

DMS-1* DIGITAL MULTIPLEX SYSTEM SYSTEM FAULT LOCATING

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Types of Faults

1.03 Faults in the DMS-1 system are divided into three categories:

(a) *Self-Alarm Faults*, are those which cause alarms to indicate directly the faulty component or circuit pack (e.g., fuse, line-fail, and ring generator alarms), and which also cause office major or minor alarms to operate. A self-alarm may be displayed on the QPP420 ALM REM unit at a Remote Concentrator Terminal (RCT); the QPP421 ALARM OFFICE unit at the Control Concentrator Terminal (CCT), or both; and, where applicable, on the faulty circuit pack (e.g., a ring generator alarm on the QPP426 RING GEN unit at an RCT).

(b) *Audit-Alarm Faults*, are those detected by the QPP431 SYS CONT during the automatic fault-locate routines. Audit-alarm faults are indicated initially by a FAULT LOC indication on the QPP421 ALARM OFFICE display at the CCT, and by an office minor alarm.

(c) *No-Alarm Faults*, are those which do not cause any alarm indications either on the DMS-1 equipment, or on the office major or minor alarm systems. No-alarm faults are usually indicated initially by either:

- customer complaints or trouble reports; or
- results of routine performance checks.

When no-alarm faults are indicated, they are located and cleared by using the procedures in Part 4 of this Section.

1. GENERAL

Scope

1.01 This section describes the procedures for locating and clearing faults in the DMS-1 system. The procedures include checks to verify system performance after a fault has been cleared.

1.02 *Reason for Reissue:* to add new and revised information.

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		Functions of Indicators	
		MTCE	ALM
Selector Switch Position	MTCE-ALM Switch Position		
RCT 1		LED 1 through 23 indicate control code faults, per Table A	LED indicates type of fault per designation at RCT 1 location, (Note)
RCT 2		LED 1 through 23 indicate memory audit faults per Table B	LED indicates type of fault per designation at RCT 2 location. (Note)
RCT 3		LED 1 through 23 indicate line audit faults, per Table C	LED indicates type of fault per designation at RCT 3 location. (Note)
RCT 4		LED 1 through 23 indicate line identification faults, per Table D	LED indicates type of fault per designation at RCT 4 location. (Note)
CCT		See Table E	LED indicates type of faults per designation at CCT location. (Note)

Note:

If FAULT LOC indicator is lit, follow the procedure for locating audit-alarm faults given in part 3; use the MTCE column above as a guide.

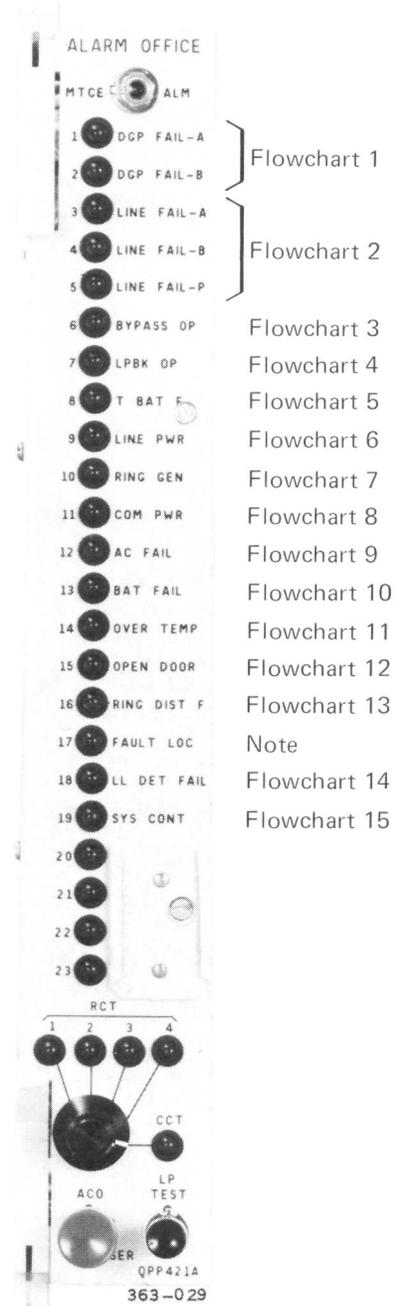


Fig. 1 — QPP421 ALARM OFFICE — Alarm Analysis

Basic Fault-Locating Procedure

1.04 When either a self-alarm or an audit-alarm fault occurs, the first indication is normally an office minor or major alarm (audible, visual, or both). When an office alarm does occur, the following steps should be taken to locate and clear the fault. On the QPP421 ALARM OFFICE unit at the CCT:

- (1) Momentarily press and release the ACO button to silence the office alarms.
- (2) Turn the RCT/CCT selector switch to the CCT or the RCT position indicated by a lighted Light Emitting Diode (LED). If more than one RCT indicator is lit, set the switch to the lowest numbered RCT indicated by a lighted LED.
- (3) Observe the alarm(s) displayed on the unit, and go to the appropriate flowchart as shown in Fig. 1. If more than one indicator is lit, go to the flowchart indicated by the first lighted LED from the top of the display.
- (4) Locate and correct the fault.
- (5) Simultaneously press and release the RESTART and RESTART ARM buttons on each system controller, in turn, to check for any new fault conditions.
- (6) Ensure that no other alarm(s) are present at the QPP421 ALARM OFFICE circuit pack.

1.05 *Precaution.* To prevent loss of clock on the digital line when removing the active QPP431 SYS CONT, the following precaution must be observed:

Verify that the FAIL lamp is on before removing the QPP431; if the lamp is not on, force it on by pressing the RESTART and RESTART ARM buttons simultaneously and holding them pressed while removing the QPP431 from the shelf.

This precaution is not necessary,

- (a) if the DMS-1 system is equipped with only one QPP431, since removing the QPP431 at any time causes total system failure;
- (b) on the standby QPP431; the standby can be removed without affecting service.

2. LOCATING SELF-ALARM FAULTS

2.01 Flowcharts 1 through 15 describe the fault-locating procedure to locate self-alarm faults.

2.02 *Notes to Flowcharts.* The following notes apply to Flowcharts 1 through 15.

Note 1: Ensure that the MTCE/ALM switch on the QPP421 ALARM OFFICE circuit pack is in the ALM position.

Note 2: Ensure that the RCT/CCT selector switch on the QPP421 ALARM OFFICE circuit pack is in a position indicated by a lighted LED.

Note 3: If the replacement of a circuit pack does not clear the fault, the original circuit pack should be returned to its operating position.

3. LOCATING AUDIT-ALARM FAULTS

3.01 When the FAULT LOC LED on the QPP421 ALARM OFFICE display lights, perform the following steps in sequence to locate and correct the fault.

- (1) Press the ACO button to turn off the audible and visual office alarms and the top-of-bay lamp.
- (2) Switch the MTCE/ALM switch to the MTCE position.
- (3) Turn the RCT/CCT selector switch to the numbered position indicated by a lighted LED. If more than one LED is lit, set the switch to the lowest number indicated by a lighted LED.
- (4) Refer to Table A, B, C, D, or E, as indicated by the selector switch (see Fig. 2). In the table, locate the maintenance action number corresponding to the first lighted alarm lamp number on the QPP421 ALARM OFFICE display (Fig. 1), and perform the steps listed under the ACTION column.

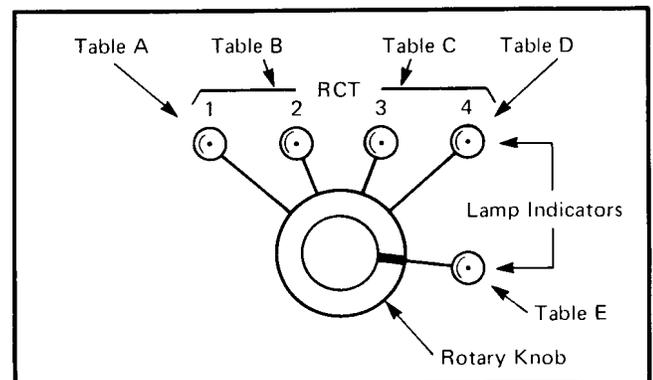


Fig. 2 — Maintenance Table Selection

(5) When the maintenance and fault-locating procedures have been completed, return the MTCE/QLM switch on the QPP421 to the ALM position, and the RCT/CCT selector switch to the CCT position. Simultaneously press the RESTART and RESTART ARM buttons on the primary QPP431 to clear the display on the QPP421. Repeat this procedure for the QPP431 backup circuit pack.

3.02 The following alarm lamps on the QPP421 ALARM OFFICE circuit pack are not turned off when the MTCE/ALM switch is in the MTCE position.

MAINTENANCE ACTION NUMBER	ALARM
11	COM PWR
19	SYS CONT

Note: Maintenance numbers 11 and 19 are not used for maintenance action indications.

4. LOCATING NO-ALARM FAULTS

4.01 No-alarm faults are subdivided into two categories (Table F). Locate the category and the nearest symptoms, and perform the appropriate steps indicated in the ACTION column.

**TABLE A
CONTROL CODE AUDIT FAULTS**

IMPORTANT: When trying to locate a fault,

- Replace only one circuit pack at a time.
- If substitution of a circuit pack does not clear a fault condition, replace the original circuit pack before substituting another.

MTCE ACTION NUMBER (QPP421)	FAULT DESCRIPTION	ACTION
1	B-word cannot be passed through RCT reliably on digroup A. System controller forces a digroup A failure and reassigns traffic to digroup B.	Replace CCT and RCT digroup A circuit packs as follows until the fault has been cleared: (a) QPP419A DIGR at CCT (b) QPP419A DIGR at RCT (c) QPP417A ADRS CONT REM at RCT.
2	B-word cannot be passed through RCT reliably on digroup B. System controller forces a digroup B failure and reassigns traffic to digroup A.	Replace CCT and RCT digroup B circuit packs as follows until the fault has been cleared: (a) QPP419A DIGR at CCT (b) QPP419A DIGR at RCT (c) QPP417A ADRS CONT REM at RCT.
3	The system controller does not receive a B-word interrupt.	

Table Continued

**TABLE A Continued
CONTROL CODE AUDIT FAULTS**

MTCE ACTION NUMBER (QPP421)	FAULT DESCRIPTION	ACTION
4	(a) No B words are returned from the RCT. (b) Waveform generator failed.	(a) Replace QPP432A B-WD circuit pack. (b) After having checked (a), replace QPP418 ADRS CONT OFF. Replace QPP431 system controller, if alarm is still present.
5	Left QPP432 B-WD circuit pack failure.	Replace left QPP432 B-WD.
6	Right QPP432 B-WD circuit pack failure.	Replace right QPP432 B-WD.
7	Waveform generator on QPP418 ADRS CONT OFF in digroup A position has failed.	Replace QPP418 ADRS CONT OFF on digroup A.
8	Waveform generator on QPP418 ADRS CONT OFF in digroup B position has failed.	Replace QPP418 ADRS CONT OFF on digroup B.
9-10	Unassigned.	
11	COM PWR alarm – see 3.02.	
12-18	Unassigned.	
19	SYS CONT alarm – see 3.02.	
20	Protection switch failure RCT1.	Replace QPP428/498 PROT SW RCT1.
21	Protection switch failure RCT2.	Replace QPP428/498 PROT SW RCT2.
22	Protection switch failure RCT3.	Replace QPP428/498 PROT SW RCT3.
23	Protection switch failure RCT4.	Replace QPP428/498 PROT SW RCT4.

**TABLE B
MEMORY AUDIT FAULTS**

Note: Some transient line error conditions may raise false alarms. To verify an alarm, press the **RESTART** and **RESTART ARM** buttons on the left-hand QPP431. If the alarm immediately reappears, it is valid. The **RESTART** should be operated only when no calls are in dialing.

MTCE ACTION NUMBER (QPP421)	FAULT DESCRIPTION	ACTION
1	<p>System controller cannot access or receive confirmation from RCT memories or registers on digroup A.</p> <p>Refer to maintenance action numbers 12 through 15 to identify RCT at fault.</p> <p>Refer to maintenance action numbers 5 through 9 for further fault subdivision.</p>	<p>Replace digroup A circuit packs at faulty RCT as follows until the fault has been cleared:</p> <p>(a) QPP417 ADRS CONT REM</p> <p>(b) QPP419 DIGR.</p>
2	<p>System controller cannot access or receive confirmation from RCT memories or registers on digroup B.</p> <p>Refer to maintenance action numbers 12 through 15 to identify faulty RCT.</p> <p>Refer to maintenance action numbers 5 through 9 for further fault subdivision.</p>	<p>Replace digroup B circuit packs at faulty RCT as follows until the fault has been cleared:</p> <p>(a) QPP417 ADRS CONT REM</p> <p>(b) QPP419 DIGR.</p>
3	<p>System controller cannot access or receive confirmation from CCT memories or registers on digroup A.</p> <p>Refer to maintenance action numbers 7 through 9 for further fault subdivision.</p>	<p>Replace digroup A circuit packs at CCT as follows until the fault has been cleared:</p> <p>(a) QPP418 ADRS CONT OFF</p> <p>(b) QPP419 DIGR.</p>
4	<p>System controller cannot access or receive confirmation from CCT memories or registers on digroup B.</p> <p>Refer to maintenance action numbers 7 through 9 for further fault subdivision.</p>	<p>Replace digroup B circuit packs at CCT as follows until the fault has been cleared:</p> <p>(a) QPP418 ADRS CONT OFF</p> <p>(b) QPP419 DIGR.</p>
5	QPP414A LOC SW circuit pack memory fault.	Replace QPP414 LOC SW at RCT indicated.
6	QPP415A LOC LK circuit pack memory fault.	Replace QPP415 LOC LK.

Table Continued

**TABLE B Continued
MEMORY AUDIT FAULTS**

MTCE ACTION NUMBER	FAULT DESCRIPTION	ACTION
7	<p>Alarm scan fault.</p> <p>RCT alarm indications should be ignored until this fault has been cleared.</p>	<p>Replace digroup A and B circuit packs at RCT as follows until the fault is cleared:</p> <p>(a) QPP417 ADRS CONT REM</p> <p>(b) QPP419 DIGR</p> <p>(c) QPP420 ALM REM.</p>
8	<p>Maintenance operation fault.</p> <p>Control codes for maintenance actions are not properly recognized or replied to.</p>	<p>(a) Refer to maintenance action numbers 1 and 2 above.</p> <p>(b) Replace QPP420 ALM REM.</p>
9	<p>Line test access fault.</p> <p>Control codes for operation of line test access relays are not properly recognized or replied to.</p>	<p>(a) Refer to maintenance action numbers 1 and 2 above.</p> <p>(b) Replace QPP417 ADD CONT REM.</p>
10	<p>Subscriber line test/test extension – memory fault.</p>	<p>Replace QPP423 or QPP447.</p>
11	<p>COM PWR alarm – see 3.02.</p>	
12	<p>Fault at RCT1.</p>	
13	<p>Fault at RCT2.</p>	
14	<p>Fault at RCT3.</p>	
15	<p>Fault at RCT4.</p>	
16	<p>System controller memory failure.</p>	<p>Replace QPP431 SYS CONT.</p>
17	<p>Line test office failure.</p>	<p>Replace QPP424.</p>
18	<p>VF fault on QPP450 Test Control.</p>	<p>(a) Replace QPP450 TEST CONTROL</p> <p>(b) Check self-test on replacement QPP450.</p>
19	<p>SYS CONT alarm – see 3.02.</p>	
20-23	<p>Unassigned.</p>	

**TABLE C
LINE AUDIT FAULTS**

MTCE ACTION NUMBER	FAULT DESCRIPTION	ACTION
1-6	Lamps 1-6 identify a circuit pack number.	<p>Lamps 10-14 give the type of card(s) fault. The number of the card can be calculated from lamps 1-6 as follows:</p> <p>(1) Line card — given by bits 1-6 (MSB is 6).</p> <p>(2) Buffer — given by bits 4-6 (MSB is 6).</p> <p>(3) Driver — given by bit 6.</p>
7-8	Lamp 7 only lit implies a Digroup A dependent fault; Lamp 8 only lit implies a Digroup B dependent fault; Lamps 7 and 8 both lit implies fault is NOT digroup dependent.	If an address card fault exists, lamp 7 (or 8) identifies that it is in digroup 7 (or 8).
10 11 12 13 14 15	<p>Line card fault.</p> <p>Not used.</p> <p>Buffer fault.</p> <p>Driver fault.</p> <p>Address card fault.</p> <p>Multiple fault.</p>	<p>(1) Replace card(s) indicated in the following order:</p> <ul style="list-style-type: none"> ● line cards ● buffer ● driver ● address control. <p>Restart each time to check if fault is fixed.</p> <p>(2) For a multiple fault, try replacing line card indicated by lamps 1-6 to see if it makes any difference. Another method is to change the option switches to select a smaller system (e.g., 1 shelf) and restart. This may isolate the trouble to a single fault.</p>
16	Fault cannot be tested with the QPP425 or QPP450 circuit pack.	
17	vf-type fault if lit; Supervisory-type fault if not lit.	Verify line audit by doing vf test on indicated lines.
18 19 20 21 22 23	<p>Fault is at CCT.</p> <p>Not used.</p> <p>Fault is at RCT1.</p> <p>Fault is at RCT2.</p> <p>Fault is at RCT3.</p> <p>Fault is at RCT4.</p>	Locate fault to one terminal.

TABLE D
LINE IDENTIFICATION FAULTS

MTCE ACTION NUMBER	FAULT DESCRIPTION	ACTION																																																						
1-8	<p>Line identification fault.</p> <p>To find the faulty line identification, observe the lamps (1 through 8) which are lit. Then refer to the following table and add together the numeric values indicated by the lighted lamps. The sum of the numeric values is the number of the faulty line.</p> <table style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="text-align: center;">LAMP</th> <th style="text-align: center;">NUMERIC VALUE</th> </tr> </thead> <tbody> <tr><td style="text-align: center;">1</td><td style="text-align: center;">1</td></tr> <tr><td style="text-align: center;">2</td><td style="text-align: center;">2</td></tr> <tr><td style="text-align: center;">3</td><td style="text-align: center;">4</td></tr> <tr><td style="text-align: center;">4</td><td style="text-align: center;">8</td></tr> <tr><td style="text-align: center;">5</td><td style="text-align: center;">16</td></tr> <tr><td style="text-align: center;">6</td><td style="text-align: center;">32</td></tr> <tr><td style="text-align: center;">7</td><td style="text-align: center;">64</td></tr> <tr><td style="text-align: center;">8</td><td style="text-align: center;">128</td></tr> </tbody> </table>	LAMP	NUMERIC VALUE	1	1	2	2	3	4	4	8	5	16	6	32	7	64	8	128	<p><i>Example:</i> If lamps 3, 4, and 6 are lit, the faulty line number is 44 (4+8+32). If no lamp lights, line 0 is faulty; check line 0.</p> <p><i>Note:</i> The line shelf on which the faulty line is located can be identified from lamps 6, 7, and 8 as follows:</p> <table style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="text-align: center;">SHELF NO.</th> <th style="text-align: center;">6</th> <th style="text-align: center;">LAMP 7</th> <th style="text-align: center;">8</th> </tr> </thead> <tbody> <tr><td style="text-align: center;">0</td><td style="text-align: center;">OFF</td><td style="text-align: center;">OFF</td><td style="text-align: center;">OFF</td></tr> <tr><td style="text-align: center;">1</td><td style="text-align: center;">ON</td><td style="text-align: center;">OFF</td><td style="text-align: center;">OFF</td></tr> <tr><td style="text-align: center;">2</td><td style="text-align: center;">OFF</td><td style="text-align: center;">ON</td><td style="text-align: center;">OFF</td></tr> <tr><td style="text-align: center;">3</td><td style="text-align: center;">ON</td><td style="text-align: center;">ON</td><td style="text-align: center;">OFF</td></tr> <tr><td style="text-align: center;">4</td><td style="text-align: center;">OFF</td><td style="text-align: center;">OFF</td><td style="text-align: center;">ON</td></tr> <tr><td style="text-align: center;">5</td><td style="text-align: center;">ON</td><td style="text-align: center;">OFF</td><td style="text-align: center;">ON</td></tr> <tr><td style="text-align: center;">6</td><td style="text-align: center;">OFF</td><td style="text-align: center;">ON</td><td style="text-align: center;">ON</td></tr> <tr><td style="text-align: center;">7</td><td style="text-align: center;">ON</td><td style="text-align: center;">ON</td><td style="text-align: center;">ON</td></tr> </tbody> </table>	SHELF NO.	6	LAMP 7	8	0	OFF	OFF	OFF	1	ON	OFF	OFF	2	OFF	ON	OFF	3	ON	ON	OFF	4	OFF	OFF	ON	5	ON	OFF	ON	6	OFF	ON	ON	7	ON	ON	ON
LAMP	NUMERIC VALUE																																																							
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6	OFF	ON	ON																																																					
7	ON	ON	ON																																																					
9 10	<p>Fault in circuit packs associated with digroup A.</p> <p>Fault in circuit packs associated with digroup B.</p>	<p>Replace the following circuit packs associated with the faulty line on digroup A or B at the CCT, in sequence, until the fault has been cleared.</p> <p>(a) QPP413 DRVR</p> <p>(b) QPP412 or QPP496 BUFR</p> <p>(c) QPP418 ADRS CONT OFF</p> <p>(d) QPP419 DIGR.</p> <p><i>Note:</i> After the circuit pack has been replaced, simultaneously press the RESTART and RESTART ARM buttons on the system controller to reset the fault display.</p>																																																						
11	COM PWR alarm – see 3.02.																																																							

Table Continued

TABLE D Continued
LINE IDENTIFICATION FAULTS

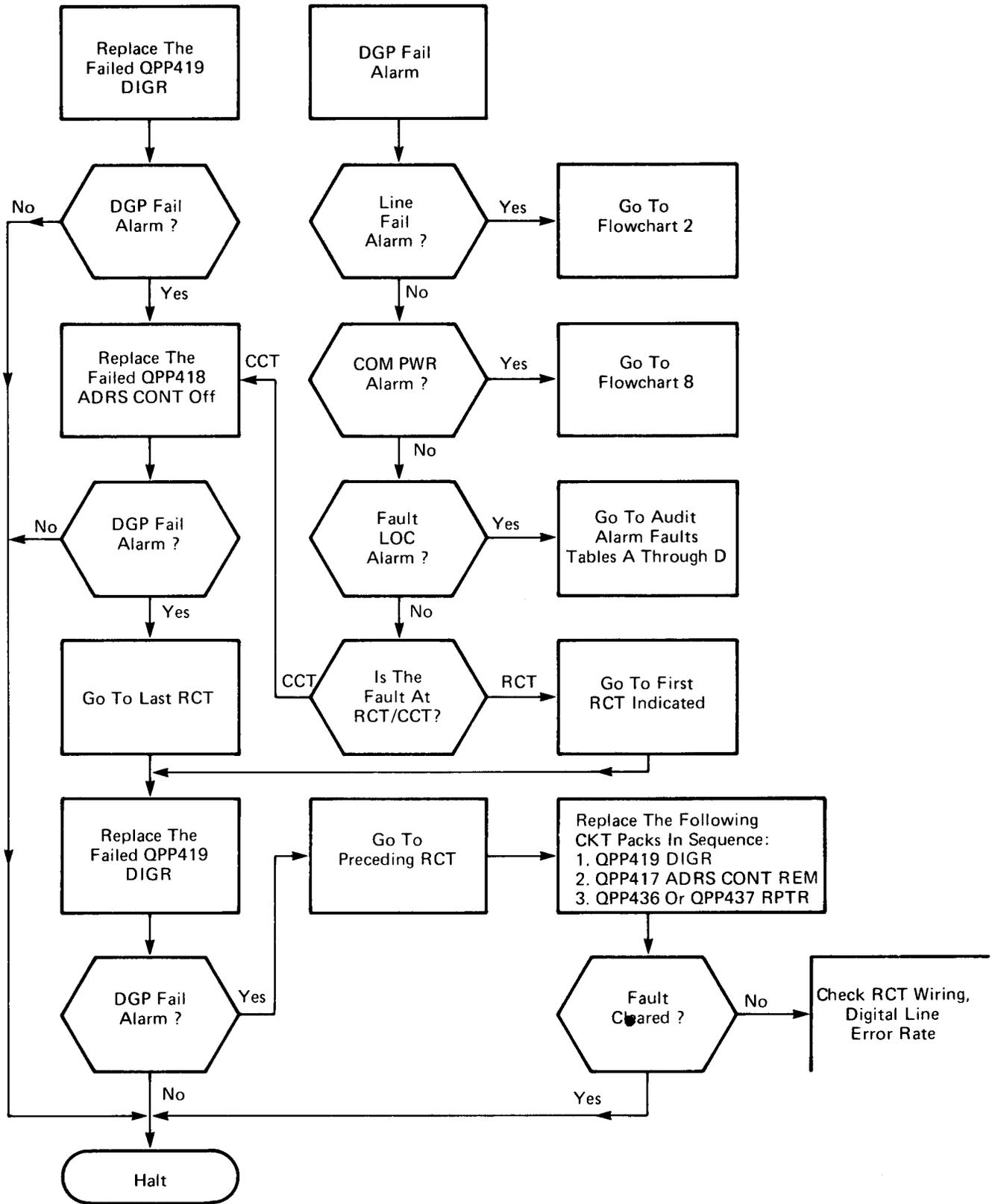
MTCE ACTION NUMBER	FAULT DESCRIPTION	ACTION
12	No line circuit packs in the line shelf indicated by lamps 6, 7, and 8.	(a) Check configuration switches on QPP421. (b) If fault exists with restart and line cards in shelf, replace QPP412 or QPP496 buffer and restart. If fault persists, change line cards sequentially and restart after each change. (c) Check for loose ribbon cable connectors.
13	Line circuit pack type change on the line indicated by lamps 1 through 8.	(a) Check line circuit pack operation. (b) Replace line circuit pack if necessary.
14	SLTE configuration identification problem.	Replace circuit packs until fault is cleared as follows: (a) QPP448 or QPP424 at CCT. (b) QPP447 or QPP423 at RCT. (c) Verify if fault is cleared by restarting after each change.
15	SLTE configuration change.	(a) If caused by SLTE card being pulled out, restart after SLTE card is put back in place. (b) If fault is caused by a condition other than in (a), replace cards as detailed for 14. (c) Exercise SLTE to bring up other fault-locate lamp indications, to pinpoint the problem to a circuit pack.
19	SYS CONT alarm – see 3.02.	

**TABLE E
SUBSCRIBER LINE TEST EXTENSION FAULT**

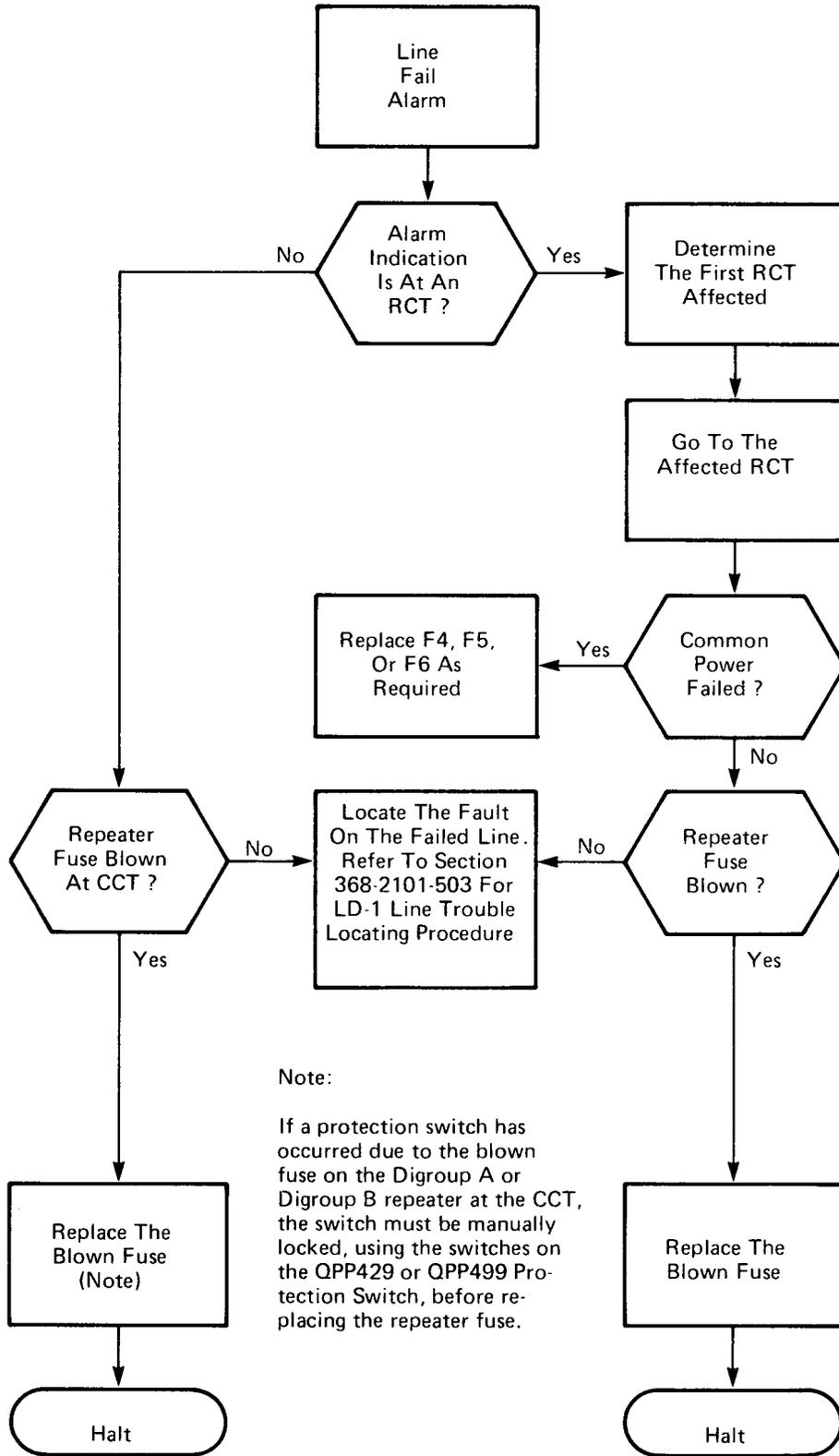
MTCE ACTION NUMBER (QPP421)	FAULT DESCRIPTION	ACTION
1	SLTE Shelf 0 fault: <ul style="list-style-type: none"> ● at CCT if lamp 9 is on ● at RCT if lamp 9 is off ● if a RCT, see lamps 20 to 23 for RCT location. 	Replace circuit packs and/or ribbon cables until fault is cleared, as follows: <ul style="list-style-type: none"> (a) QPP448 at CCT if lamp 18 is lit. (b) QPP447 at RCT indicated by lamps 20 to 23.
2 3 4 5 6 7 8 9	SLTE Shelf 1 fault (see shelf 0). SLTE Shelf 2 fault (see shelf 0). SLTE Shelf 3 fault (see shelf 0). SLTE Shelf 4 fault (see shelf 0). SLTE Shelf 5 fault (see shelf 0). SLTE Shelf 6 fault (see shelf 0). SLTE Shelf 7 fault (see shelf 0). SLTE CCT shelf fault indication: <ul style="list-style-type: none"> ● lamp on = fault at CCT ● lamp off = fault at RCT. 	<ul style="list-style-type: none"> (c) Ribbon cables and/or office bypass assemblies on CCT shelves indicated by lamps 1 to 8, if lamp 9 is lit. (d) Ribbon cables and/or remote bypass assemblies on RCT shelves indicated by lamps 1 to 8, at RCT indicated by lamps 20 to 23, if lamp 9 is off. Also check power leads to office bypass or remote bypass assemblies: <ul style="list-style-type: none"> (e) Verify repairs by manually bypassing an idle line on each shelf without causing an alarm.
10	Unassigned.	
11	CO Pwr alarm – see 3.02.	
12-17	Unassigned.	
18	SLTE CCT fault.	Same as 1 to 9.
19	System Control Alarm – see 3.02.	
20 21 22 23	SLTE RCT1 fault. SLTE RCT2 fault. SLTE RCT3 fault. SLTE RCT4 fault.	Same as 1 to 9.

**TABLE F
NO-ALARM FAULTS**

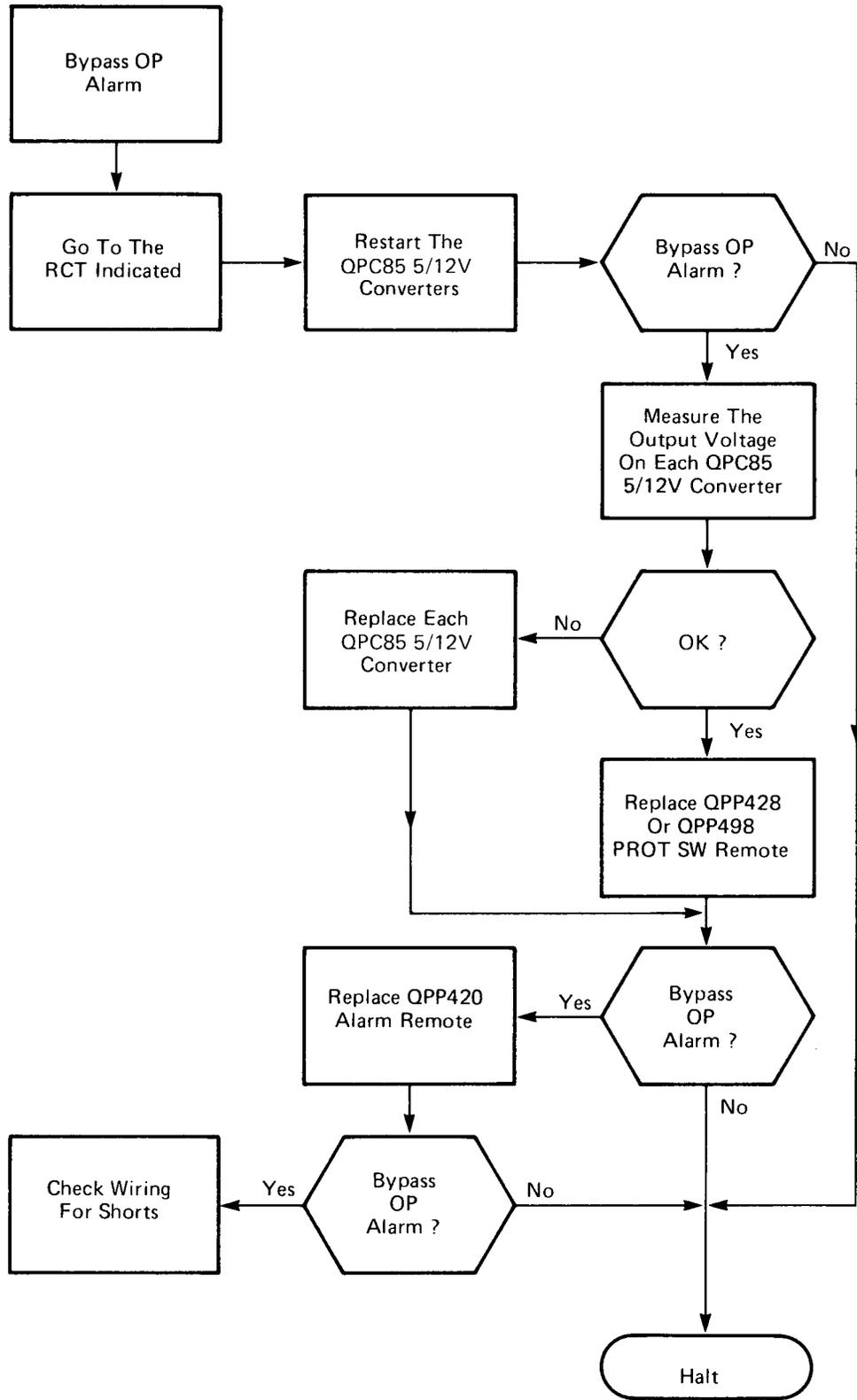
CATEGORY	SYMPTOM	ACTION
(1) Customer Reports	(a) No dial tone. (b) Noisy line. (c) Telephone does not ring but can originate calls. When calling another line, connection is broken when terminating line goes off-hook. Wrong or no long distance bills on 2-party line.	Refer to Flowchart 16. Refer to Flowchart 17. Refer to Flowchart 18. Replace QPP416 LOC LK DET. Test ANI detector using System Test – refer to Flowchart 16 and 363-2011-300.
(2) Maintenance Faults:		
2.1 QPP425 or QPP450 Detected Faults	(a) Lines test consistently HIGH or LOW. (b) No channel assigned when ASGN button operated.	(a) Calibrate using procedures in 363-2011-300. (b) Replace QPP425 or QPP450.
2.2 QPP424 Detected Faults	(a) CAL CHECK FAIL lamp lights. (b) Consistently wrong readings. (c) Incorrect operation.	(a) Replace QPP423 and retest. (b) Replace QPP423 and retest. (c) Replace QPP424 and retest.
2.3 QPP434 Traffic Faults	(a) Traffic indicators stop counting or count too fast.	(a) Replace QPP434.
2.4 QPP448 Detected Faults	Incorrect operation.	Replace QPP448 and retest.



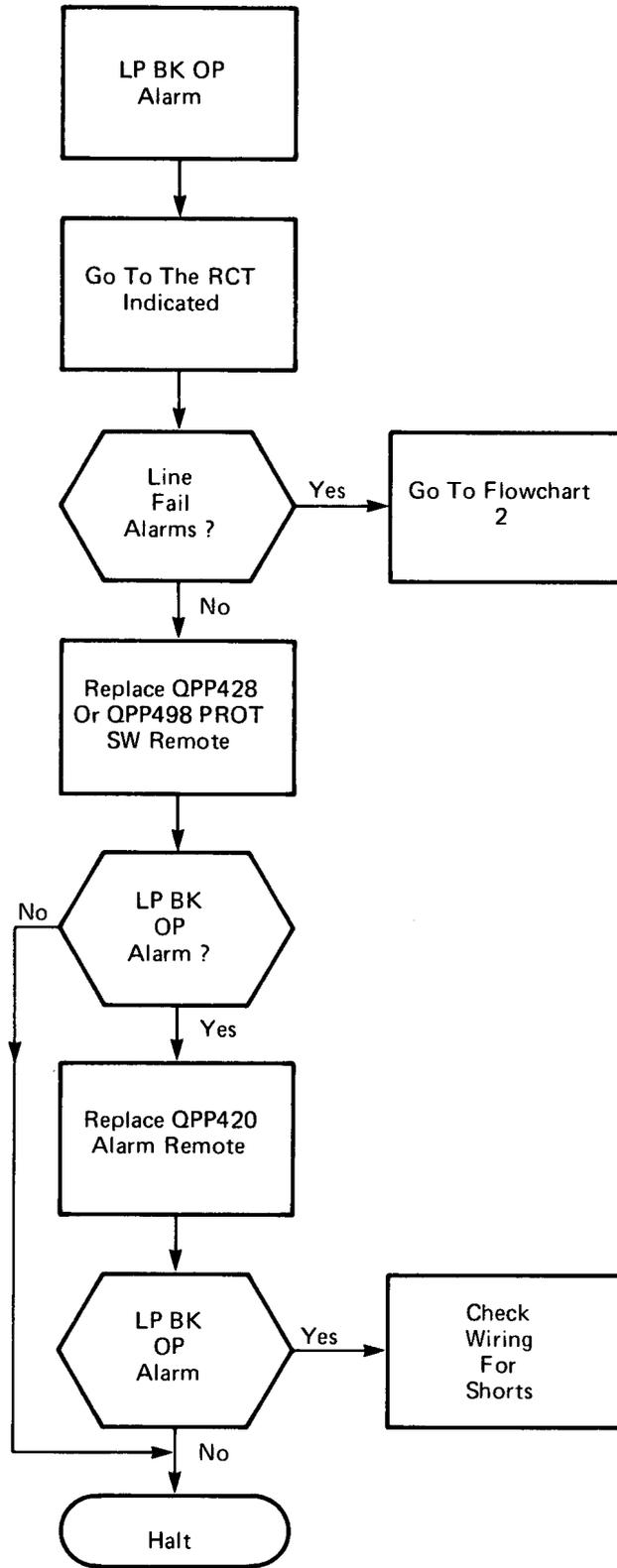
Flowchart 1 – Locating DGP FAIL Alarm Faults



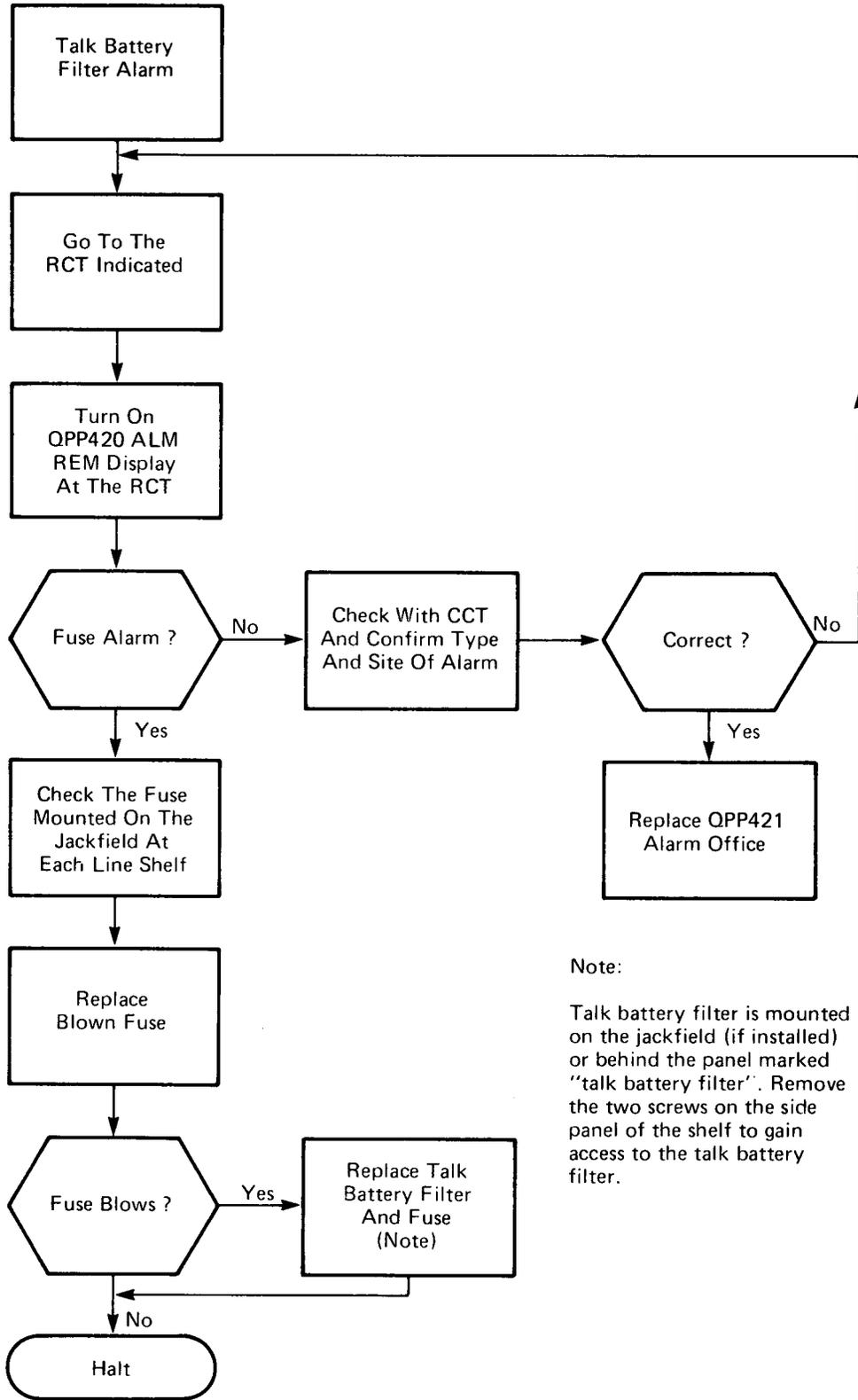
Flowchart 2 – Locating LINE FAIL Alarm Faults



Flowchart 3 – Locating BYPASS OP Alarm Faults



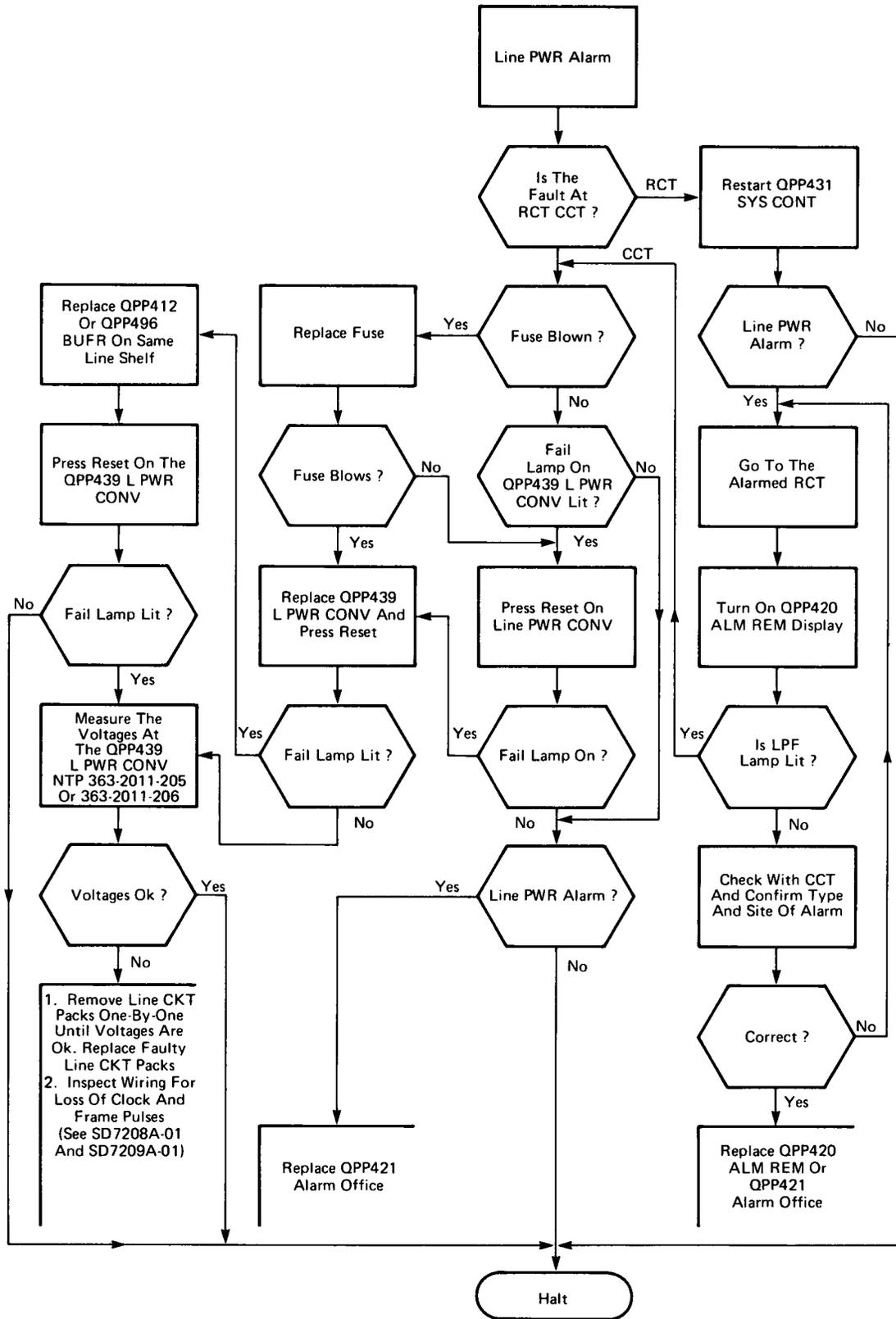
Flowchart 4 – Locating LPBK OP Alarm Faults



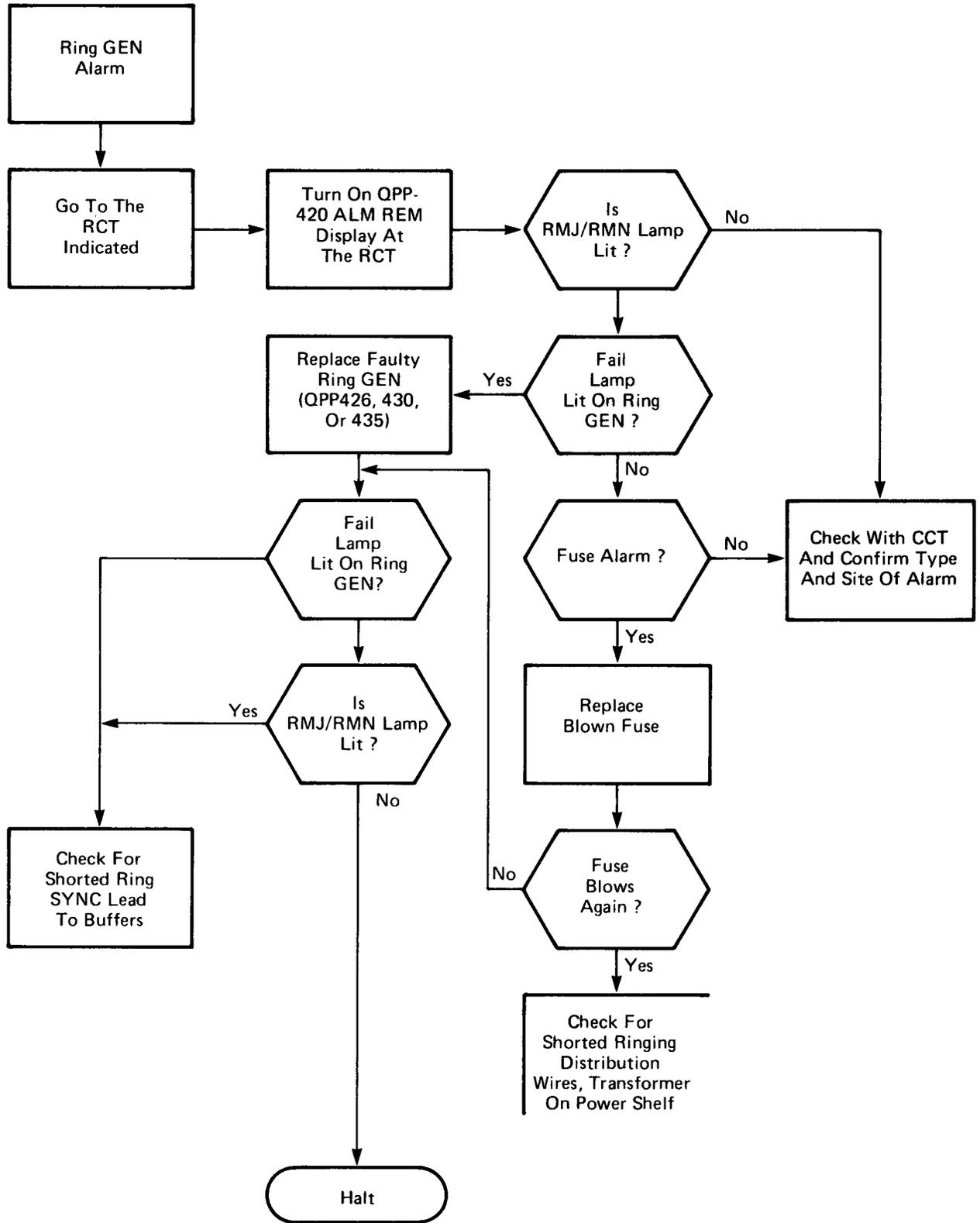
Note:

Talk battery filter is mounted on the jackfield (if installed) or behind the panel marked "talk battery filter". Remove the two screws on the side panel of the shelf to gain access to the talk battery filter.

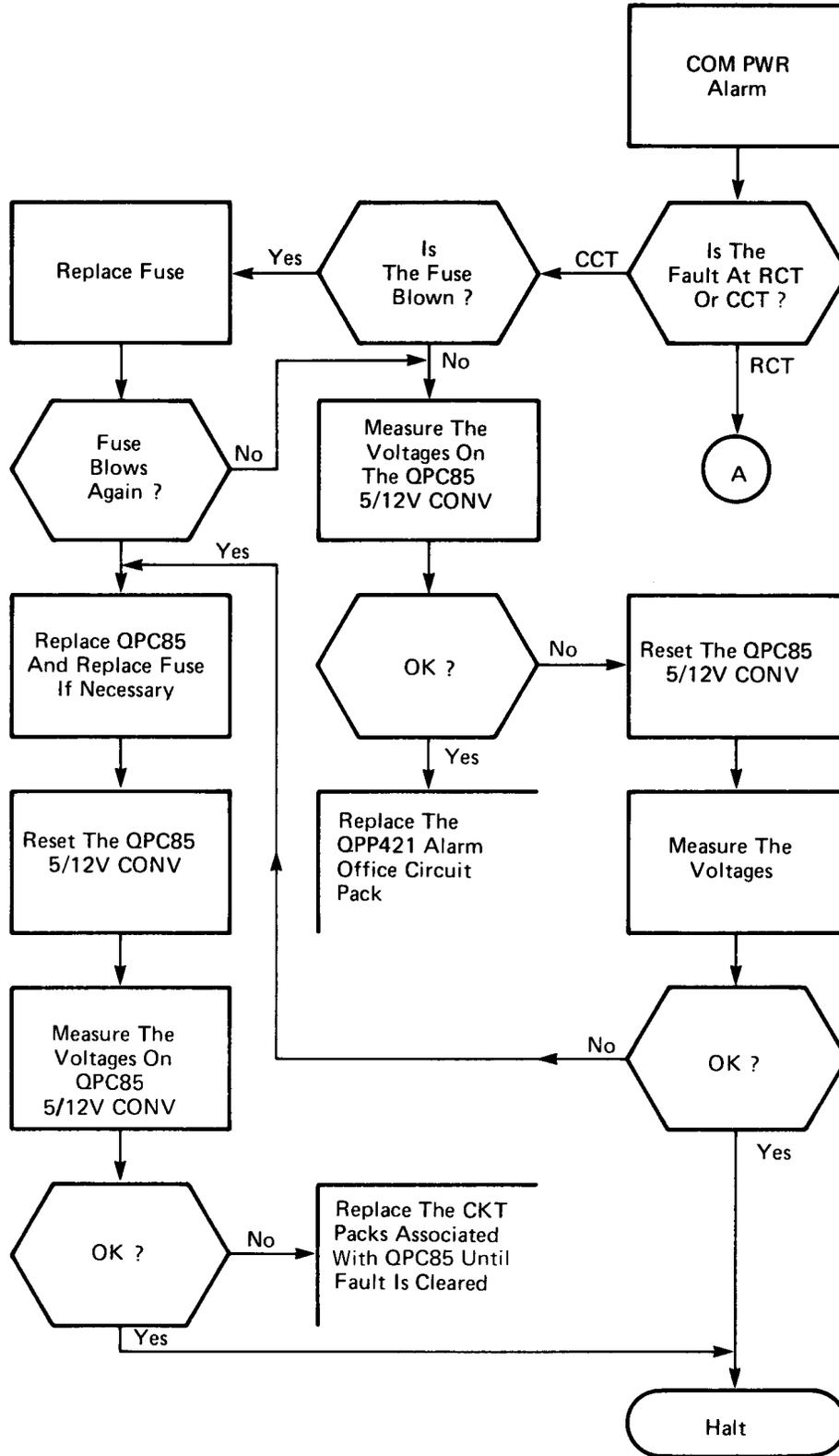
Flowchart 5 – Locating T BAT F Alarm Faults



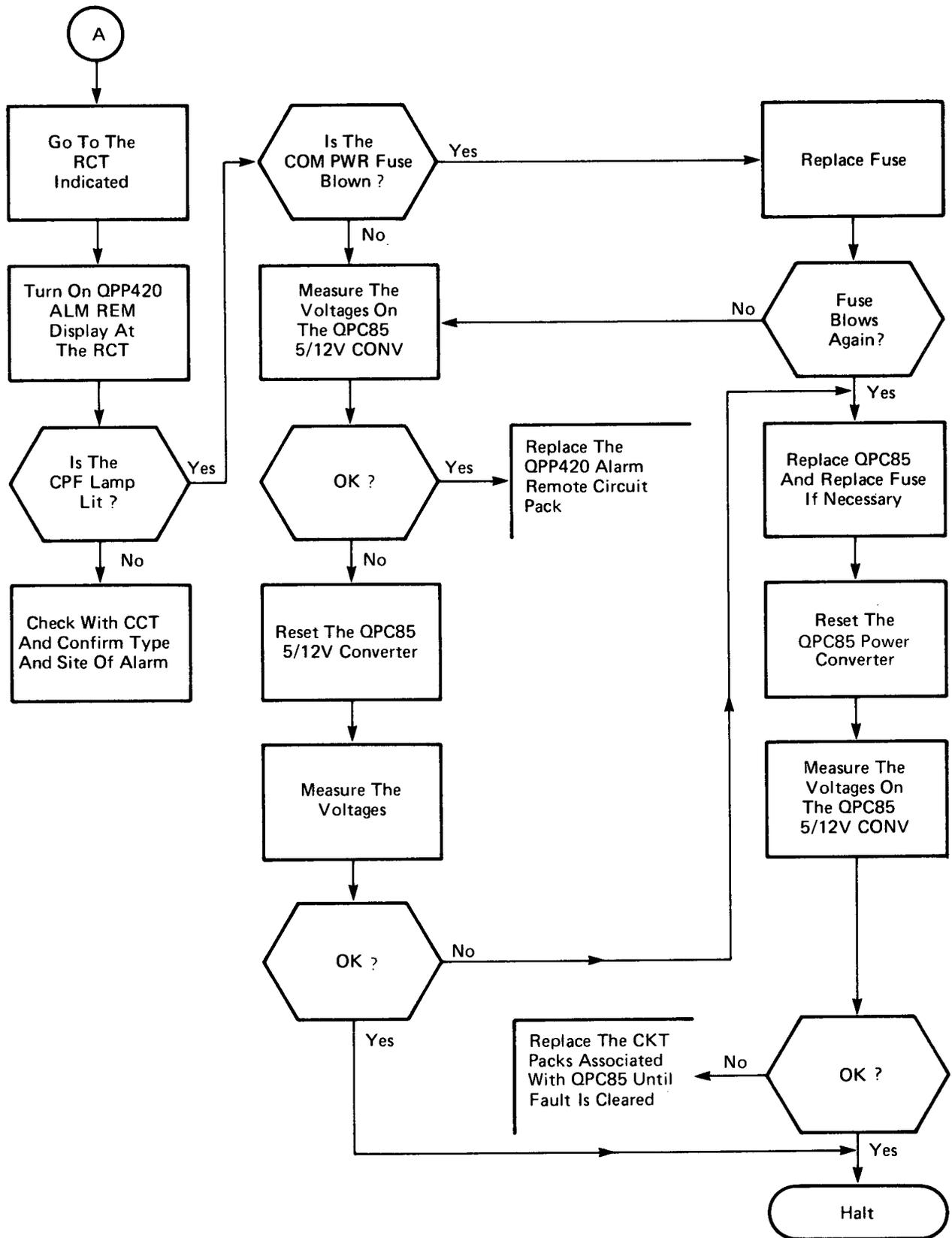
Flowchart 6 – Locating LINE PWR Alarm Faults



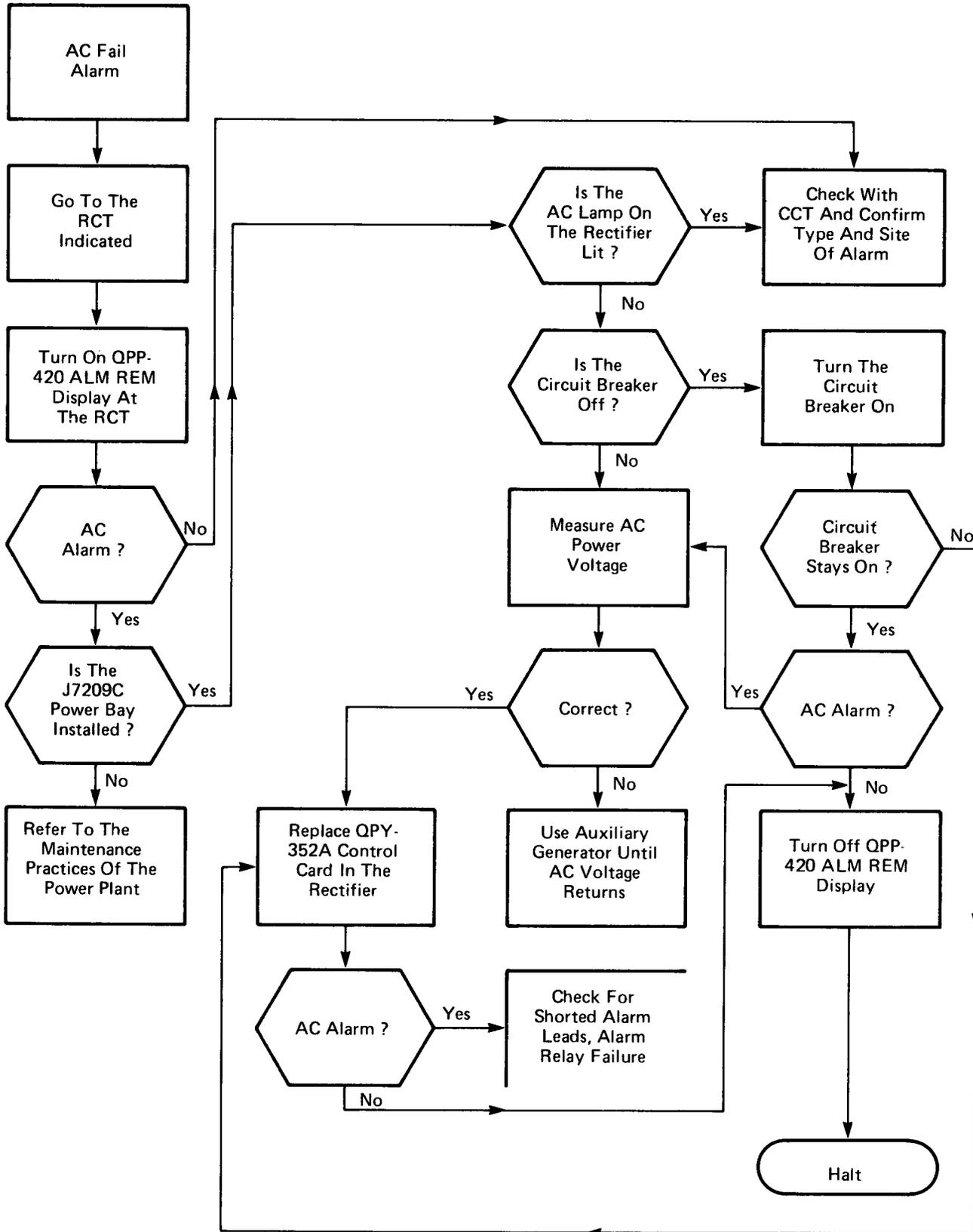
Flowchart 7 – Locating RING GEN Alarm Faults



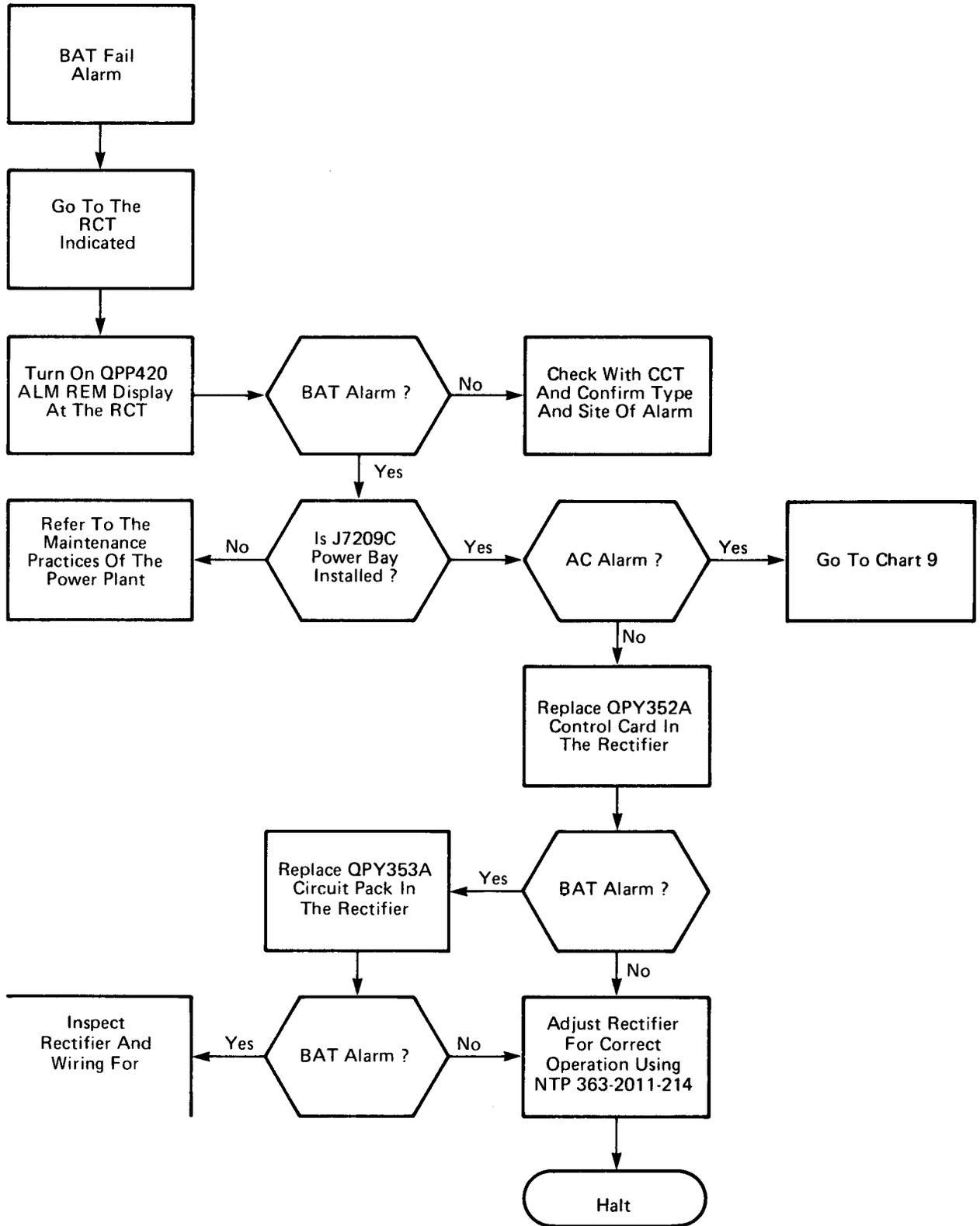
Flowchart 8 – Locating COM PWR Alarm Faults



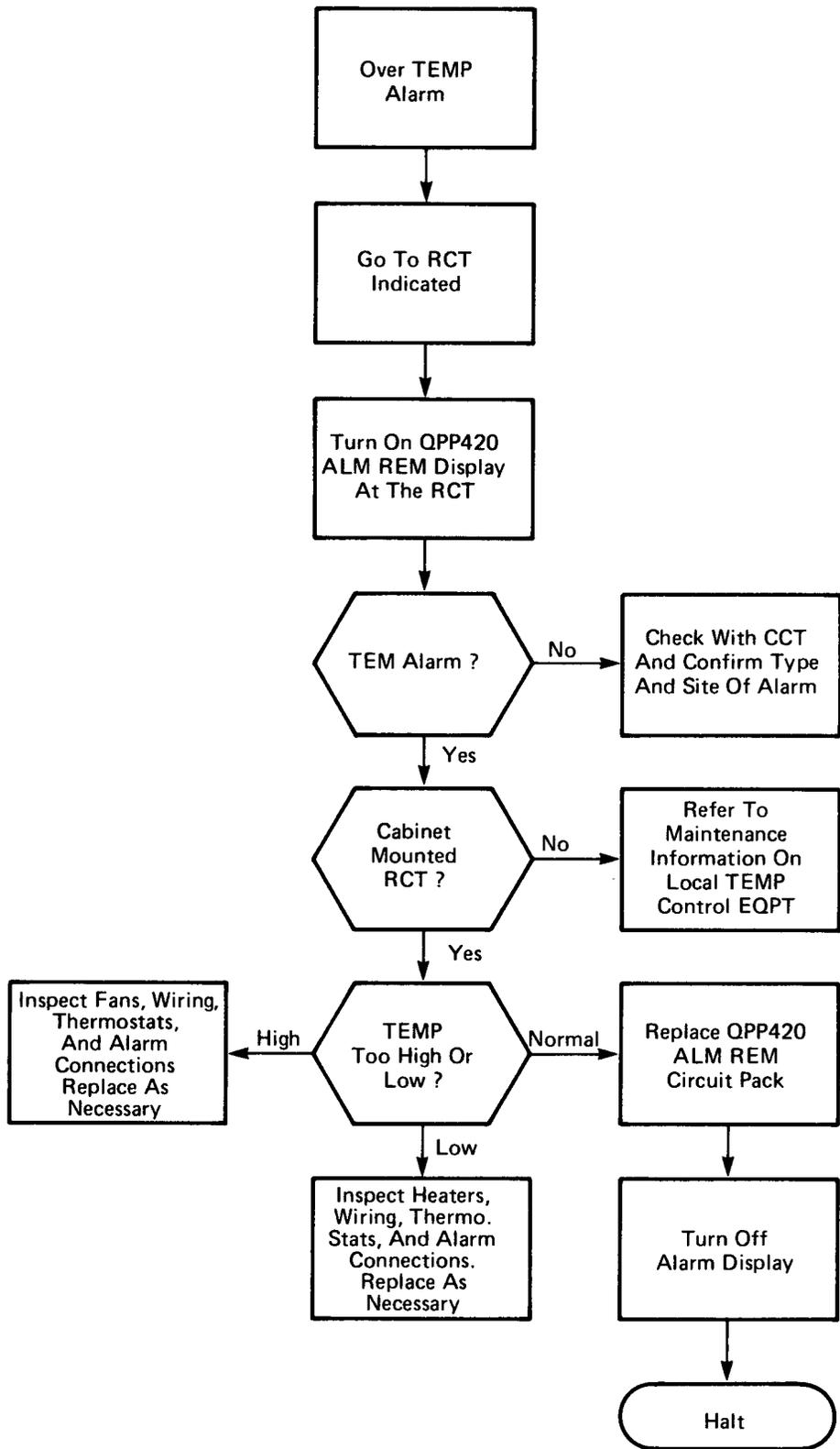
Flowchart 8 Continued – Locating COM PWR Alarm Faults



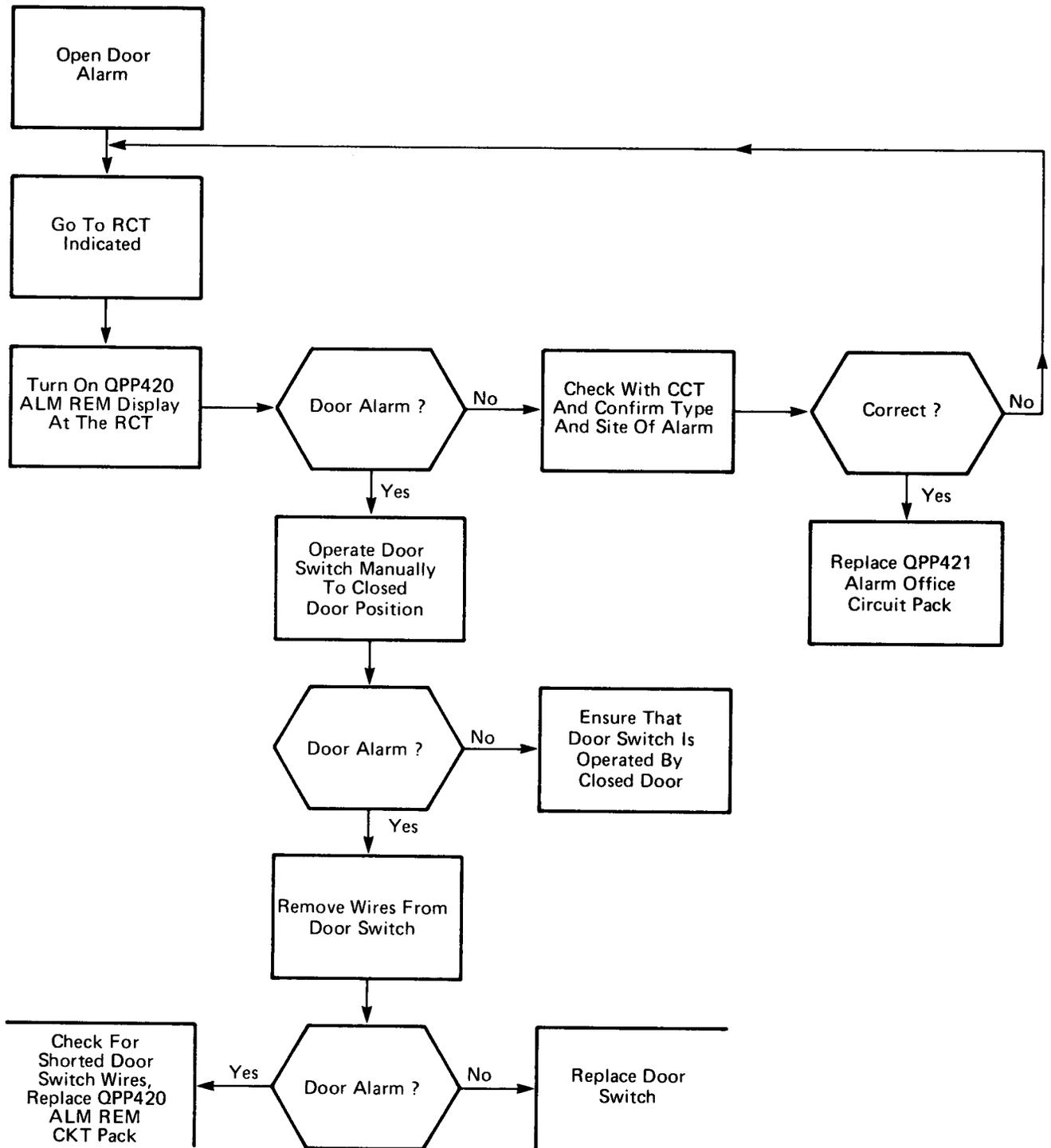
Flowchart 9 – Locating AC FAIL Alarm Faults



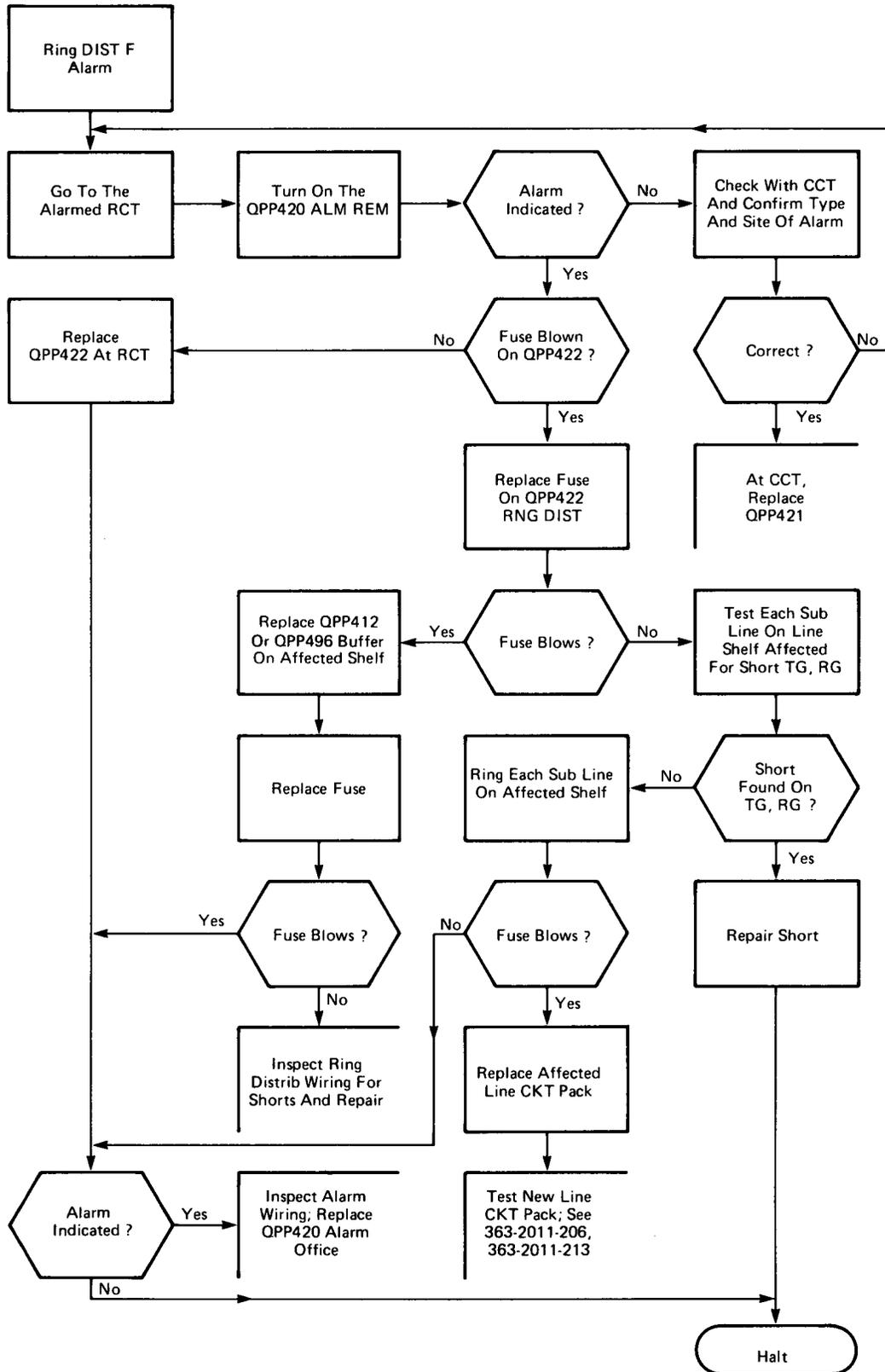
Flowchart 10 – Locating BAT FAIL Alarm Faults



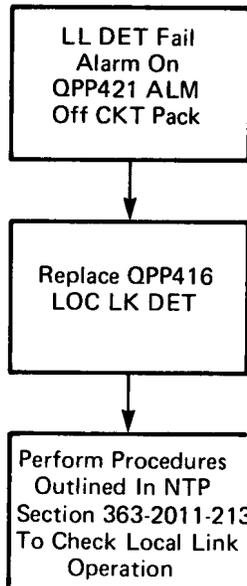
Flowchart 11 – Locating OVER TEMP Alarm Faults



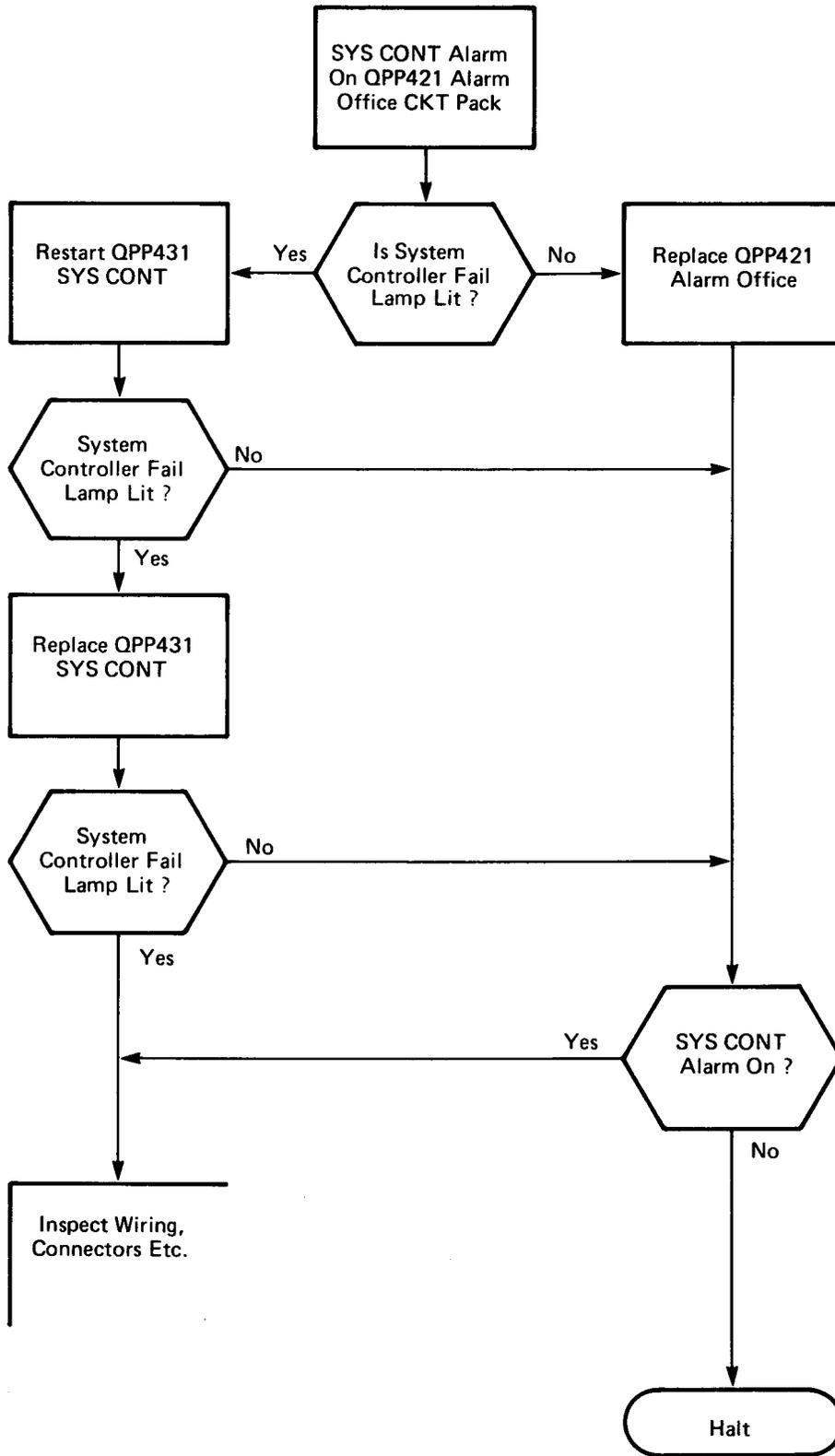
Flowchart 12 – Locating OPEN DOOR Alarm Faults



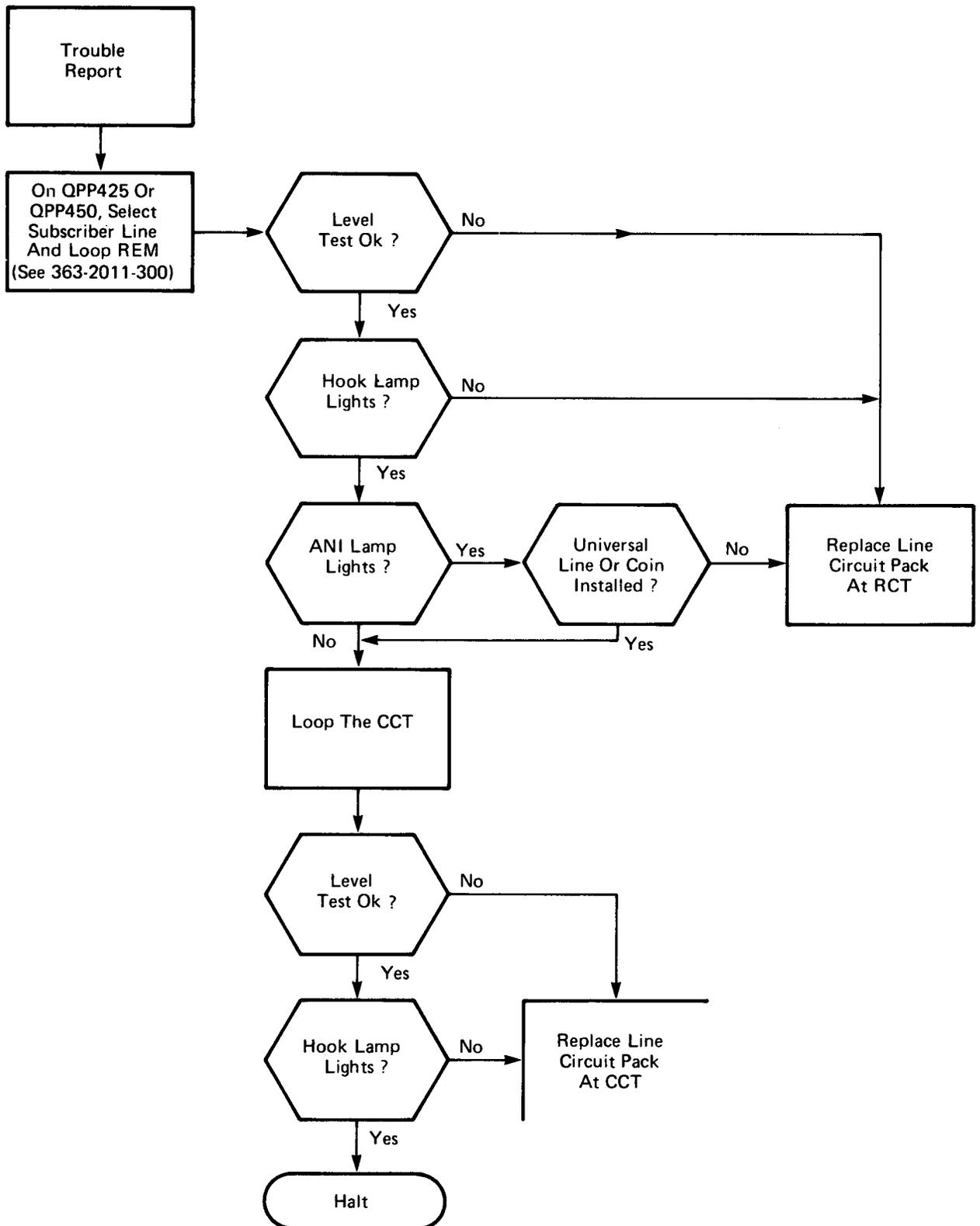
Flowchart 13 – Locating RING DIST F Alarm Faults



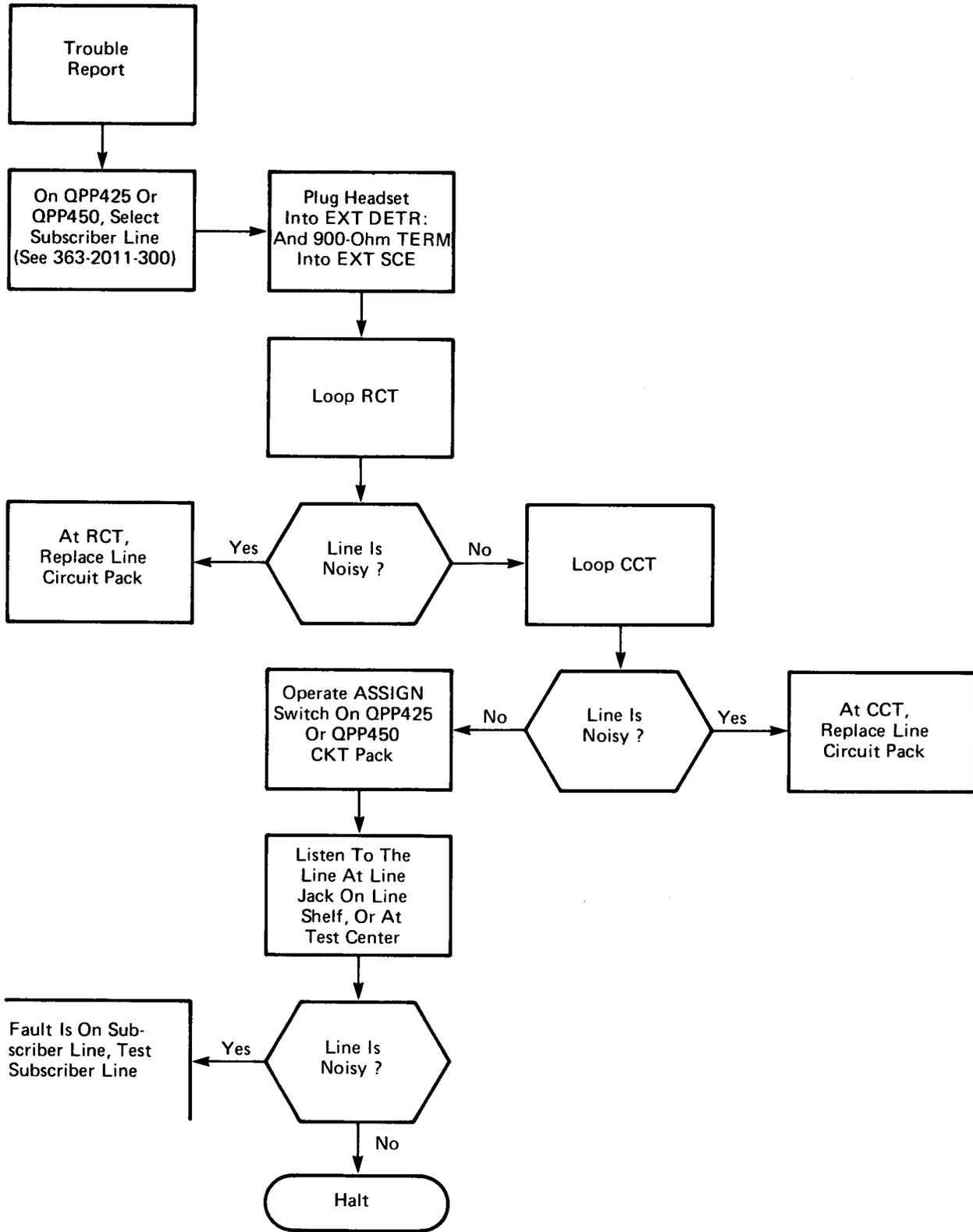
Flowchart 14 – Locating LL DET FAIL Alarm Faults



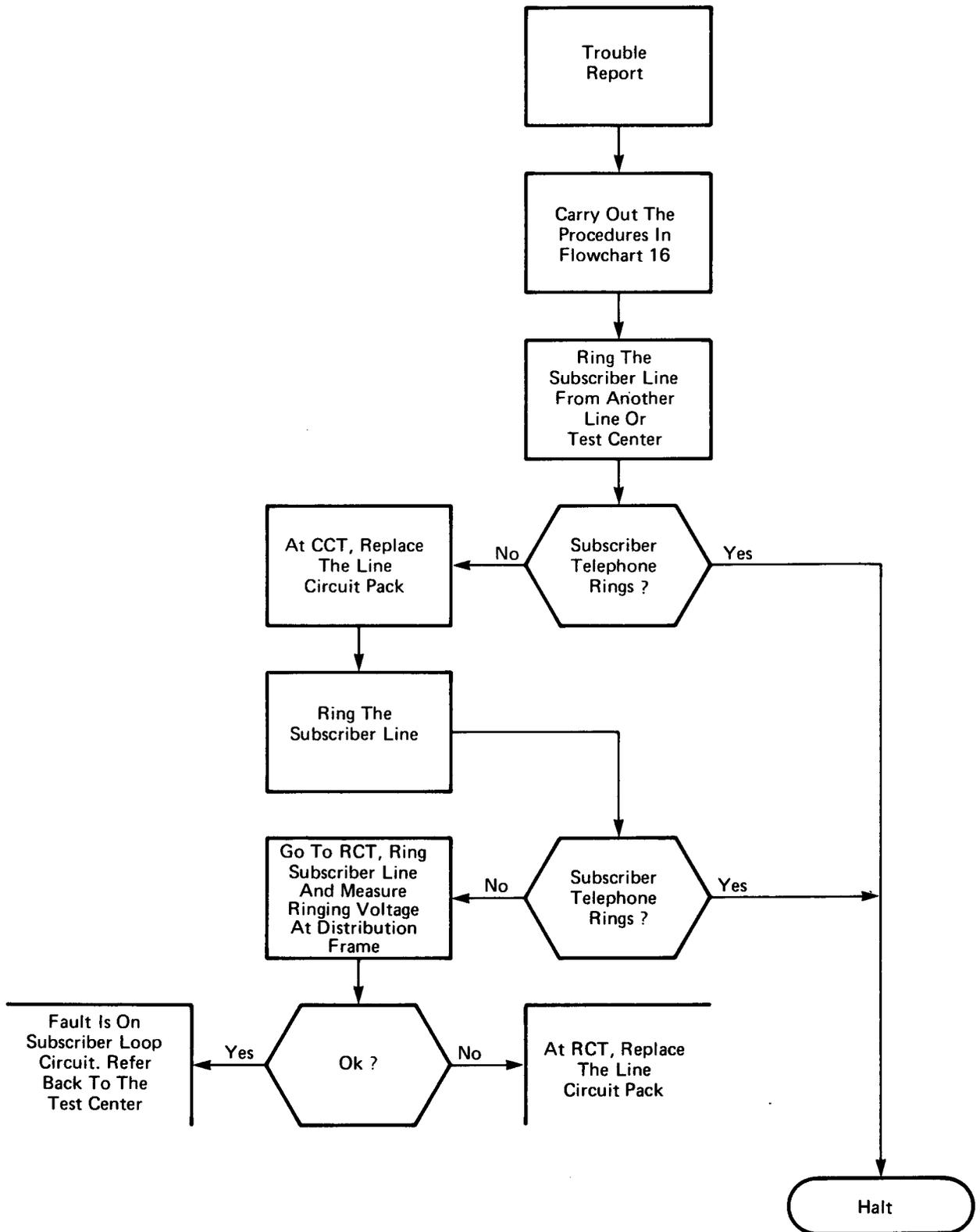
Flowchart 15 – Locating SYST CONT Alarm Faults



Flowchart 16 – Locating NO DIAL TONE Faults



Flowchart 17 -- Locating NOISY LINE Faults



Flowchart 18 – Telephone Does Not Ring