E2A TELEMETRY
ALARM PROCESSING REMOTE (APR)
MAINTENANCE

This section is designed to maintain the operational status of the J1P029A E2A alarm processing remote (APR). Contained in this section are trouble diagnosis flowcharts (Flowcharts 1 and 2) for the APR (J1P029 with L5 generic) and the APR with polling serial ports (J1P029 with L11 generic), respectively. The trouble diagnosis flowcharts are used to isolate failures to a specific area of the system. The five procedural charts, contained in this section, test the validity of the area in question. There are also various tables to assist the maintenance procedures.

Since this reissue is a general revision, arrows ordinarily used to indicate changes have been omitted.

Before performing any part of this section, the E2, SCOTS, TASC, or TCAS initial system should be checked for a failure. The initial system check should indicate whether or not the E2A APR is suspected of being defective. If the E2A is suspected of being defective, begin with Flowchart 1 or Flowchart 2 (for E2A APR with polling serial ports) of this section and proceed as directed to the appropriate chart.

Chart 1 is used independently to show the correct switch settings of the 202T data set, Chart 2 is used independently for voltage tests, and Chart 3 is used for complete bay-operational testing. Once Chart 3 is entered, proceed directly through the chart until a point is reached at which a test fails. When this point is reached, refer back to Flowchart 1 or Flowchart 2 for recommended circuit pack replacement.

Flowchart 2 should be used if the E2A APR polling serial ports are suspected of being defective. Refer to Chart 4 to test the polling serial port failure bits and/or Chart 5 to test the polling serial port operations.

If a block is reached in Flowchart 1 or Flowchart 2, referring to an SD, the failure is not in a circuit pack. Visually inspect the wiring, connectors, and terminal blocks for physical damage. Read the circuit description (CD) and study the schematic drawing (SD). Using an oscilloscope, troubleshoot the circuits to find the wiring problem.

CHART	PAGE
1—202T Data Set Replacement	3
2—Voltage Test	4
3—Operational Test	5
4—Polling Serial Port Failure Bit Test	16
5—Polling Serial Port Operational Test	19

CHART 1

202T DATA SET REPLACEMENT

The E2A remotes and associated centrals are connected via a 4-wire private line multipoint data network using a 202T-type data set. There are options or features available on the data set which are required for E2A operation. These options are checked and/or set in this chart. The remainder of the data set options should be determined at the installation environment by local engineering. For actual data set switch settings, refer to Section 590-031-200.

APPARATUS:

Spare 202T Data Set Circuit Pack

STEP	PROCEDURE
1	Remove the front cover from the 202T data set, and remove the data set circuit pack from its housing.
2	Verify the data set is set up with the following features or switch settings: • Switch S3 set up for 4-wire operation (factory furnished) • Soft turnoff and squelch intervals (switch S2) set for Ø, Ø (see Section 592-031-299) • Fast carrier detection set for "in" (factory furnished) • Clear to send interval set for "8 ms" (factory furnished) • Clamp set for "in" (factory furnished) • Carrier detection reset set for "in" (shorting plug) • Second shorting plug set for "continuous carrier out" (factory furnished) • Grounding option (switch S1) set for "signal ground not connected to frame ground."
3	Insert the new circuit pack into the data set housing, and replace the front cover.
4	Return to the flowchart.

CHART 2

VOLTAGE TEST

APPARATUS:

KS-14510, L1, Volt-Ohm-Milliammeter (VOM) or equivalent

Circuit Pack Card Extender

STEP	PROCEDURE
1	Insert the card extender into CP location M1G on the APR common control unit (J92621R).
2	Check the following voltages on the card extender with the VOM: Pin 15 −9 ±0.3 Vdc Pin 31 +12 ±0.3 Vdc Pin 34 −12 ±0.3 Vdc Pin 101 +5 ±0.3 Vdc Pin 206 +5 ±0.3 Vdc
3	Remove the card extender from the M1G location and insert it in the M1J location. Check the following voltages: Pin 101 +5 ±0.3 Vdc Pin 206 +5 ±0.3 Vdc
4	Check the following voltages on the rear of the J92621R panel: TSA (+15V) +15 ±0.3 Vdc TSA (−15V) −15 ±0.3 Vdc
5	If any voltage is not within tolerance, obtain SD-2P022-01, determine faulty circuit pack, and replace it.
6	Return to the flowchart.

CHART 3

OPERATIONAL TEST

APPARATUS:

KS-20937,L1 E-Telemetry Station Test Set

KS-20937,L4 General Purpose Plug-In

KS-20937,L6 E2A Test Cable

KS-14510,L1 Volt-Ohm-Milliammeter or equivalent

Spare Circuit Packs

STEP	PROCEDURE
	Initial Setup
1	Disconnect P1 from the 202T data set, and connect the E2A test cable between P1 and the station test set.
2	Insert the general purpose plug-in into the station test set.
3	Record the station address and communication data rate.

CHART 3 (Contd)

STEP	PROCEDURE

4 Set the station test set switches as follows:

SWITCHES	POSITION
SYSTEM	E2A if data rate is 1200 bits/sec E2 if data rate is 600 bits/sec
PARITY	B
BIT RATE	Station data rate (600 or 1200 bits/sec)
MODE	Once
ENABLE	Normal
DISPLAY WORD ERROR	OFF
DISPLAY WORD SELECT	1
RCU	OFF
MESSAGE LENGTH	1
*WORD ONE	000 Station Address 000000
WORD 2 through WORD 4	All Down
POWER	ON
MASTER CLEAR	Depress and Release

*See Table A for address switch setting.

5 Depress and release the RESTART switch on CP 100.

Alarm Poll Test

6 Depress and release the station test set START switch.

Requirement: RECEIVE INFORMATION indicators 1, 2, and 7 will light and all others will go off with the possible exception of indicator 13.

Note: If indicator 13 is lighted, an error occurred. Record this fact and proceed.

CHART 3 (Contd)

STEP	PROCEDURE

Group Report Test

7 Make the following changes in the station test set switch positions:

SWITCHES	POSITION
DISPLAY WORD SELECT	16
WORD ONE	010 Station Address 000000
RECEIVER CLEAR	Depress and Release

8 Depress and release the station test set START switch.

Requirement: RECEIVE INFORMATION indicators 1 and 2 will light and all others will go off.

9 If indicator 13 is lighted in Step 8, repeat Steps 7 and 8 with the DISPLAY WORD SELECT switch set to 15 (9 if APR is equipped with L11 generic); otherwise go to Step 19.

Requirement: Record the RECEIVE INFORMATION indicators that light, and refer to Table B to determine the type of error.

Display Report Test

10 Make the following changes in the station test set switch positions:

SWITCHES	POSITION
DISPLAY WORD SELECT	4
WORD ONE	011 Station Address 000000
WORD TWO	10000000100001000
MESSAGE LENGTH	2
RECEIVER CLEAR	Depress and Release

11 Depress and release the station test set START switch.

Requirement: Indicator 1 will be the only RECEIVE INFORMATION indicator that will light.

CHART 3 (Contd)

STEP	PROCEDURE

Remote Switch Test

12 Choose a remote switch point that is unused and connect the VOM between the RS and RSR points. Set the VOM to read ohms, and set the range switch to X1.

13 Make the following changes in the station test set switch positions:

SWITCHES	POSITION
DISPLAY WORD SELECT	1
WORD ONE	011 | Station Address | 00 Group
WORD TWO	1 | Point | P/O S.G. | 00001 | P/O S.G. | 000
RECEIVER CLEAR	Depress and Release

Note: Refer to Table C for group, point, and subgroup switch settings.

14 Depress and release the station test set START switch.

Requirement: The VOM needle will deflect, and the station test set RECEIVE INFORMATION indicators 1 and 12 will light. All other information indicators will go off (Table C).

Test 1s

15 Record the bay-equipped displays (displays 5 through 64).

16 Make the following changes in the station test set switch positions:

SWITCHES	POSITION
MESSAGE LENGTH	3
WORD ONE	01001111111011111
WORD TWO	100 Station Address 001111
WORD THREE	11000111111111111
DISPLAY WORD SELECT	1
RECEIVER CLEAR	Depress and Release

17 Depress and release the station test set START switch.

18 Change the station test set MESSAGE LENGTH switch to 2.

Requirement: RECEIVE INFORMATION indicators 1 and 12 will light and all others will go off.

CHART 3 (Contd)

STEP	PROCEDURE

19 Refer to Table D and set the station test set switches for the appropriate display, then depress and release the START switch.

Requirement: All RECEIVE INFORMATION indicators light.

20 Set the station test set DISPLAY WORD SELECT switch to 2. Depress and release the station test set RECEIVER CLEAR switch, then depress and release the START switch.

Requirement: Same as Step 19.

21 Repeat Step 20 with the station test set DISPLAY WORD SELECT switch set to 3, then 4.

Requirement: Same as Step 19.

22 Repeat Steps 19 through 21 for each display equipped.

Requirement: Same as Step 19.

Test 0s

23 Make the following changes to the station test set switch position.

SWITCHES	POSITION
MESSAGE LENGTH	3
WORD ONE	01001111111011111
WORD TWO	100 Station Address 001111
WORD THREE	11000011111111111
DISPLAY WORD SELECT	1
RECEIVER CLEAR	Depress and Release

24 Depress and release the station test set START switch.

Requirement: RECEIVE INFORMATION indicators 1 and 12 will light and all others will go off.

25 Repeat Steps 19 through 22 for each display equipped.

Requirement: Indicator 1 will be the only RECEIVE INFORMATION indicator that will light in each step.

26 Depress and release the RESTART switch on CP 100.

CHART 3 (Contd)

STEP	PROCEDURE
	Clearing Alarms
27	Refer to Table D and set the station test set switch positions for the NEW INDEX command. Transmit this command three times, first with the DISPLAY WORD SELECT switch set to 1, then to 2, then 3, and then to 4. Record all RECEIVE INFORMATION indicators, other than 1, which light.
28	Refer to Table D for the display numbers associated with the lighted indicators (display WORD 1 = displays 5 through 16, display WORD 2 = displays 17 through 32, display WORD 3= displays 33 through 48, and display WORD 4 = displays 49 through 64).
29	For each indicated display, transmit the appropriate DISPLAY command. It is only necessary to transmit this command one time.
30	Repeat Steps 27 through 29 for the ANY INDEX.
31	Make the following changes to the station test set switch positions.

SWITCHES	POSITION
MESSAGE LENGTH	1
WORD ONE	000 Station Address 000000
DISPLAY WORD SELECT	1
RECEIVER CLEAR	Depress and Release

32	Depress and release the station test set START switch.
	Requirement: Indicator 1 (and possibly 7) will be the only RECEIVE INFORMATION indicator that lights.
33	Return to the flowchart.

TABLE A

STATION ADDRESS SWITCH SETTINGS

STATION	4	5	6	7	8	9	10	11
1	0	0	0	0	0	0	0	0
2	1	0	0	0	0	0	0	0
3	0	1	0	0	0	0	0	0
4	1	1	0	0	0	0	0	0
5	0	0	1	0	0	0	0	0
6	1	0	1	0	0	0	0	0
7	0	1	1	0	0	0	0	0
8	1	1	1	0	0	0	0	0
9	0	0	0	1	0	0	0	0
10	1	0	0	1	0	0	0	0
11	0	1	0	1	0	0	0	0
12	1	1	0	1	0	0	0	0
13	0	0	1	1	0	0	0	0
14	1	0	1	1	0	0	0	0
15	0	1	1	1	0	0	0	0
16	1	1	1	1	0	0	0	0
17	0	0	0	0	1	0	0	0
'								
'								
'								
24	1	1	1	0	1	0	0	0
25	0	0	0	1	1	0	0	0
'								
'								
'								
32	1	1	1	1	1	0	0	0
33	0	0	0	0	0	1	0	0
'								
'								
'								
'								
254	1	0	1	1	1	1	1	1

TABLE B

ERROR INDICATIONS

INDICATOR	ERROR
2	Parity Error
3	Tone Drop Out
4	No Sync Bit
5	No Clear to Send
6	Clear To Send Did Not Drop
7	Remote Error
8	Illegal Central Data Received
9	Illegal Carrier Detect Interrupt
10-17	Parity Error Count

TABLE C

REMOTE SWITCH COMMANDS

WORD 1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
	0	1	1	ADDRESS								0	0	GROUP			

GROUP

2	0001
3	0010
4	0011
5	0100
6	0101
7	0110
8	0111
9	1000

WORD 2	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
	1	POINT				P/O SG		0	0	0	0	1	P/O SG		0	0	0

POINT OR SUBGROUP	SUBGROUP				POINT			
	6	7	13	14	2	3	4	5
1	0	0	0	0	0	0	0	0
2	1	0	0	0	1	0	0	0
3	0	1	0	0	0	1	0	0
4	1	1	0	0	1	1	0	0
5	0	0	1	0	0	0	1	0
6	1	0	1	0	1	0	1	0
7	0	1	1	0	0	1	1	0
8	1	1	1	0	1	1	1	0
9	0	0	0	1	0	0	0	1
10	1	0	0	1	1	0	0	1
11	0	1	0	1	0	1	0	1
12	1	1	0	1	1	1	0	1
13	0	0	1	1	0	0	1	1
14	1	0	1	1	1	0	1	1
15	0	1	1	1	0	1	1	1
16	1	1	1	1	1	1	1	1

TABLE D

NEW INDEX COMMAND SWITCH SETTINGS

DISPLAY COMMAND FORMAT																	
SWITCH —1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
WORD 1 —0	1	1				ADDRESS					0	0	X	X	X	X
WORD 2 —1	0	0	0	0	0	0	0	1	0	0	0	X	X	0	0	0

DISPLAY	WORD 1 SWITCHES				WORD 2 SWITCHES	
	14	15	16	17	13	14
NEW INDEX	0	0	0	0	0	0
ANY INDEX	0	0	0	0	1	0
5	0	0	0	1	0	0
6	0	0	0	1	1	0
7	0	0	0	1	0	1
8	0	0	0	1	1	1
9	0	0	1	0	0	0
10	0	0	1	0	1	0
11	0	0	1	0	0	1
12	0	0	1	0	1	1
13	0	0	1	1	0	0
14	0	0	1	1	1	0
15	0	0	1	1	0	1
16	0	0	1	1	1	1
17	0	1	0	0	0	0
18	0	1	0	0	1	0
19	0	1	0	0	0	1
20	0	1	0	0	1	1
21	0	1	0	1	0	0
22	0	1	0	1	1	0
23	0	1	0	1	0	1
24	0	1	0	1	1	1
25	0	1	1	0	0	0
26	0	1	1	0	1	0
27	0	1	1	0	0	1
28	0	1	1	0	1	1
29	0	1	1	1	0	0
30	0	1	1	1	1	0
31	0	1	1	1	0	1
32	0	1	1	1	1	1
33	1	0	0	0	0	0
34	1	0	0	0	1	0
35	1	0	0	0	0	1
36	1	0	0	0	1	1

TABLE D

NEW INDEX COMMAND SWITCH SETTING (Contd)

DISPLAY COMMAND FORMAT

SWITCH	—1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
WORD 1	—0	1	1				ADDRESS					0	0	X	X	X	X
WORD 2	—1	0	0	0	0	0	0	0	1	0	0	0	X	X	X	X	X

DISPLAY	WORD 1 SWITCHES				WORD 2 SWITCHES	
	14	15	16	17	13	14
37	1	0	0	1	0	0
38	1	0	0	1	1	0
39	1	0	0	1	0	1
40	1	0	0	1	1	1
41	1	0	1	0	0	0
42	1	0	1	0	1	0
43	1	0	1	0	0	1
44	1	0	1	0	1	1
45	1	0	1	1	0	0
46	1	0	1	1	1	0
47	1	0	1	1	0	1
48	1	0	1	1	1	1
49	1	1	0	0	0	0
50	1	1	0	0	1	0
51	1	1	0	0	0	1
52	1	1	0	0	1	1
53	1	1	0	1	0	0
54	1	1	0	1	1	0
55	1	1	0	1	0	1
56	1	1	0	1	1	1
57	1	1	1	0	0	0
58	1	1	1	0	1	0
59	1	1	1	0	0	1
60	1	1	1	0	1	1
61	1	1	1	1	0	0
62	1	1	1	1	1	1
63	1	1	1	1	0	1
64	1	1	1	1	1	1

CHART 4

POLLING SERIAL PORT FAILURE BIT TEST

APPARATUS:

KS-20937,L1 E-Telemetry Station Test Set

KS-20947,L4 General Purpose Plug-In

KS-20937,L6 E2A Test Cable

STEP	PROCEDURE
1	Disconnect P1 from the 202T data set, and connect the E2A test cable between P1 and the station test set.
2	Insert the general purpose plug-in into the station test set.
3	Record the station address and communication data rate.
4	Depress and release the RESTART switch on CP 100.
5	Remove all ribbon cables from ED-2P245-30 interface panel (P1 through P4).
6	For remotes controlled by a TCAS central, use Steps 7, 8, and 9. For TASC or SCOTS, use Seps 10, 11, and 12.

CHART 4 (Contd)

STEP	PROCEDURE

7 Set the station test switches as follows:

SWITCHES	POSITION
SYSTEM	E2A if data rate is 1200 bits/sec E2 if data rate is 600 bits/sec
PARITY	B
BIT RATE	Station data rate (600 or 1200 bits/sec)
MODE	Once
ENABLE	Normal
DISPLAY WORD ERROR	OFF
DISPLAY WORD SELECT	14
RCU	OFF
MESSAGE LENGTH	1
*WORD ONE	010 Station Address 000000
WORD 2 through WORD 4	All Down
POWER	ON
MASTER CLEAR	Depress and Release

*See Table A for address switch setting.

8 Depress and release the station test set START switch.

9 Record the RECEIVE INFORMATION indicators that light.

Requirement: All indicators associated with equipped ports will be lighted. Refer to Table E.

CHART 4 (Contd)

STEP	PROCEDURE
10	Set the station test set switches as follows:

SWITCHES	POSITION
SYSTEM	E2A if data rate is 1200 bits/sec E2 if data rate is 600 bits/sec
PARITY	B
BIT RATE	Station data rate (600 or 1200 bits/sec)
MODE	Once
ENABLE	Normal
DISPLAY WORD ERROR	OFF
DISPLAY WORD SELECT	4
RCU	OFF
MESSAGE LENGTH	2
WORD 1 through WORD 4	All Down
POWER	ON
MASTER CLEAR	Depress and Release

*See Table A for address switch setting.

11	Set the station test set WORD 1 and WORD 2 switches for the first equipped serial display (37 through 64) according to Table D.
12	Depress and release the station test set START switch. ***Requirement:*** Indicators 1 and 17 will light.
13	Repeat Steps 11 and 12 for each equipped serial display.
14	Return to Flowchart 2.

TABLE E

PORT INDICATOR ASSOCIATIONS

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	Port 1	Port 2	Port 3	Port 4	Port 5	Port 6	Port 7	Port 8	0	0	0	0	0	0	0	0

CHART 5

POLLING SERIAL PORT OPERATIONAL TEST

APPARATUS:

KS-20937,L1 E-Telemetry Station Test Set

KS-20937,L4 GENERAL PURPOSE PLUG-IN

KS-20937,L6 E2A Test Cable

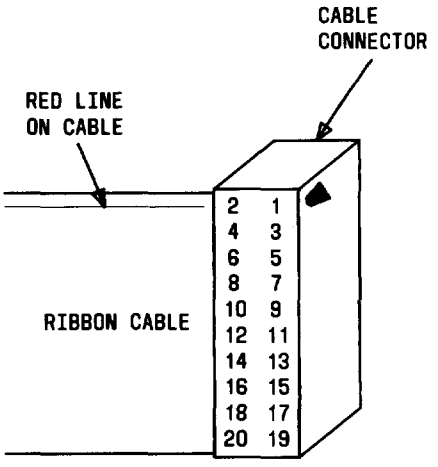
STEP	PROCEDURE
1	Disconnect P1 from the 202T data set, and connect the E2A test cable between P1 and the station test set.
2	Insert the general purpose plug-in into the station test set.
3	Record the station address and communication data rate.
4	Depress and release the restart switch or CP 100.
5	Jumper the first equipped serial port as shown in Fig. 1.

CHART 5 (Contd)

STEP	PROCEDURE
6	Set the station test set switches as follows:

SWITCHES	POSITION
SYSTEM	E2A if data rate is 1200 bits/sec E2 if data rate is 600 bits/sec
PARITY	B
BIT RATE	Station data rate (600 or 1200 bits/sec)
MODE	Once
ENABLE	Normal
DISPLAY WORD ERROR	OFF
DISPLAY WORD SELECT	2
RCU	OFF
MESSAGE LENGTH	2
WORD 1 through WORD 4	All Down
POWER	ON
MASTER CLEAR	Depress and Release

7	Set the station test set for the first equipped display for the port under test according to Table D.
8	Depress and release the station test set START switch. ***Requirement:*** Refer to Table F.
9	Repeat Steps 7 and 8 for each equipped display for the port.
10	Repeat Steps 5 through 9 for each port.
11	Return to Flowchart 2.



PORT NUMBER	LEAD FROM	CONNECTIONS TO
1	P1-2	P1-12
1	P1-3	P1-11
2	P1-5	P1-8
2	P1-6	P1-9
3	P2-2	P2-12
3	P2-3	P2-11
4	P2-5	P2-8
4	P2-6	P2-9
5	P3-2	P3-12
5	P3-3	P3-11
6	P3-5	P3-8
6	P3-6	P3-9
7	P4-2	P4-12
7	P4-3	P4-11
8	P4-5	P4-8
8	P4-6	P4-9

Fig. 1—Cable Connector With Lead Connections

TABLE F

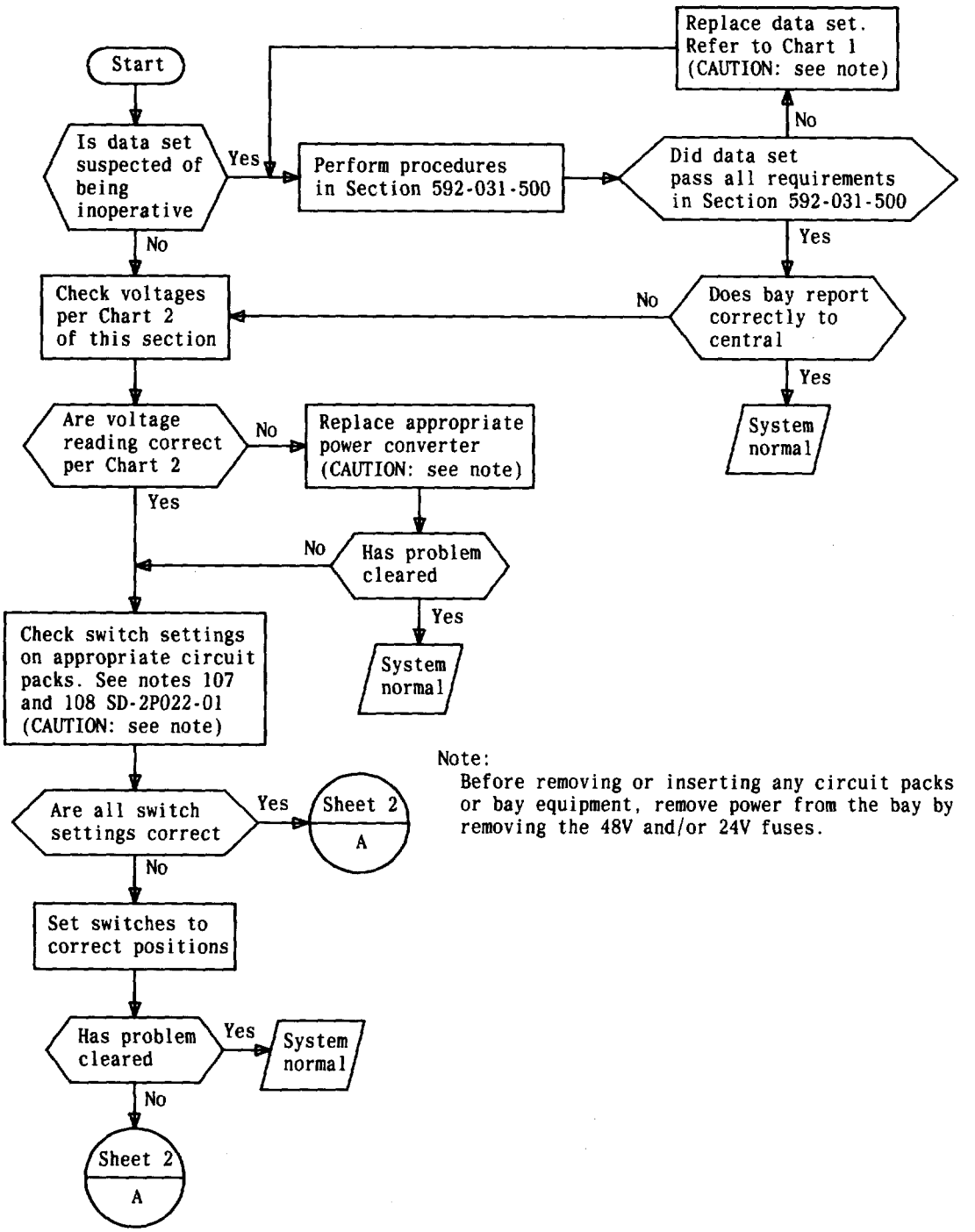
SERIAL DISPLAY RESPONSES (NOTE)

DISPLAY NUMBER FOR SERIAL PORT	BIT NUMBER																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1st	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
2nd	1	0	0	0	0	1	0	1	0	0	0	0	0	1	0	1	1
3rd	1	0	0	0	1	0	0	1	0	0	0	0	1	0	0	1	1
4th	1	0	0	0	1	1	0	1	0	0	0	0	1	1	0	1	1
5th	1	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	1
6th	1	0	0	1	0	1	0	1	0	0	0	1	0	1	0	1	1
7th	1	0	0	1	1	0	0	1	0	0	0	1	1	0	0	1	1
8th	1	0	0	1	1	1	0	1	0	0	0	1	1	1	0	1	1

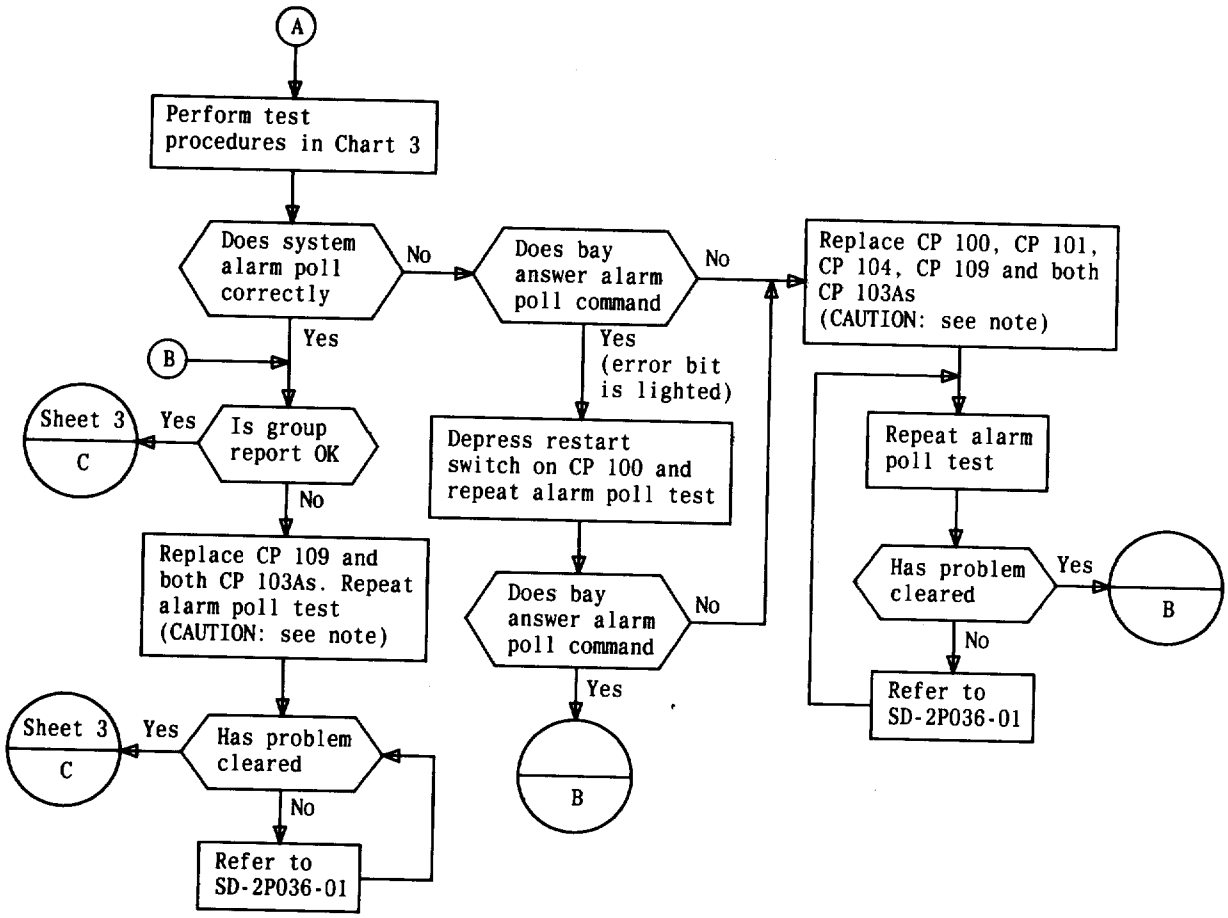
Note: Each and every port must start with display 1 of this table.

Example: If port 1 has started display number 37 and is equipped for 3 displays (37 through 39), the following responses will occur:

- Display 37 response should look like the first display number for serial port.
- Display 38 response should look like the second display number for serial port.
- Display 39 response should look like the third display number for serial port.

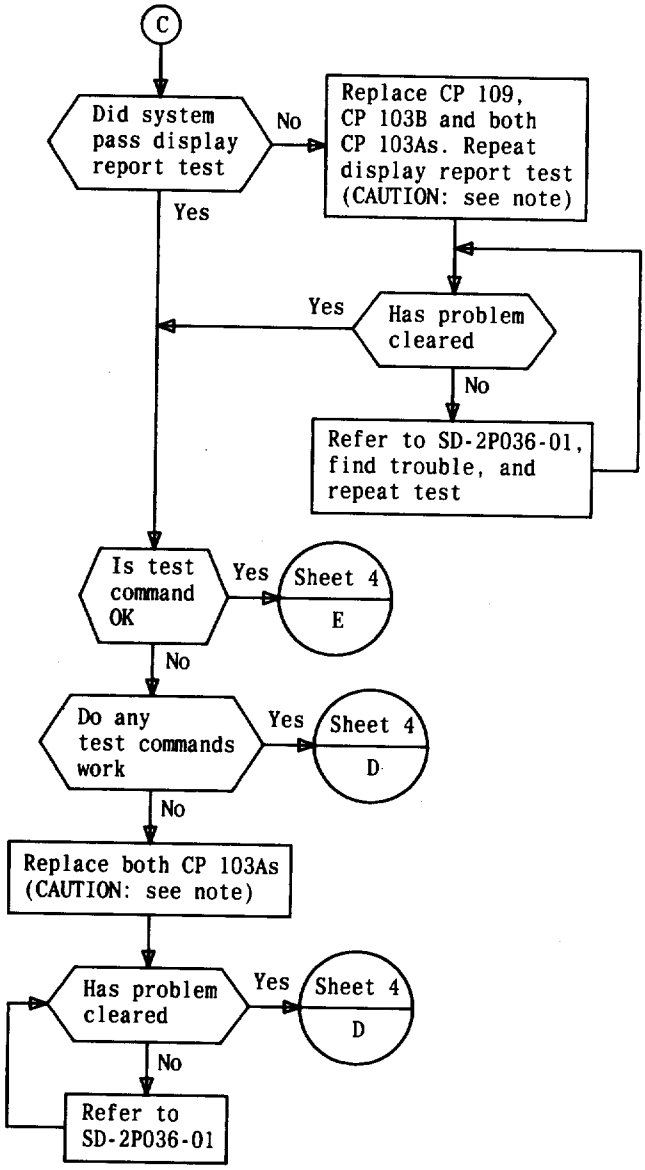


Flowchart 1—Trouble Diagnosis (Sheet 1 of 4)



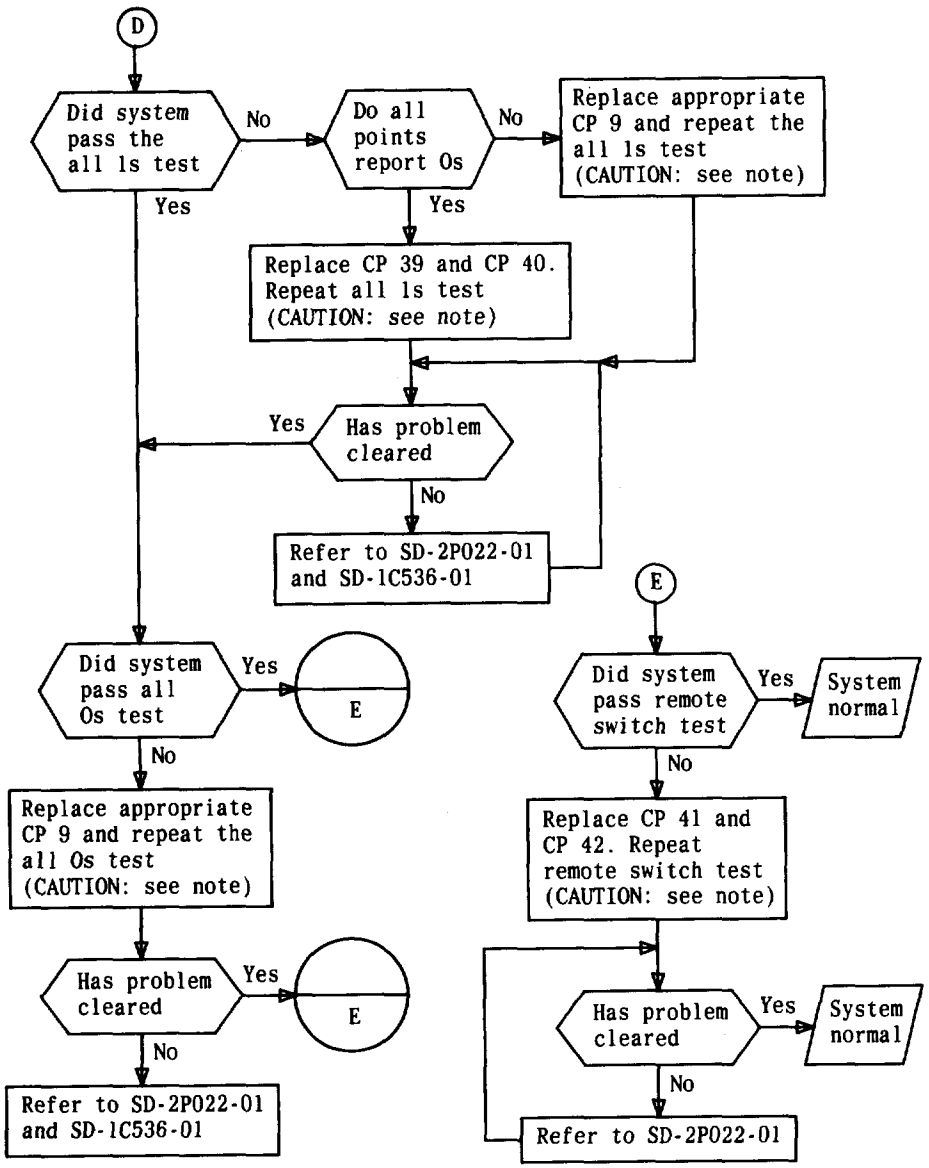
Note:
Before removing or inserting any circuit packs or bay equipment, remove power from the bay by removing the 48V and/or 24V fuses.

Flowchart 1—Trouble Diagnosis (Sheet 2 of 4)



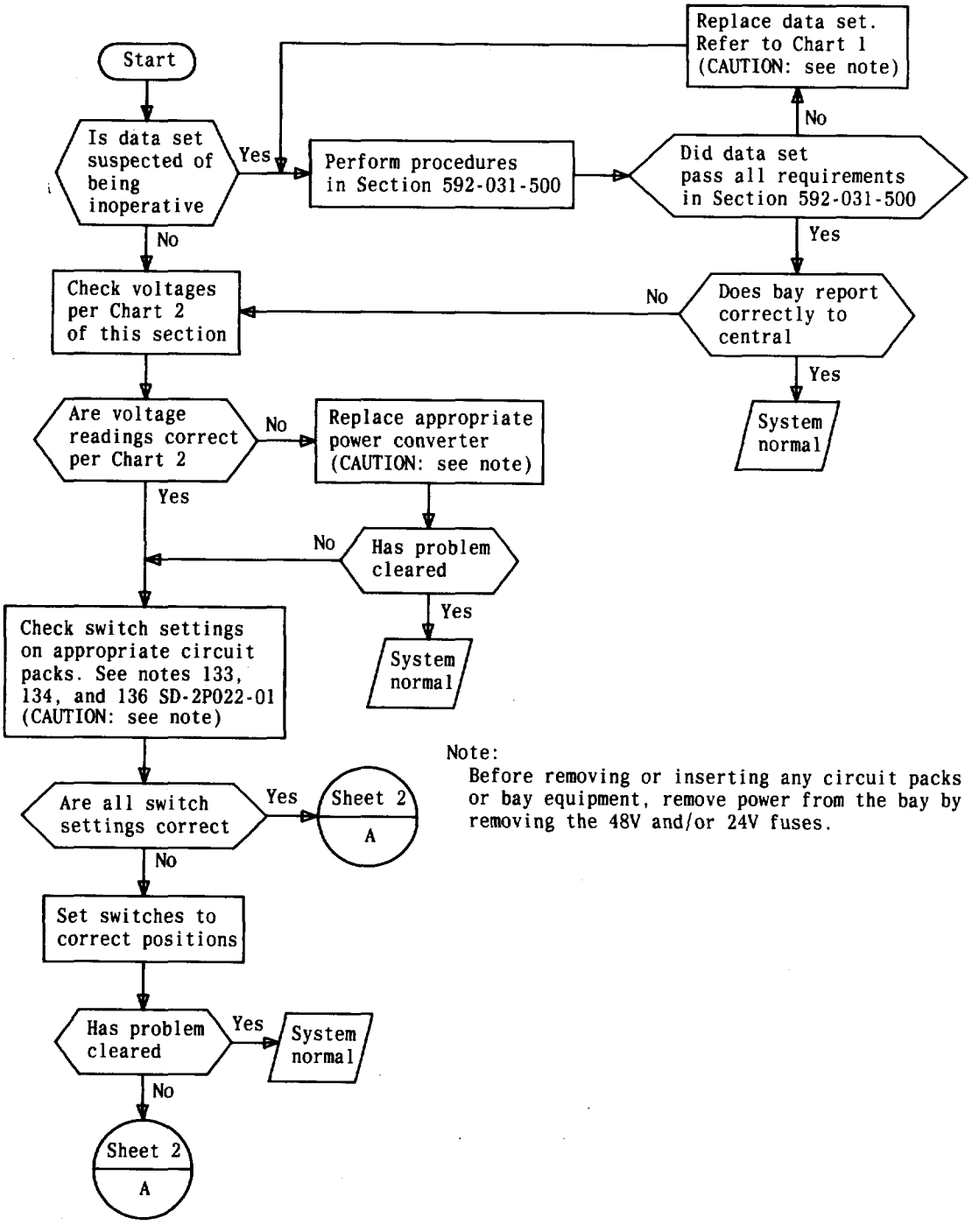
Note:
Before removing or inserting any circuit packs or bay equipment, remove power from the bay by removing the 48V and/or 24V fuses.

Flowchart 1—Trouble Diagnosis (Sheet 3 of 4)



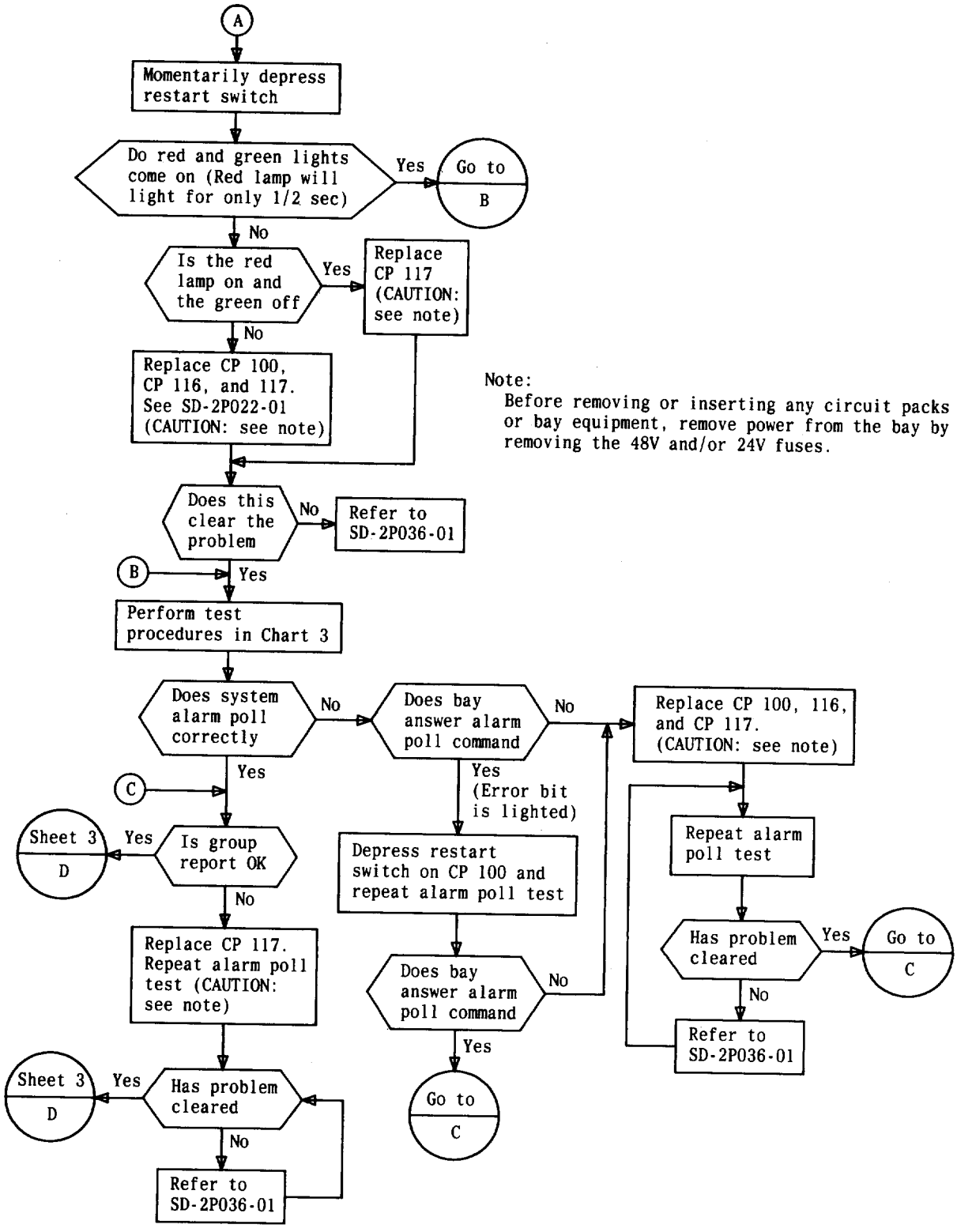
Note:
Before removing or inserting any circuit packs or bay equipment, remove power from the bay by removing the 48V and/or 24V fuses.

Flowchart 1—Trouble Diagnosis (Sheet 4 of 4)



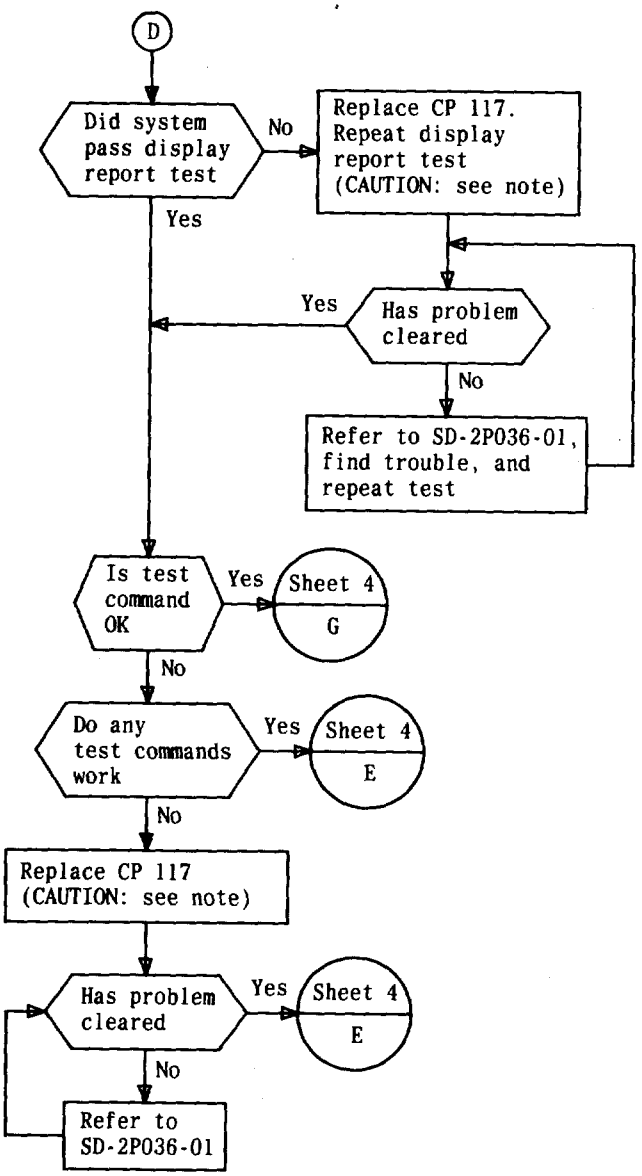
Note:
Before removing or inserting any circuit packs or bay equipment, remove power from the bay by removing the 48V and/or 24V fuses.

Flowchart 2—Polling Serial Port Trouble Diagnosis (Sheet 1 of 5)



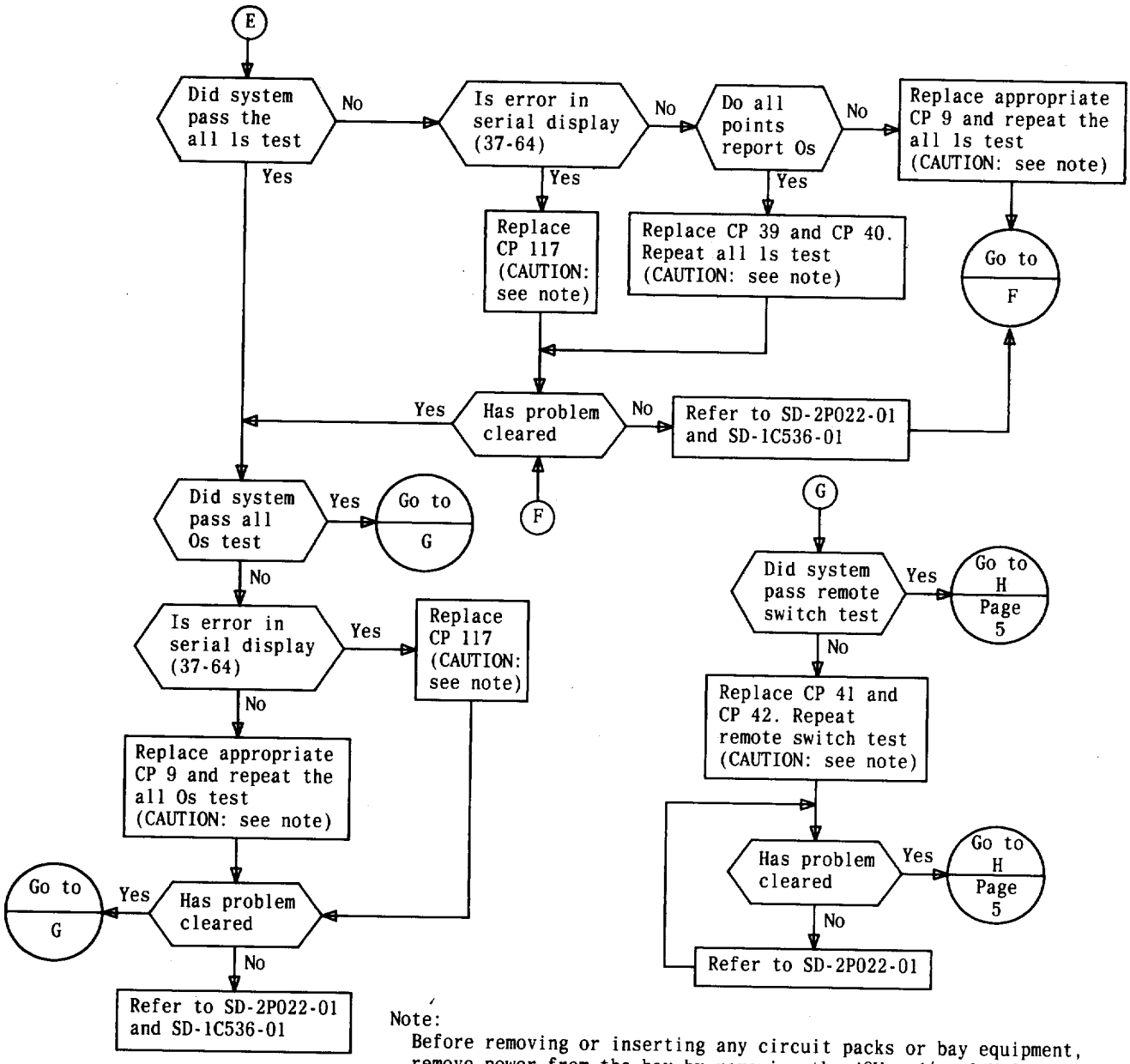
Note:
Before removing or inserting any circuit packs or bay equipment, remove power from the bay by removing the 48V and/or 24V fuses.

Flowchart 2—Polling Serial Port Trouble Diagnosis (Sheet 2 of 5)



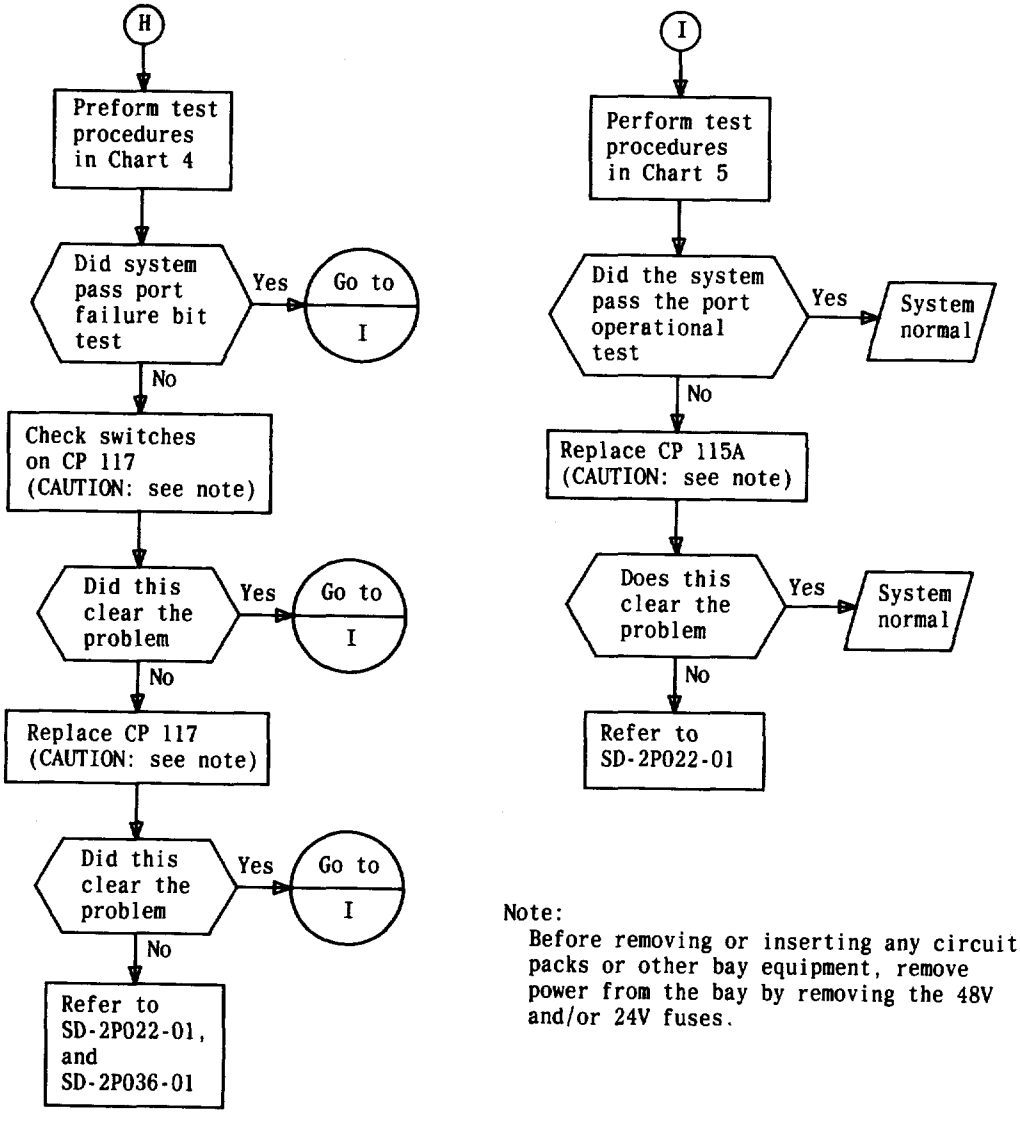
Note:
Before removing or inserting any circuit packs or bay equipment, remove power from the bay by removing the 48V and/or 24V fuses.

Flowchart 2—Polling Serial Port Trouble Diagnosis (Sheet 3 of 5)



Note:
Before removing or inserting any circuit packs or bay equipment, remove power from the bay by removing the 48V and/or 24V fuses.

Flowchart 2—Polling Serial Port Trouble Diagnosis (Sheet 4 of 5)



Note:
Before removing or inserting any circuit packs or other bay equipment, remove power from the bay by removing the 48V and/or 24V fuses.

Flowchart 2—Polling Serial Port Trouble Diagnosis (Sheet 5 of 5)