Equipment: None</p>
1	<p>On the master shelf rear panel, set the ST2/ST3 switch (Figure 1) to the ST3 position for this test, regardless of the type of clock card to be installed.</p>
2	<p>Set sections 1 and 2 of switch SW4 (Figure 8) on each ACI card to be installed to match the frequency of the input reference signal.</p>
3	<p>Insert an ACI card into the MR A slot in the master shelf.</p> <p>Requirement: On the ACI card just installed, the FAIL lamp and SRC FAIL lamps are lit red. Both lamps go off approximately 20 s after the card is installed. After the card has warmed up, the SRC ACT lamp is lit green.</p>
4	<p>If not equipped with a second ACI card, skip to Step 14. Insert the second ACI card into the MR B slot in the master shelf.</p> <p>Requirement: On the ACI card just installed, the FAIL lamp and SRC FAIL lamps are lit red. Both lamps go off approximately 20 s after the card is installed. After the card has warmed up, the SRC ACT lamp remains off.</p>
5	<p>Press the XFR pushbutton on one of the ACI cards.</p> <p>Requirement: The lit SRC ACT lamp transfers to the other ACI card.</p>
6	<p>Press the XFR pushbutton on the other ACI card.</p> <p>Requirement: The lit SRC ACT lamp lights on the original ACI card.</p>
7	<p>Remove the ACI card with its SRC ACT lamp lit.</p> <p>Requirement: The SRC ACT lamp lights on the other ACI card.</p>

Chart 8. ACI Card Test (Contd)

STEP	PROCEDURE
8	Reinsert the removed ACI card. Requirement: The SRC ACT lamp remains lit on the other ACI card.
9	Remove the ACI card with its SRC ACT lamp lit. Requirement: The SRC ACT lamp on the original ACI card lights.
10	Reinsert the removed ACI card. Requirement: The SRC ACT lamp remains lit on the other ACI card.
11	Press the XFR pushbutton on either ACI card. Requirement: The lit SRC ACT lamp transfers to the other ACI card.
12	Set the ST2/ST3 switch (SW1) on the backplane to the appropriate position for this installation. Requirement: If SW1 is set to the ST2 position, the SRC ACT lamps on both ACI cards are lit. The transfer (XFR) function between the ACI cards is disabled.
13	If an SAI card is installed in the shelf, skip this step. Use the INIT-REG command for every MRC card in the shelf. This initializes all registers on the shelf. Requirement: The response indicates the command was completed successfully.
14	Indicate completion of the ACI Card Test on the Test Sign-off form.



Note: All switches are shown in the factory-set position.

SW4 Settings

Section		Input Frequency	Factory Setting
1	2		
OFF	OFF	1 MHz	—
OFF	ON	2 MHz (2.048 MHz)	—
ON	OFF	5 MHz	—
ON	ON	10 MHz	X

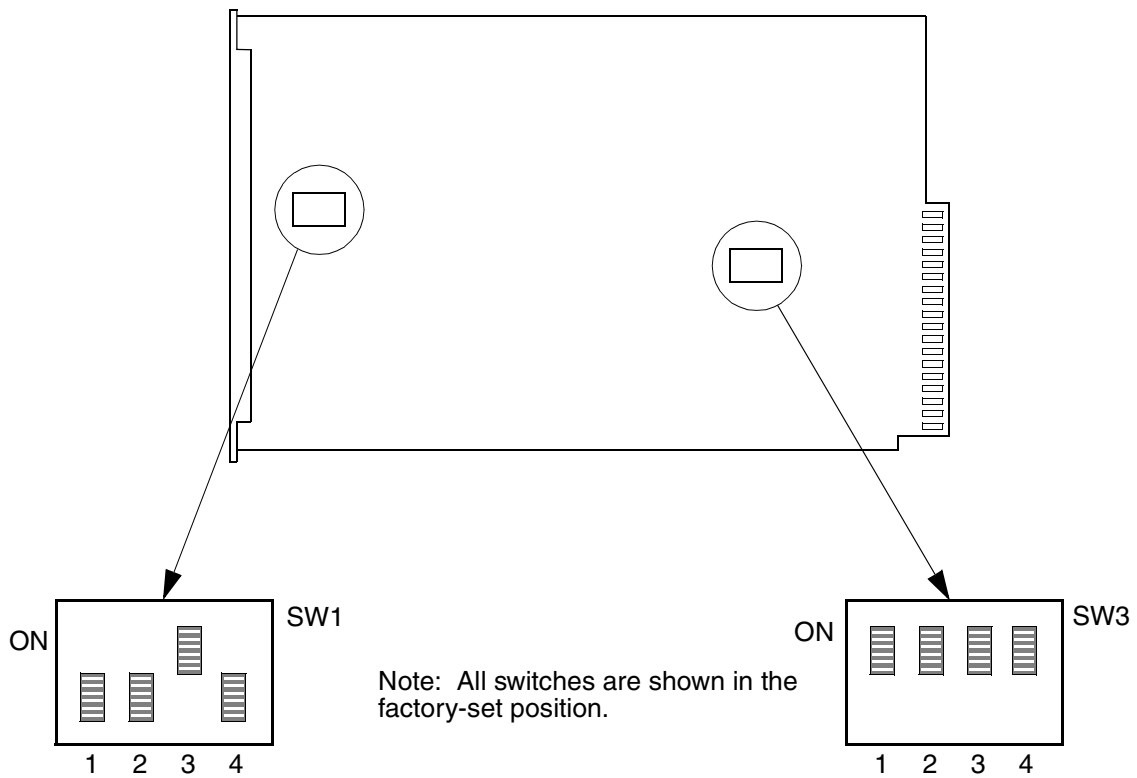
Figure 8. ACI Card Switch

Chart 9. CI-EA Card Test

STEP	PROCEDURE
	<p>Use this procedure to install the CI-EA cards. This procedure assumes the input reference signals have been connected per the Installation section of this manual. Consult the local company Installation Job Specifications to determine the type of input card to be installed in the MRA and MRB slots in the shelf.</p> <p>Note: If installing an CI-EA card in a remote system, contact your local Symmetricom distributor or Symmetricom's CTAC.</p> <p>Test Equipment: None</p>
1	<p>On the master shelf rear panel, set the ST2/ST3 switch (Figure 1) to the ST3 position for this test, regardless of the type of clock card to be installed.</p>
2	<p>Set sections 1 through 4 of switches SW1 and SW3 (Figure 9) on each CI-EA card to be installed as required.</p>
3	<p>Insert the first CI-EA card into the MR A slot.</p> <p>Requirement: On the CI-EA card just installed, the E1 lamp is lit green, and the FAIL lamp goes off after approximately 8 s to 40 s. After the card has warmed up, the SRC ACTIVE lamp lights green.</p>
4	<p>If not equipped with a second CI-EA card, skip to Step 14. Insert the second CI-EA card into the MR B slot in the master shelf.</p> <p>Requirement: On the CI-EA card just installed, the E1 lamp is lit green, and the FAIL lamp goes off after approximately 8 s to 40 s. The SRC ACTIVE lamp remains off.</p>
5	<p>Press the XFR pushbutton on one of the CI-EA cards.</p> <p>Requirement: The lit SRC ACT lamp transfers to the other CI-EA card.</p>
6	<p>Press the XFR pushbutton on the other CI-EA card.</p> <p>Requirement: The lit SRC ACT lamp lights on the original CI-EA card.</p>
7	<p>Remove the CI-EA card with its SRC ACT lamp lit.</p> <p>Requirement: The SRC ACT lamp lights on the other CI-EA card.</p>
8	<p>Reinsert the removed CI-EA card.</p> <p>Requirement: The SRC ACT lamp remains lit on the other CI-EA card.</p>
9	<p>Remove the CI-EA card with its SRC ACT lamp lit.</p> <p>Requirement: The SRC ACT lamp on the original CI-EA card lights.</p>

Chart 9. CI-EA Card Test (Contd)

STEP	PROCEDURE
10	Reinsert the removed CI-EA card. Requirement: The SRC ACT lamp remains lit on the other CI-EA card.
11	Press the XFR pushbutton on either CI-EA card. Requirement: The lit SRC ACT lamp transfers to the other CI-EA card.
12	Set the ST2/ST3 switch (SW1) on the backplane to the appropriate position for this installation. Requirement: If SW1 is set to the ST2 position, the SRC ACT lamps on both CI-EA cards are lit. The transfer (XFR) function between the CI-EA cards is disabled.
13	If an SAI card is installed in the shelf, skip this step. Use the INIT-REG command for every MRC card in the shelf. This initializes all registers on the shelf. Requirement: The response indicates the command was completed successfully.
14	Indicate completion of the CI-EA Card Test on the Test Sign-off form.



SW1 Settings

Section	Position	Meaning	Factory Setting
1 and 2	Up	Not allowed	—
	Down	Normal	X
3	Up	CRC4 is disabled	X
	Down	CRC4 is enabled	—
4	Up	CAS is disabled	—
	Down	CCS is enabled	X

SW3 Settings

Position	Meaning	Factory Setting
Up	E1 input (2.048 Mb/s)	X
Down	Analog input (2.048 MHz)	—
NOTE: All sections must be set to the same position.		

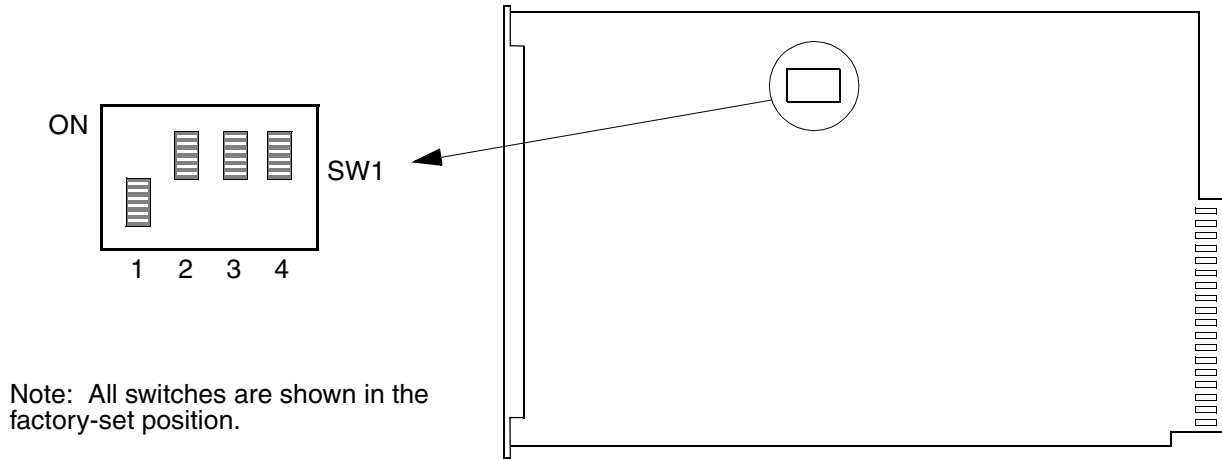
Figure 9. CI-EA Card Switch

Chart 10. CI Card Test

STEP	PROCEDURE
	<p>Use this procedure to install the CI cards. This procedure assumes the input reference signals have been connected per the Installation section of this manual.</p> <p>Note: If installing an CI card in a remote system, contact your local Symmetricom distributor or Symmetricom's CTAC.</p> <p>Test Equipment: None</p>
1	On the master shelf rear panel, set the ST2/ST3 switch (Figure 1) to the ST3 position for this test, regardless of the type of clock card to be installed.
2	Set sections 1 through 4 of switch SW1 (Figure 10) on the CI card as required for the type of clock input signal.
3	If not equipped with a second CI card, skip to the next step. Repeat the previous step for the second CI card.
4	<p>If the MRA slot is not equipped with a CI card, skip to the next step. Insert a CI card into the MRA slot.</p> <p>Requirement: On the CI card just installed, the DS1 or CC lamp is lit green, and the FAIL lamp goes off after approximately 8 s to 40 s. After the card has warmed up, the SRC ACTIVE lamp lights green.</p>
5	<p>If the MRB slot is not equipped with a CI card, skip to Step 13. Insert a CI card into the MRB slot.</p> <p>Requirement: On the CI card just installed, the DS1 or CC lamp is lit green, and the FAIL lamp goes off after approximately 8 s to 40 s. The SRC ACTIVE lamp remains off.</p>
6	<p>Press the XFR pushbutton on one of the CI cards.</p> <p>Requirement: The lit SRC ACT lamp transfers to the other CI card.</p>
7	<p>Press the XFR pushbutton on the other CI card.</p> <p>Requirement: The lit SRC ACT lamp lights on the original CI card.</p>
8	<p>Remove the CI card with its SRC ACT lamp lit.</p> <p>Requirement: The SRC ACT lamp lights on the other CI card.</p>

Chart 10. CI Card Test (Contd)

STEP	PROCEDURE
9	Reinsert the removed CI card. Requirement: The SRC ACT lamp remains lit on the other CI card.
10	Remove the CI card with its SRC ACT lamp lit. Requirement: The SRC ACT lamp on the original CI card lights.
11	Reinsert the removed CI card. Requirement: The SRC ACT lamp remains lit on the other CI card.
12	Press the XFR pushbutton on either CI card. Requirement: The lit SRC ACT lamp transfers to the other CI card.
13	Set the ST2/ST3 switch (SW1) on the backplane to the appropriate position for this installation. Requirement: If SW1 is set to the ST2 position, the SRC ACT lamps on both ACI cards are lit. The transfer (XFR) function between the ACI cards is disabled.
14	If an SAI card is installed in the shelf, skip this step. Use the INIT-REG command for every MRC card in the shelf. This initializes all registers on the shelf. Requirement: The response indicates the command was completed successfully.
15	Indicate completion of the CI Card Test on the Test Sign-off form.



SW1 Settings

Section	Position	Meaning	Factory Setting
1	ON	T1 is not the input reference	—
	OFF	T1 is the input reference	X
2	ON	CC is not the reference	X
	OFF	CC is the reference	—
3	ON	D4 framing	X
	OFF	ESF framing	—
4	ON	No bipolar 8-zero substitution	X
	OFF	Bipolar 8-zero substitution	—

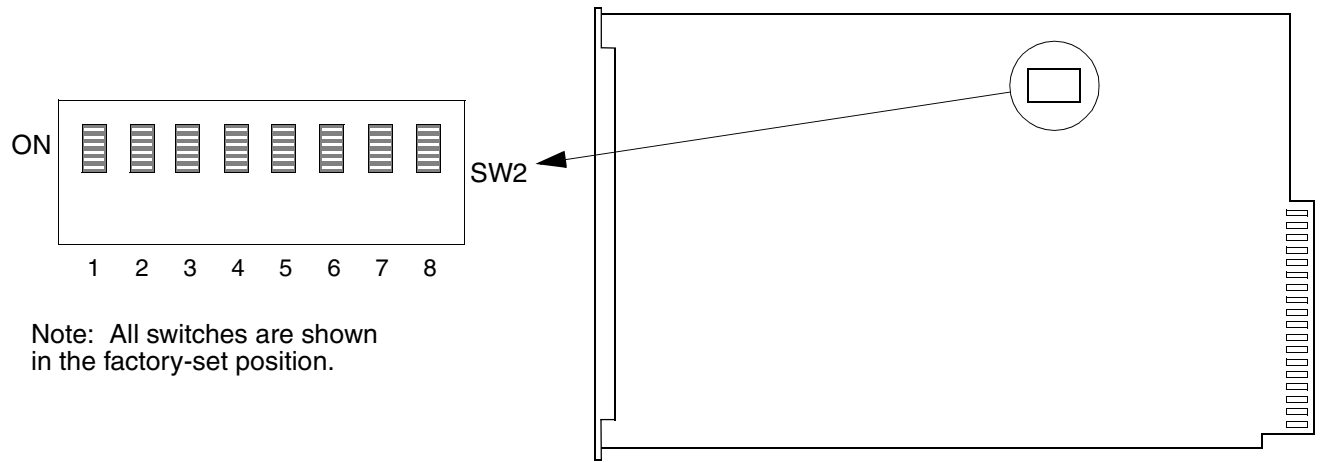
Figure 10. CI Card Switch

Chart 11. DCIM-EA or DCIM-T Card Test

STEP	PROCEDURE
	<p>Use this procedure to verify the operation of the DCIM-EA or DCIM-T cards. This procedure assumes the input reference signals have been connected per the Installation section of this manual. Consult the local company Installation Job Specifications to determine the type of input card to be installed in the MRA and MRB slots in the shelf.</p> <p>Notes:</p> <ol style="list-style-type: none"> Where information is common to the DCIM-EA and DCIM-T cards, these cards are collectively referred to as DCIM cards. If installing a DCIM card in a remote system, contact your local Symmetricom distributor or Symmetricom's CTAC. <p>Test Equipment: None</p>
1	On the master shelf rear panel, set the ST2/ST3 switch (Figure 1) to the ST3 position for this test, regardless of the type of clock card to be installed.
2	Set switch SW2 (Figure 11 for DCIM-EA, Figure 12 for DCIM-T) on each DCIM card to conform to the requirements for this installation.
3	<p>Insert the first DCIM card into the MR A slot.</p> <p>Requirement: On the DCIM card just installed, the REF 1, REF 2, STATUS 1, and STATUS 2 lamps are lit green, and the FAIL lamp goes off after approximately 1 minute. After the card has warmed up, the SRC ACTIVE lamp lights green.</p>
4	<p>If not equipped with a second DCIM card, skip to Step 14. Insert the second DCIM card into the MR B slot in the master shelf.</p> <p>Requirement: On the DCIM card just installed, the REF 1, REF 2, STATUS 1, and STATUS 2 lamps are lit green, and the FAIL lamp goes off after approximately 1 minute. After the card has warmed up, the SRC ACTIVE lamp lights green.</p>
5	<p>Press the XFR pushbutton on one of the DCIM cards.</p> <p>Requirement: The lit SRC ACTIVE lamp transfers to the other DCIM card.</p>
6	<p>Press the XFR pushbutton on the other DCIM card.</p> <p>Requirement: The lit SRC ACTIVE lamp lights on the original DCIM card.</p>
7	<p>Remove the DCIM card with its SRC ACTIVE lamp lit.</p> <p>Requirement: The SRC ACTIVE lamp lights on the other DCIM card.</p>
8	<p>Reinsert the removed DCIM card.</p> <p>Requirement: The SRC ACTIVE lamp remains lit on the other DCIM card.</p>

Chart 11. DCIM-EA or DCIM-T Card Test (Contd)

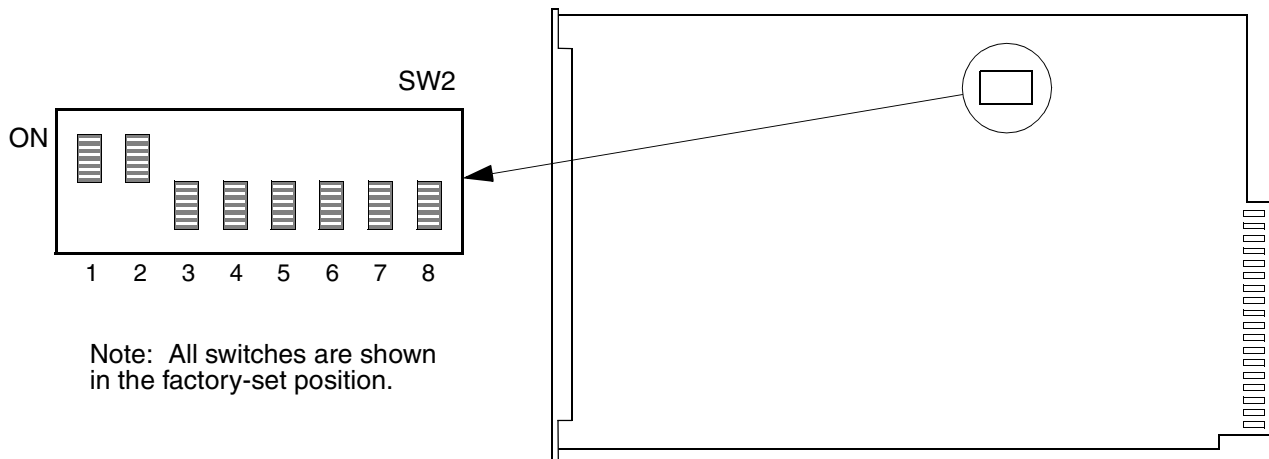
STEP	PROCEDURE
9	Remove the DCIM card with its SRC ACTIVE lamp lit. <i>Requirement:</i> The SRC ACTIVE lamp on the original DCIM card lights.
10	Reinsert the removed DCIM card. <i>Requirement:</i> The SRC ACTIVE lamp remains lit on the other DCIM card.
11	Press the XFR pushbutton on either DCIM card. <i>Requirement:</i> The lit SRC ACTIVE lamp transfers to the other DCIM card.
12	Set the ST2/ST3 switch (SW1) on the backplane to conform to the requirements for this installation. <i>Requirement:</i> If SW1 is set to the ST2 position, the SRC ACTIVE lamps on both DCIM cards are lit. The transfer (XFR) function between the DCIM cards is disabled.
13	Use the INIT-REG command for every MRC card in the shelf. This initializes all registers on the shelf. <i>Requirement:</i> The response indicates the command was completed successfully.
14	Indicate completion of the DCIM-EA or DCIM-T Card Test on the Test Sign-off form.



SW2 Settings

Section	Position	Meaning	Factory Setting
1	ON	Input Reference 1 Enabled	X
	OFF	Input Reference 1 Disabled	—
2	ON	Input Reference 2 Enabled	X
	OFF	Input Reference 2 Disabled	—
3	ON	Input Reference 1 Digital E1	X
	OFF	Input Reference 1 Analog	—
4	ON	Input Reference 2 Digital E1	X
	OFF	Input Reference 2 Analog	—
5	ON	Input Reference 1 Framing CCS	X
	OFF	Input Reference 1 Framing CAS	—
6	ON	Input Reference 1 Framing without CRC4	X
	OFF	Input Reference 1 Framing with CRC4	—
7	ON	Input Reference 2 Framing CCS	X
	OFF	Input Reference 2 Framing CAS	—
8	ON	Input Reference 2 Framing without CRC4	X
	OFF	Input Reference 2 Framing with CRC4	—

Figure 11. DCIM-EA Card Switch



SW2 Settings

Section	Position	Meaning	Factory Setting
1	ON	Input Reference 1 Enabled	X
	OFF	Input Reference 1 Disabled	—
2	ON	Input Reference 2 Enabled	X
	OFF	Input Reference 2 Disabled	—
3	ON	Not Allowed	—
	OFF	Normal Operation	X
4	ON	Not Allowed	—
	OFF	Normal Operation	X
5	ON	Input Reference 1 Framing D4	—
	OFF	Input Reference 1 Framing ESF	X
6	ON	Not Allowed	—
	OFF	Normal Operation	X
7	ON	Input Reference 2 Framing D4	—
	OFF	Input Reference 2 Framing ESF	X
8	ON	Not Allowed	—
	OFF	Normal Operation	X

Figure 12. DCIM-T Card Switch

Chart 12. ST2E or TNC-E Card Test

STEP	PROCEDURE
	<p>Use this procedure to install two ST2E or TNC-E cards installed in the same shelf. If the installation is one ST2E or TNC-E and one ST3E, TNC, or LNC, use the procedure in Chart 16 or Chart 17. This procedure assumes the procedure for the clock input cards has been completed and there are timing supplies connected to the inputs.</p> <p>Notes:</p> <ol style="list-style-type: none"> 1. The times indicated in the procedure are from the time the card is powered (inserted in the shelf). 2. If the FAIL lamp lights on an ST2E or TNC-E card at any time, the card has failed and must be replaced. 3. Resistance cannot be measured across certain test points if E2A telemetry equipment is connected to the test points or if an MIS card is installed in the shelf. 4. The HOLDOVER and HOLDOVER RTN terminal set is connected to -48 V and battery return through relay windings for the holdover MAJOR/MINOR option switch (SW3) operation. For this reason, resistance cannot be measured across this terminal set. <p>Test Equipment: Digital volt/ohm meter</p>
1	<p>On the master shelf backplane, set the ST2/ST3 switch (SW1) to the ST2 position (Figure 1).</p> <p>Requirement: Both clock input cards' SRC ACT/SRC ACTIVE lamps are lit.</p>
2	<p>On the ST2E or TNC-E cards, set SW1, all sections to the OFF (down) position (Figure 13).</p>
3	<p>In the master shelf, insert the first ST2E or TNC-E card into the ST A slot.</p> <p>Requirement: The HOLDOVER lamp flashes green during the stabilization period of approximately 60 minutes.</p>
4	<p>In the master shelf, insert the second ST2E or TNC-E card into the ST B slot.</p> <p>Note: No waiting period is necessary between when the first ST2E or TNC-E card and the second ST2E or TNC-E card may be installed.</p> <p>Requirement: The HOLDOVER lamp flashes green during the stabilization period of approximately 60 minutes.</p>
5	<p>After the stabilization period, observe the HOLDOVER, SRC A, and SRC B lamps.</p> <p>Requirement: On both ST2E or TNC-E cards, the HOLDOVER lamp goes off, and the SRC A lamp on the ST2E A or TNC-E A card and the SRC B lamp on the ST2E B or TNC-E B card both light green.</p> <p>Note: If an ST2E or TNC-E does not recognize its associated SRC input (ST2E A or TNC-E A, SRC A and ST2E B or TNC-E B, SRC B), both ST2E or TNC-E cards will look at the remaining available input and light their appropriate SRC lamps. If no inputs are available from either input card, the HOLDOVER lamp lights steady green and the ACTIVE lamp lights green to indicate the ST2E or TNC-E cards are in holdover mode.</p>

Chart 12. ST2E or TNC-E Card Test (Contd)

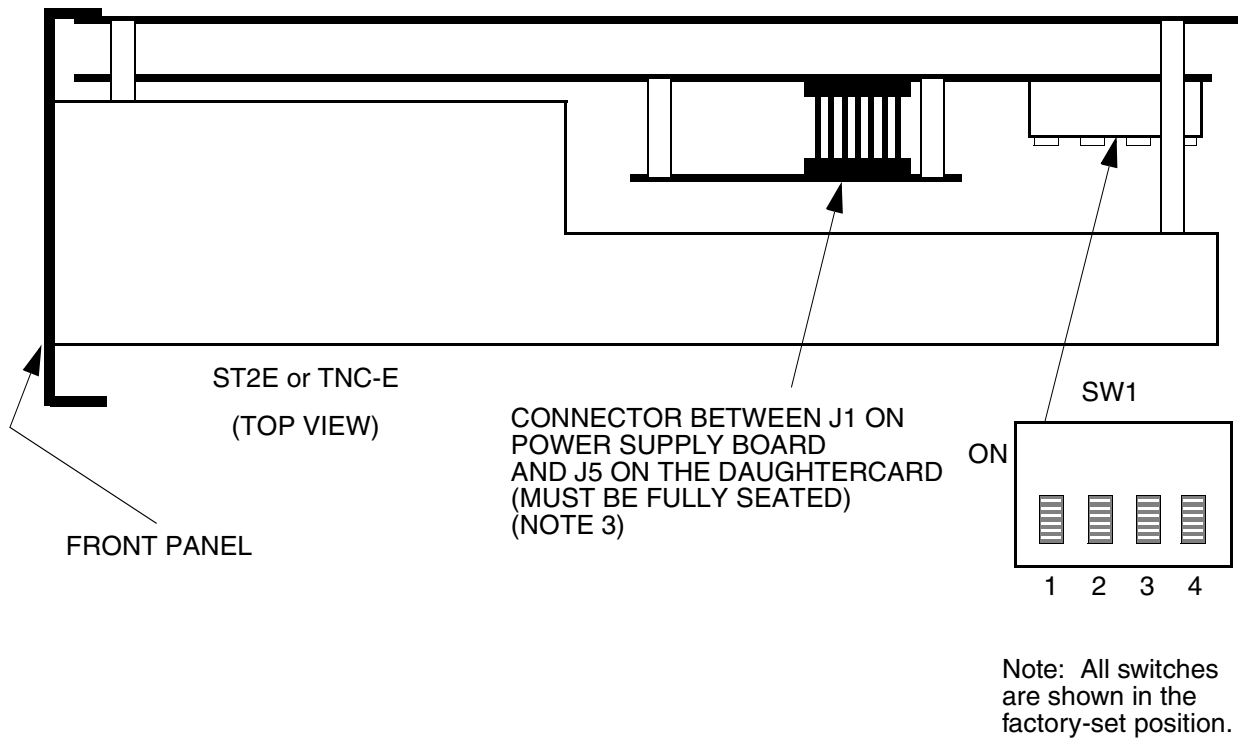
STEP	PROCEDURE																																								
6	<p>Before the ACTIVE lamps light on the ST2E or TNC-E cards, remove both clock input cards.</p> <p>Requirements: The SRC lamps on the ST2E or TNC-E cards extinguish and the HOLDOVER lamps light steady green, and the ACTIVE lamps light on both ST2E or TNC-E cards to indicate they are in freerun mode.</p>																																								
7	<p>Connect the multimeter, set to the resistance (if an SAI card is installed) or volts dc scale (if an MIS card is installed), across the following terminal sets on the shelf backplane:</p> <p>If Rev. D or earlier shelf:</p> <table border="0"> <thead> <tr> <th><u>Test Point</u></th> <th><u>Test Point</u></th> <th><u>MIS</u></th> <th><u>SAI</u></th> </tr> </thead> <tbody> <tr> <td>CLOCK STATUS A RTN</td> <td>FREERUN</td> <td><0.1 V</td> <td><10 Ω</td> </tr> <tr> <td>CLOCK STATUS A RTN</td> <td>LOCK</td> <td><0.1 V</td> <td><10 Ω</td> </tr> <tr> <td>CLOCK STATUS B RTN</td> <td>FREERUN</td> <td><0.1 V</td> <td><10 Ω</td> </tr> <tr> <td>CLOCK STATUS B RTN</td> <td>LOCK</td> <td><0.1 V</td> <td><10 Ω</td> </tr> </tbody> </table> <p>If Rev. E or later shelf:</p> <table border="0"> <thead> <tr> <th><u>Test Point</u></th> <th><u>Test Point</u></th> <th><u>MIS</u></th> <th><u>SAI</u></th> </tr> </thead> <tbody> <tr> <td>CLOCK STATUS A FREERUN</td> <td>FREERUN RTN</td> <td><0.1 V</td> <td><10 Ω</td> </tr> <tr> <td>CLOCK STATUS A LOCK</td> <td>LOCK RTN</td> <td><0.1 V</td> <td><10 Ω</td> </tr> <tr> <td>CLOCK STATUS B FREERUN</td> <td>FREERUN RTN</td> <td><0.1 V</td> <td><10 Ω</td> </tr> <tr> <td>CLOCK STATUS B LOCK</td> <td>LOCK RTN</td> <td><0.1 V</td> <td><10 Ω</td> </tr> </tbody> </table> <p>Requirement: The multimeter indicates the readings shown in the MIS or SAI column, depending on whether an MIS or SAI card is installed in the shelf.</p>	<u>Test Point</u>	<u>Test Point</u>	<u>MIS</u>	<u>SAI</u>	CLOCK STATUS A RTN	FREERUN	<0.1 V	<10 Ω	CLOCK STATUS A RTN	LOCK	<0.1 V	<10 Ω	CLOCK STATUS B RTN	FREERUN	<0.1 V	<10 Ω	CLOCK STATUS B RTN	LOCK	<0.1 V	<10 Ω	<u>Test Point</u>	<u>Test Point</u>	<u>MIS</u>	<u>SAI</u>	CLOCK STATUS A FREERUN	FREERUN RTN	<0.1 V	<10 Ω	CLOCK STATUS A LOCK	LOCK RTN	<0.1 V	<10 Ω	CLOCK STATUS B FREERUN	FREERUN RTN	<0.1 V	<10 Ω	CLOCK STATUS B LOCK	LOCK RTN	<0.1 V	<10 Ω
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CLOCK STATUS B FREERUN	FREERUN RTN	<0.1 V	<10 Ω																																						
CLOCK STATUS B LOCK	LOCK RTN	<0.1 V	<10 Ω																																						
8	<p>Reinsert both clock input cards.</p> <p>Requirements: On the clock input cards, after the input source is acquired (approximately 8 s to 40 s for CI/ACI cards, or 3 minutes to 5 minutes for MRC cards), the SRC ACT/SRC ACTIVE lamps light. The appropriate SRC lamps light, the HOLDOVER lamps go off, and the ACTIVE lamp remains lit on both ST2E or TNC-E cards.</p>																																								
9	<p>Connect the multimeter, set to the resistance (if an SAI card is installed) or volts dc scale (if an MIS card is installed), across the following terminal sets on the shelf backplane:</p> <p>If Rev. D or earlier shelf:</p> <table border="0"> <thead> <tr> <th><u>Test Point</u></th> <th><u>Test Point</u></th> <th><u>MIS</u></th> <th><u>SAI</u></th> </tr> </thead> <tbody> <tr> <td>CLOCK STATUS A RTN</td> <td>FREERUN</td> <td>-42 V to -56 V</td> <td>>1 MΩ</td> </tr> <tr> <td>CLOCK STATUS B RTN</td> <td>FREERUN</td> <td>-42 V to -56 V</td> <td>>1 MΩ</td> </tr> </tbody> </table> <p>If Rev. E or later shelf:</p> <table border="0"> <thead> <tr> <th><u>Test Point</u></th> <th><u>Test Point</u></th> <th><u>MIS</u></th> <th><u>SAI</u></th> </tr> </thead> <tbody> <tr> <td>CLOCK STATUS A FREERUN</td> <td>FREERUN RTN</td> <td>-42 V to -56 V</td> <td>>1 MΩ</td> </tr> <tr> <td>CLOCK STATUS B FREERUN</td> <td>FREERUN RTN</td> <td>-42 V to -56 V</td> <td>>1 MΩ</td> </tr> </tbody> </table> <p>Requirement: The multimeter indicates the readings shown in the MIS or SAI column, depending on whether an MIS or SAI card is installed in the shelf.</p>	<u>Test Point</u>	<u>Test Point</u>	<u>MIS</u>	<u>SAI</u>	CLOCK STATUS A RTN	FREERUN	-42 V to -56 V	>1 MΩ	CLOCK STATUS B RTN	FREERUN	-42 V to -56 V	>1 MΩ	<u>Test Point</u>	<u>Test Point</u>	<u>MIS</u>	<u>SAI</u>	CLOCK STATUS A FREERUN	FREERUN RTN	-42 V to -56 V	>1 MΩ	CLOCK STATUS B FREERUN	FREERUN RTN	-42 V to -56 V	>1 MΩ																
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Chart 12. ST2E or TNC-E Card Test (Contd)

STEP	PROCEDURE																								
10	<p>In 8 s to 40 s for ACI or CI cards, 1 minute for DCIM cards, or 3 minutes to 5 minutes for MRC cards, observe the LKD lamps on the ST2E or TNC-E cards.</p> <p>Requirement: On both ST2E or TNC-E cards, the LKD lamps light green.</p> <p>Note: This indicates that the ST2E or TNC-E cards are frequency-locked with their input sources.</p>																								
11	<p>Connect the multimeter, set to the resistance (if an SAI card is installed) or volts dc scale (if an MIS card is installed), across the following terminal sets on the shelf backplane:</p> <p>If Rev. D or earlier shelf:</p> <table border="0"> <thead> <tr> <th><u>Test Point</u></th> <th><u>Test Point</u></th> <th><u>MIS</u></th> <th><u>SAI</u></th> </tr> </thead> <tbody> <tr> <td>CLOCK STATUS A RTN</td> <td>LOCK</td> <td>-42 V to -56 V</td> <td>>1 MΩ</td> </tr> <tr> <td>CLOCK STATUS B RTN</td> <td>LOCK</td> <td>-42 V to -56 V</td> <td>>1 MΩ</td> </tr> </tbody> </table> <p>If Rev. E or later shelf:</p> <table border="0"> <thead> <tr> <th><u>Test Point</u></th> <th><u>Test Point</u></th> <th><u>MIS</u></th> <th><u>SAI</u></th> </tr> </thead> <tbody> <tr> <td>CLOCK STATUS A LOCK</td> <td>LOCK RTN</td> <td>-42 V to -56 V</td> <td>>1 MΩ</td> </tr> <tr> <td>CLOCK STATUS B LOCK</td> <td>LOCK RTN</td> <td>-42 V to -56 V</td> <td>>1 MΩ</td> </tr> </tbody> </table> <p>Requirement: The multimeter indicates the readings shown in the MIS or SAI column, depending on whether an MIS or SAI card is installed in the shelf.</p>	<u>Test Point</u>	<u>Test Point</u>	<u>MIS</u>	<u>SAI</u>	CLOCK STATUS A RTN	LOCK	-42 V to -56 V	>1 MΩ	CLOCK STATUS B RTN	LOCK	-42 V to -56 V	>1 MΩ	<u>Test Point</u>	<u>Test Point</u>	<u>MIS</u>	<u>SAI</u>	CLOCK STATUS A LOCK	LOCK RTN	-42 V to -56 V	>1 MΩ	CLOCK STATUS B LOCK	LOCK RTN	-42 V to -56 V	>1 MΩ
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CLOCK STATUS A LOCK	LOCK RTN	-42 V to -56 V	>1 MΩ																						
CLOCK STATUS B LOCK	LOCK RTN	-42 V to -56 V	>1 MΩ																						
12	<p>Remove the clock input A card.</p> <p>Requirements: The ACTIVE lamp on the ST2E A or TNC-E A card remains lit, the lit SRC A lamp goes off, and the SRC B lamp lights to indicate that the card is now receiving clocking from the clock input B card. The LKD lamp may go off, if so, it will relight after approximately 5 minutes.</p>																								
13	<p>Reinsert the clock input A card.</p> <p>Requirements: After the input source is acquired (approximately 8 s to 40 s for CI/ACI cards, 1 minute for DCIM cards, or 3 minutes to 5 minutes for MRC cards), the SRC ACT/SRC ACTIVE lamp lights on the input A card, and the SRC A lamp lights and the SRC B lamps goes off on the ST2E A or TNC-E A card. The LKD lamp may go off, if so, it will relight after approximately 5 minutes.</p>																								
14	<p>Remove the clock input B card.</p> <p>Requirement: The ACTIVE lamp on the ST2E B or TNC-E B card remains lit, the lit SRC B lamp goes off, and the SRC A lamp lights to indicate that the card is now receiving clocking from the clock input A card. The LKD lamp may go off, if so, it will relight after approximately 5 minutes.</p>																								
15	<p>Reinsert the clock input B card.</p> <p>Requirement: After the input source is acquired, the SRC ACT/SRC ACTIVE lamp lights on the clock input B card, and the SRC B lamp lights and the SRC A lamp goes off on the ST2E or TNC-E B card. The LKD lamp may go off, if so, it will relight after approximately 5 minutes.</p>																								

Chart 12. ST2E or TNC-E Card Test (Contd)

STEP	PROCEDURE																		
16	<p>Remove both clock input cards.</p> <p>Requirement: On both ST2E or TNC-E cards, the SRC and LKD lamps extinguish, the ACTIVE lamps remain lit, and the HOLDOVER lamps light red to indicate they are in holdover mode.</p>																		
17	<p>Connect the multimeter set to V dc across the following terminal sets on the shelf backplane:</p> <p>If Rev. D or earlier shelf:</p> <table border="0"> <thead> <tr> <th><u>Test Point</u></th> <th><u>Test Point</u></th> <th><u>Reading</u></th> </tr> </thead> <tbody> <tr> <td>CLOCK STATUS A RTN</td> <td>HOLDOVER</td> <td><0.1 V</td> </tr> <tr> <td>CLOCK STATUS A RTN</td> <td>HOLDOVER</td> <td><0.1 V</td> </tr> </tbody> </table> <p>If Rev. E or later shelf:</p> <table border="0"> <thead> <tr> <th><u>Test Point</u></th> <th><u>Test Point</u></th> <th><u>Reading</u></th> </tr> </thead> <tbody> <tr> <td>CLOCK STATUS A HOLDOVER</td> <td>HOLDOVER RTN</td> <td><0.1 V</td> </tr> <tr> <td>CLOCK STATUS B HOLDOVER</td> <td>HOLDOVER RTN</td> <td><0.1 V</td> </tr> </tbody> </table> <p>Requirement: The multimeter indicates the readings shown.</p>	<u>Test Point</u>	<u>Test Point</u>	<u>Reading</u>	CLOCK STATUS A RTN	HOLDOVER	<0.1 V	CLOCK STATUS A RTN	HOLDOVER	<0.1 V	<u>Test Point</u>	<u>Test Point</u>	<u>Reading</u>	CLOCK STATUS A HOLDOVER	HOLDOVER RTN	<0.1 V	CLOCK STATUS B HOLDOVER	HOLDOVER RTN	<0.1 V
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CLOCK STATUS A HOLDOVER	HOLDOVER RTN	<0.1 V																	
CLOCK STATUS B HOLDOVER	HOLDOVER RTN	<0.1 V																	
18	<p>Reinsert both clock input cards.</p> <p>Requirement: The SRC ACT/SRC ACTIVE lamps light on the clock input cards, the HOLDOVER lamps on both ST2E or TNC-E cards go off, SRC A on the ST2E A or TNC-E A and the SRC B on the ST2E B or TNC-E B lights; then the LKD lamp on the ST2E or TNC-E cards light.</p>																		
19	<p>Connect the multimeter set to V dc across the following terminal sets on the shelf backplane:</p> <p>If Rev. D or earlier shelf:</p> <table border="0"> <thead> <tr> <th><u>Test Point</u></th> <th><u>Test Point</u></th> <th><u>Reading</u></th> </tr> </thead> <tbody> <tr> <td>CLOCK STATUS A RTN</td> <td>HOLDOVER</td> <td>-42 V to -56 V</td> </tr> <tr> <td>CLOCK STATUS A RTN</td> <td>HOLDOVER</td> <td>-42 V to -56 V</td> </tr> </tbody> </table> <p>If Rev. E or later shelf:</p> <table border="0"> <thead> <tr> <th><u>Test Point</u></th> <th><u>Test Point</u></th> <th><u>Reading</u></th> </tr> </thead> <tbody> <tr> <td>CLOCK STATUS A HOLDOVER</td> <td>HOLDOVER RTN</td> <td>-42 V to -56 V</td> </tr> <tr> <td>CLOCK STATUS B HOLDOVER</td> <td>HOLDOVER RTN</td> <td>-42 V to -56 V</td> </tr> </tbody> </table> <p>Requirement: The multimeter indicates the readings shown.</p>	<u>Test Point</u>	<u>Test Point</u>	<u>Reading</u>	CLOCK STATUS A RTN	HOLDOVER	-42 V to -56 V	CLOCK STATUS A RTN	HOLDOVER	-42 V to -56 V	<u>Test Point</u>	<u>Test Point</u>	<u>Reading</u>	CLOCK STATUS A HOLDOVER	HOLDOVER RTN	-42 V to -56 V	CLOCK STATUS B HOLDOVER	HOLDOVER RTN	-42 V to -56 V
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CLOCK STATUS A HOLDOVER	HOLDOVER RTN	-42 V to -56 V																	
CLOCK STATUS B HOLDOVER	HOLDOVER RTN	-42 V to -56 V																	
20	<p>If an SAI card is installed in the shelf, skip this step. Use the INIT-REG command for every MRC card in the shelf. This initializes all registers on the shelf.</p> <p>Requirement: The response indicates the command was completed successfully.</p>																		
21	<p>This procedure is complete. Indicate completion of the ST2E or TNC-E Card Test on the Test Sign-off form.</p>																		



Switch SW1 Settings

SECTION	POSITION	MEANING	FACTORY SETTING
2	ON	An ST2E or TNC-E card installed in clock card slot A and an ST3E/LNC/TNC card installed in clock card slot B	—
	OFF	Two ST2E or TNC-E cards installed in shelf	X

Notes:

1. When Issue A or B of the ST2E card is installed, do not use the LPR as an input reference source. Issue D (or later) of the ST2E may use an LPR or a network feed as an input reference source.
2. All other sections must be set to OFF (factory setting).
3. Make sure the connector between J1 on the power supply card and J5 on the daughter card is fully seated.

Figure 13. ST2E or TNC-E Card Switch

Chart 13. ST2 Card Test

STEP	PROCEDURE
<p>Use this procedure to install the ST2 cards. This procedure assumes the procedure for the clock input cards has been completed and there are clocking supplies connected to the inputs.</p> <p>There are no switch options on the ST2 card.</p> <p>Notes:</p> <ol style="list-style-type: none"> 1. The times indicated in the procedure are from the time the card is powered (inserted in the shelf). 2. If the ST2 card is Issue D or earlier, the oscillator stabilization period is approximately 1 h and is software controlled (not a function of oscillator temperature). If Issue E or later, the rubidium temperature is checked upon insertion and the oscillator may stabilize in less than 1 h. 3. If the FAIL lamp lights on an ST2 card at any time, the card has failed and must be replaced. 4. Resistance cannot be measured across terminal sets if remote telemetry equipment is connected to the terminal sets or if an MIS card is installed in the shelf. 5. The HOLDOVER and RTN status terminal set is connected to -48 V and battery return through relay windings for the holdover MAJOR/MINOR option switch (SW3) operation. Therefore, resistance cannot be measured across this terminal set. <p>Test Equipment: Digital volt/ohm meter</p>	
1	<p>On the master shelf backplane, set the ST2/ST3 switch (SW1) to the ST2 position (Figure 1).</p> <p>Requirement: Both clock input cards' SRC ACT/SRC ACTIVE lamps are lit.</p>
2	<p>In the master shelf, insert the first ST2 card into the ST A slot.</p>
3	<p>In the master shelf, insert the second ST2 card into the ST B slot.</p> <p>Note: There is no waiting period between installation of the first ST2 card and the second ST2 card.</p>
4	<p>During the stabilization period (approximately 40 minutes to 60 minutes), observe the FREE RUN lamp on both ST2 cards.</p> <p>Requirement: On both ST2 cards, the FREE RUN lamp flashes green.</p>
5	<p>After the stabilization period, observe the FREE RUN, REF A, and REF B lamps.</p> <p>Requirement: On both ST2 cards, the FREE RUN lamp stops flashing and goes off. On the ST2 on the left (ST A), the REF A lamp lights green, and on the ST2 on the right (ST B), the REF B lamp lights green.</p> <p>Note: If an ST2 does not recognize its associated REF input (ST2 A, REF A and ST2 B, REF B), both ST2 cards will look at the remaining available input and light their appropriate REF lamps. If no inputs are available from either input card, the ST2 cards will remain in FREE RUN and their FREE RUN lamps will light steady.</p>

Chart 13. ST2 Card Test (Contd)

STEP	PROCEDURE																																								
6	<p>Before the LOCKED lamps light on the ST2 cards, remove both clock input cards.</p> <p>Requirement: The REF lamps on the ST2 card extinguish and the FREE RUN lamps light steadily; one ST2 card's ACTIVE lamp lights.</p>																																								
7	<p>Connect the multimeter, set to the resistance (if an SAI card is installed) or volts dc scale (if an MIS card is installed), across the following terminal sets on the shelf backplane:</p> <p>If Rev. D or earlier shelf:</p> <table border="0"> <thead> <tr> <th><u>Test Point</u></th> <th><u>Test Point</u></th> <th><u>MIS</u></th> <th><u>SAI</u></th> </tr> </thead> <tbody> <tr> <td>CLOCK STATUS A RTN</td> <td>FREERUN</td> <td><0.1 V</td> <td><10 Ω</td> </tr> <tr> <td>CLOCK STATUS A RTN</td> <td>LOCK</td> <td><0.1 V</td> <td><10 Ω</td> </tr> <tr> <td>CLOCK STATUS B RTN</td> <td>FREERUN</td> <td><0.1 V</td> <td><10 Ω</td> </tr> <tr> <td>CLOCK STATUS B RTN</td> <td>LOCK</td> <td><0.1 V</td> <td><10 Ω</td> </tr> </tbody> </table> <p>If Rev. E or later shelf:</p> <table border="0"> <thead> <tr> <th><u>Test Point</u></th> <th><u>Test Point</u></th> <th><u>MIS</u></th> <th><u>SAI</u></th> </tr> </thead> <tbody> <tr> <td>CLOCK STATUS A FREERUN</td> <td>FREERUN RTN</td> <td><0.1 V</td> <td><10 Ω</td> </tr> <tr> <td>CLOCK STATUS A LOCK</td> <td>LOCK RTN</td> <td><0.1 V</td> <td><10 Ω</td> </tr> <tr> <td>CLOCK STATUS B FREERUN</td> <td>FREERUN RTN</td> <td><0.1 V</td> <td><10 Ω</td> </tr> <tr> <td>CLOCK STATUS B LOCK</td> <td>LOCK RTN</td> <td><0.1 V</td> <td><10 Ω</td> </tr> </tbody> </table> <p>Requirement: The multimeter indicates the readings shown in the MIS or SAI column, depending on whether an MIS or SAI card is installed in the shelf.</p>	<u>Test Point</u>	<u>Test Point</u>	<u>MIS</u>	<u>SAI</u>	CLOCK STATUS A RTN	FREERUN	<0.1 V	<10 Ω	CLOCK STATUS A RTN	LOCK	<0.1 V	<10 Ω	CLOCK STATUS B RTN	FREERUN	<0.1 V	<10 Ω	CLOCK STATUS B RTN	LOCK	<0.1 V	<10 Ω	<u>Test Point</u>	<u>Test Point</u>	<u>MIS</u>	<u>SAI</u>	CLOCK STATUS A FREERUN	FREERUN RTN	<0.1 V	<10 Ω	CLOCK STATUS A LOCK	LOCK RTN	<0.1 V	<10 Ω	CLOCK STATUS B FREERUN	FREERUN RTN	<0.1 V	<10 Ω	CLOCK STATUS B LOCK	LOCK RTN	<0.1 V	<10 Ω
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CLOCK STATUS B LOCK	LOCK RTN	<0.1 V	<10 Ω																																						
8	<p>Reinsert both clock input cards.</p> <p>Requirement: After approximately 8 s to 40 s (for CI/ACI cards), 1 minute (for DCIM cards), or 2 minutes to 3 minutes (for MRC cards), the SRC ACT/SRC ACTIVE lamps on the clock input cards light, and the appropriate REF lamps light on the ST2 cards.</p>																																								
9	<p>Connect the multimeter, set to the resistance (if an SAI card is installed) or volts dc scale (if an MIS card is installed), across the following terminal sets on the shelf backplane.</p> <p>If Rev. D or earlier shelf:</p> <table border="0"> <thead> <tr> <th><u>Test Point</u></th> <th><u>Test Point</u></th> <th><u>MIS</u></th> <th><u>SAI</u></th> </tr> </thead> <tbody> <tr> <td>CLOCK STATUS A RTN</td> <td>FREERUN</td> <td>-42 V to -56 V</td> <td>>1 MΩ</td> </tr> <tr> <td>CLOCK STATUS B RTN</td> <td>FREERUN</td> <td>-42 V to -56 V</td> <td>>1 MΩ</td> </tr> </tbody> </table> <p>If Rev. E or later shelf:</p> <table border="0"> <thead> <tr> <th><u>Test Point</u></th> <th><u>Test Point</u></th> <th><u>MIS</u></th> <th><u>SAI</u></th> </tr> </thead> <tbody> <tr> <td>CLOCK STATUS A FREERUN</td> <td>FREERUN RTN</td> <td>-42 V to -56 V</td> <td>>1 MΩ</td> </tr> <tr> <td>CLOCK STATUS B FREERUN</td> <td>FREERUN RTN</td> <td>-42 V to -56 V</td> <td>>1 MΩ</td> </tr> </tbody> </table> <p>Requirement: The multimeter indicates the readings shown in the MIS or SAI column, depending on whether an MIS or SAI card is installed in the shelf.</p>	<u>Test Point</u>	<u>Test Point</u>	<u>MIS</u>	<u>SAI</u>	CLOCK STATUS A RTN	FREERUN	-42 V to -56 V	>1 MΩ	CLOCK STATUS B RTN	FREERUN	-42 V to -56 V	>1 MΩ	<u>Test Point</u>	<u>Test Point</u>	<u>MIS</u>	<u>SAI</u>	CLOCK STATUS A FREERUN	FREERUN RTN	-42 V to -56 V	>1 MΩ	CLOCK STATUS B FREERUN	FREERUN RTN	-42 V to -56 V	>1 MΩ																
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Chart 13. ST2 Card Test (Contd)

STEP	PROCEDURE																								
10	<p>Approximately 5 minutes (up to 20 minutes for worst-case signal conditions) after the end of the stabilization period, observe the LOCKED and ACTIVE lamps on the ST2 cards.</p> <p>Requirement: On both ST2 cards, the LOCKED lamp lights green. On one of the ST2 cards, the ACTIVE lamp is lit green.</p>																								
11	<p>Connect the multimeter, set to the resistance (if an SAI card is installed) or volts dc scale (if an MIS card is installed), across the following terminal sets on the shelf backplane:</p> <p>If Rev. D or earlier shelf:</p> <table border="0"> <thead> <tr> <th><u>Test Point</u></th> <th><u>Test Point</u></th> <th><u>MIS</u></th> <th><u>SAI</u></th> </tr> </thead> <tbody> <tr> <td>CLOCK STATUS A RTN</td> <td>LOCK</td> <td>-42 V to -56 V</td> <td>>1 MΩ</td> </tr> <tr> <td>CLOCK STATUS B RTN</td> <td>LOCK</td> <td>-42 V to -56 V</td> <td>>1 MΩ</td> </tr> </tbody> </table> <p>If Rev. E or later shelf:</p> <table border="0"> <thead> <tr> <th><u>Test Point</u></th> <th><u>Test Point</u></th> <th><u>MIS</u></th> <th><u>SAI</u></th> </tr> </thead> <tbody> <tr> <td>CLOCK STATUS A FREERUN</td> <td>FREERUN RTN</td> <td>-42 V to -56 V</td> <td>>1 MΩ</td> </tr> <tr> <td>CLOCK STATUS B FREERUN</td> <td>FREERUN RTN</td> <td>-42 V to -56 V</td> <td>>1 MΩ</td> </tr> </tbody> </table> <p>Requirement: The multimeter indicates the readings shown in the MIS or SAI column, depending on whether an MIS or SAI card is installed in the shelf.</p>	<u>Test Point</u>	<u>Test Point</u>	<u>MIS</u>	<u>SAI</u>	CLOCK STATUS A RTN	LOCK	-42 V to -56 V	>1 M Ω	CLOCK STATUS B RTN	LOCK	-42 V to -56 V	>1 M Ω	<u>Test Point</u>	<u>Test Point</u>	<u>MIS</u>	<u>SAI</u>	CLOCK STATUS A FREERUN	FREERUN RTN	-42 V to -56 V	>1 M Ω	CLOCK STATUS B FREERUN	FREERUN RTN	-42 V to -56 V	>1 M Ω
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12	<p>Press the XFR pushbutton on one of the ST2 cards.</p> <p>Requirement: The lit ACTIVE lamp indication transfers to the other ST2 card, the LOCKED lamps remain lit.</p>																								
13	<p>Press the XFR pushbutton on the other ST2 card.</p> <p>Requirement: The lit ACTIVE lamp indication transfers back to the original card, the LOCKED lamps remain lit.</p>																								
14	<p>If the ACTIVE lamp on ST2 A is not lit, press the XFR pushbutton on its faceplate to make it active. Remove the clock input A card.</p> <p>Requirement: The ACTIVE lamp on the ST2 A card remains lit, the REF A lamp goes off and the REF B lamp lights to indicate that the card is now receiving clocking from the clock input B card. The LOCKED lamp may go off, if so, it will relight after approximately 5 minutes.</p>																								
15	<p>Remove the ST2 A card.</p> <p>Requirement: The ACTIVE lamp on the ST2 B card lights.</p>																								
16	<p>Reinsert the ST2 A and clock input A cards.</p> <p>Requirement: After the stabilization period (approximately 5 minutes to 60 minutes), the SRC ACT/SRC ACTIVE lamps on the clock input A card, and the REF A and LOCKED lamps on the ST2 A card light, and the ACTIVE lamp on the ST2 B card remains lit.</p>																								

Chart 13. ST2 Card Test (Contd)

STEP	PROCEDURE																		
17	Remove the ST2 B card. Requirement: The ACTIVE lamp on the ST2 A card lights.																		
18	Reinsert the ST2 B and clock input B cards. Requirement: After the stabilization period (approximately 5 minutes to 60 minutes), the SRC ACT/SRC ACTIVE lamps on the clock input B card, the REF B and LOCKED lamps on the ST2 B card light, and the ACTIVE lamp on the ST2 A card remains lit.																		
19	Remove both clock input cards. Requirement: On both ST2 cards, the REF and LOCKED lamps go off, the ACTIVE lamp remains lit on the ST2 B card, and the red HOLDOVER lamps light on both ST2 cards.																		
20	Connect the multimeter set to V dc across the following terminal sets on the shelf backplane: If Rev. D or earlier shelf: <table border="0"> <thead> <tr> <th><u>Test Point</u></th> <th><u>Test Point</u></th> <th><u>Reading</u></th> </tr> </thead> <tbody> <tr> <td>CLOCK STATUS A RTN</td> <td>HOLDOVER</td> <td><0.1 V</td> </tr> <tr> <td>CLOCK STATUS B RTN</td> <td>HOLDOVER</td> <td><0.1 V</td> </tr> </tbody> </table> If Rev. E or later shelf: <table border="0"> <thead> <tr> <th><u>Test Point</u></th> <th><u>Test Point</u></th> <th><u>Reading</u></th> </tr> </thead> <tbody> <tr> <td>CLOCK STATUS A HOLDOVER</td> <td>HOLDOVER RTN</td> <td><0.1 V</td> </tr> <tr> <td>CLOCK STATUS B HOLDOVER</td> <td>HOLDOVER RTN</td> <td><0.1 V</td> </tr> </tbody> </table> Requirement: The multimeter indicates the readings shown.	<u>Test Point</u>	<u>Test Point</u>	<u>Reading</u>	CLOCK STATUS A RTN	HOLDOVER	<0.1 V	CLOCK STATUS B RTN	HOLDOVER	<0.1 V	<u>Test Point</u>	<u>Test Point</u>	<u>Reading</u>	CLOCK STATUS A HOLDOVER	HOLDOVER RTN	<0.1 V	CLOCK STATUS B HOLDOVER	HOLDOVER RTN	<0.1 V
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CLOCK STATUS A HOLDOVER	HOLDOVER RTN	<0.1 V																	
CLOCK STATUS B HOLDOVER	HOLDOVER RTN	<0.1 V																	
21	Reinsert both clock input cards. Requirement: The REF lamps light on the clock input cards, REF A on the ST2 A and REF B on the ST2 B light; the LOCKED lamp on both ST2 cards light and the HOLDOVER lamp on both ST2 cards go out.																		
22	Connect the multimeter set to V dc across the following terminal sets on the shelf backplane: If Rev. D or earlier shelf: <table border="0"> <thead> <tr> <th><u>Test Point</u></th> <th><u>Test Point</u></th> <th><u>Reading</u></th> </tr> </thead> <tbody> <tr> <td>CLOCK STATUS A RTN</td> <td>HOLDOVER</td> <td>-42 V to -56 V</td> </tr> <tr> <td>CLOCK STATUS B RTN</td> <td>HOLDOVER</td> <td>-42 V to -56 V</td> </tr> </tbody> </table> If Rev. E or later shelf: <table border="0"> <thead> <tr> <th><u>Test Point</u></th> <th><u>Test Point</u></th> <th><u>Reading</u></th> </tr> </thead> <tbody> <tr> <td>CLOCK STATUS A HOLDOVER</td> <td>HOLDOVER RTN</td> <td>-42 V to -56 V</td> </tr> <tr> <td>CLOCK STATUS B HOLDOVER</td> <td>HOLDOVER RTN</td> <td>-42 V to -56 V</td> </tr> </tbody> </table> Requirement: The multimeter indicates the readings shown.	<u>Test Point</u>	<u>Test Point</u>	<u>Reading</u>	CLOCK STATUS A RTN	HOLDOVER	-42 V to -56 V	CLOCK STATUS B RTN	HOLDOVER	-42 V to -56 V	<u>Test Point</u>	<u>Test Point</u>	<u>Reading</u>	CLOCK STATUS A HOLDOVER	HOLDOVER RTN	-42 V to -56 V	CLOCK STATUS B HOLDOVER	HOLDOVER RTN	-42 V to -56 V
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CLOCK STATUS B HOLDOVER	HOLDOVER RTN	-42 V to -56 V																	

Chart 13. ST2 Card Test (Contd)

STEP	PROCEDURE
23	If an SAI card is installed in the shelf, skip this step. Use the INIT-REG command for every MRC card in the shelf. This initializes all registers on the shelf. Requirement: The response indicates the command was completed successfully.
24	This procedure is complete. Indicate completion of the ST2 Card Test on the Test Sign-off form.

Chart 14. ST3E, TNC, or LNC Card Test

STEP	PROCEDURE
	<p>Use this procedure to install two 090-40019-01 (ST3E -01), TNC, or LNC cards. If the installation includes 090-40019-03 (ST3E -03) cards, perform the procedure Chart 15. If the installation is one ST2E or TNC-E and one ST3E, TNC, or LNC, use the procedure in Chart 16 or Chart 17.</p> <p>ST3E -01 cards cause major and minor alarms according to the HOLDOVER ALARM switch on the shelf back-plane and SW1 on the card. ST3E -03 (090-40019-03) cards cannot cause a minor alarm.</p> <p>Notes:</p> <ol style="list-style-type: none"> 1. Resistance cannot be measured across terminal sets if office alarm system and remote telemetry equipment are connected to the terminal sets or if an MIS card is installed in the shelf. 2. The HOLDOVER and RTN status terminal set is connected to -48 V and battery return through relay windings for the holdover MAJOR/MINOR option switch (SW3) operation. Therefore, resistance cannot be measured across this terminal set. <p>Test Equipment: Digital volt/ohm meter</p>
1	On the rear of the master shelf, set the ST3/ST2 switch (SW1) to the ST3 position and the HOLDOVER ALARM switch (SW3) to MAJ (Figure 1).
2	If TNC or LNC cards are to be installed, skip this step. On both ST3E cards, set SW1, section 5 to cause a major alarm in Holdover mode per Figure 14.
3	If ST3E cards are to be installed, skip this step. On the TNC or LNC cards, ensure that the switches are set as illustrated in Figure 15 for the TNC or Figure 16 for the LNC.
4	If TNC or ST3E cards are to be installed, skip this step. If a GTI -13 or -14 card is installed in the DCD-LPR, a thermal insulator must be installed on the LNC card's oven-controlled crystal oscillator (OCXO). Refer to the thermal insulator kit for installation instructions.
5	Insert the first ST3E, TNC, or LNC card into the ST A slot in the master shelf.
6	Insert the second ST3E, TNC, or LNC card into the ST B slot in the master shelf.
7	<p>During the 30 minute (approximately) oscillator stabilization period, observe the FREE RUN lamp on both ST3E, TNC, or LNC cards.</p> <p>Requirement: On both ST3E, TNC, or LNC cards, the FREE RUN lamps flash green.</p>
8	<p>After the 30 minute oscillator stabilization period, observe the FREE RUN, REF A, and REF B lamps.</p> <p>Requirement: On both ST3E, TNC, or LNC cards, the FREE RUN lamps stop flashing and go off. On both ST3E, TNC, or LNC cards, the REF A or B lamp lights, depending on which clock input (A or B) card's SRC ACT/SRC ACTIVE lamp is lit.</p> <p>Note: If an ST3E, TNC, or LNC card does not recognize an input reference signal, the ST3E, TNC, or LNC free runs and the FREE RUN lamp lights green (not flashing).</p>

Chart 14. ST3E, TNC, or LNC Card Test (Contd)

STEP	PROCEDURE
9	<p>Approximately 5 minutes (up to 20 minutes for worst-case signal conditions) after the end of the 30 minute oscillator stabilization period, observe the LOCKED and ACTIVE lamps on the ST3E, TNC, or LNC cards.</p> <p>Requirement: The SRC ACT/SRC ACTIVE lamp goes off on one clock input card and lights on the other. The lit REF lamp (REF A or REF B) goes off and the other REF lamp lights on both ST3E, TNC, or LNC cards. If the clock input cards are off frequency from each other, the LOCKED lamps on the ST3E, TNC, or LNC cards may go off while converging on the new reference and re-light within 5 minutes.</p>
10	<p>Press the transfer (XFR) pushbutton on either clock input card. Observe the SRC ACT/SRC ACTIVE lamps on the clock input cards and the REF and LOCKED lamps on the ST3E, TNC, or LNC cards.</p> <p>Requirement: The SRC ACT/SRC ACTIVE lamp goes off on one clock input card and lights on the other. The lit REF lamp (REF A or REF B) goes off and the other REF lamp lights on both ST3E, TNC, or LNC cards. If the clock input cards are off frequency from each other, the LOCKED lamps on the ST3E, TNC, or LNC cards may go off while converging on the new reference and re-light within 5 minutes.</p>
11	<p>Press the transfer (XFR) pushbutton on either clock input card to transfer back to the original clock input card. Observe the SRC ACT/SRC ACTIVE lamps on the clock input cards, and the REF and LOCKED lamps on the ST3E, TNC, or LNC cards.</p> <p>Requirement: The SRC ACT/SRC ACTIVE lamp goes off on one clock input card and lights on the other. The lit REF lamp (REF A or REF B) goes off and the other REF lamp lights on both ST3E, TNC, or LNC cards. If the clock input cards are off frequency from each other, the LOCKED lamps on the ST3E, TNC, or LNC cards may go off while converging on the new reference and re-light within 5 minutes.</p>
12	<p>If the clock input A card SRC ACT/SRC ACTIVE lamp is not lit, press its XFR pushbutton to make it active. Remove the clock input A card. Observe the SRC ACT/SRC ACTIVE lamp on the clock input B card, and the REF and LOCKED lamps on the ST3E, TNC, or LNC cards.</p> <p>Requirement: The SRC ACT/SRC ACTIVE lamp on the clock input B card lights. The REF A lamp goes off and the REF B lamps light on both ST3E, TNC, or LNC cards. The LOCKED lamp on one or both ST3E, TNC, or LNC cards may go off while converging on the new reference and relight after within 5 minutes.</p>
13	<p>Reinsert the clock input A card. When the FAIL lamp goes off on the clock input A card (after approximately 8 s to 40 s for ACI or CI cards, 1 minute for DCIM cards, or 3 minutes to 5 minutes for MRC cards), observe the REF lamps (A and B) on both ST3E, TNC, or LNC cards.</p> <p>Requirement: No change on the lamps.</p>
14	<p>Remove both clock input cards. Observe the lamps on the SAI/MIS and both ST3E, TNC, or LNC cards.</p> <p>Requirement: The MAJOR and MINOR lamps light on the SAI/MIS card. On both ST3E, TNC, or LNC cards, the REF and LOCKED lamps go off, and the HOLD OV lamp lights.</p>

Chart 14. ST3E, TNC, or LNC Card Test (Contd)

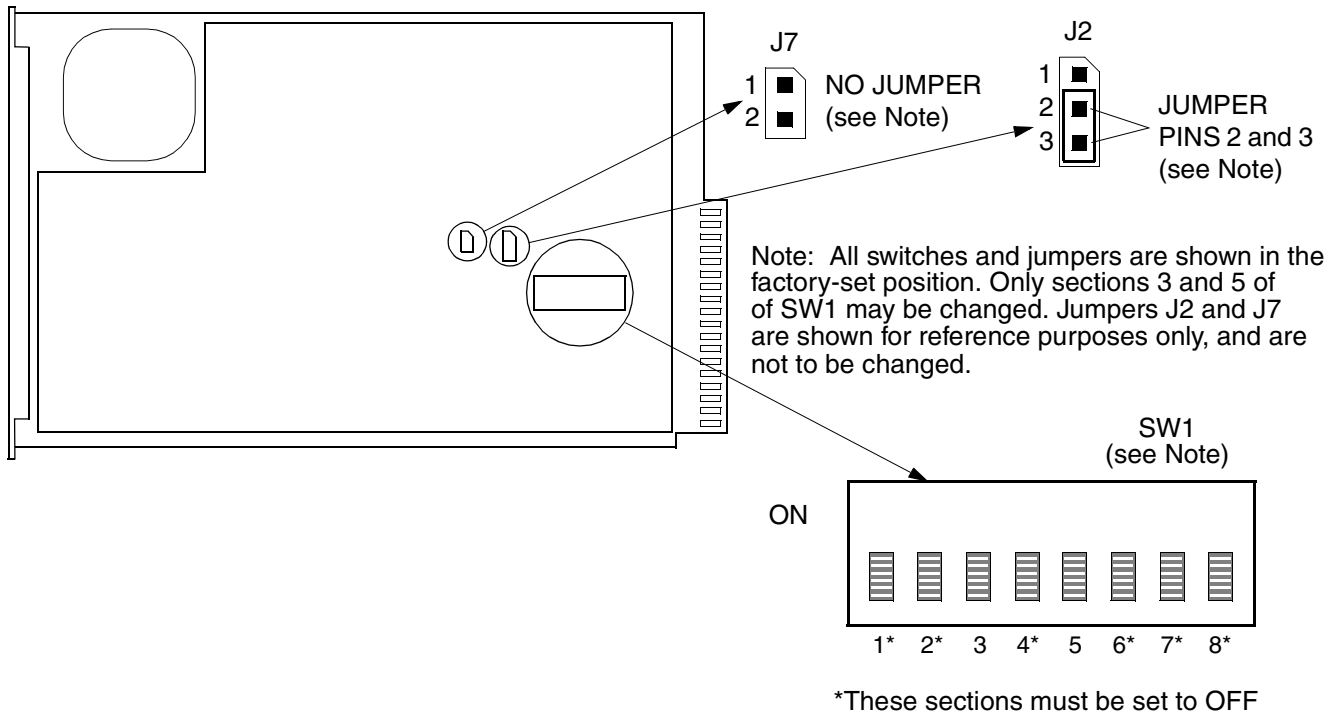
STEP	PROCEDURE																																																																																																														
15	<p>Connect the multimeter across the following Office Alarms, Shelf Status, and Clock Status A and B terminal sets on the shelf backplane (see Figure 1). If an SAI card is installed in the shelf, set the multimeter to the resistance scale for all terminal sets except HOLDOVER; set to the volts dc scale for Clock Status A and B HOLDOVER terminal sets. If an MIS card is installed in the shelf, set the multimeter to the resistance scale for MAJOR AUD, MAJOR VIS, MAJSI, MINOR AUD, MINOR VIS, and MINSI terminal sets; set to the volts dc scale for Clock Status A and B HOLD-OVER and LOCK terminal sets.</p> <p>If Rev. D or earlier shelf:</p> <table border="1"> <thead> <tr> <th>Type</th> <th>Test Point</th> <th>Test Point</th> <th>MIS</th> <th>SAI</th> </tr> </thead> <tbody> <tr> <td>OFFICE ALARM</td> <td>MINOR AUD NO</td> <td>MINOR AUD C</td> <td><10 Ω</td> <td><10 Ω</td> </tr> <tr> <td>OFFICE ALARM</td> <td>MINOR VIS NO</td> <td>MINOR VIS C</td> <td><10 Ω</td> <td><10 Ω</td> </tr> <tr> <td>OFFICE ALARM</td> <td>MAJOR AUD NO</td> <td>MAJOR AUD C</td> <td><10 Ω</td> <td><10 Ω</td> </tr> <tr> <td>OFFICE ALARM</td> <td>MAJOR VIS NO</td> <td>MAJOR VIS C</td> <td><10 Ω</td> <td><10 Ω</td> </tr> <tr> <td>SHELF STATUS</td> <td>MINSI</td> <td>MINSR</td> <td><10 Ω</td> <td><10 Ω</td> </tr> <tr> <td>SHELF STATUS</td> <td>MAJSI</td> <td>MAJSR</td> <td><10 Ω</td> <td><10 Ω</td> </tr> <tr> <td>CLOCK STATUS A</td> <td>RTN</td> <td>HOLDOVER</td> <td><0.1 V</td> <td><0.1 V</td> </tr> <tr> <td>CLOCK STATUS A</td> <td>RTN</td> <td>LOCK</td> <td><0.1 V</td> <td><10 Ω</td> </tr> <tr> <td>CLOCK STATUS B</td> <td>RTN</td> <td>HOLDOVER</td> <td><0.1 V</td> <td><0.1 V</td> </tr> <tr> <td>CLOCK STATUS B</td> <td>RTN</td> <td>LOCK</td> <td><0.1 V</td> <td><10 Ω</td> </tr> </tbody> </table> <p>If Rev. E or later shelf:</p> <table border="1"> <thead> <tr> <th>Type</th> <th>Test Point</th> <th>Test Point</th> <th>MIS</th> <th>SAI</th> </tr> </thead> <tbody> <tr> <td>OFFICE ALARM</td> <td>MINOR AUD NO</td> <td>MINOR AUD C</td> <td><10 Ω</td> <td><10 Ω</td> </tr> <tr> <td>OFFICE ALARM</td> <td>MINOR VIS NO</td> <td>MINOR VIS C</td> <td><10 Ω</td> <td><10 Ω</td> </tr> <tr> <td>OFFICE ALARM</td> <td>MAJOR AUD NO</td> <td>MAJOR AUD C</td> <td><10 Ω</td> <td><10 Ω</td> </tr> <tr> <td>OFFICE ALARM</td> <td>MAJOR VIS NO</td> <td>MAJOR VIS C</td> <td><10 Ω</td> <td><10 Ω</td> </tr> <tr> <td>SHELF STATUS</td> <td>MINSI</td> <td>MINSR</td> <td><10 Ω</td> <td><10 Ω</td> </tr> <tr> <td>SHELF STATUS</td> <td>MAJSI</td> <td>MAJSR</td> <td><10 Ω</td> <td><10 Ω</td> </tr> <tr> <td>CLOCK STATUS A</td> <td>HOLDOVER</td> <td>HOLDOVER RTN</td> <td><0.1 V</td> <td><0.1 V</td> </tr> <tr> <td>CLOCK STATUS A</td> <td>LOCK</td> <td>LOCK RTN</td> <td><0.1 V</td> <td><10 Ω</td> </tr> <tr> <td>CLOCK STATUS B</td> <td>HOLDOVER</td> <td>HOLDOVER RTN</td> <td><0.1 V</td> <td><0.1 V</td> </tr> <tr> <td>CLOCK STATUS B</td> <td>LOCK</td> <td>LOCK RTN</td> <td><0.1 V</td> <td><10 Ω</td> </tr> </tbody> </table> <p>Requirement: The multimeter indicates the readings shown in the MIS or SAI column, depending on whether an MIS or SAI card is installed in the shelf.</p>	Type	Test Point	Test Point	MIS	SAI	OFFICE ALARM	MINOR AUD NO	MINOR AUD C	<10 Ω	<10 Ω	OFFICE ALARM	MINOR VIS NO	MINOR VIS C	<10 Ω	<10 Ω	OFFICE ALARM	MAJOR AUD NO	MAJOR AUD C	<10 Ω	<10 Ω	OFFICE ALARM	MAJOR VIS NO	MAJOR VIS C	<10 Ω	<10 Ω	SHELF STATUS	MINSI	MINSR	<10 Ω	<10 Ω	SHELF STATUS	MAJSI	MAJSR	<10 Ω	<10 Ω	CLOCK STATUS A	RTN	HOLDOVER	<0.1 V	<0.1 V	CLOCK STATUS A	RTN	LOCK	<0.1 V	<10 Ω	CLOCK STATUS B	RTN	HOLDOVER	<0.1 V	<0.1 V	CLOCK STATUS B	RTN	LOCK	<0.1 V	<10 Ω	Type	Test Point	Test Point	MIS	SAI	OFFICE ALARM	MINOR AUD NO	MINOR AUD C	<10 Ω	<10 Ω	OFFICE ALARM	MINOR VIS NO	MINOR VIS C	<10 Ω	<10 Ω	OFFICE ALARM	MAJOR AUD NO	MAJOR AUD C	<10 Ω	<10 Ω	OFFICE ALARM	MAJOR VIS NO	MAJOR VIS C	<10 Ω	<10 Ω	SHELF STATUS	MINSI	MINSR	<10 Ω	<10 Ω	SHELF STATUS	MAJSI	MAJSR	<10 Ω	<10 Ω	CLOCK STATUS A	HOLDOVER	HOLDOVER RTN	<0.1 V	<0.1 V	CLOCK STATUS A	LOCK	LOCK RTN	<0.1 V	<10 Ω	CLOCK STATUS B	HOLDOVER	HOLDOVER RTN	<0.1 V	<0.1 V	CLOCK STATUS B	LOCK	LOCK RTN	<0.1 V	<10 Ω
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16	<p>Reinsert both clock input cards. Approximately 8 s to 40 s (for ACI or CI cards), 1 minute (for DCIM cards), or 3 minutes to 5 minutes (for MRC cards) after the FAIL lamps go off, observe the lamps on the SAI/MIS and both ST3E, TNC, or LNC cards.</p> <p>Requirement: On both ST3E, TNC, or LNC cards, the REF A or B lamp is lit (depending on which clock input card's SRC ACT/SRC ACTIVE lamp is lit), the LOCKED and ACTIVE lamps are lit, and the HOLD OV lamp is off. The MAJOR and MINOR lamps on the MIS or SAI card are off.</p>																																																																																																														

Chart 14. ST3E, TNC, or LNC Card Test (Contd)

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17	<p>Connect the multimeter across the following Office Alarms, Shelf Status, and Clock Status A and B terminal sets on the shelf backplane (see Figure 1). If an SAI card is installed in the shelf, set the multimeter to the resistance scale for all terminal sets except HOLDOVER; set to the volts dc scale for Clock Status A and B HOLDOVER terminal sets. If an MIS card is installed in the shelf, set the multimeter to the resistance scale for MAJOR AUD, MAJOR VIS, MAJSI, MINOR AUD, MINOR VIS, and MINSI terminal sets; set to the volts dc scale for Clock Status A and B HOLD-OVER and LOCK terminal sets.</p> <p>If Rev. D or earlier shelf:</p> <table border="1"> <thead> <tr> <th>Type</th> <th>Test Point</th> <th>Test Point</th> <th>MIS</th> <th>SAI</th> </tr> </thead> <tbody> <tr> <td>OFFICE ALARM</td> <td>MINOR AUD NO</td> <td>MINOR AUD C</td> <td>>1 MΩ</td> <td>>1 MΩ</td> </tr> <tr> <td>OFFICE ALARM</td> <td>MINOR VIS NO</td> <td>MINOR VIS C</td> <td>>1 MΩ</td> <td>>1 MΩ</td> </tr> <tr> <td>OFFICE ALARM</td> <td>MAJOR AUD NO</td> <td>MAJOR AUD C</td> <td>>1 MΩ</td> <td>>1 MΩ</td> </tr> <tr> <td>OFFICE ALARM</td> <td>MAJOR VIS NO</td> <td>MAJOR VIS C</td> <td>>1 MΩ</td> <td>>1 MΩ</td> </tr> <tr> <td>SHELF STATUS</td> <td>MINSI</td> <td>MINSR</td> <td>>1 MΩ</td> <td>>1 MΩ</td> </tr> <tr> <td>SHELF STATUS</td> <td>MAJSI</td> <td>MAJSR</td> <td>>1 MΩ</td> <td>>1 MΩ</td> </tr> <tr> <td>CLOCKSTATUSA</td> <td>RTN</td> <td>HOLDOVER</td> <td>-42 V to -56 V</td> <td>-42 V to -56 V</td> </tr> <tr> <td>CLOCK STATUS A</td> <td>RTN</td> <td>LOCK</td> <td>-42 V to -56 V</td> <td>>1 MΩ</td> </tr> <tr> <td>CLOCK STATUS B</td> <td>RTN</td> <td>HOLDOVER</td> <td>-42 V to -56 V</td> <td>-42 V to -56 V</td> </tr> <tr> <td>CLOCK STATUS B</td> <td>RTN</td> <td>LOCK</td> <td>-42 V to -56 V</td> <td>>1 MΩ</td> </tr> </tbody> </table> <p>If Rev. E or later shelf:</p> <table border="1"> <thead> <tr> <th>Type</th> <th>Test Point</th> <th>Test Point</th> <th>MIS</th> <th>SAI</th> </tr> </thead> <tbody> <tr> <td>OFFICE ALARM</td> <td>MINOR AUD NO</td> <td>MINOR AUD C</td> <td>>1 MΩ</td> <td>>1 MΩ</td> </tr> <tr> <td>OFFICE ALARM</td> <td>MINOR VIS NO</td> <td>MINOR VIS C</td> <td>>1 MΩ</td> <td>>1 MΩ</td> </tr> <tr> <td>OFFICE ALARM</td> <td>MAJOR AUD NO</td> <td>MAJOR AUD C</td> <td>>1 MΩ</td> <td>>1 MΩ</td> </tr> <tr> <td>OFFICE ALARM</td> <td>MAJOR VIS NO</td> <td>MAJOR VIS C</td> <td>>1 MΩ</td> <td>>1 MΩ</td> </tr> <tr> <td>SHELF STATUS</td> <td>MINSI</td> <td>MINSR</td> <td>>1 MΩ</td> <td>>1 MΩ</td> </tr> <tr> <td>SHELF STATUS</td> <td>MAJSI</td> <td>MAJSR</td> <td>>1 MΩ</td> <td>>1 MΩ</td> </tr> <tr> <td>CLOCK STATUS A</td> <td>HOLDOVER</td> <td>HOLDOVER RTN</td> <td>-42 V to -56 V</td> <td>-42 V to -56 V</td> </tr> <tr> <td>CLOCK STATUS A</td> <td>LOCK</td> <td>LOCK RTN</td> <td>-42 V to -56 V</td> <td>>1 MΩ</td> </tr> <tr> <td>CLOCK STATUS B</td> <td>HOLDOVER</td> <td>HOLDOVER RTN</td> <td>-42 V to -56 V</td> <td>-42 V to -56 V</td> </tr> <tr> <td>CLOCK STATUS B</td> <td>LOCK</td> <td>LOCK RTN</td> <td>-42 V to -56 V</td> <td>>1 MΩ</td> </tr> </tbody> </table> <p>Requirement: The multimeter indicates the readings shown in the MIS or SAI column, depending on whether an MIS or SAI card is installed in the shelf.</p>	Type	Test Point	Test Point	MIS	SAI	OFFICE ALARM	MINOR AUD NO	MINOR AUD C	>1 MΩ	>1 MΩ	OFFICE ALARM	MINOR VIS NO	MINOR VIS C	>1 MΩ	>1 MΩ	OFFICE ALARM	MAJOR AUD NO	MAJOR AUD C	>1 MΩ	>1 MΩ	OFFICE ALARM	MAJOR VIS NO	MAJOR VIS C	>1 MΩ	>1 MΩ	SHELF STATUS	MINSI	MINSR	>1 MΩ	>1 MΩ	SHELF STATUS	MAJSI	MAJSR	>1 MΩ	>1 MΩ	CLOCKSTATUSA	RTN	HOLDOVER	-42 V to -56 V	-42 V to -56 V	CLOCK STATUS A	RTN	LOCK	-42 V to -56 V	>1 MΩ	CLOCK STATUS B	RTN	HOLDOVER	-42 V to -56 V	-42 V to -56 V	CLOCK STATUS B	RTN	LOCK	-42 V to -56 V	>1 MΩ	Type	Test Point	Test Point	MIS	SAI	OFFICE ALARM	MINOR AUD NO	MINOR AUD C	>1 MΩ	>1 MΩ	OFFICE ALARM	MINOR VIS NO	MINOR VIS C	>1 MΩ	>1 MΩ	OFFICE ALARM	MAJOR AUD NO	MAJOR AUD C	>1 MΩ	>1 MΩ	OFFICE ALARM	MAJOR VIS NO	MAJOR VIS C	>1 MΩ	>1 MΩ	SHELF STATUS	MINSI	MINSR	>1 MΩ	>1 MΩ	SHELF STATUS	MAJSI	MAJSR	>1 MΩ	>1 MΩ	CLOCK STATUS A	HOLDOVER	HOLDOVER RTN	-42 V to -56 V	-42 V to -56 V	CLOCK STATUS A	LOCK	LOCK RTN	-42 V to -56 V	>1 MΩ	CLOCK STATUS B	HOLDOVER	HOLDOVER RTN	-42 V to -56 V	-42 V to -56 V	CLOCK STATUS B	LOCK	LOCK RTN	-42 V to -56 V	>1 MΩ
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18	<p>If TNC or LNC cards are installed, skip this step. Remove both ST3E cards and set the appropriate switch and section to cause a minor alarm in Holdover mode per Figure 14, and reinsert the ST3E cards.</p> <p>Requirement: On both ST3E cards, the REF A or B lamp lights, depending on which clock input (A or B) card's lamp is lit, and the LOCKED and ACTIVE lamps are lit green.</p>																																																																																																														
19	<p>On the shelf backplane, set the HOLDOVER ALARM switch SW3 to MIN.</p>																																																																																																														

Chart 14. ST3E, TNC, or LNC Card Test (Contd)

STEP	PROCEDURE
20	<p>Remove both clock input A and B cards. Observe the lamps on the SAI/MIS and both ST3E, TNC, or LNC cards.</p> <p>Requirement: On the SAI/MIS card, the MINOR lamp lights. On both ST3E, TNC, or LNC cards, the REF and LOCKED lamps go off, HOLD OV lamps light, and the ACTIVE lamps remain lit.</p>
21	<p>Reinsert both clock input cards. Approximately 8 s to 40 s (for ACI or CI cards), 1 minute (for DCIM cards), or 3 minutes to 5 minutes (for MRC cards) after the FAIL lamps go off, observe the lamps on the SAI/MIS and both ST3E, TNC, or LNC cards.</p> <p>Requirement: On both ST3E, TNC, or LNC cards, the REF A or B lamp is lit (depending on which clock input [A or B] card's SRC ACT/SRC ACTIVE lamp is lit), the LOCKED and ACTIVE lamps are lit, and the HOLD OV lamp is off. The MINOR lamp on the SAI/MIS is off.</p>
22	<p>If the Holdover mode is to generate a minor alarm for this system, or if TNC or LNC cards are installed, skip this step. Remove both ST3E cards, set the appropriate switch to MAJOR and reinsert the cards.</p> <p>Note: Both ST3E cards and SW3 on the shelf backplane <i>must be set</i> for the same mode, either MAJOR or MINOR alarm, in Holdover mode.</p>
23	<p>If an SAI card is installed in the shelf, skip this step. Use the INIT-REG command for every MRC card in the shelf. This initializes all registers on the shelf.</p> <p>Requirement: The response indicates the command was completed successfully.</p>
24	<p>This procedure is complete. Indicate completion of the ST3E, TNC, or LNC Card Test on the Test Sign-off form.</p>



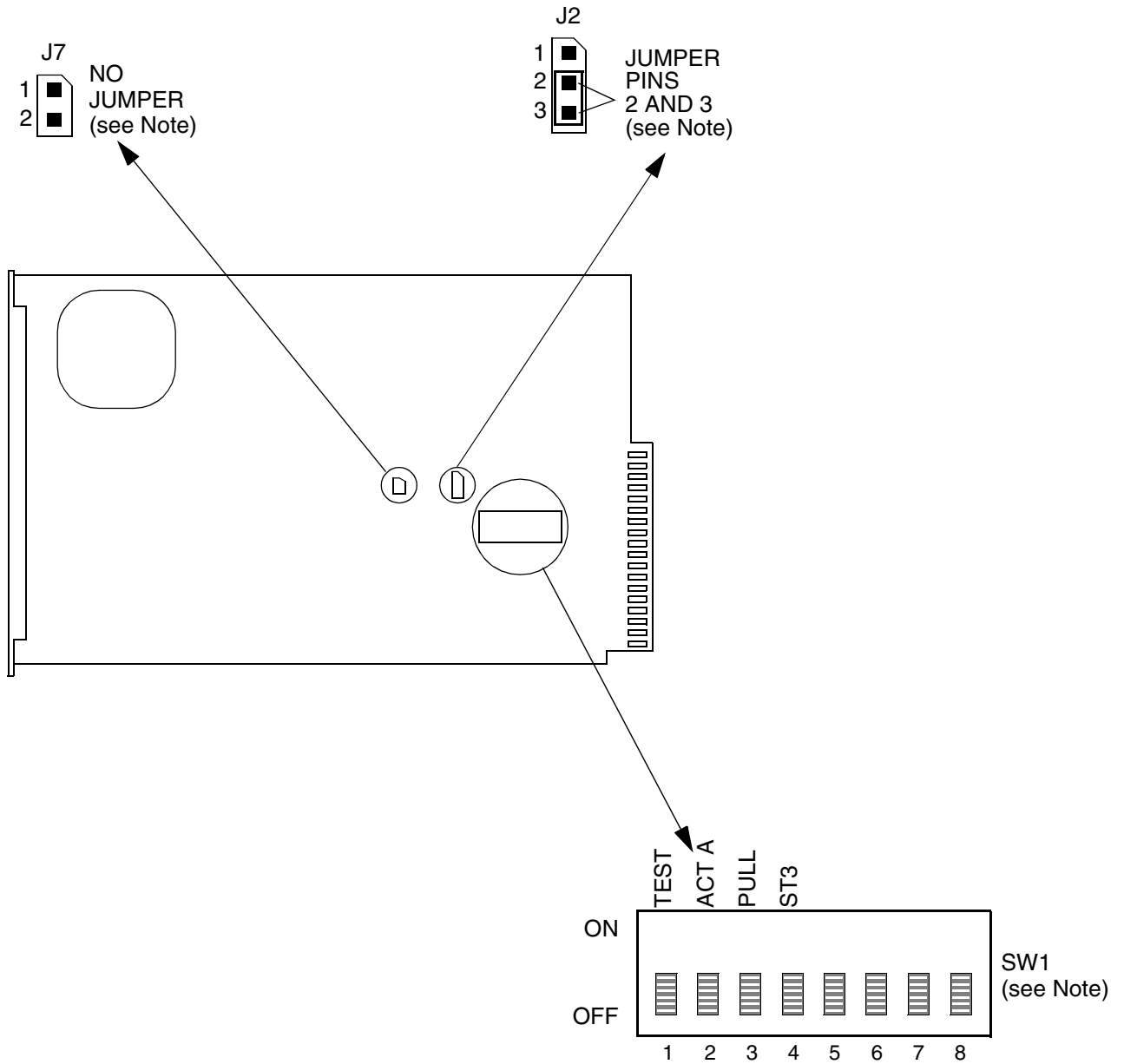
SW1 Switch Settings

Section (Note 1)	Setting	Function	Factory Setting
3 (Note 2)	ON	$\pm 2 \times 10^{-6}$ pull-in	—
	OFF	$\pm 5.6 \times 10^{-6}$ pull-in	X
5 (Notes 3 and 4)	ON	Holdover causes a major alarm (Note 5)	—
	OFF	Holdover causes a minor alarm (Note 5)	X

Notes:

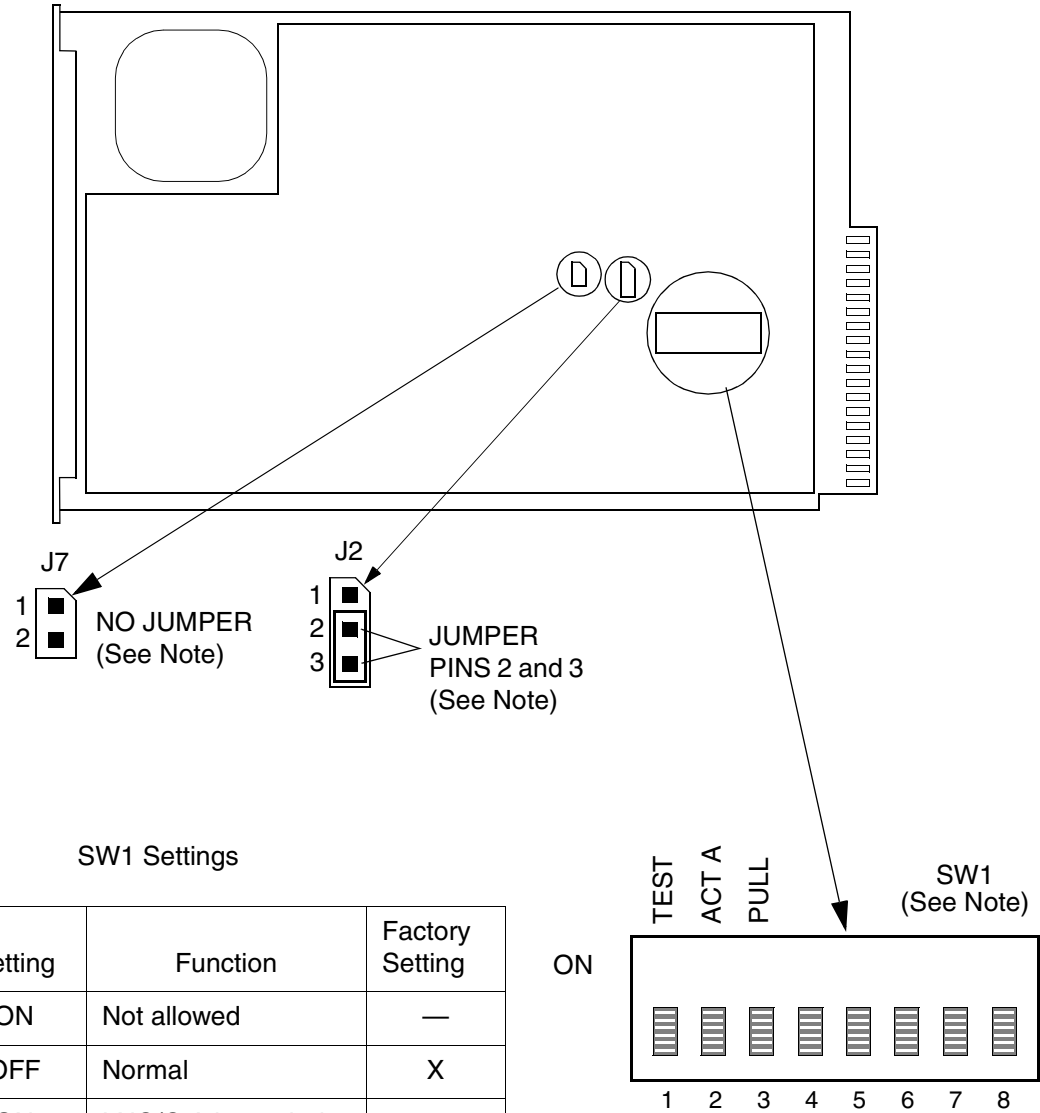
1. All sections of switch SW1 other than 3 and 5 must be set to the OFF position.
2. If the clock input reference source to the DCD-523 Shelf is ST3E quality or better, switch section 3 may be set to ON. If not, it *must be set* to OFF.
3. Two versions of the ST3E card exist;
 - p/n 090-40019-01 Issue C or later, setting section 5 of SW1 determines whether hold-over activates a major or minor alarm.
 - p/n 090-40019-03 Issue A, section 5 of SW1 is not functional, and holdover always causes a major alarm.
4. Both ST3E cards and HOLDOVER ALARM switch (SW3) on the shelf backplane must be set to the same mode, either MAJOR or MINOR alarm, in Holdover mode (p/n 090-40019-03 always reports a major alarm in Holdover mode).
5. Loss of all input references causes the card to go into Holdover mode.

Figure 14. ST3E Card Switch



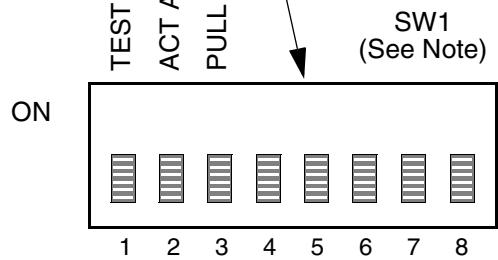
Note: All switches and jumpers are shown in the factory-set position, and are not to be changed. The switches and jumpers are shown for reference purposes only.

Figure 15. TNC Card Switch



SW1 Settings

Section	Setting	Function	Factory Setting
1	ON	Not allowed	—
	OFF	Normal	X
2	ON	LNC/C A has priority	—
	OFF	No priority set	X
3	ON	$\pm 2 \times 10^{-6}$ pull-in	—
	OFF	$\pm 5.6 \times 10^{-6}$ pull-in	X
4 to 8	ON	Not allowed	—
	OFF	Normal	X



Note: All switches and jumpers are shown in the factory-set position. Jumpers J2 and J7 are shown for reference purposes only, and are not to be set.

Figure 16. LNC Card Switch

Chart 15. ST3E Card Test

STEP	PROCEDURE
	<p>Use this procedure to install two 090-40019-03 (ST3E -03) cards. If the installation is one ST2E or TNC-E and one ST3E, TNC, or LNC, use the procedure in Chart 16 or Chart 17.</p> <p>ST3E -01 cards cause major and minor alarms according to the HOLDOVER ALARM switch on the shelf back-plane and SW1 on the card. ST3E -03 cards cannot cause a minor alarm.</p> <p>Note: Resistance cannot be measured across terminal sets if office alarm system and remote telemetry equipment are connected to the terminal sets or if an MIS card is installed in the shelf. The HOLDOVER and RTN status terminal set is connected to -48 V and battery return through relay windings for the holdover MAJOR/MINOR option switch (SW3) operation. Therefore, resistance cannot be measured across this terminal set.</p> <p>Equipment: Digital volt/ohm meter</p>
1	On the rear of the master shelf, set the ST3/ST2 switch (SW1) to the ST3 position and the HOLDOVER ALARM switch (SW3) to MAJ (Figure 1).
2	On the ST3E card, set switch SW1 (Figure 14) to conform to the requirements for this installation.
3	In the master shelf, insert the first ST3E card into the ST A slot.
4	In the master shelf, insert the second ST3E card into the ST B slot.
5	<p>During the 30 minute (approximately) oscillator stabilization period, observe the FREE RUN lamp on both ST3E cards.</p> <p>Requirement: On both ST3E cards, the FREE RUN lamps flash green.</p>
6	<p>After the 30 minute oscillator stabilization period, observe the FREE RUN, REF A, and REF B lamps.</p> <p>Requirement: On both ST3E cards, the FREE RUN lamps stop flashing and go off, and the REF A or B lamp lights, depending on which clock input (A or B) card is active.</p> <p>Note: If an ST3E card does not recognize an input reference signal, the ST3E stays in the free run mode and the FREE RUN lamp lights green (not flashing).</p>
7	<p>Approximately 5 minutes (up to 20 minutes for worst-case signal conditions) after the end of the 30 minute oscillator stabilization period, observe the LOCKED and ACTIVE lamps on the ST3E cards.</p> <p>Requirement: On both ST3E cards, the LOCKED and ACTIVE lamps light green.</p>
8	<p>Press the transfer (XFR) pushbutton on either clock input card. Observe the SRC ACT/SRC ACTIVE lamps on the clock input cards and the REF and LOCKED lamps on the ST3E cards.</p> <p>Requirement: The SRC ACT/SRC ACTIVE lamp goes off on one clock input card and lights on the other. The lit REF lamp (REF A or REF B) goes off and the other REF lamp lights on both ST3E cards. If the clock input cards are off frequency from each other, the LOCKED lamps on the ST3E cards may go off while converging on the new reference; the LOCKED lamps relight within 5 minutes.</p>

Chart 15. ST3E Card Test (Contd)

STEP	PROCEDURE
9	<p>Press the transfer (XFR) pushbutton on either clock input card to transfer back to the original clock input card. Observe the SRC ACT/SRC ACTIVE lamps on the clock input cards and the REF and LOCKED lamps on the ST3E cards.</p> <p>Requirement: The SRC ACT/SRC ACTIVE lamp goes off on one clock input card and lights on the other. The lit REF lamp (REF A or REF B) goes off and the other REF lamp lights on both ST3E cards. If the clock input cards are off frequency from each other, the LOCKED lamps on the ST3E cards may go off while converging on the new reference; the LOCKED lamps relight within 5 minutes.</p>
10	<p>If the clock input A card SRC ACT/SRC ACTIVE lamp is not lit, press its XFR pushbutton to make it active. Remove the clock input A card. Observe the SRC ACT/SRC ACTIVE lamp on the clock input B card and the REF and LOCKED lamps on the ST3E cards.</p> <p>Requirement: The SRC ACT/SRC ACTIVE lamp on the clock input B card lights. The REF A lamp goes off and the REF B lamps light on both ST3E cards. The LOCKED lamp on one or both ST3E cards may go off while converging on the new reference and relight within 5 minutes.</p>
11	<p>Reinsert the clock input A card. When the FAIL lamp goes off on the clock input A card, observe the REF lamps (A and B) on both ST3E cards.</p> <p>Requirement: No change on the lamps.</p>
12	<p>Remove both clock input cards. Observe the lamps on the SAI/MIS and both ST3E cards.</p> <p>Requirement: The MAJOR lamp lights on the SAI/MIS card. On both ST3E cards, the REF and LOCKED lamps go off, and the HOLD OV lamp lights.</p>

Chart 15. ST3E Card Test (Contd)

STEP	PROCEDURE																																																																																
13	<p>Connect the multimeter across the following Office Alarms, Shelf Status, and Clock Status A and B terminal sets on the shelf backplane (see Figure 1). If an SAI card is installed in the shelf, set the multimeter to the resistance scale for all terminal sets except HOLDOVER; set to the volts dc scale for Clock Status A and B HOLDOVER terminal sets. If an MIS card is installed in the shelf, set the multimeter to the resistance scale for MAJOR AUD, MAJOR VIS, and MAJSI terminal sets; set to the volts dc scale for Clock Status A and B HOLDOVER and LOCK terminal sets.</p> <p>If Rev. D or earlier shelf:</p> <table border="1"> <thead> <tr> <th><u>Type</u></th> <th><u>Test Point</u></th> <th><u>Test Point</u></th> <th><u>MIS</u></th> <th><u>SAI</u></th> </tr> </thead> <tbody> <tr> <td>OFFICE ALARM</td> <td>MAJOR AUD NO</td> <td>MAJOR AUD C</td> <td><10 Ω</td> <td><10 Ω</td> </tr> <tr> <td>OFFICE ALARM</td> <td>MAJOR VIS NO</td> <td>MAJOR VIS C</td> <td><10 Ω</td> <td><10 Ω</td> </tr> <tr> <td>SHELF STATUS</td> <td>MAJSI</td> <td>MAJSR</td> <td><10 Ω</td> <td><10 Ω</td> </tr> <tr> <td>CLOCK STATUS A</td> <td>RTN</td> <td>HOLDOVER</td> <td><0.1 V</td> <td><0.1 V</td> </tr> <tr> <td>CLOCK STATUS A</td> <td>RTN</td> <td>LOCK</td> <td><0.1 V</td> <td><10 Ω</td> </tr> <tr> <td>CLOCK STATUS B</td> <td>RTN</td> <td>HOLDOVER</td> <td><0.1 V</td> <td><0.1 V</td> </tr> <tr> <td>CLOCK STATUS B</td> <td>RTN</td> <td>LOCK</td> <td><0.1 V</td> <td><10 Ω</td> </tr> </tbody> </table> <p>If Rev. E or later shelf:</p> <table border="1"> <thead> <tr> <th><u>Type</u></th> <th><u>Test Point</u></th> <th><u>Test Point</u></th> <th><u>MIS</u></th> <th><u>SAI</u></th> </tr> </thead> <tbody> <tr> <td>OFFICE ALARM</td> <td>MAJOR AUD NO</td> <td>MAJOR AUD C</td> <td><10 Ω</td> <td><10 Ω</td> </tr> <tr> <td>OFFICE ALARM</td> <td>MAJOR VIS NO</td> <td>MAJOR VIS C</td> <td><10 Ω</td> <td><10 Ω</td> </tr> <tr> <td>SHELF STATUS</td> <td>MAJSI</td> <td>MAJSR</td> <td><10 Ω</td> <td><10 Ω</td> </tr> <tr> <td>CLOCK STATUS A</td> <td>HOLDOVER</td> <td>HOLDOVER RTN</td> <td><0.1 V</td> <td><0.1 V</td> </tr> <tr> <td>CLOCK STATUS A</td> <td>LOCK</td> <td>LOCK RTN</td> <td><0.1 V</td> <td><10 Ω</td> </tr> <tr> <td>CLOCK STATUS B</td> <td>HOLDOVER</td> <td>HOLDOVER RTN</td> <td><0.1 V</td> <td><0.1 V</td> </tr> <tr> <td>CLOCK STATUS B</td> <td>LOCK</td> <td>LOCK RTN</td> <td><0.1 V</td> <td><10 Ω</td> </tr> </tbody> </table> <p>Requirement: The multimeter indicates the readings shown in the MIS or SAI column, depending on whether an MIS or SAI card is installed in the shelf.</p>	<u>Type</u>	<u>Test Point</u>	<u>Test Point</u>	<u>MIS</u>	<u>SAI</u>	OFFICE ALARM	MAJOR AUD NO	MAJOR AUD C	<10 Ω	<10 Ω	OFFICE ALARM	MAJOR VIS NO	MAJOR VIS C	<10 Ω	<10 Ω	SHELF STATUS	MAJSI	MAJSR	<10 Ω	<10 Ω	CLOCK STATUS A	RTN	HOLDOVER	<0.1 V	<0.1 V	CLOCK STATUS A	RTN	LOCK	<0.1 V	<10 Ω	CLOCK STATUS B	RTN	HOLDOVER	<0.1 V	<0.1 V	CLOCK STATUS B	RTN	LOCK	<0.1 V	<10 Ω	<u>Type</u>	<u>Test Point</u>	<u>Test Point</u>	<u>MIS</u>	<u>SAI</u>	OFFICE ALARM	MAJOR AUD NO	MAJOR AUD C	<10 Ω	<10 Ω	OFFICE ALARM	MAJOR VIS NO	MAJOR VIS C	<10 Ω	<10 Ω	SHELF STATUS	MAJSI	MAJSR	<10 Ω	<10 Ω	CLOCK STATUS A	HOLDOVER	HOLDOVER RTN	<0.1 V	<0.1 V	CLOCK STATUS A	LOCK	LOCK RTN	<0.1 V	<10 Ω	CLOCK STATUS B	HOLDOVER	HOLDOVER RTN	<0.1 V	<0.1 V	CLOCK STATUS B	LOCK	LOCK RTN	<0.1 V	<10 Ω
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14	<p>Reinsert both clock input cards. Approximately 8 s to 40 s (for ACI or CI cards), 1 minute (for DCIM cards), or 3 minutes to 5 minutes (for MRC cards) after the FAIL lamps go off, observe the lamps on the SAI/MIS and both ST3E cards.</p> <p>Requirement: On both ST3E cards, the REF A or B lamp is lit (depending on which clock input card's SRC ACT/SRC ACTIVE lamp is lit), the LOCKED and ACTIVE lamps are lit, and the HOLD OV lamp is off. The MAJOR and MINOR lamps on the SAI/MIS card are off.</p>																																																																																

Chart 15. ST3E Card Test (Contd)

STEP	PROCEDURE																																																																																
15	<p>Connect the multimeter across the following Office Alarms, Shelf Status, and Clock Status A and B terminal sets on the shelf backplane (see Figure 1). If an SAI card is installed in the shelf, set the multimeter to the resistance scale for all terminal sets except HOLDOVER; set to the volts dc scale for Clock Status A and B HOLDOVER terminal sets. If an MIS card is installed in the shelf, set the multimeter to the resistance scale for MAJOR AUD, MAJOR VIS, and MAJS terminal sets; set to the volts dc scale for Clock Status A and B HOLDOVER and LOCK terminal sets.</p> <p>If Rev. D or earlier shelf:</p> <table border="1"> <thead> <tr> <th>Type</th> <th>Test Point</th> <th>Test Point</th> <th>MIS</th> <th>SAI</th> </tr> </thead> <tbody> <tr> <td>OFFICE ALARM</td> <td>MAJOR AUD NO</td> <td>MAJOR AUD C</td> <td>>1 MΩ</td> <td>>1 MΩ</td> </tr> <tr> <td>OFFICE ALARM</td> <td>MAJOR VIS NO</td> <td>MAJOR VIS C</td> <td>>1 MΩ</td> <td>>1 MΩ</td> </tr> <tr> <td>SHELF STATUS</td> <td>MAJSI</td> <td>MAJSR</td> <td>>1 MΩ</td> <td>>1 MΩ</td> </tr> <tr> <td>CLOCK STATUS A</td> <td>RTN</td> <td>HOLDOVER</td> <td>-42 V to -56 V</td> <td>-42 V to -56 V</td> </tr> <tr> <td>CLOCK STATUS A</td> <td>RTN</td> <td>LOCK</td> <td>-42 V to -56 V</td> <td>>1 MΩ</td> </tr> <tr> <td>CLOCK STATUS B</td> <td>RTN</td> <td>HOLDOVER</td> <td>-42 V to -56 V</td> <td>-42 V to -56 V</td> </tr> <tr> <td>CLOCK STATUS B</td> <td>RTN</td> <td>LOCK</td> <td>-42 V to -56 V</td> <td>>1 MΩ</td> </tr> </tbody> </table> <p>If Rev. E or later shelf:</p> <table border="1"> <thead> <tr> <th>Type</th> <th>Test Point</th> <th>Test Point</th> <th>MIS</th> <th>SAI</th> </tr> </thead> <tbody> <tr> <td>OFFICE ALARM</td> <td>MAJOR AUD NO</td> <td>MAJOR AUD C</td> <td>>1 MΩ</td> <td>>1 MΩ</td> </tr> <tr> <td>OFFICE ALARM</td> <td>MAJOR VIS NO</td> <td>MAJOR VIS C</td> <td>>1 MΩ</td> <td>>1 MΩ</td> </tr> <tr> <td>SHELF STATUS</td> <td>MAJSI</td> <td>MAJSR</td> <td>>1 MΩ</td> <td>>1 MΩ</td> </tr> <tr> <td>CLOCK STATUS A</td> <td>HOLDOVER</td> <td>HOLDOVER RTN</td> <td>-42 V to -56 V</td> <td>-42 V to -56 V</td> </tr> <tr> <td>CLOCK STATUS A</td> <td>LOCK</td> <td>LOCK RTN</td> <td>-42 V to -56 V</td> <td>>1 MΩ</td> </tr> <tr> <td>CLOCK STATUS B</td> <td>HOLDOVER</td> <td>HOLDOVER RTN</td> <td>-42 V to -56 V</td> <td>-42 V to -56 V</td> </tr> <tr> <td>CLOCK STATUS B</td> <td>LOCK</td> <td>LOCK RTN</td> <td>-42 V to -56 V</td> <td>>1 MΩ</td> </tr> </tbody> </table> <p>Requirement: The multimeter indicates the readings shown in the MIS or SAI column, depending on whether an MIS or SAI card is installed in the shelf.</p>	Type	Test Point	Test Point	MIS	SAI	OFFICE ALARM	MAJOR AUD NO	MAJOR AUD C	>1 MΩ	>1 MΩ	OFFICE ALARM	MAJOR VIS NO	MAJOR VIS C	>1 MΩ	>1 MΩ	SHELF STATUS	MAJSI	MAJSR	>1 MΩ	>1 MΩ	CLOCK STATUS A	RTN	HOLDOVER	-42 V to -56 V	-42 V to -56 V	CLOCK STATUS A	RTN	LOCK	-42 V to -56 V	>1 MΩ	CLOCK STATUS B	RTN	HOLDOVER	-42 V to -56 V	-42 V to -56 V	CLOCK STATUS B	RTN	LOCK	-42 V to -56 V	>1 MΩ	Type	Test Point	Test Point	MIS	SAI	OFFICE ALARM	MAJOR AUD NO	MAJOR AUD C	>1 MΩ	>1 MΩ	OFFICE ALARM	MAJOR VIS NO	MAJOR VIS C	>1 MΩ	>1 MΩ	SHELF STATUS	MAJSI	MAJSR	>1 MΩ	>1 MΩ	CLOCK STATUS A	HOLDOVER	HOLDOVER RTN	-42 V to -56 V	-42 V to -56 V	CLOCK STATUS A	LOCK	LOCK RTN	-42 V to -56 V	>1 MΩ	CLOCK STATUS B	HOLDOVER	HOLDOVER RTN	-42 V to -56 V	-42 V to -56 V	CLOCK STATUS B	LOCK	LOCK RTN	-42 V to -56 V	>1 MΩ
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16	<p>If an SAI card is installed in the shelf, skip this step. Use the INIT-REG command for every MRC card in the shelf. This initializes all registers on the shelf.</p> <p>Requirement: The response indicates the command was completed successfully.</p>																																																																																
17	<p>This procedure is complete. Indicate completion of the ST3E Card Test on the Test Sign-off form.</p>																																																																																

Chart 16. ST2E or TNC-E with ST3E, TNC, or LNC Card Test

STEP	PROCEDURE
	<p>Use this procedure to install one ST2E or TNC-E and one quartz-based clock card (ST3E -01, TNC, or LNC) card.</p> <p>090-40019-01 (ST3E -01) cards determine major and minor alarms according to the HOLDOVER ALARM switch on the shelf backplane. 090-40019-03 (ST3E -03) cards cannot cause a minor alarm. Perform the procedure in Chart 17 if using ST3E -03 cards.</p> <p>Notes:</p> <ol style="list-style-type: none"> 1. Resistance cannot be measured across terminal sets if office alarm system and remote telemetry equipment are connected to the terminal sets or if an MIS card is installed in the shelf. The HOLDOVER and RTN status terminal set is connected to -48V and battery return through relay windings for the holdover MAJOR/MINOR option switch (SW3) operation. Therefore, resistance cannot be measured across this terminal set. 2. When Issue A or B of the ST2E card is installed, use only the LPR as an input reference clock. Issue D of the ST2E may use an LPR or network input reference clock. Replace an Issue C of the ST2E card with Issue D. 3. When Issue A of the TNC-E card is installed, use only the LPR as an input reference clock. Issue B of the TNC-E cannot be installed in the same shelf as a quartz clock card. Issue C or later of the TNC-E may use either the DCD-LPR or a network source as a reference input. Replace an Issue B of the TNC-E with Issue C or later TNC-E card. <p>Test Equipment: Digital volt/ohm meter</p>
1	On the rear of the master shelf, set the ST3/ST2 switch (SW1) to the ST2 position and the HOLDOVER ALARM switch (SW3) to MAJ (Figure 1).
2	On the ST3E card, set section 5 of SW1 to the ON (up) position (Figure 14); on the TNC and LNC cards, ensure that the switches are set as illustrated in Figure 15 and Figure 16. On the ST2E or TNC-E card, set SW1, section 2 to the ON (up) position (Figure 13).
3	In the master shelf, insert the ST2E or TNC-E card into the ST A slot.
4	In the master shelf, insert the ST3E, TNC, or LNC card into the ST B slot.
5	<p>During the 30 minute (approximately) oscillator stabilization period (60 minutes for an ST2E or TNC-E), observe the HOLDOVER lamp and the FREE RUN lamp.</p> <p>Requirement: The HOLDOVER and FREE RUN lamps flash green during holdover.</p>
6	<p>After the 30 minute oscillator stabilization period (60 minutes for an ST2E or TNC-E), observe the HOLDOVER and SRC A lamps, and the FREE RUN and REF B lamps.</p> <p>Requirement: After the stabilization period for both cards, the HOLDOVER and FREE RUN lamps stop flashing and go off. The SRC A and REF B lamps light, indicating the clock card in slot ST A is receiving an input reference from the clock input card in CI A, and the clock card in slot ST B is receiving an input reference from the clock input card in CI B.</p> <p>Note: If a clock card does not recognize an input reference signal, the clock card free-runs and the HOLDOVER or FREE RUN lamp lights without flashing.</p>

Chart 16. ST2E or TNC-E with ST3E, TNC, or LNC Card Test (Contd)

STEP	PROCEDURE
7	<p>Approximately 5 minutes (up to 20 minutes for worst-case signal conditions) after the end of the oscillator stabilization period, observe the LKD, LOCKED, and ACTIVE lamps.</p> <p>Requirement: On both clock cards, the LKD, LOCKED, and ACTIVE lamps light green.</p>
8	<p>Remove the clock input A card.</p> <p>Requirement: SRC ACT or SRC ACTIVE lamp on the clock input B card remains lit. On clock card A, the SRC A lamp goes off and the SRC B lamp lights. On clock card B, the REF lamps do not change (REF B is still on). The LOCKED lamp on one or both clock cards may go off while the clock converges on the new reference. If so, the LOCKED lamp relights within 5 minutes.</p>
9	<p>Reinsert the clock input A card. When the FAIL lamp goes off on the clock input A card, observe the lamps.</p> <p>Requirement: After approximately 8 s to 40 s for the ACI or CI cards, 1 minute for DCIM cards, or 3 minutes to 5 minutes for MRC cards, the SRC ACT or SRC ACTIVE lamp on clock input card A lights. On clock card A, the SRC A lamp lights, and the SRC B lamp goes off. On clock card B, the REF lamps do not change (REF B is still on). The LOCKED lamp on one or both clock cards may go off while the clock converges on the new reference. If so, the LOCKED lamp relights within 5 minutes.</p>
10	<p>Remove the clock input B card.</p> <p>Requirement: The SRC ACT or SRC ACTIVE lamp on the clock input A card remains lit. On clock card A, the SRC lamps do not change (SRC A is still on). On clock card B, the REF A lamp lights and the REF B lamp goes off. The LKD or LOCKED lamps may go off while the clock converges on the new reference. If so, the lamp relights within 5 minutes.</p>
11	<p>Reinsert the clock input B card. When the FAIL lamp goes off on the clock input B card, observe the lamps.</p> <p>Requirement: After approximately 8 s to 40 s for ACI/CI cards, 1 minute for DCIM cards, or 3 minutes to 5 minutes for MRC cards, the SRC ACT or SRC ACTIVE lamp on the clock input card A lights. On clock card A, the SRC lamps do not change (SRC A is still on). On clock card B, the REF A lamp goes off and the REF A lamp lights. The LOCKED lamp on one or both clock cards may go off while the clock converges on the new reference. If so, the LOCKED lamp relights within 5 minutes.</p>
12	<p>Remove both clock input cards. Observe the lamps on the SAI/MIS and both clock cards.</p> <p>Requirement: On the SAI/MIS card, the MINOR lamp lights. On the clock cards, the SRC, LKD, REF, and LOCKED lamps go off, and the HOLDOVER and HOLD OV lamps light red.</p>

Chart 16. ST2E or TNC-E with ST3E, TNC, or LNC Card Test (Contd)

STEP	PROCEDURE																																																																																																														
13	<p>Connect the multimeter, set to the resistance or volts dc scale as indicated, across the following Office Alarms, Shelf Status, and Clock Status A and B terminal sets on the shelf backplane (see Figure 1).</p> <p>If Rev. D or earlier shelf:</p> <table border="1"> <thead> <tr> <th><u>Type</u></th> <th><u>Test Point</u></th> <th><u>Test Point</u></th> <th><u>MIS</u></th> <th><u>SAI</u></th> </tr> </thead> <tbody> <tr> <td>OFFICE ALARM</td> <td>MINOR AUD NO</td> <td>MINOR AUD C</td> <td><10 Ω</td> <td><10 Ω</td> </tr> <tr> <td>OFFICE ALARM</td> <td>MINOR VIS NO</td> <td>MINOR VIS C</td> <td><10 Ω</td> <td><10 Ω</td> </tr> <tr> <td>OFFICE ALARM</td> <td>MAJOR AUD NO</td> <td>MAJOR AUD C</td> <td><10 Ω</td> <td><10 Ω</td> </tr> <tr> <td>OFFICE ALARM</td> <td>MAJOR VIS NO</td> <td>MAJOR VIS C</td> <td><10 Ω</td> <td><10 Ω</td> </tr> <tr> <td>SHELF STATUS</td> <td>MINSI</td> <td>MINSR</td> <td><10 Ω</td> <td><10 Ω</td> </tr> <tr> <td>SHELF STATUS</td> <td>MAJSI</td> <td>MAJSR</td> <td><10 Ω</td> <td><10 Ω</td> </tr> <tr> <td>CLOCK STATUS A</td> <td>RTN</td> <td>HOLDOVER</td> <td><0.1 V</td> <td><0.1 V</td> </tr> <tr> <td>CLOCK STATUS A</td> <td>RTN</td> <td>LOCK</td> <td><0.1 V</td> <td><10 Ω</td> </tr> <tr> <td>CLOCK STATUS B</td> <td>RTN</td> <td>HOLDOVER</td> <td><0.1 V</td> <td><0.1 V</td> </tr> <tr> <td>CLOCK STATUS B</td> <td>RTN</td> <td>LOCK</td> <td><0.1 V</td> <td><10 Ω</td> </tr> </tbody> </table> <p>If Rev. E or later shelf:</p> <table border="1"> <thead> <tr> <th><u>Type</u></th> <th><u>Test Point</u></th> <th><u>Test Point</u></th> <th><u>MIS</u></th> <th><u>SAI</u></th> </tr> </thead> <tbody> <tr> <td>OFFICE ALARM</td> <td>MINOR AUD NO</td> <td>MINOR AUD C</td> <td><10 Ω</td> <td><10 Ω</td> </tr> <tr> <td>OFFICE ALARM</td> <td>MINOR VIS NO</td> <td>MINOR VIS C</td> <td><10 Ω</td> <td><10 Ω</td> </tr> <tr> <td>OFFICE ALARM</td> <td>MAJOR AUD NO</td> <td>MAJOR AUD C</td> <td><10 Ω</td> <td><10 Ω</td> </tr> <tr> <td>OFFICE ALARM</td> <td>MAJOR VIS NO</td> <td>MAJOR VIS C</td> <td><10 Ω</td> <td><10 Ω</td> </tr> <tr> <td>SHELF STATUS</td> <td>MINSI</td> <td>MINSR</td> <td><10 Ω</td> <td><10 Ω</td> </tr> <tr> <td>SHELF STATUS</td> <td>MAJSI</td> <td>MAJSR</td> <td><10 Ω</td> <td><10 Ω</td> </tr> <tr> <td>CLOCK STATUS A</td> <td>HOLDOVER</td> <td>HOLDOVER RTN</td> <td><0.1 V</td> <td><0.1 V</td> </tr> <tr> <td>CLOCK STATUS A</td> <td>LOCK</td> <td>LOCK RTN</td> <td><0.1 V</td> <td><10 Ω</td> </tr> <tr> <td>CLOCK STATUS B</td> <td>HOLDOVER</td> <td>HOLDOVER RTN</td> <td><0.1 V</td> <td><0.1 V</td> </tr> <tr> <td>CLOCK STATUS B</td> <td>LOCK</td> <td>LOCK RTN</td> <td><0.1 V</td> <td><10 Ω</td> </tr> </tbody> </table> <p>Requirement: The multimeter indicates the readings shown in the Results column.</p>	<u>Type</u>	<u>Test Point</u>	<u>Test Point</u>	<u>MIS</u>	<u>SAI</u>	OFFICE ALARM	MINOR AUD NO	MINOR AUD C	<10 Ω	<10 Ω	OFFICE ALARM	MINOR VIS NO	MINOR VIS C	<10 Ω	<10 Ω	OFFICE ALARM	MAJOR AUD NO	MAJOR AUD C	<10 Ω	<10 Ω	OFFICE ALARM	MAJOR VIS NO	MAJOR VIS C	<10 Ω	<10 Ω	SHELF STATUS	MINSI	MINSR	<10 Ω	<10 Ω	SHELF STATUS	MAJSI	MAJSR	<10 Ω	<10 Ω	CLOCK STATUS A	RTN	HOLDOVER	<0.1 V	<0.1 V	CLOCK STATUS A	RTN	LOCK	<0.1 V	<10 Ω	CLOCK STATUS B	RTN	HOLDOVER	<0.1 V	<0.1 V	CLOCK STATUS B	RTN	LOCK	<0.1 V	<10 Ω	<u>Type</u>	<u>Test Point</u>	<u>Test Point</u>	<u>MIS</u>	<u>SAI</u>	OFFICE ALARM	MINOR AUD NO	MINOR AUD C	<10 Ω	<10 Ω	OFFICE ALARM	MINOR VIS NO	MINOR VIS C	<10 Ω	<10 Ω	OFFICE ALARM	MAJOR AUD NO	MAJOR AUD C	<10 Ω	<10 Ω	OFFICE ALARM	MAJOR VIS NO	MAJOR VIS C	<10 Ω	<10 Ω	SHELF STATUS	MINSI	MINSR	<10 Ω	<10 Ω	SHELF STATUS	MAJSI	MAJSR	<10 Ω	<10 Ω	CLOCK STATUS A	HOLDOVER	HOLDOVER RTN	<0.1 V	<0.1 V	CLOCK STATUS A	LOCK	LOCK RTN	<0.1 V	<10 Ω	CLOCK STATUS B	HOLDOVER	HOLDOVER RTN	<0.1 V	<0.1 V	CLOCK STATUS B	LOCK	LOCK RTN	<0.1 V	<10 Ω
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14	<p>Reinsert both clock input cards. After the FAIL lamps go off, observe the lamps on the SAI/MIS and both clock cards after approximately 5 minutes.</p> <p>Requirement: The SRC A lamp on clock card A lights and the REF B lamp on clock card B lights. On both clock input cards, the SRC ACT/SRC ACTIVE lamp lights. On each clock card, the LOCKED and ACTIVE lamps are lit, and the HOLD OV lamp is off. The MAJOR and MINOR lamps on the MIS card are off.</p>																																																																																																														

Chart 16. ST2E or TNC-E with ST3E, TNC, or LNC Card Test (Contd)

STEP	PROCEDURE																																																																																																														
15	<p>Connect the multimeter, set to the resistance or volts dc scale as indicated, across the following Office Alarms, Shelf Status, and Clock Status A and B terminal sets on the shelf backplane (see Figure 1).</p> <p>If Rev. D or earlier shelf:</p> <table border="1"> <thead> <tr> <th>Type</th> <th>Test Point</th> <th>Test Point</th> <th>MIS</th> <th>SAI</th> </tr> </thead> <tbody> <tr> <td>OFFICE ALARM</td> <td>MINOR AUD NO</td> <td>MINOR AUD C</td> <td>>1 MΩ</td> <td>>1 MΩ</td> </tr> <tr> <td>OFFICE ALARM</td> <td>MINOR VIS NO</td> <td>MINOR VIS C</td> <td>>1 MΩ</td> <td>>1 MΩ</td> </tr> <tr> <td>OFFICE ALARM</td> <td>MAJOR AUD NO</td> <td>MAJOR AUD C</td> <td>>1 MΩ</td> <td>>1 MΩ</td> </tr> <tr> <td>OFFICE ALARM</td> <td>MAJOR VIS NO</td> <td>MAJOR VIS C</td> <td>>1 MΩ</td> <td>>1 MΩ</td> </tr> <tr> <td>SHELF STATUS</td> <td>MINSI</td> <td>MINSR</td> <td>>1 MΩ</td> <td>>1 MΩ</td> </tr> <tr> <td>SHELF STATUS</td> <td>MAJSI</td> <td>MAJSR</td> <td>>1 MΩ</td> <td>>1 MΩ</td> </tr> <tr> <td>CLOCKSTATUS A</td> <td>RTN</td> <td>HOLDOVER</td> <td>-42 V to -56 V</td> <td>-42 V to -56 V</td> </tr> <tr> <td>CLOCK STATUS A</td> <td>RTN</td> <td>LOCK</td> <td>-42 V to -56 V</td> <td>>1 MΩ</td> </tr> <tr> <td>CLOCK STATUS B</td> <td>RTN</td> <td>HOLDOVER</td> <td>-42 V to -56 V</td> <td>-42 V to -56 V</td> </tr> <tr> <td>CLOCK STATUS B</td> <td>RTN</td> <td>LOCK</td> <td>-42 V to -56 V</td> <td>>1 MΩ</td> </tr> </tbody> </table> <p>If Rev. E or later shelf:</p> <table border="1"> <thead> <tr> <th>Type</th> <th>Test Point</th> <th>Test Point</th> <th>MIS</th> <th>SAI</th> </tr> </thead> <tbody> <tr> <td>OFFICE ALARM</td> <td>MINOR AUD NO</td> <td>MINOR AUD C</td> <td>>1 MΩ</td> <td>>1 MΩ</td> </tr> <tr> <td>OFFICE ALARM</td> <td>MINOR VIS NO</td> <td>MINOR VIS C</td> <td>>1 MΩ</td> <td>>1 MΩ</td> </tr> <tr> <td>OFFICE ALARM</td> <td>MAJOR AUD NO</td> <td>MAJOR AUD C</td> <td>>1 MΩ</td> <td>>1 MΩ</td> </tr> <tr> <td>OFFICE ALARM</td> <td>MAJOR VIS NO</td> <td>MAJOR VIS C</td> <td>>1 MΩ</td> <td>>1 MΩ</td> </tr> <tr> <td>SHELF STATUS</td> <td>MINSI</td> <td>MINSR</td> <td>>1 MΩ</td> <td>>1 MΩ</td> </tr> <tr> <td>SHELF STATUS</td> <td>MAJSI</td> <td>MAJSR</td> <td>>1 MΩ</td> <td>>1 MΩ</td> </tr> <tr> <td>CLOCK STATUS A</td> <td>HOLDOVER</td> <td>HOLDOVER RTN</td> <td>-42 V to -56 V</td> <td>-42 V to -56 V</td> </tr> <tr> <td>CLOCK STATUS A</td> <td>LOCK</td> <td>LOCK RTN</td> <td>-42 V to -56 V</td> <td>>1 MΩ</td> </tr> <tr> <td>CLOCK STATUS B</td> <td>HOLDOVER</td> <td>HOLDOVER RTN</td> <td>-42 V to -56 V</td> <td>-42 V to -56 V</td> </tr> <tr> <td>CLOCK STATUS B</td> <td>LOCK</td> <td>LOCK RTN</td> <td>-42 V to -56 V</td> <td>>1 MΩ</td> </tr> </tbody> </table> <p>Requirement: The multimeter indicates the readings shown in the Results column.</p>	Type	Test Point	Test Point	MIS	SAI	OFFICE ALARM	MINOR AUD NO	MINOR AUD C	>1 MΩ	>1 MΩ	OFFICE ALARM	MINOR VIS NO	MINOR VIS C	>1 MΩ	>1 MΩ	OFFICE ALARM	MAJOR AUD NO	MAJOR AUD C	>1 MΩ	>1 MΩ	OFFICE ALARM	MAJOR VIS NO	MAJOR VIS C	>1 MΩ	>1 MΩ	SHELF STATUS	MINSI	MINSR	>1 MΩ	>1 MΩ	SHELF STATUS	MAJSI	MAJSR	>1 MΩ	>1 MΩ	CLOCKSTATUS A	RTN	HOLDOVER	-42 V to -56 V	-42 V to -56 V	CLOCK STATUS A	RTN	LOCK	-42 V to -56 V	>1 MΩ	CLOCK STATUS B	RTN	HOLDOVER	-42 V to -56 V	-42 V to -56 V	CLOCK STATUS B	RTN	LOCK	-42 V to -56 V	>1 MΩ	Type	Test Point	Test Point	MIS	SAI	OFFICE ALARM	MINOR AUD NO	MINOR AUD C	>1 MΩ	>1 MΩ	OFFICE ALARM	MINOR VIS NO	MINOR VIS C	>1 MΩ	>1 MΩ	OFFICE ALARM	MAJOR AUD NO	MAJOR AUD C	>1 MΩ	>1 MΩ	OFFICE ALARM	MAJOR VIS NO	MAJOR VIS C	>1 MΩ	>1 MΩ	SHELF STATUS	MINSI	MINSR	>1 MΩ	>1 MΩ	SHELF STATUS	MAJSI	MAJSR	>1 MΩ	>1 MΩ	CLOCK STATUS A	HOLDOVER	HOLDOVER RTN	-42 V to -56 V	-42 V to -56 V	CLOCK STATUS A	LOCK	LOCK RTN	-42 V to -56 V	>1 MΩ	CLOCK STATUS B	HOLDOVER	HOLDOVER RTN	-42 V to -56 V	-42 V to -56 V	CLOCK STATUS B	LOCK	LOCK RTN	-42 V to -56 V	>1 MΩ
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16	On the ST3E card, set section 5 of SW1 to the OFF (down) position (Figure 14); on the TNC and LNC cards, ensure that the switches are set as illustrated in Figure 15 and Figure 16.																																																																																																														
17	On the shelf backplane, set the HOLDOVER ALARM switch SW3 to MIN.																																																																																																														

Chart 16. ST2E or TNC-E with ST3E, TNC, or LNC Card Test (Contd)

STEP	PROCEDURE
18	<p>Remove both clock input cards. Observe the lamps on the SAI/MIS and both clock cards.</p> <p>Requirement: On the SAI/MIS card, the MINOR lamp lights. On the clock cards, the SRC, LKD, REF, and LOCKED lamps go off, and the HOLDOVER and HOLD OV lamps light red.</p>
19	<p>Reinsert both clock input cards. After the FAIL lamps go off, observe the lamps on the clock input cards, clock cards, and SAI/MIS after about 5 minutes.</p> <p>Requirement: On the clock input cards, the SRC ACT/SRC ACTIVE lamp is lit. On clock card A, the SRC A and LKD lamps are lit. On clock card B, the REF B and LOCKED lamps are lit. The HOLDOVER (clock card A) and HOLD OV (clock card B) lamps are off. On the MIS card, the MINOR lamp is off.</p>
20	<p>If the Holdover mode is to generate a minor alarm, continue to the next step. Remove the ST3E card, set the appropriate switch to MAJOR, and reinsert the card. On the shelf backplane, set the HOLDOVER ALARM switch (SW3) to MAJ.</p> <p>Note: The switch on the ST3E card and SW3 on the shelf backplane <i>must be set</i> for the same mode, either MAJOR or MINOR alarm.</p>
21	<p>If an SAI card is installed in the shelf, skip this step. Use the INIT-REG command for every MRC card in the shelf. This initializes all registers on the shelf.</p> <p>Requirement: The response indicates the command was completed successfully.</p>
22	<p>This procedure is complete. Indicate completion of the ST2E or TNC-E with ST3E, TNC, or LNC Card Test on the Test Sign-off form.</p>

Chart 17. ST2E or TNC-E with ST3E Card Test

STEP	PROCEDURE
	<p>Use this procedure to install one ST2E or TNC-E and one 090-40019-03 (ST3E -03) clock card.</p> <p>ST3E -03 cards cannot cause a minor alarm. Perform the procedure in Chart 16 if using ST3E -01, TNC, or LNC cards.</p> <p>Notes:</p> <ol style="list-style-type: none"> When Issue A or B of the ST2E card is installed, use only the LPR as an input reference clock. Issue D of the ST2E may use an LPR or network input reference clock. Replace an Issue C of the ST2E card with Issue D. Resistance cannot be measured across terminal sets if office alarm system and remote telemetry equipment are connected to the terminal sets or if an MIS card is installed in the shelf. The HOLDOVER and RTN status terminal set is connected to -48V and battery return through relay windings for the holdover MAJOR/MINOR option switch (SW3) operation. Therefore, resistance cannot be measured across this terminal set. When Issue A of the TNC-E card is installed, use only the LPR as an input reference clock. Issue B of the TNC-E cannot be installed in the same shelf as a quartz clock card. Issue C or later of the TNC-E may use either the DCD-LPR or a network source as a reference input. Replace an Issue B of the TNC-E with Issue C or later TNC-E card. <p>Test Equipment: Digital volt/ohm meter</p>
1	On the rear of the master shelf, set the ST3/ST2 switch (SW1) to the ST2 position and the HOLD-OVER ALARM switch (SW3) to MAJ (Figure 1).
2	On the ST3E card, set the appropriate switch and section to cause a major alarm in Holdover mode per Figure 14.
3	On the ST2E or TNC-E card, set SW1, section 2 to the ON (up) position (Figure 13).
4	In the master shelf, insert the ST2E or TNC-E card into the ST A slot.
5	In the master shelf, insert the ST3E card into the ST B slot.
6	<p>During the 30 minute (approximately) oscillator stabilization period (60 minutes for an ST2E or TNC-E), observe the HOLDOVER lamp and the FREE RUN lamp.</p> <p>Requirement: The HOLDOVER and FREE RUN lamps flash green during holdover.</p>
7	<p>After the 30 minute oscillator stabilization period (60 minutes for an ST2E or TNC-E), observe the HOLDOVER and SRC A lamps, and the FREE RUN and REF B lamps.</p> <p>Requirement: After the stabilization period for both cards, the HOLDOVER and FREE RUN lamps stop flashing and go off. The SRC A and REF B lamps light, indicating the clock card in slot ST A is receiving an input reference from the clock input card in CI A, and the clock card in slot ST B is receiving an input reference from the clock input card in CI B.</p> <p>Note: If a clock card does not recognize an input reference signal, the clock card free-runs and the HOLDOVER or FREE RUN lamp lights without flashing.</p>

Chart 17. ST2E or TNC-E with ST3E Card Test (Contd)

STEP	PROCEDURE
8	<p>Approximately 5 minutes (up to 20 minutes for worst-case signal conditions) after the end of the oscillator stabilization period, observe the LKD, LOCKED, and ACTIVE lamps.</p> <p>Requirement: On both clock cards, the LKD, LOCKED, and ACTIVE lamps light green.</p>
9	<p>Remove the clock input A card.</p> <p>Requirement: SRC ACT or SRC ACTIVE lamp on the clock input B card remains lit. On clock card A, the SRC A lamp goes off and the SRC B lamp lights. On clock card B, the REF lamps do not change (REF B is still on). The LOCKED lamp on one or both clock cards may go off while the clock converges on the new reference. If so, the LOCKED lamp relights within 5 minutes.</p>
10	<p>Reinsert the clock input A card. When the FAIL lamp goes off on the clock input A card, observe the lamps.</p> <p>Requirement: After approximately 8 s to 40 s for ACI/CI cards, 1 minute for DCIM cards, or 3 minutes to 5 minutes for MRC cards, the SRC ACT or SRC ACTIVE lamp on clock input card A lights. On clock card A, the SRC A lamp lights, and the SRC B lamp goes off. On clock card B, the REF lamps do not change (REF B is still on). The LOCKED lamp on one or both clock cards may go off while the clock converges on the new reference. If so, the LOCKED lamp relights within 5 minutes.</p>
11	<p>Remove the clock input B card.</p> <p>Requirement: SRC ACT or SRC ACTIVE lamp on the clock input A card remains lit. On clock card A, the SRC lamps do not change (SRC A is still on). On clock card B, the REF A lamp lights and the REF B lamp goes off. The LKD or LOCKED lamps may go off while the clock converges on the new reference. If so, the lamp relights within 5 minutes.</p>
12	<p>Reinsert the clock input B card. When the FAIL lamp goes off on the clock input B card, observe the lamps.</p> <p>Requirement: After approximately 8 s to 40 s for ACI/CI cards, 1 minute for DCIM cards, or 3 minutes to 5 minutes for MRC cards, the SRC ACT or SRC ACTIVE lamp on clock input card A lights. On clock card A, the SRC lamps do not change (SRC A is still on). On clock card B, the REF A lamp goes off and the REF A lamp lights. The LOCKED lamp on one or both clock cards may go off while the clock converges on the new reference. If so, the LOCKED lamp relights within 5 minutes.</p>
13	<p>Remove both clock input cards. Observe the lamps on the SAI/MIS and both clock cards.</p> <p>Requirement: On the SAI/MIS card, the MINOR lamp lights. On the clock cards, the SRC, LKD, REF, and LOCKED lamps go off, and the HOLDOVER and HOLD OV lamps light red.</p>

Chart 17. ST2E or TNC-E with ST3E Card Test (Contd)

STEP	PROCEDURE																																																																																																														
14	<p>Connect the multimeter across the following Office Alarms, Shelf Status, and Clock Status A and B terminal sets on the shelf backplane (see Figure 1). If an SAI card is installed in the shelf, set the multimeter to the resistance scale for all terminal sets except HOLDOVER; set to the volts dc scale for Clock Status A and B HOLDOVER terminal sets. If an MIS card is installed in the shelf, set the multimeter to the resistance scale for MAJOR AUD, MAJOR VIS, MAJSI, MINOR AUD, MINOR VIS, and MINSI terminal sets; set to the volts dc scale for Clock Status A and B HOLD-OVER and LOCK terminal sets.</p> <p>If Rev. D or earlier shelf:</p> <table border="1"> <thead> <tr> <th>Type</th> <th>Test Point</th> <th>Test Point</th> <th>MIS</th> <th>SAI</th> </tr> </thead> <tbody> <tr> <td>OFFICE ALARM</td> <td>MINOR AUD NO</td> <td>MINOR AUD C</td> <td><10 Ω</td> <td><10 Ω</td> </tr> <tr> <td>OFFICE ALARM</td> <td>MINOR VIS NO</td> <td>MINOR VIS C</td> <td><10 Ω</td> <td><10 Ω</td> </tr> <tr> <td>OFFICE ALARM</td> <td>MAJOR AUD NO</td> <td>MAJOR AUD C</td> <td><10 Ω</td> <td><10 Ω</td> </tr> <tr> <td>OFFICE ALARM</td> <td>MAJOR VIS NO</td> <td>MAJOR VIS C</td> <td><10 Ω</td> <td><10 Ω</td> </tr> <tr> <td>SHELF STATUS</td> <td>MINSI</td> <td>MINSR</td> <td><10 Ω</td> <td><10 Ω</td> </tr> <tr> <td>SHELF STATUS</td> <td>MAJSI</td> <td>MAJSR</td> <td><10 Ω</td> <td><10 Ω</td> </tr> <tr> <td>CLOCK STATUS A</td> <td>RTN</td> <td>HOLDOVER</td> <td><0.1 V</td> <td><0.1 V</td> </tr> <tr> <td>CLOCK STATUS A</td> <td>RTN</td> <td>LOCK</td> <td><0.1 V</td> <td><10 Ω</td> </tr> <tr> <td>CLOCK STATUS B</td> <td>RTN</td> <td>HOLDOVER</td> <td><0.1 V</td> <td><0.1 V</td> </tr> <tr> <td>CLOCK STATUS B</td> <td>RTN</td> <td>LOCK</td> <td><0.1 V</td> <td><10 Ω</td> </tr> </tbody> </table> <p>If Rev. E or later shelf:</p> <table border="1"> <thead> <tr> <th>Type</th> <th>Test Point</th> <th>Test Point</th> <th>MIS</th> <th>SAI</th> </tr> </thead> <tbody> <tr> <td>OFFICE ALARM</td> <td>MINOR AUD NO</td> <td>MINOR AUD C</td> <td><10 Ω</td> <td><10 Ω</td> </tr> <tr> <td>OFFICE ALARM</td> <td>MINOR VIS NO</td> <td>MINOR VIS C</td> <td><10 Ω</td> <td><10 Ω</td> </tr> <tr> <td>OFFICE ALARM</td> <td>MAJOR AUD NO</td> <td>MAJOR AUD C</td> <td><10 Ω</td> <td><10 Ω</td> </tr> <tr> <td>OFFICE ALARM</td> <td>MAJOR VIS NO</td> <td>MAJOR VIS C</td> <td><10 Ω</td> <td><10 Ω</td> </tr> <tr> <td>SHELF STATUS</td> <td>MINSI</td> <td>MINSR</td> <td><10 Ω</td> <td><10 Ω</td> </tr> <tr> <td>SHELF STATUS</td> <td>MAJSI</td> <td>MAJSR</td> <td><10 Ω</td> <td><10 Ω</td> </tr> <tr> <td>CLOCK STATUS A</td> <td>HOLDOVER</td> <td>HOLDOVER RTN</td> <td><0.1 V</td> <td><0.1 V</td> </tr> <tr> <td>CLOCK STATUS A</td> <td>LOCK</td> <td>LOCK RTN</td> <td><0.1 V</td> <td><10 Ω</td> </tr> <tr> <td>CLOCK STATUS B</td> <td>HOLDOVER</td> <td>HOLDOVER RTN</td> <td><0.1 V</td> <td><0.1 V</td> </tr> <tr> <td>CLOCK STATUS B</td> <td>LOCK</td> <td>LOCK RTN</td> <td><0.1 V</td> <td><10 Ω</td> </tr> </tbody> </table> <p>Requirement: The multimeter indicates the readings shown in the MIS or SAI column, depending on whether an MIS or SAI card is installed in the shelf.</p>	Type	Test Point	Test Point	MIS	SAI	OFFICE ALARM	MINOR AUD NO	MINOR AUD C	<10 Ω	<10 Ω	OFFICE ALARM	MINOR VIS NO	MINOR VIS C	<10 Ω	<10 Ω	OFFICE ALARM	MAJOR AUD NO	MAJOR AUD C	<10 Ω	<10 Ω	OFFICE ALARM	MAJOR VIS NO	MAJOR VIS C	<10 Ω	<10 Ω	SHELF STATUS	MINSI	MINSR	<10 Ω	<10 Ω	SHELF STATUS	MAJSI	MAJSR	<10 Ω	<10 Ω	CLOCK STATUS A	RTN	HOLDOVER	<0.1 V	<0.1 V	CLOCK STATUS A	RTN	LOCK	<0.1 V	<10 Ω	CLOCK STATUS B	RTN	HOLDOVER	<0.1 V	<0.1 V	CLOCK STATUS B	RTN	LOCK	<0.1 V	<10 Ω	Type	Test Point	Test Point	MIS	SAI	OFFICE ALARM	MINOR AUD NO	MINOR AUD C	<10 Ω	<10 Ω	OFFICE ALARM	MINOR VIS NO	MINOR VIS C	<10 Ω	<10 Ω	OFFICE ALARM	MAJOR AUD NO	MAJOR AUD C	<10 Ω	<10 Ω	OFFICE ALARM	MAJOR VIS NO	MAJOR VIS C	<10 Ω	<10 Ω	SHELF STATUS	MINSI	MINSR	<10 Ω	<10 Ω	SHELF STATUS	MAJSI	MAJSR	<10 Ω	<10 Ω	CLOCK STATUS A	HOLDOVER	HOLDOVER RTN	<0.1 V	<0.1 V	CLOCK STATUS A	LOCK	LOCK RTN	<0.1 V	<10 Ω	CLOCK STATUS B	HOLDOVER	HOLDOVER RTN	<0.1 V	<0.1 V	CLOCK STATUS B	LOCK	LOCK RTN	<0.1 V	<10 Ω
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15	<p>Reinsert both clock input cards. After the FAIL lamps go off, observe the lamps on the SAI/MIS and both clock cards after approximately 5 minutes.</p> <p>Requirement: The SRC A lamp on clock card A lights. The REF B lamp on clock card B lights. On both clock input cards, the SRC ACT/SRC ACTIVE lamp lights. On each clock card, the LOCKED and ACTIVE lamps are lit, and the HOLD OV lamp is off. The MAJOR and MINOR lamps on the SAI/MIS card are off.</p>																																																																																																														

Chart 17. ST2E or TNC-E with ST3E Card Test (Contd)

STEP	PROCEDURE																																																																																																														
16	<p>Connect the multimeter across the following Office Alarms, Shelf Status, and Clock Status A and B terminal sets on the shelf backplane (see Figure 1). If an SAI card is installed in the shelf, set the multimeter to the resistance scale for all terminal sets except HOLDOVER; set to the volts dc scale for Clock Status A and B HOLDOVER terminal sets. If an MIS card is installed in the shelf, set the multimeter to the resistance scale for MAJOR AUD, MAJOR VIS, MAJSI, MINOR AUD, MINOR VIS, and MINSI terminal sets; set to the volts dc scale for Clock Status A and B HOLDOVER and LOCK terminal sets.</p> <p>If Rev. D or earlier shelf:</p> <table border="1"> <thead> <tr> <th>Type</th> <th>Test Point</th> <th>Test Point</th> <th>MIS</th> <th>SAI</th> </tr> </thead> <tbody> <tr> <td>OFFICE ALARM</td> <td>MINOR AUD NO</td> <td>MINOR AUD C</td> <td>>1 MΩ</td> <td>>1 MΩ</td> </tr> <tr> <td>OFFICE ALARM</td> <td>MINOR VIS NO</td> <td>MINOR VIS C</td> <td>>1 MΩ</td> <td>>1 MΩ</td> </tr> <tr> <td>OFFICE ALARM</td> <td>MAJOR AUD NO</td> <td>MAJOR AUD C</td> <td>>1 MΩ</td> <td>>1 MΩ</td> </tr> <tr> <td>OFFICE ALARM</td> <td>MAJOR VIS NO</td> <td>MAJOR VIS C</td> <td>>1 MΩ</td> <td>>1 MΩ</td> </tr> <tr> <td>SHELF STATUS</td> <td>MINSI</td> <td>MINSR</td> <td>>1 MΩ</td> <td>>1 MΩ</td> </tr> <tr> <td>SHELF STATUS</td> <td>MAJSI</td> <td>MAJSR</td> <td>>1 MΩ</td> <td>>1 MΩ</td> </tr> <tr> <td>CLOCK STATUS A</td> <td>RTN</td> <td>HOLDOVER</td> <td>-42 V to -56 V</td> <td>-42 V to -56 V</td> </tr> <tr> <td>CLOCK STATUS A</td> <td>RTN</td> <td>LOCK</td> <td>-42 V to -56 V</td> <td>>1 MΩ</td> </tr> <tr> <td>CLOCK STATUS B</td> <td>RTN</td> <td>HOLDOVER</td> <td>-42 V to -56 V</td> <td>-42 V to -56 V</td> </tr> <tr> <td>CLOCK STATUS B</td> <td>RTN</td> <td>LOCK</td> <td>-42 V to -56 V</td> <td>>1 MΩ</td> </tr> </tbody> </table> <p>If Rev. E or later shelf:</p> <table border="1"> <thead> <tr> <th>Type</th> <th>Test Point</th> <th>Test Point</th> <th>MIS</th> <th>SAI</th> </tr> </thead> <tbody> <tr> <td>OFFICE ALARM</td> <td>MINOR AUD NO</td> <td>MINOR AUD C</td> <td>>1 MΩ</td> <td>>1 MΩ</td> </tr> <tr> <td>OFFICE ALARM</td> <td>MINOR VIS NO</td> <td>MINOR VIS C</td> <td>>1 MΩ</td> <td>>1 MΩ</td> </tr> <tr> <td>OFFICE ALARM</td> <td>MAJOR AUD NO</td> <td>MAJOR AUD C</td> <td>>1 MΩ</td> <td>>1 MΩ</td> </tr> <tr> <td>OFFICE ALARM</td> <td>MAJOR VIS NO</td> <td>MAJOR VIS C</td> <td>>1 MΩ</td> <td>>1 MΩ</td> </tr> <tr> <td>SHELF STATUS</td> <td>MINSI</td> <td>MINSR</td> <td>>1 MΩ</td> <td>>1 MΩ</td> </tr> <tr> <td>SHELF STATUS</td> <td>MAJSI</td> <td>MAJSR</td> <td>>1 MΩ</td> <td>>1 MΩ</td> </tr> <tr> <td>CLOCK STATUS A</td> <td>HOLDOVER</td> <td>HOLDOVER RTN</td> <td>-42 V to -56 V</td> <td>-42 V to -56 V</td> </tr> <tr> <td>CLOCK STATUS A</td> <td>LOCK</td> <td>LOCK RTN</td> <td>-42 V to -56 V</td> <td>>1 MΩ</td> </tr> <tr> <td>CLOCK STATUS B</td> <td>HOLDOVER</td> <td>HOLDOVER RTN</td> <td>-42 V to -56 V</td> <td>-42 V to -56 V</td> </tr> <tr> <td>CLOCK STATUS B</td> <td>LOCK</td> <td>LOCK RTN</td> <td>-42 V to -56 V</td> <td>>1 MΩ</td> </tr> </tbody> </table> <p>Requirement: The multimeter indicates the readings shown in the MIS or SAI column, depending on whether an MIS or SAI card is installed in the shelf.</p>	Type	Test Point	Test Point	MIS	SAI	OFFICE ALARM	MINOR AUD NO	MINOR AUD C	>1 MΩ	>1 MΩ	OFFICE ALARM	MINOR VIS NO	MINOR VIS C	>1 MΩ	>1 MΩ	OFFICE ALARM	MAJOR AUD NO	MAJOR AUD C	>1 MΩ	>1 MΩ	OFFICE ALARM	MAJOR VIS NO	MAJOR VIS C	>1 MΩ	>1 MΩ	SHELF STATUS	MINSI	MINSR	>1 MΩ	>1 MΩ	SHELF STATUS	MAJSI	MAJSR	>1 MΩ	>1 MΩ	CLOCK STATUS A	RTN	HOLDOVER	-42 V to -56 V	-42 V to -56 V	CLOCK STATUS A	RTN	LOCK	-42 V to -56 V	>1 MΩ	CLOCK STATUS B	RTN	HOLDOVER	-42 V to -56 V	-42 V to -56 V	CLOCK STATUS B	RTN	LOCK	-42 V to -56 V	>1 MΩ	Type	Test Point	Test Point	MIS	SAI	OFFICE ALARM	MINOR AUD NO	MINOR AUD C	>1 MΩ	>1 MΩ	OFFICE ALARM	MINOR VIS NO	MINOR VIS C	>1 MΩ	>1 MΩ	OFFICE ALARM	MAJOR AUD NO	MAJOR AUD C	>1 MΩ	>1 MΩ	OFFICE ALARM	MAJOR VIS NO	MAJOR VIS C	>1 MΩ	>1 MΩ	SHELF STATUS	MINSI	MINSR	>1 MΩ	>1 MΩ	SHELF STATUS	MAJSI	MAJSR	>1 MΩ	>1 MΩ	CLOCK STATUS A	HOLDOVER	HOLDOVER RTN	-42 V to -56 V	-42 V to -56 V	CLOCK STATUS A	LOCK	LOCK RTN	-42 V to -56 V	>1 MΩ	CLOCK STATUS B	HOLDOVER	HOLDOVER RTN	-42 V to -56 V	-42 V to -56 V	CLOCK STATUS B	LOCK	LOCK RTN	-42 V to -56 V	>1 MΩ
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17	<p>If an SAI card is installed in the shelf, skip this step. Use the INIT-REG command for every MRC card in the shelf. This initializes all registers on the shelf.</p> <p>Requirement: The response indicates the command was completed successfully.</p>																																																																																																														
18	<p>This procedure is complete. Indicate completion of the ST2E or TNC-E with ST3E Card Test on the Test Sign-off form.</p>																																																																																																														

Chart 18. ST3 Card Test

STEP	PROCEDURE
Use this procedure to install the ST3 cards. The ST3 card is completely configured at the factory and no switch or jumper settings to the card are required.	
Test Equipment: Digital volt/ohm meter	
1	On the rear of the master shelf, set the ST3/ST2 switch (SW1) (Figure 1) to the ST3 position. The HOLDOVER ALARM switch (SW3) does not affect shelf operation when ST3 cards are installed.
2	In the master shelf, insert the first ST3 card into the ST A slot, and the second ST3 card into the ST B slot.
3	Observe the FAIL and LOCK lamps on both ST3 cards. Requirement: On both ST3 cards, the FAIL lamps go off. After approximately 40 s, the LOCK lamps go off, and either the REF A or B lamp is lit, depending on which clock input (A or B) card's SRC ACT/SCR ACTIVE lamp is lit.
4	Press the transfer (XFR) pushbutton on either clock input card. Observe the SRC ACT/SRC ACTIVE lamps on the clock input cards and the REF and LOCK lamps on the ST3 cards. Requirement: The SRC ACT/SRC ACTIVE lamp goes off on one clock input card and lights on the other. The lit REF lamp (REF A or REF B) goes off and the other REF lamp lights on both ST3 cards. If the clock input cards are off frequency from each other, the LOCK lamps on the ST3 cards may light momentarily.
5	Press the transfer (XFR) pushbutton on either clock input card to transfer back to the original clock input card. Observe the SRC ACT/SRC ACTIVE lamps on the clock input cards and the REF and LOCK lamps on the ST3 cards. Requirement: The SRC ACT/SRC ACTIVE lamp goes off on one clock input card and lights on the other. The lit REF lamp (REF A or REF B) goes off and the other REF lamp lights on both ST3 cards. If the clock input cards are off frequency from each other, the LOCK lamps on the ST3 cards may light momentarily.
Caution: DO NOT perform the following test on in-service DCD-523 Shelves because it will adversely affect network elements receiving timing from the shelf.	
6	If the clock input A card SRC ACT/SRC ACTIVE lamp is not lit, press its XFR pushbutton to make it active. Remove the clock input A card. Observe the SRC ACT/SRC ACTIVE lamp on the clock input B card and the REF and LOCK lamps on the ST3 cards. Requirement: The SRC ACT/SRC ACTIVE lamp on the clock input B card lights. The REF A lamp goes off and the REF B lamp lights on both ST3 cards. The LOCKED lamp on one or both ST3 cards may light momentarily.
7	Reinsert the clock input A card. When the FAIL lamp goes off on the clock input A card, observe the REF lamps (A and B) on both ST3 cards. Requirement: No change on the lamps.
Caution: DO NOT perform the following test on in-service DCD-523 Shelves because it will adversely affect network elements receiving timing from the shelf.	

Chart 18. ST3 Card Test (Contd)

STEP	PROCEDURE																					
8	<p>Remove both clock input cards. Observe the lamps on the SAI/MIS and both ST3 cards.</p> <p>Requirement: The MAJOR and MINOR lamps light on the SAI/MIS card. On both ST3 cards, the REF lamps go off, and the FAIL and LOCK lamps light red.</p>																					
9	<p>Connect the multimeter, set to resistance, across the following Office Alarm and Shelf Status terminal sets, and the Clock Status A and B terminal sets on the shelf backplane (see Figure 1):</p> <table border="0"> <thead> <tr> <th style="text-align: center;"><u>Type</u></th> <th style="text-align: center;"><u>Test Point</u></th> <th style="text-align: center;"><u>Test Point</u></th> </tr> </thead> <tbody> <tr> <td>OFFICE ALARM</td> <td>MINOR AUD NO</td> <td>MINOR AUD C</td> </tr> <tr> <td>OFFICE ALARM</td> <td>MINOR VIS NO</td> <td>MINOR VIS C</td> </tr> <tr> <td>OFFICE ALARM</td> <td>MAJOR AUD NO</td> <td>MAJOR AUD C</td> </tr> <tr> <td>OFFICE ALARM</td> <td>MAJOR VIS NO</td> <td>MAJOR VIS C</td> </tr> <tr> <td>SHELF STATUS</td> <td>MINSI</td> <td>MINSR</td> </tr> <tr> <td>SHELF STATUS</td> <td>MAJSI</td> <td>MAJSR</td> </tr> </tbody> </table> <p>Requirement: All alarm contacts are closed (<10 Ω).</p> <p>Note: Resistance cannot be measured across terminal sets if office alarm system and remote telemetry equipment are connected to the terminal sets.</p>	<u>Type</u>	<u>Test Point</u>	<u>Test Point</u>	OFFICE ALARM	MINOR AUD NO	MINOR AUD C	OFFICE ALARM	MINOR VIS NO	MINOR VIS C	OFFICE ALARM	MAJOR AUD NO	MAJOR AUD C	OFFICE ALARM	MAJOR VIS NO	MAJOR VIS C	SHELF STATUS	MINSI	MINSR	SHELF STATUS	MAJSI	MAJSR
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SHELF STATUS	MINSI	MINSR																				
SHELF STATUS	MAJSI	MAJSR																				
10	<p>Reinsert both clock input cards. After the FAIL lamps go off, observe the lamps on the SAI/MIS and both ST3 cards.</p> <p>Requirement: On both ST3 cards, the REF A or B lamp is lit (depending on which clock input card's SRC ACT/SRC ACTIVE lamp is lit), and the LOCK and FAIL lamps are off. The MAJOR and MINOR lamps on the SAI/MIS card are off.</p>																					
11	<p>Connect the multimeter, set to resistance, across the following Office Alarm and Shelf Status terminal sets, and the Clock Status A and B terminal sets on the shelf backplane (see Figure 1):</p> <table border="0"> <thead> <tr> <th style="text-align: center;"><u>Type</u></th> <th style="text-align: center;"><u>Test Point</u></th> <th style="text-align: center;"><u>Test Point</u></th> </tr> </thead> <tbody> <tr> <td>OFFICE ALARM</td> <td>MINOR AUD NO</td> <td>MINOR AUD C</td> </tr> <tr> <td>OFFICE ALARM</td> <td>MINOR VIS NO</td> <td>MINOR VIS C</td> </tr> <tr> <td>OFFICE ALARM</td> <td>MAJOR AUD NO</td> <td>MAJOR AUD C</td> </tr> <tr> <td>OFFICE ALARM</td> <td>MAJOR VIS NO</td> <td>MAJOR VIS C</td> </tr> <tr> <td>SHELF STATUS</td> <td>MINSI</td> <td>MINSR</td> </tr> <tr> <td>SHELF STATUS</td> <td>MAJSI</td> <td>MAJSR</td> </tr> </tbody> </table> <p>Requirement: All alarm contacts are open (>1 MΩ).</p> <p>Note: Resistance cannot be measured across terminal sets if office alarm system and remote telemetry equipment are connected to the terminal sets.</p>	<u>Type</u>	<u>Test Point</u>	<u>Test Point</u>	OFFICE ALARM	MINOR AUD NO	MINOR AUD C	OFFICE ALARM	MINOR VIS NO	MINOR VIS C	OFFICE ALARM	MAJOR AUD NO	MAJOR AUD C	OFFICE ALARM	MAJOR VIS NO	MAJOR VIS C	SHELF STATUS	MINSI	MINSR	SHELF STATUS	MAJSI	MAJSR
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12	<p>If an SAI card is installed in the shelf, skip this step. Use the INIT-REG command for every MRC card in the shelf. This initializes all registers on the shelf.</p> <p>Requirement: The response indicates the command was completed successfully.</p>																					
13	<p>This procedure is complete. Indicate completion of the ST3 Card Test on the Test Sign-off form.</p>																					

Chart 19. MCA-5 or MCA-5M Card Test

STEP	PROCEDURE
	<p>Use this procedure to install the MCA-5 or MCA-5M card.</p> <p>Note: An MCA-5 card is required if the shelf uses 1:N protection. An MCA-5M card is required if the shelf uses SSM messaging and 1:N protection. Redundant-pair protection cannot be mixed with 1:N protection in the same shelf.</p> <p>Test Equipment: Dual-channel oscilloscope with 100 MHz minimum bandwidth</p> <p>Caution: <i>Certain restrictions apply when selecting HS TO cards for 1:N protection. In some cases, if a specific TO card is in an HS slot, certain other TO card types cannot be installed in any TO or HS slot on the shelf. In the case of the TOTA series of cards, special instructions apply. Refer to Tables G and H.</i></p>
1	<p>On each MCA-5M card, ensure that Sections 1, 2, and 3 of SW1 are set to the OFF position (Figure 18). On each MCA-5 card, ensure that SW1 is set per the following (see Figure 17):</p> <ul style="list-style-type: none"> • Section 1 to MSTR (ON) • Section 2 to AUTO (ON) • Section 3 to ON • Sections 4 through 8 to the OFF position
2	<p>Insert the cards into the MC slot in each shelf (master and expansion) requiring an MCA-5 card. Consult the local company Installation Job Specifications to determine which shelves require MCA-5 cards.</p> <p>Requirement: The lamps momentarily light, then go off, then the AUTO lamp lights.</p>
3	<p>Obtain two TO cards of the same type (e.g., two TOTA cards), for each shelf installed. Set the two left sections of SW1 on each card (sections 1 and 2 on some TO cards and sections 4 and 3 on other TO cards) to different settings (e.g., on TOTA cards, set one card for D4 framing, and the other card for ESF framing).</p>
4	<p>Insert one of the TO cards into slot TO1 (if two ST3E, TNC, LNC or ST3 cards are installed) or TO4 (if two ST2 or ST2E cards are installed) of the master shelf, and the other TO card into slot TO1 of the expansion shelves. Insert the other card into the HS1 slot of each shelf installed.</p> <p>Requirement: The ST, INPUT, and OPTION (e.g., D4 or ESF on TOTA cards) lamps are lit green on both card on all shelves.</p> <p>Note: The cards should have different OPTION lamps, e.g., D4 is lit on the TO1/TO4 card, and ESF is lit on the HS1 card.</p>

Chart 19. MCA-5 or MCA-5M Card Test (Contd)

STEP	PROCEDURE
5	<p>Setup a dual-trace 100 MHz oscilloscope, using the manufacturer's manual and Table C. Clip the scope probes' ground leads together. Connect an appropriate value Test Load Impedance resistor (see the appropriate figure for the type of TO card used) across the two scope probes. At the interface panel, connect the scope probes across each of the TO1/TO4 card's outputs (refer to Table J, Table K, and Table L for output terminals). Leave the scope probes connected to the last output port checked.</p> <p>Requirement: The output waveforms must be as shown in the waveform diagram for the card type used.</p>
6	<p>Remove the TO card in slot TO1/TO4 to activate an automatic protection switch to the HS1 card. Observe the lamps on the SAI or MIS, MCA-5, HS1 TO cards, and the Output Protection/Spare Select Panel. Also, observe the oscilloscope waveform.</p> <p>Requirements:</p> <ul style="list-style-type: none"> • SAI or MIS card: CRITICAL (MIS only), MAJOR, and MINOR lamps are off • MCA-5 card: AUTO lamp flashes for 6 s and then lights steady • HS1 TO card: Lit OPTION lamp goes off and the OPTION lamp that was lit on the removed TO1/TO4 TO card lights on the HS1 TO card (e.g., D4 becomes ESF) • Output Protection/Spare Select Panel: Pushbutton lamps over slots TO1/TO4 and HS1 are lit • Oscilloscope: The waveform on the scope returns when switch operation is completed (scope connection was made in Step 5)
7	<p>Reinsert the TO card in slot TO1/TO4. Wait 10 s, then press and hold for 3 s, the pushbutton over slot HS1 (on the Output Protection/Spare Select Panel) to release the protection switch. Observe the lamps on the SAI or MIS, MCA-5, HS1 TO cards, and the Output Protection/Spare Select Panel. Also, observe the oscilloscope waveform.</p> <p>Requirements:</p> <ul style="list-style-type: none"> • SAI or MIS card: CRITICAL (MIS only), MAJOR, and MINOR lamps are off • MCA-5 card: MAN lamp flashes for 6 s, then goes off • HS1 TO card: No change to OPTION lamps • Output Protection/Spare Select Panel: Pushbutton lamps over slots TO1/TO4 and HS1 go off • Oscilloscope: The waveform on the scope returns when switch operation is completed (scope connection was made in Step 5)

Chart 19. MCA-5 or MCA-5M Card Test (Contd)

STEP	PROCEDURE
8	<p>Simultaneously press and hold the pushbuttons over slots TO1/TO4 and HS1 (on the Output Protection/Spare Select Panel) for 3 s to activate a manual protection switch to the HS1 card. Observe the lamps on the SAI or MIS, MCA-5, HS1 TO cards, and the Output Protection/Spare Select Panel. Also, observe the oscilloscope waveform.</p> <p>Requirements:</p> <ul style="list-style-type: none"> • SAI or MIS card: CRITICAL (MIS only), MAJOR, and MINOR lamps are off • MCA-5 card: MAN lamp flashes continuously for as long as the protection switch is activated • HS1 TO card: No change to OPTION lamps • Output Protection/Spare Select Panel: Pushbutton lamps over slots TO1/TO4 and HS1 are lit • Oscilloscope: The waveform on the scope returns when switch operation is completed (scope connection was made in Step 5)
9	<p>Press and hold for 3 s, the pushbutton over slot HS1 (on the Output Protection/Spare Select Panel) to release the protection switch. Observe the lamps on the SAI or MIS, MCA-5, HS1 TO cards, and the Output Protection/Spare Select Panel. Also, observe the oscilloscope waveform.</p> <p>Requirements:</p> <ul style="list-style-type: none"> • SAI or MIS card: CRITICAL (MIS only), MAJOR, and MINOR lamps are off • MCA-5 card: MAN lamp stops flashing after 6 s and goes off • HS1 TO card: No change to OPTION lamps • Output Protection/Spare Select Panel: Pushbutton lamps over slots TO1/TO4 and HS1 go off • Oscilloscope: The waveform on the scope returns when switch operation is completed (scope connection was made in Step 5)
10	<p>Move the TO card from slot HS1 to slot HS2 and repeat Steps 6 through 9, substituting the HS2 slot/pushbutton for HS1 slot/pushbutton.</p>
11	<p>Remove the TO card from slot HS2. Move the TO card in slot TO1/TO4 to slot TO2/TO5. Insert the other TO card in slot HS1.</p>
12	<p>Repeat Steps 5 through 11, progressing one TO slot each time until slots TO1 through TO10 have been tested with HS1 and HS2 slots. Move the oscilloscope probes to an output port on the interface panel for the TO slot being tested.</p>
13	<p>Remove the MCA-5 card. Set switch SW1: section 5 to ON and section 3 to OFF (Figure 17). Reinsert the MCA-5 card.</p>

Chart 19. MCA-5 or MCA-5M Card Test (Contd)

STEP	PROCEDURE
14	<p>Remove the TO card in slot TO10 to activate an automatic protection switch to slot HS2. Observe the lamps on the SAI or MIS, MCA-5, HS2 TO cards, and the Output Protection/Spare Select Panel. Also, observe the oscilloscope waveform.</p> <p>Requirements:</p> <ul style="list-style-type: none"> • SAI or MIS card: MAJOR lamp lights • MCA-5 card: AUTO lamp flashes for 6 s, then lights steady • HS2 TO card: Lit OPTION lamp goes off, and the OPTION lamp that was lit on the removed TO10 TO card lights on the HS2 TO card • Output Protection/Spare Select Panel: Pushbutton lamps over slots TO10 and HS2 are lit • Oscilloscope: The waveform on the scope returns when switch operation is completed
15	<p>Reinsert the TO card in slot TO10. Wait 10 s, then press and hold the pushbutton over slot HS2 (on the Output Protection/Spare Select Panel) for 3 s to release the protection switch. Observe the lamps on the SAI or MIS, MCA-5, HS2 TO cards, and the Output Protection/Spare Select Panel. Also, observe the oscilloscope waveform.</p> <p>Requirements:</p> <ul style="list-style-type: none"> • SAI or MIS card: MAJOR lamp goes off • MCA-5 card: MAN lamp flashes for 6 s and then goes out • HS2 TO card: No change to OPTION lamps • Output Protection/Spare Select Panel: Pushbutton lamps over slots TO10 and HS2 go off • Oscilloscope: The waveform on the scope returns when switch operation is completed
16	<p>Simultaneously press and hold the pushbuttons over slots TO10 and HS2 (on the Output Protection/Spare Select Panel) for 3 s to activate a manual protection switch to the HS2 card. Observe the lamps on the SAI or MIS, MCA-5, HS2 TO cards, and the Output Protection/Spare Select Panel. Also, observe the oscilloscope waveform.</p> <p>Requirements:</p> <ul style="list-style-type: none"> • SAI or MIS card: MAJOR lamp lights • MCA-5 card: MAN lamp flashes continuously for as long as the protection switch is activated • HS2 TO card: No change to OPTION lamps • Output Protection/Spare Select Panel: Pushbutton lamps over slots TO10 and HS2 are lit • Oscilloscope: The waveform on the scope returns when switch operation is completed

Chart 19. MCA-5 or MCA-5M Card Test (Contd)

STEP	PROCEDURE
17	<p>Press and hold the pushbutton over slot HS2 (on the Output Protection/Spare Select Panel) for 3 s to release the protection switch. Observe the lamps on the SAI or MIS, MCA-5, HS2 TO cards, and the Output Protection/Spare Select Panel. Also, observe the oscilloscope waveform.</p> <p>Requirements:</p> <ul style="list-style-type: none"> • SAI or MIS card: MAJOR lamp goes off • MCA-5 card: MAN lamp stops flashing after 6 s and goes off • HS2 TO card: No change to OPTION lamps • Output Protection/Spare Select Panel: Pushbutton lamps over slots TO10 and HS2 go off • Oscilloscope: The waveform on the scope returns when switch operation is completed
18	<p>Remove the MCA-5 card. Set switch SW1, section 5 to OFF, and section 3 to ON. Reinsert the MCA-5 card.</p>
19	<p>Remove the TO card in slot TO10 to activate an automatic protection switch to slot HS2. Observe the lamps on the SAI or MIS, MCA-5, HS2 TO cards, and the Output Protection/Spare Select Panel. Also, observe the oscilloscope waveform.</p> <p>Requirements:</p> <ul style="list-style-type: none"> • SAI or MIS card: MINOR lamp lights • MCA-5 card: AUTO lamp flashes for 6 s and then lights steady • HS2 TO card: No change to OPTION lamps • Output Protection/Spare Select Panel: Pushbutton lamps over slots TO10 and HS2 are lit • Oscilloscope: The waveform on the scope returns when switch operation is completed
20	<p>Reinsert the TO card in slot TO10. Wait 10 s, then press and hold the pushbutton over slot HS2 (on the Output Protection/Spare Select Panel) for 3 s to release the protection switch. Observe the lamps on the SAI or MIS, MCA-5, HS2 TO cards, and the Output Protection/Spare Select Panel. Also, observe the oscilloscope waveform.</p> <p>Requirements:</p> <ul style="list-style-type: none"> • SAI or MIS card: MINOR lamp goes off • MCA-5 card: MAN lamp flashes for 6 s, then goes off • HS2 TO card: No change to OPTION lamps • Output Protection/Spare Select Panel: Pushbutton lamps over slots TO10 and HS2 go off • Oscilloscope: The waveform on the scope returns when switch operation is completed

Chart 19. MCA-5 or MCA-5M Card Test (Contd)

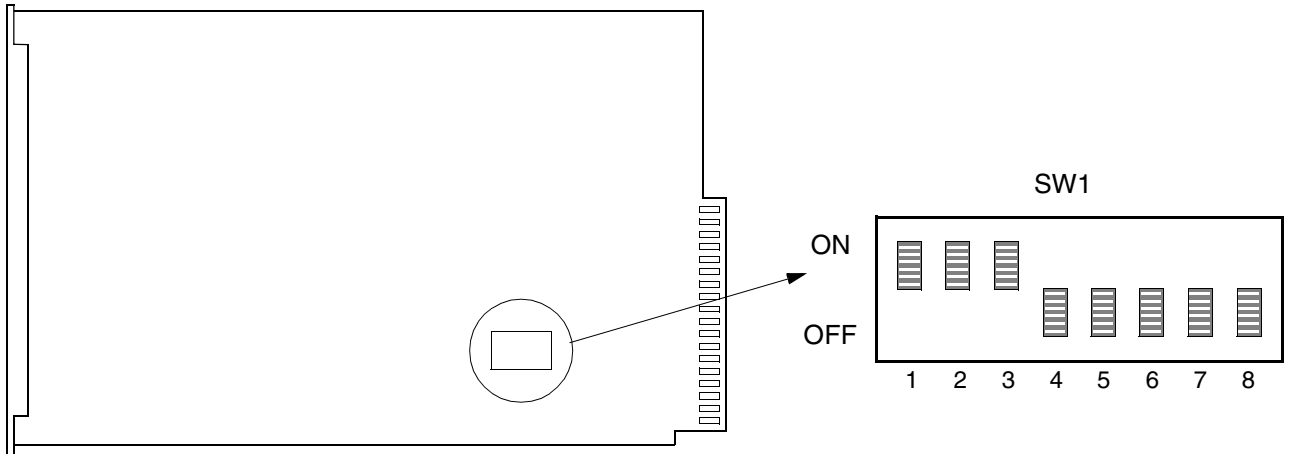
STEP	PROCEDURE
21	<p>Simultaneously press and hold the pushbuttons over slots TO10 and HS2 (on the Output Protection/Spare Select Panel) for 3 s to activate a manual protection switch to the HS2 card. Observe the lamps on the SAI or MIS, MCA-5, HS2 TO cards, and the Output Protection/Spare Select Panel. Also, observe the oscilloscope waveform.</p> <p>Requirements:</p> <ul style="list-style-type: none"> • SAI or MIS card: MINOR lamp lights • MCA-5 card: MAN lamp flashes continuously for as long as the protection switch is activated • HS2 TO card: No change to OPTION lamps • Output Protection/Spare Select Panel: Pushbutton lamps over slots TO10 and HS2 are lit • Oscilloscope: The waveform on the scope returns when switch operation is completed
22	<p>Press and hold the pushbutton over slot HS2 (on the Output Protection/Spare Select Panel) for 3 s to release the protection switch. Observe the lamps on the SAI or MIS, MCA-5, HS2 TO cards, and the Output Protection/Spare Select Panel. Also, observe the oscilloscope waveform.</p> <p>Requirements:</p> <ul style="list-style-type: none"> • SAI or MIS card: MINOR lamp goes off • MCA-5 card: MAN lamp stops flashing after 6 s and goes off • HS2 TO card: No change to OPTION lamps • Output Protection/Spare Select Panel: Pushbutton lamps over slots TO10 and HS2 go off • Oscilloscope: The waveform on the scope returns when switch operation is completed
23	<p>Consult the local company Installation Job Specifications as to whether the MCA-5 card is to be set to generate a major alarm, minor alarm, or no alarm when a protection switch is activated. If it is to be set for MINOR, proceed to the next step. If it is to be set for MAJOR or NO ALARM, remove the MCA-5 card and set SW1, section 3 to OFF, and section 5 to ON for MAJOR; set sections 3 and 5 to OFF for NO ALARM. Reinsert the MCA-5 card and proceed to the next step.</p>
24	<p>Repeat Steps 1 through 23 to each shelf containing an MCA-5 card.</p>
25	<p>If an SAI card is installed in the shelf, skip this step. Use the INIT-REG command for every MRC card in the shelf. This initializes all registers on the shelf.</p> <p>Requirement: The response indicates the command was completed successfully.</p>
26	<p>This procedure is complete. Indicate completion of the MCA-5 or MCA-5M Card Test on the Test Sign-off form.</p>

Table G. TO Card Incompatibility

CARD IN HS SLOT	DO NOT INSTALL IN SHELF
TOAA-01	TOAA-02, TOAA-03, TOLA-07
TOAA-02	TOAA-01, TOAA-03, TOLA-07
TOAA-03	TOAA-01, TOAA-02, TOLA-07
TOAA-05, TOAA-15	No restrictions
TOCA	TOLA-05
TOEA, TOGA, TO-EAN	No restrictions
TOLA-01	TOLA-02, TOLA-04
TOLA-02	TOLA-01, TOLA-04
TOLA-03	No restrictions
TOLA-04	TOLA-01, TOLA-02
TOLA-05	TOCA
TOLA-06	TOTA, TOTA-5, TOTA-M, TOTL
TOLA-07	TOAA-01, TOAA-02, TOAA-03
TOTA, TOTA-5, TOTA-M	TOTL, TOLA-06
TOTA-5	TOTA-M
TOTA-M	TOTA-5
TOTL	TOTA, TOTA-5, TOTA-M, TOLA-06

Table H. 1:N TOTA Card Compatibility with MCA-5M Card

TO CARDS INSTALLED IN SHELF	CARD REQUIRED IN AN HS SLOT
TOTA-M	TOTA-M
TOTA-M & TOTA-5	TOTA-M
TOTA-M & TOTA	TOTA-M
TOTA-M & TOTA-5 & TOTA	TOTA-M
TOTA-5 & TOTA	TOTA-5 or TOTA-M
TOTA-5	TOTA-5 or TOTA-M
TOTA	TOTA or TOTA-5 or TOTA-M
Note: The MCA-5 card can be used, but it transfers only the framing parameters when making a protection switch. The MCA-5M card transfers framing parameters, individual port configurations, trouble codes, alarm severity, and SSM codes.	

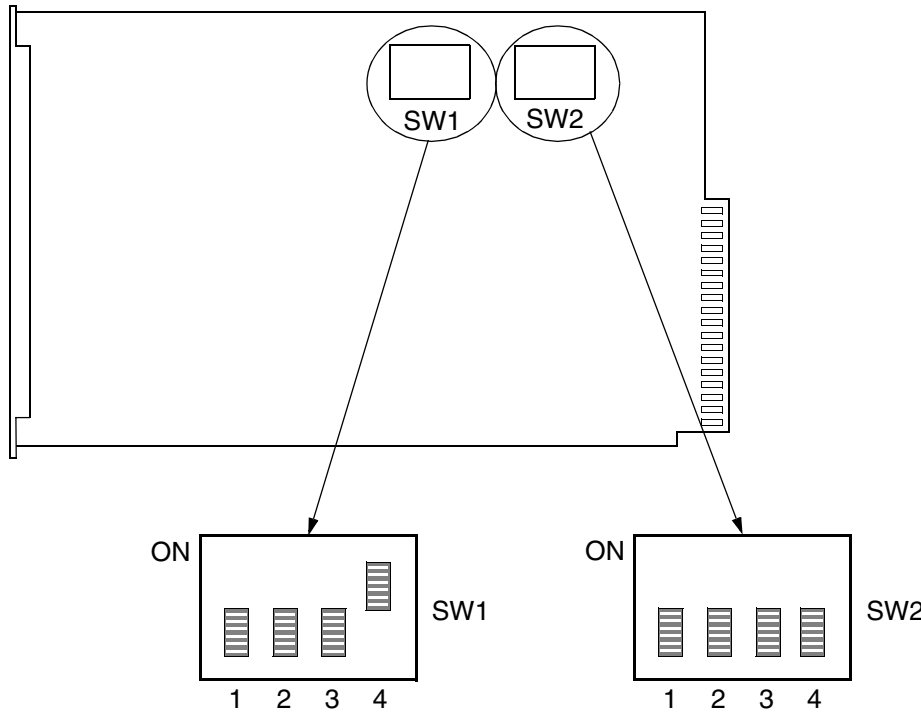


Note: All switches are shown in the factory-set position.

SW1 Settings

Section	Setting	Function	Factory Setting
1	ON	Master mode of operation	X
	OFF	Not allowed	—
2	ON	Auto switching mode	X
	OFF	Manual switching mode	—
3 and 5	3=ON 5=OFF	Minor alarm generated when protection switching occurs	X
	3=OFF 5=ON	Major alarm will be generated when protection switching occurs	—
	3=OFF 5=OFF	No alarm will be generated when protection switching occurs	—
	3=ON 5=ON	Not allowed	—
4	ON	Not allowed	—
	OFF	Normal operation	X
6 – 8	OFF	Not used	X

Figure 17. MCA-5 Card Switch



Notes:
 1. Refer to Table I for SW1 and SW2 switch settings.
 2. All switches are shown in the factory-set position.

Figure 18. MCA-5M Card Switch

Table I. MCA-5M Switch Settings

SECTION	POSITION	MEANING	FACTORY SETTING
SW1 SETTINGS			
1	ON	Not allowed	—
	OFF	Normal operation	X
2	ON	Manual protection switching only	—
	OFF	Automatic protection switching enabled	X
3	ON	Port alarms generate a MAJOR alarm	—
	OFF	Port alarms generate a MINOR alarm	X
4	ON	Normal alarm operation	X
	OFF	Port alarms do not generate an alarm	—
SW2 SETTINGS			
1	ON	After a protection switch, the MCA-5M switches back to the TO card when the signal is good	—
	OFF	After a protection switch, the MCA-5M keeps the HS card active until commands or pressed buttons make a switch	X
2-4	OFF	Not used	—

Table J. Wire-Wrap Output Connections

WIRE-WRAP LEADS (Note 1):		TOCA, TOEA, TOGA, TOTA, TOTA-5, TOTA-M, TOTL		TOLA (RS-422) (Note 2)		TOLA (RS-423) (Note 3)		TOAA (ANALOG)	
OUT-PUT	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 —	N/A	N/A
2	T R S	2	T R S	N/A	N/A	1 2 —	C1 C2 —	N/A	N/A
3	T R S	3	T R S	2	D+ D-	3 4 —	D3 D4 —	2 (Note 4)	T S —
4	T R S	4	T R S	N/A	N/A	3 4 —	C3 C4 —	N/A	N/A
5	T R S	5	T R S	3	D+ D-	5 6 —	D5 D6 —	N/A	N/A
6	T R S	6	T R S	N/A	N/A	5 6 —	C5 C6 —	N/A	N/A
7	T R S	7	T R S	4	D+ D-	7 8 —	D7 D8 —	N/A	N/A
8	T R S	8	T R S	N/A	N/A	7 8 —	C7 C8 —	1 (Note 4)	T S —
9	T R S	9	T R S	5	D+ D-	9 10 —	D9 D10 —	N/A	N/A
10	T R S	10	T R S	N/A	N/A	— 9 and 10 —	TP1 C9 and C10 —	N/A	N/A

Legend: T=Tip R=Ring C=Digital Ground S=Shield Ground (Note 2) D+=Data, +422 D- =Data, -422 D=Data, 423

1. 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.
2. 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.
3. For TOLA RS-423 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).
4. When using TOAA, connect the shield lead of the coax cable to the Ring (R) pin of the wire-wrap module.
5. 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 K. DB9 Output Connections

DB9 CONNECTOR		TOCA, TOEA, TOGA, TOTA, TOTA-5, TOTA-M		TOLA (RS-422)		TOLA (RS-423)		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	— — —	9 and 10 — —	C9, C10 — —	N/A	N/A
	4 3 1	2	T R S		D+ D- S	9 10 —	D9 D10 —	N/A	N/A
J3	9 5 1	3	T R S	4	— — —	7 8 —	C7 C8 —	2	T S —
	4 3 1	4	T R S		D+ D- S	7 8 —	D7 D8 —	N/A	N/A
J4	9 5 1	5	T R S	3	— — —	5 6 —	C5 C6 —	N/A	N/A
	4 3 1	6	T R S		D+ D- S	5 6 —	D5 D6 —	N/A	N/A
J5	9 5 1	7	T R S	2	— — —	3 4 —	C3 C4 —	N/A	N/A
	4 3 1	8	T R S		D+ D- S	3 4 —	D3 D4 —	1	T S —
J6	9 5 1	9	T R S	1	— — —	1 2 —	C1 C2 —	N/A	N/A
	4 3 1	10	T R S		D+ D- S	1 2 —	D1 D2 —	N/A	N/A

Legend: T=Tip R=Ring C=Digital Ground S=Shield Ground (Note) D+=Data, +422 D-=Data, -422 D=Data, 423

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.

Table L. Wire-Wrap Output Connections (RS-232) for TOLA-03 Only

WIRE-WRAP LEADS		TIMING PORT	LEAD
OUTPUT	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	1	CLOCK GND —

Table L. Wire-Wrap Output Connections (RS-232) for TOLA-03 Only (Contd)

WIRE-WRAP LEADS		TIMING PORT	LEAD
OUTPUT	PIN		
7	T R S	—	—
8	T R S	2	CLOCK GND —
9	T R S	—	—
10	T R S	3	TEST GND —

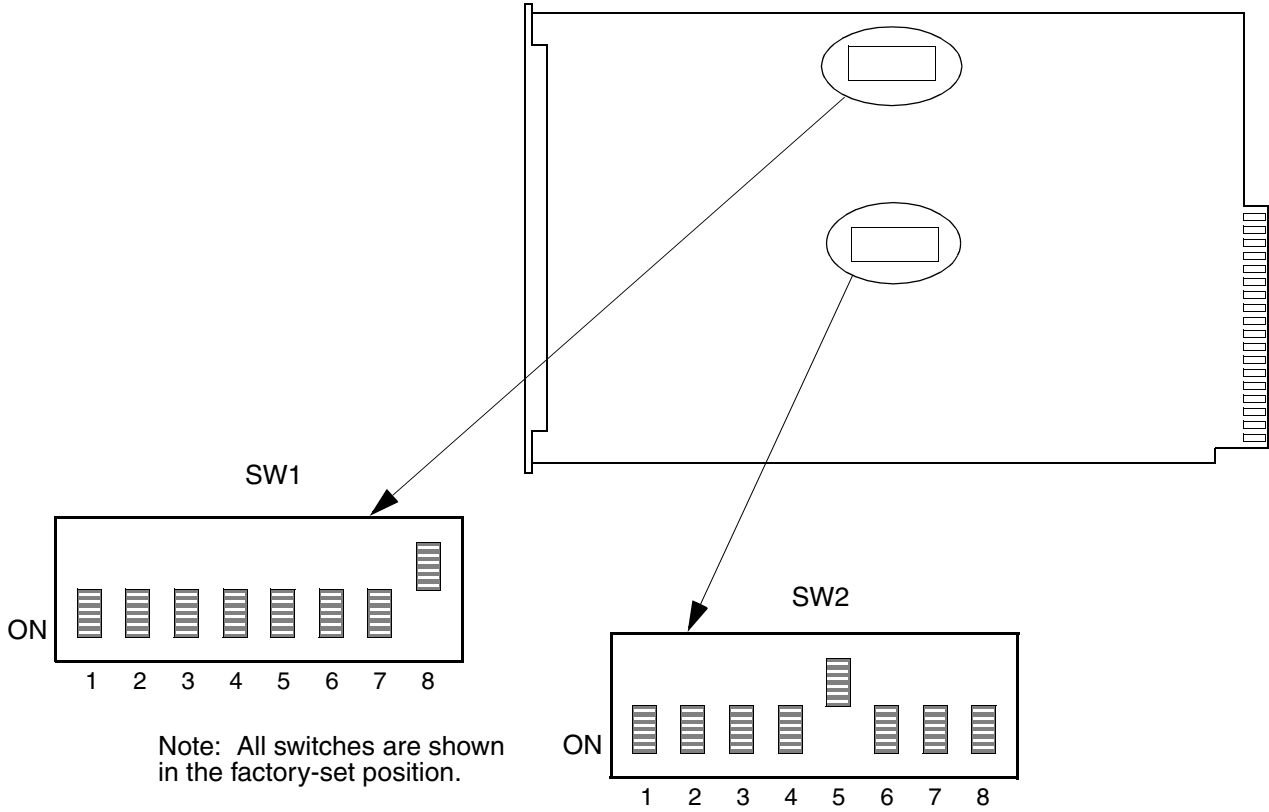
Note: When connecting the TOLA-03 output ports to NEs for external timing reference, the Tip (T) terminal is the clock lead, and the Ring (R) terminal is the ground lead of the interface panel. The Shield (S) terminal is not used. The output ports are on T and R terminal sets 1, 3, 5, 7, and 9.

Chart 20. EA10 or EA10M Card Test

STEP	PROCEDURE
	<p>Use this procedure to install EA10 or EA10M cards.</p> <p>Notes:</p> <ol style="list-style-type: none"> 1. Where information is common to the EA10 and EA10M cards, these cards are collectively referred to as EA cards. 2. Depending upon the card option settings, the EA may output digital or analog waveforms on any of its outputs. 3. When installing a redundant EA card pair, both cards must have the same part number and S/W Rev letter, and both cards must be configured identically to ensure optimum output switching protection. 4. Install one card of a redundant EA card pair in an odd-numbered slot, and the other card in the even-numbered slot immediately to the right. 5. When installing a redundant EA card pair, install a double-wide output module on the appropriate connectors of the output panel, according to the Installation section of this manual. 6. The timing outputs must be disconnected during this test. 7. Because the EA card may be set as part of a redundant pair or as a stand-alone unit, the pulse amplitude may vary slightly when cards are initially installed and coming into service. Depending on the type of test set used (i.e., HP 377722A, Digital Telecom Analyzer), in some cases, the test set may indicate a false loss of signal (LOS), or framing errors, etc. <p>Test Equipment: Dual-trace 100 MHz oscilloscope (refer to Table C for typical oscilloscope settings)</p>
1	<p>Be sure section 8 of SW1 (Figure 19) on each EA card is set to the OFF position for the purposes of this procedure, and set the other sections of SW1 and SW2 to conform to the requirements for this installation according to the Installation Job Specifications (refer to Table M).</p>
2	<p>Insert all EA cards in the TO slots specified by the local company Installation Job Specifications in all installed master and expansion shelves in the system.</p> <p>Requirements:</p> <ul style="list-style-type: none"> • The installed card performs a lamp test lasting up to 20 s. • On the EA cards just installed, the FAIL and PORT ALM lamps are off. (If the FAIL lamp lights when a clock or clock input card is active, replace the EA card.) • The INP A, INP B, ST A, and ST B lamps light green, indicating the EA cards are receiving reference signals from the active clock input cards and clock cards. (If the INP and ST lamps associated with active cards do not light, retest the clock input cards and the clock cards.) • The ACTV lamp lights green, indicating the card is providing outputs. • The option lamps (CCS, CAS, and CRC4) light according to the options selected in Step 1.

Chart 20. EA10 or EA10M Card Test (Contd)

STEP	PROCEDURE
3	<p>Note: The oscilloscope procedure for this step requires that the probes be terminated with the Test Load Impedance given on the waveform figure.</p> <p>Check each output of the cards just installed in the TO slots at the output panel, using a dual-trace 100 MHz oscilloscope. Table C lists the oscilloscope settings.</p> <p>Requirement: The output waveforms must be as shown in Figure 20 and Figure 21.</p>
4	<p>If no redundant output card pairs are installed in the system, go to Step 7. Remove the left card from each redundant output card pair and repeat Step 3 at the output of each redundant output card pair.</p>
5	<p>Replace the left card in each redundant output card pair. Remove the right card from each redundant output card pair and repeat Step 3 at the output of each redundant output card pair.</p>
6	<p>Replace the right card in each redundant output card pair.</p>
7	<p>If section 8 of SW1 is set to conform to this installation, skip this step. Remove the EA cards, set section 8 of SW1 to the ON position, and replace the cards.</p>
8	<p>If an SAI card is installed in the shelf, skip this step. Use the INIT-REG command for every MRC card in the shelf. This initializes all registers on the shelf.</p> <p>Requirement: The response indicates the command was completed successfully.</p>
9	<p>This procedure is complete. Indicate completion of the EA10 or EA10M Card Test on the Test Sign-off form.</p>



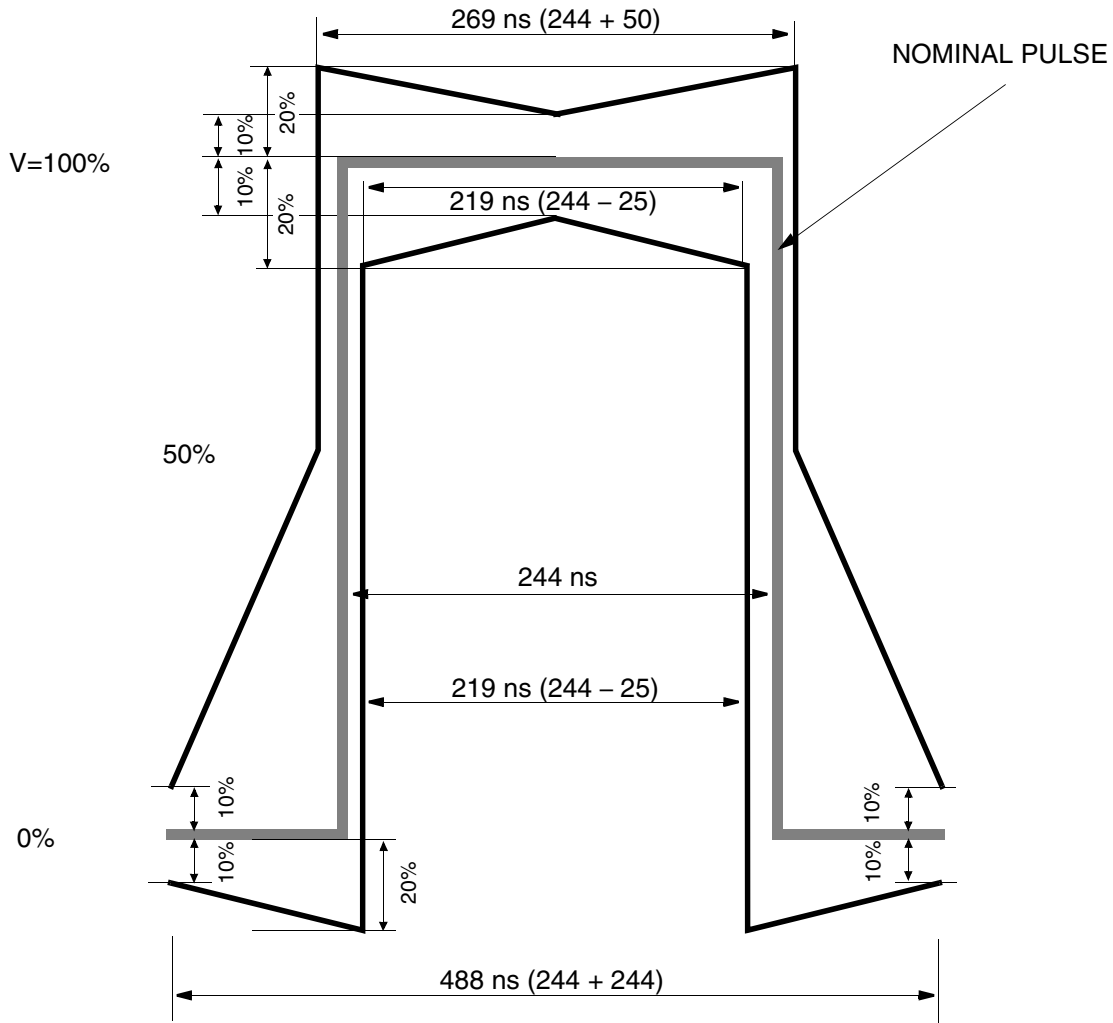
Notes:

1. Refer to Table M for SW1 and SW2 switch settings.
2. Jumpers (not shown) must be left as set by the factory (J2 is closed. J3, J4, and J5 are open.)

Figure 19. EA10 or EA10M Card Switches

Table M. EA10 and EA10M Switch Settings

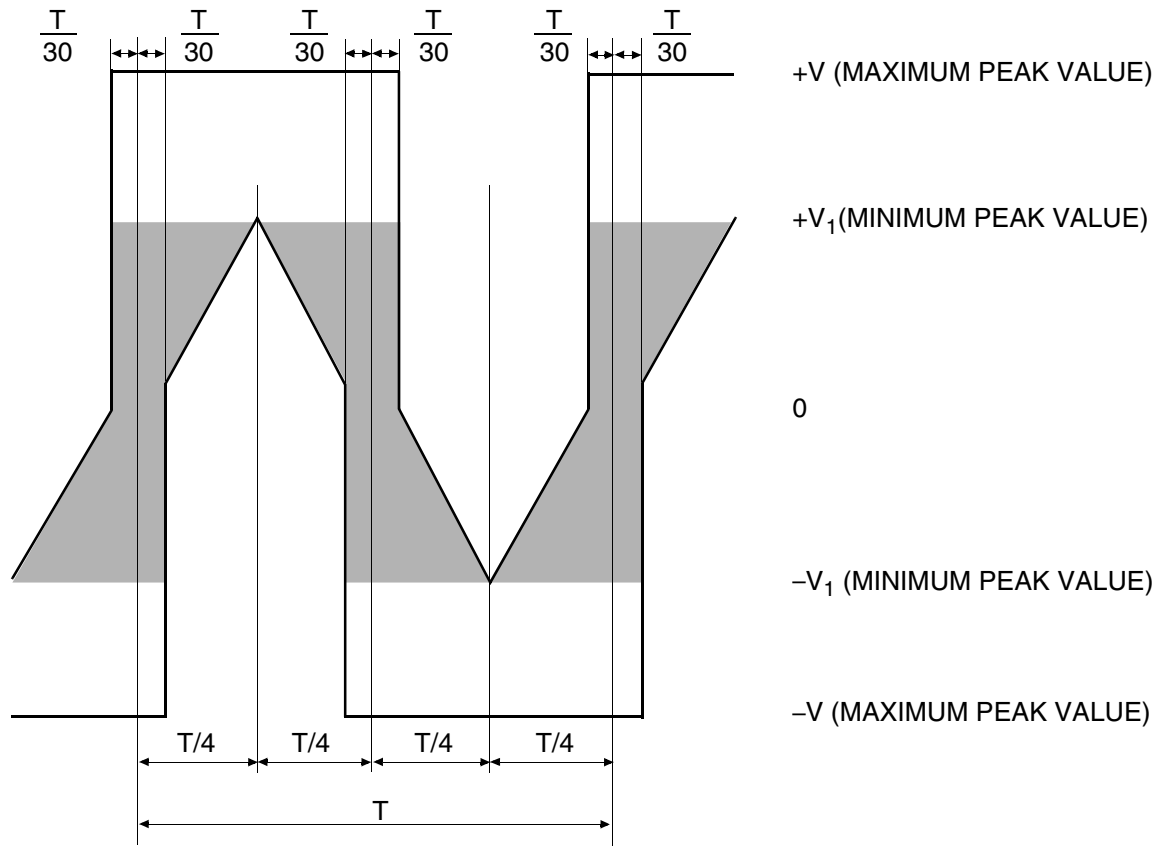
SECTION	POSITION	MEANING	FACTORY SETTING
SW1 SETTINGS			
Note: If set for E1 output, only one framing format per card is permitted.			
1	OFF	CAS framing	—
	ON	CCS framing	X
2	OFF	CRC-4 Multiframe disabled	—
	ON	CRC-4 Multiframe enabled	X
3	OFF	MINOR alarm initiated upon PORT ALM	X
	ON	MAJOR alarm initiated upon PORT ALM	—
4	OFF	All outputs are squelched upon card failure	X
	ON	Caution: If any port on the card is set for analog output, set SW1 section 4 to the OFF position. AIS is sent on all ports upon card failure	—
5	OFF	Card set for 1+1 outputs (the outputs of both cards of the pair are enabled) (section 5 of SW2 must be set to OFF)	X
	ON	Card set for 1:1 outputs (the outputs of one card of the pair are enabled) (section 5 of SW2 must be set to OFF)	—
6	OFF	For factory use only; must be set to OFF	X
7	OFF	Does not revert back to input signal when it becomes available	X
	ON	Reverts back to input signal when it becomes available Caution: Use of revertive switching may result in phase offsets between cards.	—
8	OFF	Upon power-up, the outputs are enabled, and the card operates using switch settings (if configured properly). Configuration can be changed by TL1 commands.	X
	ON	Upon power-up, the outputs are disabled. If replacing a card, the switch settings on the new card will be overridden by the MIS card. Configuration can be changed by TL1 commands.	—
SW2 SETTINGS			
1	OFF	Output ports 1 through 5 designated for Analog signal	—
	ON	Output ports 1 through 5 designated for E1 signal	X
2	OFF	Output ports 6 through 10 designated for Analog signal	—
	ON	Output ports 6 through 10 designated for E1 signal	X
3	ON	Reserved; must be set to ON	X
4	ON	Reserved; must be set to ON	X
5	OFF	Card set for redundant-pair operation (according to section 5 of SW1)	X
	ON	Card set for stand-alone operation	—
6 through 8	ON	Reserved; must be set to ON	X



Output Impedance & Levels

Specification	Unbalanced	Balanced
Test Load Impedance	75 Ω resistive	120 Ω resistive
Nominal Peak Voltage of a Mark (Pulse)	2.37 V	3 V
Nominal Peak Voltage of a Space (No Pulse)	0 ± 0.237 V	0 ± 0.3 V
Nominal Pulse Width	244 ns	244 ns

Figure 20. EA10, EA10M, TOEA, TO-EA, TO-EAN, and TO-EA5 Card Digital Output Waveform |



Area in which signal should be monotonic

T = 488 ns (approximately) (period of a 2.048 MHz signal)

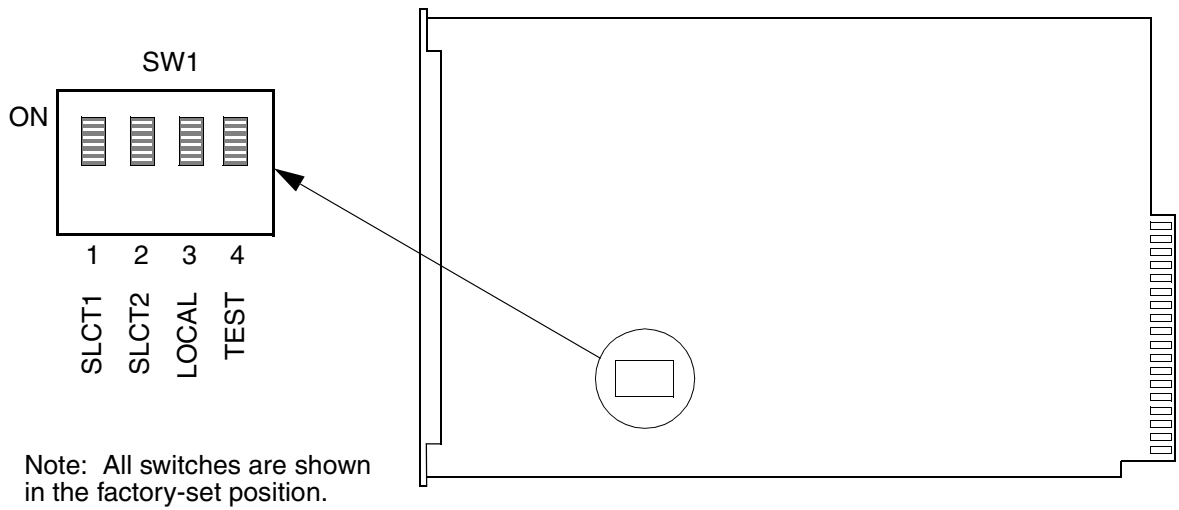
Output Impedance & Levels

Specification	Unbalanced	Balanced
Test Load Impedance	75 Ω resistive	120 Ω resistive
Maximum Peak Voltage	1.5 V	1.9 V
Minimum Peak Voltage	0.75 V	1.0 V

Figure 21. EA10, EA10M, TO-EA, TO-EAN, TO-EA5, and TOGA Card Analog Output Waveform

Chart 21. TOAA, TOLA, or TOTL Card Test

STEP	PROCEDURE
	<p>Use this procedure to install a TOAA, TOLA, or TOTL card.</p> <p>Note: The timing outputs must be disconnected during this test.</p> <p>Test Equipment: Dual-trace 100 MHz oscilloscope (refer to Table C for typical oscilloscope settings)</p> <p>Caution: <i>Certain restrictions apply when selecting HS TO cards for 1:N protection. In some cases, if a specific TO card is in an HS slot, certain other TO card types cannot be installed in any TO or HS slot on the shelf. Refer to Table G.</i></p>
1	<p>Set the option switches on each TO card according to the local company Installation Job Specifications. Refer to Figures 22 through 24 for option settings.</p>
2	<p>Insert all TO cards in the TO slots specified by the local company Installation Job Specifications in all installed master and expansion shelves in the system.</p> <p>Requirements:</p> <ul style="list-style-type: none"> • On the TO cards just installed, the FAIL and PORT ALM lamps are off. (If the FAIL lamp lights when a clock or clock input card is active, replace the TO card.) • The ST and INPUT lamps light green (indicating the cards are receiving reference signals). (If the ST and INPUT lamps do not light, retest the clock input cards and the clock cards.) • On each 090-40022-01 or -02 TOAA card, a 2048, 1000, 512, or 64 KHZ lamp on the front panel is lit according to the switch settings. • On each TOLA card, a 3, 2, 1, or 0 GROUP lamp on the front panel is lit according to the switch settings. • On each TOTL card, a D4 or ESF lamp on the front panel is lit according to the switch settings. <p>Note: 090-40022-05 and 090-40028-10 TOAA/C cards do not have front-panel lamps to indicate frequency.</p>
3	<p>Note: The oscilloscope procedure for this step requires that the probes be terminated with the Test Load Impedance given on the waveform figure.</p> <p>Check each card output at the output panel with a dual-trace 100 MHz oscilloscope:</p> <ul style="list-style-type: none"> • Table C lists the oscilloscope settings. • Table J lists the output signal pins when using a wire-wrap module. • Table K lists the output signal pins when using a DB9 module. • Table L lists the output signals for the TOLA (090-45023-03) card. <p>Requirement: The output waveforms must be as shown in the waveform diagrams.</p>
4	<p>If an SAI card is installed in the shelf, skip this step. Use the INIT-REG command for every MRC card in the shelf. This initializes all registers on the shelf.</p> <p>Requirement: The response indicates the command was completed successfully.</p>
5	<p>This procedure is complete. Indicate completion of the TOAA, TOLA, or TOTL Card Test on the Test Sign-off form.</p>

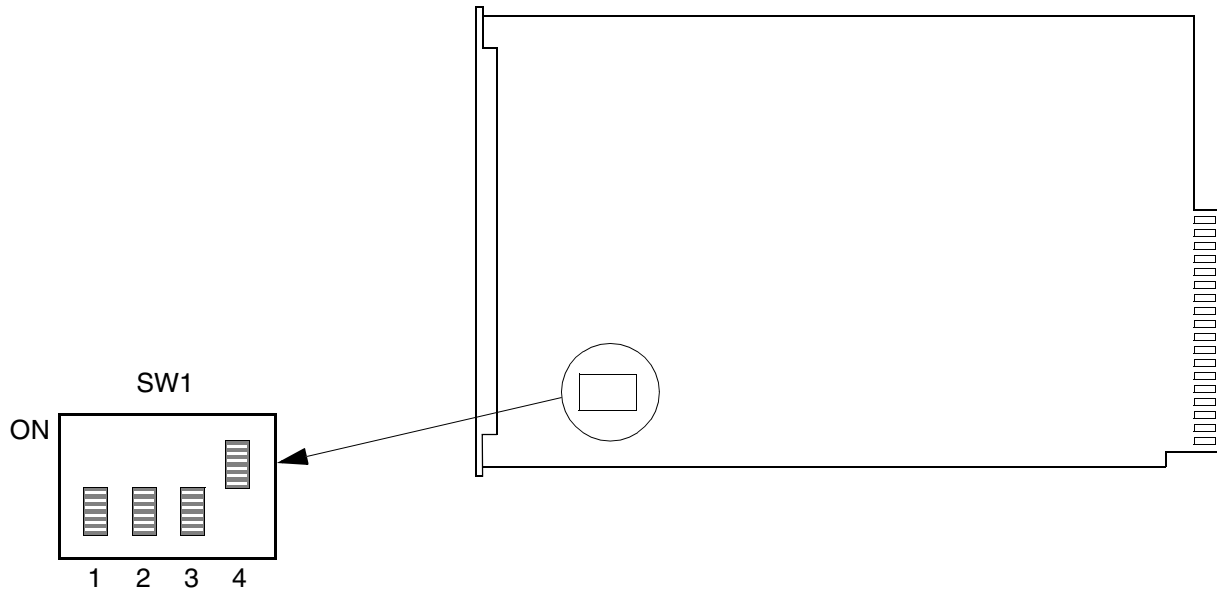


Note: A switch on the front panel of the 090-40028-10 card selects output frequencies of 1.0 MHz, 5.0 MHz, and 10.0 MHz. Do not change any other switch on this card.

SW1 Settings

1	2	3	4	Meaning			Factory Setting
				-01 and -02	-03	-05 and -15	
ON	ON	—	—	64 kHz	8 kHz	5 MHz	X
ON	OFF	—	—	512 kHz	512 kHz	Not allowed	—
OFF	ON	—	—	1.0 MHz	1.0 MHz	Not allowed	—
OFF	OFF	—	—	2.048 MHz	2.048 MHz	Not allowed	—
—	—	ON	—	Not used	Not used	Not used	X
—	—	OFF	—	Not used	Not used	Not used	—
—	—	—	ON	Normal	Normal	Normal	X
—	—	—	OFF	Not allowed	Not allowed	Not allowed	—

Figure 22. TOAA Card Switch



Note: All switches are shown in the factory-set position.

SW1 Settings

1	2	3	4	Meaning	Factory Setting
ON	ON	—	—	Data rate set to Group 0	—
ON	OFF	—	—	Data rate set to Group 1	—
OFF	ON	—	—	Data rate set to Group 2	—
OFF	OFF	—	—	Data rate set to Group 3	X
—	—	ON	—	Not used	—
—	—	OFF	—		X
—Note: Refer to Table N for the output frequencies of each group.					X
—	—	—	OFF	Not used	—

Figure 23. TOLA Card Switch

Table N. TOLA Card Output Frequencies (From Wire-wrap Module)

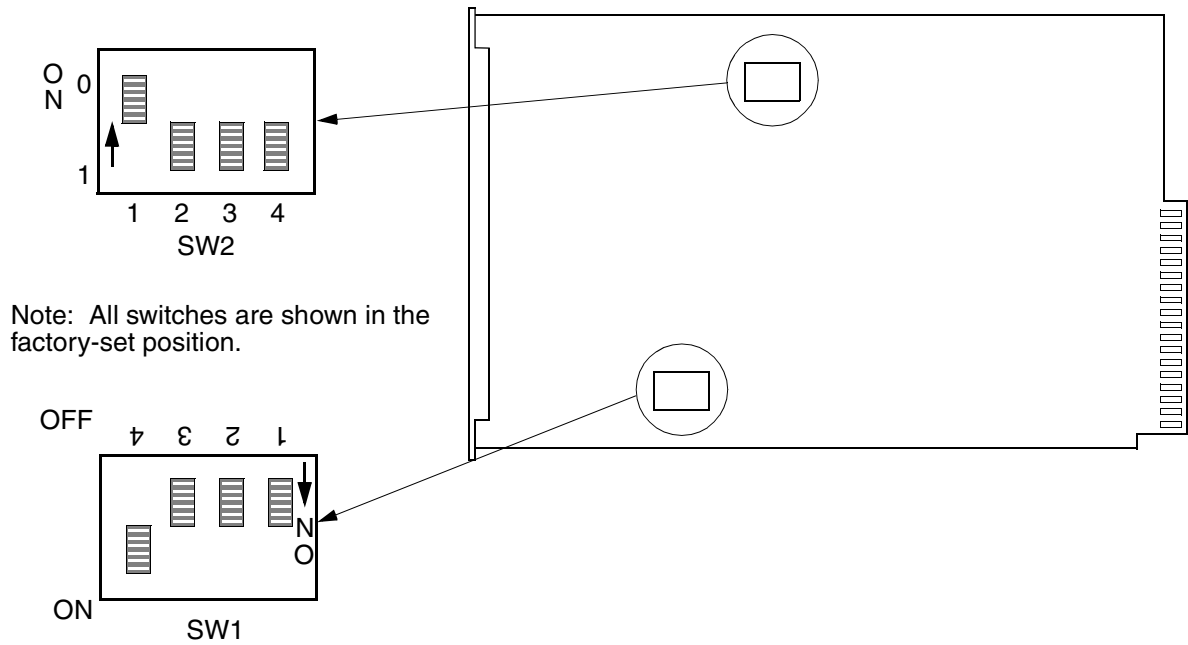
GROUP	OUT 1	OUT 2	OUT 3	OUT 4	OUT 5
TOLA -01 CARD					
0	1.544 Mb/s	1.544 Mb/s	64 kb/s	8 kb/s	4 kb/s
1	1.544 Mb/s	1.544 Mb/s	2.048 Mb/s	512 kb/s	256 kb/s
2	1.544 Mb/s	1.544 Mb/s	1.536 Mb/s	768 kb/s	384 kb/s
3	1.544 Mb/s	1.544 Mb/s	1.544 Mb/s	1.544 Mb/s	1.544 Mb/s
TOLA -02 CARD					
0	8 kb/s	8 kb/s	8 kb/s	8 kb/s	8 kb/s
1	1.544 Mb/s	1.544 Mb/s	2.048 Mb/s	512 kb/s	256 kb/s
2	1.544 Mb/s	1.544 Mb/s	1.536 Mb/s	768 kb/s	384 kb/s
3	1.544 Mb/s	1.544 Mb/s	1.544 Mb/s	1.544 Mb/s	1.544 Mb/s
TOLA -03 CARD					
0	4.8 kb/s	4.8 kb/s	4.8 kb/s	4.8 kb/s	4.8 kb/s
1	9.6 kb/s	9.6 kb/s	9.6 kb/s	9.6 kb/s	9.6 kb/s
2	19.2 kb/s	19.2 kb/s	19.2 kb/s	19.2 kb/s	19.2 kb/s
3	56 kb/s	56 kb/s	56 kb/s	56 kb/s	56 kb/s
TOLA -04 CARD					
For all groups and all ports, the output is 2.048 Mb/s					
TOLA -05 CARD					
0	1.544 Mb/s	64 kb/s	128 kb/s	192 kb/s	1.024 Mb/s
1	1.544 Mb/s	64 kb/s	128 kb/s	192 kb/s	1.024 Mb/s
2	1.544 Mb/s	64 kb/s	128 kb/s	192 kb/s	1.024 Mb/s
3	1.544 Mb/s	64 kb/s	128 kb/s	192 kb/s	1.024 Mb/s
TOLA-06 CARD					
0	4.8 kb/s	4.8 kb/s	4.8 kb/s	4.8 kb/s	4.8 kb/s
1	9.6 kb/s	9.6 kb/s	9.6 kb/s	9.6 kb/s	9.6 kb/s
2	19.2 kb/s	19.2 kb/s	19.2 kb/s	19.2 kb/s	19.2 kb/s
3	56 kb/s	56 kb/s	56 kb/s	56 kb/s	56 kb/s
TOLA -07 CARD					
0	2048 kb/s	2048 kb/s	2048 kb/s	2048 kb/s	2048 kb/s
1	1024 kb/s	1024 kb/s	1024 kb/s	1024 kb/s	1024 kb/s
2	512 kb/s	512 kb/s	512 kb/s	512 kb/s	512 kb/s
3	256 kb/s	256 kb/s	256 kb/s	256 kb/s	256 kb/s

Notes:

1. Outputs for the -01, -02, -04, -05, -06, and -07 are RS-422 or TTL. Outputs for the -03 card are RS-232 only.
2. When using TTL outputs (each half of the RS-422 signal is used separately) through a 10-output I/O module, the output frequencies of outputs 1 and 2 are the same as listed for OUT 1, outputs 3 and 4 are the same as listed for OUT 2, outputs 5 and 6 are the same as listed for OUT 3, outputs 7 and 8 are the same as listed for OUT 4, and outputs 9 and 10 are the same as listed for OUT 5.

Table O. TOLA Card Output Frequencies (From DB9 Connector)

GROUP	OUT 1	OUT 2	OUT 3	OUT 4	OUT 5
TOLA -01 CARD					
0	1.544 Mb/s	1.544 Mb/s	64 kb/s	8 kb/s	4 kb/s
1	1.544 Mb/s	1.544 Mb/s	2.048 Mb/s	512 kb/s	256 kb/s
2	1.544 Mb/s	1.544 Mb/s	1.536 Mb/s	768 kb/s	384 kb/s
3	1.544 Mb/s	1.544 Mb/s	1.544 Mb/s	1.544 Mb/s	1.544 Mb/s
TOLA -02 CARD					
0	8 kb/s	8 kb/s	8 kb/s	8 kb/s	8 kb/s
1	1.544 Mb/s	1.544 Mb/s	2.048 Mb/s	512 kb/s	256 kb/s
2	1.544 Mb/s	1.544 Mb/s	1.536 Mb/s	768 kb/s	384 kb/s
3	1.544 Mb/s	1.544 Mb/s	1.544 Mb/s	1.544 Mb/s	1.544 Mb/s
TOLA -03 CARD					
0	4.8 kb/s	4.8 kb/s	4.8 kb/s	4.8 kb/s	4.8 kb/s
1	9.6 kb/s	9.6 kb/s	9.6 kb/s	9.6 kb/s	9.6 kb/s
2	19.2 kb/s	19.2 kb/s	19.2 kb/s	19.2 kb/s	19.2 kb/s
3	56 kb/s	56 kb/s	56 kb/s	56 kb/s	56 kb/s
TOLA -04 CARD					
For all groups and all ports, the output is 2.048 Mb/s					
TOLA -05 CARD					
0	1.024 Mb/s	192 kb/s	128 kb/s	64 kb/s	1.024 Mb/s
1	1.024 Mb/s	192 kb/s	128 kb/s	64 kb/s	1.024 Mb/s
2	1.024 Mb/s	192 kb/s	128 kb/s	64 kb/s	1.024 Mb/s
3	1.024 Mb/s	192 kb/s	128 kb/s	64 kb/s	1.024 Mb/s
TOLA -06 CARD					
0	4.8 kb/s	4.8 kb/s	4.8 kb/s	4.8 kb/s	4.8 kb/s
1	9.6 kb/s	9.6 kb/s	9.6 kb/s	9.6 kb/s	9.6 kb/s
2	19.2 kb/s	19.2 kb/s	19.2 kb/s	19.2 kb/s	19.2 kb/s
3	56 kb/s	56 kb/s	56 kb/s	56 kb/s	56 kb/s
TOLA -07 CARD					
0	2048 kb/s	2048 kb/s	2048 kb/s	2048 kb/s	2048 kb/s
1	1024 kb/s	1024 kb/s	1024 kb/s	1024 kb/s	1024 kb/s
2	512 kb/s	512 kb/s	512 kb/s	512 kb/s	512 kb/s
3	256 kb/s	256 kb/s	256 kb/s	256 kb/s	256 kb/s
Notes:					
1. Outputs for the -01, -02, -04, -05, -06, and -07 are RS-422 or TTL. Outputs for the -03 card are RS-232 only.					
2. When using TTL outputs (each half of the RS-422 signal is used separately) through a 10-output I/O module, the output frequencies of outputs 1 and 2 are the same as listed for OUT 1, outputs 3 and 4 are the same as listed for OUT 2, outputs 5 and 6 are the same as listed for OUT 3, outputs 7 and 8 are the same as listed for OUT 4, and outputs 9 and 10 are the same as listed for OUT 5.					



SW2 Settings

Meaning	1	2	3	4	Factory Setting
0 m - 40 m (0 ft - 133 ft)	0	1	1	1	X
40 m - 80 m (133 ft - 266 ft)	1	0	0	1	—
80 m - 120 m (266 ft - 399 ft)	1	0	1	1	—
120 m - 160 m (399 ft - 533 ft)	1	1	0	1	—
160 m - 200 m (533 ft - 655 ft)	1	1	1	1	—

SW1 Settings

Meaning	1	2	3	4	Factory Setting
D4 framing	ON	OFF	OFF	OFF	X
ESF framing	OFF	ON	OFF	OFF	—

Figure 24. TOTL Card Switches

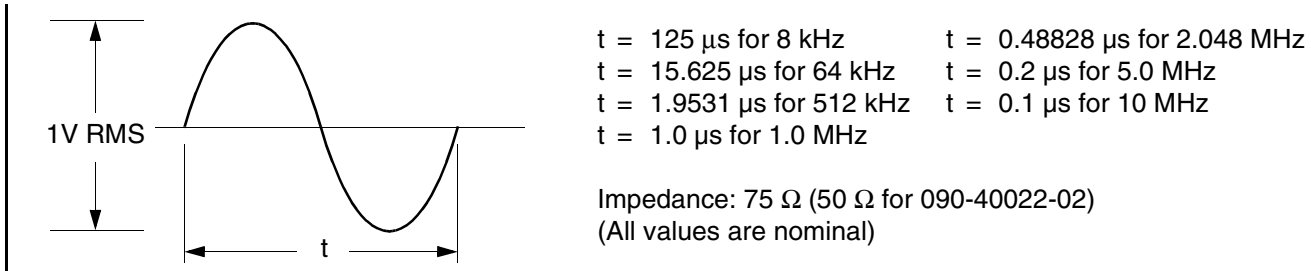
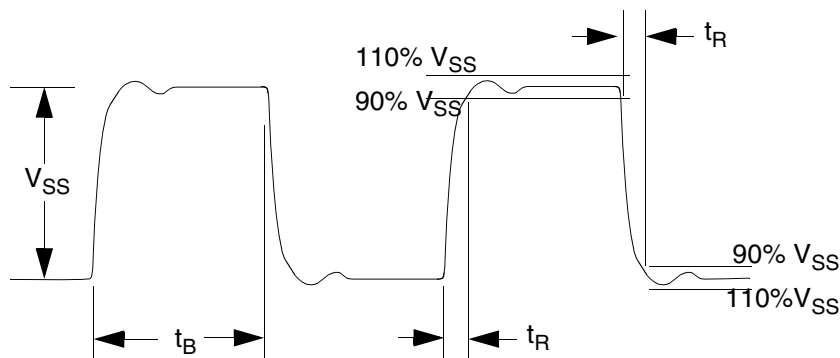


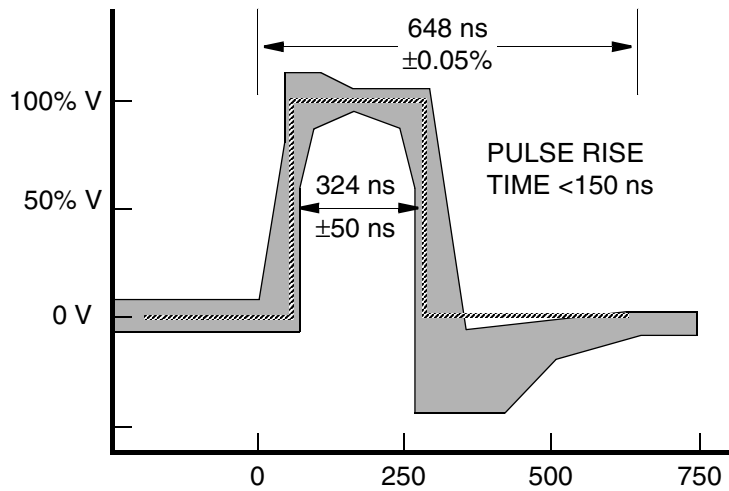
Figure 25. TOAA Card Output Waveform



t_B = Bit time duration (8 kb/s to 1.544 Mb/s)
 t_R = $t_B/10$
 V_{SS} = Difference in steady-state voltages:
 2 V to 6 V pp for RS-422 (balanced) into 100 Ω
 Greater than 3 V for RS-423 (unbalanced) into 450 Ω
 Greater than +3 V from GND and greater than -3 V from GND for RS-232 into 3 k Ω to 7 k Ω

Bit Duration			Bit Duration		
Data Rate	t_B	t_R	Data Rate	t_B	t_R
4 kb/s	125 μs	12.5 μs	256 kb/s	1.95 μs	195 μs
4.8 kb/s	104.1 μs	10.41 μs	384 kb/s	1.3 μs	130 ns
8 kb/s	62.5 μs	6.25 μs	512 kb/s	977 ns	97.7 ns
9.6 kb/s	52 μs	5.2 μs	768 kb/s	651 ns	65.1 ns
19.2 kb/s	26 μs	2.6 μs	1.536 Mb/s	326 ns	32.6 ns
56 kb/s	8.9 μs	890 ns	1.544 Mb/s	324 ns	32.4 ns
64 kb/s	7.8 μs	780 ns	2.048 Mb/s	244 ns	24.4 ns

Figure 26. TOLA Card Output Waveform



100% V = 2.4 V TO 3.6 V

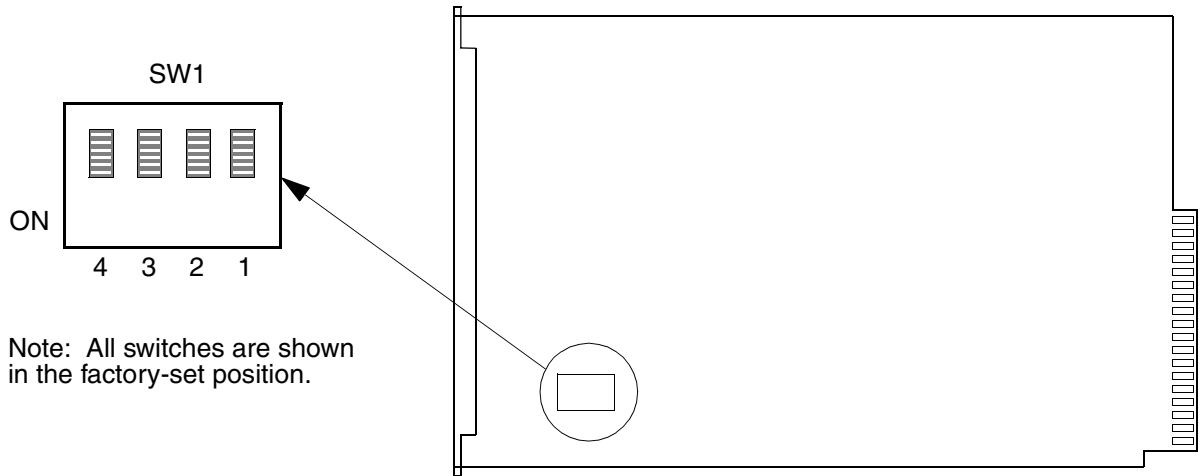
TEST LOAD IMPEDANCE: 100 Ω FOR 0.643 mm (22 AWG) TWISTED PAIR CABLE. 75 Ω FOR COAX CABLE

Note: Only the positive pulse is shown. The negative pulse is an upside down, mirror image of the positive pulse.

Figure 27. TOTA, TOTA-5, TOTA-M, and TOTL Card Output Waveform

Chart 22. TOCA, TOEA, or TOTA Card Test

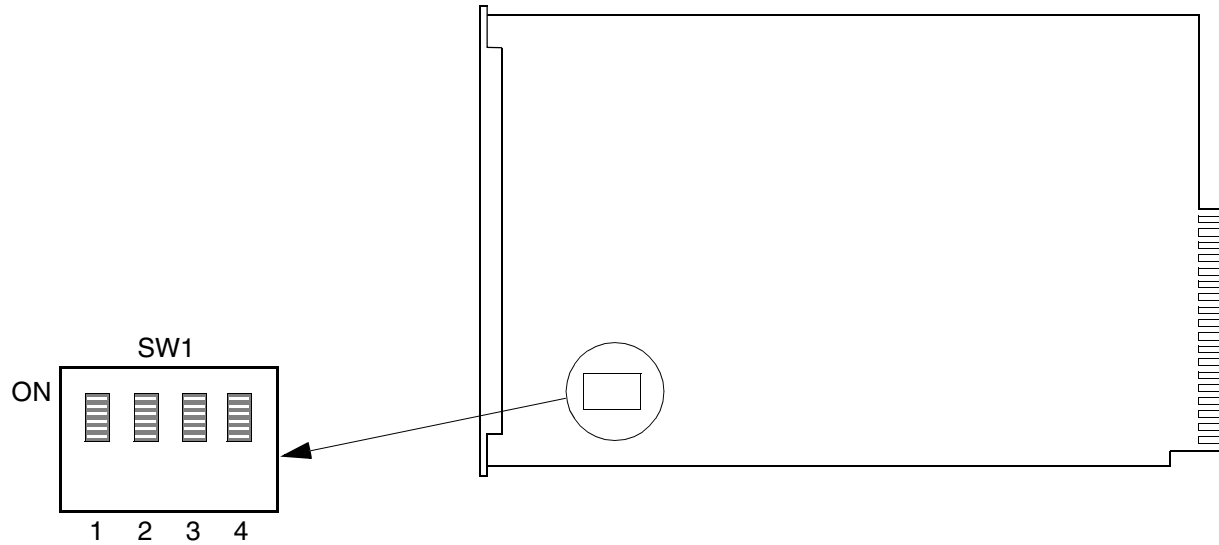
STEP	PROCEDURE
	<p>Use this procedure to install TOCA, TOEA, or TOTA cards.</p> <p>Note: The timing outputs must be disconnected during this test.</p> <p>Test Equipment: Dual-trace 100 MHz oscilloscope (refer to Table C for typical oscilloscope settings)</p> <p>Caution: <i>Certain restrictions apply when selecting HS TO cards for 1:N protection. In some cases, if a specific TO card is in an HS slot, certain other TO card types cannot be installed in any TO or HS slot on the shelf. Refer to Tables G and H.</i></p>
1	<p>Set the option switches on each TO card according to the local company Installation Job Specifications. Refer to Figures 28 through 30 for option settings.</p>
2	<p>Insert all TO cards in the TO slots specified by the local company Installation Job Specifications in all installed master and expansion shelves in the system.</p> <p>Requirements:</p> <ul style="list-style-type: none"> • On the TO cards just installed, the FAIL and PORT ALM lamps are off. (If the FAIL lamp lights when a clock or clock input card is active, replace the TO card.) • The INPUT and ST lamps light green (indicating the cards are receiving reference signals). (If the INPUT and ST lamps do not light, retest the clock input cards and the clock cards.)
3	<p>Note: The oscilloscope procedure for this step requires that the probes be terminated with the Test Load Impedance given on the waveform figure.</p> <p>Check each output of the cards just installed in the TO slots at the output panel, using a dual-trace 100 MHz oscilloscope.</p> <ul style="list-style-type: none"> • Table C lists the oscilloscope settings. • Table J lists the output signal pins when using a wire-wrap module. • Table K lists the output signal pins when using a DB9 module <p>Requirement: The output waveforms must be as shown in Figures 20, 27, and 31.</p>
4	<p>Insert a disabling pin into each of the disabling jacks on the front panel of the card, one at a time.</p> <p>Requirement: The output of the port associated with the disabling jack is inhibited.</p>
5	<p>If an SAI card is installed in the shelf, skip this step. Use the INIT-REG command for every MRC card in the shelf. This initializes all registers on the shelf.</p> <p>Requirement: The response indicates the command was completed successfully.</p>
6	<p>This procedure is complete. Indicate completion of the TOCA, TOEA, or TOTA Card Test on the Test Sign-off form.</p>



SW1 Settings

4	3	2	1	Meaning	Factory Setting
OFF	OFF	—	—	0 m to 457 m (0 ft to 1500 ft)	X
ON	OFF	—	—	458 m to 610 m (1501 ft to 2000 ft)	—
OFF	ON	—	—	610 m to 762 m (2001 ft to 2500 ft)	—
ON	ON	—	—	762 m to 914 m (2501 ft to 3000 ft)	—
—	—	ON	—	PORT ALM lamp lit when disabling pin inserted in jack	—
—	—	OFF	—	PORT ALM lamp NOT lit when disabling pin inserted in jack	X
—	—	—	ON	Not allowed	—
—	—	—	OFF	Normal	X

Figure 28. TOCA Card Switch

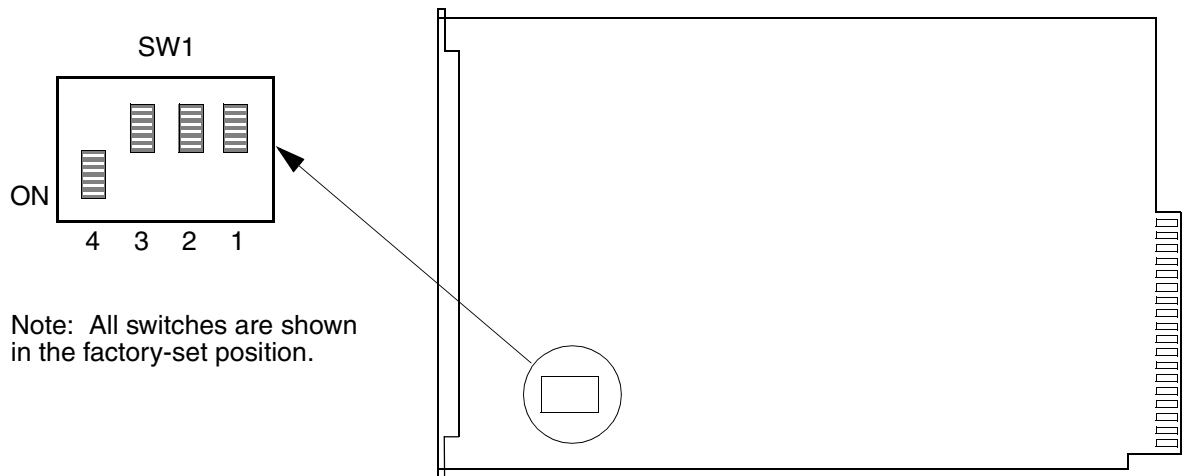


Note: All switches are shown in the factory-set position.

SW1 Settings

SWITCH	POSITION	Meaning	Factory Setting
1	ON	CRC-4 Multiframe enable	X
	OFF	CRC-4 Multiframe disable	—
2	ON	CCS-Common Channel Signaling	X
	OFF	CAS-Channel Associated Signaling	—
3	ON	Not used	X
	OFF	Not used	—
4	ON	Normal	X
	OFF	Not allowed	—

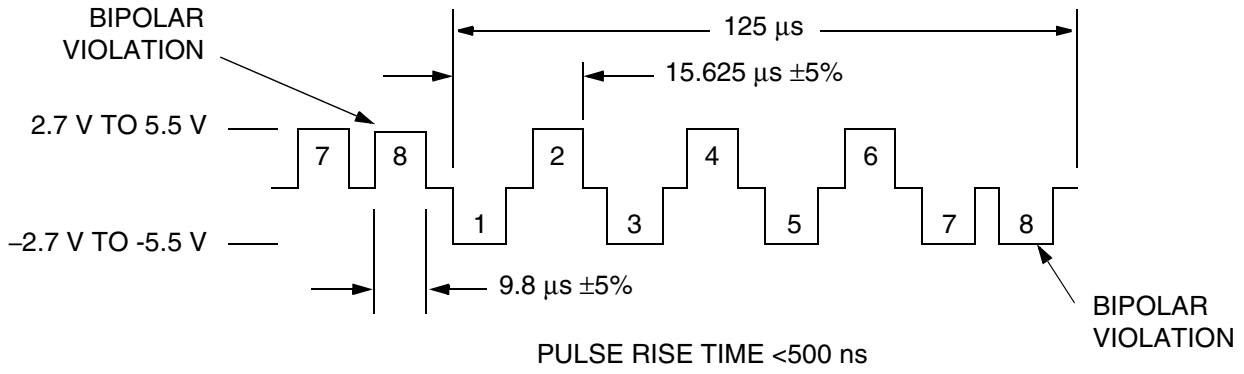
Figure 29. TOEA Card Switch



SW1 Settings

4	3	2	1	Meaning	Factory Setting
OFF	OFF	—	—	Not allowed	—
ON	OFF	—	—	D4 framing	X
OFF	ON	—	—	ESF framing	—
ON	ON	—	—	Not allowed	—
—	—	ON	—	PORT ALM lamp lit when disabling pin inserted in jack	—
—	—	OFF	—	PORT ALM lamp NOT lit when disabling pin inserted in jack	X
—	—	—	ON	Not allowed	—
—	—	—	OFF	Normal	X

Figure 30. TOTA Card Switch



TEST LOAD IMPEDANCE: 133 Ω FOR 25.3 mils, 0.643 mm (22 AWG) TWISTED PAIR CABLE

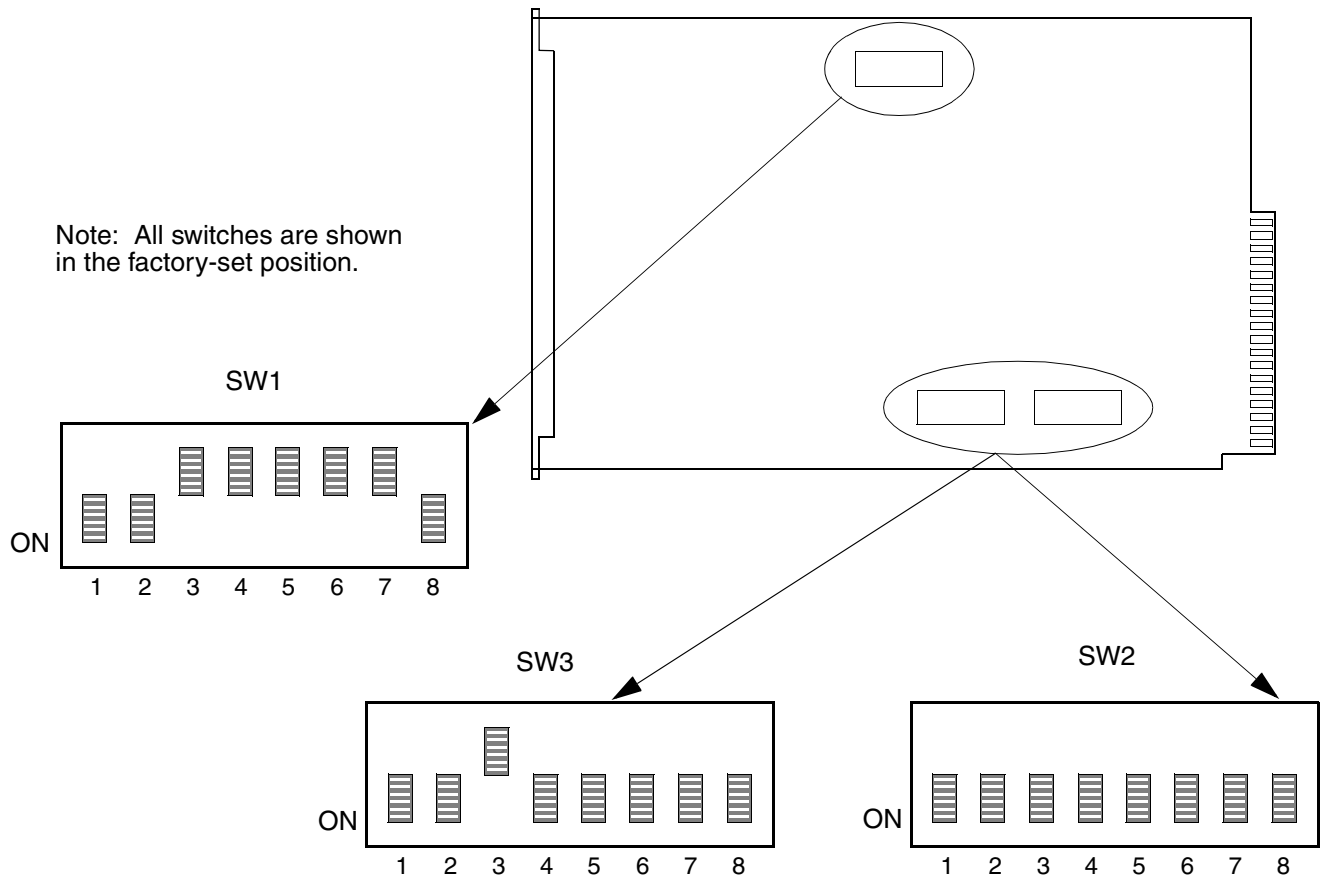
Figure 31. TOCA Card Output Waveform

Chart 23. TO-EA Card Test

STEP	PROCEDURE
	<p>Use this procedure to install the TO-EA cards.</p> <p>Notes:</p> <ol style="list-style-type: none"> 1. Depending upon the card option settings, the TO-EA may output digital or analog waveforms on any of its outputs. 2. When installing a 1+1 TO-EA card pair, both cards must have the same part number and S/W Rev letter, and both cards must be configured identically. 3. When installing a 1+1 TO-EA card pair, install a double-wide output module on the appropriate connectors of the output panel. 4. The timing outputs must be disconnected during this test. 5. Because the TO-EA card may be set as a 1+1 or standalone unit, the pulse amplitude may vary slightly when cards are initially installed and coming into service. Depending on the type of test set used (i.e., HP 377722A, Digital Telecom Analyzer), in some cases, the test set may indicate a false loss of signal (LOS), or framing errors, etc. 6. Insertion of a disabling pin in a single port on a card of a 1+1 pair can cause the amplitude to be reduced from nominal. The result may be marginal with the nominal pulse mask, but well within the specification for signal reception by all office NEs. <p>Test Equipment: Dual-trace 100 MHz oscilloscope (refer to Table C for typical oscilloscope settings)</p> <p>Caution: <i>Certain restriction apply when selecting HS TO cards. In some cases, if a specific TO card is in an HS slot, certain other TO card types cannot be installed in any TO or HS slot on the shelf. For a list of incompatible TO and HS TO cards, refer to Table G.</i></p>
1	<p>Set the option switches on each TO-EA card to conform to the requirements for this installation according to the local company Installation Job Specifications. Refer to Figure 32 for option settings.</p>
2	<p>Insert all TO-EA cards in the TO slots specified by the local company Installation Job Specifications in all installed master and expansion shelves in the system.</p> <p>Requirements:</p> <ul style="list-style-type: none"> • On the TO-EA cards just installed, the FAIL and PORT ALM lamps are off. (If the FAIL lamp lights when a clock or clock input card is active, replace the TO card.) • The INPUT and ST lamps light green (indicating the cards are receiving reference signals). (If the INPUT and ST lamps do not light, retest the clock input cards and the clock cards.)

Chart 23. TO-EA Card Test (Contd)

STEP	PROCEDURE
3	<p>Note: The oscilloscope procedure for this step requires that the probes be terminated with the Test Load Impedance given on the waveform figure.</p> <p>Check each output of the cards just installed in the TO slots at the output panel, using a dual-trace 100 MHz oscilloscope.</p> <ul style="list-style-type: none"> • Table C lists the oscilloscope settings. • Table J lists the output signal pins when using a wire-wrap module. • Table K lists the output signal pins when using a DB9 module. <p>Requirement: The output waveforms must be as shown in Figure 20 and in Figure 21.</p>
4	<p>If no 1+1 output card pairs are installed in the system, go to Step 8. Otherwise, remove the left card from each 1+1 output card pair and repeat Step 3 at the output of each 1+1 output card pair.</p>
5	<p>Replace the left card in each 1+1 output card pair. Remove the right card from each 1+1 output card pair and repeat Step 3 at the output of each 1+1 output card pair.</p>
6	<p>Replace the right card in each 1+1 output card pair.</p>
7	<p>Insert a disabling pin into each of the disabling jacks on the front panel of the card, one at a time.</p> <p>Requirement: The output of the port associated with the disabling jack is inhibited.</p>
8	<p>If an SAI card is installed in the shelf, skip this step. Use the INIT-REG command for every MRC card in the shelf. This initializes all registers on the shelf.</p> <p>Requirement: The response indicates the command was completed successfully.</p>
9	<p>This procedure is complete. Indicate completion of the TO-EA Card Test on the Test Sign-off form.</p>



Notes:

1. Refer to Table P for SW1, SW2, and SW3 switch settings.
2. Sections 1 through 8 on SW2 correspond to output ports 1 through 8; sections 1 and 2 on SW3 correspond to output ports 9 and 10; section 3 sets the card operation mode (1+1 or stand-alone). Ports can be designated for any combination of E1 and/or analog outputs.

Figure 32. TO-EA Card Switch

Table P. TO-EA Switch Settings

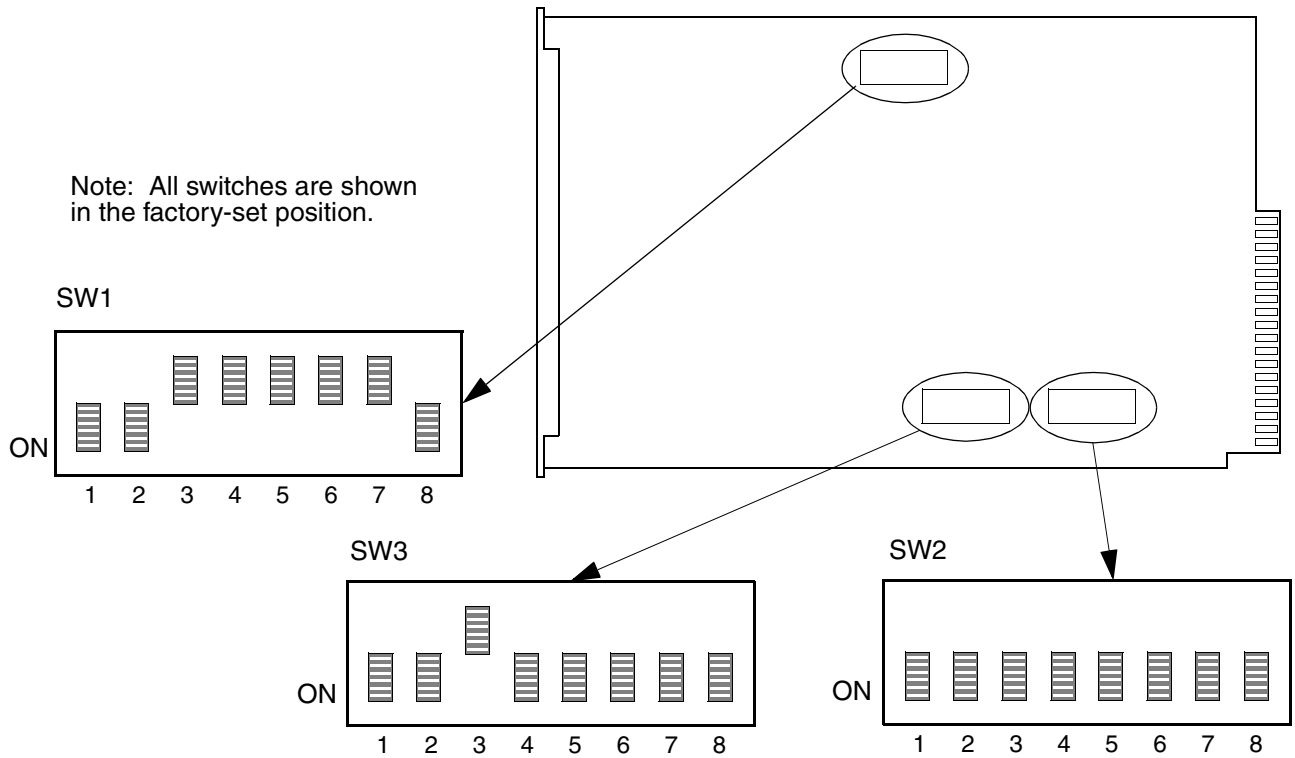
SECTION	POSITION	MEANING	FACTORY SETTING
SW1 SETTINGS			
Note: If set for E1 output, only one framing format per card is permitted.			
1	OFF	CAS framing	—
	ON	CCS framing	X
2	OFF	CRC-4 Multiframe disabled	—
	ON	CRC-4 Multiframe enabled	X
3	OFF	MINOR alarm initiated upon PORT ALM	X
	ON	MAJOR alarm initiated upon PORT ALM	—
4	OFF	Squelches outputs on a per port basis during MINOR alarm	X
	ON	Sends AIS on a per port basis during MINOR alarm	—
5 and 6	OFF	For factory use only; must be set to OFF	X
7	OFF	Reverts back to input signal when it becomes available Caution: Use of revertive switching may result in phase offsets between cards.	X
	ON	Does not revert back to input signal when it becomes available	—
8	ON	Reserved; must be set to ON	X
Sections 1 through 8 on SW2 correspond to output ports 1 through 8; sections 1 and 2 on SW3 correspond to output ports 9 and 10. Ports can be designated for any combination of E1 and/or analog outputs			
SW2 SETTINGS			
1 through 8	OFF	Output port designated for Analog signal	—
	ON	Output port designated for E1 signal	X
SW3 SETTINGS			
Sections 1 and 2 correspond to output ports 9 and 10.			
1	OFF	Output port 9 designated for Analog signal	—
	ON	Output port 9 designated for E1 signal	X
2	OFF	Output port 10 designated for Analog signal	—
	ON	Output port 10 designated for E1 signal	X
3	OFF	Card set for 1+1 operation	X
	ON	Card set for stand-alone operation	—
4 through 8	ON	Reserved; must be set to ON	X

Chart 24. TO-EAN Card Test

STEP	PROCEDURE
	<p>Use this procedure to verify the operation of the TO-EAN cards.</p> <p>Notes:</p> <ol style="list-style-type: none"> 1. Depending upon the card option settings, the TO-EAN may output digital or analog waveforms on any consecutively numbered group of outputs. 2. The timing outputs must be disconnected during this test. 3. The pulse amplitude may vary slightly when cards are initially installed and coming into service. Depending on the type of test set used (i.e., HP 377722A, Digital Telecom Analyzer), in some cases, the test set may indicate a false loss of signal (LOS), or framing errors, etc. <p>Test Equipment: Dual-trace 100 MHz oscilloscope (refer to Table C for typical oscilloscope settings)</p> <p>Caution: <i>Certain restrictions apply when selecting HS TO cards for 1:N protection. In some cases, if a specific TO card is in an HS slot, certain other TO card types cannot be installed in any TO or HS slot on the shelf. Refer to Tables G and H.</i></p>
1	<p>Set section 8 of SW1 on each TO-EAN card to the OFF position for the purposes of this procedure, and set the other sections of SW1, SW2, and SW3 on each TO-EAN card to conform to the requirements for this installation according to the local company Installation Job Specifications. Refer to Figure 33 for option settings.</p>
2	<p>Insert all TO-EAN cards in the TO slots specified by the local company Installation Job Specifications in all installed master and expansion shelves in the system.</p> <p>Requirement:</p> <ul style="list-style-type: none"> • On the TO-EAN cards just installed, the FAIL and PORT ALM lamps are off. (If the FAIL lamp lights when a clock or clock input card is active, replace the TO card.) • The INPUT and ST lamps light green (indicating the cards are receiving reference signals). (If the INPUT and ST lamps do not light, retest the clock input cards and the clock cards.)
3	<p>Note: The oscilloscope procedure for this step requires that the probes be terminated with the Test Load Impedance given on the waveform figure. Check each output of the cards just installed in the TO slots at the output panel, using a dual-trace 100 MHz oscilloscope.</p> <ul style="list-style-type: none"> • Table C lists the oscilloscope settings. • Table J lists the output signal pins when using a wire-wrap module. <p>Requirement: The output waveforms must be as shown in Figure 20 and in Figure 21.</p>
4	<p>If 1:N protection is not installed in the shelf for TO-EAN cards (for 1:N protection, a TO-EAN card is installed in an HS slot, and an MCA-5M card is installed in the MC slot), go to Step 6. Use the SET-ATTR-CONT command to set the TO-EAN cards in the shelf to the 1:N protection mode.</p>

Chart 24. TO-EAN Card Test (Contd)

STEP	PROCEDURE
5	For each 1:N TO-EAN card in the shelf: Remove a TO-EAN card from the shelf, repeat Step 3 at the card's output, replace and restore the card, and wait 30 seconds before starting on the next card.
6	Replace any TO-EAN card removed during this procedure.
7	If an SAI card is installed in the shelf, skip this step. Use the INIT-REG command for every MRC card in the shelf. This initializes all registers on the shelf. Requirement: The response indicates the command was completed successfully.
8	This procedure is complete. Indicate completion of the TO-EAN Card Test on the Test Sign-off form.



Notes:

1. Refer to Table P for SW1, SW2, and SW3 switch settings.
2. Sections 1 through 8 on SW2 correspond to output ports 1 through 8; sections 1 and 2 on SW3 correspond to output ports 9 and 10. The 20 allowable configurations of analog (A) and E1 ports are in the list below.

Config-uration	Output Port Number									
	1	2	3	4	5	6	7	8	9	10
1	A	A	A	A	A	A	A	A	A	A
2	E1	A	A	A	A	A	A	A	A	A
3	E1	E1	A	A	A	A	A	A	A	A
4	E1	E1	E1	A	A	A	A	A	A	A
5	E1	E1	E1	E1	A	A	A	A	A	A
6	E1	E1	E1	E1	E1	A	A	A	A	A
7	E1	E1	E1	E1	E1	E1	A	A	A	A
8	E1	E1	E1	E1	E1	E1	E1	A	A	A
9	E1	E1	E1	E1	E1	E1	E1	E1	A	A
10	E1	E1	E1	E1	E1	E1	E1	E1	E1	A

Config-uration	Output Port Number									
	1	2	3	4	5	6	7	8	9	10
11	E1	E1	E1	E1	E1	E1	E1	E1	E1	E1
12	A	E1	E1	E1	E1	E1	E1	E1	E1	E1
13	A	A	E1	E1	E1	E1	E1	E1	E1	E1
14	A	A	A	E1	E1	E1	E1	E1	E1	E1
15	A	A	A	A	E1	E1	E1	E1	E1	E1
16	A	A	A	A	A	E1	E1	E1	E1	E1
17	A	A	A	A	A	A	E1	E1	E1	E1
18	A	A	A	A	A	A	A	E1	E1	E1
19	A	A	A	A	A	A	A	A	E1	E1
20	A	A	A	A	A	A	A	A	A	E1

Figure 33. TO-EAN Card Switch

Table Q. TO-EAN Switch Settings

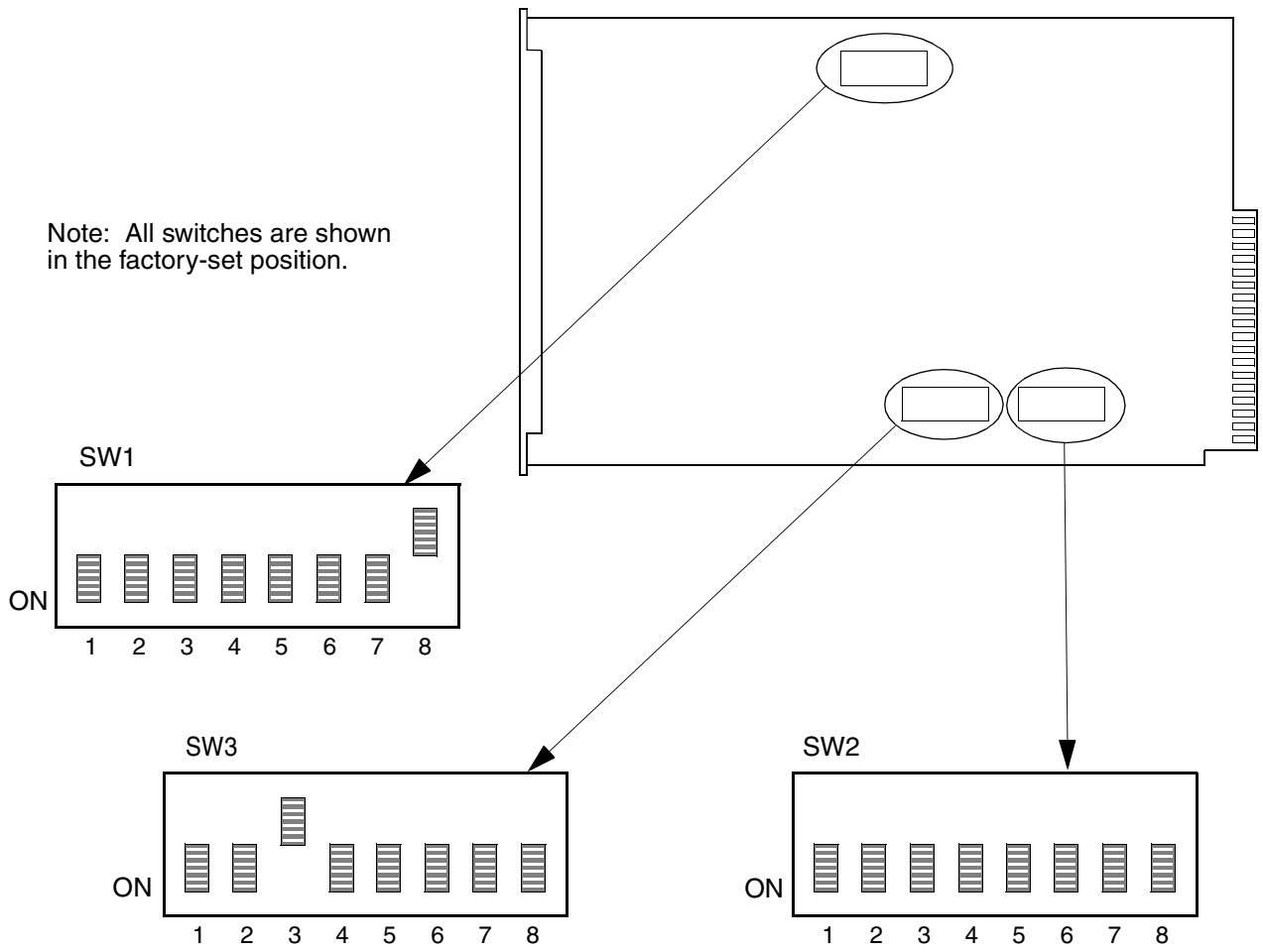
SECTION	POSITION	MEANING	FACTORY SETTING
SW1 SETTINGS			
<i>Note:</i> Note: If set for E1 output, only one framing format per card is permitted.			
1	OFF	CAS framing	—
	ON	CCS framing	X
2	OFF	CRC-4 Multiframe disabled	—
	ON	CRC-4 Multiframe enabled	X
3	OFF	MINOR alarm initiated upon PORT ALM	X
	ON	MAJOR alarm initiated upon PORT ALM	—
4	OFF	Squelches outputs on a per port basis during MINOR alarm	X
	ON	Sends AIS on a per port basis during MINOR alarm	—
5 and 6	OFF	For factory use only; must be set to OFF	X
7	OFF	Reverts back to input signal when it becomes available	X
	ON	Caution: Use of revertive switching may result in phase offsets between cards. Does not revert back to input signal when it becomes available	—
8	OFF	Upon power-up, the outputs are enabled, and the card operates using switch settings (if configured properly). Configuration can be changed by TL1 commands.	—
	ON	Upon power-up, the outputs are disabled. If replacing a card, the switch settings on the new card will be overridden by the MIS card. Configuration can be changed by TL1 commands.	X
Sections 1 through 8 on SW2 correspond to output ports 1 through 8; sections 1 and 2 on SW3 correspond to output ports 9 and 10. Consecutively numbered ports starting with port 1 or ending with port 10 can be configured as E1 or analog outputs; for example, E1 at ports 1 through 4, and analog at ports 5 through 10.			
SW2 SETTINGS			
1 through 8	OFF	Output port designated for Analog signal	—
	ON	Output port designated for E1 signal	X
SW3 SETTINGS			
Sections 1 and 2 correspond to output ports 9 and 10.			
1	OFF	Output port 9 designated for Analog signal	—
	ON	Output port 9 designated for E1 signal	X
2	OFF	Output port 10 designated for Analog signal	—
	ON	Output port 10 designated for E1 signal	X
3 through 8	ON	Reserved; must be set to ON	X

Chart 25. TO-EA5 Card Test

STEP	PROCEDURE
	<p>Use this procedure to verify the operation of the TO-EA5 cards.</p> <p>Notes:</p> <ol style="list-style-type: none"> 1. Depending upon the card option settings, the TO-EA5 may output digital or analog waveforms on any of its outputs. 2. When installing a redundant TO-EA5 card pair, both cards must have the same part number and S/W Rev letter, and both cards must be configured identically to ensure optimum output switching protection. 3. Install one card of a redundant pair of TO-EA5 cards in an odd-numbered slot, and the other card in the even-numbered slot immediately to the right. 4. When installing a redundant TO-EA5 card pair, install a double-wide output module on the appropriate connectors of the output panel. 5. The timing outputs must be disconnected during this test. 6. Because the TO-EA5 card may be set as a redundant or standalone unit, the pulse amplitude may vary slightly when cards are initially installed and coming into service. Depending on the type of test set used (i.e., HP 377722A, Digital Telecom Analyzer), in some cases, the test set may indicate a false loss of signal (LOS), or framing errors, etc. 7. Insertion of a disabling pin in a single port on a card of a redundant pair can cause the amplitude to be reduced from nominal. The result may be marginal with the nominal pulse mask, but well within the specification for signal reception by all office NEs. <p>Test Equipment: Dual-trace 100 MHz oscilloscope (refer to Table C for typical oscilloscope settings)</p>
1	<p>Set section 8 of SW1 on each TO-EA5 card to the OFF position for the purposes of this procedure, and set the other sections of SW1, SW2, and SW3 on each TO-EA5 card to conform to the requirements for this installation according to the Installation Job Specifications (Figure 34).</p>
2	<p>Insert all TO cards in the TO slots specified by the local company Installation Job Specifications in all installed master and expansion shelves in the system.</p> <p>Requirements:</p> <ul style="list-style-type: none"> • On the TO cards just installed, the FAIL and PORT ALM lamps are off. (If the FAIL lamp lights when a clock or clock input card is active, replace the TO card.) • The INPUT and ST lamps light green (indicating the cards are receiving reference signals). (If the INPUT and ST lamps do not light, retest the clock input cards and the clock cards.) • The CCS and CAS lamps are lit according to the options selected in Step 1.

Chart 25. TO-EA5 Card Test (Contd)

STEP	PROCEDURE
3	<p>Note: The oscilloscope procedure for this step requires that the probes be terminated with the Test Load Impedance given on the waveform figure.</p> <p>Check each output of the cards just installed in the TO slots at the output panel, using a dual-trace 100 MHz oscilloscope.</p> <ul style="list-style-type: none"> • Table C lists the oscilloscope settings. • Table J lists the output signal pins when using a wire-wrap module. • Table K lists the output signal pins when using a DB9 module. <p>Requirement: The output waveforms must be as shown in Figure 20 and Figure 21.</p>
4	<p>If no redundant output card pairs are installed in the system, go to Step 7. Remove the left card from each redundant output card pair and repeat Step 3 at the output of each redundant output card pair.</p>
5	<p>Replace the left card in each redundant output card pair. Remove the right card from each redundant output card pair and repeat Step 3 at the output of each redundant output card pair.</p>
6	<p>Replace the right card in each redundant output card pair.</p>
7	<p>Insert a disabling pin into each of the disabling jacks on the front panel of the card, one at a time.</p> <p>Requirement: The output of the port associated with the disabling jack is inhibited.</p>
8	<p>If section 8 of SW1 is set to conform to this installation, skip this step. Remove the TO-EA5 cards, set section 8 of SW1 to the ON position, and replace the cards.</p>
9	<p>If an SAI card is installed in the shelf, skip this step. Use the INIT-REG command for every MRC card in the shelf. This initializes all registers on the shelf.</p> <p>Requirement: The response indicates the command was completed successfully.</p>
10	<p>This procedure is complete. Indicate completion of the TO-EA5 Card Test on the Test Sign-off form.</p>



Notes:

1. Refer to Table P for SW1, SW2, and SW3 switch settings.
2. Sections 1 through 8 on SW2 correspond to output ports 1 through 8; sections 1 and 2 on SW3 correspond to output ports 9 and 10; section 3 sets the card operation mode (1+1 or stand-alone). Ports can be designated for any combination of E1 and/or analog outputs.

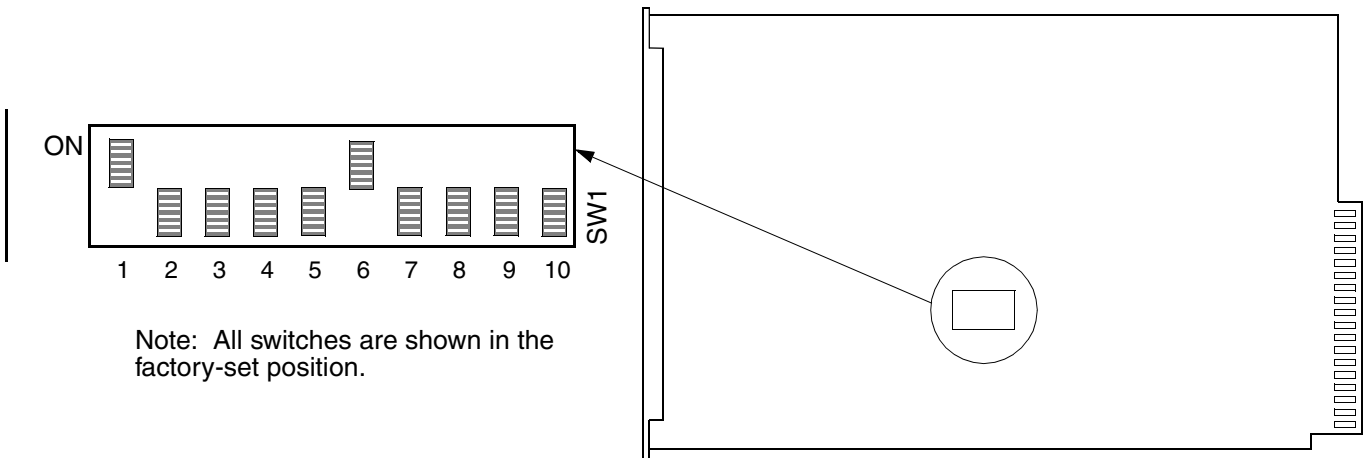
Figure 34. TO-EA5 Card Switches

Table R. TO-EA5 Switch Settings

SECTION	POSITION	MEANING	FACTORY SETTING
SW1 SETTINGS			
Note: If set for E1 output, only one framing format per card is permitted.			
1	OFF	CAS framing	—
	ON	CCS framing	X
2	OFF	CRC-4 Multiframe disabled	—
	ON	CRC-4 Multiframe enabled	X
3	OFF	MINOR alarm initiated upon PORT ALM	X
	ON	MAJOR alarm initiated upon PORT ALM	—
4	OFF	Squelches outputs on a per port basis during MINOR alarm	X
	ON	Sends AIS on a per port basis during MINOR alarm	—
5 and 6	OFF	For factory use only; must be set to OFF	X
7	OFF	Reverts back to input signal when it becomes available	X
	ON	Caution: Use of revertive switching may result in phase offsets between cards. Does not revert back to input signal when it becomes available	—
8	OFF	Upon power-up, the outputs are enabled, and the card operates using switch settings (if configured properly). Configuration can be changed by TL1 commands.	—
	ON	Upon power-up, the outputs are disabled. If replacing a card, the switch settings on the new card will be overridden by the MIS card. Configuration can be changed by TL1 commands.	X
Sections 1 through 8 on SW2 correspond to output ports 1 through 8; sections 1 and 2 on SW3 correspond to output ports 9 and 10. Ports can be designated for any combination of E1 and/or analog outputs			
SW2 SETTINGS			
1 through 8	OFF	Output port designated for Analog signal	—
	ON	Output port designated for E1 signal	X
SW3 SETTINGS			
Sections 1 and 2 correspond to output ports 9 and 10.			
1	OFF	Output port 9 designated for Analog signal	—
	ON	Output port 9 designated for E1 signal	X
2	OFF	Output port 10 designated for Analog signal	—
	ON	Output port 10 designated for E1 signal	X
3	OFF	Card set for 1+1 operation	X
	ON	TO-EA5 card set for stand-alone operation	—
4 through 8	ON	Reserved; must be set to ON	X

Chart 26. TOTA-5 or TOTA-M Card Test

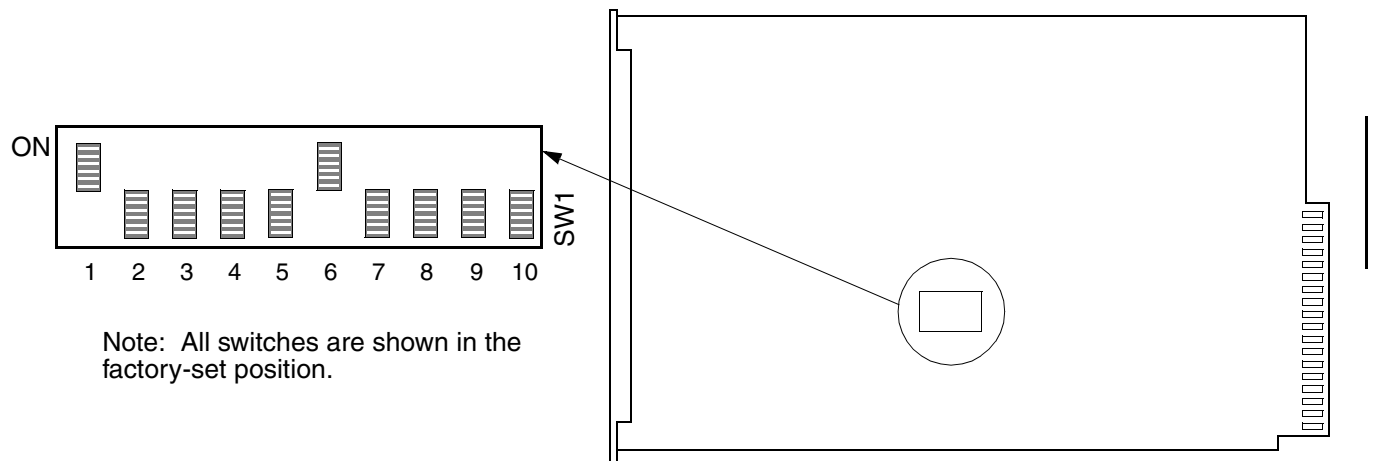
STEP	PROCEDURE
	<p>Use this procedure to verify the operation of the TOTA-5 and TOTA-M cards.</p> <p>Notes:</p> <ol style="list-style-type: none"> 1. The timing outputs must be disconnected during this test. 2. Do not install a TOTA-M card in the same shelf as a TOTA-5 card. <p>Test Equipment: Dual-trace 100 MHz oscilloscope (refer to Table C for typical oscilloscope settings)</p> <p>Caution: <i>Certain restrictions apply when selecting HS TO cards for 1:N protection. In some cases, if a specific TO card is in an HS slot, certain other TO card types cannot be installed in any TO or HS slot on the shelf. In the case of the TOTA series of cards, special instructions apply. Refer to Tables G and H.</i></p>
1	<p>Be sure section 8 of SW1 on each TOTA-5 or TOTA-M card is set to the OFF position for the purposes of this procedure, and set the other sections of SW1 (Figure 35 or Figure 36) to conform to the requirements for this installation according to the Installation Job Specifications.</p>
2	<p>Insert all TO cards in the TO slots specified by the local company Installation Job Specifications in all installed master and expansion shelves in the system.</p> <p>Requirements:</p> <ul style="list-style-type: none"> • On the TO cards just installed, the FAIL and PORT ALM lamps are off. (If the FAIL lamp lights when a clock or clock input card is active, replace the TO card.) • The INPUT and ST lamps light green (indicating the cards are receiving reference signals). (If the INPUT and ST lamps do not light, retest the clock input cards and the clock cards.) • The option lamps (CCS or CAS and D4 or ESF) are lit according to the options selected in Step 1.
3	<p>Note: The oscilloscope procedure for this step requires that the probes be terminated with the Test Load Impedance given on the waveform figure.</p> <p>Check each output of the cards just installed in the TO slots at the output panel, using a dual-trace 100 MHz oscilloscope. Table C lists the oscilloscope settings.</p> <p>Requirement: The output waveforms must be as shown in Figure 27.</p>
4	<p>If section 8 of SW1 is set to conform to this installation, skip this step. Remove the TOTA-5 or TOTA-M cards, set section 8 of SW1 to the ON position, and replace the cards.</p>
5	<p>Use the INIT-REG command for every MRC card in the shelf. This initializes all registers on the shelf.</p> <p>Requirement: The response indicates the command was completed successfully.</p>
6	<p>This procedure is complete. Indicate completion of the TOTA-5 or TOTA-M Card Test on the Test Sign-off form.</p>



SW1 Settings

Section	Position	Meaning	Factory Setting
1	ON	D4 framing (Section 2 must be OFF)	X
	OFF	ESF framing (Section 2 must be ON)	—
2	ON	ESF framing (Section 1 must be OFF)	—
	OFF	D4 framing (Section 1 must be ON)	X
3	ON	Not allowed; used for testing purposes only	—
	OFF	Normal operation	X
4	ON	Not allowed; used for testing purposes only	—
	OFF	Normal operation	X
5	ON	Disables all 10 outputs during MAJOR alarm	—
	OFF	Sends AIS on all 10 outputs during MAJOR alarm	X
6	ON	Reverts back to clock card signal when it becomes available	X
	OFF	Does not revert back to clock card signal when it becomes available	—
7	ON	MAJOR alarm initiated upon PORT ALM	
	OFF	MINOR alarm initiated upon PORT ALM	X
8	ON	Upon power-up, the outputs are enabled. Card is configured according to the switch settings. Configuration can be changed by TL1 commands.	—
	OFF	Upon power-up, the outputs are disabled. Card is configured and operated solely by TL1 commands. If replacing a card, the switch settings on the new card will be overridden by the MIS card.	X
9	ON	Not allowed; used for testing purposes only	—
	OFF	Normal operation	X
10	ON	Not allowed; used for testing purposes only	—
	OFF	Normal operation	X

Figure 35. TOTA-5 Card Switch



SW1 Settings

Section	Position	Meaning	Factory Setting
1	ON	D4 framing (Section 2 must be OFF)	X
	OFF	ESF framing (Section 2 must be ON)	—
2	ON	ESF framing (Section 1 must be OFF)	—
	OFF	D4 framing (Section 1 must be ON)	X
3	ON	Not allowed; used for testing purposes only	—
	OFF	Normal operation	X
4	ON	Not allowed; used for testing purposes only	—
	OFF	Normal operation	X
5	ON	Disables all 10 outputs when a card failure is detected	—
	OFF	Sends AIS on all 10 outputs when a card failure is detected	X
6	ON	Reverts back to clock card reference signal when it becomes available	X
	OFF	Does not revert back to clock card reference signal when it becomes available	—
7	ON	MAJOR alarm initiated upon PORT ALM	—
	OFF	MINOR alarm initiated upon PORT ALM	X
8	ON	Upon power-up, the outputs are enabled. Card is configured according to the switch settings. Configuration can be changed by TL1 commands.	—
	OFF	Upon power-up, the outputs are disabled. Card is configured and operated solely by TL1 commands. If replacing a card, the switch settings on the new card will be overridden by the MIS card.	X
9	ON	Not allowed; used for testing purposes only	—
	OFF	Normal operation	X
10	ON	Not allowed; used for testing purposes only	—
	OFF	Normal operation	X

Figure 36. TOTA-M Card Switch

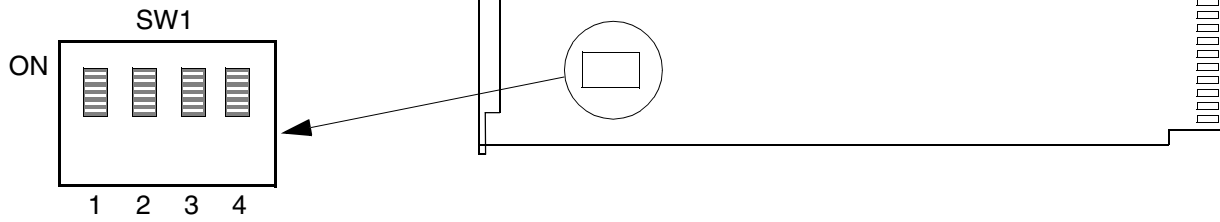
Chart 27. TOGA Card Test

STEP	PROCEDURE
	<p>Use this procedure to install the TOGA cards.</p> <p>Notes:</p> <ol style="list-style-type: none"> 1. The timing outputs must be disconnected during this test. 2. Because the TOGA card may be set as a 1+1 or stand-alone unit, the pulse amplitude may vary slightly when cards are initially installed and coming into service. Depending on the type of test set used (i.e., HP 377722A, Digital Telecom Analyzer), in some cases, the test set may indicate a false loss of signal (LOS), or framing errors, etc. 3. Insertion of a disabling pin in a single port on a card of a 1+1 pair can cause the amplitude to be reduced from nominal. The result may be marginal with the nominal pulse mask, but well within the specification for signal reception by all office NEs. <p>Test Equipment: Dual-trace 100 MHz oscilloscope (refer to Table C for typical oscilloscope settings)</p> <p>Caution: <i>Certain restrictions apply when selecting HS TO cards for 1:N protection. In some cases, if a specific TO card is in an HS slot, certain other TO card types cannot be installed in any TO or HS slot on the shelf. Refer to Table G.</i></p>
1	<p>Set the option switches on each TOGA card to conform to the requirements for this installation according to the local company Installation Job Specifications. Refer to Figure 37 for option settings.</p>
2	<p>Insert all TOGA cards in the TO slots specified by the local company Installation Job Specifications in all installed master and expansion shelves in the system.</p> <p>Requirements:</p> <ul style="list-style-type: none"> • On the TOGA cards just installed, the FAIL and PORT ALM lamps are off. (If the FAIL lamp lights when a clock or clock input card is active, replace the TO card.) • The INPUT and ST lamps light green (indicating the cards are receiving reference signals). (If the INPUT and ST lamps do not light, retest the clock input cards and the clock cards.)
3	<p>Note: The oscilloscope procedure for this step requires that the probes be terminated with the Test Load Impedance given on the waveform figure.</p> <p>Check each output of the cards just installed in the TO slots at the output panel, using a dual-trace 100 MHz oscilloscope.</p> <ul style="list-style-type: none"> • Table C lists the oscilloscope settings. • Table J lists the output signal pins when using a wire-wrap module. • Table K lists the output signal pins when using a DB9 module. <p>Requirement: The output waveform must be as shown in Figure 21.</p>

Chart 27. TOGA Card Test (Contd)

STEP	PROCEDURE
4	If no 1+1 output card pairs are installed in the system, go to Step 8. Remove the left card from each 1+1 output card pair and repeat Step 3 at the output of each 1+1 output card pair.
5	Replace the left card in each 1+1 output card pair. Remove the right card from each 1+1 output card pair and repeat Step 3 at the output of each 1+1 output card pair.
6	Replace the right card in each 1+1 output card pair.
7	<p>Insert a disabling pin into each of the disabling jacks on the front panel of the card, one at a time.</p> <p>Requirement: The output of the port associated with the disabling jack is inhibited.</p> <p>Note: Inserting a disabling pin in a single port on a card of a 1+1 pair (power-combined redundant card pair) can cause the amplitude to be reduced from nominal. The result may be marginal with the nominal pulse mask, but well within the specification for signal reception by all office NEs.</p>
8	<p>If an SAI card is installed in the shelf, skip this step. Use the INIT-REG command for every MRC card in the shelf. This initializes all registers on the shelf.</p> <p>Requirement: The response indicates the command was completed successfully.</p>
9	This procedure is complete. Indicate completion of the TOGA Card Test on the Test Sign-off form.

Note: All switches are shown in the factory-set position. Only section 3 may be changed.



SW1 Settings

Section	Position	Meaning	Factory Setting
1	ON	Not used	X
	OFF	Not used	—
2	ON	Not used	X
	OFF	Not used	—
3	ON	When a disabling pin is inserted in jack, a PORT ALM lamp does not light and a switch to the HS card is not made	X
	OFF	When a disabling pin is inserted in jack, a PORT ALM lamp lights and a switch to the HS card is made	—
4	ON	Normal	X
	OFF	Not allowed	—

Figure 37. TOGA Card Switch

Chart 28. SCIU or ESCIU Card Test

STEP	PROCEDURE
	<p>Use this procedure to install the SCIU and ESCIU cards.</p> <p>Test Equipment: A DS1 Bit Error Rate Test Set (BERTS) for SCIU cards or an E1 BERTS for the ESCIU cards. This procedure assumes that standard level access jack sets (i.e., DSX-1) were cabled to the SCIU or ESCIU wire-wrap module.</p> <p>Note: If jack sets are not connected to the module, then the BERTS will need to be clipped to the Network Element (NE) ends of the cables connected to the SCIU or ESCIU wire-wrap module.</p>
1	Set up the BERTS transmit signal to match the framing format and line coding of the traffic-carrying system into which the SCIU or ESCIU card will be inserted.
2	<p>Set all sections of the switches on each SCIU card (Figure 38) to the factory-set positions, except section DS1A MAJ of SW1 (set to the ON (up) position).</p> <p>Set all sections of the switches on each ESCIU card (Figure 39) to the factory-set positions, except section E1A MAJ of SW1 (set to the ON (up) position).</p>
3	<p>Connect the 0 dB DSX (3 V b-p) transmit signal from the BERTS to the SCIU or ESCIU jack set (Table U) EAST A IN jack with a patch cord. Connect another patch cord from the SCIU or ESCIU jack set WEST A OUT jack to the receive jack on the BERTS. Start the BERTS test and observe the receiver for 5 minutes.</p> <p>Requirement: No DS1 or E1 parameters are exceeded (no errors) on the BERTS receiver.</p>
4	<p>Move the BERTS transmit patch cord from the EAST A IN jack to the WEST B IN jack. Move the BERTS receive patch cord from the WEST A OUT jack to the EAST B OUT jack. Start the BERTS test and observe the receiver for 5 minutes.</p> <p>Requirement: No DS1 or E1 parameters are exceeded (no errors) on the BERTS receiver.</p>
5	After the test, leave the BERTS patch cords up.
6	<p>Insert an SCIU or ESCIU card in the first TO slot, and check its lamp status.</p> <p>Requirement: On the card just installed, the FAIL lamp lights and then goes off, the SYNC and DS1B/E1B lamps light green, and the DS1A/E1A lamp lights red. On the SAI or MIS card, the MAJOR lamp is lit red to indicate that the DS1A/E1A receive signal is not present.</p> <p>Note: If the FAIL lamp remains lit, replace the card. If the SYNC lamp is lit red, the card is not receiving system reference from the clock input or clock cards, or expansion bus cable; verify the clock input and clock cards are operating correctly in the master shelf. If in an expansion shelf, verify the master to expansion cable is installed correctly.</p>
7	<p>Remove the SCIU card and change SW1, section DS1A MAJ to OFF, and section DS1A MIN to ON. Reinsert the card.</p> <p>Remove the ESCIU card and change SW2, section E1A MAJ to OFF, and section E1A MIN to ON. Reinsert the card.</p> <p>Requirement: The MINOR lamp on the SAI or MIS card is lit (the MAJOR lamp goes off on SAI or MIS card 6 s to 10 s after the SCIU or ESCIU card is removed).</p>

Chart 28. SCIU or ESCIU Card Test (Contd)

STEP	PROCEDURE
8	<p>Start the BERTS test and observe the receiver for 5 minutes.</p> <p>Requirement: No DS1 or E1 parameters are exceeded (no errors) on the BERTS receiver.</p>
9	<p>Move the BERTS transmit patch cord from the WEST B IN jack to the EAST A IN jack. Move the BERTS receive patch cord from the EAST B OUT jack to the WEST A OUT jack. Restart the BERTS test and observe the receiver for 5 minutes.</p> <p>Requirement: No DS1 or E1 parameters are exceeded, except slips on the BERTS receiver. On the SCIU or ESCIU card, the DS1B/E1B lamp is lit red, the DS1A/E1A lamp is lit green, the bit slip lamps (0, 64, and 128 on SCIU card; 0, 128, and 192 on ESCIU card) alternately light and then go off, and the SLIP and HI SLIP lamps are lit red. The MAJOR and MINOR lamps on the SAI or MIS card are off.</p>
10	<p>Remove the SCIU card and change SW1, section DS1A MIN to OFF, and section DS1B MAJ to OFF. Reinsert the card.</p> <p>Remove the ESCIU card and change SW2, section E1A MIN to OFF, and section E1B MAJ to ON. Reinsert the card.</p> <p>Requirement: The MAJOR lamp is lit on the SAI or MIS card to indicate DS1B/E1B receive signal is not present. DS1B/E1B lamp is lit red on the SCIU or ESCIU card.</p>
11	<p>Remove the SCIU card and change SW1, section DS1B MAJ to OFF, and section DS1B MIN to ON. Reinsert the card.</p> <p>Remove the ESCIU card and change SW2, section E1B MAJ to OFF, and section E1B MIN to ON. Reinsert the card.</p> <p>Requirement: The MINOR lamp is lit on the SAI or MIS card. DS1B/E1B lamp is lit red on the SCIU or ESCIU card (MAJOR lamp goes off on SAI or MIS card 6 s to 10 s after the SCIU or ESCIU card is removed).</p>
12	<p>Remove the SCIU card and change SW1, section DS1B MIN to OFF, and section SLIP MAJ to ON. Reinsert the card.</p> <p>Remove the ESCIU card and change SW2, section E1B MIN to OFF, and section SLIP MAJ to ON. Reinsert the card.</p> <p>Requirement: Initially, the MAJOR and MINOR lamps are off on the SAI or MIS card. When the SLIP lamp on the SCIU or ESCIU card lights red (may take several minutes), the MAJOR lamp lights on the SAI or MIS card (MINOR lamp goes off on SAI or MIS card 6 s to 10 s after the SCIU or ESCIU card is removed).</p>

Chart 28. SCIU or ESCIU Card Test (Contd)

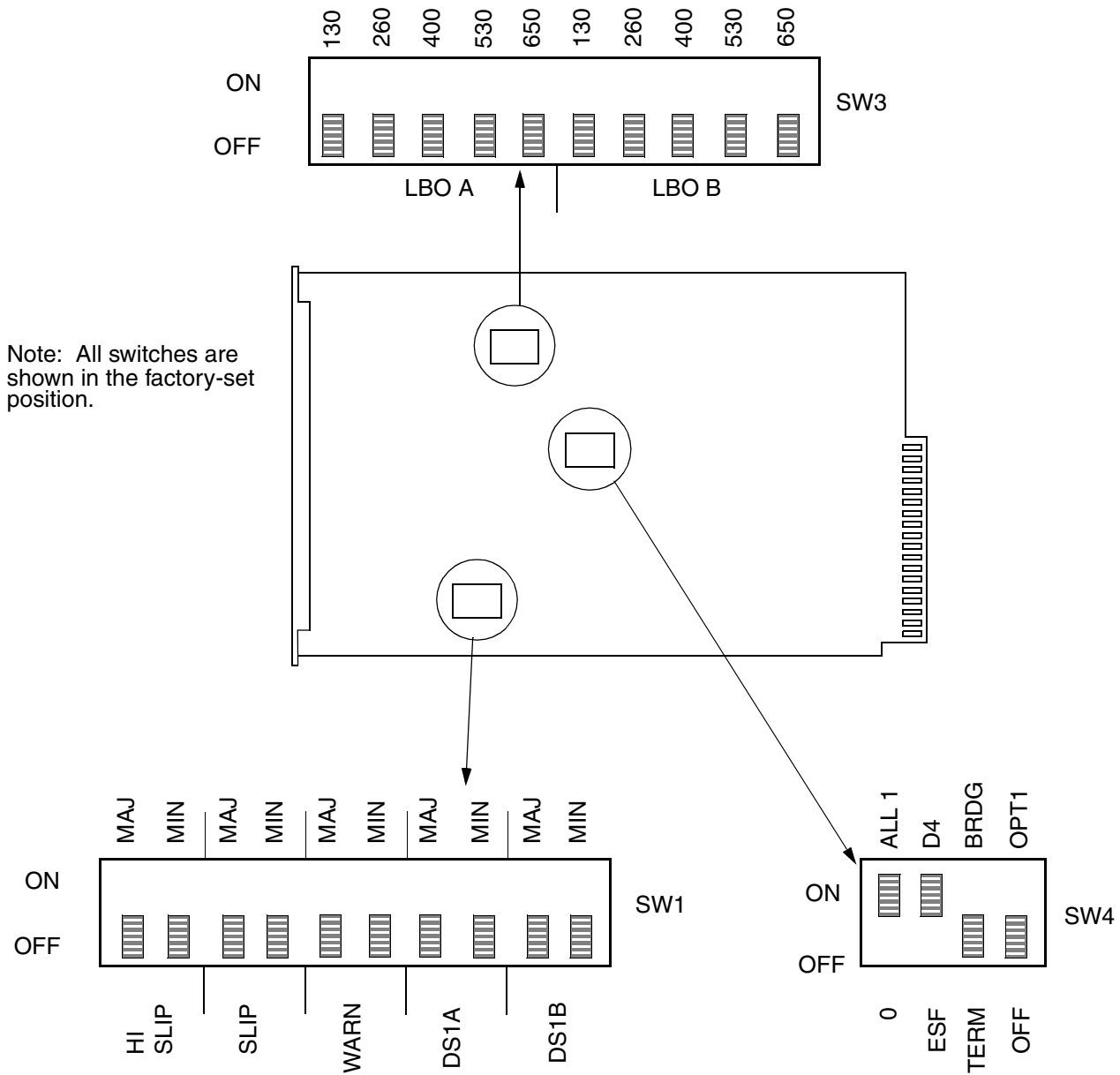
STEP	PROCEDURE
13	<p>Remove the SCIU card and change SW1, section SLIP MAJ to OFF, and section SLIP MIN to ON. Reinsert the card.</p> <p>Remove the ESCIU card and change SW2, section SLIP MAJ to OFF, and section SLIP MIN to ON. Reinsert the card.</p> <p>Requirement: When the SLIP lamp on the SCIU or ESCIU card lights red (may take several minutes), the MINOR lamp lights on the SAI or MIS card (MAJOR lamp goes off on SAI or MIS card 6 s to 10 s after the SCIU or ESCIU card is removed).</p>
14	<p>Remove the SCIU card and change SW1, section SLIP MIN to OFF, and section HI SLIP MAJ to ON. Reinsert the card.</p> <p>Remove the ESCIU card and change SW2, section SLIP MIN to OFF, and section HI SLIP MAJ to ON. Reinsert the card.</p> <p>Requirement: First, the SLIP lamp on the SCIU or ESCIU card lights red after several minutes (the MAJOR and MINOR lamps on the SAI or MIS card are off), then after several more minutes, the HI SLIP lamp on the SCIU or ESCIU card lights red, and the MAJOR lamp on the SAI or MIS card lights (the MINOR lamp goes off on SAI or MIS card 6 s to 10 s after the SCIU or ESCIU card is removed).</p>
15	<p>Remove the SCIU card and change SW1, section HI SLIP MAJ to OFF, and section HI SLIP MIN to ON. Reinsert the card.</p> <p>Remove the ESCIU card and change SW2, section HI SLIP MAJ to OFF, and section HI SLIP MIN to ON. Reinsert the card.</p> <p>Requirement: After several minutes, when the HI SLIP lamp on the SCIU or ESCIU card lights red, the MINOR lamp on the SAI or MIS card lights (the MAJOR lamp goes off on the SAI or MIS card 6 s to 10 s after the SCIU or ESCIU card is removed).</p>
16	<p>Remove the SCIU card and change SW1, section HI SLIP MIN to OFF. Reinsert the card and wait for the SLIP and HI SLIP lamps to light (may take several minutes).</p> <p>Remove the ESCIU card and change SW2, section HI SLIP MIN to OFF. Reinsert the card and wait for the SLIP and HI SLIP lamps to light (may take several minutes).</p> <p>Requirement: The MAJOR and MINOR lamps on the SAI or MIS card are off.</p>
17	<p>Connect a patch cord from a MON jack cabled to an NE that is being timed from the DCD Shelf, to the external clock reference jack on the BERTS. Restart the BERTS test and observe the receiver for 5 minutes.</p> <p>Requirement: No DS1 or E1 parameters are exceeded (no errors) on the BERTS receiver.</p>
18	<p>At the SCIU or ESCIU card, press the RESET pushbutton on the front panel.</p> <p>Requirement: The SLIP and HI SLIP lamps go off. If the 64 or 128 (SCIU), or the 128 or 192 (ESCIU) bit slip lamps were lit, they will remain lit.</p>

Chart 28. SCIU or ESCIU Card Test (Contd)

STEP	PROCEDURE
19	<p>If the 64 or 128 (SCIU), or the 128 or 192 (ESCIU) bit slip lamps are lit, remove and reinsert the SCIU or ESCIU card.</p> <p>Requirement: The SLIP, HI SLIP, and all bit slip lamps are off and remain off for 5 minutes.</p>
20	<p>Remove the SCIU card and set switch SW4, section 0/ALL1 to ON, and section OFF/OPT1 to OFF, and reinsert the card in the shelf. Set the BERTS receiver to Auto Signal Detect. Restart the BERTS test and observe the receiver for 5 minutes.</p> <p>Remove the ESCIU card and set switch SW1, section 0/ALL1 to ON, and section OFF/OPT1 to OFF, and reinsert the card in the shelf. Set the BERTS receiver to Auto Signal Detect. Restart the BERTS test and observe the receiver for 5 minutes.</p> <p>Requirement: The BERTS receiver sees same signal format as transmitted from the BERTS and no parameters are exceeded (no errors).</p>
21	<p>Remove the transmit patch cord from the BERTS.</p> <p>Requirement: The BERTS receives a framed all-ones signal.</p>
22	<p>Reinsert the BERTS transmit patch cord.</p> <p>Requirement: The BERTS receiver changes from framed all-ones back to the BERTS transmit signal.</p>
23	<p>Send an out-of-frame (OOF) condition from the BERTS.</p> <p>Requirement: The BERTS receives a framed all-ones signal.</p>
24	<p>Restore framing from the BERTS transmitter.</p> <p>Requirement: The BERTS receiver changes from framed all-ones back to the BERTS transmit signal.</p>
25	<p>Remove the SCIU card and set switch SW4, section 0/ALL1 to OFF, and position OFF/OPT1 to ON, and reinsert the card in the shelf. Restart the BERTS test and observe the receiver for 5 minutes.</p> <p>Remove the ESCIU card and set switch SW1, section 0/ALL1 to OFF, and position OFF/OPT1 to ON, and reinsert the card in the shelf. Restart the BERTS test and observe the receiver for 5 minutes.</p> <p>Requirement: The BERTS receiver sees same signal format as transmitted for the BERTS and no parameters are exceeded (no errors).</p>
26	<p>Remove the transmit patch cord from the BERTS.</p> <p>Requirement: The BERTS receives a loss-of-signal (LOS).</p>
27	<p>Reinsert the BERTS transmit patch cord.</p> <p>Requirement: The BERTS receiver sees the BERTS transmit signal.</p>

Chart 28. SCIU or ESCIU Card Test (Contd)

STEP	PROCEDURE
28	<p>Send an OOF condition from the BERTS.</p> <p>Requirement: The BERTS receiver sees OOF.</p>
29	<p>Reinsert the BERTS transmit patch cord.</p> <p>Requirement: The BERTS receiver sees the BERTS transmit signal.</p>
30	<p>On the SCIU or ESCIU card, insert a disabling pin (provided) in the BYPASS jack on the front panel. Restart the BERTS test.</p> <p>Requirement: On the SCIU or ESCIU card, the BYPASS lamp is lit red. On a 5 minute BERTS test, no DS1 or E1 parameters are exceeded (no errors). On the SCIU or ESCIU card, the SLIP, HI SLIP, and bit slip lamps are off.</p>
31	<p>Remove the patch cord from the BERTS external clock reference jack. Restart the BERTS test and observe the receiver for 5 minutes.</p> <p>Requirement: No DS1 or E1 parameters are exceeded on the BERTS receiver. On the SCIU or ESCIU card, the SLIP, HI SLIP, and bit slip lamps are off.</p>
32	<p>Remove the disabling pin from the BYPASS jack on the SCIU or ESCIU card.</p> <p>Requirement: The BYPASS lamp goes off.</p>
33	<p>Remove the BERTS patch cords from the SCIU or ESCIU access jacks.</p>
34	<p>Remove the SCIU card and set the option switches (SW1, SW3, and SW4) according to local company Installation Job Specifications (refer to Figure 38, Table S, Table T, and Table U). Reinsert the card in the shelf.</p> <p>Remove the ESCIU card and set the option switches (SW1 and SW2) according to local company Installation Job Specifications (refer to Figure 39, Table V, and Table W). Reinsert the card in the shelf. The ESCIU card does not have option switch settings for LBO.</p> <p>Note: SW1 (sections 5 and 6) WARN alarm option on the SCIU card, and SW2 (sections 5 and 6) on the ESCIU card, must always be set to OFF. The WARN alarm is associated with the 128-bit slip lamp (SCIU) and the 192-bit slip lamp (ESCIU) on the front panel of the SCIU or ESCIU card, and there is no way to reset or clear this alarm until a full frame slip occurs.</p>
35	<p>Repeat Steps 2 through 34 for each SCIU or ESCIU card to be installed in all shelves.</p>
36	<p>If an SAI card is installed in the shelf, skip this step. Use the INIT-REG command for every MRC card in the shelf. This initializes all registers on the shelf.</p> <p>Requirement: The response indicates the command was completed successfully.</p>
37	<p>This procedure is complete. Indicate completion of the SCIU or ESCIU Card Test on the Test Sign-off form.</p>



Notes:

1. See Table S for the SCIU card option switch settings.
2. Factory settings for SW1 and SW3 are OFF.
3. Factory settings for SW4: 0 / ALL 1 and ESF/D4 to ON, TERM/BRDG and OFF/OPT 1 to OFF.
4. WARN MAJ and MIN switch positions on SW1 must always be set to OFF.
5. On SW1, MAJ and MIN switch positions for each alarm (HI SLIP, SLIP, DS1A, and DS1B) are mutually exclusive – one ON and the other OFF – or both OFF for NO ALARM for that condition.

Figure 38. SCIU Card Switches

Table S. SCIU Option Settings

SECTION	SETTING	RESULT
SWITCH SW1		
HI SLIP MAJ	ON	Major alarm
HI SLIP MIN	OFF	
HI SLIP MAJ	OFF	Minor alarm
HI SLIP MIN	ON	
HI SLIP MAJ	OFF	No alarm (Factory setting)
HI SLIP MIN	OFF	
SLIP MAJ	ON	Major alarm
SLIP MIN	OFF	
SLIP MAJ	OFF	Minor alarm
SLIP MIN	ON	
SLIP MAJ	OFF	No alarm (Factory setting)
SLIP MIN	OFF	
WARN MAJ	ON	Major alarm
WARN MIN	OFF	
WARN MAJ	OFF	Minor alarm
WARN MIN	ON	
WARN MAJ	OFF	No alarm (Factory setting)
WARN MIN	OFF	
DS1A MAJ	ON	Major alarm
DS1A MIN	OFF	
DS1A MAJ	OFF	Minor alarm
DS1A MIN	ON	
DS1A MAJ	OFF	No alarm (Factory setting)
DS1A MIN	OFF	
DS1B MAJ	ON	Major alarm
DS1B MIN	OFF	
DS1B MAJ	OFF	Minor alarm
DS1B MIN	ON	
DS1B MAJ	OFF	No alarm (Factory setting)
DS1B MIN	OFF	
<p>Note: It is recommended the WARN option not be set for alarm activation. If set for alarm activation, the alarm cannot be retired with the RESET button. The WARN alarm is associated with the 128 lamp.</p>		

Table S. SCIU Option Settings (Contd)

SECTION	SETTING	RESULT
SWITCH SW3 (Note 1)		
LBO A - 130	OFF	0 m - 40 m (0 ft - 130 ft)
LBO A - 260	OFF	40 m - 80 m (130 ft - 260 ft)
LBO A - 400	OFF	80 m - 120 m (260 ft - 400 ft)
LBO A - 530	OFF	120 m - 160 m (400 ft - 530 ft)
LBO A - 650	OFF	160 m - 200 m (530 ft - 650 ft)
LBO B - 130	OFF	0 m - 40 m (0 ft - 130 ft)
LBO B - 260	OFF	40 m - 80 m (130 ft - 260 ft)
LBO B - 400	OFF	80 m - 120 m (260 ft - 400 ft)
LBO B - 530	OFF	120 m - 160 m (400 ft - 530 ft)
LBO B - 650	OFF	160 m - 200 m (530 ft - 650 ft)
<p>Note 1: Only one LBO A switch can be in the up position at the same time, and only one LBO B switch can be in the up position at the same time. Note 2: Factory settings for SW1 and SW3 are OFF.</p>		
SWITCH SW4		
0 / ALL 1	See Table T	
ESF / D4	ON	D4 (SF) Framing
	OFF	ESF Framing
TERM / BRDG	ON	Bridging mode
	OFF	Terminated mode
OFF / OPT1	See Table T	

Table T. SCIU SW4 Section 0 / ALL 1 and OFF / OPT1 Settings

SECTION	LABEL	SETTING	RESULT	
			INPUT LOS	INPUT OOF
1	0 / ALL 1	OFF	LOS output	LOS output
4	OFF / OPT1	OFF		
1	0 / ALL 1	OFF	LOS output	Received signal output
4	OFF / OPT1	ON		
1	0 / ALL 1	ON	Framed all-ones output	Framed all-ones output
4	OFF / OPT1	OFF		
1	0 / ALL 1	ON	Framed all-ones output	Received signal output
4	OFF / OPT1	ON		

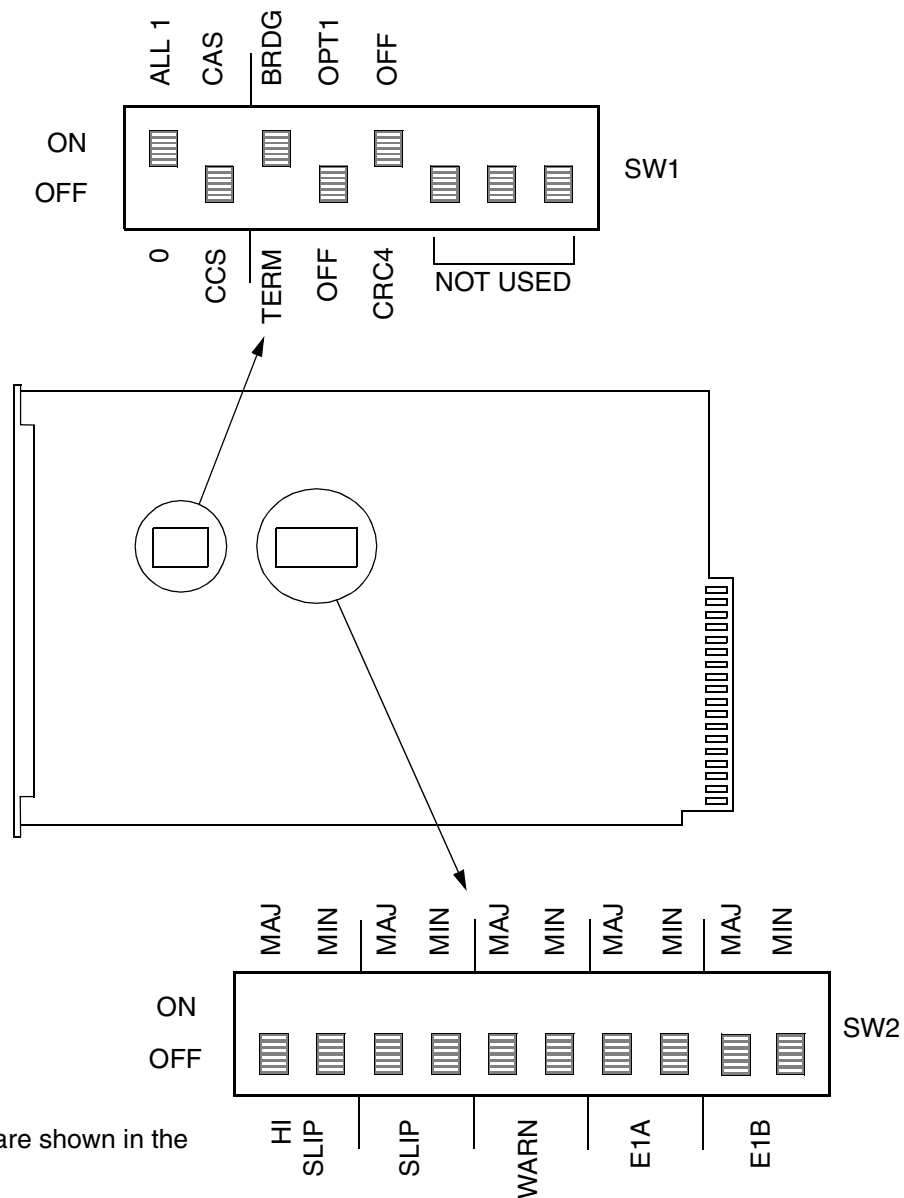
Note: Factory settings for SW4: Section 1 (0/ALL 1) and section 2 (ESF/D4) are ON; section 3 (TERM/BRDG) and section 4 (OFF/OPT 1) are OFF.

Table U. SCIU or ESCIU Wire-Wrap Connections

WIRE-WRAP LEADS		CONNECTION	LEAD	WIRE-WRAP LEADS		CONNECTION	LEAD
OUTPUT	PIN			OUTPUT	PIN		
1	T R S	B OUT	T R S	6	T R S	UNIT FAIL	SI RTN
2	T R S	A IN	T R S	7	T R S	DS1/E1 B FAIL	SI RTN
3	T R S	WARNING	SI RTN	8	T R S	DS1/E1 A FAIL	SI RTN
4	T R S	SLIP	SI RTN	9	T R S	B IN	T R S
5	T R S	—	—	10	T R S	A OUT	T R S

Legend: T=Tip R=Ring C=Digital Ground S=Shield Ground* D+=Data, +422 D- =Data, -422 D=Data, 423

* 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.



Note: All switches are shown in the factory-set position.

Notes:

1. See Table V for the ESCIU card option switch settings.
2. Factory settings for SW1: 0 / ALL 1, TERM/BRDG, and CRC4 are ON; CCS/CAS, OFF/OPT 1, and the three switches not used are set to OFF.
3. Factory settings for SW2: All are set to OFF.
4. On SW1, MAJ and MIN switch positions for each alarm (HI SLIP, SLIP, E1A, and E1B) are mutually exclusive – one ON and the other OFF – or both OFF for NO ALARM for that condition.

Figure 39. ESCIU Card Switches

Table V. ESCIU Option Settings

SECTION	SETTING	RESULT
SWITCH SW1		
0 / ALL 1	See Table W (Factory set to ON)	
CCS/ CAS	ON	CAS Framing
	OFF	CCS Framing (Factory setting)
TERM / BRDG	ON	Bridging mode (Factory setting)
	OFF	Terminated mode
OFF OPT1	See Table W (Factory set to OFF)	
CRC4	ON	CRC Disabled (Factory setting)
	OFF	CRC Enabled
6	Not allowed (Factory set to OFF)	
7		
8		
SWITCH SW2		
HI SLIP MAJ	ON	Major alarm
HI SLIP MIN	OFF	
HI SLIP MAJ	OFF	Minor alarm
HI SLIP MIN	ON	
HI SLIP MAJ	OFF	No alarm (Factory setting)
HI SLIP MIN	OFF	
SLIP MAJ	ON	Major alarm
SLIP MIN	OFF	
SLIP MAJ	OFF	Minor alarm
SLIP MIN	ON	

Table V. ESCIU Option Settings (Contd)

SECTION	SETTING	RESULT
SWITCH SW2 (Contd)		
SLIP MAJ	OFF	No alarm (Factory setting)
SLIP MIN	OFF	
WARN MAJ	ON	Major alarm
WARN MIN	OFF	
WARN MAJ	OFF	Minor alarm
WARN MIN	ON	
WARN MAJ	OFF	No alarm (Factory setting)
WARN MIN	OFF	
E1A MAJ	ON	Major alarm
E1A MIN	OFF	
E1A MAJ	OFF	Minor alarm
E1A MIN	ON	
E1A MAJ	OFF	No alarm (Factory setting)
E1A MIN	OFF	
E1B MAJ	ON	Major alarm
E1B MIN	OFF	
E1B MAJ	OFF	Minor alarm
E1B MIN	ON	
E1B MAJ	OFF	No alarm (Factory setting)
E1B MIN	OFF	
Note: It is recommended the WARN option not be set for alarm activation. If set for alarm activation, the alarm cannot be retired with the RESET button. The WARN alarm is associated with the 128 lamp.		

Table W. ESCIU SW1 Section 0/ALL 1 and OFF/OPT1 Settings

SECTION	LABEL	SETTING	RESULT	
			INPUT LOS	INPUT OOF
1	0 / ALL 1	OFF	LOS output	LOS output
4	OFF / OPT1	OFF		
1	0 / ALL 1	OFF	LOS output	Received signal output
4	OFF / OPT1	ON		
1	0 / ALL 1	ON	Framed all-ones output (Factory setting)	Framed all-ones output (Factory setting)
4	OFF / OPT1	OFF		
1	0 / ALL 1	ON	Framed all-ones output	Received signal output
4	OFF / OPT1	ON		

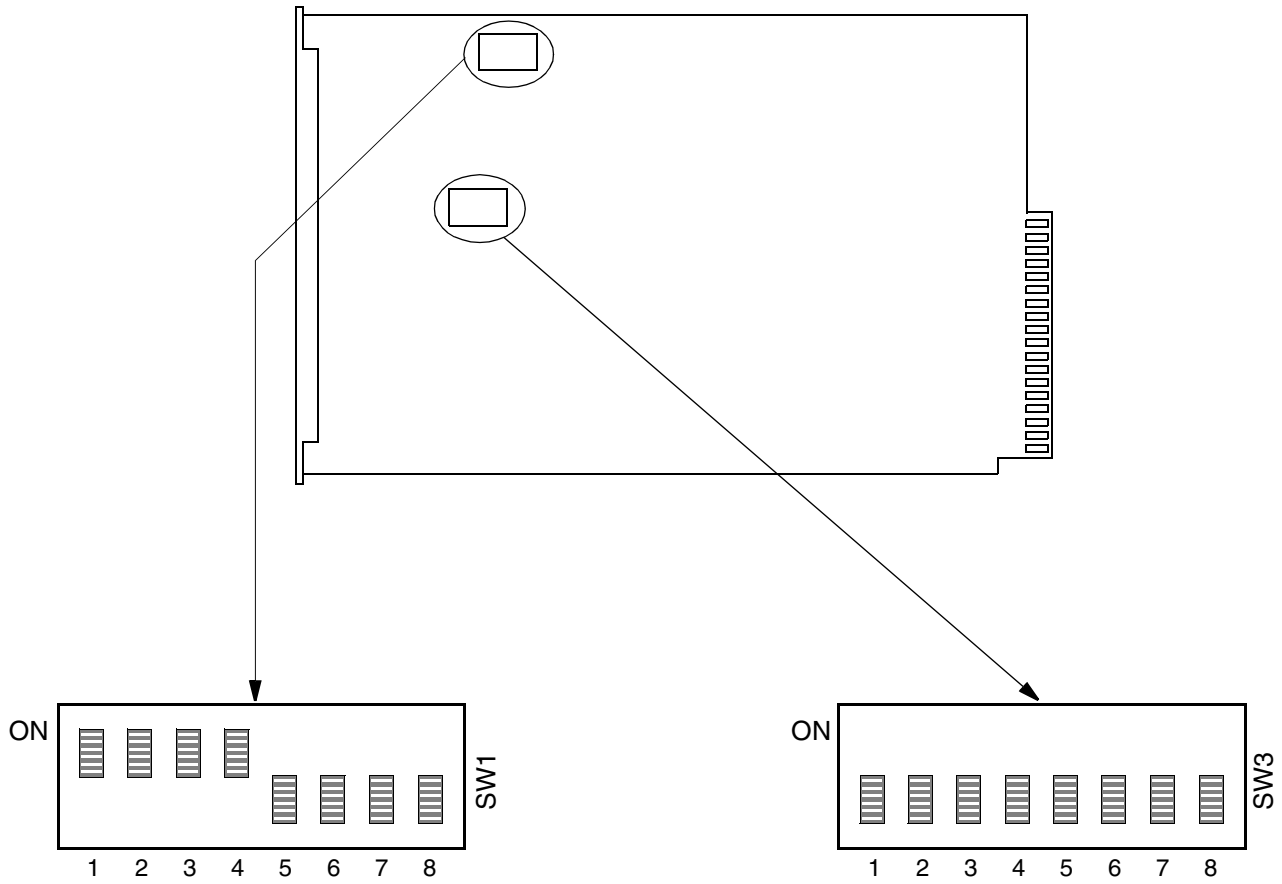
Note: Factory settings for SW4: Section 1 (0/ALL 1) and section 2 (ESF/D4) are ON; section 3 (TERM/BRDG) and section 4 (OFF/OPT 1) are OFF.

Chart 29. PSM Card Test

STEP	PROCEDURE
	<p>Use this procedure to test PSM cards. This procedure requires that communications have been established with a computer terminal per Chart 3, Chart 4, or Chart 5.</p> <p>Test Equipment: Optional: E1 and T1 test set, or BERTS</p>
1	On the PSM card, set sections 1 through 4 of switch SW1 (Figure 40) to the ON position.
2	Set switch SW3 (Figure 40) to accept the framing for the input reference signal.
3	<p>Insert the PSM card into the appropriate shelf slot and wait 2 minutes.</p> <p>Notes:</p> <ol style="list-style-type: none"> 1. No more than two nonstandard PSM cards may be installed in any one shelf, and no more than seven may be installed in any one system. The number of standard PSM cards in a system is limited only by the number of slots. 2. During the 2 minutes after insertion, the PSM card performs a lamp test. <p>Requirement: After the signals have been qualified, the FAIL lamp is off. The REF lamps are lit red for the enabled (but not yet connected) inputs. The TOL lamps are off. The ST and INP lamps are lit green.</p>
4	Repeat Steps 1 through 3 for each remaining PSM card to be installed in the system.
5	<p>Temporarily connect one known good timing signal with framing (ST3 [LNC] or better quality, 0 db signal strength) to PSM port 1 at the interface module and wait 2 minutes.</p> <p>Notes:</p> <ol style="list-style-type: none"> 1. Timing signals that are assumed to be good are those from an E1 or T1 test set, such as a BERTS. Another source of timing signals assumed to be good is an E1 or T1 output from a DCD Shelf that is equipped with a reference input, two clock input cards, two clock cards, and an appropriate timing output card, all of which have been tested. 2. All four PSM card inputs are to be tested. The cables must be disconnected and reconnected during this procedure. <p>Requirement: REF lamp 1 is lit green.</p>
6	Repeat Step 5 with the other the PSM input ports.
7	Remove all temporary input timing signals connected in the previous steps.
8	Set switches SW1 and SW3 on the PSM card according to the Installation Job Specifications.

Chart 29. PSM Card Test (Contd)

STEP	PROCEDURE
9	If an SAI card or a nonstandard MIS card is installed in the shelf, skip this step. Refer to the Operations or User's Guide manuals that were supplied with the MIS card that is installed in the shelf to enter the card into service and perform other required functions.
10	Repeat Steps 1 through 9 for each remaining PSM card to be installed in the system.
11	If an SAI card is installed in the shelf, skip this step. Use the INIT-REG command for every MRC and PSM card in the shelf. This initializes all registers on the shelf. Requirement: The response indicates the command was completed successfully.
12	This procedure is complete. Indicate completion of the PSM Card Test on the Test Sign-off form.



Note: All switches are shown in the factory-set position.

Note: Refer to Table X or Table Y for SW1 settings, and Table Z or Table AA for SW3 switch settings.

Figure 40. PSM Card Switches

Table X. PSM-T and PSM-E Card Switch SW1 Settings

SECTION	POSITION	MEANING	FACTORY SETTING
1	ON	Input 1 enabled	X
	OFF	Input 1 disabled	—
2	ON	Input 2 enabled	X
	OFF	Input 2 disabled	—
3	ON	Input 3 enabled	X
	OFF	Input 3 disabled	—
4	ON	Input 4 enabled	X
	OFF	Input 4 disabled	—
Note: Sections 5, 6, 7, and 8 are not used.			

Table Y. PSM-EA Card Switch SW1 Settings

SECTION	POSITION	MEANING	FACTORY SETTING
1	ON	Input 1 enabled	X
	OFF	Input 1 disabled	—
2	ON	Input 2 enabled	X
	OFF	Input 2 disabled	—
3	ON	Input 3 enabled	X
	OFF	Input 3 disabled	—
4	ON	Input 4 enabled	X
	OFF	Input 4 disabled	—
5	ON	Analog signal	—
	OFF	E1 signal	X
6	ON	Analog signal	—
	OFF	E1 signal	X
7	ON	Analog signal	—
	OFF	E1 signal	X
8	ON	Analog signal	—
	OFF	E1 signal	X

Table Z. PSM-T Card Switch SW3 Settings

SECTION/SETTING	MEANING	FACTORY SETTING
1 = ON, 2 = ON	Autoframing on input 1 enabled	—
1 = ON, 2 = OFF	ESF framing on input 1 enabled	—
1 = OFF, 2 = ON	D4 framing on input 1 enabled	—
1 = OFF, 2 = OFF	Autoframing on input 1 enabled	X
3 = ON, 4 = ON	Autoframing on input 2 enabled	—
3 = ON, 4 = OFF	ESF framing on input 2 enabled	—
3 = OFF, 4 = ON	D4 framing on input 2 enabled	—
3 = OFF, 4 = OFF	Autoframing on input 2 enabled	X
5 = ON, 6 = ON	Autoframing on input 3 enabled	—
5 = ON, 6 = OFF	ESF framing on input 3 enabled	—
5 = OFF, 6 = ON	D4 framing on input 3 enabled	—
5 = OFF, 6 = OFF	Autoframing on input 3 enabled	X
7 = ON, 8 = ON	Autoframing on input 4 enabled	—
7 = ON, 8 = OFF	ESF framing on input 4 enabled	—
7 = OFF, 8 = ON	D4 framing on input 4 enabled	—
7 = OFF, 8 = OFF	Autoframing on input 4 enabled	X

Table AA. PSM-E and PSM-EA Card Switch SW3 Settings

SECTION	POSITION	MEANING	FACTORY SETTING
1	ON	CAS multiframing on input 1 enabled	—
	OFF	CCS multiframing on input 1 enabled	X
2	ON	CRC4 multiframing on input 1 enabled	—
	OFF	CRC4 multiframing on input 1 disabled	X
3	ON	CAS multiframing on input 2 enabled	—
	OFF	CCS multiframing on input 2 enabled	X
4	ON	CRC4 multiframing on input 2 enabled	—
	OFF	CRC4 multiframing on input 2 disabled	X
5	ON	CAS multiframing on input 3 enabled	—
	OFF	CCS multiframing on input 3 enabled	X
6	ON	CRC4 multiframing on input 3 enabled	—
	OFF	CRC4 multiframing on input 3 disabled	X
7	ON	CAS multiframing on input 4 enabled	—
	OFF	CCS multiframing on input 4 enabled	X
8	ON	CRC4 multiframing on input 4 enabled	—
	OFF	CRC4 multiframing on input 4 disabled	X

Chart 30. MIS Card System Management Setup

STEP	PROCEDURE
	<p>Use this procedure to set up the card databases for a shelf that contains a 090-45018-05 MIS card as installed and tested in Chart 3 or a 090-45018-25 MIS card as installed and tested in Chart 4. The standard system uses this information for system management.</p> <p>Note: See the TL1 User's Guide for instructions about commands indicated in this procedure.</p>
1	<p>If SW1 on the MIS card conforms to the requirements for this installation, skip this step. Remove the MIS card, set the sections on SW1 to the required positions, and replace the MIS card.</p> <p>Requirement: On the MIS card (after the lamp test), the FAIL lamp is off, the MAJOR lamp is off, and the MINOR lamp flashes for up to 3 minutes before turning off.</p>
2	<p>If section 4 of SW1 is in the down (off) position, skip this step. Use the ACT-USER command to log on to the MIS card.</p> <p>Requirement: The user is logged on.</p>
3	<p>Use the INIT-SYS command with the appropriate <ph> value (see below and the TL1 User's Guide packaged with the appropriate software).</p> <p>If <ph> is 3:</p> <ul style="list-style-type: none"> • Deletes all card information from the database • Retains all security information as previously entered, including the users and passwords • Retains the source ID (SID) as previously entered • Retains all communication parameters as previously entered <p>If <ph> is 9:</p> <ul style="list-style-type: none"> • Deletes all card information from the database • Resets all security information to the factory settings • Resets the source ID (SID) to the factory settings, including only one user named "super" with a password of "sparky" • Resets all communication parameters to factory settings <p>Requirement: After up to 5 minutes, the response includes COMPLD.</p>
4	<p>Caution: Use the following command to transfer information in the direction indicated. Transferring configuration information to cards that are in service may interrupt service.</p> <p>Use the COPY-MEM command from the shelf to the MIS card to gather configuration information from the standard cards in the DCD-523 Shelf, and any GTI cards in an associated DCD-LPR Shelf.</p> <p>Requirement: The response includes COMPLD.</p>

Chart 30. MIS Card System Management Setup (Contd)

STEP	PROCEDURE
5	<p>Use the INIT-REG command for every MRC and PSM card in the shelf. This initializes all registers on the shelf.</p> <p>Requirement: The response includes COMPLD.</p>
6	<p>Refer to the Operations section of the TL1 User's Guide for the steps to put the equipment into service and into the database.</p>
7	<p>If section 4 of SW1 is in the down (off) position, skip this step. Use the CANC-USER command to log off of the MIS card.</p> <p>Requirement: The user is logged off.</p>
8	<p>This procedure is complete. Indicate completion of the MIS Card System Management Setup on the Test Sign-off form.</p>

Table AB. Test Sign-off

CHART #	TEST	COMPLETED
The test and acceptance procedures listed in this section are recommended guidelines. The Test Sign-off form is for customer use only. Use a check mark or initials beside each individual test after test is completed. When all tests have been completed, sign and date at the bottom, and file locally, as per local company practice.		
1	Power Test	
2	Amplitude Verification Test	
3	090-45018-05 MIS Card Test	
4	090-45018-25 MIS Card Test	
5	090-45018-04 or 090-45018-14 MIS Card Test	
6	SAI Card Test	
7	MRC Card Test	
8	ACI Card Test	
9	CI-EA Card Test	
10	CI Card Test	
11	DCIM-EA or DCIM-T Card Test	
12	ST2E or TNC-E Card Test	
13	ST2 Card Test	
14	ST3E, TNC, or LNC Card Test	
15	ST3E Card Test	
16	ST2E or TNC-E with ST3E, TNC, or LNC Card Test	
17	ST2E or TNC-E with ST3E Card Test	
18	ST3 Card Test	
19	MCA-5 or MCA-5M Card Test	
20	EA10 or EA10M Card Test	
21	TOAA, TOLA, and TOTL Card Test	
22	TOCA, TOEA, and TOTA Card Test	
23	TO-EA Card Test	
24	TO-EAN Card Test	
25	TO-EA5 Card Test	
26	TOTA-5 or TOTA-M Card Test	

Table AB. Test Sign-off (Contd)

CHART #	TEST	COMPLETED
27	TOGA Card Test	
28	SCIU or ESCIU Card Test	
29	PSM Card Test	
30	MIS Card System Management Setup	

DCD-523 Test and Acceptance completed by: _____

Date: _____

Comments: