

# DIGITAL CLOCK DISTRIBUTOR

## 500 SERIES

### TROUBLESHOOTING

#### RELEASE 5.03.xx

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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 090-44018-05 or 090-45018-05. The language used in this practice is Transaction Language 1 (TL1).

**1.02** Whenever this practice is reissued, the reason for reissue will be given in this paragraph.

#### 2. TROUBLESHOOTING

**2.01** Troubleshooting consists of using lamps on the front of the equipment, shelf backplane contact clo-

tures, 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. The equipment and port states are listed in Table C.

**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
ACQUIRED AT LEAST ONE SATELLITE	At least 1 satellite has been found.	None required.
ALARM INDICATION SIGNAL RECEIVED	An alarm indication signal has been received on the specified input.	Check specified input signal.
BPV THRESHOLD EXCEEDED	The bipolar-violation threshold has been exceeded on the specified input.	Check specified input signal.
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 CPY-MEM command to copy the card information from the card to the system database, or from the system database to the card (which ever is appropriate). <b>Caution: Ensure that the card information in the database is correct before copying from the MIS to other cards. This could cause service interruption if the existing card information is not correct.</b>
CARD FAIL:A/D FAILURE	The specified card has failed.	Replace the specified card.
CARD FAIL:CLOCK SYNTHESIZER FAILURE	For an MRC card: the two 4-kHz signals (from the clock cards) have been lost. For a PSM card: the four 4-kHz signals (from the input cards and the clock cards) have been lost, or the PSM card has failed.	<u>Message generated by MRC card:</u> Check frequency of 5-MHz outputs at shelf backplane. If out of tolerance, check the STA and STB lamps on the MRC card. Replace the clock card corresponding to the red STA or STB lamp. If the 5-MHz outputs are ok, check the MRC reference signals. Troubleshoot bad reference signals. If there are no bad reference signals, replace the specified MRC card.  <u>Message generated by PSM card:</u> Check ST and INP lamp on PSM card. If either is lit green, replace PSM card. If both are off, wait for MRC or clock cards to become active.
CARD FAIL:FRAMER FAILURE	The specified card has failed.	Replace the specified card.
CARD FAIL:INTERNAL FAILURE	The specified card has failed.	Replace the specified card.
CARD FAIL:OSCILLATOR PLL OUT OF LOCK	The specified card has failed.	Replace the specified card.

Table A. Messages (Contd)

MESSAGE (conddescr)	EXPLANATION	ACTION
CARD FAIL:PLL OUT OF LOCK	The specified card has failed.	If a single reference is being used, verify that the signal is within tolerance. If bad, troubleshoot signal. Otherwise, replace the specified card.
CARD FAIL:PRIMARY REFERENCE PLL OUT OF LOCK	The specified card has failed.	If a single reference is being used, verify that the signal is within tolerance. If bad, troubleshoot signal. Otherwise, replace the specified card.
CARD FAIL: REFERENCE VOLTAGE FAILURE	The specified card has failed.	Replace the specified card.
CARD FAILED	The specified card has failed.	Replace the specified card.
CARD FAULT:REFERENCE PLL OUT OF LOCK	The specified card has failed.	If a single reference is being used, verify that the signal is within tolerance. If bad, troubleshoot signal. Otherwise, replace the specified card.
CARD IS NOT SUPPLYING A SIGNAL TO THE CLOCK(S)	The input card is not supplying a signal to the clock card(s). (This may be a normal condition: if ST3 or ST3E cards are being used, only a single MRC card is active.)	Verify that the card provisioning is correct. If backplane switch is in ST3 position, do nothing. If backplane switch is not in ST3 position, use the RTRV-ALM command to check for a failed card. This could be a transitory condition during warm-up. If condition persists after warm-up, replace the specified card.
CARD IS SUPPLYING A SIGNAL TO THE CLOCK(S)	The input card is supplying a signal to the clock card(s).	None required.
CARD NOW USING SPECIFIED INPUT SIGNAL	The MRC card has switched to the specified input based on the select signal priority.	Determine why the switch occurred (a reference signal may have failed), and repair the faulty input.
CLOCK CONVERGED ON REFERENCE INPUT	The clock card has converged on the signal from the clock input card.	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.	<ol style="list-style-type: none"> <li>1. Check MRC provisioning for correct OSC1 and OSC2 types.</li> <li>2. Check MRC input signals for frequency tolerance.</li> <li>3. Wait a minimum of 24 hr for oscillators to stabilize.</li> <li>4. Check input signal frequency tolerance.</li> <li>5. If all the above have been done and are ok, and the alarm persists, replace specified clock card.</li> </ol>

Table A. Messages (Contd)

MESSAGE (conddescr)	EXPLANATION	ACTION
CLOCK FREERUNNING	The clock card is freerunning.	No action required (power-up state). If condition persists, check input card to determine why no 4-kHz signal is being provided.
CLOCK IN HOLDOVER	The clock card is in holdover.	Check the status of the input cards.
CLOCK IS NOT SUPPLYING SIGNAL	The clock card is not supplying a timing signal to the timing output cards (the specified clock is inactive).	None required.
CLOCK IS SUPPLYING SIGNAL	The clock card is supplying a timing signal to the timing output cards (the specified clock is active).	None required.
CLOCK NOT CONVERGED ON REFERENCE INPUT	The clock card has not converged on the signal from the clock input card.	None required.
CRC THRESHOLD EXCEEDED	The cyclic-redundancy-check error threshold has been exceeded 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.
DOWNLOAD COMPLETED	The MIS card downloading has been completed.	None required.
DOWNLOAD IN PROGRESS	The MIS card downloading is in progress (may take up to 5 minutes).	None required.
EXPANSION SHELF NOT PRESENT	There is no communication between the MIS card in the master shelf and the MIS card in the specified expansion shelf.	If not equipped with an expansion shelf, no action is required (this is a standing condition). If equipped with an expansion shelf, check for MIS card port failures in MIS in the master and expansion shelves; also check all cabling between the master and expansion shelves.
EXPANSION SHELF PRESENT	Communication between the MIS card in the master shelf and the MIS card in the specified expansion shelf is ok.	None required.
EXTERNAL OSCILLATOR OUT OF TOLERANCE	The specified OSC input signal to the GTI card is out of tolerance. (Threshold is $1 \times 10^{-9}$ for rubidium; $5 \times 10^{-5}$ for quartz.)	Check the specified OSC input signal.

Table A. Messages (Contd)

MESSAGE (conddescr)	EXPLANATION	ACTION
FAIL:LOSS OF SIGNAL TO DSP OR DSP FAIL	The card has failed.	Replace the specified card.
FAIL:PRIMARY REFERENCE PLL OUT OF LOCK	The card has failed.	Replace the specified card.
FAIL:PROCESSOR FAIL	The card has failed.	Replace the specified card.
FAIL:SYNTHESIZER PLL OUT OF LOCK	The card has failed.	Replace the specified card.
FAIL:TRANSFER OSC PLL OUT OF LOCK	The card has failed.	Replace the specified card.
FAILURE TO SWITCH TO CLK x	The selected clock card reference signal cannot be used by the timing output card.	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. If more than one TO card reports the condition, replace the specified clock card; if only one TO card reports the condition, replace the reporting TO card.
FAILURE TO SWITCH TO INPUT x	The selected input card reference signal cannot be used by the timing output card.	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. If more than one TO card reports the condition, replace the specified input card; if only one TO card reports the condition, replace the reporting TO 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.
GENERAL PURPOSE MAJOR ALARM ON SHELF	This alarm was activated by a blown fuse or a card in the shelf. This alarm is activated when any other alarm is present in the shelf.	For standard cards, use the accompanying TL1 message for troubleshooting. For non-standard cards, use shelf lamps for troubleshooting.
GENERAL PURPOSE MINOR ALARM ON SHELF	This alarm was activated by a blown fuse or a card in the shelf. This alarm is activated when any other alarm is present in the shelf.	For standard cards, use the accompanying TL1 message for troubleshooting. For non-standard cards, use shelf lamps for troubleshooting.
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. If condition persists, replace GTR.

Table A. Messages (Contd)

MESSAGE (conddescr)	EXPLANATION	ACTION
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	At least 2 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 OUT OF TOLERANCE	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.
GTR FAIL:RAM MEMORY FAIL	The GTR has failed.	Replace the GTR.
GTR FAULT:NOT LOCKED TO UTC TIME - GTR OR SKY PROBLEM	The GTR has failed or there is a satellite visibility problem.	Replace the GTR or check for sky obstructions.
GTR IS LOCKED	The GTR is supplying a stable timing signal.	None required.
GTR IS NOT LOCKED TO GPS SIGNAL	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.
GPS INVALID	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. Check the OSC1 and OSC2 signals for frequency stability.
GTR POWER FAULT	Current to the GTR is out of tolerance.	Troubleshoot per the DCD-LPR Manual.
IMPROPER CARD REMOVAL	The card has been improperly removed from the shelf, or has failed to communicate with the MIS card.	Reinsert specified card, reprovision specified slot, or replace specified card.

Table A. Messages (Contd)

MESSAGE (conddescr)	EXPLANATION	ACTION
IMPROPER CARD REMOVAL OR COMM FAILURE	The card has been improperly removed from the shelf, or has failed to communicate with the MIS card.	Check the communications cable between the DCD shelf and the LPR shelf. If ok, reinsert specified card, reprovision specified slot, or replace specified card.
INPUT IS DRIFTING	The clock card has detected drift in the specified signal.	Check the specified input reference signal.
INPUT SWITCHED	The specified TO card has switched to a different timing source. This happened as a result of a command (OPR-SYN-CNSW), references becoming active, 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.
INSUFFICIENT SATELLITES IN VIEW < 3	There are less than 3 satellites in view which is an insufficient number.	None required.
LOCKED TO LORAN STATION	The third zero crossing of at least one LORAN station has been found.	None required.
LORAN STATION FOUND	The first GRI has been detected.	None required.
LOSS OF ALL EXTERNAL INPUT REFERENCES	All external input references to the input card have been lost.	Check all inputs.
LOSS OF BOTH LOCAL OSCILLATOR SIGNALS	The OSC1 and OSC2 signals from the DCD shelf have been lost.	Check the OSC1 and OSC2 signals into the LPR shelf.
LOSS OF CLOCK SIGNAL	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 EXTERNAL OSCILLATOR	The specified OSC signal from the DCD shelf has been lost.	Check the specified signal (OSC1 or OSC2) into the LPR shelf.
LOSS OF EXTERNAL REFERENCE	The specified input has been lost.	Check specified input.
LOSS OF OSCILLATORS AND INPUT FROM ANTENNA	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.

Table A. Messages (Contd)

MESSAGE (conddescr)	EXPLANATION	ACTION
LOSS OF GPS SIGNAL FROM GTR	The GTI card has detected a loss of signal from the GTR.	Check the LED on the I/O Module on the rear of the LPR shelf: If not lit, the fiber or the GTR is faulty: determine which has failed and replace faulty item. If lit green, the fiber is ok (the GTR or GTI card is faulty): replace the GTI card, then the GTR, one at a time to determine which is faulty.
LOSS OF TIMING OUTPUT SIGNAL	The GTI or LTI card has detected a failure of the output signal from the specified card.	Check for external shorts: If shorts, repair shorts. If no shorts, replace specified card.
LPR SHELF 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 IN HOLDOVER	An external reference has been disqualified or is missing.	Check the OSC1 and OSC2 signals into the LPR shelf.
LTI IS LOCKED	At least one LORAN station has been found and the LTI output is stable.	None required.
MIS HAS RESET	The specified card has been power cycled, the card diagnostics has reset the processor on the card, or an INIT-SYS command has been executed.	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.
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 not switched by command, replace the mate timing output card.
OUTPUT CARD IS USING SPECIFIED CLOCK CARD	The timing output card is using the timing signal from the specified clock card.	None required.
OUTPUT CARD IS USING SPECIFIED INPUT CARD	The timing output card is using the timing signal from the specified clock input card.	None required.
OUTPUT PORT HAS FAILED	The specified output port has failed.	Check for external shorts on the specified output port. If ok, replace the specified timing output card.



Table A. Messages (Contd)

MESSAGE (conddescr)	EXPLANATION	ACTION
PROTECTION CARD CONFIGURATION MISMATCH OR PAIRED CARD MISSING	Protection mode (1:1 or 1+1) or other card provisioning is not the same for working/protection card pair, or one card of the pair is missing or the wrong type.	Ensure that the protection card of the same type is installed and provisioned the same as the working card. If ok, replace faulty card.
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.
SEARCHING FOR FIRST SATELLITE	The first satellite has not been found.	None required.
SEARCHING FOR LORAN STATION	The LTI card is searching for LORAN signals.	None required.
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.
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.
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 persist in reporting this condition, replace the specified clock card. (This is a normal transitory state when clock signals are being qualified.)
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 persist in reporting this condition, replace the specified clock card. (This is a normal transitory state when clock signals are being qualified.)

Table A. Messages (Contd)

MESSAGE (conddescr)	EXPLANATION	ACTION
TIMING SIGNAL NOT YET STABLE	The timing signal from the specified GTI card is not stable.	If temporary (less than 24 hours), no action required. If condition persists: <ol style="list-style-type: none"> <li>1. Use the RTRV-GPS-STAT command to check the minimum of each: number of satellites in view (4) and the S/N (34 dB Hz).</li> <li>2. Check OSC 1 and OSC 2 for excessive noise.</li> <li>3. Check the location of the GTR for sky obstructions.</li> </ol>
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 mate card is incompatible or faulty.	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. Use the RTRV-ALM-EQPT and RTRV-ALM-PORT commands to determine the status of the mate card.
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"> <li>Used invalid range (may involve &amp; or &amp;&amp;)</li> <li>Mismatched &lt;montype&gt; and &lt;montm&gt;</li> </ul>	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"> <li>Used unsupported or invalid &lt;montype&gt;</li> </ul>	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"> <li>Used inappropriate framing or signal type</li> </ul>	Re-enter the command ensuring that the framing or signaling type match the card type.
IEAE	The specified card, port, or user already exists. (An attempt was made to enter equipment or ports already entered in the database.)	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.
IIAC	The aid is not valid.	Re-enter the command with a valid aid.
IICT	The ctag is not valid.	Re-enter the command with a valid ctag (six characters or less).
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.

Table B. Error Codes (Contd)

CODE	MEANING	ACTION
PLNA	An attempt was made to enter a command without being logged on.	Logon and repeat command.
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 has been denied.	Check the provisioning of the working and protection card. Use the RTRV-ALM-EQPT and RTRV-ALM-PORT commands to determine the status of the protection card.
SROF	An attempt was made to communicate with a nonstandard card (see note), a failed standard card, or a card not entered into the database.  Note: Refer to the Input/Output Reference Guide section of this manual for a list of standard cards (all other cards are nonstandard).	Use RTRV-EQPT to verify that card type is correct for the entered command.  <ol style="list-style-type: none"> <li>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"> <li>• If the slot is not equipped, re-address the command to an equipped slot, or equip the addressed slot.</li> <li>• If the card is nonstandard, the denied command cannot be addressed to that card type.</li> </ul> </li> <li>2. Use the RTRV-ALM-EQPT and RTRV-ALM-PORT commands to check the alarm status of the card. <ul style="list-style-type: none"> <li>• If the standard card is restored: <ul style="list-style-type: none"> <li>– If the card status shows it has failed, replace the card.</li> <li>– If the card status shows it has not failed, repeat the command or contact the system administrator.</li> </ul> </li> </ul> </li> <li>3. Use the RTRV-COND command to check the status of the card. <ul style="list-style-type: none"> <li>• If the standard card is not restored, the status will show nothing. Therefore, the card has failed and must be replaced.</li> </ul> </li> </ol>
	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.

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 to 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 provisioning of the working and protection card. Use the RTRV-ALM-EQPT and RTRV-ALM-PORT commands to determine the status of the protection card.

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.		