SECTION 363-201-400
Issue 1, March 1981

Task Oriented Practice
(TOP)

"SLC*"-40 SUBSCRIBER LOOP CARRIER SYSTEM

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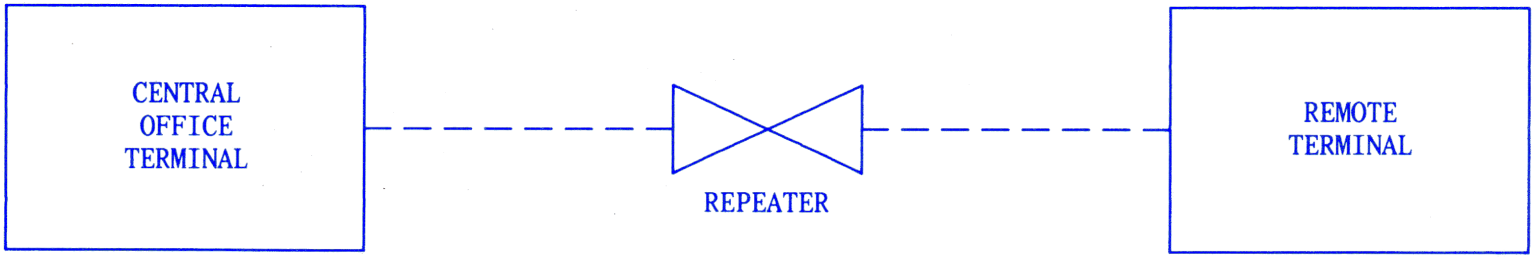
TOP Comments Hot Line (1)-800-334-0404
8:00 a.m. – 4:00 p.m. Eastern Time
Monday through Friday
In North Carolina call 919-727-3167

SUBSCRIBER LOOP CARRIER – 40 SYSTEM
TOP DOCUMENTATION PLAN
ONE VOLUME



BELL SYSTEM PRACTICES
AT&TCo Provisional

Task Oriented Practice
(TOP)

"SLC*"-40 SUBSCRIBER LOOP CARRIER SYSTEM

NOTE

Before using TOP for the first time, complete the TOP-USER Plant Training Course–PTC No. 278.

A short version of PTC No. 278 is in the back of this volume.

Printed in U.S.A.

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● REVISED OR ADDED ITEM □ CANCELED ITEM

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CHECKLIST

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ROUTINE TASKS	PROCEDURE NUMBER
Perform Spare Line Tests	RTP-002
Perform Remote Terminal Cabinet Tests	RTP-003

ITEM	SUBTASKS	PROCEDURE NUMBER
	NOTE: This test should be made during periods of light traffic on system being tested because of audible clicks during switching of digital line. No alarm lamps should be lighted at the COT prior to this test. If spare line option is used, the spare line must be idle	–
1	Obtain Support Apparatus Listed Below: At Central Office Terminal (COT): • 1 – Dummy Plug At Remote Terminal (RT): • 1 – 1014A Hand Test Set, or Equivalent	–
2	Dispatch Personnel to Remote Terminal to Assist in Monitoring Test Call	–
3	Have RT Personnel Establish a Test Call From RT Cross-Connect Terminal	–
4	Perform Transfer-to-Spare Line Tests While Monitoring Test Call	DLP-500
5	Verify Operation of SPLT (Spare-Line-Trouble) Alarm, Using a Dummy Plug in **S1-OUT** Jack on COT Jack Panel for System Being Tested	DLP-501
6	Release Test Call and Restore System to Normal	–

ITEM	SUBTASKS	PROCEDURE NUMBER
1	Obtain Support Apparatus Listed Below: • 1 – KS-14510 Volt-Ohm-Milliammeter (VOM) or Equivalent • 1 – 70-Type Defective Fuse • 1 – 9/16-Inch Taped (Insulated) Open-End Wrench • 1 – 216 Type Tool or 7/16-Inch Wrench • 1 – Bucket of Clean Tap Water • 1 – Container of Distilled or Approved Water • 1 – Bulb and Tube-Type Dispenser •*1 – Pair of Rubber Gloves, Approved for Use in Handling Batteries •*1 – Rubberized Fabric or Plastic Apron •*1 – Set of Splash-Type Eye Protectors (Goggles) •†1 – KS-21527 List 2 Eye Wash Rinse • 1 – Stiff, Narrow, Plastic Toothbrush • KS-19094 L2 Anti-Seize Compound (Grease) • Clean Cloths • Nonmetallic Waste Container • Spray Can of Freon	–
	Danger: The safety apparel designated by * should be worn at all times when working with batteries. Items designated by † should be readily available when working with the batteries to minimize the consequences of any accident with the electrolyte	
2	Visually Inspect Exterior of RT Cabinet for Any Signs of Physical Damage	–
3	If Cabinet is Dusty or Dirty, Wipe it Clean With a Clean Cloth, Moistened in Water if Necessary	–
4	Check Padlock Located on Commercial ac Fuse Box for Proper Operation	–
5	Inspect Crossarm Structure for Damage or Loose Hardware	–

ITEM	SUBTASKS	PROCEDURE NUMBER
6	Inspect Bonding and Grounding of Cable Sheath and RT Cabinet	DLP-502
7	Inspect Gaskets, Vents, Drains, and Access Holes on RT Cabinet	–
8	Check All Cabinet Locking Mechanisms for Proper Operation	–
9	Establish a Talking Circuit With COT Location Per Local Procedures	–
10	Verify Proper Operation of **RT MN** Alarm Lamp at COT Indicating an Open RT Cabinet Door	DLP-503
11	Measure Battery Voltage at **KE9 CIRCUIT PACK** Between Test Jacks **BN(–)** and **BG(+)**. Repeat With **BC** Fuse (on RT Power Panel) Removed. Note Alarm Lamp Indicators. See TABLE A for Requirements. Reinsert **BC** Fuse	DLP-504
12	Remove BF Fuse From RT Power Panel	–
	Danger: Allow 15 minutes to elapse after removing BF fuse to allow dissipation of hydrogen and oxygen gases in the battery compartment before starting Step 13	
13	From a distance of Two Inches, Direct a Several-Second Spray of Freon Against Low-Temperature Alarm Sensor (**LOW TEMP ALM**) on Side of Battery Compartment. Repeat Until Sensor is Frosty. Verify That **TEMP/SPL LOCK** Lamp at RT is Lighted. Have COT Verify **RT MN** Lamp is Lighted	–
14	Verify Battery Heater Panel Operation	DLP-505

TABLE A

BC FUSE	BATTERY VOLTAGE (ON KE9 CIRCUIT PACK)	ALARM INDICATORS LIGHTED	
		COT (KE12)	RT (KE15)
In	40 to 46 volts dc	–	–
Out	36 to 42 volts dc	**RT MN**	**AC**

ITEM	SUBTASKS	PROCEDURE NUMBER
	Danger: If electrolyte or battery top residue gets on or in: • ***Eyes–Wash eyes immediately and repeatedly with eye wash solution. Services of a hospital or physician are required as quickly as possible*** • ***Skin – Flush affected area immediately with water or eye wash solution. Seek medical help if required*** • ***Clothing or tools – Flush affected area immediately with water*** • ***Cabinet surfaces – Blot up using clean, damp wiping cloth. Dispose of cloth in nonmetallic waste container*** • ***Electronic apparatus – Replace***	
	Danger: Batteries are capable of generating high currents if a short is placed across its terminals (dropped wrench, for instance). Extreme care should be exercised when working with or near batteries	
15	Visually Inspect Battery Cells for Correct Electrolyte Level, Cracks or Leaks, Terminal Corrosion, and Worn or Broken Cable Ties	–
16	Fill Battery Cells Up to Upper Electrolyte Level Line Using Distilled or Approved Water	–
17	Soak and Clean Battery Vent Caps in a Bucket of Water	–
18	Clean Residue or Corrosion From Battery Cell Terminals, if Needed	DLP-506
19	Measure Voltage Across Each Pair of Battery Cells. Cell Voltage Must be at Least 2.4 Volts dc	DLP-507
20	Measure Voltage Across Entire Battery String. Battery String Voltage Must be at Least 36 Volts dc	DLP-508
21	Replace **BF** Fuse on RT Power Panel	–
22	Apply KS-19094-L2 Anti-Seize Compound to Each Door Hinge. If Anti-seize Compound is not Available, Apply Light Oil (3 in 1, for example) Followed by Automotive-Type Grease to Each Hinge	–
23	Work Cabinet Door Sections to Ensure Doors Work Freely	–
24	Remove All Test Equipment and Materials	–
25	Firmly Secure RT Cabinet Doors	–

ACCEPTANCE TASKS	PROCEDURE NUMBER
Accept Central Office Terminal	ATP-031
Accept Frame-Mounted Remote Terminal	ATP-032

ITEM	SUBTASKS	PROCEDURE NUMBER
1	Perform Overall Visual Inspection of Central Office Terminal	DLP-509
2	Check Central Office Terminal Fuse Panel and Office Alarms	DLP-510

ACCEPT SLC-40 CENTRAL OFFICE TERMINAL

ITEM	SUBTASKS	PROCEDURE NUMBER
1	Check Frame-Mounted Remote Terminal Wiring Options	DLP-583

COMPANY ORDER TASKS	PROCEDURE NUMBER
ENGINEERING WORK ORDERS	
Establish SLC*-40 Carrier System	COP-051
SERVICE ORDERS	
Perform Service Cutover Procedures	COP-052

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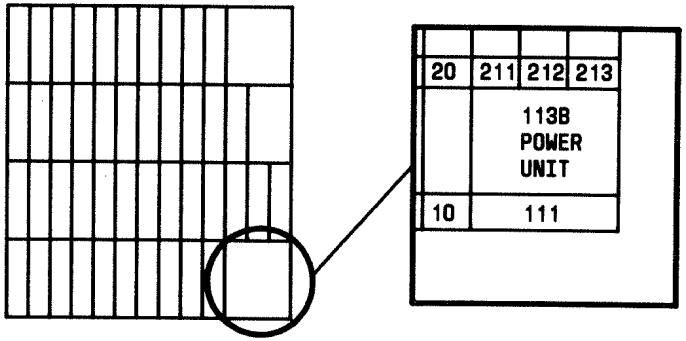
ITEM	SUBTASKS	PROCEDURE NUMBER
1	Obtain Support Apparatus Listed Below at Central Office Terminal: • 1–70-Type "Defective" Fuse (blown) • 1–KS-14510 Volt-Ohm-Milliammeter (VOM) or equivalent • 4–P3-Type Patch Cords with 310-Type Plugs (P3BH Cords are Recommended) • 1–1014B Hand Test Set • 5–310-Type Dummy Plugs	–
	CENTRAL OFFICE TERMINAL TURN-UP TESTS	
2	Unpack and Inspect Each Plug-in Unit to be Used	
3	With power switch in OFF position, Install 113B Power Unit into Slot 111 and Operate Power Switch to ON Position 	DLP-511
4	Measure Voltages on 113B Power Unit [TABLE A]	DLP-512

TABLE A

TEST POINTS		REQUIREMENT (Vdc)
FROM (+)	TO (–)	
BG	BN	45 to 53
+5	CG	4.5 to 5.5
CG	–8	7 to 9

ITEM	SUBTASKS	PROCEDURE NUMBER
5	If Using T1/Outstate or M1-Type Multiplexer Interface, Proceed to Item 9, Otherwise Continue With Item 6	
6	Install 70-Type Fuse for Powering Line Power Unit per TABLE B (Observe Color Code)	DLP-513
7	With Power Switch in OFF Position Install Line Power Unit That You Have Into Slot 411 Using A or B Below and Operate Power Switch to ON Position	–
	A. **114A** or **250**() Power Unit	DLP-514
	B. **209**() or **238**() Power Unit (Using 1 and 2 Below)	–
	1. Install Good 70F Fuse(s) for Powering ±130V Line Power Unit per TABLE C	DLP-515
	2. Install **209**() or **238**() Power Unit into Slot 411	DLP-516
8	Measure Voltages on Line Power Unit That You Have (Ignore meter fluctuations) Then Operate Power Switch to OFF Position	–
	A. **114A** or **250**() Power Unit (Test Points and Requirements are in TABLE D)	DLP-517

TABLE B

FOR SYSTEM POSITION	FUSE HOLDER DESIGNATION
1	F1C
2	F4C
3	F7C
4	F10C

TABLE C

FOR EQUIPPED SYSTEM POSITION	FUSE HOLDER DESIGNATION		
	209A OR 238A	209B OR 238B	209C OR 238C
1	F1A, F1B	F1A	F1B
2	F4A, F4B	F4A	F4B
3	F7A, F7B	F7A	F7B
4	F10A, F10B	F10A	F10B

ITEM	SUBTASKS	PROCEDURE NUMBER
8 (Contd)		

TABLE D

TEST POINTS FROM (+)	TEST POINTS TO (−)	114A REQUIREMENT (Vdc)	250() REQUIREMENT (Vdc)
BG	BN	45 to 53	45 to 53
LP	LG	100 to 160	120 to 150
LG	LN	0 to 60	120 to 150

B. **209**() or **238**() Power Unit (Test Points and Requirements are in TABLE E) — DLP-518

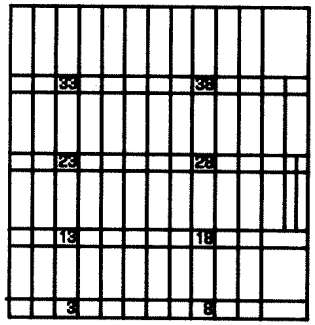
TABLE E

TEST POINTS FROM (+)	TEST POINTS TO (−)	REQUIREMENTS (Vdc) 209A/238A	209B/238B
BP	BN	240 to 280	165 to 195
LP	LG	120 to 140	120 to 140
LG	LN	120 to 140	42 to 53
		209C/238C	
BG	BN	120 to 140	
LP	LG	0	
LG	LN	120 to 140	

9 Install 70-Type Fuse per TABLE F (Observe Color Code) — DLP-519

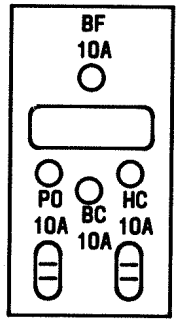
TABLE F

FOR SYSTEM POSITION	FUSE HOLDER DESIGNATION
1	F3C
2	F6C
3	F9C
4	F12C

ITEM	SUBTASKS	PROCEDURE NUMBER
10	Notify Central Office Personnel That Office Alarms Tests Are Being Conducted	–
11	Install and Test Central Office Maintenance (**CO MAINT**) Unit (**KE12**)	DLP-520
12	Install Central Office Line Interface (**CO LINE INT**) Unit that You Have Into Slot 312 NOTE: If **KE31A** is to be used, it must be equipped with 983-type equalizer as determined from TABLE G **TABLE G** **983-TYPE EQUALIZERS** Cable Length: 0-220' | 220'-440' | 440' – 660' Cable Loss: 0-1 dB | 1-2 dB | 2-3 dB Use Code: A | B | C Requirement: **SYS OUT**, **CLK/ERR**, **FR/MPX**, and **ACO** Lamps Lighted on **KE12**	DLP-521
13	Install Central Office Multiplex Units (**KE13** or **KE23**, **KF11** or **KF3**, and **KF2** or **KF4**) into Slots 211, 213, and 212 Respectively Requirement: **SYS OUT**, **CLK/ERR**, **FR/MPX**, and **ACO** Lamps Lighted on **KE12**	DLP-522
14	Check Central Office Alarms for Digital Line Switching	DLP-523
15	Plug Any **KE17B**, **KE27B**, or **KE47B** Channel Units (8 Total) into Channel Positions 3, 8, 13, 18, 23, 28, 33 and 38 	–

ITEM	SUBTASKS	PROCEDURE NUMBER
16	Prepare a Test Line (Temporary Subscriber Line Circuit and Call Number) per Local Procedures	–
17	At MDF, Temporarily Connect Test Line to Tip and Ring of Channel 18	–
18	At MDF, With **MON-TALK** Switch in **MON** Position, Connect **1014B** Handset Across Tip and Ring of Channel 18	–
19	Perform 8-Channel Loop-Around Test	DLP-524
20	Perform Central Office Terminal Final **SYS OUT** State Test	–
	A. For Systems Equipped With **KE21**	DLP-525
	B. For Systems Equipped With **KE31A**	DLP-526
21	Obtain Support Apparatus Listed Below For Use at Remote Terminal: • 1 – KS-14510 Volt-Ohm-Milliammeter (VOM) or Equivalent • 1 – 70-Type "Defective" Fuse (Blown) • 4 – 310-Type Dummy Plugs	–
	REMOTE TERMINAL TURN-UP TESTS	
22	If Remote Terminal is to be Frame-Mounted, go to Item 54. Otherwise Continue with Item 23	–
23	Obtain the Additional Support Apparatus Listed Below For Use in Installing Batteries • 1 – 117-Volt Extension Lamp and Cord (Bell System-Approved) • 1 – 9/16-Inch Taped (Insulated) Wrench • 1 – Container of Distilled Water or Approved Water (Container Must be Suitable for Pouring) •*1 – Pair of Rubber Gloves (Approved for Use in Handling Batteries) •*1 – Rubberized Fabric or Plastic Apron •*1 – Set of Splash-Type Eye Protectors (Goggles) •†1 – KS-21527 List 2 Eye Wash Rinse •†1 – Bucket of Clean Tap Water •†1 – Nonmetallic Waste Container • – Wiping Cloths (as Required)	–

ITEM	SUBTASKS	PROCEDURE NUMBER
	NOTE: The safety apparel designated by * should be worn at all times when working with the batteries. The items designated by † should be readily available when working with the batteries to minimize the consequences of any accident with the electrolyte. ***Danger: The battery electrolyte and top residue are highly corrosive to skin and clothing. The safety apparel (*) must be worn and the first aid items (†) must be on hand before starting work on the batteries. The batteries generate small quantities of hydrogen and oxygen which are normally vented from the cabinet. Smoking and open flames should be limited to areas well away from the cabinet.***	
24	Review Safety and First Aid Procedures	DLP-527
25	Prepare Commercial AC Power For Use at RT	DLP-528
26	Visually Inspect Each Cell For Excess Residue Buildup and Electrolyte Levels Requirement: Each Cell is Free of Excess Residue and Electrolyte Level is at Upper Colored Line on Cell Cases	DLP-529
27	Hand-tighten All Vent Caps on Cells	–
28	Measure Voltage Across Battery Cell Pairs Requirement: VOM Indicates at Least 2.4 Vdc For Each Pair of Cells	DLP-507
29	Install and Connect Batteries in RT Cabinet	DLP-530
30	Measure Total Battery Voltage of Each Shelf (5 Pairs of Cells) Requirement: 12 to 14 Vdc	DLP-531
31	Measure Total Battery Voltage Across Total Battery String Requirement: At Least 36 Vdc	DLP-508
32	Remove Antileak Shipping Devices From Gas Vents on Top of Each Cell NOTE: The Antileak Shipping Devices May be Either Plastic Covers Over Vent Caps or a Plastic Film Under Each Vent Cap ***Danger 1: Electrolyte may Spray From Cells When Antileak Shipping Devices Are Removed*** ***Danger 2: Cells may Burst Due to Gas Buildup if Antileak Shipping Devices Are Not Removed***	–

ITEM	SUBTASKS	PROCEDURE NUMBER
33	Leave Battery Compartment Door Open For at Least 15 Minutes After Removing Antileak Shipping Devices ***Danger: If Spare Cells Were Received, These Cells Must be Vented by Removing the Antileak Shipping Devices for 3 to 4 Hours Before Storing***	–
34	Install 10-Ampere Fuses (Three Total) in Positions **BC**, **BF**, and **HC** on RT Power Panel NOTE: Fuses Are Shipped in a Bag Attached to the RT Power Panel 	–
35	Set Power Switch on External Power Panel to **ON** Position Requirement: Fuses Installed in Item 34 do not Operate (blow)	–
36	Verify Battery Heater Panel Operation	DLP-505
37	Close and Secure Rear Compartment Door and Release Locking Mechanisms to Access Front Cabinet Apparatus Shelves	–
38	Verify All Fuses in **KU1** Circuit Pack Are in Place and Undamaged	–
39	Plug **KU1** Circuit Pack into Slot 011	–
40	Plug **KE9** Circuit Pack into Slot 012	–
41	Measure Voltage Between Test Jacks **BG**(+) and **BN**(–) on Faceplate of **KE9** Circuit Pack Requirement: 40 to 46 Vdc	DLP-532
42	With Power Switch in OFF Position Install **113B** Power Unit into Slot 111 at RT Then Operate Power Switch to ON Position Requirement: Fuses on **KU1** Circuit Pack do not Operate (blow)	DLP-533

ITEM	SUBTASKS	PROCEDURE NUMBER
43	Measure Voltages on **113B** Power Unit at RT Cabinet **TABLE H** TEST POINTS: FROM (+) / TO (–) — REQUIREMENT (Vdc) BG / BN — 40 to 46 +5 / CG — 4.5 to 5.5 CG / –8 — 7 to 9	DLP-534
44	Plug **KW1B** Circuit Pack into Slot 014, then Plug **KE10** Circuit Pack into Slot 013 Requirement: Fuses on **KU1** Circuit Pack do not Operate (blow)	DLP-535
45	If Work Order Specifies a **KE11**, Go to Item 49. Otherwise Continue With Item 46	–
46	Install **114A** or **250()** Power Unit into Slot 411 Requirement: No Fuses Operate	DLP-514
47	Measure Voltages on **114A** or **250()** Power Unit According to TABLE I **TABLE I** TEST POINTS: FROM (+) / TO (–) — 114A REQUIREMENT (Vdc) — 250() REQUIREMENT (Vdc) BG / BN — 40 to 46 — 40 to 46 LP / LG — 100 to 160 — 120 to 150 LG / LN — 0 to 60 — 120 to 150	DLP-536
48	Set Power Switch on **114A** or **250()** Power Unit to **OFF** position NOTE: The Power Unit Switch Should be Left in the **OFF** position Until Power is Required on Digital Line	–
49	If Work Order Specifies a **KE11** Circuit Pack, Plug the **KE11** Unit into Slot 411	–
50	Open Rear Compartment of Cabinet and Remove Fuse **BC** From RT Power Panel	–

ITEM	SUBTASKS	PROCEDURE NUMBER
51	Measure Voltages Between Test Jacks **BG**(+) and **BN**(–) on Faceplate of **KE9** Circuit Pack Requirement: At Least 33 Volts	DLP-537
52	Reinsert Fuse **BC** into RT Power Panel	–
53	Proceed to Item 75	
54	On RT Frame, Verify Appropriate ac Fuses are in Place, Circuit Breakers are **ON** and –48V Supply is **ON**	–
55	Measure –48V Supply Between Terminals **–48 RTN**(+) and **–48V**(–) on Connector Block **TB901** Requirement: Between 45 and 53 Volts dc	DLP-538
56	Verify RT Frame Assembly and Associated Power and Connecting Cables Have Been Properly Installed and Terminated	–
57	Unpack and Inspect Each Plug-in Circuit Pack, including Power Units, to be Used in the Remote Terminal According to the Work Order ***Warning: Avoid Touching any of the Components on the Circuit Packs***	–
58	If **KE34A** RT Line Interface Unit is to be Used, Equip it With a 983-Type Equalizer. The Proper Equalizer Type is Determined From TABLE J When the Dressed Cable Length is Known	–
59	Remove the Plastic Jack Protectors From Each Circuit Pack	–
60	Place, But do not Plug in, Each Circuit Pack in the Slot Where it Belongs	DLP-539
61	Locate Sector of Fuse, Filter, and Jack Panel Which Serves the System Being Installed	–
62	Insert 70C Fuses (six total) in Positions **TA**, **TB**, **HV**, **LV**, **SA**, and **SB** on **FF&J Panel** NOTE: The Fuses Are Shipped in a Bag Attached to the **FF&J Panel** Requirement: None of the Fuses Operate (Blow)	DLP-540

TABLE J

983-TYPE EQUALIZERS

CABLE LENGTH	0-220'	220'-440'	440'-660'
CABLE LOSS	0-1 dB	1-2 dB	2-3 dB
USE CODE	A	B	C

ITEM	SUBTASKS	PROCEDURE NUMBER
63	If One of the Two Systems of the RT Frame Assembly has Previously Been Installed and Tested, Proceed to Item 67; Otherwise, Continue With Item 64	–
64	Insert 70C Fuse in Position **RS** Located in **SYS 1** Sector of **FF&J Panel** Requirement: The Fuse Does Not Operate (Blow)	DLP-541
65	Plug **KW2** Circuit Pack into Slot 901 Requirement: The **RS** Fuse on **FF&J Panel** and the **+48 RNG** Fuse on **KW2** do not Operate (Blow)	DLP-542
66	Measure Voltage Between Test Jacks **+48 RNG** (+) and **CG**(–) on Faceplate of **KW2** Requirement: Between 43 and 55 Volts dc	DLP-543
67	With Power Switch in **OFF** Position, Plug **113B** Power Unit into 111 or 511 Depending on Which System is Being Installed, Then Set Power Switch to ON Position Requirement: Fuse **LV** on **FF&J Panel** Does Not Operate (Blow)	DLP-544
68	Measure Voltages on **113B** Power Unit According to TABLE K **TABLE K** **TEST POINTS** / **FROM (+)** / **TO (–)** / **REQUIREMENT (Vdc)** BG / BN / 45 to 53 +5 / CG / 4.5 to 5.5 CG / –8 / 7 to 9	DLP-512
69	If Work Order Specifies **KE11** Circuit Pack, Proceed to Item 73. Otherwise, Continue With Item 70	–
70	With Power Switch in **OFF** Position, Plug **114A** or **250**() Power Unit into Slot 411 or 811 Depending on Which System is Being Installed, Then Set Power Switch to **ON** Position Requirement: No Fuses Operate	DLP-514

<table>
<tr><th>ITEM</th><th>SUBTASKS</th><th>PROCEDURE NUMBER</th></tr>
<tr><td>71</td><td>Measure Voltages on 114A or 250() Power Unit According to TABLE L
NOTE: Disregard Minor Oscillation of Meter Reading
<table>
<tr><th colspan="3">TABLE L</th></tr>
<tr><th colspan="2">TEST POINTS</th><th rowspan="2">114A REQUIREMENTS (Vdc)</th><th rowspan="2">250() REQUIREMENTS (Vdc)</th></tr>
<tr><th>FROM (+)</th><th>TO (–)</th></tr>
<tr><td>BG</td><td>BN</td><td>45 to 53</td><td>45 to 53</td></tr>
<tr><td>LP</td><td>LG</td><td>100 to 160</td><td>120 to 150</td></tr>
<tr><td>LG</td><td>LN</td><td>0 to 60</td><td>120 to 150</td></tr>
</table></td><td>DLP-517</td></tr>
<tr><td>72</td><td>Set Power Switch on 114A or 250() Power Unit to OFF Position
NOTE: The Power Unit Switch Should be Left in the OFF Position Until Power is Required on Digital Line</td><td>–</td></tr>
<tr><td>73</td><td>If Work Order Specifies KE11 Circuit Pack, Plug the KE11 Unit into Slot 411 or 811 Depending on Which System is Being Installed</td><td>–</td></tr>
<tr><td>74</td><td>Insert 310-Type Dummy Plugs in MAIN SIDE 1 and MAIN SIDE 2 Jacks on FF&J Panel of System Under Test</td><td>–</td></tr>
<tr><td>75</td><td>With Power Switch on 113B in OFF Position, Plug KE15 Circuit Pack into Slot 311 (or Slot 711 for RT Frame Upper System) and Set Power Switch on 113B to ON position
Requirement: After 5 Seconds, Lamps on KE15 will be as Follows (Ignore all Others)
Lighted: SYS OUT, CLK/ERR, FR/MPX
Off: RNG, BAT, AC</td><td>DLP-545</td></tr>
<tr><td>76</td><td>In the Order Given, Plug the Following Circuit Packs into the Designated Slots () For System Under Test KE24 or KE34A (312 or 712), KE16 or KE26 (211 or 611), KF11 or KF3 (213 or 613) and KF2 or KF4 (212 or 612)
Requirement: Lamps on KE15 will be as Follows (Ignore all Others)
Lighted: SYS OUT, CLK/ERR, FR/MPX
Off: RNG, BAT, AC</td><td>DLP-546</td></tr>
<tr><td>77</td><td>Check Operation of SPL LOCK Key on KE15</td><td>DLP-547</td></tr>
<tr><td>78</td><td>If Installing Frame-Mounted RT, Proceed to Item 84. Otherwise, Continue With Item 79</td><td>–</td></tr>
<tr><td>79</td><td>If TEMP/SPL LOCK Lamp is Lighted, Verify Heater Panel is Warm to the Touch</td><td>DLP-505</td></tr>
</table>

ITEM	SUBTASKS	PROCEDURE NUMBER
80	If System Being Installed is to be Priority (odd-numbered) System of Shared Spare Line Configuration, Plug **KE20** into Slot 015	–
81	If System Being Installed is to be Non-Priority (even-numbered) System with J1C049AA Channel Bank at COT, Plug **KE30** Into Slot 015	–
	NOTE: If Shared Spare Digital Line Option is <u>not</u> Being Used or if COT is Equipped with J1C049AF Channel Bank, Slot 015 is Left Empty	
82	Remove Fuse **BC** From RT Power Panel Requirement: **AC** Lamp on **KE15** Lights	DLP-548
83	Proceed to Item 85	–
84	Remove Dummy Plugs From **MAIN SIDE 1** and **MAIN SIDE 2** Jacks at RT of System Under Test	–
	DIGITAL LINE POWERING TESTS	
	NOTE: Before Attempting Digital Line Powering Tests (Items 85 through 105), the Digital Line Preservice Tests of Section 363-201-215 Must Have Been Completed. If T1/OS or M1-Type Multiplexer Powers the Line, the T1/OS Tests Should be Completed Before Proceeding to Item 106	
85	Obtain Support Apparatus Listed Below: At Central Office Terminal (COT) • 1 – KS-14510 Volt-Ohm-Milliammeter (VOM) or equivalent At Remote Terminal (RT) • 1 – KS-14510 Volt-Ohm-Milliammeter (VOM) or equivalent	–
86	Dispatch Personnel to Remote Terminal (RT)	–
87	If Digital Line is to be Powered from <u>both</u> Central Office Terminal and Remote Terminal, go to Item 96. Otherwise, if Digital Line is to be Powered from Central Office Terminal Only, Continue with Item 88	
88	Prepare Central Office Terminal for Line Powering	DLP-549
89	Request RT Personnel to Prepare Remote Terminal for Line Powering (Line Power From COT only)	DLP-550
90	Remove all Patch Cords and Dummy Plugs from COT Jack Panel and Reinsert **KE21 Circuit Pack** in COT Channel Bank	–
91	Turn on Line **Power Unit** at COT	–

ITEM	SUBTASKS	PROCEDURE NUMBER
92	Perform Line Current Test on **KE21 Circuit Pack** per TABLE M NOTE: **I TEST** button must be depressed for valid reading	DLP-551
93	Measure and Record, for Future Reference, Line Voltage on **POWER UNIT** (**LP** and **LN** Test Jacks), (290 Vdc Maximum)	DLP-552
94	Request RT Personnel to Perform Line Current Test on **KE24 Circuit Pack** per TABLE N NOTE: **I TEST** button must be depressed for valid reading	DLP-553
95	Digital Line Powering Tests (Line Power From COT Only) are Complete. Go to Item 106	
96	Prepare Central Office Terminal for Line Powering	DLP-549
97	Request RT Personnel to Prepare Remote Terminal for Line Powering (Line Power From COT and RT)	DLP-554
98	Remove all Patch Cords and Dummy Plugs from COT Jack Panel and Reinsert **KE21 Circuit Pack** in COT Channel Bank	–
99	Turn On Line **Power Unit** at COT	–

TABLE M

TYPE OF LINE POWER UNIT AT COT	KE21 CIRCUIT PACK I TEST VOLTAGE
114A or 209-Type	1.3 to 1.5 Vdc
250 or 238-Type	0.5 to 0.7 Vdc

TABLE N

TYPE OF LINE POWER UNIT AT COT	KE24 CIRCUIT PACK I TEST VOLTAGE
114A or 209-Type	1.3 to 1.5 Vdc
250 or 238-Type	0.5 to 0.7 Vdc

ITEM	SUBTASKS	PROCEDURE NUMBER
100	Perform Line Current Test on **KE21 Circuit Pack** per TABLE O NOTE: **I TEST** button must be depressed for valid reading	DLP-551
101	Measure and Record, For Future Reference, Line Voltage on **Power Unit** (**LP** and **LN** Test Jacks), (290 Vdc Maximum)	DLP-552
102	Request RT Personnel to Reinsert **KE24 Circuit Pack** in RT Channel Bank	–
103	Request RT Personnel to Turn On RT Line **POWER UNIT**	–
104	Request RT Personnel to Perform Line Current Test on **KE24 Circuit Pack** per TABLE P NOTE: **I TEST** button must be depressed for valid reading	DLP-553
105	Request RT Personnel to Measure and Record, for Future Reference, Line Voltage on **POWER UNIT** (**LP** and **LN** Test Jacks), (290 Vdc Maximum)	DLP-555
	TERMINAL-TO-TERMINAL TESTS	
106	Perform System Framing Tests	DLP-556
107	If COT is Equipped With **KE31A**, Proceed to Item 109. Otherwise Continue With Item 108	–
108	Perform Preliminary System Major Functions Tests	DLP-557
109	Perform Receive Multiplex Tests	DLP-558
110	If System is Equipped With a Spare Line, Continue With Item 111; Otherwise Proceed to Item 112	–

TABLE O

TYPE OF LINE POWER UNIT AT COT	KE21 CIRCUIT PACK I TEST VOLTAGE
114A or 209-Type	1.3 to 1.5 Vdc
250 or 238-Type	0.5 to 0.7 Vdc

TABLE P

TYPE OF LINE POWER UNIT AT RT	KE24 CIRCUIT PACK I TEST VOLTAGE
114A-Type	1.3 to 1.5 Vdc
250-Type	0.5 to 0.7 Vdc

ITEM	SUBTASKS	PROCEDURE NUMBER
111	Check Spare Line Switching for Faulty Main Line	DLP-559
112	Perform System Major Functions Tests For Type of RT That You Have:	–
	A. Cabinet-Mounted Remote Terminal	DLP-560
	B. Frame-Mounted Remote Terminal	DLP-561
113	Perform System Minor Functions Tests For Type of RT That You Have:	–
	A. Cabinet-Mounted Remote Terminal	DLP-562
	B. Frame-Mounted Remote Terminal	DLP-563
114	Perform Manual Retry of Spare Line (If Equipped With Spare Line)	DLP-564
115	Perform Automatic Retry of Spare Line (If Equipped With Spare Line)	DLP-565
116	Perform Verification of Final **SYS OUT** state	DLP-566
	TERMINAL-TO-TERMINAL CHANNEL TESTS	
117	Obtain Support Apparatus Listed Below for Type of Service Being Equipped: Single Party – At RT: • 1 – 500-Type Telephone Set Party-Line (ONI) – At RT: • 1 – 500-Type Telephone Set • 1 – KS-14510 VOM or equivalent Two-Party (ANI) – At RT: • 2 – 500-Type Telephone Sets Coin – At COT: • 1 – KS-21838 Extractor Tool At RT: • 1 – KS-21838 Extractor Tool • Nickel, dime, and quarter in change	–

ITEM	SUBTASKS	PROCEDURE NUMBER
118	Perform Terminal-To-Terminal Channel Tests at Remote Terminal for Type of Service Being Equipped:	
	A. Single Party –	DLP-567
	B. Party-Line (ONI) – TABLE Q Shows VOM Test Points (on test telephone cord connecting block at RT) and VOM Voltage Requirements for RT Talk Battery and Ringing	DLP-568
	C. Two-Party (ANI) – TABLE R Shows Resistance-to-Ground Test Voltages (on Tip side of Line) Requirements Made at Central Office Test Desk or No. 3 Test Cabinet (Test Position)	DLP-569
	D. Coin-Dial Tone First (DFT) or Coin First (CF) Mode	DLP-570

TABLE Q

TEST	VOM TEST POINTS		VOM REQUIREMENTS	
	POSITIVE (+) TEST LEAD	NEGATIVE (-) TEST LEAD	FRAME-MOUNTED RT (Vdc)	CABINET-MOUNTED RT (Vdc)
Talk Bat.	Ground	Ring	45 to 53	30 to 60
Neg. Ringing on Rng Pty	Ground	Ring	42 to 53	25 to 80
Neg. Ringing on Tip Pty	Ground	Tip	42 to 53	25 to 80
*Pos. Ringing on Rng Pty	Ring	Ground	42 to 53	25 to 80
*Pos. Ringing on Tip Pty	Tip	Ground	42 to 53	25 to 80
* If CO is equipped				

TABLE R

PHONE OFF-HOOK AT RT	TEST VOLTAGE REQUIREMENTS
Ring Test Phone	Less Than 3 Vdc
Tip Test Phone	At Least 95 Vdc

ITEM	SUBTASKS	PROCEDURE NUMBER
1	Obtain Support Apparatus Listed Below: • 1 – 1013B Hand Test Set or Equivalent • 1 – Looping Cord	
2	Perform Service Cutover Procedures	DLP-571
	Caution: This method must not be used if excessive induction is present on the pairs. Induction is excessive if the ac voltage between the ring side and ground on a working but idle line (measured from the CO) exceeds 10 volts (72 dBrn Ng, 3-kHz FLAT as measured by a 3-type noise set). Where induction is excessive, cutover must be a coordinated transfer at each end of the system	

TROUBLE INDICATOR	MAY ALSO BE REPORTED AS	PROCEDURE NUMBER
Maintenance Philosophy		TAD-100
Automatic Devices		
Major Alarm Lamp Lighted and Blown Fuse(s) on **F&ALM PNL** at COT		TAP-101
Major Alarm Lamp Lighted and **SYS OUT** Alarm Lamp Lighted at COT		TAP-102
Major Alarm Lamp Lighted and **RT MJ** Alarm Lamp Lighted at COT		TAP-103
Major Alarm Lamp Lighted at COT		TAP-117
Minor Alarm Lamp Lighted and **RT MN** Alarm Lamp Lighted at COT		TAP-104
Minor Alarm Lamp Lighted and **SPL** Alarm Lamp Lighted at COT		TAP-105
Minor Alarm Lamp Lighted and **SPLT** Alarm Lamp Lighted at COT		TAP-106
Trouble Reports		
Trouble on One or More Channels		TAP-113

GENERAL

The SLC*-40 Submember Loop Carrier System is a digital subscriber carrier system providing 40 full-time speech channels, when fully equipped, between a central office terminal (COT) and a remote terminal (RT) using a T1-type digital line. In the SLC-40 system all carrier-derived channels are full-time channels (no concentration) and no traffic administration is required. Each channel corresponds to one line assignment, thereby easing administration and maintenance. The SLC-40 system is available in two basic configurations: cabinet-mounted RT or frame-mounted RT. The frame-mounted systems may also interface with T1/OS or M1-type multiplexers such as microwave radio.

TROUBLE ANALYSIS

Trouble procedures in this document involve replacing suspected plug-in units. Except for fuses, the plug-in unit is the smallest replaceable item considered in the trouble clearing procedures. Assumptions made in trouble clearing are:

(1) Only one trouble is addressed at a time
(2) Replacement units are in good working condition
(3) Test equipment is in good working condition
(4) Latest generation of circuit packs are used (TABLE A, Page 2 gives cross-reference of old to new circuit packs)

TROUBLE-LOCATING PROCEDURES

Trouble on a SLC-40 system will be indicated by major and minor alarms at the central office terminal (COT) or by subscriber reports. The trouble will be one of two categories: system troubles or per-line troubles. System troubles affect several channels or the entire system and always cause an alarm. Per-line troubles affect one or more channels, do not cause an alarm, and are detected by subscriber reports.

A major alarm indicates that subscribers on the system are out of service. A minor alarm indicates that future interruption of service is possible. Major (red) and minor (white) alarm lamps are located on the SLC-40 bay fuse and alarm panel. System status alarms are located on maintenance units KE12 at the COT and KE15 at the RT. The alarm lamps listed on the Trouble Indicator List (TIL-095) are ranked according to priority. Therefore, if more than one alarm lamp is lighted on KE12, follow the procedures for the first lighted lamp listed on TIL-095.

CONCLUSION

Whenever the procedures of this volume do not locate the trouble, an obscure trouble or multiple trouble is assumed to exist. The necessary SDs, CDs, etc, should be available to assist in locating an obscure wiring problem when the procedures of this volume do not locate the trouble.

* Trademark of Western Electric

TABLE A

LISTS OF SUPERSEDED CODES AND REPLACING NEW CODES

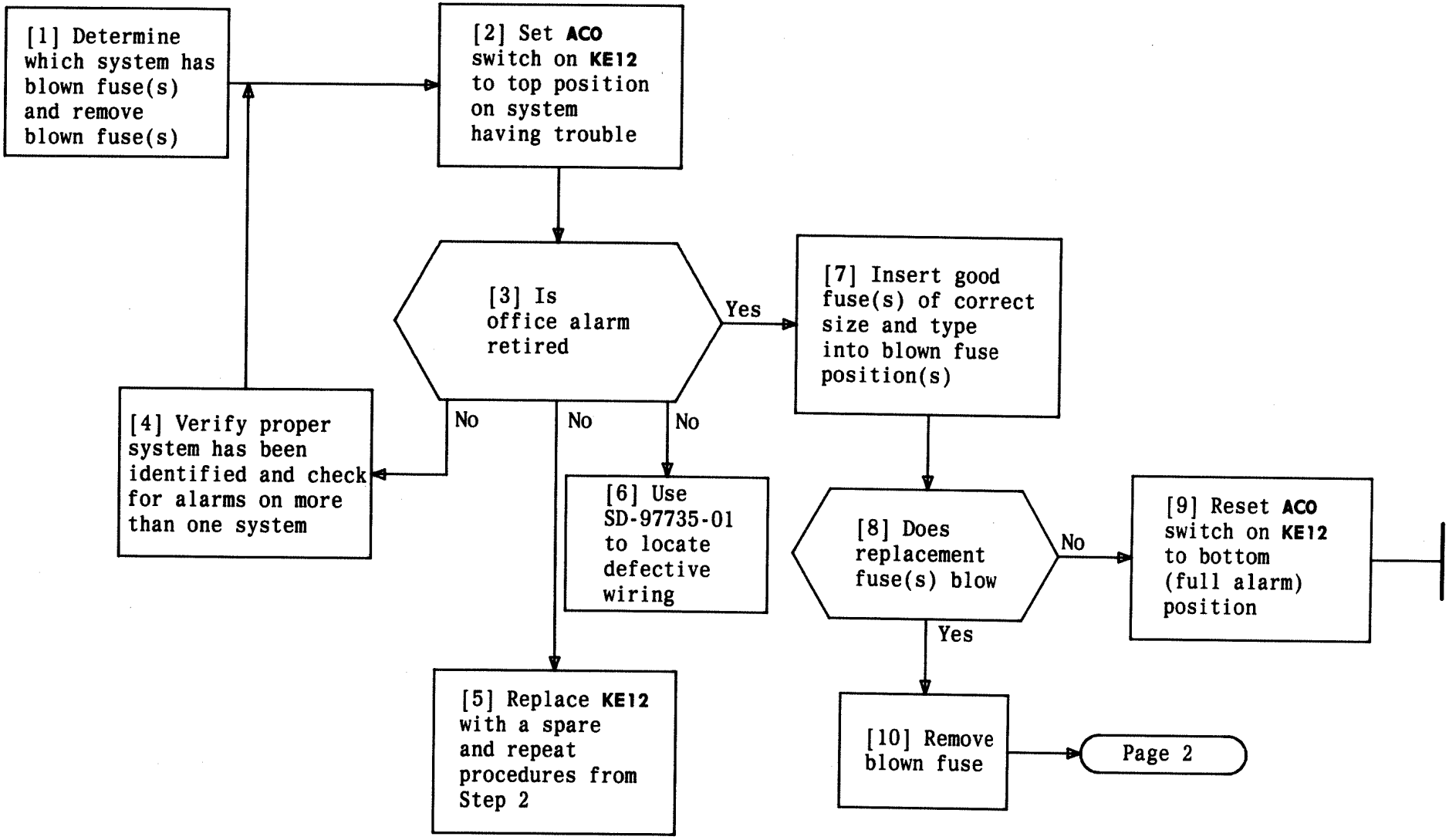
CENTRAL OFFICE TERMINAL	
OLD CODE	NEW CODE
J1C049AA	J1C049AF*
J1C049AB	J1C049AD*
J1C049AC	J1C049AE*
KE1	KE21*
KE2	KE12*
KE3	KE13*
KF1	KF11*
113A	113B
KE7,KE17	KE17B
KE27	KE27B
KE47	KE47B

REMOTE TERMINAL FRAME	
OLD CODES	NEW CODE
KE5	KE15
KE6	KE16
KF1	KF11
KE4	KE24¶
113A	113B
KE18	KE18B
KE28	KE28B
KE48	KE48B

REMOTE TERMINAL CABINET	
OLD CODES	NEW CODE
33A,33B	33C
KE4	KE24†
KE5	KE15
KE6	KE16
KF1	KF11
113A	113B
KW1	KW1B
LE1‡	LE2‡
KE8,KE18	KE18B
KE28	KE28B
KE48	KE48B

T1/OUTSTATE OR M1-TYPE MULTIPLEXER INTERFACE		
NEW CODE	USED INSTEAD OF	USED AT
KE31A	KE21	COT
KE34A	KE24	RT
KE23	KE13	COT
KE26	KE16	RT
KF3	KF11	COT and RT
KF4	KF2	COT and RT

* New code always a substitute for the old code, but old code may not necessarily be a substitute for new code.
† Required for low power digital lines.
‡ Required only with 33A cabinet.
§ The KE8 circuit pack has been excluded from RT frame.
¶ Required for low power digital lines.



REPAIR MAJOR ALARM CAUSED BY BLOWN FUSE

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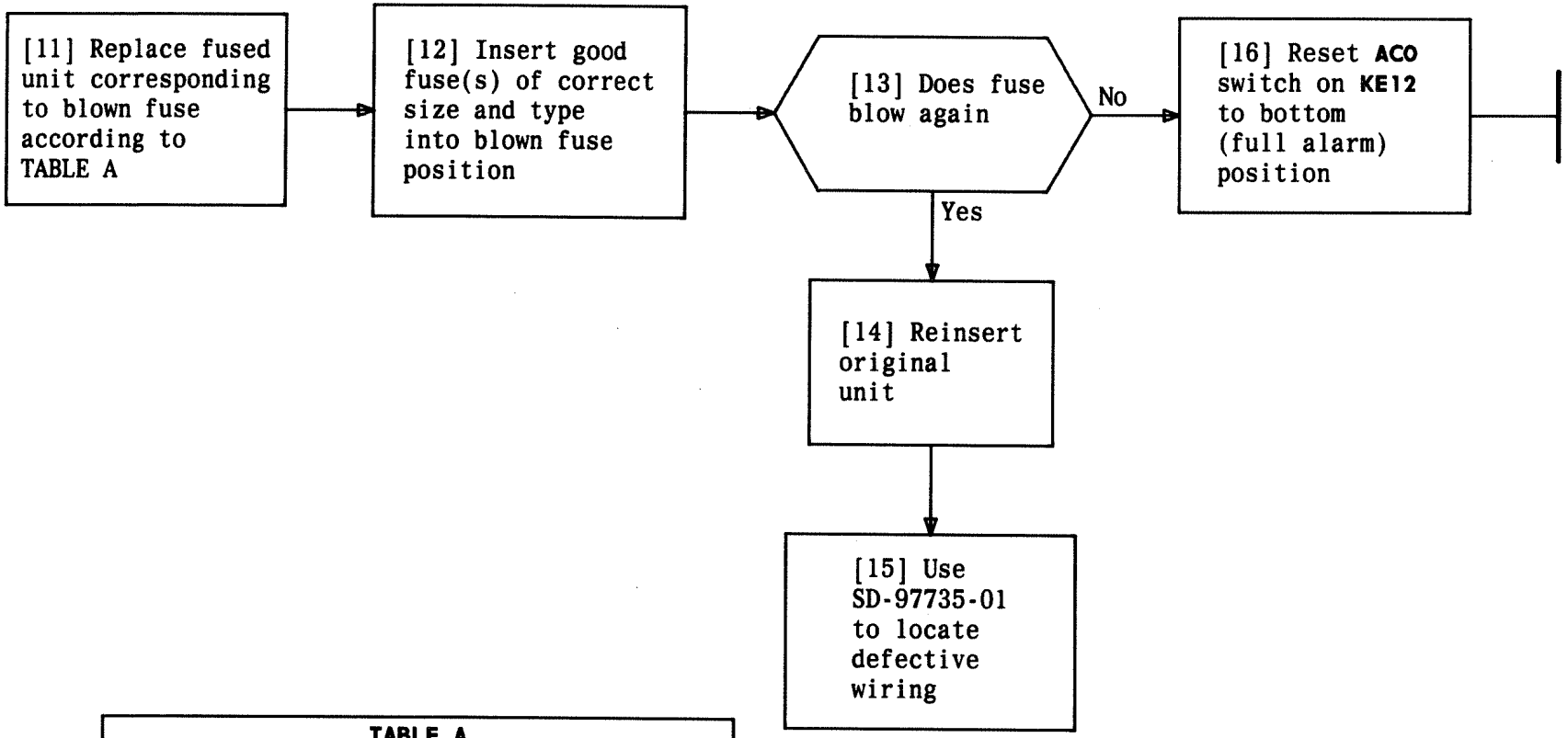
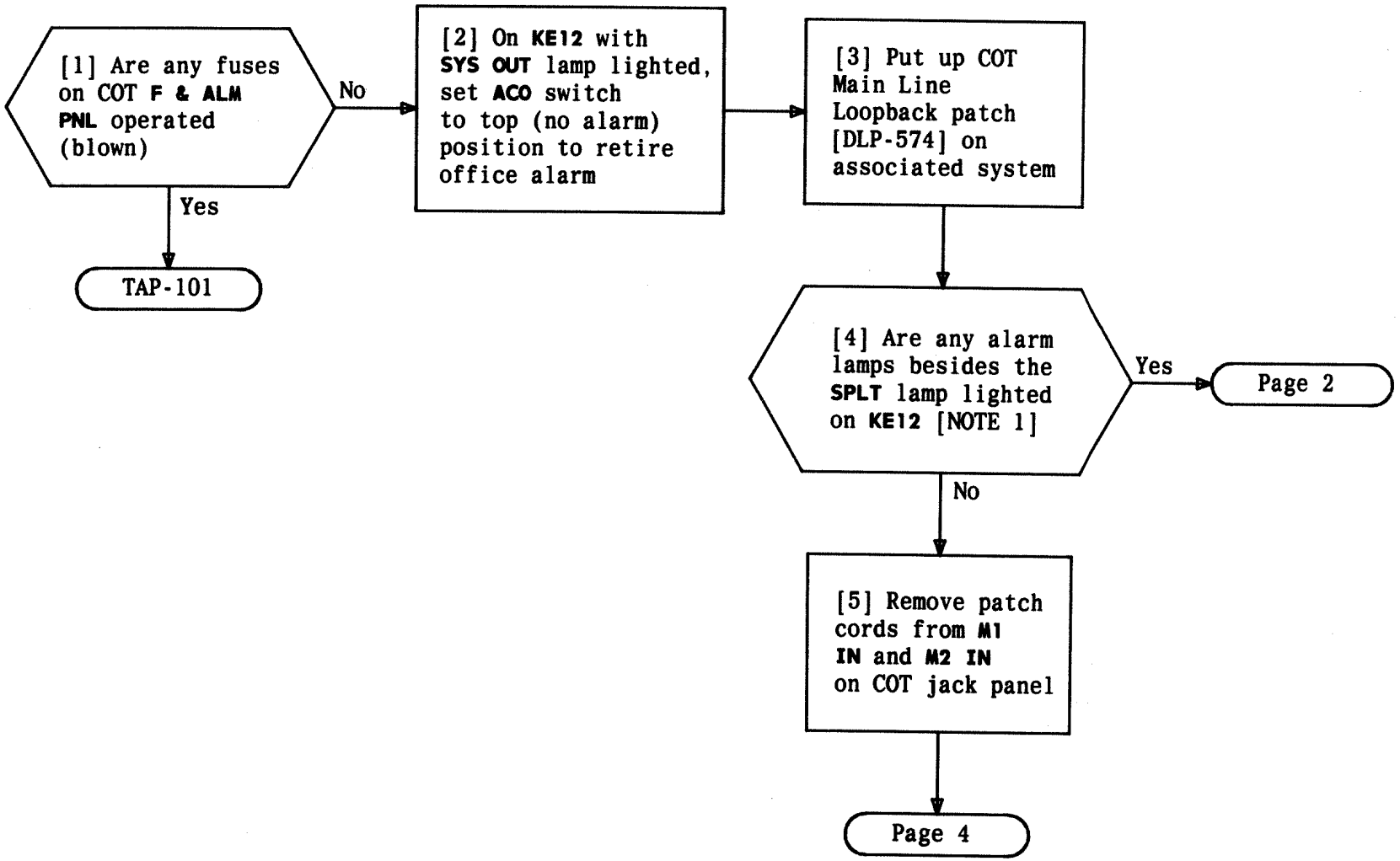


TABLE A

BLOWN FUSE(S)	CORRESPONDING UNITS
F1C, F4C, F7C, F10C	114A, 209B, 238B, 250A
F2C, F5C, F8C, F11C	113B
F3C, F6C, F9C, F12C	KE12, KE21 or KE31A
F1A, F4A, F7A, F10A	209A, 209B, 238A, 238B
F1B, F4B, F7B, F10B	209A, 209C, 238A, 238C

REPAIR MAJOR ALARM CAUSED BY BLOWN FUSE



NOTE 1

Four minutes may be required for SPL lamp to extinguish, if lighted

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CLEAR SYS OUT ALARM

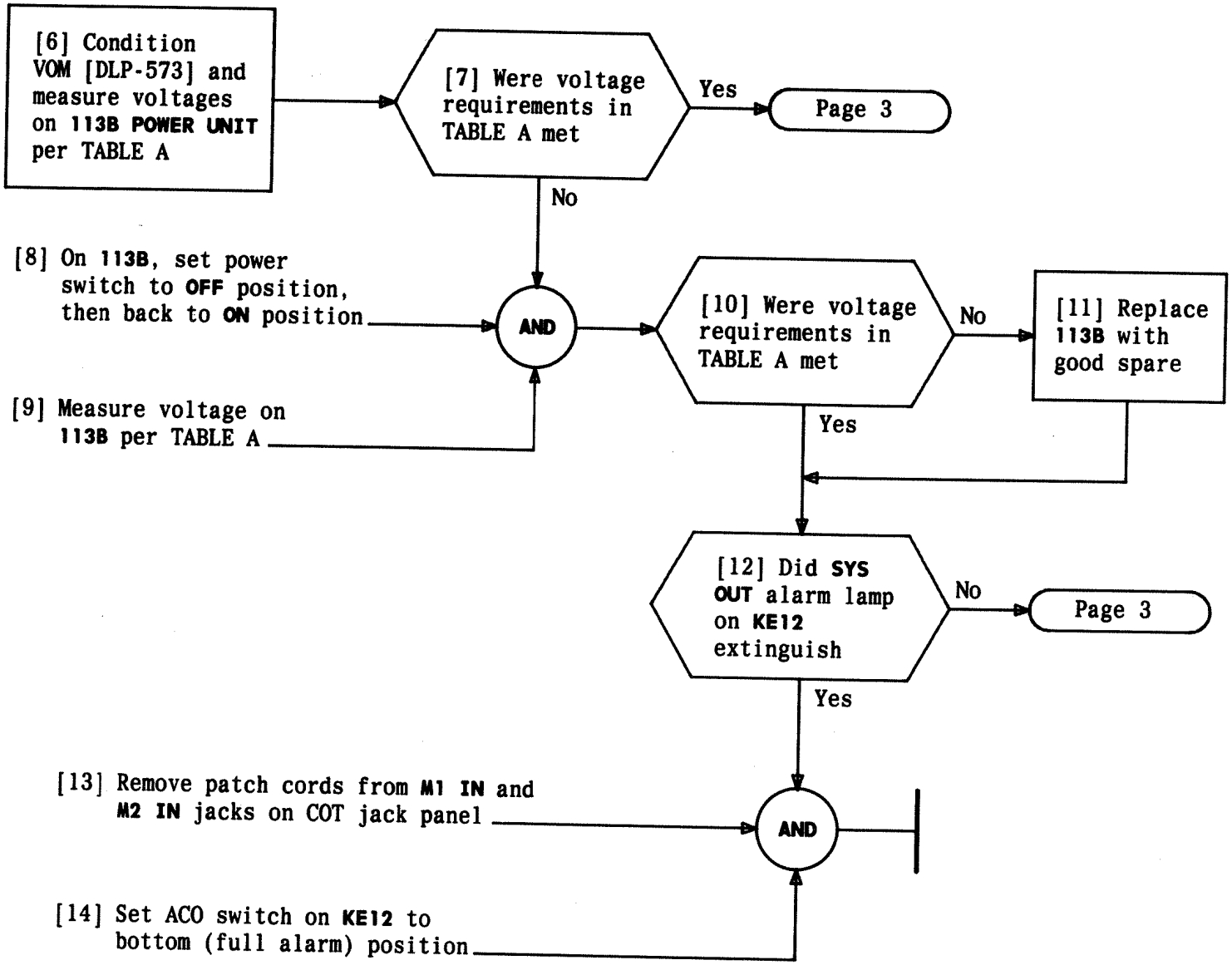
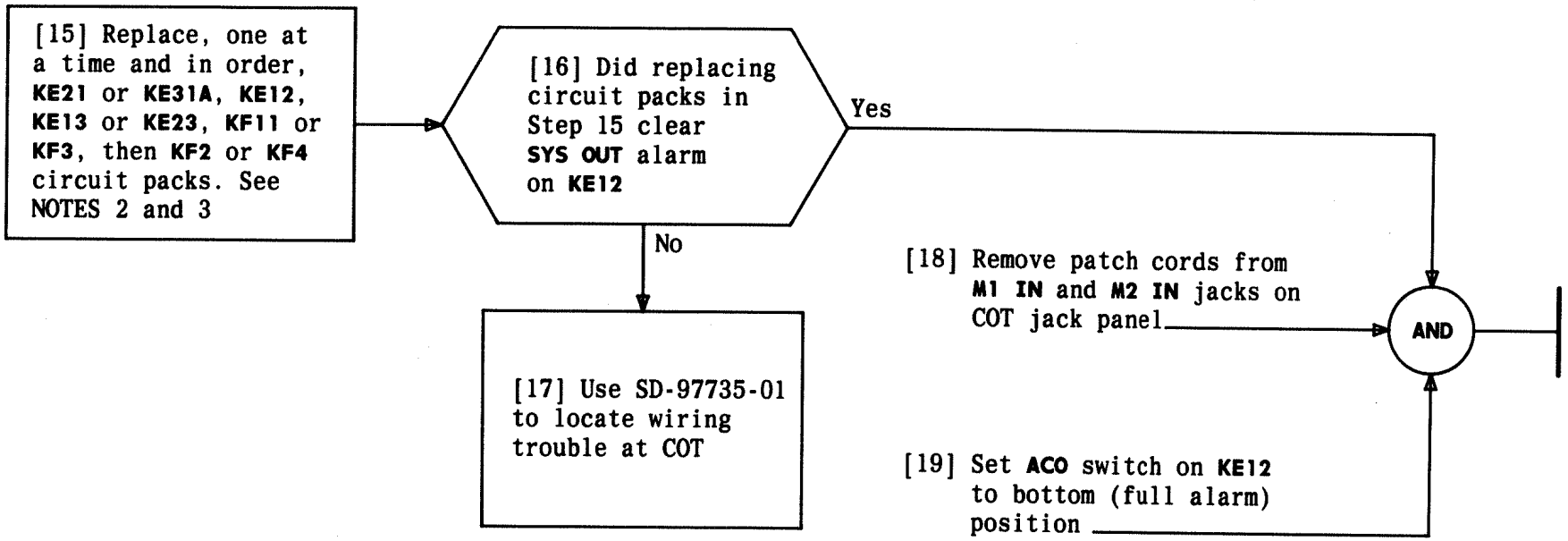


TABLE A
113B TEST REQUIREMENTS

TEST POINTS		REQUIREMENTS (VOLTS DC)
+ FROM	– TO	
BG	BN	45 to 53
+5	CG	4.5 to 5.5
CG	–8	7 to 9

CLEAR SYS OUT ALARM



NOTES

2. When trouble is cleared, the old circuit packs should be replaced, one at a time, until the defective circuit pack(s) are identified and replaced
3. Correct 983() equalizer should be installed on replacement **KE31A CIRCUIT PACK**

CLEAR SYS OUT ALARM

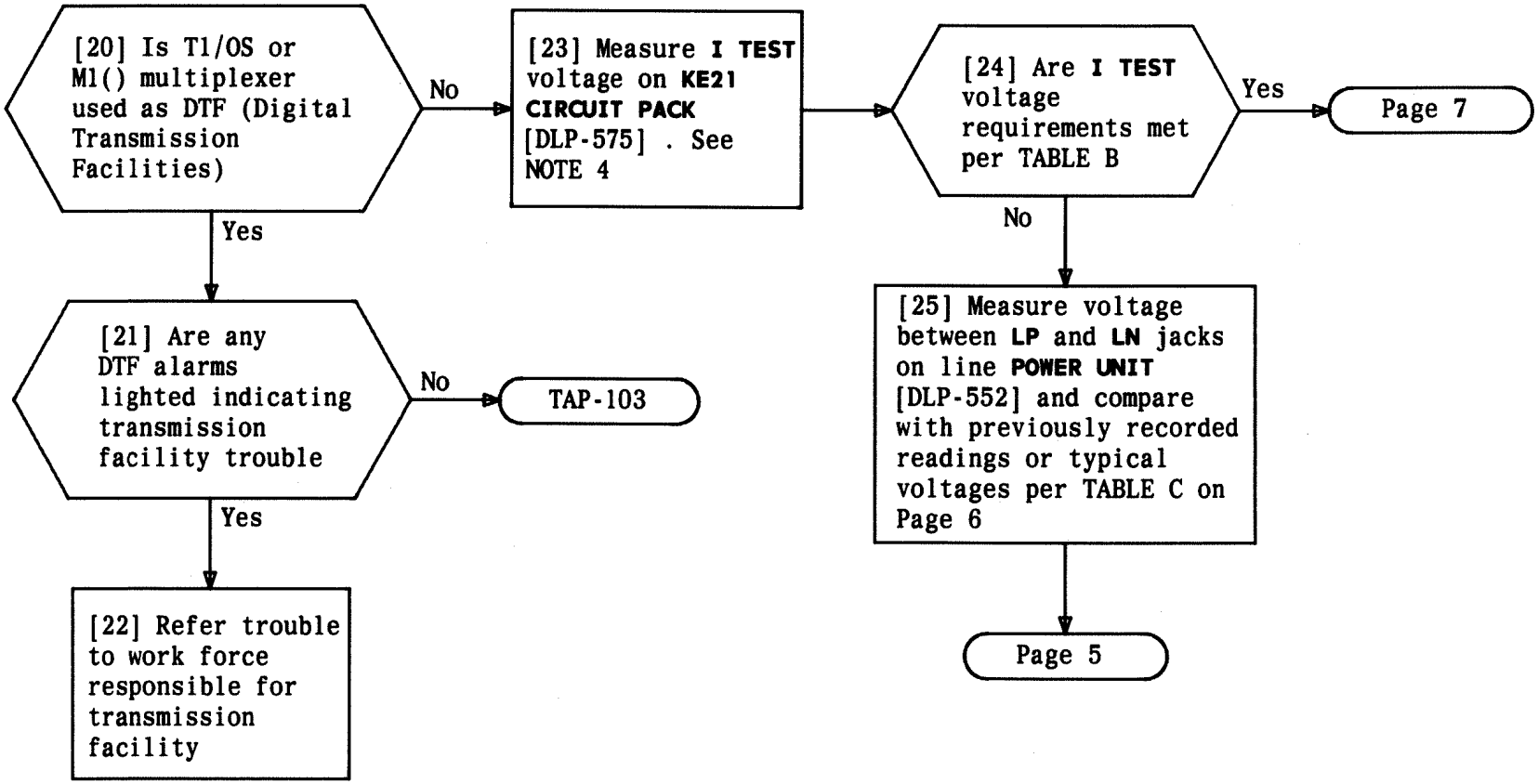
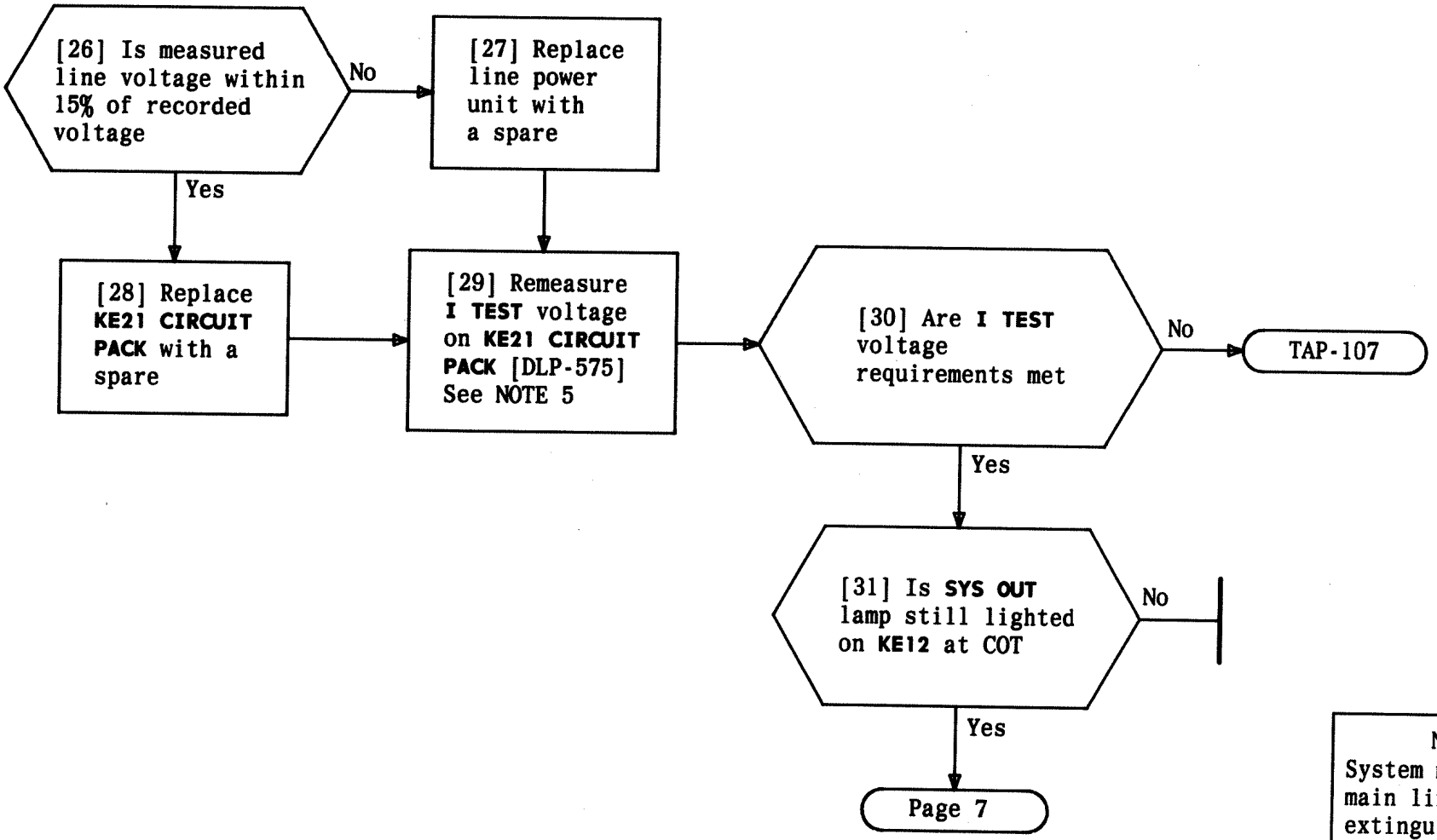


TABLE B	
TYPE OF LINE POWER UNIT AT COT	KE21 CIRCUIT PACK I TEST VOLTAGE
114A or 209-Type	1.3 to 1.5 Vdc
250 or 238-Type	0.5 to 0.7 Vdc

NOTE 4
System must be on main line (**SPL** lamp extinguished) before **I TEST** current can be measured. A 10-minute settling time may be required to ensure that both COT and RT are on the main line

CLEAR SYS OUT ALARM



NOTE 5
System must be on main line (SPL lamp extinguished) before I Test current can be measured. A 10-minute settling time may be required to ensure that both COT and RT are on the main line

CLEAR SYS OUT ALARM

TABLE C		
NUMBER OF LINE REPEATERS POWERED FROM COT	TEST POINTS LP (+) TO LN (–), VOLTS DC TYPICAL VALUES ONLY, NOT REQUIREMENTS*	
	STANDARD POWER REPEATERS 114A OR 209() POWER UNIT	LOW POWER REPEATERS 250() OR 238() POWER UNIT
2	–	30
3	70	45
4	95	60
5	120	75
6	145	90
7	170	105
8	195	120
9	220	135
10	245	150
11	270	165
12	–	175
13	–	190
14	–	205
15	–	220
16	–	235
17	–	250

* The actual meter indications may vary significantly from the typical values depending on the specific digital line makeup; however, in no case should any voltage exceed 290 Vdc

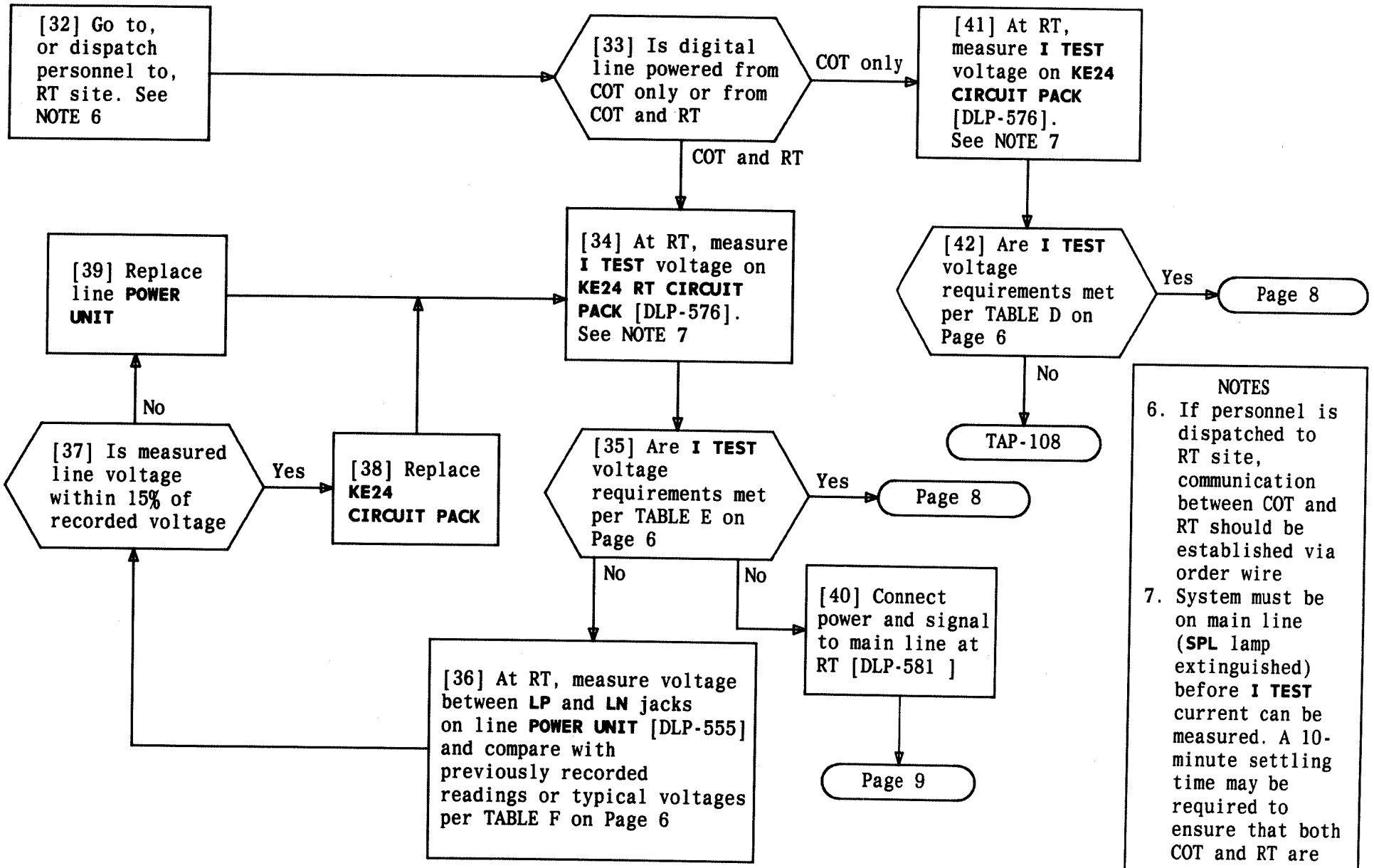
TABLE D	
TYPE OF LINE POWER UNIT AT COT	KE24 CIRCUIT PACK I TEST VOLTAGE
114A or 209 type	1.3 to 1.5 Vdc
250 or 238 type	0.5 to 0.7 Vdc

TABLE E	
TYPE OF LINE POWER UNIT AT RT	KE24 CIRCUIT PACK I TEST VOLTAGE
114A Type	1.3 to 1.5 Vdc
250() Type	0.5 to 0.7 Vdc

TABLE F		
NUMBER OF LINE REPEATERS POWERED FROM RT	TEST POINTS LP (+) TO LN (–), VOLTS DC TYPICAL VALUES ONLY, NOT REQUIREMENTS*	
	STANDARD POWER REPEATERS 114A POWER UNIT	LOW POWER REPEATERS 250() POWER UNIT
1	–	20
2	–	35
3	70	50
4	95	65
5	120	80
6	145	95
7	170	110
8	195	125
9	220	140
10	245	155
11	270	170
12	–	180
13	–	195
14	–	210
15	–	225
16	–	240
17	–	255

* The actual meter indications may vary significantly from the typical values depending on the specific digital line makeup; however, in no case should any voltage exceed 290 Vdc

CLEAR SYS OUT ALARM



NOTES

6. If personnel is dispatched to RT site, communication between COT and RT should be established via order wire
7. System must be on main line (SPL lamp extinguished) before I TEST current can be measured. A 10-minute settling time may be required to ensure that both COT and RT are on the main line

CLEAR SYS OUT ALARM

[43] See DANGER 1. At RT, perform Bridged Pulse Test [DLP-577] on **MAIN SIDE 1**. Connect patch cord as shown in FIG. 1

[44] Are pulses present on **MAIN SIDE 1** of line

No → Page 10

Yes

[45] See DANGER 1. At RT, perform Bridged Error Test [DLP-577] on **MAIN SIDE 2**. Connect patch cord as shown in FIG. 2

[46] Are pulses present on **MAIN SIDE 2** of line

No → [47] Remove patch cord from RT jack panel → TAP-103

Yes → [48] Remove patch cord from RT jack panel → Page 11

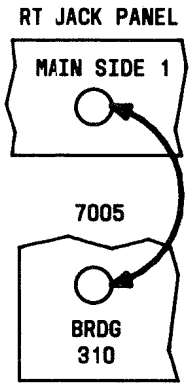


FIG. 1

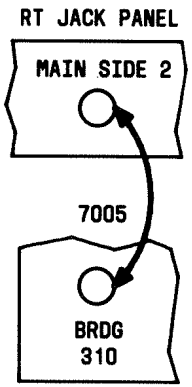
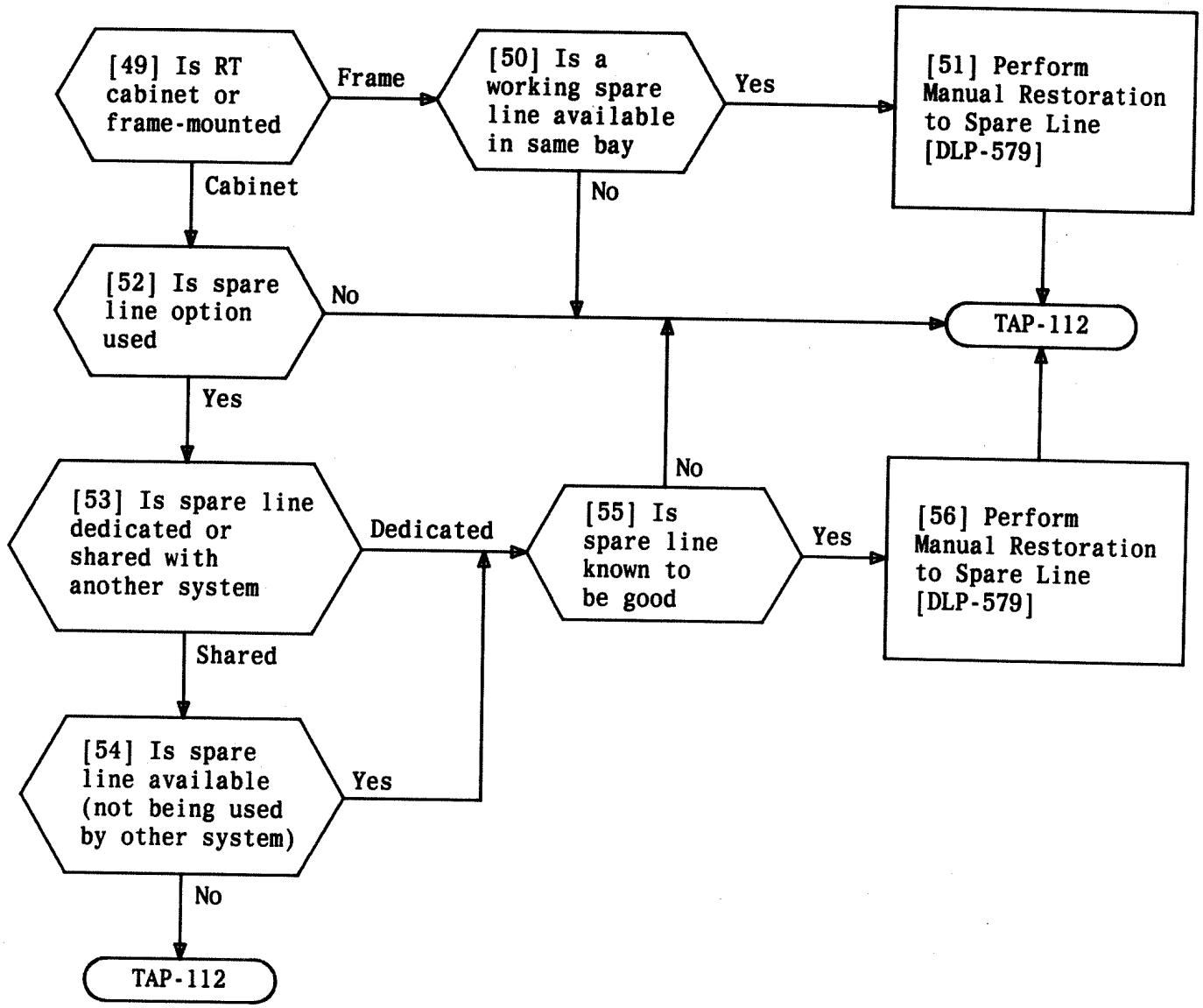


FIG. 2

DANGER 1
Voltages to 300 volts exist on the RT test jacks appearances. Patch cords should be connected to RT test jacks last

CLEAR SYS OUT ALARM



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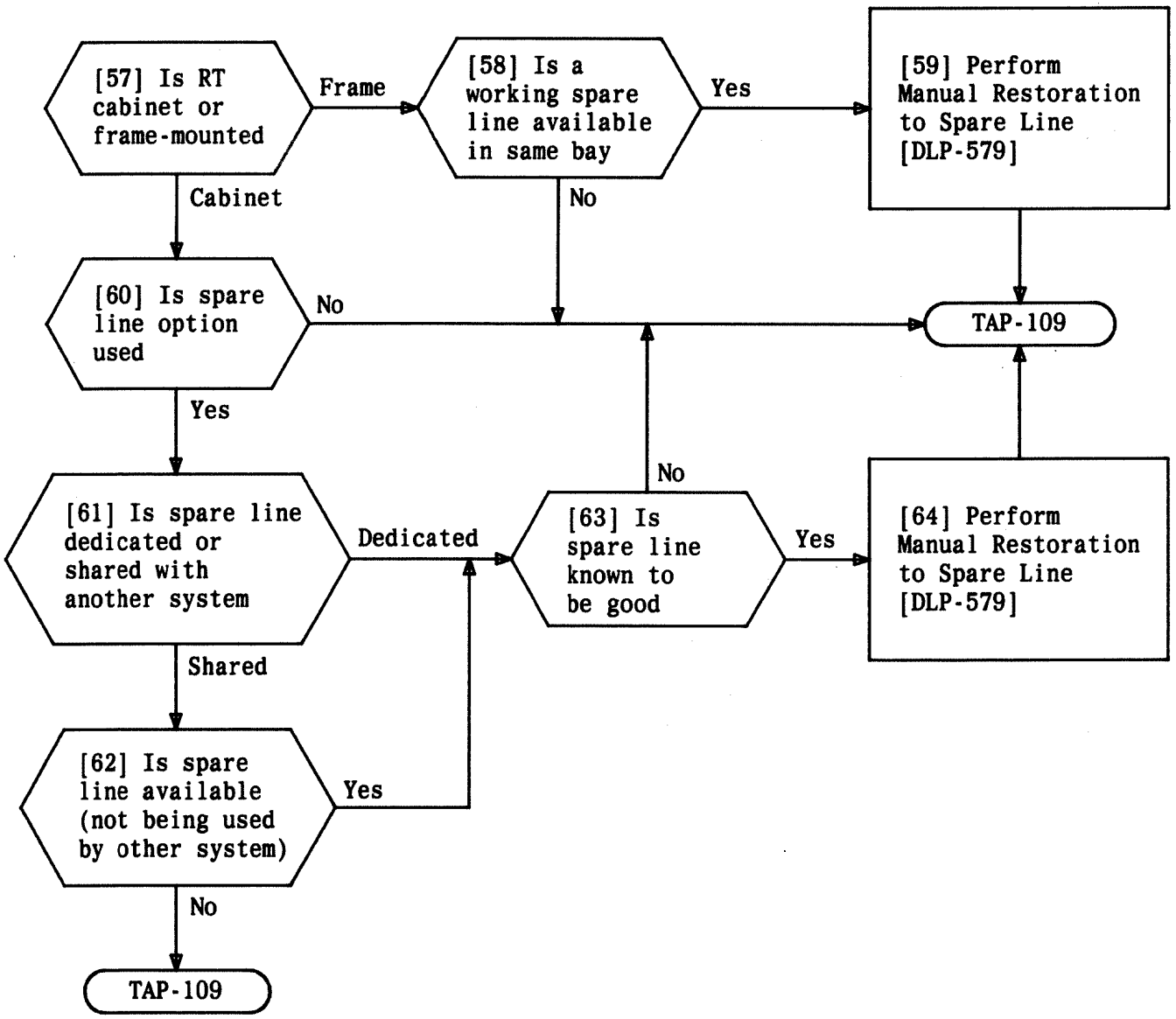

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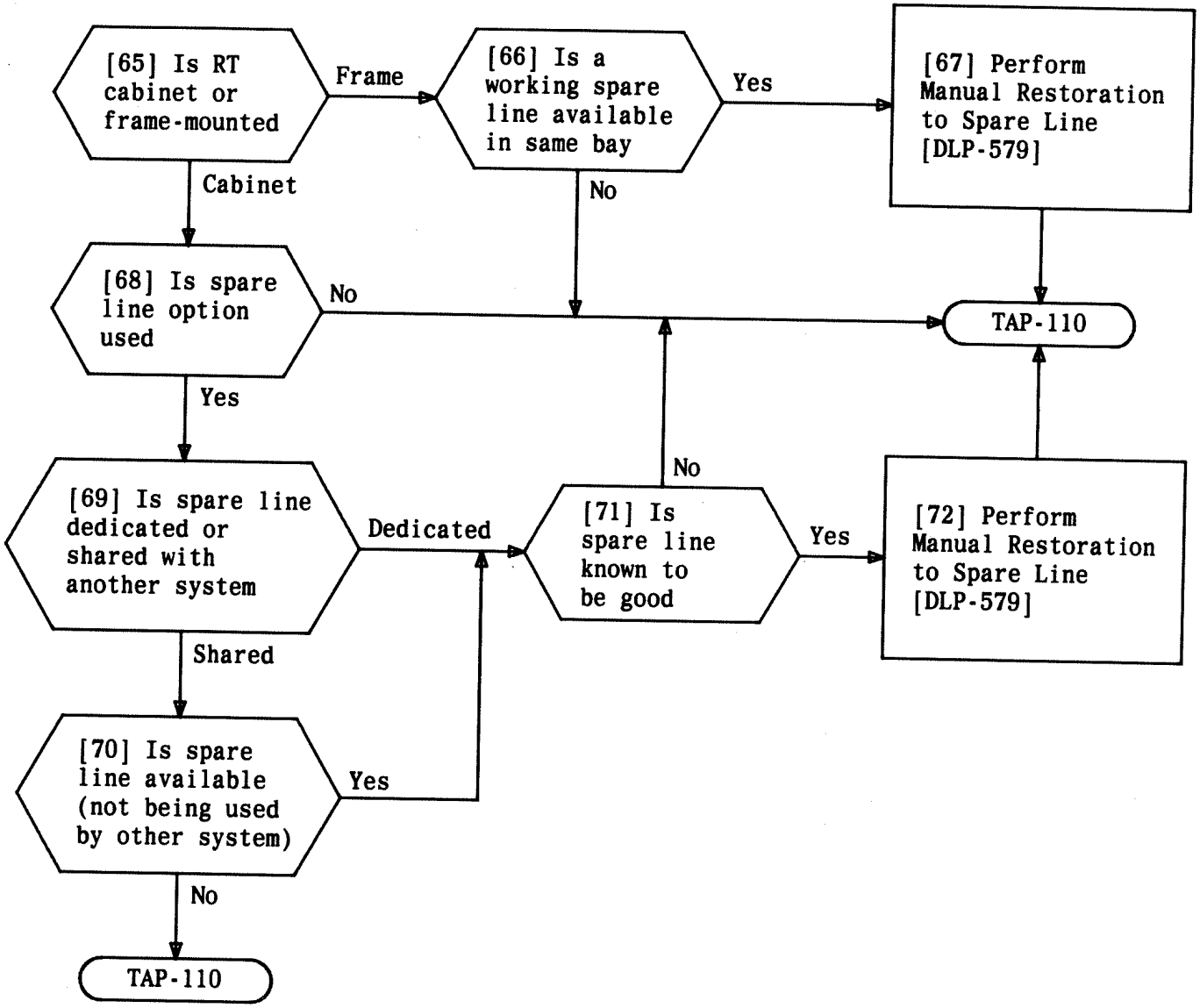
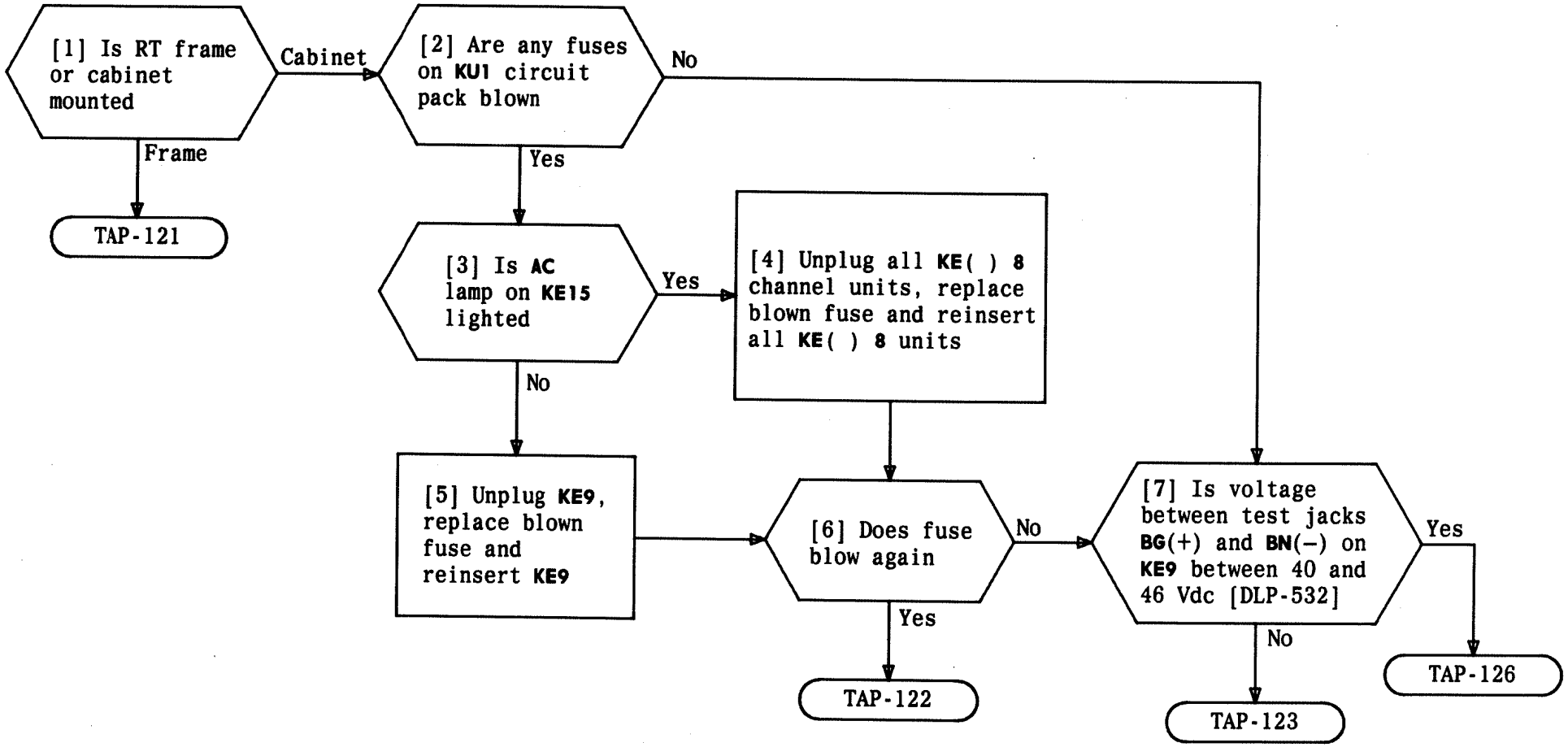


CLEAR SYS OUT ALARM



CLEAR REMOTE TERMINAL MAJOR ALARM

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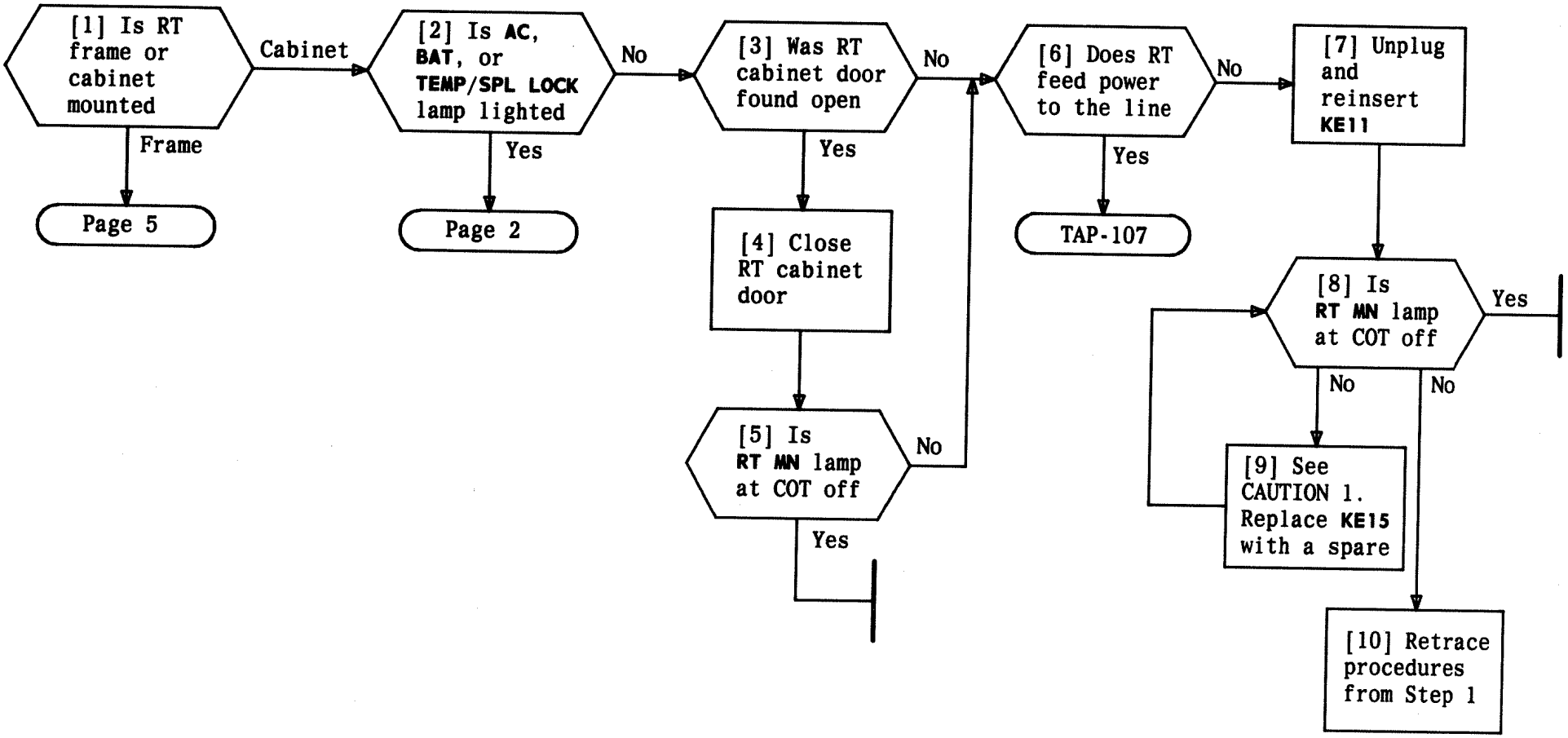

CAUTION 1

Changing this unit will temporarily put the system out of service

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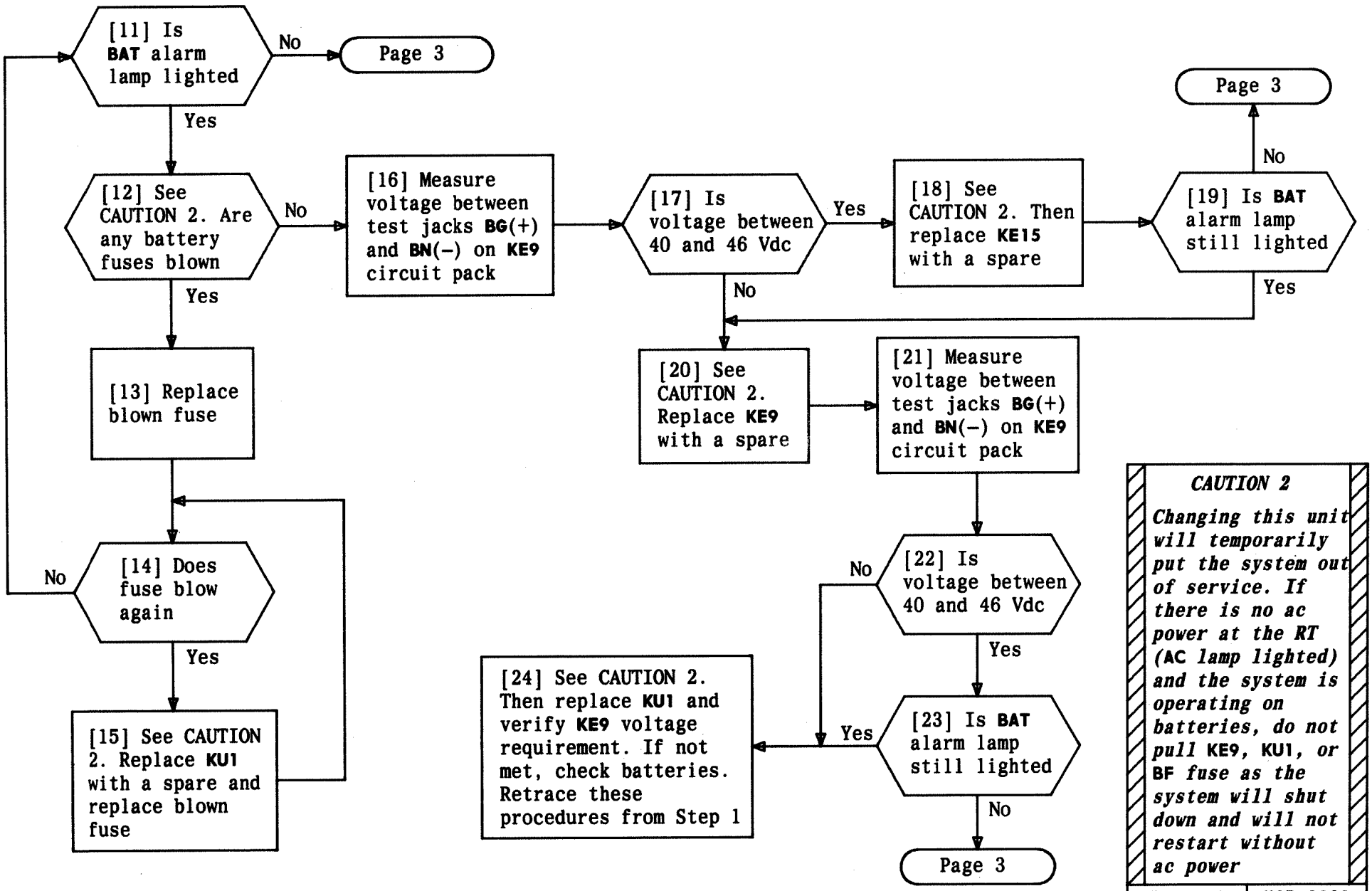
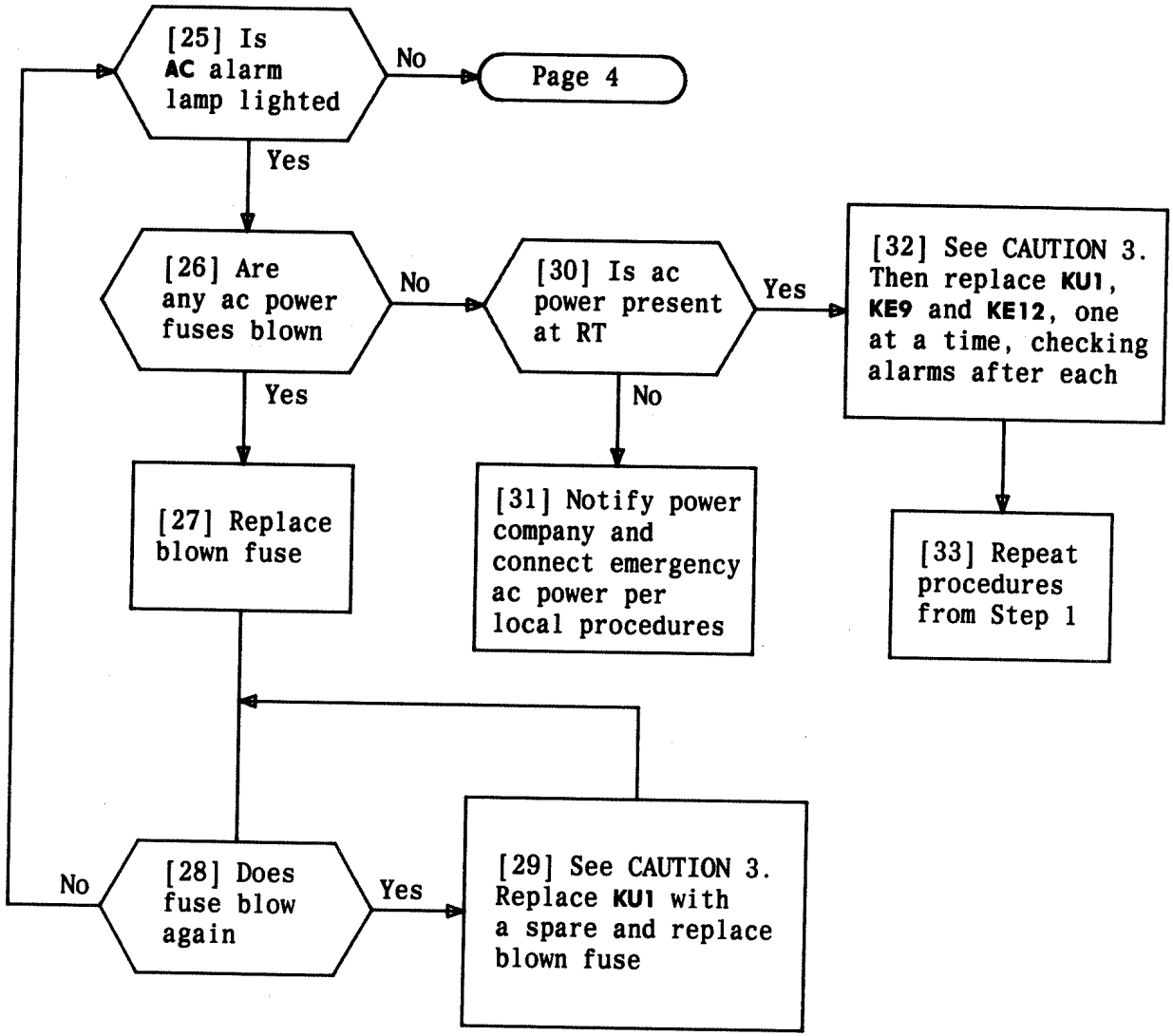
CLEAR REMOTE TERMINAL MINOR ALARM



CAUTION 2

Changing this unit will temporarily put the system out of service. If there is no ac power at the RT (AC lamp lighted) and the system is operating on batteries, do not pull KE9, KU1, or BF fuse as the system will shut down and will not restart without ac power

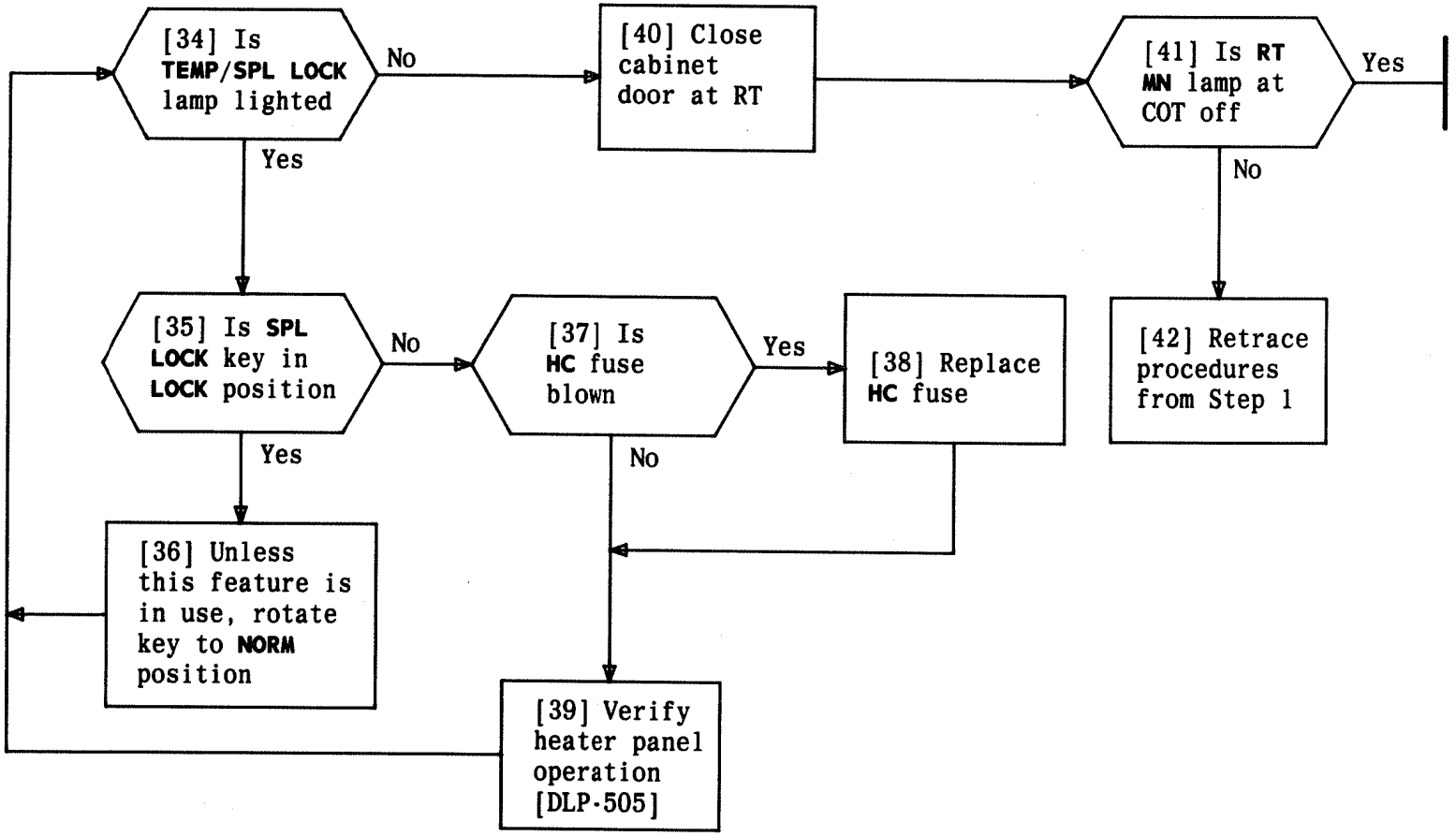
CLEAR REMOTE TERMINAL MINOR ALARM



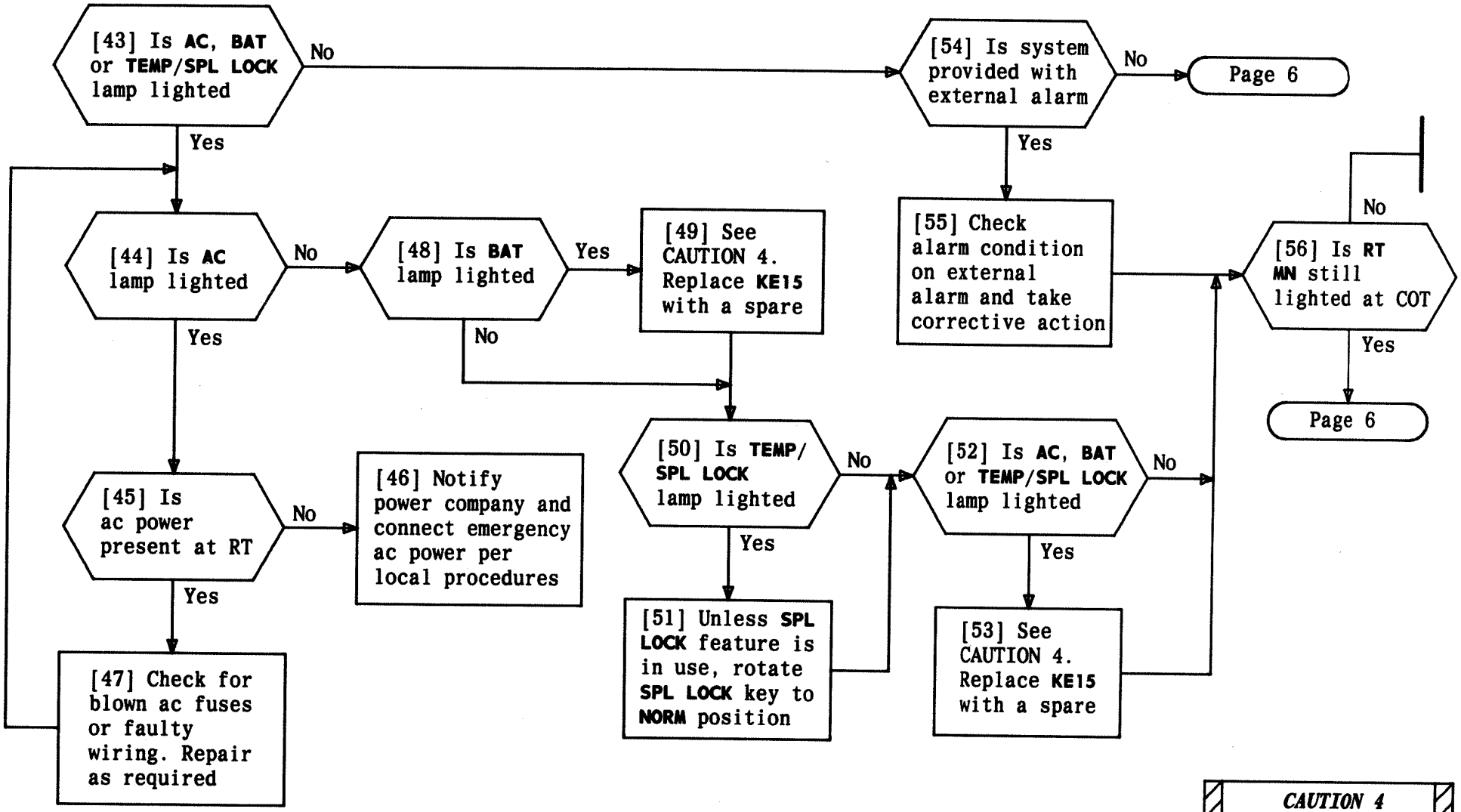
CLEAR REMOTE TERMINAL MINOR ALARM

CAUTION 3

Changing this unit will temporarily put the system out of service. If there is no ac power at the RT (AC lamp lighted) and the system is operating on batteries, do not pull KE9, KU1, or BF fuse as the system will shut down and will not restart without ac power



CLEAR REMOTE TERMINAL MINOR ALARM



CAUTION 4

Changing this unit will temporarily put the system out of service

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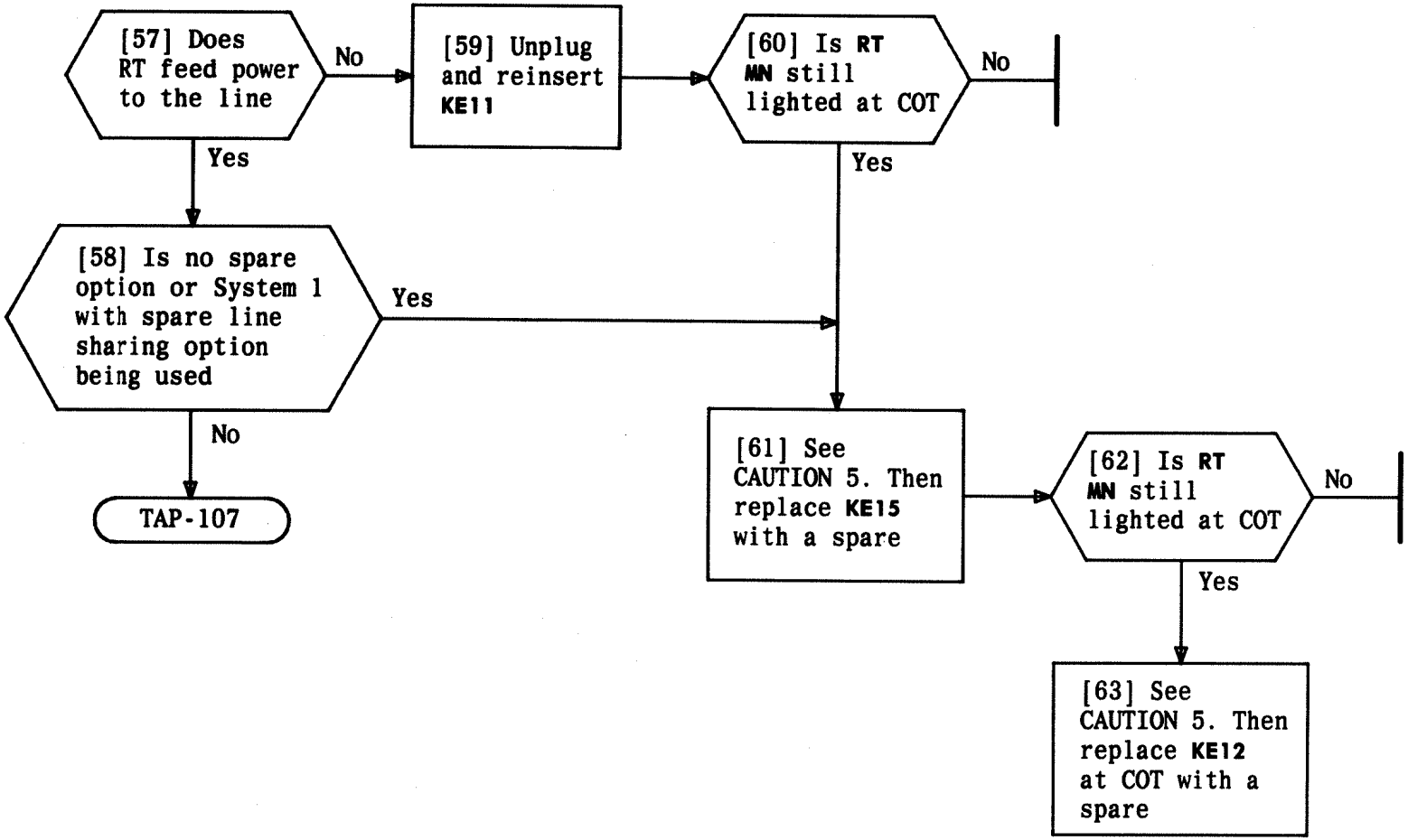
CLEAR REMOTE TERMINAL MINOR ALARM



CAUTION 5
Changing this unit will temporarily put the system out of service

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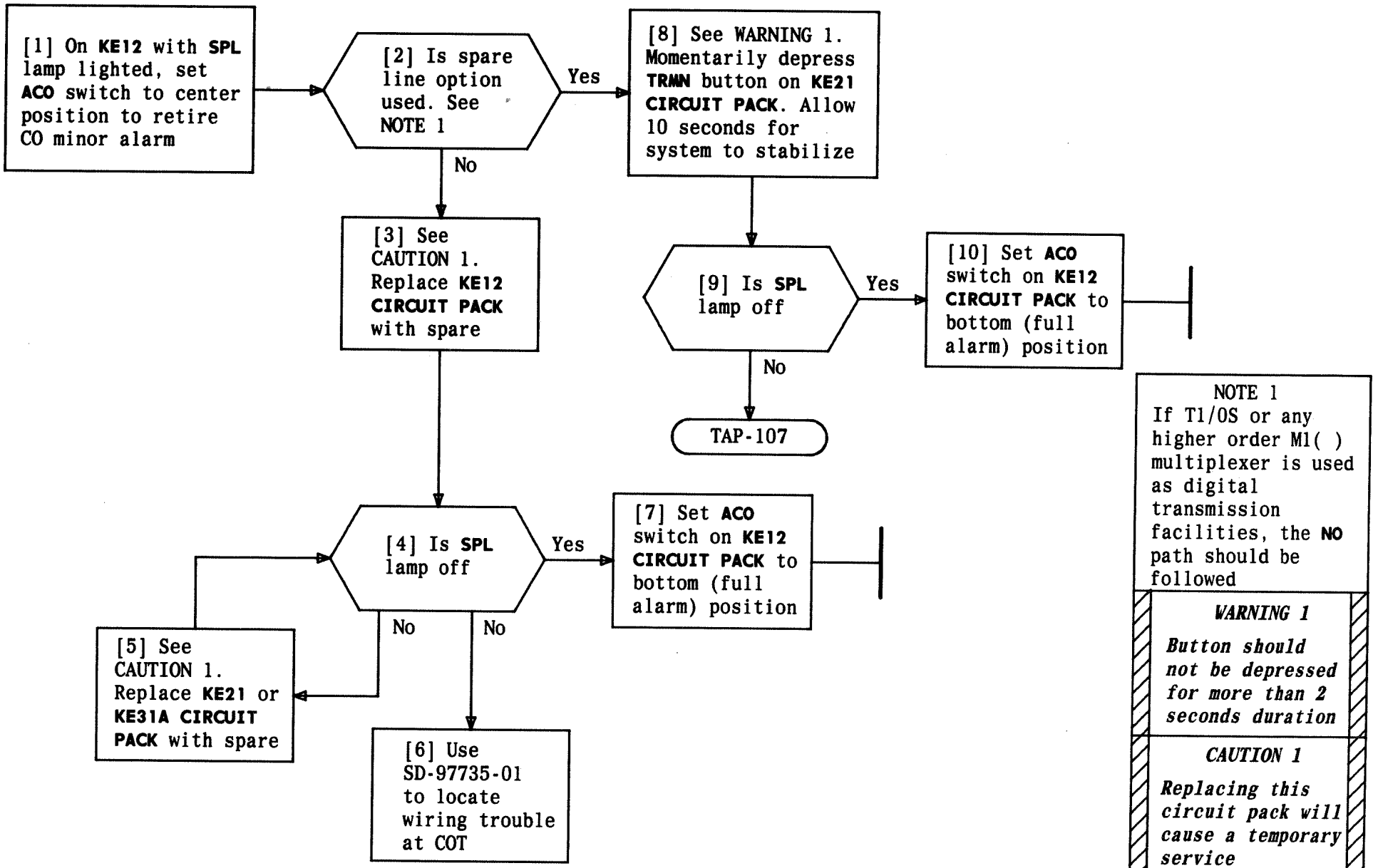
CLEAR REMOTE TERMINAL MINOR ALARM



NOTE 1
If T1/OS or any higher order M1( ) multiplexer is used as digital transmission facilities, the NO path should be followed

WARNING 1

Button should not be depressed for more than 2 seconds duration

CAUTION 1

Replacing this circuit pack will cause a temporary service interruption

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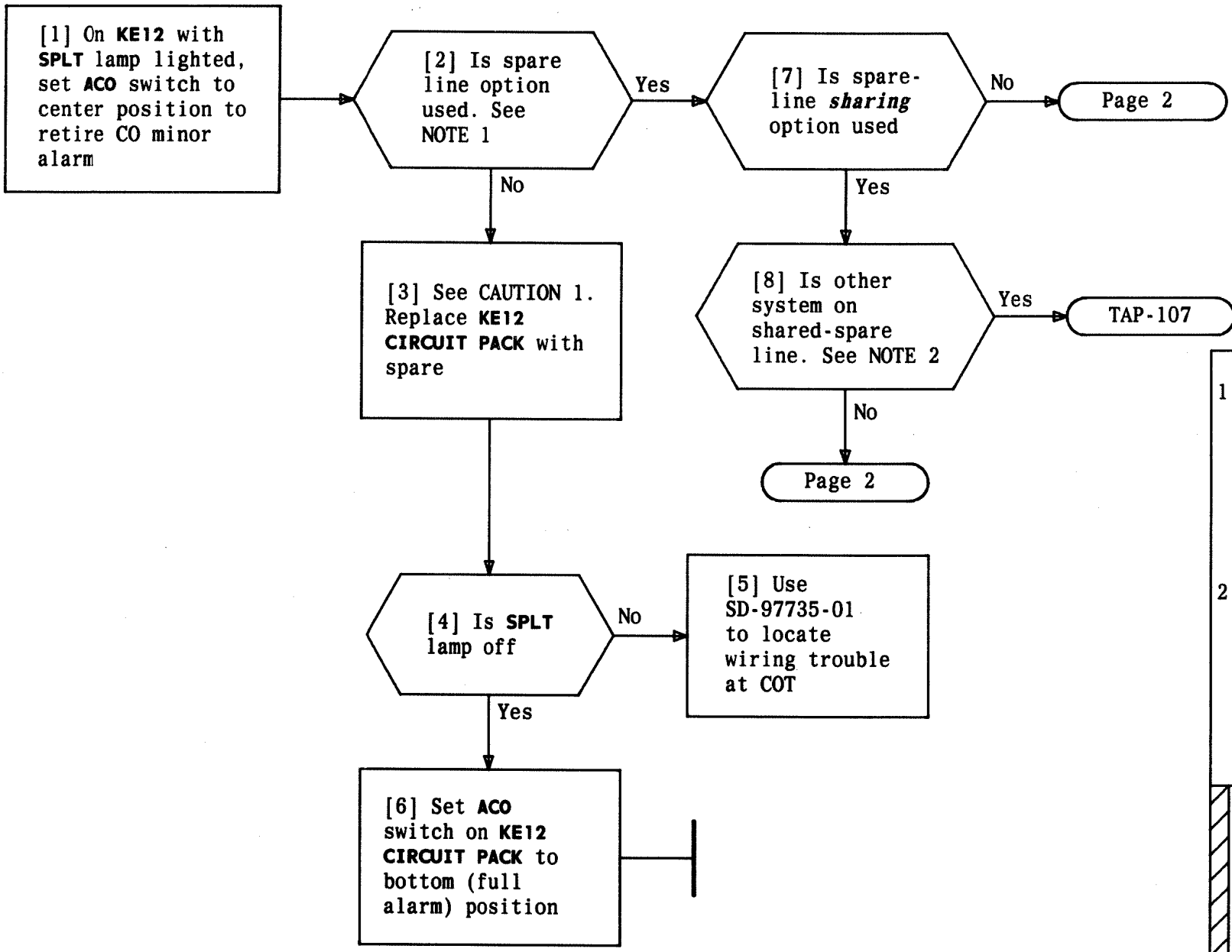
CLEAR SPL ALARM

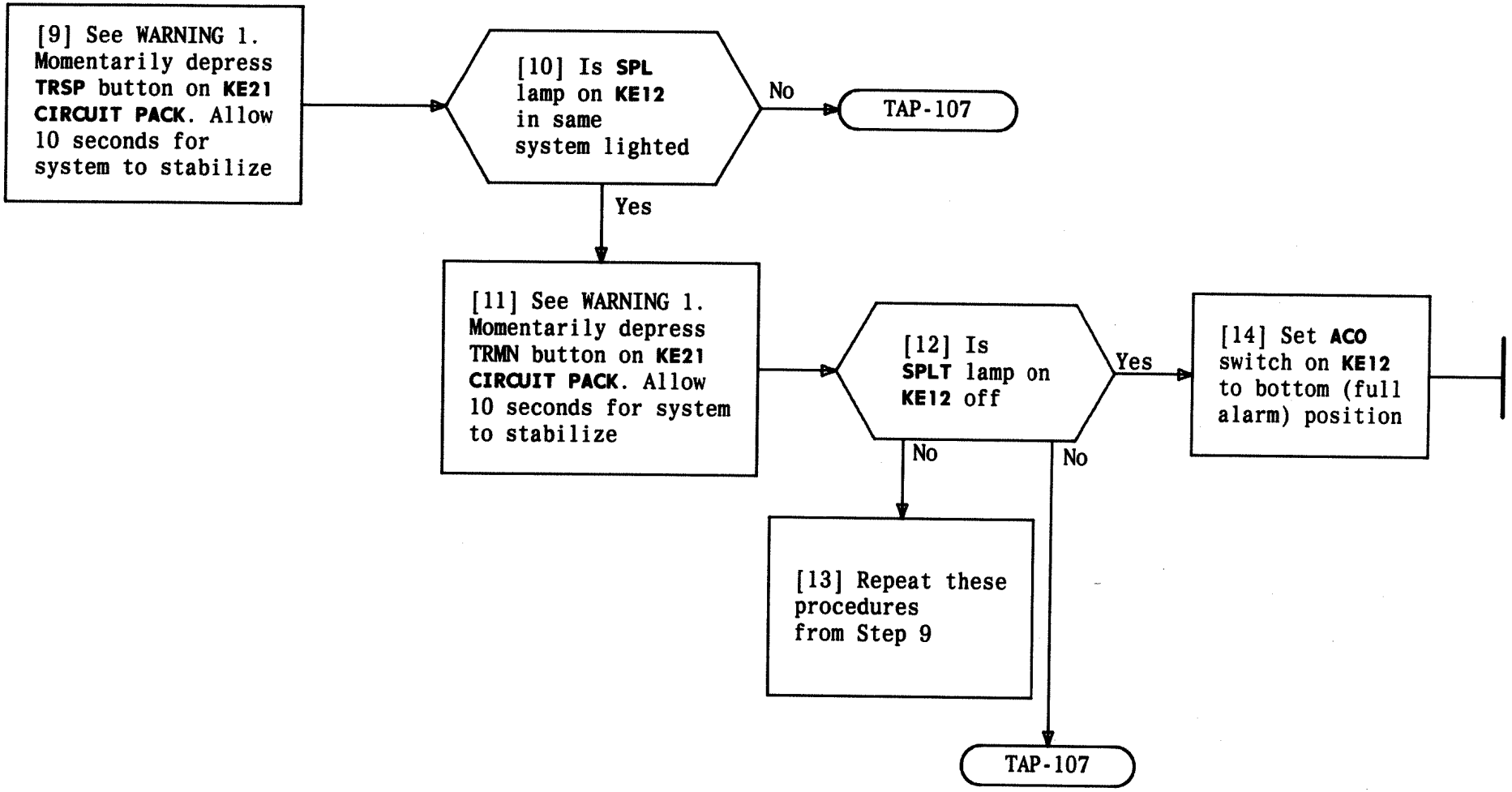


NOTES

1. If T1/OS or any higher order M1( ) multiplexer is used as digital transmission facilities, the **NO** path should be followed
2. If other system is on spare line, its main line may be in trouble. TAP-105 can be used to clear **SPL** alarm on other system

CAUTION 1
Replacing this circuit pack will cause a temporary service interruption

CLEAR SPLT ALARM



CLEAR SPLT ALARM

WARNING 1
Buttons should not be depressed for more than 2 seconds duration

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PERFORM REPEATERED LINE TROUBLE TESTS

[1] Does RT feed power to the line

No

[2] Is trouble on main or spare line

Main

[3] Perform line powering tests on main line at COT [DLP-580]

Yes

Page 3

Spare

[6] Perform line powering tests on spare line at COT [DLP-580]

[4] Are power requirements met

No

TAP-108

Yes

[5] See DANGER 1. Perform Bridged Error Test [DLP-577] on **MAIN SIDE 1** as shown in FIG. 2

Page 2

[7] Are power requirements met

No

TAP-108

Yes

[8] See DANGER 1. Perform Bridged Error Test [DLP-577] on **SPARE SIDE 1** as shown in FIG. 1

Page 2

RT JACK PANEL

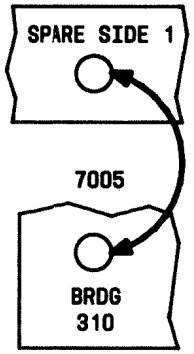

FIG. 1

RT JACK PANEL

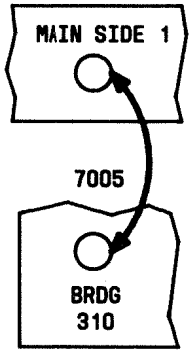

FIG. 2

DANGER 1

Voltages to 300 volts exist at RT test jack appearances. Patch cords should be connected to RT test jacks last

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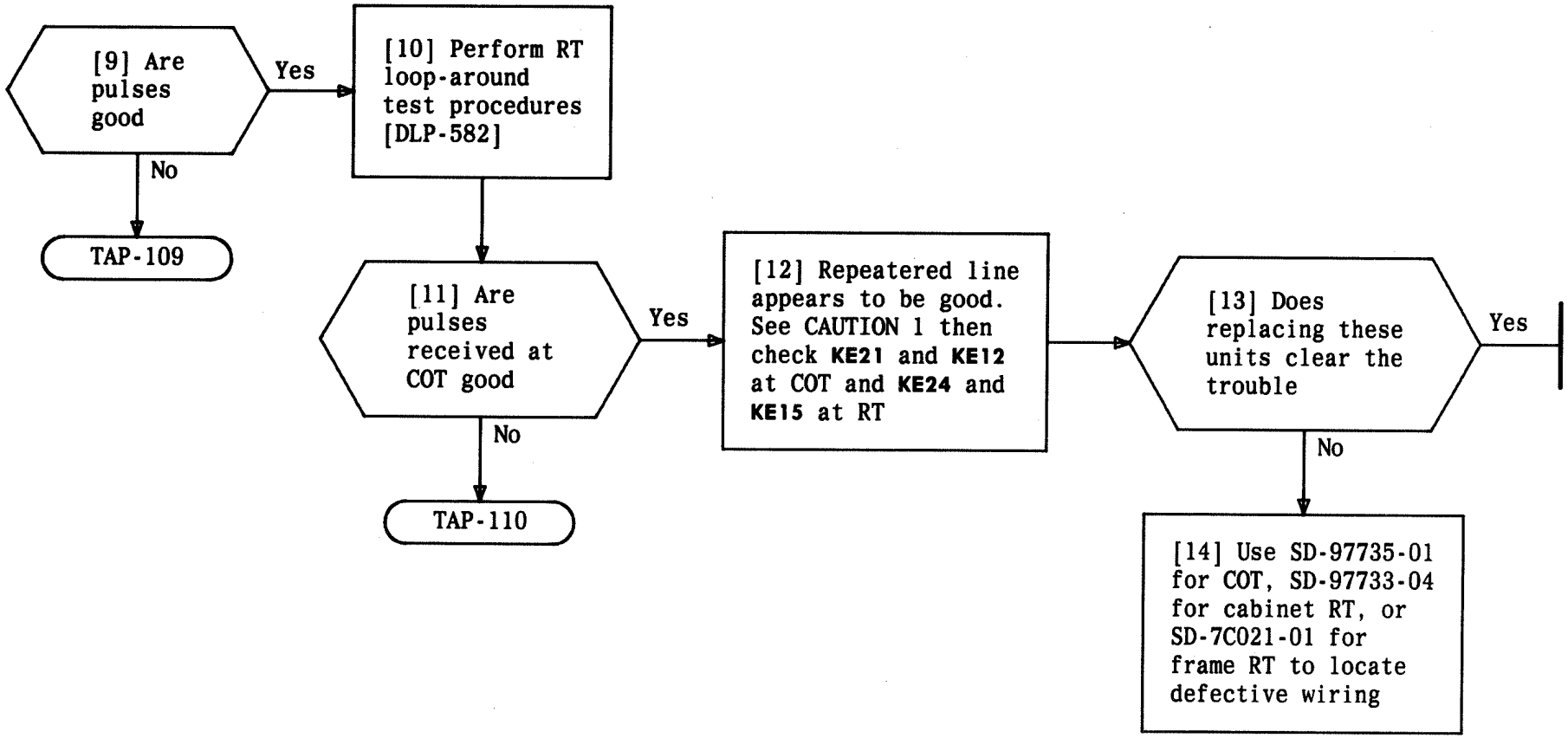
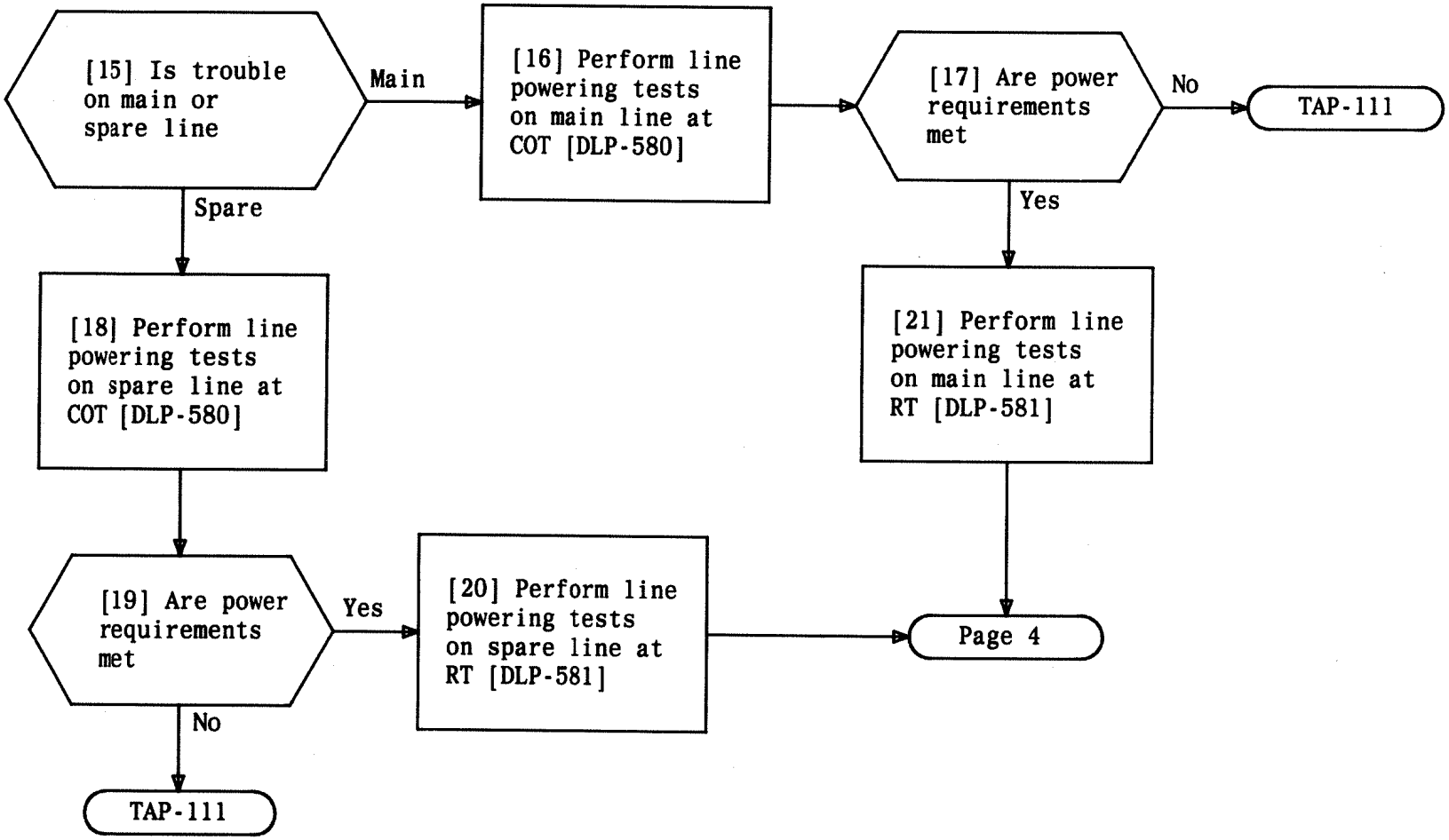
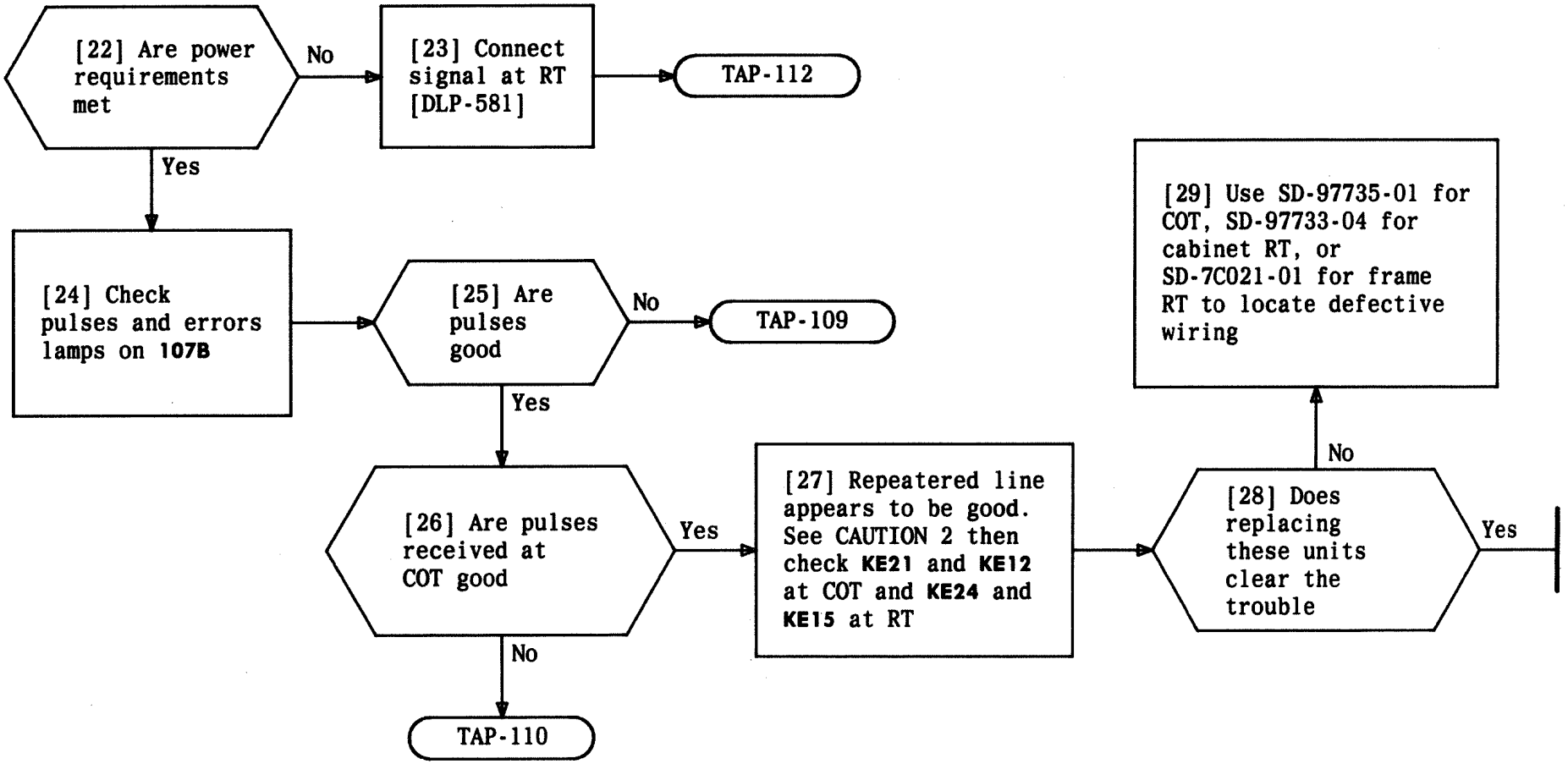


CAUTION 1
Changing these units will temporarily put the system out of service

PERFORM REPEATERED LINE TROUBLE TESTS



PERFORM REPEATERED LINE TROUBLE TESTS



PERFORM REPEATERED LINE TROUBLE TESTS

CAUTION 2
Changing these units will temporarily put the system out of service

[1] See NOTE 1. Select as initial test location the repeater halfway between COT and RT. Go to this location

[2] At selected test location, identify repeater associated with troubled system

[3] Connect **239A ADAPTER** between repeater and associated cable

[4] See DANGER 1. With patch cords connected, and switches set (on **7005**) as indicated in FIG. 1, Page 2, perform Terminated Pulse Test [DLP-578]

AND

[5] Are pulses indicated on 7005

Yes → Page 3

No

[6] See NOTE 2. Does this isolate trouble to one section between two repeaters

No → [8] Remove **239A ADAPTER** and reconnect repeater to line

[8] → [9] Select new test location at a repeater on COT side of this location; midway in span. Repeat this procedure from Step 2, for new test location

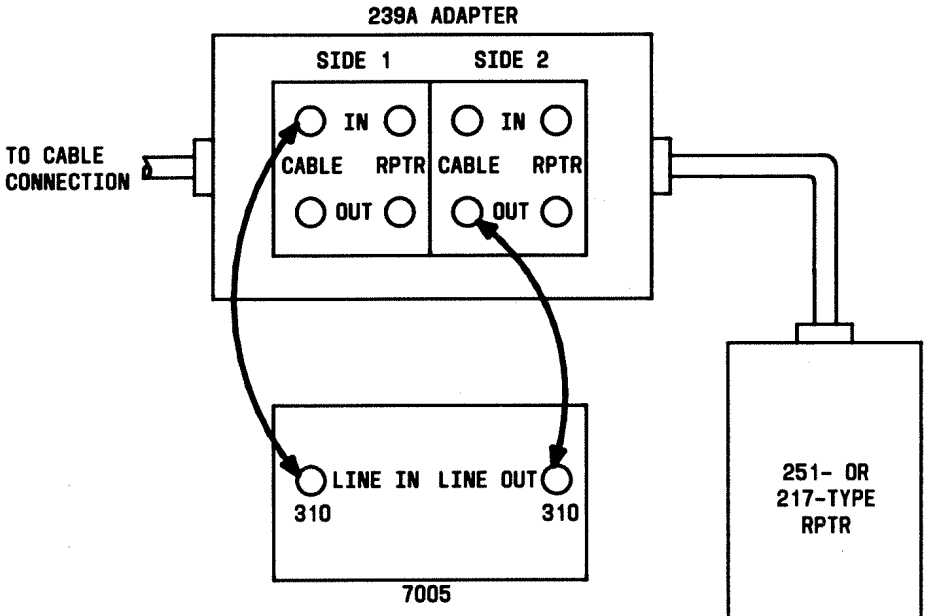
Yes → [7] Disconnect repeaters at both ends of cable section. Then use local procedures to locate and repair cable trouble. See NOTE 3

NOTES

1. This procedure is designed to locate an open loop or repeater after trouble has been isolated to the digital line powering loop. Standard cable trouble procedures should be used to clear opens, crosses, and grounds
2. Trouble is on COT side of this location
3. When trouble is cleared, repeaters should be reconnected, and all patch cords, test equipment, and test connections should be removed

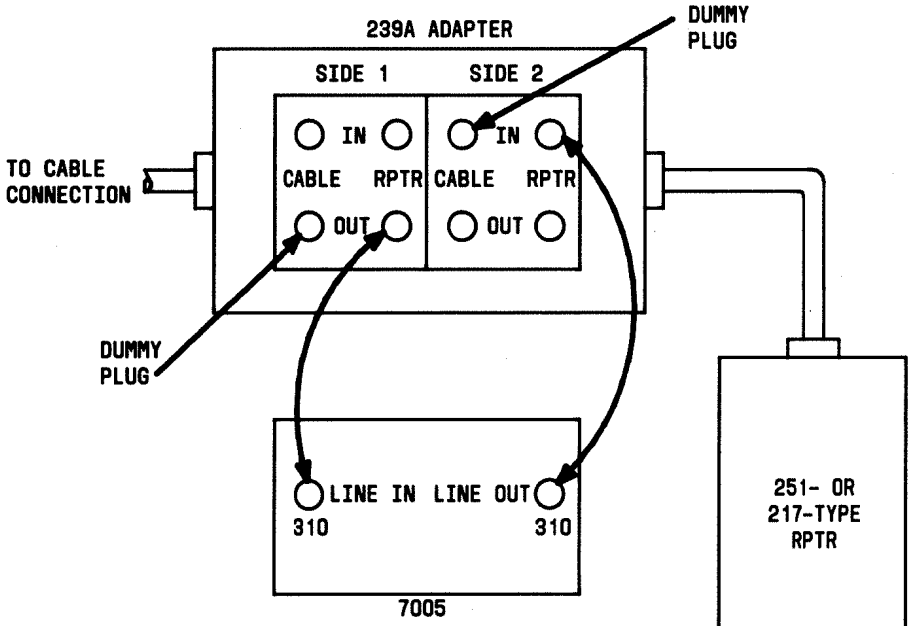
DANGER 1
Voltages to 300 volts exist at* 239A ADAPTER *test jacks. Patch cords should be connected to* 239A *last

CLEAR REPEATERED LINE POWERING TROUBLE (LINE POWERED FROM COT ONLY)



LINE IN/BRDG SWITCH TO LINE IN POSITION
TERM/NORMAL SWITCH TO TERM POSITION

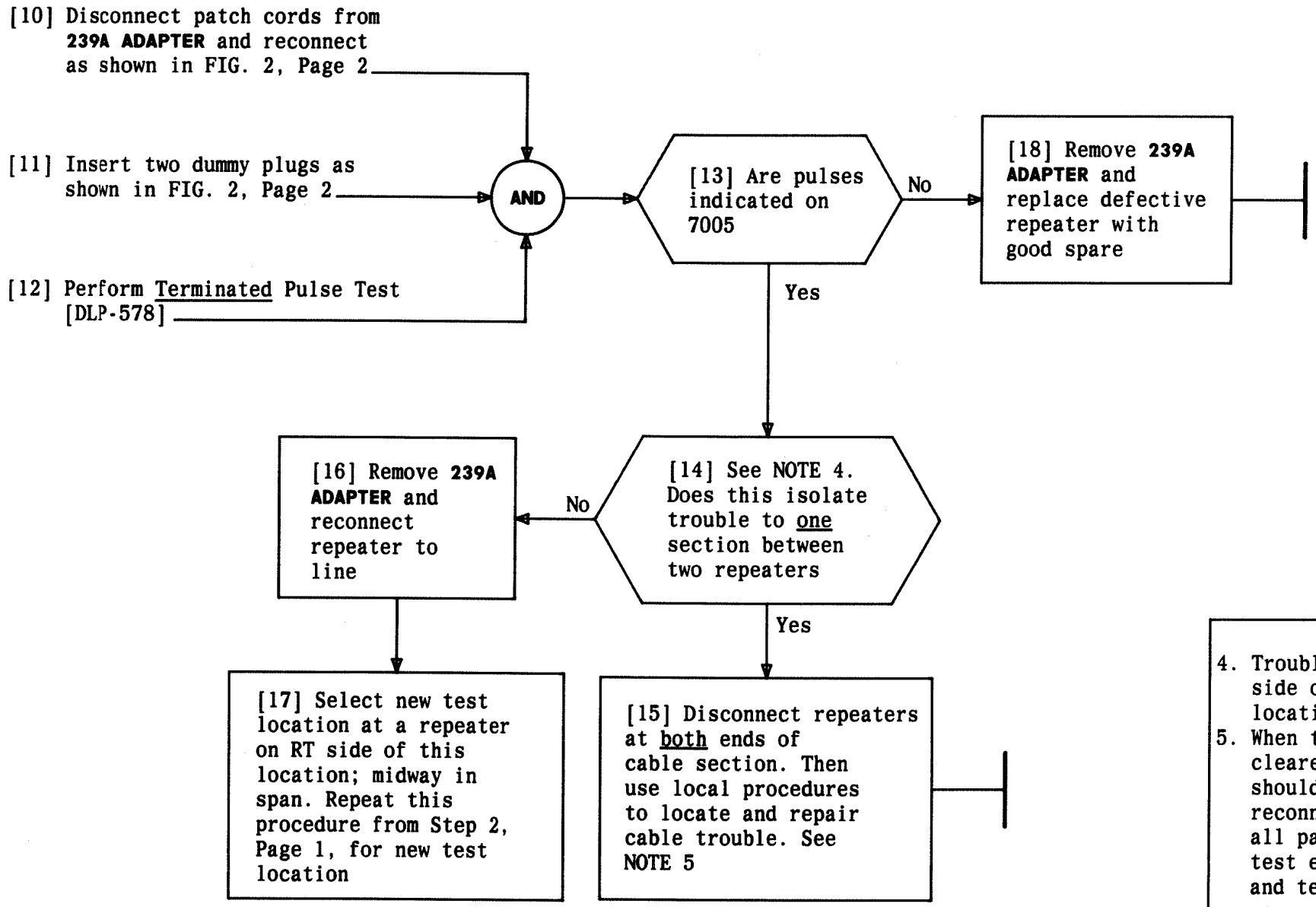
FIG. 1



LINE IN/BRDG SWITCH TO LINE IN POSITION
TERM/NORMAL SWITCH TO TERM POSITION

FIG. 2

CLEAR REPEATERED LINE POWERING TROUBLE (LINE POWERED FROM COT ONLY)



NOTES

4. Trouble is on RT side of this location
5. When trouble is cleared, repeaters should be reconnected, and all patch cords, test equipment, and test connections should be removed

CLEAR REPEATERED LINE POWERING TROUBLE (LINE POWERED FROM COT ONLY)

[1] Select as initial test location the repeater halfway between COT and RT. Go to this location

[2] At selected test location, identify repeater associated with troubled system

[3] Connect **239A ADAPTER** between repeater and associated cable

[4] See DANGER 1. With patch cords connected, and switches set (on **7005**) as indicated in FIG. 1, Page 2, perform Terminated Pulse Error Test [DLP-578]

AND

[5] Are pulses indicated and no more than 5 errors per 30-second period present on **7005**

Yes

[10] See DANGER 1. Unplug patch cords from **239A** and reconnect as shown in FIG. 2, Page 2

Page 3

No

[6] See NOTE 1. Does this isolate trouble to one section between two repeaters

No

[8] Remove **239A ADAPTER** and reconnect repeater to line

[9] Select new test location at a repeater on COT side of this location; midway in span. Repeat this procedure from Step 2, for new test location

Yes

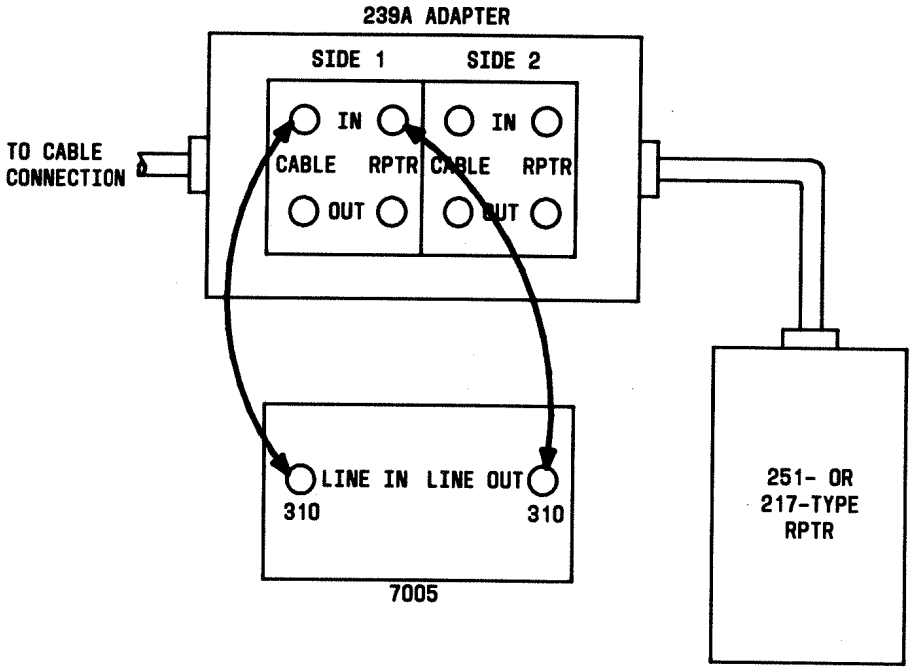
[7] Disconnect repeaters at both ends of cable section. Then use local procedures to locate and repair cable trouble. See NOTE 2

NOTES

1. Trouble is on COT side of this location
2. When trouble is cleared, repeaters should be reconnected, and all patch cords, test equipment, and test connections should be removed

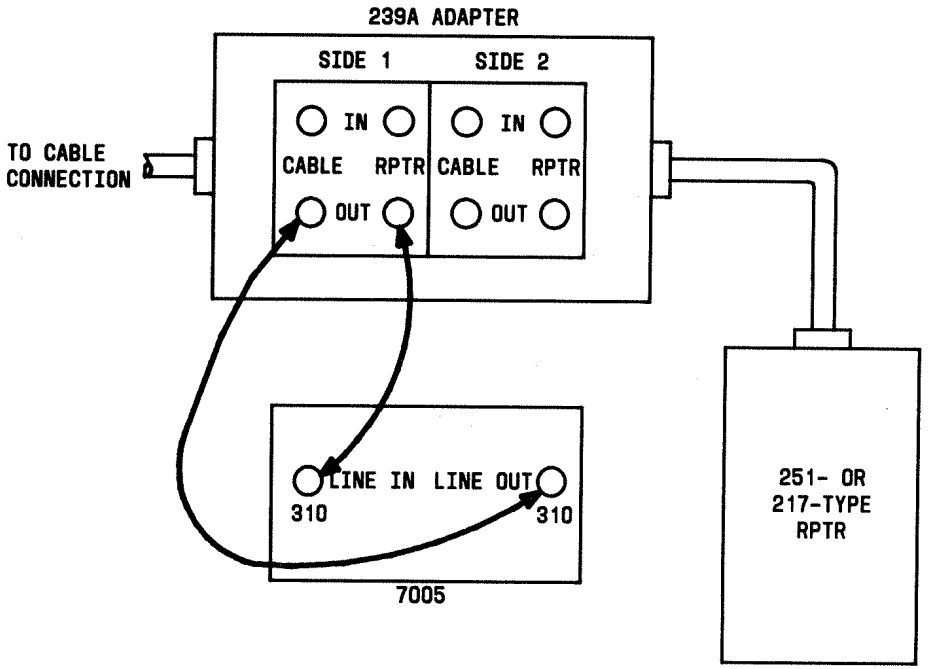
DANGER 1
Voltages to 300 volts exist at* 239A ADAPTER *test jacks. Patch cords should be connected to* 239A *last

CLEAR REPEATERED LINE SIGNAL TROUBLE ON SIDE 1



LINE IN/BRDG SWITCH TO LINE IN POSITION
TERM/NORMAL SWITCH TO TERM POSITION

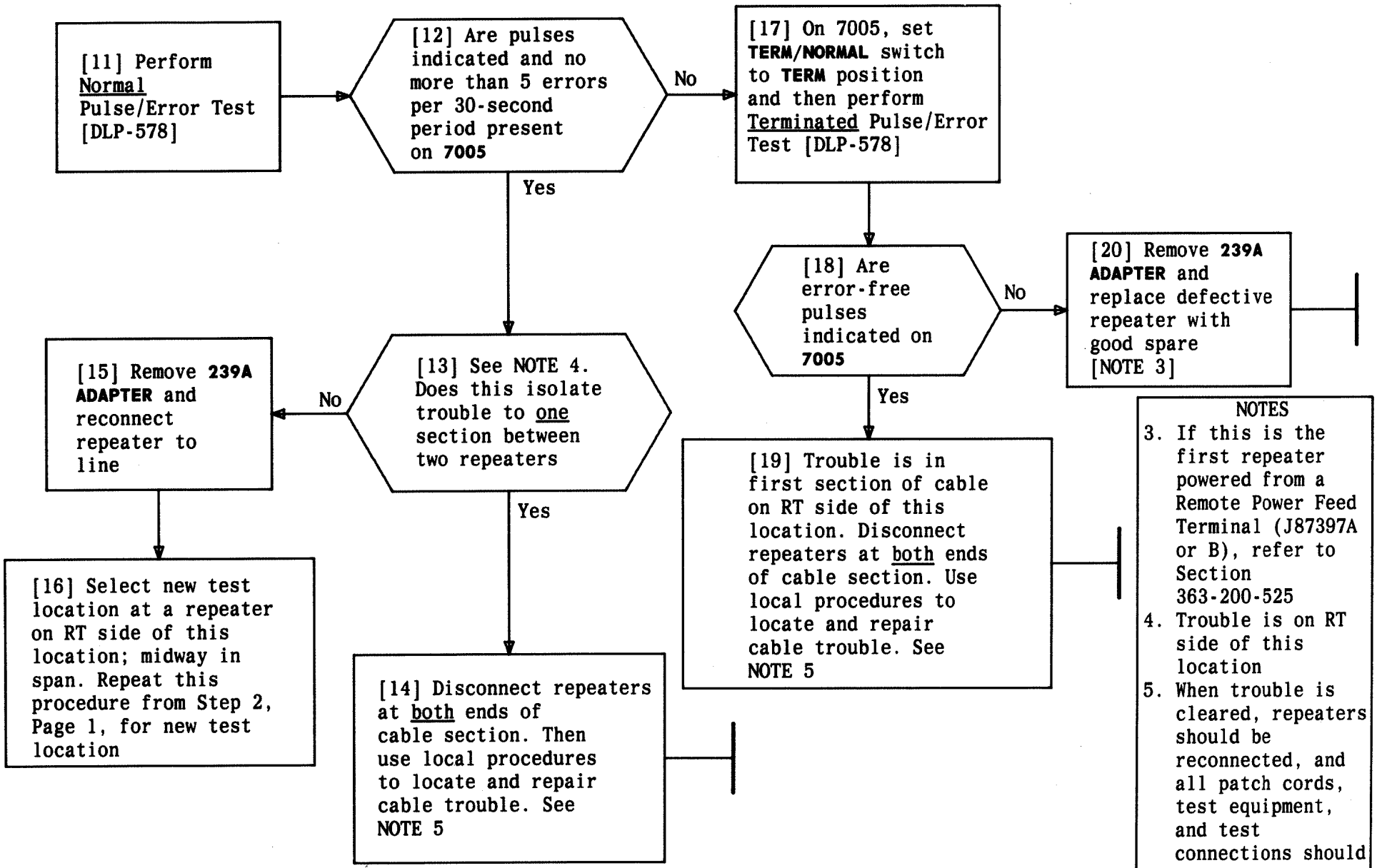
FIG. 1



LINE IN/BRDG SWITCH TO LINE IN POSITION
TERM/NORMAL SWITCH TO NORMAL POSITION

FIG. 2

CLEAR REPEATERED LINE SIGNAL TROUBLE ON SIDE 1



CLEAR REPEATERED LINE SIGNAL TROUBLE ON SIDE 1

[1] Select as initial test location the repeater halfway between COT and RT. Go to this location

[2] At selected test location, identify repeater associated with troubled system

[3] Connect **239A ADAPTER** between repeater and associated cable

[4] See DANGER 1. With patch cords connected, and switches set (on **7005**) as indicated in FIG. 1, Page 2, perform Terminated Pulse/Error Test [DLP-578]

AND

[5] Are pulses indicated and no more than 5 errors per 30-second period present on **7005**

Yes

[10] See DANGER 1. Unplug patch cords from **239A** and reconnect as shown in FIG. 2, Page 2

Page 3

No

[6] See NOTE 1. Does this isolate trouble to one section between two repeaters

No

[8] Remove **239A ADAPTER** and reconnect repeater to line

[9] Select new test location at a repeater on RT side of this location; midway in span. Repeat this procedure from Step 2, for new test location

Yes

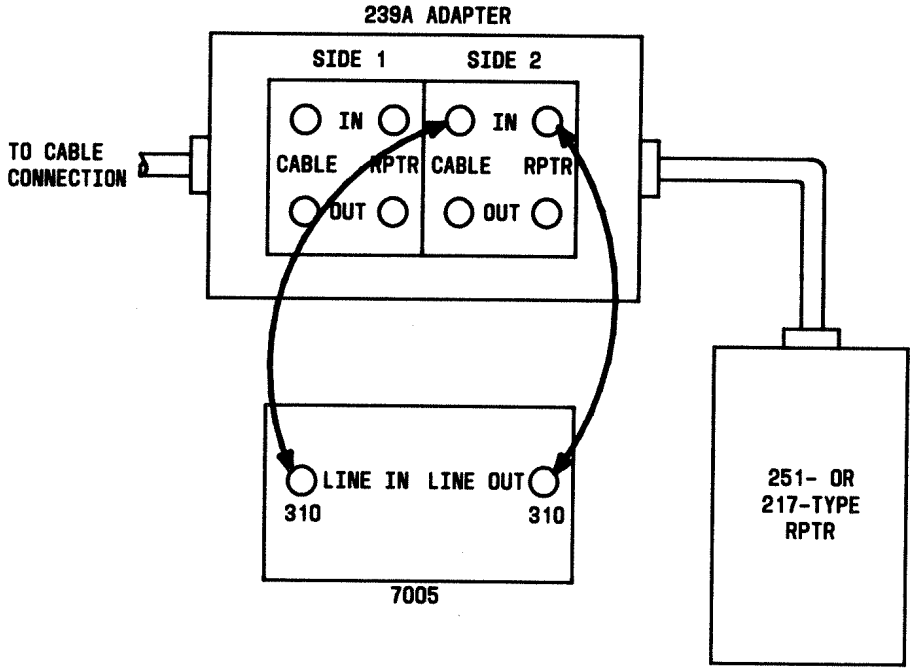
[7] Disconnect repeaters at both ends of cable section. Then use local procedures to locate and repair cable trouble. See NOTE 2

NOTES

1. Trouble is on RT side of this location
2. When trouble is cleared, repeaters should be reconnected, and all patch cords, test equipment, and test connections should be removed

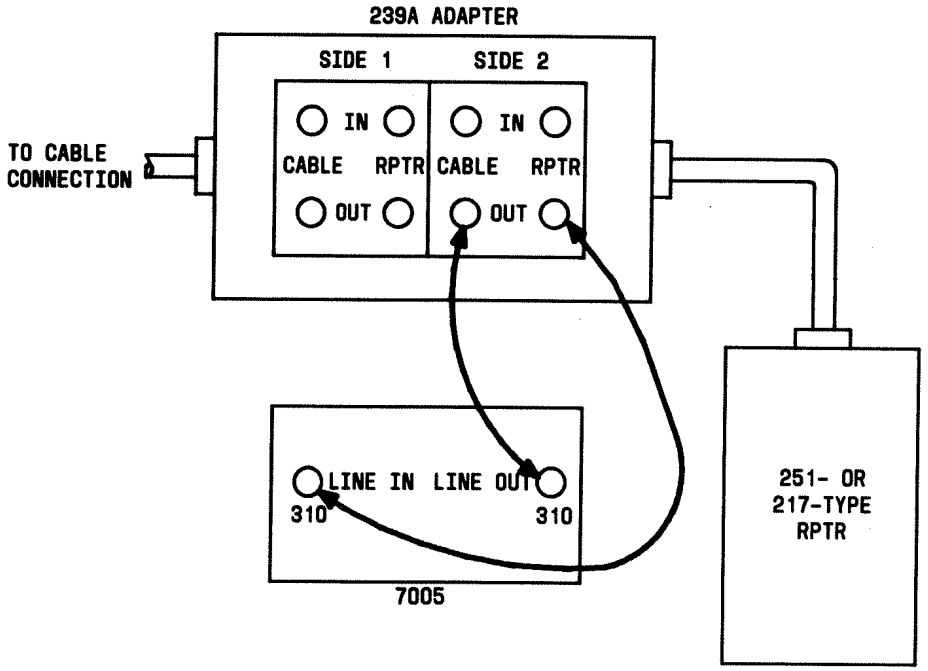
DANGER 1
Voltages to 300 volts exist at* 239A ADAPTER *test jacks. Patch cords should be connected to* 239A *last

CLEAR REPEATERED LINE SIGNAL TROUBLE ON SIDE 2



LINE IN/BRDG SWITCH TO LINE IN POSITION
TERM/NORMAL SWITCH TO TERM POSITION

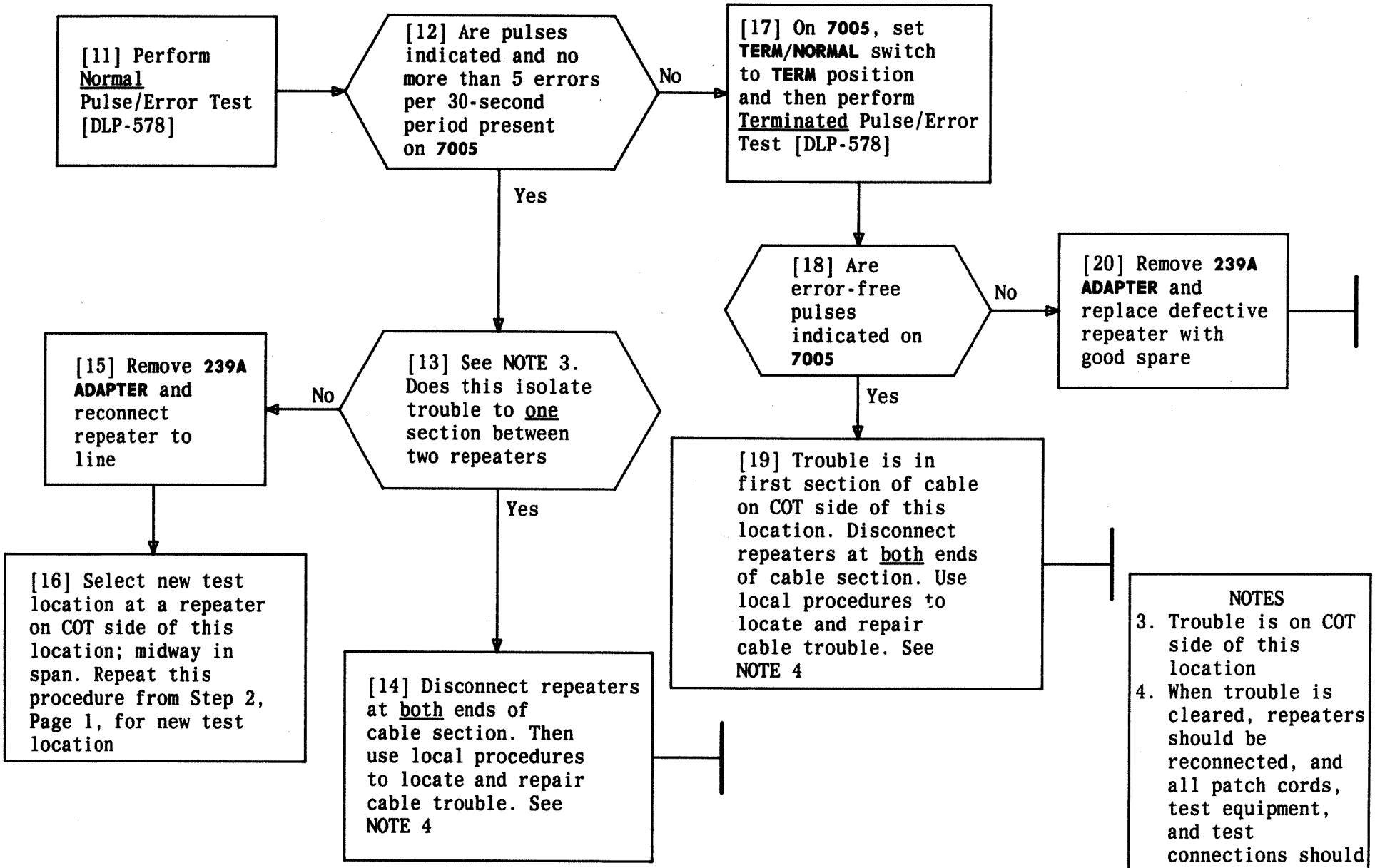
FIG. 1



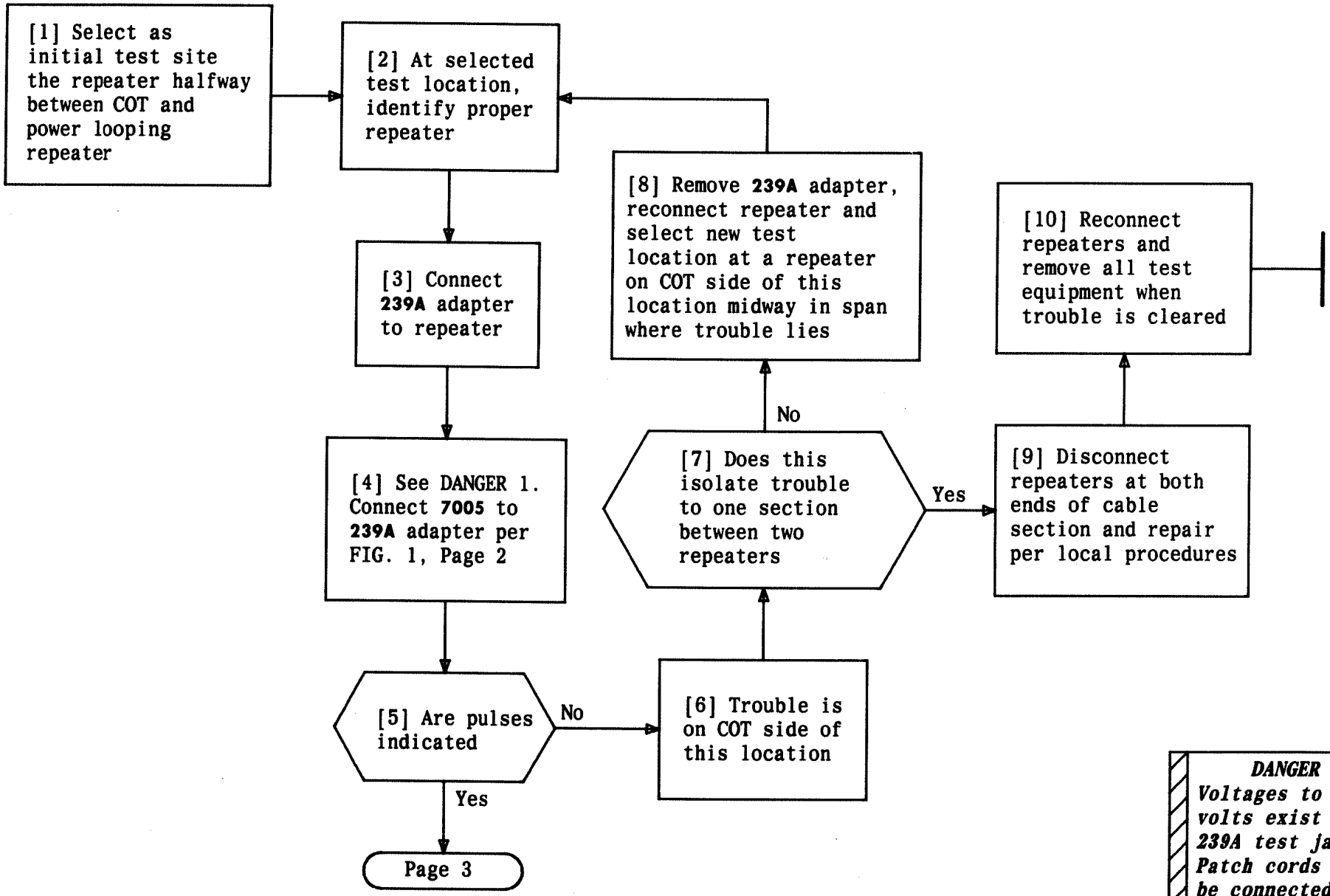
LINE IN/BRDG SWITCH TO LINE IN POSITION
TERM/NORMAL SWITCH TO NORMAL POSITION

FIG. 2

CLEAR REPEATERED LINE SIGNAL TROUBLE ON SIDE 2



CLEAR REPEATERED LINE SIGNAL TROUBLE ON SIDE 2



DANGER 1
Voltages to 300 volts exist at 239A test jacks. Patch cords should be connected to 239A adapter last

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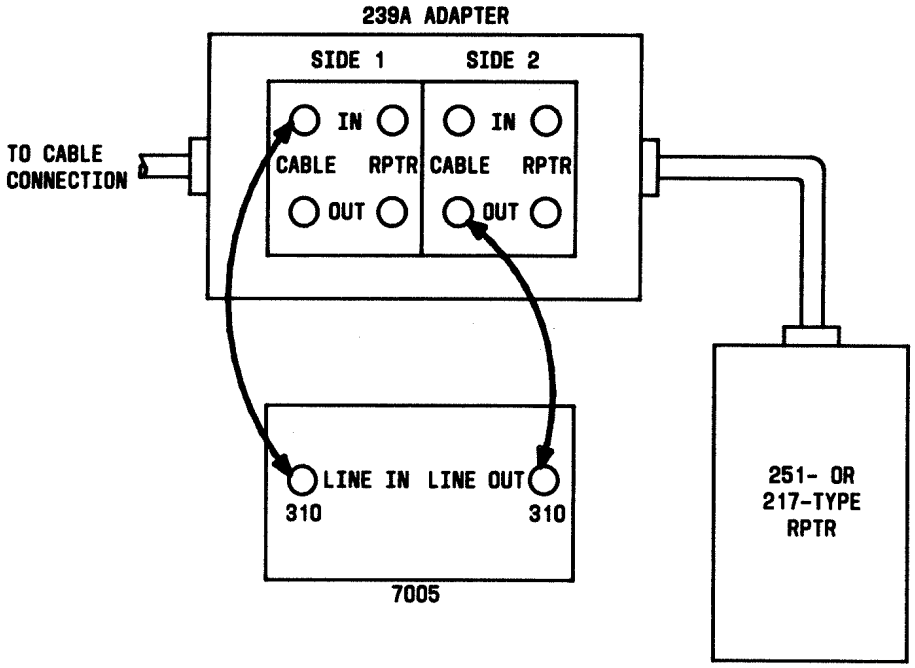
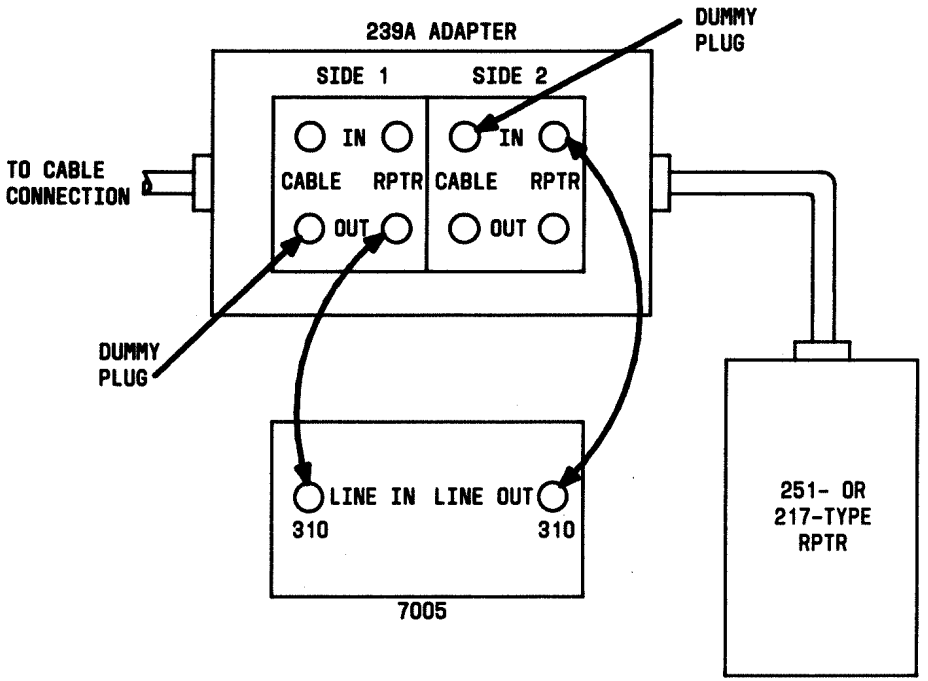
CLEAR REPEATERED LINE POWERING TROUBLE – COT POWER LOOP



LINE IN/BRDG SWITCH TO LINE IN POSITION
TERM/NORMAL SWITCH TO TERM POSITION

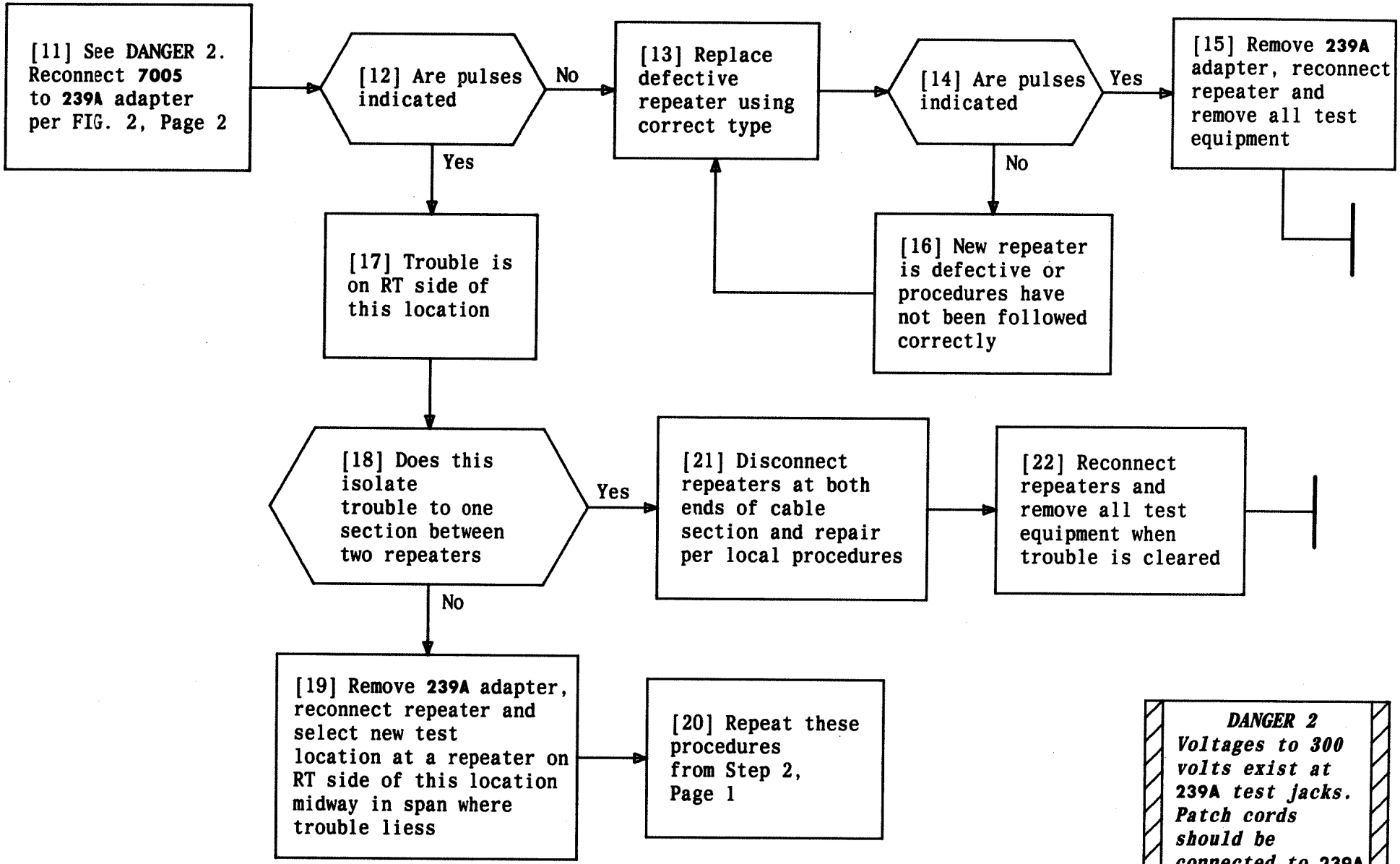
FIG. 1



LINE IN/BRDG SWITCH TO LINE IN POSITION
TERM/NORMAL SWITCH TO TERM POSITION

FIG. 2

CLEAR REPEATERED LINE POWERING TROUBLE – COT POWER LOOP



DANGER 2
Voltages to 300 volts exist at 239A test jacks. Patch cords should be connected to 239A adapter last

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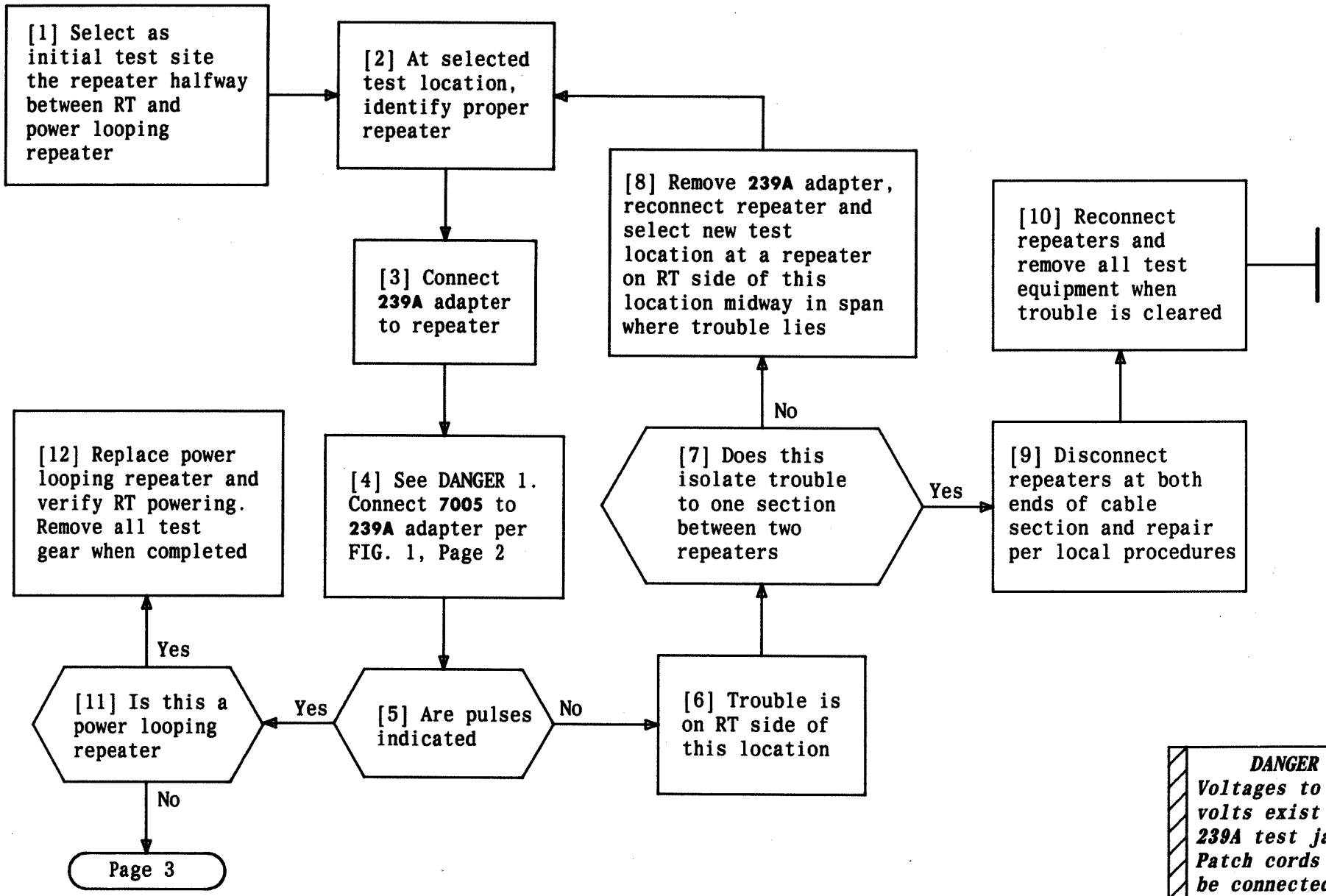
CLEAR REPEATERED LINE POWERING TROUBLE — COT POWER LOOP



DANGER 1
Voltages to 300 volts exist at 239A test jacks. Patch cords should be connected to 239A adapter last

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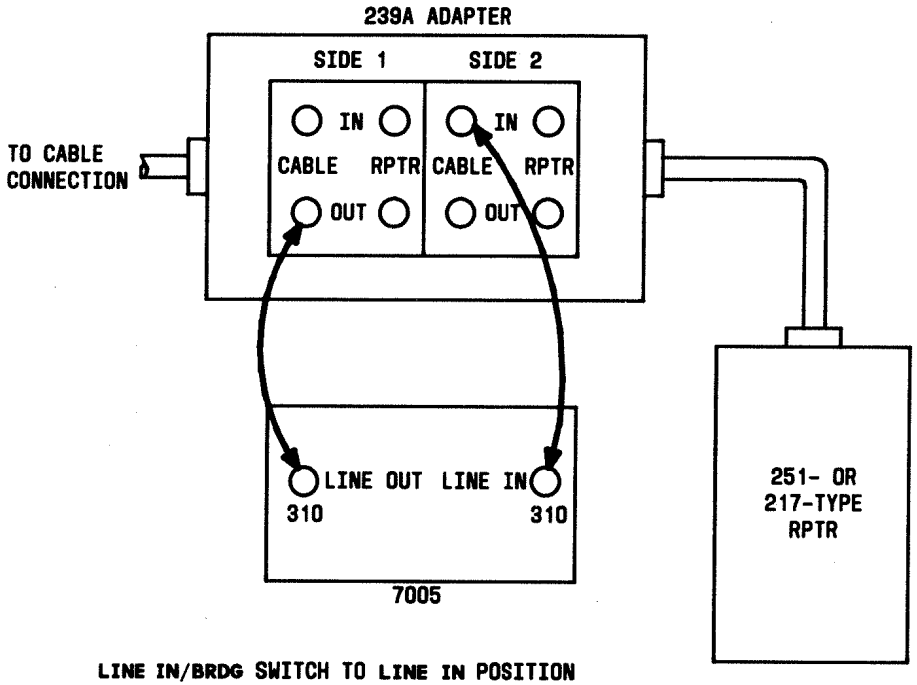
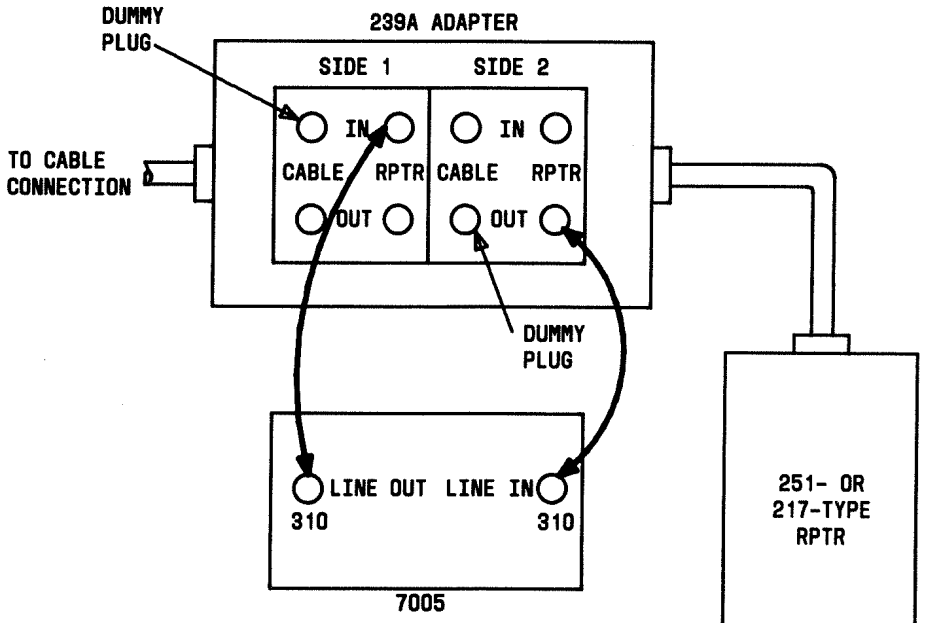
CLEAR REPEATERED LINE POWERING TROUBLE — RT POWER LOOP



LINE IN/BRDG SWITCH TO LINE IN POSITION
TERM/NORMAL SWITCH TO TERM POSITION

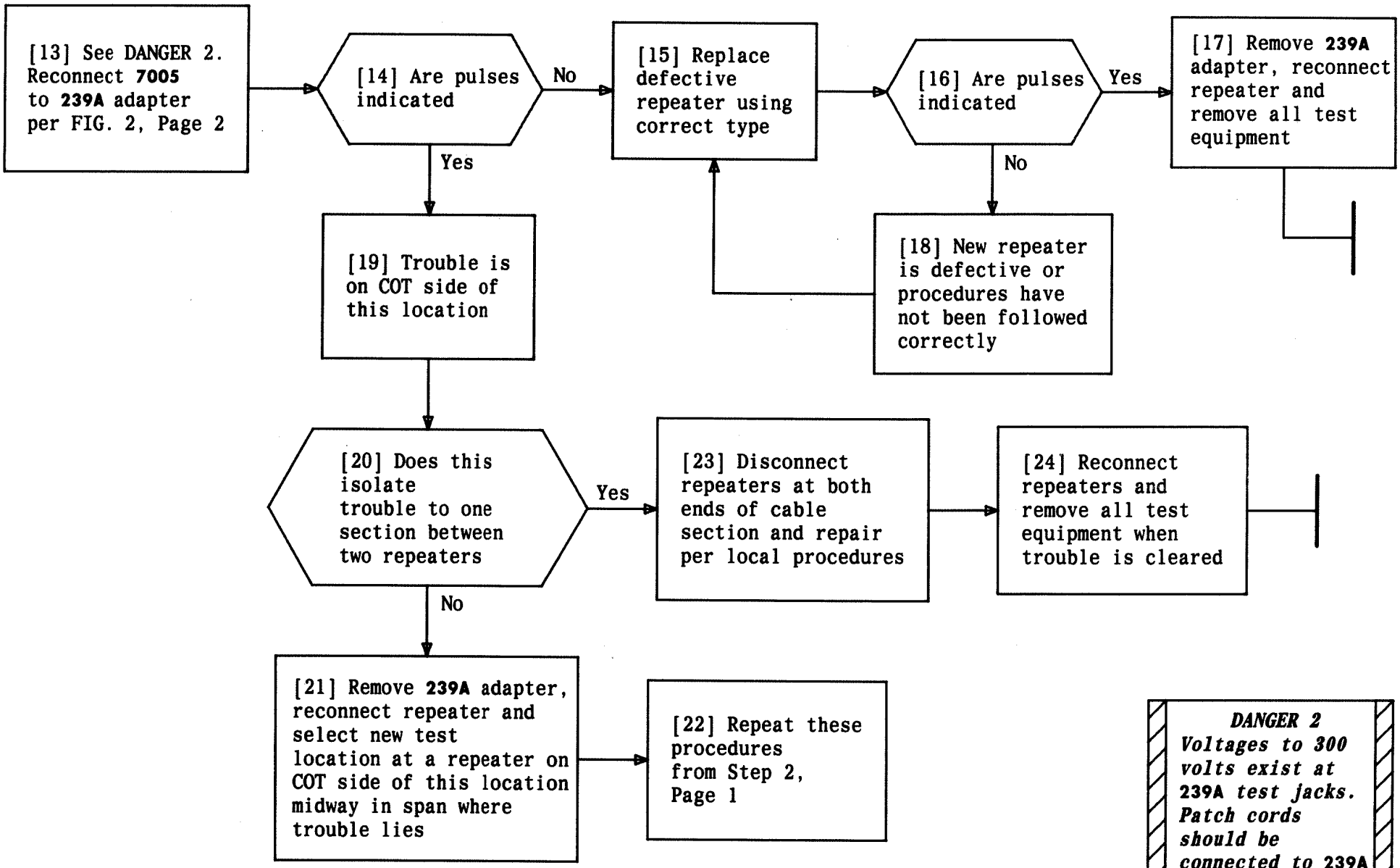
FIG. 1



LINE IN/BRDG SWITCH TO LINE IN POSITION
TERM/NORMAL SWITCH TO TERM POSITION

FIG. 2

CLEAR REPEATERED LINE POWERING TROUBLE – RT POWER LOOP



DANGER 2
Voltages to 300 volts exist at 239A test jacks. Patch cords should be connected to 239A adapter last

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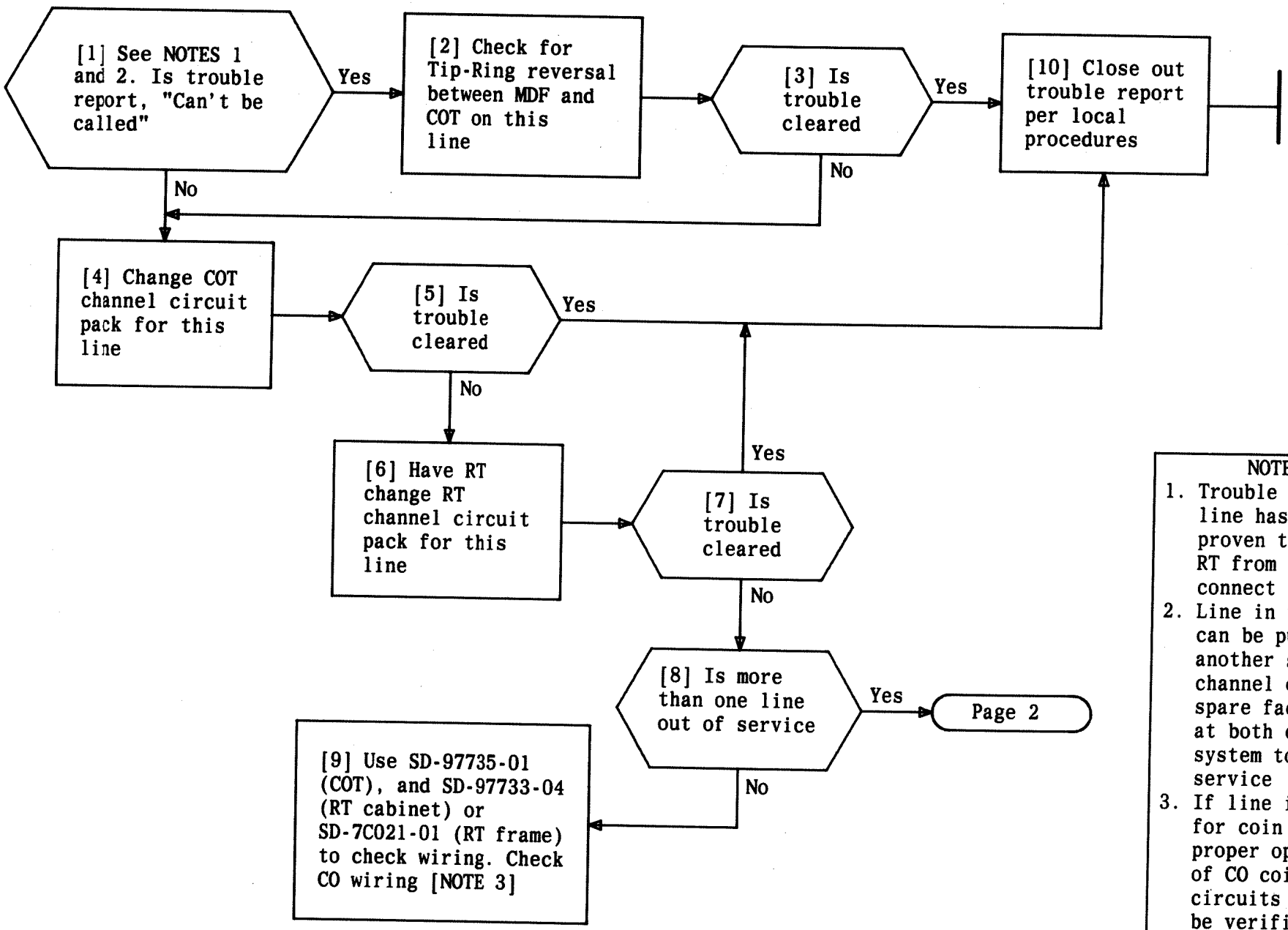
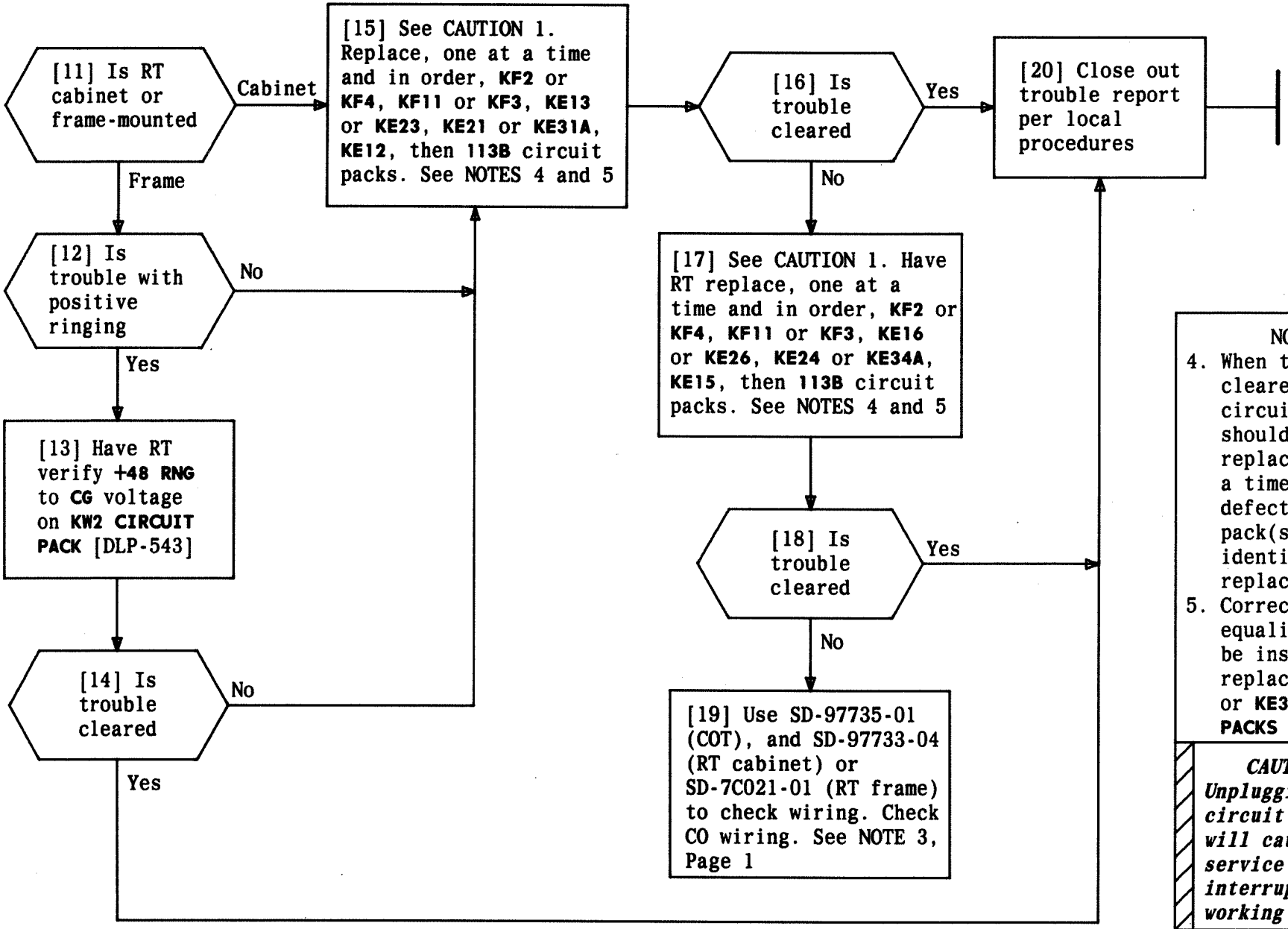
CLEAR REPEATERED LINE POWERING TROUBLE – RT POWER LOOP



NOTES

1. Trouble on this line has been proven towards RT from cross-connect facility
2. Line in trouble can be put on another spare channel or other spare facilities at both ends of system to restore service
3. If line is used for coin service, proper operation of CO coin circuits should be verified

CLEAR CUSTOMER REPORTED CHANNEL TROUBLE

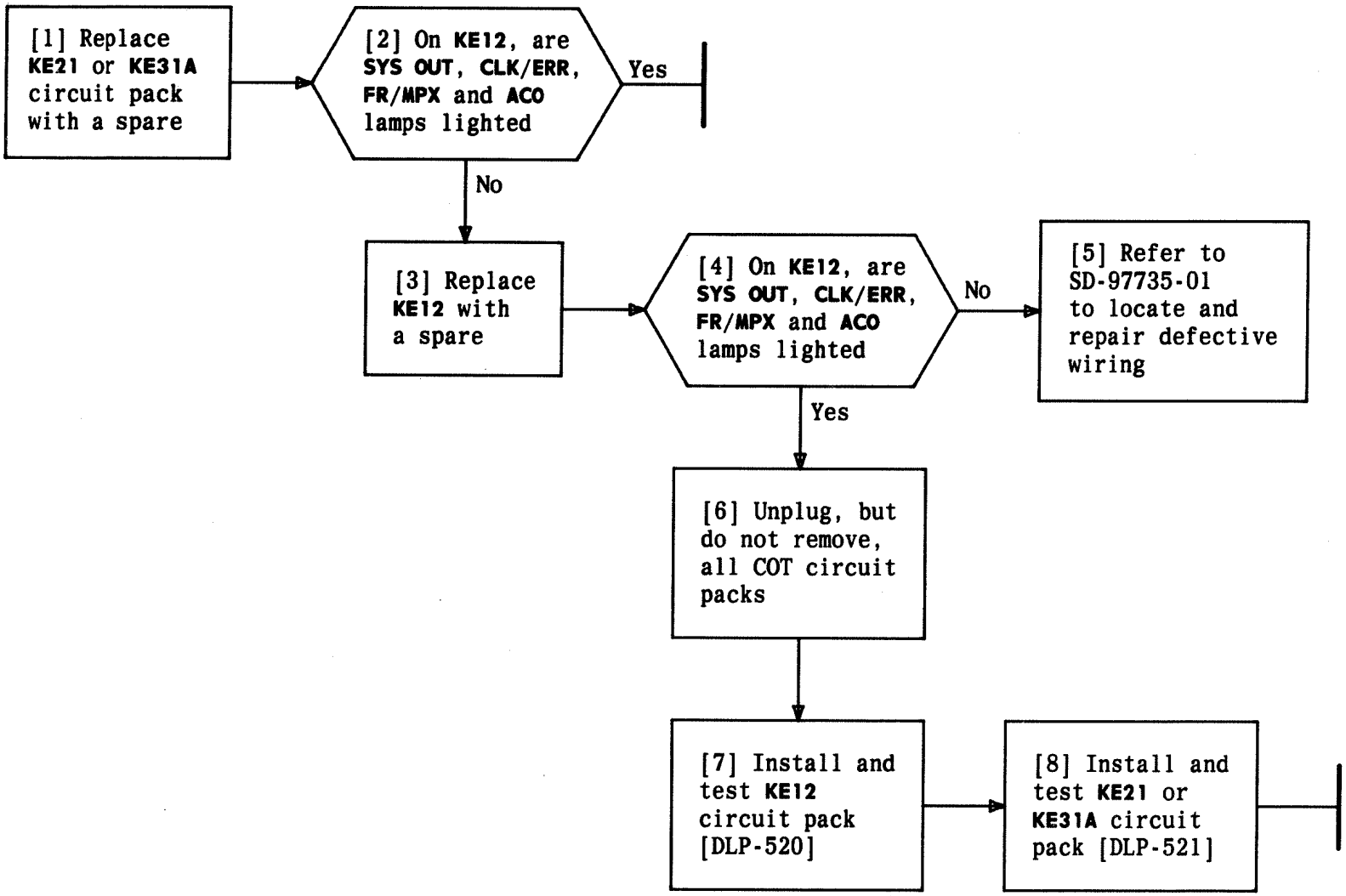


NOTES

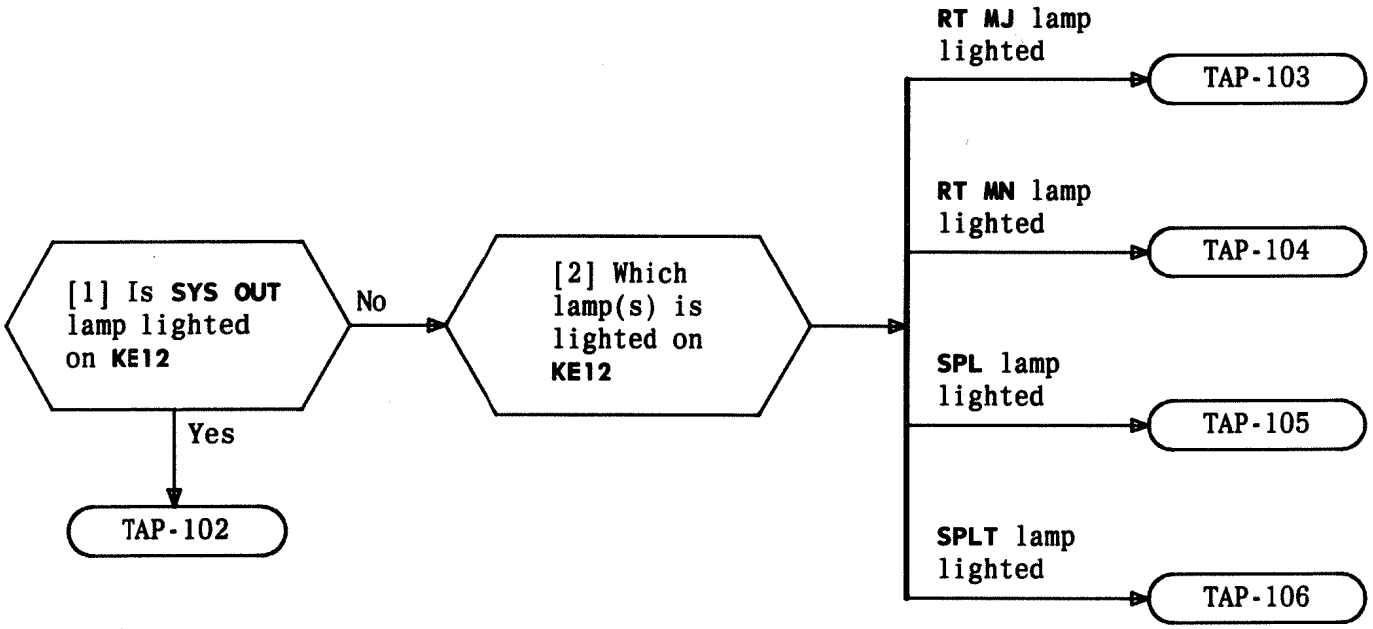
4. When trouble is cleared, the old circuit packs should be replaced, one at a time, until the defective circuit pack(s) are identified and replaced
5. Correct **938( )** equalizer should be installed on replacement **KE31A** or **KE34A CIRCUIT PACKS**

CAUTION 1
Unplugging these circuit packs will cause a service interruption on working channels

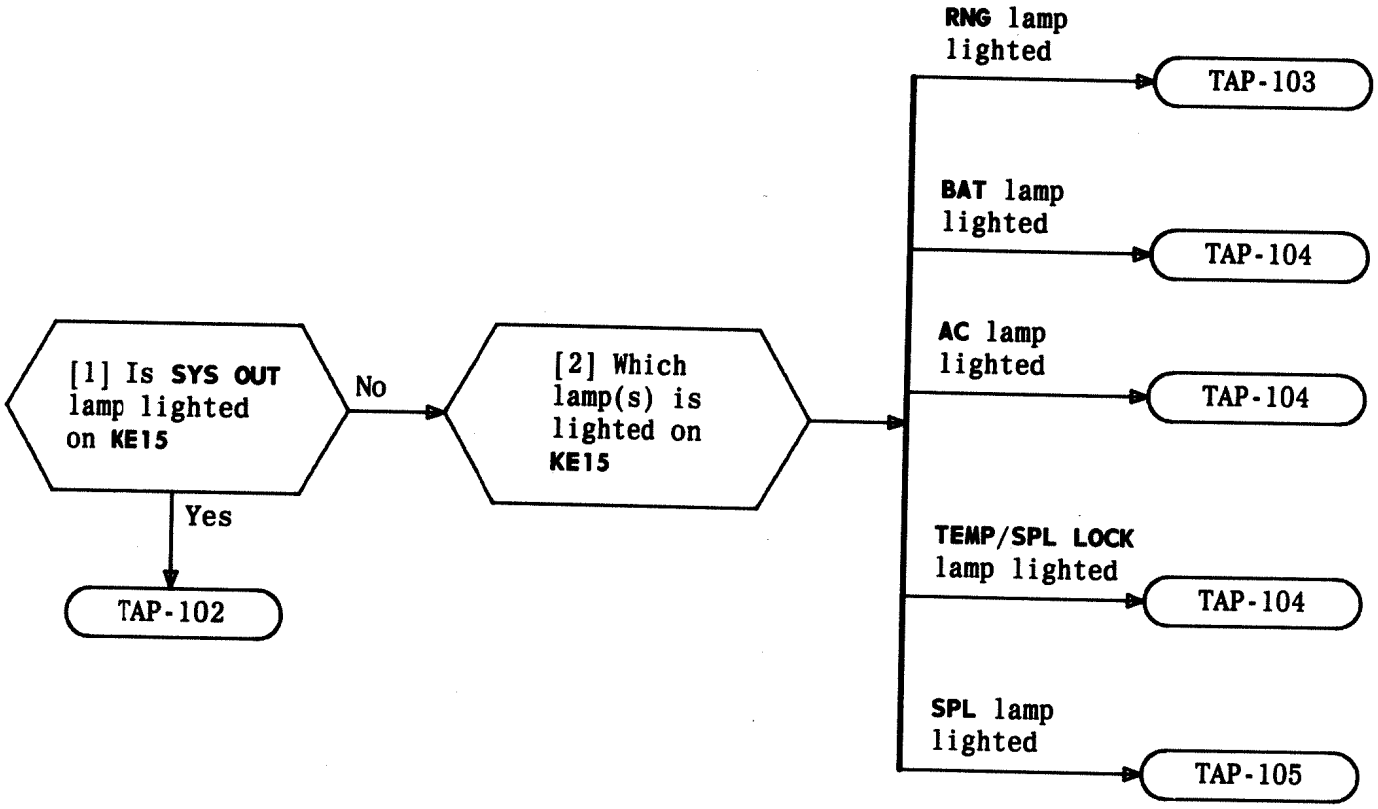
CLEAR CUSTOMER REPORTED CHANNEL TROUBLE



CLEAR KE12 LAMP TROUBLE WHEN INSTALLING CENTRAL OFFICE MULTIPLEX UNITS



ISOLATE PROCEDURES FOR ALARM LAMPS ON KE12



ISOLATE PROCEDURES FOR ALARM LAMPS ON KE15

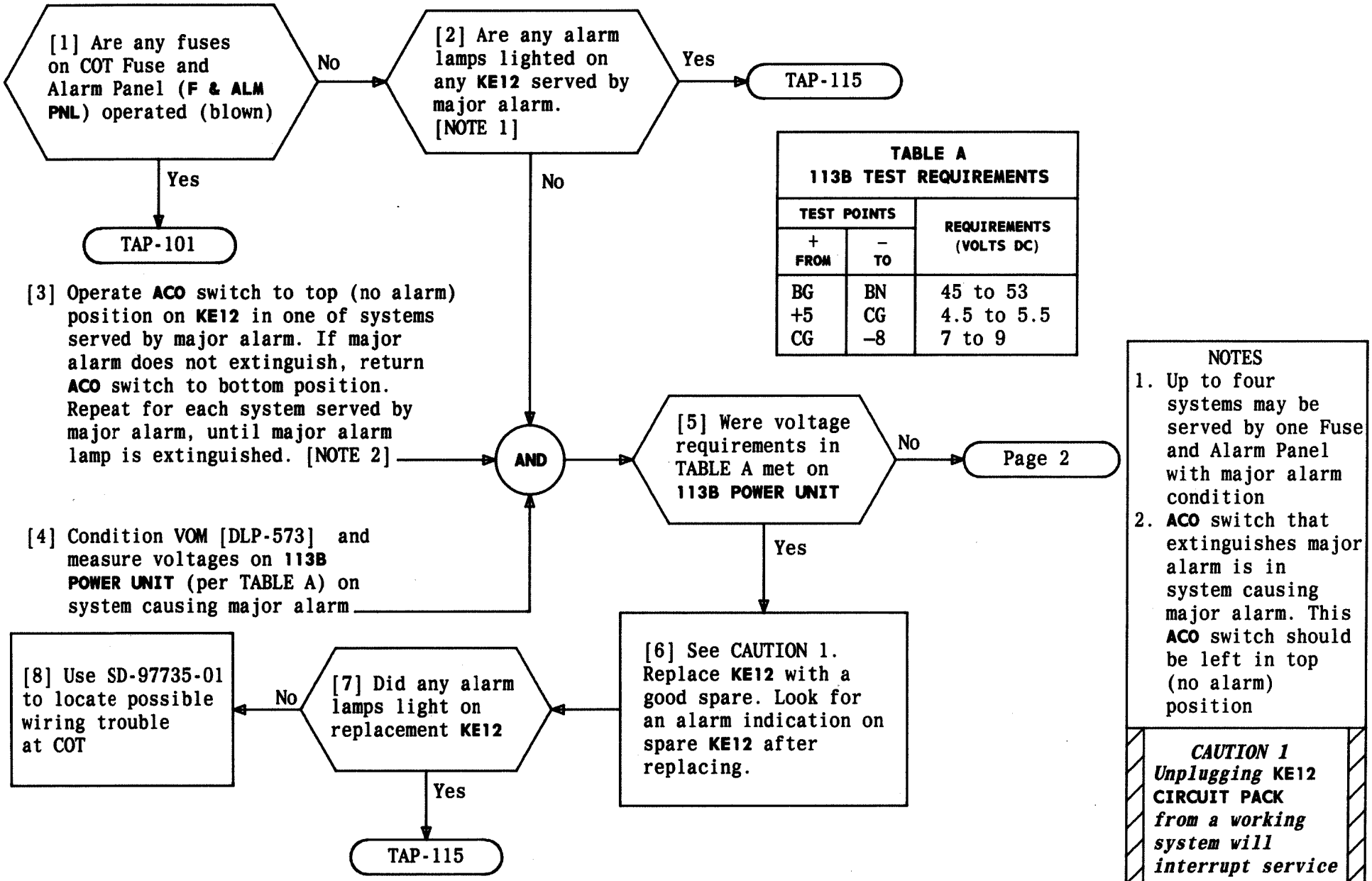


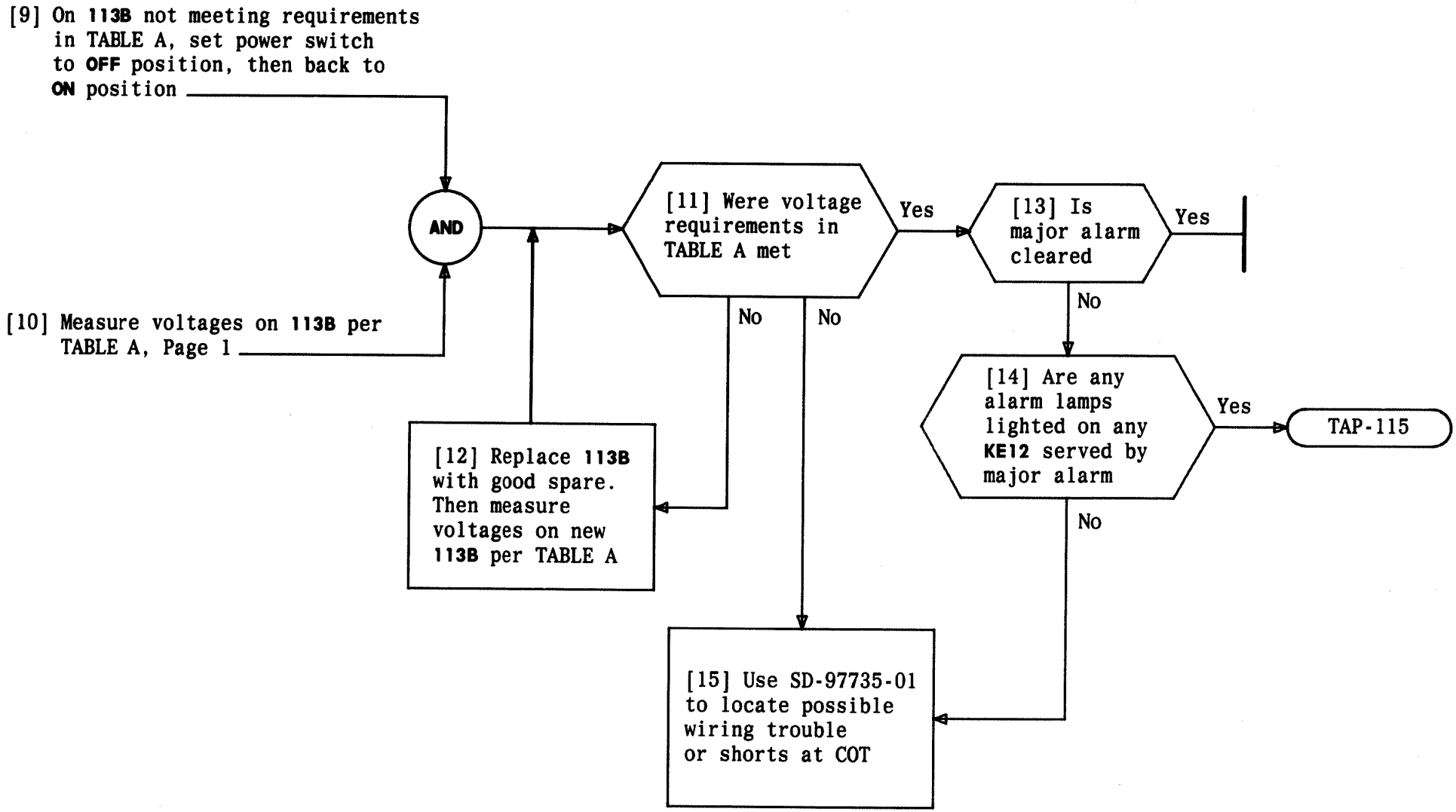
TABLE A
113B TEST REQUIREMENTS

TEST POINTS		REQUIREMENTS (VOLTS DC)
+ FROM	– TO	
BG	BN	45 to 53
+5	CG	4.5 to 5.5
CG	–8	7 to 9

NOTES
1. Up to four systems may be served by one Fuse and Alarm Panel with major alarm condition
2. ACO switch that extinguishes major alarm is in system causing major alarm. This ACO switch should be left in top (no alarm) position

CAUTION 1
Unplugging KE12 CIRCUIT PACK from a working system will interrupt service

CLEAR MAJOR ALARM AT COT



CLEAR MAJOR ALARM AT COT

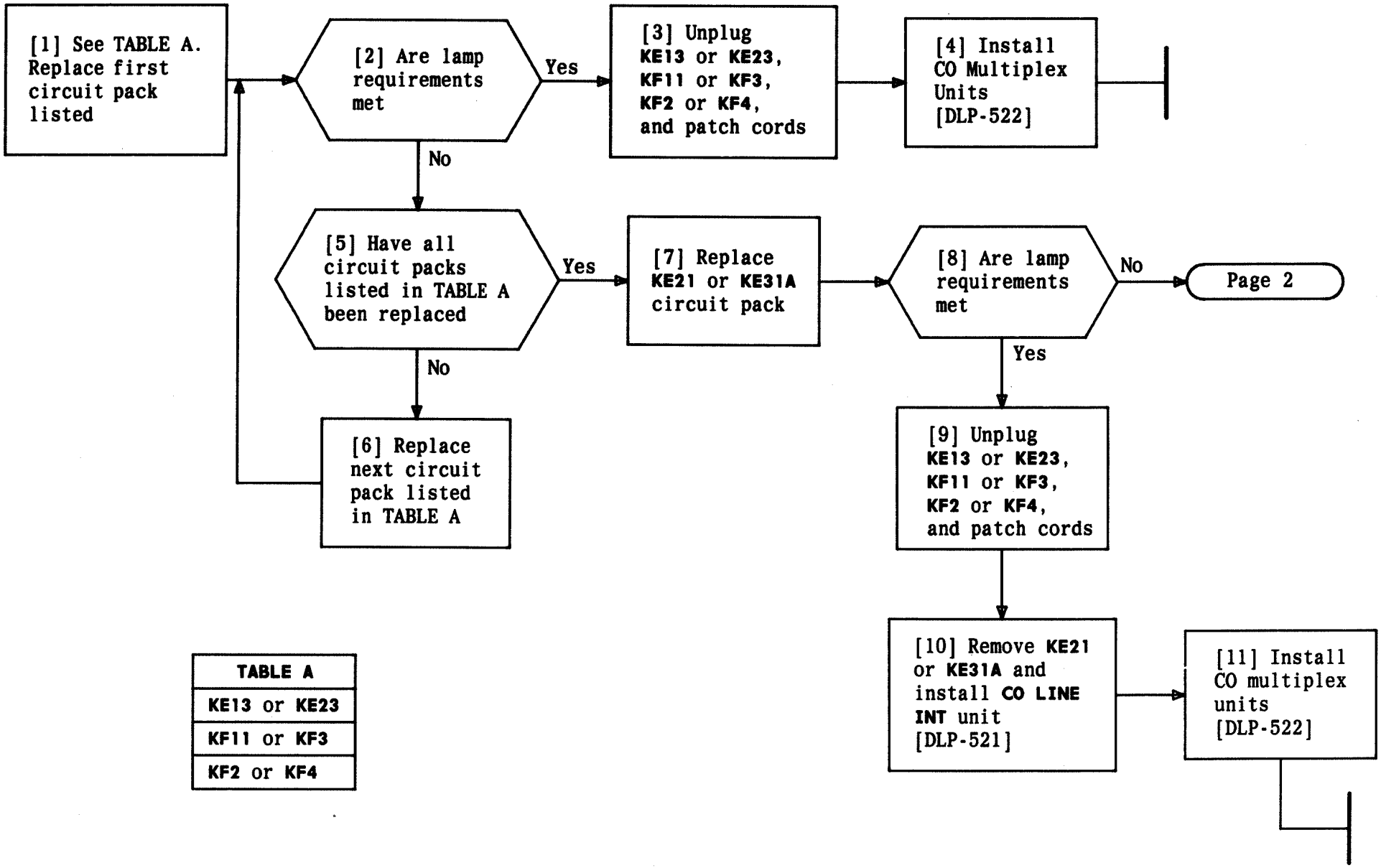
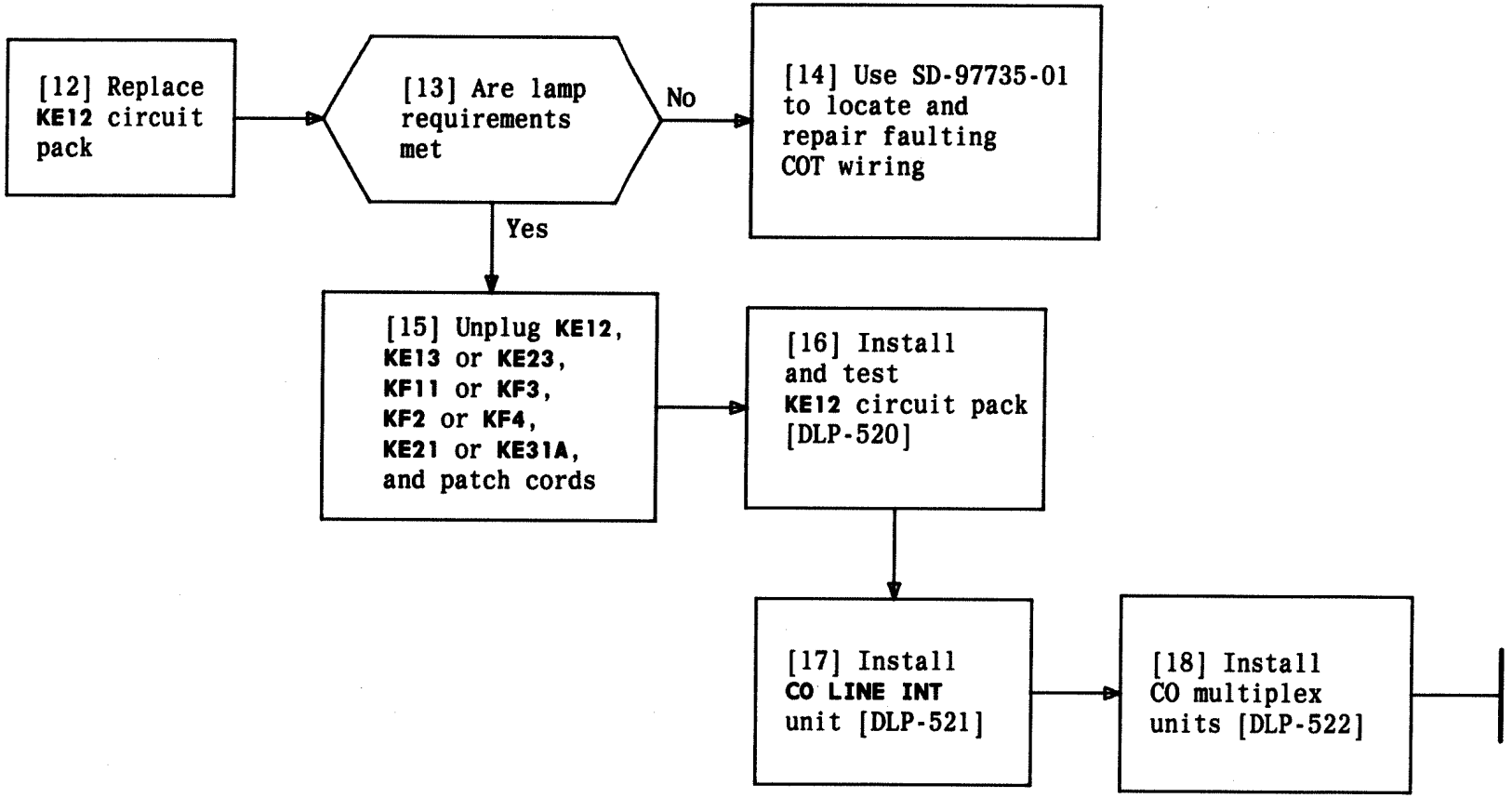


TABLE A
KE13 or KE23
KF11 or KF3
KF2 or KF4

CLEAR KE12 LAMP TROUBLE WHEN CHECKING CENTRAL OFFICE ALARMS FOR LINE SWITCHING



CLEAR KE12 LAMP TROUBLE WHEN CHECKING CENTRAL OFFICE ALARMS FOR LINE SWITCHING

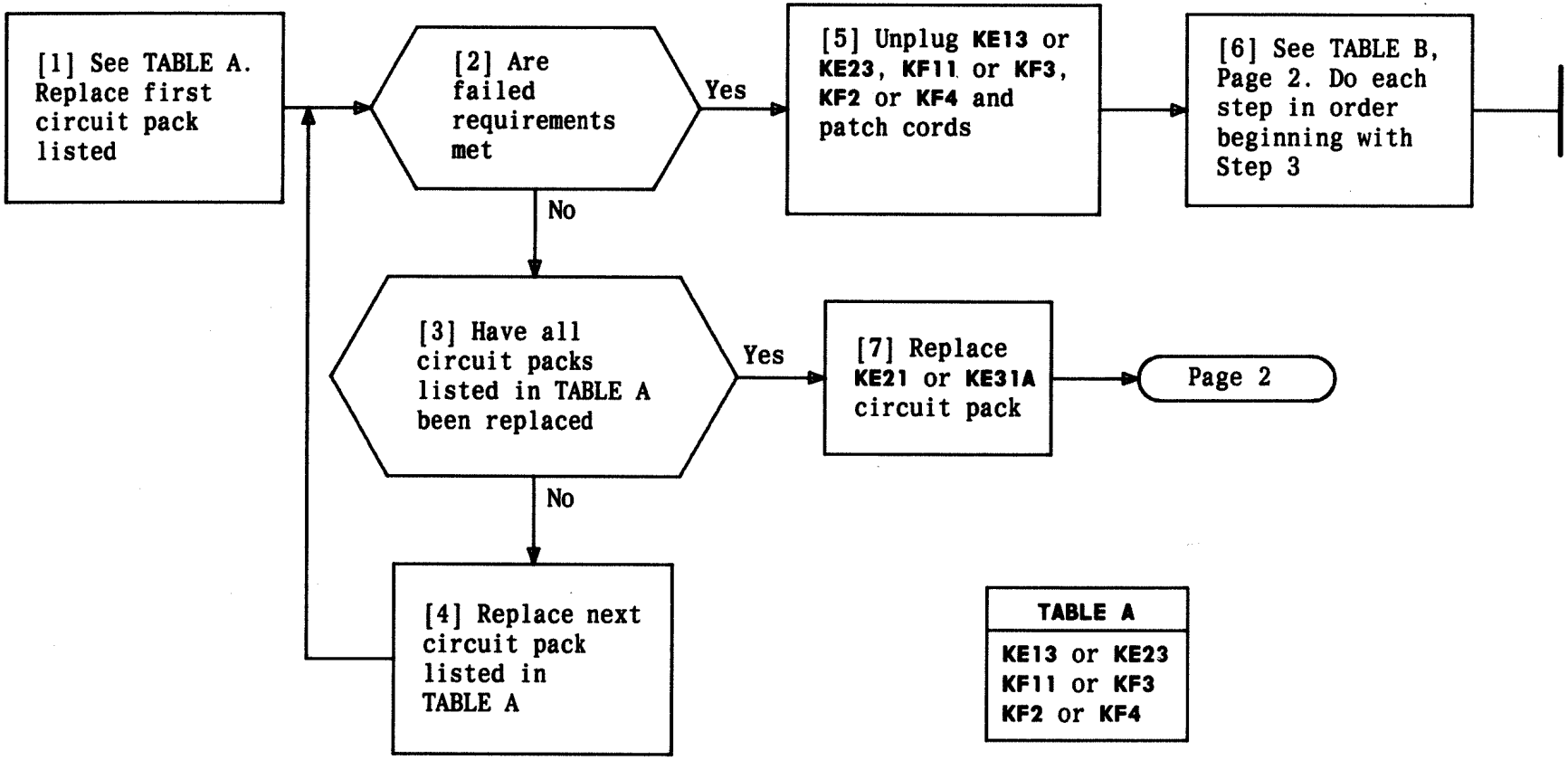


TABLE A
KE13 or KE23
KF11 or KF3
KF2 or KF4

CLEAR 8-CHANNEL LOOP AROUND TROUBLE

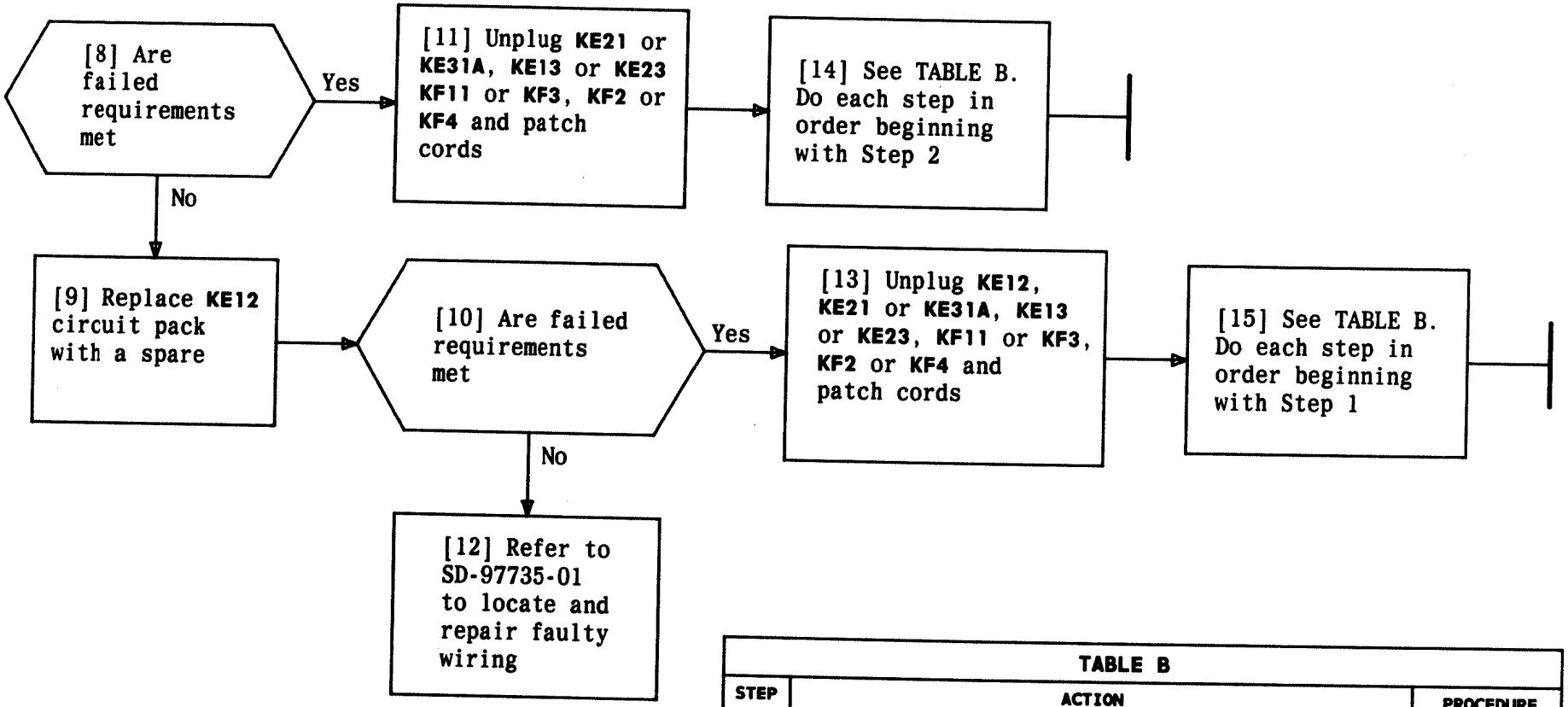


TABLE B

STEP	ACTION	PROCEDURE
1	Install and Test CO MAINT UNIT (KE12)	DLP-520
2	Install CO LINE INT (KE21 or KE31A)	DLP-521
3	Install Central office Multiplex Units	DLP-522
4	Check CO Alarms for Digital Line Switching	DLP-523

CLEAR 8-CHANNEL LOOP AROUND TROUBLE

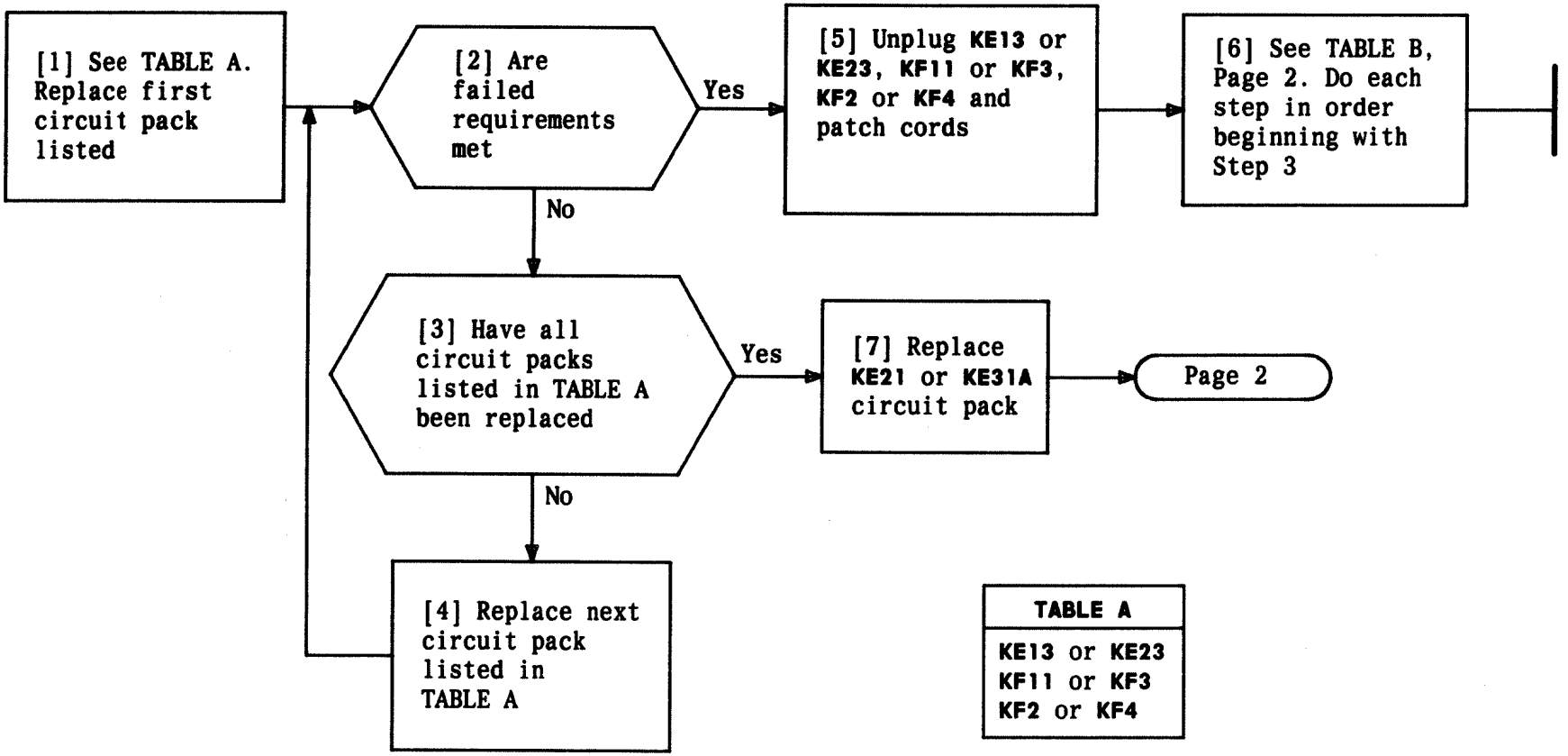


TABLE A
KE13 or KE23
KF11 or KF3
KF2 or KF4

CLEAR COT FINAL SYS OUT STATE TEST TROUBLE

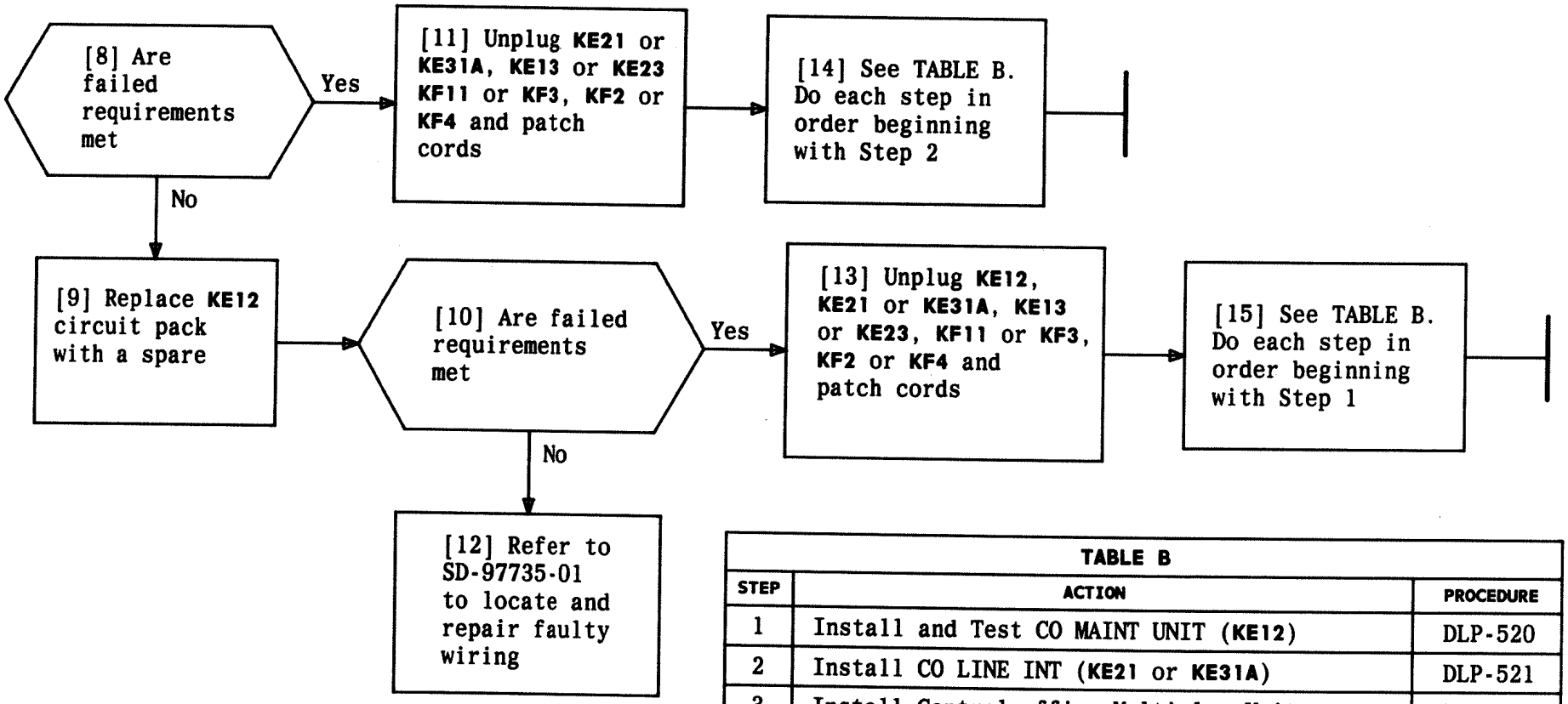


TABLE B

STEP	ACTION	PROCEDURE
1	Install and Test CO MAINT UNIT (KE12)	DLP-520
2	Install CO LINE INT (KE21 or KE31A)	DLP-521
3	Install Central office Multiplex Units	DLP-522
4	Check CO Alarms for Digital Line Switching	DLP-523
5	Connect Test Line to Tip and Ring of Chan. 18	–
6	Connect 1014B Handset Across Tip and Ring of Chan. 18 with MON-TALK switch in MON	–
7	Perform 8-Channel Loop-Around Test	DLP-524

CLEAR COT FINAL SYS OUT STATE TEST TROUBLE

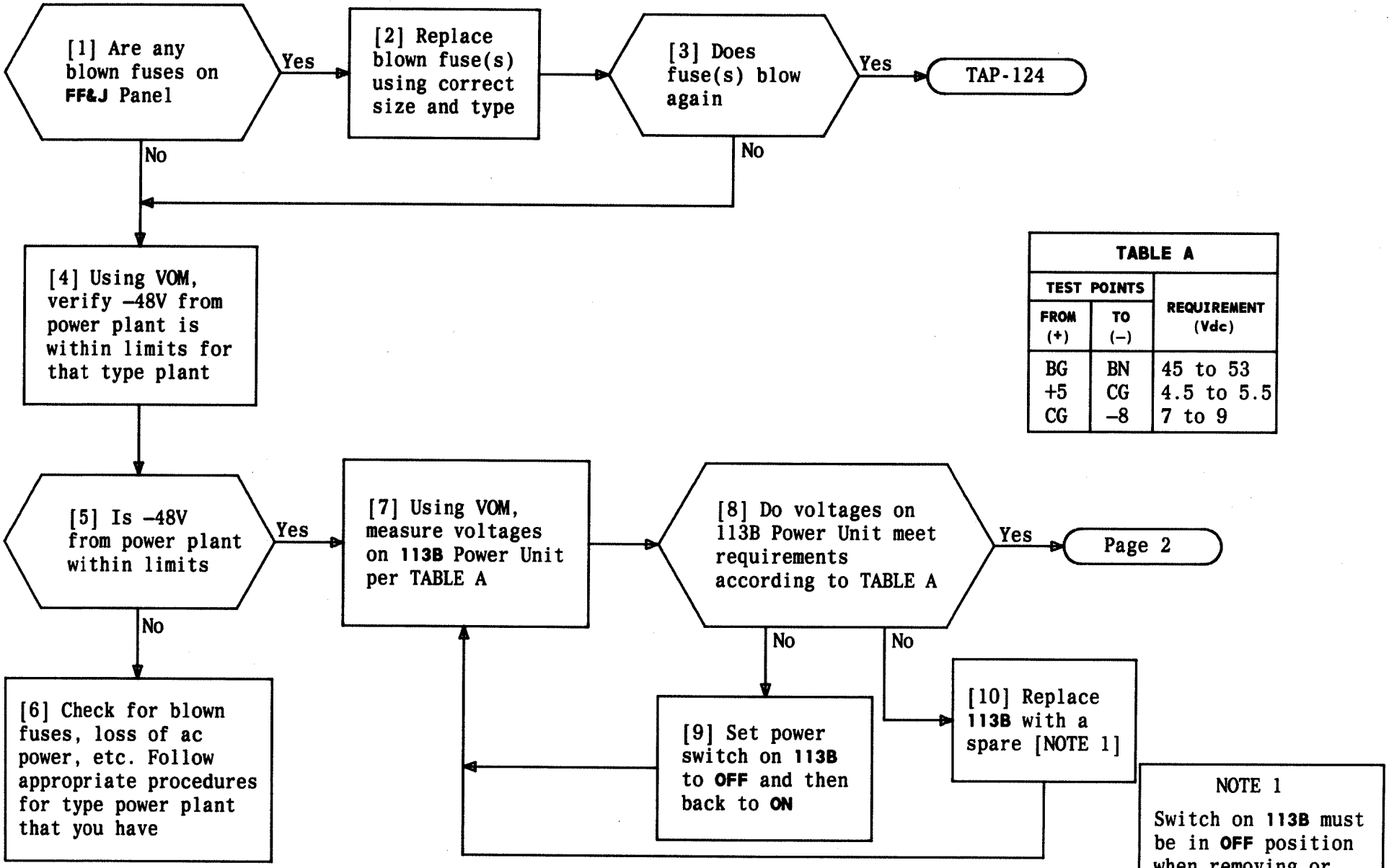


TABLE A		
TEST POINTS		REQUIREMENT (Vdc)
FROM (+)	TO (–)	
BG	BN	45 to 53
+5	CG	4.5 to 5.5
CG	–8	7 to 9

NOTE 1

Switch on 113B must be in OFF position when removing or replacing unit

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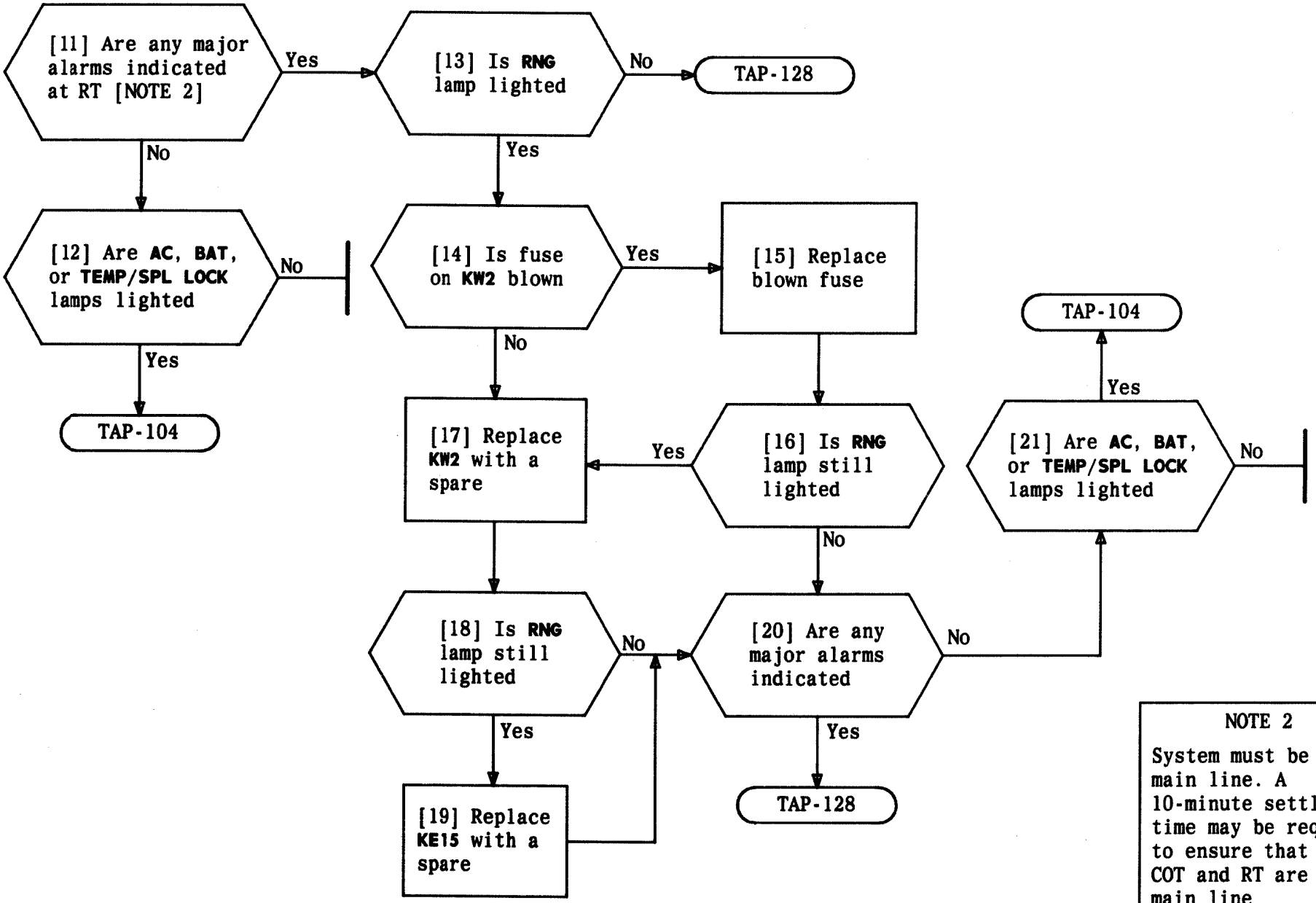
CLEAR REMOTE TERMINAL MAJOR ALARM (FRAME-MOUNTED)



NOTE 2

System must be on main line. A 10-minute settling time may be required to ensure that both COT and RT are on main line

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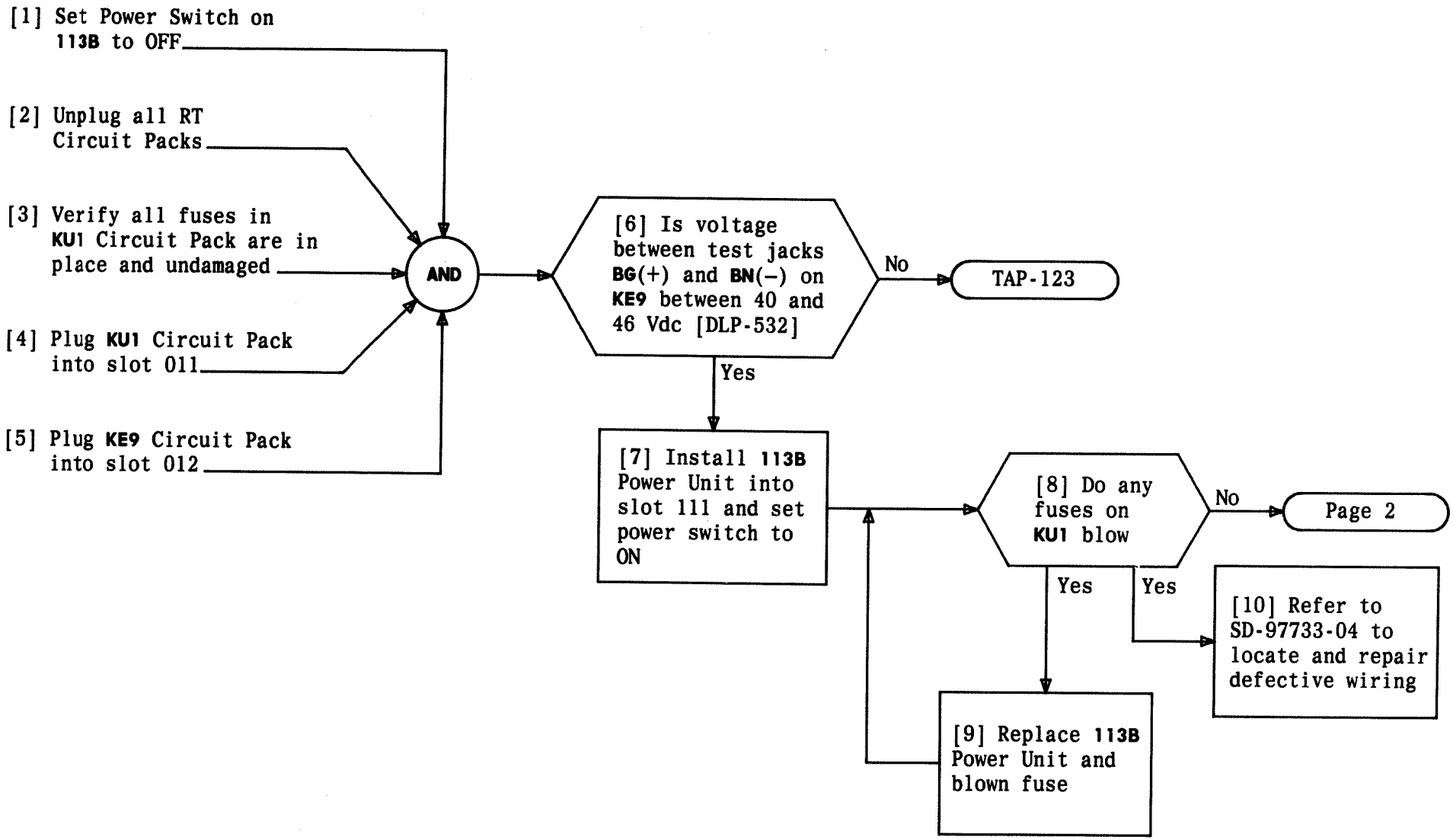
CLEAR REMOTE TERMINAL MAJOR ALARM (FRAME-MOUNTED)



REPAIR RT CABINET BLOWN FUSE CONDITION

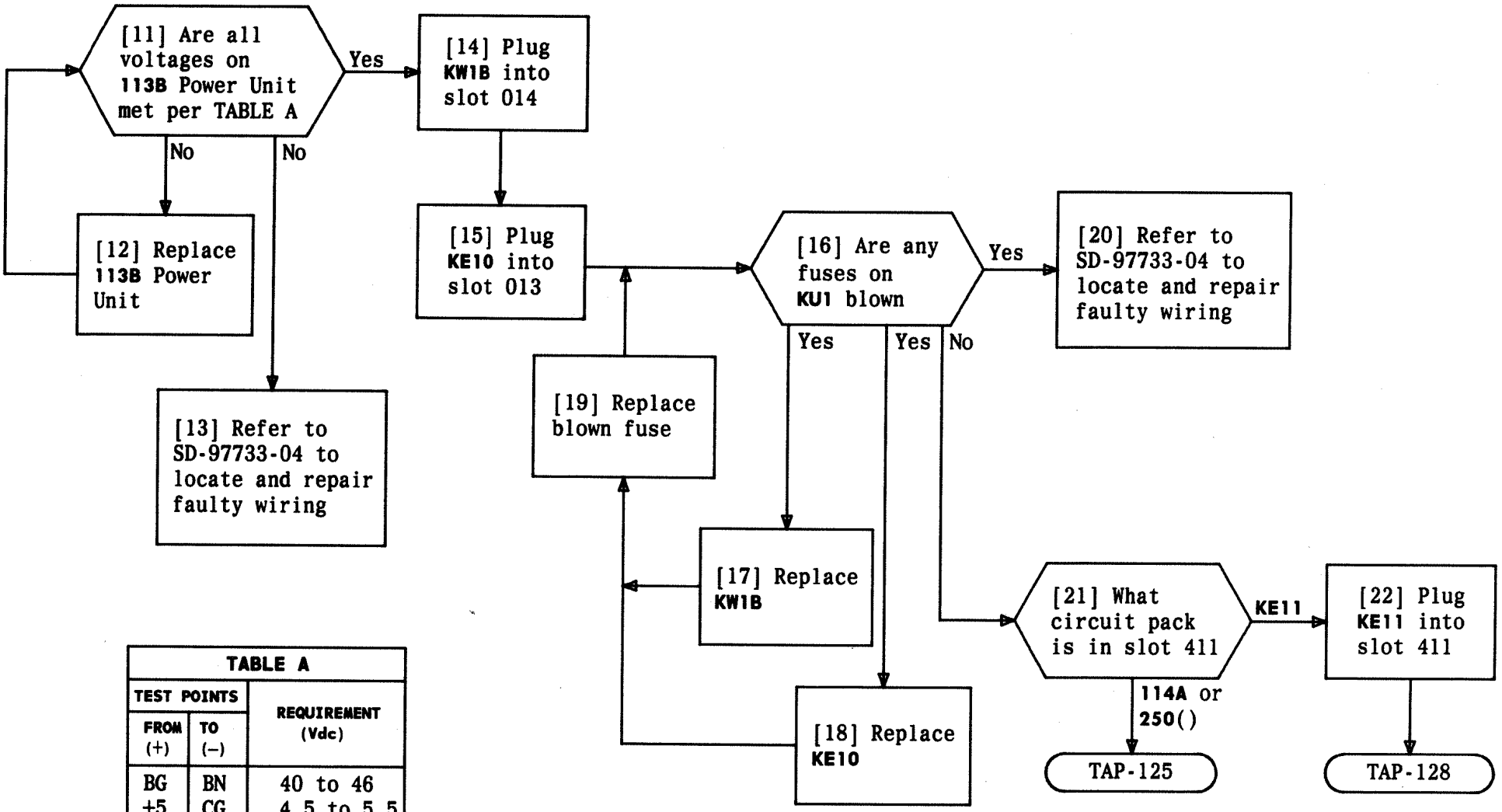
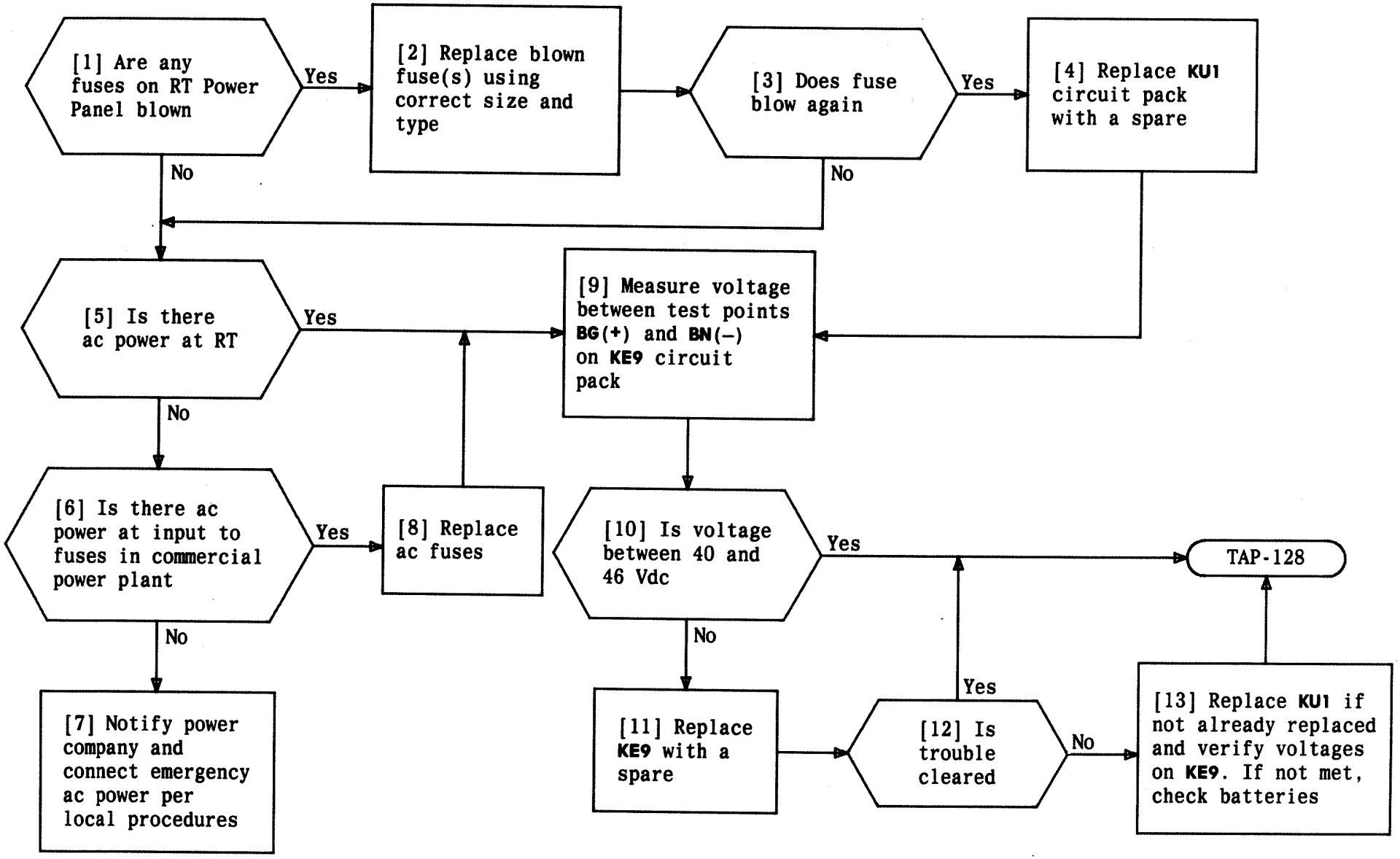


TABLE A		
TEST POINTS		REQUIREMENT (Vdc)
FROM (+)	TO (–)	
BG	BN	40 to 46
+5	CG	4.5 to 5.5
CG	–8	7 to 9

REPAIR RT CABINET BLOWN FUSE CONDITION



REPAIR RT CABINET POWER TROUBLE

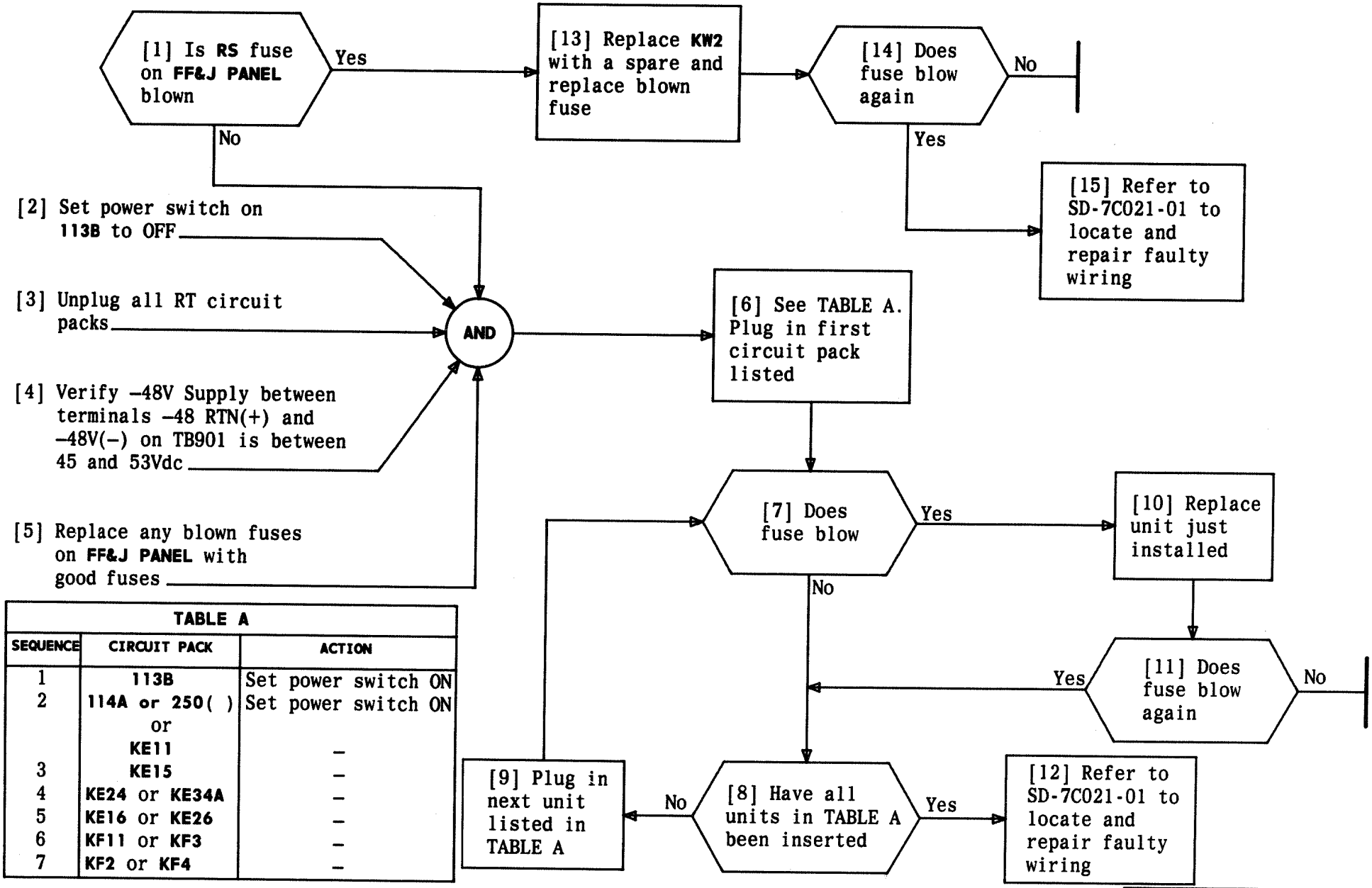


TABLE A

SEQUENCE	CIRCUIT PACK	ACTION
1	113B	Set power switch ON
2	114A or 250( )	Set power switch ON
	or	
	KE11	–
3	KE15	–
4	KE24 or KE34A	–
5	KE16 or KE26	–
6	KF11 or KF3	–
7	KF2 or KF4	–

REPAIR RT FRAME BLOWN FUSE CONDITION

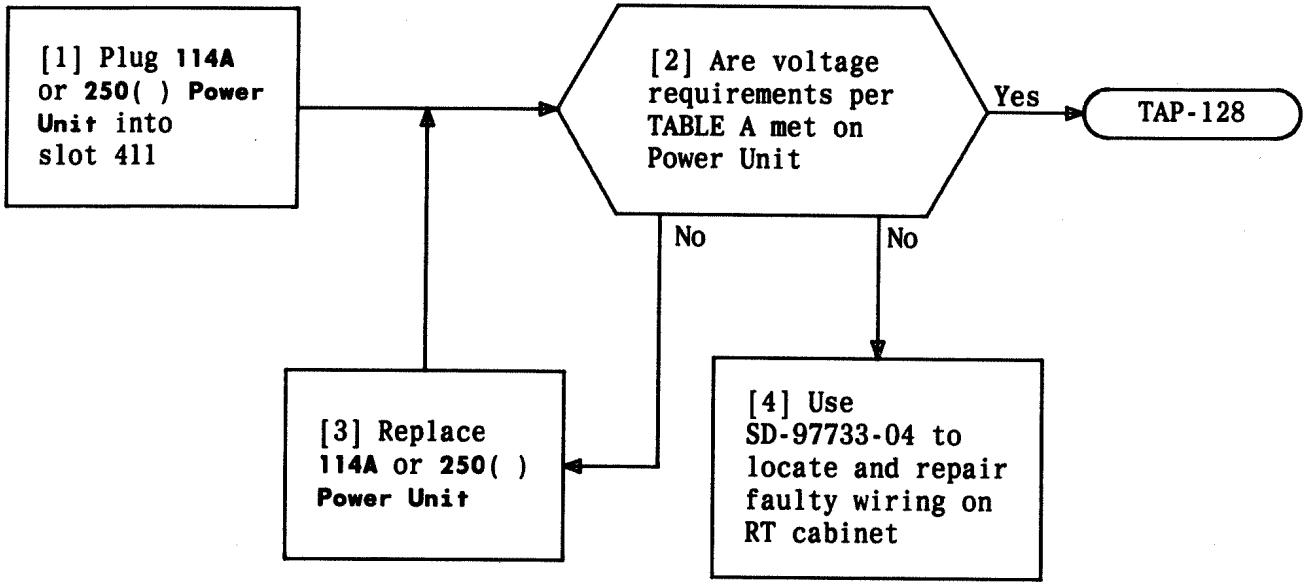


TABLE A

TEST POINTS		REQUIREMENTS (Vdc)	
FROM (+)	TO (−)	114A POWER UNIT	250( ) POWER UNIT
BG	BN	40 to 46	40 to 46
LP	LG	100 to 160	120 to 150
LG	LN	0 to 60	120 to 150

CHECK LINE POWER UNIT FOR TROUBLE

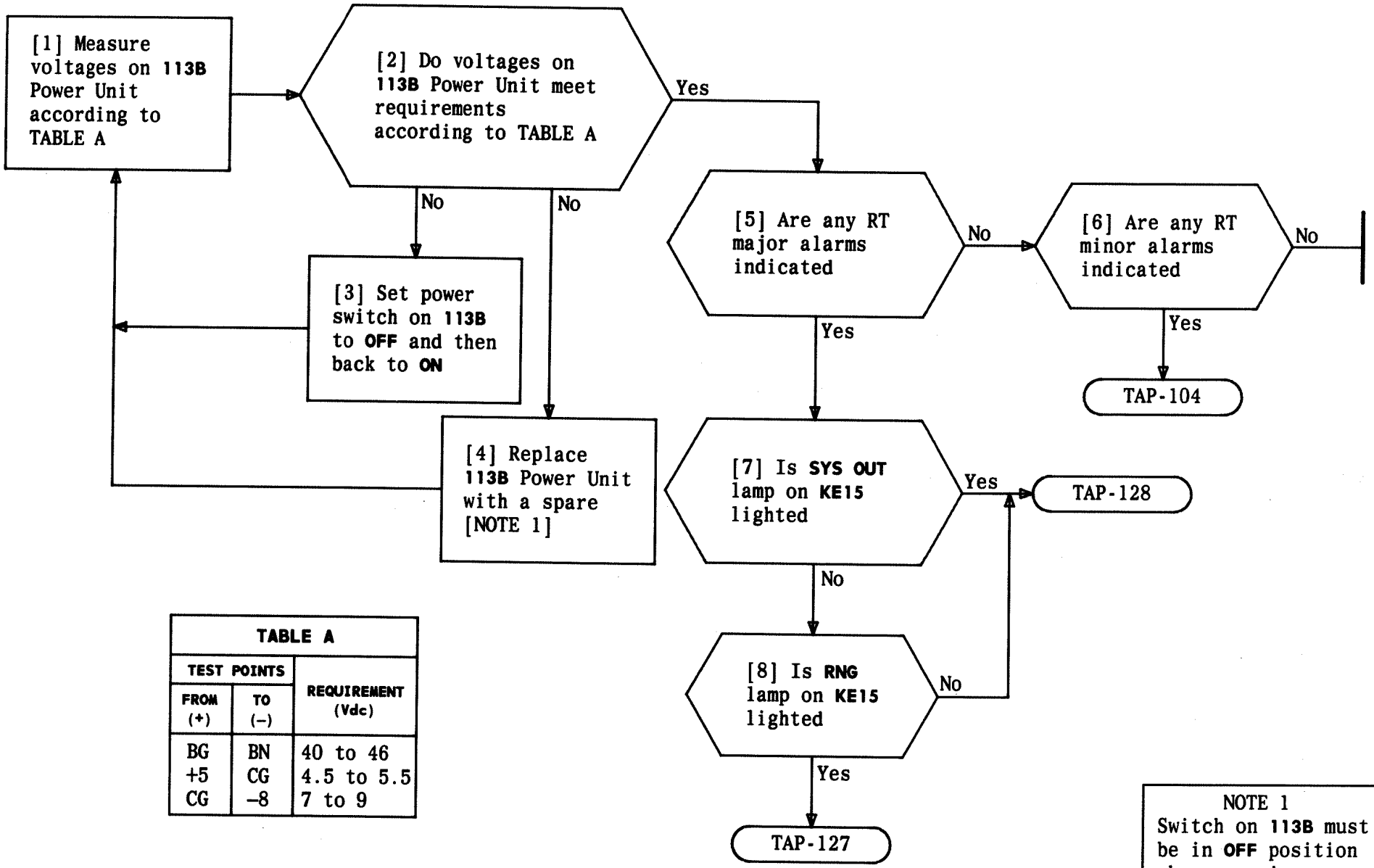


TABLE A		
TEST POINTS		REQUIREMENT (Vdc)
FROM (+)	TO (–)	
BG	BN	40 to 46
+5	CG	4.5 to 5.5
CG	–8	7 to 9

NOTE 1
Switch on 113B must be in OFF position when removing or replacing unit

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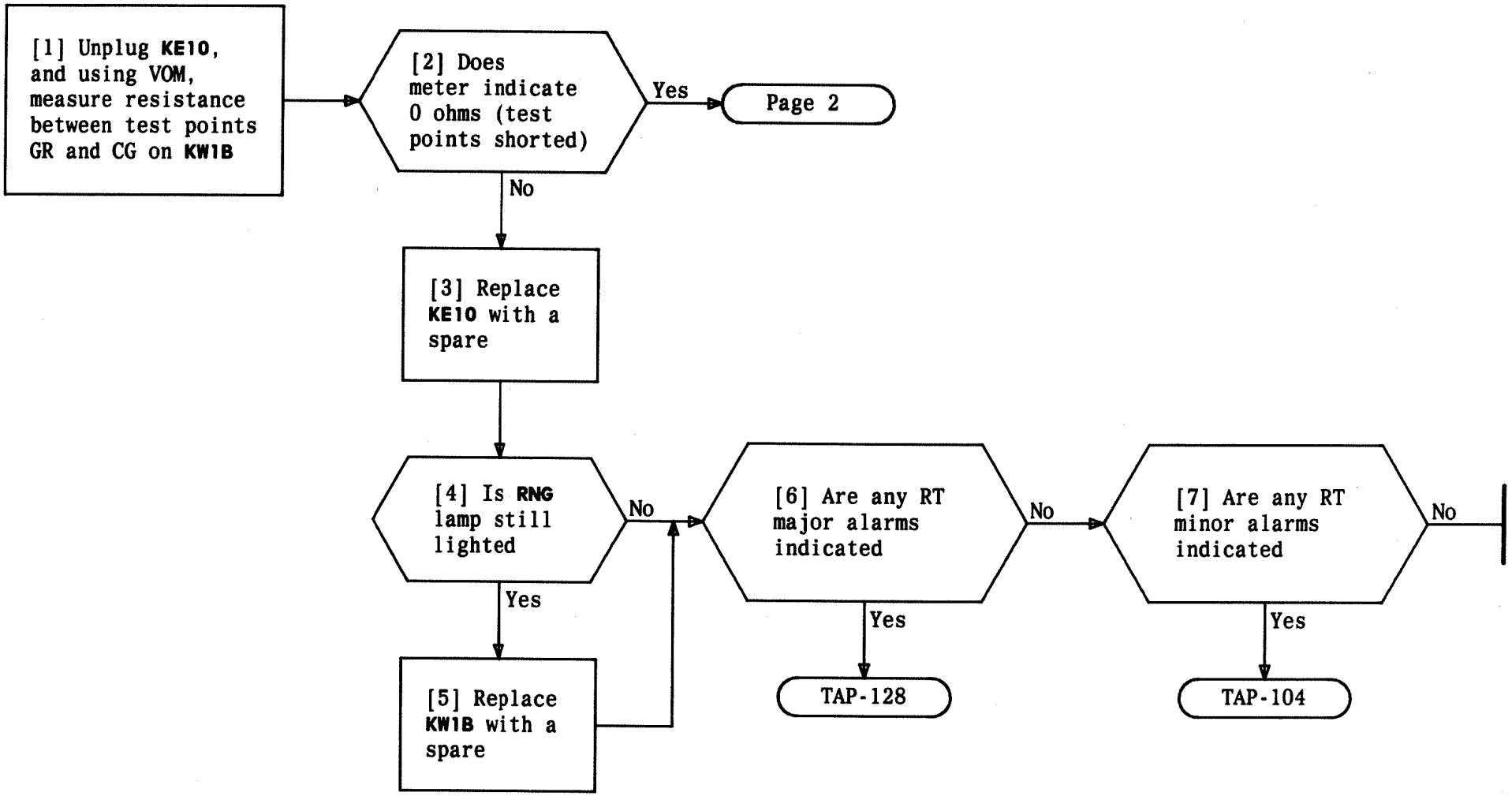
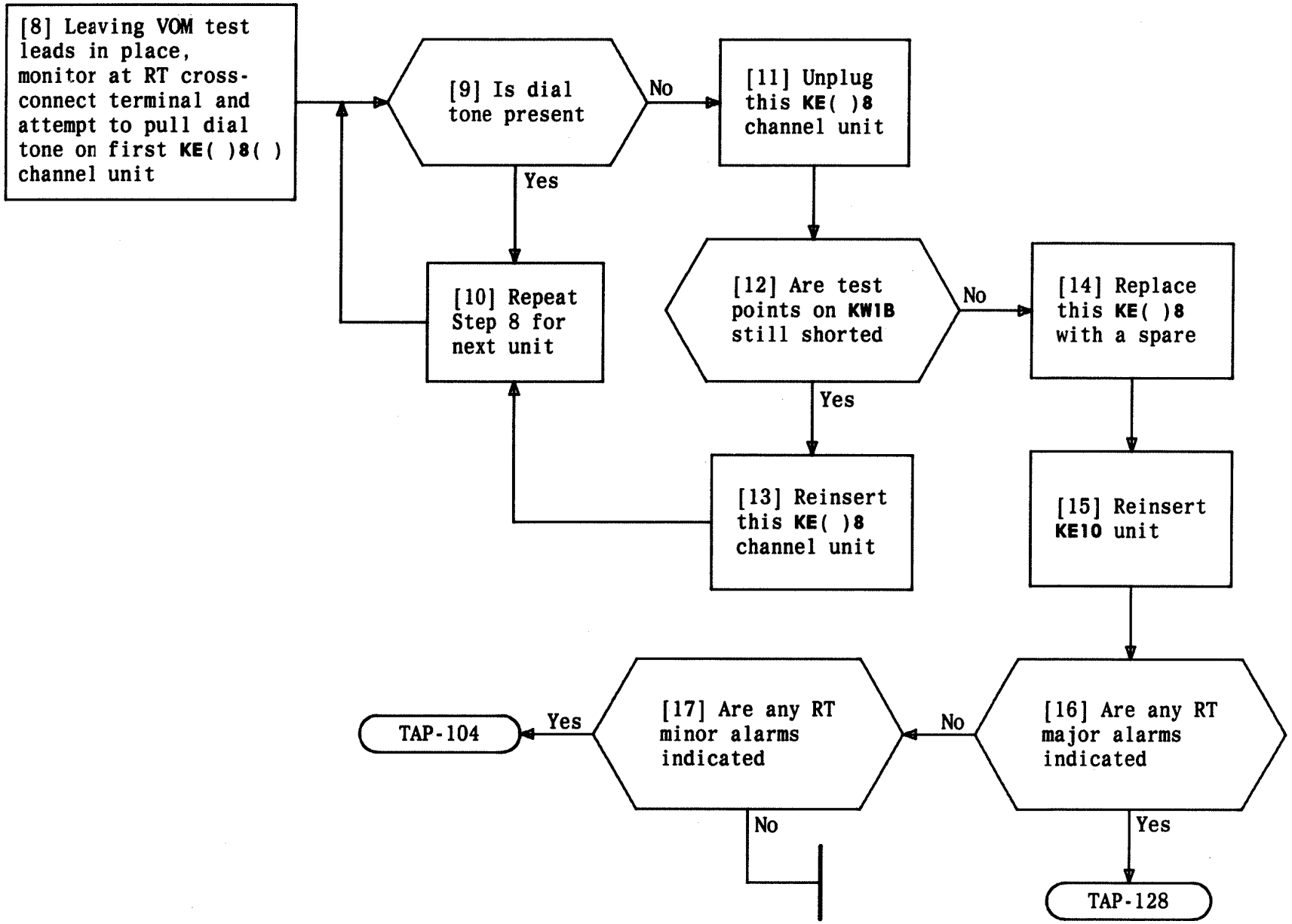
CHECK 113B POWER UNIT FOR TROUBLE IN RT CABINET



CLEAR RNG ALARM AT RT CABINET



CLEAR RNG ALARM AT RT CABINET

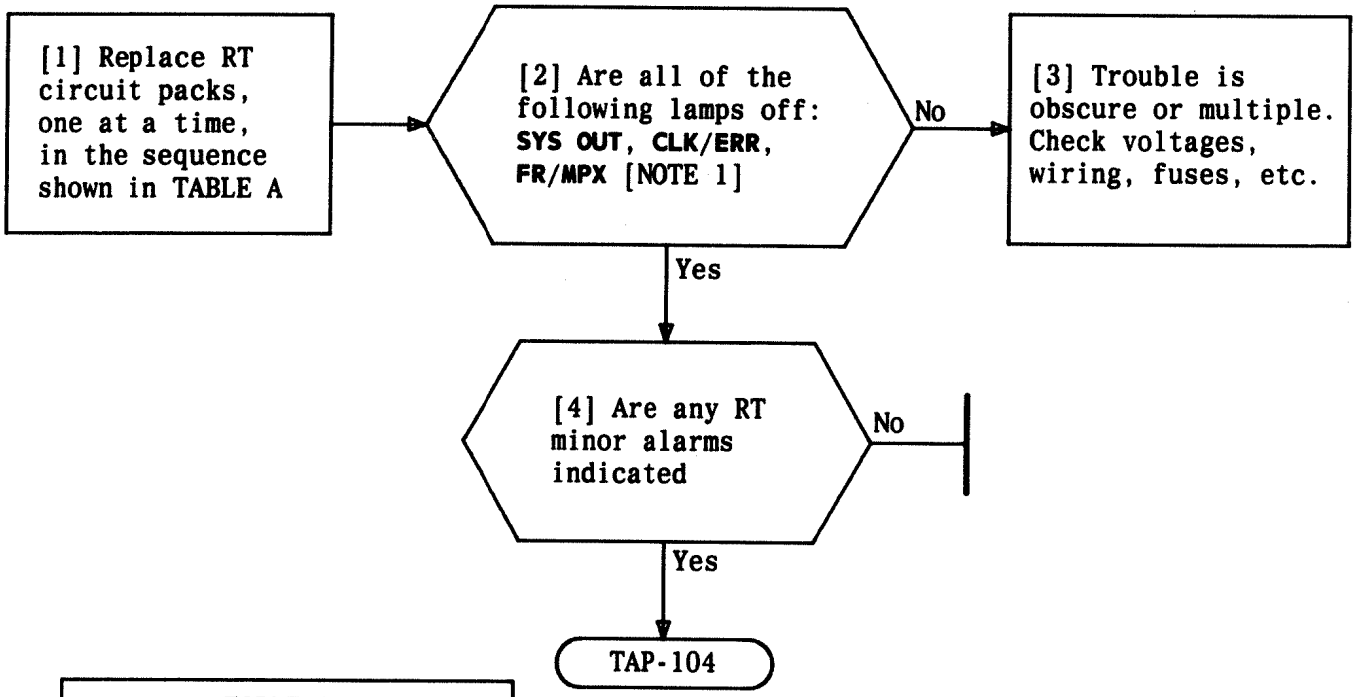


TABLE A	
SEQUENCE†	CIRCUIT PACK
1	KE24 or KE34A*
2	KE15
3	KE16 or KE26
4	KF11 or KF3
5	KF2 or KF4

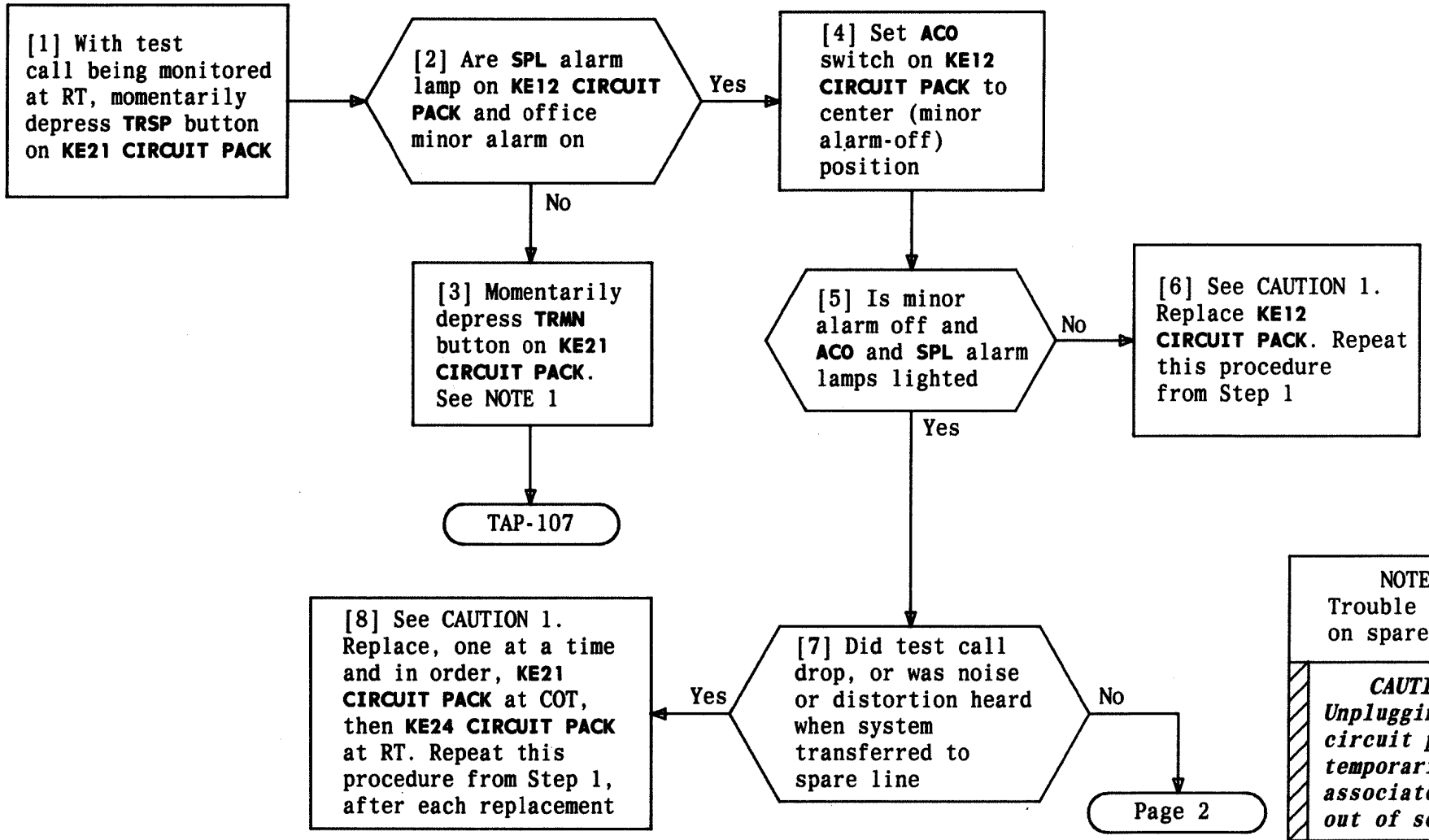
* Requires correct 983( )-equalizer (remove and save equalizer from any unit being returned)
† Alarm lamps should be checked after replacing each unit

NOTE 1

System must be on main line. A 10-minute settling time may be required to ensure that both COT and RT are on main line

LOCATE DEFECTIVE RT CIRCUIT PACK

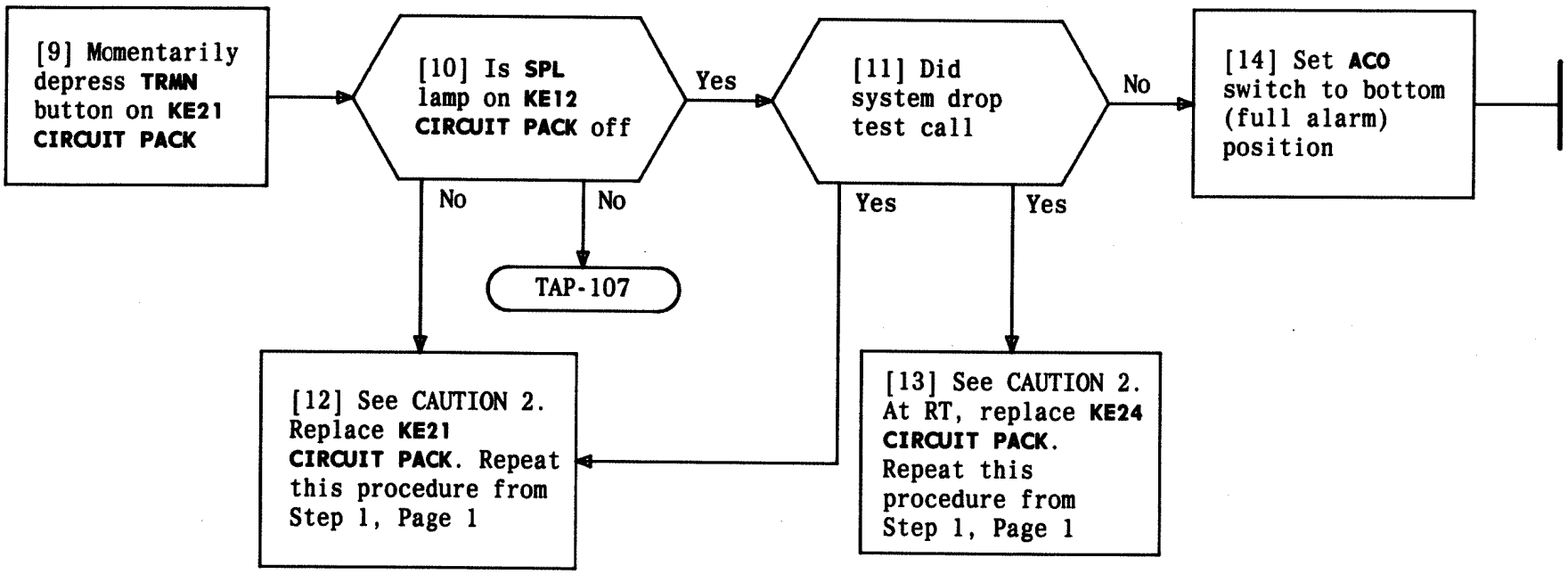
SUMMARY
With test call being monitored, transfer to spare line and then back to main line. Verify proper operation of **SPL** and **ACO** alarm lamps, office minor alarm during test. No distortion or noise should be heard during transfer.



NOTE 1
Trouble may be on spare line

CAUTION 1
Unplugging this circuit pack will temporarily put associated system out of service

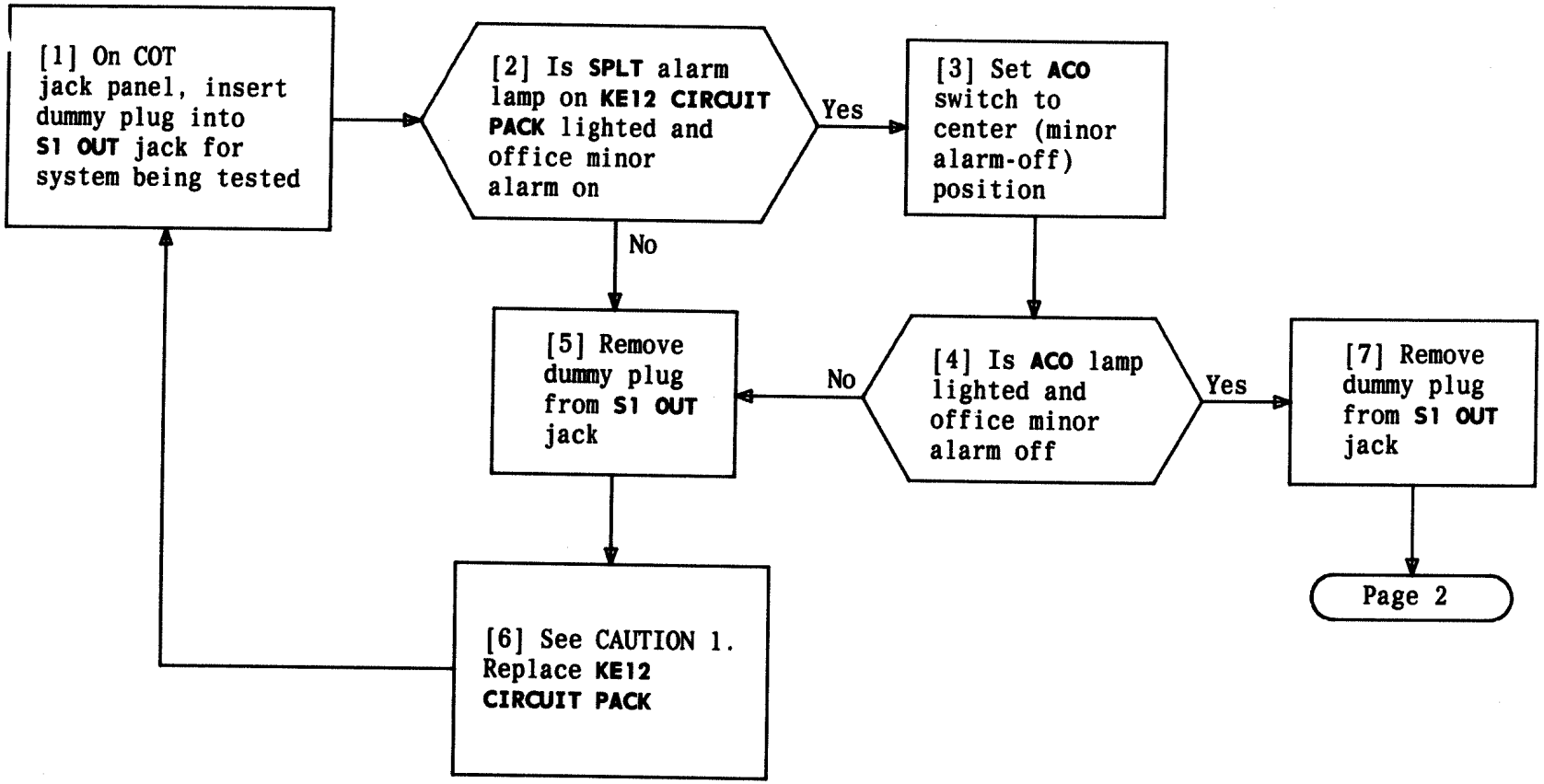
PERFORM TRANSFER-TO- SPARE LINE TESTS



CAUTION 2

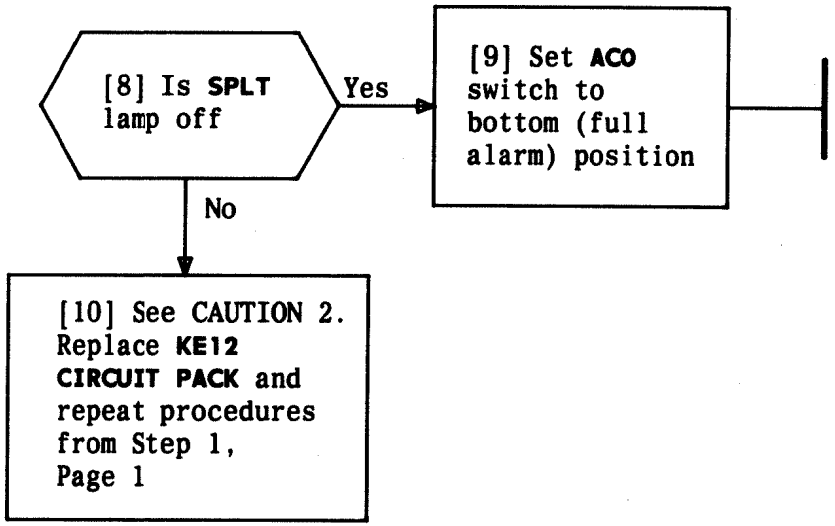
Unplugging this circuit pack will temporarily put associated system out of service

PERFORM TRANSFER-TO-SPARE LINE TESTS



VERIFY OPERATION OF SPLT ALARM

CAUTION 1
Unplugging* KE12 CIRCUIT PACK *will temporarily put associated system out of service



VERIFY OPERATION OF SPLT ALARM

CAUTION 2
Unplugging* KE12 CIRCUIT PACK *will temporarily put associated system out of service

[1] See WARNING 1 and NOTE 1. Locate ground bracket and bond clamp in rear of RT cabinet next to battery compartment [FIG. 1]

[2] Verify bond clamp is securely installed in cable sheath [FIG. 2]. Verify ground bracket is securely attached to RT cabinet

[3] Using a 216-type tool or 7/16-inch wrench, verify nut on bond clamp is tight

AND

[4] Outside of RT cabinet, locate where ground wire connects to D ground rod or power company ground rod. See FIG. 3 for example of pole-mounted RT cabinet

[5] Verify all ground rod connections are secure

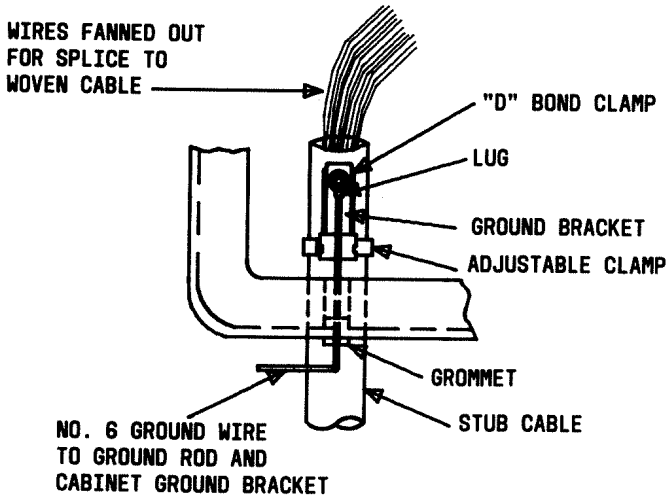


FIG. 1

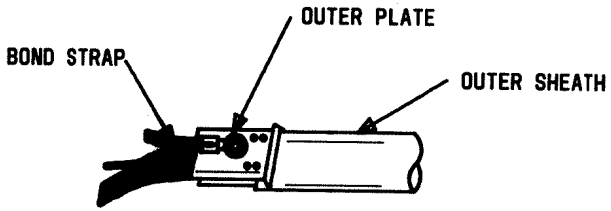
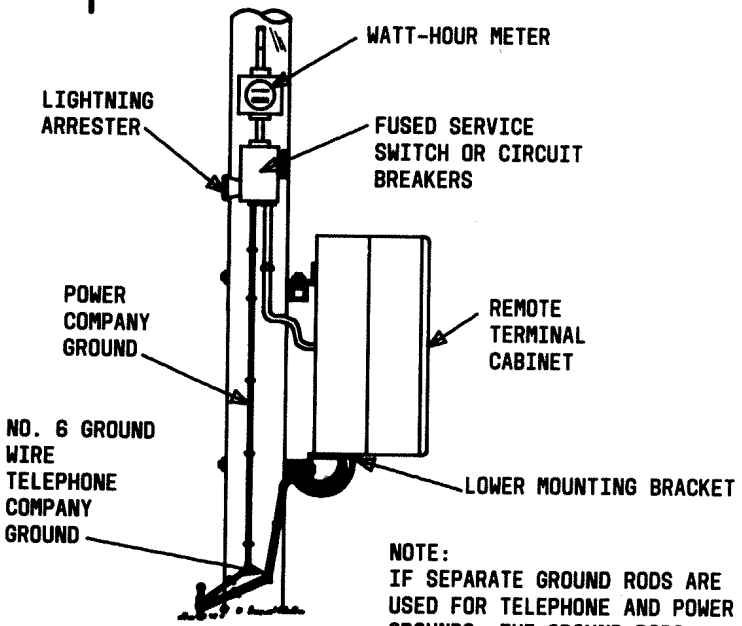


FIG. 2



NOTE:
IF SEPARATE GROUND RODS ARE USED FOR TELEPHONE AND POWER GROUNDS, THE GROUND RODS MUST BE BONDED TOGETHER USING NO. 6 GROUND WIRE

FIG. 3

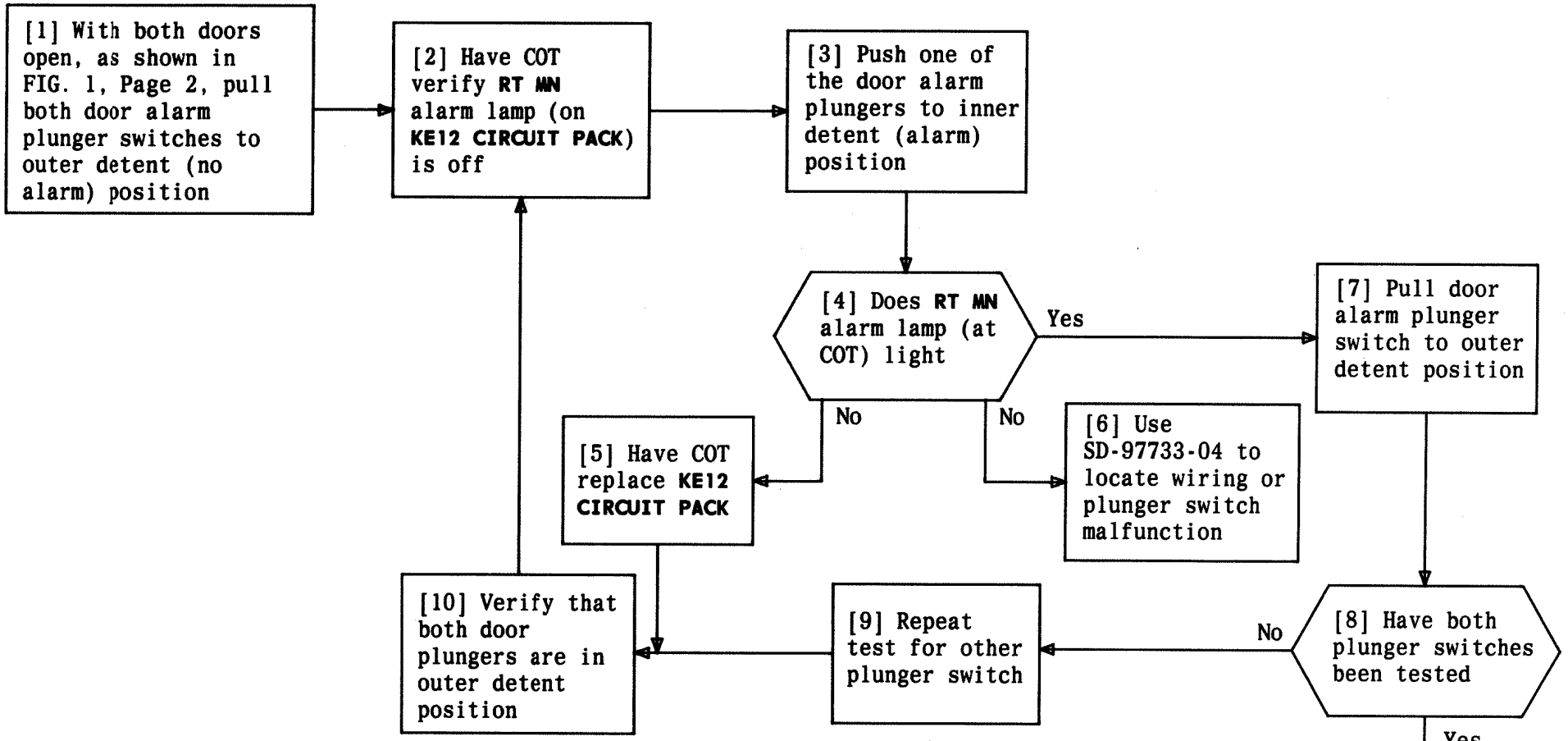
NOTE 1
Proper installation the bond clamp is vital. It establishes shield continuity and provides electrical protection which allows the installation to meet transmission objectives

WARNING 1
Sheath continuity must be maintained at all times. If bond strap is removed from bond clamp, use of a temporary bond will be necessary

INSPECT BONDING AND GROUNDING OF CABLE SHEATH AND RT CABINET

SUMMARY

With both door alarm plunger switches pulled to the outer detent (no alarm) position, push each one, one at a time, to the inner detent (alarm) position and then all the way in (closed door position). Have COT verify that **RT MN** alarm lamp lights only when plunger(s) are in the alarm position.



VERIFY OPERATION OF RT MN ALARM LAMP (AT COT) INDICATING OPEN RT CABINET DOOR

[11] Push one of the door alarm plunger switches all the way in (closed door position)

[12] Does RT MN alarm lamp (at COT) remain off

No

[13] Use SD-97733-04 to locate wiring or plunger switch malfunction

Yes

[14] Pull plunger switch just tested, to outer detent (no alarm) position

[15] Have both plunger switches been tested

No

[16] Repeat test for other plunger switch

Yes

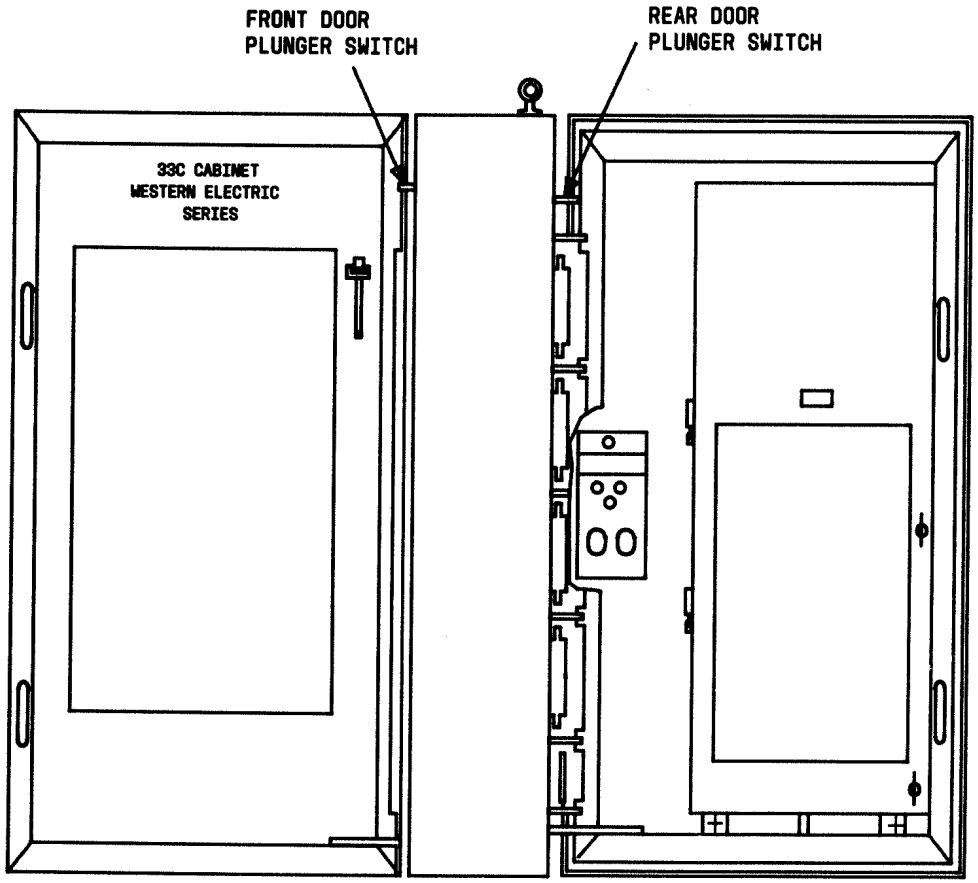


FIG. 1

VERIFY OPERATION OF RT MN ALARM LAMP (AT COT) INDICATING OPEN RT CABINET DOOR

SUMMARY

Measure battery voltage at **KE9 CIRCUIT PACK BG** (+) and **BN**(–) test jacks. Measured voltage should be between 40 to 46 Vdc. Remove **BC** (battery charger) fuse on RT power panel. Verify **AC** alarm lamp is lighted and have COT verify **RT MN** alarm lamp is lighted. **KE9** voltage measurement with **BC** fuse removed should be between 36 and 42 Vdc. Reinsert **BC** fuse.

[1] Get KS-14510 Volt-Ohm-Milliammeter (VOM), or equivalent

[2] Condition VOM [DLP-573] and set selector switch to **DC VOLTS-60** position

[3] Insert VOM positive (+) lead into **BG** test jack on **KE9 CIRCUIT PACK** (slot 012 in RT cabinet channel bank assembly). See FIG. 1

[4] Insert VOM negative (–) lead into **BN** test jack on **KE9 CIRCUIT PACK**

AND

Page 2

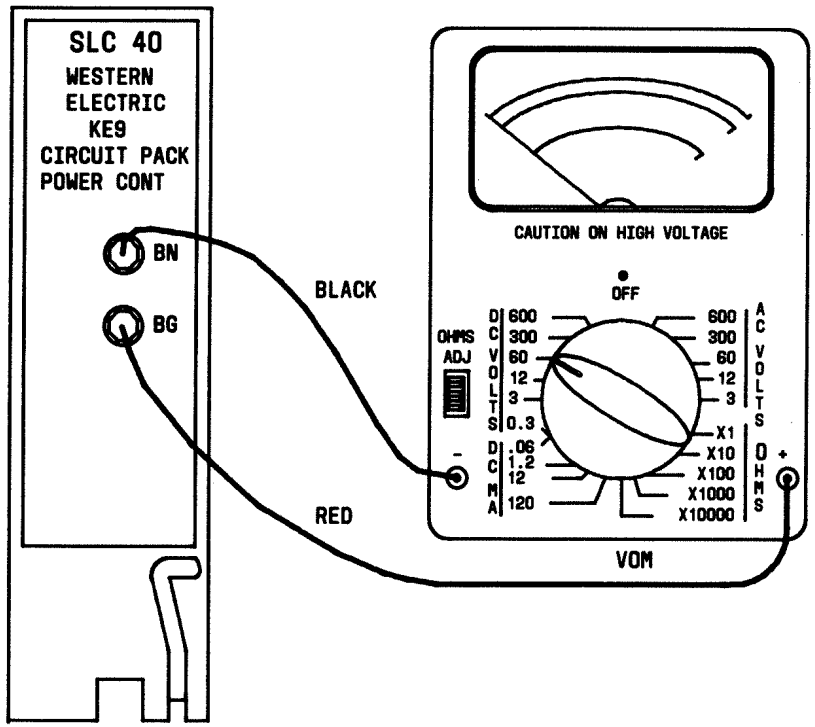


FIG. 1

MEASURE BATTERY VOLTAGE AT KE9 CIRCUIT PACK

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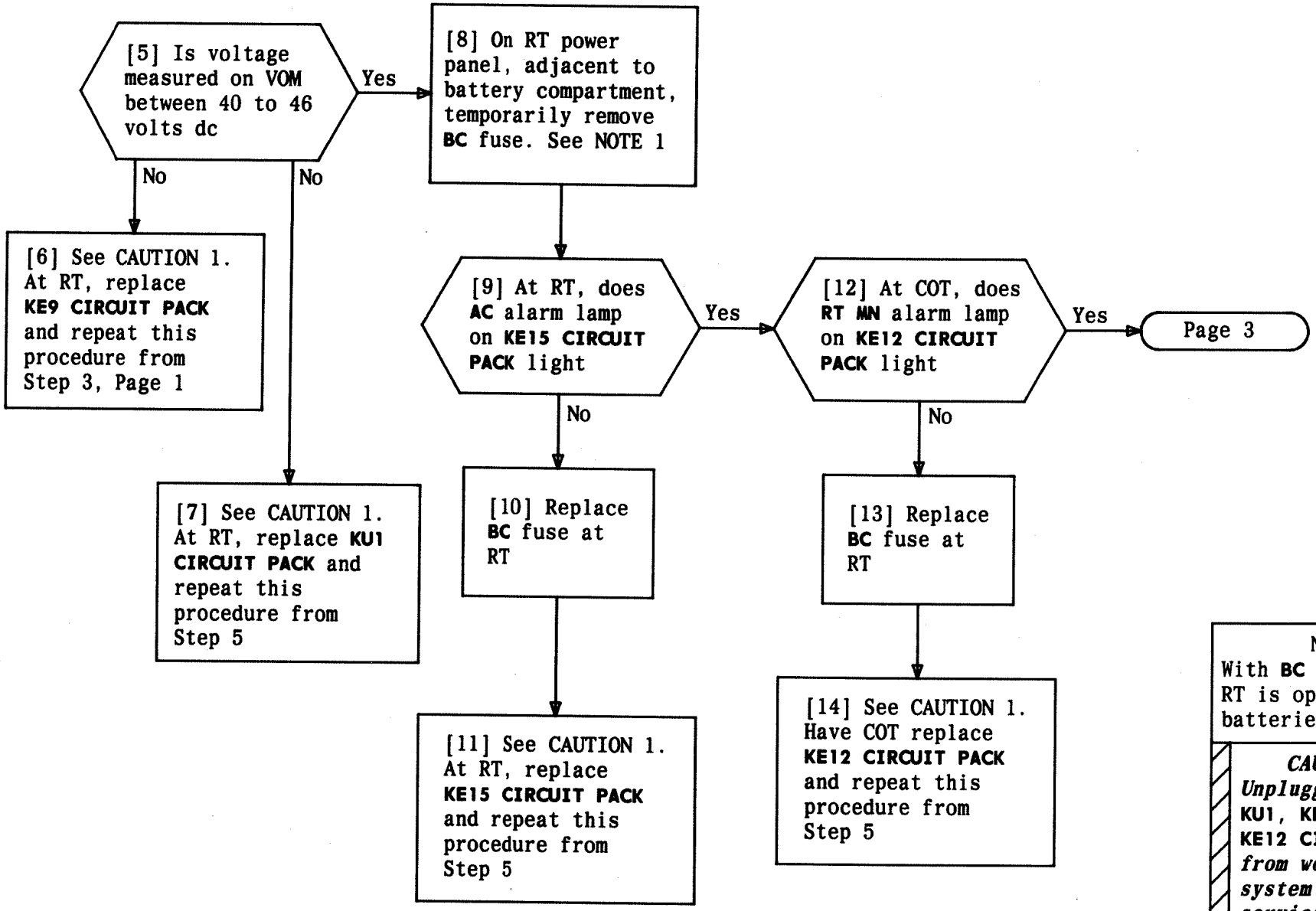
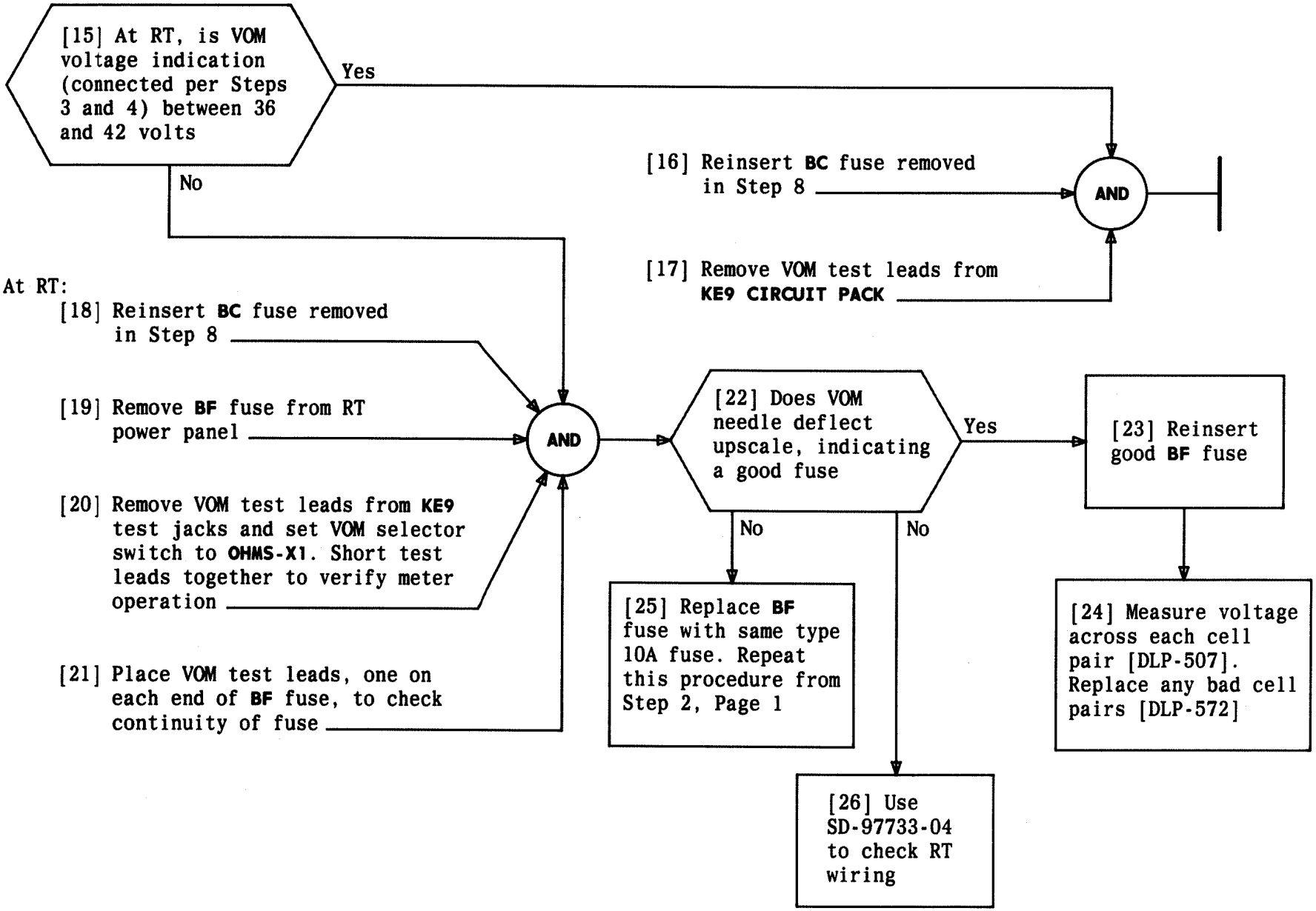


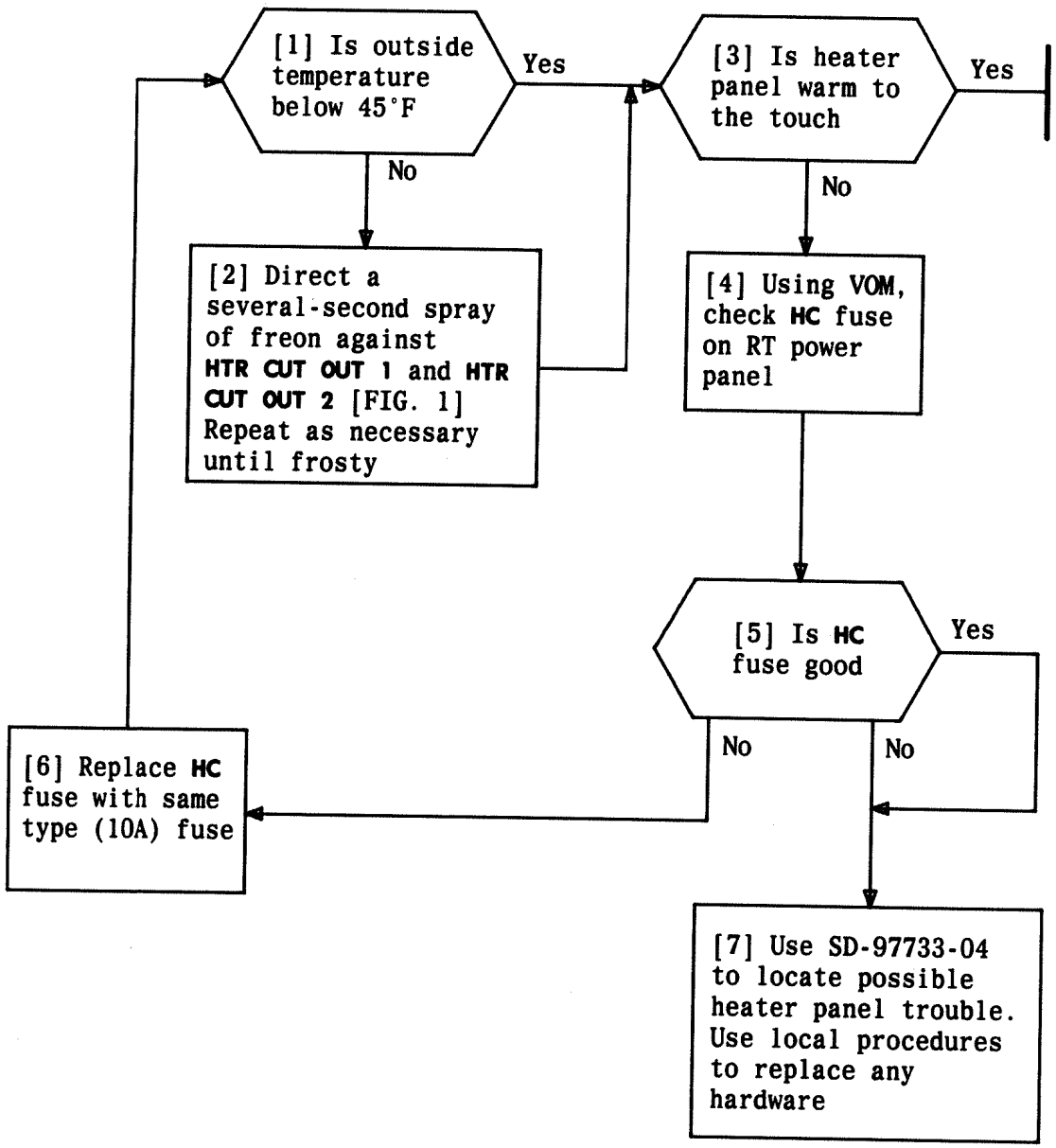
NOTE 1
With **BC** fuse removed, RT is operating on batteries

CAUTION 1
Unplugging* KE9, KU1, KE15, or KE12 CIRCUIT PACK *from working system will cause service interruption

MEASURE BATTERY VOLTAGE AT KE9 CIRCUIT PACK



MEASURE BATTERY VOLTAGE AT KE9 CIRCUIT PACK



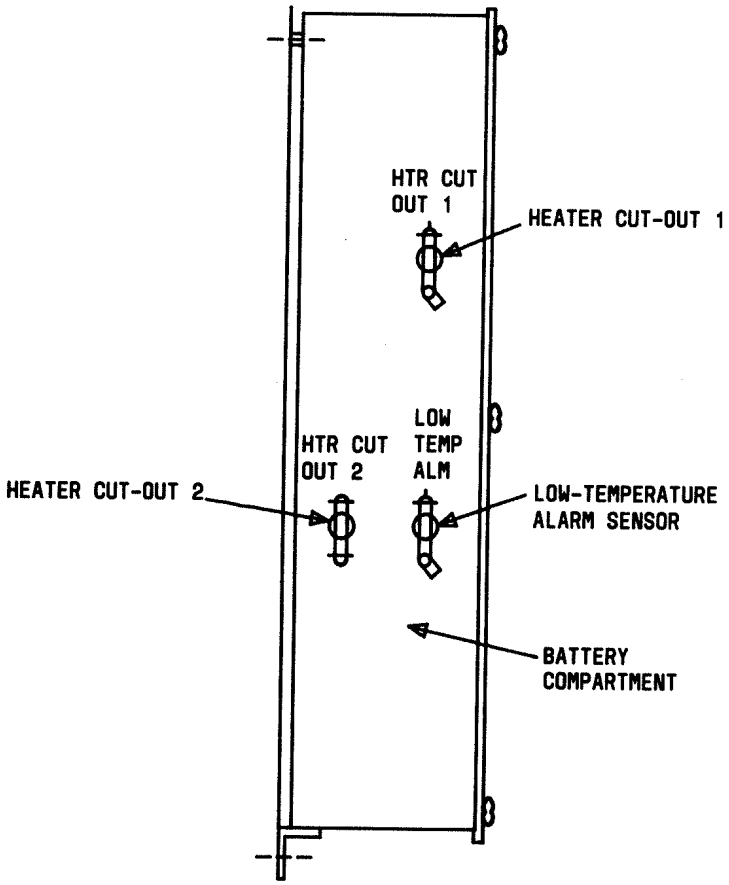


FIG. 1

VERIFY BATTERY HEATER PANEL OPERATION

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[1] Verify **BF** fuse (on RT power panel) is removed

[2] See DANGER 1. Using taped (insulated) wrench, remove one of corroded cell pairs

[3] Referring to FIG. 1, remove lower nut and washer from one of front battery terminals

[4] Clean terminal with toothbrush and replace washer and nut on clean terminal. Hand-tighten. Using the taped wrench, tighten lower terminal nut until firm

[5] Repeat Steps 2 and 3 for other front terminal

AND

Front terminals on cell pair cleaned

[6] Remove upper and lower terminal nuts, washer, and tie bar from one of rear battery terminals. Leave other end of tie bar connected to other rear terminal

[7] Clean terminal with toothbrush. Replace washers, nuts, and tie bar on clean terminal. Hand tighten

[8] Repeat Steps 5 and 6 for other rear terminal

[9] Using taped wrench, further tighten all rear nuts until firm

AND

Rear terminals on cell pair cleaned

Page 2

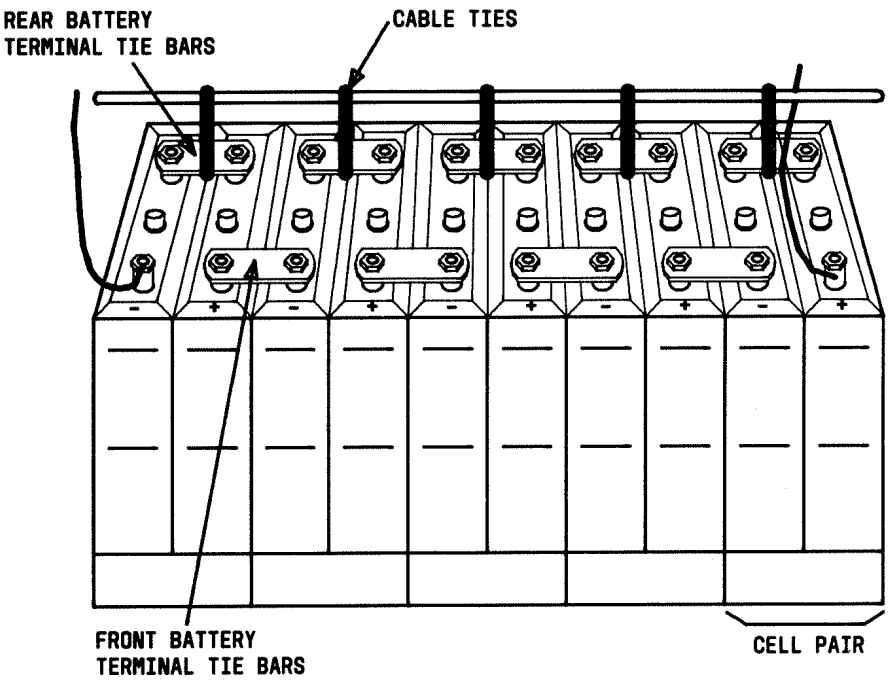
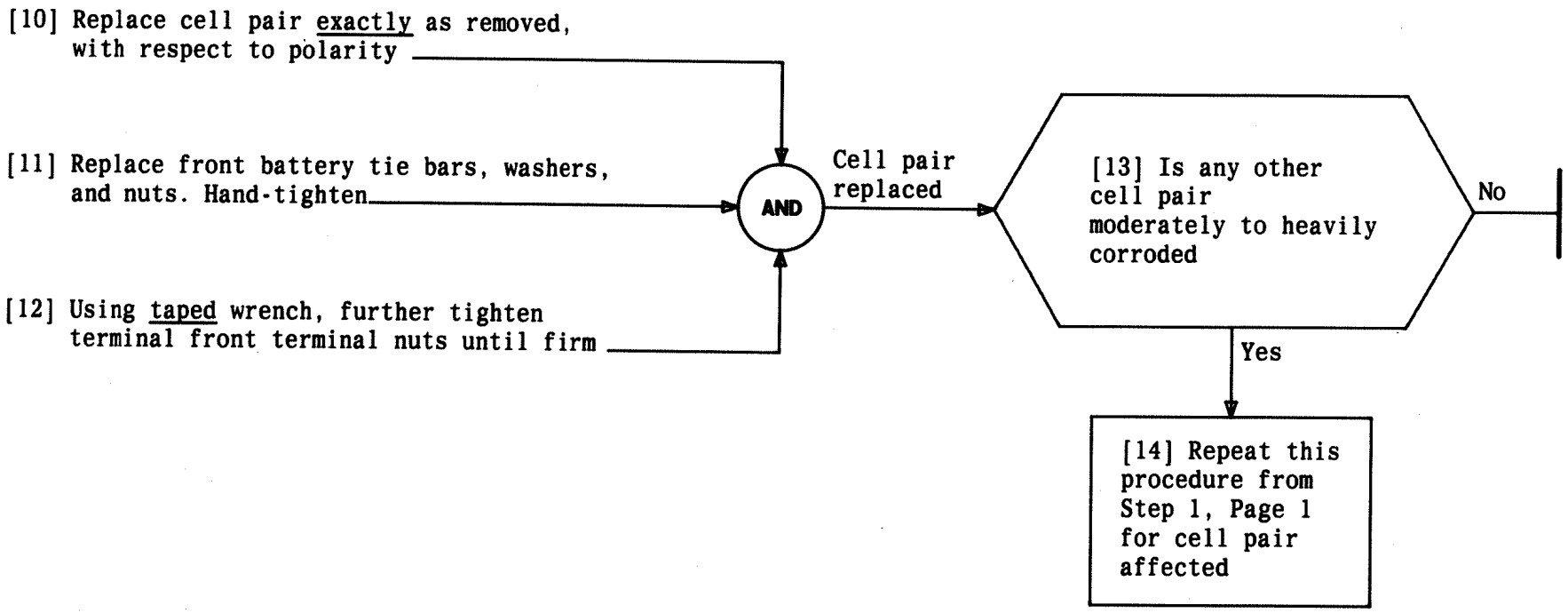


FIG. 1

DANGER 1

Note polarity location of cell pair. Cell pair must be replaced exactly as removed

CLEAN RESIDUE OR CORROSION FROM BATTERY CELL TERMINALS



CLEAN RESIDUE OR CORROSION FROM BATTERY CELL TERMINALS

[1] Verify **BF** fuse is removed from RT power panel

[2] Get KS-14510 Volt-Ohm-Milliammeter (VOM), or equivalent

[3] Condition VOM [DLP-573] and set selector switch to **DC VOLTS – 3** position

AND

[4] See WARNING 1. Place VOM positive (+) test lead on positive (+) terminal and negative (–) test lead on negative (–) terminal of cell pair to be measured [FIG. 1]

[5] Does VOM indicate at least 2.4 volts dc

No

[6] Replace any bad cell pair(s) [DLP-572] or wiring

Yes

[7] Have all cell pair voltages been measured

Yes

No

[8] Repeat Steps 4 through 7 for next pair

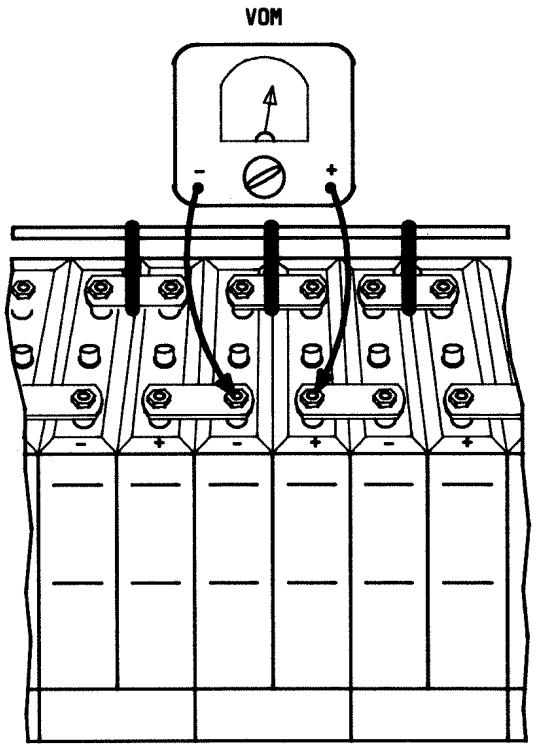


FIG. 1

WARNING 1

VOM may be damaged if incorrect scale is used, or if correct test lead polarity is not observed

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MEASURE VOLTAGE ACROSS BATTERY CELL PAIRS

MEASURE VOLTAGE ACROSS BATTERY STRING

[1] See DANGER 1. Verify **BF** fuse is removed from RT power panel

[2] Get KS-14510 Volt-Ohm-Milliammeter (VOM), or equivalent

[3] Condition VOM [DLP-573] and set selector switch to **DC VOLTS-60** position

[4] See WARNING 1. Place VOM positive (red) lead on positive (+) terminal of last cell of battery string [FIG. 1]

[5] Place VOM negative (black) lead on negative (–) terminal of first cell of battery string

AND

[6] Is VOM indication at least 36 volts dc

Yes

No

[7] Referring to FIG. 1, verify all battery cell pairs are connected correctly (series-aiding)

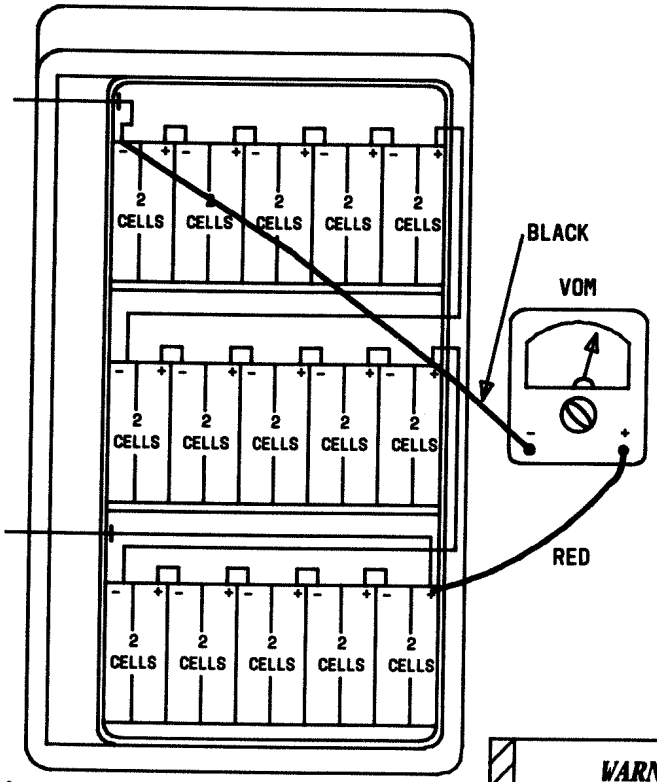

FIG. 1

WARNING 1
VOM may be damaged if incorrect scale is used, or if correct test lead-polarity is not observed

DANGER 1
Extreme care should be exercised when working with or near batteries

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[1] Verify that no plug-in units are installed (remove any that are installed)

At rear of Central Office Terminal:

[2] Verify that there is no broken or damaged equipment (connectors, wiring, backplane wiring board, etc.)

[3] Verify that there are no bent, broken or crossed terminals on backplane

[4] Verify that all cabling and wiring is terminated and tied into forms

[5] Determine COT wiring options to be used from Engineering Work Order or from TABLE A

[6] Using TABLES B through J, Page 2, verify that all options to be used are installed and that all options not to be used are removed

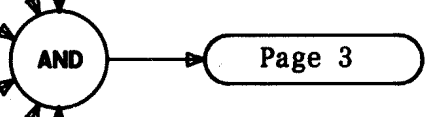


TABLE A
COT OPTIONS

OPTIONS	FUNCTIONS
"Z"	Spare line sharing of one spare for two SLC-40 systems – must be specified for both systems
"Y"	Dedicated spare line – must be specified for all systems having a dedicated spare line
"W"	Must be specified for COTs that interface with frame-mounted or 33C cabinet RTs, T1/OS or Digital Multiplexer Configurations
"U"	Use for spare line sharing – must be specified for priority system – 1 and 3
"V"	Use for no spare, T1/OS and Digital Multiplexer Configurations
"Q"	Use for Digital Multiplexer Configurations
"X"	Use for ±130 volt battery (209/238 line power units)
"R"	Use to specify fault locate

PERFORM OVERALL VISUAL INSPECTION OF SLC-40 CENTRAL OFFICE TERMINAL

TABLE B
"Z" OPTION
SYSTEMS 1 & 2 OR 3 & 4

FROM: JACK PANEL		TO: RELAY ASS. 1 & 2 (3 & 4)
SYSTEM 1 (3)	SYSTEM 2 (4)	
TSA(TSC)-3B		BT1-M
-4B		BR1-M
-9B		BT2-M
-10B		BR2-M
	TSB(TSD)-3A	BT1-F
	-4A	BR1-F
	-9A	BT2-F
	-10A	BR2-F
	-13B	BT1-B
	-14B	BR1-B
	-15A	BT2-B
	-15B	BR2-B
FROM: CHANNEL BANK		
TB3-10B		1
-11B		2
-3A		S1(S3)
	TB3-3A	S2(S4)
FROM: F & A PANEL		
TSA GRD 4		GRD 5

TABLE C
"Y" OPTION
SYSTEMS 1 OR 3

ON: JACK PANEL	
TSA(TSC)-3B	TSA(TSC)-13B
-4B	-14B
-9B	-15A
-10B	-15B

TABLE D
"Y" OPTION
SYSTEMS 2 OR 4

ON: JACK PANEL	
TSB(TSD)-3A	TSB(TSD)-13B
-4A	-14B
-9A	-15A
-10A	-15B

TABLE E
"W" OPTION (SYSTEMS 1, 2, 3, OR 4)

ON: CHANNEL BANK	
TB3-2A	TB3-3B

TABLE F
"U" OPTION
SYSTEMS 1 OR 3 ONLY

ON: CHANNEL BANK	
TB3-1A	TB3-1B

TABLE G
"V" OPTION
SYSTEMS 1, 2, 3, OR 4

ON: JACK PANEL	
TSA (TSB), (TSC), (TSD) -9B	TSA (TSB), (TSC), (TSD) -10B
ON: CHANNEL BANK	
TB3-1A	TB3-2B

TABLE H
"Q" OPTION
SYSTEMS 1, 2, 3, OR 4

ON: CHANNEL BANK	
J212-13	J211-18
J212-5	J212-14

TABLE J
"R" OPTION
SYSTEMS 1, 2, 3, OR 4

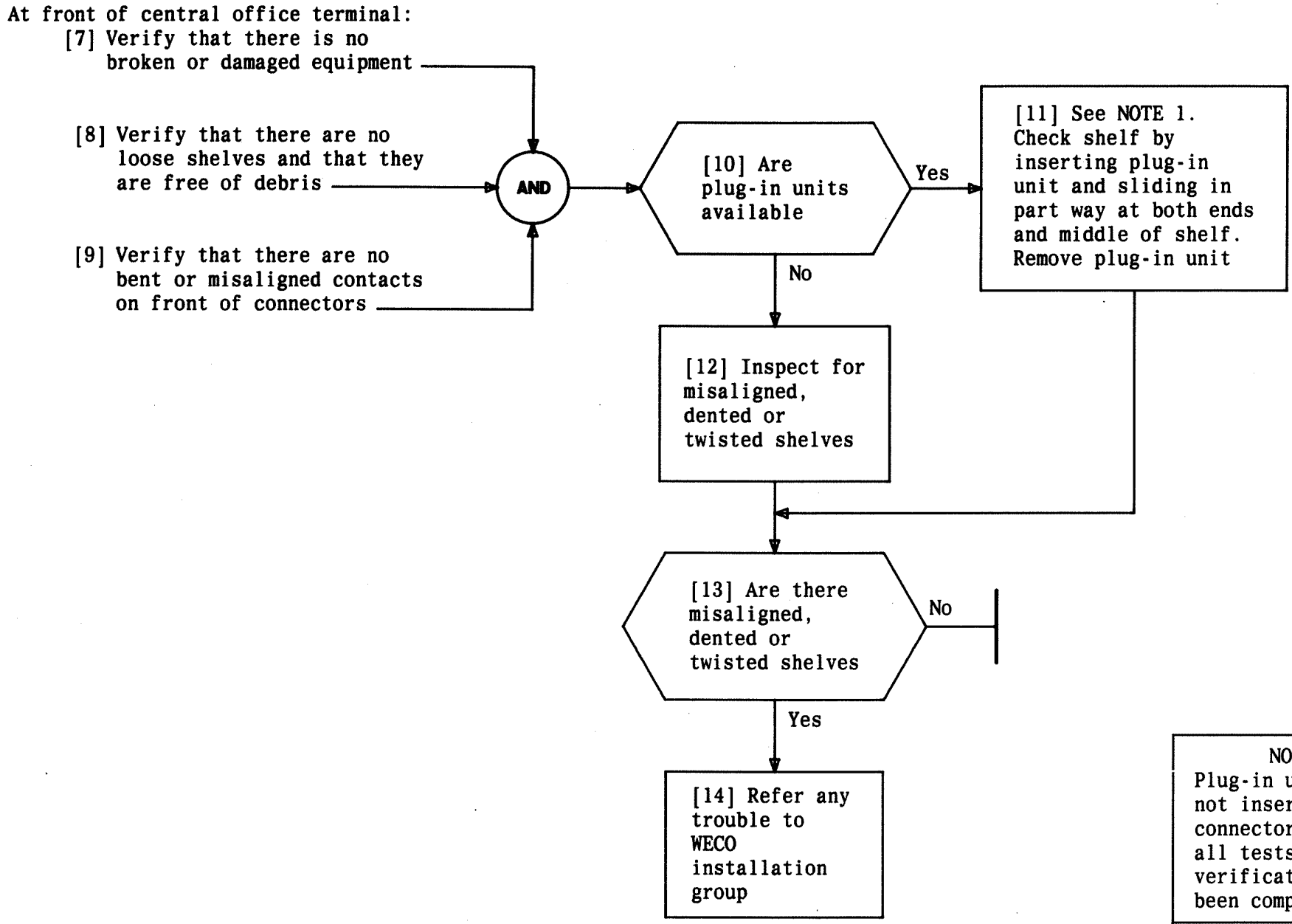
FROM: JACK PANEL	TO: MDF*
TSA (TSB), (TSC), (TSD) -11B	T, R: OF FAULT LOCATE PAIR
-12B	

*MAIN DISTRIBUTION FRAME

TABLE I
"X" OPTION
SYSTEMS 1, 2, 3, OR 4

FROM: CHANNEL BANK	TO: FUSE & ALARM PANEL
TB3-4A	TSG-RES2(-) (2)
-5A	-RES2(+) SYS. 1 (3)
-6A	-RES1 (4)
-4B	TSC (TSD), (TSE), (TSF) +130V
-5B	-130V

PERFORM OVERALL VISUAL INSPECTION OF SLC-40 CENTRAL OFFICE TERMINAL



NOTE 1
Plug-in units are not inserted into connectors until all tests and verifications have been completed

PERFORM OVERALL VISUAL INSPECTION OF SLC-40 CENTRAL OFFICE TERMINAL

CHECK CENTRAL OFFICE TERMINAL FUSE PANEL AND OFFICE ALARMS

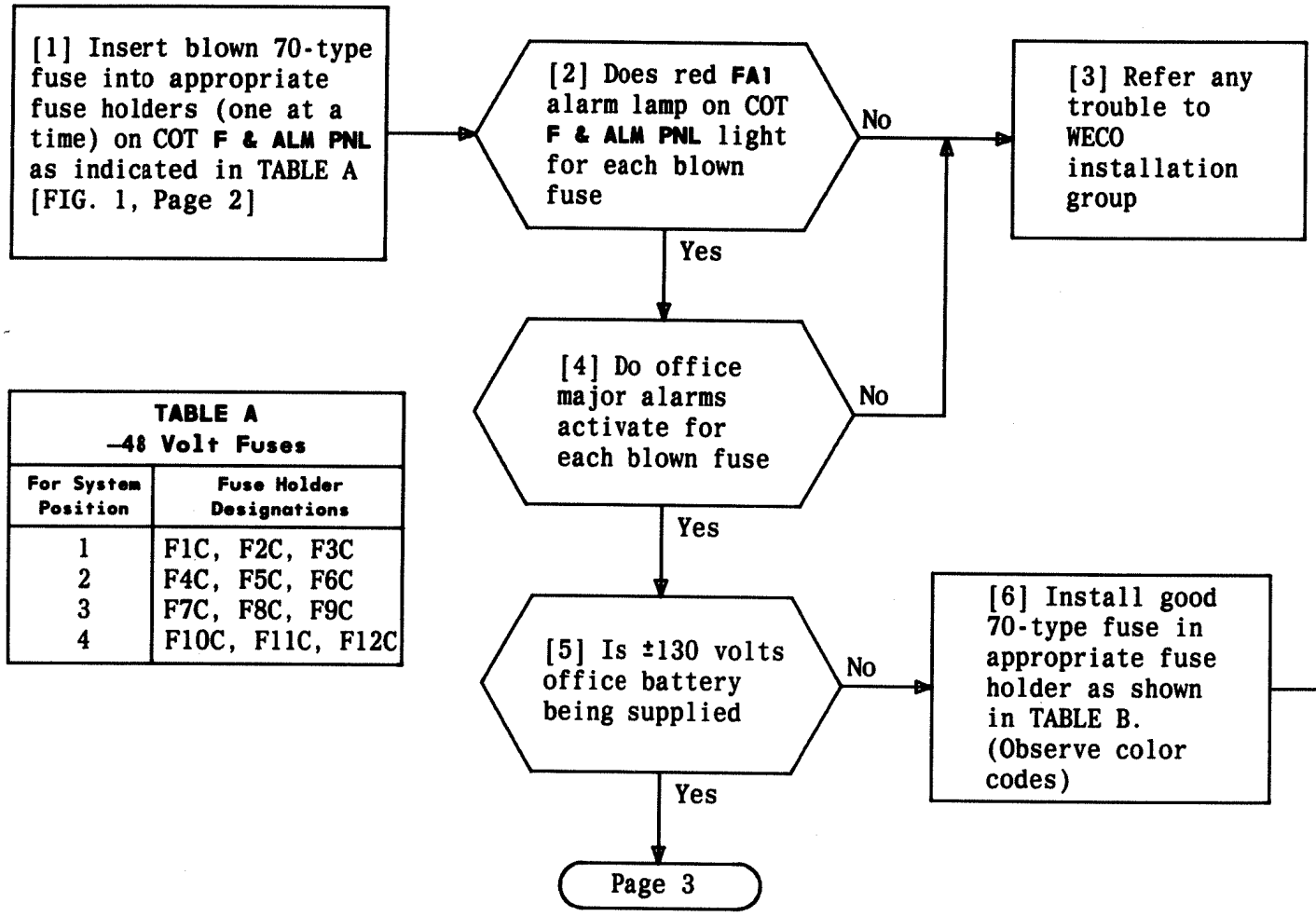
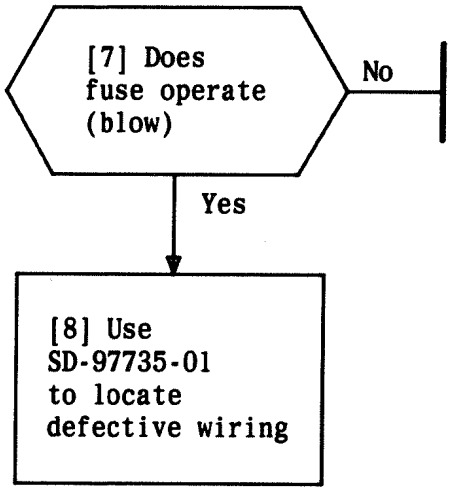


TABLE A
–48 Volt Fuses

For System Position	Fuse Holder Designations
1	F1C, F2C, F3C
2	F4C, F5C, F6C
3	F7C, F8C, F9C
4	F10C, F11C, F12C

TABLE B
–48 Volt Fuses

For System Position	Fuse Holder Designations
1	F2C
2	F5C
3	F8C
4	F11C



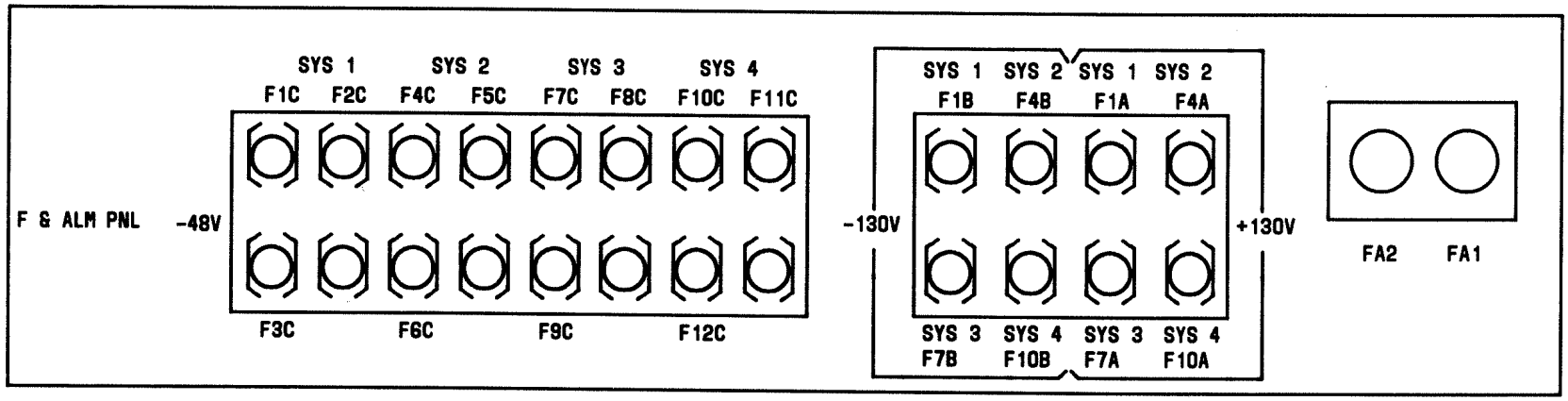


FIG. 1

CHECK CENTRAL OFFICE TERMINAL FUSE PANEL AND OFFICE ALARMS

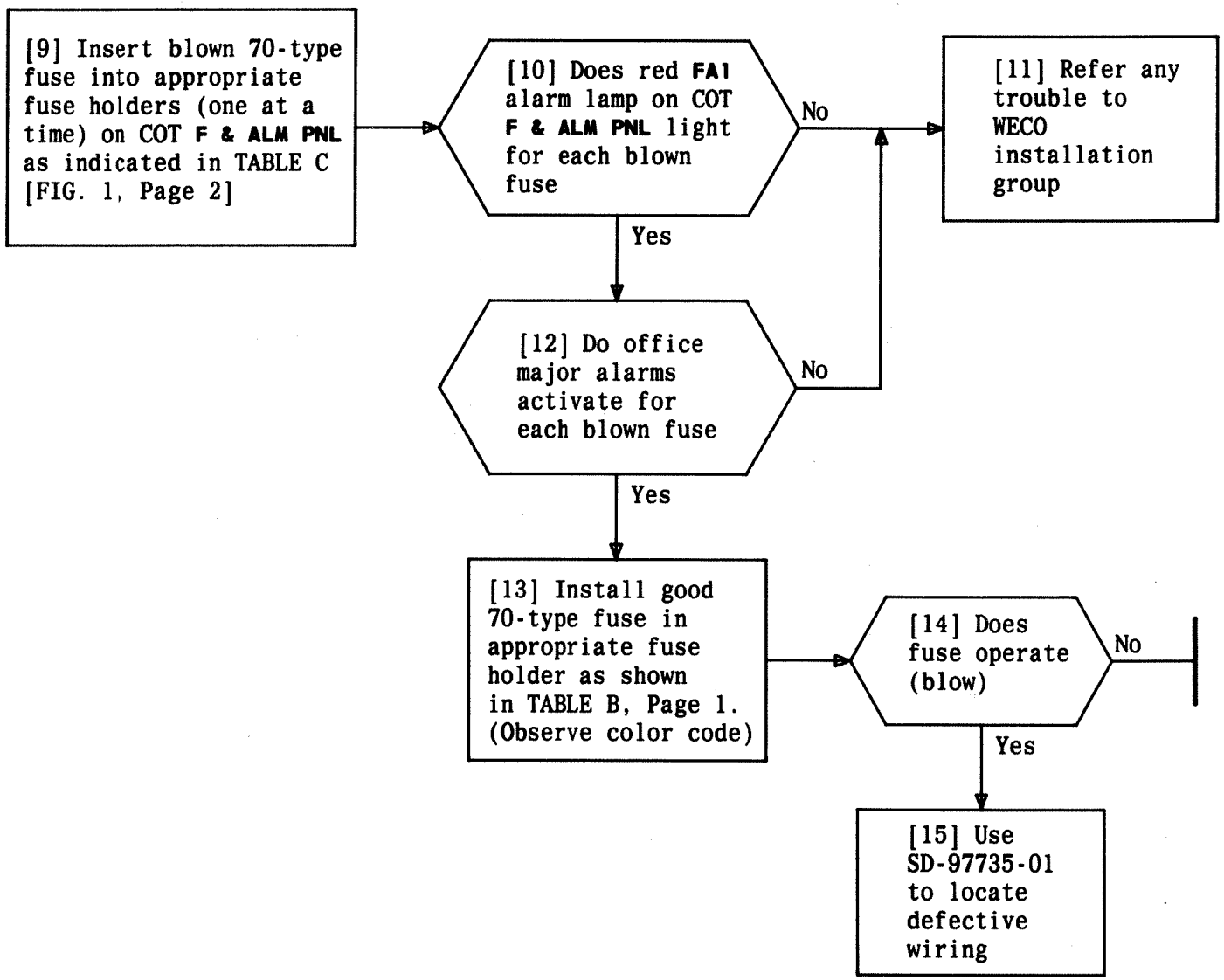


TABLE C
±130 Volt Fuses

For System Position	Fuse Holder Designation
1	F1A, F1B
2	F4A, F4B
3	F7A, F7B
4	F10A, F10B

CHECK CENTRAL OFFICE TERMINAL FUSE PANEL AND OFFICE ALARMS

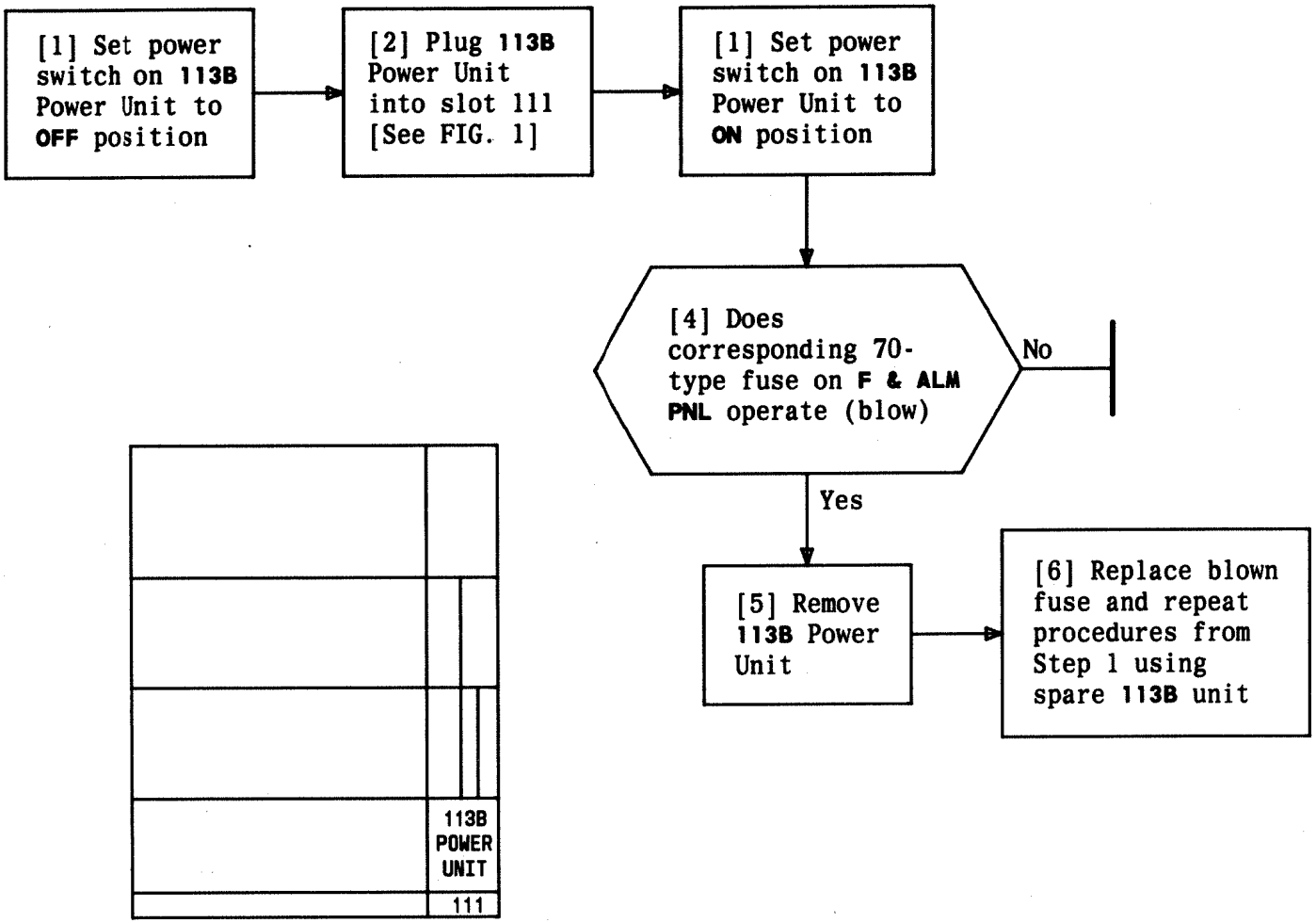


FIG. 1

INSTALL 113B POWER UNIT INTO SLOT 111 AT COT

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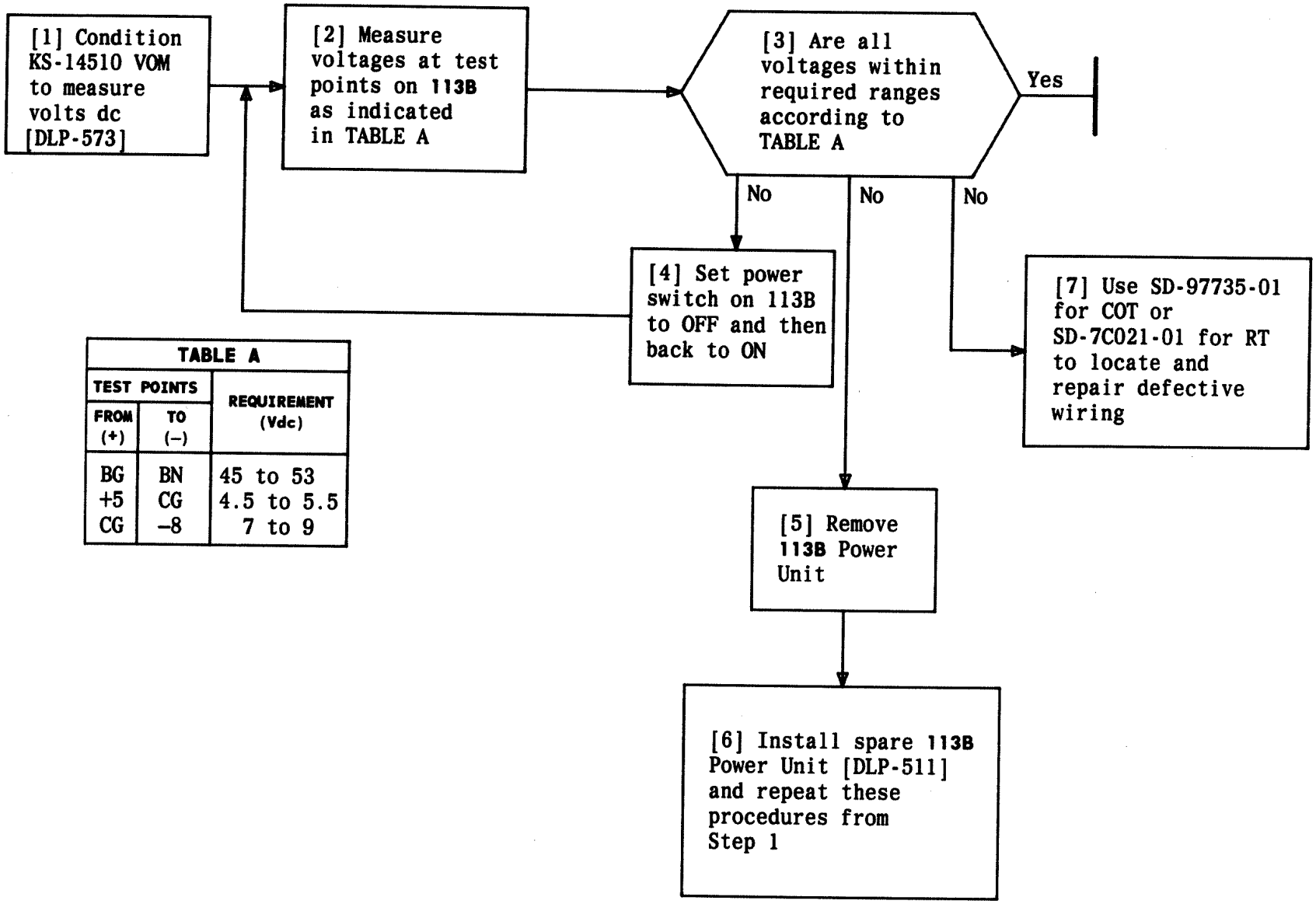

TABLE A

TEST POINTS		REQUIREMENT (Vdc)
FROM (+)	TO (–)	
BG	BN	45 to 53
+5	CG	4.5 to 5.5
CG	–8	7 to 9

MEASURE VOLTAGES ON 113B POWER UNIT

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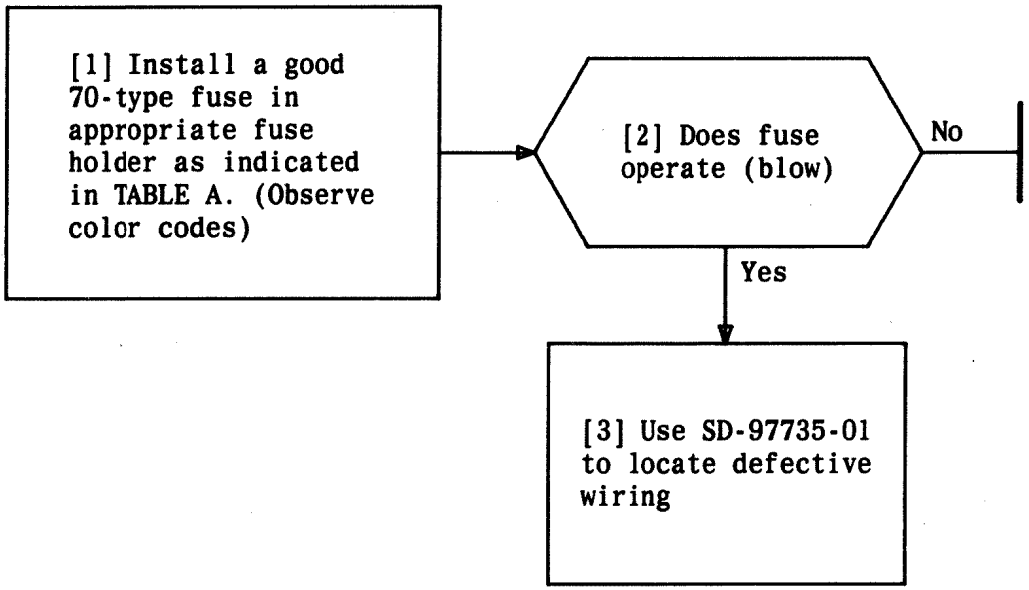

TABLE A

For System Position	Fuse Holder Designation
1	F1C
2	F4C
3	F7C
4	F10C

INSTALL 70-TYPE FUSE FOR POWERING LINE POWER UNIT

[1] Set power switch on **114A** or **250**() power unit to OFF position

[2] Plug **114A** or **250**() power unit into slot 411 or 811 (Frame Upper System) [FIG. 1]

[3] Set power switch on **114A** or **250**() power unit to ON position

AND

114A or **250**() power unit installed

[4] Does 70-type fuse operate (blow)

No

Yes

[5] Remove **114A** or **250**() power unit

[6] Replace blown fuse [DLP-513] and repeat these procedures from Step 1 using spare power unit

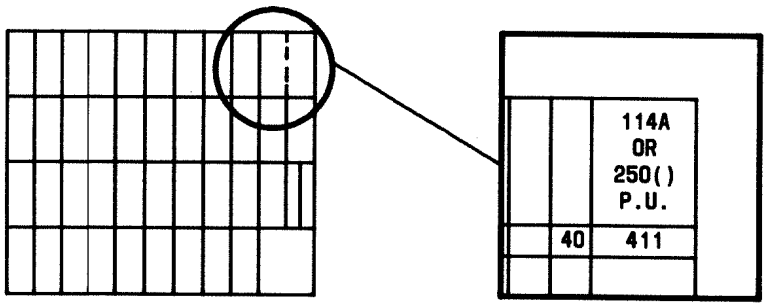

FIG. 1

INSTALL 114A OR 250( ) POWER UNIT

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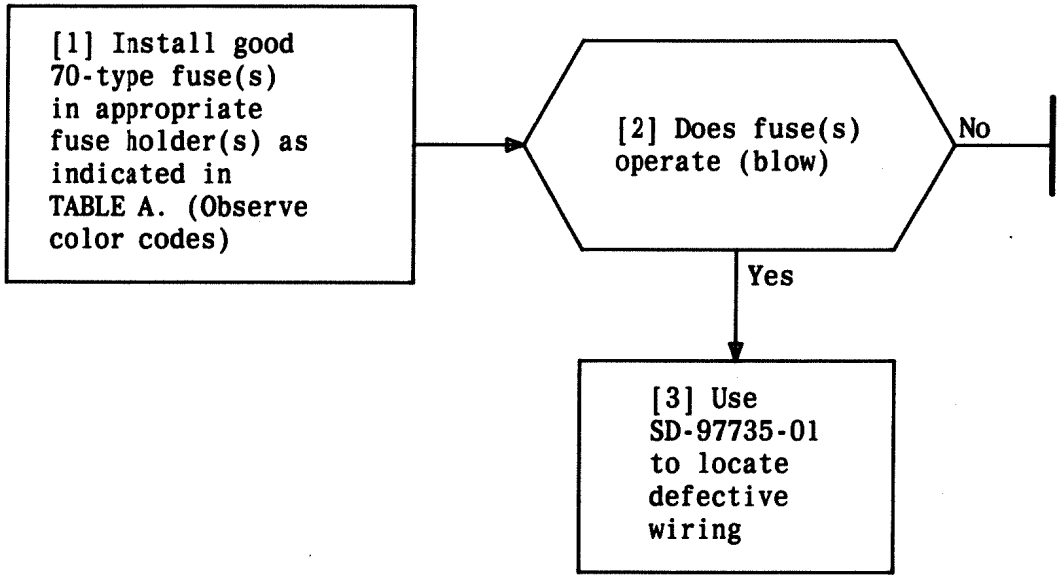

TABLE A

For Equipped System Position	Fuse Holder Designation		
	209A 238A	209A 238B	209C 238C
1	F1A, F1B	F1A	F1B
2	F4A, F4B	F4A	F4B
3	F7A, F7B	F7A	F7B
4	F10A, F10B	F10A	F10B

INSTALL 70-TYPE FUSE(S) FOR POWERING ±130V LINE POWER UNIT

[1] Set power switch on **209()** or **238()** power unit to OFF position

[2] Plug **209()** or **238()** power unit into slot 411 [FIG. 1]

[3] Set power switch on **209()** or **238()** power unit to ON position

AND

209() or **238()** power unit installed

[4] Does 70-type fuse(s) operate (blow)

No

Yes

Yes

[5] Remove **209()** or **238()** power unit

[7] Use SD-97733-04 to locate defective wiring

[6] Replace blown fuse(s) [DLP-515] and repeat these procedures from Step 1

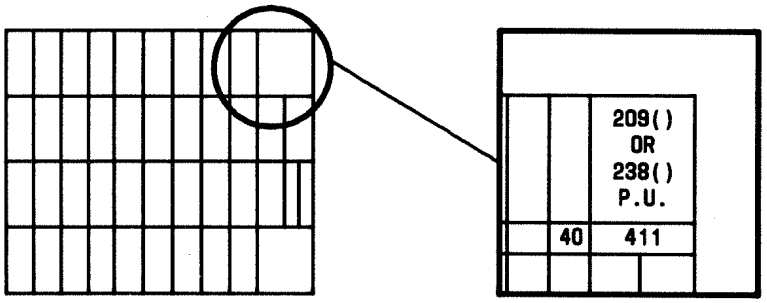

FIG. 1

INSTALL 209( ) OR 238( ) POWER UNIT

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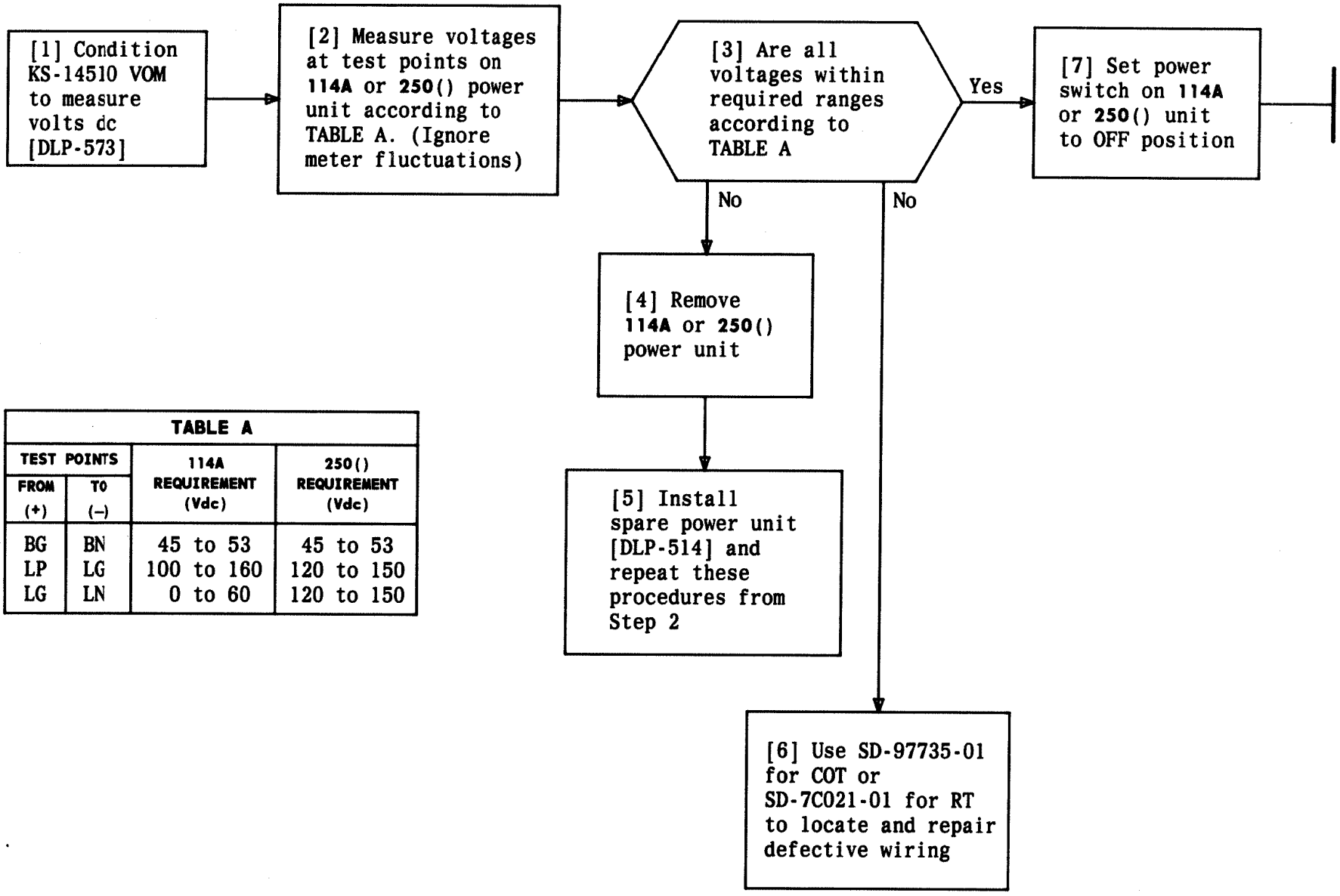

TABLE A

TEST POINTS		114A REQUIREMENT (Vdc)	250() REQUIREMENT (Vdc)
FROM (+)	TO (–)		
BG	BN	45 to 53	45 to 53
LP	LG	100 to 160	120 to 150
LG	LN	0 to 60	120 to 150

MEASURE VOLTAGES ON 114A OR 250() POWER UNIT AT COT

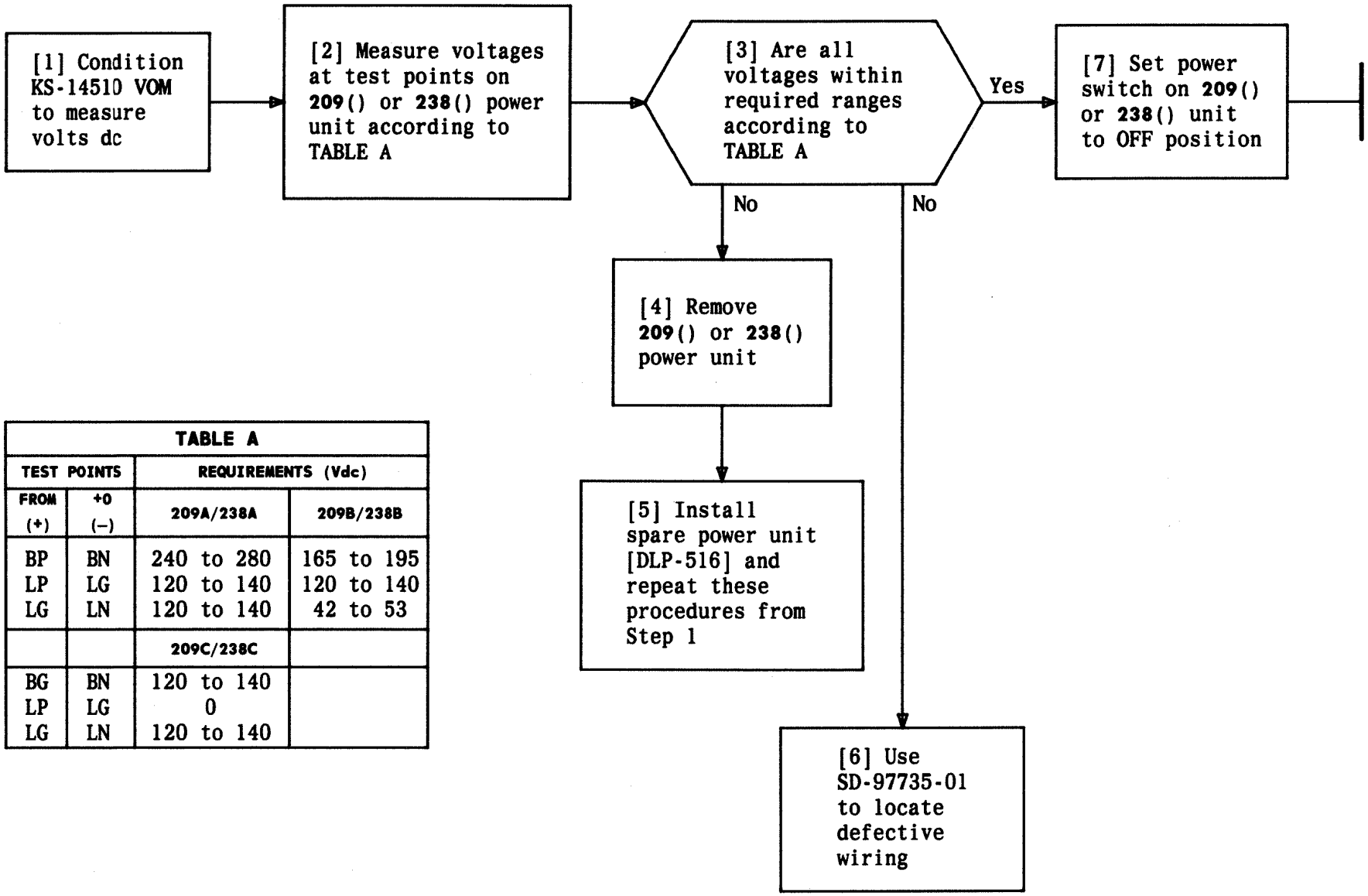

TABLE A

TEST POINTS		REQUIREMENTS (Vdc)	
FROM (+)	+O (−)	209A/238A	209B/238B
BP	BN	240 to 280	165 to 195
LP	LG	120 to 140	120 to 140
LG	LN	120 to 140	42 to 53
		209C/238C	
BG	BN	120 to 140	
LP	LG	0	
LG	LN	120 to 140	

MEASURE VOLTAGES ON 209() OR 238() POWER UNIT

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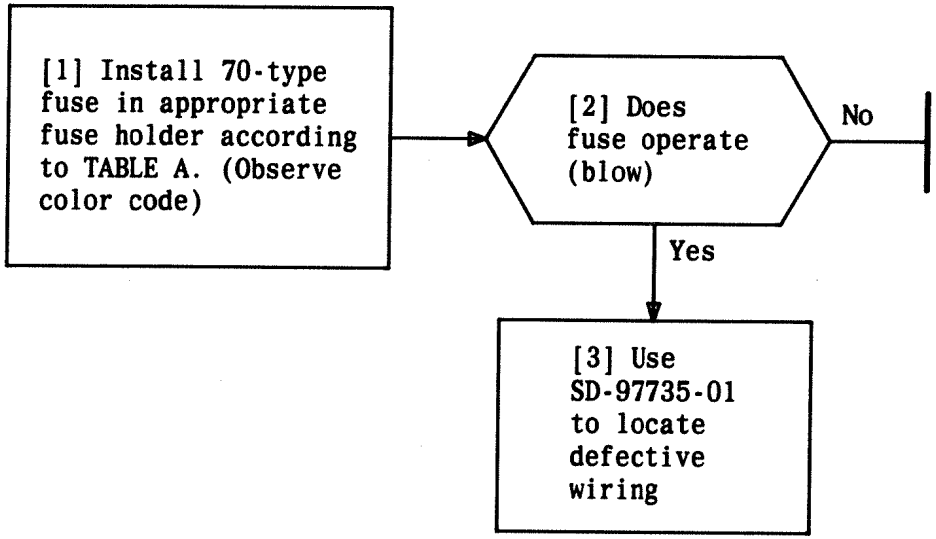

TABLE A	
FOR SYSTEM POSITION	FUSE HOLDER DESIGNATION
1	F3C
2	F6C
3	F9C
4	F12C

INSTALL 70-TYPE FUSE FOR POWERING LINE INTERFACE UNIT

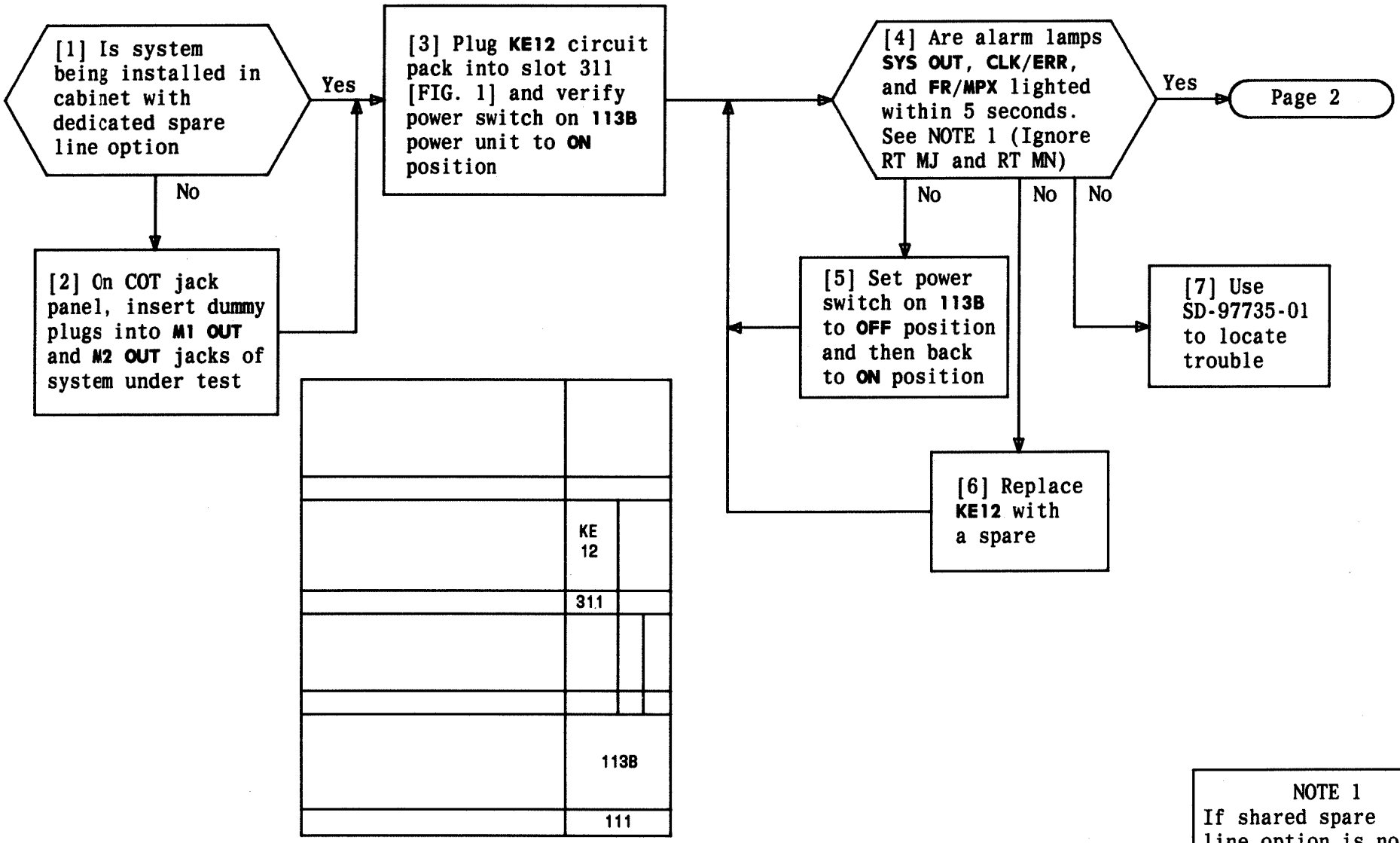

FIG. 1

NOTE 1
If shared spare line option is not being used, SPLT alarm lamp will also be lighted

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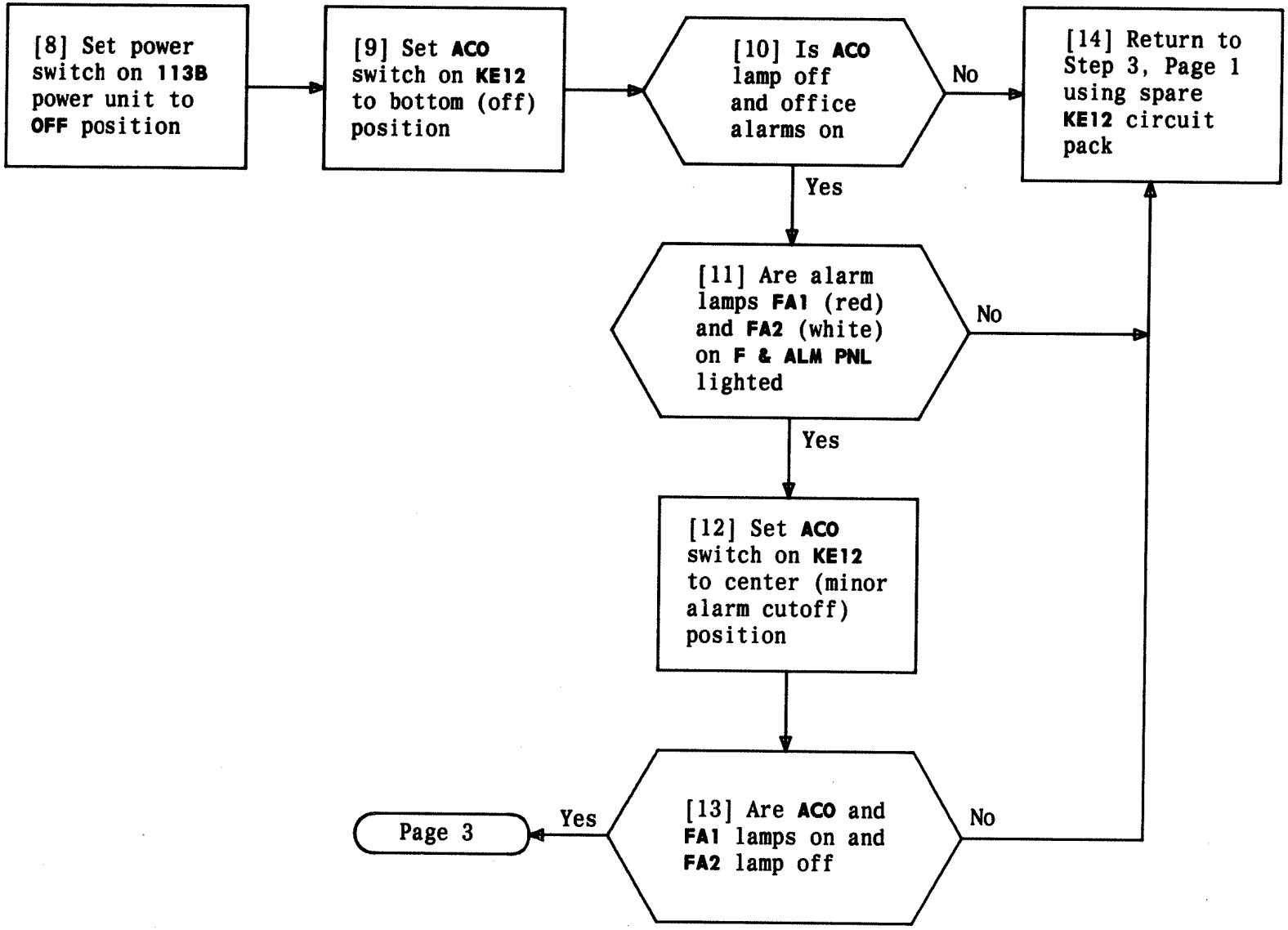
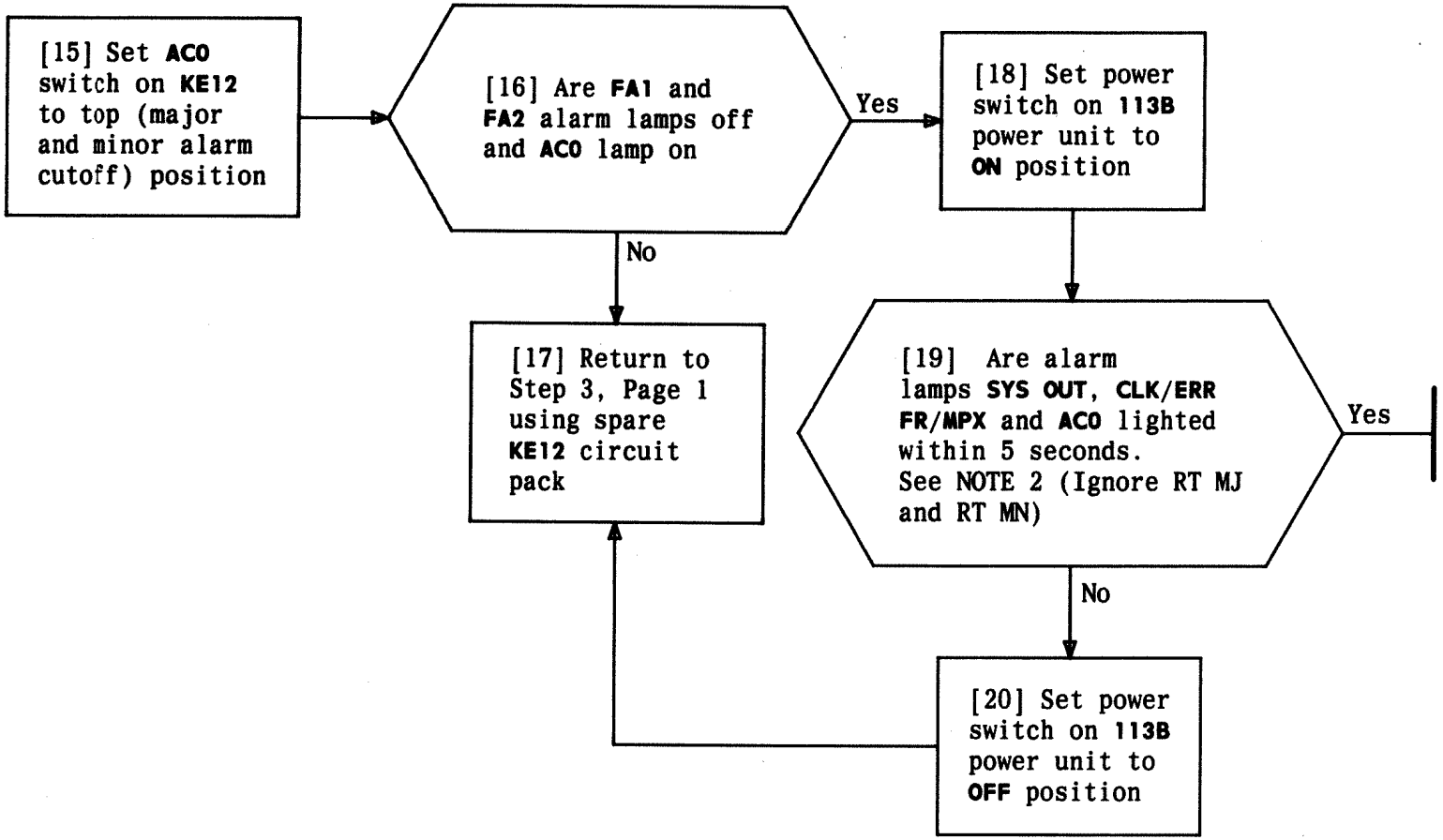
INSTALL AND TEST CENTRAL OFFICE MAINTENANCE (CO MAINT) UNIT (KE12)

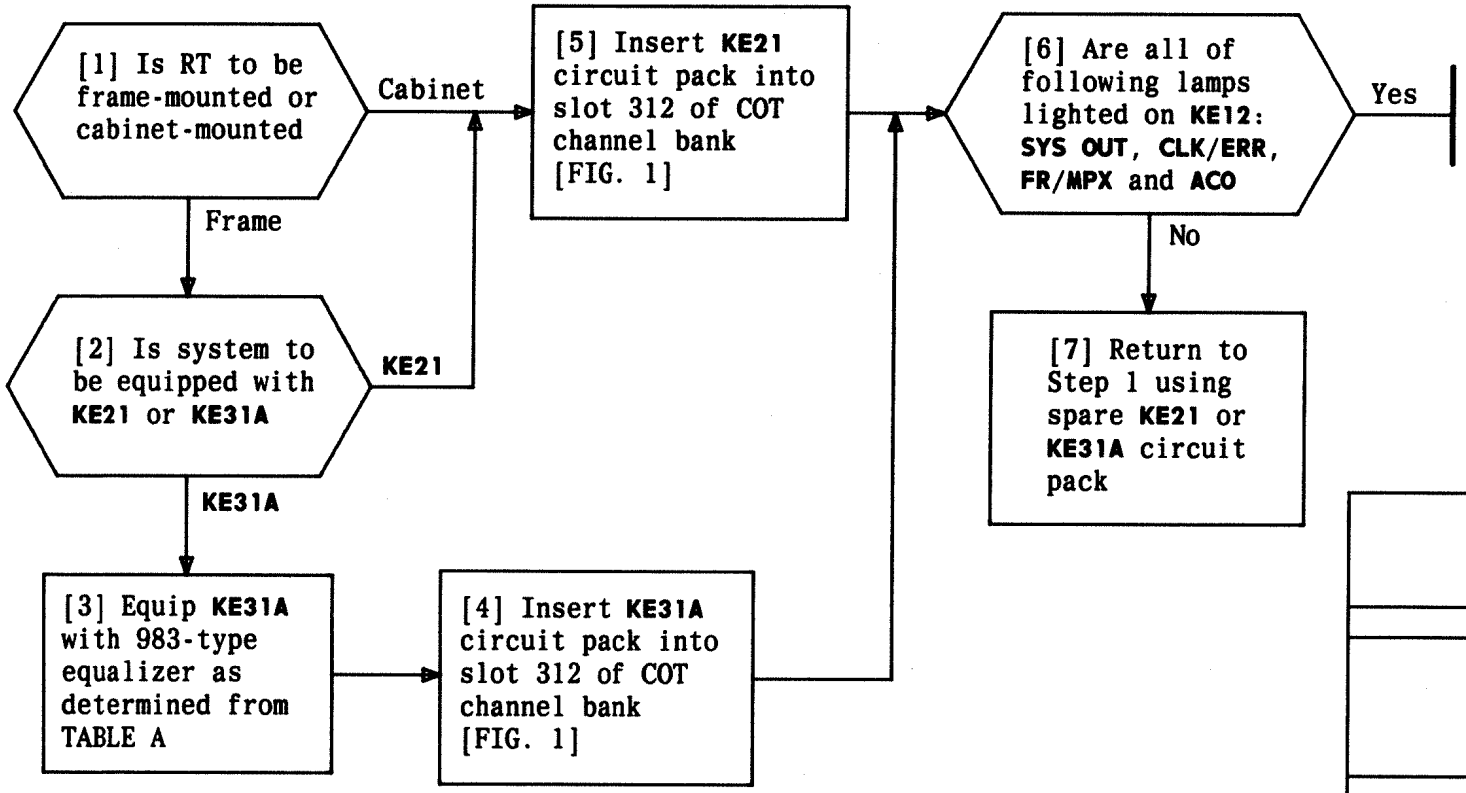


INSTALL AND TEST CENTRAL OFFICE MAINTENANCE (CO MAINT) UNIT (KE12)



NOTE 2
If shared spare line option is not being used, SPLT lamp will also be lighted

INSTALL AND TEST CENTRAL OFFICE MAINTENANCE (CO MAINT) UNIT (KE12)



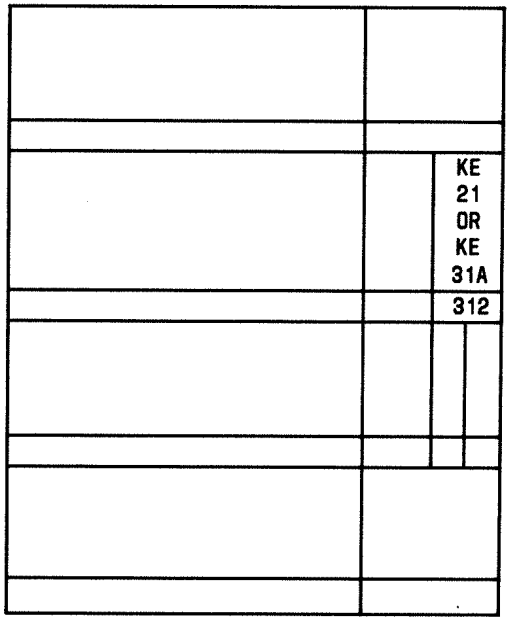
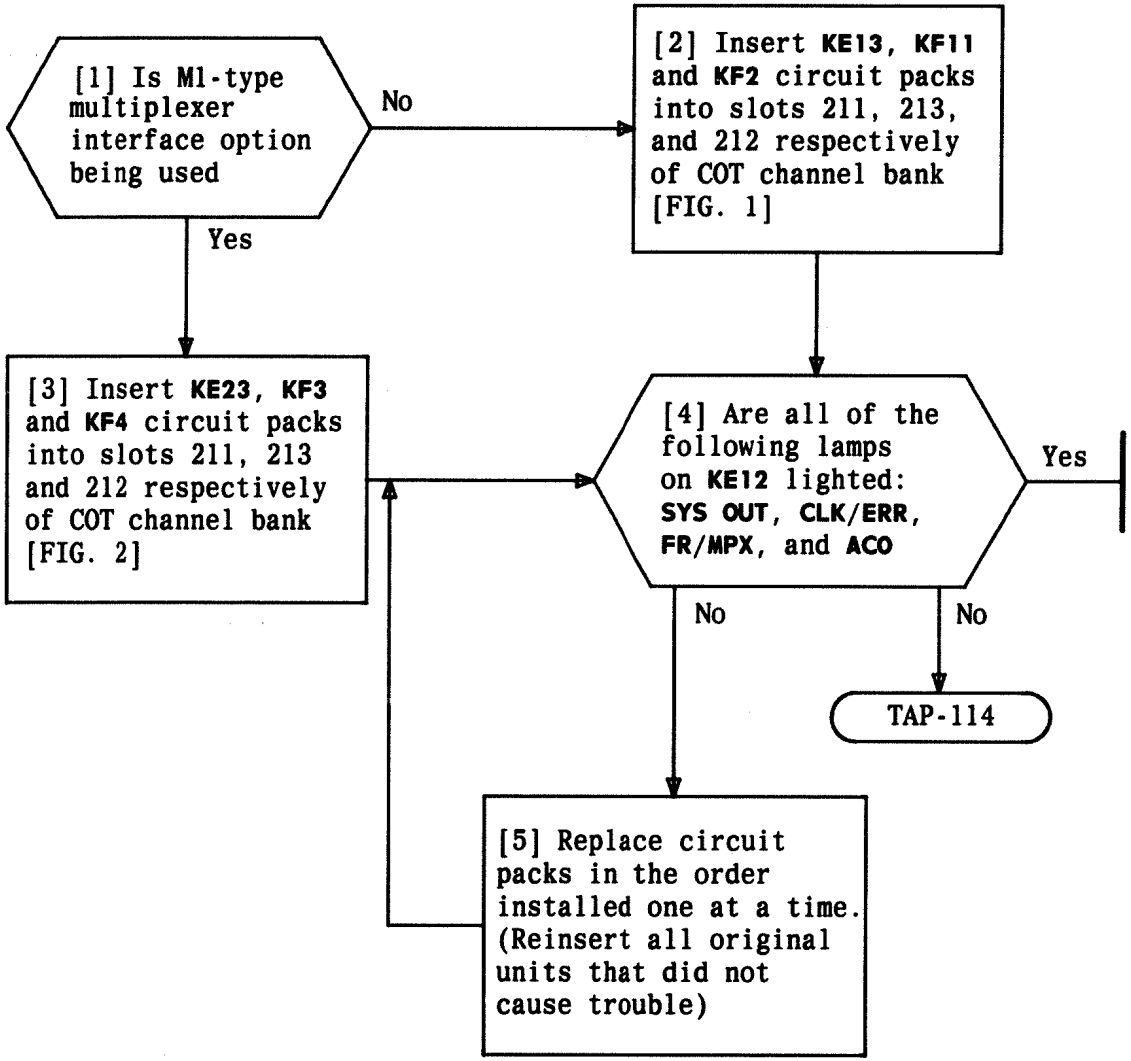


FIG. 1

TABLE A			
983-TYPE EQUALIZERS			
Cable Length	0-220'	220'-440'	440'-660'
Cable Loss	0-1 dB	1-2 dB	2-3 dB
Use Code	A	B	C

INSTALL CENTRAL OFFICE LINE INTERFACE (CO LINE INT) UNIT (KE21 OR KE31A)



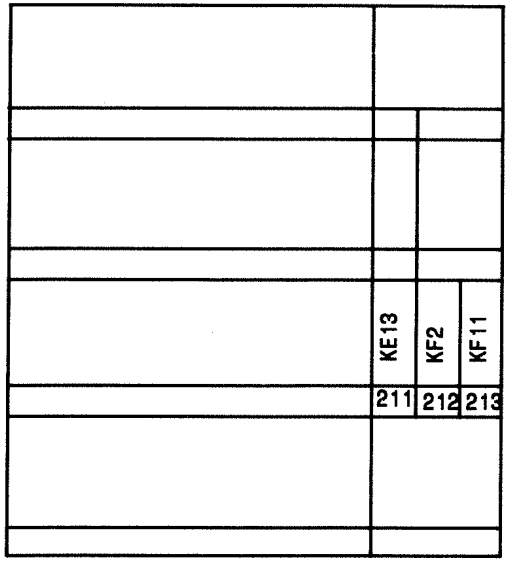


FIG. 1

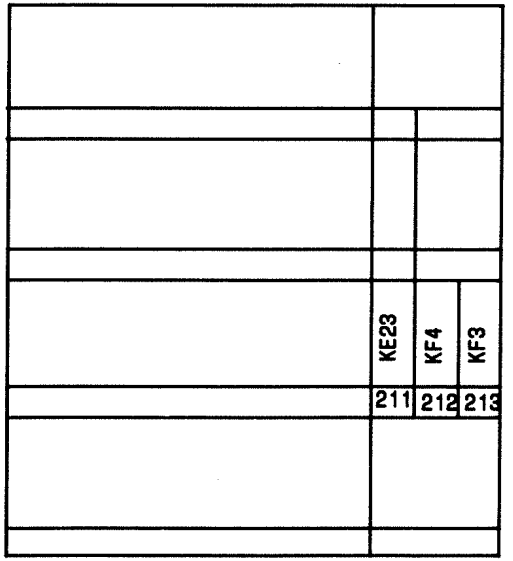


FIG. 2

INSTALL CENTRAL OFFICE MULTIPLEX UNITS

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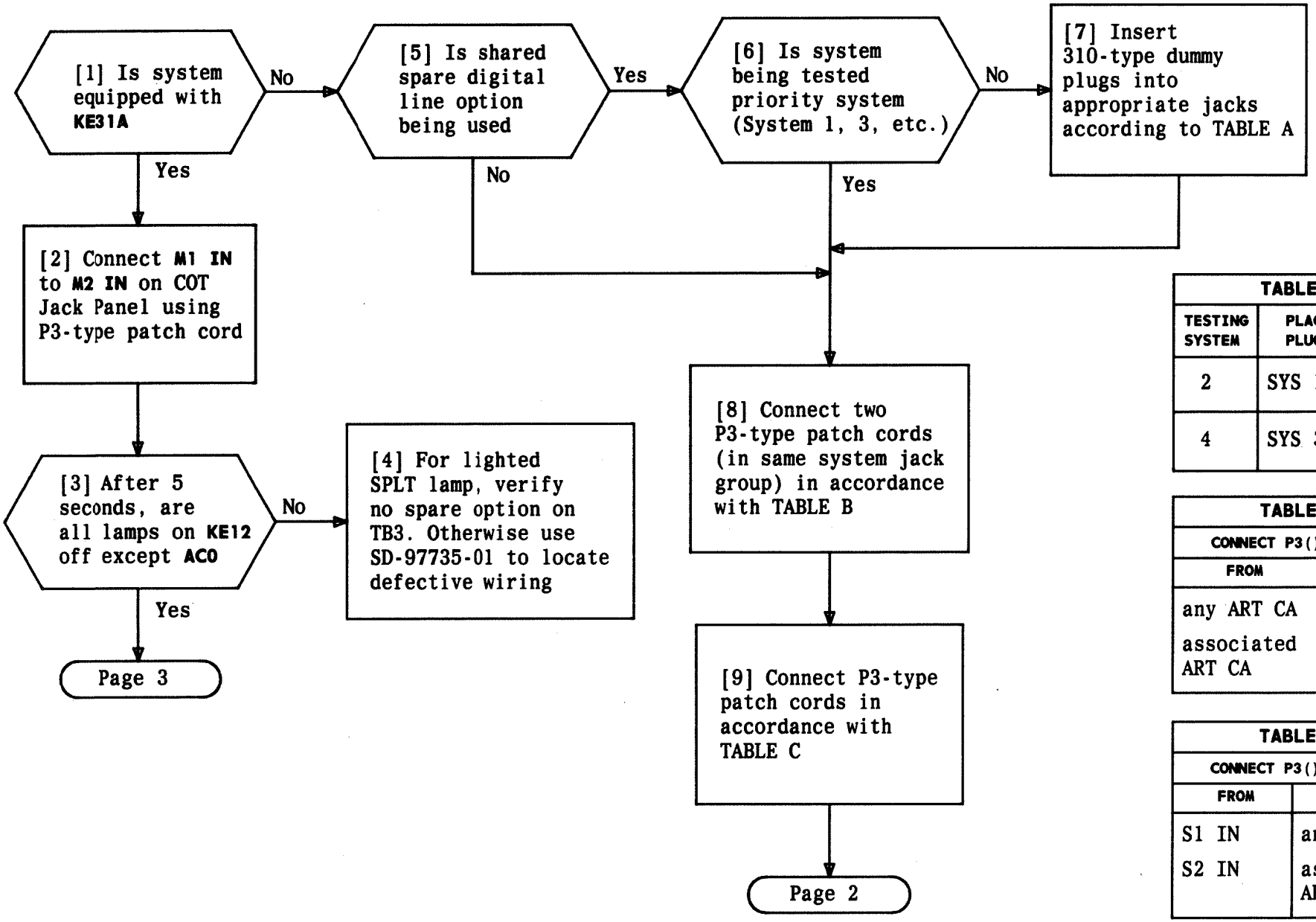

TABLE A

TESTING SYSTEM	PLACE DUMMY PLUGS IN JACKS	
2	SYS 1	S1 OUT S2 OUT
4	SYS 3	S1 OUT S2 OUT

TABLE B

CONNECT P3() CORDS	
FROM	TO
any ART CA	M1 IN
associated ART CA	M2 IN

TABLE C

CONNECT P3() CORDS	
FROM	TO
S1 IN	any ART CA
S2 IN	associated ART CA

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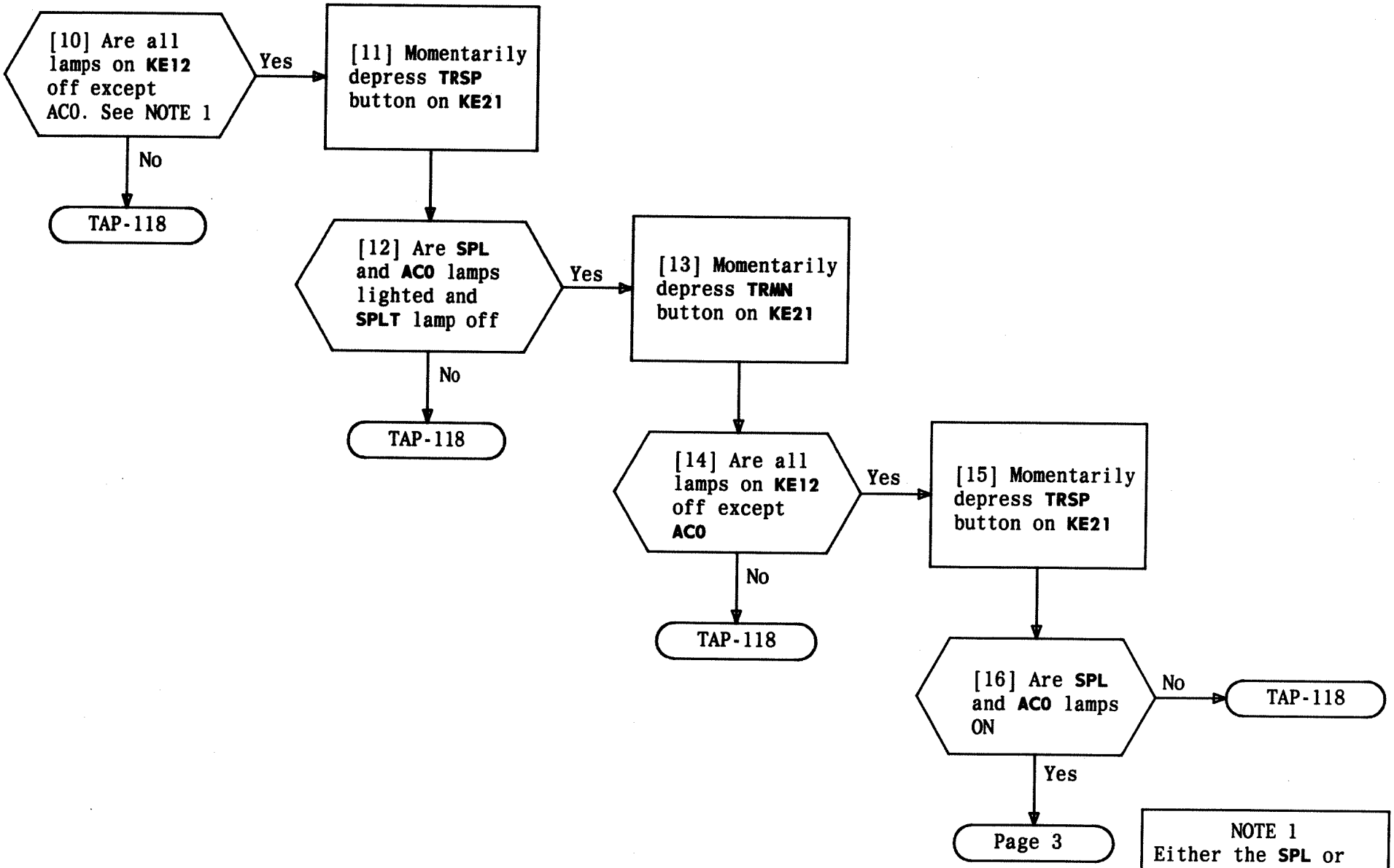
CHECK CENTRAL OFFICE ALARMS FOR DIGITAL LINE SWITCHING



NOTE 1
Either the SPL or SPLT alarm lamp may also be lighted

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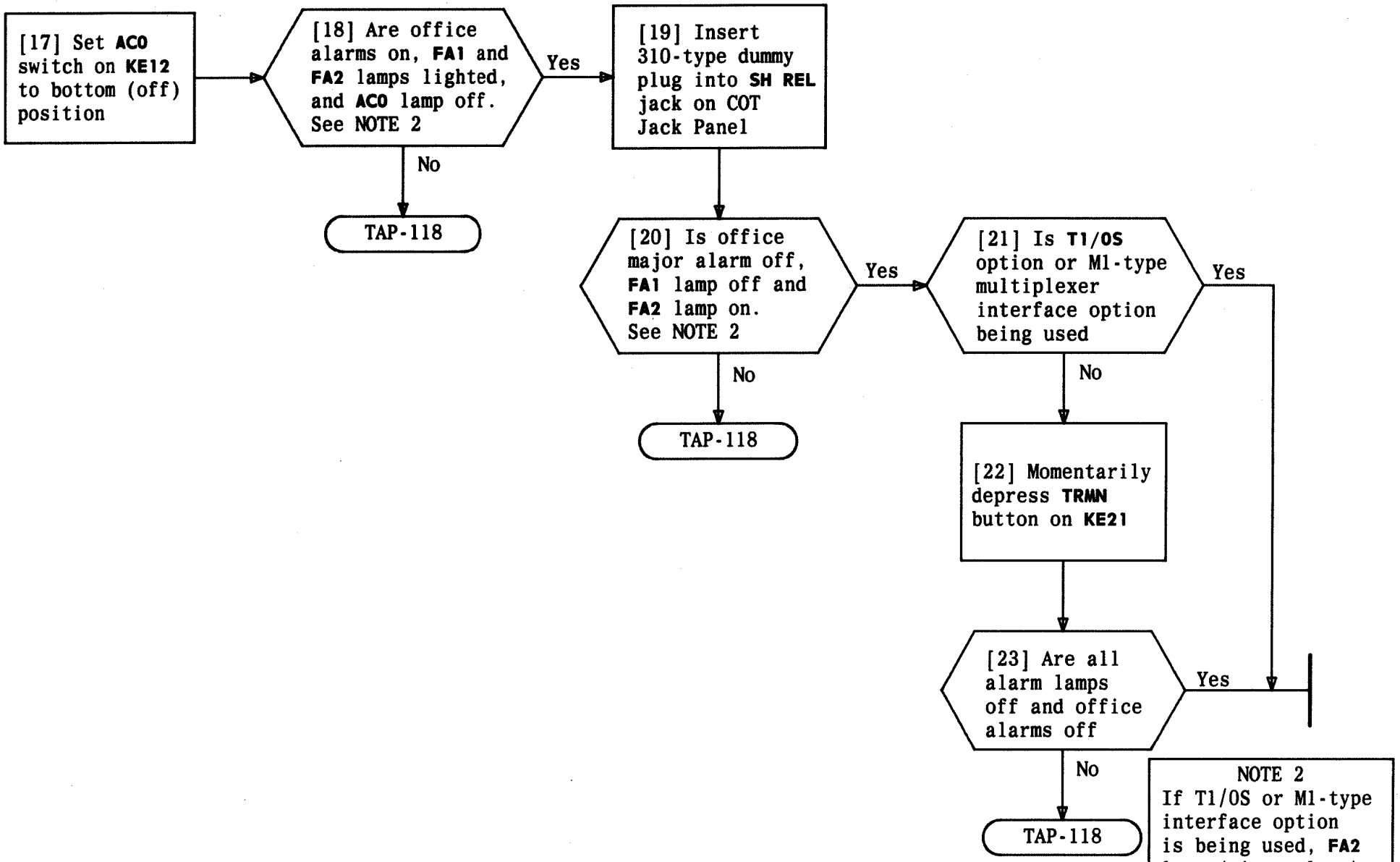
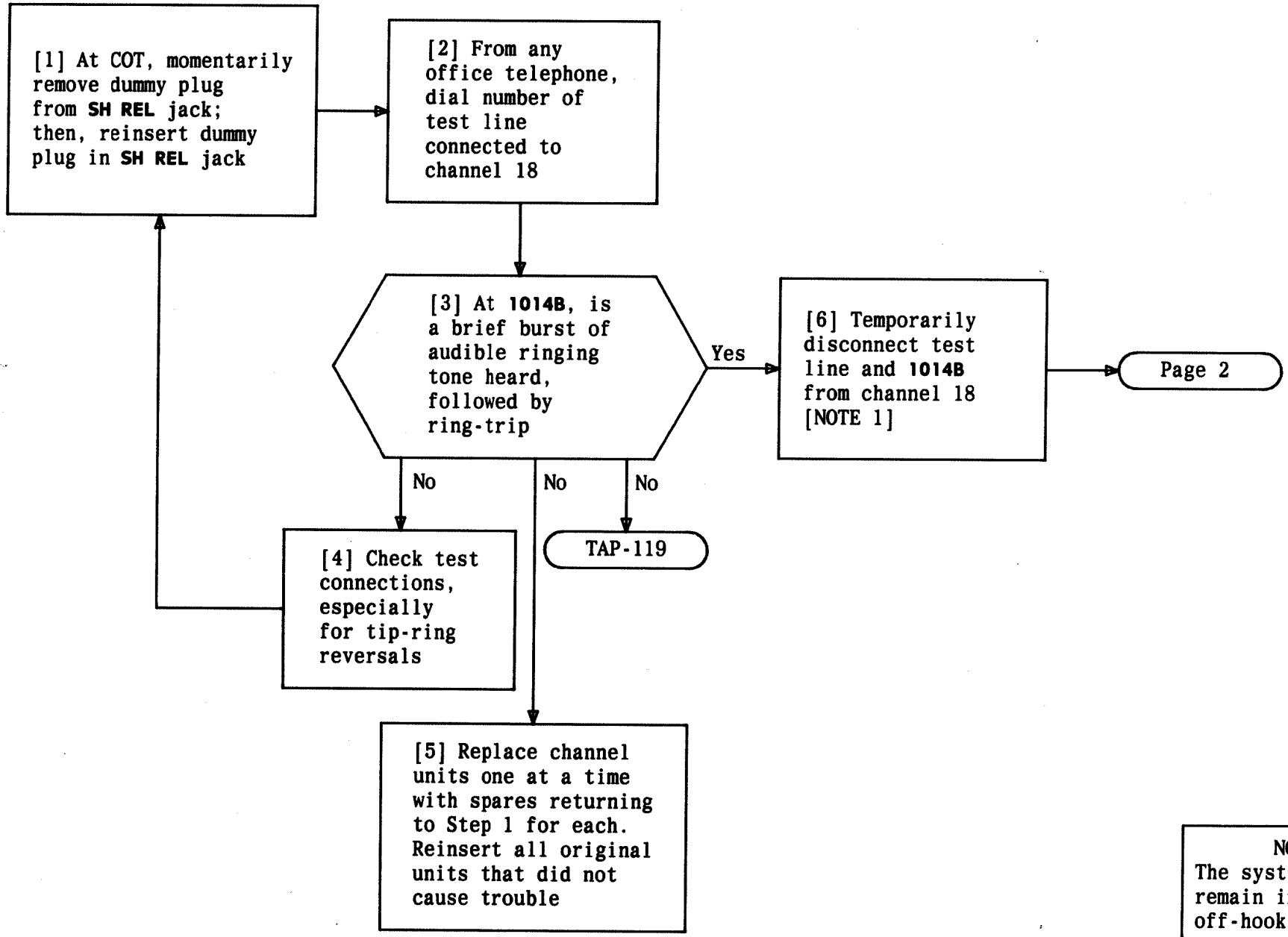
CHECK CENTRAL OFFICE ALARMS FOR DIGITAL LINE SWITCHING



CHECK CENTRAL OFFICE ALARMS FOR DIGITAL LINE SWITCHING



NOTE 1
The system will remain in an off-hook condition

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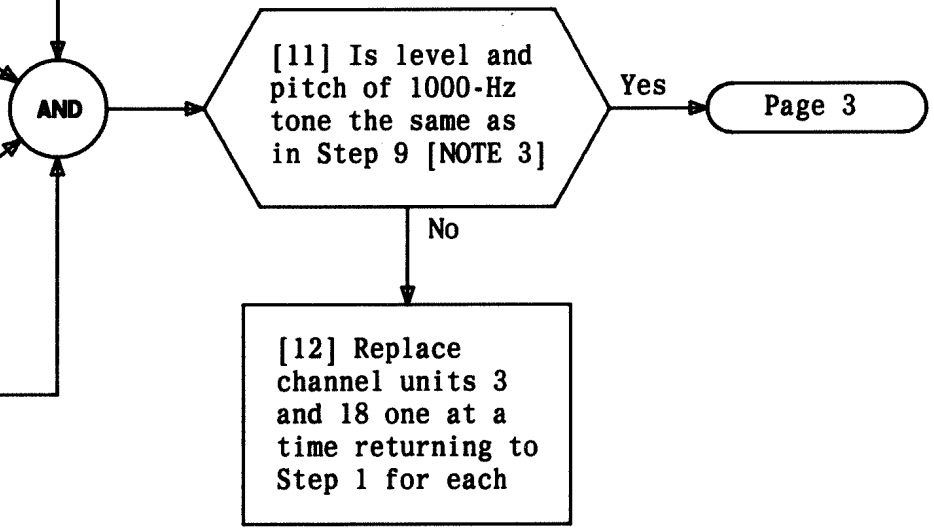
PERFORM 8-CHANNEL LOOP-AROUND TEST

[7] Connect test line to **1014B** and, with **MON-TALK** switch in **TALK** position, dial number for milliwatt supply

[8] When 1000-Hz tone is returned, reconnect test line and **1014B** to channel 18. See NOTE 2

[9] Operate **1014B MON-TALK** switch to **MON** position and note level and pitch of 1000-Hz tone

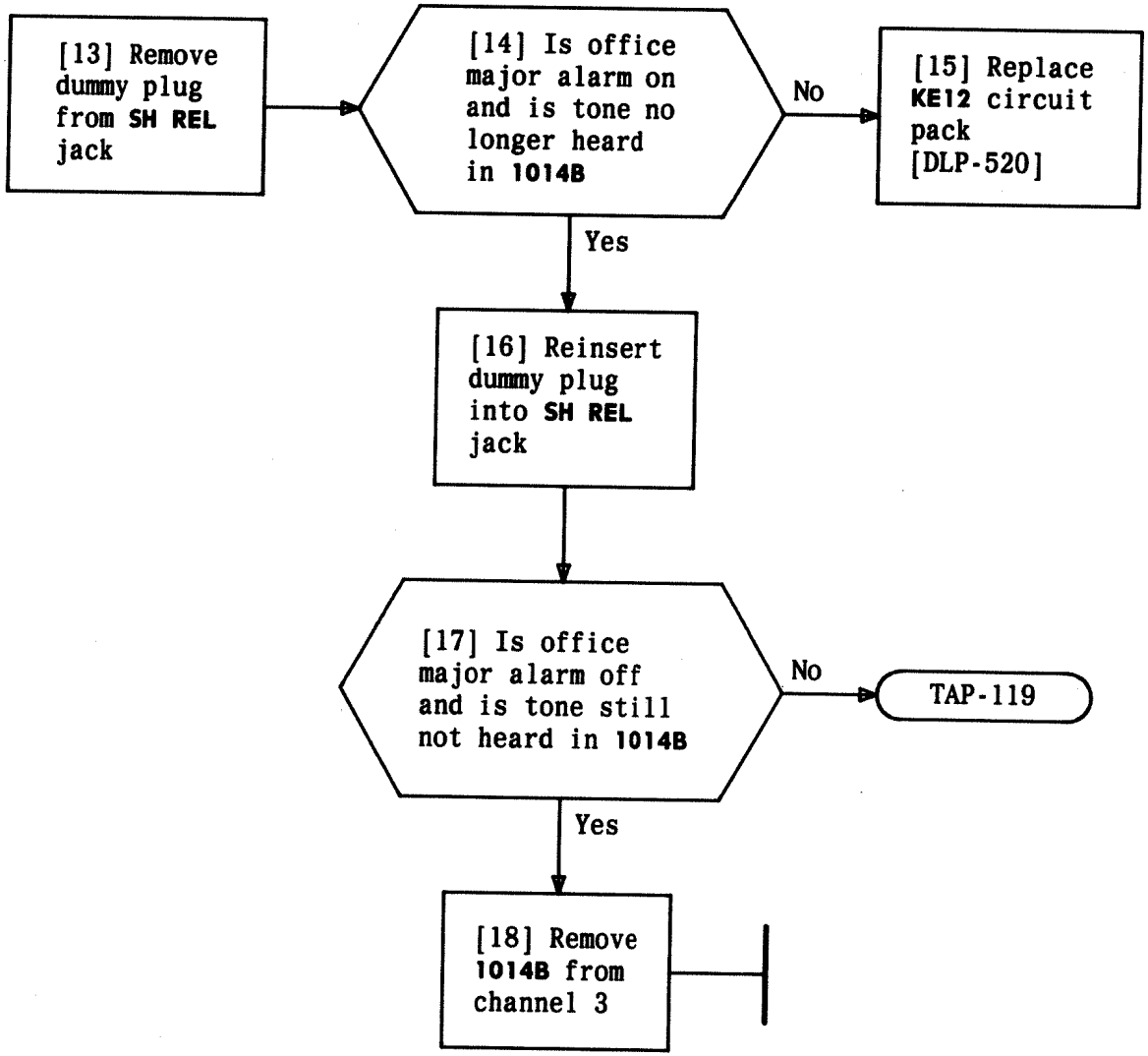
[10] Transfer test clips of **1014B** to bridge across tip and ring associated with channel 3. Note level and pitch of 1000-Hz tone



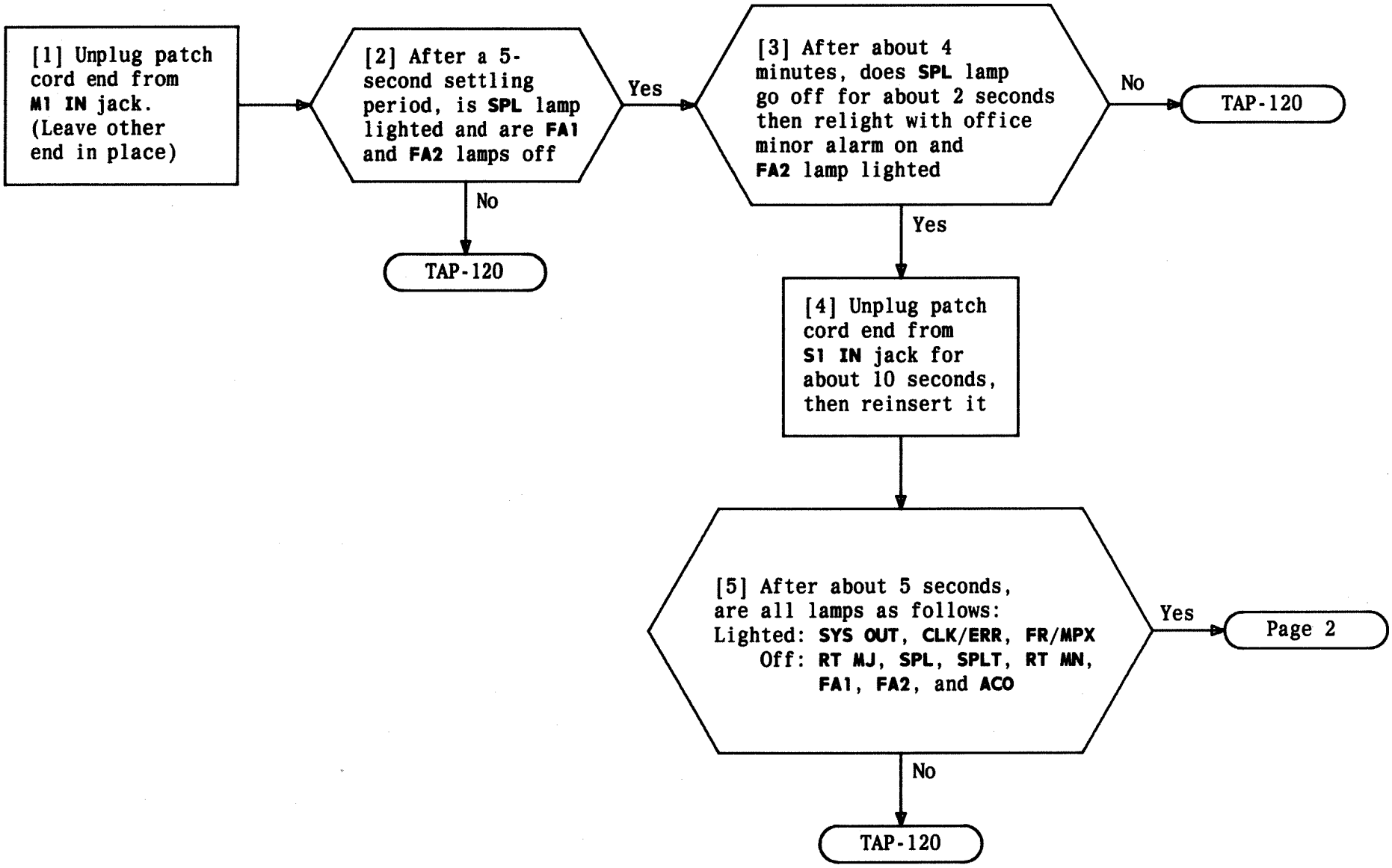
NOTES

2. Do not remove **1014B** while making connections or call will be dropped
3. The tone level may be slightly lower than that heard in Step 9 with no distortion and no additional tones

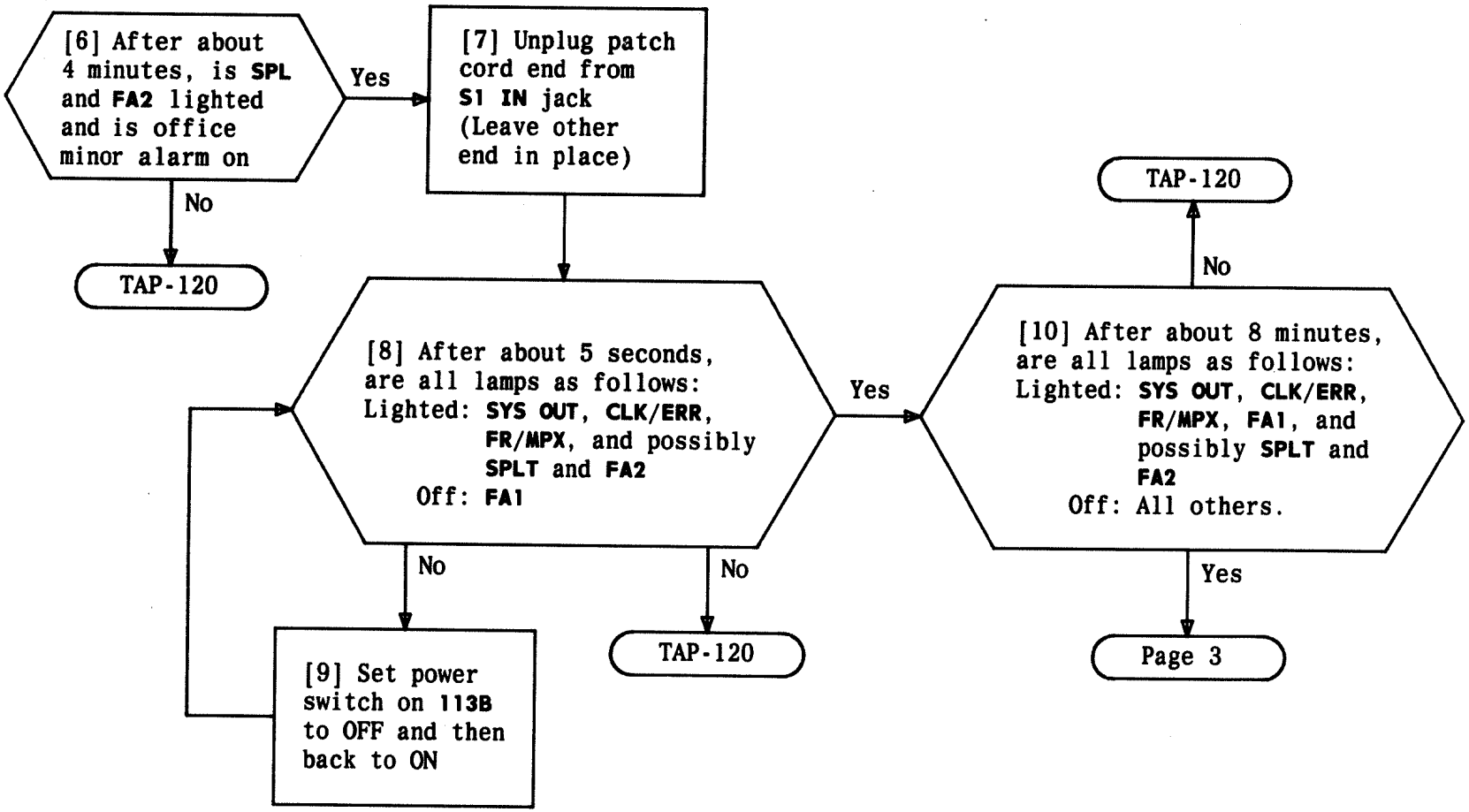
PERFORM 8-CHANNEL LOOP-AROUND TEST



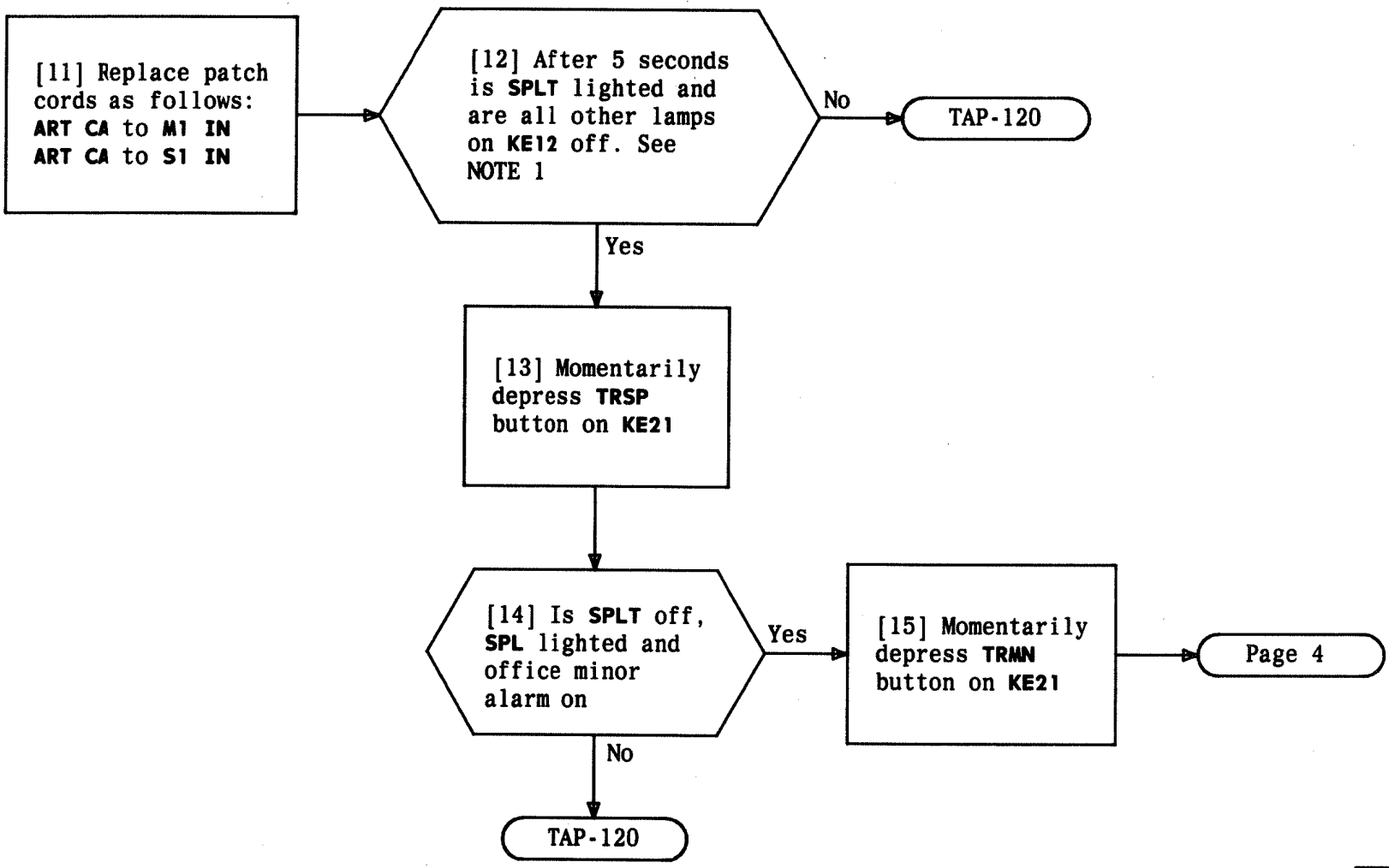
PERFORM 8-CHANNEL LOOP-AROUND TEST



PERFORM CENTRAL OFFICE TERMINAL FINAL SYS OUT STATE TESTS FOR SYSTEMS EQUIPPED WITH KE21

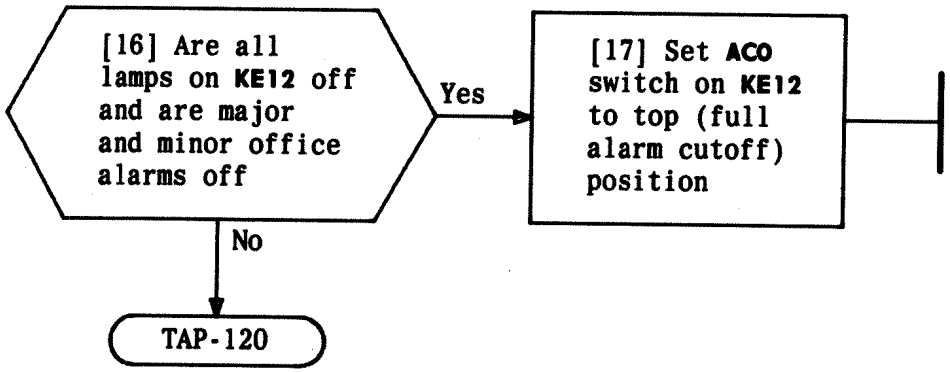


PERFORM CENTRAL OFFICE TERMINAL FINAL SYS OUT STATE TESTS FOR SYSTEMS EQUIPPED WITH KE21

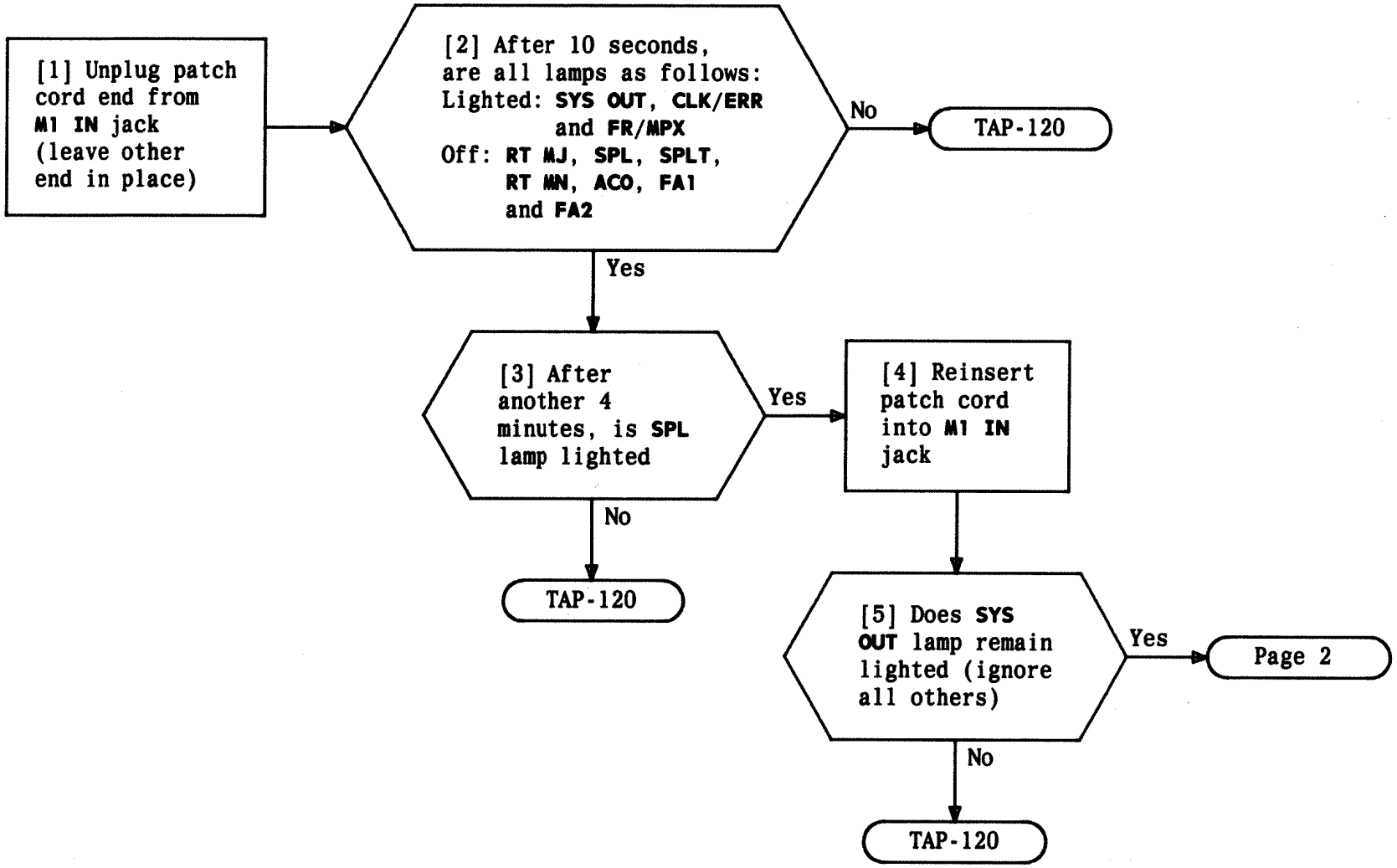


NOTE 1
SPLT will be off if equipped with no spare option. FA2 and minor alarm should be ignored

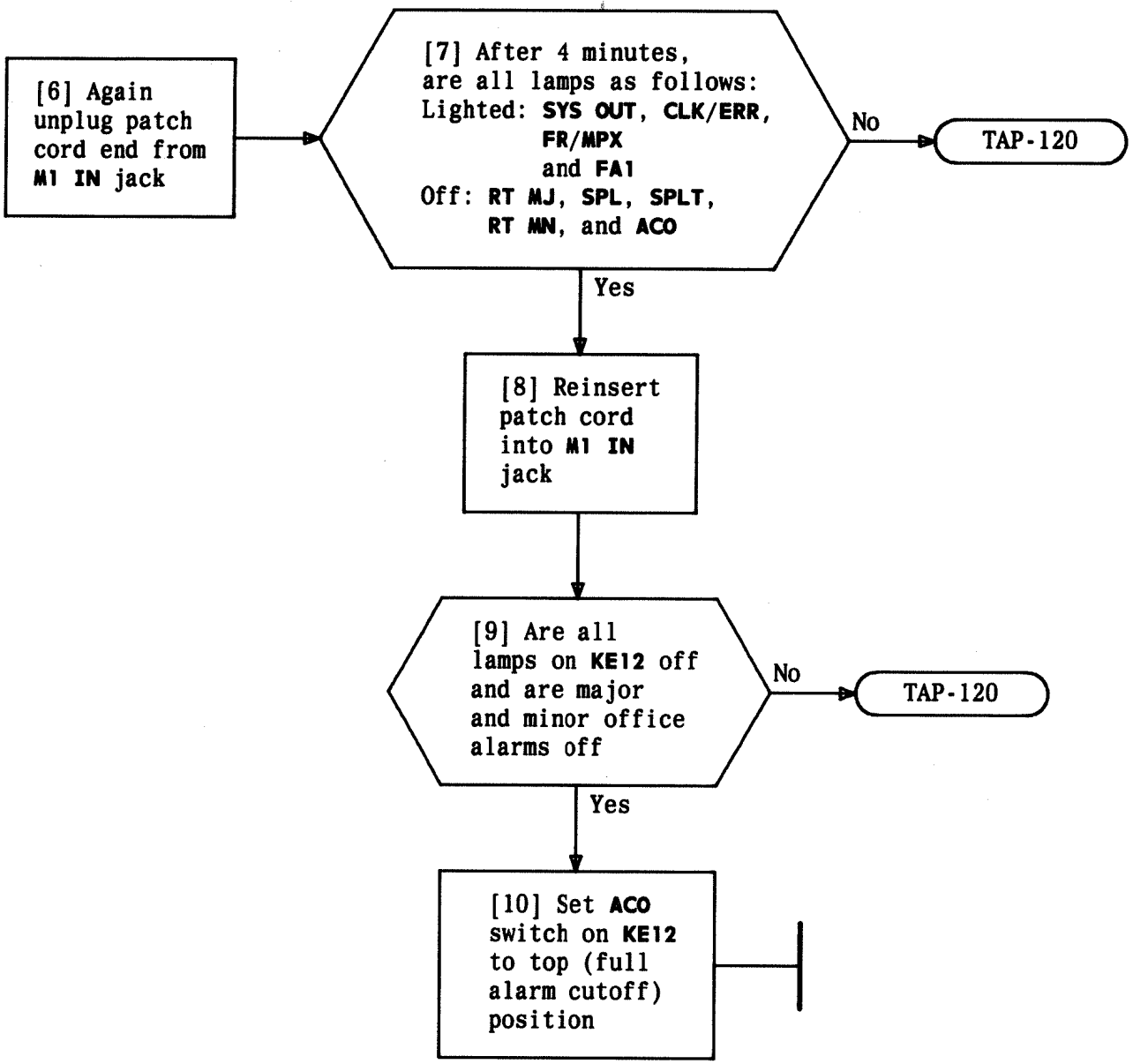
PERFORM CENTRAL OFFICE TERMINAL FINAL SYS OUT STATE TESTS FOR SYSTEMS EQUIPPED WITH KE21



PERFORM CENTRAL OFFICE TERMINAL FINAL SYS OUT STATE TESTS FOR SYSTEMS EQUIPPED WITH KE21



PERFORM CENTRAL OFFICE TERMINAL FINAL SYS OUT STATE TESTS FOR SYSTEMS EQUIPPED WITH KE31A



PERFORM CENTRAL OFFICE TERMINAL FINAL SYS OUT STATE TESTS FOR SYSTEMS EQUIPPED WITH KE31A

If the electrolyte or battery top residue accidently gets on or in:

- The Eyes – Wash the eyes immediately and repeatedly with clean water or the eye wash rinse. The services of a hospital or physician are then required as quickly as possible
- The Skin – Flush the affected area immediately with water
- Clothing or Tools – Flush the affected area immediately with water
- Cabinet Surfaces – Blot up using clean, damp, wiping cloth. Dispose of cloth in nonmetallic waste container
- Electronic Apparatus – Replace

REVIEW SAFETY AND FIRST AID PROCEDURES

[1] Verify that switch on external (commercial) power is set to OFF position

[2] Release door lock mechanisms on 33C cabinet to access rear compartment

[3] Install 10-amp fuse for convenience outlets in **PO** fuse holder position [FIG. 1]

[4] Plug Bell System approved 117-volt lamp and extension cord into one of two convenience outlets on power panel [FIG. 1]

AND

[5] Set switch on external power panel to **ON** position

[6] Does **PO** fuse operate (blow)

Yes

[8] Refer trouble to construction personnel or power company personnel

No

[7] Does 117-volt lamp light

No

Yes

[9] Set switch on external power panel to **OFF** and remove 117-volt lamp from outlet

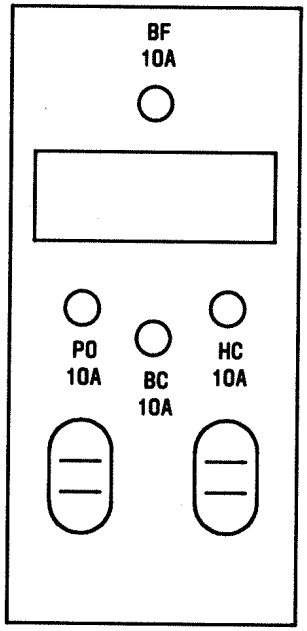


FIG. 1

PREPARE COMMERCIAL AC POWER FOR USE AT RT

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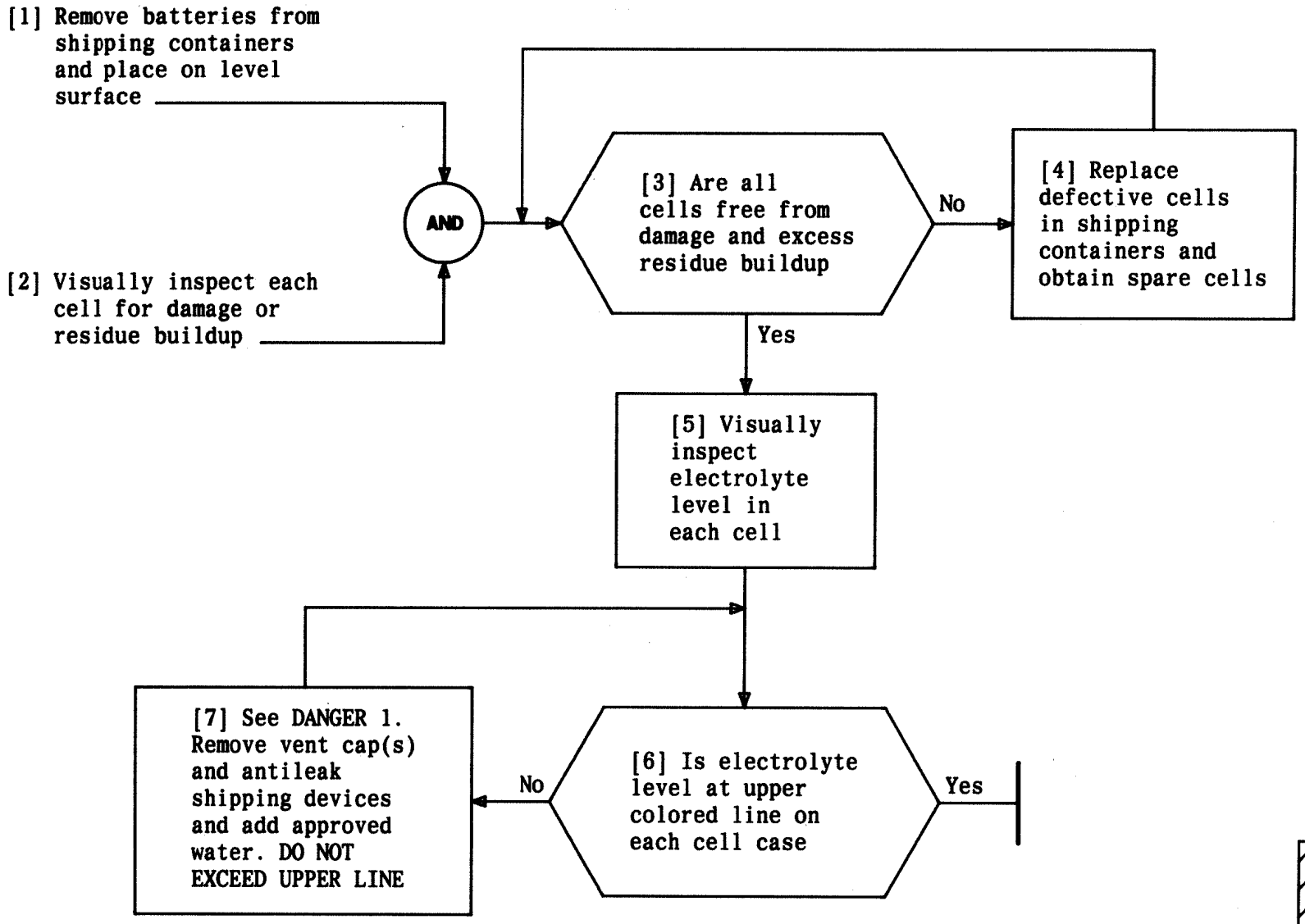

VISUALLY INSPECT EACH CELL FOR EXCESS RESIDUE BUILDUP AND ELECTROLYTE LEVELS

DANGER 1
Electrolyte may spray from cells when antileak shipping devices are removed

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[1] Verify factory-installed tie bars on each pair of cells connect a positive and a negative terminal

[2] Tighten factory-installed tie bars using 9/16-inch taped open-end wrench. DO NOT OVERTIGHTEN

AND

[3] Place batteries on shelves in back compartment of cabinet (five 2-cell batteries per shelf) [FIG. 1]. Start from right side of each shelf, top shelf first. See NOTE 1

Page 2

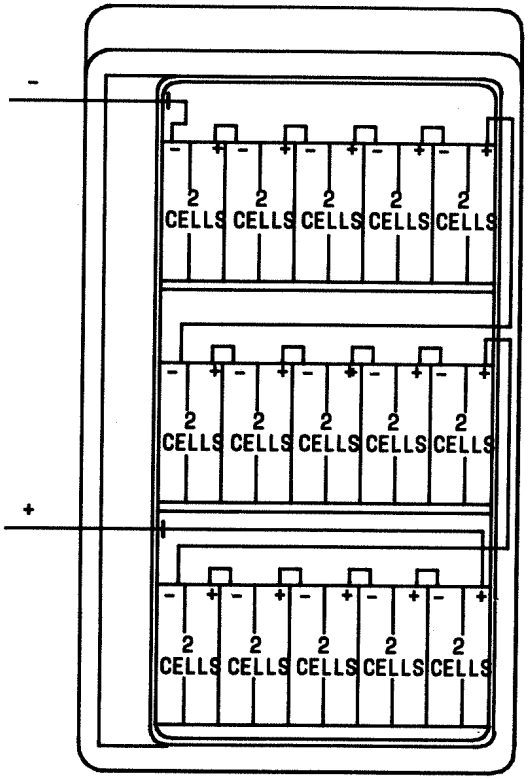

FIG. 1

NOTE 1

Cells should be oriented so that factory-installed tie bars are at back and right front terminal of each pair of cells is the positive terminal

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INSTALL AND CONNECT BATTERIES IN RT CABINET

[4] Using tie bars shipped with batteries, series-connect batteries on each shelf as shown in FIG. 2

[5] Tighten front terminal nuts using 9/16-inch taped open-end wrench. DO NOT OVERTIGHTEN

[6] Working from right to left and top to bottom, connect ends of preformed battery cables to battery terminals as shown in FIG. 1, Page 1

[7] Tighten terminal nuts using 9/16-inch taped open-end wrench. DO NOT OVERTIGHTEN

[8] Fasten batteries to back of cabinet using cable ties as shown in FIG. 2

AND

Batteries installed

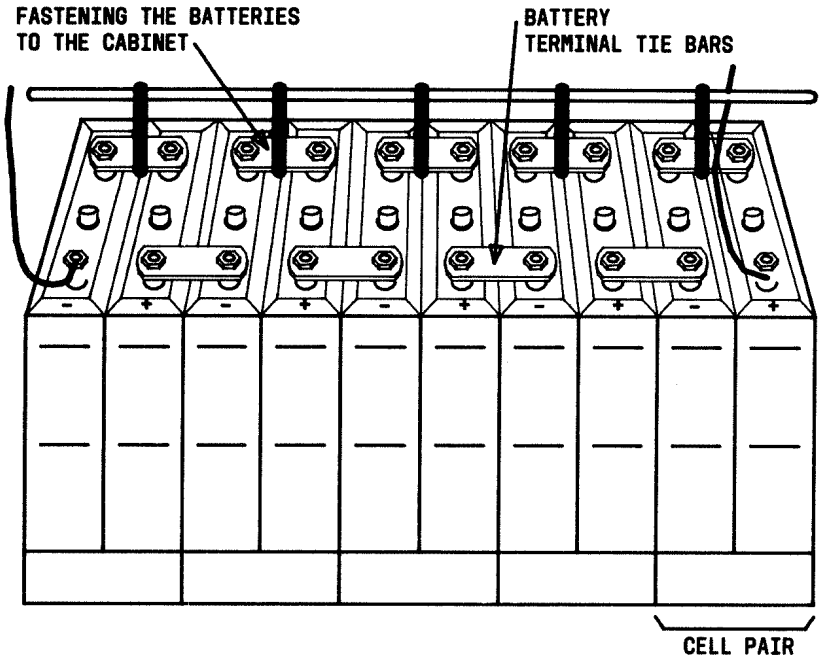

FIG. 2

INSTALL AND CONNECT BATTERIES IN RT CABINET

[1] Obtain KS-14510 VOM or equivalent

[2] Condition VOM [DLP-573] and set selector switch to **DC VOLTS 60** position

AND

[3] See WARNING 1. Place VOM positive (red) lead on positive (+) terminal of battery on right side and place negative (black) lead to negative (–) terminal of battery on left side [FIG. 1]

[4] Does VOM indicate between 12 and 14 Vdc

No

[5] Verify cells are oriented properly and series-connected properly

Yes

[6] Have all shelf voltages been measured

Yes

No

[7] Repeat for next shelf

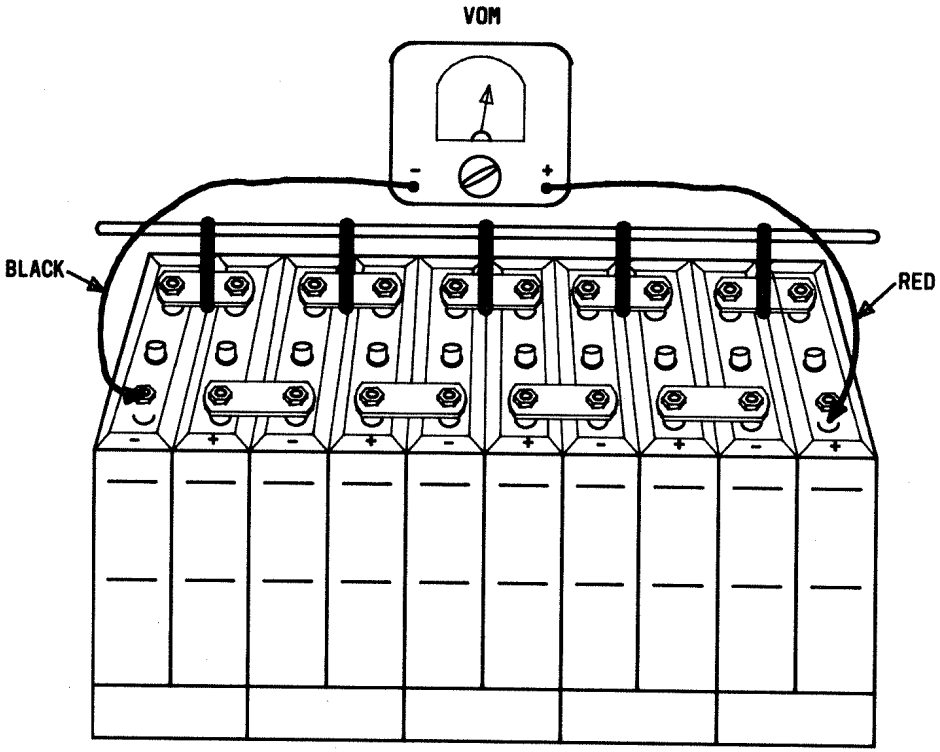

FIG. 1

WARNING 1

VOM may be damaged if incorrect scale is used, or if correct test lead polarity is not observed

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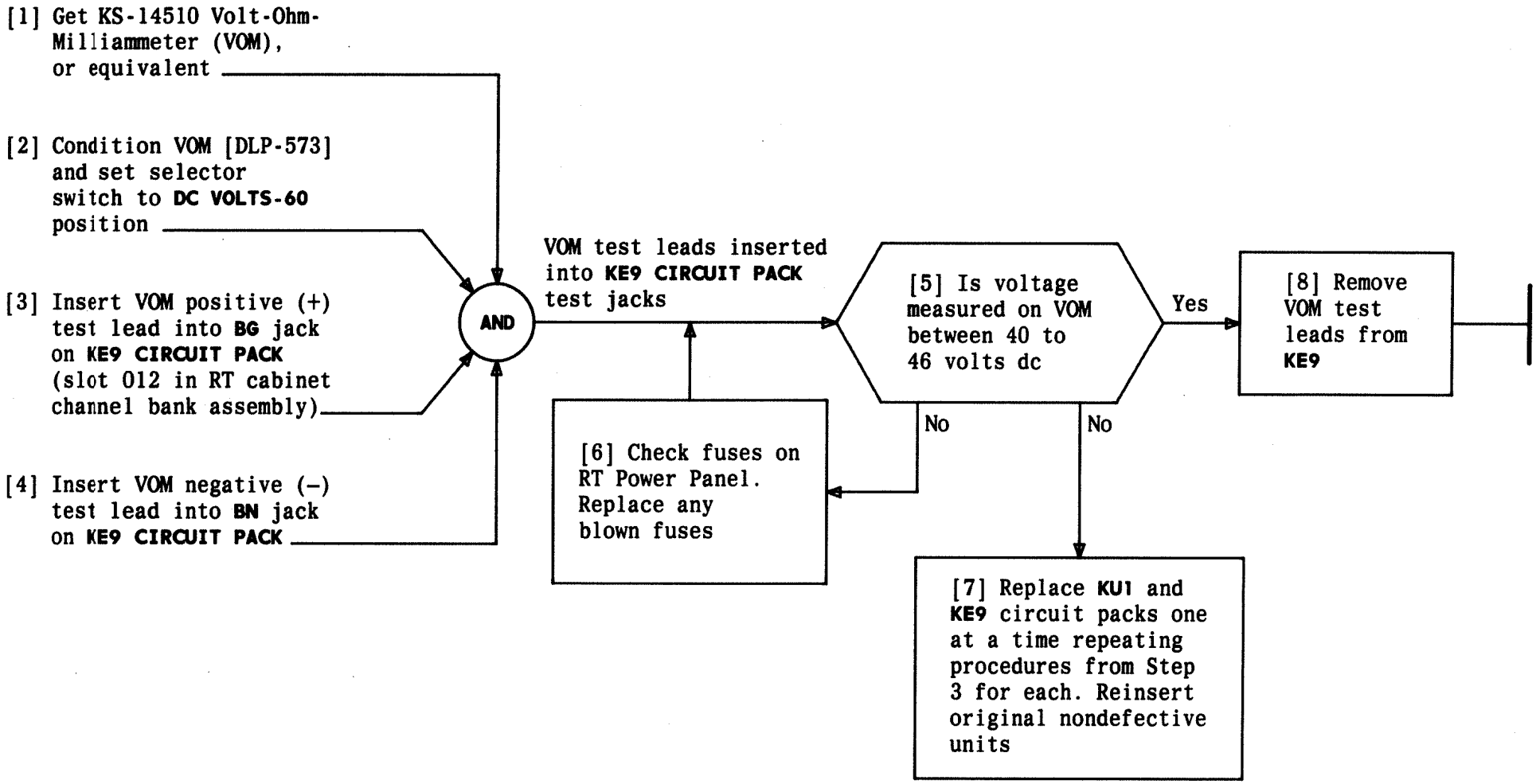
MEASURE BATTERY VOLTAGE OF EACH SHELF (5 PAIRS OF CELLS)



MEASURE BATTERY VOLTAGE AT KE9 CIRCUIT PACK (BC FUSE INSTALLED)

[1] Set power switch on **113B** power unit to **OFF** position

[2] Plug **113B** power unit into slot 111 [FIG. 1]

[3] Set power switch on **113B** power unit to **ON** position

[4] Do any fuses on **KU1** circuit pack operate (blow)

No

Yes

Yes

[5] Remove **113B** power unit

[6] Replace blown fuse and repeat procedures from Step 1 using spare **113B**

[7] Use SD-97733-04 to locate defective wiring

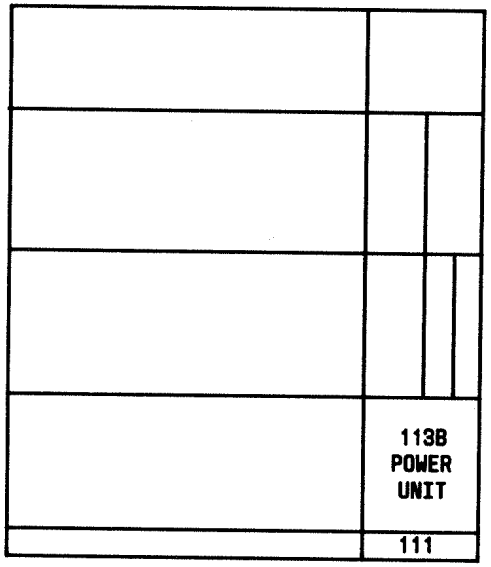


FIG. 1

INSTALL 113B POWER UNIT INTO SLOT 111 AT RT CABINET

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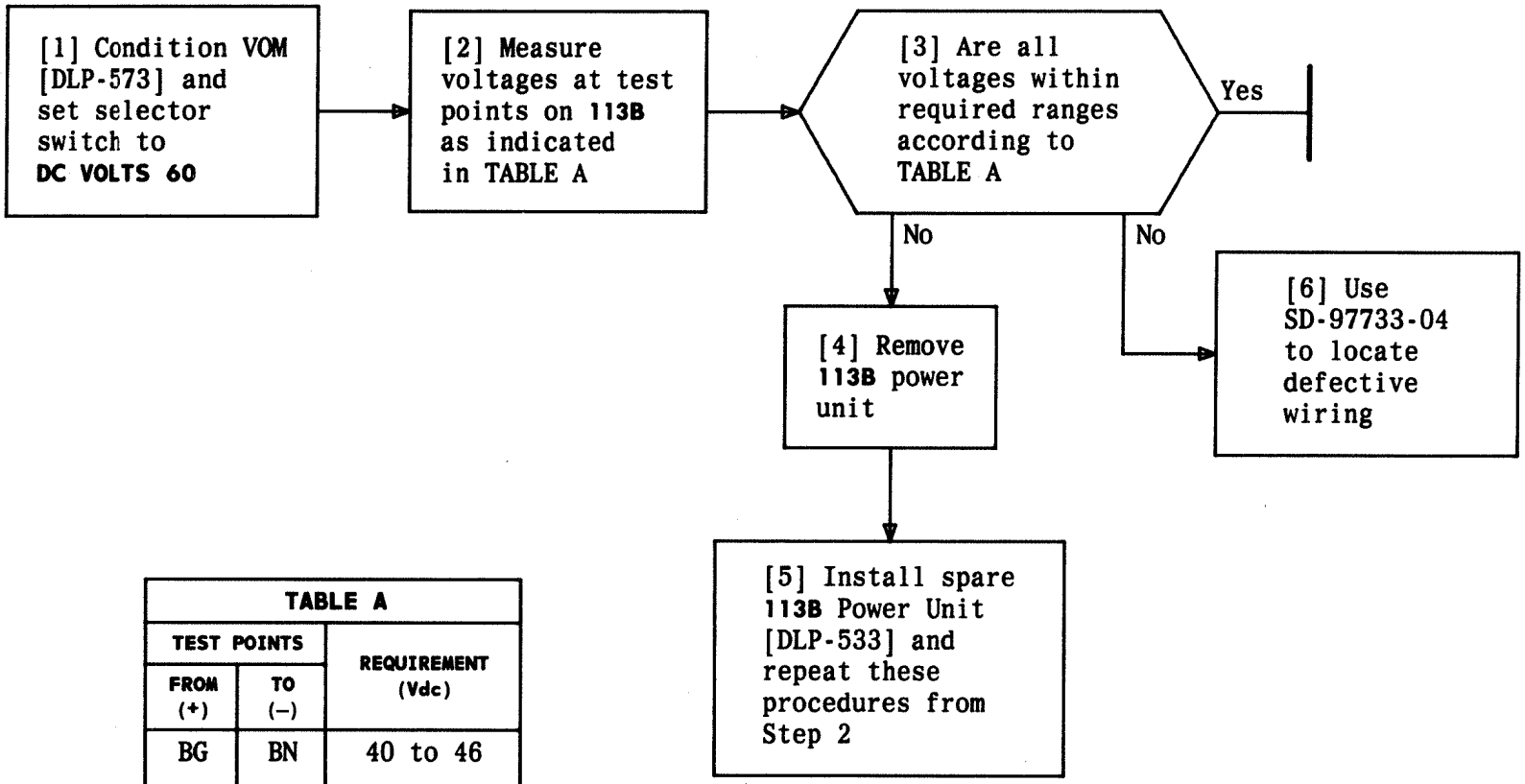
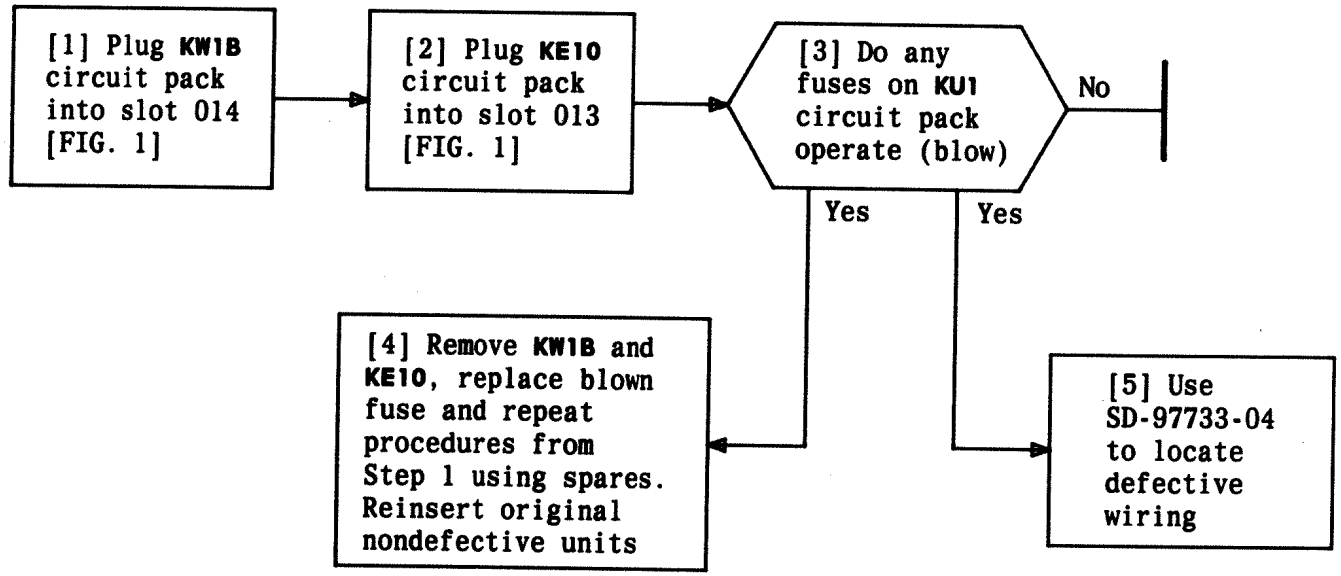


TABLE A

TEST POINTS		REQUIREMENT (Vdc)
FROM (+)	TO (–)	
BG	BN	40 to 46
+5	CG	4.5 to 5.5
CG	–8	7 to 9

MEASURE VOLTAGES ON 113B POWER UNIT AT RT CABINET



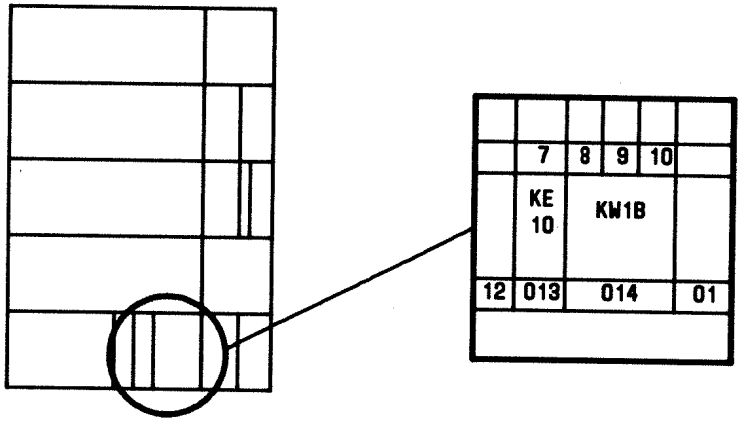


FIG. 1

INSTALL KW1B AND KE10 CIRCUIT PACKS

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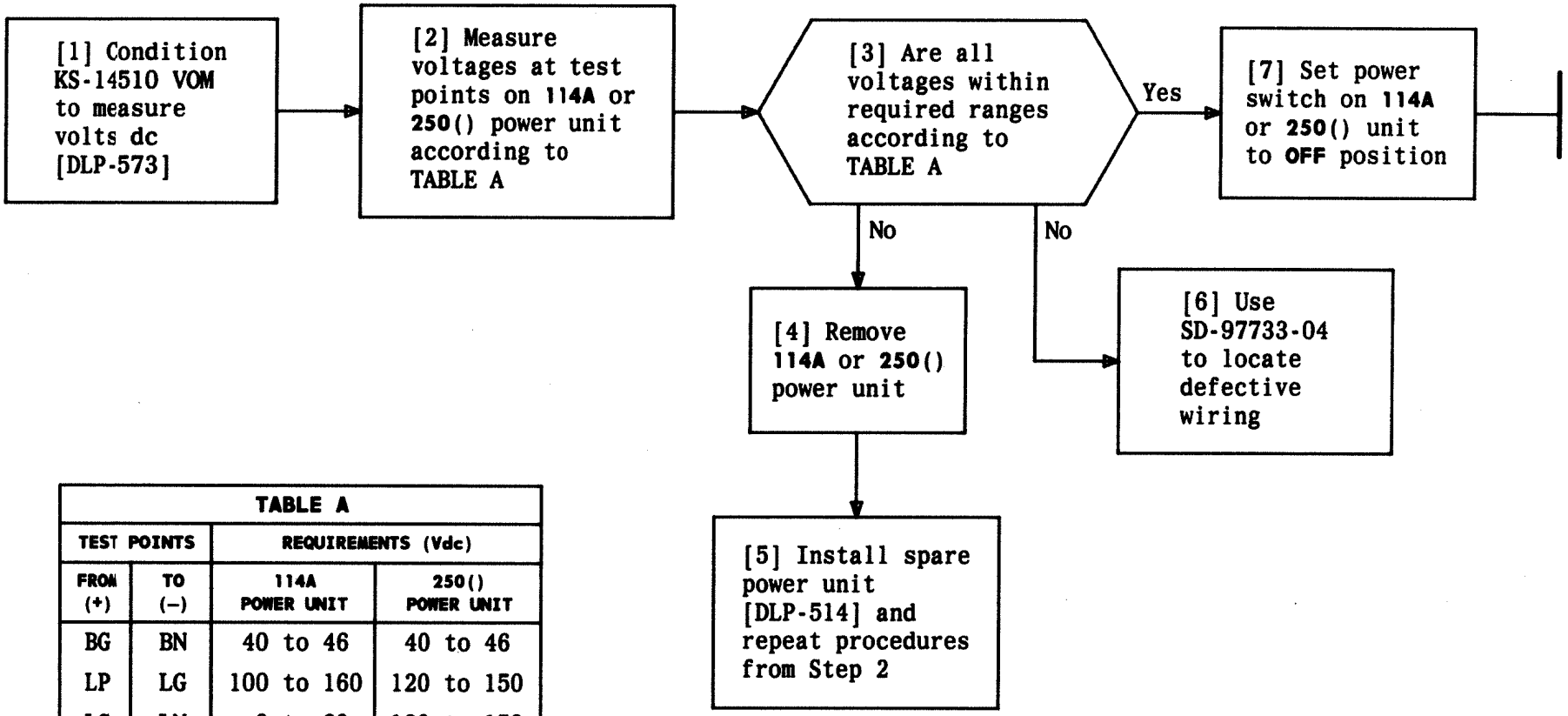
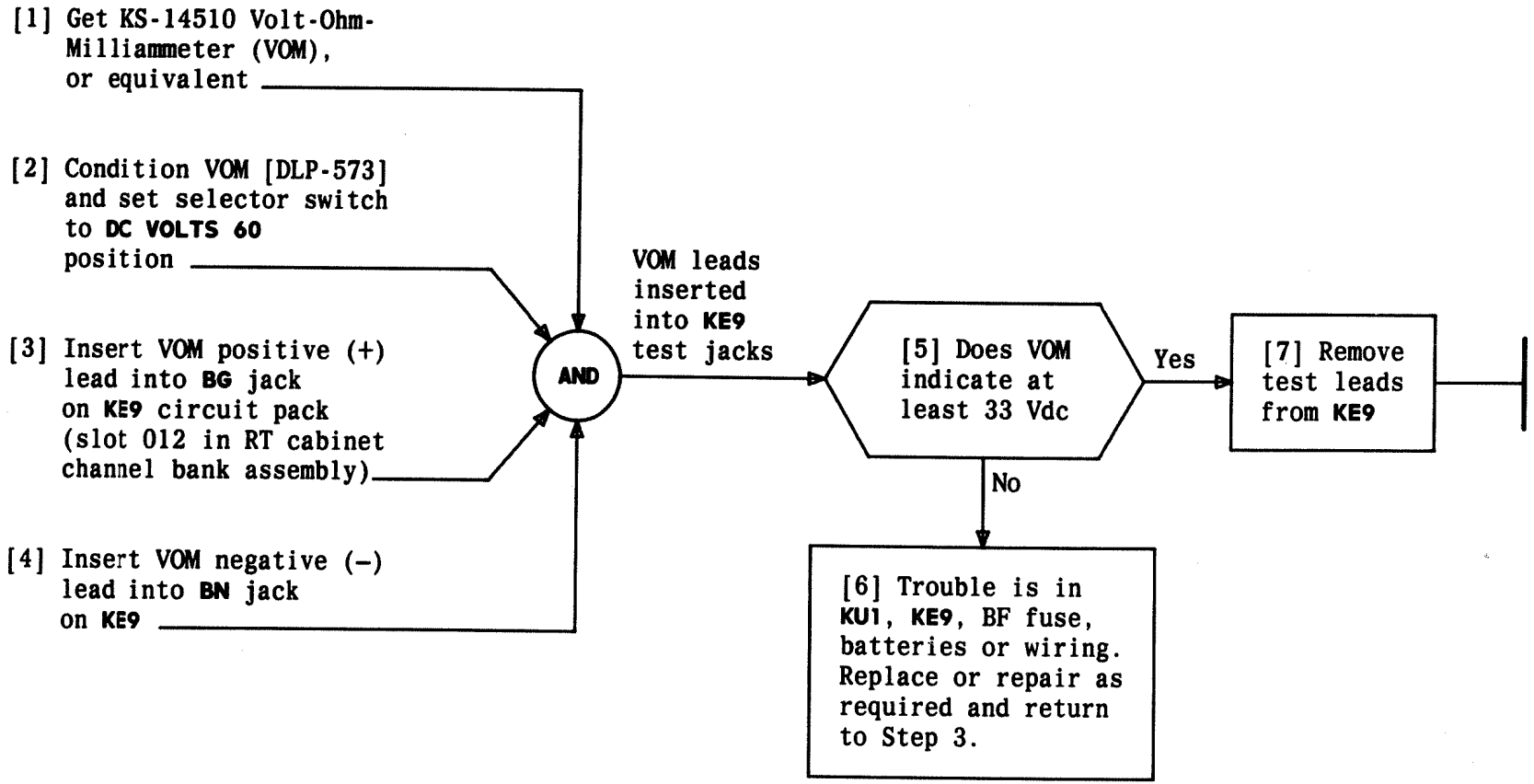


TABLE A

TEST POINTS		REQUIREMENTS (Vdc)	
FROM (+)	TO (−)	114A POWER UNIT	250() POWER UNIT
BG	BN	40 to 46	40 to 46
LP	LG	100 to 160	120 to 150
LG	LN	0 to 60	120 to 150

MEASURE VOLTAGES ON 114A OR 250() POWER UNIT AT RT



MEASURE BATTERY VOLTAGE AT KE9 CIRCUIT PACK (BC FUSE REMOVED)

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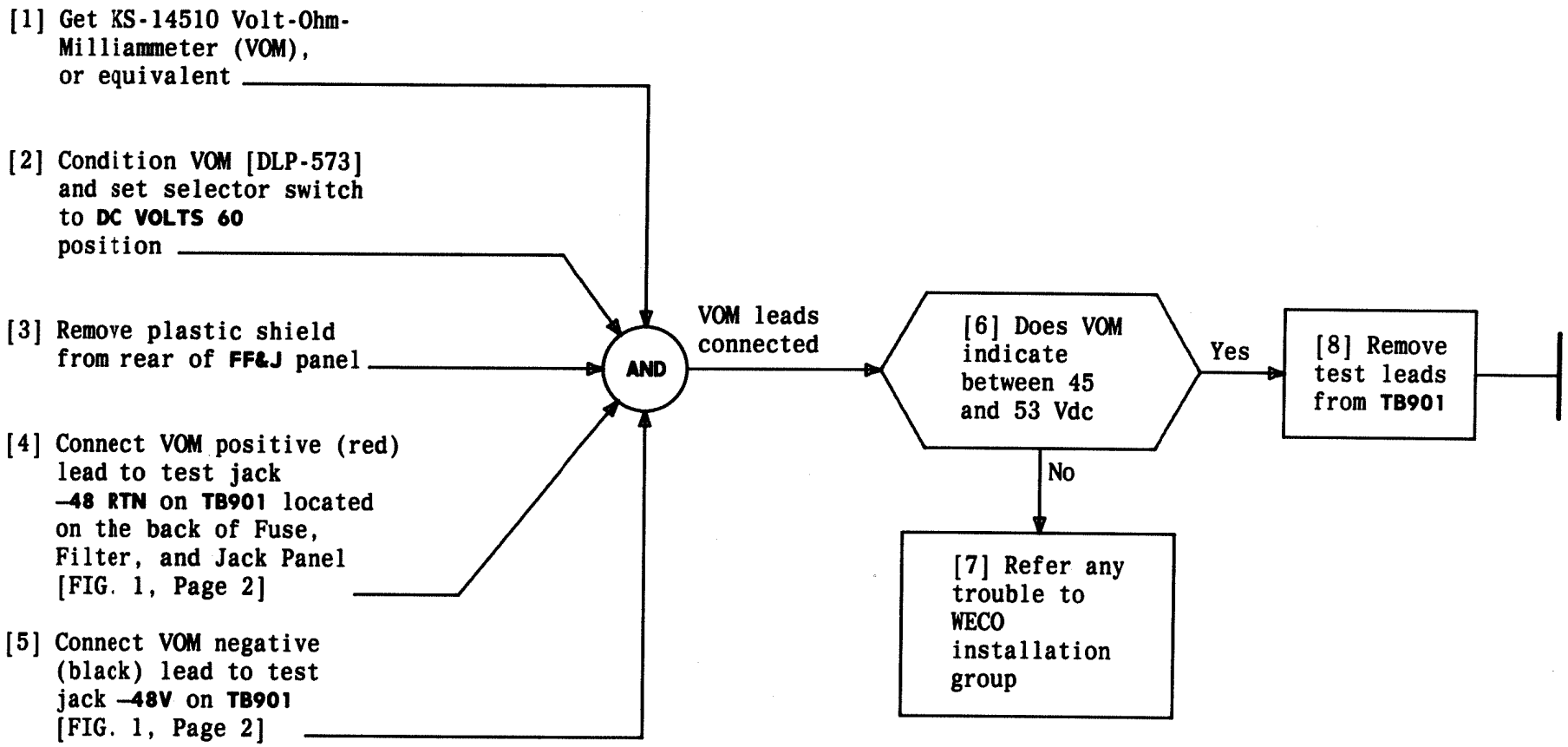

MEASURE -48V SUPPLY FOR RT FRAME

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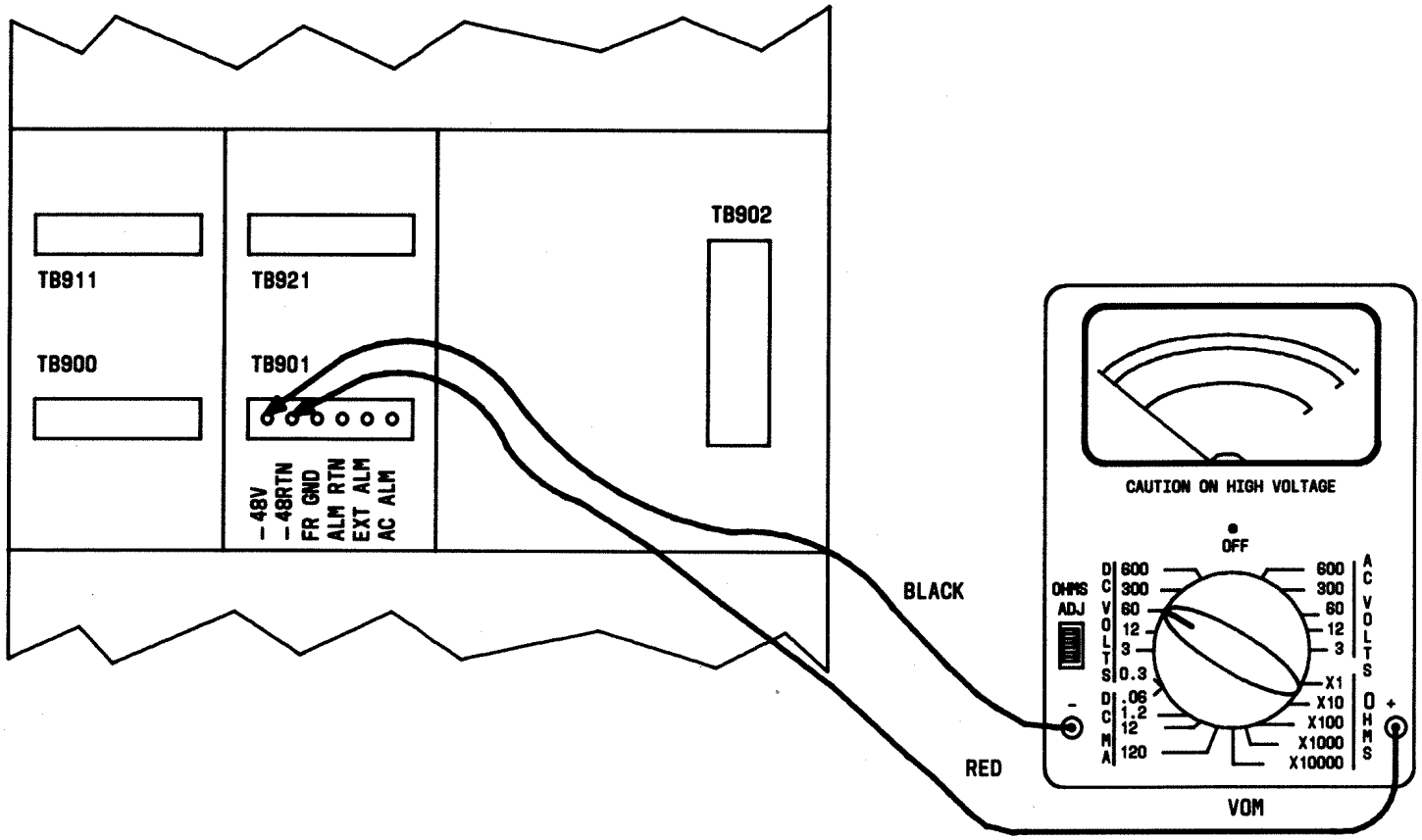

FIG. 1

MEASURE –48V SUPPLY FOR RT FRAME

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1. Place, but do not plug in, each circuit pack where it belongs according to FIG. 1 and FIG. 2, Page 2

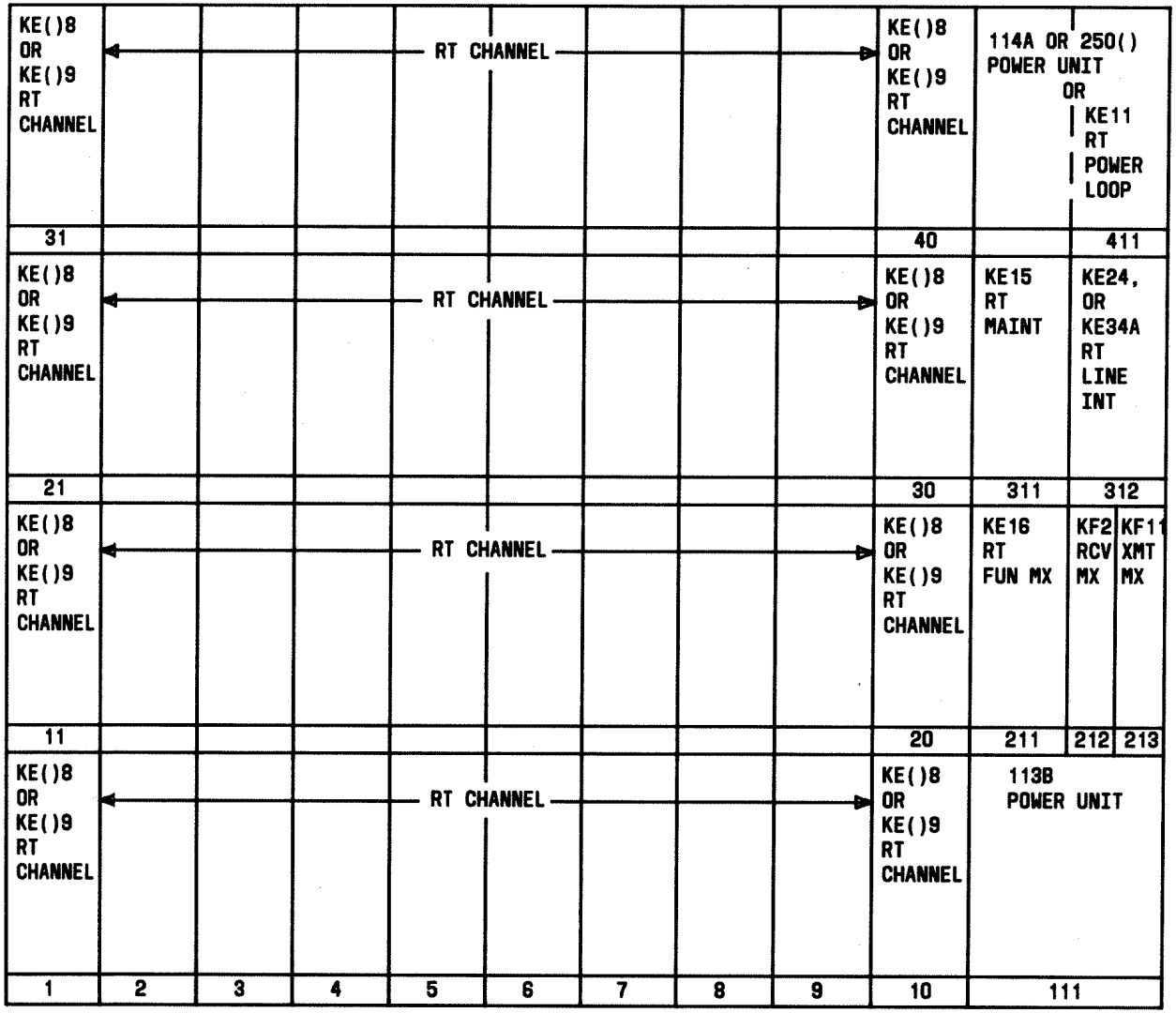

FIG. 1 – RT Frame (Lower System) – Circuit Pack Locations Shown

PLACE, BUT DO NOT PLUG IN, EACH CIRCUIT PACK IN THE SLOT WHERE IT BELONGS

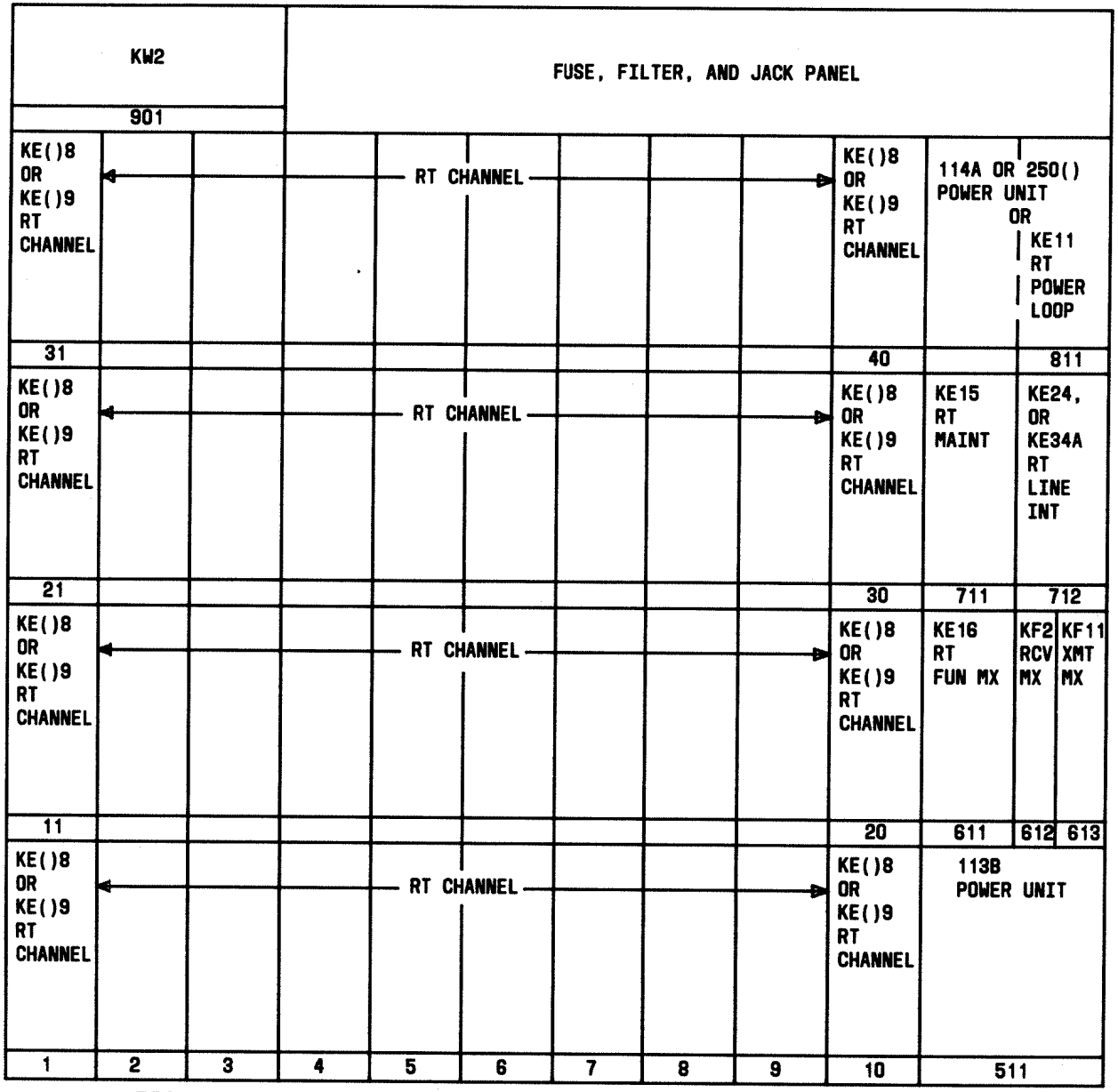

FIG. 2 – RT Frame (Upper System) – Circuit Pack Locations Shown

PLACE, BUT DO NOT PLUG IN, EACH CIRCUIT PACK IN THE SLOT WHERE IT BELONGS

[1] Insert 70C fuses (six total) into positions **TA**, **TB**, **HV**, **LV**, **SA** and **SB** on **FF&J** panel. See FIG. 1 and NOTE 1

[2] Do any fuses operate (blow)

No

Yes

[3] Use SD-7C021-01 to locate defective wiring

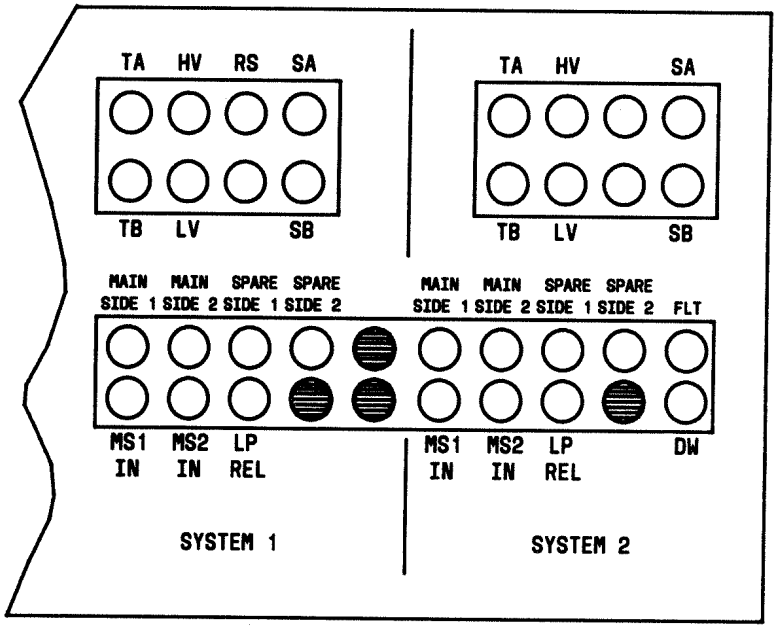

FIG. 1

NOTE 1
Fuses are shipped in a bag attached to the **FF&J** panel

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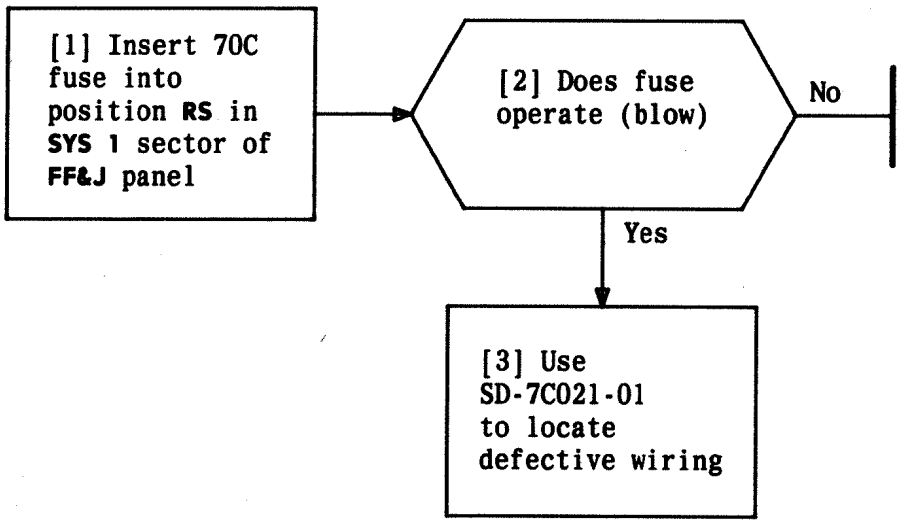
INSERT FUSES TA, TB, HV, LV, SA, AND SB IN FF&J PANEL



INSERT 70C FUSE IN POSITION RS LOCATED IN SYS 1 SECTOR OF FF&J PANEL

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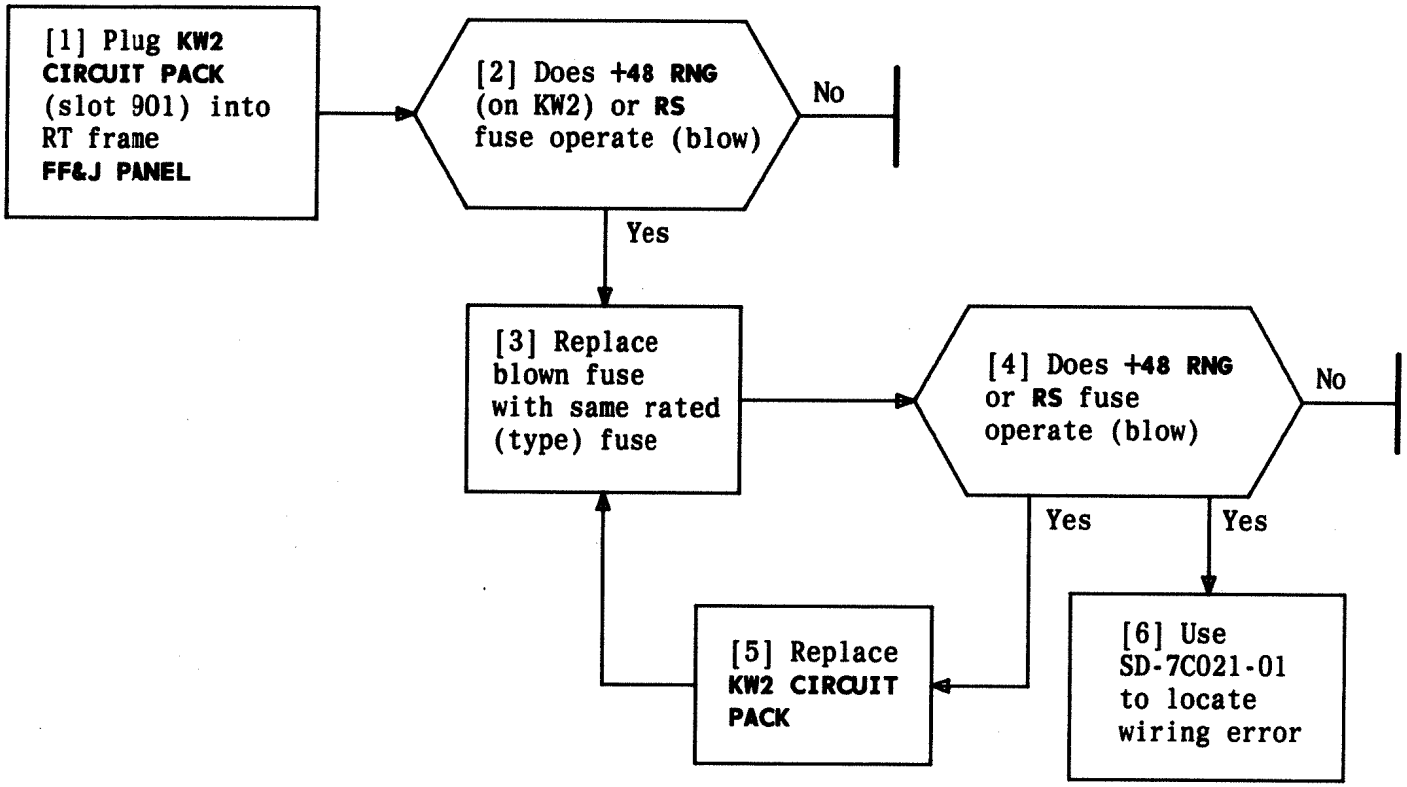

PLUG KW2 CIRCUIT PACK INTO SLOT 901 OF RT FRAME

[1] Get KS-14510 volt-ohm-milliammeter (VOM), or equivalent

[2] Condition VOM [DLP-573] and set selector switch to **DC VOLTS-60** position

[3] Insert VOM positive (red) test lead into **+48 RNG** jack and negative (black) test lead into **CG** jack on **KW2 CIRCUIT PACK** [FIG. 1]

AND

[4] Does VOM indicate 43 to 55 Vdc

Yes

No

[5] Replace **KW2 CIRCUIT PACK** and repeat this procedure from Step 3

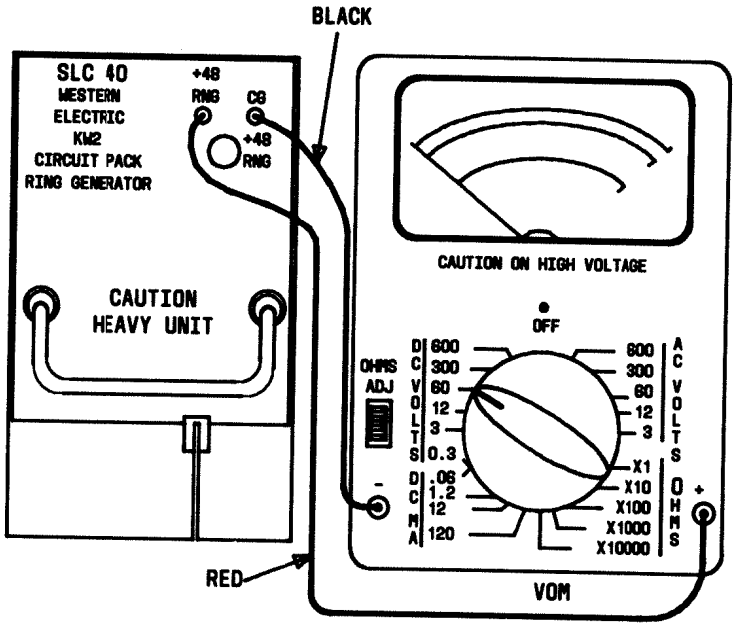

FIG. 1

MEASURE VOLTAGE BETWEEN TEST JACKS +48 RNG AND CG ON KW2 CIRCUIT PACK

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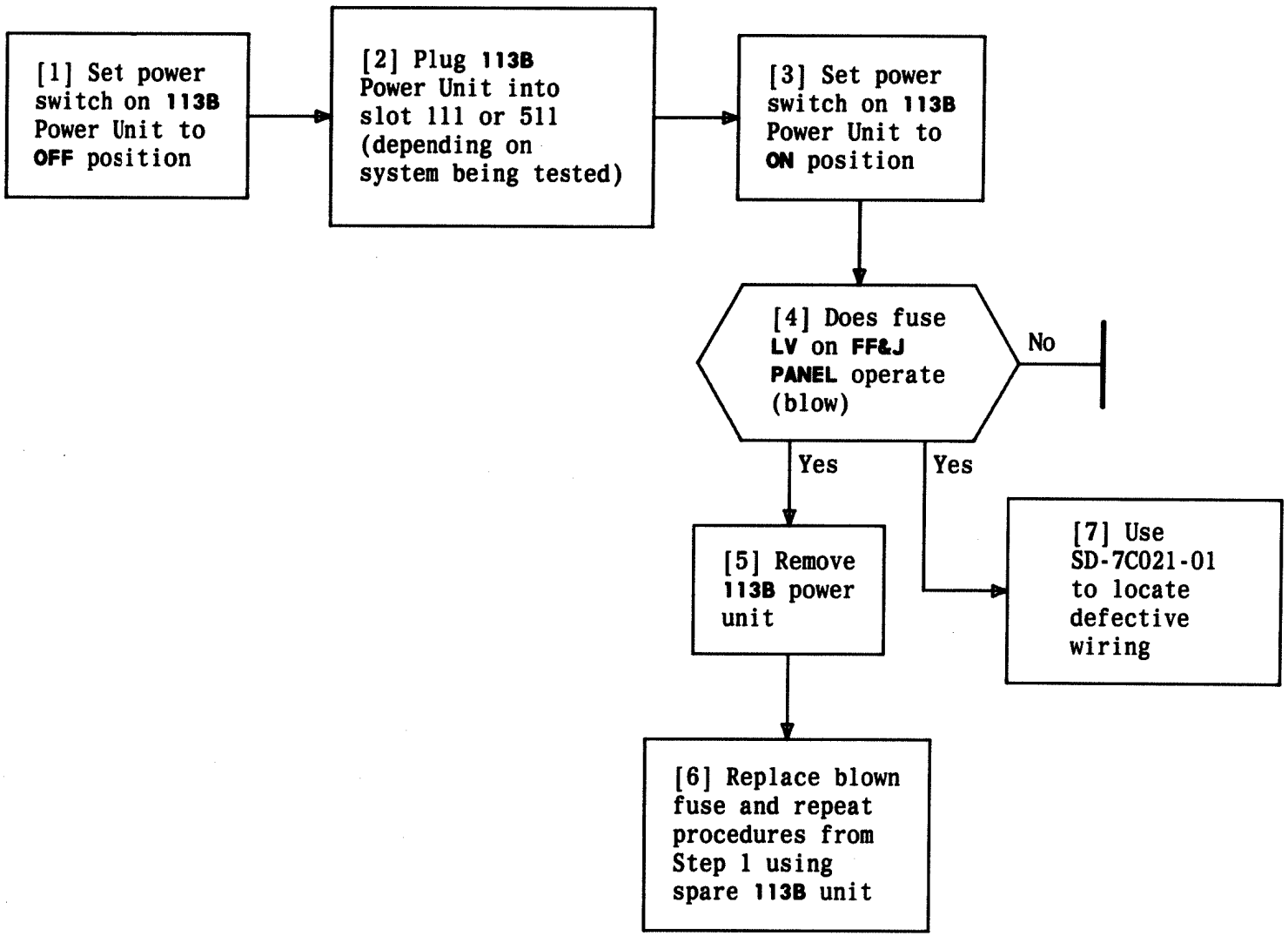
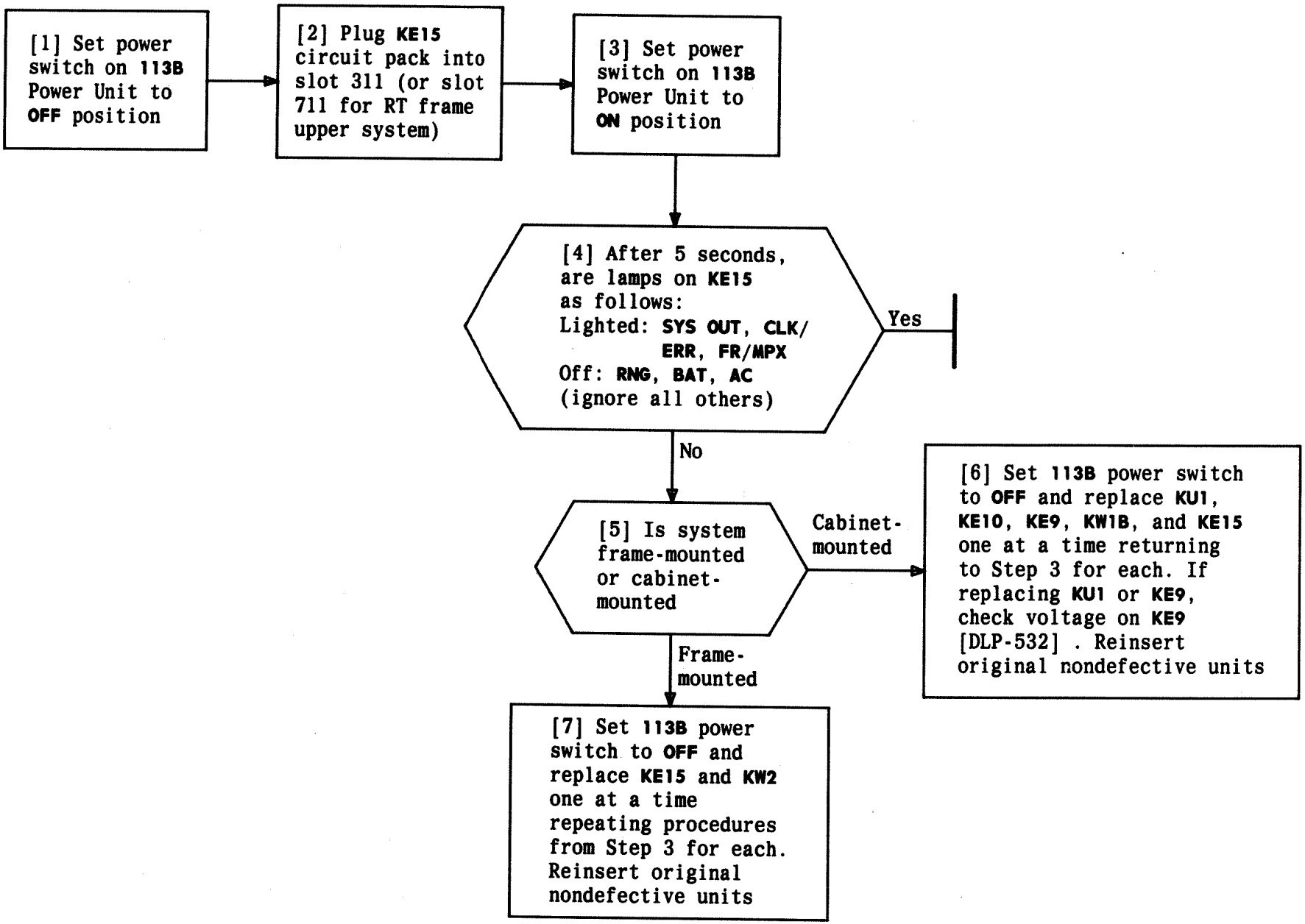


INSTALL 113B POWER UNIT AT RT FRAME



INSTALL KE15 CIRCUIT PACK

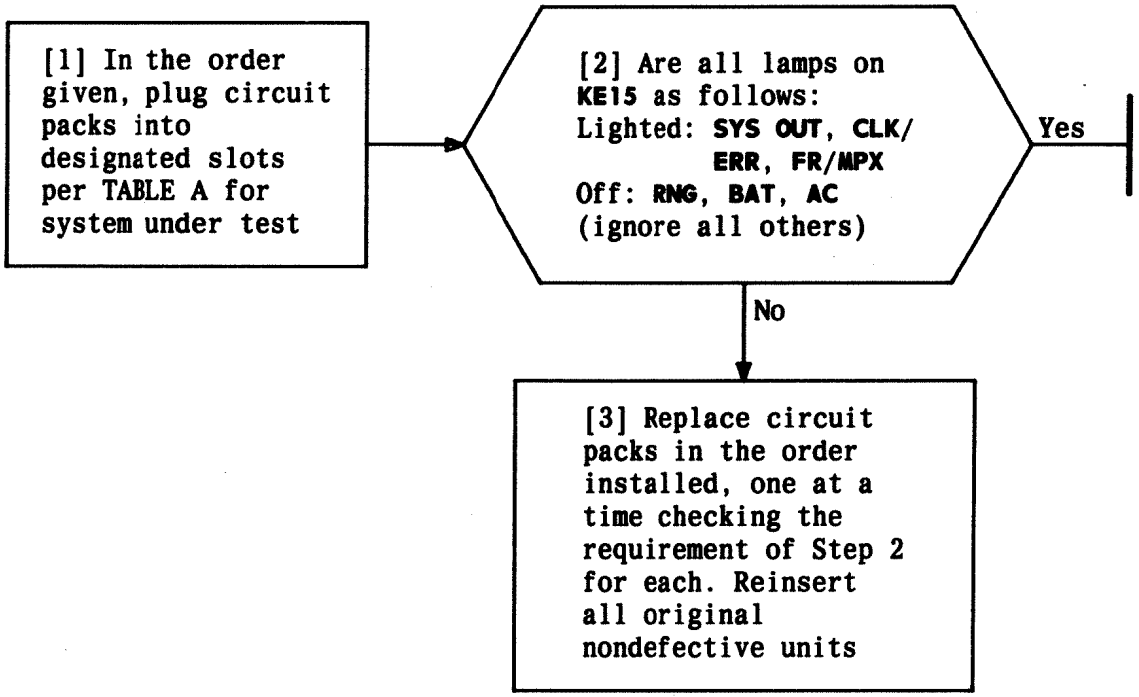
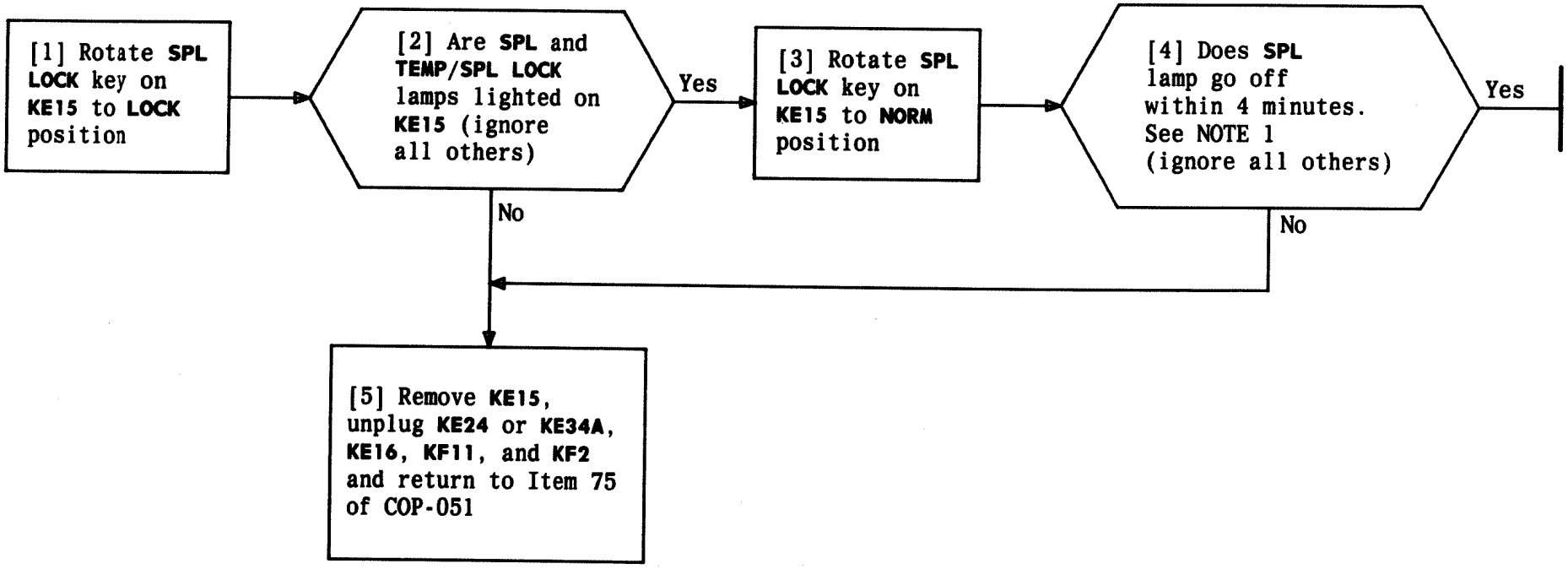


TABLE A

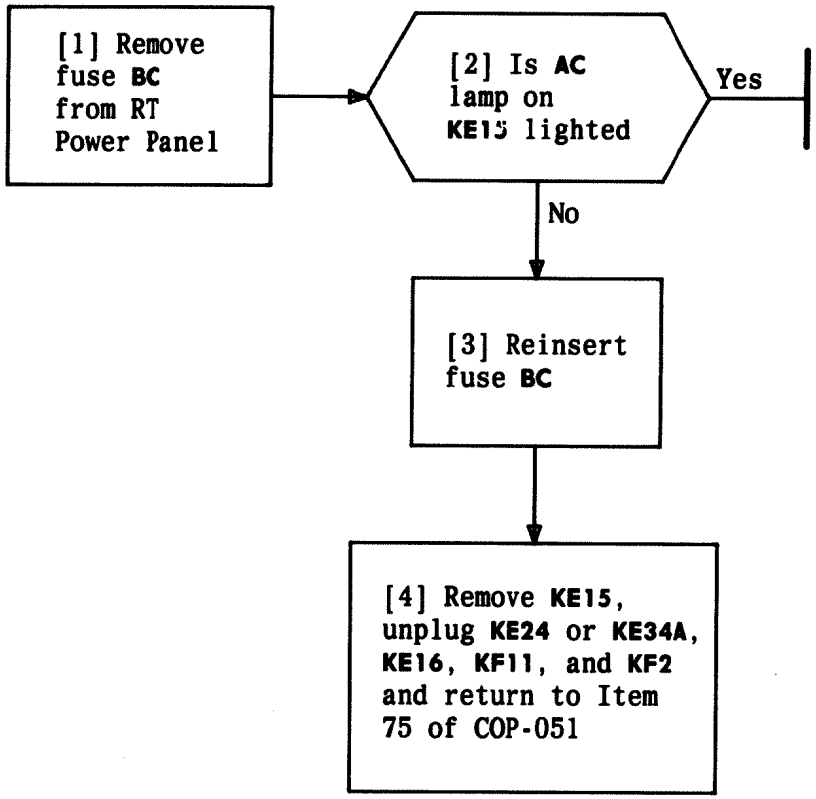
CIRCUIT PACKS	DESIGNATED SLOTS	
	CABINET OR FRAME LOWER SYSTEM	FRAME UPPER SYSTEM
KE24/KE34A	312	712
KE16/KE26	211	611
KF11/KF3	213	613
KF2/KF4	212	612

INSTALL KE24 OR KE34A, KE16 OR KE26, KF11 OR KF3 AND KF2 OR KF4 UNITS



NOTE 1
TEMP/SPL LOCK lamp will also be off in frame-mounted RT and may be off in cabinet-mounted RT

CHECK OPERATION OF SPL LOCK KEY ON KE15



REMOVE FUSE BC FROM RT POWER PANEL

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[1] Establish communication between Remote Terminal (RT) and Central Office Terminal (COT) via order wire

[2] Verify that power switch on line power unit (slot 411) in COT channel bank assembly [FIG. 1] is in **OFF** position

[3] On **KE12** (slot 311), verify that **ACO** switch is in top position (major **and** minor alarm cutoff position)

[4] Unplug, but do not remove **KE21 CIRCUIT PACK** (slot 312) from channel bank assembly

[5] Verify that MDF jumpers for carrier pairs are connected in accordance with work order or cut-sheet, and that carbon blocks and heat coils are installed at MDF protectors. See NOTE 1

AND

KE()7B									KE()7B	POWER UNIT
31	32	33	34	35	36	37	38	39	40	411
KE()7B									KE()7B	KE12	KE21
21	22	23	24	25	26	27	28	29	30	311	312
KE()7B									KE()7B	KE13	KF2	KF11
11	12	13	14	15	16	17	18	19	20	211	212	213
KE()7B									KE()7B	113B
1	2	3	4	5	6	7	8	9	10	111

FIG. 1

NOTE 1
If shared spare line option is used, spare lines are connected to test jacks of non-priority system (2, 4, etc)

PREPARE CENTRAL OFFICE TERMINAL FOR LINE POWERING

[1] Is remote terminal frame or cabinet-mounted

Frame

Cabinet

Page 2

At RT frame:

[2] Verify that **KE11 CIRCUIT PACK** is in slot 411 or 811, according to FIG. 1

[3] Verify that connections have been made to carrier pairs in accordance with work order

[4] Notify central office personnel that connections are complete

AND

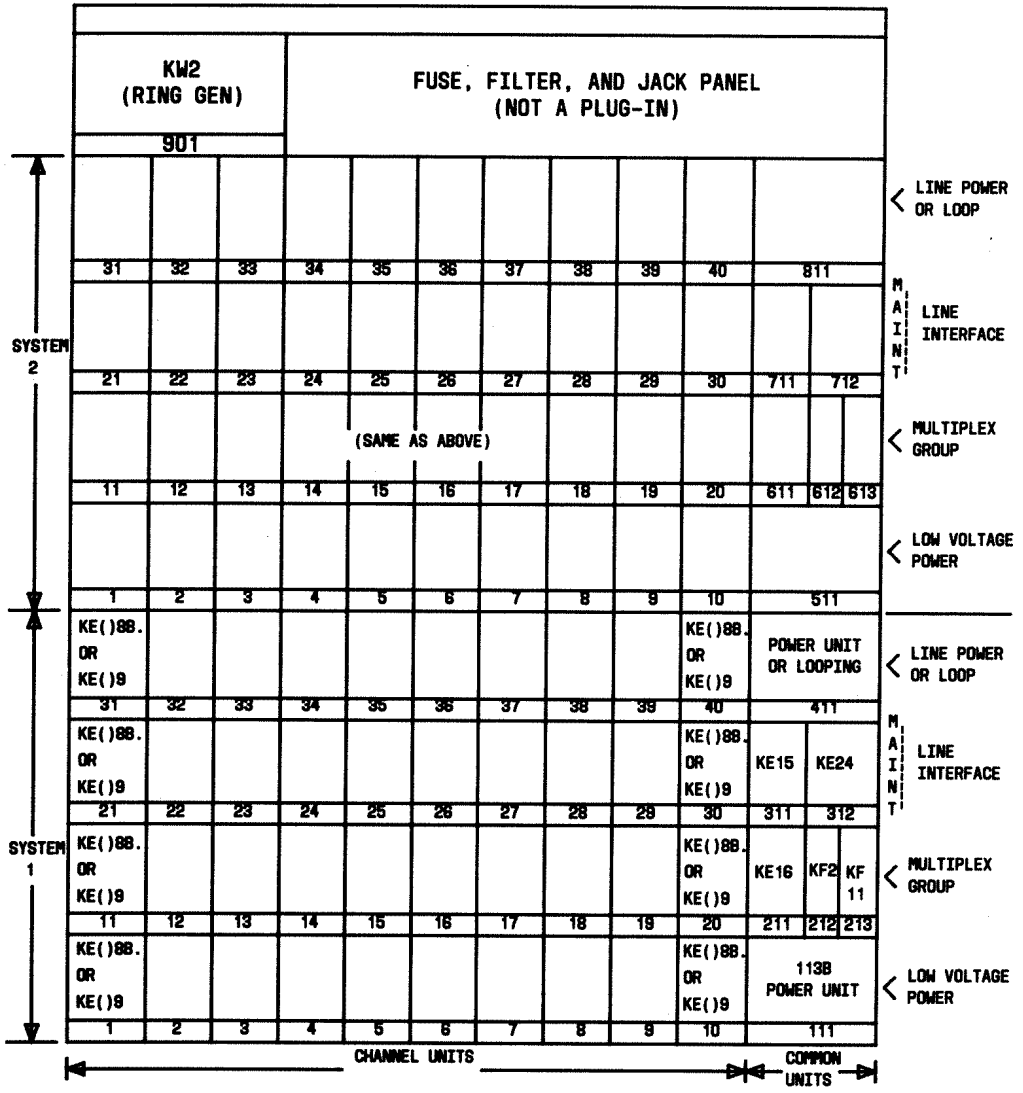


FIG. 1

PREPARE REMOTE TERMINAL FOR LINE POWERING (LINE POWER FROM COT ONLY)

At RT cabinet:

[5] Replace fuses **BC** and **BF** [on RT power panel, FIG. 2], in that order

[6] Verify that external ac power switch is in **ON** position

[7] Verify that **KE11 CIRCUIT PACK** is in slot 411 in RT channel bank [FIG. 3]

[8] Verify that connections have been made to carrier pairs in accordance with work order. See NOTE 1

[9] Notify central office personnel that connections are complete

AND

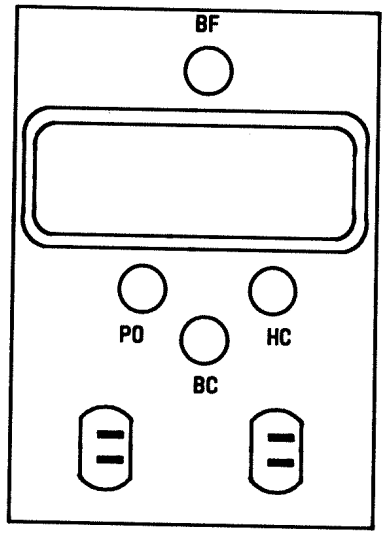


FIG. 2

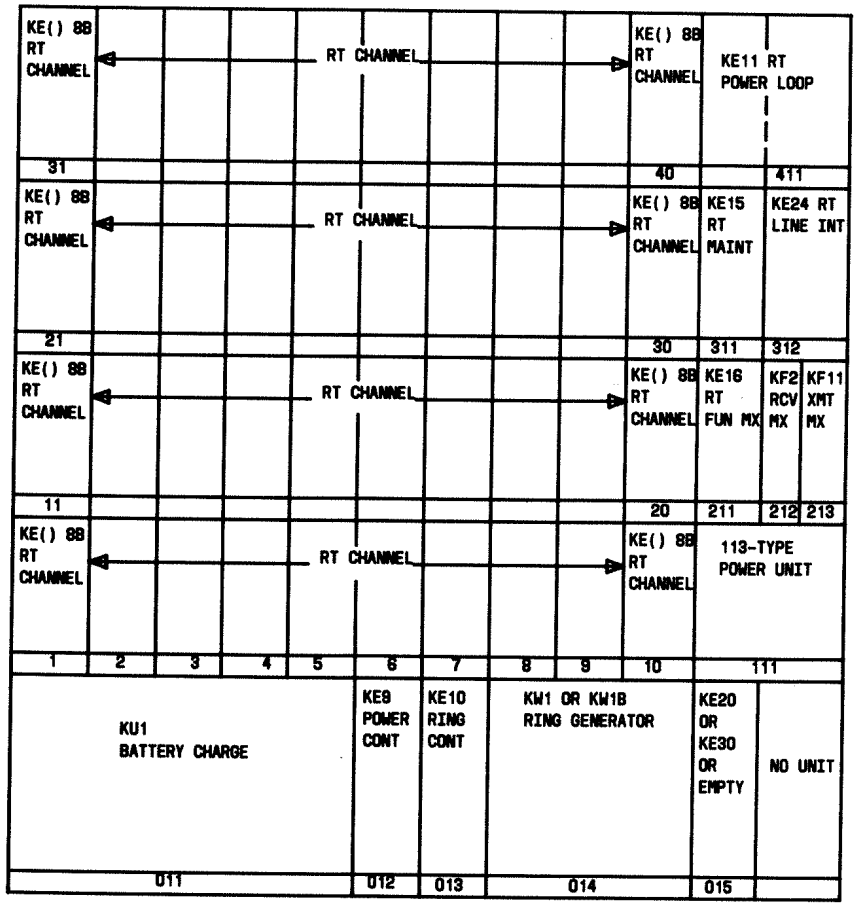


FIG. 3

NOTE 1
Section 640-250-215 contains installation procedures for 33C RT cabinet

PREPARE REMOTE TERMINAL FOR LINE POWERING (LINE POWER FROM COT ONLY)

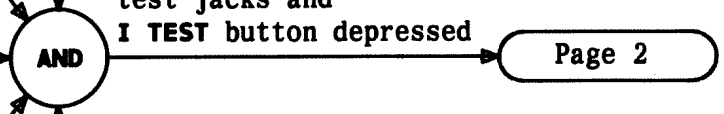
[1] Get KS-14510 Volt-Ohm-Milliammeter (VOM), or equivalent

[2] Condition VOM [DLP-573] and set selector switch to **DC VOLTS-3** position

[3] Insert VOM positive (+) lead into **I TEST +** jack on **KE21 CIRCUIT PACK**

[4] Insert VOM negative (–) lead into **I TEST –** jack on **KE21 CIRCUIT PACK**

[5] Read Steps 6 through 8, Page 2 before performing this step. Momentarily depress the **I TEST** button on **KE21 CIRCUIT PACK** while observing voltage indication on VOM. See NOTE 1



VOM test leads inserted into **I TEST** test jacks and **I TEST** button depressed

Page 2

NOTE 1

SPL lamp on **KE12 CIRCUIT PACK** (slot 311) must be extinguished before voltage measurement can be made. Up to 4 minutes may be required for **SPL** lamp to extinguish

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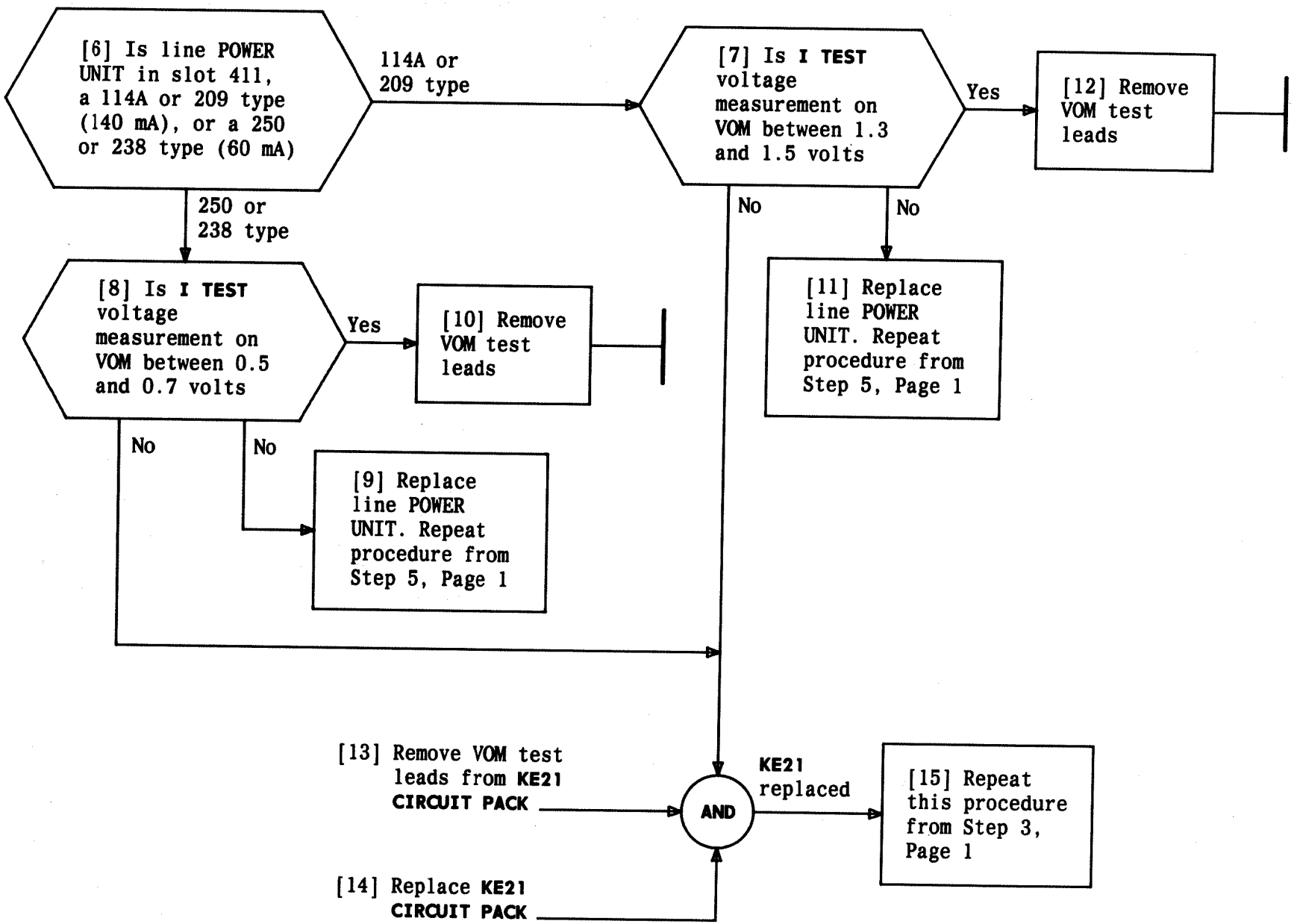
PERFORM LINE CURRENT TEST ON KE21 CIRCUIT PACK AT COT



PERFORM LINE CURRENT TEST ON KE21 CIRCUIT PACK AT COT

[1] Get KS-14510 Volt-Ohm-Milliammeter (VOM), or equivalent

[2] Condition VOM [DLP-573] and set selector switch to **DC VOLTS –300** position

[3] On line POWER UNIT (slot 411), insert VOM positive (+) lead into **LP** test jack

[4] On line POWER UNIT, insert VOM negative (–) lead into **LN** test jack

[5] Note line-voltage measured on VOM. See TABLE A for *typical* voltages (depending on number of repeaters being powered). See NOTE 1

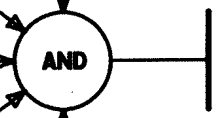
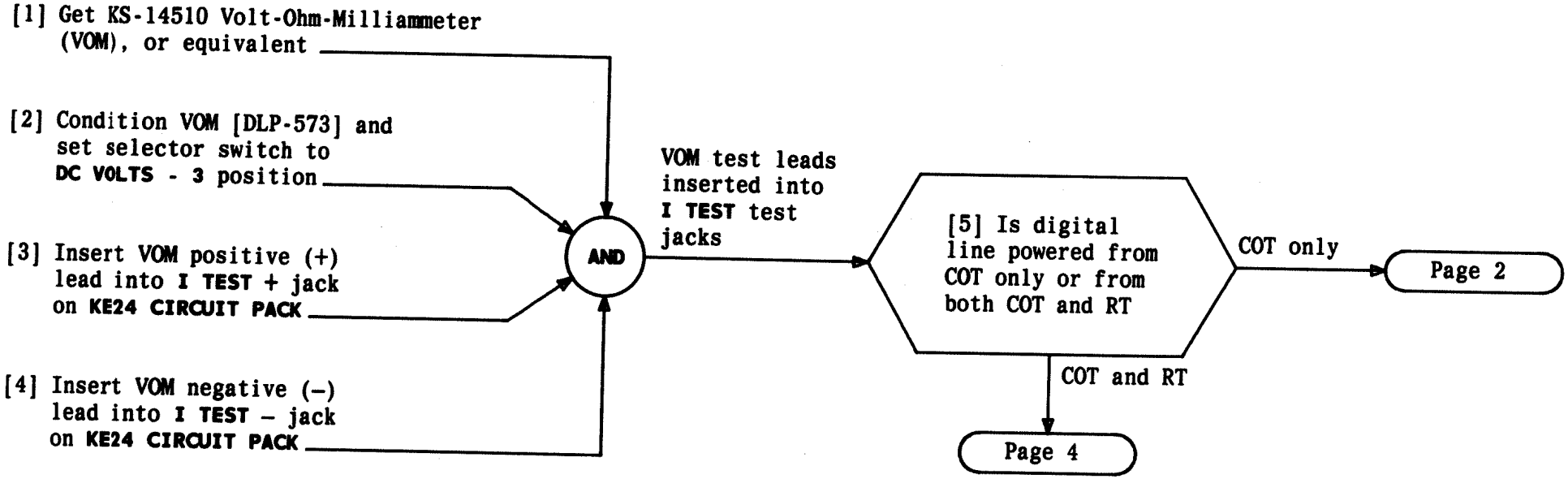


TABLE A

NUMBER OF LINE REPEATERS POWERED FROM COT	TEST POINTS LP(+) TO LN(–), VOLTS DC TYPICAL VALUES ONLY, NOT REQUIREMENTS	
	STANDARD POWER REPEATERS 114A or 209() POWER UNIT	LOW POWER REPEATERS 250() OR 238() POWER UNIT
2	–	30
3	70	45
4	95	60
5	120	75
6	145	90
7	170	105
8	195	120
9	220	135
10	245	150
11	270	165
12	–	175
13	–	190
14	–	205
15	–	220
16	–	235
17	–	250

NOTE 1
Actual meter indications may vary significantly from typical values depending on specific digital line makeup; however in no case should any voltages exceed 290 Vdc. **KE24**, used in the RT, should *not* be counted as an additional repeater

MEASURE LINE VOLTAGE ON POWER UNIT AT COT



PERFORM LINE CURRENT TEST ON KE24 CIRCUIT PACK AT RT

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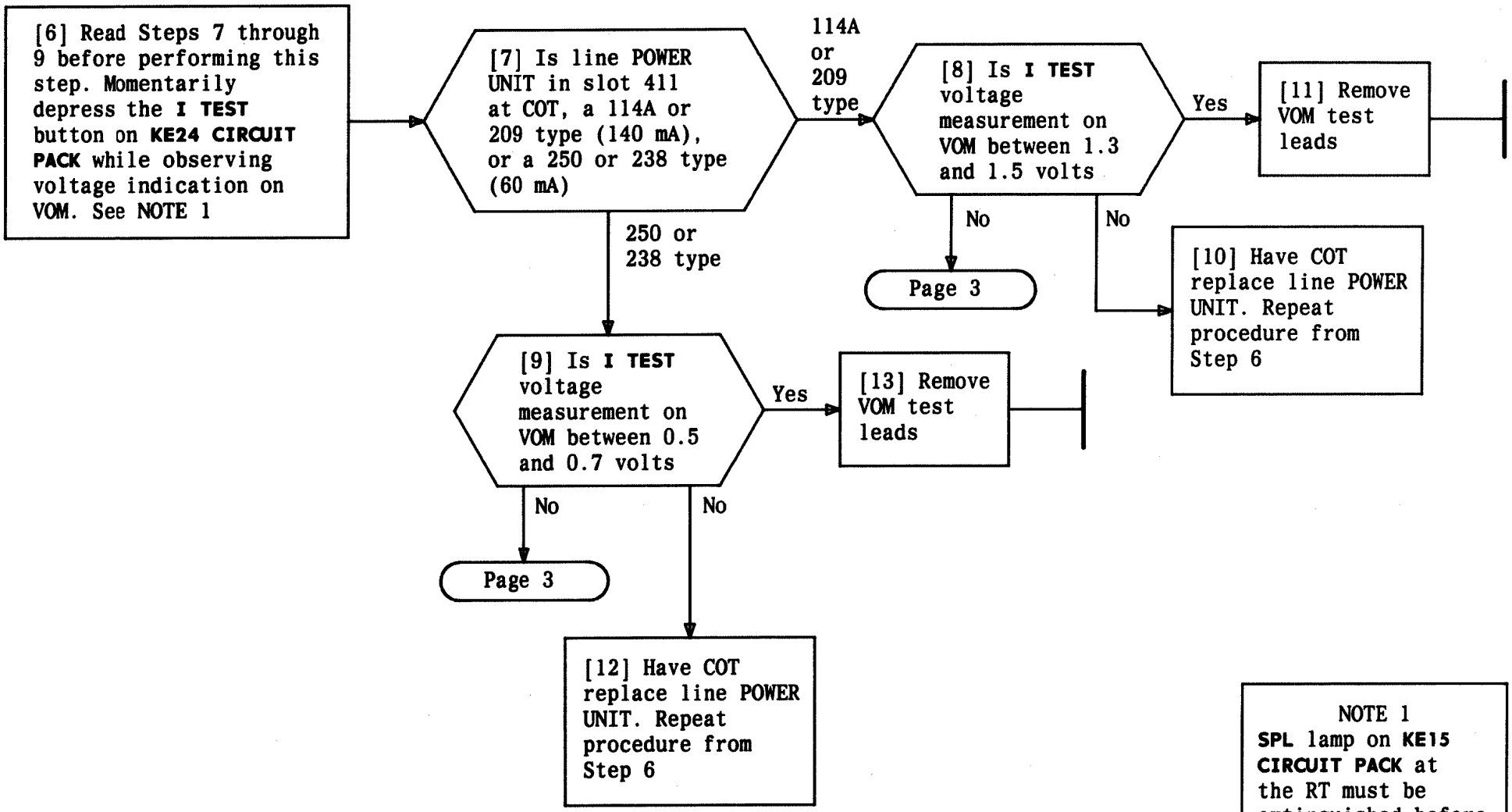
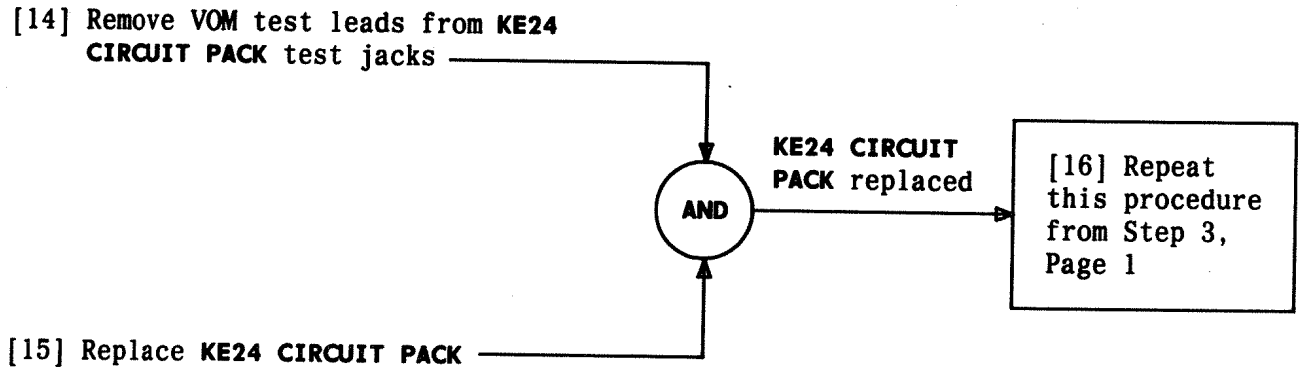
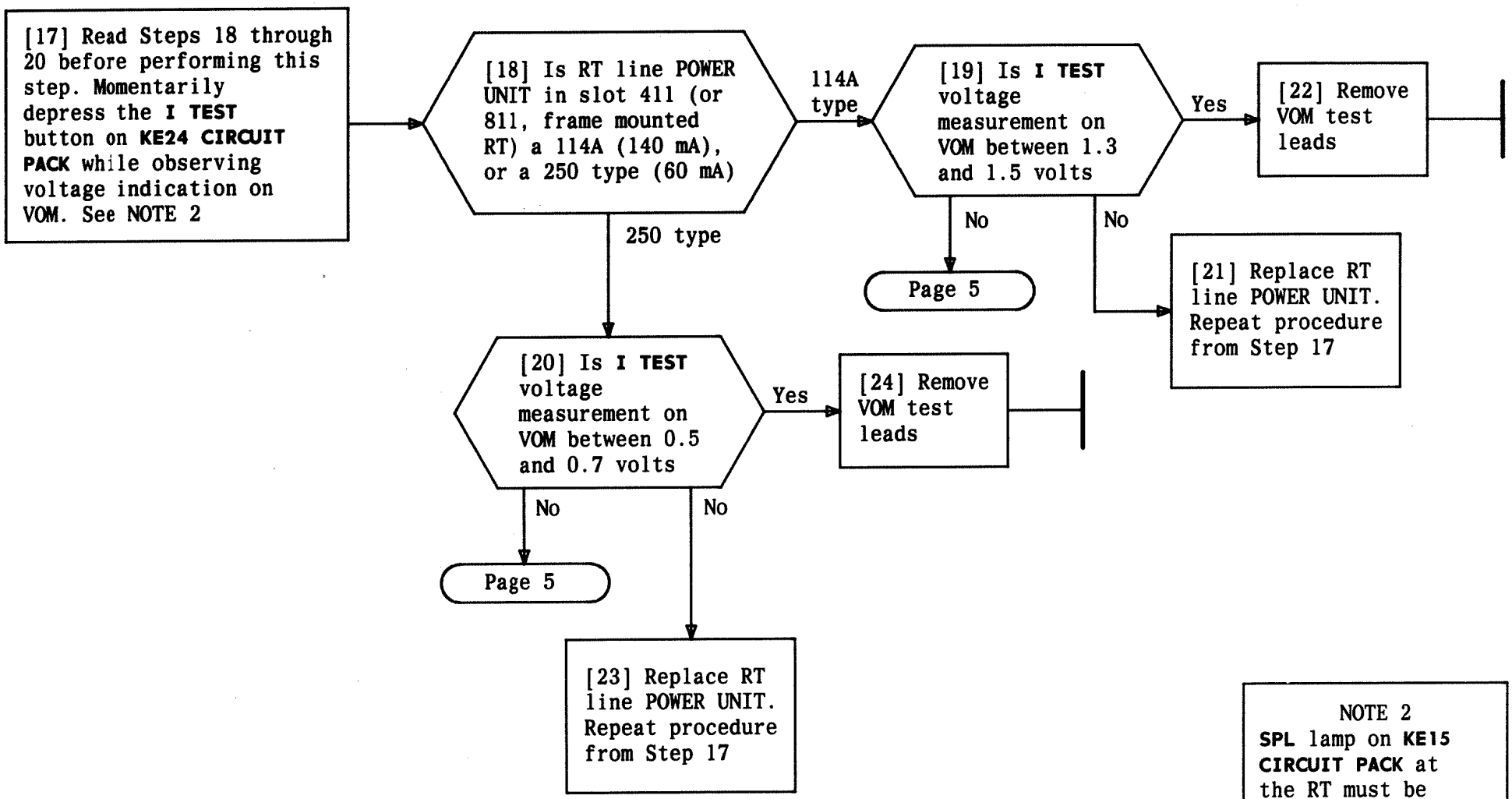


NOTE 1
SPL lamp on KE15 CIRCUIT PACK at the RT must be extinguished before voltage measurement can be made. Up to 4 minutes may be required for SPL lamp to extinguish

PERFORM LINE CURRENT TEST ON KE24 CIRCUIT PACK AT RT

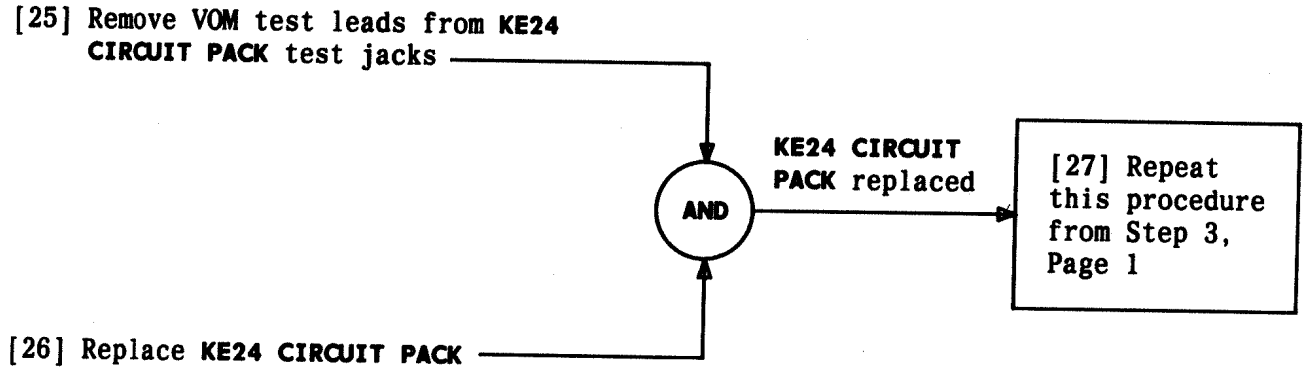


PERFORM LINE CURRENT TEST ON KE24 CIRCUIT PACK AT RT



NOTE 2
SPL lamp on KE15 CIRCUIT PACK at the RT must be extinguished before voltage measurement can be made. Up to 4 minutes may be required for SPL lamp to extinguish

PERFORM LINE CURRENT TEST ON KE24 CIRCUIT PACK AT RT



PERFORM LINE CURRENT TEST ON KE24 CIRCUIT PACK AT RT

[1] Is Remote Terminal Frame or cabinet-mounted

Frame

Cabinet

Page 2

At RT frame:

[2] Verify that power switch on RT line POWER UNIT (slot 411 or 811, FIG. 1) is in the **OFF** position

[3] Unplug, but do not remove, **KE24 CIRCUIT PACK** (slot 312) from RT channel bank assembly

[4] Verify that connections have been made to carrier pairs in accordance with work order

[5] Notify central office personnel that connections are complete

AND

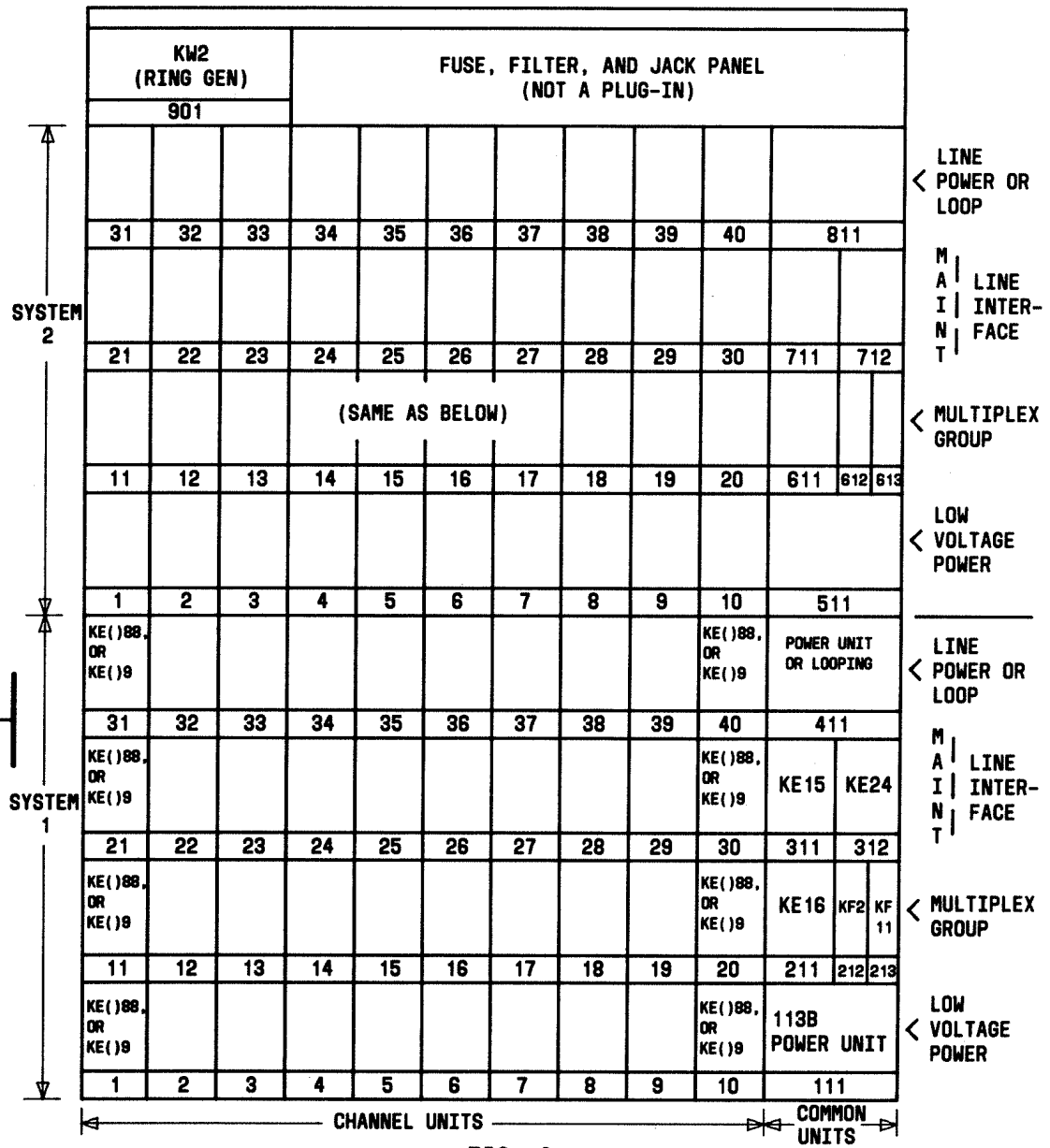


FIG. 1

PREPARE REMOTE TERMINAL FOR LINE POWERING (LINE POWER FROM BOTH COT AND RT)

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At RT cabinet:

[6] Replace fuses **BC** and **BF** [on RT power panel, FIG. 2], in that order

[7] Verify that external ac power switch is in **ON** position

[8] Verify that power switch on RT line POWER UNIT [slot 411, FIG. 3] is in **OFF** position

[9] Unplug, but do not remove, the **KE24 CIRCUIT PACK** [slot 312] from RT channel bank assembly

[10] Verify that connections have been made to carrier pairs in accordance with work order. See NOTE 1

[11] Notify central office personnel that connections are complete

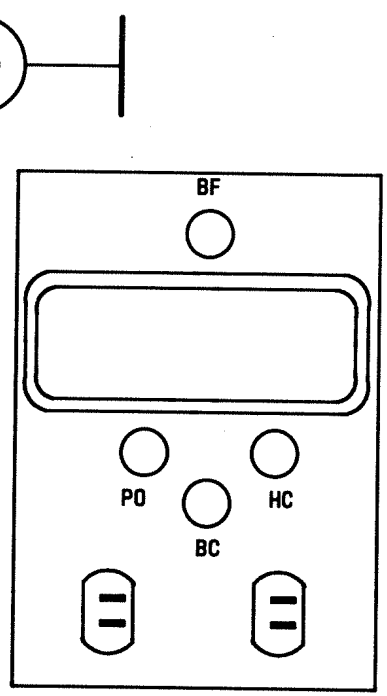


FIG. 2

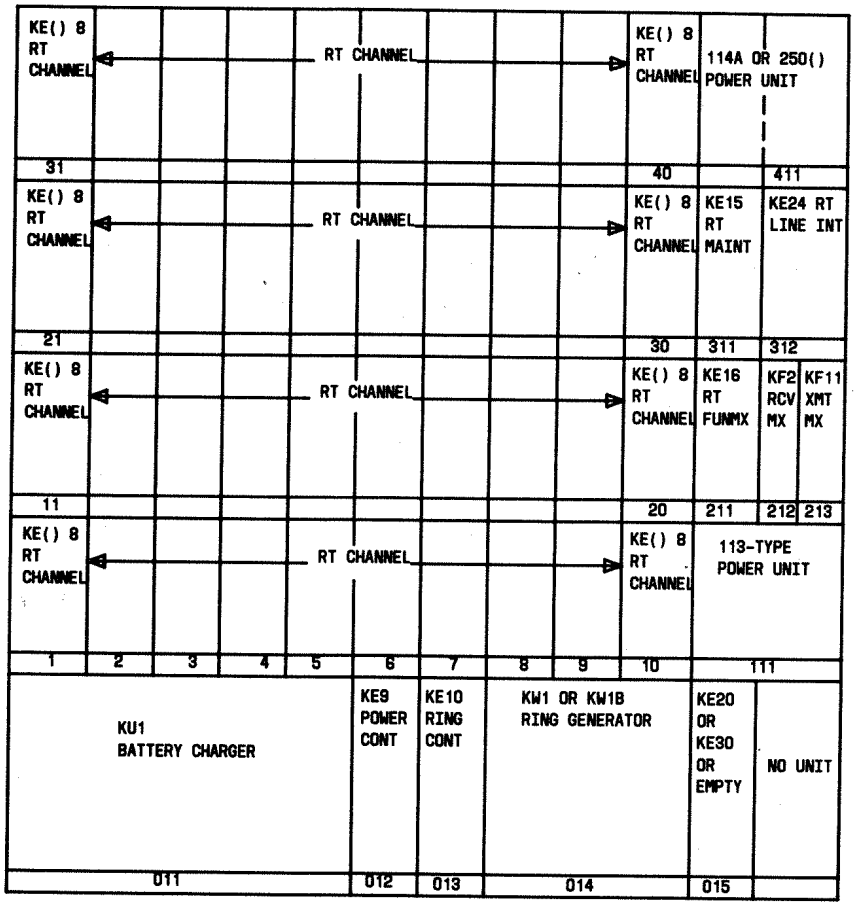


FIG. 3

PREPARE REMOTE TERMINAL FOR LINE POWERING (LINE POWER FROM BOTH COT AND RT)

NOTE 1
Section 640-250-215 contains installation procedures for 33C RT cabinet

[1] Get KS-14510 Volt-Ohm-Milliammeter (VOM), or equivalent

[2] Condition VOM [DLP-573] and set selector switch to **DC VOLTS -300** position

[3] On line POWER UNIT, insert VOM positive (+) test lead into **LP** test jack

[4] On line POWER UNIT, insert VOM negative (–) test lead into **LN** test jack

[5] Record for **future reference**, line – voltage measured with VOM. See TABLE A for **typical** voltages (depending on number of repeaters being powered). See NOTE 1

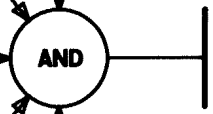
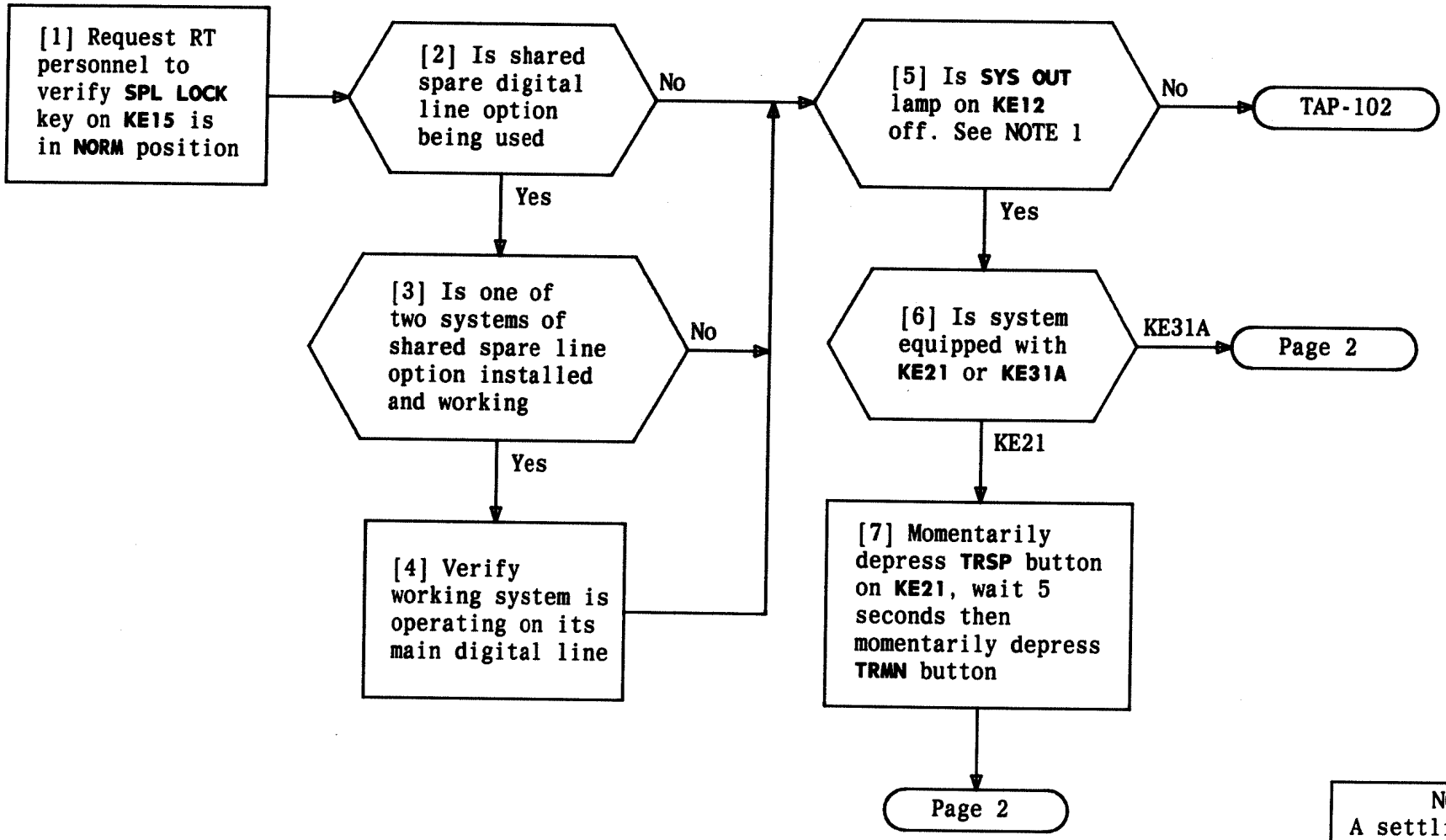


TABLE A
RT POWER LOOP

NUMBER OF LINE REPEATERS POWERED FROM RT	TEST POINTS LP(+) TO LN(–), VOLTS DC TYPICAL VALUES ONLY, NOT REQUIREMENTS	
	STANDARD POWER REPEATERS 114A POWER UNIT	LOW POWER REPEATERS 250( ) POWER UNIT
1	–	20
2	–	35
3	70	50
4	95	65
5	120	80
6	145	95
7	170	110
8	195	125
9	220	140
10	245	155
11	270	170
12	–	180
13	–	195
14	–	210
15	–	225
16	–	240
17	–	255

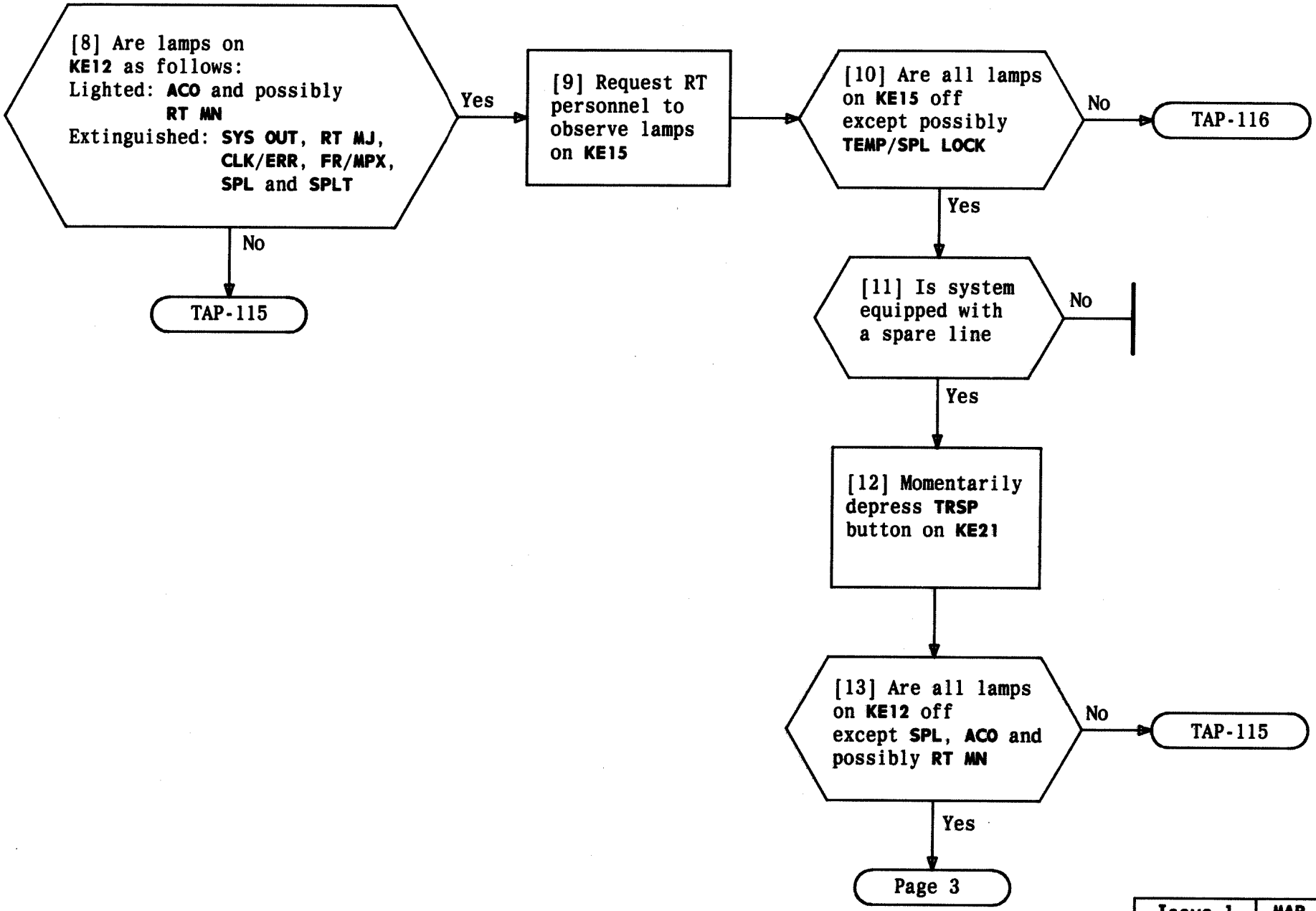
NOTE 1
Actual meter indications may vary significantly from typical values depending on specific digital line makeup; however in no case should any voltages exceed 290 Vdc. **KE24**, used in the RT, should **not** be counted as an additional repeater

MEASURE LINE VOLTAGE ON POWER UNIT AT RT



NOTE 1
A settling time of 10 minutes may be required before SYS OUT lamp is extinguished due to two terminals attempting to work on opposite digital lines

PERFORM SYSTEM FRAMING TESTS



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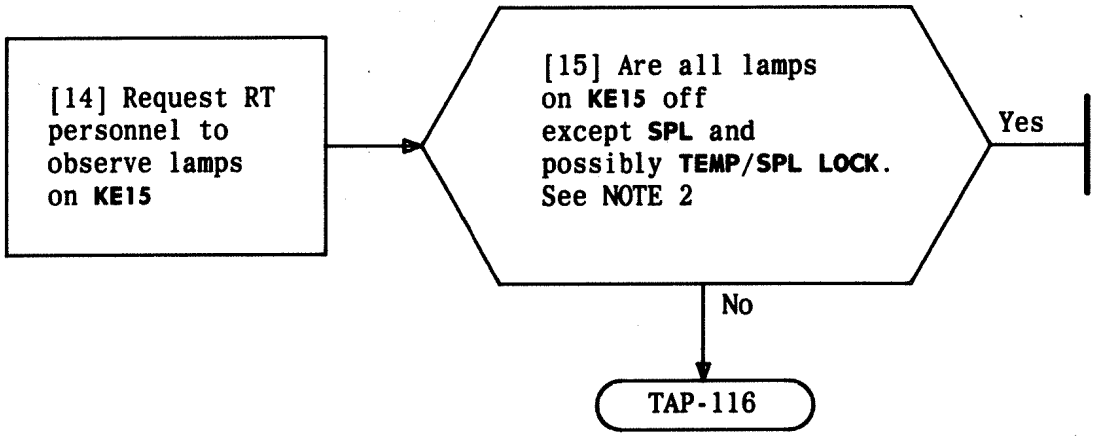
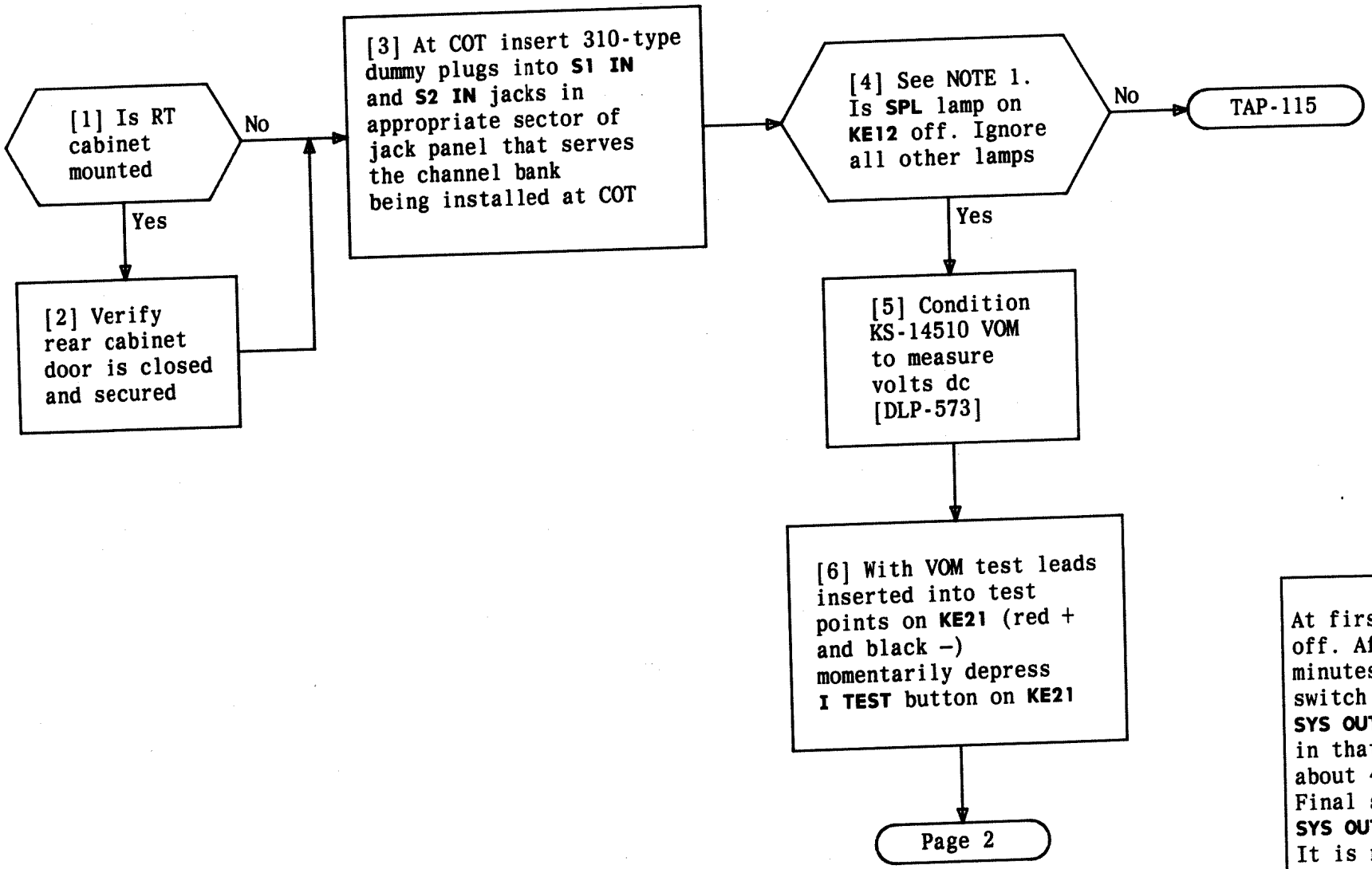
PERFORM SYSTEM FRAMING TESTS



NOTE 2
TEMP/SPL LOCK lamp may be lighted because cabinet door is open and outside temperature is cold

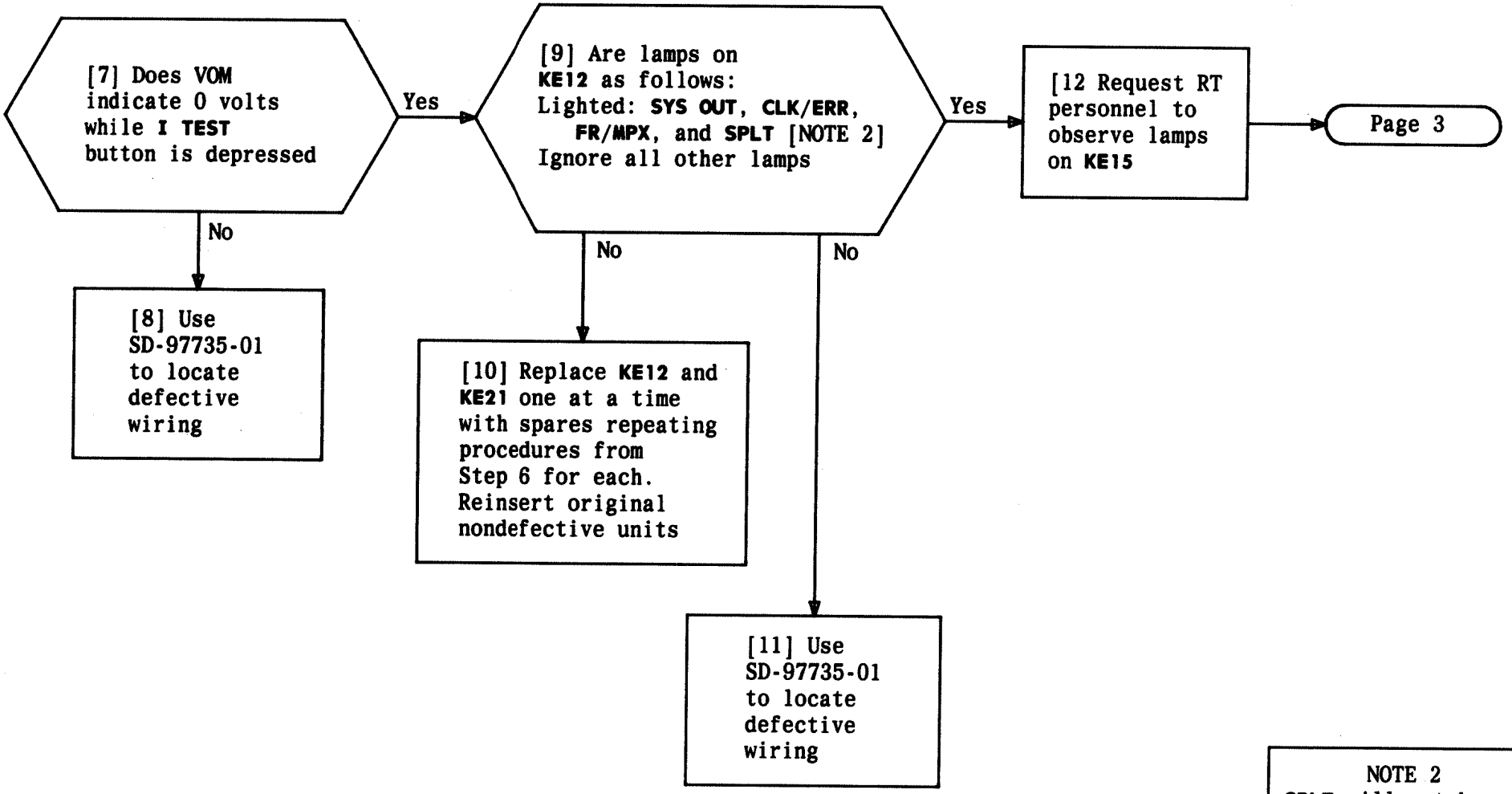
PERFORM SYSTEM FRAMING TESTS



NOTE 1

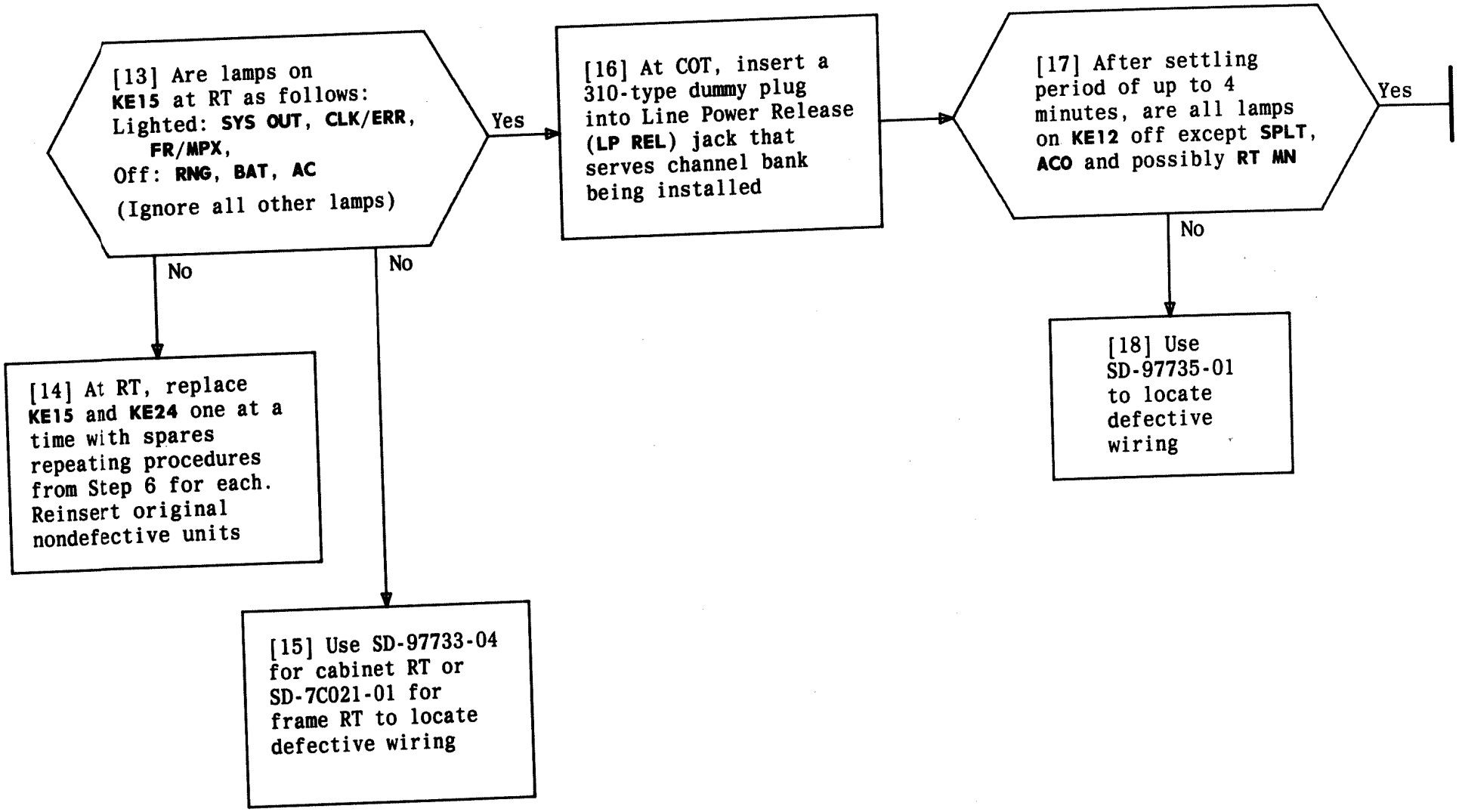
At first **SPL** will be off. After about 4 minutes, system will switch to **SPL** and **SYS OUT** and remain in that state for about 4 minutes. Final state will be **SYS OUT** on main line. It is not necessary to wait until this happens but ***SPL must be extinguished before continuing***

PERFORM PRELIMINARY MAJOR FUNCTIONS TESTS

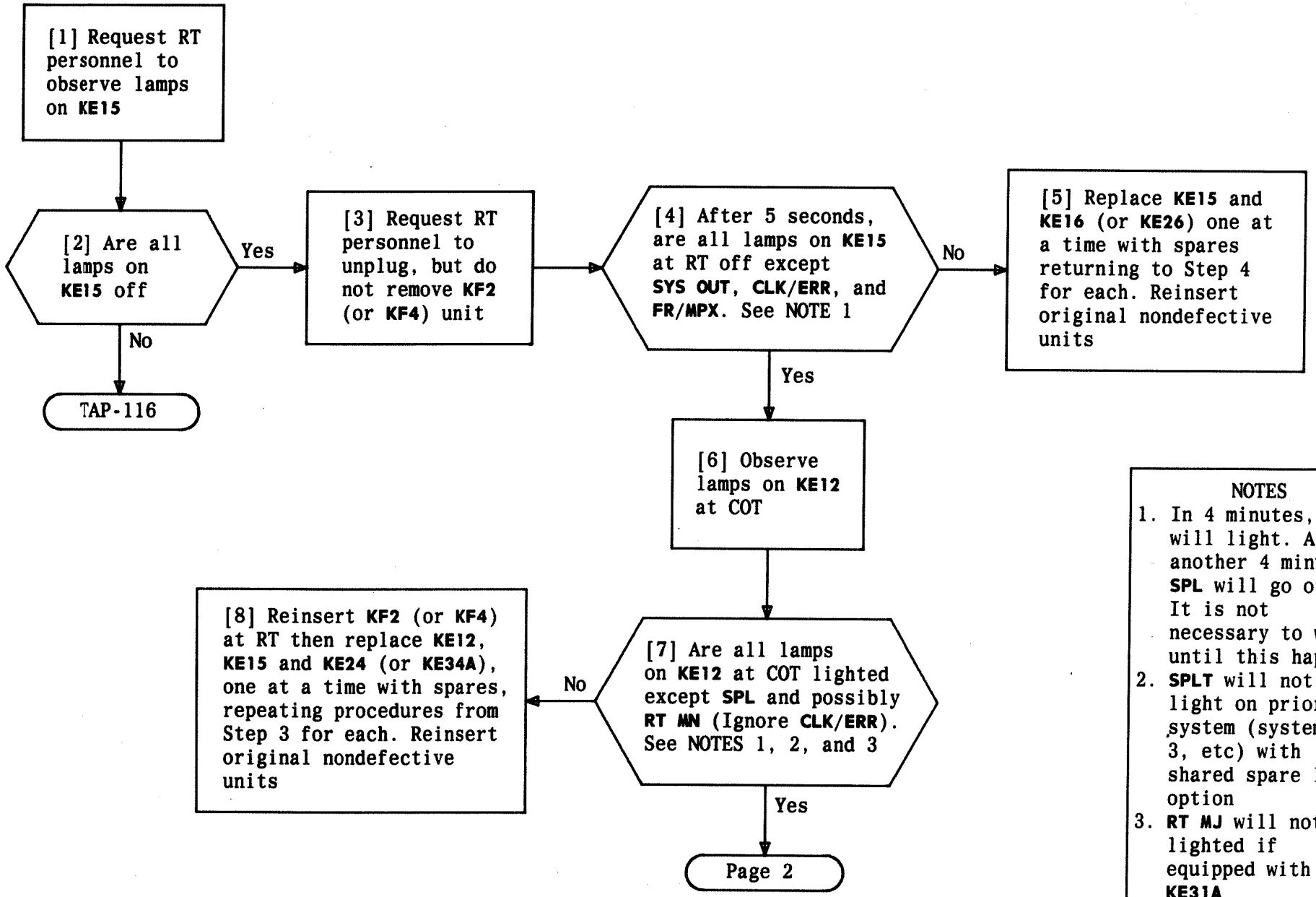


NOTE 2
SPLT will not be lighted on priority system (system 1, 3, etc) of shared spare line option nor will it be lighted for no spare option

PERFORM PRELIMINARY MAJOR FUNCTIONS TESTS



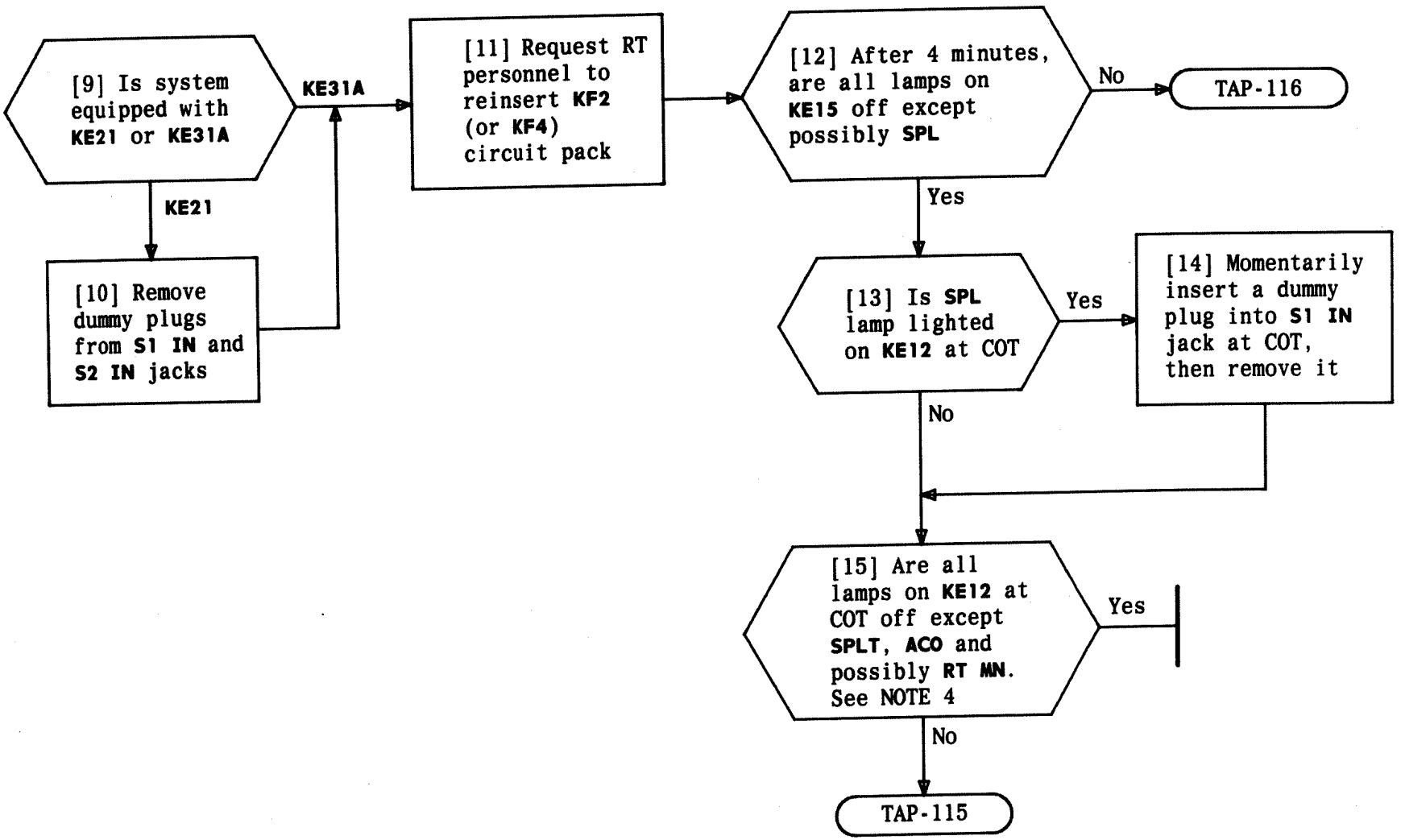
PERFORM PRELIMINARY MAJOR FUNCTIONS TESTS



NOTES

1. In 4 minutes, SPL will light. After another 4 minutes SPL will go off. It is not necessary to wait until this happens
2. SPLT will not light on priority system (system 1, 3, etc) with shared spare line option
3. RT MJ will not be lighted if equipped with KE31A

PERFORM RECEIVE MULTIPLEXER TESTS



NOTE 4
SPLT will not light if equipped for no spare option

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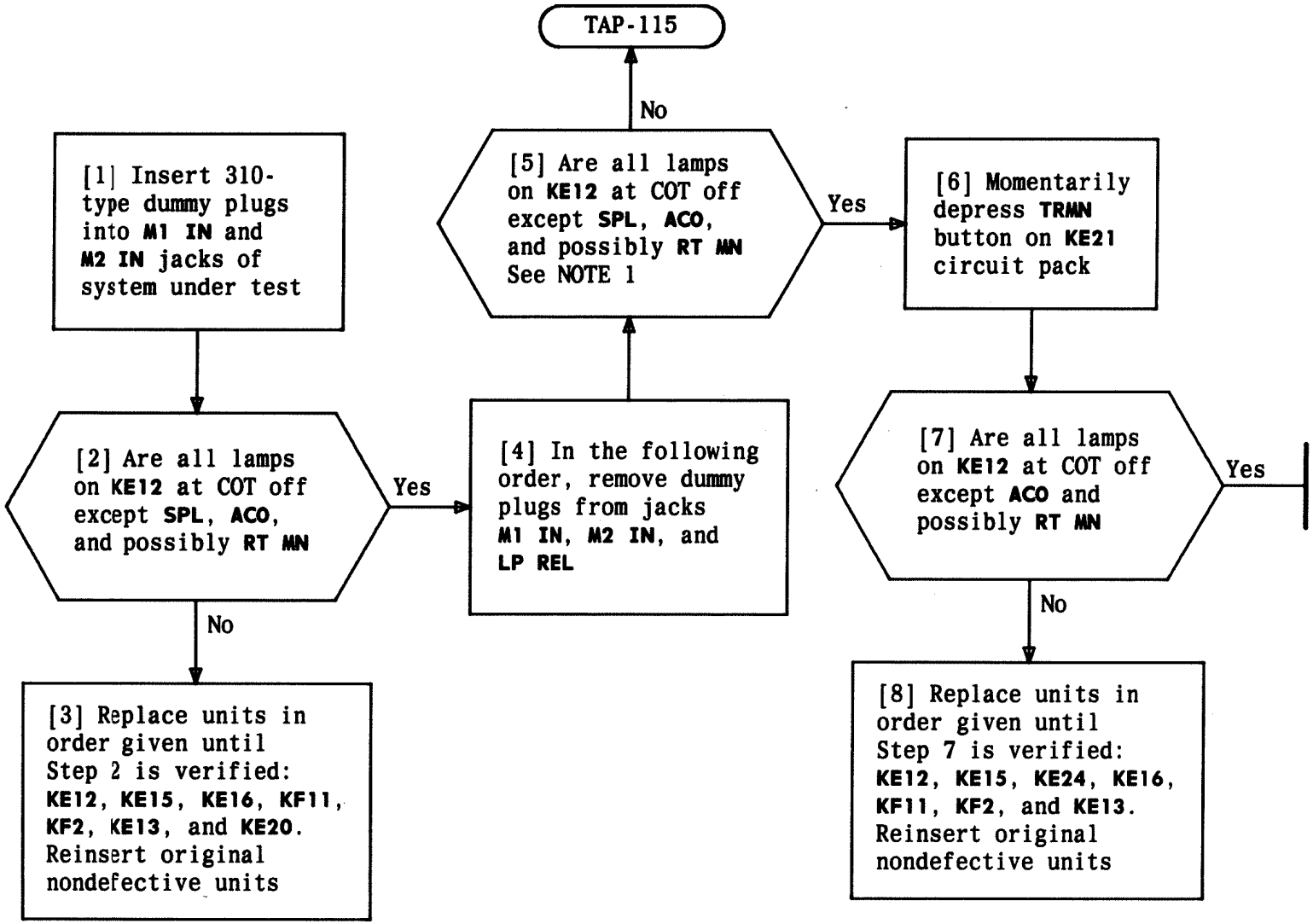
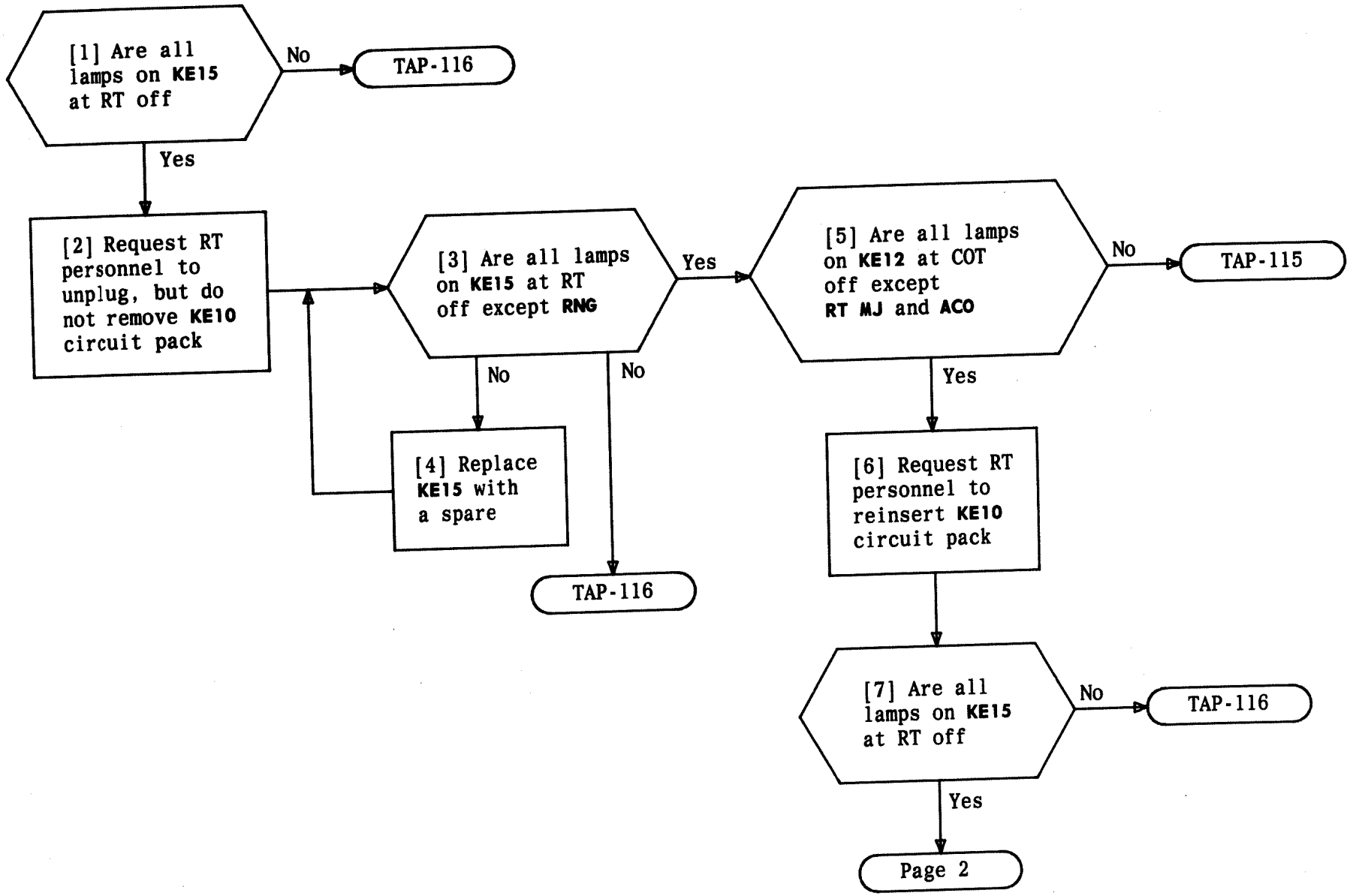
PERFORM RECEIVE MULTIPLEXER TESTS



NOTE 1
After 4 minutes, system will switch to main line. SPL lamp will then be extinguished. It is not necessary to wait until this happens

CHECK SPARE LINE SWITCHING FOR FAULTY MAIN LINE



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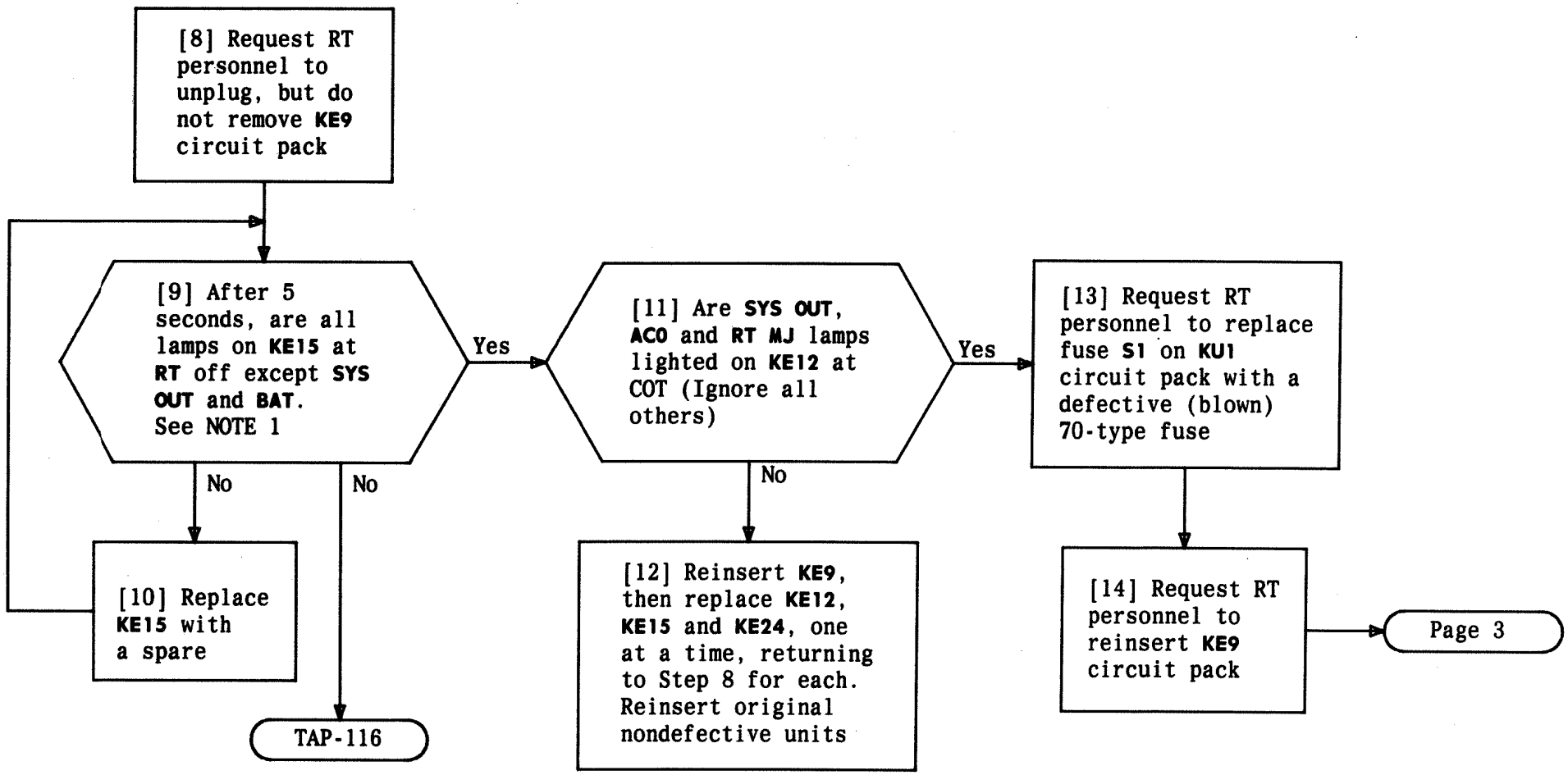
PERFORM SYSTEM MAJOR FUNCTIONS TESTS FOR CABINET RT



NOTE 1
If **KE9** remains unplugged for 4 minutes or more, **SPL** may be lighted

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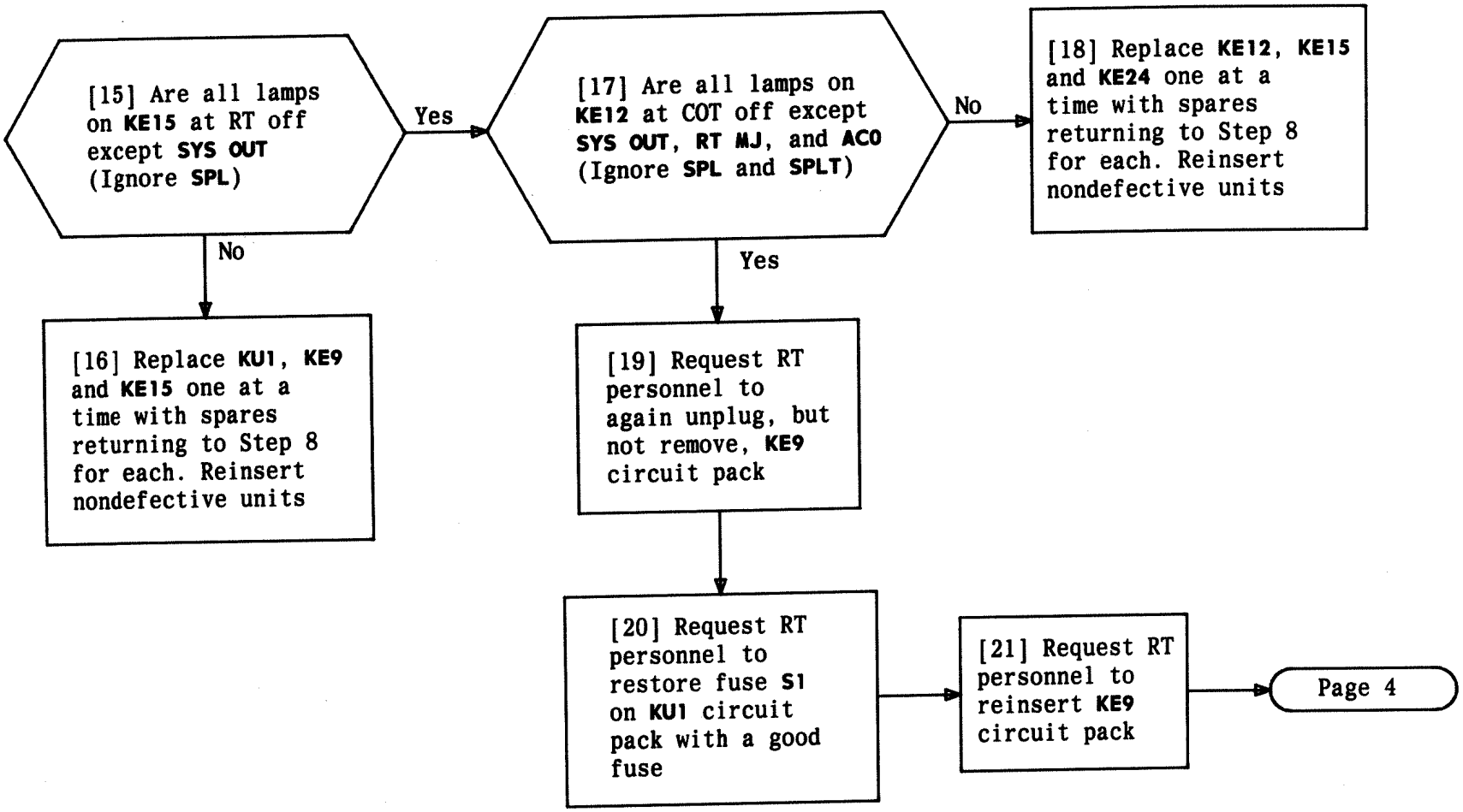
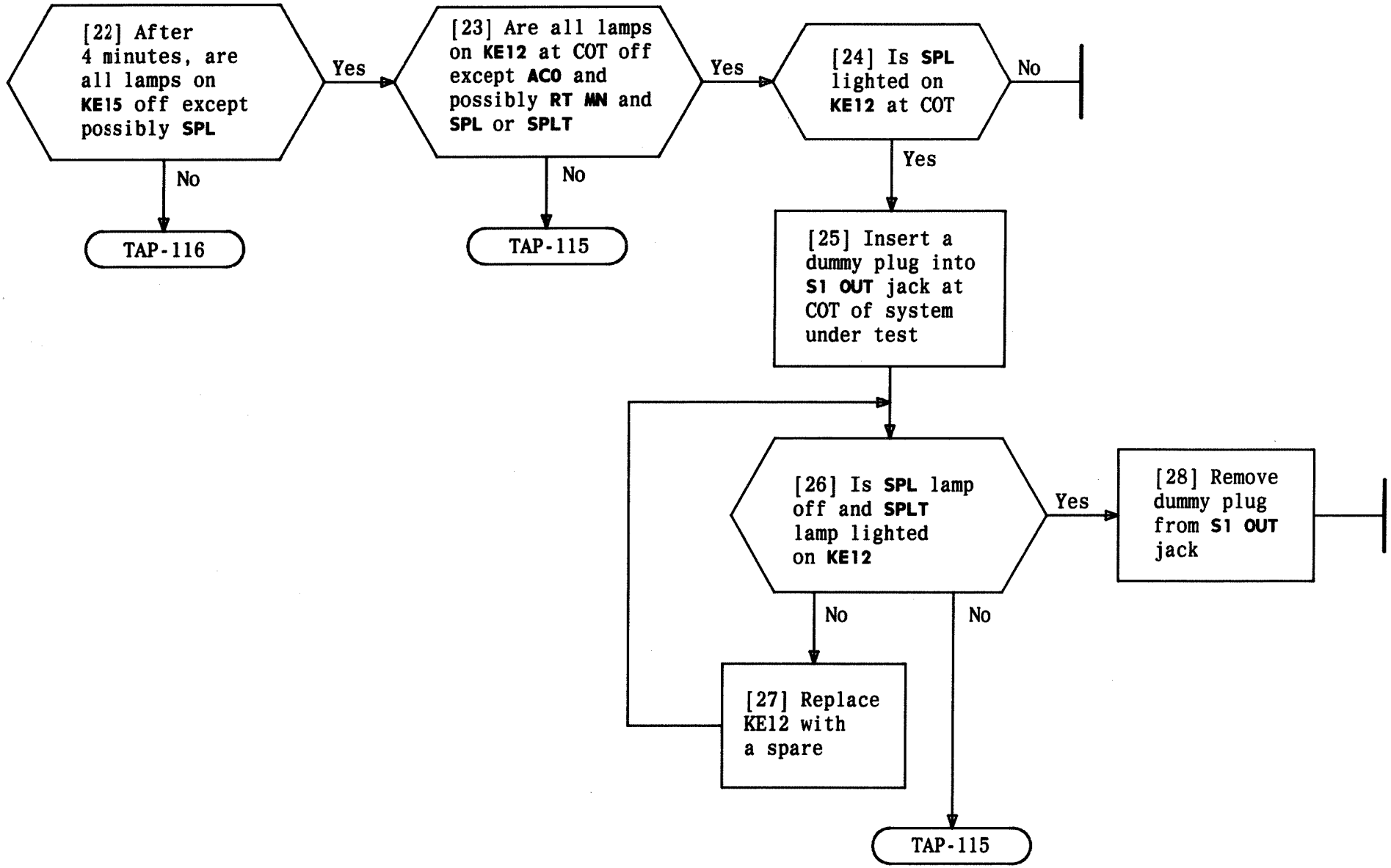
PERFORM SYSTEM MAJOR FUNCTIONS TESTS FOR CABINET RT



PERFORM SYSTEM MAJOR FUNCTIONS TESTS FOR CABINET RT



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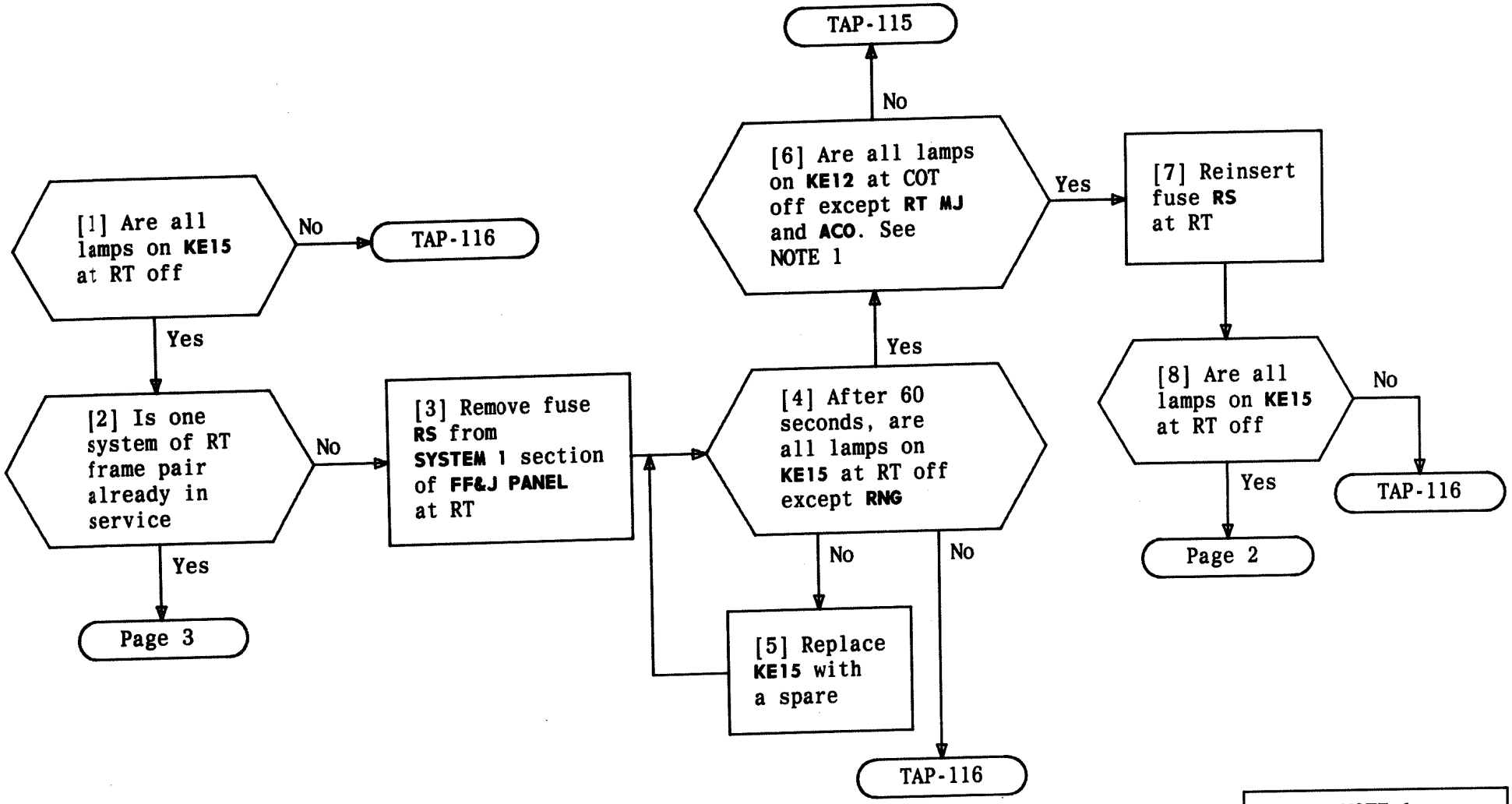
PERFORM SYSTEM MAJOR FUNCTIONS TESTS FOR CABINET RT



NOTE 1
If **RT MN** is lighted, strap on **TB3** (option W) may be missing [SD-7C021-01]

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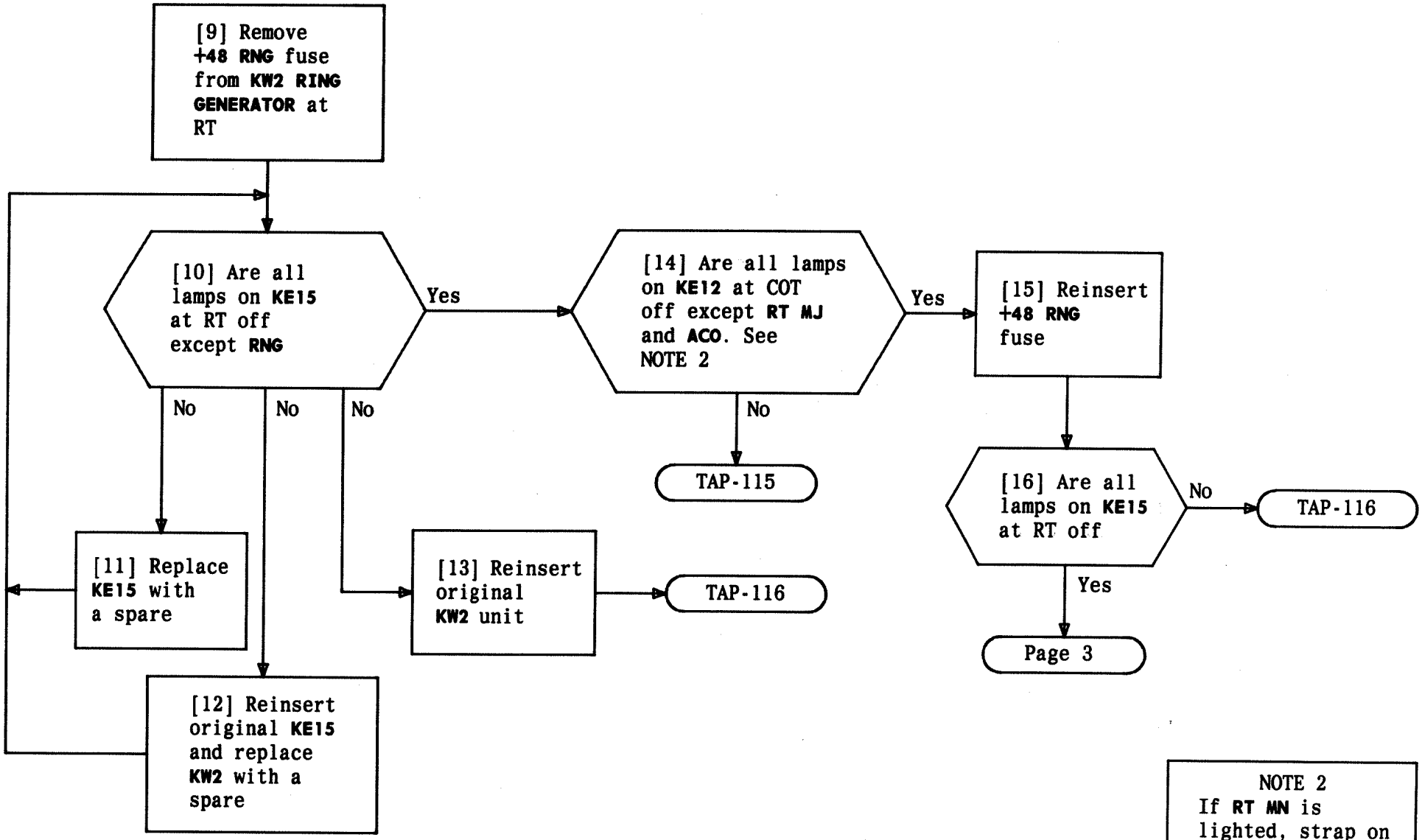
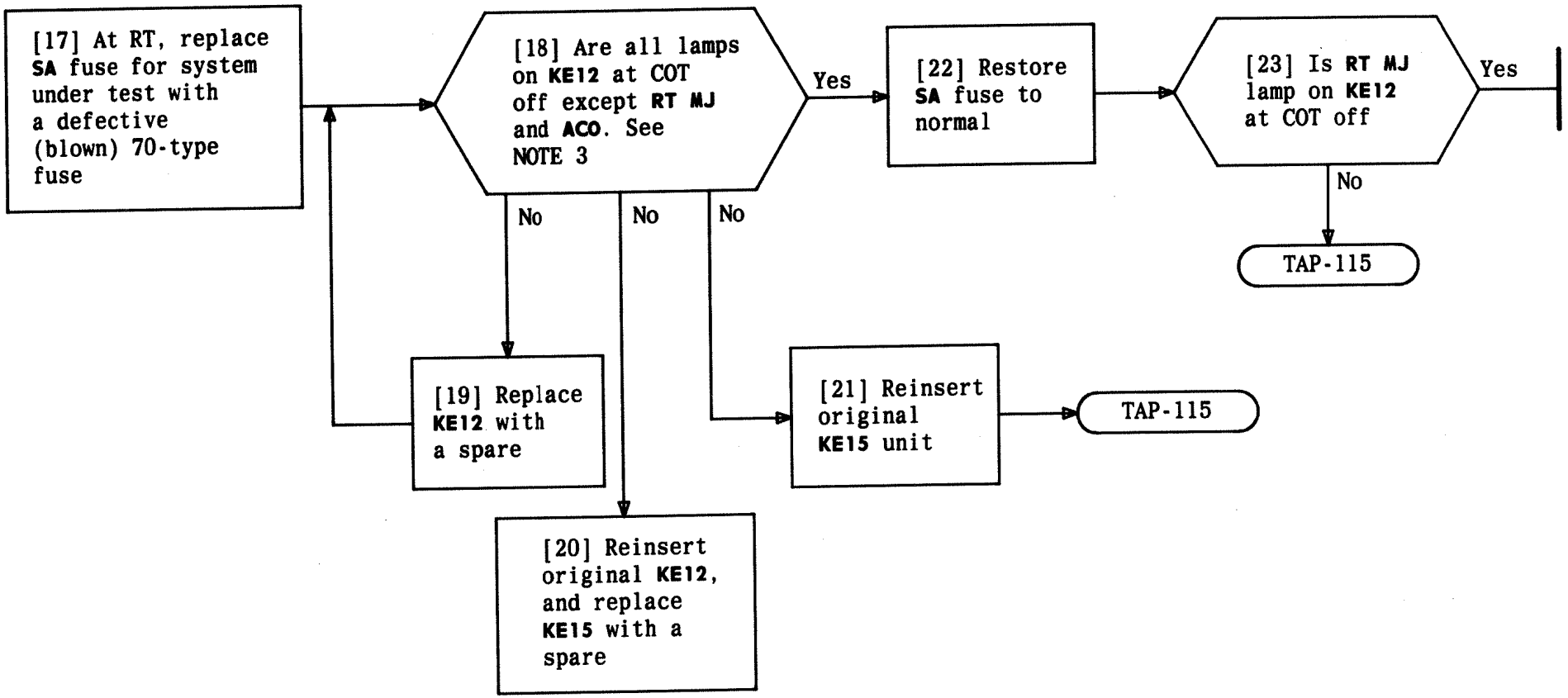
PERFORM SYSTEM MAJOR FUNCTIONS TESTS FOR FRAME RT



NOTE 2
If RT MN is lighted, strap on TB3 (option W) may be missing [SD-7C021-01]

PERFORM SYSTEM MAJOR FUNCTIONS TESTS FOR FRAME RT



NOTE 3
If **RT MN** is lighted, strap on **TB3** (option W) may be missing [SD-7C021-01]

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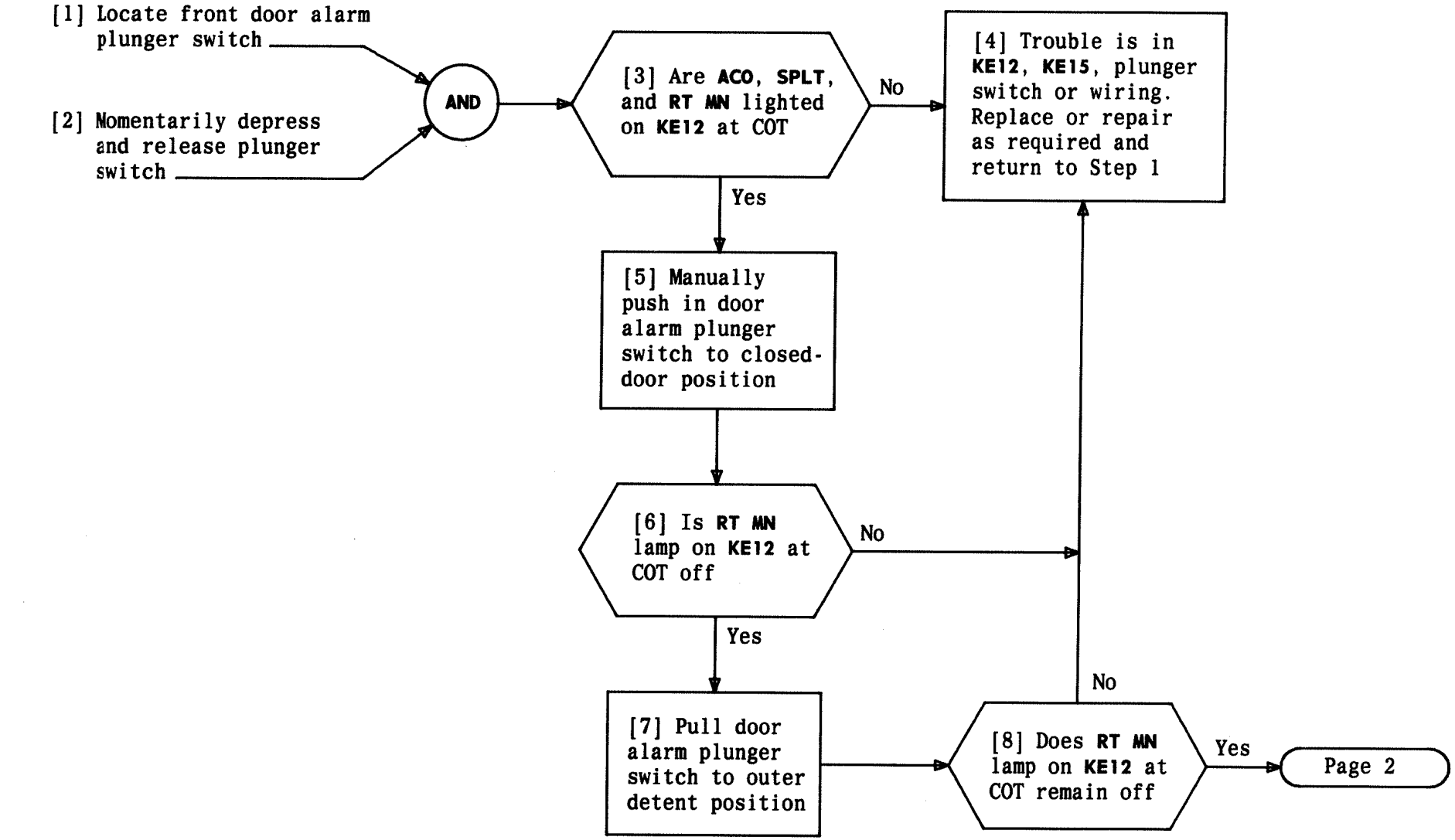
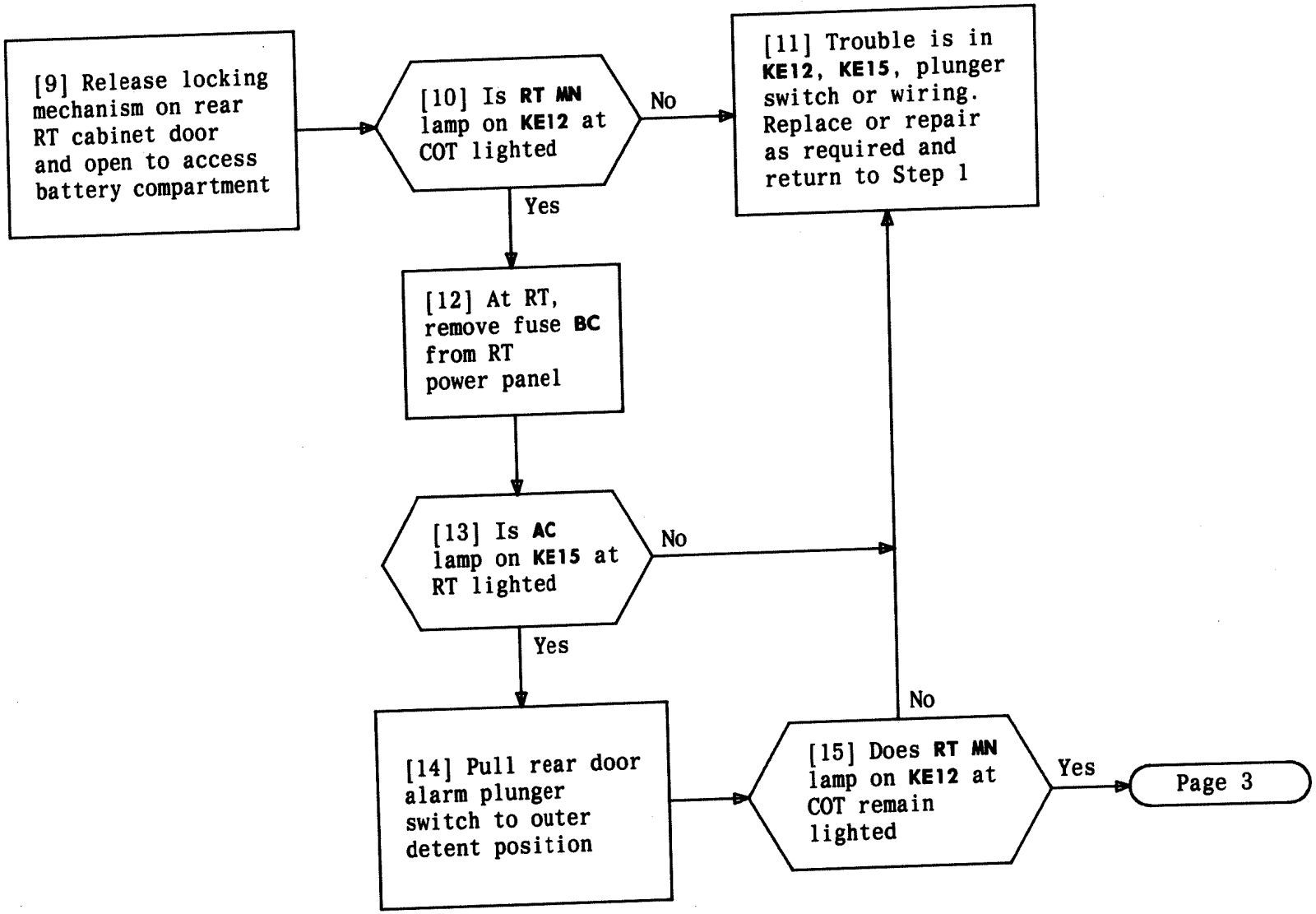
PERFORM SYSTEM MAJOR FUNCTIONS TESTS FOR FRAME RT

At RT:



PERFORM SYSTEM MINOR FUNCTIONS TESTS (CABINET RT)



PERFORM SYSTEM MINOR FUNCTIONS TESTS (CABINET RT)

[16] At RT, reinsert fuse **BC** into RT power panel

[17] Are all lamps on **KE15** at RT off

No → TAP-116

Yes

[18] AT COT, are **ACO** and **SPLT** lamps lighted and **RT MN** lamp off

No

Yes

[19] Locate low-temperature alarm sensor and spray freon at gap between sensor and panel until sensor forms a coating of frost [FIG. 1]

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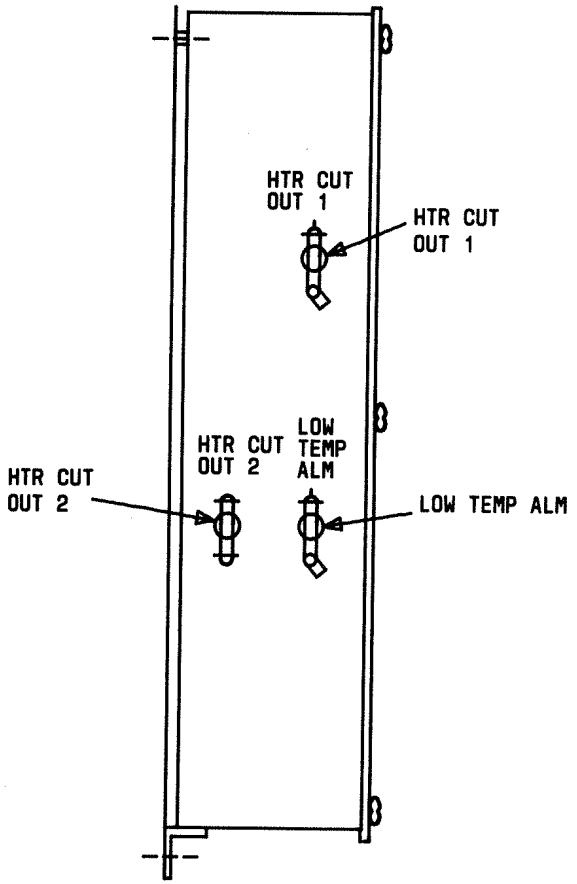
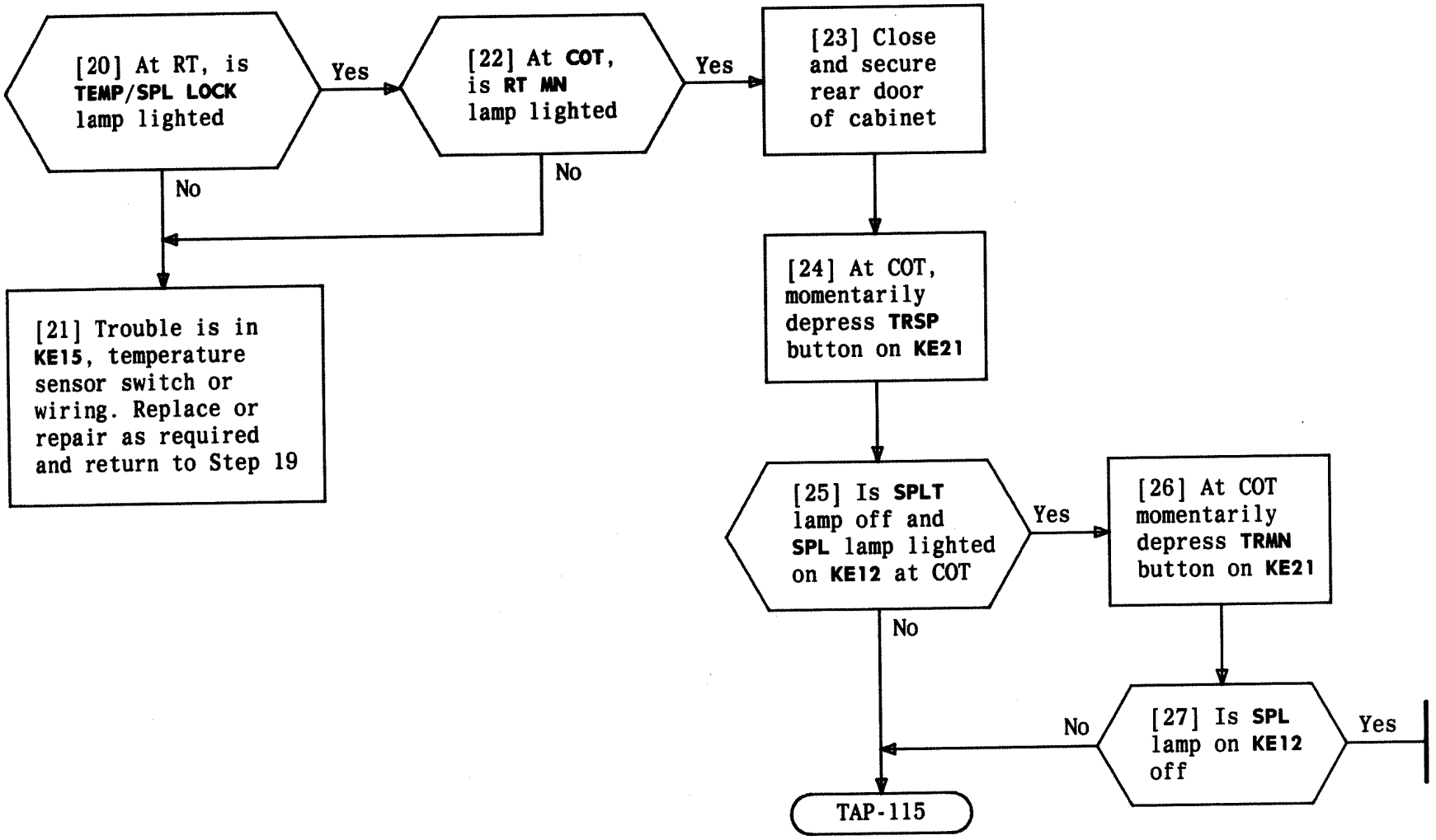
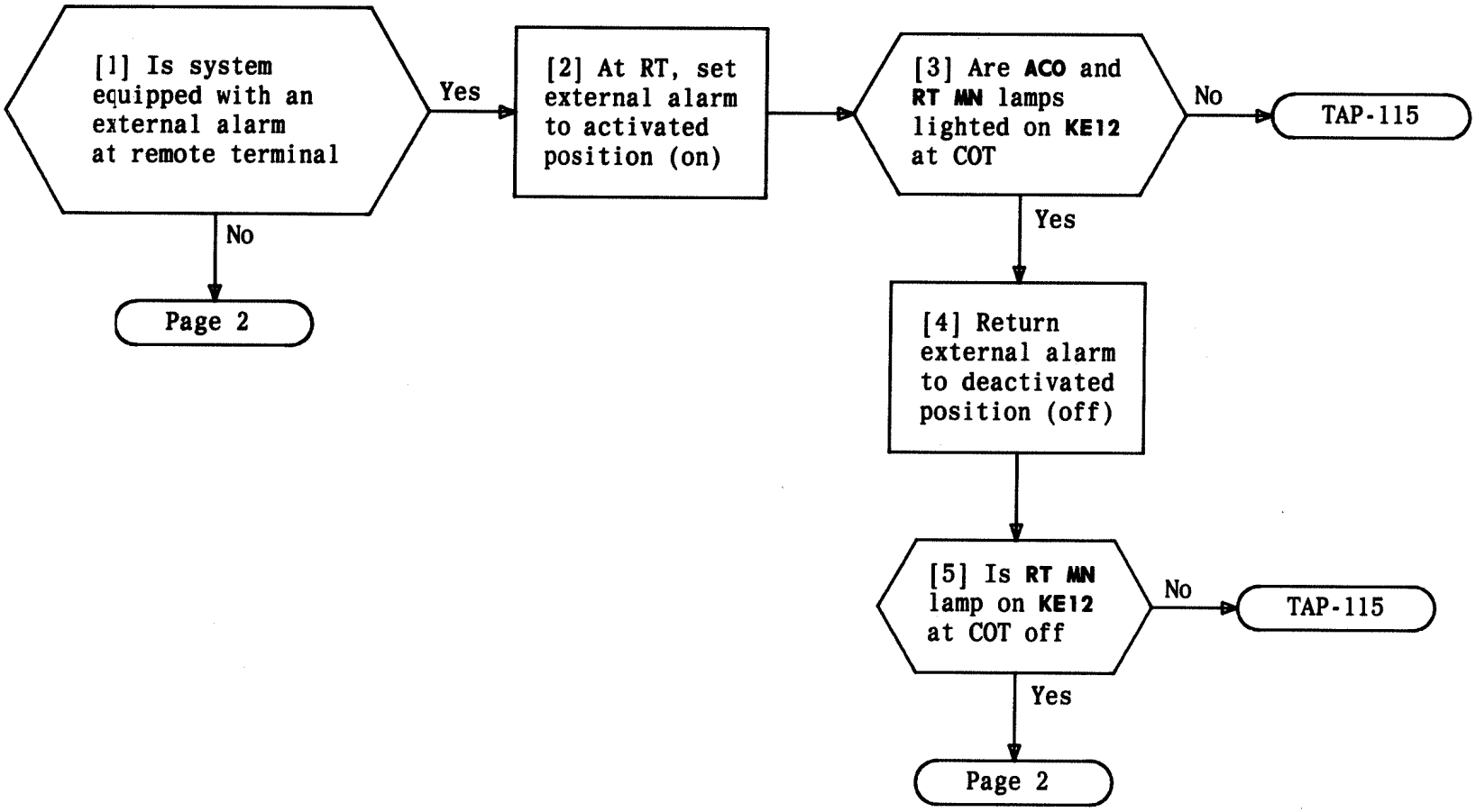


FIG. 1

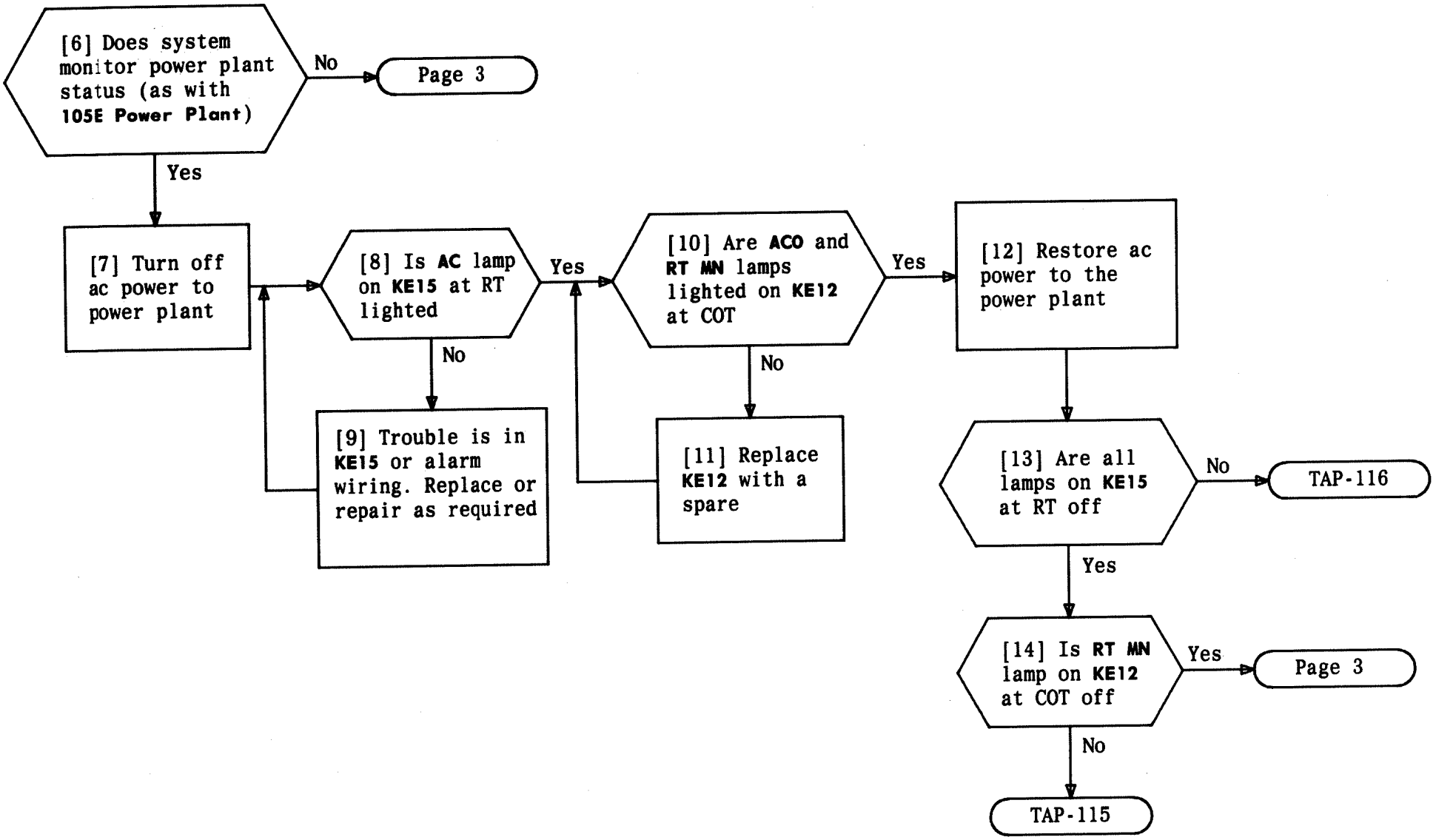
PERFORM SYSTEM MINOR FUNCTIONS TESTS (CABINET RT)



PERFORM SYSTEM MINOR FUNCTIONS TESTS (CABINET RT)



PERFORM SYSTEM MINOR FUNCTIONS TESTS (FRAME RT)



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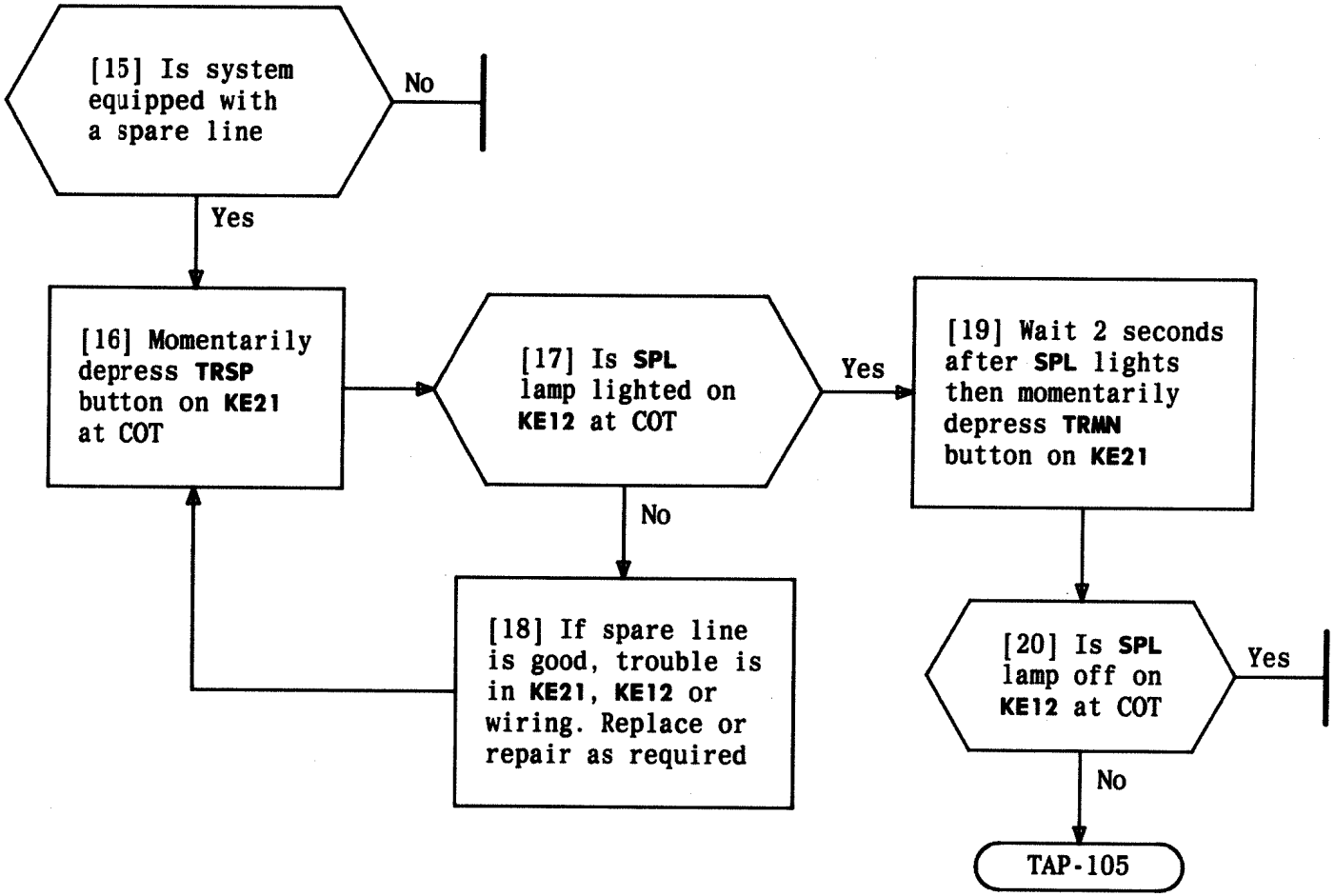
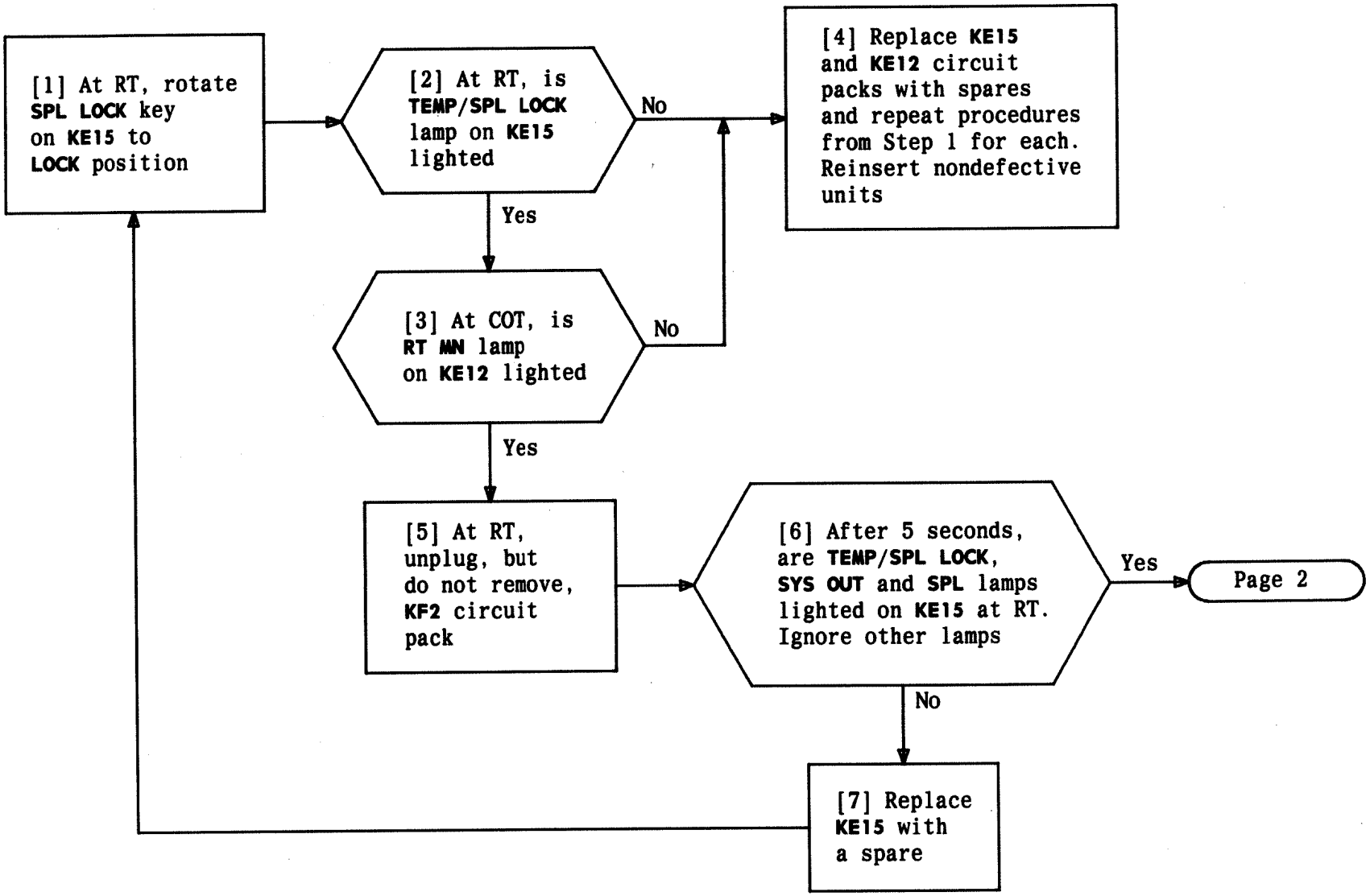
PERFORM SYSTEM MINOR FUNCTIONS TESTS (FRAME RT)



PERFORM SYSTEM MINOR FUNCTIONS TESTS (FRAME RT)



PERFORM MANUAL RETRY OF SPARE LINE

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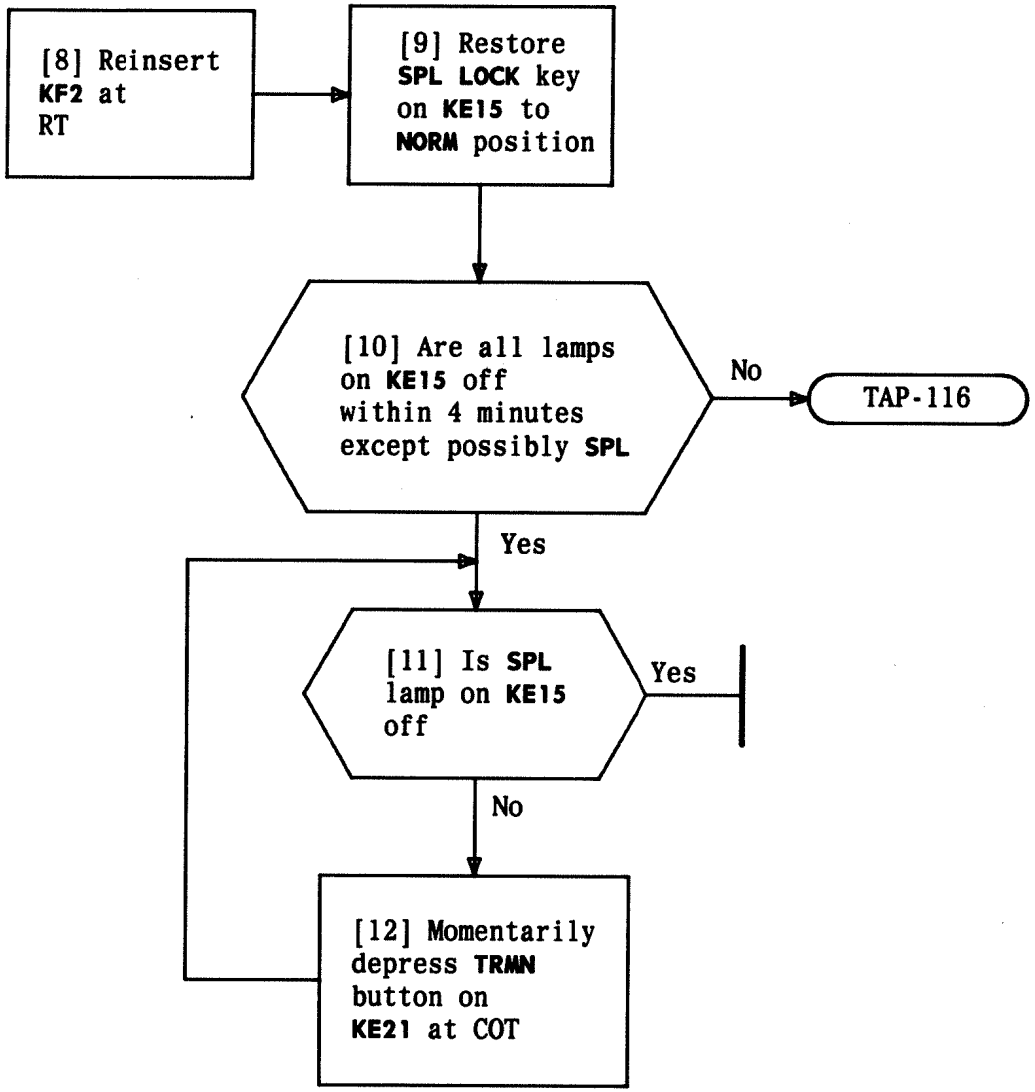
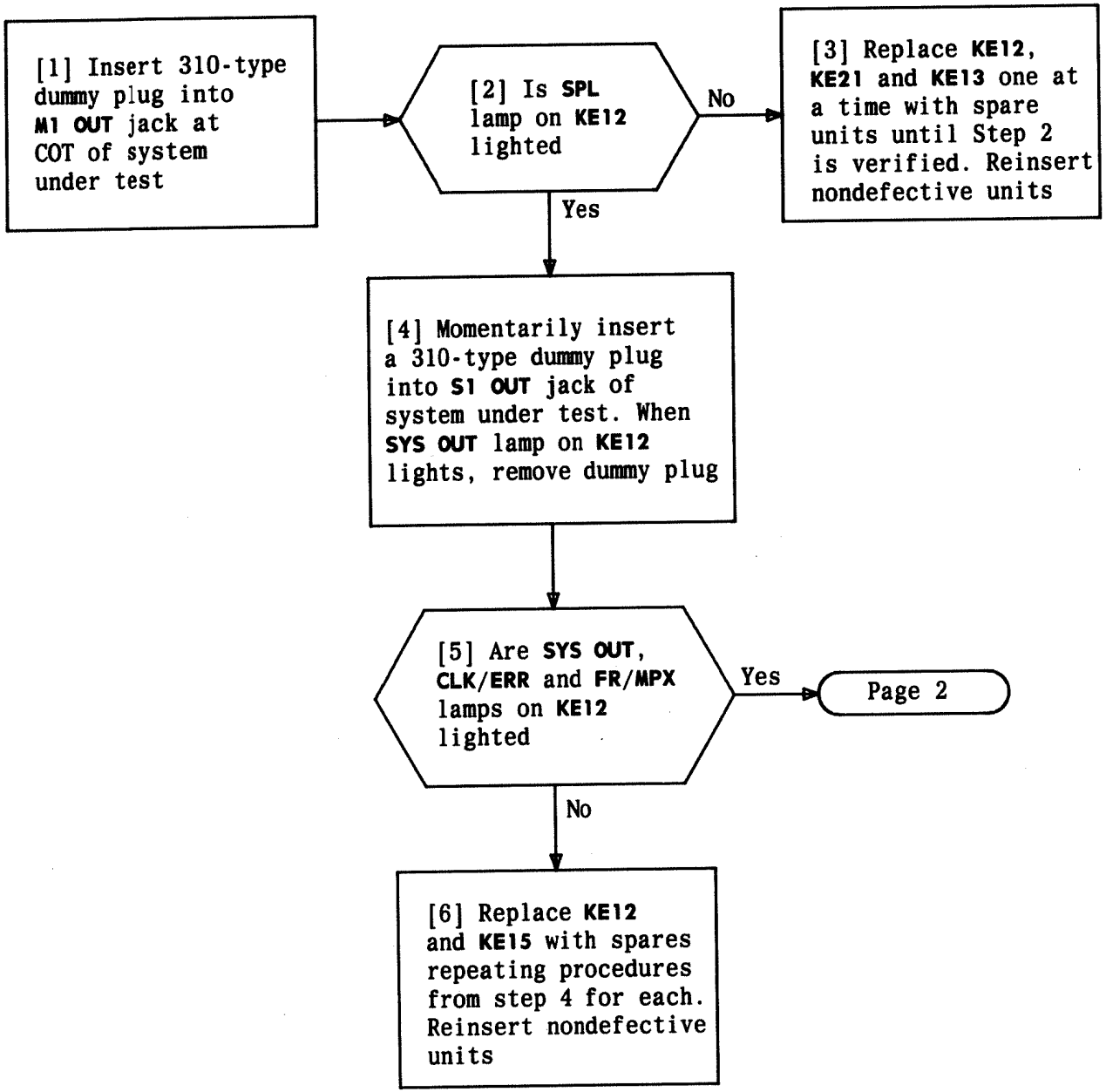
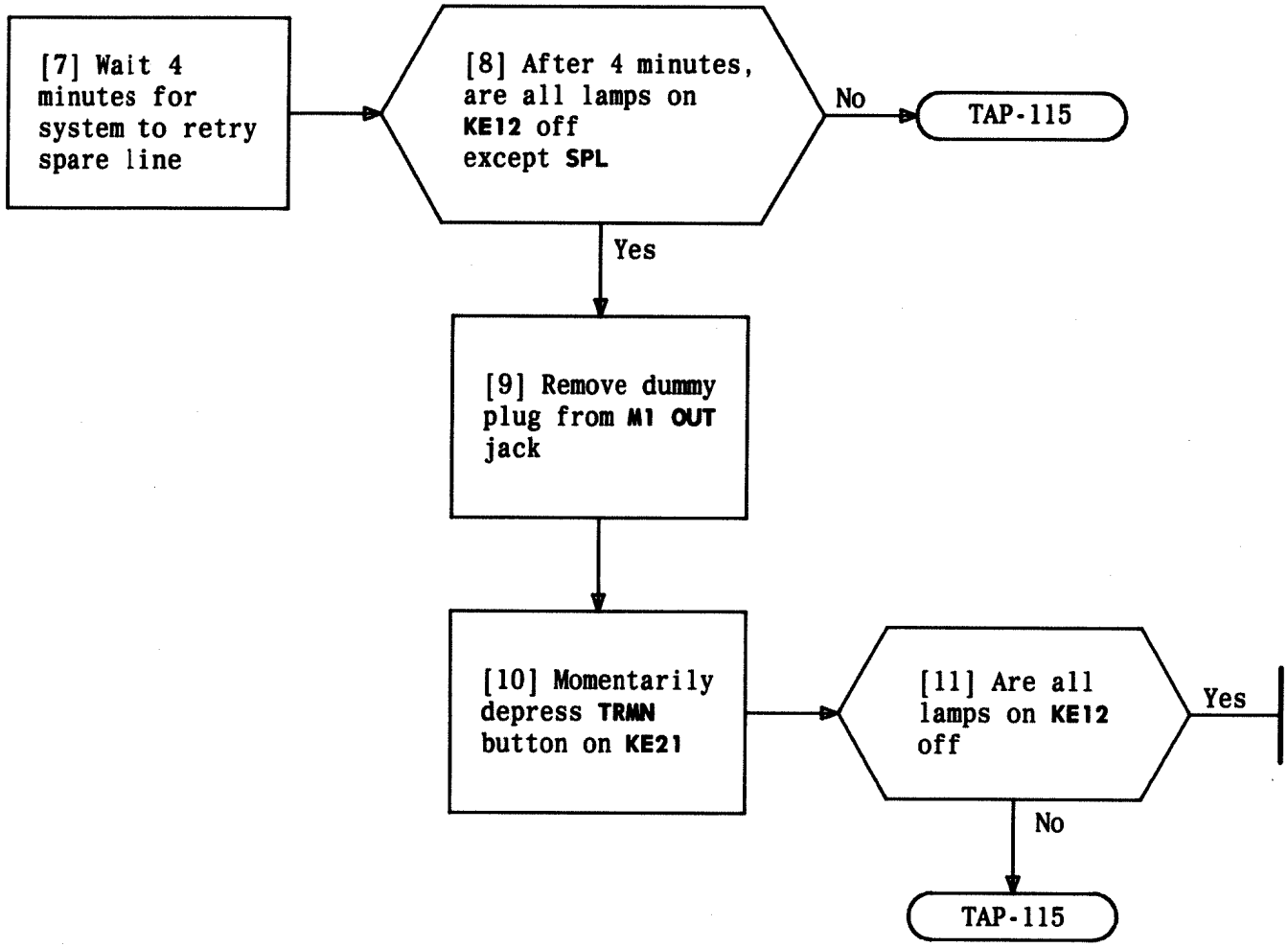


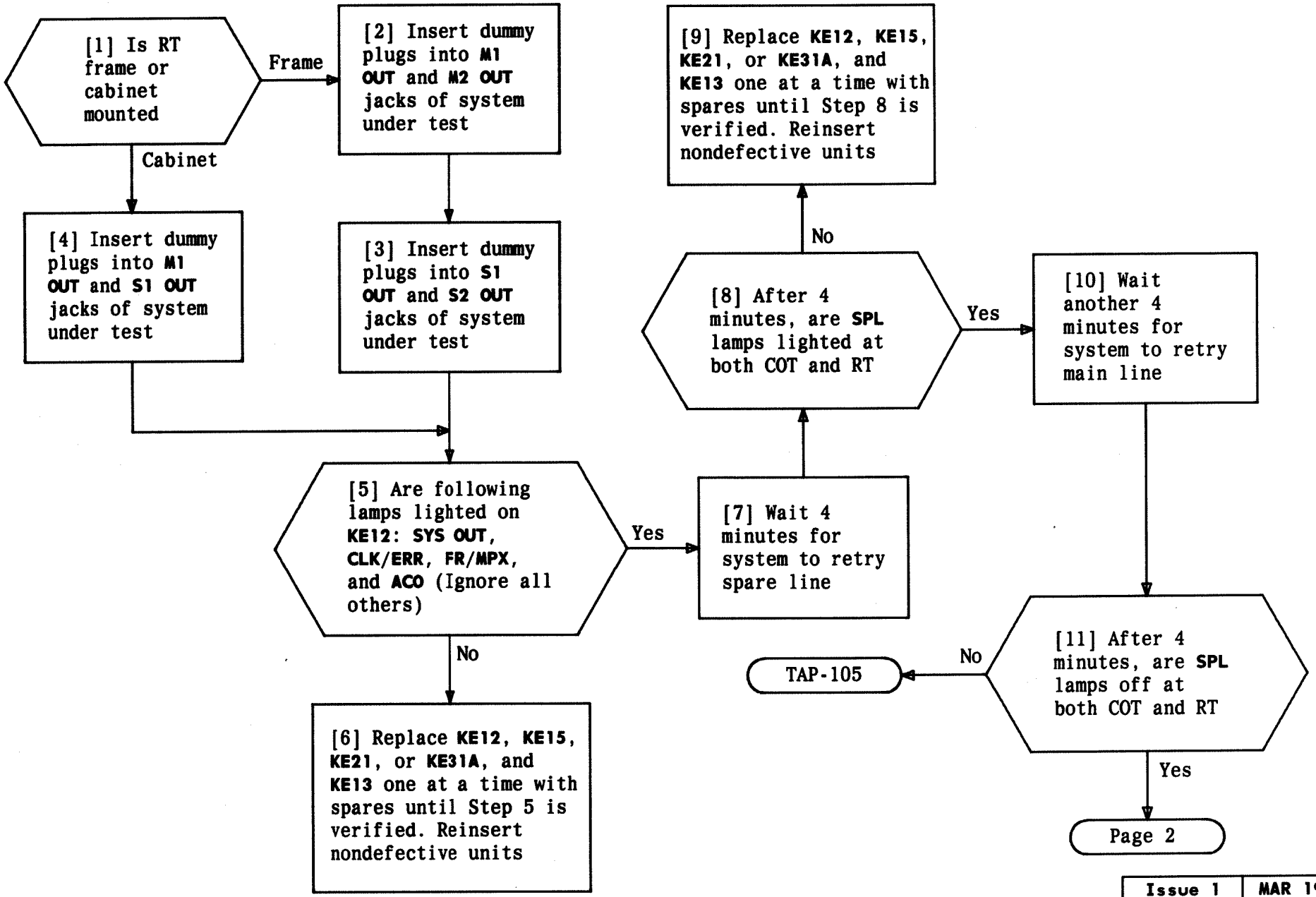
PERFORM MANUAL RETRY OF SPARE LINE



PERFORM AUTOMATIC RETRY OF SPARE LINE



PERFORM AUTOMATIC RETRY OF SPARE LINE



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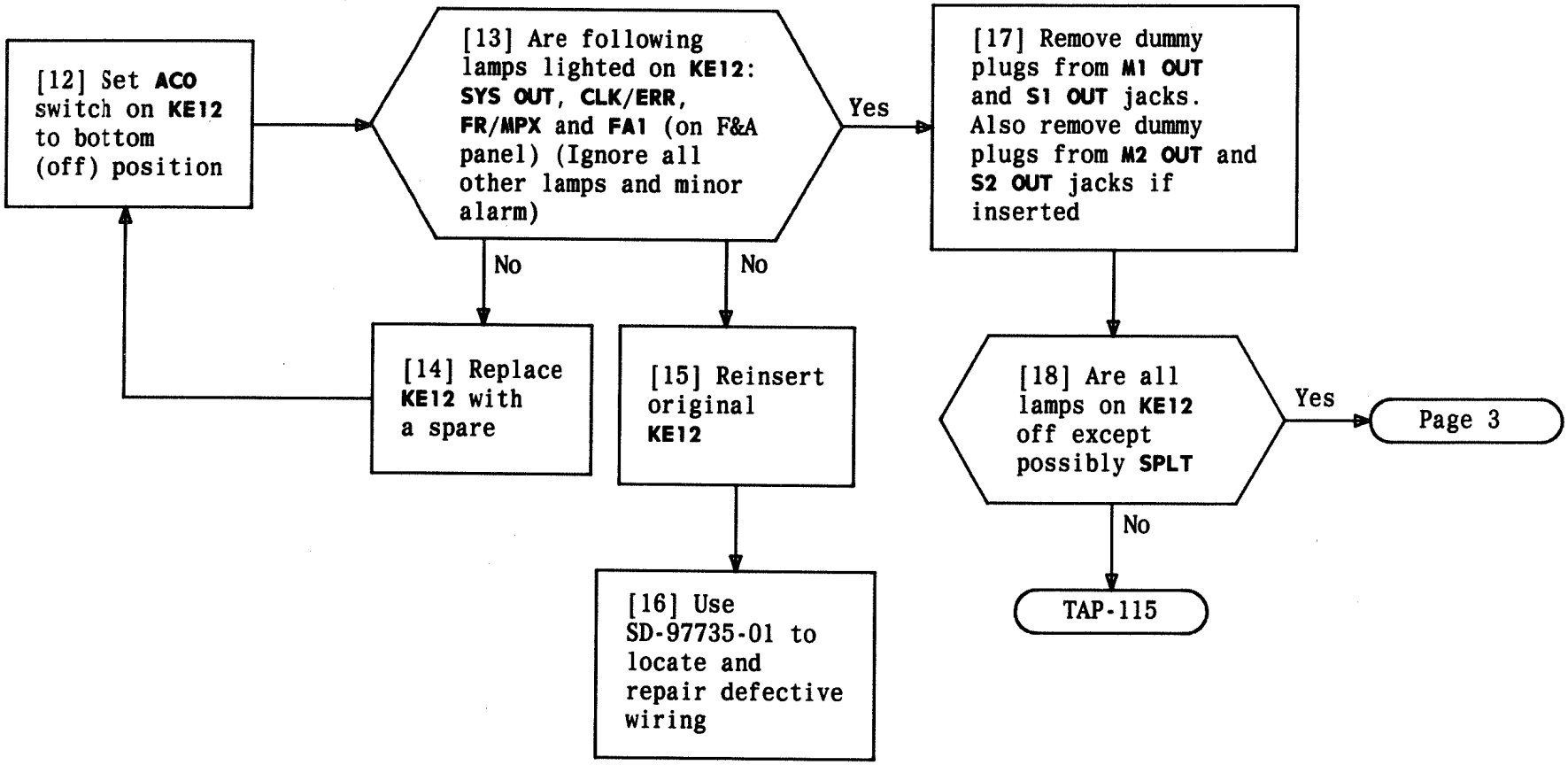
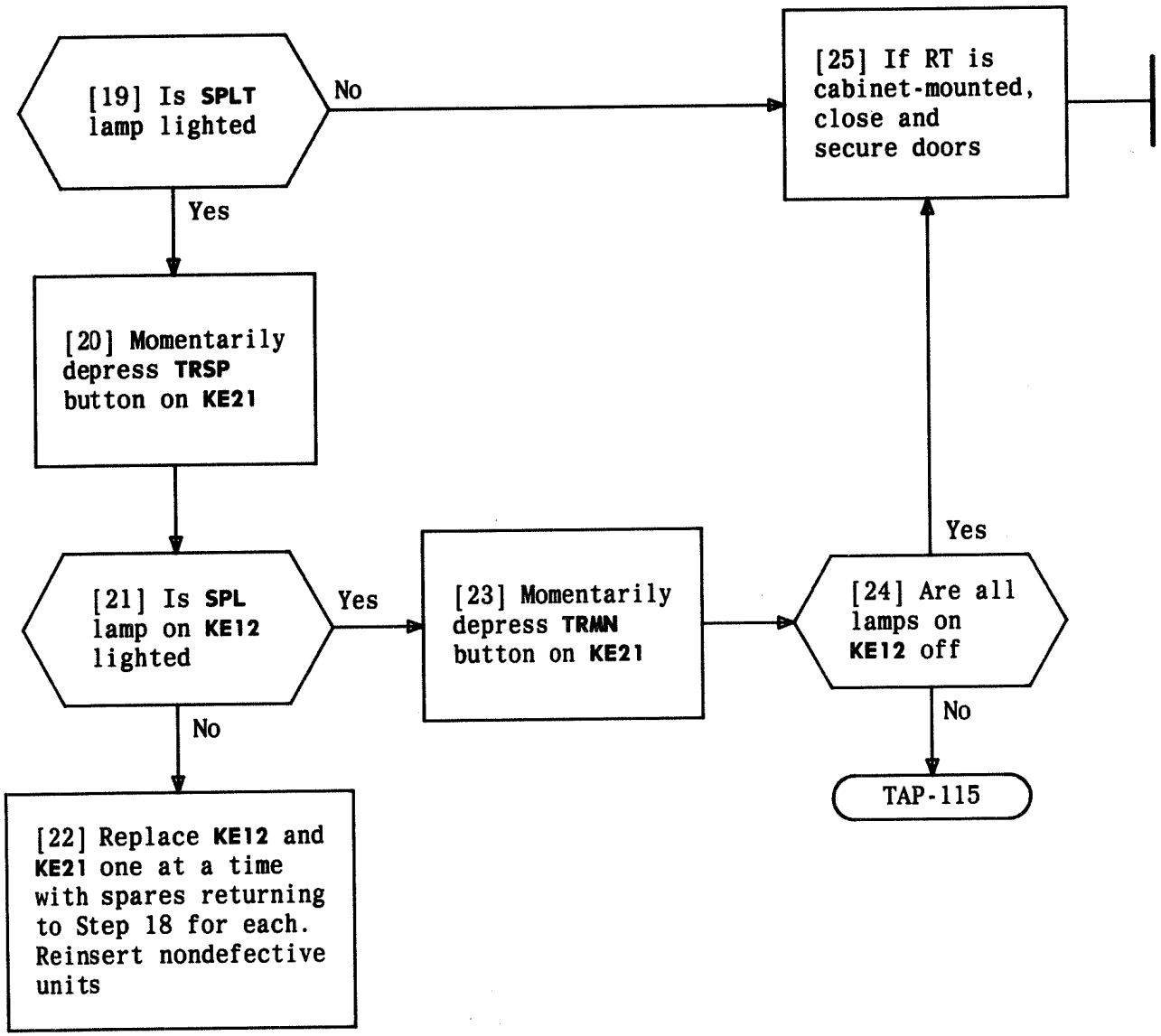
PERFORM VERIFICATION OF FINAL SYS OUT STATE



PERFORM VERIFICATION OF FINAL SYS OUT STATE



PERFORM VERIFICATION OF FINAL SYS OUT STATE

SUMMARY

Have COT install a **KE17B CIRCUIT PACK** and use a test line to connect unassigned subscriber line and call number to channel being tested. At RT, install appropriate channel unit [TABLE A]. Connect a test telephone set (connected for bridged ringing) to channel being tested. Perform talking, dialing, ringing and ring-trip tests. Repeat for each channel being equipped in single party mode.

TABLE A

CONFIGURATION	CABINET SYSTEM	FRAME SYSTEM		
SERVICE RANGE	0-900 OHMS	0-900 OHMS	901-1600 OHMS	1601-2800 OHMS
RT CHANNEL UNIT	KE18B	KE18B	KE19	KE19
RANGE EXTENDER				5A

[1] Establish communication between Remote Terminal (RT) and Central Office Terminal (COT) via order wire

Have COT Personnel:

[2] Select a channel for testing and plug in a **KE17B CIRCUIT PACK** into slot corresponding to channel being equipped

[3] At selected channel appearance on MDF, connect a temporary call number and subscriber line circuit test line

AND

Channel units installed, CO test line and RT test telephone connected

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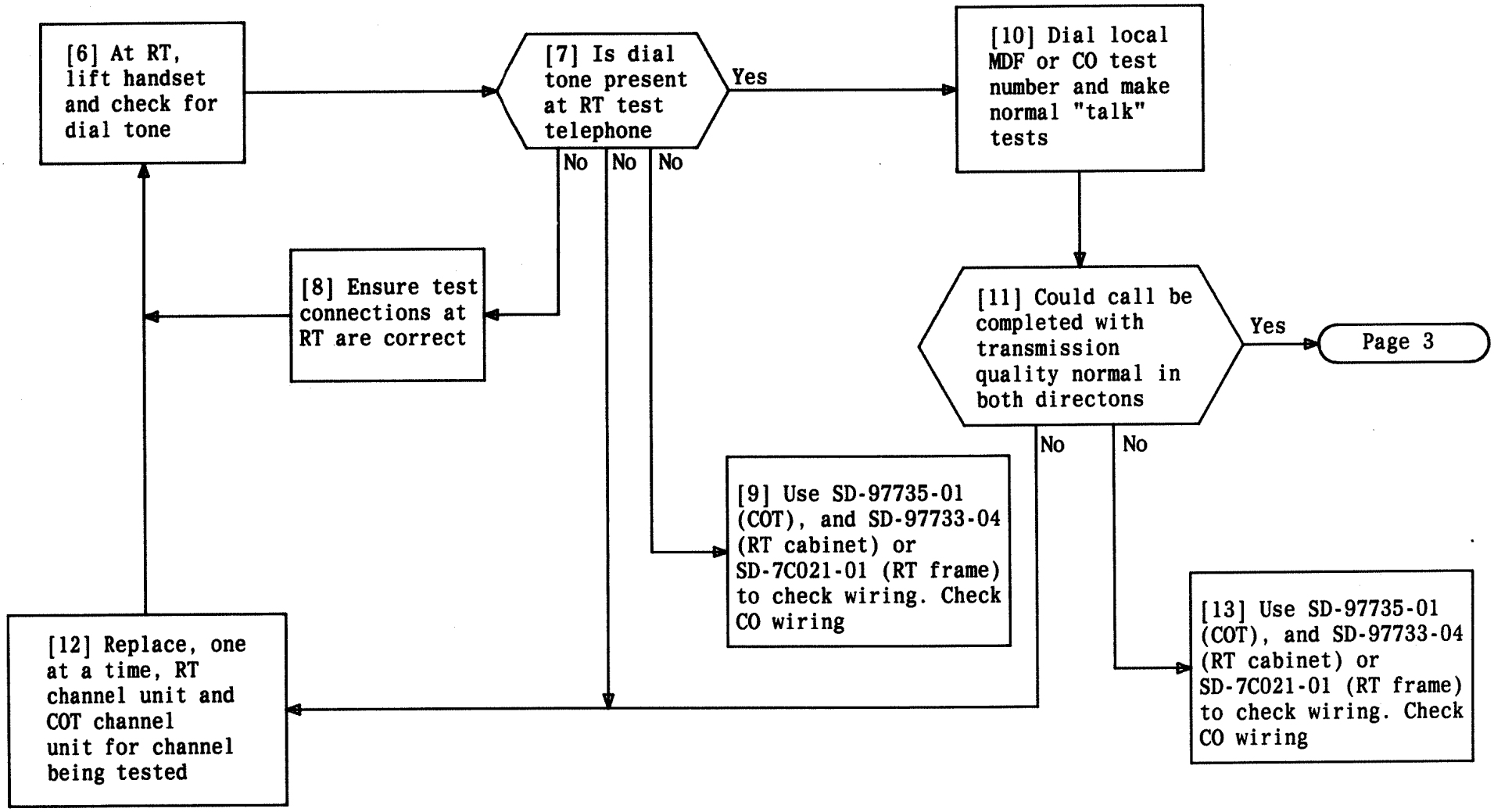
At RT:

[4] Plug a **KE18B** or **KE19 CIRCUIT PACK** [TABLE A] into slot corresponding to channel selected in Step 2

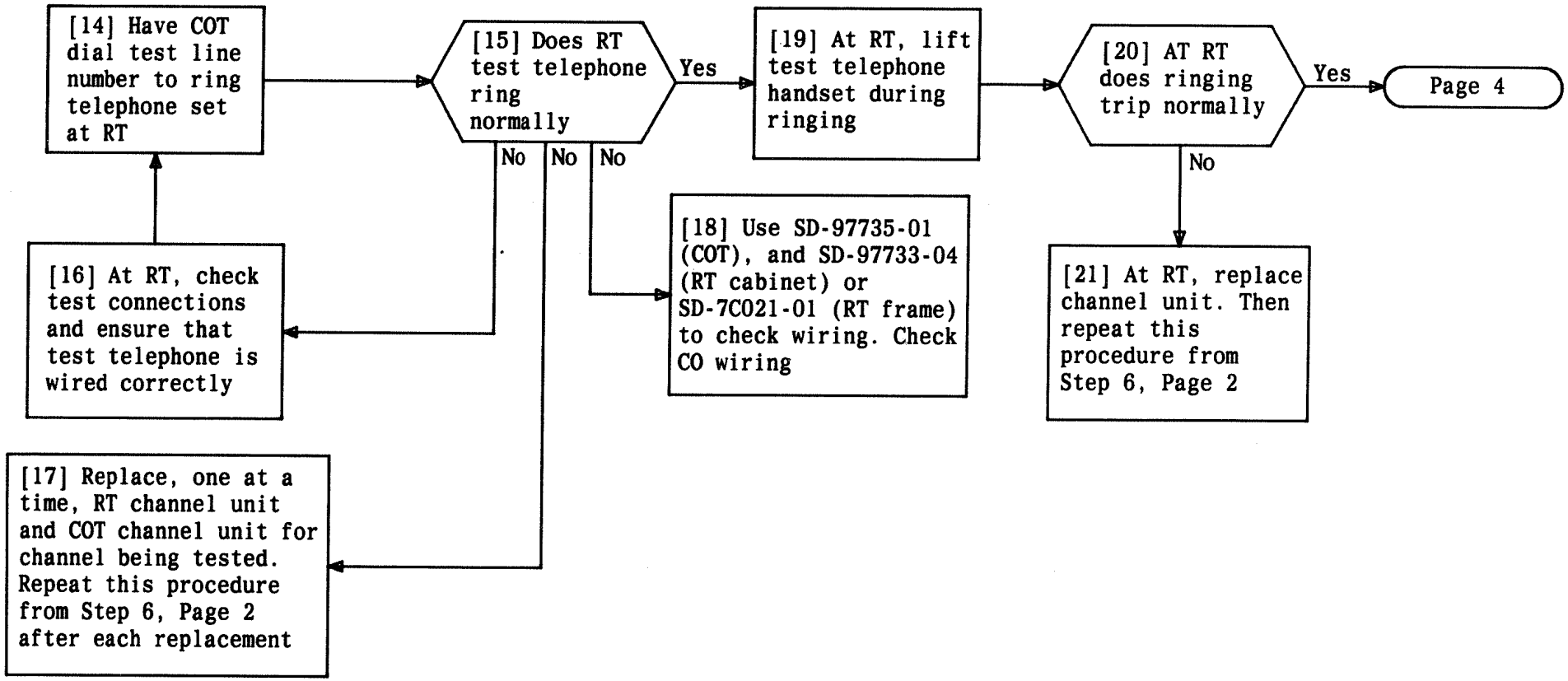
[5] At cross-connecting terminal adjacent to RT, temporarily connect a test telephone to terminals associated with selected channel. See NOTE 1

NOTE 1
Test telephone should be connected for bridged ringing

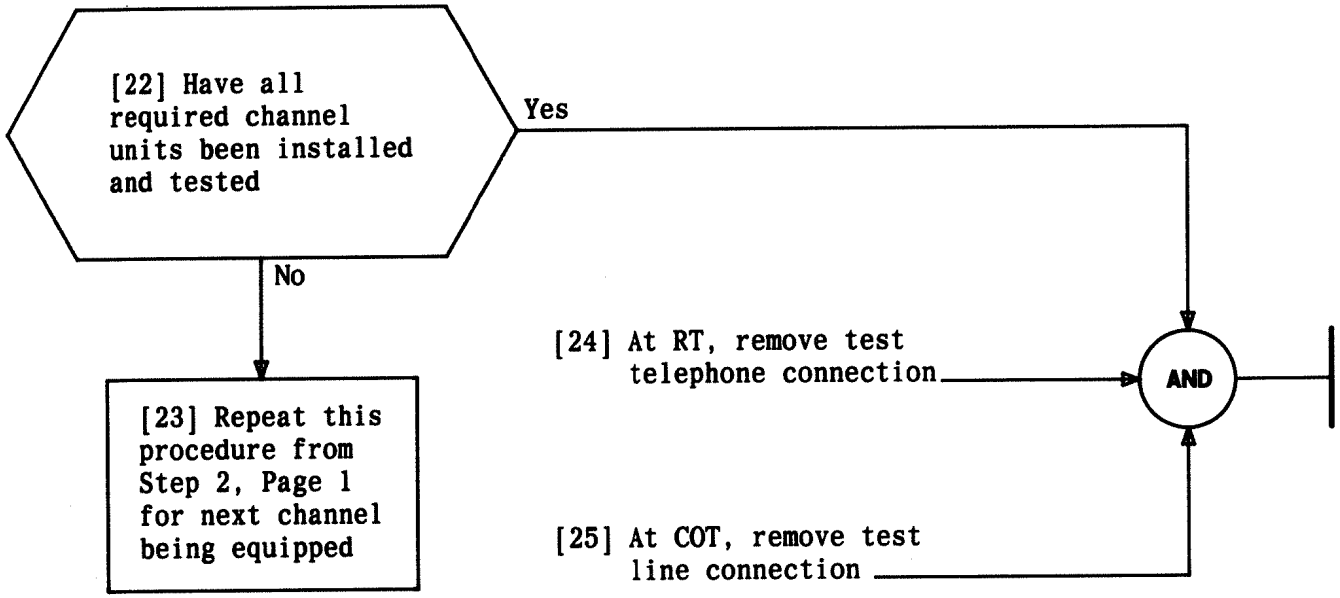
PERFORM TERMINAL-TO-TERMINAL SINGLE-PARTY CHANNEL TESTS



PERFORM TERMINAL-TO-TERMINAL SINGLE-PARTY CHANNEL TESTS



PERFORM TERMINAL-TO-TERMINAL SINGLE-PARTY CHANNEL TESTS



PERFORM TERMINAL-TO-TERMINAL SINGLE-PARTY CHANNEL TESTS

SUMMARY

Have COT install a **KE47B CIRCUIT PACK** and use test line to connect unassigned subscriber line and call number to channel being equipped. At RT, install appropriate channel unit [TABLE A]. Connect a test telephone set (connected for bridged ringing) to channel being equipped. Use VOM (negative test lead on ring conductor and positive lead grounded) to measure talk battery voltage on ring conductor. VOM should indicate 30 to 60 Vdc if RT is cabinet-mounted, or 45 to 53 Vdc if frame-mounted. Perform negative ringing (and positive ringing test if CO is equipped), talking, and dialing tests. After all required channel units are installed, make reverting call test (per local procedures) from test telephone on any one channel.

TABLE A

CONFIGURATION	CABINET SYSTEM	FRAME SYSTEM		
Service Range	0-900 ohms	0-900 ohms	901-1600 ohms	1601-2800 ohms
RT Channel Unit	**KE48B**	**KE48B**	**KE49**	**KE49**
Range Extender				**5A**

[1] Establish communication between Remote Terminal (RT) and Central Office Terminal (COT) via order wire

Have COT Personnel:

[2] Select a channel for testing and plug in a **KE47B CIRCUIT PACK** into slot corresponding to channel being equipped

[3] At selected channel appearance on MDF, connect a temporary call number and subscriber line circuit (ring party) test line

AND

Channel units installed CO test line and RT test telephone connected

Page 2

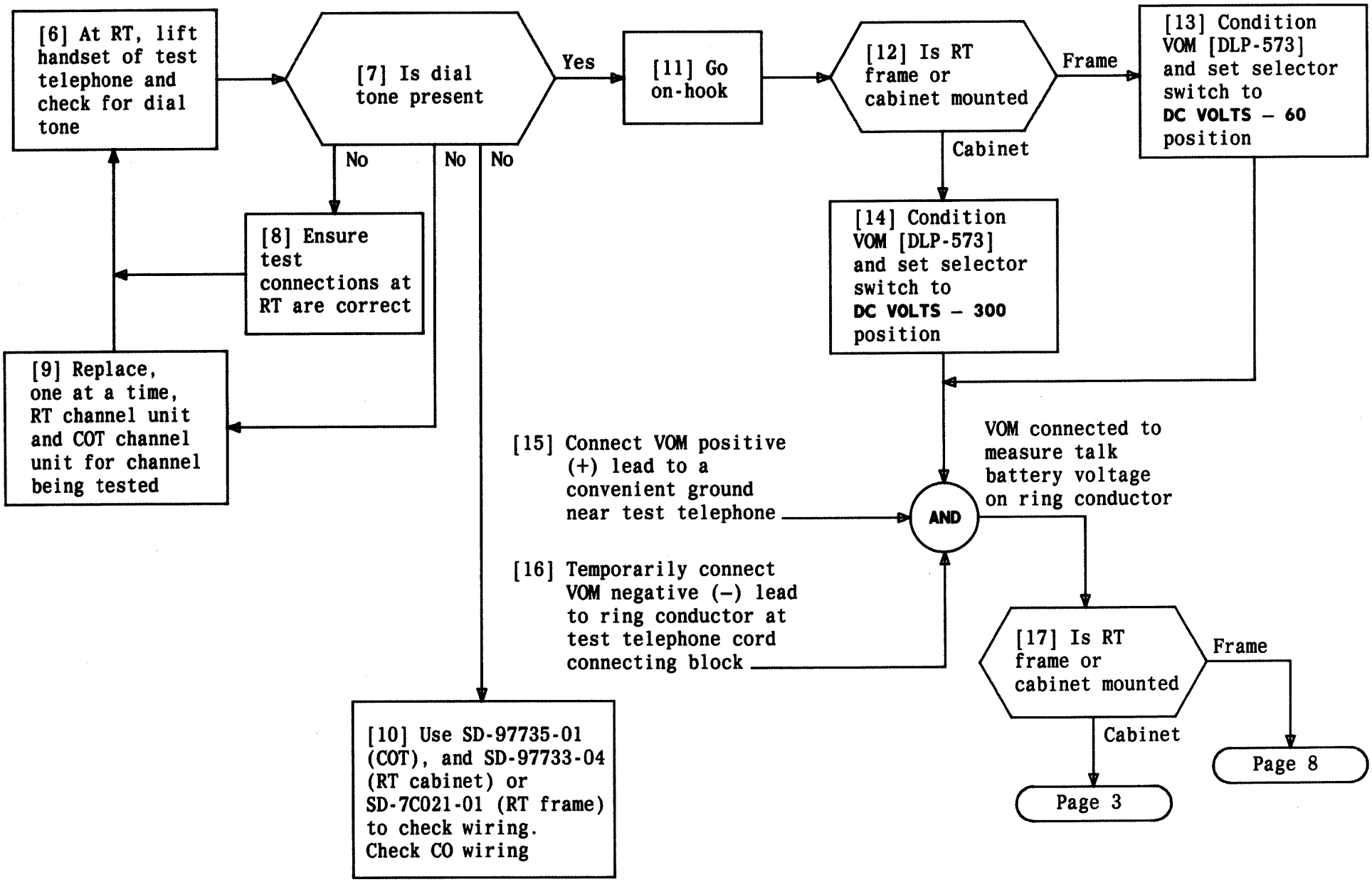
At RT:

[4] Plug a **KE48B** or **KE49 CIRCUIT PACK** [TABLE A] into slot corresponding to channel selected in Step 2

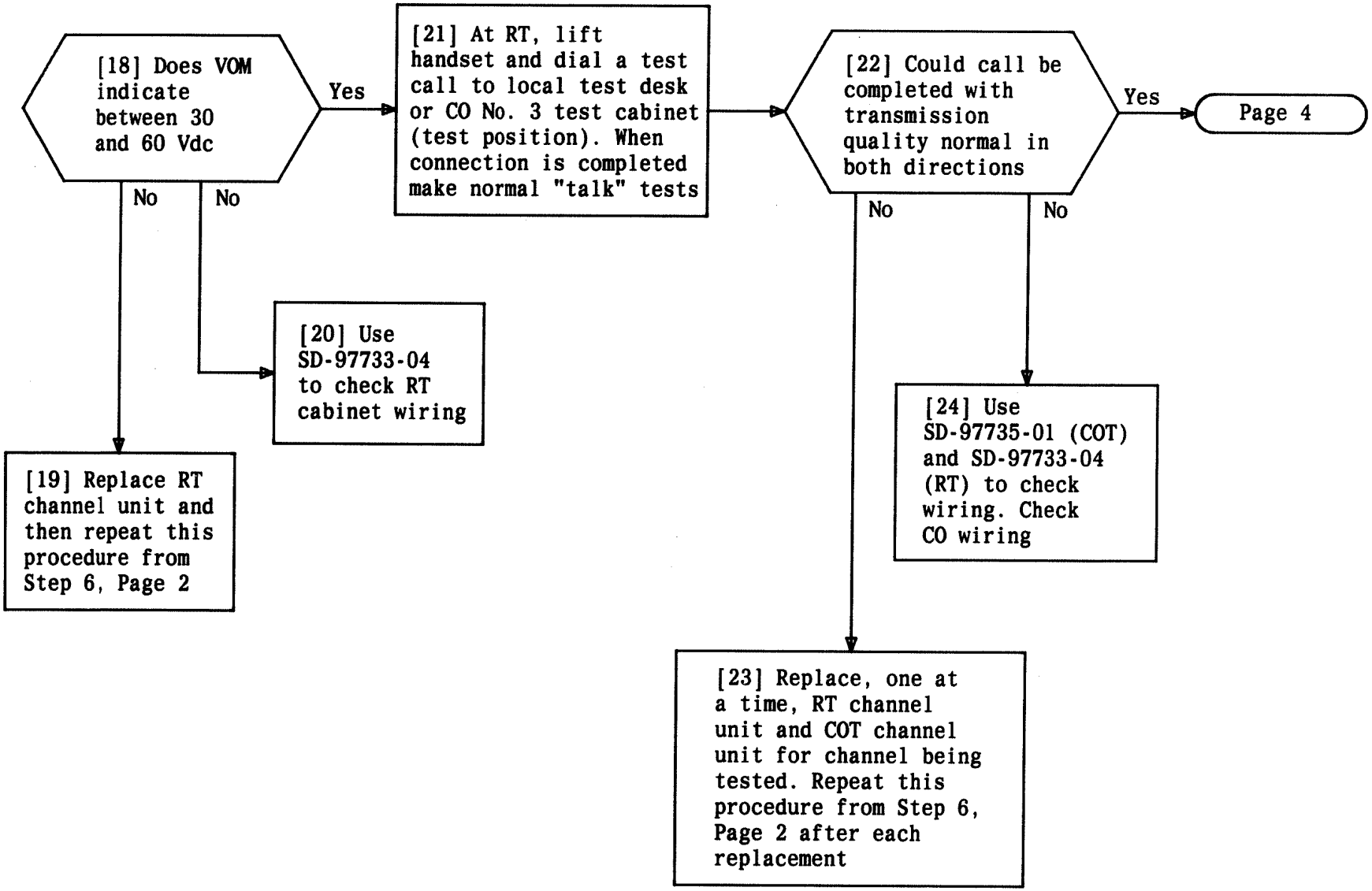
[5] At cross-connecting terminal adjacent to RT, temporarily connect a test telephone set to terminals associated with selected channel. See NOTE 1

NOTE 1
Test telephone should be connected for bridged ringing

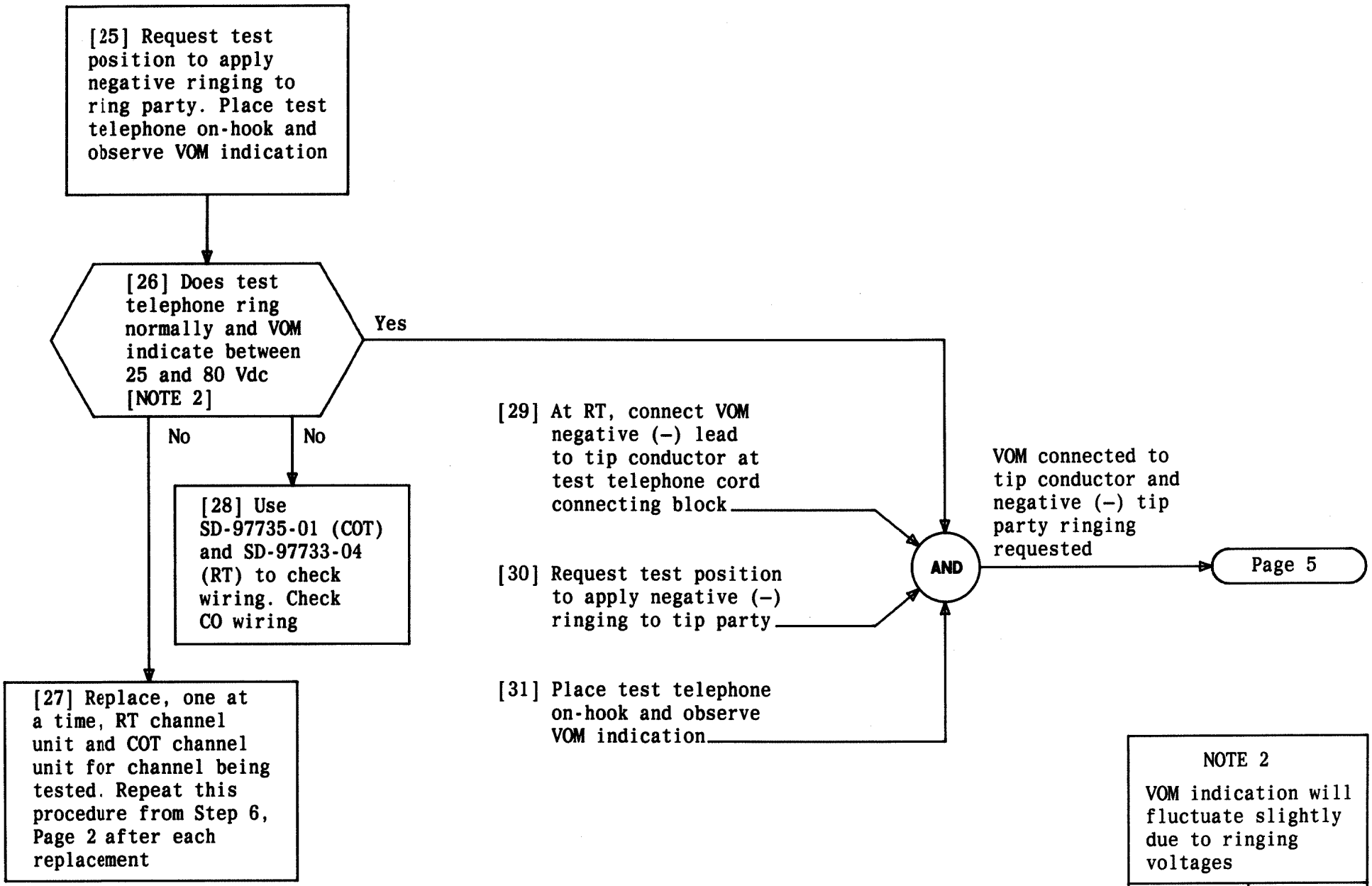
PERFORM TERMINAL-TO-TERMINAL PARTY-LINE (ONI) CHANNEL TESTS



PERFORM TERMINAL-TO-TERMINAL PARTY-LINE (ONI) CHANNEL TESTS



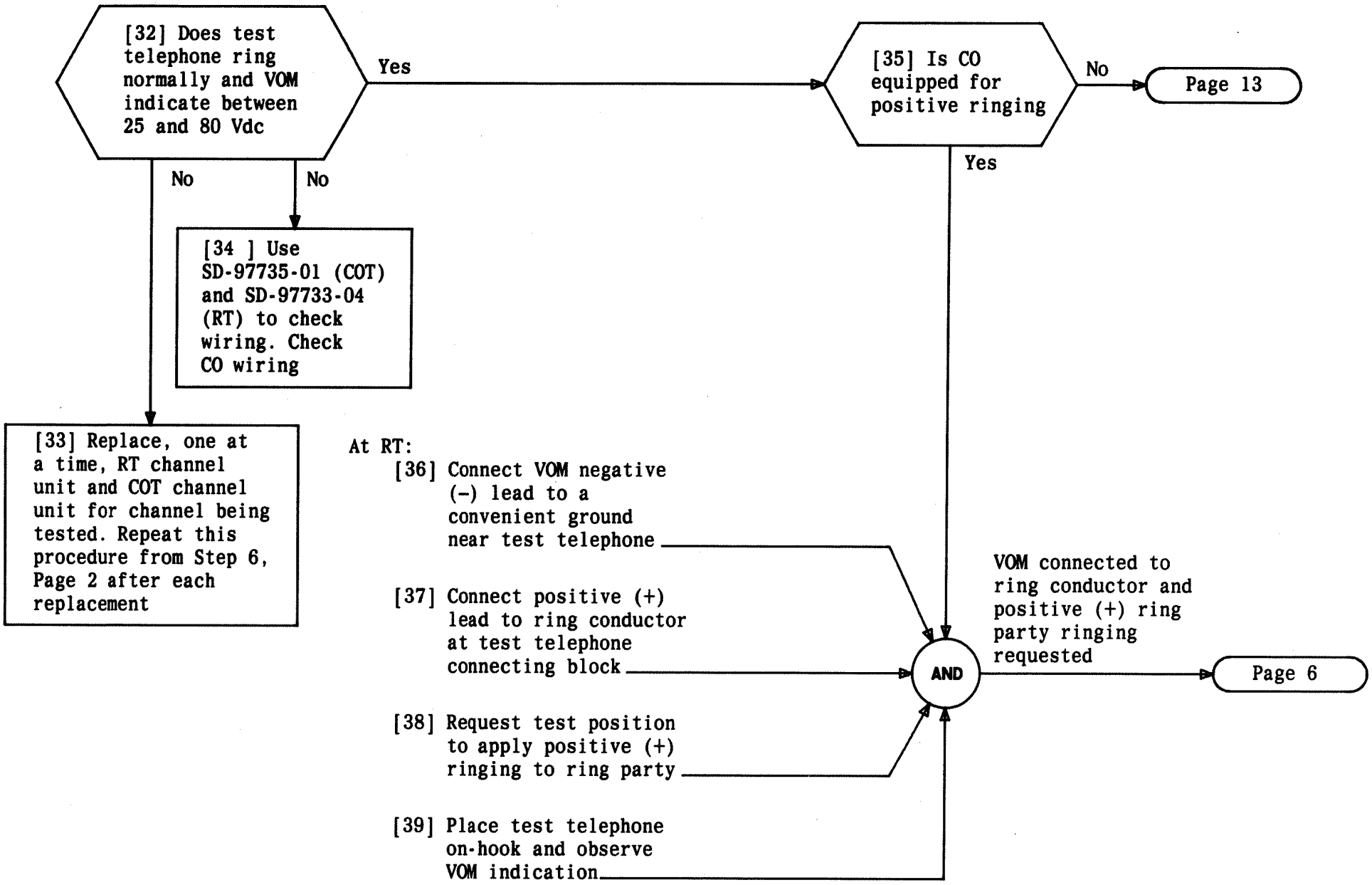
PERFORM TERMINAL-TO-TERMINAL PARTY-LINE (ONI) CHANNEL TESTS



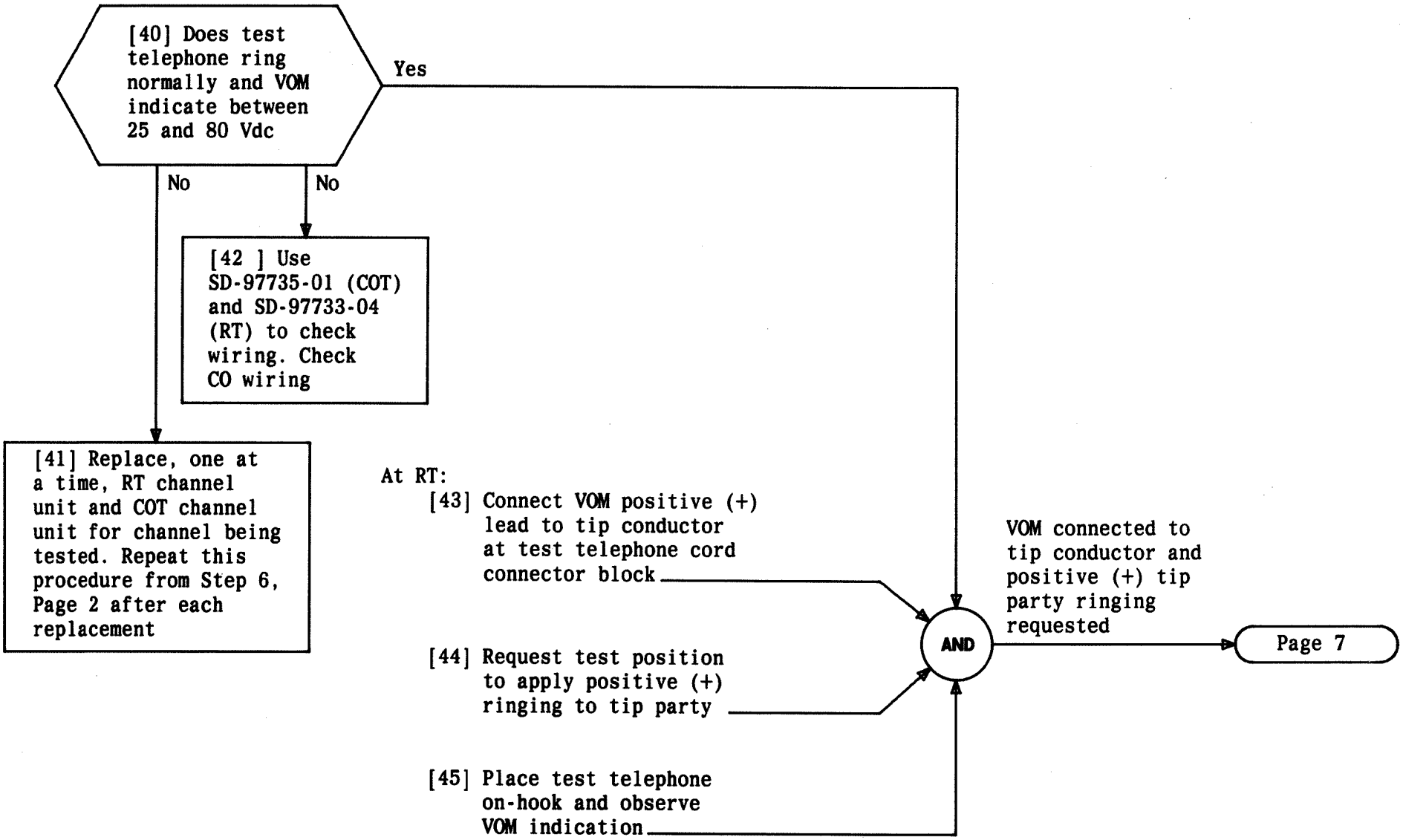
NOTE 2

VOM indication will fluctuate slightly due to ringing voltages

PERFORM TERMINAL-TO-TERMINAL PARTY-LINE (ONI) CHANNEL TESTS



PERFORM TERMINAL-TO-TERMINAL PARTY-LINE (ONI) CHANNEL TESTS



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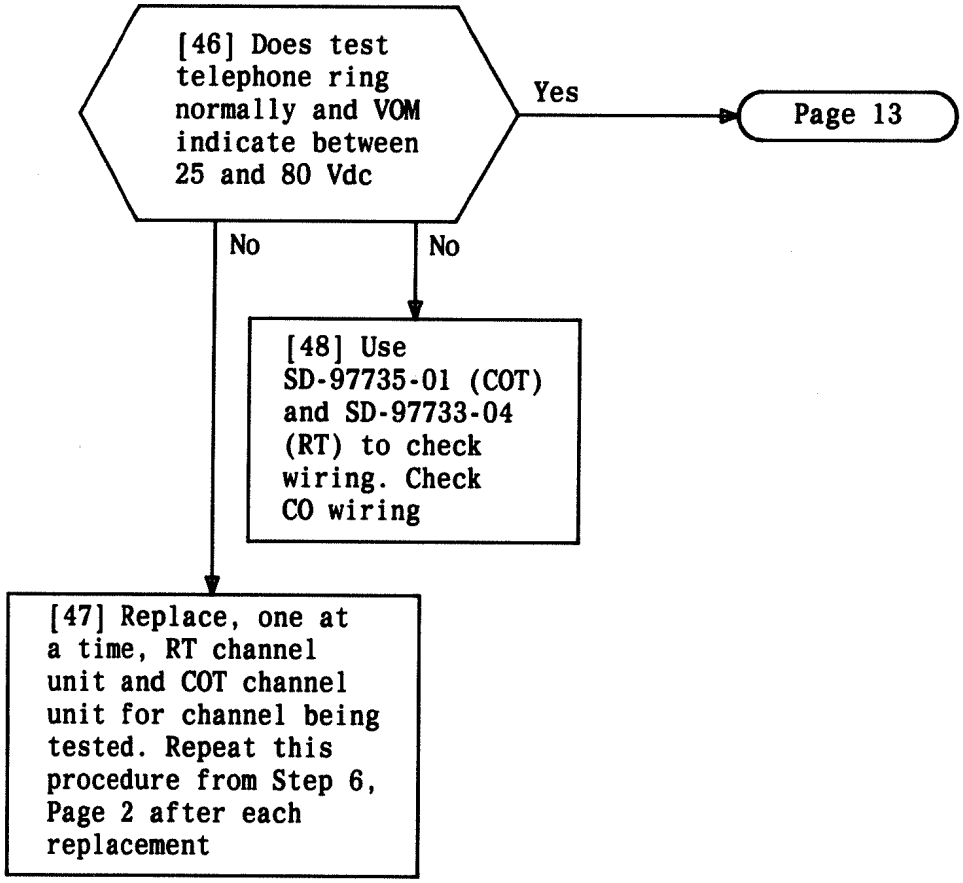
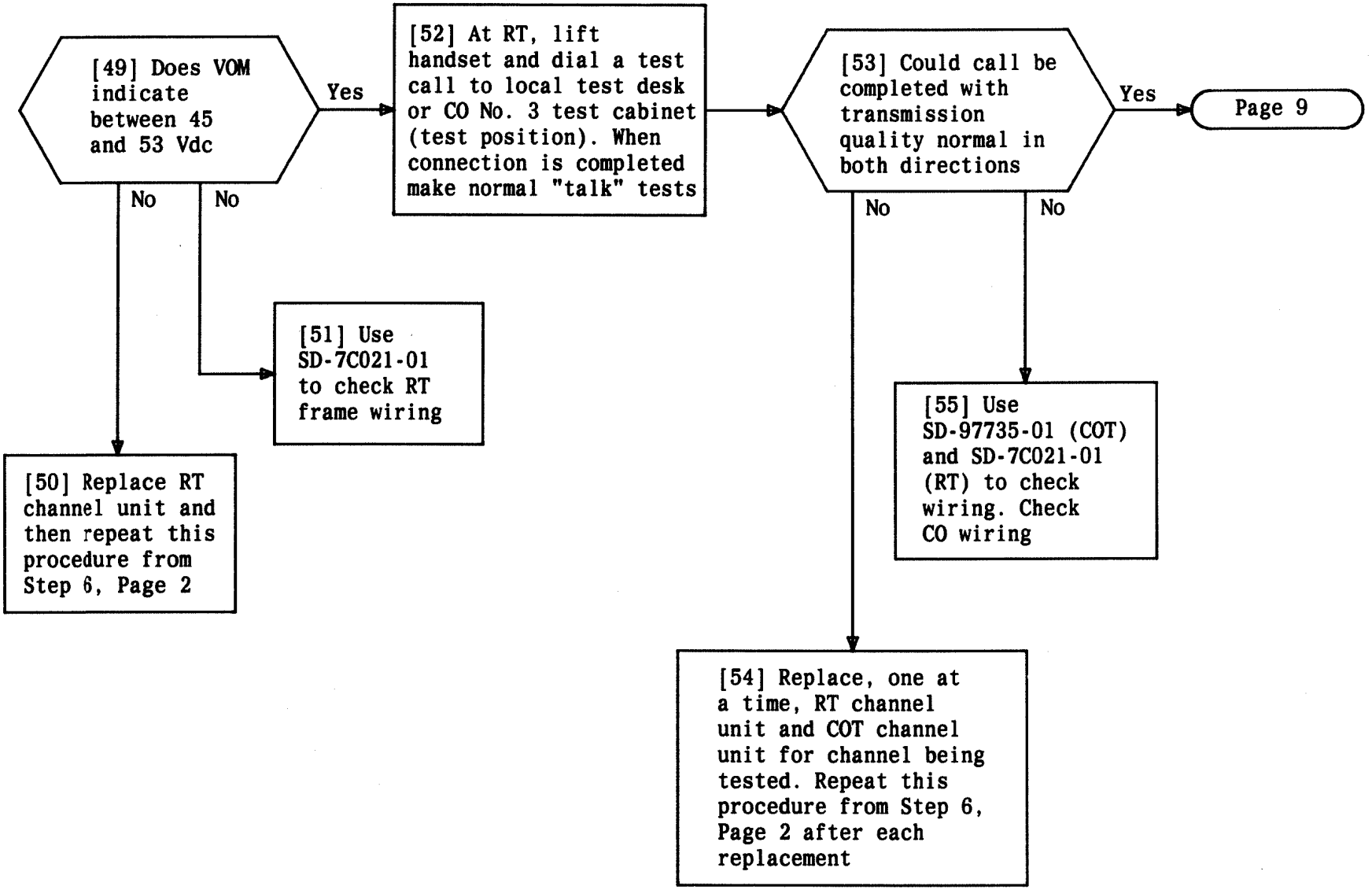
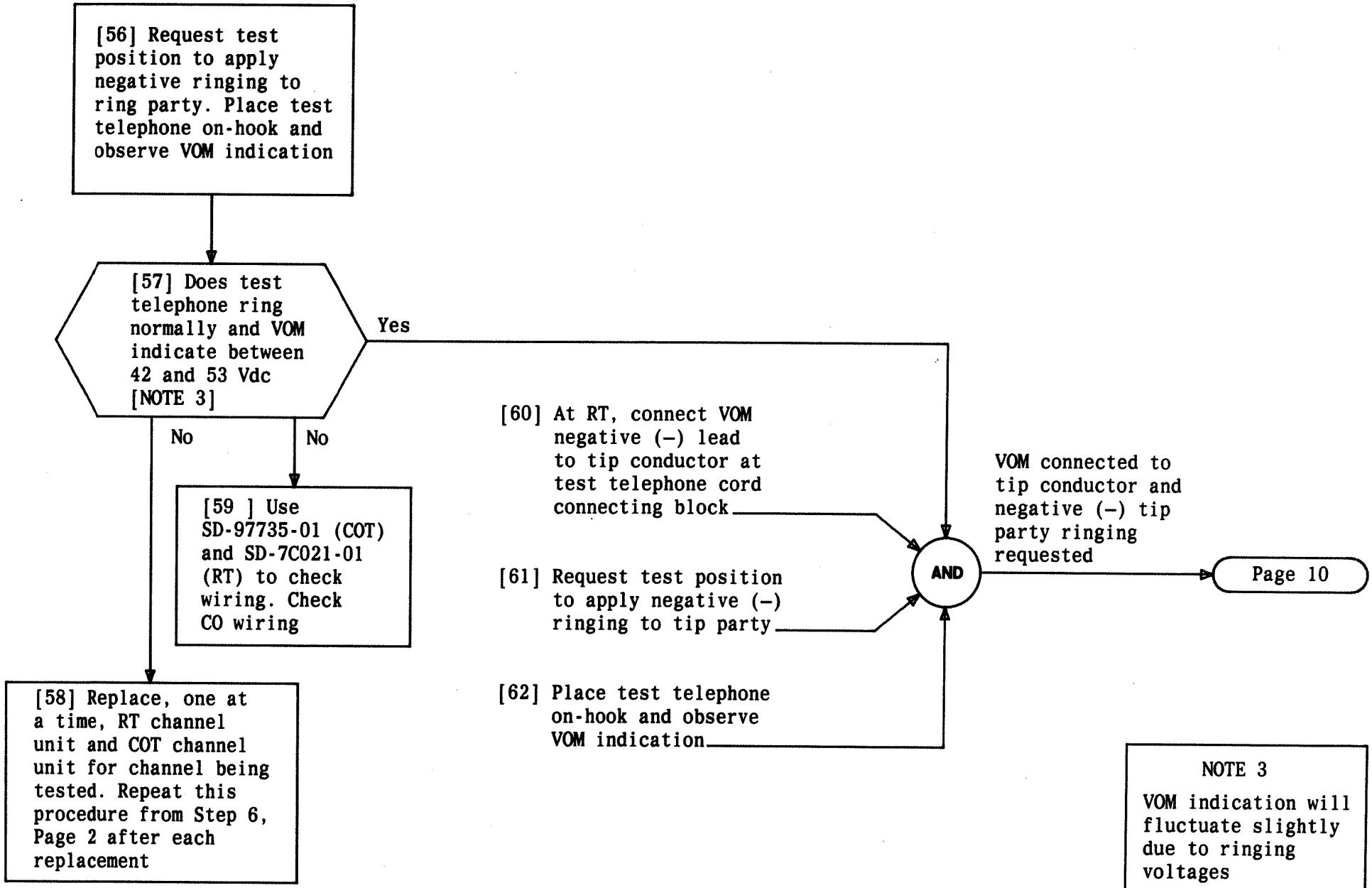


PERFORM TERMINAL-TO-TERMINAL PARTY-LINE (ONI) CHANNEL TESTS



PERFORM TERMINAL-TO-TERMINAL PARTY-LINE (ONI) CHANNEL TESTS



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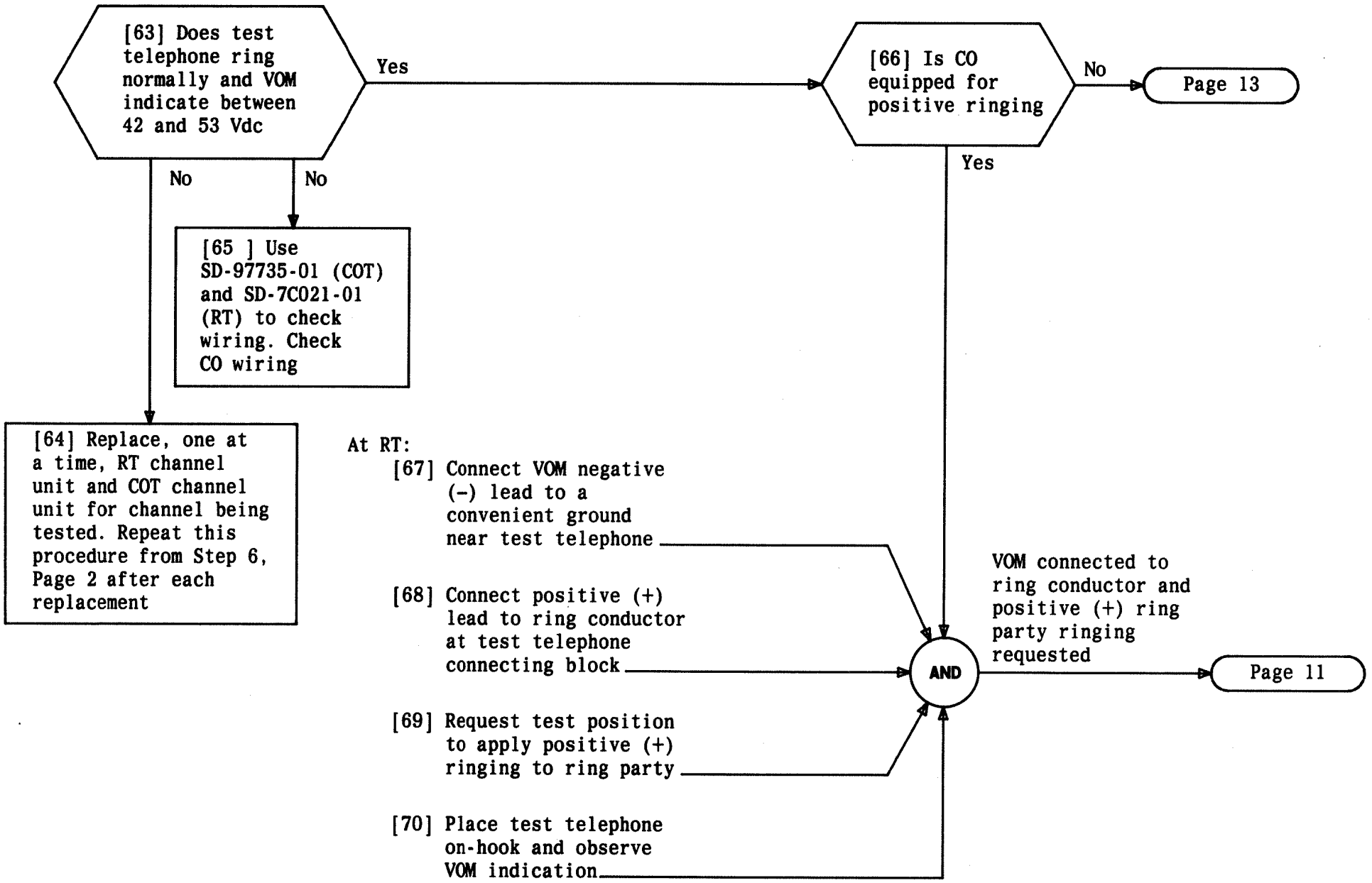
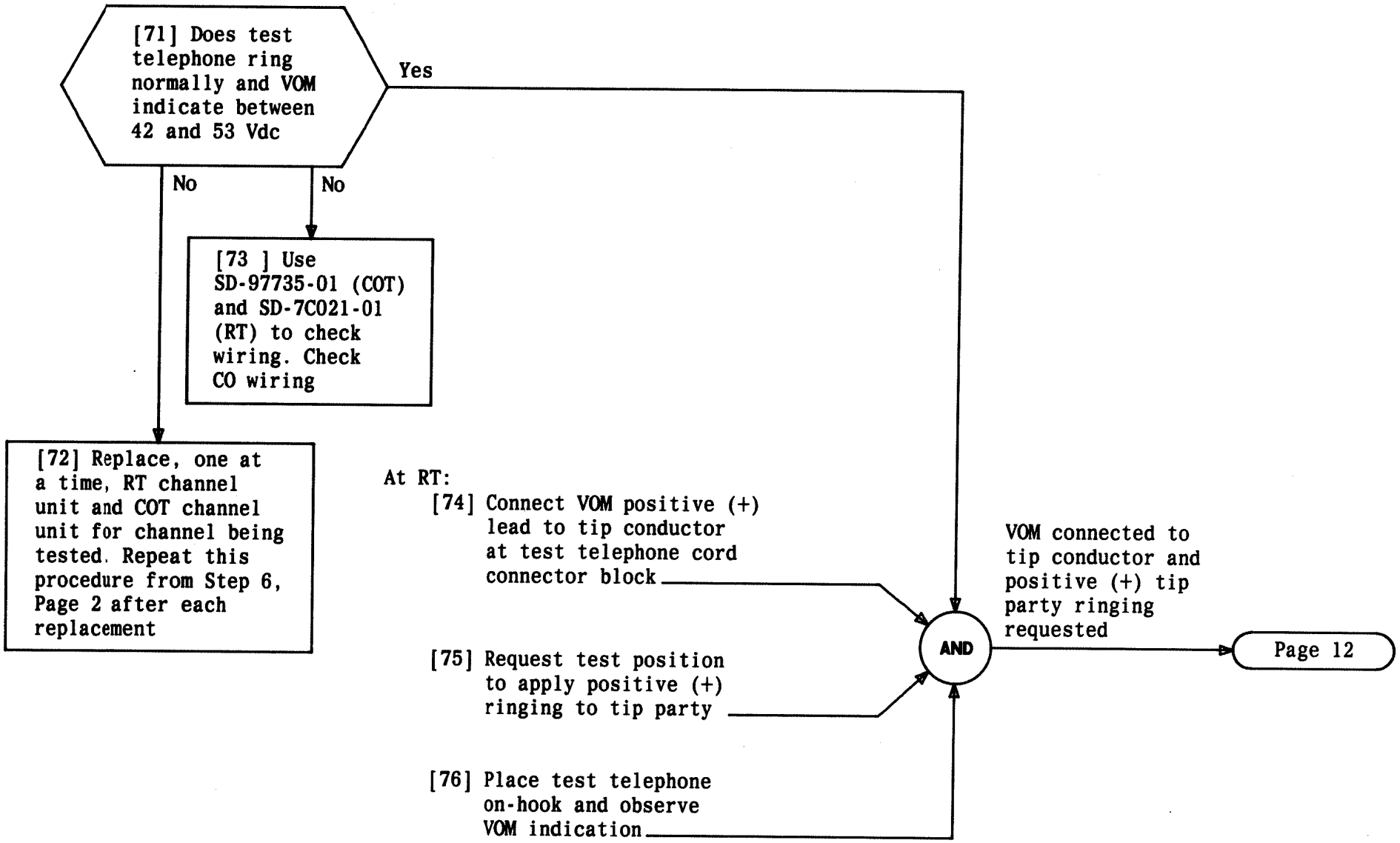
VOM indication will fluctuate slightly due to ringing voltages

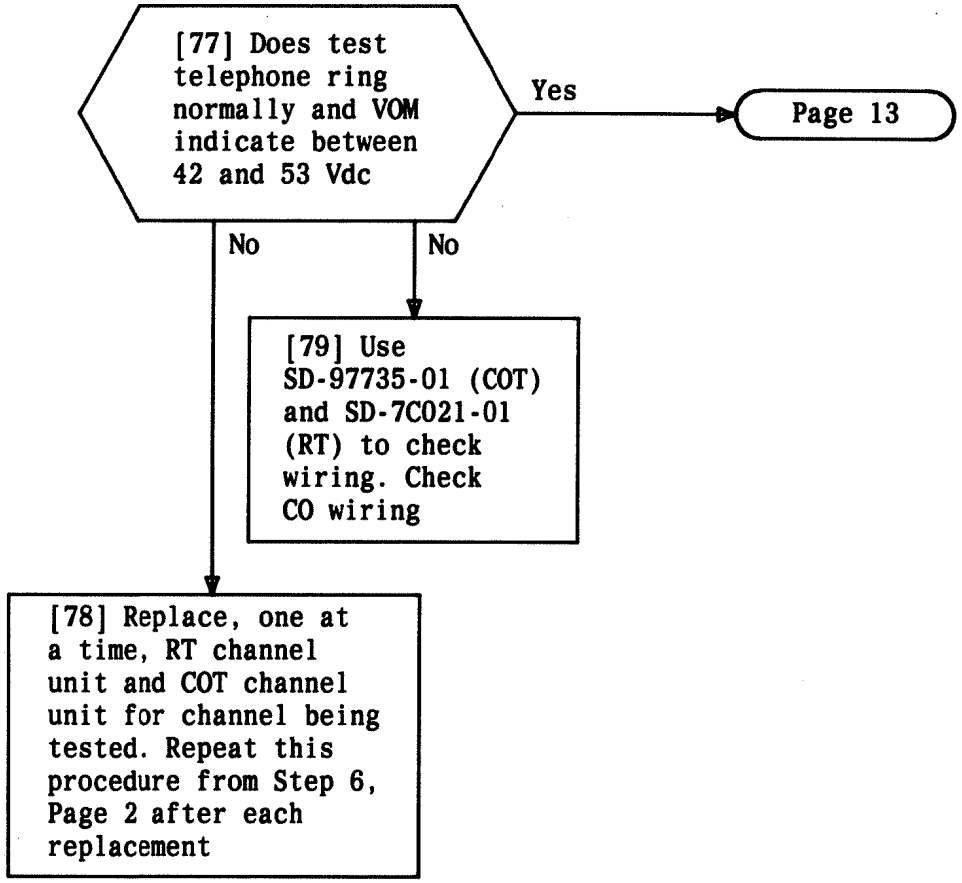
PERFORM TERMINAL-TO-TERMINAL PARTY-LINE (ONI) CHANNEL TESTS



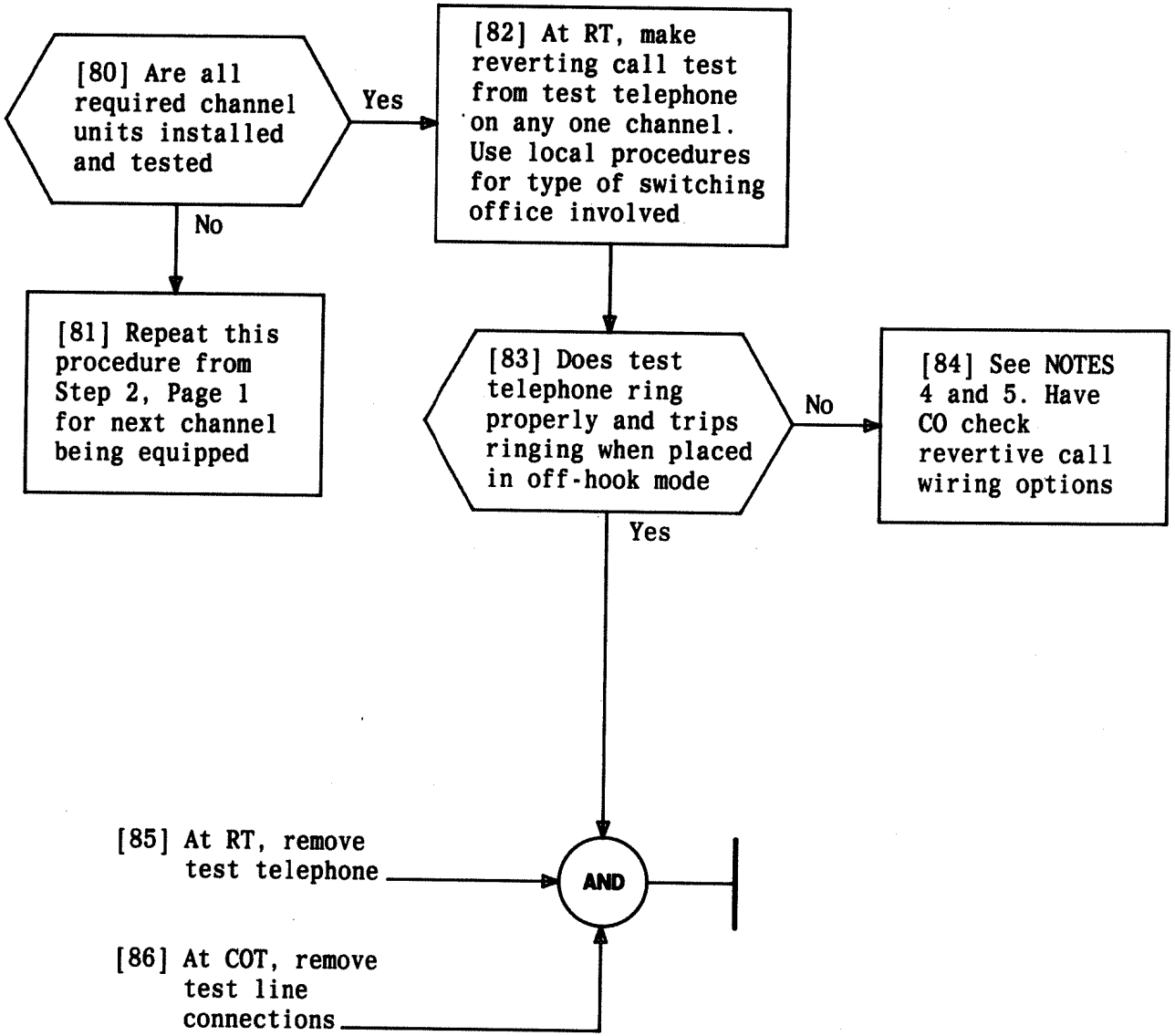
PERFORM TERMINAL-TO-TERMINAL PARTY-LINE (ONI) CHANNEL TESTS



PERFORM TERMINAL-TO-TERMINAL PARTY-LINE (ONI) CHANNEL TESTS



PERFORM TERMINAL-TO-TERMINAL PARTY-LINE (ONI) CHANNEL TESTS



NOTES

4. For step-by-step offices it may be necessary to modify revertive call selectors, such as SD-31762-01 and SD-31831-01, to eliminate a simultaneous ringing condition on both tip and ring when used with **KE47B** channel unit
5. No. 5 crossbar reverting call trunk circuits, SD-26068-01 and SD-26068-05, require option "S" to ground called party's side of line while calling party is being rung

PERFORM TERMINAL-TO-TERMINAL PARTY-LINE (ONI) CHANNEL TESTS

SUMMARY

Have COT install a **KE27B CIRCUIT PACK** and use test line to connect unassigned subscriber line and call number to channel being equipped. At RT, install appropriate channel unit [TABLE A]. Connect two test telephones to cross-connecting terminal at RT associated with the channel being equipped. One set should be wired as the ring party, and the other set as the tip party (both sets wired for ANI). Perform talking, dialing, ringing, ring-trip, and resistance-to-ground tests. After all channel units are installed, make reverting call test (per local procedures) from one of the test telephones on any one channel.

[1] Establish communication between Remote Terminal (RT) and Central Office Terminal (COT) via order wire

Have COT Personnel:

[2] Select a channel for testing and plug in a **KE27B CIRCUIT PACK** into slot corresponding to channel being equipped

[3] At selected channel appearance on MDF, connect temporary call numbers and subscriber line circuit test line [NOTE 1]

At RT:

[4] Plug a **KE28B** or **KE29 CIRCUIT PACK** [TABLE A] into slot corresponding to channel selected in Step 2

[5] At cross-connecting terminal adjacent to RT, temporarily connect jumpers from terminals associated with channel under test to connecting blocks of tip and ring test telephones [NOTE 2]

AND

Channel units installed, CO test lines, and tip and ring RT test telephones connected

Page 2

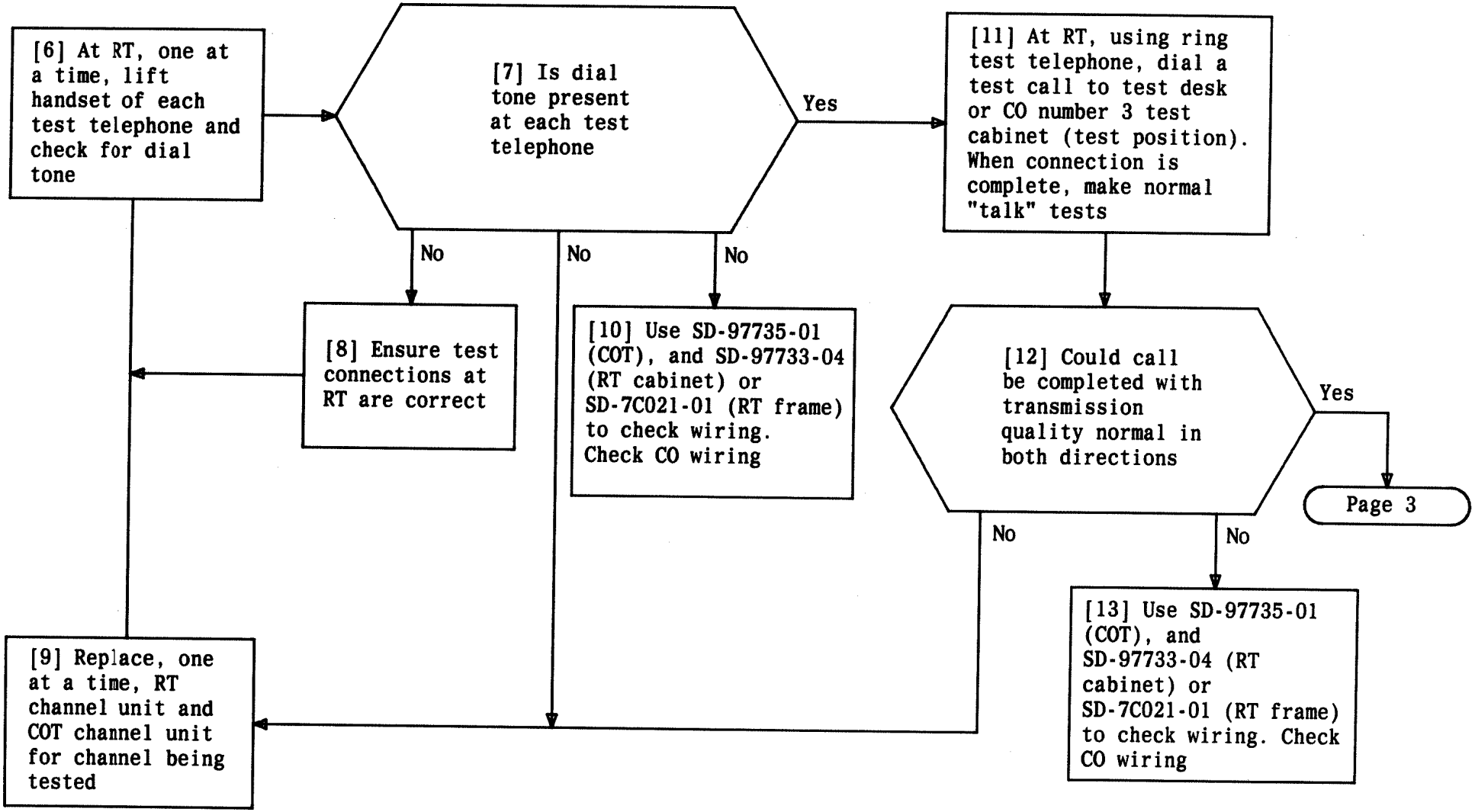
TABLE A

CONFIGURATION	CABINET SYSTEM	FRAME SYSTEM		
SERVICE RANGE	0-900 OHMS	0-900 OHMS	901-1600 OHMS	1601-2800 OHMS
RT CHANNEL UNIT	KE28B	KE28B	KE29	KE29
RANGE EXTENDER				5A

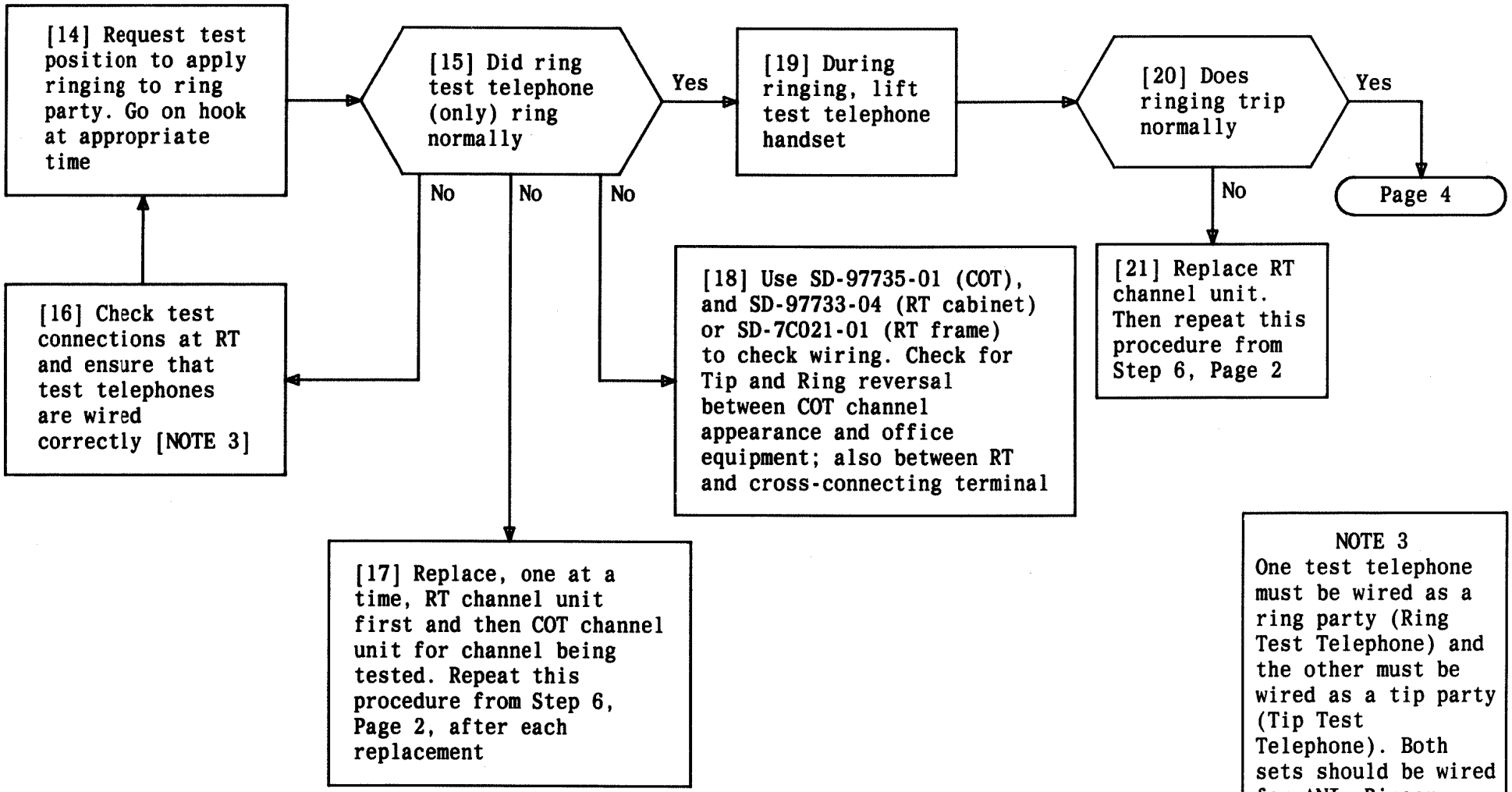
NOTES

1. First call number should be connected for ring party ANI and second call number should be connected for tip party ANI
2. One test telephone must be wired as a ring party (Ring Test Telephone) and the other must be wired as a tip party (Tip Test Telephone). Both sets should be wired for ANI. Ringer connections for various types of ringers and service arrangements may be found in Section 500-114-100

PERFORM TERMINAL-TO-TERMINAL TWO-PARTY (ANI) CHANNEL TESTS

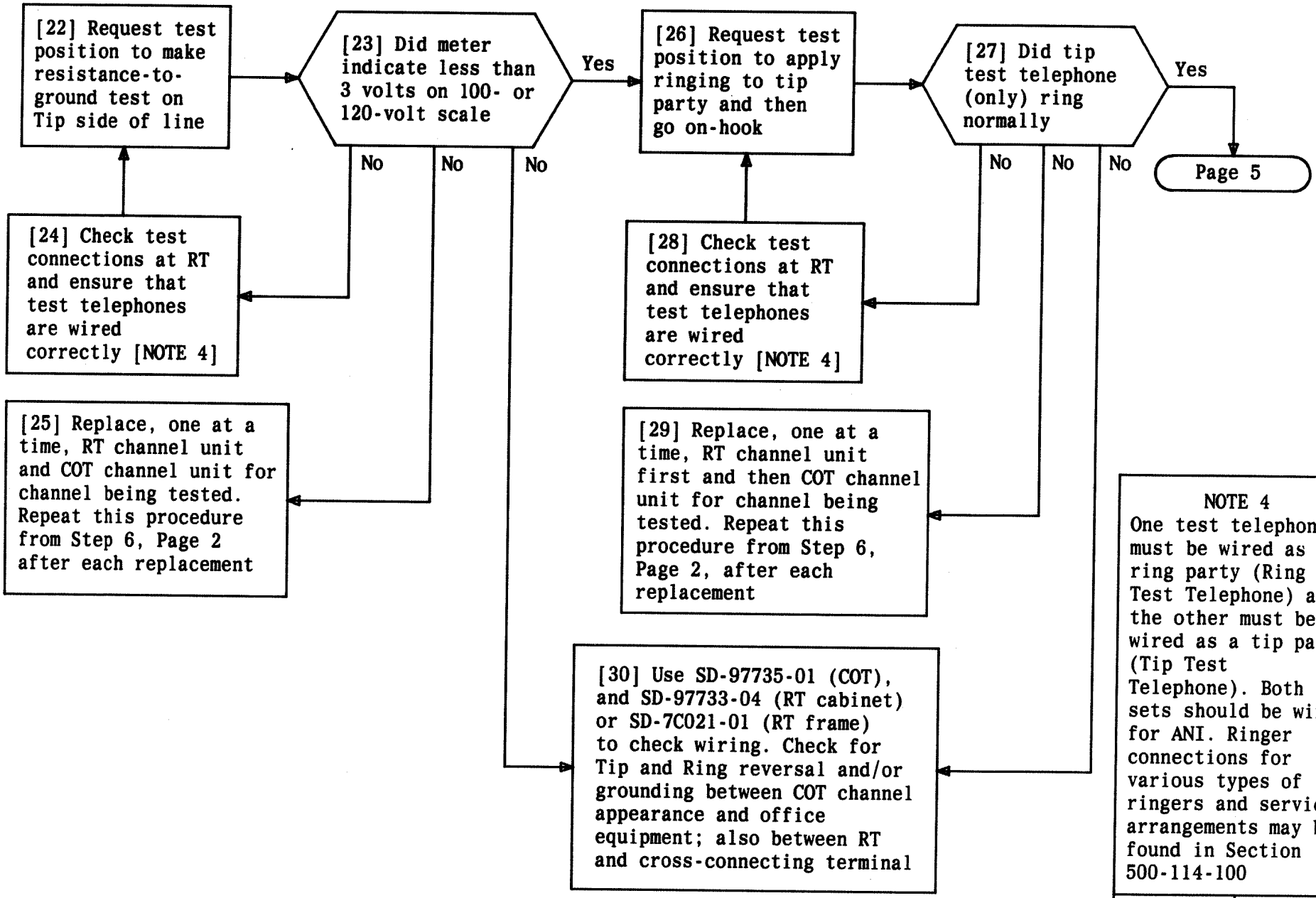


PERFORM TERMINAL-TO-TERMINAL TWO-PARTY (ANI) CHANNEL TESTS



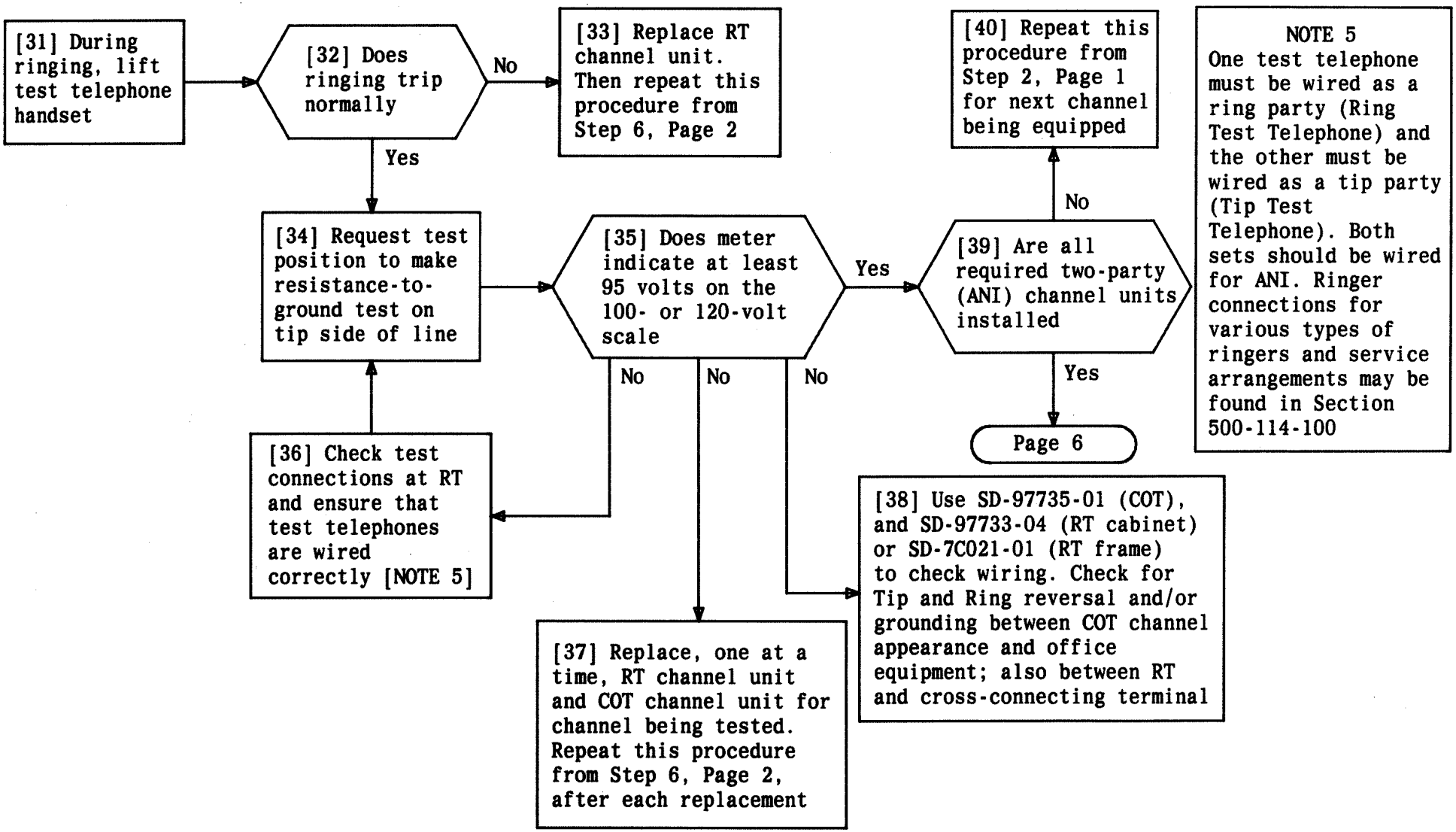
NOTE 3
One test telephone must be wired as a ring party (Ring Test Telephone) and the other must be wired as a tip party (Tip Test Telephone). Both sets should be wired for ANI. Ringer connections for various types of ringers and service arrangements may be found in Section 500-114-100

PERFORM TERMINAL-TO-TERMINAL TWO-PARTY (ANI) CHANNEL TESTS

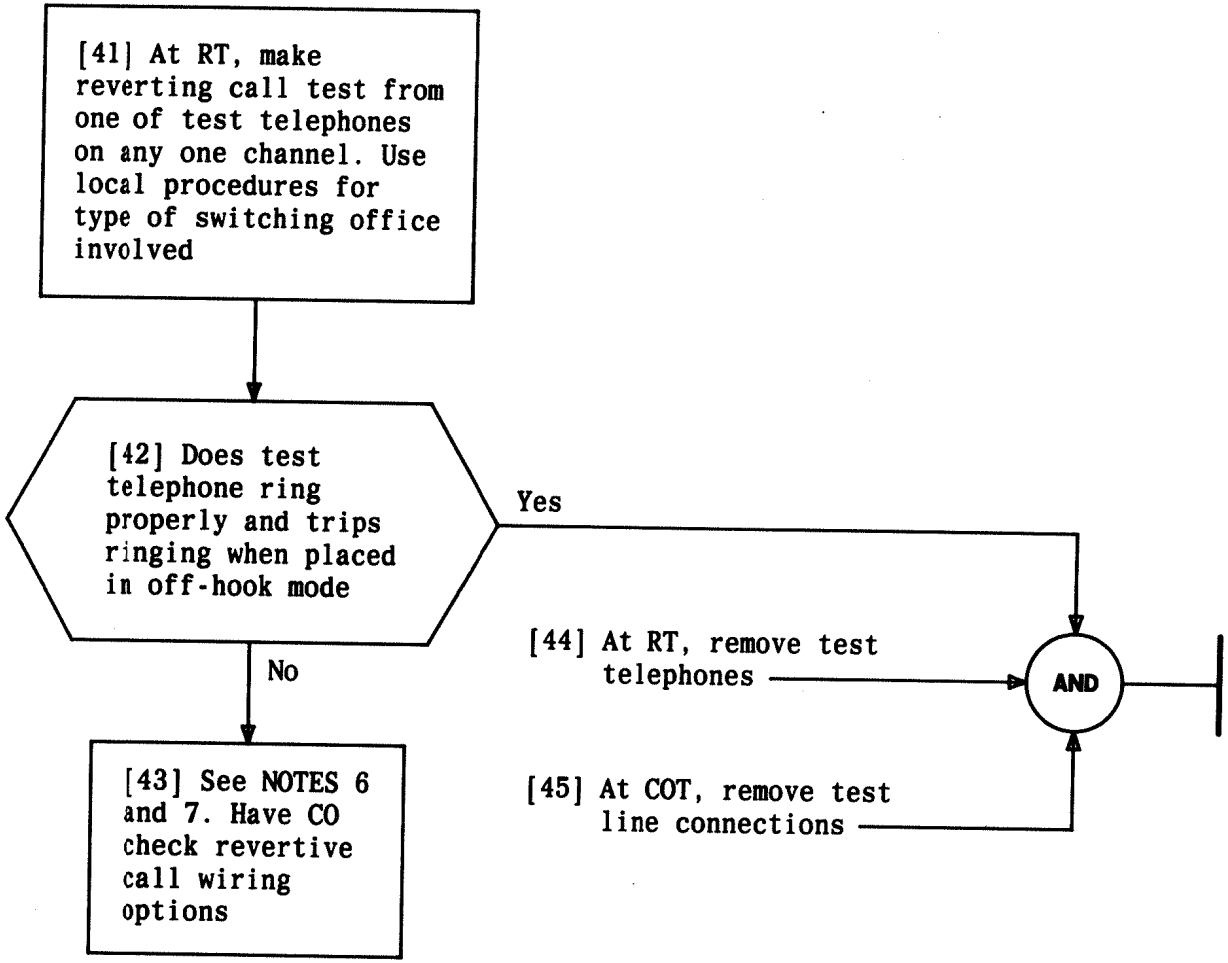


NOTE 4
One test telephone must be wired as a ring party (Ring Test Telephone) and the other must be wired as a tip party (Tip Test Telephone). Both sets should be wired for ANI. Ringer connections for various types of ringers and service arrangements may be found in Section 500-114-100

PERFORM TERMINAL-TO-TERMINAL TWO-PARTY (ANI) CHANNEL TESTS



PERFORM TERMINAL-TO-TERMINAL TWO-PARTY (ANI) CHANNEL TESTS



NOTES

6. For step-by-step offices it may be necessary to modify revertive call selectors, such as SD-31762-01 and SD-31831-01, to eliminate a simultaneous ringing condition on both tip and ring when used with **KE27B** channel unit
7. No. 5 crossbar reverting call trunk circuits, SD-26068-01 and SD-26068-05, require option "S" to ground called party's side of line while calling party is being rung

PERFORM TERMINAL-TO-TERMINAL TWO-PARTY (ANI) CHANNEL TESTS

SUMMARY

Have COT install a **KE37 CIRCUIT PACK** (with option plugs installed for correct type of service, TABLE A) and use a test line to connect the coin line circuit test line to channel being equipped. At RT, install a **KE38(KE39** 901 to 1600 ohms service range) CIRCUIT PACK (with option plugs installed for correct type of service, TABLE A). At cross-connecting terminal next to RT, connect channel to be tested to coin phone circuit. Perform dial-tone tests, coin collect and return tests. Have operator identify and return coins. Have operator call you at coin phone to verify ringing and perform "talk" tests. Repeat for each coin channel to be equipped.

[1] See NOTE 1. Determine type of service required for channel being equipped [TABLE A]

[2] Establish communication between Remote Terminal (RT) and Central Office Terminal (COT) via order wire

AND

[3] Have COT verify that **KE37** channel pack option plugs indicate correct type of service required [FIG. 1]

Page 2

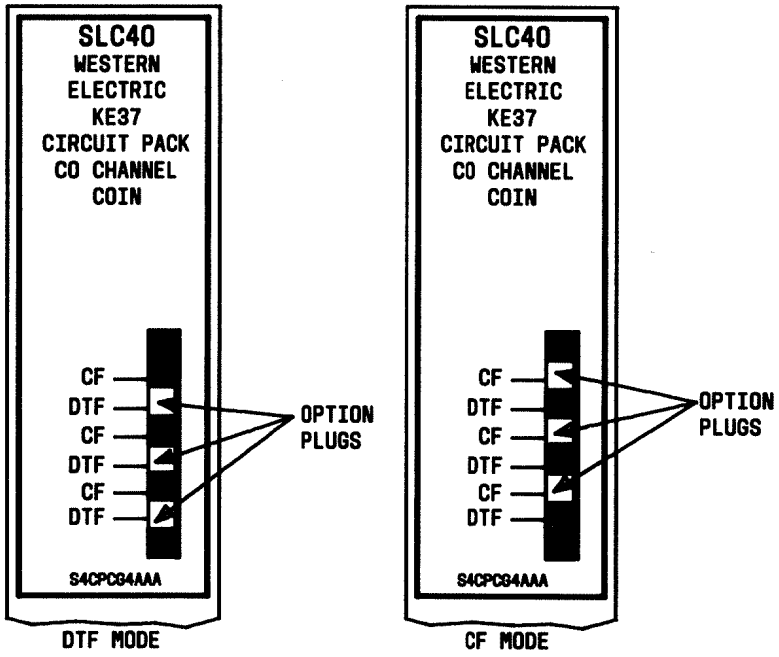


FIG. 1

TABLE A	
SERVICE REQUIRED	OPTION
Dial tone first	DTF
Coin first	CF
Manual post pay	DTF
Single party (DTF mode)	DTF

NOTE 1

Before performing this procedure, coin phone set must be correctly wired for service desired (Coin First or Dial Tone First) and be operating correctly. This procedure ***does not*** verify correct operation of coin phone set, only SLC*-40 channel functions. Section 506-900-503 can be referred to for coin maintenance procedures

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PERFORM TERMINAL-TO-TERMINAL COIN CHANNEL TESTS

[4] Do all (3) **KE37** option plugs indicate correct type of service

Yes

No

[5] See WARNING 1. Have COT personnel use KS-21838 extractor tool [FIG. 2] or equivalent to place option plugs [FIG. 3] in correct position

Have COT Personnel:

[6] Plug **KE37 CIRCUIT PACK** into COT slot corresponding to channel being equipped

[7] At selected channel appearance on MDF, connect a temporary call number and coin line circuit test line

AND

COT channel unit installed and CO test line connected

Page 3

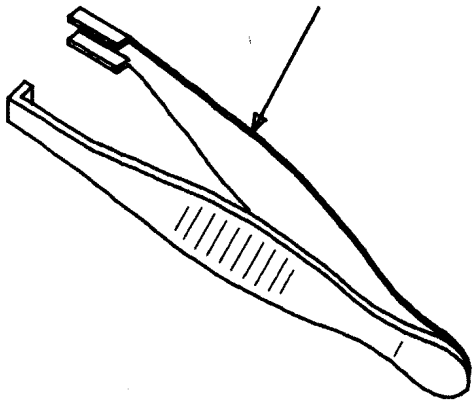


FIG. 2

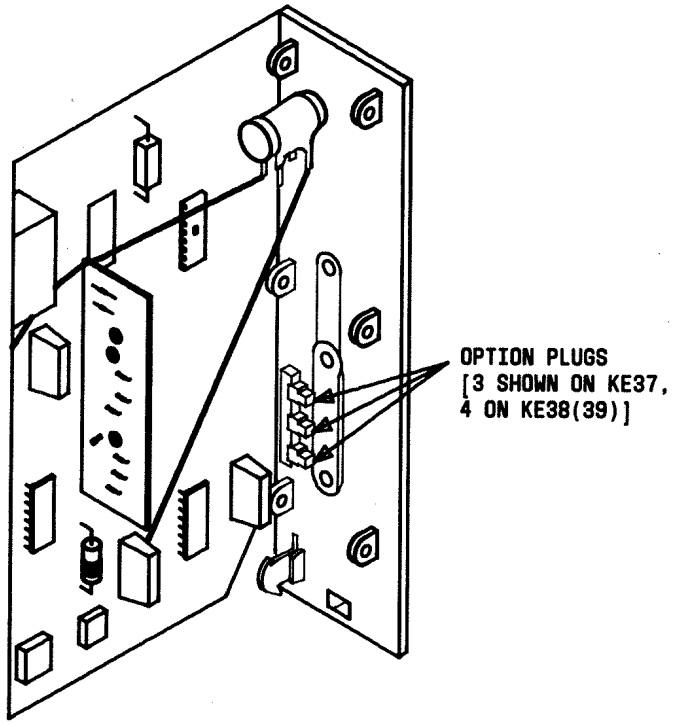


FIG. 3

WARNING 1
White plugs must be inserted or removed carefully (in a straight line) to avoid damage to the socket plug assembly

PERFORM TERMINAL-TO-TERMINAL COIN CHANNEL TESTS

[8] At RT, verify that **KE38** (**KE39** 901 to 1600 ohms service range) channel pack option plugs indicate correct type of service required [FIG. 4]

[9] Do all(4) **KE38(39)** option plugs indicate correct type of service

No

[10] See WARNING 2. Use KS-21838 extractor tool [FIG. 2, Page 2] or equivalent to place option plugs [FIG. 3, Page 2] in correct position

Yes

[11] Plug **KE38(39) CIRCUIT PACK** into RT slot corresponding to channel being equipped

RT channel unit installed and RT test line connected

AND

Page 4

[12] At cross-connecting terminal adjacent to RT, temporarily connect jumpers from terminals associated with selected channel to coin phone set

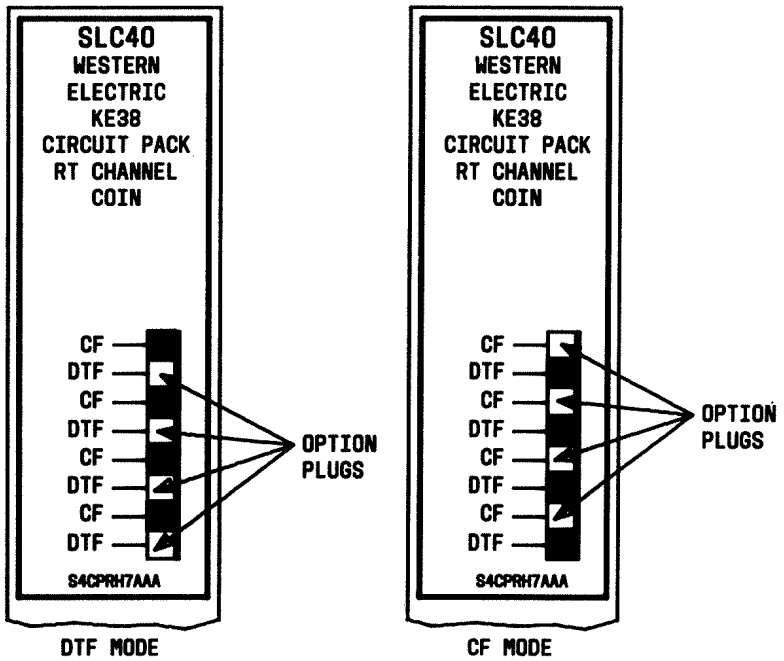
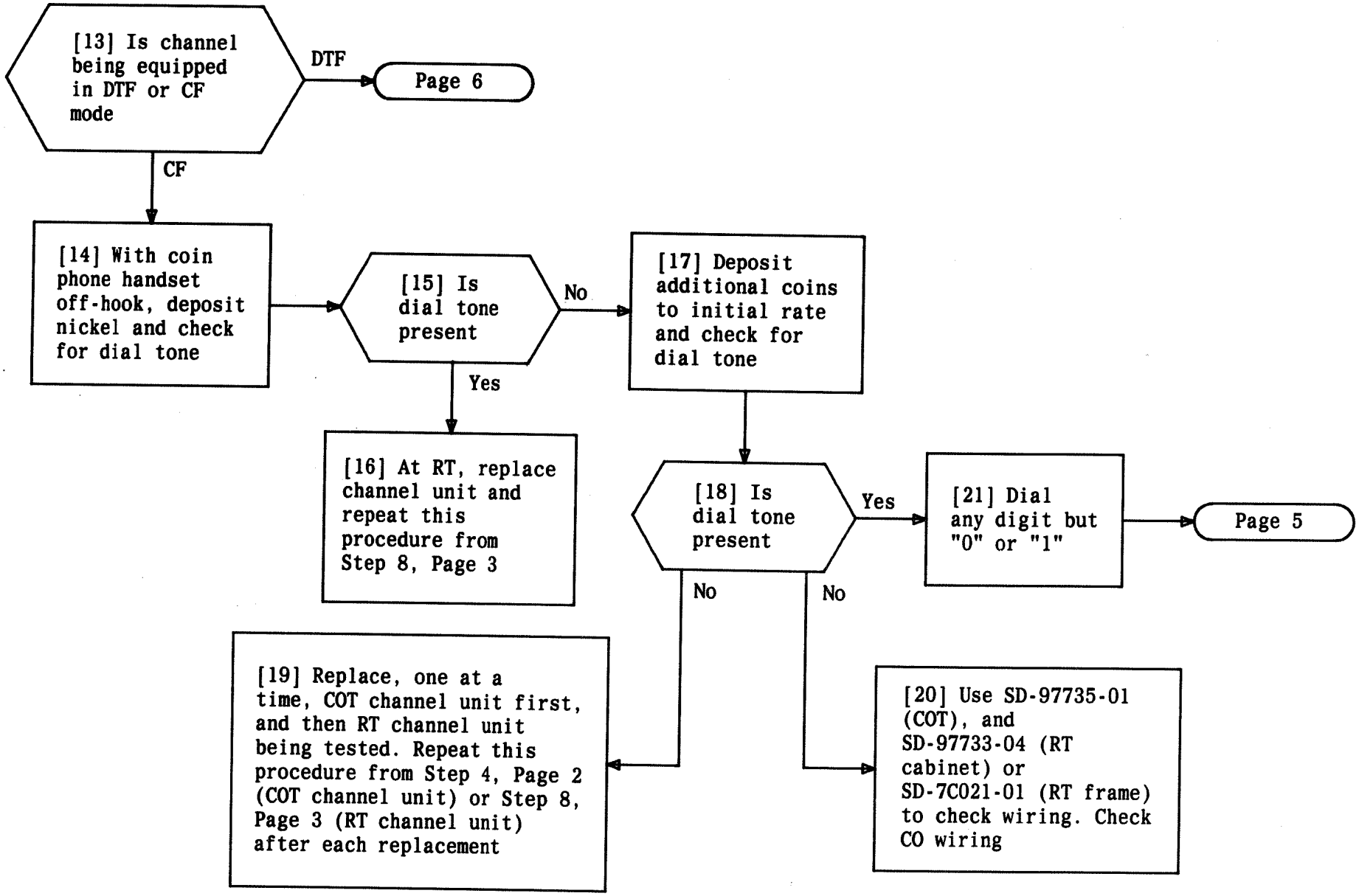


FIG. 4

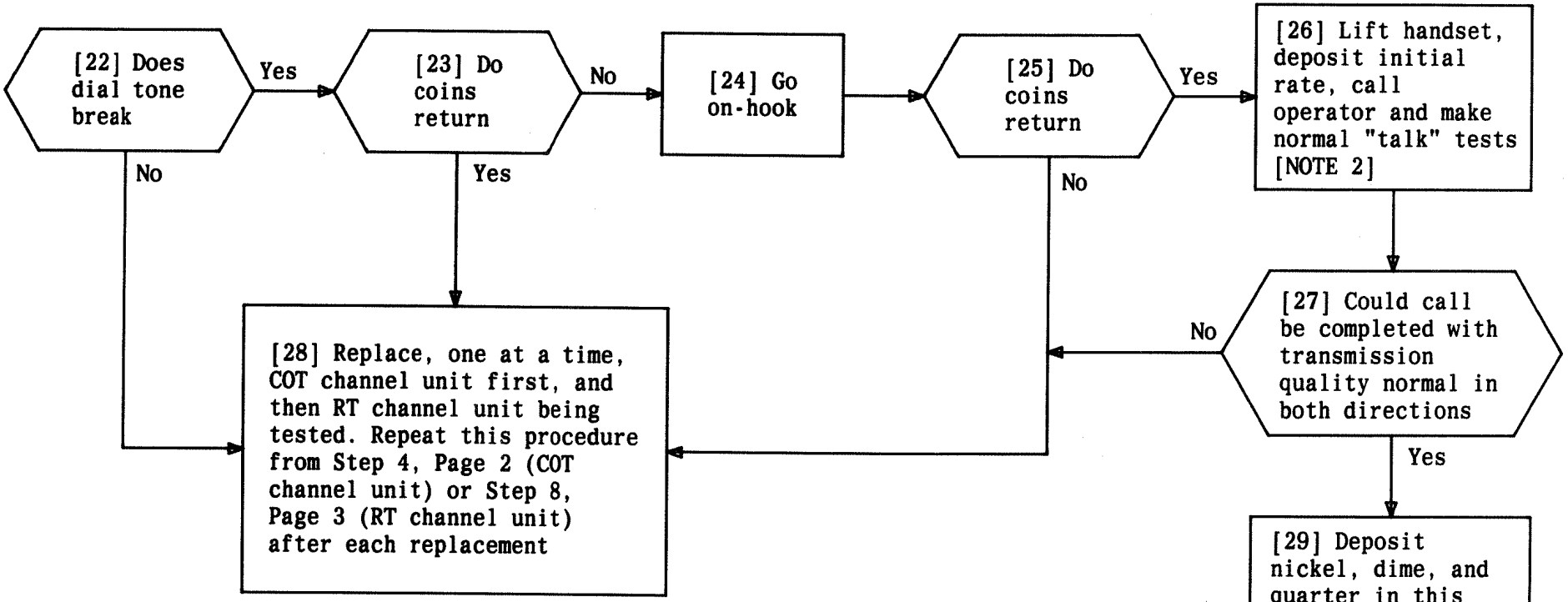
WARNING 2

White plugs must be inserted or removed carefully (in a straight line) to avoid damage to the socket plug assembly

PERFORM TERMINAL-TO-TERMINAL COIN CHANNEL TESTS

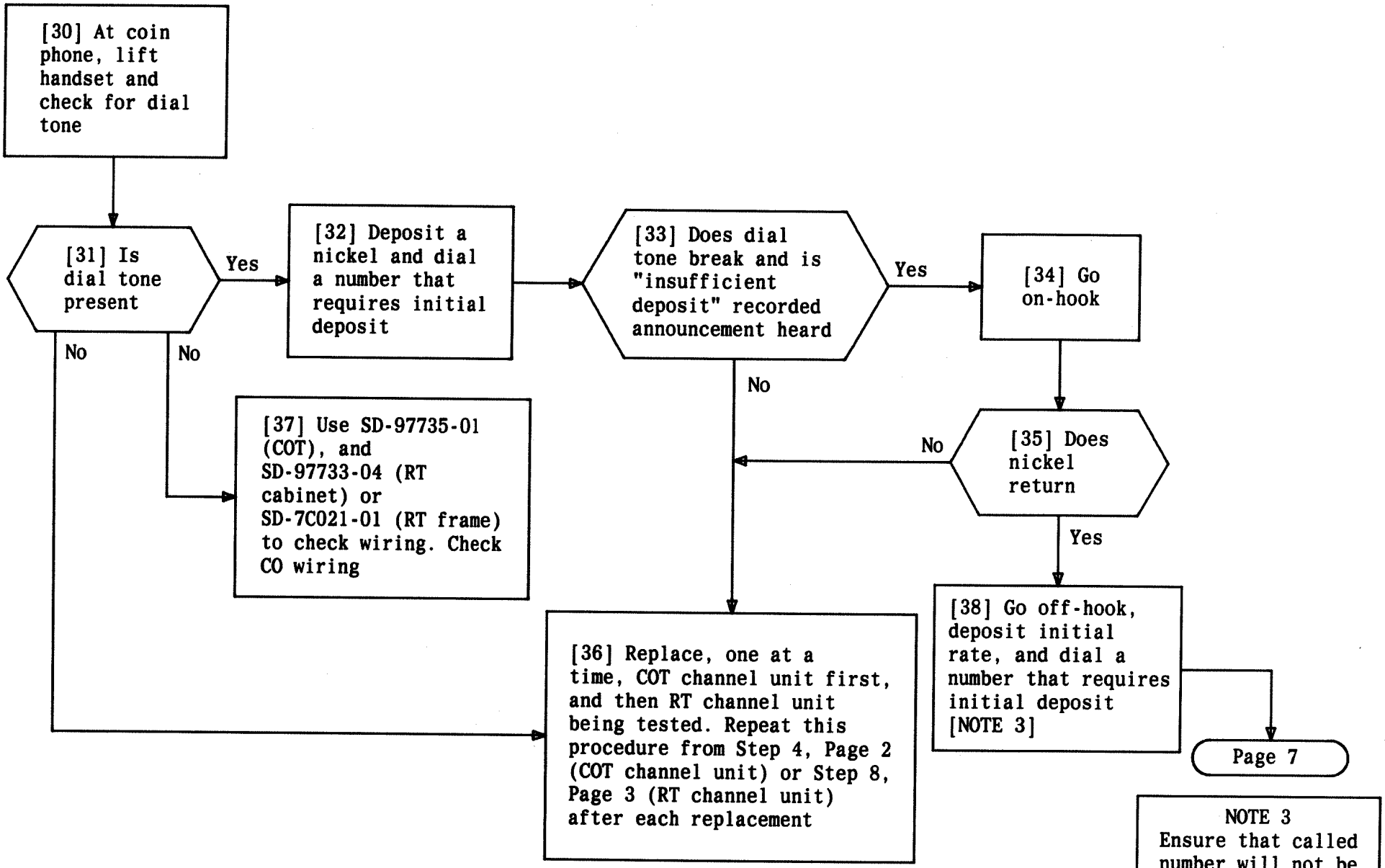


PERFORM TERMINAL-TO-TERMINAL COIN CHANNEL TESTS



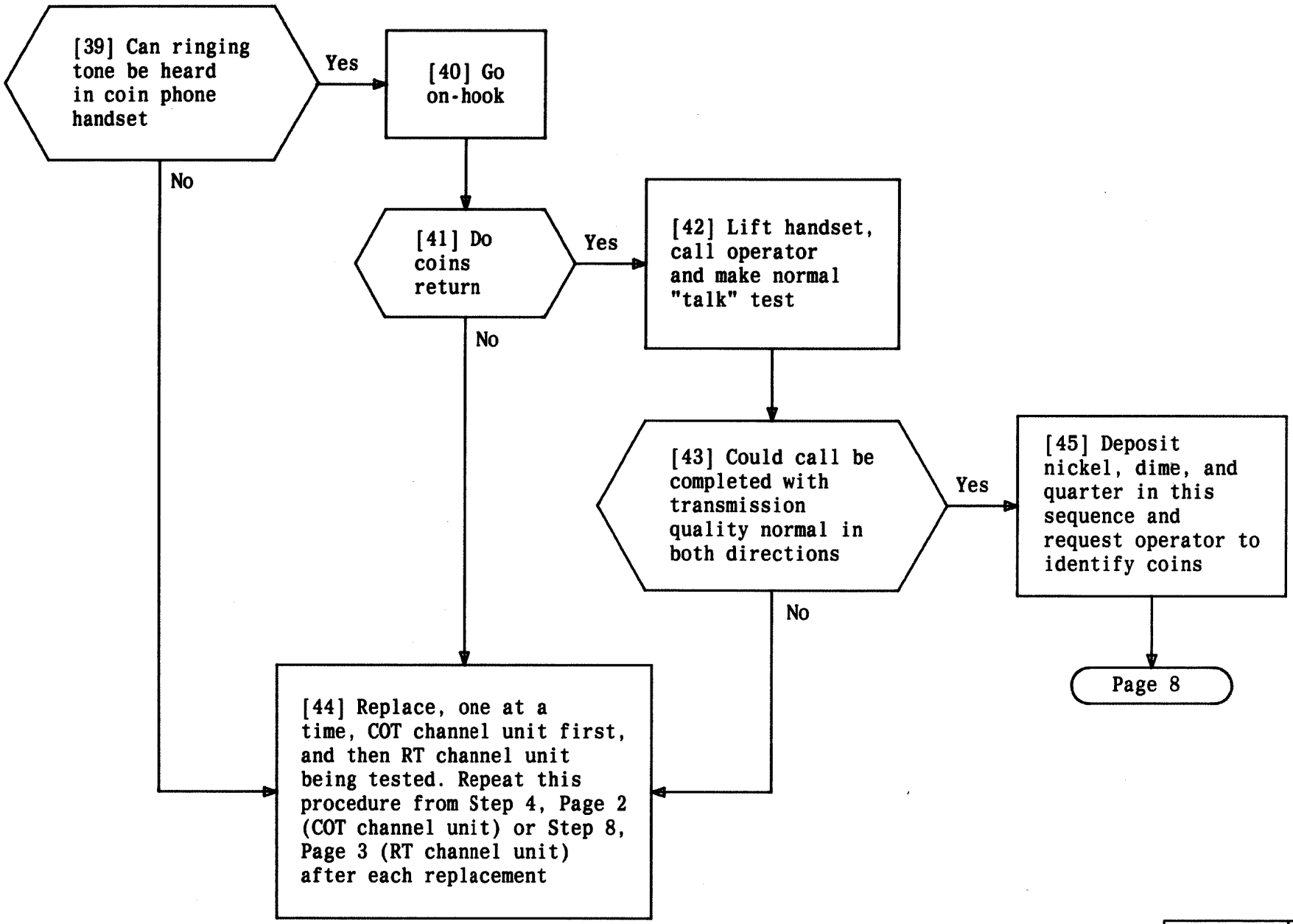
NOTE 2
If deposit is not automatically refunded when operator answers, request coins be returned

PERFORM TERMINAL-TO-TERMINAL COIN CHANNEL TESTS

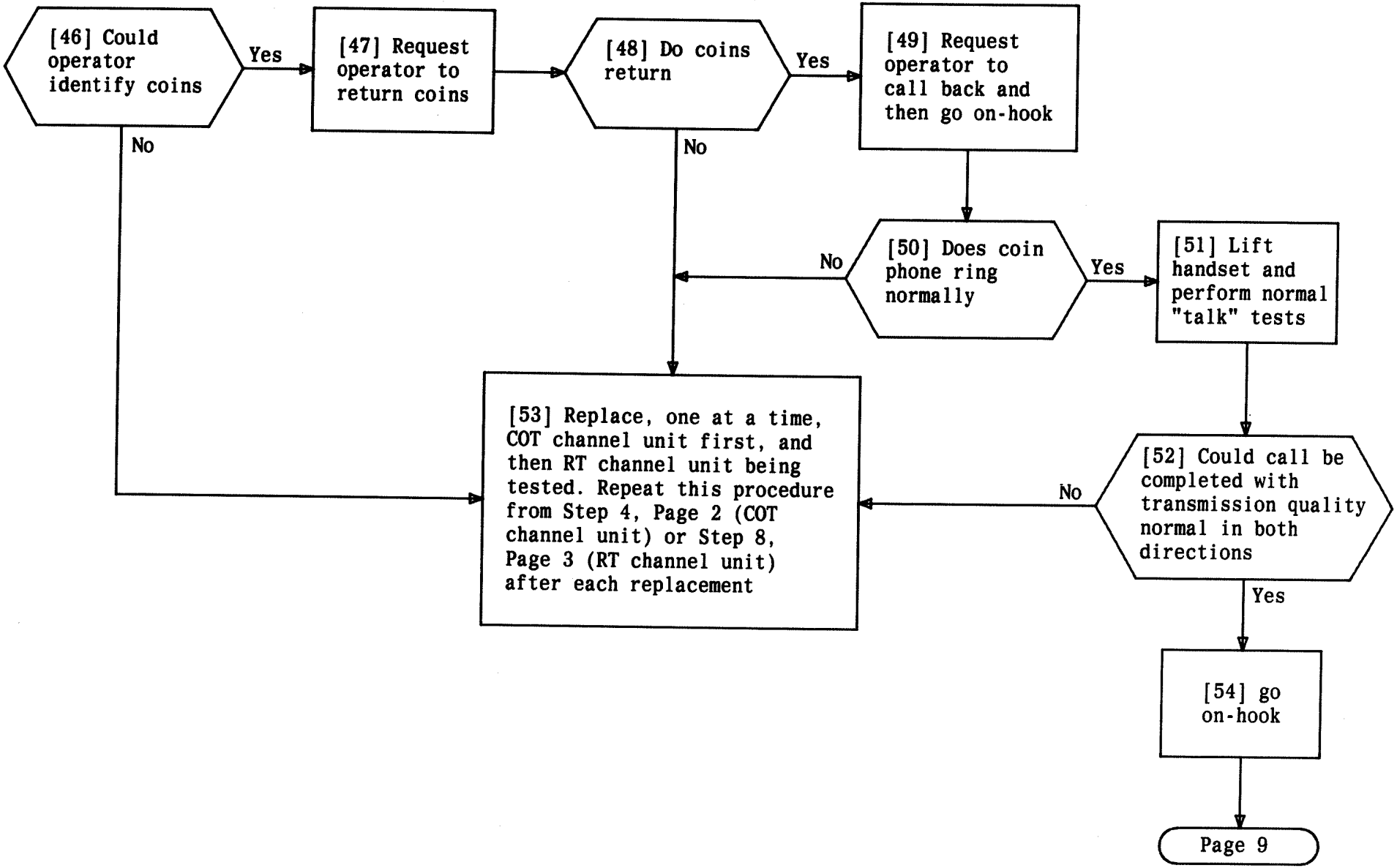


NOTE 3
Ensure that called number will not be answered

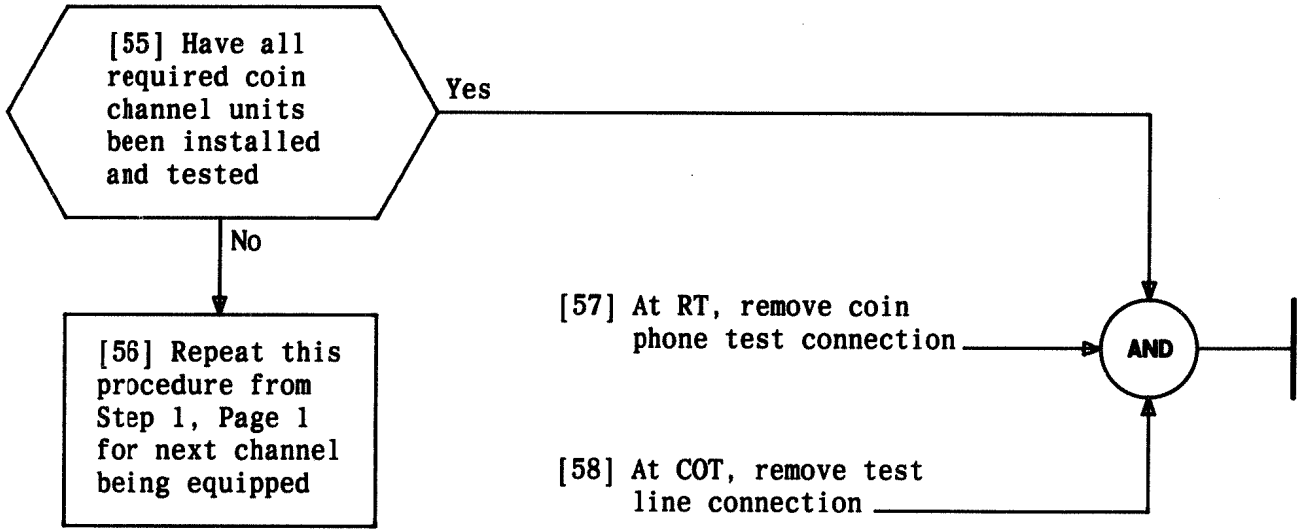
PERFORM TERMINAL-TO-TERMINAL COIN CHANNEL TESTS



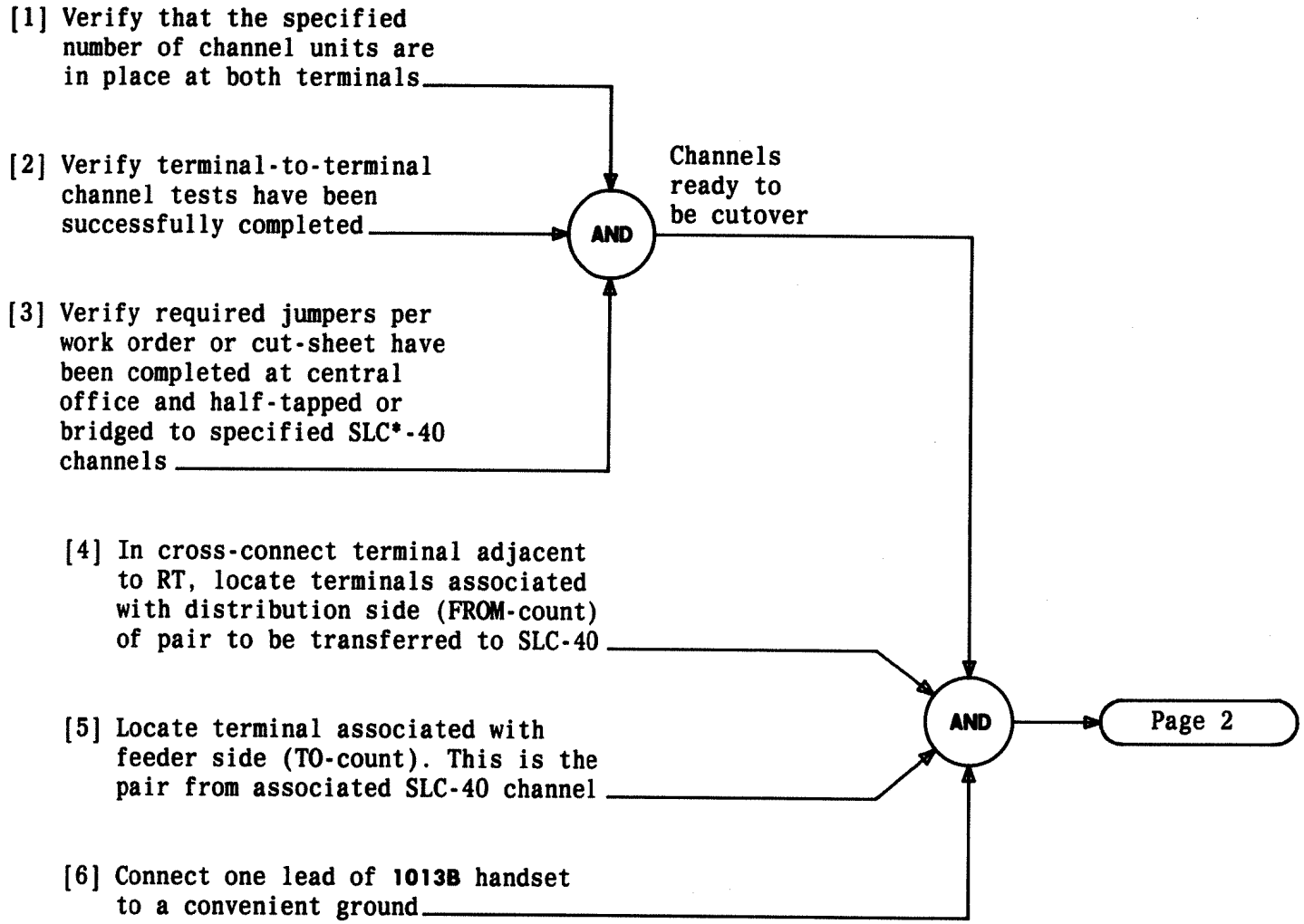
PERFORM TERMINAL-TO-TERMINAL COIN CHANNEL TESTS



PERFORM TERMINAL-TO-TERMINAL COIN CHANNEL TESTS



PERFORM TERMINAL-TO-TERMINAL COIN CHANNEL TESTS



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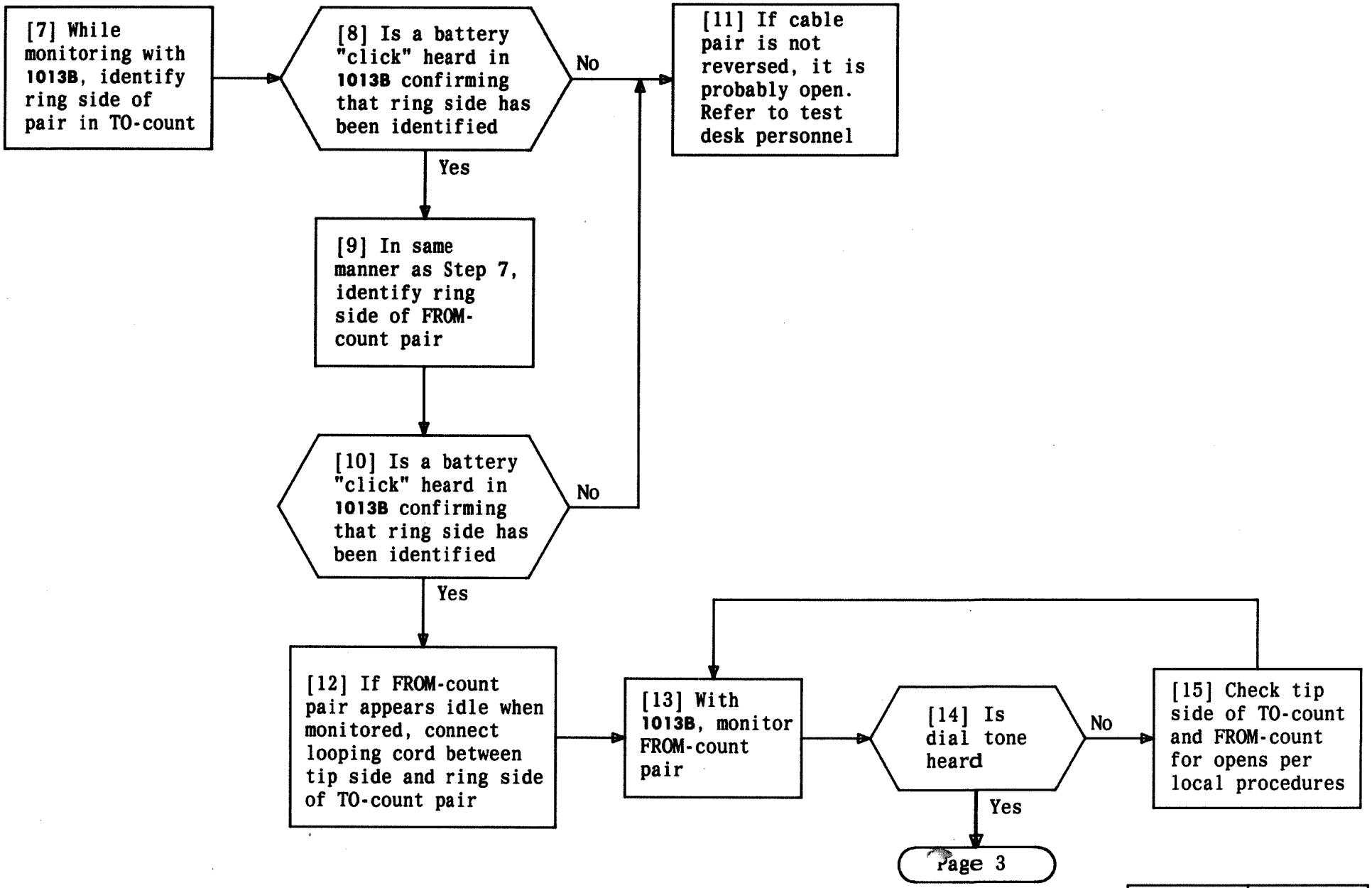
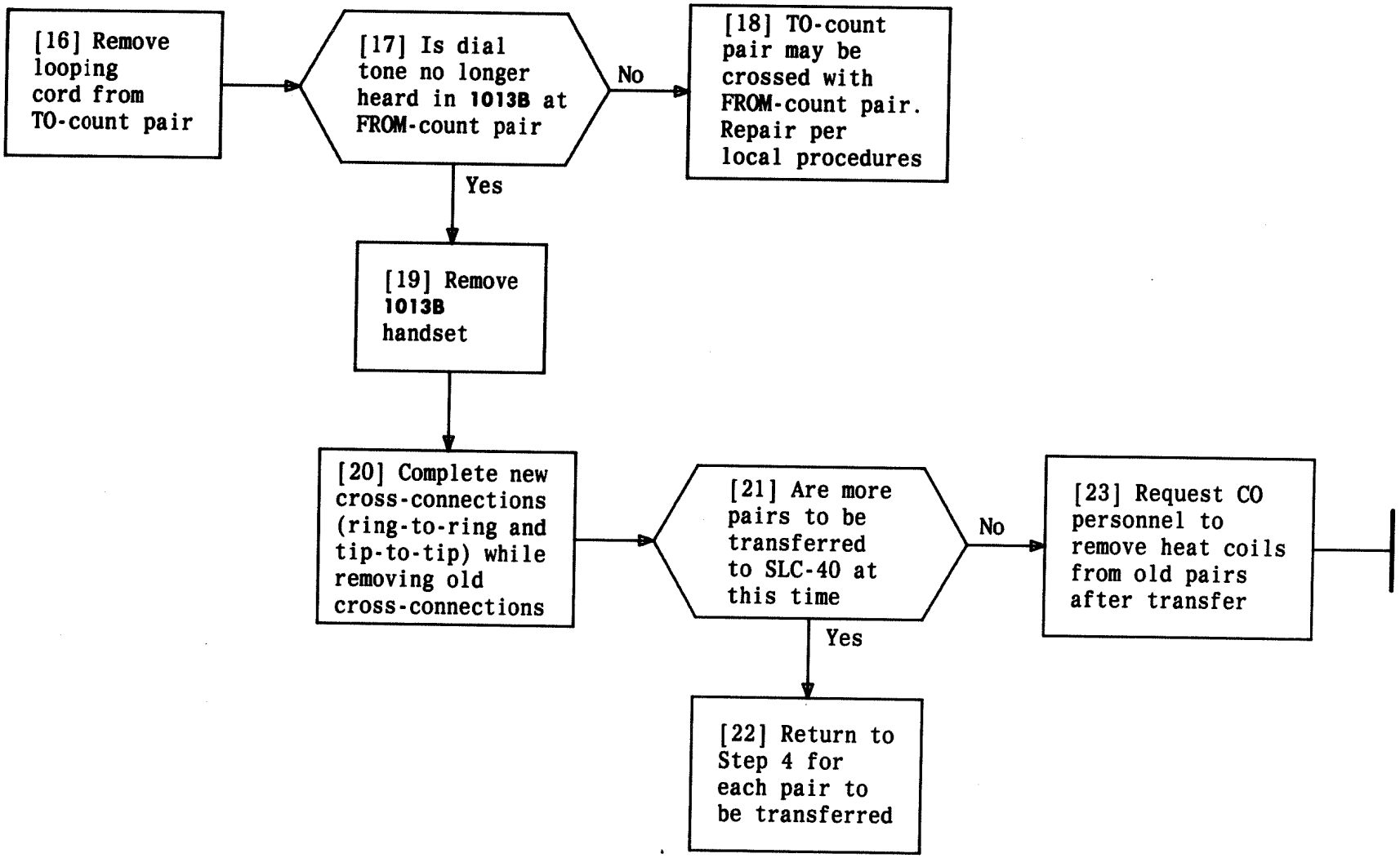
PERFORM SERVICE CUTOVER PROCEDURES



PERFORM SERVICE CUTOVER PROCEDURES



PERFORM SERVICE CUTOVER PROCEDURES

[1] Verify **BF** fuse on RT power panel is removed

[2] Remove cable tie holding rear terminal tie bar of battery to be removed [FIG. 1]

[3] Remove front tie bars from cell pair terminals to be replaced, using 9/16-inch **taped** wrench

[4] Lift cell pair out of battery compartment, keeping battery level as to not spill electrolyte

AND

Bad cell pair removed

[5] Get new cell pair

[6] Install new cell pair **observing correct polarity**

[7] Replace front tie bars, washers, and nuts; hand-tighten. Using 9/16-inch **taped** wrench, further tighten terminal nuts until firm. Check rear terminal nuts for tightness

[8] Put new cable tie on rear tie bar

AND

[9] Dispose of bad cell pair per local procedure

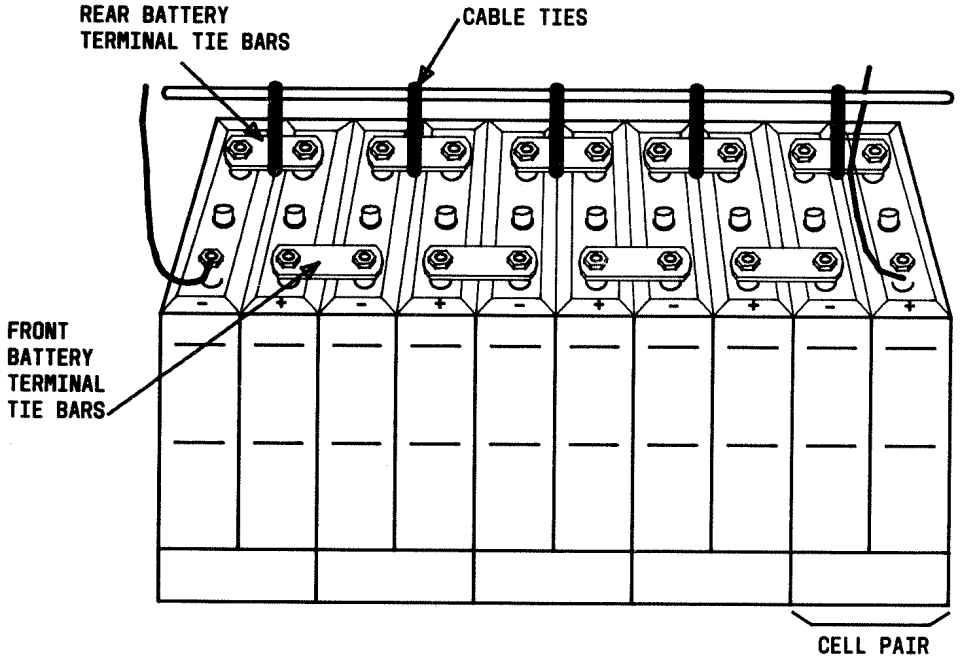


FIG. 1

REPLACE BAD BATTERY CELL PAIR

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[1] Place VOM on horizontal with face of meter up [NOTE 1]

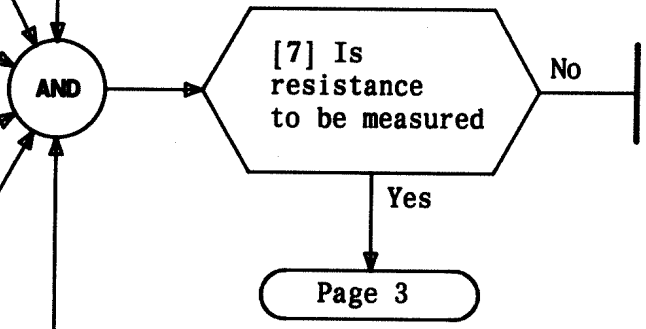
[2] Set function switch to **OFF** position [FIG. 1, Page 2]

[3] Adjust meter zero screw [FIG. 1] until meter indicator aligns with 0 volts mark at left of scale

[4] Insert plug of red test lead into (+) jack per FIG. 1

[5] Insert plug of black test lead into (–) jack per FIG. 1

[6] See WARNING 1. Set function switch to parameter to be measured (**DC VOLTS**, **OHMS**, etc) and scale having a value higher than value to be measured [EXAMPLE 1]



NOTE 1
Meter should not be placed on or near a magnetic surface or location where magnetic field will influence meter movement

EXAMPLE 1
If 48 volts dc is to be measured, function switch is set to **60** range of the **DC VOLTS** parameter

WARNING 1
If voltage or current value to be measured is in doubt, function switch should be set to highest range and decreased step-by-step for on-scale indication at time of measurement. This prevents driving indicator against its stop

CONDITION KS-14510 METER (VOM) FOR MEASUREMENT

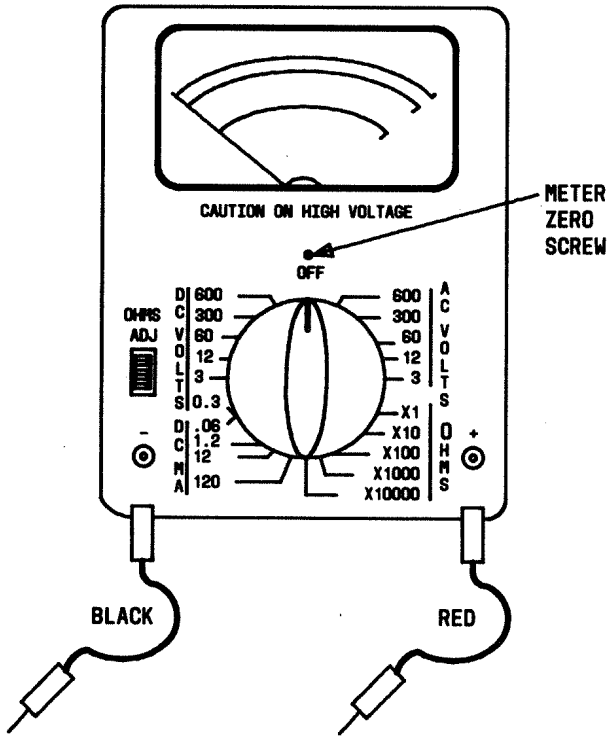
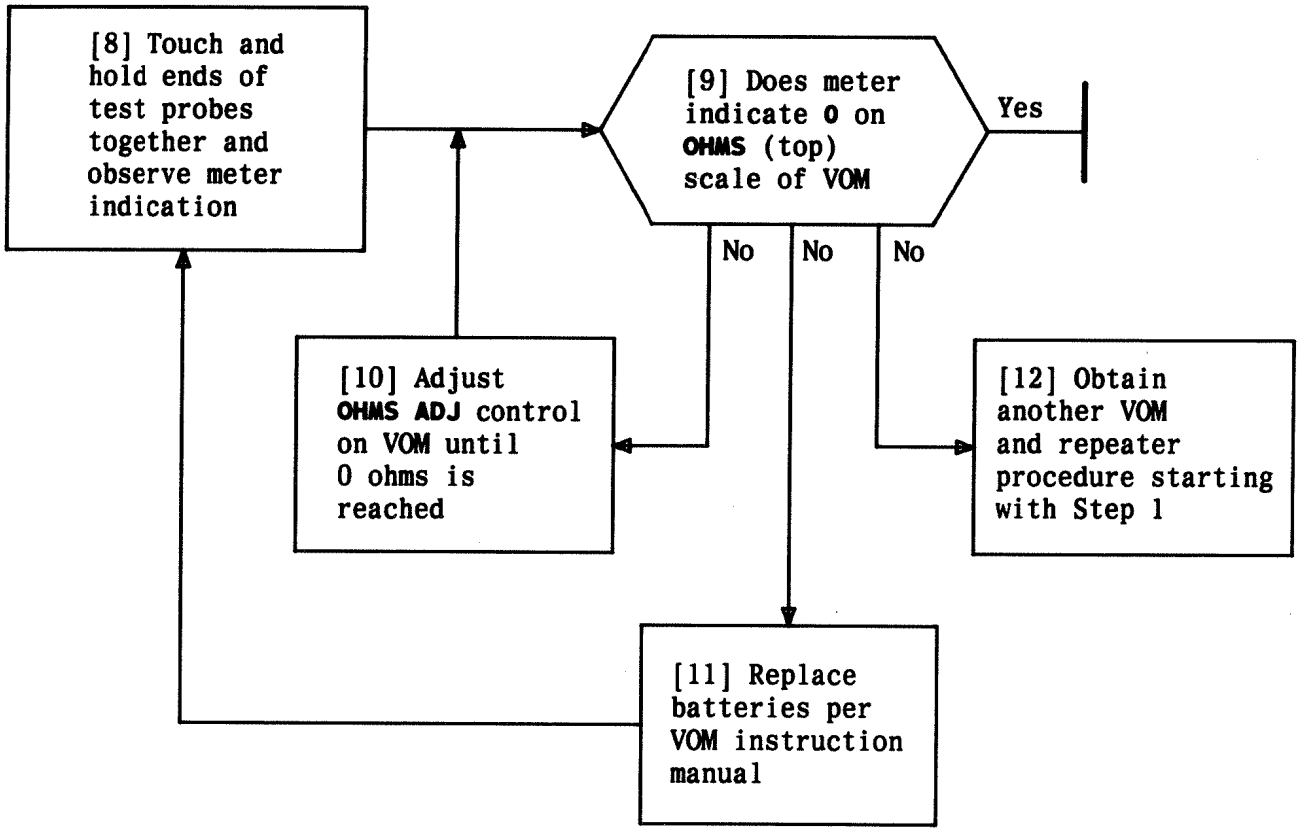


FIG. 1

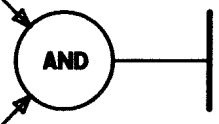
CONDITION KS-14510 METER (VOM) FOR MEASUREMENT



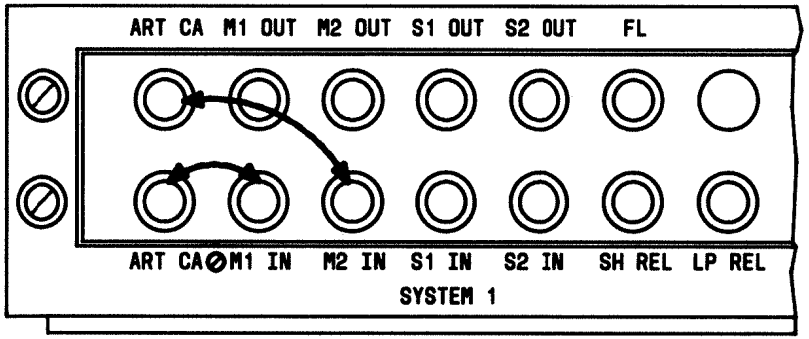
CONDITION KS-14510 METER (VOM) FOR MEASUREMENT

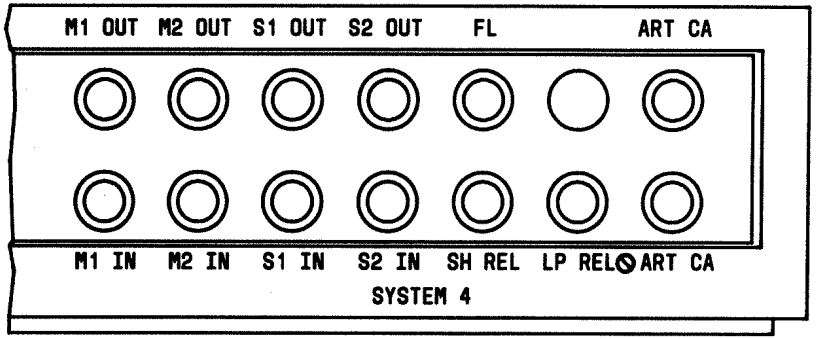
[1] See CAUTION 1. On COT jack panel and using P3-type patch cord, place patch from **M1 IN** of system involved to any **ART CA**

[2] Place second patch from **M2 IN** of same system to associated **ART CA** used in Step 1. See FIG. 1



COT JACK PANEL





SYSTEMS 2 AND 3

ANY ONE OF FOUR SYSTEMS CAN BE USED WITH ANY ART CA (ARTIFICIAL CABLE) PAIR

FIG. 1

CAUTION 1

System involved must not be in service on main line or service will be interrupted

PUT UP COT MAIN LINE LOOPBACK PATCH

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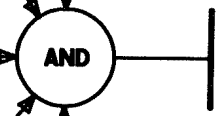
[1] Get KS-14510 Volt-Ohm-Milliammeter (VOM), or equivalent

[2] Condition VOM [DLP-573] and set selector switch to **DC VOLTS – 3** position

[3] See NOTE 1. Insert VOM positive (+) lead into **I TEST** + jack on **KE21 CIRCUIT PACK**

[4] Insert VOM negative (–) lead into **I TEST** – jack

[5] See NOTE 2. Press **I TEST** button and note reading



NOTES

1. System must be on main line (**SPL** lamp extinguished) before **I TEST** current can be measured. A 10-minute settling time may be required to ensure that both COT and RT are on the main line
2. **I TEST** button should not be held more than 1 minute or reading may be inaccurate

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MEASURE I TEST VOLTAGE ON KE21 CIRCUIT PACK AT COT

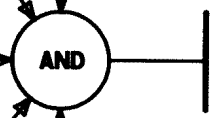
[1] Get KS-14510 Volt-Ohm-Milliammeter (VOM), or equivalent

[2] Condition VOM [DLP-573] and set selector switch to **DC VOLTS – 3** position

[3] See NOTE 1. Insert VOM positive (+) lead into **I TEST** + jack on **KE24 CIRCUIT PACK**

[4] Insert VOM negative (–) lead into **I TEST** – jack

[5] See NOTE 2. Press **I TEST** button and note reading



NOTES

1. System must be on main line (**SPL** lamp extinguished) before **I TEST** current can be measured. A 10-minute settling time may be required to ensure that both COT and RT are on the main line
2. **I TEST** button should not be held more than 1 minute or reading may be inaccurate

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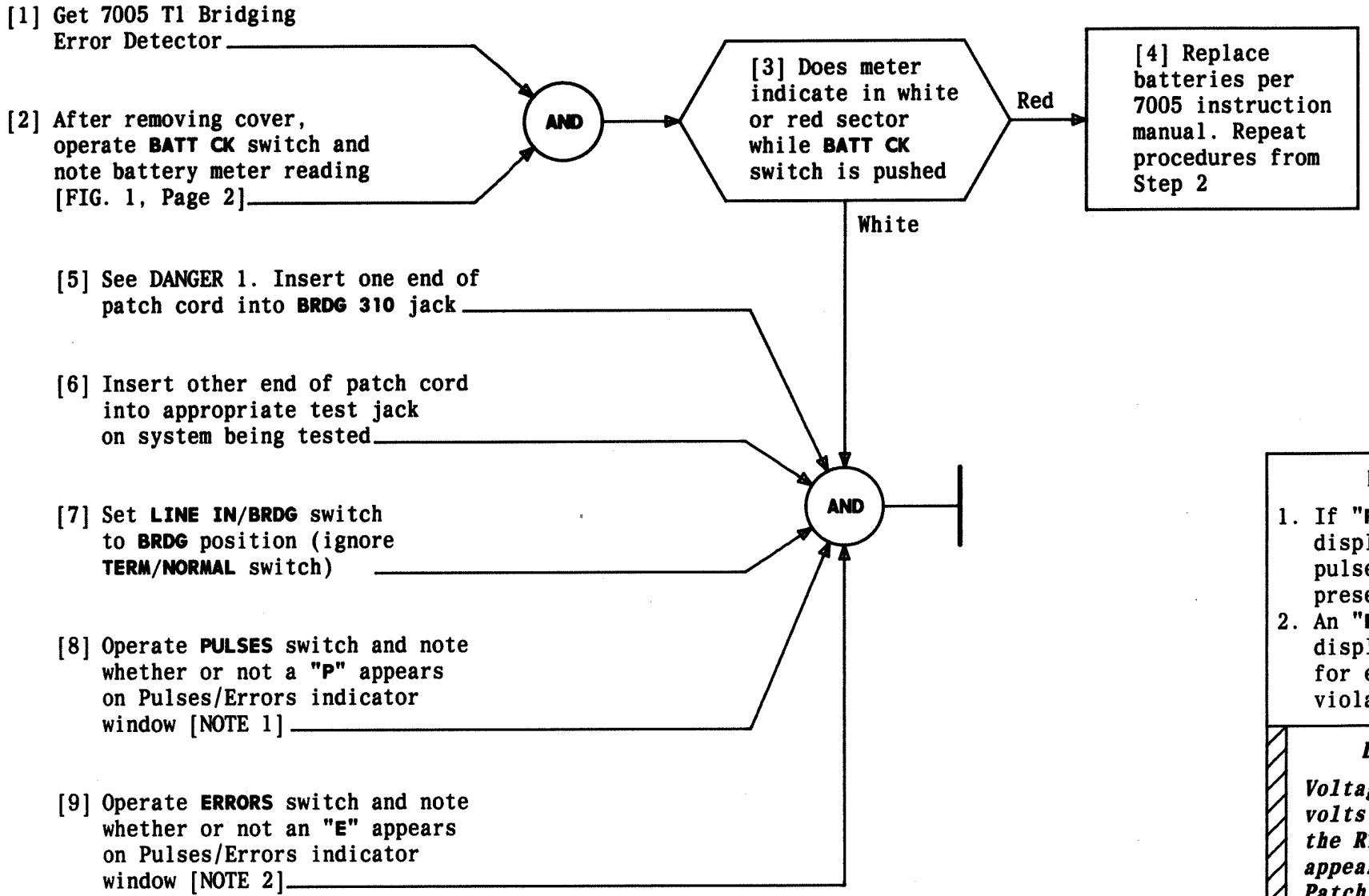
MEASURE I TEST VOLTAGE ON KE24 CIRCUIT PACK AT RT



NOTES

1. If "P" appears on display window, pulses are present on line
2. An "E" flashes on display window for each bipolar violation

DANGER 1

Voltages to 300 volts exist on the RT test jacks appearances. Patch cords should be connected to RT test jacks last

PERFORM BRIDGED PULSE/ERROR TEST USING 7005 T1 BRIDGING ERROR DETECTOR

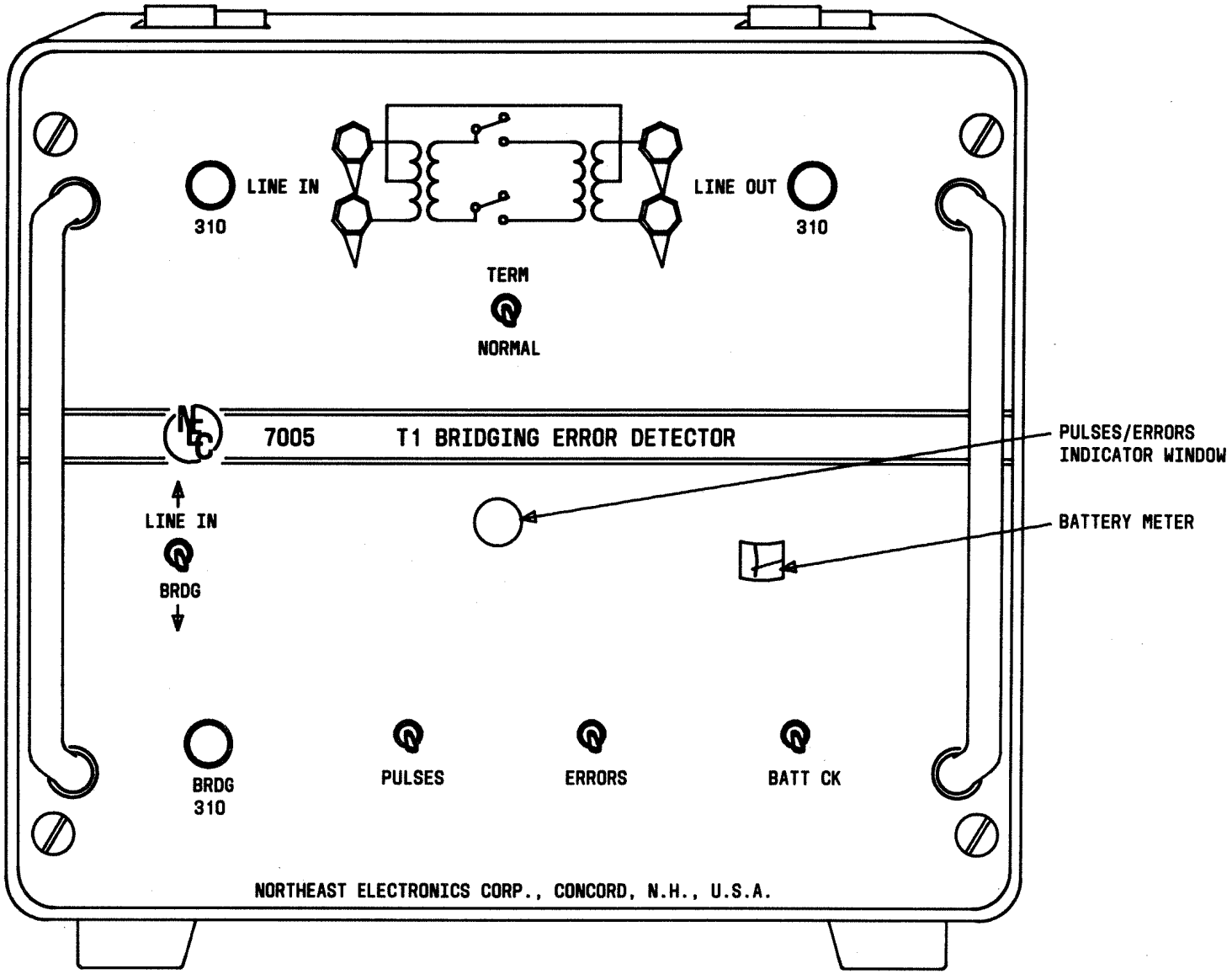


FIG. 1

PERFORM BRIDGED PULSE/ERROR TEST USING 7005 T1 BRIDGING ERROR DETECTOR

[1] Get 7005 T1 Bridging Error Detector

[2] After removing cover, operate **BATT CK** switch and note battery meter reading [FIG. 1]

AND

[3] Does meter indicate in white or red sector while **BATT CK** switch is pushed

Red → [4] Replace batteries per **7005** instruction manual. Repeat procedure from Step 2

White

[5] See DANGER 1. Insert a patch cord into **LINE IN 310** jack and a second patch cord into **LINE OUT 310** jack

[6] Insert other end of patch cords into appropriate test jacks on **239A ADAPTER**

[7] Set **LINE IN/BRDG** switch to **LINE IN** position

AND → Page 2

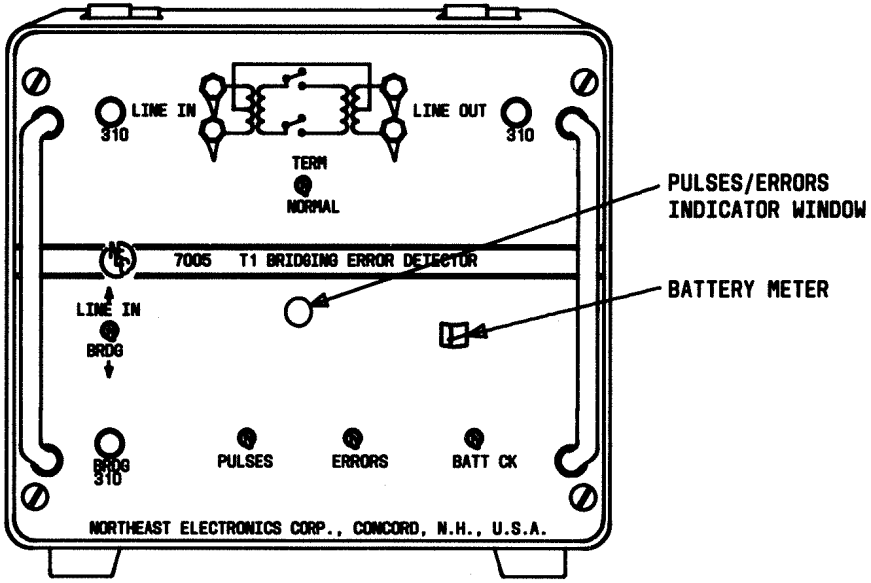


FIG. 1

DANGER 1
Voltages to 300 volts exist at the* 239A ADAPTER *test jacks. Patch cords should be connected to the* 239A *last

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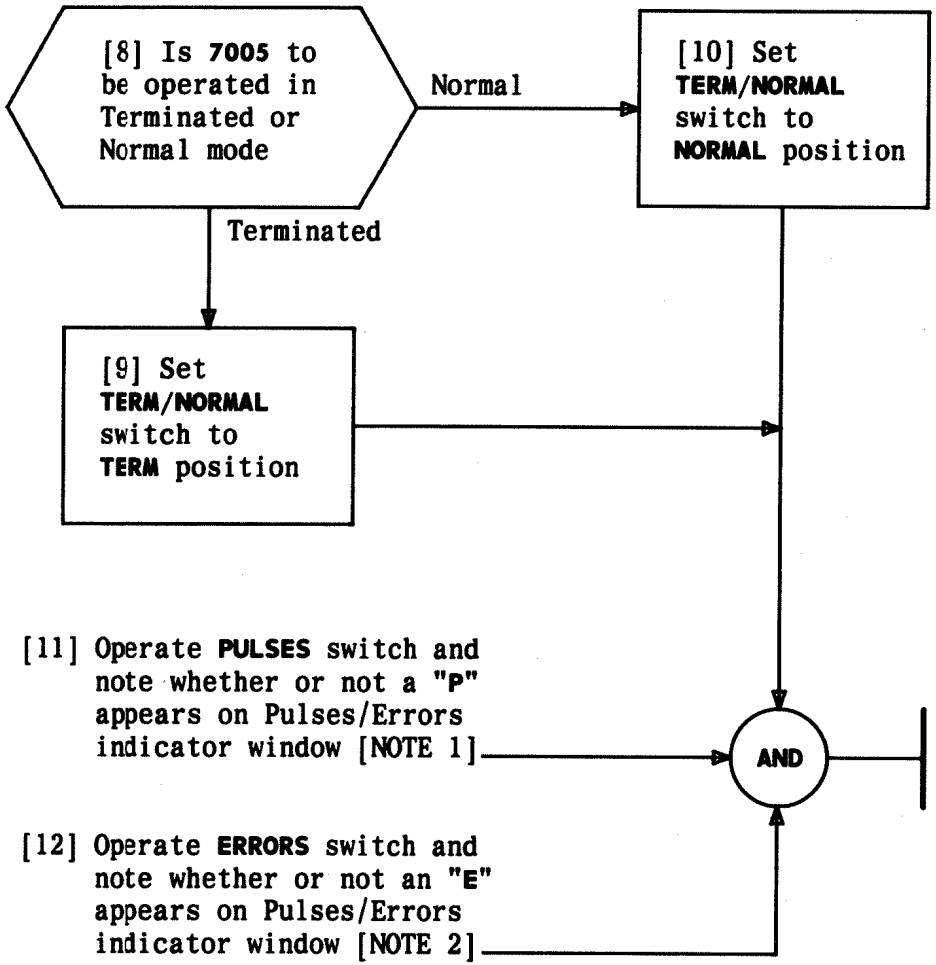
PERFORM PULSE/ERROR TEST USING 7005 T1 BRIDGING ERROR DETECTOR



NOTES

1. If "P" appears on display window, pulses are present on line
2. An "E" flashes on display window for each bipolar violation

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PERFORM PULSE/ERROR TEST USING 7005 T1 BRIDGING ERROR DETECTOR

PERFORM MANUAL RESTORATION TO THE SPARE LINE

[1] See CAUTION 1. Is RT cabinet or frame mounted

Frame

Cabinet

[2] Is system equipped with automatically switched spare line (spare line option)

No → Page 3

Yes

[3] Have RT personnel operate, on **KE15 CIRCUIT PACK**, **SPL LOCK** key to **LOCK** position [FIG. 1]

SPL and **TEMP/SPL LOCK** lamps light at RT

At COT:

[4] On COT jack panel, using P3-type patch cord, place patch for system involved from **M1 IN** to any **ART CA**

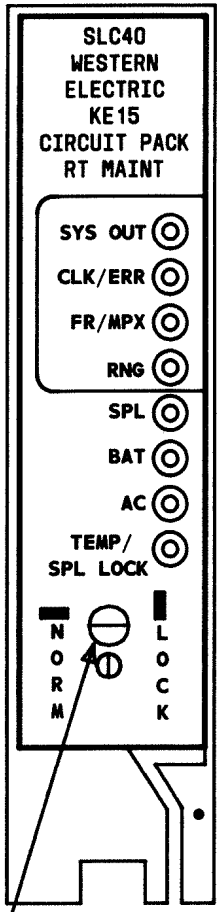
[5] Using another patch cord, place patch (for same system) from **M2 IN** to associated **ART CA**

All lamps extinguish except **SPLT** lamp

AND

[6] Remove both patch cords at the same time from **M1 IN** and **M2 IN** jacks on COT jack panel [NOTE 1]

Page 2



SPL LOCK KEY (SHOWN IN NORM POSITION)

FIG. 1

NOTE 1
The two cords must be removed within 2 seconds of one another, or the system will fail to work on the spare line

CAUTION 1
This procedure is to be used only if the system is in the* SYS OUT *state and the spare line is not being used by any other system

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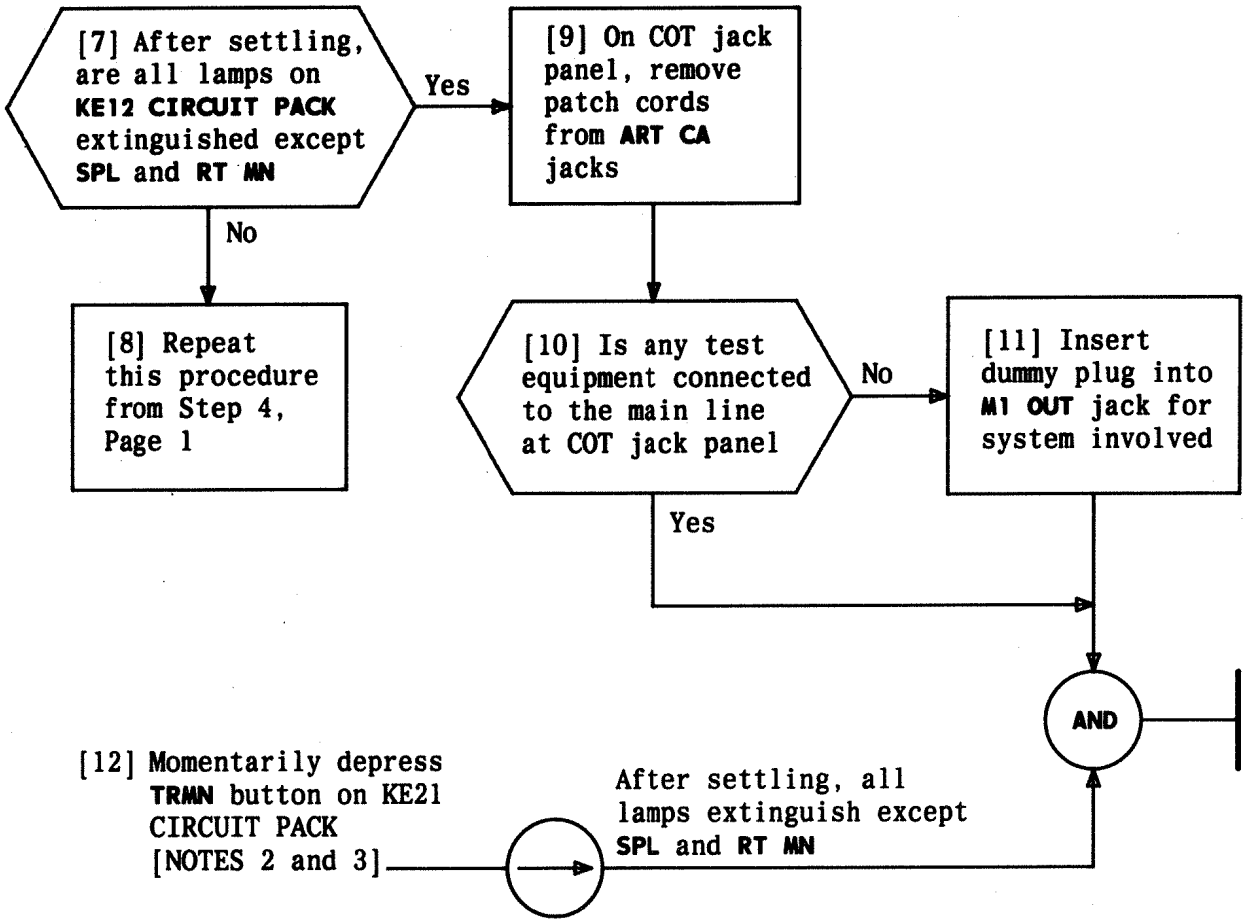

NOTES

2. This step prevents an automatic retry of the main line at a later time
3. When the main line has been repaired, all test equipment or dummy plugs should be removed from the COT jack panel and the SPL LOCK key restored to the NORM position at the RT

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PERFORM MANUAL RESTORATION TO THE SPARE LINE

PERFORM MANUAL RESTORATION TO THE SPARE LINE

At COT:

[13] Verify that there are no patch cords or dummy plugs connected to **LP REL** and **SH REL** jack on COT jack panel

[14] At donar system (system with spare line to be used), operate **ACO** switch on **KE12 CIRCUIT PACK** to center (major alarm only) position

[15] On COT jack panel, using P3-type patch cords, place patch from **M1 IN** on system to be restored to **S1 OUT** on donar system

[16] Place second patch from **M2 IN** on system to be restored to **S2 OUT** on donar system

AND

COT patch connections established

Have personnel at RT:

[17] Locate jacks for spare line of donar system and jacks for main line of system to be restored on RT **FF & J PANEL**

[18] See NOTE 4. Using P3-type patch cord, place patch from **MS1 IN** of system being restored to **SPARE SIDE 1** of donar system

[19] Place second patch from **MS2 IN** of system being restored, to **SPARE SIDE 2** of donar system

[20] Place 310-type dummy plug in **LP REL** jack of system being restored

AND

RT patch connections established

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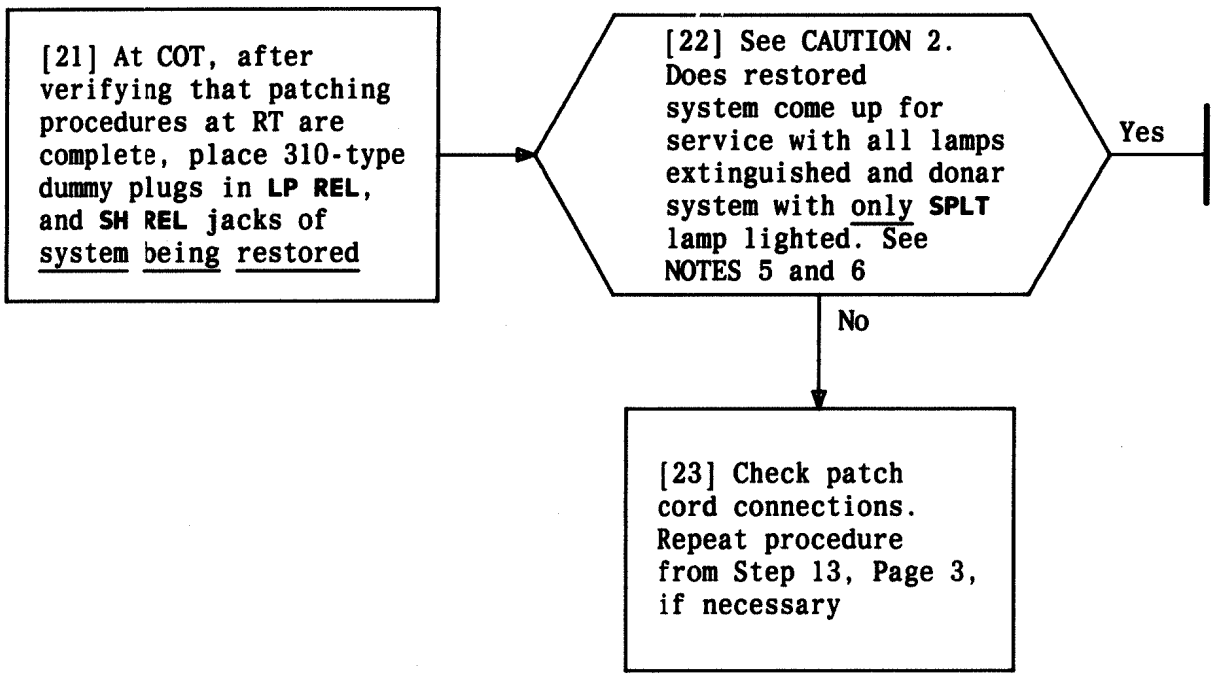
NOTE 4

Connections in Steps 18 and 19 must be performed in the given order



NOTES

5. The restored system may require a 10-minute settling period to ensure that both COT and RT are on the spare line
6. After trouble has been cleared, patch cord connections and dummy plugs should be removed in reverse order of their connection.

CAUTION 2
Removal of the patch cords in NOTE 6 will momentarily interrupt service

PERFORM MANUAL RESTORATION TO THE SPARE LINE

[1] Verify **AC ON/OFF** switch on **107B** is in **OFF** positon

[2] Set **LINE CURRENT** switch on **107B** for type repeaters that you have per TABLE A

[3] See DANGERS 1 and 2. Using special patch cord furnished with **107B**, make patch cord connection per TABLE B

[4] Plug **107B** power cord into 117-Vac 60-Hz outlet

[5] Set **107B** meter switch to **V OUT** (0-320V) position

AND

107B Connected

[6] Set **107B ON/OFF** switch to **ON** position

[7] Is **OUTPUT ON** lamp lighted and does meter indicate between 20 and 270 volts

Yes → Page 2

No

[8] Verify proper operation of **107B** per **107B** manual and recheck test connections

TABLE A

REPEATER TYPE	LINE CURRENT SWITCH SETTING
Standard Power 208-, 209-, 217-Type [114A or 209() Power Unit in COT]	140 mA
Low Power 238, 239, 251-Type [250() or 238() Power Unit in COT]	60 mA

TABLE B

PATCH CORD CONNECTION (one cord)

DIGITAL LINE	FROM	TO
MAIN LINE	107B LSO 107B LSI	M1 OUT M2 OUT
SPARE LINE*	107B LSO 107B LSI	S1 OUT S2 OUT

* SPL lamp on KE12 must be OFF. If spare line sharing is used, the spare line for system 1 and 2 appears at system 2, etc.

DANGERS

1. *The **107B** must produce a high dc voltage (±135 volts to ground) to power repeatered line under test. It is designed to prevent high voltages on patch cords until connections have been made to both **107B** jacks and COT test jacks. The double patch cord supplied with **107B** must be used to make connections. Use of substitute cords defeat safety features and may prevent **107B** from powering line under test*
2. *Patch cord should always be connected to COT test jacks LAST*

CONNECT POWER AND SIGNAL TO DIGITAL LINE AT COT

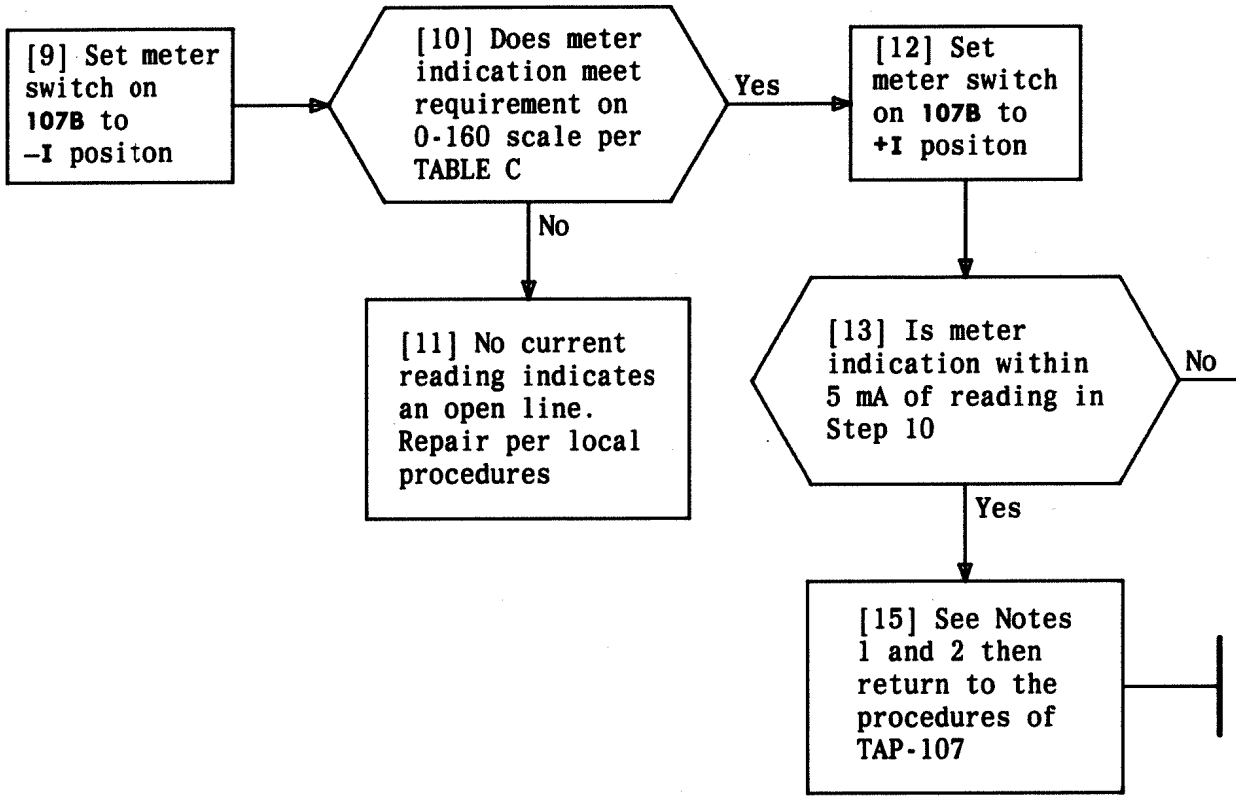


TABLE C	
REPEATER TYPE	REQUIREMENT
Standard Power 208-, 209-, 217-Type [114A or 209() Power Unit in COT]	130 to 150 mA
Low Power 238, 239, 251-Type [250() or 238() Power Unit in COT]	50 to 70 mA

NOTES

1. The **107B** contains a quasi-random signal source which is now connected to transmit out on the line and a pulse-error detector which monitors the incoming signal
2. The test equipment and test connections must be removed when trouble is cleared, in reverse order in which they were established. Connections at RT should be removed before removing test connections at COT

CONNECT POWER AND SIGNAL TO DIGITAL LINE AT COT

CONNECT POWER AND SIGNAL TO DIGITAL LINE AT RT

[1] Verify **AC ON/OFF** switch on **107B** is in **OFF** position

[2] Set **LINE CURRENT** switch on **107B** for type repeaters that you have per TABLE A

[3] Using P3-type patch cord, connect one end to **107B RECEIVE DSI** jack first then the other end to **107B FL SIG** jack

[4] See DANGERS 1 and 2. Using special patch cord furnished with **107B**, make patch cord connection per TABLE B

[5] Plug **107B** power cord into 117-Volt 60-Hz outlet

[6] Set **107B** meter switch to **V OUT** (0-320V) position

AND

107B Connected

[7] Set **107B AC ON/OFF** switch to **ON** position

[8] Is **OUTPUT ON** lamp lighted and does meter indicate between 20 and 270 volts

Yes → Page 2

No

[9] Verify proper operation of **107B** per **107B** manual and recheck test connections

TABLE A

REPEATER TYPE	LINE CURRENT SWITCH SETTING
Standard Power 208-, 209-, 217-Type [114A or 209() Power Unit in COT]	140 mA
Low Power 238, 239, 251-Type [250() or 238() Power Unit in COT]	60 mA

TABLE B

PATCH CORD CONNECTION (one cord)

DIGITAL LINE	FROM	TO
MAIN LINE	107B LSI 107B LS0	MAIN SIDE 1 MAIN SIDE 2
SPARE LINE*	107B LSI 107B LS0	SPARE SIDE 1 SPARE SIDE 2

* SPL lamp on KE15 must be OFF. If spare line sharing is used, the spare line for systems 1 and 2 appears at system 2, etc.

DANGERS

1. *The* **107B** *must produce a high dc voltage (±135 volts to ground) to power repeatered line under test. It is designed to prevent high voltages on patch cords until connections have been made to both* **107B** *jacks and RT test jacks. The double patch cord supplied with* **107B** *must be used to make connections. Use of substitute cords defeat safety features and may prevent* **107B** *from powering line under test*
2. *Patch cord should always be connected to RT test jacks LAST*

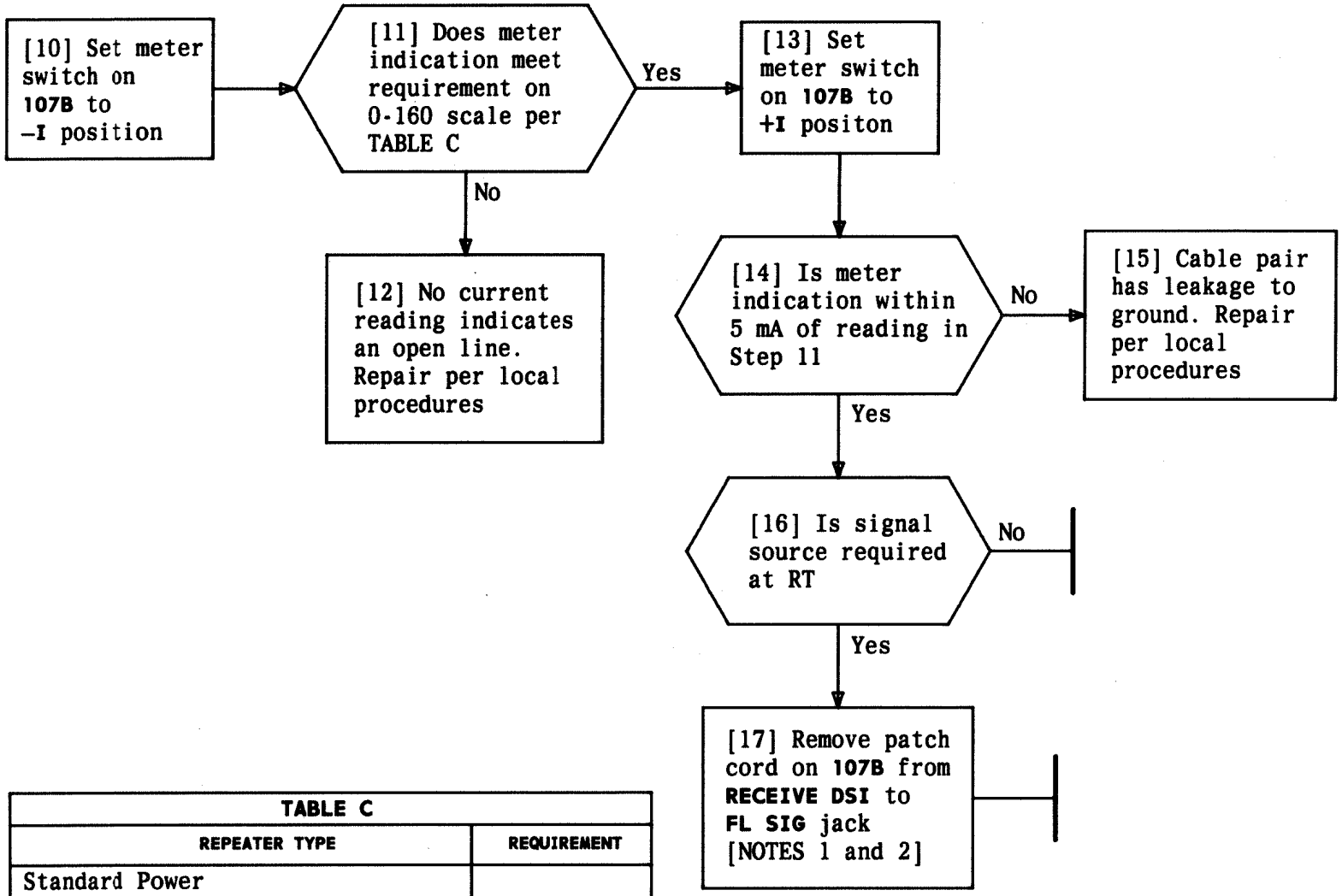


TABLE C	
REPEATER TYPE	**REQUIREMENT**
Standard Power 208-, 209-, 217-Type [114A or 209() Power Unit in COT]	130 to 150 mA
Low Power 238, 239, 251-Type [250() or 238() Power Unit in COT]	50 to 70 mA

NOTES

1. The **107B** contains a quasi-random signal source which is now connected to transmit out on the line and a pulse-error detector which monitors the incoming signal
2. The test equipment and test connections must be removed when trouble is cleared, in reverse order in which they were established. Connections at RT should be removed before removing test connections at COT

CONNECT POWER AND SIGNAL TO DIGITAL LINE AT RT

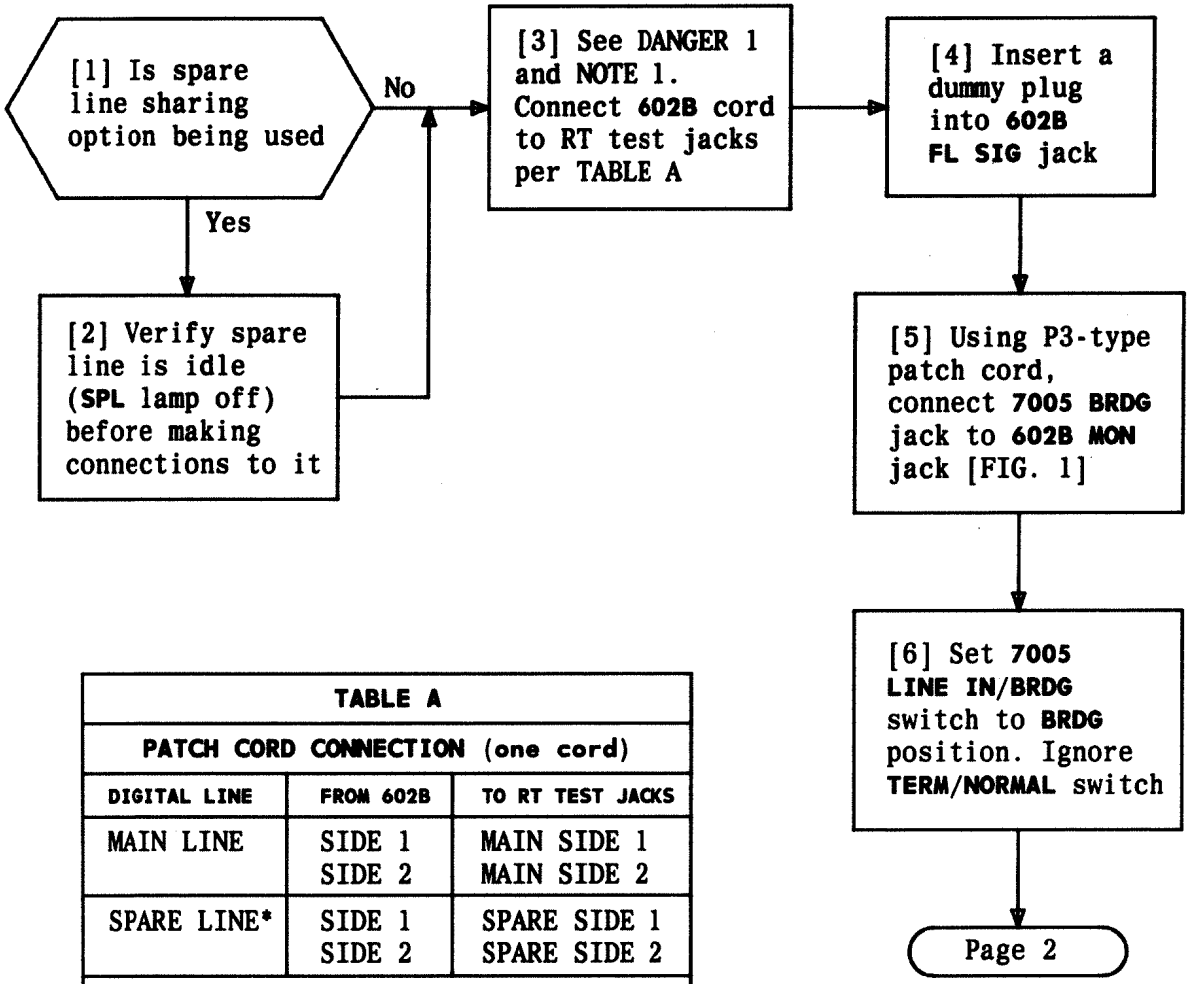


TABLE A		
PATCH CORD CONNECTION (one cord)		
DIGITAL LINE	FROM 602B	TO RT TEST JACKS
MAIN LINE	SIDE 1 SIDE 2	MAIN SIDE 1 MAIN SIDE 2
SPARE LINE*	SIDE 1 SIDE 2	SPARE SIDE 1 SPARE SIDE 2

* SPL lamp on KE15 must be OFF. If spare line sharing is used, the spare line for systems 1 and 2 appears at test jacks of system 2 etc.

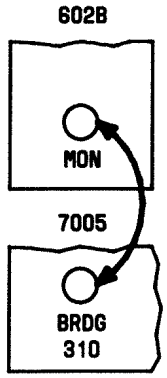
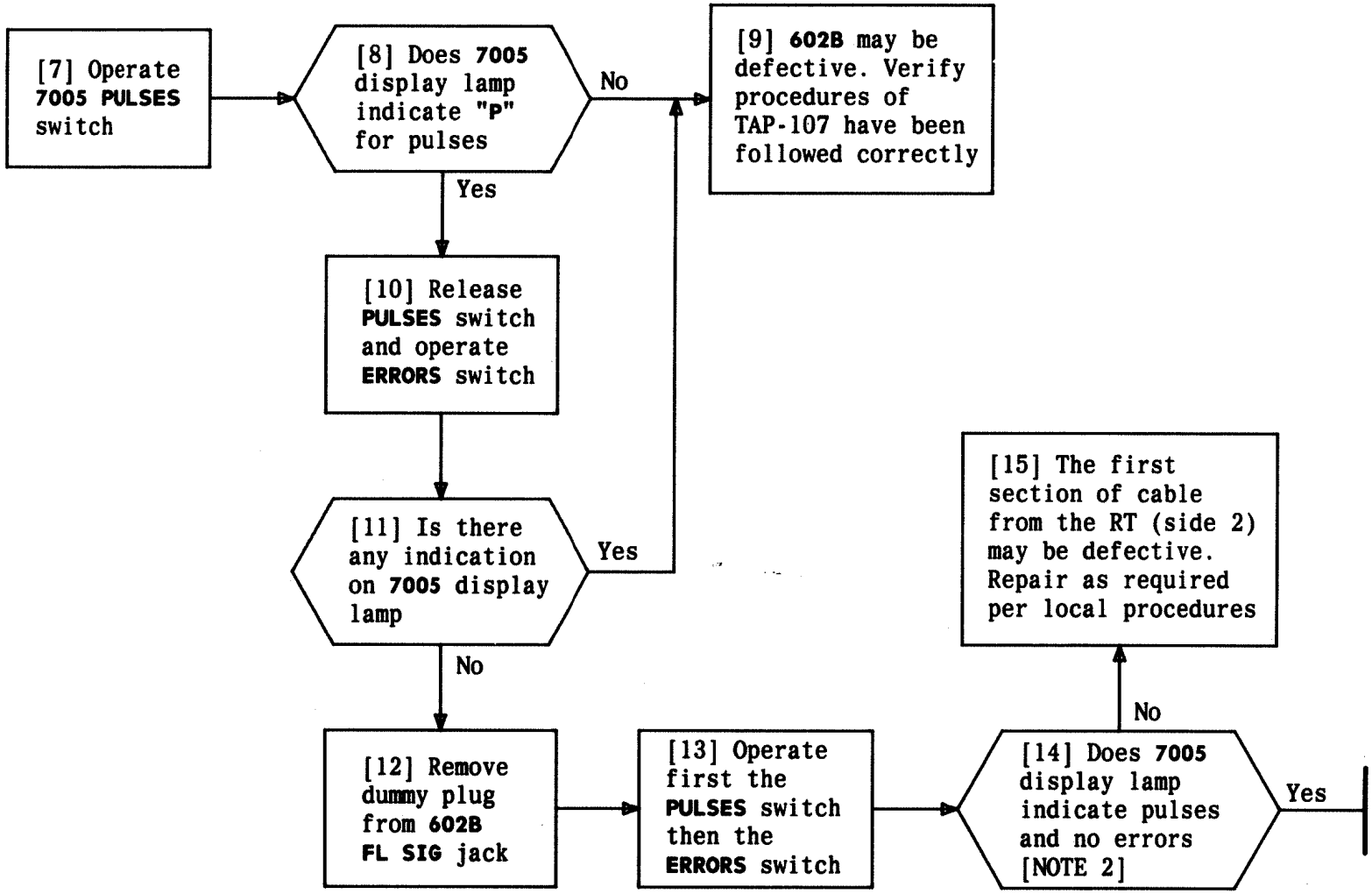


FIG. 1

NOTE 1
This procedure loops power and signal to allow tests on side 2 of the line

DANGER 1
Voltages of ±135 volts to ground and 270 volts between test jacks exist at RT test jacks. All patch cords and test cords should be connected in the order given

PERFORM RT LOOPBACK PROCEDURES



NOTE 2

The 602B must be removed when trouble is cleared. The 602B should be removed before test connections are removed from RT

PERFORM RT LOOPBACK PROCEDURES

[1] Determine RT wiring options to be used from Engineering Work Order or from TABLE A. See NOTE 1

[2] Using TABLES B through K, Page 2, verify that all options to be used are installed and that all options not to be used are removed

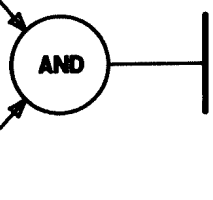


TABLE A RT OPTIONS	
OPTIONS	
"Z"	Required for spare line sharing when interfacing with two SLC-40 COTs
"X"	Required when only system 1 uses dedicated spare line. System 2 uses no spare line
"W"	Required when only system 2 uses dedicated spare line. System 1 uses no spare line
"Y"	Required when both systems 1 and 2 use dedicated spare lines
"V"	No spare line for either system 1 or system 2. Also use for Digital Multiplex use
"U"	For AC alarm
"T"	For external alarm
"S"	For order wire
"R"	For fault locate
"Q"	Use for Digital Multiplexer Configurations

NOTE 1
If RT is cabinet-mounted, no wiring options are specified

CHECK FRAME-MOUNTED REMOTE TERMINAL WIRING OPTIONS

TABLE B	
"Z" OPTION (SYSTEMS 1 & 2)	
ON: FF&A PANEL	
TB910-3A -4A -9A -10A TB920-3A -4A -9A -10A	TB910-3B -4B -9B -10B TB920-3B -4B -9B -10B
ON: CHANNEL BANK	
TB3-1A	TB3-1B

TABLE C	
"X" OPTION (SYSTEM 1)	
ON: FF&A PANEL	
TB910-3A -4A -9A -10A TB920-3A -4A	TB910-2B -5B -8B -11B TB920-4A -9A

TABLE D	
"W" OPTION (SYSTEM 2)	
ON: FF&A PANEL	
TB910-3A -4A TB920-3A -4A -9A -10A	TB910-4A -9A TB920-2B -5B -8B -11B

TABLE E	
"Y" OPTION (SYSTEMS 1 & 2)	
ON: FF&A PANEL	
TB910-3A -4A -9A -10A TB920-3A -4A -9A -10A	TB910-2B -5B -8B -11B TB920-2B -5B -8B -11B

TABLE F	
"V" OPTION (SYSTEMS 1 & 2)	
ON: FF&A PANEL	
TB910-3A -4A TB920-3A -4A	TB910-4A -9A TB920-4A -9A

TABLE G	
"U" OPTION	
FROM: FF&A PANEL	TO: POWER PLANT
TB901-6	-48 VOLTS FROM EXT. POWER PLANT

TABLE H	
"T" OPTION	
FROM: FF&A PANEL	TO: EXT ALARMS
TB901-4 -5	CLOSURE FROM EXT. ALARMS

TABLE I	
"S" OPTION	
FROM: FF&A PANEL	TO: XCONNECT
TB900-11B -12B	T R

TABLE J	
"R" OPTION	
FROM: FF&A PANEL	TO: XCONNECT
TB900-11A -12A	T R

TABLE K	
"Q" OPTION (SYSTEMS 1 & 2)	
ON CHANNEL BANK	
J213-16 J213-32 J613-16 J613-32	J211-47 J212-13 J611-47 J612-13

CHECK FRAME-MOUNTED REMOTE TERMINAL WIRING OPTIONS

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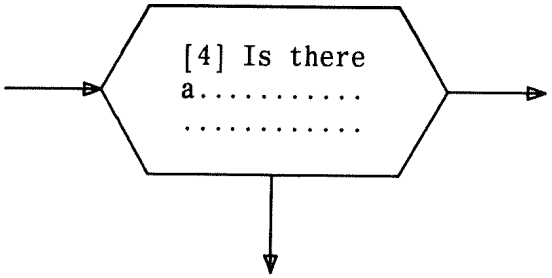
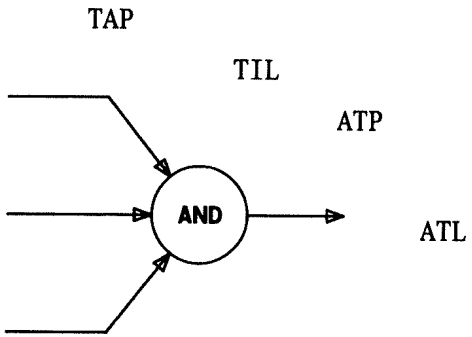


WARNING
Always be safety conscious on and off the job

This is a . . . . . .

TASK ORIENTED PRACTICE. . . . . or TOP

The next few pages will tell you how to use this document.



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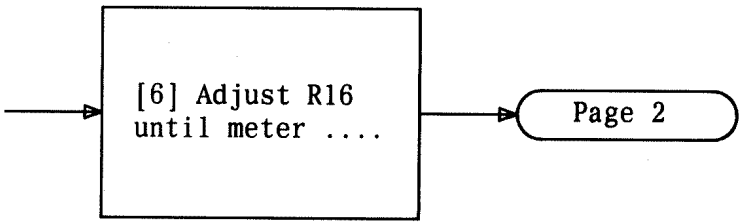


HOW TO USE THIS "TOP"

This book is called a Task Oriented Practice or a "TOP." It is a type of programmed document – one which gives you step-by-step instructions of how to do a job (or task). A TOP can be a big help in your everyday work, but you must know how to use it correctly. Take a few minutes, say 15 or 20, and study these few pages until you feel you understand how to use a TOP. Taking this time now will very likely save you time and effort later on.

An important thing to remember about TOP is that it contains all the needed instructions to complete a job. If you are doing the job for the first time, you will be directed through each action without having to guess or remember where to find the necessary information. If you are experienced on a particular job, TOP can provide just that information which you may have forgotten.

Almost all of your jobs can be classified into one of four types – ***Routine, Acceptance, Company Order,*** or ***Trouble Clearing***. This is how TOP defines these four work types:

Routine

that work you do as part of a Controlled Maintenance Plan like scheduled cleaning or scheduled tests. Routine work may also include those things you do as a "routine" part of your job like requesting a TTY printout or turning on equipment in the mornings and off in the evenings.

Acceptance

that work you do to verify that equipment is installed properly. Normally this is a test or inspection you perform when Western Electric has completed a new installation or addition. It could also be a test you perform when another group from ***your*** Company has completed an installation or addition of equipment. Acceptance work, however, is always related to testing or checking newly installed equipment.

Company Order

that work you do in response to one of several different "orders" which may be given to you. Some of the orders you may be familiar with are Circuit Orders, Service Orders, Traffic Orders, Recent Change Orders, etc. Normally, company order type work is something done to install, establish, change, or discontinue some service offered by the telephone company.

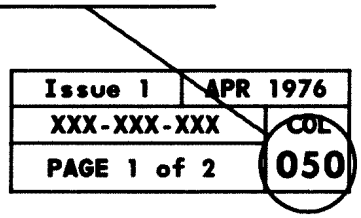
Trouble Clearing

is simply what it says – that work you do to clear and repair troubles in the system. Trouble clearing may be done in answering a customer complaint, responding to some office alarm, an abnormal TTY printout, etc.

Try to fix these four work types firmly in your mind. As you will see, you must classify each job you get in one of these four types before you will be able to look up the instructions in the TOP.

Now glance briefly at the front cover; there are several things which will be useful there. In the upper-right corner is the 9-digit volume number. Near the center is the volume title which tells you something about the contents – such things as the system (or subsystem) name and perhaps the type of jobs included in the volume. Next is a four-line index located in the lower-left corner. This index provides the location of four "lists" which are simply a listing of all the jobs in each of the four job types. If a nine-digit (XXX-XXX-XXX) number appears on

the front cover index, that particular list is located in another volume of the TOP. A three-digit number on the line means that the list is in this volume, and the list can be located by searching the lower-right corner of each page for the ***referenced number***.



These numbers will always be arranged in numerical order; however, all numbers in the sequence will not be used.

Some TOP volumes may cover only a small part of a system, so on the inside of each front cover you will find a documentation plan. This plan will give a bird's-eye view of all the volumes in the TOP and can help you quickly determine the correct volume.

Locate one of the TOP volumes which contains a Company Order List, and note from the front cover that this list is numbered "050." Turn to that number in the TOP.

This Company Order List (COL) is simply a listing of all the Circuit Order jobs, Service Order jobs, etc, that may be done on this system. Once you know the job you have to do, use the lists as an index to find the number of the "procedure" which tells you ***what to do*** to complete that job.

Now pick one of these jobs from the list which references to a COP (Company Order Procedure), and using the referenced number, locate that procedure in the TOP. Look over this procedure and note that it gives all the items which must be done to complete the job.

The items are numbered and must be completed in that order; however, you may see some lettered (A, B, C...) items in the procedure. These letters are assigned to options or other items which may be done differently because of equipment variations, etc. Look over the following example to get a better idea of what is meant by the numbers (1, 2, 3...) and letters (A, B, C...) which may be used in the procedure.

ITEM	SUBTASKS	PROCEDURE NUMBER
1	Do the first thing first	DLP-XXX
2	Do the second item next	DLP-XXX
3	Do the following optional items as required by the Company Order or as is required by the system you are working on	
	A. An optional item	DLP-XXX
	B. Another optional item	–
	C. Another optional item which must be done in the sequence below	
	1. First part of Option "C"	DLP-XXX
	2. Last part of Option "C"	DLP-XXX
4	Do the next part of the job	DLP-XXX
5	Do the last part of the job	DLP-XXX

Remember that this procedure tells you ***what*** to do in order to complete the total job. If you know ***how*** to do an item in the procedure, you should go ahead and complete it. If you need further information on ***how*** to do part of the job, then you should turn to the referenced DLP or Detail Level Procedure. When you complete all the steps in the DLP, then you must turn back to the COP or Company Order Procedure to find the next item to be done.

TOP is designed so that you will have to read only what is necessary to get your job done. At any time when you know how to perform all the steps in an item, it is not necessary to look further for the "how to" information – simply complete the item and go on to the next one. This idea, in TOP, is known as "bypassing."

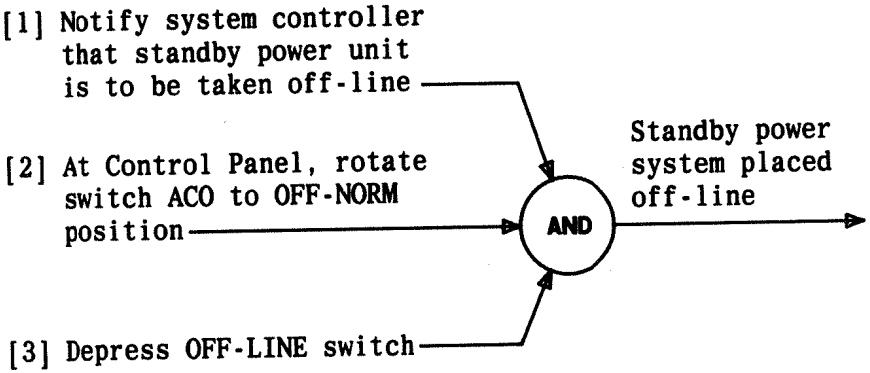
Here are some of the things designed into TOP to help you "bypass" information you may already know:

Summary Statement

A summary statement is used with a DLP (or the flow-charted procedures). It tells you briefly what the procedure does and what type measurement or result can be observed. After reading the summary, you may be able to complete the procedure without reading further. Some shorter DLPs, of course, do not have summary statements.

Result Statement

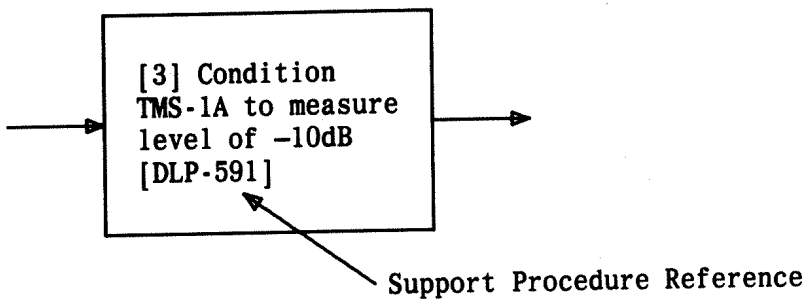
A result statement may be used in a flow-charted procedure along with the "AND" symbol. Here is an example of the "AND" symbol and a ***result statement***:



When using a procedure, read the result statement first. If you know how to place standby power system in off-line status, it would be unnecessary to read steps 1, 2, and 3.

Support Procedures

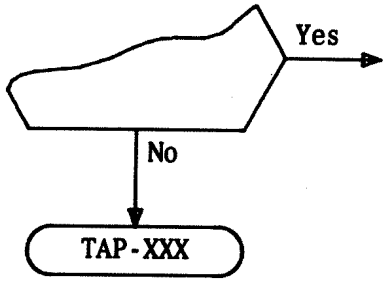
When you see this kind of reference in TOP, it refers to a support procedure.



The support procedure (DLP-591) would provide information about how to operate the TMS-1A. Of course, if you are familiar with the TMS-1A, there is no reason to look up DLP-591.

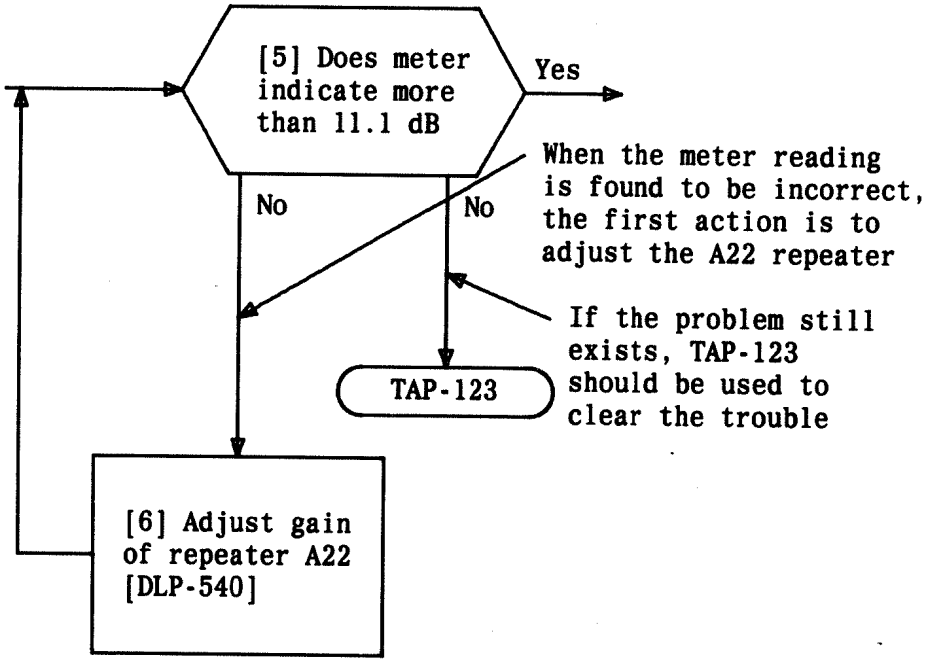
So far, the Company Order type jobs have been the main topic; however, you will find that the Routine and Acceptance categories are used in the same manner. You may come across a couple of new abbreviations in those categories, namely, Acceptance Task Procedure (ATP) and Routine Task Procedure (RTP). These categories are used in the same way that the Company Order Procedure (COP) is used in the Company Order work.

While using TOP, you probably will run across a reference similar to this:



This reference to TAP-XXX indicates that the equipment is not operating correctly and the TAP (Trouble Analysis Procedure) should be used to help you find and repair the trouble.

This idea can be carried further. In some cases, a decision block may have more than one abnormal output. This simply means that you should try more than one solution to the problem. See the example below.



Trouble clearing information in TOP is basically used the same way as the other types. When a trouble report or equipment alarm requires you to troubleshoot a system, the Trouble Indicator List (TIL) is the place to start. This (TIL) is a listing of trouble symptoms or alarms with a reference to a Trouble Analysis Procedure (TAP). The TAP is an aid in analyzing and locating the cause of the trouble. The TAP may reference to other information such as a Trouble Analysis Data (TAD) or an Isolation Diagram (ISD) as an aid in the trouble clearing process.

Any job must always be done safely and it is no different with TOP. Here are three items which you should look for in TOP:

DANGER – ***means there is a possibility of personal injury***

CAUTION – ***means there is a possibility of service interruption***

WARNING – ***means there is a possibility of equipment damage***

The last page of this introductory section is a diagram which shows all the elements used to make up a TOP and basically how they are organized to make a complete document. The diagram may, at first, seem to be complex; but remember, TOP is a programmed document and it always tells you where to find the next bit of information required to do the job. The diagram, however, may be useful later if you need to know the words which DLP, TAP, etc, represent or simply a memory jogger about TOP in general.

While using any TOP, if you find errors, or if a procedure is inadequate or missing, your comments are greatly needed. They may be forwarded by using the standard form E3973 which is available through your Company. Thank you for helping us prepare better documentation.