

DIGITAL CLOCK DISTRIBUTOR

521 CE MARK COMPLIANT HIGH DENSITY

MAINTENANCE

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1. DCD-521/C HD Shelf Switches, Terminals, and Connectors	16	1.01 This manual provides maintenance procedures for the Digital Clock Distributor 521 CE Mark Compliant High Density (DCD-521/C HD) System.	
2. MIS/C Card Controls and Indicators	34	1.02 This section was reissued to add information to Figure 18. Changes and additions are marked by change bars.	
3. ACI/C Card Controls and Indicators	35	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.	
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1.04 The following acronyms are used in this document:

ACO	alarm cutoff
DCD	Digital Clock Distributor
E1	European Signal, Level 1 (2.048 Mb/s)
LNC	Local Node Clock
LOS	loss of signal
MTIE	maximum time interval error
TNC	Transit Node Clock
TO	timing output card or slot

Notes:

1. Where information is common to the MRC-EA/C, MRC-EA/C^{V5}, CI-EA/C, DCIM-EA/C, and ACI/C cards, these cards are collectively referred to as clock input cards.
2. MRC-EA/C and MRC-EA/C^{V5} cards are sometimes referred to as MRC/C cards.
3. Where information is common to the PSM-EA/C, PSM-EA/C^{V5}, PSM-E/C, and PSM-E/C^{V5} cards, these cards are collectively referred to as PSM/C cards.
4. Where information is common to the TNC-E/C and TNC/C cards, these cards are collectively referred to as clock cards.
5. Where information is common to the EA10/C, EA20/C, EA10M/C, and EA20M/C cards, these cards are collectively referred to as EA/C cards.
6. Wire gauge size is listed in wire diameter in mils and mm with the American Wire Gauge (AWG) designation in parenthesis.

1.05 The DCD-521/C HD System consists of a single universal shelf that can serve as either a master or an expansion shelf. For this reason, the term “expansion shelf” in this document refers to the DCD-521/C HD universal shelf used as an expansion shelf, and the term “master shelf” refers to the DCD-521/C HD universal shelf used as a master shelf.

1.06 The DCD-521/C HD conforms to the European Standards EN55022, EN50082-1, and EN60950, and carries the CE Mark certification.

1.07 If problems are encountered when performing any of the procedures listed in this document, or if the 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 Symmetricom’s Inside Sales in the U.S.A.:

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

2. PREVENTIVE MAINTENANCE

2.01 The DCD-521/C HD System does not require preventive maintenance.

3. TROUBLESHOOTING

A. Troubleshooting Considerations

3.01 Most alarm conditions in the DCD-521/C HD System are not out-of service or service-affecting conditions. The system is designed with redundant power, reference inputs, clock input cards, clock cards and output card protection switching.

3.02 The only true out-of-service condition for the shelf is when ALL power is lost to a shelf, or ALL reference inputs AND both clock cards fail. In most cases, these two conditions are caused by operating errors from hasty attempts at troubleshooting alarm conditions in the system before proper alarm analysis is performed.

3.03 The only true out-of-service condition for an individual timing output card is if a stand-alone timing output card fails, or if both cards in a redundant pair fail. In either case, the card may not be at fault. Compare the condition of all the lamps on the shelf with the conditions identified in the alarm conditions tables before replacing the card.

3.04 Before taking any action on the system, such as removing cards, first consider the following guidelines for troubleshooting the DCD System:

1. **DO** write down any alarm and normal lamp conditions in the shelf. These help you to determine where to look for the cause of the condition.
2. **DO** determine if any network elements (NE) being timed from the DCD System are in alarm, or reporting slips.
3. **DO** use the DCD System manual and available job aids to assist you.
4. **DO NOT** touch the shelf until you have analyzed the condition and know the possible result of any planned corrective actions.
5. **DO NOT PANIC!** Both major and minor alarms in the shelf require immediate attention. But very few alarms in the DCD System affect service. **IMPROPER** corrective actions could disrupt service.
6. **DO NOT** touch the shelf until you have been properly grounded.
7. **DO** take your time. An operating error can affect **ALL** network elements in the office.
8. **DO NOT** remove a clock card from the shelf unless you are certain it is the cause of the condition. This is especially true if the clock card is in the Holdover mode (its HOLD OV lamp is lit). Removal of both clock cards in this condition causes total loss of all outputs from the system.
9. **DO** contact your supervisor, technical support and/or Symmetricom if you are not sure what to do.
10. **DO** follow proper electrostatic discharge (ESD) precautions when handling DCD shelf cards. This includes, but is not limited to:
 - Wearing a properly grounded and tested wrist strap when handling cards.
 - Storing DCD cards only in antistatic packaging provided by the factory.

B. Trouble Isolation

3.05 The DCD-521/C HD System MIS/C card always generates contact closures for MAJOR and/or MINOR alarms (both Office Alarm and Shelf Status [remote] contact closures are activated) for abnormal conditions in the shelf. In addition, Shelf Status PRTA (Port Alarm), CLKL (Clock Loss), BATTALM (Battery Alarm), and Clock Status A and B indicators are activated to assist in trouble isolation and repair.

3.06 When a system alarm is generated, the audible office alarm is activated. Press the Alarm Cutoff (ACO) pushbutton on the MIS/C card, in the DCD shelf with the alarm, to silence the office audible alarm. The ACO does not deactivate the office visual alarm or any remote alarms. The ACO automatically resets when the alarm condition is cleared or when another type of alarm is generated. For example, if a MINOR alarm was previously acknowledged (ACO pressed) and a new MAJOR alarm is generated, then the ACO resets (the ACO lamp goes off) and the office audible alarm sounds again.

3.07 Before replacing cards, write down all abnormal and normal lamp conditions for the shelf with the alarm lamp lit on its MIS/C card. This assists in isolating the cause of the condition.

3.08 When isolating clock card and clock input card faults, refer to Tables A and C. When the condition has been identified, the corrective action is listed in Tables B and D. Use Figure 1 to assist in locating shelf backplane switches, terminals and connectors.

Use Figures 2 through 22 to assist in interpreting the shelf and card lamp indications.

3.09 When isolating faults at the shelf, the ABNORMAL CARD LAMPS columns in Tables A and C identify fault conditions. When identifying faults from a remote location, the ACTIVATED OFFICE ALARMS AND SHELF STATUS and ACTIVATED CLOCK STATUS A and B columns in Tables A and C identify fault conditions.

3.10 The numbers in the CONDITION TYPE # column in Tables A and C match the numbers in the CONDITION TYPE # column in Tables B and D, where corrective actions are listed to correct the fault.

3.11 Use Table A to isolate faults in master shelves equipped with TNC-E/C clock cards with input and clock alarm conditions. Table B lists corrective actions.

3.12 Use Table C to isolate faults in master shelves equipped with TNC/C clock cards with input and clock alarm conditions. Table D lists corrective actions.

3.13 Use Table E to isolate and correct faults that are not related to input and clock alarm conditions.

3.14 Use Table F to isolate and correct faults in EA10/C, EA20/C, EA10M/C, or EA20M/C cards.

3.15 If the fault is determined to be a defective card, perform the appropriate card replacement procedure in this manual.

Table A. Input and TNC-E/C Alarm Conditions

MIS/C LAMPS	ABNORMAL CARD LAMPS	ACTIVATED OFFICE ALARMS AND SHELF STATUS	ACTIVATED CLOCK STATUS A AND B	CONDITION TYPE # (FOR USE IN TABLE B)
Note: For MRC/C or DCIM-EA/C cards, all REF lights are red.				
None lit	TNC-E/C A and/or TNC-E/C B = Only HOLDOVER (green) and ACTIVE (green) lit	None	TNC A = LOCK and FREERUN and/or TNC B = LOCK and FREERUN	1
None lit	TNC-E/C A and/or TNC-E/C B = LKD off	None	TNC A = LOCK and/or TNC B = LOCK	2
CRITICAL (MIS/C only), MAJOR, and MINOR lit (Note)	Input cards A and B = FAIL or REF lit, frequency/bit rate lamp off, SR FL lit (AC/C only) TNC-E/C A and B = HOLDOVER flashing green ALL TO cards = FAIL lit, ST and INPUT off. Option lamps are all off or all on	Audible and Visual = MAJOR, MINOR, and CRITICAL (MIS/C only) Shelf Status = MAJSI, MINSI, CRTSI (MIS/C only), and CLKL	TNC A = LOCK and FREERUN on and off (flashing) and/or TNC B = LOCK and FREERUN on and off (flashing)	3
MINOR lit	TNC-E/C A and B = INP TOL (red), LKD and ACTIVE (green) lit, SRC A or B lit red	Audible and Visual = MINOR Shelf Status = MINSI	TNC A = INPTOL and LOCK and TNC B = INPTOL and LOCK	4
MINOR lit	TNC-E/C A and/or B = DRIFT lit. SRC A and/or B flashing green	Audible and Visual = MINOR Shelf Status = MINSI	TNC A = UN LOCK and/or TNC B = UNLOCK	5

Table A. Input and TNC-E/C Alarm Conditions (Contd)

MIS/C LAMPS	ABNORMAL CARD LAMPS	ACTIVATED OFFICE ALARMS AND SHELF STATUS	ACTIVATED CLOCK STATUS A AND B	CONDITION TYPE # (FOR USE IN TABLE B)
MINOR lit (Note)	Input cards A and B = FAIL or REF lit, frequency/bit rate lamp off, SR FL lit (ACI/C only) TNC-E/C A and B = HOLDOVER (red) and ACTIVE (green) lit, LKD and SRC A and B off	Audible and Visual = MINOR Shelf Status = MINSI and CLKL	TNC A = LOCK and HOLDOVER and TNC B = LOCK and HOLDOVER	6
MINOR lit (Note)	Input cards A and B = FAIL or REF lit, frequency/bit rate lamp off, SR FL lit (ACI/C only) TNC-E/C A = SRC B lit if input card A FAIL lamp lit, possibly LKD off. TNC-E/C B = SRC A lit if input card B FAIL lamp lit, possibly LKD off.	Audible and Visual = MINOR Shelf Status = MINSI and CLKL	TNC A = possibly LOCK or TNC B = possibly LOCK	7
MAJOR lit	TNC-E/C A or B = FAIL lit. LKD and possibly SRC A and B off, OSC lit red	Audible and Visual = MAJOR Shelf Status = MAJSI	TNC A = LOCK or TNC B = LOCK	8

Table B. Input and TNC-E/C Corrective Actions

CONDITION TYPE # (FROM TABLE A)	CONDITION AND PROBABLE CAUSE	CORRECTIVE ACTIONS
1	No input cards installed. Outputs are as accurate as the freerunning clock cards.	Install at least one input card (Charts 1 through 2).
2	In a 10 second to 5 minute period, the input reference has drifted out of spec. TNC-E/C is trying to reconverge and lock to the input reference. If successful, its LKD lamp will light. If not, it will try to converge until its pull-in range is exceeded, which causes the INP TOL alarm and enters HOLD OVER mode (CONDITION TYPE #4). Does not affect outputs.	May have been a phase transient on input reference. Wait 5 minutes to 20 minutes to see if the TNC-E/C card's LKD lamp lights. If not, isolate and repair input reference facility.
3	Input reference A and B failed and the TNC-E/C A and B clock cards have recently (5 minutes to 60 minutes) been removed and then reseated. All outputs are squelched.	Check input reference connections at the shelf and source ends. Reconnect if required. Isolate and repair input reference facilities, if required.
		Wait for TNC-E/C A and B to stabilize and come on-line.
4	The SRC A or B lamps lit red on both TNC-E/C cards, indicates which input source has excessive jitter, wander, or severe frequency offset (out of pull-in range of TNC-E/C cards).	Fix input source facility for the TNC-E/C with its INP TOL and HOLD OV/HOLDOVER lamps lit.
5	Input reference A and/or B rate of frequency change, compared to TNC-E/C output has exceeded the Drift specification. The green flashing SRC (A and/or B) lamp(s) indicates which input reference is drifting.	Isolate and repair the input reference (A and/or B) facility (the one associated with the green flashing SRC [A and/or B] lamp).

Table B. Input and TNC-E/C Corrective Actions (Contd)

CONDITION TYPE # (FROM TABLE A)	CONDITION AND PROBABLE CAUSE	CORRECTIVE ACTIONS
6	All A and B input sources have failed.	Check input reference connections at the shelf and source ends. Reconnect if required. Isolate and repair input reference facilities, if required.
	The input reference facility framing format rearranged from CCS to CAS, or vice versa, and the input card options were not changed to match it.	Change the option switch settings to match the current framing format of the input reference facilities.
	The input reference has been recently re-assigned, and the signal amplitude is too high.	Wire a 100 Ω , 1/4 W resistor across T and R input terminals on the shelf backplane.
	Both input cards have failed.	Replace both input cards (Charts 1 through 2).
7	All input references for A or B have failed (frequency/bit rate lamp off) or has exceeded BPV, OOF, or excessive zeros parameters (frequency/bit rate lamp lit). Note: TNC-E/C card's LKD lamp will be off if TNC-E/C card is still converging on new input reference.	Check input reference connections at the shelf and source ends. Reconnect if required. Isolate and repair input reference A or B facility (one associated with the input card displaying a lit FAIL lamp).
	Input card A or B has failed. Note: TNC-E/C card's LKD lamp will be off if TNC-E/C card is still converging on new input reference.	Replace the input card with the FAIL lamp lit (Charts 1 through 2).
	The input reference facility framing format rearranged from CCS to CAS, or vice versa, and the input card options were not changed to match it.	Change the option switch settings to match the current framing format of the input reference facilities.
	The input reference has been recently re-assigned, and the signal amplitude is too high.	Wire a 100 Ω , 1/4 W resistor across T and R input terminals on the shelf backplane.
8	TNC-E/C A or B card has failed	Replace failed TNC-E/C card (Chart 3).

Table C. Input and TNC/C Alarm Conditions

MIS/C LAMPS (NOTE 1)	ABNORMAL CARD LAMPS	ACTIVATED OFFICE ALARMS AND SHELF STATUS (NOTE)	ACTIVATED CLOCK STATUS A AND B	CONDITION TYPE # (FOR USE IN TABLE D)
<p>Notes:</p> <p>1. If SW1 position 5 on either TNC/C card is set for MAJ, it will cause MAJOR and MINOR alarm conditions when its HOLD OV lamp is lit. Both TNC/C cards' SW1 switches must be set to MIN to cause only a MINOR alarm condition when the TNC/C card's HOLD OV lamp is lit.</p> <p>2. For MRC/C or DCIM-EA/C cards, all REF lights are red.</p>				
None lit	TNC/C A and/or TNC/C B = Only FREE RUN and ACTIVE lit	None	TNC A = LOCK and FREERUN and/or TNC B = LOCK and FREERUN	1
None lit	TNC/C A and/or TNC/C B = LOCKED off	None	TNC A = LOCK and/or TNC B = LOCK	2
CRITICAL (MIS/C only), MAJOR, and MINOR lit (Note 2)	Input cards A and B = FAIL or REF lit, frequency/bit rate lamp off, SR FL lit (ACI/C only) TNC/C A and B = FREE RUN flashing, ACTIVE and LOCKED are off ALL TO cards = FAIL lit, ST and INPUT off. Option lamps are all off or all on	Audible and Visual = MAJOR, MINOR, and CRITICAL (MIS/C only) Shelf Status = MAJSI, MINSI, CRTSI (MIS/C only), and CLKL	TNC A = LOCK on, and FREERUN on and off (flashing) and/or TNC B = LOCK on, and FREERUN on and off (flashing)	3
MINOR lit	TNC/C A and B = INP TOL and HOLD OV lit, LOCKED off	Audible and Visual = MINOR Shelf Status = MINSI and CLKL (SW1, position 5 on each TNC/C set to MIN)	TNC A = INPTOL, HOLDOVER, and LOCK and TNC B = INPTOL, HOLDOVER, and LOCK	4
MINOR lit	TNC/C A or B = INP TOL and HOLD OV lit, LOCKED off	Audible and Visual = MINOR Shelf Status = MINSI and CLKL (SW1, position 5 on each TNC/C set to MIN)	TNC A = INPTOL, HOLDOVER, and LOCK or TNC B = INPTOL, HOLDOVER, and LOCK	5

Table C. Input and TNC/C Alarm Conditions (Contd)

MIS/C LAMPS (NOTE 1)	ABNORMAL CARD LAMPS	ACTIVATED OFFICE ALARMS AND SHELF STATUS (NOTE)	ACTIVATED CLOCK STATUS A AND B	CONDITION TYPE # (FOR USE IN TABLE D)
MINOR lit (Note 2)	Input cards A and B = FAIL or REF lit, frequency/bit rate lamp off, SR FL lit (ACI/C only) TNC/C A and B = HOLD OV lit, LOCKED and REF A and B off	Audible and Visual = MINOR Shelf Status = MINSI and CLKL (SW1, position 5 on each TNC/C set to MIN)	TNC A = LOCK and HOLDOVER and TNC B = LOCK and HOLDOVER	6
MINOR lit (Note 2)	Input cards A and B = FAIL or REF lit, frequency/bit rate lamp off, SR FL lit (ACI/C only) TNC/C A and B = possibly LOCKED off	Audible and Visual = MINOR Shelf Status = MINSI and CLKL	TNC A = possibly LOCK and TNC B = possibly LOCK	7
MAJOR lit	TNC/C A or B = FAIL lit. LOCKED and possibly REF A and B off	Audible and Visual = MAJOR Shelf Status = MAJSI	TNC A = LOCK or TNC B = LOCK	8
MAJOR and MINOR lit	TNC/C A and B = INP TOL and HOLD OV lit, LOCKED off	Audible and Visual = MAJOR and MINOR Shelf Status = MAJSI, MINSI, and CLKL (SW1 position 5 on each TNC/C set to MAJ)	TNC A = INPTOL, HOLDOVER, and LOCK and TNC B = INPTOL, HOLDOVER, and LOCK	4
MAJOR and MINOR lit (Note 2)	Input cards A and B = FAIL or REF lit, frequency/bit rate lamp off, SR FL lit (ACI/C only) TNC/C A and B = HOLD OV lit, LOCKED and REF A and B off	Audible and Visual = MAJOR and MINOR Shelf Status = MAJSI, MINSI, and CLKL (SW1 position 5 on each TNC/C set to MAJ)	TNC A = LOCK and HOLDOVER and TNC B = LOCK and HOLDOVER	6

Table D. Input and TNC/C Corrective Actions

CONDITION TYPE # (FROM TABLE C)	CONDITION AND PROBABLE CAUSE	CORRECTIVE ACTIONS
1	No input cards installed. Outputs are as accurate as the freerunning clock cards.	Install at least one input card (Charts 1 through 2).
2	In a 10 second to 5 minute period, the input reference has drifted out of spec. TNC/C is trying to reconverge and lock to the input reference. If successful, its LOCKED lamp will light. If not, it will try to converge until its pull-in range is exceeded, which causes the INP TOL alarm and enters HOLD OVER mode (CONDITION TYPE #4). Does not affect outputs.	<p>May have been a phase transient on input reference. Wait 5 minutes to 20 minutes to see if the TNC/C card's LOCKED lamp lights. If not, isolate and repair input reference facility.</p> <p>If the TNC/C has been installed for less than 6 hours, then wait for the TNC/C to fully converge on the input reference. During this period, the LOCKED lamp may go on and off several times.</p>
3	Input reference A and B failed, and the TNC/C A and B clock cards have recently (5 minutes to 35 minutes) been removed and then resealed. All outputs are squelched.	<p>Check input reference connections at the shelf and source ends. Reconnect if required. Isolate and repair input reference facilities, if required.</p> <p>Wait for TNC/C A and B to stabilize and come online.</p>
4	The active input reference has excessive jitter, wander, or severe frequency offset (out of pull-in range of TNC/C cards). Does not affect outputs for several hours. Outputs are as accurate as clock in holdover mode.	<p>Press the transfer (XFR) pushbutton on either input card to switch source (SRC) active to the other input card (SRC ACT (EC/C or ACI/C) or SRC ACTIVE (MRC/C) lamp goes off on one input card and lights on the other). Then observe the INP TOL and HOLD-OVER lamps and perform one of the following:</p> <ol style="list-style-type: none"> 1. If the INP TOL and HOLD-OVER lamps on the TNC/C cards go off in approximately 2 minutes, then isolate and repair input reference facility, and/or replace the previously active input card (Charts 1 through 2). 2. If the INP TOL and HOLD-OVER lamps do not go off in approximately 2 minutes, then isolate and repair both input reference facilities, and/or replace both input cards (Charts 1 through 2).

Table D. Input and TNC/C Corrective Actions (Contd)

CONDITION TYPE # (FROM TABLE C)	CONDITION AND PROBABLE CAUSE	CORRECTIVE ACTIONS
5	One of the TNC/C cards is not functioning properly. Outputs are off frequency if the TNC/C A is not functioning properly.	Trial and error; replace TNC/C cards one at a time (Chart 4). Hint: If no network elements (NE) being timed from DCD outputs are reporting slips, then replace TNC/C B first. If NEs are reporting slips, then replace TNC/C A first.
6	All A and B input references have failed.	Check input reference connections at the shelf and source ends. Reconnect if required. Isolate and repair input reference facilities, if required.
	The A and B input reference facility framing format rearranged from CAS to CCS, or vice versa, and the input card options were not changed to match it.	Change the option switch settings to match the current framing format of the input reference facilities.
	The input reference has been recently reassigned, and the signal amplitude is too high.	Wire a 100 Ω , 1/4 W resistor across T and R input terminals on the shelf backplane.
	Both input cards have failed.	Replace both input cards (Charts 1 through 2).
7	Input reference A or B has failed (frequency/bit rate lamp off) or has exceeded BPV, OOF, or excessive zeros parameters (frequency/bit rate lamp lit). Note: TNC/C card's LOCKED lamp will be off if TNC/C card is still converging on new input reference.	Check input reference connections at the shelf and source ends. Reconnect if required. Isolate and repair input reference A or B facility (one associated with the input card displaying a lit FAIL lamp).
	Input card A or B has failed. Note: TNC/C card's LOCKED lamp will be off if TNC/C card is still converging on new input reference.	Replace the input card with the FAIL lamp lit (Charts 1 through 2).
	The A or B input reference facility framing format rearranged from CCS to CAS, or vice versa, and the input card options were not changed to match it.	Change the option switch settings to match the current framing format of the input reference facilities.
	The A or B input reference has been recently reassigned, and the signal amplitude is too high.	Wire a 100 Ω , 1/4 W resistor across T and R input terminals on the shelf backplane.
8	TNC/C A or B card has failed. Outputs are not affected.	Replace the failed TNC/C card (Chart 4).

Table E. Shelf and Output Alarm Conditions

MIS/C LAMPS	ABNORMAL SHELF AND CARD LAMPS	CONDITION AND PROBABLE CAUSE	CORRECTIVE ACTIONS
MINOR lit	Shelf fuse A or B lamp lit	Loss of Battery A or B to shelf. Does not affect outputs. Causes could be from operating error, blown fuse, or a component failure, e.g., isolation diode which shorts battery to battery return.	<ol style="list-style-type: none"> 1. Determine cause of loss of battery and repair. 2. Replace blown fuses in battery distribution bays, MIS/Ccellaneous fuse bays, and panels, and/or on DCD shelf.
MAJOR lit and/or MINOR lit	FAIL lamp lit on any TO card, MIS/C card, or clock card	Card with FAIL lamp lit has failed, except for input card which causes a minor alarm when its FAIL lamp lights. Outputs are not affected if redundant card is installed.	Replace the card with the FAIL lamp lit (Chart 1 through Chart 6, or Chart 9).
MAJOR and MINOR lit	Shelf fuse A or B lamp lit	Loss of Battery A or B to shelf. Does not affect outputs. Causes could be from operating error, blown fuse, or a component failure, e.g., isolation diode which shorts battery to battery return.	<ol style="list-style-type: none"> 1. Determine cause of loss of battery and repair. 2. Replace faulty items in battery distribution path to DCD shelf.
CRITICAL lit	All lamps on all cards except MIS/C are off	Loss of Battery A and B to shelf. All outputs are squelched. Causes could be from operating error, office battery source failure, blown fuses, or a component failure, e.g., isolation diode which shorts battery to battery return.	<ol style="list-style-type: none"> 1. Determine cause of loss of battery and repair. 2. Restore office battery source. 3. Replace faulty items in battery distribution path to DCD shelf.

Table F. EA10/C, EA20/C, EA10M/C, or EA20M/C Card Fault Isolation

MIS LAMPS	EA/C CARD LAMPS	FAULT CONDITION	CORRECTIVE ACTION
Notes: 1. Where information is common to the EA10/C, EA20/C, EA10M/C, and EA20M/C cards, these cards are collectively referred to as EA/C cards. 2. The EA/C cards can be configured to generate a minor or major alarm upon a PORT ALM condition, using the card switch or TL1 commands.			
MINOR or MAJOR lit (Note 2)	PORT ALM on card is lit	One or more of the timing outputs on the EA/C card have failed	Replace the faulty EA/C card (Chart 5).
MINOR lit	1 to 3 reference lamps (ST A, ST B, INP A, and/or INP B) on the card are lit red	<ul style="list-style-type: none"> One or more of the 4 kHz input reference signals have been disqualified A clock or clock input card is not installed or has failed The EA/C card has failed 	<ol style="list-style-type: none"> Check that all clock and clock input cards are installed. Check the clock and clock input cards for faults (Table A or Table C). If all clock and clock input cards are installed and working properly, replace the faulty EA/C card (Chart 5).
MINOR lit	<ul style="list-style-type: none"> ST A, ST B, INP A, INP B, CAS, CCS, CRC4 lamps on both cards in a redundant pair do not match One card of a redundant pair is missing 	One card of a redundant pair has been improperly provisioned or removed	Set both cards in the redundant pair with exactly the same values for all parameters and the same settings for all switch sections, whether or not those parameters and settings are currently in use.
MAJOR lit	FAIL lamp is lit, no other EA/C lamps are abnormal	The EA/C card has failed	Replace the faulty EA/C card (Chart 5).
CRITICAL and MAJOR lit	ST A, ST B, INP A, INP B, and the FAIL lamp on the are lit red	<ul style="list-style-type: none"> All clock or clock input cards are not installed or have failed The EA/C card has failed 	<ol style="list-style-type: none"> Check that all clock and clock input cards are installed. Check the clock and clock input cards for faults (Table A or Table C). If all clock and clock input cards are installed and working properly, replace the faulty EA/C card (Chart 5).

4. CARD REPLACEMENT PROCEDURES

4.01 Each card in the system has a FAIL lamp on its front panel. This lamp lights when the power supply or the microprocessor on the card has failed. The card may be removed from the shelf without negative effect to the shelf's operation.

Caution: Always Tables A, C, E, and F to isolate the source of the trouble. Do not reseat cards in an attempt to clear alarms. This may cause loss of ALL timing in the office.

Note: If replacing a card does not clear the trouble, install the original card after re-verifying its option switch settings.

Note: When removing or replacing a card, do not "drag" it in or out slowly.

Caution: Never remove both clock cards at the same time if the HOLD OV HOLD-OVER or FREE RUN lamps on both cards are lit. This action will cause ALL DCD system outputs to fail.

Caution: Swapping clock cards that are not in holdover mode or freerun mode may cause hits on the outputs.

4.02 Figure 1 shows the shelf switches, terminals, and connectors. Charts 1 through 9 contain the card replacement procedures.

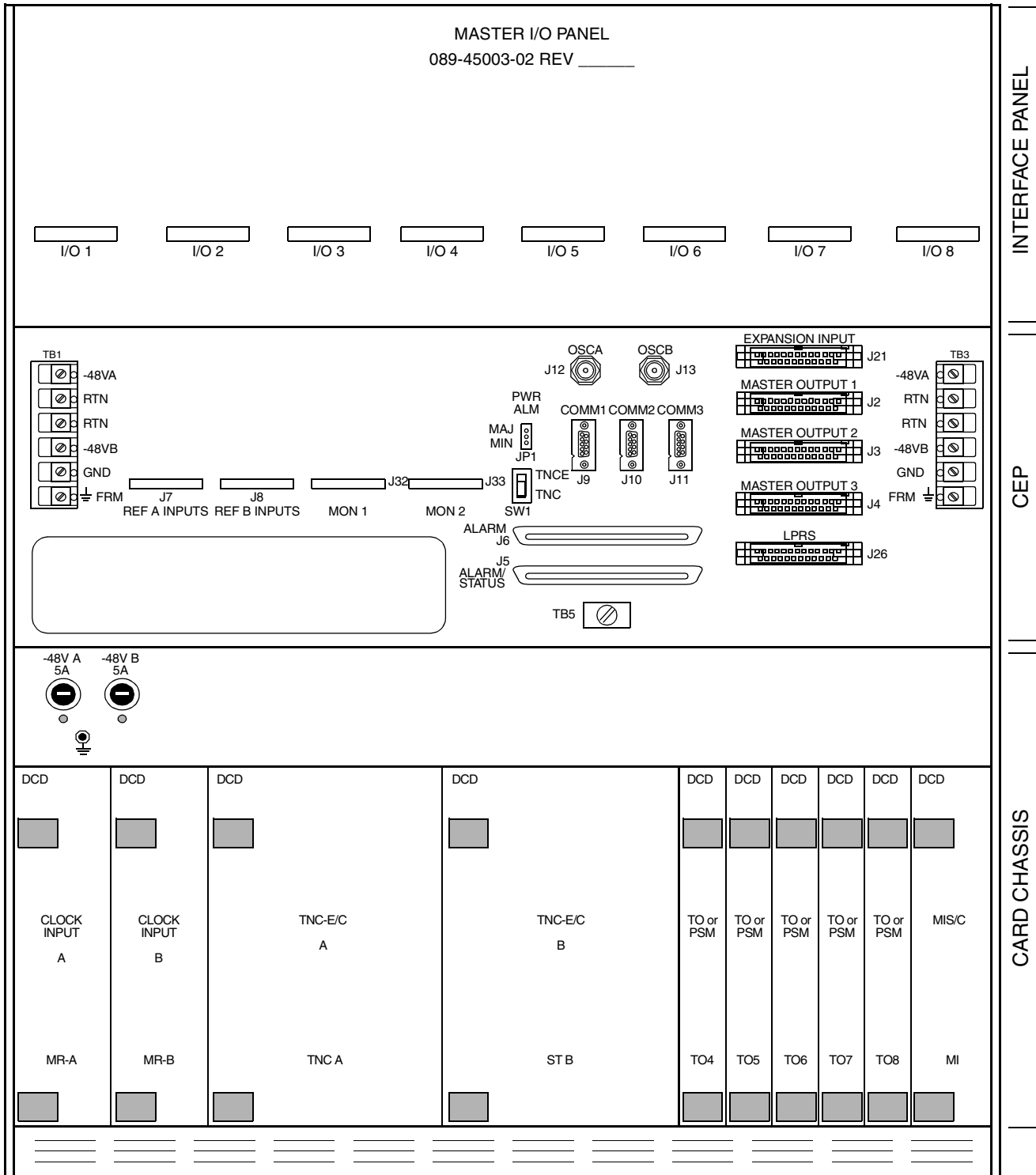


Figure 1. DCD-521/C HD Shelf Switches, Terminals and Connectors

Chart 1. CI-EA/C, CI/C, DCIM-EA/C, or ACI/C Card Replacement

STEP	PROCEDURE
	<p>Use this procedure to replace a CI-EA/C, CI/C, DCIM-EA/C, or ACI/C card.</p> <p>Notes:</p> <ol style="list-style-type: none"> 1. Use this chart whether or not the card's FAIL lamp is lit. 2. See the TL1 Users Guide for instructions about commands indicated in this procedure.
1	<p>If the shelf is in alarm, press the ACO pushbutton on the MIS/C card or use a TL1 command to silence the office audible alarm.</p>
2	<p>If a failed card is being replaced, skip this step. To replace a card that is in service, remove the input reference signal associated with the clock input card to be removed. Perform one of the following:</p> <ol style="list-style-type: none"> a. If the equipment at the source of the reference input has a miscellaneous synchronization jack, insert an open plug or the end of a patch cord in the jack to stop the input reference signal. b. If the input reference is cabled through an external bridging repeater, insert an open plug or the end of a patch cord in the OUT jack at the bridging repeater to stop the input reference signal. c. If the input reference signal is directly cabled from the source to the DCD Shelf, either lift the leads off the input module connectors, or short the tip (T) and ring (R) pins of the input module connector, using a clip cord that is no longer than 5 centimeters. <p>Caution: A clip cord longer than 5 centimeters may not look like a short to the clock input card and the input reference may continue to drive it.</p> <p>Requirement: On a CI/C card, the DS1 lamp is off and the FAIL lamp is lit. On an ACI/C card, the SRC FAIL and INPUT FAIL lamps are lit red. On a CI-EA/C, the SIG FLT and FAIL lamps are lit red. On a DCIM-EA/C card, the FAIL, REF 1, and REF 2 lamps are lit red, and the STATUS 1, STATUS 2, and SRC ACTIVE lamps are off.</p> <p>Note: Do not proceed if the requirements have not been met; unmet requirements are an indication that the input reference has not been properly removed.</p>
3	<p>Follow the instructions in the TL1 Operations Guide to remove the card from service.</p>
4	<p>If the SRC ACTIVE or SRC ACT lamp is lit on only one input card, press the transfer (XFR) pushbutton on either input card to transfer active status to the nonfailed input card.</p> <p>Requirement: The SRC ACTIVE or SRC ACT lamp is off on the card to be replaced.</p>
5	<p>Remove the upper and lower securing screws from the front panel of the failed clock input card, and remove the card from the shelf.</p> <p>Requirement: Wait for a CARD IS MISSING message to appear on the terminal.</p>

Chart 1. CI-EA/C, CI/C, DCIM-EA/C, or ACI/C Card Replacement (Contd)

STEP	PROCEDURE
6	Set the option switches on the replacement card to the same positions as the switches on the removed card.
7	Insert the replacement card into the same slot as the card that was removed. Secure the card to the shelf with the upper and lower securing screws.
8	If a failed card is being replaced, skip this step. Restore the input references by removing the open plug, clip cord, or reconnecting the leads to the input module connector.
9	Observe the front-panel lamps. Requirement: Wait for the input card to acquire the input reference signal (about 8 seconds to 60 seconds). The SRC ACT or SRC ACTIVE lamp lights green on the active card.
10	For DCIM-EA/C cards, ignore this step. If the card was entered into the MIS/C card's database, enter the serial number of the replacement card, using the ED-INVENTORY command. If the failed card was not entered into the MIS/C card's database, enter the replacement card inventory data, using the ENT-INVENTORY command. Requirement: The response indicates the command was completed successfully.
11	Follow the instructions in the TL1 Operations Guide to place the card into service.
12	If no MRC/C or PSM/C cards are in the shelf, skip this step. Use the INIT-REG command to initialize all registers on the shelf. Requirement: The response indicates the command was completed successfully.
13	This procedure is completed.

Chart 2. MRC/C^{V5} Card Replacement

STEP	PROCEDURE
	<p>Use this procedure to replace a MRC/C^{V5} card.</p> <p>Notes:</p> <ol style="list-style-type: none"> 1. Use this chart whether or not the card's FAIL lamp is lit. 2. When replacing an MRC/C^{V5} card, make sure the replacement card has the same part number as the card being replaced; i.e., replace a -56 card with a -56 card. 3. See the TL1 Users Guide for instructions about commands indicated in this procedure.
1	<p>If the shelf is in alarm, press the ACO pushbutton on the MIS/C card or use a TL1 command to silence the office audible alarm.</p>
2	<p>If the shelf is equipped with a TNC/C card, the TNCE/TNC switch (SW1) on the CEP (Figure 1) is set to TNC, and the FAIL lamp on the failed input card is not lit, check the status of the input card SRC ACT or SRC ACTIVE lamp. If lit, press the transfer (XFR) pushbutton on either clock input card.</p> <p>Requirement: The SRC ACT or SRC ACTIVE lamp on the nonfailed input card lights. The SRC ACT or SRC ACTIVE lamp on the failed clock input card goes off.</p>
3	<p>If a failed card is being replaced, skip this step. To replace a card that is in service, remove the input reference signal associated with the clock input card to be removed. Perform one of the following:</p> <ol style="list-style-type: none"> a. If the equipment at the source of the reference input has a miscellaneous synchronization jack, insert an open plug or the end of a patch cord in the jack to stop the input reference signal. b. If the input reference is cabled through an external bridging repeater, insert an open plug or the end of a patch cord in the OUT jack at the bridging repeater to stop the input reference signal. c. If the input reference signal is directly cabled from the source to the DCD Shelf, either lift the leads off the input module connectors, or short the tip (T) and ring (R) pins of the input module connector, using a clip cord that is no longer than 5 centimeters. <p>Caution: A clip cord longer than 5 centimeters may not look like a short to the clock input card and the input reference may continue to drive it.</p> <p>Requirement: The SRC ACTIVE lamp is off, the REF lamps for enabled inputs are lit red, and the STATUS lamps for enabled inputs are lit yellow.</p> <p>Note: Do not proceed if the requirements have not been met; unmet requirements are an indication that the input reference has not been properly removed.</p>
4	<p>Follow the instructions in the TL1 Operations Guide to remove the card from service.</p>
5	<p>If the shelf is equipped with a TNC/C card, and the TNCE/TNC switch (SW1) on the CEP is set to TNC, check the status of the SRC ACTIVE lamp on the card to be replaced. If lit, press the transfer (XFR) pushbutton on either input card.</p> <p>Requirement: The SRC ACTIVE lamp is off on the card to be replaced.</p>

Chart 2. MRC/C^{V5} Card Replacement (Contd)

STEP	PROCEDURE
6	<p>Remove the upper and lower securing screws from the front panel of the failed clock input card, and remove the card from the shelf.</p> <p>Requirement: Wait for an IMPROPER CARD REMOVAL message to appear on the terminal.</p>
7	<p>Set the option switches on the replacement card to the same positions as the switches on the removed card and insert the replacement card into the same slot as the card that was removed. Secure the card to the shelf with the upper and lower securing screws.</p>
8	<p>If the replaced card was a failed card, skip this step. Restore the input reference by removing the open plug, clip cord, or reconnecting the leads to input module connectors.</p> <p>Requirement: Wait for the MRC/C card to acquire the input reference signal (about 3 minutes to 5 minutes). The appropriate REF and SRC ACTIVE lamps light green on the MRC/C card.</p> <p>Note: The MIS/C card detects that a new card has been installed, gets the inventory data from the new card, and configures the new MRC/C card to the settings of the previous MRC/C card (determined by switch SW1, section 5). If MRC/C card configuration changes are required, see the TL1 Users Guide for instructions.</p>
9	<p>Wait 1 minute while the MIS/C card verifies the configuration of the shelf cards.</p>
10	<p>Set the TNCE/TNC switch (SW1) on the CEP to conform to the requirements for this installation: The TNCE position sets the master shelf for operation with rubidium (TNC-E/C) clock cards, and 090-44010-57, and -57T MRC/C cards. The TNC position sets the master shelf for operation with quartz (TNC/C or LNC/C) clock cards, unless a TNCE/C card is also installed.</p> <p>Requirement: If equipped with a second MRC/C card and the switch is in the TNCE position, the SRC ACTIVE lamps on both MRC/C cards are lit. The transfer (XFR) function between the cards is disabled.</p>
11	<p>Follow the instructions in the TL1 Operations Guide to place the card into service.</p>
12	<p>Use the INIT-REG command to initialize all MRC/C or PSM/C registers on the shelf.</p> <p>Requirement: The response indicates the command was completed successfully.</p>
13	<p>This procedure is completed.</p>

Chart 3. TNC-E/C Card Replacement

STEP	PROCEDURE
	<p>Use this procedure to replace a failed TNC-E/C card. The only time an TNC-E/C card should be replaced is when its FAIL or OSC lamp is lit red, or its OSC lamp is flashing green (indicating the oscillator requires factory maintenance). If its LKD, ACTIVE, and SRC (A or B) lamps are lit green while the network elements (NE) being timed from the shelf are reporting slips, the slips are probably caused by a timing loop (the TNC-E/C card is probably good).</p> <p>Do not replace the TNC-E/C if its INP TOL (input tolerance) and/or HOLD OVER lamp(s) are lit red, since these are indications that the input reference (and not the card) has failed, has excessive errors, or has excessive jitter, wander, phase movement, or frequency offset. In this case the input reference should be repaired or reassigned.</p> <p>Notes:</p> <ol style="list-style-type: none"> On the TNC-E/C card installed in the ST B slot, the DSBL pushbutton does not function. See the TL1 Users Guide for instructions about commands indicated in this procedure.
1	<p>Press the ACO pushbutton on the MIS/C card to silence the office audible alarm, if the shelf is in alarm.</p>
2	<p>Verify that the input references meet or exceed the specifications in the Description and Specifications section of this manual, and both clock input cards are installed and functioning properly with both cards' SRC ACT or SRC ACTIVE lamps lit. If the DRIFT lamp on the TNC-E/C card is lit amber, it is one indication that the input reference does not meet specifications. Ensure that the SHELF MODE switch SW1 on the CEP (Figure 1) is set to the TNC position.</p>
3	<p>Use the OPR-SYCNCSW command to force the timing output cards to use a nonfailed timing source on the internal timing bus.</p> <p>Requirement: The response indicates the command was completed successfully.</p>
4	<p>Remove the upper and lower securing screws from the front panel of the clock card to be removed.</p> <p>Caution: Do not press the DSBL pushbutton on the TNC-E/C card in TNC A unless is to be removed from the shelf, since its output will be disabled for 10 minutes to 20 minutes. Do not remove the TNC-E/C card in ST B when the TNC-E/C card in TNC A has been disabled. Removing the TNC-E/C card in TNC A without first pressing the DSBL pushbutton may cause hits on the timing outputs.</p> <p>Warning: The TNC-E/C card is heavier than a normal card, and must be supported with both hands during installation and removal.</p> <p>If the card to be replaced is in slot A (TNC A), remove the mylar cover over the DSBL pushbutton and press and release the recessed DSBL (disable) pushbutton switch with a shorting pin or paper clip to disable the output of the card. Remove the card immediately.</p> <p>If the card to be replaced is in slot B (ST B), remove the card.</p> <p>Requirement: The alarm lamp on the MIS/C card goes off 10 seconds after the TNC-E/C card is removed.</p>
5	<p>Set the option switches on the replacement card to the same positions as the switches on the removed card (all sections of SW1 should be set to the OFF position).</p>

Chart 3. TNC-E/C Card Replacement (Contd)

STEP	PROCEDURE
6	<p>Insert the replacement TNC-E/C in the shelf and install the upper and lower securing screws.</p> <p>Requirement: The HOLD OVER lamp flashes for 30 minutes to 1 hour during the warm-up (stabilization) period. Upon completion of the stabilization period, the HOLD OVER lamp stops flashing and goes off, and either SRC A or SRC B lamp lights (depending on which clock input card is its active input). This indicates that the TNC-E/C has recognized a valid input reference signal from its clock input card and is converging on the input reference.</p> <p>Note: If the TNC-E/C does not recognize the input reference signal as valid, it enters freerun mode, its HOLD OVER lamp lights steady green, the ACTIVE lamp lights, and SRC A and SRC B lamps are off.</p> <p>Requirement: 5 to 20 minutes after an SRC lamp lights, the LKD and ACTIVE lamps light, indicating the card is within lock range of the input reference. It may take an additional hour or two for the TNC-E/C to completely converge on the input reference.</p> <p>Note: If the LKD lamp does not light, verify that the input reference is at least TNC quality and does not have excessive jitter, wander, phase movement, or frequency offset on it. If so, the input reference will have to be repaired or reassigned before proceeding.</p>
7	<p>Verify that the alarm (MAJOR or MINOR) and ACO lamps on the MIS/C card are off.</p>
8	<p>If the card was entered into the MIS/C card's database, enter the serial number of the replacement card using the ED-INVENTORY command. If the failed card was not entered into the MIS/C card's database, enter the replacement card inventory data using the ENT-INVENTORY command.</p> <p>Requirement: The response indicates the command was completed successfully.</p>
9	<p>Use the ENT-EQPT command with no parameters for the replaced clock card.</p> <p>Requirement: The response indicates the command was completed successfully.</p>
10	<p>If the OPR-SYNCNSW command was used in Step 3, use the RLS-SYNCNSW command to allow the timing output cards to use the appropriate signal on the internal timing bus.</p> <p>Requirement: The response indicates the command was completed successfully.</p>
11	<p>If no MRC/C or PSM/C cards are in the shelf, skip this step. Use the INIT-REG command to initialize all registers on the shelf.</p> <p>Requirement: The response indicates the command was completed successfully.</p>
12	<p>This procedure is completed.</p>

Chart 4. TNC/C Card Replacement

STEP	PROCEDURE
	<p>Use this procedure to replace a failed TNC/C card. The only time a TNC/C card should be replaced is if its FAIL lamp is lit. If it is in the TNC A slot, its LOCKED and ACTIVE lamps are lit and the network elements (NE) being timed from the shelf are reporting slips, the problem is probably a timing loop and not a bad TNC/C card.</p> <p>Note: See the TL1 Users Guide for instructions about commands indicated in this procedure.</p>
1	<p>Press the ACO pushbutton on the MIS/C card or use TL1 a command to silence the office audible alarm, if the shelf is in alarm.</p>
2	<p>Use the OPR-SYNCNSW command to force the timing output cards to use a nonfailed timing source on the internal timing bus.</p> <p>Requirement: The response indicates the command was completed successfully.</p>
3	<p>Note: If a TNC/C card has been replaced, allow the first TNC/C card 6 hours to stabilize before replacing the second TNC/C card.</p> <p>Remove the upper and lower securing screws from the front panel of the failed clock card, and remove the TNC/C card from the shelf.</p> <p>Requirement: If the card is in the ST A slot and not failed, the ST B clock card will automatically become the preferred source for the outputs.</p> <p>Note: If the ST A card had failed, the ST B clock card is already the preferred source to the outputs. If ST B is being replaced, it is in standby and may be removed without negative effect to the outputs.</p>
4	<p>Set the option switches on the replacement card to the same positions as the switches on the removed card.</p>

Chart 4. TNC/C Card Replacement (Contd)

STEP	PROCEDURE
5	<p>Insert the replacement TNC/C card in the shelf and install the upper and lower securing screws.</p> <p>Requirement: The FREE RUN lamp flashes for 30 minutes during the warm-up (stabilization) period.</p> <p>Requirement: Upon completion of the stabilization period, the FREE RUN lamp stops flashing and goes off, and either REF A or REF B lamp lights (depending on which clock input card is the active input). This indicates that the TNC/C card has recognized a valid input reference signal from the clock input card and is converging on the input reference.</p> <p>Note: If the TNC/C card does not recognize the input reference signal as valid, it enters free run mode, its FREE RUN and ACTIVE lamps light solid, and REF A and REF B lamps are off.</p> <p>Requirement: After a REF lamp lights (5 minutes to 20 minutes), the LOCKED lamp lights, indicating the card is within lock range of the input reference.</p> <p>Requirement: Approximately 0.5 hour to 2 hours after insertion in the shelf, the ACTIVE lamp lights. If TNC A was the replaced card, it will automatically become the preferred source to the outputs when its ACTIVE lamp lights. It may take up to 6 hours for the TNC/C card to completely converge on the input reference. During this period, its LOCKED lamp may go off and on several times as part of the converging process.</p> <p>Note: If the other ST3E or TNC card is also to be replaced, allow the first ST3E or TNC card 6 hours to stabilize before replacing the second ST3E or TNC card.</p>
6	<p>If the card was entered into the MIS/C card's database, enter the serial number of the replacement card using the ED-INVENTORY command. If the failed card was not entered into the MIS/C card's database, enter the replacement card inventory data using the ENT-INVENTORY command.</p> <p>Note: Inventory data is available on the front panel of the card. Where data for a field in the command is unavailable, leave the field blank.</p> <p>Requirement: The response indicates the command was completed successfully.</p>
7	<p>Use the ENT-EQPT command with no parameters for the replaced clock card.</p> <p>Requirement: The terminal indicates a completed command.</p>
8	<p>If the OPR-SYCNCSW command was used in Step 3, use the RLS-SYCNCSW command to allow the timing output cards to use the appropriate signal on the internal timing bus.</p> <p>Requirement: The response indicates the command was completed successfully.</p>
9	<p>If no MRC/C or PSM/C cards are in the shelf, skip this step. Use the INIT-REG command to initialize all registers on the shelf.</p> <p>Requirement: The response indicates the command was completed successfully.</p>
10	<p>This procedure is completed.</p>

Chart 5. EA10/C, EA20/C, EA10M/C, EA20M/C, or TO-EA5/C Card Replacement

STEP	PROCEDURE
	<p>Use this procedure to replace an EA10/C, EA20/C, EA10M/C, EA20M/C, or TO-EA5/C card. If the output card's PORT ALM lamp is lit, determine if the failure is on the card, or if it is a shorted or unterminated cable external to the shelf (refer to Table E or Table F). If the PORT ALM failure can be isolated to the card, replace the output card.</p> <p>Note: See the TL1 Users Guide for instructions about commands indicated in this procedure.</p>
1	<p>Press the ACO pushbutton on the MIS/C card or use TL1 a command to silence the office audible alarm, if the shelf is in alarm.</p>
2	<p>If redundant-pair protection is not used with the card to be replaced, skip this step. If the card which is paired with the failed card is active, skip this step. Use the OPR-PROTNSW or RLS-PROTNSW command to make the nonfailed card in the pair active.</p> <p>Requirement: The FAIL and PORT ALM lamps are not lit on the nonfailed card in the pair.</p>
3	<p>If the card to be replaced is failed (automatically removed from service), skip this step. Follow the instructions in the TL1 Operations Guide to remove the card from service.</p>
4	<p>Remove the output card from the shelf.</p> <p>Requirement: After 30 seconds, a CARD IS MISSING message appears on the terminal.</p>
5	<p>Set the option switches to the same positions as the switches on the removed card. If the card is part of a redundant pair, be sure the replacement card is configured the same as the other card in the pair. Insert the replacement card in the same slot from which the card was removed.</p> <p>Requirement: The MIS/C card performs a lamp test. After 30 seconds, the MIS/C card has cleared the error message.</p>
6	<p>Follow the instructions in the TL1 Operations Guide to bring the card into service.</p> <p>Requirement: The response indicates that each command was completed successfully.</p>
7	<p>Wait 10 seconds after the requirement in the previous step to allow the replacement card to warm up and generate outputs.</p>
8	<p>Use the INIT-REG command to initialize all registers on the shelf.</p> <p>Requirement: The response indicates the command was completed successfully.</p>
9	<p>This procedure is completed.</p>

Chart 6. TO Card Replacement

STEP	PROCEDURE
	<p>Use this procedure to replace a TO card in a shelf that contains a 090-44018-05 MIS/C card. If the TO PORT ALM lamp is lit, determine if the failure is on the card, or if it is a shorted or unterminated cable external to the shelf (refer to Table E). If the PORT ALM failure can be isolated to the card, replace the TO card.</p> <p>Note: See the TL1 Users Guide for instructions about commands indicated in this procedure.</p>
1	<p>Press the ACO pushbutton on the MIS/C card or use TL1 a command to silence the office audible alarm, if the shelf is in alarm.</p>
2	<p>If protection is not used with the card to be replaced, skip this step. Verify that the card which protects the failed card is active.</p> <p>Requirement: The FAIL and PORT ALM lamps are not lit on the protection card. If an automatic 1:N protection switch has been activated, the Output Protection pushbutton lamps are lit over the failed card and a like HS TO card.</p> <p>Note: If the protection card is active and a protection switch has not been made, activate a protection switch using TL1 commands. If 1:N protection is in effect, press and hold the Output Protection pushbuttons over the failed card and a like HS TO card until the switch is made (about 2 seconds).</p>
3	<p>If the card to be replaced has been removed from service, skip this step. Follow the instructions in the TL1 Operations Guide to remove the card from service.</p>
4	<p>Remove the failed TO card from the shelf.</p> <p>Requirement: After 30 seconds, a CARD IS MISSING message appears on the terminal.</p>
5	<p>Set the option switches to the same positions as the switches on the removed card. Insert the replacement card in the shelf.</p> <p>Requirement: The FAIL lamp on the replacement card remains off and the INPUT lamp is lit. An ST lamp lights if the system is equipped with one or more clock cards. After 30 seconds, the MIS/C card has cleared the CARD IS MISSING error message.</p>
6	<p>Wait 10 seconds after the requirement in the previous step to allow the replacement card to warm up and generate outputs.</p>
7	<p>If 1:N protection is not in effect, skip this step. Press the lit Output Protection pushbutton over the HS TO card slot for about 2 seconds.</p> <p>Requirement: The Output Protection pushbutton lamps go off over the failed card and the HS TO card. This releases the HS protection switch and puts the replacement card on-line.</p>

Chart 6. TO Card Replacement (Contd)

STEP	PROCEDURE
8	<p>If the card was entered into the MIS/C card's database, enter the serial number of the replacement card using the ED-INVENTORY command. If the failed card was not entered into the MIS/C card's database, enter the replacement card inventory data using the ENT-INVENTORY command.</p> <p>Requirement: The response indicates the command was completed successfully.</p>
9	<p>If no MRC/C or PSM/C cards are in the shelf, skip this step. Use the INIT-REG command to initialize all registers on the shelf.</p> <p>Requirement: The response indicates the command was completed successfully.</p>
10	<p>This procedure is completed.</p>

Chart 7. ESCIU/C Card Replacement

STEP	PROCEDURE
	<p>Use this procedure to replace an ESCIU/C card in a shelf that contains a 090-44018-05 MIS/C card.</p> <p>The ESCIU/C card should not be replaced if its SYNC lamp is off or lit red (indicating loss of 4 kHz signal from DCD clock and input cards), or its E1 A or E1 B lamps are lit red (indicating loss of signal from the traffic-carrying E1 bit stream from either the EAST A IN or WEST B IN direction of transmission), or the HI SLIP, SLIP, and bit slip (192, 128, or 0) lamps are lit (indicating the EAST A IN received bit stream has a frequency offset from the DCD clock [WEST A OUT]), which are facility related problems outside the DCD System. The ESCIU/C card must be replaced if its FAIL lamp is lit.</p> <p>Note: See the TL1 Users Guide for instructions about commands indicated in this procedure.</p>
1	<p>Press the ACO pushbutton on the MIS/C card to silence the office audible alarm, if the shelf is in alarm.</p>
2	<p>If the card to be replaced is failed, skip this step. Follow the instructions in the TL1 Operations Guide to remove the card from service.</p>
3	<p>Remove the ESCIU/C card from the shelf. Set the option switches on the replacement card to the same positions as the switches on the removed card. Insert the replacement card into the shelf.</p> <p>Requirement: The FAIL lamp is off, and the SYNC, DS1 A and DS1 B (SCIU) or E1 A and E1 B (ESCIU/C) lamps are lit green.</p> <p>Caution: <i>The ESCIU/C card's inputs and outputs must be cabled from an ESCIU/C module (p/n 990-45021-11) which has bypass relays that release to maintain continuity on the traffic-carrying DS1 while the ESCIU/C card is removed from the shelf. If the ESCIU/C inputs and outputs are cabled from a standard DCD shelf wire-wrap panel, the ESCIU/C <u>must</u> be patched around at the DSX-1 jacks before the ESCIU/C is removed from the shelf.</i></p>
4	<p>If the card was entered into the MIS/C card's database, enter the serial number of the replacement card using the ED-INVENTORY command. If the failed card was not entered into the MIS/C card's database, enter the replacement card inventory data using the ENT-INVENTORY command.</p> <p>Requirement: The response indicates the command was completed successfully.</p>
5	<p>If no MRC/C or PSM/C cards are in the shelf, skip this step. Use the INIT-REG command to initialize all registers on the shelf.</p> <p>Requirement: The response indicates the command was completed successfully.</p>
6	<p>This procedure is completed.</p>

Chart 8. PSM/C Card Replacement

STEP	PROCEDURE
	<p>Use this procedure to replace a PSM/C card.</p> <p>Notes:</p> <ol style="list-style-type: none"> 1. The PSM/C cards, failed or not, may be removed or inserted in the shelf any time without negative effect on the DCD synchronization outputs. 2. See the TL1 Users Guide for instructions about commands indicated in this procedure.
1	<p>Press the ACO pushbutton on the MIS/C card or use TL1 a command to silence the office audible alarm, if the shelf is in alarm.</p>
2	<p>If the card to be replaced is failed, skip this step. Follow the instructions in the TL1 Operations Guide to remove the card from service.</p>
3	<p>Remove the failed PSM/C card from the shelf.</p> <p>Requirement: Wait for a CARD IS MISSING message to appear on the terminal.</p>
4	<p>If the failed card was entered into the MIS/C card's database, skip this step. Set the option switches to the same positions as the switches on the removed card.</p> <p>Requirement: The FAIL lamp on the replacement card remains off and the INPUT lamp is lit. An ST lamp lights if the system is equipped with one or more clock cards.</p>
<p>Warning: Do not attempt to install a PSM/C card into the TO3 slot of a master shelf or the TO4 slot of an expansion shelf. Failure to observe this warning may result in damage to the PSM/C card.</p>	
5	<p>Install the replacement PSM/C card in the same slot as the failed PSM/C card and wait 2 minutes.</p> <p>Note: During the 2 minutes, the PSM/C performs a lamp test (green and red lamps). The remainder of the time is spent qualifying equipped input signals.</p> <p>Requirement: The FAIL lamp is off. The REF lamps are lit green for the enabled inputs and are off for the disabled inputs. All TOL lamps are off. The ST and INP lamps are lit green.</p>
6	<p>If the card was entered into the MIS/C card's database, enter the serial number of the replacement card using the ED-INVENTORY command. If the failed card was not entered into the MIS/C card's database, enter the replacement card inventory data using the ENT-INVENTORY command.</p> <p>Requirement: The response indicates the command was completed successfully.</p>
7	<p>If no MRC/C or PSM/C cards are in the shelf, skip this step. Use the INIT-REG command to initialize all registers on the shelf.</p> <p>Requirement: The response indicates the command was completed successfully.</p>
8	<p>This procedure is completed.</p>

Chart 9. MIS/C Card Replacement

STEP	PROCEDURE
	<p>Use this procedure to replace an MIS/C card.</p> <p>Note: See the TL1 Users Guide for instructions about commands indicated in this procedure.</p>
1	<p>If the shelf is in alarm, press the ACO pushbutton on the MIS/C card to silence the office audible alarm. The CRITICAL, MAJOR, and MINOR lamps may or may not be lit, depending on the nature of the failure on the card.</p>
2	<p>Remove the failed MIS/C card from the shelf.</p> <p>Note: All communications and alarms from the shelf are lost. Synchronization services provided by the shelf are not interrupted.</p> <p>Caution: SSM messages will change state.</p>
3	<p>On the replacement card, set section 7 of SW1 to OFF if the shelf is a master shelf, or to ON if the shelf is an expansion shelf or part of a remote system. Set all other sections of SW1 to the factory-set position.</p>
4	<p>Be sure the RS-232 settings for the external terminal or computer allow communication with the MIS/C card.</p> <p>Note: COM1, COM2, and COM3 on the rear panel of the shelf 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. COM2 may be set to 1200 baud by SW1 on the MIS/C card. COM1 and COM3 may be set to 1200 baud by TL1 command.</p>
5	<p>Insert the replacement card into the shelf.</p> <p>Requirement: The MIS card performs a lamp test, and the MINOR lamp flashes for up to a minute. The CRITICAL and MINOR lamps stay lit.</p>
6	<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/C card as follows:</p> <pre> TELECOM <date> <time> M <ctag> DENY ICNV ; </pre> <p>Where <date> and <time> are the date and time in the MIS/C card, <ctag> is a random number, and all upper-case letters are shown as they should appear. (See the TL1 User's Guide for TL1 language definitions.)</p>

Chart 9. MIS/C Card Replacement (Contd)

STEP	PROCEDURE
7	<p>Use the INIT-SYS command with <ph> 9 to reset the MIS/C card to its factory settings.</p> <p>Requirement: After up to 5 minutes, the response includes COMPLD.</p> <p>Note: The INIT-SYS command with <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
8	<p>Be sure the RS-232 settings for the external terminal or computer allow communication with the MIS/C card.</p> <p>Note: COM1, COM2, and COM3 on the rear panel of the shelf 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. COM2 may be set to 1200 baud by SW1 on the MIS/C card. COM1 and COM3 may be set to 1200 baud by TL1 command.</p>
9	<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/C card 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/C card, <ctag> is a random number, and all upper-case letters are shown as they should appear. (See the TL1 User’s Guide for TL1 language definitions.)</p>
10	<p>Refer to the Software Release Document to install and activate the software appropriate for this installation (if required).</p>

Chart 9. MIS/C Card Replacement (Contd)

STEP	PROCEDURE
11	<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/C card to gather configuration information from the Version 5 cards in the DCD-521/C HD shelf, and any GTI/C cards in an associated DCD-LPR/C shelf.</p> <p>Requirement: The response includes COMPLD.</p>
12	<p>Use the INIT-REG command for every MRC/C and PSM/C card in the shelf. This initializes all registers on the shelf.</p> <p>Requirement: The response includes COMPLD.</p>
13	<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>
14	<p>If no changes to switch SW1 on the MIS/C card are required, skip this step. Remove the MIS/C card, change the switches, and insert the card back into the slot.</p> <p>Requirement: On the MIS/C 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>
15	<p>This procedure is completed.</p>

5. REPAIR AND RETURN PROCEDURES

5.01 When returning defective equipment for factory repair, obtain the following information prior to calling Symmetricom:

- A complete description of the trouble (alarms, equipment behavior, etc.), part number, serial number, issue/revision level, and warranty expiration date.
- If the warranty has expired, a purchase order with “bill to” information.
- A customer field technical contact including address, phone number and FAX number.
- Return shipping information.

5.02 To return defective or damaged equipment, do the following:

1. Call Symmetricom’s Customer Assistance Center at one of the following numbers to obtain a Return Material Authorization (RMA) number and shipping address:

- +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.)

Note: Retain the RMA number for future reference. The RMA number is used by Symmetricom for internal tracking of the unit. Reference the RMA number in all communications with Symmetricom regarding the unit.

2. Pack the defective equipment, including a list containing all the information obtained above, in the original packing material. If the original packing material is not available, inform Symmetricom and the appropriate shipping material will be provided.

Note: Equipment must be returned in the original packaging or approved replacement packaging for the warranty to be honored.

3. Mark the RMA number and the equipment serial number on the outside of the shipping carton.
4. Ship the equipment prepaid and insured to one of the addresses below as directed by the Customer Assistance Center:

Symmetricom
Attn: Customer Service
2300 Orchard Parkway
San Jose, CA 95131

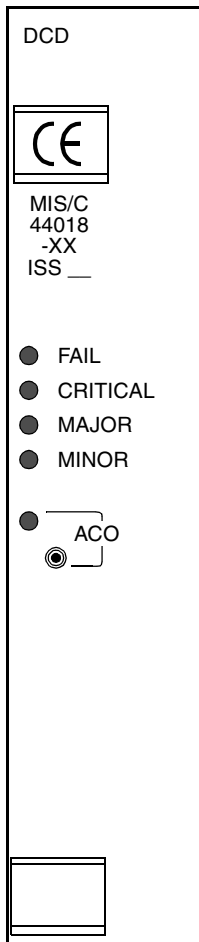
or

Symmetricom
Attn: Repair and Return
Building 7
Aguada West Industrial Site
Aguada, Puerto Rico 00602

- 5.03 Repaired equipment is typically shipped within 30 days of receipt by Symmetricom, or per contract terms. Shipping costs to Symmetricom are paid by the customer; shipping costs back to the customer are paid by Symmetricom.

6. CONTROLS AND INDICATORS

- 6.01 The controls and indicators of the cards used in DCD-521/C HD shelves are shown in Figures 2 through 22. Each figure includes an explanation of all front panel items.



- FAIL: Lamp that lights red if the card or power supply fails.
- CRITICAL: Lamp that lights red if the system or card has a critical alarm.
- MAJOR: Lamp that lights red if the system or card has a major alarm.
- MINOR: Lamp that lights yellow if the system or card has a minor alarm; flashes yellow during database transfers.
- ACO: Lamp that lights green if the ACO pushbutton has been pressed.

When pressed, this pushbutton silences the audible alarm.

Figure 2. MIS/C Card Controls and Indicators

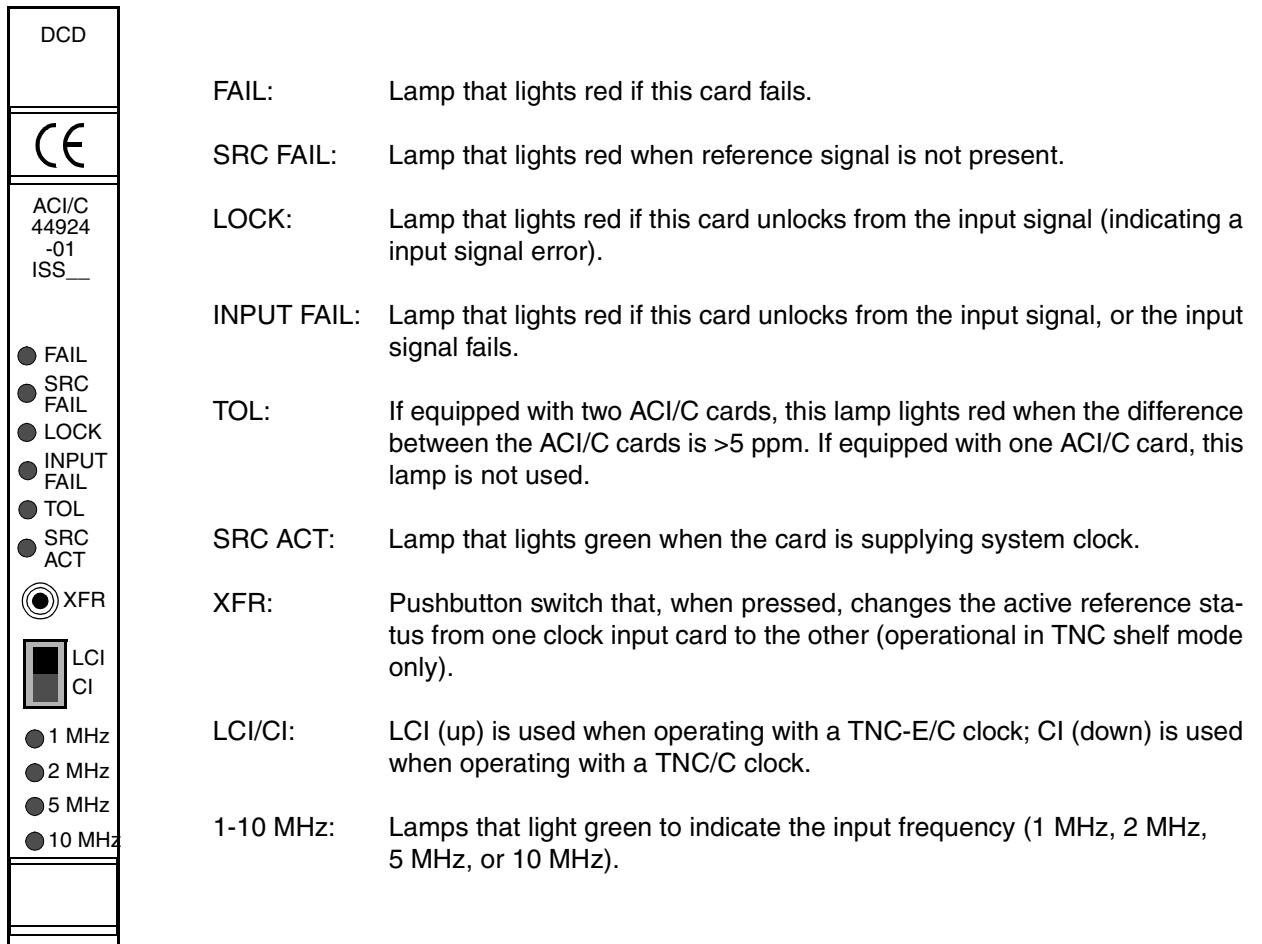
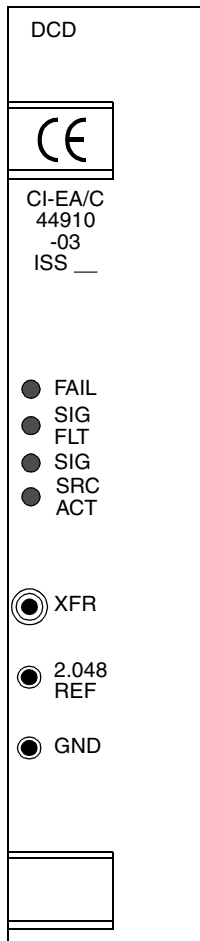
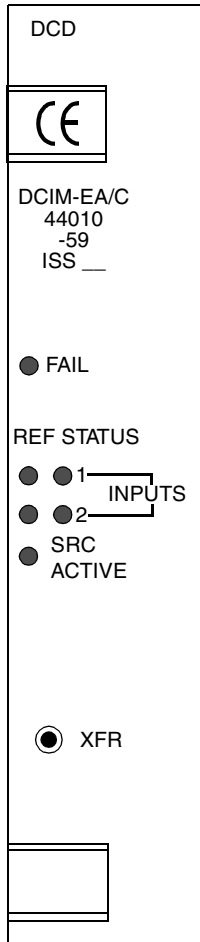


Figure 3. ACI/C Card Controls and Indicators



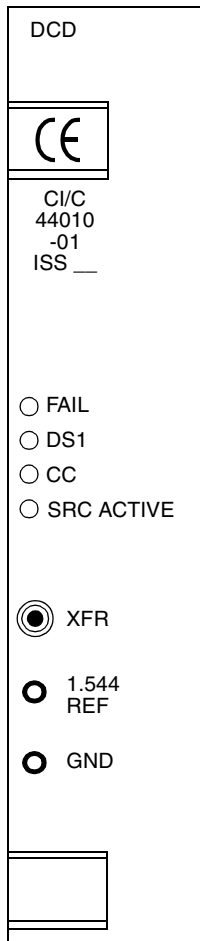
- FAIL: Lamp that lights red if the card or input fails (major alarm).
- SIG FLT: Lamp that lights red when an E1 or analog source is not present.
- SIG: Lamp that lights green when an E1 or analog source is present.
- SRC ACT: Lamp that lights green when the card is on-line providing a DCD reference.
- XFR: Pushbutton that, when pressed, changes the active reference status from one clock input card to the other (operational in TNC shelf mode only).
- 2.048 REF: Test point used to check the stability of the internal TTL-level 2.048 Mb/s signal.
- GND: Test point reference for the 2.048 REF test point.

Figure 4. CI-EA/C Card Controls and Indicators



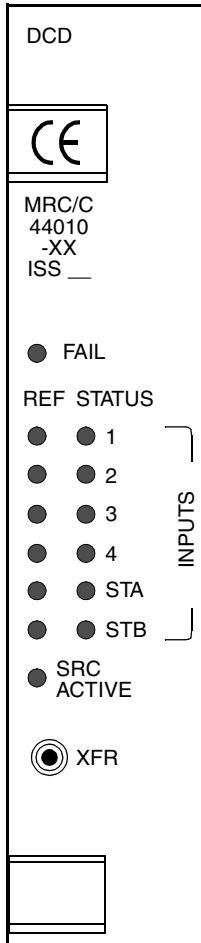
- FAIL:** Lamp that lights red if the card or input fails (major alarm).
- REF 1:** Lamp that lights green if Input 1 is provisioned with an error-free signal; red if Input 1 is provisioned, but the signal has errors or is missing; off if Input 1 is not provisioned.
- REF 2:** Lamp that lights green if Input 2 is provisioned with an error-free signal; red if Input 2 is provisioned, but the signal has errors or is missing; off if Input 2 is not provisioned.
- STATUS 1:** Lamp that lights green if the Input 1 reference is being used, off if the Input 1 reference is not being used.
- STATUS 2:** Lamp that lights green if the Input 2 reference is being used, off if the Input 2 reference is not being used.
- SRC ACTIVE:** Lamp that lights green when the card is providing a DCD reference to the clock and output cards.
- XFR:** Pushbutton switch that, when pressed, changes the active reference status from one clock input card to the other (operational in TNC shelf mode only).

Figure 5. DCIM-EA/C Card Controls and Indicators



- FAIL: Lamp that lights red if this card or its input has failed (its output is disabled and causes a minor alarm when this lamp is lit).
- DS1: Lamp that lights green when a DS1 source is present. The lamp is off when DS1 source is not present.
- CC: Lamp that lights green when a CC source is present. The lamp is off when CC source is not present.
- SRC ACTIVE: Lamp that lights green when the card is on-line providing a DCD reference to ST and output cards. The lamp is off if the card is in standby mode.
- XFR: Pushbutton that, when pressed, changes the active reference status from one clock input card to the other (operational in TNC shelf mode only).
- 1.544 REF: Test point used to check the stability of the internal 1.544 Mb/s signal.
- GND: Test point reference for the 1.544 REF test point.

Figure 6. CI/C Card Controls and Indicators



- FAIL:** Lamp that lights red if the self tests performed during power up fail.

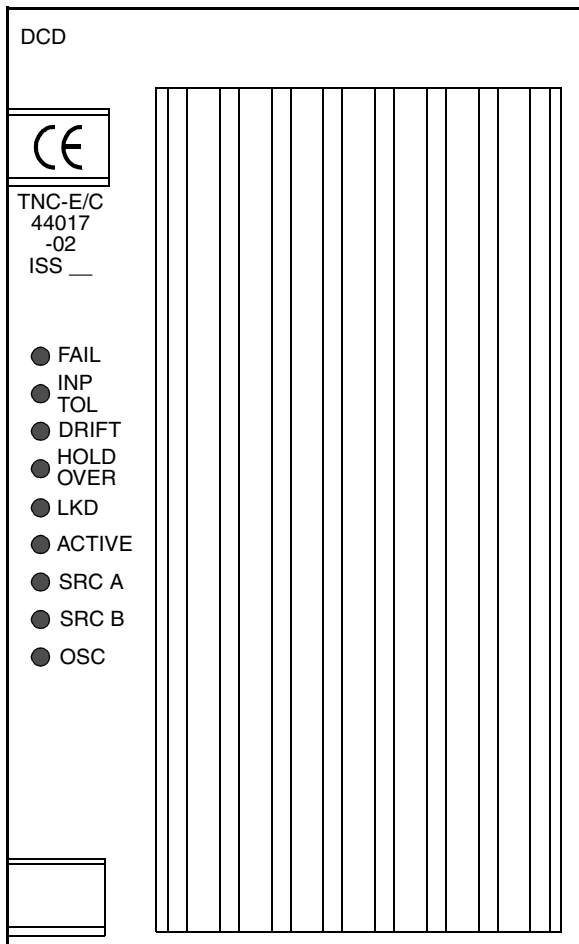
- REF INPUTS:** Bicolored lamp that lights green when an input is enabled and has passed the error check; lights red when an input is enabled and has the failed error check (high CRC, OOF, BPV, AIS, or LOS); does not light if the input is not enabled. There is a separate lamp for each reference source.

- STATUS INPUTS:** Bicolored lamp that lights green when an input has been selected as priority; lights yellow when rejected because the input has exceeded stability threshold; the lamp is dark when the reference is accepted by majority vote and has not exceeded stability threshold. There is a separate lamp for each reference source.

- SRC ACTIVE:** Lamp that lights green when the MRC/C is on-line providing DCD reference to clock and output cards. The lamp is dark if the MRC/C is in standby mode.

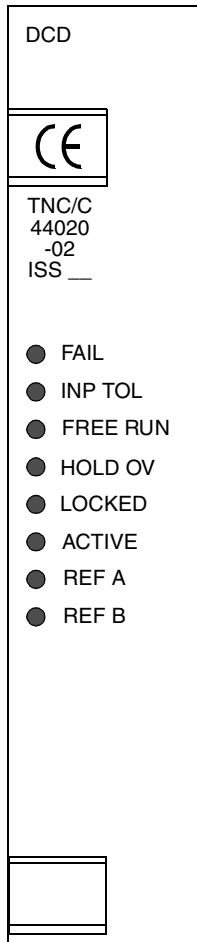
- XFR:** Pushbutton that, when pressed, switches source SRC ACTIVE status from one MRC/C card to the other (operational in TNC shelf mode only).

Figure 7. MRC/C Card Controls and Indicators



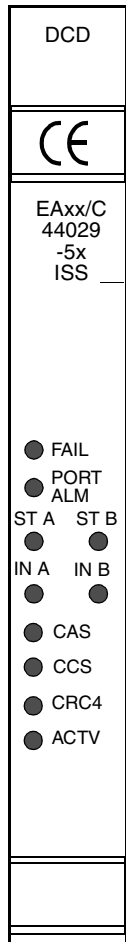
- FAIL: Lamp that lights red if the card has failed (the output is disabled when this lamp is lit).
- INP TOL: Lamp that lights red if the input frequency offset is greater than the pull-in range.
- DRIFT: Lamp that lights yellow when the input reference rate of frequency change, compared to the oscillator output, has exceeded the factory-set threshold (the SRC A and/or SRC B lamp flashes green to indicate which reference is drifting).
- HOLD OVER: Lamp that flashes green during warm up; lights solid green after warm-up if neither input reference is present or not qualified; lights red if all clock input signals are removed or exceed the pull-in range causing the clock to go into holdover mode.
- LKD: Lamp that lights green when this card has converged on the input reference.
- ACTIVE: Lamp that lights green when the TNC-E/C is providing reference to the timing output cards.
- SRC A: Lamp that lights green if the TNC-E/C is tracking the output of clock input card A; lights red if the reference from clock input card A is disqualified; is off if the reference from clock input card A is missing; flashes green if the input reference from clock input card A is drifting.
- SRC B: Lamp that lights green if the TNC-E/C is tracking the output of clock input card B; lights red if the reference from clock input card B is disqualified; is off if the reference from clock input card B is missing; flashes green if the input reference from clock input card B is drifting.
- OSC: Lamp that lights red if the oscillator has failed, which disables the TNC-E/C card output; flashes green if the card requires factory maintenance (flashes for approximately two weeks).

Figure 8. TNC-E/C Card Controls and Indicators



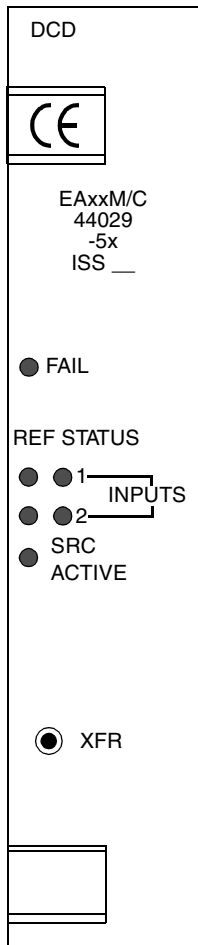
- FAIL: Lamp that lights red if the card has failed.
- INP TOL: Lamp that lights red if the input signal frequency exceeds the input tolerance. This parameter is verified every 10 seconds.
- FREE RUN: Lamp that flashes green when the card is in warm-up (approx. 30 minutes). The lamp then changes to a steady green to indicate that the card is not yet locked to an incoming signal and has never been locked since being powered. This lamp goes off when either the REF A or REF B lamp lights.
- HOLD OV: Lamp that lights red if the input signal is not present or is out of pull-in range.
- LOCKED: Lamp that lights green when the difference between the input signal and the synthesizer output is less than the lock range (approximately 10 minutes to 30 minutes after power-up).
- ACTIVE: This lamp lights green when the 4 kHz output signal is present.
- REF A: Lamp that lights green if card is tracking the output of clock input card A.
- REF B: Lamp that lights green if card is tracking the output of clock input card B.

Figure 9. TNC/C Card Controls and Indicators



- FAIL:** Lamp that lights red if this card fails or if there is a loss of all input references to this card. All outputs are squelched when this lamp lights.
- PORT ALM:** Lamp that lights red if at least one of the outputs fail or have been externally shorted; card can be configured (via switch or TL1 command) to send a minor or major alarm upon the detection of a port alarm.
- ST A:** Lamp that lights green when clock card A is present, qualified, and selected as the input reference for this card. This lamp lights red if clock card A is present but not qualified, and is off if clock card A is either qualified and not selected, or not present.
- ST B:** Lamp that lights green when clock card B is present, qualified, and selected as the input reference for this card. This lamp lights red if clock card B is present but not qualified, and is off if clock card B is either qualified and not selected, or not present.
- INP A:** Lamp that lights green when clock input A is present, qualified, and selected as the input reference for this card. This lamp lights red if clock input A is present but not qualified, and is off if timing input A is either qualified and not selected, or not present.
- INP B:** Lamp that lights green when clock input B is present, qualified, and selected as the input reference for this card. This lamp lights red if clock input B is present but not qualified, and is off if timing input B is either qualified and not selected, or not present.
- CAS:** Lamp that lights green when the outputs are set for CAS framing.
- CCS:** Lamp that lights green when the outputs are set for CCS framing.
- CRC-4:** Lamp that lights green when the outputs are set for CRC-4 framing.
- ACTV:** Lamp that lights green when the card is active and providing at least one output (card and port must be entered and restored).

Figure 10. EA10/C and EA20/C Card Controls and Indicators



- FAIL: Lamp that lights red if this card fails or if there is a loss of all input references to this card. All outputs are squelched when this lamp lights.

- PORT ALM: Lamp that lights red if at least one of the outputs fail or have been externally shorted; card can be configured (via switch or TL1 command) to send a minor or major alarm upon the detection of a port alarm.

- ST A: Lamp that lights green when clock card A is present, qualified, and selected as the input reference for this card. This lamp lights red if clock card A is present but not qualified, and is off if clock card A is either qualified and not selected, or not present.

- ST B: Lamp that lights green when clock card B is present, qualified, and selected as the input reference for this card. This lamp lights red if clock card B is present but not qualified, and is off if clock card B is either qualified and not selected, or not present.

- INP A: Lamp that lights green when clock input A is present, qualified, and selected as the input reference for this card. This lamp lights red if clock input A is present but not qualified, and is off if timing input A is either qualified and not selected, or not present.

- INP B: Lamp that lights green when clock input B is present, qualified, and selected as the input reference for this card. This lamp lights red if clock input B is present but not qualified, and is off if timing input B is either qualified and not selected, or not present.

- CAS: Lamp that lights green when the outputs are set for CAS framing.

- CCS: Lamp that lights green when the outputs are set for CCS framing.

- CRC-4: Lamp that lights green when the outputs are set for CRC-4 framing.

- ACTV: Lamp that lights green when the card is active and providing at least one output (card and port must be entered and restored).

Figure 11. EA10M/C and EA20M/C Card Controls and Indicators

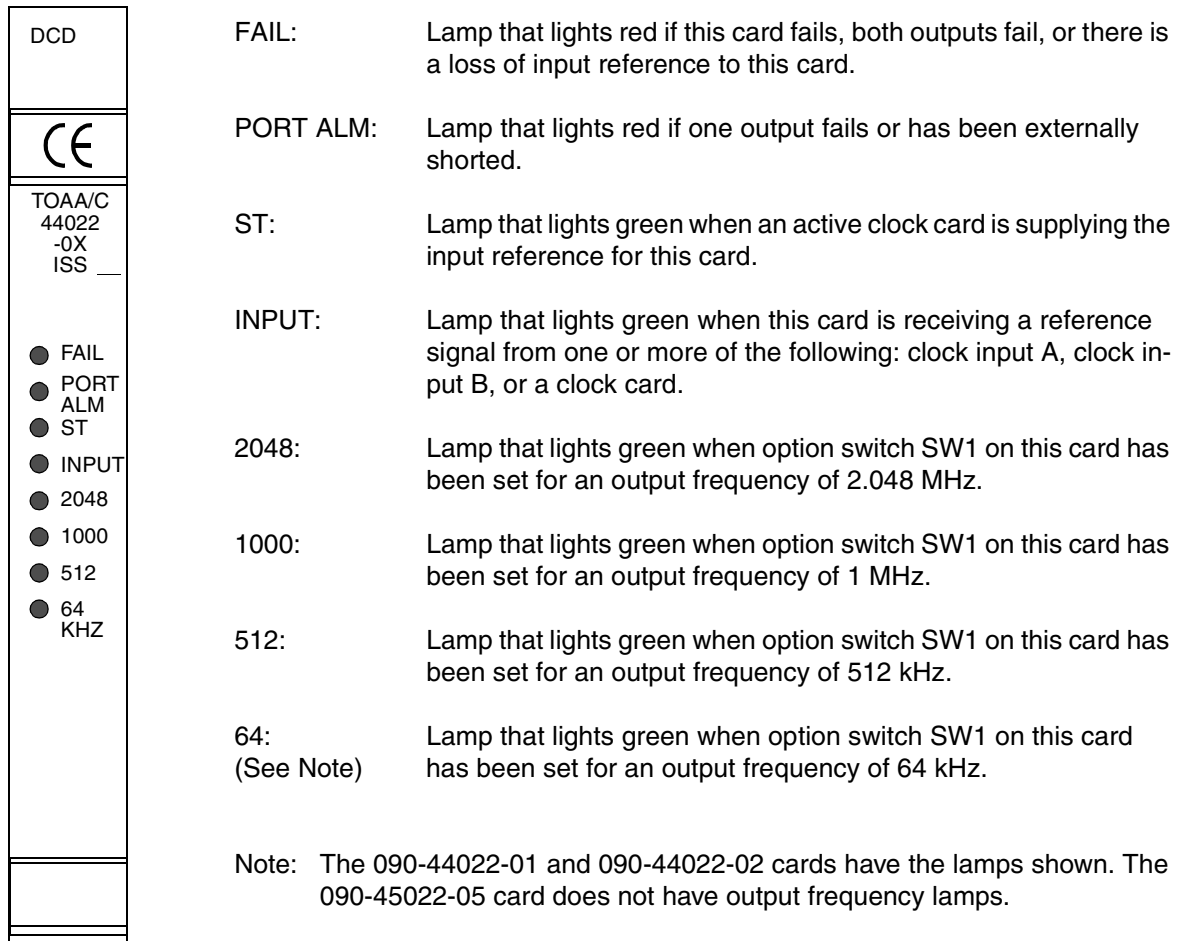
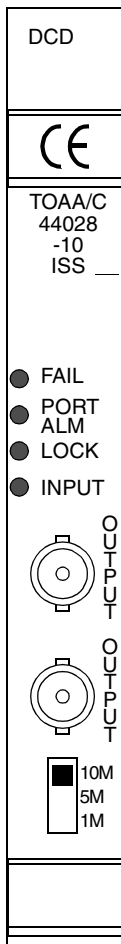
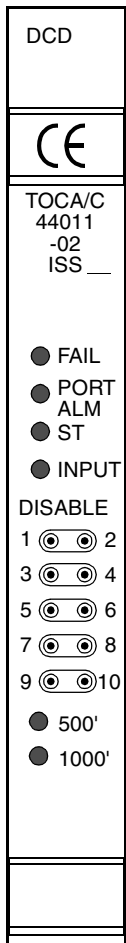


Figure 12. 090-44022-xx TOAA/C Card Controls and Indicators



- FAIL:** Lamp that lights red if this card fails or there is a loss of all input references to this card (major alarm).
 - PORT ALM:** Lamp that lights red if one output fails (minor alarm).
 - LOCK:** Lamp that lights red if the card is not locked to the input from the DCD internal timing bus.
 - INPUT:** Lamp that lights green when this card is receiving a reference signal from one or more of the following: clock input A, clock input B, clock card A or clock card B.
 - OUTPUT (2):** BNC connector for output signal.
 - 10M/5M/1M:** Switch to select frequency of output signal:
 - 10M selects 10 MHz signal
 - 5M selects 5 MHz signal
 - 1M selects 1 MHz signal
- Notes:**
1. No outputs from this card are available at the rear panel.
 2. Do not change the settings of any switches other than the one on the front panel.
 3. No output protection is available for this card.

Figure 13. 090-44028-10 TOAA/C Card Controls and Indicators

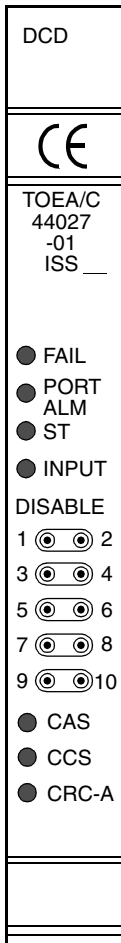


- FAIL:** Lamp that lights red if this card fails, all ports fail, or there is a loss of input reference to this card (major alarm).
 - PORT ALM:** Lamp that lights red if one to nine outputs fail or have been externally shorted (minor alarm).
 - ST:** Lamp that lights green when an active clock card is supplying the input reference for this card.
 - INPUT:** Lamp that lights green when this card is receiving a reference signal from one or more of the following: clock input A, clock input B, or a clock card.
 - DISABLE 1–10:** Input jacks that accept disabling pins which disable the corresponding output (1–10).
 - 500':** Lamp that lights green when option switch SW1-4 on this board is set to the down (ON) position. (Refer to the table below.)
 - 1000':** Lamp that lights green when option switch SW1-3 on this board is set to the down (ON) position. (Refer to the table below.)
- Note: Both the 500' and 1000' lamps will be off if SW1-3 and SW1-4 are set to the up (OFF) position. (Refer to the table below.)

Switch Settings and Indicators for Cable Length Compensation

Section		Lamp Lit		Cable Compensation
4	3	500'	1000'	
OFF	OFF	No	No	0 m to 457 m
ON	OFF	Yes	No	458 m to 610 m
OFF	ON	No	Yes	611 m to 762 m
ON	ON	Yes	Yes	763 m to 914 m

Figure 14. TOCA/C Card Controls and Indicators



- FAIL:** Lamp that lights red if this card fails, all ports fail, or there is a loss of input reference to this card (major alarm).
 - PORT ALM:** Lamp that lights red if one to ten outputs fail.
 - ST:** Lamp that lights green when an active clock card is supplying the input reference for this card.
 - INPUT:** Lamp that lights green when this card is receiving a reference signal from one or more of the following: clock input A or clock input B.
 - DISABLE 1–10:** Input jacks that accept disabling pins which disable the corresponding output (1–10).
 - CAS:** Lamp that lights green when the outputs are set for CAS framing.
 - CCS:** Lamp that lights green when the outputs are set for CCS framing.
 - CRC-4:** Lamp that lights green when the outputs are set for CRC-4 framing.
- Note:** The TOEA/C card cannot be used in 1:1 protection mode.

Figure 15. TOEA/C Card Controls and Indicators

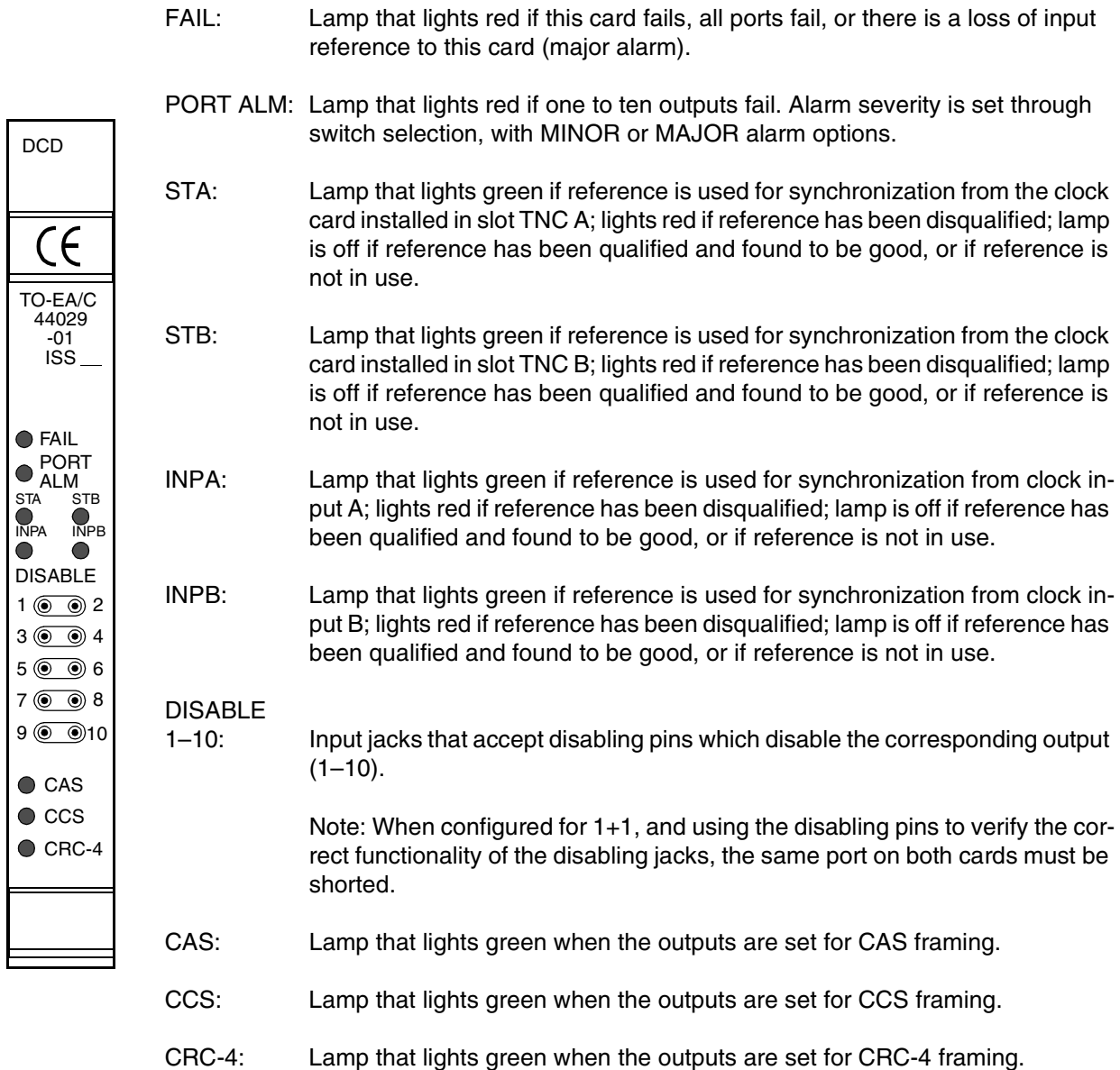
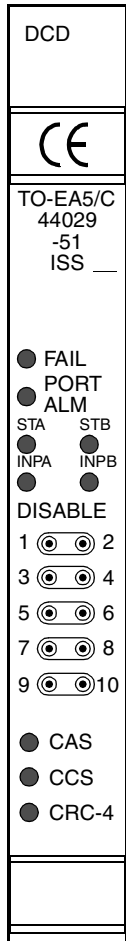


Figure 16. TO-EA/C Card Controls and Indicators



- FAIL: Lamp that lights red if this card fails, all ports fail, or there is a loss of input reference to this card (major alarm).

- PORT ALM: Lamp that lights red if one to ten outputs fail. Alarm severity is set through switch selection or TL1 commands, with MINOR or MAJOR alarm options.

- STA: Lamp that lights green if reference is used for synchronization from the clock card installed in slot TNC A; lights red if reference has been disqualified; lamp is off if reference has been qualified and found to be good, or if reference is not in use.

- STB: Lamp that lights green if reference is used for synchronization from the clock card installed in slot TNC B; lights red if reference has been disqualified; lamp is off if reference has been qualified and found to be good, or if reference is not in use.

- INPA: Lamp that lights green if reference is used for synchronization from clock input A; lights red if reference has been disqualified; lamp is off if reference has been qualified and found to be good, or if reference is not in use.

- INPB: Lamp that lights green if reference is used for synchronization from clock input B; lights red if reference has been disqualified; lamp is off if reference has been qualified and found to be good, or if reference is not in use.

- DISABLE 1–10: Input jacks that accept disabling pins which disable the corresponding output (1–10).

 Note: When configured as a redundant pair, and using the disabling pins to verify the correct functionality of the disabling jacks, the same port on both cards must be shorted.

- CAS: Lamp that lights green when the outputs are set for CAS framing.

- CCS: Lamp that lights green when the outputs are set for CCS framing.

- CRC-4: Lamp that lights green when the outputs are set for CRC-4 framing.

Figure 17. TO-EA5/C Card Controls and Indicators

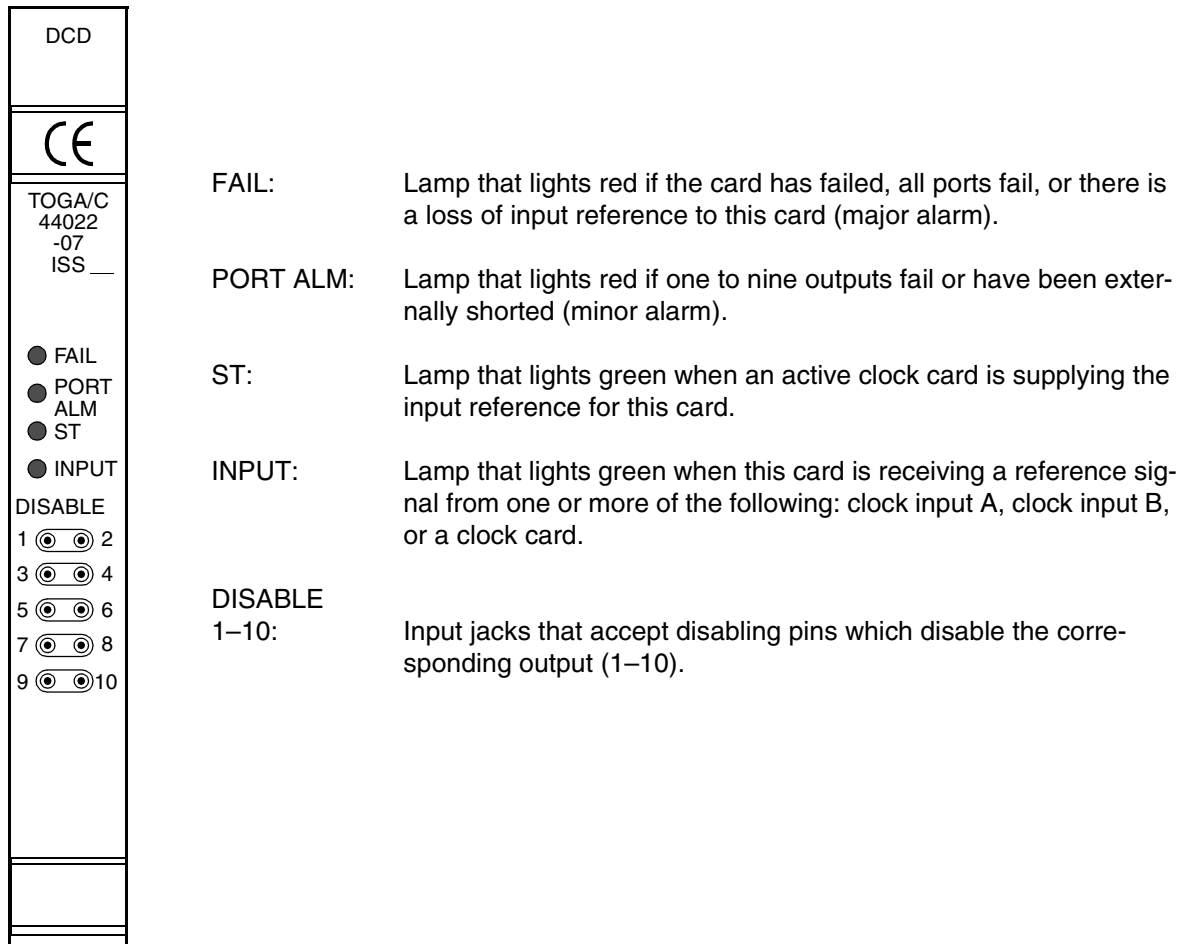
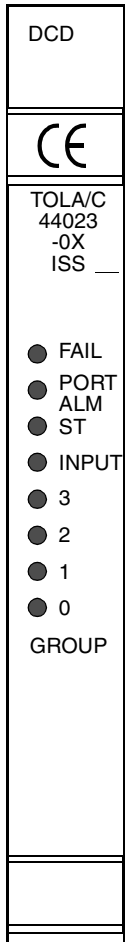


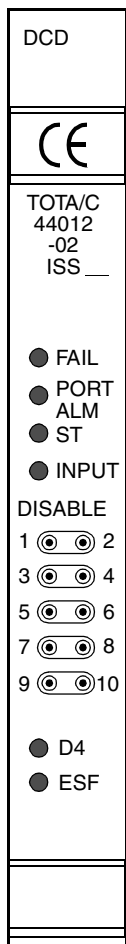
Figure 18. TOGA/C Card Controls and Indicators



- FAIL: Lamp that lights red if this card fails, all ports fail, or there is a loss of input reference to this card (major alarm).
- PORT ALM: Lamp that lights red if one to four outputs fail (minor alarm).
- ST: Lamp that lights green when an active clock card is supplying the input reference for this card.
- INPUT: Lamp that lights green when this card is receiving a reference signal from one or more of the following: clock input A, clock input B, or a clock card.
- GROUP 3: Lights when Group 3 frequencies are selected.
- GROUP 2: Lights when Group 2 frequencies are selected.
- GROUP 1: Lights when Group 1 frequencies are selected.
- GROUP 0: Lights when Group 0 frequencies are selected.

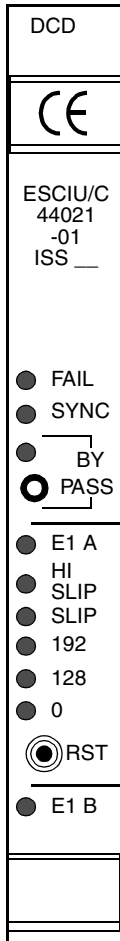
Note: For information on the TOLA/C card frequencies, refer to the Description and Specifications section of this manual.

Figure 19. TOLA/C Card Controls and Indicators



- FAIL: Lamp that lights red if this card fails, all ports fail, or there is a loss of input reference to this card (major alarm).
 - PORT ALM: Lamp that lights red if one to nine outputs fail or have been externally shorted (minor alarm).
 - ST: Lamp that lights green when an active clock card is supplying the input reference for this card.
 - INPUT: Lamp that lights green when this card is receiving a reference signal from one or more of the following: clock input A or clock input B.
 - DISABLE 1–10: Input jacks that accept disabling pins which disable the corresponding output (1–10).
 - D4: Lamp that lights green when the outputs are set for D4 framing.
 - ESF: Lamp that lights green when the outputs are set for ESF framing.
- Note: If both the D4 and ESF lamps are lit, check option switches; only one or the other should be set.

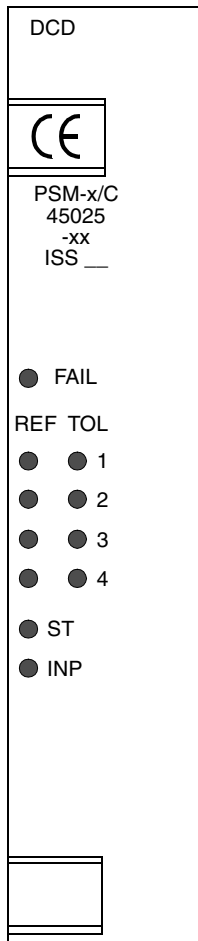
Figure 20. TOTA/C Card Controls and Indicators



- FAIL: Lamp that lights red if this card fails, or there is a loss of input reference to this card (major alarm).
- SYNC: Lamp that lights green when a system reference is present, and red when it is not present.
- BYPASS: Lamp that lights red if the electronic bypass is activated. When Bypass is activated, the card's reclocking feature is inhibited.

Jack that allows the user to bypass the card's buffer. This function is provided for test purposes only, and is not recommended for general use.
- E1 A: Lamp that lights green when E1 A is a valid signal; red when E1 A has LOS, OOF (major, minor, or none alarm option settings).
- HI SLIP: Lamp that lights red when E1A has had 8 or more frame slips (major, minor, or none alarm option settings).
- SLIP: Lamp that lights red when E1 A has 1 or more frame slips (major, minor, or none alarm option settings).
- 192: Lamp that lights yellow when E1 A has 192 to 256 bit slips (major, minor, or none alarm option settings [it is strongly recommended that the none option setting be used]).
- 128: Lamp that lights green when E1 A has 128 to 191 bit slips.
- 0: Lamp that lights green when E1 A has less than 128 bit slips.
- RST: Pushbutton that clears the HI SLIP and SLIP alarms and lamps. It does not clear the 192 bit slip alarm and lamp.
- E1 B: Lamp that lights green when E1 B is a valid signal; red when E1 B has LOS (major, minor, or none alarm option settings); and is off when ESCIU/C is in monitor mode.

Figure 21. ESCIU/C Card Controls and Indicators



FAIL: Lamp that lights red if this card fails, all ports fail, or there is a loss of input reference to this card (major alarm).

REF: Lamps that indicate the status of reference inputs 1, 2, 3, and 4: off if the input is not enabled; lights green if the input is enabled and has no E1 errors; lights red if the input is enabled but has excessive E1 errors.

TOL: Lamps that indicate the stability of reference inputs 1, 2, 3, and 4: off if the input is not enabled, or enabled and within stability tolerance; lights yellow if the input is enabled and out of stability tolerance.

ST: Lamp that is off if no DCD shelf clock cards are active; lights green if at least one DCD shelf clock card is active.

INP: Lamp that is off if no clock input cards are active; lights green if at least one clock input card is active.

Note: The PSM-E/C cards (090-44025-02 and 090-44025-52) and PSM-EA/C cards (090-44025-54) contain the same controls and indicators.

Figure 22. PSM/C Card Controls and Indicators