

DIGITAL CLOCK DISTRIBUTOR

500 SERIES

TROUBLESHOOTING

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1. GENERAL

1.01 This practice provides troubleshooting information for Telecom Solutions' Digital Clock Distributor (DCD) 500 System when equipped with MIS card 090-44018-15. The language used in this practice is Transaction Language 1 (TL1).

1.02 This practice has been reissued to delete Part 4, Card Replacement, including Chart 1 (for card-replacement procedures, refer to the manual that came with the shelf where the card is installed). Also, Table A, Messages, was modified.

1.03 The following abbreviations are used in this document:

GPS	Global Positioning System
GTI	GPS Timing Interface
GTR	GPS Timing Antenna/Receiver
LTI	LORAN-C Timing Interface

2. TROUBLESHOOTING

2.01 Troubleshooting consists of using lamps on the front of the equipment, shelf backplane contact closures, and TL1 messages. To troubleshoot using lamps on the front of the equipment or shelf backplane contact closure, refer to the Maintenance section of the manual that came with the shelf. This practice contains TL1 message information only.

3. ALARM MESSAGES

3.01 Table A lists the alarm and status messages which may occur. Included in Table A is an explanation of the message and a suggested action to take. When replacing equipment, use the replacement procedures in the Maintenance section of the manual that came with the shelf.

3.02 If a command generates an error code, refer to Table B for a suggested action to take. Table C lists the possible state codes.

Note: Depending on the quality of the input signal, performance monitoring alarms may persist for long periods (days). The INIT-REG command can be used to clear the performance monitoring registers and the alarm.

Note: Because there is no hysteresis on BPV and CRC performance monitoring parameters, it is possible for a signal to cause a performance monitoring alarm for these parameters to activate, clear, and reactivate in a short period of time.

Table A. Messages

MESSAGE (conddescr)	EXPLANATION	ACTION
ALARM INDICATION SIGNAL RECEIVED	An alarm indication signal has been received on the specified input.	Check specified input.
ALL INPUTS TO THE GTI HAVE BEEN LOST	The OSC A input, the OSC B input, and the antenna input have been lost.	Check the OSC A input, the OSC B input, and the input from the antenna.
ALL INPUTS TO THE LTI HAVE BEEN LOST	The OSC A input, the OSC B input, and the antenna input have been lost.	Check the OSC A input, the OSC B input, and the input from the antenna.
BPV DETECTED	The bipolar-violations have been detected on the specified input.	Check specified input.
CARD INFORMATION DOES NOT MATCH DATABASE	Configuration and/or inventory information in the card does not match the system database.	Confirm that the correct card is in the specified slot. If card is correct, use the COPY-MEM command to copy the card information from the card to the system database, or from the system database to the card.
CARD FAIL:PRIMARY REFERENCE PLL OUT OF LOCK	The card has failed.	Replace the specified card.
CARD FAIL: REFERENCE VOLTAGE FAILURE	The card has failed.	Replace the specified card.
CARD FAIL: OSCILLATOR PLL OUT OF LOCK	The card has failed.	Replace the specified card.
CARD FAIL: FRAMER FAILURE	The card has failed.	Replace the specified card.
CARD FAIL:A/D FAILURE	The card has failed.	Replace the specified card.
CARD FAIL:CLOCK SYNTHESIZER FAILURE	The card has failed.	Replace the specified card.
CARD FAIL:INTERNAL FAILURE	The card has failed.	Replace the specified card.
CARD FAIL:PLL OUT OF LOCK	The card has failed.	Replace the specified card.
CARD FAILED	The card has failed.	Replace the specified card.
CARD FAULT: REFERENCE PLL OUT OF LOCK	The card has failed.	Replace the specified card.

Table A. Messages (Contd)

MESSAGE (conddescr)	EXPLANATION	ACTION
CARD IS MISSING	The card has been removed from the shelf.	Reinsert card, or reprovision slot
CARD IS NOT SUPPLYING A SIGNAL TO THE CLOCK(S)	The input card is not supplying a signal to the clock card(s).	Use the RTRV-ALM command to check for a failed card. If there are no failed cards, check reference signals into shelf.
CARD IS SUPPLYING A SIGNAL TO THE CLOCK(S)	The input card is supplying a signal to the clock card(s).	None required.
CLOCK IS SUPPLYING SIGNAL TO OUTPUT CARDS	The clock card is supplying a timing signal to the timing output cards.	None required.
CLOCK DISQUALIFIED:FREQ THRESHOLD EXCEEDED	The input card has detected that the signal from the specified clock card has exceeded the fractional frequency threshold.	Replace specified clock card.
CLOCK IN FREERUN	The clock card is freerunning.	No action required (power-up state).
CLOCK LOCKED TO INPUT SIGNAL	The clock card has converged on the signal from the clock input card.	None required.
CLOCK IN HOLDOVER	The clock card is in holdover.	Replace specified clock card.
CLOCK IS NOT SUPPLYING SIGNAL TO OUTPUT CARD	The clock card is not supplying a timing signal to the timing output cards.	If only one timing output card is sending this message, replace the timing output card. If all timing output cards are sending this message, replace the clock card.
CLOCK NOT CONVERGED ON REFERENCE INPUT	The clock card has not converged on the signal from the clock input card.	None required.
CRC DETECTED	Cyclic-redundancy-check errors have been detected on the specified input.	Check specified input.
CURRENT TO ANTENNA IS OUT OF TOLERANCE	The current to the antenna is out of tolerance.	Troubleshoot using the DCD-LPR Manual.
EXPANSION MAJOR	The specified shelf has a major alarm.	Troubleshoot the shelf lamps per the DCD shelf manual.
EXPANSION MINOR	The specified shelf has a minor alarm.	Troubleshoot the shelf lamps per the DCD shelf manual.

Table A. Messages (Contd)

MESSAGE (conddescr)	EXPLANATION	ACTION
FAILURE TO SWITCH TO CLK x	The selected clock card is faulty and cannot be used.	Use the RTRV-COND and RTRV-ALM commands on the specified clock card. Also, use the RTRV-COND and RTRV-ALM commands on any standard input or timing output card to verify the failure. After verification that the clock card is faulty, replace the faulty clock card.
FAILURE TO SWITCH TO INPUT x	The selected input card is faulty and cannot be used.	Use the RTRV-COND and RTRV-ALM commands on the specified input card. Also, use the RTRV-COND and RTRV-ALM commands on any standard timing output card to verify the failure. After verification that the input card is faulty, replace the faulty input card.
FUSE BLOWN OR POWER FAIL	A fuse has blown on the specified shelf or the input power to the shelf has failed.	Check the shelf fuse or power into the shelf.
GPS FREQUENCY OUT OF TOLERANCE	The GTR has determined that the frequency of the oscillator in the GTR is out of tolerance compared to the frequency of the signal from the satellites.	None required.
GTI ACQUIRED	At least 1 satellite has been found.	None required.
GTI IN SEARCH MODE	The first satellite has not yet been found.	None required.
GTI IS LOCKED	At least 4 satellites have been found. The GTR is supplying a stable timing signal, and the system has locked to UTC time and the output is stable.	None required.
GTI TRACKING	Either 2 or 3 satellites have been found.	None required.
GTR COMMUNICATIONS FAIL	Communications between the GTI card and the GTR has failed.	Replace the GTR.
GTR FAIL:ANTENNA CURRENT FAIL	The GTR has failed.	Replace the GTR.
GTR FAIL:FLASH MEMORY FAIL	The GTR has failed.	Replace the GTR.
GTR FAIL:GTR PLL OUT OF LOCK	The GTR has failed.	Replace the GTR.

Table A. Messages (Contd)

MESSAGE (conddescr)	EXPLANATION	ACTION
GTR FAIL:NOT LOCKED TO UTC TIME	The GTR has failed or there is a satellite visibility problem.	Replace the GTR or check for sky obstructions.
GTR FAIL:RAM MEMORY FAIL	The GTR has failed.	Replace the GTR.
GTR IS LOCKED	The GTR is supplying a stable timing signal.	None required.
GTR LOCATION, SKY PROBLEM OR GND/ OSCILLATOR NOISE	There is a GTR location problem, a sky problem, a noise problem because of grounding, or a noisy oscillator.	If temporary, no action required. If problem continues: 1. Check the location of the GTR for sky obstructions. 2. Check shelf grounding. 3. Use the RTRV-GPS-STAT command to check OSC A & B for excessive noise.
GTR POWER FAULT	Current to the GTR is out of tolerance.	Troubleshoot per the DCD-LPR Manual.
GTR UNLOCK	The GTR does not have a position and/or timing solution.	If temporary, no action required. If problem continues, check the location of the GTR for sky obstructions.
INPUT IS DRIFTING	The clock card has detected drift in the specified signal.	Check the specified reference signal.
INPUT SWITCHED	The specified TO card has switched to a different timing source. This happened as a result of a command (OPR-SYNCNSW) or a card fault.	If this happened as a result of a command, no action is required. If this did not happen as a result of a command (card fault), use the RTRV-COND and RTRV-ALM commands to determine the faulty card, then replace the faulty card.
INPUT TIMING SIGNAL SWITCHED	The specified input card has switched to a different input timing signal.	Check previous alarms. This may be a switch away from a faulty reference or a return to a reference which was previously faulty but is now good (in which case, no action is required). If previous alarms indicate that this is a switch away from a faulty reference, troubleshoot the faulty reference.
INSUFFICIENT SATELLITES	There are less than 3 satellites in view which is an insufficient number.	None required.
LOCAL OSCILLATOR SIGNAL LOSS	The signal on the specified OSC input to the GTI card has been lost.	Check connection from DCD shelf to LPR. Check the specified OSC input signal. If ok, replace clock card.
LOSS OF ALL EXTERNAL INPUT REFERENCES	All external input references to the input card have been lost.	Check all inputs.

Table A. Messages (Contd)

MESSAGE (conddescr)	EXPLANATION	ACTION
LOSS OF BOTH LOCAL OSCILLATOR SIGNALS	The LPR shelf has detected a loss of the OSC1 and OSC2 signals from the DCD shelf.	Check the OSC1 and OSC2 signals into the LPR shelf.
LOSS OF INPUT FROM THE CLOCK	The input or monitor card has lost the signal from the specified clock card.	Use the RTRV-ALM command to determine which clock card has failed, then replace the faulty clock card.
LOSS OF LOCAL OSCILLATOR SIGNAL	The LPR shelf has detected a loss of the specified signal (OSC1 or OSC2) from the DCD shelf.	Check the specified signal (OSC1 or OSC2) into the LPR shelf.
LPR FUSE BLOWN OR POWER FAIL	A fuse has blown on the specified shelf or the input power to the shelf has failed.	Check the shelf fuse or power into the shelf.
LTI FAIL:PRIMARY REFERENCE PLL OUT OF LOCK	The card has failed.	Replace the specified card.
LTI FAIL: SYNTHESIZER PLL OUT OF LOCK	The card has failed.	Replace the specified card.
LTI FAIL: TRANSFER OSC PLL OUT OF LOCK	The card has failed.	Replace the specified card.
LTI FAIL:LOSS OF SIGNAL TO DSP OR DSP FAIL	The card has failed.	Replace the specified card.
LTI FAIL:LOSS OF COMM TO DSP OR DSP FAIL	The card has failed.	Replace the specified card.
LTI IS IN SEARCH MODE	The LTI card is searching for LORAN signals.	None required.
MIS HAS RESET	The specified card has been power cycled or the card diagnostics has reset the processor on the card.	None required if there are no other indications of trouble. However, if there is no response to subsequent commands, replace the MIS card.
OOF DETECTED	An out-of-frame condition has been detected on the specified input.	Check specified input.
OSCILLATOR OUT OF FREQUENCY TOLERANCE	The specified OSC input signal to the GTI card is out of tolerance. (Threshold is 1×10^{-9} for rubidium; 5×10^{-5} for quartz.)	Check the specified OSC input signal.
OUTPUT CARD PROTECTION SWITCH	The protection card is now providing timing output signals instead of the specified card.	If switched by command, none required. If failed, replace the specified timing output card.

Table A. Messages (Contd)

MESSAGE (conddescr)	EXPLANATION	ACTION
OUTPUT CARD IS USING CLK x	The timing output card is using the timing signal from the specified clock card.	None required.
OUTPUT CARD IS USING INPUT x	The timing output card is using the timing signal from the specified clock input card.	None required.
OUTPUT FROM THE GTR HAS BEEN LOST	The GTI has detected a failure of the input signal from the GTR.	Check the GTR signal into the GTI.
OUTPUT FROM THE LTI HAS BEEN LOST	There is no signal output from the LTI card.	Replace the LTI card.
OUTPUT PORT HAS FAILED	The specified output port has failed.	Replace the specified timing output card.
PROTECTION CARD CONFIGURATION MISMATCH OR PAIRED CARD MISSING	An attempt was made to do a protection switch to a different card type or to an unequipped slot.	Ensure that the slot to which the switch was being attempted is equipped with the same card type.
REF INPUT FRACTIONAL FREQ THRESHOLD EXCEEDED	The specified input frequency is changing at a rate (relative to the local reference) beyond the set threshold.	Check specified input.
REFERENCE INPUT SIGNAL HAS BEEN LOST	The specified input signal has been lost.	Check specified input.
SHELF INPUT ALARM	A shelf minor alarm has been generated by an input card or a clock card.	Troubleshoot the shelf lamps per the DCD shelf manual.
SHELF MAJOR	There is a major alarm on the specified shelf.	Troubleshoot the shelf lamps per the DCD shelf manual.
SHELF MINOR	There is a minor alarm on the specified shelf.	Troubleshoot the shelf lamps per the DCD shelf manual.
SIGNAL FROM THE GTR HAS BEEN LOST	The GPS signal from the GTR to the GTI card has been lost.	Replace the GTR.
SYSTEM INPUT TO CLOCK OUT OF TOLERANCE	The clock card has detected that the signal from the clock input card is out of tolerance.	Check reference signals into shelf.
TIMING OUTPUT SOURCE SELECTED BY COMMAND	The timing source being used by the timing output cards has been forced by command.	None required. If desired, the forced timing source can be released by using the RLS-SYNCNSW command.

Table A. Messages (Contd)

MESSAGE (conddescr)	EXPLANATION	ACTION
TIMING SIGNAL FROM CLOCK CARD DISQUALIFIED	The timing signal from the clock card has been disqualified by a timing output card.	If one timing output card reports this condition, replace the timing output card. If all timing output cards report this condition, replace the specified clock card.
TIMING SIGNAL FROM INPUT CARD DISQUALIFIED	The timing signal from the input card has been disqualified by a timing output card.	If one timing output card reports this condition, replace the timing output card. If all timing output cards report this condition, replace the specified input card.
TIMING SIGNAL FROM INPUT CARD LOSS	The clock card has detected that the signal from the clock input card has failed.	Check reference signals into shelf.
TIMING SIGNAL NOT YET STABLE (SKY PROBLEM)	The timing signal from the specified GTI card is not stable.	If temporary (less than 24 hours), no action required. If condition persists: 1. Use the RTRV-GPS-STAT command to check the minimum of each: number of satellites in view (4) and the S/N (40 dB Hz). 2. Use the RTRV-GPS-STAT command to check OSC 1 and OSC 2 for excessive noise (check FFREQ and MDEV). 3. Check the location of the GTR for sky obstructions.
x SECOND THRESHOLD EXCEEDED	The xx second threshold has been exceeded.	Check specified input.

Table B. Error Codes

CODE	MEANING	ACTION
ENEQ	The specified card or port has not been entered into the system database or is missing.	Re-enter the command with the proper aid. Or, enter the specified card or port into the database. Or, install the missing card.
ENPS	The specified card type is not compatible with the requested switch operation.	Verify the systems protection type using RTRV-ATTR-CONT. If the system is not configured for protection the system configuration will need to be reprovisioned to allow protection switching (use SET-ATTR-CONT). Use the RTRV-COND-EQPT to determine the which card(s) is the working card and which is the protection card(s). Then re-enter the appropriate command.
IIAC	The access identifier, <aid>, is invalid.	Re-enter the command with a valid aid.
ICNV	The command verb or modifier is not valid.	Use a valid command.
IDNV	A parameter value is not valid or is inconsistent: <ul style="list-style-type: none"> Used invalid range (may involve & or &&) Mismatched <montype> and <montm> 	Re-enter the command with valid parameters per User's Guide.
	A parameter value is not valid or is inconsistent: <ul style="list-style-type: none"> Used unsupported or invalid <montype> 	Compare response of RTRV-TH-PORT (with a <montype> of ALL) to all the possible entries shown in the User's Guide. If the number of <montypes> is not the same, refer to the Card Differences section of the Card Information practice in this manual.
	A parameter value is inconsistent with the card type: <ul style="list-style-type: none"> Used inappropriate framing or signal type 	Re-enter the command ensuring that the framing or signaling type match the card type.
IEAE	The specified card, port, or user already exists.	To change a parameter, use the ED command. To change card types (change <aid>), use the DLT command to delete the present card, then use the ENT command to enter the new card.
IICT	The ctag is not valid.	Re-enter the command with a valid aid.
IISP	A character or punctuation mark violated syntax rules.	Re-enter the command with valid syntax and punctuation.
IITA	The tid is not valid.	Re-enter the command with a valid tid.
IPMS	A required parameter is missing.	Re-enter the command with all required parameters.
PIUC	The user's access level is incorrect for the command entered.	Contact system administrator.
PIUI	An illegal user name or password was used during log on.	Verify that user name and password are correct and re-enter command, or contact system administrator.
PLNA	An attempt was made to enter a command without being logged on.	Logon and repeat command.

Table B. Error Codes (Contd)

CODE	MEANING	ACTION
SARB	The system is busy and cannot complete the command.	Try again later.
SCSN	An invalid sequence was used.	Re-enter the command with using the proper sequence (e.g. enter, restore, remove, delete).
SDNA	An attempt was made to switch (OPR-SYNCNSW or RLS-SYNCNSW) to a timing source card (input or clock) which is not restored or has failed.	Ensure that the card is in-service and has not failed.
SPFA	A switch request was made to a card that was designated as a protection output card, however, the card has failed and the switch request is denied	Check the system log (RTRV-LOG) to confirm the failed card. Replace the card and re-issue the command.
SROF	An attempt was made to communicate with a nonstandard card (see note) or a standard card that has failed. Note: Version 5 PSM-E/C, Version 5 MRC-EA/C, and Version 5 TO-EA/C cards are standard cards; all other cards are nonstandard.	Use RTRV-EQPT to verify that card type is correct for the entered command. 1. If the response shows the slot is equipped with a standard card (see note), skip to Step 2. If response shows that the card is unequipped, the card either is not equipped or is nonstandard. <ul style="list-style-type: none"> • If the slot is not equipped, re-address the command to an equipped slot, or equip the addressed slot. • If the card is nonstandard, the denied command cannot be addressed to that card type. 2. Use the RTRV-COND command to check the status of the card. <ul style="list-style-type: none"> • If the standard card is restored: <ul style="list-style-type: none"> – If the card status shows it has failed, replace the card. – If the card status shows it has not failed, repeat the command or contact the system administrator. • If the standard card is not restored, the status will show nothing. Therefore, the card has failed and must be replaced.
	An attempt was made to make configuration changes through an MIS card in an expansion or remote shelf.	Re-enter the command through the master shelf.
	An attempt was made to communicate with particular a card the hardware and/or software of which is incompatible with the MIS.	Examine the system log for a database mismatch <condtype> event, and query the card using the RTRV-COND-EQPT to determine the state of this card.

Table B. Error Codes (Contd)

CODE	MEANING	ACTION
SROF (contd)	An attempt was made to execute a command that could not be executed.	Examine the configuration of the system using all of the applicable RTRV commands to determine if a configuration mismatch exists. If it does, correct it by issuing the appropriate command (refer the tasks chart in the operations section of the manual) If the response persists a system incompatibility may exist, call CTAC to trouble shoot the problem.
SWFA	A switch request was made back to a card that was designated as a working output card, however, the card has failed and the switch request is denied	Check the system log (RTRV-LOG) to confirm the failed card. Replace the card and re-issue the command.

Table C. State Codes

STATE CODE	EXPANDED STATE CODE	MEANING
IS-NR	In service, normal	The nonredundant card or port is in service and operating normally.
IS-NR-ACT	In service, normal, active	The redundant card or port is in service, is operating normally, and is active.
IS-NR-STBY	In service, normal, standby	The redundant card or port is in service, is operating normally, and is standing by (not active).
OOS-MT	Out of service, maintenance	The card or port has been removed by command and is out of service.
OOS-MT-FLT	Out of service, maintenance, fault	The card or port has failed and is out of service.
OOS-MT-LOCK	Out of service, maintenance, locked	The card is locked in an out-of-service state and cannot automatically return to service.
OOS-MT-MTCE	Out of service, maintenance, manually removed	The card or port is not installed.
Note: The state of a card or port can be determined by using the RTRV-COND command.		