REMOTE TERMINAL SD-7C000-01

TROUBLE LOCATING PROCEDURES

USING REMOTE TERMINAL TEST SET (J1C013AD, L1)

CABLE PRESSURE MONITORING SYSTEM

1. GENERAL

1.01 This section provides procedures for analysis, locating, and corrective action for trouble within the remote terminal (RT) of the Cable Pressure Monitoring System (CPMS).

1.02 This section is reissued to incorporate changes necessitated by issue 4 of SD-7C000-01.

1.03 This section provides information to isolate the troubles to a specific cause and the corrective action.

1.04 The Procedures and Tests covered in this section are:

1.05 There are basically two types of trouble conditions observed and reported:

(a) Class I alarms are provided by panel lamps at the remote terminal within the central office. These conditions and lamp indications are shown in Table A.

(b) Class II alarms are received at the central terminal and transmitted to the responsible organization in the form of a trouble report. Table B provides a trouble locating chart for Class II alarms.

1.06 Test set J1C013AD, L1 is used to perform the procedures in this section. The test set must be set up to perform three modes of operation which are covered in Part 3.

1.07 The operation and description of the test set (J1C013AD, L1) is found in Section 201-612-101.

1.08 Table C provides an explanation of the symbols that are used in the trouble isolation diagram and the trouble locating procedures (Fig. 1 and 2).

1.09 The trouble isolation diagram (Fig. 1) is used to determine which trouble locating procedure (TLP) should be used to clear a Class I alarm.

1.10 ***Lettered Steps:*** A letter a, b, c, etc, added to a step number in Part 3 of this section indicates an action which may or may not be required, depending on local conditions. The condition under which a lettered step or a series of lettered steps should be made is given in the ACTION column, and all steps governed by the same condition are designated by the same letter within a test. Where a condition does not apply, all steps designated by that letter should be omitted.

2. APPARATUS

2.01 One test set—(J1C013AD, L1) containing two M50H cords (6 feet), three red jumper leads, and one black jumper lead (5 feet), and a 25-pair adapter.

2.02 One CPMS Remote Terminal Maintenance Kit—(ED-2P007-01) containing spare circuit packs.

2.03 One volt-ohm-milliammeter (KS-20538-L1 or equivalent).

TABLE A

CLASS I ALARMS

TROUBLE CONDITION	REMOTE TERMINAL ALARMS					REMARKS
	PS LAMP	-48F LAMP	FSR LAMP	DAL LAMP	EZA LAMP	
Power Lost on 24A Power Unit	ON	OFF	OFF	OFF	ON	Refer to Fig-1 for Corrective Procedures
Power Lost on -48V Fused Within Remote Terminal	OFF	ON	OFF	OFF	OFF	
Relay Malfunction	OFF	OFF	ON	OFF	OFF	
One of 16 dedicated Pair Leads Has Closure	OFF	OFF	OFF	ON	OFF	
+5 Volt Power Loss	ON	ON	ON	ON	OFF	
60 Hz Power Loss But -48 Voltage is Still On	ON	ON	ON	ON	OFF	
Power Loss of -48V Used For Alarm Circuits	OFF	OFF	OFF	OFF	ON	
E2A Failures	OFF	OFF	OFF	OFF	ON	

TABLE B

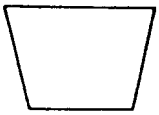
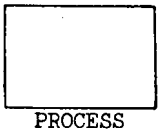
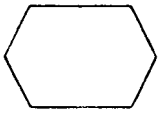
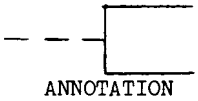
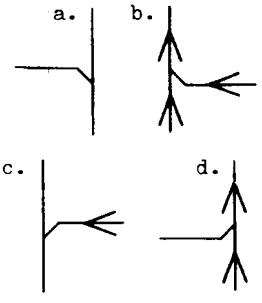
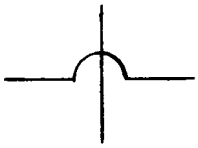
CLASS II ALARMS

TROUBLE LOCATING CHART

CODE	DEFINITION	POSSIBLE TROUBLE LOCATION
OCT Open Circuit	Whenever a transducer has been assigned - to a relay and the response for that transducer indicates that the circuit is open.	MDF
IRS Low Insulation Resistance	Whenever the remote terminal measures a resistance between 33,000 and 95,000 ohms on a pair and indicates a low leakage resistance across the pair.	Outside Plant
AF0 Airflow Equals Zero	Whenever airflow output the remote terminal reads an active airflow meter as zero.	An airflow counter in Circuit Pack (CP) HY11 — Test CP, HY11 per Test Procedure Part 3
EXB Excessive Busy	Whenever a pair with a transducer is busy an excessive number of times.	Line access and idle detector CPs, HY4, HY5, HY12 — Test using Test Procedures Part 3
EAF Erratic Airflow	An airflow device which goes into alarm and out of alarm frequently or yields unrealistic flow readings.	An airflow counter in HY11 — Test Procedure Part 3
CAL Calibration	Occurs when either one or both of two calibration readings are in error.	CP5 — Calibrate per Test Procedure Part 3
TPE Transmit Parity Error	Whenever a response from the remote terminal contains even parity instead of odd parity.	E2A TROUBLE — Refer to Section 201-653-503
NQR No Quick Reply	This usually occurs when either the E2A processing circuits do not respond or when the Data Set fails to transmit.	Use Test Procedures E2A — 202S-592-028-500 to isolate trouble
TCT 3 Word/ 1 Word Error	This occurs whenever there is trouble between the TCT and the central terminal computer.	Central Terminal will diagnose to trouble location. Section 637-600-400
CAC Can Not Access	This occurs when the E2A circuit or 202S data set have problems.	Central Terminal will diagnose to trouble location. 637-600-400
RPE Receive Parity Error	This occurs when an input command word to the CPM has odd parity instead of even parity.	Central Terminal will diagnose to trouble location. 637-600-400
ROE Relay Operate Error	This occurs when a relay operation is incorrect.	HY7 — Perform Test Procedure Part 3
MVE Non-Valid Error	This occurs whenever non-valid error message data is received.	Perform Isolation Test — Section 637-600-400
RHE Relay Hold Error	This will normally cause a Class I alarm (FSR) unless it is due to a data processing error in the remote terminal.	HY7 — Perform Isolation Test — Part 3

TABLE C

FLOWCHART SYMBOLS

SYMBOL	DEFINITION
 TERMINAL	INDICATES A TERMINAL POINT IN THE TROUBLE LOCATING PROCEDURE, FOR EXAMPLE, START, END OF TEST, AND REFERENCES TO ANOTHER TLP.
 MANUAL OPERATION	INDICATES AN OPERATION GEARED TO THE SPEED OF A HUMAN BEING, FOR EXAMPLE, OPERATION OF SWITCHES, DIALING.
 PROCESS	INDICATES AN ACTION REQUIRED OR RESULT OBTAINED AT THIS POINT IN THE PROCEDURE WHICH IS NOT A MANUAL OPERATION OR DOES NOT REQUIRE A DECISION.
 DECISION	INDICATES A DECISION-TYPE OF OPERATION THAT DETERMINES WHICH OF TWO PATHS IS TO BE FOLLOWED.
 ANNOTATION	USED AS AN AID IN DESCRIBING THE TEST PROCEDURES OR SEQUENCE. NOT PART OF THE OPERATION.
 CONNECTOR	INDICATES AN ENTRY FROM OR AN EXIT TO ANOTHER POINT OF THE TROUBLE LOCATING FLOW CHART.
 NORMAL FLOW LINES	INDICATES THE NORMAL FLOW OF SEQUENCE FROM TOP TO BOTTOM OR LEFT TO RIGHT, WITHOUT ARROWS.
 NONNORMAL FLOW LINES	INDICATES THE NONNORMAL FLOW OF SEQUENCE FROM BOTTOM TO TOP OR RIGHT TO LEFT , WITH ARROWS.
 COMBINATION OF FLOW LINES	a. NORMAL FLOW - TWO PROCESSES FLOW INTO A COMMON SEQUENCE DOWNWARD. b. NONNORMAL FLOW - TWO PROCESSES FLOW INTO A COMMON SEQUENCE UPWARD. c. NORMAL AND NONNORMAL FLOW - TWO PROCESSES FLOW INTO A COMMON SEQUENCE DOWNWARD. d. NORMAL AND NONNORMAL FLOW - TWO PROCESSES FLOW INTO A COMMON SEQUENCE UPWARD.
 FLOW LINE CROSSING	REPRESENTS ONE FLOW LINE CROSSING ANOTHER WITH NO CONNECTION BETWEEN THE TWO.

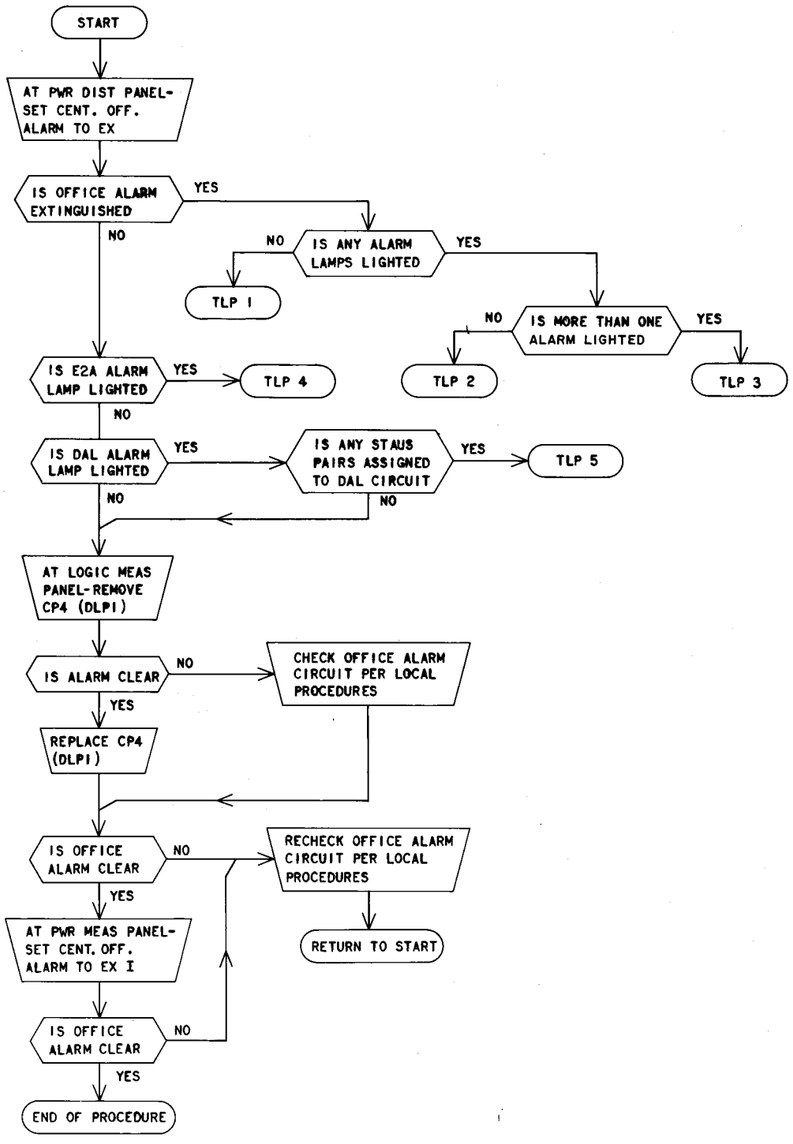


FIG. 1 TROUBLE ISOLATION DIAGRAM FOR CLASS I OFFICE ALARMS

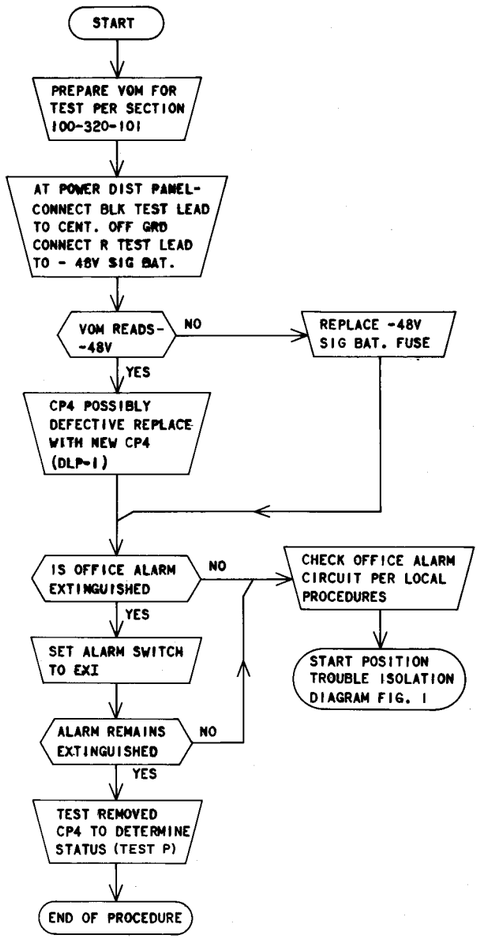


FIG. 1A TLP 1 - NO ALARM LAMPS LIGHTED

Fig. 1—Trouble Isolation Diagram

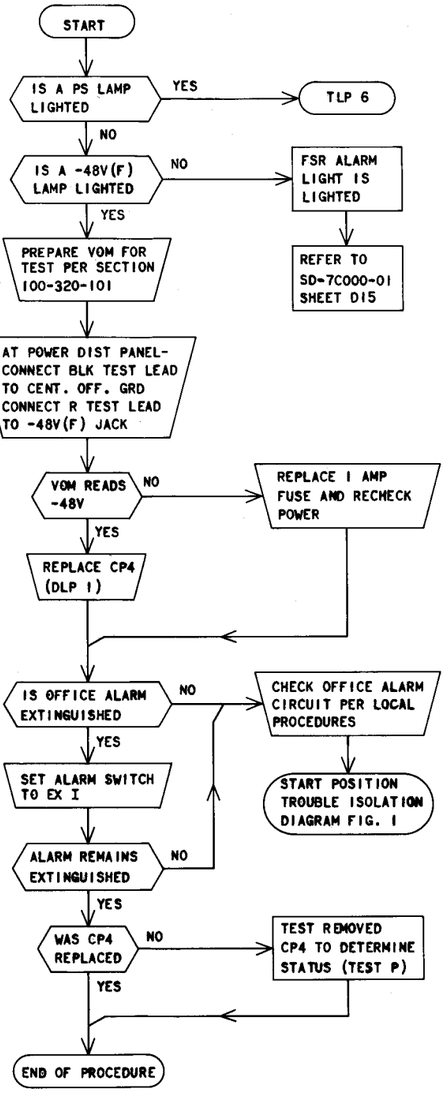


FIG. 1B TLP 2 - ONE ALARM LIGHTED (SHEET 2)

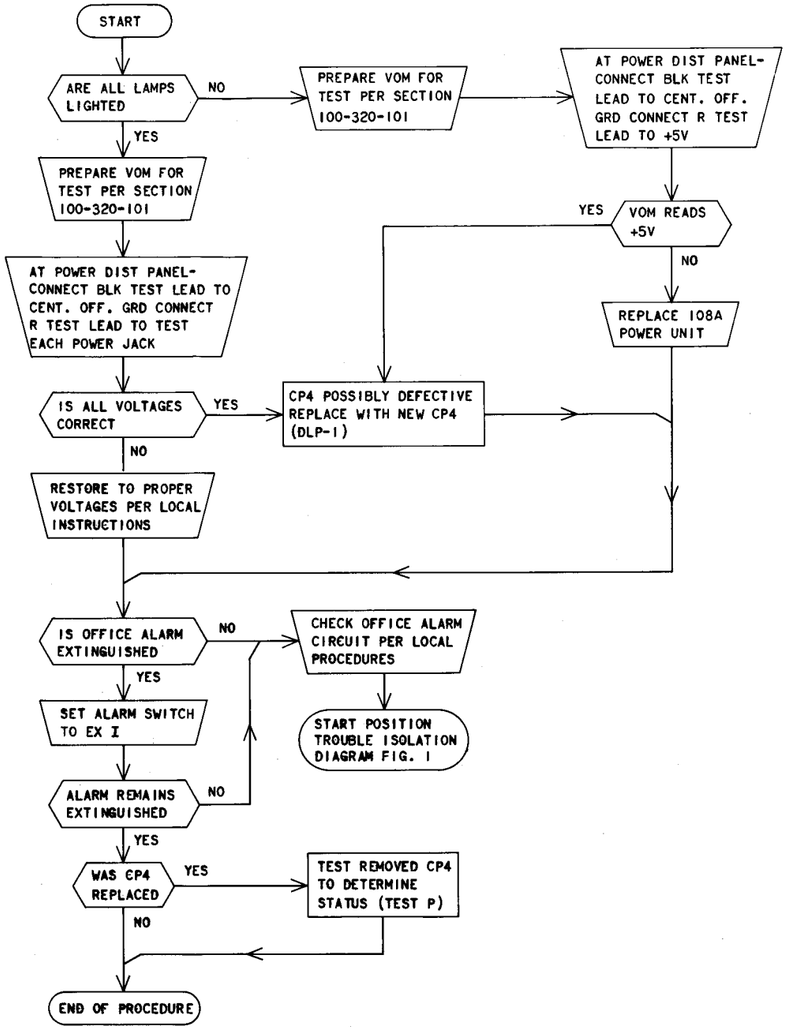


FIG. 1C TLP 3 - MORE THAN ONE ALARM LIGHTED (SHEET 2)

Fig. 2—Trouble Isolation Diagram

2.04 Patching cord, 893 cord, 6 feet long, equipped with two 360A tools (1W13B cord), one 518C tool, and one KS-6278 alligator clip.

2.05 One 10K-ohm (±10%) resistor.

2.06 One 620-ohm (±5% 2 watts or more) resistor.

2.07 One KS-14369, 45-volt dry cell battery.

2.08 One 1013A handset equipped with a 2W37A cord assembly.

2.09 The apparatus requirements and associated tests are shown in detail in Table D.

3. TROUBLE LOCATING, TEST REQUIREMENTS, AND CALIBRATION PROCEDURES

A. Trouble Locating—Satellite Terminal Access Circuits Installed

3.01 The CPMS satellite terminal access circuits consist of circuit packs HY18, the second HY10 (location 0012-09), HY13, and HY14. Circuit packs HY18 and HY10 are used in the other remote terminal operational modes; however, HY13 and HY14 are used exclusively for the satellite terminal mode and must be used together.

3.02 The first step in clearing trouble is to determine if circuit packs HY13 and HY14 are installed in the remote terminal. If they are installed, refer to Section 637-600-400 to determine if the trouble is in the satellite terminal access circuits. When the trouble is in the satellite terminal access circuits, refer to Section 201-612-311 for trouble clearing procedures.

3.03 If the trouble is not identified with circuit packs HY13 and HY14 installed, remove power from remote terminal (this consists of disconnecting the AC power cord and removing the 1 AMP fuse at the power distribution panel) and remove HY13 and HY14. If trouble still exists, reconnect AC power cord, replace 1 AMP fuse, and go to 3.C.

3.04 If trouble is cleared, substitute a known good circuit pack for HY13 and replace HY13 and HY14. Restore power to the remote terminal. If trouble still exists, remove power, replace original HY13, replace HY14 with a known good circuit pack, and restore power.

3.05 The remote terminal will not function in any mode unless both HY13 and HY14 are either installed or removed.

B. Trouble Locating—Class I Alarm

3.06 Fig. 1 presents a logical sequence of steps in flowchart format for isolating, locating, and correcting the trouble causing Class I alarms.

C. Trouble Locating—Class II Alarms

3.07 The central terminal operator, by use of diagnostic programs, will isolate trouble within the remote terminal to a specific cause or equipment. When a specific circuit pack is reported (Table B), the removal, testing, and replacement may be accomplished by using Tests A through U. However, if a specific circuit pack is not designated and an error message report is received, Test V will provide procedures for locating and correcting the trouble.

D. Calibration Procedure

3.08 Test W will provide the procedures and test requirements which will be used to determine the calibration and integrity of the remote terminal.

STEP	ACTION	VERIFICATION
A. HY1 Test Requirements		
	Note 1: Before removing or replacing HY1 circuit pack, disconnect AC power cord and remove 1 AMP fuse at power distribution panel.	
	Note 2: If the HY1 circuit pack fails any of the output requirements, consider it as a defective unit.	

TABLE D

APPARATUS REQUIREMENTS

APPARATUS	TESTS																							CLASS 1 TEST FIG. 1
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	
Test Set (2.01	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Maintenance Kit (2.02)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Volt-Ohm Meter (2.03)					X														X	X	X				X
Patching Cord (2.04)																			X				X		
Resistor 10KΩ (2.05)				X																X		X			
Resistor 620Ω (2.06)									X																
Battery Dry Cell (2.07)			X																				X		
Handset (2.08)														X											

STEP	ACTION	VERIFICATION
1	Using red and black jumper leads, connect test set +5V and GRD terminal posts to remote terminal power distribution panel +5V and GRD terminals.	
2	At test set— Set +5V switch to +5V.	
3	Set all logic switches to 0.	All lamps extinguished.
4	Set all logic switches to OFF.	All lamps lighted.
5	Set +5V switch to OFF.	
6	Insert HY1 circuit pack to be tested into J3 connector.	
7	Set +5V switch to +5V. ***Note:*** Circuit definitions are shown in Table E.	
8	Set all input switches shown in Table E to 0.	
9	Set logic switch 17 to 0, 1, then back to 0.	Lamps 13, 36-39, 44, 46-49, 52-57, and 58-60 extinguished. Lamps 4, 11-12, 14, 18-20, 40-42, 45, and 50-51 lighted.
10	Set all input switches shown in Table E to 1.	Lamps 13, 36-39, 44, 46-49, 52-57, and 58-60 extinguished. Lamps 4, 11-12, 14, 18-20, 40-42, 45, and 50-51 lighted.
11	Set logic switch 17 to 1; then to 0.	Lamps 4, 11, 13-14, 40-41, 43, 46, 51 to 57 extinguished. Lamps 12, 18-20, 36-39, 42, 44, 45, 47-50 and 58 to 60 lighted.
12	Set 21 to 24, 28 switches to 0.	
13	Set logic switch 17 to 1; then to 0.	Lamp 13 lighted. Lamp 42 extinguished.
14	After setting switches as shown in first line of Table F, set logic switch 17 to 1, then to 0, observe output requirement, continue to line 2 of Table F, perform same as above, until all lines of Table F have been completed.	As shown for line being tested in Table F.

STEP	ACTION	VERIFICATION

TABLE E

CIRCUIT DEFINITIONS
FOR TESTING HY1 CIRCUIT PACK

INPUT		OUTPUT			
SWITCH	LEAD	LAMP	LEAD	LAMP	LEAD
6	RD2	*	$\overline{A1}$	44	B3
7	RD4	4	$\overline{A0}$	45	$\overline{E7P0}$
8	RD3	11	CE	46	E9
9	RD1	12	PRE	47	A1
10	RD7	13	$\overline{PR}$	48	A3
16	RD5	14	E	49	A2
21	RD9	18	$\overline{AF1}$	50	$\overline{AF4}$
22	RD10	19	$\overline{AF2}$	51	E0
23	RD12	20	$\overline{AF3}$	52	E1
24	RD11	36	A0	53	E3
25	RD15	37	B0	54	E2
26	RD13	38	B1	55	E4
27	RD14	39	B2	56	E5
28	RD16	40	$\overline{B3}$	57	E6P
29	RD6	41	$\overline{A3}$	58	D0
30	RD8	42	$\overline{PR}$	59	D1
		43	E8P	60	D2

Note: *This lead must be checked with VOM.

15	Repeat input portion of Step 14, except reverse the setting position of switch 28 on each line of Table F.	Lamps 11, 43, and 57 extinguished. Lamp 45 lighted. Lamp 12 will be lighted for first six lines of Table F, but extinguished for the remainder of the lines.
16	Set switches 6, 9 and 10, 16, 25 to 27, 29 and 30 to 1.	
17	After setting switches as shown in first line of Table G, set logic switch 17 to 1 then to 0, observe output requirement, continue to line 2 of Table G, perform same procedure until all lines of Table G are completed.	As shown for line being tested in Table G.

STEP ACTION VERIFICATION

TABLE F

INPUT					OUTPUT												
SWITCH SETTINGS					LAMP DISPLAYS												
28	23	24	22	21	14	51	52	54	53	55	56	57	45	43	46	11	12
1	0	0	0	0	1	1	0	0	0	0	0	0	1	0	0	1	1
0	0	0	0	1	1	0	1	0	0	0	0	0	1	0	0	1	1
0	0	0	1	0	1	0	0	1	0	0	0	0	1	0	0	1	1
1	0	0	1	1	1	0	0	0	1	0	0	0	1	0	0	1	1
0	0	1	0	0	1	0	0	0	0	1	0	0	1	0	0	1	1
1	0	1	0	1	1	0	0	0	0	0	1	0	1	0	0	1	1
1	0	1	1	0	0	0	0	0	0	0	0	1	1	0	0	0	1
0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1
0	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1
1	1	0	0	1	0	0	0	0	0	0	0	0	1	0	1	0	1
1	1	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	1
0	1	0	1	1	0	0	0	0	0	0	0	0	1	0	0	0	1
1	1	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
0	1	1	0	1	0	0	0	0	0	0	0	0	1	0	0	0	1
0	1	1	1	0	0	0	0	0	0	0	0	0	1	0	0	0	1
1	1	1	1	1	0	0	0	0	0	0	0	0	1	0	0	0	1

Note: 0 = indicates lamp is extinguished.
1 = indicates lamp is lighted.

18 Set +5V switch to OFF.

B. HY2 Test Requirements

Note 1: Before removing or replacing HY2 circuit pack, disconnect AC power cord and remove 1 AMP fuse at power distribution panel.

Note 2: If the HY2 circuit pack fails any of the output requirements, consider it as a defective unit.

1 Using red and black jumper leads, connect test set +5V and GRD terminals to remote

STEP	ACTION	VERIFICATION

TABLE G

INPUT							OUTPUT			
SWITCH SETTINGS							LAMP DISPLAYS			
28	23	24	22	21	7	8	18	19	20	50
1	0	1	1	0	0	0	0	1	1	1
0	0	1	1	0	0	1	1	0	1	1
0	0	1	1	0	1	0	1	1	0	1
1	0	1	1	0	1	1	1	1	1	0
ALL OTHER CONDITIONS							1	1	1	1

Note: 0 = indicates lamp is extinguished.
1 = indicates lamp is lighted.

	terminal power distribution panel +5V and GRD jacks.	
2	At test set— Set +5V switch to +5V.	
3	Set all logic switches to 0.	All lamps extinguished.
4	Set all logic switches to OFF.	All lamps lighted.
5	Set +5V switch to OFF.	
6	Insert HY2 circuit pack to be tested into J3 connector.	
7	Set +5V switch to +5V. ***Note:*** Circuit definitions are shown in Table H.	
8	Set switches 13, 19, and 28 to 0.	
9	Set switches as shown in Table I for "A" set designation.	Lamps 35 to 42 and 53 to 60 lighted.
10	Set switches as shown in Table I for "P" set designation.	Lamps 35 to 42 and 53 and 60 lighted.
11	Set switch 19 to 1.	
12	Set switches as shown in Table I for each set designation.	As shown in Table I for each set designation being tested.

STEP ACTION VERIFICATION

TABLE H

CIRCUIT DEFINITIONS FOR TESTING
HY2 CIRCUIT PACK

INPUT						OUTPUT	
DATA WORD TERMINALS		INPUT TERMINAL		CONTROL TERMINAL		OUTPUT TERMINALS	
SWITCH	LEAD	SWITCH	LEAD	SWITCH	LEAD	LAMPS	LEADS
14	D2	13	SIG	19	E	35	DC6
15	$\overline{D3}$	28	SIG			36	DC7
16	D3					37	DC15
17	D1					39	DC12
18	D0					38	DC13
						40	DC5
						41	DC4
						42	DC14
						53	DC9
						54	DC3
						55	DC2
						56	DC11
						57	DC0
						58	DC1
						59	DC10
						60	DC8

13 Set +5V switch to OFF.

C. HY3 Test Requirements

Note 1: Before removing or replacing HY3 circuit pack, disconnect AC power cord and remove 1 AMP fuse at power distribution panel.

Note 2: If the HY3 circuit pack fails any of the output requirements, consider it as a defective unit.

1 Using read and black jumper leads, connect test set +5V and GRD terminals to remote

STEP	ACTION	VERIFICATION

TABLE I

SET DESIG.	INPUT SWITCH SETTINGS					OUTPUT LAMP DISPLAYS															
	DATA WORD					DECODER (DC)															
	15	16	14	17	18	57	58	55	54	41	40	35	36	60	53	59	56	39	38	42	37
A	1	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
B	1	0	0	0	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1
C	1	0	0	1	0	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1
D	1	0	0	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1
E	1	0	1	0	0	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1
F	1	0	1	0	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1
G	1	0	1	1	0	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1
H	1	0	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1
I	0	1	0	0	0	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1
J	0	1	0	0	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1
K	0	1	0	1	0	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1
L	0	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1
M	0	1	1	0	0	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1
N	0	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1
O	0	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1
P	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0

Note: 0 = indicates lamp is extinguished.
1 = indicates lamp is lighted.

terminal power distribution panel +5V and GRD jacks.

2 At test set—
Set +5V switch to +5V.

3 Set all logic switches to 0. All lamps extinguished.

4 Set all logic switches to OFF. All lamps lighted.

5 Set +5V switch to OFF.

6 Insert HY3 circuit pack to be tested into J3 connector.

7 Set +5V switch to +5V.

Note: Circuit definitions are shown in Table J.

STEP	ACTION	VERIFICATION

TABLE J

CIRCUIT DEFINITIONS FOR TESTING HY3 CIRCUIT PACK

INPUT						OUTPUT	
DATA WORD TERMINALS		CONTROL TERMINALS		INPUT TERMINALS		OUTPUT TERMINALS	
SWITCH	LEAD	SWITCH	LEAD	SWITCH	LEADS	LAMPS	LEADS
24	D3	21	E	5	ED10	52	$\overline{SC}$
27	D2	22	P3E	7	ED11	53	X
28	D1			8	ED13	55	$\overline{X}$
29	D0			9	ED15	60	SC
				10	ED12		
				11	ED14		
				12	ED2		
				13	ED8		
				14	ED5		
				15	ED0		
				16	ED3		
				17	ED6		
				18	ED1		
				19	ED7		
				20	ED4		
				30	ED9		

8	Set switches 21 and 22 to 0.	Lamp 53 extinguished.
9	Set all input switches shown in Table J to 1.	Lamp 55 lighted.
10	Set input switches to 0, one at a time.	For each of these switch settings, lamp 53 lighted and lamp 55 extinguished.
11	Set switches 21 and 22 to 1.	
12	Set data word switches to corresponding BCD word as shown in Table K, and set input/decoder output switches to 0, one at a time. (See Table K.)	Lamp 60 extinguished. Lamp 52 lighted.
13	Set all input/decoder output switches to 1, except switches 15 and 18. (See Table K.)	

STEP **ACTION** **VERIFICATION**

TABLE K

LINE	SWITCHES DATA WORD				INPUT/DECODER OUTPUT SWITCHES															
	24	27	28	29	15	18	12	16	20	14	17	19	13	30	5	7	10	8	11	9
A	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
B	0	0	0	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1
C	0	0	1	0	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1
D	0	0	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1
E	0	1	0	0	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1
F	0	1	0	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1
G	0	1	1	0	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1
H	0	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1
I	1	0	0	0	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1
J	1	0	0	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1
K	1	0	1	0	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1
L	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1
M	1	1	0	0	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1
N	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1
O	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1
P	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0

14	Set data word switches to 0. (See Table K.)	Lamp 60 lighted. Lamp 52 extinguished.
15	Set input/decoder output switches to Line A as shown in Table K.	
16	Set data word switches to Line B as shown in Table K.	Lamp 60 lighted. Lamp 52 extinguished.
17	Set +5V switch to OFF.	

D. HY4 Test Requirements

Note 1: A working remote terminal must be used to test a HY4 circuit pack.

Note 2: If the HY4 circuit pack fails any of the output requirements, consider it to be a defective unit.

STEP	ACTION	VERIFICATION
1	At test set— Set READ, voltage, and logic switches to OFF.	
2	Connect red jumper to +5V jack on test set and the +5V jack on the power distribution panel.	
3	Connect black jumper to GRD jack on test set and the FLT GRD jack on the power distribution panel.	
4	At test set— Set +5V switch to +5V.	All light emitting diodes (LEDs) lighted.
5	Connect a M50H cord to J1, connect other end to J1 on back of power distribution panel.	
6	At test set— Connect a M50H cord to J2, connect other end to J2 on the back of power distribution panel.	
7	At power distribution panel— Disconnect AC power cord.	
8	Remove 1 AMP fuse.	
9	At logic and measurement panel— Replace the working HY4 circuit pack with one to be tested.	
10	At power distribution panel— Reinsert the 1 AMP fuse.	
11	Reconnect AC line cord to power outlet.	
12	Set TD1 to TD16 switches to OFF.	
13	Set READ switch to OFF.	
14	At power distribution panel— Using red test lead, connect -5V jack.	
15	At line access relay panel— Connect clip end of red test lead to LR connecting block, terminal 00-0.	
16	At test set— Set RD1 to RD16 switches to 0.	

STEP	ACTION	VERIFICATION
17	Set READ switch to ON.	For each READ pulse received, the lamps will display as shown in Table L.
18	Set READ switch to OFF.	
19	At line access relay panel— Remove test cord from terminal 00-0 and connect to terminal 00-2.	
20	At test set— Set READ switch to ON.	For each READ pulse received, the lamps will display as shown in Table M.
21	Set READ switch to OFF.	
22	At power distribution panel— Disconnect test cord from -5V jack.	
23	At line access relay panel— Disconnect test cord from terminal 00-2 and connect to 00-1.	
24	Connect test cord to positive terminal of KS-14369 battery. Connect negative terminal to ground.	
25	At test set— Set READ switch to ON.	For each READ pulse received, the lamps will display as shown in Table N.
26	Set READ switch to OFF.	

TABLE L

TD LAMPS															
16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
1	0	0	0	0	0	0	1	0	1	0	1	1	1	0	0

Note: 0 = indicates lamp extinguished.
1 = indicates lamp lighted.

TABLE M

TD LAMPS															
16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
1	0	0	0	0	0	1	1	1	0	0	0	0	0	0	1

Note: 0 = indicates lamp extinguished.
1 = indicates lamp lighted.

STEP	ACTION	VERIFICATION

TABLE N

TD LAMPS															
16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
0	0	0	0	0	0	0	1	0	1	0	1	1	1	0	0

Note: 0 = indicates lamp extinguished.
1 = indicates lamp lighted.

27 At line access relay panel—
Disconnect test cord from terminal 00-1 and connect to terminal 00-3.

28 At test set—
Set READ switch to ON.

For each READ pulse received, the lamps will display as shown in Table O.

29 Set READ switch to OFF.

30 Remove test cord from KS-14369 battery.

31 At line access relay panel—
Remove test cord from terminal 00-3.

32 Connect a 10K-ohm (±10%) resistor on connecting block LR, between terminals 00-4 and 00-5.

Note: The resistor should be connected to the designated terminals with insulated alligator clips to prevent shorting two or more terminals together.

33 At test set—
Set READ switch to ON.

For each READ pulse received, the lamps will display as shown in Table P.

34 Set READ switch to OFF.

TABLE O

TD LAMPS															
16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
1	0	0	0	0	0	1	1	1	0	0	0	0	0	0	1

Note: 0 = indicates lamp extinguished.
1 = indicates lamp lighted.

STEP	ACTION	VERIFICATION

TABLE P

TD LAMPS															
16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
0	0	0	0	0	0	0	1	0	1	0	1	1	1	0	0

Note: 0 = indicates lamp extinguished.
1 = indicates lamp lighted.

35 At line access relay panel—
Disconnect resistor from terminals 00-4 and 00-5 and connect to terminals 00-6 and 00-7.

36 At test set—
Set READ switch to ON.

For each READ pulse received, the lamps will display as shown in Table Q.

37 Set READ switch to OFF.

38 At line access relay panel—
Remove resistor from terminals 00-6 and 00-7.

39 Restore remote terminal to an on-line condition.

E. HY5 Test Requirements

Note 1: Before removing or replacing HY5 circuit pack, disconnect AC power cord and remove 1 AMP fuse at power distribution panel.

Note 2: If the HY5 circuit pack fails any of the output requirements, consider it as a defective unit.

1 Using red and black jumper leads, connect test set +5V and GRD, also -48V dc and GRD terminals to the respective remote

TABLE Q

TD LAMPS															
16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
1	0	0	0	0	0	1	1	1	0	0	0	0	0	0	1

Note: 0 = indicates lamp extinguished.
1 = indicates lamp lighted.

STEP	ACTION	VERIFICATION
	terminals power distribution panel +5V, -48V dc, and FLT GRD jacks.	
2	At test set— Set +5V switch to +5V.	
3	Set all logic switches to 0.	All lamps extinguished.
4	Set all logic switches to OFF.	All lamps lighted.
5	Set +5V switch to OFF.	
6	Insert HY5 circuit pack to be tested into J3 connector.	
7	Set +5V switch to +5V.	
	Note: Circuit definitions are shown in Table R.	
8	Using a clip lead, connect the negative side of C3 capacitor (KS-16390, L3 10uf) of HY5 circuit pack to one of the test set GRD terminals.	
	Caution: Failure to ground C3 capacitor could cause damage.	
9	Set switches 8, 9, 11, 12, 14, 17, 18, 28, and 29 to 0.	
10	Set switches 15, 19, 21, and 30 to 1.	
11	Press and hold -48V pushbutton.	All output lamps as shown in Table R are extinguished.
12	Release -48V pushbutton.	
13	Set switches 9 and 11 to 1.	
14	Press and hold -48V pushbutton.	All output lamps as shown in Table R are extinguished.
15	Release -48V pushbutton.	
16	Set switch 8 to 1.	
17	Set switches 15, 17, 18, 19, 21, 28, 29, and 30 to OFF.	

STEP	ACTION	VERIFICATION

TABLE R

CIRCUIT DEFINITIONS FOR
TESTING HY5 CIRCUIT PACK

INPUT TERMINALS		OUTPUT TERMINALS	
SWITCHES	LEADS	LAMPS	LEADS
8	P5G	42	THA
9	$\overline{LA}$	43	TVA
11	$\overline{LB}$	44	RVA
12	CA12	46	RHA
14	CB10	52	THB
15	TA	53	TVB
17	MRA	59	RVB
18	MTA	60	RHB
19	RA		
21	TB		
28	MRB		
29	MTB		
30	RB		

18	Press and hold -48V pushbutton.	Lamps 17, 18, 28, 29, 42, 46, 52, and 60 lighted. Lamps 43, 44, 53, and 59 extinguished.
19	Set switch 12 to 1.	Lamps 17, 18, 28, 29, 42, 46, 52, and 60 lighted. Lamps 43, 44, 53, and 59 extinguished.
20	Set switch 14 to 1.	Lamps 15, 17, 18, 19, 21, 28, 29, 30, 42, 44, 46, 52, 53, 59, and 60 lighted.
21	Release -48V pushbutton.	
22	Set switches 9, 11, 12, 14, 17, 18, 28, and 29 to 0.	
23	Press and hold -48V pushbutton.	Lamps 42, 43, 44, 46, 52, 53, 59, and 60 extinguished. Lamps 15, 19, 21, and 30 lighted.
24	Release -48V pushbutton.	

STEP	ACTION	VERIFICATION
25	Set +5V switch to OFF.	
26	Remove HY5 circuit pack from J3 terminal.	
27	At HY5 circuit pack— Visually check resistors R9 (3.16KΩ), R10 (110KΩ), and R11 (301KΩ) for damage.	
28a	If resistor R9 is suspected of damage— Using a VOM setup for a resistance measurement— Connect red test cord to lead 36 on circuit pack and black test cord to ground.	VOM reading of 3.16KΩ.
29b	If resistor R10 is suspected of damage— Use same test procedure as Step 28a, except connect test leads to leads 38 and 40 on circuit pack.	VOM reading of 110KΩ.
30c	If resistor R11 is suspected of damage— Use same test procedure as Step 28a, except connect test leads to leads 55 and 58 on circuit pack.	VOM reading of 301KΩ.

F. HY6 Test Requirements

Note 1: Before removing or replacing HY6 circuit pack, disconnect AC power cord and remove 1 AMP fuse at power distribution panel.

Note 2: If the HY6 circuit pack fails any of the output requirements, consider it as a defective unit.

1	Using red and black jumper leads, connect test set to +5V and GRD terminals to remote terminal power distribution panel +5V and FLT GRD jacks.	
2	At test set— Set +5V switch to +5V.	
3	Set all logic switches to 0.	All lamps extinguished.
4	Set all logic switches to OFF.	All lamps lighted.
5	Set +5V switch to OFF.	
6	Insert HY6 circuit pack to be tested into J3 connector.	
7	Set +5V switch to +5V.	

STEP	ACTION	VERIFICATION
	Note: Circuit definitions are shown in Table S.	
8	Set all input switches shown in Table S to OFF.	Output lamps shown in Table S lighted.
9	Set input switches for each line as shown in Table T.	As shown in Table T.
10	Set +5V switch to OFF.	

G. HY7 Test Requirements

Note 1: Before removing or replacing HY7 circuit pack, disconnect AC power cord and remove 1 AMP fuse at power distribution panel.

Note 2: If the HY7 circuit pack fails any of the output requirements, consider it as a defective unit.

1 Using red and black jumper leads, connect test set to +5V and GRD terminals to remote

TABLE S

INPUT TERMINALS						OUTPUT TERMINALS	
SWITCHES	LEADS	SWITCHES	LEADS	SWITCHES	LEADS	LAMPS	LEADS
5	X3	23	Z5	43	Z2	9	T2
6	Z3	25	Y5	46	X7	10	T1
7	Y3	26	W6	47	W7	20	T6
8	W4	27	Y6	48	Y8	21	T5
11	X1	28	Z9	49	Z8	36	T3
12	Z1	29	W10	50	W5	37	T4
13	Y1	30	X10	51	X6	44	T7
14	W2	35	W3	52	Z6	45	T8
15	Y2	38	X4	53	W9	59	T9
16	Y7	39	Y4	55	X9	60	T10
17	Z7	40	Z4	56	Y9		
18	X8	41	W1	57	Y10		
19	W8	42	X2	58	Z10		
22	X5						

TABLE T

	INPUT SWITCH SETTINGS																																							OUTPUT LAMPS*									
LINE	5	6	7	8	11	12	13	14	15	16	17	18	19	22	23	25	26	27	28	29	30	35	38	39	40	41	42	43	46	47	48	49	50	51	52	53	55	56	57	58	9	10	20	21	36	37	44	45	59	60
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	1	0	0	0	1	0	0	0	0	1	0	0	0	1	0	0	0	1	0	0	0	0	0	1	0	0	1	0	0	0	1	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
3	0	0	1	0	0	0	1	0	1	1	0	0	0	0	0	1	0	1	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0
4	0	1	1	0	0	1	1	0	1	1	1	0	0	0	1	1	0	1	1	0	0	0	0	1	1	0	0	1	0	0	1	1	0	0	1	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0
5	1	0	0	0	1	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	1	0	1	0	0	0	1	0	1	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
6	1	1	0	0	1	1	0	0	0	0	1	1	0	1	1	0	0	0	1	0	1	0	1	0	1	0	1	1	1	0	0	1	0	1	1	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0
7	1	0	1	0	1	0	1	0	1	1	0	1	0	1	0	1	0	1	0	0	1	0	1	1	0	0	1	0	1	0	1	0	0	1	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0
8	1	1	1	0	1	1	1	0	1	1	1	1	0	1	1	1	0	1	1	0	1	0	1	1	1	0	1	1	1	0	1	1	0	1	1	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0
9	0	0	0	1	0	0	0	1	0	0	0	0	1	0	0	0	1	0	0	1	0	1	0	0	0	1	0	0	0	1	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	1	0	1	0	1	0	1	0	0	1	0	1	0	1	0	1	0	1	1	0	1	0	0	1	1	0	1	0	1	0	1	1	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0
11	0	0	1	1	0	0	1	1	1	1	0	0	1	0	0	1	1	1	0	1	0	1	0	1	0	1	0	0	0	1	1	0	1	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0
12	0	1	1	1	0	1	1	1	1	1	1	0	1	0	1	1	1	1	1	1	0	1	0	1	1	1	0	1	0	1	1	1	1	0	1	1	0	1	1	1	0	0	0	0	0	0	0	0	0	0
13	1	0	0	1	1	0	0	1	0	0	0	1	1	1	0	0	1	0	0	1	1	1	1	0	0	1	1	0	1	1	0	0	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
14	1	1	0	1	1	1	0	1	0	0	1	1	1	1	1	0	1	0	1	1	1	1	1	0	1	1	1	1	1	1	0	1	1	1	1	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0
15	1	0	1	1	1	0	1	1	1	1	0	1	1	1	0	1	1	1	0	1	1	1	1	1	0	1	1	0	1	1	1	0	1	1	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0
16	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

Note: *0 = indicates lamp extinguished.
1 = indicates lamp lighted.

STEP	ACTION	VERIFICATION
	terminal power distribution panel +5V and FLT GRD jacks.	
2	At test set— Set +5V switch to +5V.	
3	Set all logic switches to 0.	All lamps extinguished.
4	Set all logic switches to OFF.	All lamps lighted.
5	Set +5V switch to OFF.	
6	Insert HY7 circuit pack to be tested into J3 connector.	
7	Set +5V switch to +5V. ***Note:*** Circuit definitions are shown in Table U.	
8	Set clock terminal switches shown in Table U to 0.	
9	Set switches 15 and 40 to 1.	
10	Set switches 5, 6, 7, 8, 9, 10, 12, 13, 16, 17, 24, 25, 26, 27, and 30 to 0.	
11	Set clock terminal switches shown in Table U to 1; then back to 0.	Lamps 35, 36, 37, 47, 48, 49, 50, 51, 52, 53, 55, 56, 57, 59, and 60 lighted. Lamp 46 should be extinguished.
12	Set switches 5, 6, 7, 8, 9, 10, 12, 13, 16, 17, 24, 25, 26, 27, and 30 to 1.	Lamps 35, 36, 37, 47, 48, 49, 50, 51, 52, 53, 55, 56, 57, 59, and 60 lighted. Lamp 46 should be extinguished.
13	Set switch 40 to 0.	Lamps 35, 36, 37, 47, 48, 49, 50, 51, 52, 53, 55, 56, 57, 59, and 60 lighted. Lamp 46 should be extinguished.
14	Set clock terminal switches shown in Table U to 1; then back to 0.	All lamp outputs as shown in Table U are extinguished.
15	Set switch 40 to 1.	Lamp 46 lighted.
16	Set switch 15 to 0.	All lamp outputs as shown in Table U are lighted.
17	Set switch 15 to 1.	

STEP	ACTION	VERIFICATION

TABLE U

CIRCUIT DEFINITIONS FOR TESTING HY7 CIRCUIT PACK

INPUTS						OUTPUTS	
INPUT TERMINALS		CLOCK TERMINALS		CONTROL TERMINALS		OUTPUT TERMINALS	
SWITCH	LEAD	SWITCH	LEAD	SWITCH	LEAD	LAMP	LEAD
5	$\overline{EW7}$	14	P7	15	P12	35	TD11
6	$\overline{EW9}$	19	P11			36	TD9
7	$\overline{EW10}$	20	P11			37	TD13
8	$\overline{EW8}$	21	P11			46	TD16
9	$\overline{EW6}$	22	K9			47	TD4
10	$\overline{EW5}$	23	P2			48	TD5
12	$\overline{EW4}$	28	P4			49	TD2
13	$\overline{EW2}$					50	TD10
16	$\overline{EW3}$					51	TD7
17	$\overline{EW1}$					52	TD6
24	$\overline{EW13}$					53	TD3
25	$\overline{EW11}$					55	TD1
26	$\overline{EW14}$					56	TD8
27	$\overline{EW15}$					57	TD12
30	$\overline{EW12}$					59	TD15
40	PRE					60	TD14

18 Set switches 5, 6, 7, 8, 9, 10, 12, 13, 16, 17, 24, 25, 26, 27, and 30 to any possible input combination.

19 Set clock terminal switches as shown in Table U to 1; then back to 0.

Lamp 46 lighted for an even number of 0—states on the inputs of Step 14; and extinguished for an odd number of 0—states on inputs of Step 18.

20 Set +5V switch to +5V.

H. HY8 Test Requirements

Note 1: Before removing or replacing HY8 circuit pack, disconnect AC power cord and

STEP	ACTION	VERIFICATION
	remove 1 AMP fuse at power distribution panel.	
	Note 2: If the HYB circuit pack fails any of the output requirements, consider it as a defective unit.	
1	Using red and black jumper leads, connect test set to +5V and GRD terminals to remote terminal power distribution panel +5V and FLT GRD jacks.	
2	At test set— Set +5V switch to +5V.	
3	Set all logic switches to 0.	All lamps extinguished.
4	Set all logic switches to OFF.	All lamps lighted.
5	Set +5V switch to OFF.	
6	Insert HY8 circuit pack to be tested into J3 connector.	
7	Set +5V switch to +5V. ***Note:*** Circuit definitions are shown in Table V.	
8	Set switches 9 and 21 to 0.	
9	Set switches 5, 7, 13, 19, 20, 23 to 30 to 1.	All output lamps shown in Table V lighted.
10	Set switches 5, 7, 13, 19, 20, and 27 to 29 to 0.	Lamps 42 to 44, 50, and 52 lighted. Lamps 38, 41, and 45 to 47 extinguished.
11	Set switch 24 to 0.	Lamps 38, 41 to 44, 50, and 52 lighted. Lamps 45 to 47 extinguished.
12	Set switch 23 to 0 and switch 24 to 1.	Lamps 38, 41 to 44, 50, and 52 lighted. Lamps 45 to 47 extinguished.
13	Set switch 24 to 0.	Lamps 38, 41 to 44, 50, and 52 lighted. Lamps 45 to 47 extinguished.
14	Set switch 30 to 0.	
15	Set switches 5, 7, 9, 13, 19, 20, 23, 24, and 27 to 29 to 1.	All output lamps shown in Table V lighted.
16	Set switches 5, 7, 13, 19, 20, and 27 to 29 to 0.	Lamps 42, 43, 44, 50, and 52 extinguished. Lamps 38, 41, 45, 46, and 47 lighted.

STEP	ACTION	VERIFICATION

TABLE V

CIRCUIT DEFINITIONS
FOR TESTING HY8 CIRCUIT PACK

INPUT TERMINALS		CONTROL TERMINALS		OUTPUT TERMINALS	
SWITCH	LEAD	SWITCH	LEAD	LAMP	LEAD
5	S0	9	P8G	38	$\overline{WA0}$
7	S1	21	K3	41	$\overline{WA1}$
13	S2	30	P6G	42	$\overline{WB4}$
19	S6			43	$\overline{WB2}$
20	S7			44	$\overline{WB3}$
23	$\overline{LBA}$			45	$\overline{WA4}$
24	$\overline{A}$			46	$\overline{WA2}$
25	$\overline{B}$			47	$\overline{WA3}$
26	$\overline{LBB}$			50	$\overline{WB1}$
27	S4			51	$\overline{LA}$
28	S3			52	$\overline{WB0}$
29	S5			53	$\overline{LB}$

17	Set switch 25 to 0.	Lamps 38, 41, 45 to 47, 50, and 52 lighted. Lamps 42 to 44 extinguished.
18	Set switch 25 to 1 and switch 26 to 0.	Lamps 38, 41, 45 to 47, 50, and 52 lighted. Lamps 42 to 44 extinguished.
19	Set switch 25 to 0.	Lamps 38, 41, 45 to 47, 50, and 52 lighted. Lamps 42 to 44 extinguished.
20	Set switch 9 to 0, and switches 25 and 26 to 1.	
21	Set switches 5, 7, 13, 19, 20, and 27 to 29 to any possible input condition.	All output lamps shown in Table V lighted for all possible input conditions.
22	Set switches 5, 7, 13, 19, 20, 21, and 27 to 29 to 1.	Lamps 42, 44, 51 and 53 lighted. All other lamps shown in Table V extinguished.
23	Set switches 5, 7, 13, 19, 20, and 27 to 29 to 0.	All output lamps shown in Table V lighted.
24	Set +5V switch to OFF.	

STEP	ACTION	VERIFICATION

I. HY9 Test Requirements

Note 1: Before removing or replacing HY9 circuit pack, disconnect AC power cord and remove 1 AMP fuse at power distribution panel.

Note 2: If the HY9 circuit pack fails any of the output requirements, consider it as a defective unit.

1 Using red and black jumper leads, connect test set to +5V and GRD terminals to remote terminal power distribution panel +5V and FLT GRD jacks.

2 Set all logic switches to 0. — All lamps extinguished.

3 Set all logic switches to OFF. — All lamps lighted.

4 Insert HY9 circuit pack to be tested into J3 connector.

Note: Circuit definitions are shown in Table W.

TABLE W

CIRCUIT DEFINITIONS FOR TESTING HY9 CIRCUIT PACK

INPUT				OUTPUT	
INPUT TERMINALS		CONTROL TERMINALS		OUTPUT TERMINALS	
SWITCH	LEAD	SWITCH	LEAD	LAMP	LEAD
36	L6	12	E4	9	$\overline{SD6}$
37	L5	13	E5	10	$\overline{SD5}$
38	L4			11	$\overline{SD4}$
46	L8			17	$\overline{SD10}$
51	L10			18	$\overline{SD9}$
52	L9			19	$\overline{SD3}$
55	L3			21	$\overline{SD8}$
56	L7			24	$\overline{SD2}$
57	L2			25	$\overline{SD7}$
59	L1			30	$\overline{SD1}$
				35	SIV

STEP	ACTION	VERIFICATION
5	Using a jumper wire, connect -48V terminal to a GRD terminal. ***Caution: Do NOT apply -48Vdc to the test set until instructed as to when and how to do so.***	
6	Set +5V switch to +5V.	
7	Set switches 12 and 13 to 0.	
8	Depress and hold -48V pushbutton.	Lamp 35 lighted.
9	Release -48V pushbutton.	
10	Set switch 12 to 1.	
11	Depress and hold -48V pushbutton.	Lamp 35 extinguished.
12	Release -48V pushbutton.	
13	Set switch 13 to 1.	
14	Depress and hold -48V pushbutton.	Lamp 35 lighted.
15	Release -48V pushbutton.	
16	Set switch 12 to 0.	
17	Depress and hold -48V pushbutton.	Lamp 35 extinguished.
18	Disconnect jumper wire between test set -48V terminal and GRD terminal.	
19	Set +5V switch to OFF.	
20	Remove HY9 and tape terminal 35.	
21	Reinsert HY9 into J3.	
22	Connect a 620Ω (±5%, 2 watts or more) resistor to test set -48V terminal and connect red jumper lead to resistor and then to power distribution panel -48V jack.	
23	Set +5V switch to +5V.	
24	Set switch 35 to 0. ***Caution: Steps 18 to 22 must be performed to prevent equipment damage.***	

STEP	ACTION	VERIFICATION
25	Set switches 36 to 38, 46, 51, 52, 55 to 57, and 59 to 0.	
26	Depress and hold -48V pushbutton.	Lamps 9 to 11, 17 to 19, 21, 24, 25, and 30 lighted.
27	Release -48V pushbutton.	
28	Set switch 12 to 1 and switch 13 to 0.	
29	Depress and hold -48V pushbutton.	Lamps 9 to 11, 17 to 19, 21, 24, 25, and 30 extinguished.
30	Release -48V pushbutton.	
31	Set +5V switch to OFF.	
32	Remove HY9 and remove tape from terminal 35.	

J. HY10 Test Requirements

Note 1: Before removing or replacing HY10 circuit pack, disconnect AC power cord and remove 1 AMP fuse at power distribution panel.

Note 2: If the HY10 circuit pack fails any of the output requirements, consider it as a defective unit.

1	Using red and black jumper leads, connect test set +5V and GRD, also -48V terminals to remote terminal power distribution panel +5V, -48V, and FLT GRD jacks.	
2	Set all logic switches to 0.	All lamps extinguished.
3	Set all logic switches to OFF.	All lamps lighted.
4	Set +5V switch to OFF.	
5	Insert HY10 circuit pack to be tested into J3 connector.	
	Note: Circuit definitions are shown in Table X.	
6	Set +5V switch to +5V.	
7	Set switches 15 to 19, 31, 37, 40, 43 to 47, 51, and 58 to 0.	All output lamps shown in Table X lighted.

STEP	ACTION	VERIFICATION

TABLE X

CIRCUIT DEFINITIONS FOR TESTING HY10 CIRCUIT PACK

INPUT				OUTPUT			
INPUT TERMINALS		CONTROL TERMINALS		OUTPUT LEADS			
SWITCH	LEAD	SWITCH	LEAD	LAMP	LEAD	LAMP	LEAD
4	SIV	19	CDC0	1	21	29	15
15	L4	37	CDC2	2	22	30	16
16	L10	40	CDC3	3	23	32	CED2
17	L9	58	CDC1	5	24	33	27
18	L8			6	25	34	28
31	GRD			7	26	35	30
43	L3			8	35	36	29
44	L2			9	36	38	40
45	L1			10	34	39	39
46	L5			11	33	41	32
47	L6			12	38	42	31
51	L7			13	37	48	10
				14	CED3	49	8
				20	7	50	9
				21	CED0	52	4
				22	CED1	53	3
				23	19	54	2
				24	20	55	1
				25	13	56	5
				26	12	57	6
				27	11	59	17
				28	14	60	18

8	Depress and hold -48V pushbutton.	All output lamps shown in Table X are extinguished.

K. HY11 Test Requirements

Note 1: Before removing or replacing HY11 circuit pack, disconnect AC power cord and

STEP	ACTION	VERIFICATION
	remove 1 AMP fuse at power distribution panel.	
	Note 2: If the HY11 circuit pack fails any of the output requirements, consider it as a defective unit.	
1	Using the red and black jumper leads, connect test set +5V and GRD, also -48V terminals to remote terminal power distribution panel +5V, -48V, and FLT GRD jacks.	
2	At test set— Set +5V switch to +5V.	
3	Set all logic switches to 0.	All lamps extinguished.
4	Set all logic switches to OFF.	All lamps lighted.
5	Set +5V switch to OFF.	
6	Insert HY11 circuit pack to be tested into J3 connector.	
7	Set +5V switch to +5V.	
	Note: Circuit definitions are shown in Table Y.	
8	Set switches 7, 8, 20, and 21 to 1.	
9	Set switch 15 to 0.	
10	Set switches 7, 8, 20, and 21 to 0 then back to 1.	
11	Set switches 16 and 17 to 0.	All output lamps shown in Table Y lighted.
12	Set switch 17 to 1.	All output lamps shown in Table Y lighted.
13	Set switch 16 to 1 and switch 17 to 0.	All output lamps shown in Table Y lighted.
14	Set switch 17 to 1.	All output lamps shown in Table Y lighted.
15	Set switches 5, 6, 27, and 29 to 0.	
16	Set switches 7, 8, 20, and 21 to 0, then back to 1.	
17	Depress and release the -48V pushbutton five times.	

STEP	ACTION	VERIFICATION

TABLE Y

CIRCUIT DEFINITIONS FOR
TESTING HY11 CIRCUIT PACK

INPUT LEADS		OUTPUT LEADS	
SWITCH	LEAD	LAMP	LEAD
5	RAF1	42	$\overline{AD3}$
6	RAF0	43	$\overline{AD2}$
7	$\overline{E7P1}$	44	$\overline{AD1}$
8	$\overline{E7P1}$	48	$\overline{AD0}$
15	$\overline{AF1}$	49	$\overline{AD4}$
16	A0		
17	A1		
20	$\overline{E7P1}$		
21	$\overline{E7P1}$		
27	RAF3		
29	RAF2		

18	Set switches 16 and 17 to 0.	Lamps 42, 44, and 49 lighted. Lamps 43 and 48 extinguished.
19	Set switch 17 to 1.	Lamps 42, 44, and 49 lighted. Lamps 43 and 48 extinguished.
20	Set switch 16 to 1, and switch 17 to 0.	Lamps 42, 44, and 49 lighted. Lamps 43 and 48 extinguished.
21	Set switch 17 to 1.	Lamps 42, 44, and 49 lighted. Lamps 43 and 48 extinguished.
22	Depress and release -48V pushbutton 26 times.	
23	Set switches 16 and 17 to 0.	All output lamps shown in Table Y extinguished.
24	Set switch 17 to 1.	All output lamps shown in Table Y extinguished.
25	Set switch 16 to 1, and switch 17 to 0.	All output lamps shown in Table Y extinguished.
26	Set switch 17 to 1.	All output lamps shown in Table Y extinguished.
27	Depress and release -48V pushbutton two times.	

STEP	ACTION	VERIFICATION
28	Set switches 16 and 17 to 0.	All output lamps shown in Table Y extinguished.
29	Set switch 17 to 1.	All output lamps shown in Table Y extinguished.
30	Set switch 16 to 1, and switch 17 to 0.	All output lamps shown in Table Y extinguished.
31	Set switch 17 to 1.	All output lamps shown in Table Y extinguished.
32	Set switch 15 to 1.	
33	Set switches 16 and 17 to 0.	All output lamps shown in Table Y lighted.
34	Set switches 7, 8, 27, and 29 to 0, then back to 1.	
35	Set switch 15 to 0.	All output lamps shown in Table Y lighted.
36	Set switch 17 to 1.	All output lamps shown in Table Y lighted.
37	Set switch 16 to 1, and switch 17 to 0.	All output lamps shown in Table Y lighted.
38	Set switch 17 to 1.	All output lamps shown in Table Y lighted.
39	Set +5V switch to OFF.	

L. HY12 Test Requirements

Note 1: Before removing or replacing HY12 circuit pack, disconnect AC power cord and remove 1 AMP fuse at power distribution panel.

Note 2: If the HY12 circuit pack fails any of the output requirements, consider it as a defective unit.

1	Using the red and black jumper leads, connect test set +5V and GRD, also -48V terminals to remote terminal power distribution panel +5V, -48V, and FLT GRD jacks.	
2	Set +5V switch to +5V.	
3	Set all logic switches to 0.	All lamps extinguished.
4	Set all logic switches to OFF.	All lamps lighted.
5	At test set— Set all input and control terminal switches shown in Table Z to 0.	All output lamps shown in Table Z lighted.
6	Set +5V switch to OFF.	

STEP	ACTION	VERIFICATION
7	Insert HY12 circuit pack to be tested into J3 connector. *Note:* Circuit definitions are shown in Table Z.	
8	Set +5V switch to +5V.	
9	Set switches 12, 23, 26, 28, 36, 37, 38, 39, 43, 44, 45, 49, 50, 51, 55, and 59 to 0.	Lamps 6, 7, 8, 9, 13, 14, 15, 19, 20, 21, 25, 29, 42, 43, 56, and 58 extinguished.
10	Set all logic switches to OFF.	
11	Set switches 11, 16, 17, 18, 27, 40, 48, and 54 to 0.	

TABLE Z

CIRCUIT DEFINITIONS FOR TESTING HY12 CIRCUIT PACK

INPUT				OUTPUT			
INPUT TERMINALS		CONTROL TERMINALS		OUTPUT LEADS			
SWITCH	LEAD	SWITCH	LEAD	LAMP	LEAD	LAMP	LEAD
1	I	16	K3	6	H2	36	G2
4	K	18	K0	7	F2	37	E2
5	H	40	K2	8	D2	38	C2
11	E	54	K1	9	B2	39	A2
17	G			10	J3	42	H3
24	F			12	G3	43	E3
27	C			13	F3	44	A3
31	I			14	B3	45	C3
41	D			15	D3	47	J
46	B			19	B0	49	A0
48	A			20	F0	50	E0
				21	F1	51	E1
				23	A1	53	B1
				25	D1	55	C1
				26	G1	56	H1
				28	C0	57	J1
				29	H0	58	D0
				35	J2	59	G0
						60	J0

STEP	ACTION	VERIFICATION
12	Depress and hold -48V pushbutton.	Lamps 10, 12, 23, 26, 28, 35, 36, 37, 38, 39, 43, 44, 45, 47, 49, 50, 51, 55, 57, 59, and 60 extinguished. Lamps 6, 7, 8, 9, 13, 14, 15, 19, 20, 21, 25, 29, 42, 53, 56, and 58 lighted.
13	Release -48V pushbutton.	
14	Set switches 5, 24, 41, and 46 to 0.	
15	Depress and hold -48V pushbutton.	All output lamps shown in Table Z extinguished.
	Note: The preceding tests provide a conclusive result for all relay functions except for the closure of the NO side of contact 11 of each relay. If this contact is in doubt, an ohm meter may be used to check it, or the circuit pack may be tested in the remote terminal using the data simulation mode of the test set.	

M. HY13 Test Requirements

Note 1: Before removing or replacing HY13 circuit pack, disconnect AC power cord and remove 1 AMP fuse at power distribution panel.

Note 2: If the HY13 circuit pack fails any of the requirements, consider it as a defective unit.

1	Using red and black jumper leads, connect test set +5V and GRD terminal posts to remote terminal power distribution panel +5V and GRD terminals.	
2	At test set— Set all logic switches to 0.	
3	Set +5V switch to +5V.	All lamps extinguished.
4	Set all logic switches to OFF.	All lamps lighted.
5	Set +5V switch to OFF.	
6	Insert HY13 circuit pack to be tested into J3 connector.	
	Note: Circuit definition are shown in Table AA.	

STEP	ACTION	VERIFICATION

TABLE AA

CIRCUIT DEFINITIONS FOR TESTING HY13 CIRCUIT PACK

INPUT				OUTPUT			
SWITCH	LEAD	SWITCH	LEAD	LAMP	LEAD	LAMP	LEAD
7	IXO	36	IP10	5	$\overline{\text{TECL}}$	25	B3
10	P2S	38	$\overline{\text{IXO}}$	6	P10	29	K3
11	READ	39	CE	8	$\overline{\text{XO}}$	34	RK1
13	$\overline{\text{ISCO}}$	40	P2R	9	CEN	35	RDCT
14	IA2	42	IPRE	12	PRE	37	XO
17	E9	45	E5	15	LR	43	$\overline{\text{SCO}}$
19	$\overline{\text{IA3}}$	50	IPCE1	16	TN9	44	A2
21	IRC	53	IA3	20	PCE1	49	$\overline{\text{A3}}$
24	P6	55	IB3	22	TN10	51	RC
26	RCT	56	RCR	23	A3	58	P6GE
27	E	57	PR				
28	P6G	59	IK3				

7	Set +5V switch to +5V.	
8	Sequentially apply each set of logic states shown in Table AB to switches specified.	As shown in Table AB for each set of input conditions.
9	Set logic switch 40 to 1.	
10	Set logic switches 11, 17, and 36 to 0.	
11	Set logic switch 10 to 1, then to 0, and then back to 1.	Lamp 35 extinguished. Lamp 5 lighted.
12	Set logic switch 11 from 0 to 1, then back to 0.	Lamps 35 and 5 lighted.
13	Set logic switch 10 from 1 to 0, then back to 1.	Lamp 35 extinguished. Lamp 5 lighted.
14	Set logic switch 17 to 1.	
15	Repeat Step 13.	

STEP	ACTION	VERIFICATION

TABLE AB

LINE	INPUT SWITCH SETTINGS								OUTPUT LAMPS (SEE NOTE)								
	14	17	19	27	45	53	55	57	9	12	15	16	22	23	25	44	49
1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
2	1	0	0	0	1	1	1	1	0	1	1	0	0	1	1	1	0
3	1	0	0	1	1	1	1	0	0	1	1	0	0	1	1	1	0
4	1	0	0	1	1	1	1	1	1	1	1	0	0	1	1	1	0
5	0	1	1	0	0	0	0	0	0	1	1	0	0	0	1	1	1
6	0	1	1	0	0	0	0	1	1	1	1	0	0	0	1	1	1
7	0	1	1	1	0	0	0	0	0	1	1	0	0	0	1	1	1
8	1	1	0	1	1	1	1	1	1	1	1	1	1	0	1	1	1

Note: 0 indicates lamp extinguished
1 indicates lamp lighted

16	Repeat Step 12.	Lamps 5 and 35 lighted.
17	Set logic switch 40 from 1 to 0, then back to 1.	Lamp 35 lighted. Lamp 5 extinguished.
18	Set logic switch 10 from 1 to 0, then back to 1.	Same as Step 17.
19	Set logic switch 11 from 0 to 1, then back to 0.	Lamp 35 extinguished.
20	Set logic switch 40 from 1 to 0, then back to 1.	
21	Set logic switch 10 from 1 to 0, then back to 1.	Lamp 5 lighted.
22	Set logic switch 11 from 0 to 1, then back to 0.	Lamps 5 and 35 lighted.
23	Set logic switch 36 from 0 to 1, then back to 0.	Lamp 35 extinguished.
24	Sequentially apply each set of logic states shown in Table AC to switches specified.	As shown in Table AC for each set of input conditions.
25	Set logic switch 36 to 0.	

STEP	ACTION	VERIFICATION

TABLE AC

LINE	INPUT SWITCH SETTINGS										OUTPUT LAMPS (SEE NOTE)							
	7	13	17	24	27	28	36	50	57	59	6	8	20	29	34	37	43	58
1	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0
2	1	1	0	1	1	0	1	1	0	1	1	0	0	1	0	1	1	0
3	1	1	0	0	1	1	1	0	1	1	1	0	0	1	0	1	1	1
4	1	1	0	1	1	1	1	1	1	1	1	0	1	1	0	1	1	1
5	1	1	1	0	1	0	1	1	1	1	1	0	1	1	1	1	1	0
6	1	1	1	1	1	0	1	1	1	1	1	0	1	1	1	1	1	1
7	1	1	1	0	1	1	1	1	1	1	1	0	1	1	1	1	1	1
8	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1

Note: 0 indicates lamp extinguished
1 indicates lamp lighted

26 Repeat Step 12.

27 Repeat Step 17.

28 Sequentially apply each set of logic states shown in Table AD to switches specified. — As shown in Table AD for each set of input conditions.

29 Set +5V switch to OFF.

N. HY14 Test Requirements

Note 1: Before removing or replacing HY14 circuit pack, disconnect AC power cord and remove 1 AMP fuse at power distribution panel.

Note 2: If the HY14 circuit pack fails any of the requirements, consider it as a defective unit.

1 Using red and black jumper leads, connect test set +5V and GRD terminal posts to remote terminal power distribution panel +5V and GRD terminals.

2 At test set—
Set all logic switches to 0.

STEP	ACTION	VERIFICATION

TABLE AD

LINE	INPUT SWITCH SETTINGS										OUTPUT LAMPS (SEE NOTE)							
	7	13	17	24	27	28	36	50	57	59	6	8	20	29	34	37	43	58
1	0	0	1	0	1	0	0	0	0	0	0	1	0	0	0	0	1	0
2	1	1	1	1	1	0	1	1	0	1	0	1	0	0	0	0	1	0
3	1	1	1	0	1	1	1	0	1	1	0	1	1	0	1	0	1	1
4	1	1	1	0	1	0	1	1	1	1	0	1	1	0	1	0	1	0
5	1	1	1	1	1	0	1	1	1	1	0	1	1	0	1	0	1	0
6	1	1	1	0	1	1	1	1	1	1	0	1	1	0	1	0	1	1
7	1	1	1	1	1	1	1	1	1	1	0	1	1	0	1	0	1	1

Note: 0 indicates lamp extinguished
1 indicates lamp lighted

3	Set +5V switch to +5V.	All lamps extinguished.
4	Set all logic switches to OFF.	All lamps lighted.
5	Set +5V switch to OFF.	
6	Insert HY14 circuit pack to be tested into J3 connector.	
7	Set +5V switch to +5V.	
8	Set logic switch 57 to 0.	
9	Set logic switches 28 and 30 to 1.	
10	Set logic switch 27 to 0.	
11	Set logic switch 29 to 0.	Lamps 56 and 60 extinguished. Lamps 26 and 59 lighted.
12	Set logic switch 29 to OFF.	
13	Set logic switch 57 to 1.	Lamps 26, 29, 56, and 59 extinguished. Lamp 60 lighted.
14	Set logic switch 27 to 1.	Same as Step 13.
15	Set logic switch 28 to 0.	Lamps 26, 29, 56, 59, and 60 lighted.

STEP	ACTION	VERIFICATION
16	Set logic switch 28 to 1.	Lamps 26, 29, 56, and 59 extinguished.
17	Set logic switch 27 to 0 and then back to 1.	Lamps 26, 29, 56, 59, and 60 lighted.
18	Set +5V switch to OFF.	
19	Remove HY14 from test set.	
20	Set READ, voltage, and logic switches to OFF.	
21	At remote terminal power distribution panel, disconnect AC power cord and remove 1 AMP fuse.	
22	At test set— Connect an M50H cord to J1; connect other end to J1 on back of power distribution panel.	
23	Connect an M50H cord to J2; connect other end to J2 on back of power distribution panel.	
24	At logic and measurement panel— Replace working HY14 circuit pack with one to be tested.	
25	Using a 103A handset equipped with a 2W37A cord assembly, connect clips to pins 0023-61-29 and 0023-61-56. ***Caution: Exercise extreme care when connecting clips to avoid shorting pins.***	
26	At power distribution panel, reinsert 1 AMP fuse and reconnect AC power cord.	
27	Set +5V switch to +5V.	
28	Sequentially apply each set of logic states shown in Table AE to switches specified, set READ switch to ON for each sequence, and listen in handset for tones.	As shown in Table AE for each set of input conditions.
29	Connect the 1013A handset clips to 0023-61-56 and ground.	
30	Perform sequence D of Table AE and listen in handset.	Approximately 1000-Hz tone heard.
31	Connect the 1013A handset clips to 0023-61-29 and ground.	

STEP ACTION VERIFICATION

TABLE AE

SEQUENCE	RD SWITCH SETTINGS																OUTPUT FREQUENCY (Hz)
	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	
A	1	0	1	1	1	0	0	1	0	0	0	0	0	1	0	0	666
B	0	0	1	0	1	0	0	1	0	0	0	0	0	1	0	0	762
C	0	0	0	1	1	0	0	1	0	0	0	0	0	1	0	0	889
D	1	0	0	0	1	0	0	1	0	0	0	0	0	1	0	0	1067
E	0	0	1	1	1	0	0	1	0	0	0	0	0	0	0	0	1333
F	1	0	1	0	1	0	0	1	0	0	0	0	0	0	0	0	1524
G	1	0	0	1	1	0	0	1	0	0	0	0	0	0	0	0	1778
H	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	2133
I	1	1	0	0	1	0	0	1	0	0	0	0	0	0	0	0	2133 & 333
J	1	0	0	0	1	0	0	1	0	0	0	0	1	0	0	0	2133 & 500
K	0	1	0	0	1	0	0	1	0	0	0	0	1	0	0	0	2133, 333, & 500

32 Repeat Step 30.

33 Disconnect 1013A handset.

34 At test set—
Disconnect from data simulation mode.

35 Restore the remote terminal to on-line status.

O. HY18 Test Requirements

Note 1: Before removing or replacing HY18 circuit pack, disconnect AC power cord and remove 1 AMP fuse at power distribution panel.

Note 2: If the HY18 circuit pack fails any of the requirements, consider it as a defective unit.

1 Using red and black jumper leads, connect test set +5V and GRD terminal posts to

STEP	ACTION	VERIFICATION
	remote terminal power distribution panel +5V and GRD terminals.	
2	At test set— Set all logic switches to 0.	
3	Set +5V switch to +5V.	All lamps extinguished.
4	Set all logic switches to OFF.	All lamps lighted.
5	Set +5V switch to OFF.	
6	Insert HY18 circuit pack to be tested into J3 connector. ***Note:*** Circuit definitions are shown in Table AF.	
7	Set +5V switch to +5V.	
8	Set logic switches 13, 19, and 28 to 0.	
9	Set switches as shown in Table AG for set designation B.	Lamps 39, 41, and 53 thru 60 lighted.
10	Set switches as shown in Table AG for set designation F.	Same as Step 9.
11	Set logic switch 19 to 1.	
12	Sequentially apply each set of logic states shown in Table AG to switches specified.	As shown in Table AG for each set of input conditions.
13	Set +5V switch to OFF.	

P. CP1 Test Requirements

Note 1: Before removing or replacing CP1 circuit pack, disconnect AC power cord and remove 1 AMP fuse at power distribution panel.

Note 2: If the CP1 circuit pack fails any of the output requirements, consider it as a defective unit.

1	Using the red and black jumper leads, connect test set +5V and GRD terminals to remote terminal power distribution panel +5V and FLT GRD jacks.	

STEP	ACTION	VERIFICATION

TABLE AF

CIRCUIT DEFINITIONS FOR
TESTING HY18 CIRCUIT PACK

INPUT		OUTPUT	
SWITCH	LEAD	LAMP	LEAD
12	X0	39	RW4
13	SIG1	41	CLM4
14	Y2	53	RW1
15	EN1	54	CLM3
16	EN2	55	CLM2
17	Y1	56	RW3
18	Y0	57	CLM0
19	EN0	58	CLM1
28	SIG2	59	RW2
37	X1	60	RW0
38	X2		

2	At test set— Set +5V switch to +5V.	
3	Set all logic switches to 0.	All lamps extinguished.
4	Set all logic switches to OFF.	All lamps lighted.
5	Set +5V switch to OFF.	
6	Insert CP1 circuit pack to be tested into J3 connector.	
7	Set +5V switch to +5V.	
	Note 1: Circuit definitions are shown in Table AH.	
	Note 2: Allow a few seconds for circuit pack warm up time before proceeding with test.	

STEP	ACTION	VERIFICATION

TABLE AG

SET DESIG.	INPUT SWITCH SETTINGS								OUTPUT LAMPS (SEE NOTE)									
	12	14	15	16	17	18	37	38	39	41	53	54	55	56	57	58	59	60
A	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1
B	0	0	1	1	0	0	0	0	1	1	1	1	1	1	0	1	1	0
C	0	0	1	1	0	1	0	0	1	1	0	1	1	1	1	0	1	1
D	1	0	1	1	1	0	1	0	1	1	1	1	0	1	1	1	0	1
E	1	0	1	1	1	1	1	0	1	1	1	0	1	0	1	1	1	1
F	0	1	1	1	0	0	0	1	0	0	1	1	1	1	1	1	1	1
G	1	1	1	1	0	1	0	1	1	1	1	1	1	1	1	1	1	1
H	0	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1
I	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
J	1	1	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1

Note: 0 indicates lamp extinguished
1 indicates lamp lighted

8	Set switch 29 to 1.	Lamps 44, 46, 47, 49, and 50 flash on and off. Lamp 45 is extinguished. Lamps 38, 39, 40, 41, 42, 48, and 51 lighted. ***Note:*** Lamps 38 to 42, 48, and 51 may show some flicker or be dimly lighted.
9	Set switch 29 to 0. ***Note:*** Steps 8 and 9 will indicate whether or not the 32 kHz oscillator, the reset logic, and the frequency dividers are operating properly; however, this is not an absolutely conclusive test since no frequency checks are made.	Lamps 38, 39, 40, 41, 42, 44, 45, 46, 47, 48, 49, 50, and 51 extinguished.
10	Set switches 24 and 36 to 1.	
11	Sequentially apply each set of logic states shown in Table AI to switches specified.	As shown in Table AI for each set of input conditions.

STEP	ACTION	VERIFICATION

TABLE AH

CIRCUIT DEFINITIONS FOR TESTING CP1 CIRCUIT PACK

INPUT LEADS				OUTPUT LEADS			
SWITCH	LEAD	SWITCH	LEAD	LAMP	LEAD	LAMP	LEAD
5	$\overline{SC1}$	21	CB12	38	F0	47	F10
6	$\overline{SC0}$	22	CA9	39	F1	48	CLK
8	$\overline{SC3}$	23	$\overline{X0}$	40	F3	49	F7
9	$\overline{SC2}$	24	P10	41	F2	50	F6
10	$\overline{SC4}$	25	X1	42	F4	51	F5
15	$\overline{CA10}$	26	X2	44	F8	53	R
16	$\overline{CB10}$	27	X3	45	F11	57	$\overline{SCS}$
17	MR	28	X4	46	F9	59	$\overline{XS}$
18	$\overline{CA12}$	29	READ			60	ST
19	CD3	30	X0				
20	CA7	36	PR				

12	Set switches 5, 6, 9, 8, 10, 23, 24, 25, 26, 27, 28, and 36 to 0.	Lamps 57 and 59 lighted.
13	Set switches 17, 29, and 30 to 1.	
14	Set switch 36 to 0.	Lamp 53 lighted.
15	Set switch 17 to 0.	Lamp 53 remains lighted.
16	Set switch 17 to 1.	
17	Sequentially apply each set of logic states shown in Table AJ to switches specified.	As shown in Table AJ for each set of input conditions.
18	Set switches 5, 6, 8, 9, 10, and 29 to 0.	
19	Set switch 36 to 1.	Lamp 53 lighted.
20	Set switch 17 to 0.	
21	Set switch 36 to 0.	Lamp 53 remains lighted.
22	Set switch 17 to 1.	Lamp 53 extinguished.
23	Sequentially apply each set of logic states shown in Table AK to switches specified.	As shown in Table AK for each set of input conditions.

TABLE AI

SEQUENCE	INPUT TERMINALS					OUTPUT TERMINALS	
	SWITCHES					LAMPS*	
	6 and 23	5 and 25	9 and 26	8 and 27	10 and 28	57	59
1	0	0	0	0	0	0	0
2	0	0	0	0	1	0	0
3	0	0	0	1	0	0	0
4	0	0	0	1	1	0	0
5	0	0	1	0	0	0	0
6	0	0	1	0	1	0	0
7	0	0	1	1	0	0	0
8	0	0	1	1	1	0	0
9	0	1	0	0	0	0	0
10	0	1	0	0	1	0	0
11	0	1	0	1	0	0	0
12	0	1	0	1	1	0	0
13	0	1	1	0	0	0	0
14	0	1	1	0	1	0	0
15	0	1	1	1	0	0	0
16	0	1	1	1	1	0	0
17	1	0	0	0	0	0	0
18	1	0	0	0	1	0	0
19	1	0	0	1	0	0	0
20	1	0	0	1	1	0	0
21	1	0	1	0	0	0	0
22	1	0	1	0	1	0	0
23	1	0	1	1	0	0	0
24	1	0	1	1	1	0	0
25	1	1	0	0	0	0	0
26	1	1	0	0	1	0	0
27	1	1	0	1	0	0	0
28	1	1	0	1	1	0	0
29	1	1	1	0	0	0	0
30	1	1	1	0	1	0	0
31	1	1	1	1	0	0	0
32	1	1	1	1	1	1	1

Note: *0 = indicates lamp is extinguished.
1 = indicates lamp is lighted.

STEP ACTION VERIFICATION

TABLE AJ

SEQUENCE	INPUT TERMINALS		OUTPUT TERMINAL
	SWITCHES		LAMPS*
	30	29	53
1	0	0	0
2	1	0	0
3	0	1	0

Note: *0 = indicates lamp is extinguished.
1 = indicates lamp is lighted.

24 Set +5V switch to OFF.

Q. CP2 Test Requirements

Note 1: Before removing or replacing CP2 circuit pack, disconnect AC power cord and remove 1 AMP fuse at power distribution panel.

Note 2: If the CP2 circuit pack fails any of the output requirements, consider it as a defective unit.

1 Using the red and black jumper leads, connect test set +5V and GRD terminals to remote terminal power distribution panel +5V and FLT GRD jacks.

TABLE AK

SEQUENCE	INPUT TERMINALS							OUTPUT TERMINALS
	SWITCHES							LAMPS*
	19	16	15	18	20	21	22	60
1	1	1	1	1	1	1	1	1
2	1	1	1	0	0	0	0	1
3	1	1	0	1	0	0	0	0
4	1	1	0	1	1	1	0	1
5	1	1	0	1	0	1	1	0

Note: *1 = indicates lamp is lighted.
0 = indicates lamp is extinguished.

STEP	ACTION	VERIFICATION
2	At test set— Set +5V switch to +5V.	
3	Set all logic switches to 0.	All lamps extinguished.
4	Set all logic switches to OFF.	All lamps lighted.
5	Set +5V switch to OFF.	
6	Insert CP2 circuit pack to be tested into J3 connector.	
7	Set +5V switch to +5V. ***Note:*** Circuit definitions are shown in Table AL.	
8	Sequentially apply each set of logic states shown in Table AM to switches specified.	As shown in Table AM for each set of input conditions. Only the selected output lamp(s) shall be extinguished while all other output lamps shall be lighted.
9	Set +5V switch to OFF.	

TABLE AL

CIRCUIT DEFINITIONS FOR TESTING CP2 CIRCUIT PACK

INPUT LEADS		OUTPUT LEADS			
SWITCH	LEAD	LAMP	LEAD	LAMP	LEAD
5	F4	25	P7R	49	P5S
6	F5	26	P2R	50	P5R
7	F6	27	P11S	51	P3S
9	F0	28	P12S	52	P10S
10	F1	29	P4R	53	P11R
11	F2	30	P10R	54	P4S
12	F7	42	P6S	55	P8R
13	F3	43	P6R	56	P9R
14	F11	44	P7S	57	P9S
15	F10	46	P2S	58	P1R
16	F8	47	P12R	59	P3R
17	F9	48	P1S	60	P8S
18	READ				

STEP ACTION VERIFICATION

TABLE AM

INPUT TERMINALS SWITCHES													SELECTED OUTPUT TERMINAL LAMP IS EXTINGUISHED
13	11	10	9	12	7	6	5	14	15	17	16	18	
0	0	0	1	0	0	0	0	0	0	0	0	0	48
0	0	1	0	0	0	0	0	0	0	0	0	0	46
1	1	0	1	0	0	0	1	0	0	0	0	0	51
1	1	1	0	0	0	0	1	0	0	0	0	0	54
1	1	0	1	0	1	1	0	0	0	0	0	0	49
0	1	1	1	1	0	1	0	0	0	1	0	0	42
1	1	0	1	1	0	1	1	0	0	1	0	0	44
0	1	0	1	1	1	0	0	0	0	1	0	0	60
1	0	1	0	1	1	0	1	0	0	1	0	0	57
0	0	0	0	1	0	0	0	0	0	1	1	0	52
0	0	1	0	1	0	0	0	0	0	1	1	0	27
1	1	0	0	1	0	0	0	0	0	1	1	0	28
0	1	0	0	1	1	1	1	0	0	1	0	0	58 and 59
0	1	1	1	0	0	0	0	0	0	0	0	0	26
0	1	0	0	0	0	1	0	0	0	0	0	0	29
0	0	1	0	1	1	1	1	0	0	1	0	0	50
0	0	0	0	1	1	0	0	0	0	1	0	0	43
1	1	1	1	1	0	1	1	0	0	1	0	0	25
1	1	0	1	1	1	0	1	0	0	1	0	0	55
1	1	0	0	1	1	0	1	0	0	1	0	0	56
0	1	1	1	1	0	0	0	0	0	1	01	0	30
0	1	0	1	1	0	0	0	0	0	1	01	0	53
0	0	0	0	0	0	0	0	ND*	ND*	ND*	ND*	1	47

Note: *N D = NOT DEFINED

R. CP3 Test Requirements

Note 1: Before removing or replacing CP3 circuit pack, disconnect AC power cord and remove 1 AMP fuse at power distribution panel.

STEP	ACTION	VERIFICATION
	Note 2: If the CP3 circuit pack fails any of the output requirements, consider it as a defective unit.	
1	Using the red and black jumper leads, connect test set +5V and GRD terminals to remote terminal power distribution panel +5V and FLT GRD jacks.	
2	At test set— Set +5V switch to +5V.	
3	Set all logic switches to 0.	All lamps extinguished.
4	Set all logic switches to OFF.	All lamps lighted.
5	Set +5V switch to OFF.	
6	Insert CP3 circuit pack to be tested into J3 connector.	
7	Set +5V switch to +5V.	
	Note: Circuit definitions are shown in Table AN.	
8	Set switches 20 and 52 to 0.	
9	Set switch 34 to 1.	
10	Set remaining input switches as shown in Table AN to either 1 or 0.	Lamp 22 lighted.
11	Set switch 34 to 0.	Lamp 22 extinguished.
12	Set switches 5, 12, 17, and 20 to 0.	
13	Set switches 21 and 30 to 1.	
14	Set switch 52 to 0.	
15	Set switches 25, 26, and 54 to 1.	
16	Set switch 55 to 0.	
17	Set switches 6, 13, and 18 to 0.	Lamps 44, 47, and 51 lighted.
18	Set switches 6, 13, and 18 to 1.	Lamps 44, 47, and 51 extinguished.
19	Set switches 6, 13, and 18 to 0.	
20	Set switch 52 to 1.	

STEP	ACTION	VERIFICATION

TABLE AN

CIRCUIT DEFINITIONS FOR TESTING CP3 CIRCUIT PACK

INPUT TERMINALS				OUTPUT TERMINALS			
SWITCH	LEADS	SWITCH	LEADS	LAMP	LEADS	LAMP	LEADS
4	E5	23	P11R	22	PCE1	48	P7
5	P5R	24	P11S	35	K9	50	P9
6	P5S	25	E2	36	K1	51	P8
7	P7R	26	E3	37	K3	53	P2
8	P7S	27	P12S	38	P3E	56	P12
9	P9R	28	P12R	40	K2	57	P4
10	P9S	29	E6P	41	Q2	58	P11
11	P3S	30	SCS	44	P5G	59	P6G
12	P6R	33	E	46	P10	60	P8G
13	P6S	34	CE	47	P6		
14	P4R	39	P3R				
15	P4S	42	P2R				
16	P10R	43	P2S				
17	P8R	45	P10S				
18	P8S	52	P1S				
20	P1R	54	E1				
21	PR	55	E0				

21	Set switch 34 to 1.	Lamps 22, 44, 47, and 51 extinguished.
22	Set switch 34 to 0.	Lamps 22, 44, 47, and 51 extinguished.
23	Set switches 21 and 52 to 0.	Lamps 22, 44, 47, and 51 extinguished.
24	Set switch 21 to 1.	
25	Set switch 30 to 0.	Lamps 22, 44, 47, and 51 extinguished.
26	Set switches 5, 6, 12, 13, 17, 18, 20, and 52 to 0.	
27	Sequentially apply each set of logic states shown in Table AO to switches specified.	As shown in Table AO for each set of input conditions.

STEP	ACTION	VERIFICATION

TABLE AO

SEQUENCE	INPUT TERMINALS				OUTPUT TERMINALS		
	SWITCHES				LAMPS*		
	26	25	54	55	44	59	60
1	0	0	0	0	0	0	0
2	0	0	0	1	1	1	1
3	0	0	1	0	1	1	1
4	0	0	1	1	0	0	0
5	0	1	0	0	1	1	1
6	0	1	0	1	0	0	0
7	0	1	1	0	0	0	0
8	0	1	1	1	1	1	1
9	1	0	0	0	1	1	1
10	1	0	0	1	0	0	0
11	1	0	1	0	0	0	0
12	1	0	1	1	1	1	1
13	1	1	0	0	0	0	0
14	1	1	0	1	1	1	1
15	1	1	1	0	1	1	1
16	1	1	1	1	0	0	0

Note: *0 = indicates lamp is extinguished.
1 = indicates lamp is lighted.

28	Set switches 6, 13, and 18 to 1.	
29	Set switches 25, 26, and 54 to 0.	
30	Set switch 55 to 1.	Lamps 44, 59, and 60 extinguished.
31	Set switches 12, 17, 20, and 52 to 0.	
32	Sequentially apply each set of logic states shown in Table AP to switches specified.	As shown in Table AP for each set of input conditions.
33	Set switches 7 and 9 to 0.	
34	Sequentially apply each set of logic states shown in Table AQ to switches specified.	As shown in Table AQ for each set of input conditions.

STEP	ACTION	VERIFICATION

TABLE AP

SEQUENCE	INPUT TERMINALS			OUTPUT TERMINALS		
	SWITCHES			LAMPS*		
	18	13	4	36	40	37
1	0	0	0	1	1	0
2	1	1	0	0	0	0
3	0	0	1	0	0	1
4	1	1	1	0	0	0

Note: *0 = indicates lamp is extinguished.
1 = indicates lamp is lighted.

TABLE AQ

SEQUENCE	INPUT TERMINALS			OUTPUT TERMINALS
	SWITCHES			LAMP*
	8	10	4	35
1	0	0	0	1
2	1	0	0	1
3	0	1	0	0
4	1	1	0	0
5	0	0	1	1
6	1	0	1	0
7	0	1	1	1
8	1	1	1	0

Note: *0 = indicates lamp is extinguished.
1 = indicates lamp is lighted.

35	Set switches 9, 14, 20, 23, 42, and 52 to 0.	
36	Sequentially apply each set of logic states shown in Table AR to switches specified.	As shown in Table AR for each set of input conditions.
37	Set switches 16, 28, and 39 to 0.	
38	Sequentially apply each set of logic states shown in Table AS to switches specified.	As shown in Table AS for each set of input conditions.

STEP	ACTION	VERIFICATION

TABLE AR

SEQUENCE	INPUT TERMINALS					OUTPUT TERMINALS		
	SWITCHES					LAMPS*		
	29	43	15	24	10	53	57	58
1	0	0	0	0	0	1	1	1
2	0	0	0	0	1	1	1	1
3	0	1	1	1	0	0	0	0
4	0	1	1	1	1	0	0	0
5	1	0	0	0	0	1	1	1
6	1	0	0	0	1	0	0	0
7	1	1	1	1	0	1	1	1
8	1	1	1	1	1	0	0	0

Note: *0 = indicates lamp is extinguished.
1 = indicates lamp is lighted.

TABLE AS

SEQUENCE	INPUT TERMINALS				OUTPUT TERMINALS		
	SWITCHES				LAMPS*		
	27	45	33	11	46	38	56
1	0	0	0	0	1	0	1
2	1	1	0	1	0	0	0
3	1	1	1	0	0	1	0
4	0	0	1	1	1	0	1

Note: *0 = indicates lamps is extinguished.
1 = indicates lamp is lighted.

39	Set switch 34 to 1.	
40	Set switches 20 and 52 to 0.	Lamp 22 lighted.
41	Set switch 20 to 1, then switch 52 to 1.	Lamp 22 remains lighted.
42	Set switch 20 to 0.	Lamp 22 extinguished.
43	Set switches 20, 29, 52, and 55 to 0.	

STEP	ACTION	VERIFICATION
44	Set switches 21, 25, 26, 30, and 54 to 1.	
45	Set switches 5, 7, 9, 12, 14, 16, 17, 23, 28, 39, and 42 to 0.	
46	Set switches 6, 8, 10, 11, 13, 15, 17, 24, 27, 43, and 45 to 0.	Lamps 38, 41, 44, 46, 47, 48, 50, 51, 53, 56, 57, and 58 lighted.
47	Set switches 5, 7, 9, 12, 14, 16, 17, 23, 28, 39 and 42 to 1.	
48	Set switches 6, 8, 10, 11, 13, 15, 18, 24, 27, 43, and 45 to 1.	Same as Step 49.
49	Set switches 5, 7, 9, 12, 14, 16, 17, 23, 28, 39, and 42 to 0.	Lamps 38, 41, 44, 46, 47, 48, 50, 51, 53, 56, 57, and 58 extinguished.
50	Set +5V switch to OFF.	

S. CP4 Test Requirements

Note 1: Before removing or replacing CP4 circuit pack, disconnect AC power cord and remove 1 AMP fuse at power distribution panel.

Note 2: If the CP4 circuit pack fails any of the output requirements, consider it as a defective unit.

1	Using the red and black jumper leads, connect test set +5V and GRD terminals to remote terminal power distribution panel +5V and FLT GRD jacks.	
2	At test set— Set +5V switch to +5V.	
3	Set all logic switches to 0.	All lamps extinguished.
4	Set all logic switches to OFF.	All lamps lighted.
5	Set +5V switch to OFF.	
6	Insert CP4 circuit pack to be tested into J3 connector.	
7	Set +5V switch to +5V.	Lamps 22, 23, 26, 27, 28, and 29 lighted.
	Note: Circuit definitions are shown in Table AT.	

STEP	ACTION	VERIFICATION

TABLE AT

CIRCUIT DEFINITIONS FOR TESTING CP4 CIRCUIT PACK

INPUT TERMINALS		OUTPUT TERMINALS	
SWITCH	LEAD	LAMP	LEAD
6	-48V(F)	9	TP
7	R	10	$\overline{R}$
11	E8	15	TP5
12	MR0	19	PE
17	$\overline{PR}$	20	A1
18	E	22	DA1
22	DA1	23	DA0
23	DA0	26	MNR
27	MN	27	MN
28	MNV	28	MNV
48	TP9	29	MNVR
53	$\overline{A0}$	30	$\overline{E7P1}$
54	$\overline{A1}$	36	SW
60	$\overline{E7P0}$	42	MR
25	DA2	52	A0

8	Set switches 23, 27, and 28 to 0.	Lamps 26 and 29 extinguished. Lamp 22 lighted.
9	Set switches 53 and 54 to 0.	Lamps 20 and 52 lighted.
10	Set switches 53 and 54 to 1.	Lamps 20 and 52 extinguished.
11	Set switch 60 to 0.	Lamp 30 extinguished.
12	Set switch 60 to 1.	Lamp 30 lighted.
13	Set switch 7 to 1.	
14	Set switch 6 to 0.	Lamp 36 lighted. Lamps 9 and 10 extinguished.
15	Set switch 7 to 0.	Lamp 36 extinguished.

STEP	ACTION	VERIFICATION
16	Set all logic switches to OFF.	Lamp 15 extinguished.
17a	If lamp 15 remains lighted, set switch 48 to 0.	Lamp 15 extinguished.
18	Set switch 48 to 1.	Lamp 15 lighted.
19	Sequentially apply each set of logic states shown in Table AU to switches specified.	As shown in Table AU for each set of input conditions.
20	Set +5V switch to OFF.	
21	Remove CP4 circuit pack from J3 connector.	
22	At remote terminal power distribution panel— Disconnect AC power cord.	
23	Remove 1 AMP fuse.	
24	At logic and measuring panel— Remove CP5 circuit pack.	
25a	If equipped with HY14 circuit pack— Remove HY14 circuit pack.	
26	At power distribution panel— Reinsert 1 AMP fuse.	
27	Reconnect AC power cord.	
28	Using a volt-ohm-meter (VOM), check the voltage readings on -24V and +24V test point jacks.	VOM indicates -24Vdc at -24V jack, +24Vdc at +24V jack.
29b	If output requirements of Step 28 are not correct— Check -24Vdc and +24Vdc power supply per local procedures.	

TABLE AU

SEQUENCE	INPUT TERMINALS				OUTPUT TERMINALS	
	SWITCHES				LAMPS	
	18	17	12	11	19	42
1	0	0	0	0	1	0
2	0	1	0	1	1	1
3	1	0	1	0	1	1
4	1	1	1	1	0	1

STEP	ACTION	VERIFICATION
30	Disconnect AC power cord.	
31	Remove 1 AMP fuse.	
32	At logic and measuring panel— Insert CP4 circuit pack into its proper position.	
33	At power distribution panel— Reinsert 1 AMP fuse.	
34	Reconnect AC power cord.	
35	Using a VOM, check the voltage readings on -12V and +12V test jacks.	VOM indicates -12Vdc at -12V jack and +12Vdc at +12V jack.
36	Remove AC power cord.	
37	Remove 1 AMP fuse.	
38	At logic and measuring panel— Insert CP5 circuit pack into its proper position.	
39a	If equipped with HY14 circuit pack— Reinsert HY14 circuit pack into its proper position.	
40	At power distribution panel— Reinsert 1 AMP fuse.	
41	Reconnect AC power cord.	
42	Repeat Step 35. ***Note 1:*** The -48V (SIG BAT) voltage should be correct before proceeding. ***Note 2:*** If an alarm state exists on one or more of the 16 dedicated alarm pairs, it must be eliminated before proceeding. ***Note 3:*** If an alarm lamp fails to light on command, check the lamp itself before condemning the CP4 under test.	Same as Step 35.
43	At test set— Set READ, voltage, and logic switches to OFF.	
44	Connect red jumper to +5V jack on test set and +5V jack on the power distribution panel.	

STEP	ACTION	VERIFICATION
45	Connect black jumper to GRD jack on test set and the FLT GRD jack on the power distribution panel.	
46	At test set— Set +5V switch to +5V.	All light emitting diodes (LEDs) lighted.
47	Connect a M50H cord to J1, connect other end to J1 on back of power distribution panel.	
48	At test set— Connect a M50H cord to J2, connect other end to J2 on the back of power distribution panel. ***Note:*** Do not set READ switch to ON at this time.	
49c	If FSR lamp lighted— At power distribution panel— Depress RESET pushbutton.	
50	At test set— Set switches RD1 to RD10 to 1.	
51	Set switches RD11 to RD16 to 0. ***Note:*** Switches TD1 to TD16 must be in OFF position.	
52	Set READ switch to ON.	At power distribution panel— FSR lamp lighted.
53	Set READ switch to OFF.	
54	At power distribution panel— Depress RESET pushbutton.	FSR lamp extinguished.
55	At rear of CP4 terminal— Using a 893 cord, connect a ground to lead 24.	At power distribution panel— DAL lamp lighted.
56	Remove ground from lead 24.	DAL lamp extinguished.
57	At power distribution panel— Remove 1 AMP fuse.	-48V(F) lamp lighted.
58	Reinsert 1 AMP fuse.	-48V(F) lamp extinguished.
59	At 108 power unit— Push down to open the circuit breaker.	At power distribution panel— All alarm lamps lighted.

STEP	ACTION	VERIFICATION
60	Reset the circuit breaker.	
61	At power distribution panel— Depress RESET pushbutton.	All alarms lamps extinguished.
62	At test set— Remove test set from remote terminal and return remote terminal to operational status.	

T. CP5 Test Requirements

Note 1: An operating remote terminal must be used to dynamically check a CP5 circuit pack.

Note 2: If the CP5 circuit pack fails any of the output requirements, it is a defective unit.

1	At test set— Set READ, voltage, and logic switches to OFF.	
2	Connect red jumper to +5V jack on test set and +5V jack on the power distribution panel.	
3	Connect black jumper to GRD jack on test set and the FLT GRD jack on the power distribution panel.	
4	At test set— Set +5V switch to +5V.	All light emitting diodes (LEDs) lighted.
5	Connect a M50H cord to J1, connect other end to J1 on back of power distribution panel.	
6	At test set— Connect a M50H cord to J2, connect other end to J2 on the back of power distribution panel.	
7	At power distribution panel— Remove AC power cord.	
8	Remove 1 AMP fuse.	
9	At logic and measuring panel— Remove working CP5 circuit pack and insert CP5 to be tested.	
10	At power distribution panel— Reinsert 1 AMP fuse.	

STEP	ACTION	VERIFICATION
11	Reconnect AC power cord.	
12	At test set— Set +5V switch to ON. ***Note:*** Verify READ, TD1 to TD16 switches are in OFF position.	
13	At power distribution panel— Using VOM, measure the voltage at -48V (F) test jack.	VOM indicates -48Vdc, ±2V.
14a	If the VOM indicates -48Vdc, ±2V in Step 13— Using VOM, measure the voltage at -40V test jack.	VOM indicates -40Vdc, ±0.5V. ***Note:*** If VOM reading is not within -35V to -45Vdc, CP5 is defective.
15b	If VOM indicates -35V to -45Vdc in Step 14a— At CP5 circuit pack— ▶Adjust R64 potentiometer.◀	VOM reading of -40Vdc, ±0.5V.
16c	If VOM indicates less than -46V in Step 14a— At power distribution panel— Using VOM, measure voltage at -40V test jack.	VOM indicates -40Vdc, ±0.5V. ***Note:*** ▶If VOM reading is not within -32V to -42Vdc, CP5 is defective.◀
17d	If VOM indicates -32V to 42Vdc in Step 16c— At CP5 circuit pack— ▶Adjust R64 potentiometer.◀	VOM reading of -40Vdc, ±0.5V.
18	At logic and measuring panel— Connect a 10K ohm (±10%) resistor on connecting block LR, between terminals 00-4 and 00-5. ***Note:*** The resistor should be connected to the designated terminals with insulated alligator clips to prevent shorting two or more terminals together.	
19	At test set— Set switches RD1 to RD16 to 0.	
20	Set READ switch to ON.	For each READ pulse received, Lamps TD3, TD4, and TD5 lighted. Lamps TD1 and TD2 are extinguished.
21	Set READ switch to OFF.	
22	At logic and measuring panel— Remove resistor from terminals 00-4 and 00-5 and connect between terminals 00-6 and 00-7.	

STEP	ACTION	VERIFICATION
23	At test set— Set READ switch to ON.	For each READ pulse received, Lamps TD8, TD9, TD10 lighted. Lamps TD6 and TD7 are extinguished.
24	Set READ switch to OFF.	
25	At logic and measuring panel— Remove resistor from terminals 00-6 and 00-7. ***Note:*** Before proceeding with test, allow a 5-minute warm-up period.	
26	At test set— ▶Set switches RD1 to RD16 to 0.◀	
27	Set READ switch to ON.	For each READ pulse received, one of the patterns shown in Table AV is observed. ***Note:*** ▶If none of the seven patterns shown◀ in Table AV are displayed, the CP5 circuit pack is defective.
28	▶If the output pattern observed in Step 27 was other than Pattern 4—◀ At CP5 circuit pack— ▶Adjust R67 potentiometer.◀	▶Pattern 4 as shown in Table AV is displayed◀ on test set.
29	At test set— Set READ switch to OFF.	
30	▶Set switches RD9 and RD11 to 1.◀	
31	Set READ switch to ON.	For each READ pulse received, one of the patterns shown in Table AW is observed. ***Note:*** If none of the seven patterns shown in Table AW are displayed, the CP5 circuit pack is defective.
32	▶At test set— Set READ switch to OFF.	

▶TABLE AV◀

PATTERN	TD10	TD9	TD8	TD7	TD6	TD5	TD4	TD3	TD2	TD1
1	0	1	0	0	0	0	0	0	0	0
2	0	1	0	0	1	0	0	0	0	0
3	0	1	0	1	0	0	0	0	0	0
4	0	1	0	1	0	0	0	0	0	1

STEP	ACTION	VERIFICATION

◗TABLE AV (Cont)◖

PATTERN	TD10	TD9	TD8	TD7	TD6	TD5	TD4	TD3	TD2	TD1
5	0	1	0	1	0	0	0	0	1	0
6	0	1	0	1	1	0	0	0	1	0
7	0	1	1	0	0	0	0	0	1	1

◗TABLE AW◖

PATTERN	TD10	TD9	TD8	TD7	TD6	TD5	TD4	TD3	TD2	TD1
1	0	0	0	1	1	1	1	0	1	1
2	0	0	0	1	1	1	1	1	0	0
3	0	0	0	1	1	1	1	1	0	1
4	0	0	0	1	1	1	1	1	1	0
5	0	0	0	1	1	1	1	1	1	1
6	0	0	1	0	0	0	0	0	0	0
7	0	0	1	0	0	0	0	0	0	1

Note: 0 = indicates lamp is extinguished.
1 = indicates lamp is lighted.

33 Set switches RD1—RD6 to an input code that allows access to an open circuit for the A and B transducer channels.

Note: The central terminal operator can provide the code or codes necessary to perform Step 33.

34 Set READ switch to ON.

Pattern for channel A and B as shown in Table AX is displayed on test set.

Note: If this pattern is not displayed, the CP5 circuit pack is defective.

◗TABLE AX◖

PATTERN	LAMPS*									
	TD10	TD9	TD8	TD7	TD6	TD5	TD4	TD3	TD2	TD1
	1	0	1	0	0	1	0	1	0	0

Note: *0 = indicates lamp is extinguished.
1 indicates lamp is lighted.

STEP	ACTION	VERIFICATION
35	At test set— Set switches RD1-RD16 to 0.	
36	Set READ switch to ON.	
37	After remote terminal has received at least one READ pulse, set READ switch to OFF.	
38	Using VOM, measure voltage from terminal 15 of CP5 to ground, and from terminal 16 of CP5 to ground. ***CAUTION: Care should be exercised to avoid shorting two or more terminals together.***	The voltage from terminals 15 and 16 to ground should not exceed -2.5 volts dc.
39	If CP5 circuit pack is defective— At power distribution panel— Remove AC power cord.	
40	Remove 1 AMP fuse.	
41	At logic and measuring panel— Remove defective CP5 and replace with a known working CP5 circuit pack.	
42	At power distribution panel— Reinsert 1 AMP fuse.	
43	Reconnect AC power cord.	
44	Restore remote terminal to normal on-line status.	
45	If CP5 circuit pack is good— Align per instructions listed in Test U.	

U. CP5 A/D Converter Alignment Procedure

Note: This alignment procedure assumes that the circuitry of the remote terminal is operating properly.

1a	If test set is not in data simulation mode— Set READ, voltage, and logic switches to OFF.	
2a	Connect red jumper to +5V jack on test set and +5V jack on the power distribution panel.	

STEP	ACTION	VERIFICATION
3a	Connect black jumper to GRD jack on test set and the FLT GRD jack on the power distribution panel.	
4a	At test set— Set +5V switch to +5V.	All light emitting diodes (LEDs) lighted.
5a	Connect a M50H cord to J1 connector, connect other end to J1 on back of power distribution panel.	
6a	At test set— Connect a M50H cord to J2 connector, connect other end to J2 on back of power distribution panel.	
7b	If CP5 circuit pack is to be aligned it must be placed in the remote terminal— At power distribution panel— Remove AC power cord.	
8b	Remove 1 AMP fuse.	
9b	At logic and measurement panel— Remove working CP5 circuit pack and insert CP5 to be aligned.	
10b	At power distribution panel— Insert 1 AMP fuse.	
11b	Connect AC power cord.	
12	At test set— Set switches RD1 to RD16 to 0. ***Note:*** Switches TD1 to TD16 and READ should be in OFF position.	
13	Set +5V switch to +5V. ***Note:*** Before proceeding, allow a 5-minute warm-up period.	
14	At power distribution panel— Using VOM, measure power at -40V jack.	VOM indicates -40Vdc, ±0.5V.
15c	If VOM reading of Step 14 does not meet output requirement— At CP5 circuit pack— ◗Adjust R64 potentiometer.◖	VOM indicates -40Vdc, ±0.1V.

STEP	ACTION	VERIFICATION
16	At test set— ▶Observe switches RD9 thru RD16 are set to 0.◀	
17	Set READ switch to ON.	▶Pattern shown in Table AY is observed.◀
18d	If the output requirement of Step 17 is not met— At CP5 circuit pack— ▶Slowly adjust R67 potentiometer.◀	At test set— ▶Pattern shown in Table AY is observed.◀
19d	▶Set switches RD9 and RD11 to 1.◀	Pattern shown in Table AZ should be observed.
20e	If the output requirement of Step 19 is not met— At CP5 circuit pack— ▶Slowly adjust R52 potentiometer.◀ ***Note:*** Before proceeding, allow 15 minutes warm-up period.	At test set— Pattern shown in Table AZ is observed.
21	Repeat Steps 14 to 20e. ***Note:*** ▶If the output requirements of Step 21 are not met, CP5 circuit pack is defective and should be returned to WECo for alignment.◀	

TABLE AY

PATTERN	LAMPS*									
	TD10	TD9	TD8	TD7	TD6	TD5	TD4	TD3	TD2	TD1
	0	1	0	1	0	0	0	0	0	1

Note: *0 = indicates lamp is extinguished.
1 = indicates lamp is lighted.

▶TABLE AZ◀

PATTERN	LAMPS*									
	TD10	TD9	TD8	TD7	TD6	TD5	TD4	TD3	TD2	TD1
	0	0	0	1	1	1	1	1	1	0

Note: *0 = indicates lamp is extinguished.
1 = indicates lamp is lighted.

STEP	ACTION	VERIFICATION
22	Set switches RD1 to RD16 to an input code that allows access to an open circuit for the A and B transducer channels. ***Note:*** The central terminal operator can provide the code or codes necessary to perform Step 22. ***Note:*** ◗If the output requirement of Step 22 is not met, CP5 circuit pack is defective and should be returned to WECo for alignment.◖	Pattern for channel A and B shown in Table BA should be observed.
23f	◗If the CP5 circuit pack is defective— Proceed to Step 24g.◖	
24g	At power distribution panel— Remove AC power cord.	
25g	Remove 1 AMP fuse.	
26g	At logic and measuring panel— Remove CP5 circuit pack; insert an acceptable CP5.	
27g	At power distribution panel— Reinsert 1 AMP fuse.	
28g	Reconnect AC power cord.	
29g	Restore the remote terminal to on-line status.	

V. Error Message Data Test

1	At test set— Set READ, voltage, and logic switches to OFF.	
2	Connect red jumper to +5V jack on test set and +5V jack on the power distribution panel.	

TABLE BA

PATTERN	LAMPS*									
	TD10	TD9	TD8	TD7	TD6	TD5	TD4	TD3	TD2	TD1
Channel B	1	0	1	0	0					
Channel A						1	0	1	0	0

Note: *0 = indicates lamp is extinguished.
1 = indicates lamp is lighted.

STEP	ACTION	VERIFICATION
3	Connect black jumper to GRD jack on test set and the FLT GRD jack on the power distribution panel.	
4	At test set— Set +5V switch to +5V.	All light emitting diodes (LEDs) lighted.
5	Connect a M50H cord to J1, connect other end to J1 on back of power distribution panel.	
6	At test set— Connect a M50H cord to J2, connect other end to J2 on the back of power distribution panel.	
7	Sequentially apply the CAL 1 and CAL 2 ▶switch settings shown in Table BB.◀	As shown in Table BB for CAL 1 and CAL 2 output data responses.
8a	If the output data responses of Step 7 are correct— At E2A cable interface— Check the cable wiring per information contained in SD-7C000-01.	
9b	If E2A cable interface wiring is defective or incorrect— Repair or correct per SD-7C000-01 and local procedures.	
10b	Proceed to Step 88.	
11c	If the E2A cable interface is wired correctly— At E2A— Perform maintenance routine per Section 201-653-503.	
12d	If the output data responses of Step 7 are not correct— At test set— Determine the error message data response state per Table BC.	
13e	If the error message state is 0 in Step 12d— At logic and measuring panel— Perform Test U, CP5 A/D Converter Alignment Procedure or Test W, Calibration Procedure.	
14e	Proceed to Step 88.	
15f	If the error messages state is not 0 in Step 12d—	

TABLE BB

INPUT DATA WORD SETTINGS AND OUTPUT DATA WORD RESPONSES FOR THE CPMS TEST SET

INPUT DATA WORD STATES	SWITCHES SET TO THIS LOGIC STATE					OUTPUT DATA RESPONSE	OUTPUT LAMPS				
	RD	RD	RD	RD	RD		TD	TD	TD	TD	
	16	15 14 13	12 11 10 9	8 7 6 5	4 3 2 1		16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1	
CAL 1	0	0 0 0	0 0 0 0	0 0 0 0	0 0 0 0		0	0 0 0 0 0	0 1 0 1 0	0 0 0 0 1	
CAL 2	0	0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	ACCEPTABLE CAL 2 RESPONSES	1	0 0 0 0 0	0 0 1 0 0	0 0 1 0 1	
							0	0 0 0 0 0	0 0 1 0 0	0 0 0 1 0	
							1	0 0 0 0 0	0 0 0 1 1	1 1 1 1 1	
CAL 3	1	0 0 0	0 0 0 0	0 0 0 0	0 0 0 1		1	0 0 0 0 0	1 0 1 0 1	1 0 1 0 0	
BCAL	0	0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	RDA; IDLA; ORA	0	0 0 0 0 0	0 1 0 1 0	1 1 1 0 0	
						RDB; IDLA; OHB	1	0 0 0 0 0	1 1 1 0 0	0 0 0 0 1	

Note: 0 = indicates lamp is extinguished.
1 = indicates lamp is lighted.

STEP	ACTION	VERIFICATION

TABLE BC

ERROR MESSAGE DATA RESPONSE

ERROR MESSAGE STATE	LAMPS*				
	TD15	TD14	TD13	TD12	TD11
0	0	0	0	0	0
1	0	0	0	0	1
2	0	0	0	1	0
3	0	0	0	1	1
4	0	0	1	0	0
5	0	0	1	0	1
6	0	0	1	1	0
7	0	0	1	1	1
8		ALL OTHERS			

Note: *0 = indicates lamp extinguished.
1 = indicates lamp lighted.

	At power distribution panel— Disconnect AC power cord.	
16f	Remove 1 AMP fuse.	
17f	At logic and measuring panel— Remove HY11 circuit pack from position 0023-48.	
18f	At power distribution panel— Reinsert 1 AMP fuse.	
19f	Reconnect AC power cord.	
20f	At test set— Set READ switch to ON.	Observe error message state per Table BC.
21g	If error message state is 0 in Step 20f— At power distribution panel— Disconnect AC power cord.	
22g	Remove 1 AMP fuse.	
23g	At logic and measuring panel— Place a new HY11 circuit pack into position 0023-48.	

STEP	ACTION	VERIFICATION
24g	At power distribution panel— Reinsert 1 AMP fuse.	
25g	Reconnect AC power cord.	At test set— Observe error message state per Table BC.
26h	If error message state is 0 in Step 25g— Proceed to Step 88.	
27i	If error message state is not 0 in Step 25g— At power distribution panel— Disconnect AC power cord.	
28i	Remove 1 AMP fuse.	
29i	At logic and measuring panel— Replace HY11 circuit pack at position 0012-33.	
30i	At power distribution panel— Reinsert 1 AMP fuse.	
31i	Reconnect AC power cord.	At test set— Observe error message state per Table BC.
32j	If error message state is 0 in Step 31i— Proceed to Step 88.	
33k	If error message state is not 0 in Step 31i— At power distribution panel— Disconnect AC power cord.	
34k	Remove 1 AMP fuse.	
35k	At logic and measuring panel— Replace HY11 circuit pack into position 0012-42.	
36k	At power distribution panel— Reinsert 1 AMP fuse.	
37k	Reconnect AC power cord.	At test set— Observe error message state per Table BC.
38l	If error message state is 0 in Step 37k— Proceed to Step 88.	
39m	If error message state is not 0 in Step 37k— At power distribution panel— Disconnect AC power cord.	
40m	Remove 1 AMP fuse.	

STEP	ACTION	VERIFICATION
41m	At logic and measuring panel— Replace HY11 circuit pack at position 0012-51.	
42m	At power distribution panel— Reinsert 1 AMP fuse.	
43m	Reconnect AC power cord.	At test set— Observe error message state per Table BC.
44n	If error message state is 0 in Step 43m— Proceed to Step 88.	
45o	If error message state is not 0 in Step 43m— At power distribution panel— Disconnect AC power cord.	
46o	Remove 1 AMP fuse.	
47o	At logic and measuring panel— Replace HY11 circuit pack at position 0012-60.	
48o	At power distribution panel— Reinsert 1 AMP fuse.	
49o	Reconnect AC power cord.	At test set— Observe error message state per Table BC.
50o	If error message state is 0 in Step 49o— Proceed to Step 88.	
51q	If error message state is not 0— Using Test K, test the failed HY11 circuit packs.	
52r	If error message state is not 0 in Step 20f— At power distributor panel— Disconnect AC power cord.	
53r	Remove 1 AMP fuse.	
54	At logic and measuring panel— Reinsert HY6 circuit pack into position 0023-48.	
55r	At test set— Set switches for CAL1 as shown in Table BB.	Observe error message state per Table BC.
56s	If error message state from Step 51q is 1, 2, or 3— At power distribution panel— Disconnect AC power cord.	
57s	Remove 1 AMP fuse.	

STEP	ACTION	VERIFICATION
58s	At logic and measuring panel— Replace HY7 circuit pack at position 0023-52.	
59s	At power distribution panel— Reinsert 1 AMP fuse.	
60s	Reconnect AC power cord.	At test set— Observe error message state per Table BC.
61t	If error message state is 0 in Step 60s— Proceed to Step 88.	
62u	If error message state is not 0 in Step 60s— At power distribution panel— Disconnect AC power cord.	
63u	Remove 1 AMP fuse.	
64u	At logic and measuring panel— Replace HY1 circuit pack at position 0023-01.	
65u	At power distribution panel— Reinsert 1 AMP fuse.	
66u	Reconnect AC power cord.	At test set— Observe error message state per Table BC.
67v	If error message state is 0 in Step 66u— Proceed to Step 88.	
68w	If error message state is not 0 in Step 66u— At power distribution panel— Disconnect AC power cord.	
69w	Remove 1 AMP fuse.	
70w	At logic a[illegible] measuring panel— Replace C[illegible] circuit pack at position 0023-39.	
71w	At power distribution panel— Reinsert 1 AMP fuse.	
72w	Reconnect AC power cord.	At test set— Observe error message state per Table BC.
73x	If error message state is 0 in Step 72w— Proceed to Step 88.	
74y	If error message state is not 0 in Step 72w— At power distribution panel— Disconnect AC power cord.	

STEP	ACTION	VERIFICATION
75y	Remove 1 AMP fuse.	
76y	At logic and measuring panel— Replace CP2 circuit pack into position 0023-37.	
77y	At power distribution panel— Reinsert 1 AMP fuse.	
78y	Reconnect AC power cord.	At test set— Observe error message state per Table BC.
79z	If error message state is 0 in Step 78y— Proceed to Step 88.	
80aa	If error message state is not 0 in Step 78y— At power distribution panel— Disconnect AC power cord.	
81aa	Remove 1 AMP fuse.	
82aa	At logic and measuring panel— Replace CP1 circuit pack into position 0023-35.	
83aa	At power distribution panel— Reinsert 1 AMP fuse.	
84aa	Reconnect AC power cord.	At test set— Observe error message state per Table BC.
85ab	If error message is 0 in Step 84aa— Proceed to Step 88.	
86ac	If error message state is not 0 in Step 84aa— Using appropriate tests as outlined in this section, test the failed circuit packs.	
87ad	If error message state from Step 54r is 4, or 5, or 6, or 7— Perform alarm routine shown in SD-7C000-01, Sheet D15.	
88	At test set— Disconnect from data simulation mode.	
89	Restore the remote terminal to on-line status.	

W. Calibration Procedures

1	At test set— Set READ, voltage, and logic switches to OFF.	

STEP	ACTION	VERIFICATION
2	Connect red jumper to +5V jack on test set and +5V jack on the power distribution panel.	
3	Connect black jumper to GRD jack on test set and the FLT GRD jack on the power distribution panel.	
4	At test set— Set +5V switch to +5V.	All light emitting diodes (LEDs) lighted.
5	Connect a M50H cord to J1, connect other end to J1 on back of power distribution panel.	
6	At test set— Connect a M50H cord to J2, connect other end to J2 on the back of power distribution panel. ***Note:*** Remote terminal must be warmed up for 30 minutes prior to performing the following steps.	
Channel A Ring Test (RDA)		
7	At Line Access Relay Panel (LARP)-0— Using an 893 cord equipped with two KS-6278 clips, connect one clip to terminal 00-1 and the other clip to the positive terminal of a KS-14369 battery. Connect negative side of battery to ground.	
8	At test set— Set switches to correspond to input data word state BCAL of Table BB.	
9	Set READ switch to ON. ***Note:*** If response is incorrect, note test failure for future use in this test.	As shown in Table BB for RDA output data response.
10	Set READ switch to OFF.	
Channel B Ring Test (RDB)		
11	At LARP-0— Remove cord at terminal 00-1 and reconnect to terminal 00-3.	
12	At test set— Set switches to correspond to input data word state BCAL of Table BB.	

STEP	ACTION	VERIFICATION
13	Set READ switch to ON. ***Note:*** If response is incorrect, note test failure for future use in this test.	As shown in Table BB for RDB output data response.
14	Set READ switch to OFF.	
15	At LARP-0— Disconnect cord at terminal 00-3 and +45 volt source.	
	Channel A Idle Test (IDLA)	
16	At LARP-0— Using 893 patching cord, connect one end to terminal 00-0 and the other end to the -5 volt jack on the power distribution panel.	
17	At test set— Set switches to correspond to input data word BCAL of Table BB.	
18	Set READ switch to ON. ***Note:*** If response is incorrect, note test failure for future use in this test.	As shown in Table BB for IDLA output data response.
19	Set READ switch to OFF.	
	Channel B Idle Test (IDLB)	
20	At LARP-0— Disconnect cord at terminal 00-0 and reconnect to terminal 00-2.	
21	At test set— Set switches to correspond to input data word state BCAL of Table BB.	
22	Set READ switch to ON. ***Note:*** If response is incorrect, note test failure for future use in this test.	As shown in Table BB for IDLB output data response.
23	Set READ switch to OFF.	
24	At LARP-0— Disconnect cord from terminal 00-2 and -5 volt location on the power distribution panel.	

STEP	ACTION	VERIFICATION
	Channel A Off-Hook Test (OHA)	
25	At LARP-0— Connect a 10K ohm resistor (±10%) across terminals 00-4 and 00-5. ***Note:*** The resistor should be connected to terminals using insulated alligator clips to prevent shorting.	
26	At test set— Set switches to correspond to input data word state BCAL of Table BB.	
27	Set READ switch to ON. ***Note:*** If response is incorrect, note test failure for future use in this test.	
28	Set READ switch to OFF.	
	Channel B Off-Hook Test (OHB)	
29	At LARP-0— Remove resistor from terminals 00-4 and 00-5, and reconnect resistor between terminals 00-6 and 00-7. ***Note:*** The resistor should be connected to terminals using insulated alligator clips to prevent shorting.	
30	At test set— Set switches to correspond to input data word state BVAL of Table BB.	
31	Set READ switch to ON. ***Note:*** If response is incorrect, note test failure for future use in this test.	As shown in Table BB for OHB output data response.
32	Set READ switch to OFF.	
33	At LARP-0— Remove resistor from terminals 00-6 and 00-7.	
34a	If all responses are correct, proceed to Step 36b.	
35b	If any responses were incorrect, proceed to Step 46d.	

STEP	ACTION	VERIFICATION
36b	At test set— Set switches to correspond for input data word state CAL1 in Table BB.	
37b	Set READ switch to ON. ***Note:*** If response is incorrect, note test failure for future use in this test.	As shown in Table BB for CAL1 output data response.
38b	Set READ switch to OFF.	
39b	Set switches to correspond to input data word state CAL2 in Table BB.	
40b	Set READ switch to ON. ***Note:*** If response is incorrect, note test failure for future use in this test.	As shown in Table BB for CAL2 output data response.
41b	Set READ switch to OFF.	
42b	Set switches to correspond to input data word state CAL3 in Table BB.	
43b	Set READ switch to ON. ***Note:*** If response is incorrect, note test failure for future use in this test.	As shown in Table BB for CAL3 output data response.
44b	Set READ switch to OFF. ***Note:*** When all responses for these three tests are correct—calibration procedure W is complete.	
45c	If either test failed— Perform Test U in this section, then repeat Steps 35b through 44b.	
46d	If response for either Test OHA or Test OHB is bad— At power distribution panel— Remove AC power cord.	
47d	Remove 1 AMP fuse.	
48d	At logic and measurement panel— Remove circuit pack CP5.	
49d	Plug in a CP5 which is known to be good.	

STEP	ACTION	VERIFICATION
50d	At power distribution panel— Insert 1 AMP fuse.	
51d	Plug in AC power cord.	
52d	Repeat Steps 25 through 34a. ***Note:*** If either test fails, check wiring per local central office procedure and repeat calibration procedure W.	
53e	If either test fails— At power distribution panel— Remove AC power cord.	
54e	Remove 1 AMP fuse.	
55e	At logic and measurement panel— Remove circuit pack HY4.	
56e	Plug in an HY4 which is known to be good.	
57e	At power distribution panel— Install 1 AMP fuse.	
58e	Connect AC power cord.	
59e	Repeat Steps 25 through 34a. ***Note 1:*** If either test fails, check wiring per local central office procedure and repeat calibration procedure W. ***Note 2:*** If tests pass, the removed HY4 is defective and should be returned to Western Electric Company for repair.	
60f	If tests are correct— Perform Steps 36b through 45c. ***Note:*** The removed CP5 is defective and should be returned to Western Electric Company for repair.	
61g	If any response for Tests RDA, TDB, IDLA, or IDLB is incorrect— At power distribution panel— Remove AC power cord.	
62g	Remove 1 AMP fuse.	

STEP	ACTION	VERIFICATION
63g	At logic and measurement panel— Remove circuit pack HY4.	
64g	Plug in a HY4 which is known to be good.	
65g	At power distribution panel— Install 1 AMP fuse.	
66g	Connect AC power cord.	
67g	At test set— Repeat test that failed.	
68h	If test passes— Perform Steps 36b through 45c.	
69i	If test fails— At power distribution panel— Remove AC power cord.	
70i	Remove 1 AMP fuse.	
71i	At logic and measurement panel— Remove circuit pack CP5.	
72i	Plug in a CP5 that is known to be good.	
73i	At power distribution panel— Install 1 AMP fuse.	
74i	Connect AC power cord.	
75i	At test set— Repeat test that failed.	
76j	If test passes— Perform Steps 36b through 45c.	
77k	If test fails— Check wiring per local central office procedures and repeat calibration procedure W.	

X. Satellite Terminal Access

Note: Circuit packs HY13, HY14, HY18, and the second HY10 must be installed in the remote terminal.

1	At test set— Set READ, voltage, and logic switches to OFF.	

STEP	ACTION	VERIFICATION
2	Connect red jumper to +5V jack on test set and +5V jack on the power distribution panel.	
3	Connect black jumper to GRD jack on test set and the FLT GRD jack on the power distribution panel.	
4	At test set— Set +5V switch to +5V.	All light emitting diodes (LEDs) lighted.
5	Connect a M50H cord to J1; connect other end to J1 on back of power distribution panel.	
6	At test set— Connect a M50H cord to J2; connect other end to J2 on the back of power distribution panel.	
7	Set switches RD16, RD12, RD9, RD7, RD2, and RD1 to 1. Set all other RD switches to 0. ***Note:*** This input setting assumes that there is no dedicated pair connection to terminals 15-7 and 20-7 on SIA2 section of auxiliary terminal strip on horizontal MDF.	
8	Set READ switch to ON.	TD lamps alternate between the two states in Table BD.
9a	If requirement of Step 8 is not met— Perform HY13 test requirements (Test M).	
10	Perform HY14 test requirements (Test N).	
11	Remove all cords.	

TABLE BD

	TD LAMPS (SEE NOTE)															
	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
STATE 1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
STATE 2	1	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0

Note: 0 = indicates lamp extinguished.
1 = indicates lamp lighted.