

DIGITAL ALARM SCANNER (DAS) MAINTENANCE E2A TELEMETRY

This section is designed to maintain the operational status of the J1P056A E2A digital alarm scanner (DAS) remote. Contained in this section is a trouble diagnosis flowchart (Flowchart 1) for the E2A DAS remote. The trouble diagnosis flowchart is used to isolate failures to a specific area of the system. The procedural charts, contained in this section, test the validity of the area in question. There are various tables used to assist the maintenance procedures. Before performing any part of this section, the E2, E2A, Surveillance and Control of Transmission System (SCOTS), Telecommunications Alarm Surveillance and Control (TASC), T-Carrier Administration System (TCAS), or other Operations Support Systems (OSS) should be checked for failure. The OSS check should indicate whether or not the E2A DAS is suspected of being defective. If the E2A DAS is suspected of being defective, begin with the flowchart and proceed as directed to the appropriate chart.

This section is being reissued to correct errors found in the field test. Revision arrows are used to indicate the more significant changes. The equipment test lists are not affected.

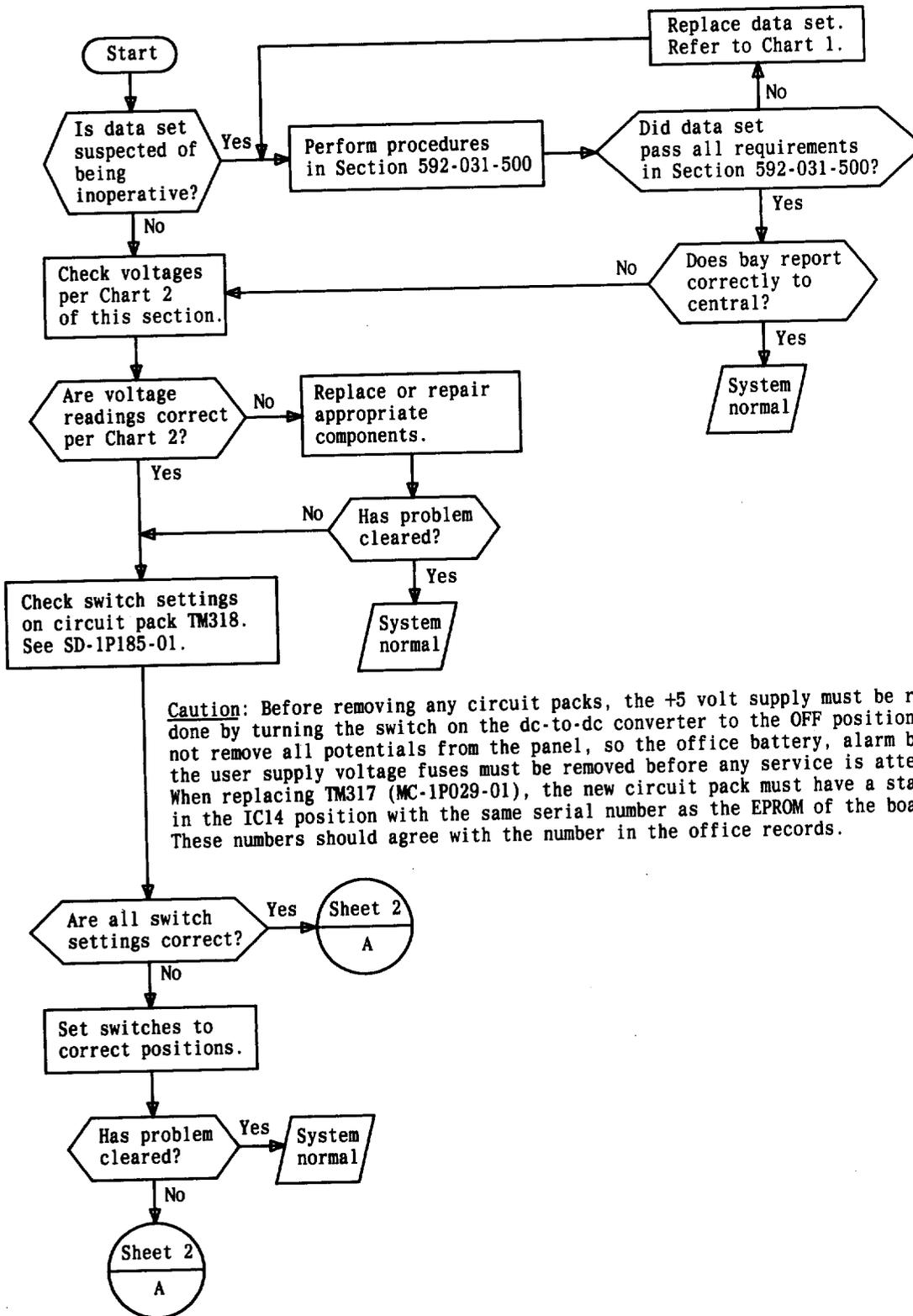
Chart 1 is used independently to show the correct switch settings of the 202T data set. Chart 2 is used independently for voltage test. Chart 3 is used for complete operational testing. Once Chart 3 is entered, proceed directly through the chart until a point is reached at which a test fails. When this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

If a block is reached in the flowchart referring to a schematic drawing (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 SD. Using an oscilloscope, trouble shoot the circuits to find the wiring problem.

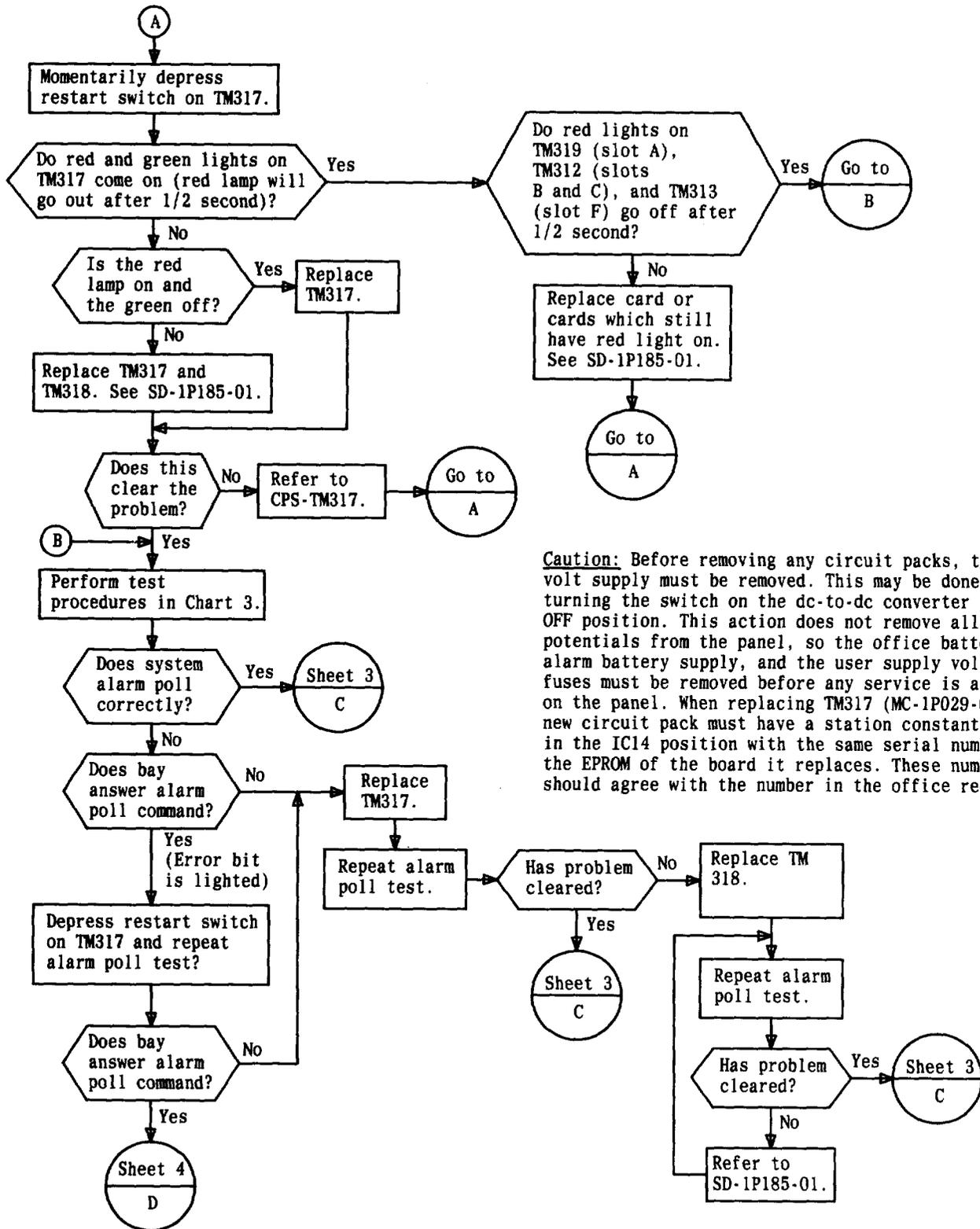
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NOTICE

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Bell System except under written agreement

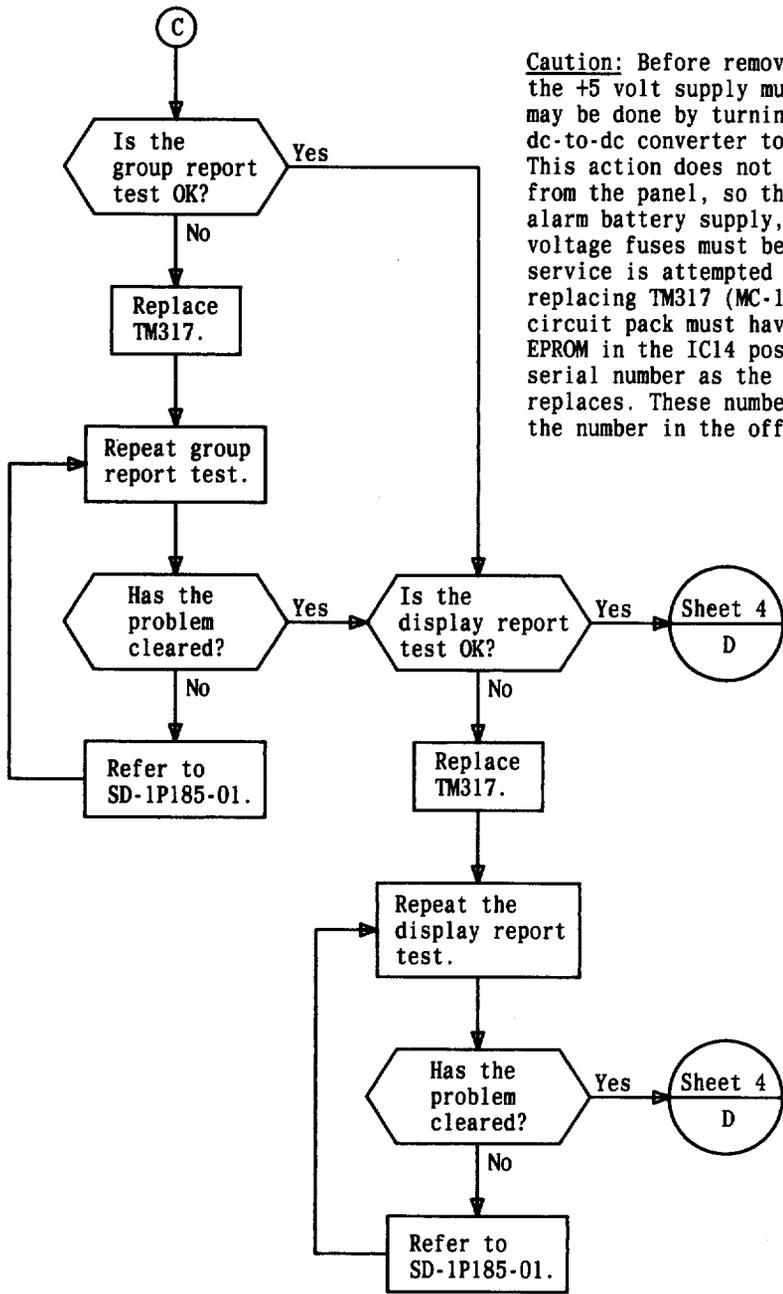


Flowchart 1—Trouble Diagnosis (See Caution) (Sheet 1 of 6)



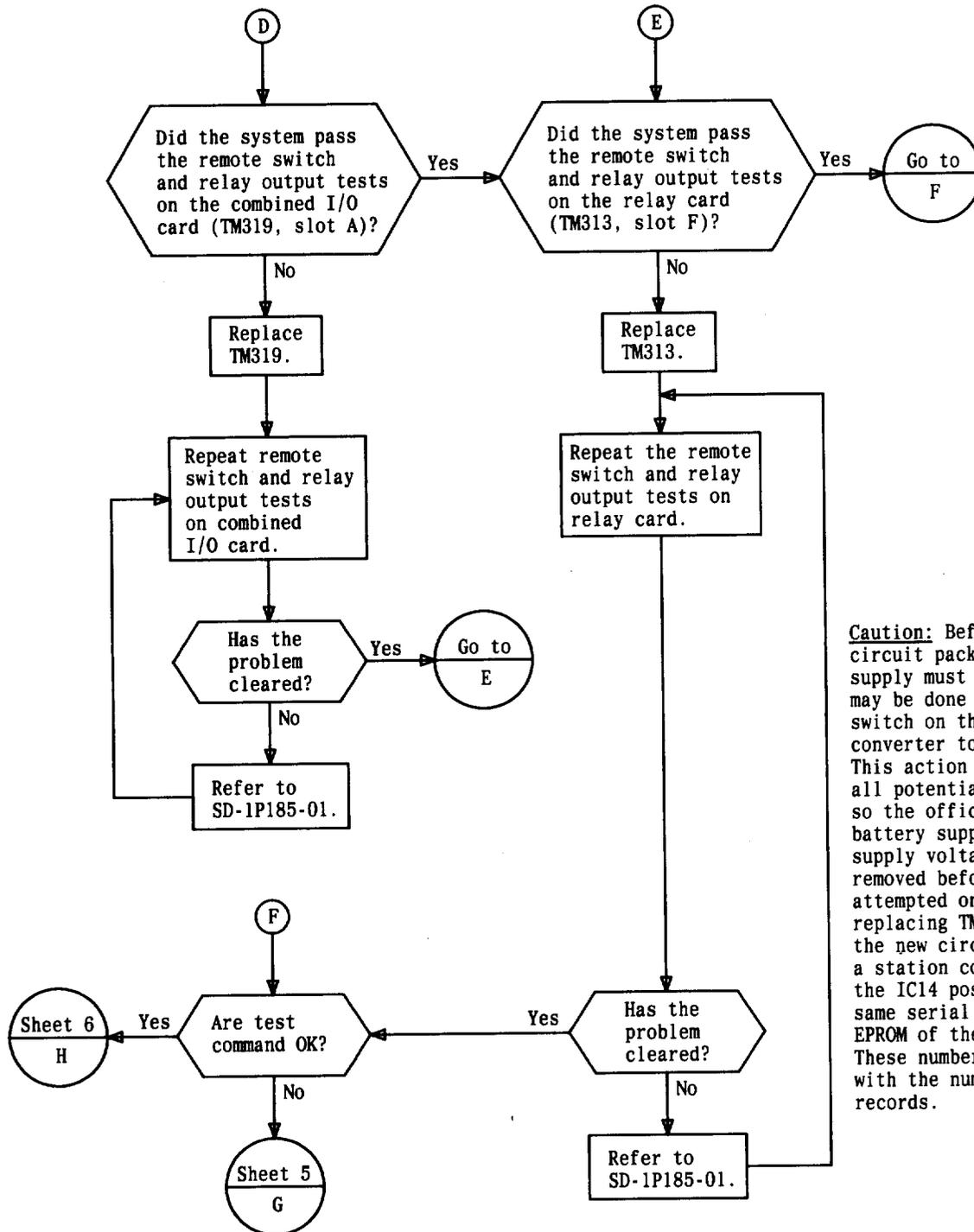
Caution: Before removing any circuit packs, the +5 volt supply must be removed. This may be done by turning the switch on the dc-to-dc converter to the OFF position. This action does not remove all potentials from the panel, so the office battery, alarm battery supply, and the user supply voltage fuses must be removed before any service is attempted on the panel. When replacing TM317 (MC-1P029-01), the new circuit pack must have a station constants EPROM in the IC14 position with the same serial number as the EPROM of the board it replaces. These numbers should agree with the number in the office records.

Flowchart 1 — Trouble Diagnosis (See Caution) (Sheet 2 of 6)



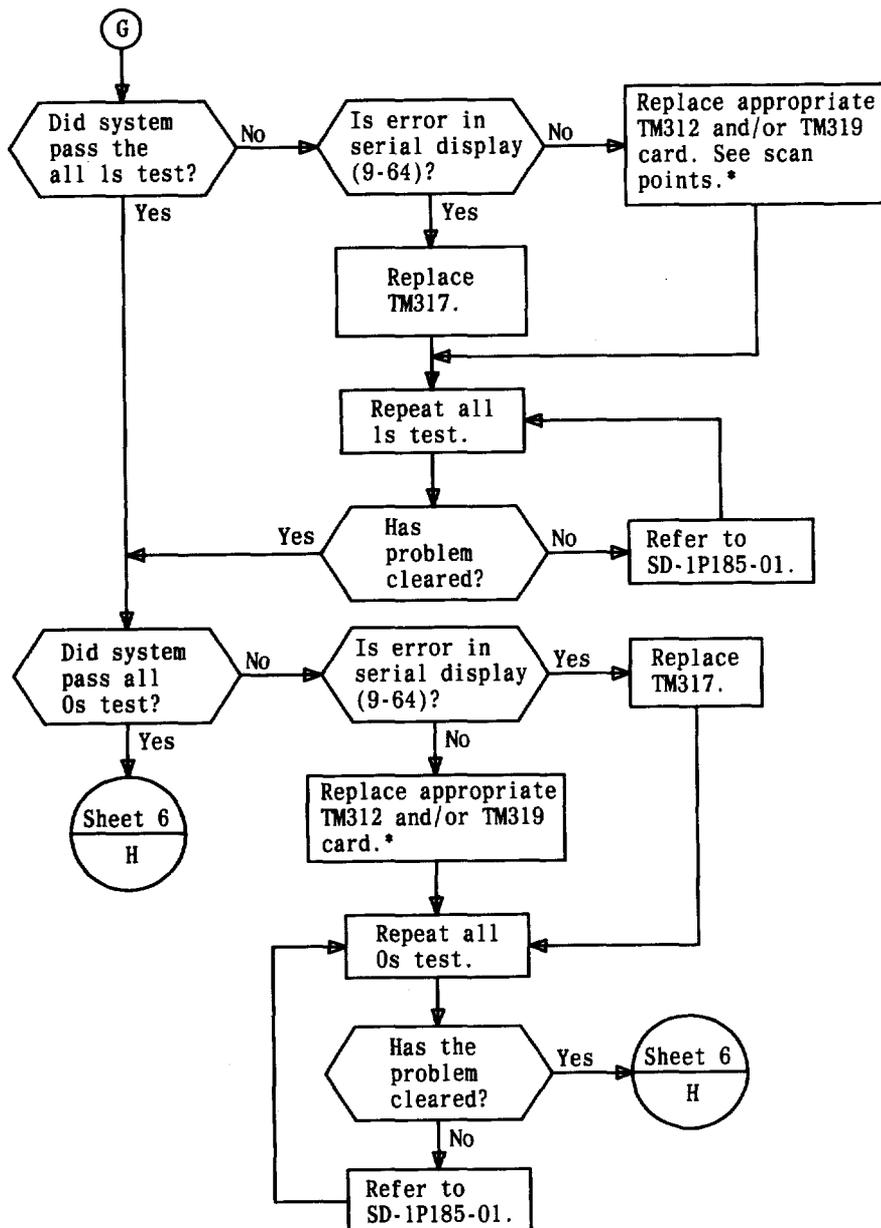
Caution: Before removing any circuit packs, the +5 volt supply must be removed. This may be done by turning the switch on the dc-to-dc converter to the OFF position. This action does not remove all potentials from the panel, so the office battery, alarm battery supply, and the user supply voltage fuses must be removed before any service is attempted on the panel. When replacing TM317 (MC-1P029-01), the new circuit pack must have a station constants EPROM in the IC14 position with the same serial number as the EPROM of the board it replaces. These numbers should agree with the number in the office records.

Flowchart 1—Trouble Diagnosis (See Caution) (Sheet 3 of 6)



Caution: Before removing any circuit packs, the +5 volt supply must be removed. This may be done by turning the switch on the dc-to-dc converter to the OFF position. This action does not remove all potentials from the panel, so the office battery, alarm battery supply, and the user supply voltage fuses must be removed before any service is attempted on the panel. When replacing TM317 (MC-1P029-01), the new circuit pack must have a station constants EPROM in the IC14 position with the same serial number as the EPROM of the board it replaces. These numbers should agree with the number in the office records.

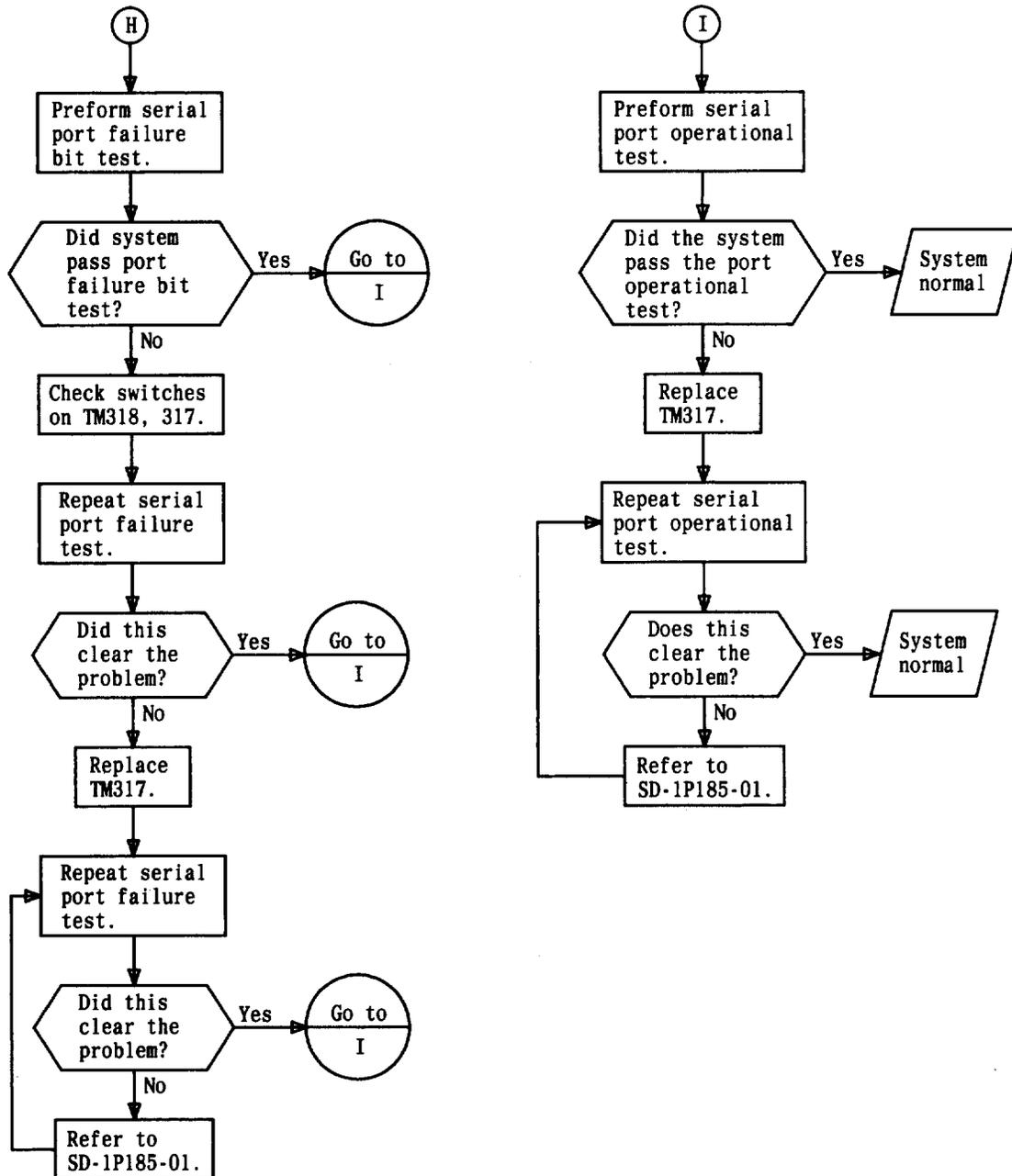
Flowchart 1—Trouble Diagnosis (See Caution) (Sheet 4 of 6)



Caution: Before removing any circuit packs, the +5 volt supply must be removed. This may be done by turning the switch on the dc-to-dc converter to the OFF position. This action does not remove all potentials from the panel, so the office battery, alarm battery supply, and the user supply voltage fuses must be removed before any service is attempted on the panel. When replacing TM317 (MC-1P029-01), the new circuit pack must have a station constants EPROM in the IC14 position with the same serial number as the EPROM of the board it replaces. These numbers should agree with the number in the office records.

*Scan points 1-64 in display 5 are on TM319. Scan points 65-160 in display 6 and first half of display 7 are on TM312 (slot B). Scan points 161-256 in second half of display 7 and display are 8 on TM312 (slot C).

Flowchart 1—Trouble Diagnosis (See Caution) (Sheet 5 of 6)



Caution: Before removing any circuit packs, the +5 volt supply must be removed. This may be done by turning the switch on the dc-to-dc converter to the OFF position. This action does not remove all potentials from the panel, so the office battery, alarm battery supply, and the user supply voltage fuses must be removed before any service is attempted on the panel. When replacing TM317 (MC-1P029-01), the new circuit pack must have a station constants EPROM in the IC14 position with the same serial number as the EPROM of the board it replaces. These numbers should agree with the number in the office records.

Flowchart 1—Trouble Diagnosis (See Caution) (Sheet 6 of 6)

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 site 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 is set up for 4-wire operation (factory furnished).
 - Soft turnoff and squelch intervals (switch S2) are set for \emptyset, \emptyset (see Section 592-031-299).
 - Fast carrier detection is set for "in" (factory furnished).
 - Clear-to-send interval is set for "8 ms" (factory furnished).
 - Clamp is set for "in" (factory furnished).
 - Carrier detection reset is set for "in" (shorting plug).
 - Second shorting plug is set for "continuous carrier out" (factory furnished).
 - Grounding option (screw S1) is 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

39A DAS Test Extender Card

Note: Whenever the extender is used, the switches on it must be in the NORMAL (up) position unless otherwise specified.

STEP**PROCEDURE**

-
- | STEP | PROCEDURE |
|-------------|---|
| 1 | <i>Caution: Before removing any circuit packs, the +5 volt supply must be removed. This may be done by turning the switch on the dc-to-dc converter to the OFF position. This action does not remove all potentials from the panel; therefore, the office battery, alarm battery supply, and the user supply voltage fuses must be removed before any service is attempted on the panel. When replacing TM317 (MC-1P029-01), the new circuit pack must have a station constant erasable programmable read-only memory (EPROM) in the IC14 position with the same serial number as the EPROM of the board it replaces. These numbers should agree with the number in the office records.</i> |
| 2 | Remove TM317 card from slot D. |
| 3 | Insert the circuit pack extender into slot D and insert the TM317 card into it. |
| 4 | Use pins 200, 201, 300, and 301 as a ground reference, and measure pins 000, 001, 100, and 101 for +5 volts ± 0.25 volts. |
| 5 | Check pin 032 for -5 volts ± 0.5 volts. |
| 6 | Replace the TM317 card in slot D. |
| 7 | Remove TM318 card from slot E. |
| 8 | Insert the circuit pack extender into slot E and insert the TM318 card into it. |
| 9 | Use pins 200, 201, 300, and 301 as a ground reference, and measure pins 000, 001, 100, and 101 for +5 volts ± 0.25 volts. |
| 10 | Check pin 032 for -5 volts ± 0.5 volts. |
| 11 | Check pin 056 for alarm battery supply (-24 volts, or -48 volts). |
| 12 | Replace the TM318 card in slot E. |

CHART 2 (Contd)

STEP	PROCEDURE
13	Remove TM319 card from slot A (if equipped).
14	Insert the circuit pack extender into slot A and insert the TM319 card into it.
15	Use pins 200, 201, 300, and 301 as ground reference, and measure pins 000, 001, 100, and 101 for +5 volts ± 0.25 volts.
16	Check pin 056 for the user supply voltage (-24 or -48 volts).
17	Replace the TM319 in slot A.
18	Remove TM312 card from slot B (if equipped).
19	Insert the circuit pack extender in slot B and insert the TM312 card into it.
20	Repeat Steps 15 and 16.
21	Replace the TM312 card into slot B.
22	Remove TM312 card from slot C (if equipped).
23	Insert the circuit pack extender in slot C and insert the TM312 card into it.
24	Repeat Steps 15 and 16.
25	Replace the TM312 card into slot C.
26	Remove TM313 card from slot F (if equipped).
27	Insert the circuit pack extender in slot F and insert the TM313 card into it.
28	Repeat Step 15.
29	Replace the TM313 card into slot F.
30	If any voltage is not correct, refer to SD-1P185-01 and determine the faulty circuit pack, converter, or wiring.
31	Return to Flowchart 1.

CHART 3
OPERATIONAL TESTS

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 (VOM) or equivalent
Spare Circuit Packs
39A DAS Test Extender Card

Note: Whenever the extender is used, the switches on it must be in the NORMAL (up) position unless otherwise specified.

STEP**PROCEDURE****A. Initial Setup**

- 1 **Caution:** Before removing any circuit packs, the +5 volt supply must be removed. This may be done by turning the switch on the dc-to-dc converter to the OFF position. This action does not remove all potentials from the panel; therefore, the office battery, alarm battery supply, and the user supply voltage fuses must be removed before any service is attempted on the panel. When replacing TM317 (MC-1P029-01), the new circuit pack must have a station constant EPROM in the IC14 position with the same serial number as the EPROM of the board it replaces. These numbers should agree with the number in the office records.
- 2 Disconnect P1 from the 202T data set, and connect the E2A test cable between P1 and the station test set.
- 3 Insert the general purpose plug-in into the station test set.
- 4 Record the station address and communication data rate.

CHART 3 (Contd)

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

<u>SWITCHES</u>	<u>POSITION</u>
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 1

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

WORD 2 through WORD 4	All down
POWER	ON
MASTER CLEAR	Depress and release

* See Table A for address switch setting.

CHART 3 (Contd)

STEP	PROCEDURE
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6 Depress and release the RESTART switch on TM317.

B. Alarm Poll Test

7 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.

C. Group Report Test

8 Make the following changes to the station test set switch positions:

SWITCHES

POSITION

DISPLAY WORD SELECT 16

WORD 1

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

RECEIVER CLEAR Depress and release

9 Depress and release the station test set START switch.

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

10 If indicator 13 was lighted in Step 7, repeat Steps 8 and 9 with the DISPLAY WORD SELECT switch set to 9; otherwise, go to Step 11.

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

CHART 3 (Contd)

STEP

PROCEDURE

D. Display Report Test

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

SWITCHES
 DISPLAY WORD 4
 SELECT

POSITION

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

MESSAGE LENGTH 2

RECEIVER CLEAR Depress and release

12 Depress and release the station test set START switch.

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

13 If the DAS is equipped with the combined I/O card (TM319), perform Steps 14 through 20; if equipped with the relay card (TM313), perform Steps 21 through 27, also. If the DAS has neither of these cards, perform Step 28.

E. Remote Switch Test for Combined I/O Card

14 Choose a discrete control point from 1 through 16 that is unused and connect the VOM between the CC and CCR points. Set the VOM to read OHMS, and set the range switch to X1.

CHART 3 (Contd)

STEP**PROCEDURE**

- 15 **Make the following changes in the station test set switch positions:**

SWITCHES**POSITION**

DISPLAY WORD 1
SELECT

WORD 1

WORD 2

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

RECEIVER CLEAR Depress and release

Note: Refer to Table C for point switch settings.

- 16 **Depress and release the station test set START switch.**

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

CHART 3 (Contd)

STEP PROCEDURE

F. Relay Output Test for Combined I/O Card

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

	<u>SWITCHES</u>			<u>POSITION</u>													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
WORD 1	0	1	0	0	1	1	1	1	1	1	1	0	1	1	1	1	1
WORD 2	1	0	0	Station Address								0	0	1	1	1	1
WORD 3	1	1	0	0	0	Point				0	0	0	0	0	0	0	0

RECEIVER CLEAR Depress and release

MESSAGE LENGTH 3

Note: Refer to Table D for point switch settings.

18 Depress and release the station test set START switch.

Requirement: The VOM needle will deflect upwards and remain high. The station test set RECEIVE INFORMATION indicators 1 and 12 will light. All other information indicators will go off.

CHART 3 (Contd)

STEP	PROCEDURE
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19 Make the following changes in the station test set switch positions:

	<u>SWITCHES</u>					<u>POSITION</u>											
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
WORD 3	1	0	0	0	0	Point				0	0	0	0	0	0	0	0

RECEIVER CLEAR Depress and release

20 Depress and release the station test set START switch.

Requirement: The VOM needle will return to the normal position, and the station test set RECEIVE INFORMATION indicators 1 and 12 will light. All other information indicators will go off.

G. Remote Switch Test for Relay Card

21 Choose a discrete control point from 17 through 80 that is unused and connect the VOM between the CC and CCR points. Set the VOM to read OHMS, and set the range switch to X1.

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

	<u>SWITCHES</u>					<u>POSITION</u>											
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
WORD 1	0	1	1	Station Address				0	0	0	0	0	0	0	0	0	
WORD 2	1	Point		P/OSG		0	0	0	0	1	P/OSG		0	0	0		

RECEIVER CLEAR Depress and release

MESSAGE LENGTH 2

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

CHART 3 (Contd)

STEP	PROCEDURE
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23 Depress and release the station test set START switch.

Requirement: The VOM needle will momentarily deflect upward and the station test set RECEIVE INFORMATION indicators 1 and 12 will light. All other information indicators will go off.

H. Relay Output Test for Relay Card

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

	<u>SWITCHES</u>			<u>POSITION</u>													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
WORD 1	0	1	0	0	1	1	1	1	1	1	1	0	1	1	1	1	1
WORD 2	1	0	0	Station Address								0	0	1	1	1	1
WORD 3	1	1	0	0	0	Point				Block			0	0	0	0	0

MESSAGE LENGTH 3

RECEIVER CLEAR Depress and release

Note: Refer to Table D for point and block switch settings. ◆

25 Depress and release the station test set START switch.

Requirement: The VOM needle will deflect upward and remain high. The station test set RECEIVE INFORMATION indicators 1 and 12 will light. All other information indicators will go off.

CHART 3 (Contd)

STEP	PROCEDURE
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30 Depress and release the station test set START switch.

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

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

SWITCHES
MESSAGE LENGTH 1

POSITION

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

WORD 2 All down
WORD 3 All down
WORD 4 All down
RECEIVER CLEAR Depress and release

32 Depress and release the station test set START switch.

Requirement: RECEIVE INFORMATION indicators 1 and 6 (and possibly 13) will light and all others will go off.

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

34 Refer to Table E and set the station test set switches for the appropriate display; then, depress and release the START switch.

Requirement: All RECEIVE INFORMATION indicators light.

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

Requirement: All RECEIVE INFORMATION indicators light.

CHART 3 (Contd)

STEP	PROCEDURE
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36 Repeat Step 35 with the station test set DISPLAY WORD SELECT switch set to 3, then to 4.

Requirement: All RECEIVE INFORMATION indicators light.

37 Repeat Steps 33 through 36 for each display equipped.

Requirement: All RECEIVE INFORMATION indicators light.

J. Test Os

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

SWITCHES
MESSAGE LENGTH 3

POSITION

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

RECEIVER CLEAR Depress and release

39 Depress and release the RESTART switch on TM317.

40 Depress and release the station test set START switch.

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

41 Repeat Steps 31 through 37 for each display equipped.

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

42 Depress and release the RESTART switch on TM317.

CHART 3 (Contd)

STEP	PROCEDURE
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K. Polling Serial Ports Failure Bit Test

- 43 Turn the POWER switch on the dc-to-dc converter to OFF.
- 44 Remove TM317 card from slot D.
- 45 Insert the circuit pack extender into slot D and insert the TM317 card into it.
- 46 Place all switches on the circuit pack extender in the OPEN CKT (center) positions.
- 47 Turn the POWER switch on the dc-to-dc converter to ON.
- 48 Depress and release the RESTART switch on TM317.
- 49 For remotes controlled by a TCAS central, use Steps 50, 51, and 52. For TASC or SCOTS, use Steps 53, 54, and 55.
- 50 Set the station test switches as follows:

<u>SWITCHES</u>	<u>POSITION</u>
DISPLAY WORD SELECT	15
MESSAGE LENGTH	1

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
*WORD 1			0	1	0	Station Address					0	0	0	0	0	0

WORD 2 through WORD 4 All down

RECEIVER CLEAR Depress and release

* See Table A for address switch setting.

- 51 Depress and release the station test set START switch.

CHART 3 (Contd)

STEP**PROCEDURE**

52 Record the RECEIVE INFORMATION indicators that light.

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

53 Set the station test set switches as follows:

<u>SWITCHES</u>	<u>POSITION</u>
DISPLAY WORD SELECT	4
MESSAGE LENGTH	2
WORD 3 and WORD 4	All down
RECEIVER CLEAR	Depress and release

54 Set the station test set WORD 1 and WORD 2 switches for the first equipped serial display (9 through 64) according to Table E.

55 Depress and release the station test set START switch.

Requirement: Indicators 1 and 17 will light.

56 Repeat Steps 54 and 55 for each equipped serial display.

I. Polling Serial Port Operational Test

57 For each equipped serial port (1 through 6), put its associated circuit pack extender switch (1 through 6) in the LOOPBACK (down) position.

58 If port 7 is equipped for use in the RS422 mode (switch 2 on TM317 in the 422 position), put extender switch 7 in the LOOPBACK position.

59 If port 7 is equipped for use in the RS232 mode (switch 2 on TM317 in the 232 position), set switch 9 on the extender to the LOOPBACK position.

60 If port 8 is equipped for use in the RS422 mode (switch 3 on TM317 in the 422 position), put extender switch 8 in the LOOPBACK position.

61 If port 8 is equipped for use in the RS232 mode (switch 3 on TM317 in the 232 position), set switch 10 on the extender to the LOOPBACK position.

62 Depress and release the RESTART switch on TM317.

CHART 3 (Contd)

STEP	PROCEDURE
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63 Set the station test switches as follows:

<u>SWITCHES</u>	<u>POSITION</u>
◆ DISPLAY WORD SELECT	2
RECEIVER CLEAR	Depress and release◆

64 Set the station test set for the first equipped display for the port under test according to Table E.

65 Depress and release the station test set START switch.

Requirement: Refer to Table G.

66 Repeat Steps 64 and 65 for each equipped display for the port.

67 Repeat Steps 64 through 66 for each port.

M. Clearing Alarms

68 Refer to Table E and set the station test set switch positions for the NEW INDEX command. Transmit this command four 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, that light.

69 Refer to Table E for the display numbers associated with the lighted indicators (display WORD 1 = displays ◆4◆ through 16 [bits 5 through 17], display WORD 2 = displays 17 through 32, display WORD 3 = displays 33 through 48, display WORD 4 = displays 49 through 64).

70 For each indicated display, transmit the appropriate DISPLAY command. It is only necessary to transmit this command one time.

71 Repeat Steps 68 through 70 for the ANY INDEX.

CHART 3 (Contd)

STEP

PROCEDURE

72 Make the following changes to the station test set switch positions:

SWITCHES

POSITION

MESSAGE LENGTH 1

WORD 1

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

DISPLAY WORD SELECT 1

RECEIVER CLEAR Depress and release

73 Depress and release the station test set START switch.

Requirement: Indicator 1 (and possibly 7) will be the only RECEIVE INFORMATION indicators that light.

74 Return to Flowchart 1.

TABLE A
STATION ADDRESS SWITCH SETTINGS

BIT SWITCHES				BIT SWITCHES	TO POSITION															
8	9	10	11	4	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1
				5	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1
TO POSITION				6	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1
				7	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
FOR STATION ADDRESS																				
0	0	0	0		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	0	0	0		17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
0	1	0	0		33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
1	1	0	0		49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64
0	0	1	0		65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
1	0	1	0		81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96
0	1	1	0		97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112
1	1	1	0		113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128
0	0	0	1		129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144
1	0	0	1		145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160
0	1	0	1		161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176
1	1	0	1		177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192
0	0	1	1		193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208
1	0	1	1		209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224
0	1	1	1		225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240
1	1	1	1		241	242	243	244	245	246	247	248	249	250	251	252	253	254		U

TABLE B
ERROR INDICATIONS

INDICATOR	ERROR
2	Communication 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	Communication 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		GROUP	
1	0000	10	1001
3	0010	11	1010
4	0011	12	1011
5	0100	13	1100
6	0101	14	1101
7	0110	15	1110
8	0111	16	1111
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
RELAY OUTPUT COMMANDS

BLOCK NUMBER	RELAY NUMBER	CP		WORD 3 SWITCHES						
		NUMBER	LOC	POINT				BLOCK		
				6	7	8	9	10	11	12
1	1	TM319	A	0	0	0	0	0	0	0
	2			1	0	0	0	0	0	0
	3			0	1	0	0	0	0	0
	4			1	1	0	0	0	0	0
	5			0	0	1	0	0	0	0
	6			1	0	1	0	0	0	0
	7			0	1	1	0	0	0	0
	8			1	1	1	0	0	0	0
	9	TM319	A	0	0	0	1	0	0	0
	10			1	0	0	1	0	0	0
	11			0	1	0	1	0	0	0
	12			1	1	0	1	0	0	0
	13			0	0	1	1	0	0	0
	14			1	0	1	1	0	0	0
	15			0	1	1	1	0	0	0
	16			1	1	1	1	0	0	0
2	17	TM313	F	0	0	0	0	1	0	0
	18			1	0	0	0	1	0	0
	19			0	1	0	0	1	0	0
	20			1	1	0	0	1	0	0
	21			0	0	1	0	1	0	0
	22			1	0	1	0	1	0	0
	23			0	1	1	0	1	0	0
	24			1	1	1	0	1	0	0
	25	TM313	F	0	0	0	1	1	0	0
	26			1	0	0	1	1	0	0
	27			0	1	0	1	1	0	0
	28			1	1	0	1	1	0	0
	29			0	0	1	1	1	0	0
	30			1	0	1	1	1	0	0
	31			0	1	1	1	1	0	0
	32			1	1	1	1	1	0	0

TABLE D (Contd)
RELAY OUTPUT COMMANDS

BLOCK NUMBER	RELAY NUMBER	CP		WORD 3 SWITCHES							
		NUMBER	LOC	POINT				BLOCK			
				6	7	8	9	10	11	12	
3	33	TM313	F	0	0	0	0	0	0	1	0
	34			1	0	0	0	0	1	0	
	35			0	1	0	0	0	1	0	
	36			1	1	0	0	0	1	0	
	37			0	0	1	0	0	1	0	
	38			1	0	1	0	0	1	0	
	39			0	1	1	0	0	1	0	
	40			1	1	1	0	0	1	0	
	41	TM313	F	0	0	0	1	0	1	0	
	42			1	0	0	1	0	1	0	
	43			0	1	0	1	0	1	0	
	44			1	1	0	1	0	1	0	
	45			0	0	1	1	0	1	0	
	46			1	0	1	1	0	1	0	
	47			0	1	1	1	0	1	0	
	48			1	1	1	1	0	1	0	
4	49	TM313	F	0	0	0	0	1	1	0	
	50			1	0	0	0	1	1	0	
	51			0	1	0	0	1	1	0	
	52			1	1	0	0	1	1	0	
	53			0	0	1	0	1	1	0	
	54			1	0	1	0	1	1	0	
	55			0	1	1	0	1	1	0	
	56			1	1	1	0	1	1	0	
	57	TM313	F	0	0	0	1	1	1	0	
	58			1	0	0	1	1	1	0	
	59			0	1	0	1	1	1	0	
	60			1	1	0	1	1	1	0	
	61			0	0	1	1	1	1	0	
	62			1	0	1	1	1	1	0	
	63			0	1	1	1	1	1	0	
	64			1	1	1	1	1	1	0	

TABLE D (Contd)

RELAY OUTPUT COMMANDS

BLOCK NUMBER	RELAY NUMBER	CP		WORD 3 SWITCHES							
		NUMBER	LOC	POINT				BLOCK			
				6	7	8	9	10	11	12	
5	65	TM313	F	0	0	0	0	0	0	0	1
	66			1	0	0	0	0	0	1	
	67			0	1	0	0	0	0	1	
	68			1	1	0	0	0	0	1	
	69			0	0	1	0	0	0	1	
	70			1	0	1	0	0	0	1	
	71			0	1	1	0	0	0	1	
	72			1	1	1	0	0	0	1	
	73	TM313	F	0	0	0	1	0	0	1	
	74			1	0	0	1	0	0	1	
	75			0	1	0	1	0	0	1	
	76			1	1	0	1	0	0	1	
	77			0	0	1	1	0	0	1	
	78			1	0	1	1	0	0	1	
	79			0	1	1	1	0	0	1	
80	1			1	1	1	0	0	1		

TABLE E

DISPLAY 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											
4	0	0	0	0	1	1											
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 E ♦ (Contd)

DISPLAY 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										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												
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												

♦TABLE F♦

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

* Check switch 2 or 3 on TM317 for associated port. If in 232 position and if loopback test is alright, check data set and associated circuit.

♦TABLE G♦

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	1	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; eg, if port 1 has starting display number 9 and is equipped for 3 displays (9 through 11), the following responses will occur:

- Display 9 response should look like the first display number for serial port.
- Display 10 responses should look like the second display number for serial port.
- Display 11 response should look like the third display number for serial port.