

### LINE TERMINAL ALARM MATRIX

The line terminal alarm matrix, Table F, can be used to quickly determine the most probable cause of a line terminal alarm and the corrective action necessary to clear the alarm. The block diagram of the line terminal, Fig. 3 and 4, supplements the alarm matrix by identifying the major line terminal units and the nominal power levels.

The line terminal requirements are provided in Table G. These requirements should be met after replacing a defective unit and/or when performing a test identified in the alarm matrix or the replacement matrix.

**TABLE F**  
**LINE TERMINAL FRAME ALARM MATRIX (NOTES 1 THROUGH 7)**

REMOTE SCANPOINT - ALARM (A) OR STATUS (S)	LOCAL INDICATION	UNIT	POSSIBLE CONDITION(S) CAUSING ALARM	SUGGESTED CORRECTIVE ACTION
<b>COMMON ALARMS</b>				
TERMINAL POWER FAIL (A)	ALM/OFF	POWER UNIT	(1) Faulty power unit (2) Abnormal current demand from a supplied unit	(1) Replace power unit (2) Replace supplied unit causing failure
TERMINAL CONTROL SYSTEM ALARM (A)	CONTR FAIL	LINE CONTROLLER	Faulty LINE CONTROLLER unit	Replace LINE CONTROLLER unit
TERMINAL CONTROL SYSTEM ALARM (A)	CONTR FAIL	CHANNEL CONTROLLER	Faulty CHANNEL CONTROLLER unit	Replace CHANNEL CONTROLLER unit
TERMINAL CONTROL SYSTEM ALARM (A)	CONTR FAIL	TELEMETRY CONTROLLER	Faulty TELEMETRY CONTROLLER unit	Replace TELEMETRY CONTROLLER unit
TERMINAL CONTROL SYSTEM ALARM (A)	CODE (numeric display)	RECEIVING STATUS	Cause of alarm depends on what numeric code is displayed	Refer to "Line Terminal Frame Trouble Isolation" tab in the Operation and Maintenance manual for required action.

**Notes:**

1. Knowledge of admonishments, equipment, and procedures is required to use this matrix.
2. Any indication not listed in this matrix is the result of other alarm indications or manual operations. Clear all other indications and/or release manual operations before proceeding with suggested corrective action.
3. Indications are listed in order of priority.
4. The dc voltages and cable connectors should always be checked before attempting corrective action.
5. Detailed instructions to clear alarms are provided in "Line Terminal Frame Trouble Isolation" tab in the Operation and Maintenance manual for the Terminal Station (421-300-103).
6. If original unit has been replaced and new unit does not correct problem, reinstall original unit. Detailed instructions to replace units are provided in "Line Terminal Replacement Procedures" tab in the Operations and Maintenance manual for the Terminal Station (421-300-103).
7. Line terminal requirements for the tests referenced in this matrix are provided in Table G.

TABLE F (Contd) LINE TERMINAL FRAME ALARM MATRIX (NOTES 1 THROUGH 7)				
REMOTE SCANPOINT - ALARM (A) OR STATUS (S)	LOCAL INDICATION	UNIT	POSSIBLE CONDITION(S) CAUSING ALARM	SUGGESTED CORRECTIVE ACTION
TERMINAL CONTROL SYSTEM ALARM (A)	LINK FAIL	TELEMETRY CONTROLLER	Serial link test fails between TELEMETRY CONTROLLER unit and E2A remote equipment	(1) Replace the TELEMETRY CONTROLLER unit (2) Suspect wiring or E2A remote equipment trouble
DIGITAL TRANSMITTER ALARMS				
TRMTG CHANNEL( ): (1) INCOMING FAIL (A) (2) INCOMING AIS (S)	INC AIS	CMI DECODER	AIS signal received at input to CMI DECODER unit	Notify appropriate personnel at previous station of this switch section
TRMTG CHANNEL( ): (1) INCOMING FAIL (A) (2) FAIL ALARM (A) (3) NETWORK INTFC FAIL (S)	DCODR FAIL	CMI DECODER (Regular Channel)	(1) Faulty CMI DECODER unit (2) Bad input to CMI DECODER unit	(1) Replace CMI DECODER unit (2) Suspect bad input or faulty REG TRMT INTERFACE unit

**TABLE F (Contd)**  
**LINE TERMINAL FRAME ALARM MATRIX (NOTES 1 THROUGH 7)**

REMOTE SCANPOINT - ALARM (A) OR STATUS (S)	LOCAL INDICATION	UNIT	POSSIBLE CONDITION(S) CAUSING ALARM	SUGGESTED CORRECTIVE ACTION
TRMTG PROTECTION: (1) FAIL ALARM (A) (2) NETWORK INTFC FAIL (S)	DCODR FAIL	CMI DECODER (Protection Channel)	(1) Faulty CMI DECODER unit (2) Bad input to CMI DECODER unit (3) Suspect bad input or faulty PROTN TRMT INTERFACE unit (if access switch is operated), or faulty REG TRMT INTERFACE unit for regular channel that is bridge to protection	(1) Replace CMI DECODER unit (2) Replace INPUT DIRECTOR unit (3) Replace the PROTN TRMT INTERFACE (4) Replace the REG TRMT INTERFACE
TRMTG CHANNEL ( ) or or TRMTG PROTECTION: (1) FAIL ALARM (A) (2) DIG TERM FAIL (A)	SYNC LOSS	TRANSMIT ELASTIC ST	(1) Faulty TRANSMIT ELASTIC ST unit (2) Bad input to TRANSMIT ELASTIC ST unit	(1) Replace the TRANSMIT ELASTIC ST unit (2) Replace the FRAME GENERATOR unit (3) Replace the CMI DECODER unit

**TABLE F (Contd)**  
**LINE TERMINAL FRAME ALARM MATRIX (NOTES 1 THROUGH 7)**

REMOTE SCANPOINT - ALARM (A) OR STATUS (S)	LOCAL INDICATION	UNIT	POSSIBLE CONDITION(S) CAUSING ALARM	SUGGESTED CORRECTIVE ACTION
TRMTG CHANNEL ( ) or TRMTG PROTECTION: (1) FAIL ALARM(A) (2) DIG TERM FAIL (S)	DATA LOSS	ENCODER	(1) Faulty ENCODER unit (2) Bad input to ENCODER unit	(1) Replace the ENCODER unit (2) Replace the FRAME GENERATOR unit (3) Replace the TRANSMIT ELASTIC ST unit
TRMTG CHANNEL ( ) or TRMTG PROTECTION: (1) FAIL ALARM(A) (2) DIG TERM FAIL (S)	OUTPUT LOSS	MODULATOR	(1) Faulty MODULATOR unit (2) Bad input to MODULATOR unit	(1) Replace the MODULATOR unit (2) Replace the ENCODER unit (3) Replace the TRANSMIT FILTER unit
<b>DIGITAL RECEIVER ALARMS</b>				
RCVG CHANNEL ( ): (1) SERVICE ALARM(A) (2) PREV SECT FAIL (S)	PSF	REGULAR STATUS	Trouble is in transmission equipment of previous switch section	Notify appropriate personnel at previous switch section.

**TABLE F (Contd)**  
**LINE TERMINAL FRAME ALARM MATRIX (NOTES 1 THROUGH 7)**

REMOTE SCANPOINT - ALARM (A) OR STATUS (S)	LOCAL INDICATION	UNIT	POSSIBLE CONDITION(S) CAUSING ALARM	SUGGESTED CORRECTIVE ACTION
RCVG CHANNEL ( ) or RCVG PROTECTION: (1) FAIL ALARM(A) (2) LINE/DIG TERM FAIL (S)	LOCK LOSS	DECISION (2 units)	(1) Bad IF input to digital receiver (2) Faulty digital receiver unit	(1) Check IF input (may want to loop back from IF OUT of local transmitter to IF IN on failed digital receiver channel to ensure good IF input) (2) If only one DECISION unit LOCK LOSS indicator is lighted, replace the following one at a time: DECISION with LOCK LOSS lighted with CARRIER RECOVERY, DEMODULATOR (3) If both DECISION unit LOCK LOSS indicators are lighted, replace the following one at a time: CARRIER RECOVERY, DEMODULATOR, DECISION (both units)

**TABLE F (Contd)**  
**LINE TERMINAL FRAME ALARM MATRIX (NOTES 1 THROUGH 7)**

REMOTE SCANPOINT - ALARM (A) OR STATUS (S)	LOCAL INDICATION	UNIT	POSSIBLE CONDITION(S) CAUSING ALARM	SUGGESTED CORRECTIVE ACTION
RCVG CHANNEL ( ) or RCVG PROTECTION: (1) FAIL ALARM(A) (2) LINE/DIG TERM FAIL (S)	LOCK LOSS	CARRIER RECOVERY	(1) Bad IF input to digital receiver (2) Faulty digital receiver units	(1) Check IF input, may want to loop back from IF OUT on local digital transmitter to IF IN on failed digital receiver to ensure good IF input (2) Replace CARRIER RECOVERY unit (3) Replace both DECISION units
RCVG CHANNEL ( ) or RCVG PROTECTION: (1) FAIL ALARM(A) (2) LINE/DIG TERM FAIL (S)	OUTPUT LOSS	DECODER		(1) Check IF input, may want to loop back from IF OUT on local digital transmitter to IF IN on failed digital receiver to ensure good IF input (2) Replace DECODER unit (3) Replace all units from DEMODULATOR to DECODER
RCVG CHANNEL ( ) or RCVG PROTECTION: (1) FAIL ALARM(A) (2) LINE/DIG TERM FAIL (S) (3) LOSS OF FRAME FAIL (S)	FR LOSS	LOW SPEED FRAMER		(1) Check IF input, may want to loop back from IF OUT on local digital transmitter to IF IN on failed digital receiver to ensure good IF input (2) Replace LOW SPEED FRAMER unit (3) Replace HIGH SPEED FRAMER unit (4) Replace all units from DEMODULATOR to LOW SPEED FRAMER

**TABLE F (Contd)**  
**LINE TERMINAL FRAME ALARM MATRIX (NOTES 1 THROUGH 7)**

REMOTE SCANPOINT - ALARM (A) OR STATUS (S)	LOCAL INDICATION	UNIT	POSSIBLE CONDITION(S) CAUSING ALARM	SUGGESTED CORRECTIVE ACTION
RCVG CHANNEL ( ) or RCVG PROTECTION: (1) FAIL ALARM(A) (2) LINE/DIG TERM FAIL (S)	LOCK LOSS	REG RCV ELASTIC ST or PROT RCV ELASTIC ST	Faulty REG RCV ELASTIC ST or PROT RCV ELASTIC ST unit	(1) Replace REG RCV ELASTIC ST or PROT RCV ELASTIC ST unit (2) Replace the HIGH SPEED FRAMER unit (3) Replace the LOW SPEED FRAMER unit
RCVG CHANNEL ( ): (1) FAIL ALARM(A) (2) NETWORK INTFC FAIL (S)	CDR FAIL CDR SW	CMI CODER (Regular Channel)	(1) Faulty CMI CODER unit (2) Bad input to CMI CODER unit	(1) Replace the CMI CODER unit (2) Replace each LINE SWITCH unit
RCVG PROTECTION ( ): (1) FAIL ALARM(A) (2) NETWORK INTFC FAIL (S)	CDR FAIL	CMI CODER (Protection Channel)	(1) Faulty CMI CODER unit (2) Bad input to CMI CODER unit	(1) Replace the CMI CODER unit (2) Replace each ALIGNMENT unit



**TABLE F (Contd)**  
**LINE TERMINAL FRAME ALARM MATRIX (NOTES 1 THROUGH 7)**

REMOTE SCANPOINT - ALARM (A) OR STATUS (S)	LOCAL INDICATION	UNIT	POSSIBLE CONDITION(S) CAUSING ALARM	SUGGESTED CORRECTIVE ACTION
RCVG CHANNEL ( ) FAIL ALARM (A)	SW REQ	CHANNEL CONTROLLER (Regular Channel)	(1) Faulty unit in receiving network interface equipment (2) Switching section out-of-frame occurs (3) Switching section error rate greater than switch threshold occurs (4) Receiving digital terminal equipment out-of-frame	(1) Replace the CODER unit (2) Replace each LINE SWITCH unit (3) If there are no other alarms that point to trouble, report nature of problem to maintenance transmission engineer and follow instructions
RCVG PROTECTION FAIL ALARM	SW REQ	CHANNEL CONTROLLER (Protection Channel)		(1) Replace the CMI CODER unit (2) Replace each ALIGNMENT unit (3) Replace the OUTPUT DIRECTOR unit (4) If there are no other alarms that point to trouble, report nature of problem to maintenance transmission engineer and follow instructions

**TABLE F (Contd)**  
**LINE TERMINAL FRAME ALARM MATRIX (NOTES 1 THROUGH 7)**

REMOTE SCANPOINT - ALARM (A) OR STATUS (S)	LOCAL INDICATION	UNIT	POSSIBLE CONDITION(S) CAUSING ALARM	SUGGESTED CORRECTIVE ACTION
RCVG CHANNEL ( ) or RVCG PROTECTION PERFORMANCE ALARM	ERR RATE (display) EXCESS ACT EXCESS ERR RATE EXCESS MFR	CHANNEL CONTROLLER	Problem in equipment between the previous station digital trans- mitter and this digital receiver that exceeds the performance objectives	Go to the Terminal Performance Alarm Trouble-Clearing Flowchart
N/A	FR RSPLY	CHANNEL CONTROLLER	Terminal is receiving a frame resupply signal	No action required. The previous station regenerator is transmitting a frame resupply signal
TERMINAL SWITCH SIGNALING FAIL	SIG FAIL	TRANSMITTING STATUS	Equipment failure in the W1 or W2 sub- channel (within service channel) path between this digital receiver and digital transmitter at the previous station or at the transmitting end terminal station	Go to Terminal Frame Signaling Fail Trouble- Clearing Flowchart
N/A	LOCAL OFF-HK	ORDER WIRE TERMINATION	(1) Indicates the HNDST SWHK pushbutton is operated (2) Faulty ORDER WIRE TERMINATION unit	(1) Release HNDST SWHK pushbutton (2) Replace ORDER WIRE TERMINATION unit

TABLE G (Contd) LINE TERMINAL FRAME REQUIREMENTS					
UNIT	SHELF	TEST POINT	NOMINAL VALUE	RECOMMENDED ADJUSTMENT OR OPTIMUM TOLERANCE	MAINTENANCE OPERATING WINDOW
471/474 EA POWER UNIT	CONTROL AND PROTECTION TRANSMITTING (Lower half)	V1	-5.2 V	No Adjustment	-4.9 V to -5.5 V
		V2	-15 V		-14.5 V to -19.0 V
		V2	+15 V		+14.5 V to +19.0 V
		V IN	-24 V		-20.0 V to -28.5 V
		V IN	-48 V		-42.0 V to -60.0 V
471/474 BA POWER UNIT (Left unit)	PROTECTION RECEIVING (Lower half)	V1	-5.2 V		-4.5 V to -5.5 V
		V IN	-24 V		-20.0 V to -28.5 V
		V IN	-48 V		-42.0 V to -60.0 V
471/474 BA POWER UNIT (Right unit)	PROTECTION RECEIVING (Lower half)	V1	-5.2 V		-4.9 V to -5.5 V
		V IN	-24 V		-20.0 V to -28.5 V
		V IN	-48 V		-42.0 V to -60.0 V
471/474 BA POWER UNIT	PROTECTION RECEIVING (Upper half)	V1	+5 V		+4.7 V to +5.3 V
		V2	-15 V		-14.5 V to -19.0 V
		V2	+15 V		+14.5 V to +19.0 V
		V IN	-24 V	↓	-20.0 V to -28.5 V
		V IN	-48 V	No Adjustment	-42.0 V to -60.0 V
PATCH PANEL (Located on right side of frame)	Regular DIGITAL TERMINAL or PROTECTION RECEIVING	Cable removed from IF IN jack	-8.2 dBm at 70 MHz	±1.0 dB	-7.2 to -9.2 dBm at 70 MHz

**TABLE G (Contd)  
LINE TERMINAL FRAME REQUIREMENTS**

UNIT	SHELF	TEST POINT	NOMINAL VALUE	RECOMMENDED ADJUSTMENT OR OPTIMUM TOLERANCE	MAINTENANCE OPERATING WINDOW
1470CA DEMODULATOR	Regular DIGITAL TERMINAL or PROTECTION RECEIVING	CARRIER MON	70 MHz	±280 kHz	69.720 MHz to 70.280 MHz
1470BP DECISION	Regular DIGITAL TERMINAL or PROTECTION RECEIVING	CLK MON	35 MHz	Not required for normal maintenance	35.2 MHz to 35.5 MHz
		BASEBAND MON	0.0 dBm when IF input is -8.2 dBm		-0.3 to -2.3 dBm when IF input is at -8.2 dBm at IF IN jack
1470CN LOW SPEED FRAMER	Regular DIGITAL TERMINAL or PROTECTION RECEIVING	FR LOSS	Not required for normal maintenance. The requirements reflect the effect on performance when a specified interference tone is introduced to the signal. Refer to appropriate signal-to-interference test.		
		HOP PTY			
		SEC PTY			
1470AT CMI CODER	Regular DIGITAL TERMINAL or PROTECTION RECEIVING	DS 139 MON	139.264 MHz	None	Tracks the input signal sent by the multiplex equipment
1473AB CHANNEL CONTROLLER	Regular DIGITAL TERMINAL or PROTECTION RECEIVING	ERR RATE display	Displays the error rate of the channel during performance alarms and is used to evaluate S/I tests.		
See footnote at end of table.					

TABLE G (Contd) LINE TERMINAL FRAME REQUIREMENTS					
UNIT	SHELF	TEST POINT	NOMINAL VALUE	RECOMMENDED ADJUSTMENT OR OPTIMUM TOLERANCE	MAINTENANCE OPERATING WINDOW
1470AS CMI DECODER	Regular DIGITAL TERMINAL or CONTROL AND PROTECTION TRANSMITTING	DS 139 MON	139.264 MHz	None	Tracks the input signal sent by the receiving units of the digital terminal equipment
1470AL FRAME GENERATOR	Regular DIGITAL TERMINAL or CONTROL AND PROTECTION TRANSMITTING	35 MHz	35 MHz	Not required for normal maintenance	35.2 MHz to 35.5 MHz
1470CB MODULATOR	Regular DIGITAL TERMINAL or CONTROL AND PROTECTION TRANSMITTING	70 MHz MON	70 MHz	$\pm 700$ Hz	69,999,300 Hz to 70,000,700 Hz
PATCH PANEL (Located on right side of frame)	Regular DIGITAL TERMINAL or CONTROL AND PROTECTION TRANSMITTING	Cable removed from IF OUT jack	-7.1 dBm at IF OUT	$\pm 1.0$ dB	-6.1 to -8.1 dBm at IF OUT