

**AT&T PRACTICE
Provisional**

**Task Oriented Practice
(TOP)**

3"ESS" SWITCH

SYSTEM TROUBLE CLEARING

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	• CRITICAL Lamp Lighted	
	• REPT TRBL FLT LIST FULL	TAP-101
	• REPT MULT PC TRBL	TAP-102
	• REPT DTDA OFN	TAP-176
	• CRITICAL & AMA Lamps Lighted	
	• REPT AMA MULT LINKS OOS	TAP-103
	• REPT AMA BUF	TAP-103
	• CRITICAL & PANEL TIME OUT Lamps Lighted	
	• Panel Time Out Alarm	TAP-105
	• CRITICAL & RT Lamps Lighted	
	• REPT MULT RT TRBL	TAP-106
2	Major Alarm Condition (Lamps & TTY)	
	• MAJOR & AMA Lamps Lighted	
	• REPT AMA PRIMARY LINK OOS	TAP-103
	• MAJOR & CU Lamps Lighted	
	• RMV CU	TAP-104
	• MAJOR & MAJOR POWER Lamps Lighted	
	• REPT PWR A OOL	TAP-109
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	• REPT PWR B OFN	TAP-110
	• REPT PWR D OFN	TAP-159

DO THE ITEMS BELOW IN THE ORDER LISTED FOR DETAILS, GO TO

	• MAJOR & NWC Lamps Lighted	
	• RMV NWC	TAP-139
	• MAJOR & PPD Lamps Lighted	
	• RMV PPD	TAP-132
	• RMV PWR PCF	TAP-111
	• MAJOR & RT Lamps Lighted	
	• RMV RT	TAP-152
	• RMV PWR RT	TAP-112
	• MAJOR & SC Lamps Lighted	
	• RMV SC	TAP-134
	• MAJOR & SVC LIM Lamps Lighted	
	• REPT SVC GRP OOS LIMIT	TAP-113
	• MAJOR & TRK LIM Lamps Lighted	
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3	Minor Alarm Condition (Lamps & TTY)	
	• MINOR Lamp Lighted	
	• REPT CGA OFN (or REPT TOLL OFN)	DLP-553
	• REPT LINE TN TRBL	TAP-115
	• REPT PD TRBL	TAP-132
	• REPT PWR TRBLE PCF	TAP-117
	• REPT SM COLS TRBL • REPT SM ROW TRBL	TAP-134
	• REPT TV TC TRBL	TAP-108
	• RMV ALNK	TAP-120

3ESS SWITCH

DO THE ITEMS BELOW IN THE ORDER LISTED FOR DETAILS, GO TO

• RMV BLNK	TAP-121
• RMV JC	TAP-122
• RMV LINE TN	TAP-123
• RMV SVC LKO	TAP-118
• RMV TRK LKO	TAP-116
• RMV TV	TAP-108
• MINOR & AMA Lamps Lighted	
• REPT CKT TRBL AMA	TAP-125
• MINOR & MINOR POWER Lamps Lighted	
• REPT PWR C OFN	TAP-126
• MINOR & TDC Lamps Lighted	
• TAPE Data Controller FATL READ/FATL WRIT	TAP-127
• TAPE OPER ABT	TAP-128
• TAPE RMV	TAP-129
• MINOR & TTYC Lamps Lighted	
• REPT STAT TTYC CHAN OOS	TAP-130
CUSTOMER REPORTED TROUBLE	
• No Dial Tone	TAP-131

Faults that occur within the No. 3 ESS are software/hardware detected in response to automatic or manual tests, and result in teletypewriter (TTY) messages as well as visual and audible indications. The Trouble Indicator List (TIL-095) should be utilized to access fault clearing procedures. The TIL is organized by a combination of System Status Panel (SSP) indicators and TTY messages with trouble analysis procedures grouped in order of trouble severity (critical, major, minor, customer-reported trouble).

At an appropriate point in the isolation procedures a diagnostic test will be run to obtain definite fault identification data. Such data is utilized with a Trouble Locating Manual (TLM) to identify the unit most likely at fault. For each trouble the TLM lists the cause in order of probability, ie, the most likely cause first, the least likely cause last. To minimize the number of possibly bad circuit packs, only one circuit pack should be replaced at a time using proper power down/up procedures. After each circuit pack replacement the diagnostic is run again. If the trouble number is the same, the circuit pack just installed should be removed and the original circuit pack reinstated. The circuit packs should be replaced in the same order as the TLM listing unless indicated otherwise by a specific TOP procedure.

CAUTION - Packs should be handled by their edges or face-plates to avoid scratching the gold-plated contacts or deforming components and leads.

Faulty equipment should be tagged with the following information:

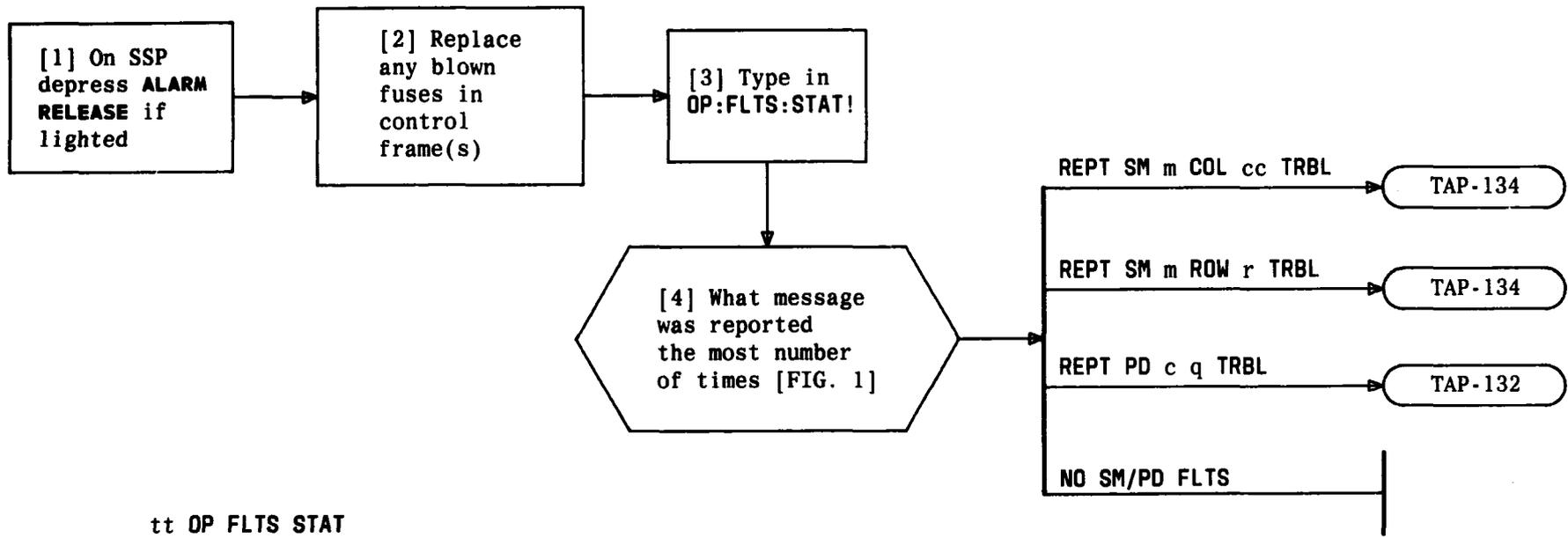
- (a) Office location
- (b) Frame and mounting location
- (c) Diagnostic trouble number
- (d) Date taken out of service

The Switching Control Center System (SCCS) is able to take any action that only requires TTY input/output messages and/or SSP key activation.

Documents stored in the office useful in maintenance include: Trouble Locating Manuals (TLMs), Input/Output Manuals (IM/OMs), Schematic Diagrams (SDs), Program Applications (PAs), Program Listings (PRs), and Bell System Practices (BSPs).

Craft persons should be familiar with the following equipment abbreviations:

3A CC/CU	-Processor/Control Unit
AMA/AMARC	-Automatic Message Accounting Recording Center
CDF	-Combined Distributing Frame
DMM	-Digital Multimeter
FIOC	-Frame Input/Output Controller
NWC	-Network Controller
PCF	-Peripheral Control Frame
PPD	-Peripheral Pulse Distributor
SC	-Scanner Controller
SSP	-System Status Panel
SVC	-Service Circuit
TDC	-Tape Data Controller
TLTP	-Trunk and Line Test Panel
TRK	-Trunk Circuit
TTY/C	-Teletypewriter/Controller



```

tt OP FLTS STAT
  SM m ROW r TRBL
  .
  .
  SM m COL cc TRBL
  .
  .
  PD c q TRBL
  or
  NO SM/PD FLTS
  OP FLTS STAT COMPL
  
```

FIG. 1 - OP FLTS Output Message

CLEAR KNOWN FAULT LIST FULL ALARM

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[1] If communication via TTY is not possible-on SSP-depress TTY INIT

[2] Depress LOCK key to prevent continuous initializations

[3] If system is initializing wait for OP POSTMORT printout

AND

[4] Did system restore automatically after initialization

Yes

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No

[5] From TTY messages, SSP, or control frame lamps, decide which side is best per local procedures [SYC 0 or 1]

[6] Is the side determined as best on-line at this time

Yes

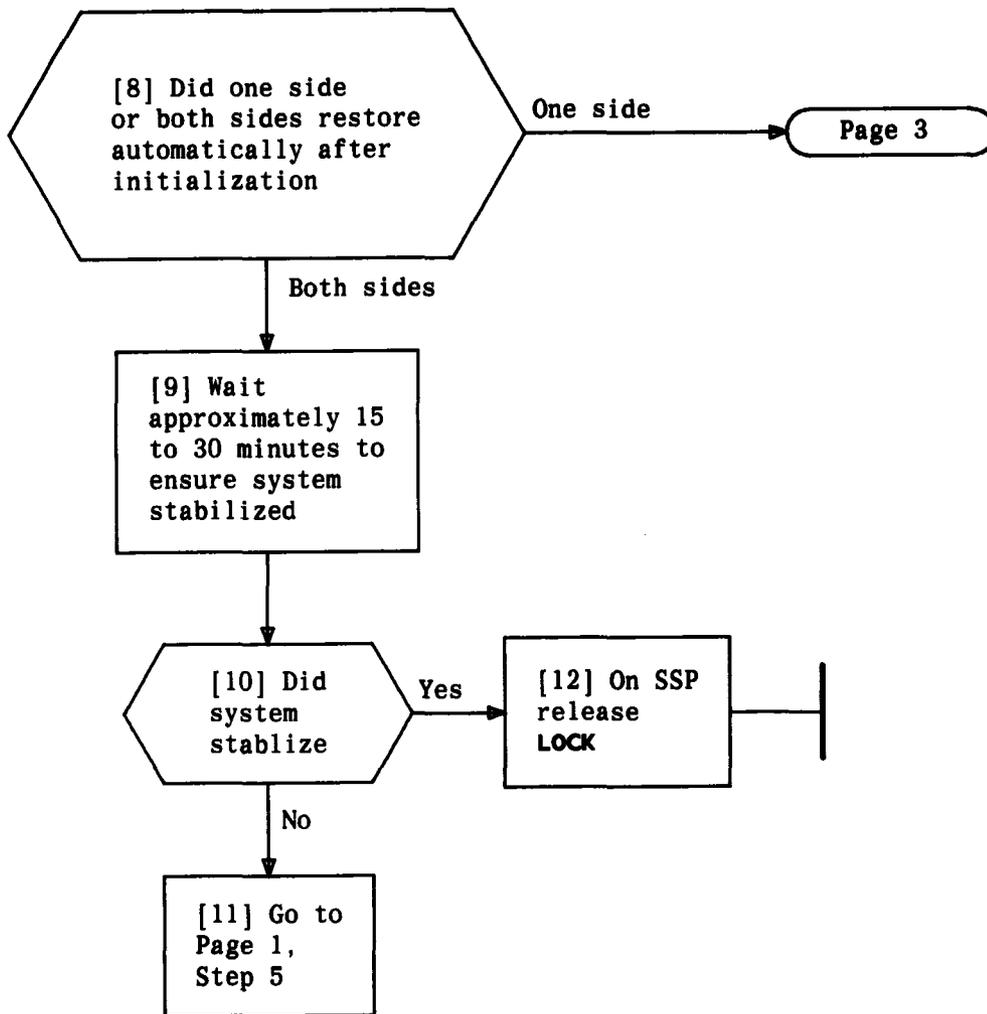
[7] Go to Page 3, Step 16

No

Page 3

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CLEAR MULTIPLE PERIPHERAL CONTROLLER (PC) TROUBLE



CLEAR MULTIPLE PERIPHERAL CONTROLLER (PC) TROUBLE

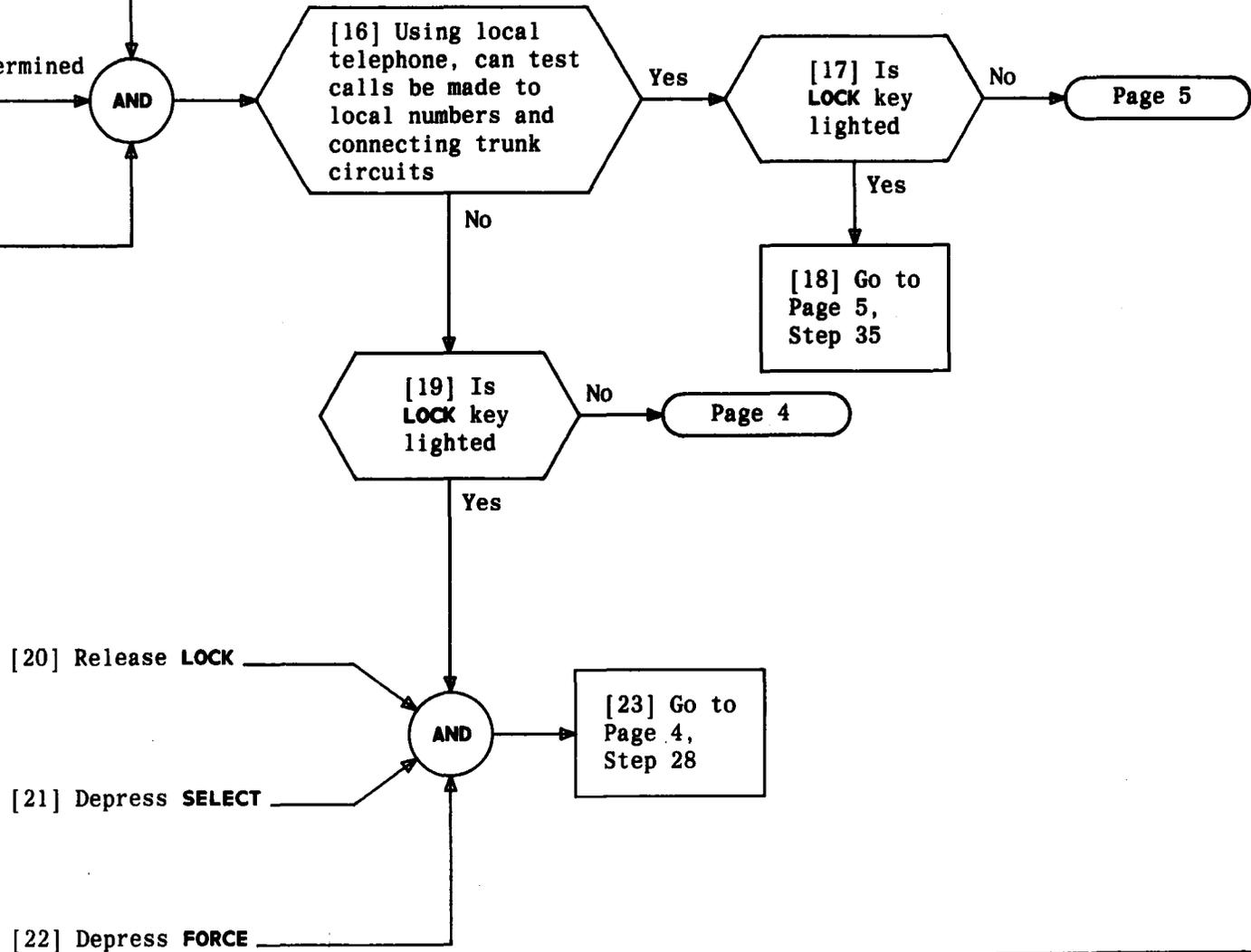
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On SSP:

[13] Release LOCK

[14] Depress SELECT
(0 or 1) [side determined
the best side]

[15] Depress FORCE

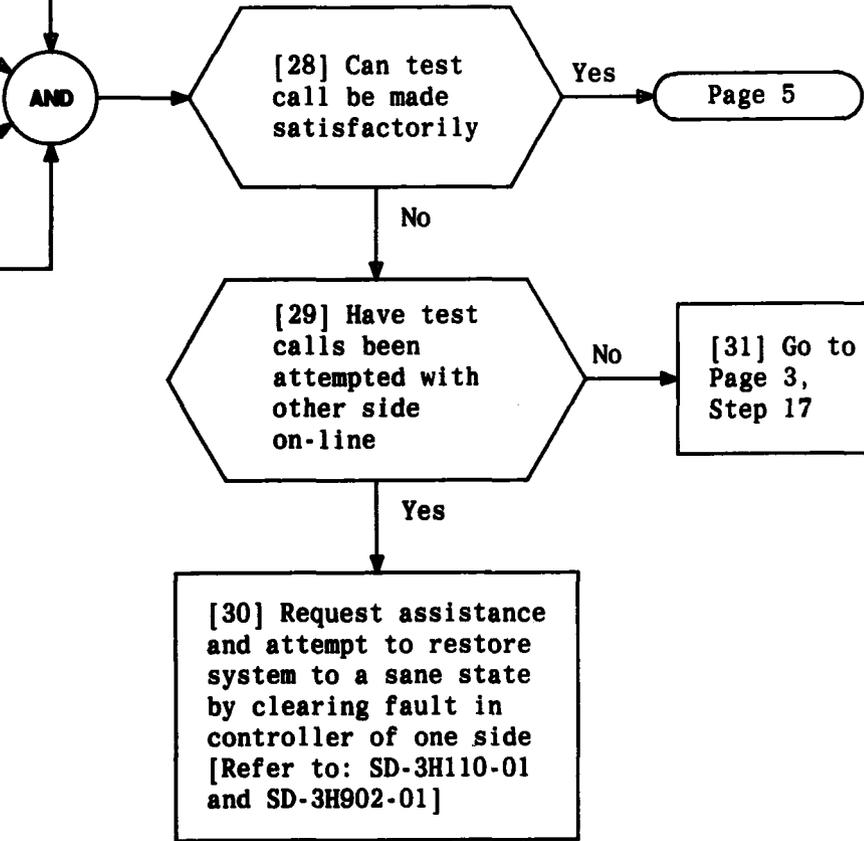


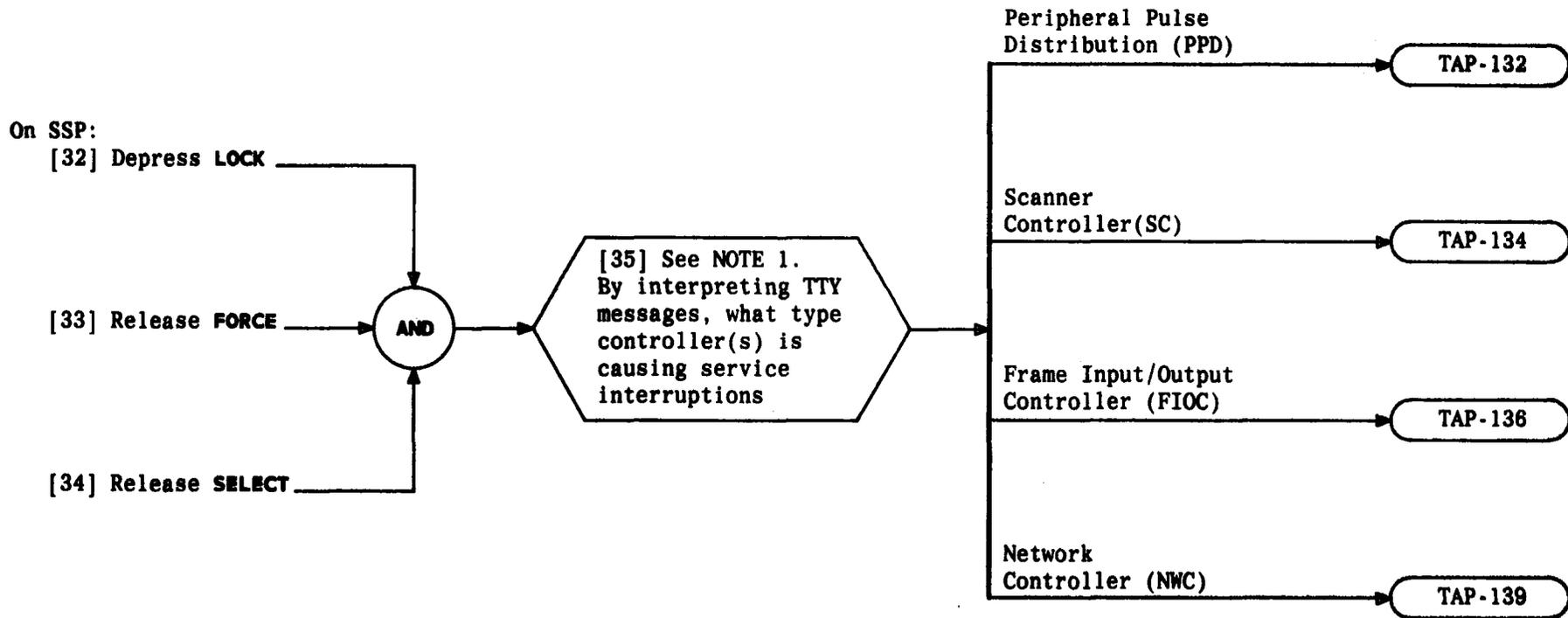
CLEAR MULTIPLE PERIPHERAL CONTROLLER (PC) TROUBLE

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On SSP:

- [24] Release FORCE
- [25] Release lighted SELECT (0 or 1) [side previously locked on-line]
- [26] Depress SELECT (0 or 1) [side not previously locked on-line]
- [27] Depress FORCE





NOTE 1	
If FIOC is one of controllers listed as in trouble, try to repair it first	
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CLEAR MULTIPLE PERIPHERAL CONTROLLER (PC) TROUBLE

1. Find TTY message for trouble condition in
TABLE A and take appropriate action as directed

TABLE A		
TTY MESSAGE	CAUSE OF TROUBLE CONDITION	ACTION TO BE TAKEN
REPT AMA MULT LINKS OOS	Both the primary and backup links are removed from service	* Report condition immediately to repair group that maintains data facilities
REPT AMA PRIMARY LINK OOS	Primary data link is out of service	* Report condition to repair group that maintains data facilities
REPT AMABUF OVF	Data link is bad causing the buffer to overflow. Primary data link is down and backup cannot be brought into service	* Report condition to repair group that maintains data facilities
REPT AMABUF OUS	AMA buffer is out of synchronization resulting from memory or program problem	If no other messages have been received the buffer has recovered and no further action is required. If problem continues to repeat, refer condition to Switching Control Center (SCC) for analysis
REPT AMABUF BDT	AMA buffer was transmitted bad data. One of the AMA software routines has an error	Refer problem to SCC for further action
REPT CKT TRBL AMA	AMA request to the office was bad. Complement on request from AMARC was not matched	Refer problem to SCC
* AMA link is bad or data set must be repaired or replaced		

CLEAR AMA TROUBLE

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[1] If CU has not been removed from service, type on TTY
RMV:CU!

[2] On 3A Control Panel, depress
MANUAL if lighted

[3] On TTY type, RST:CU!

On TTY type:
[6] SW:SYC!

[7] RMV:CU!

[8] RST:CU!

On-line SYC
switches sides

AND

[4] See NOTE 1.
Does system
respond with
DGN CU ATP
RST CU COMPL

No

Page 2

Yes

[5] Wait
approximately
10 minutes to
ensure system
has stabilized

AND

[9] See NOTE 1.
Does system
respond with
DGN CU ATP
RST CU COMPL

Yes

No

Page 2

NOTE 1

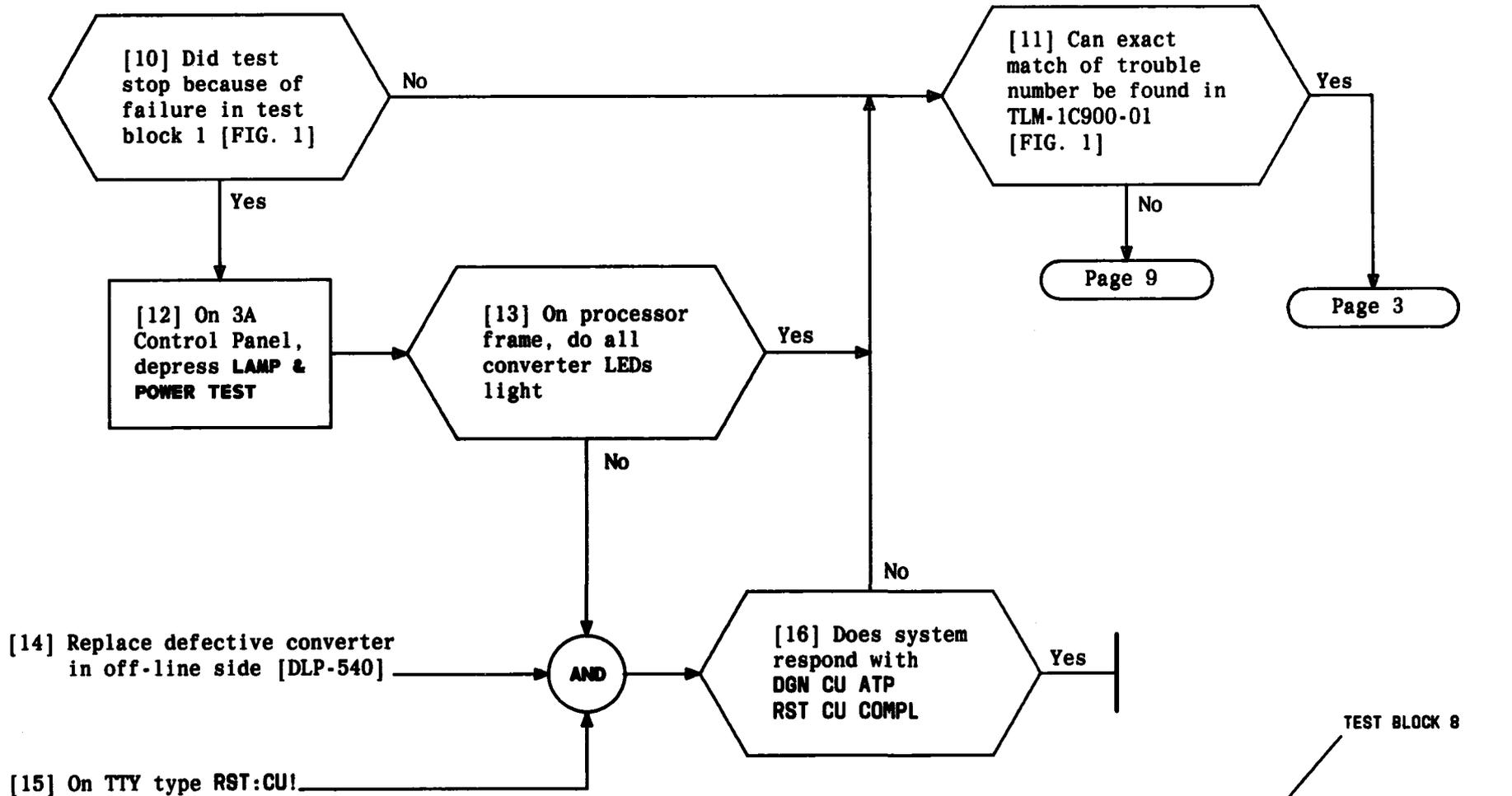
It takes
approximately 10
minutes for CU
diagnostics to run

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CLEAR CONTROL UNIT (CU) REMOVED FROM SERVICE



TEST BLOCK 8

M 14 DGN CU 0 STOPPED TST 8 SEG 1 ADR 01646 0039
 LOOP 3 TRBL 0804 DATA 0005 3535

TROUBLE NUMBER

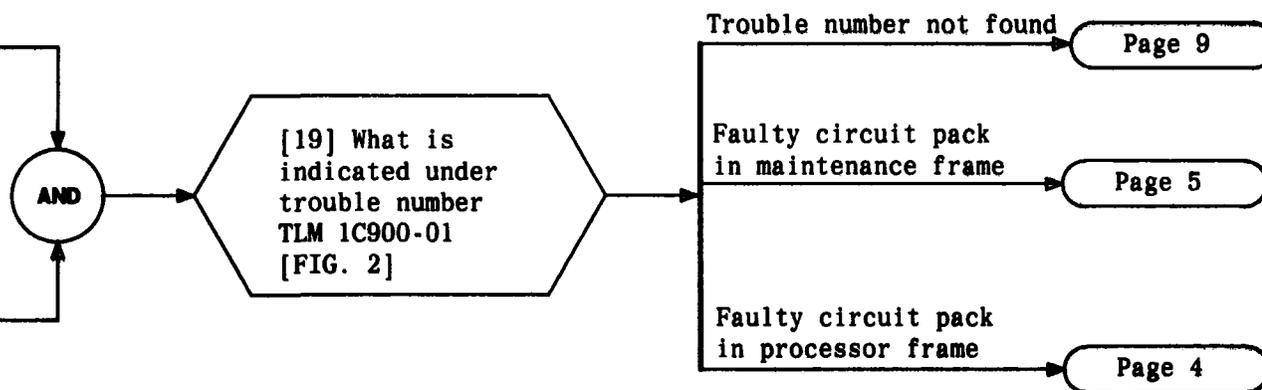
FIG. 1

CLEAR CONTROL UNIT (CU) REMOVED FROM SERVICE

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[17] On TTY type
 DGN:CU;STEP:aa!
 aa = test number received
 when test failed

[18] On SSP depress
 TEST CONTROL - EXECUTE
 to repeat diagnostic test
 of test that failed



PROCESSOR FRAME
 PROC 02-27 FA1037 MAINTENANCE CHANNEL CONTROL

MAIN STORE
 MASCM 08-08 FA1060 MAIN STORE CONTROLLER - BITS 6 & 14

MAINTENANCE FRAME
 MTCE 02-25 FA1101 SSP CONTROL BOARD 1

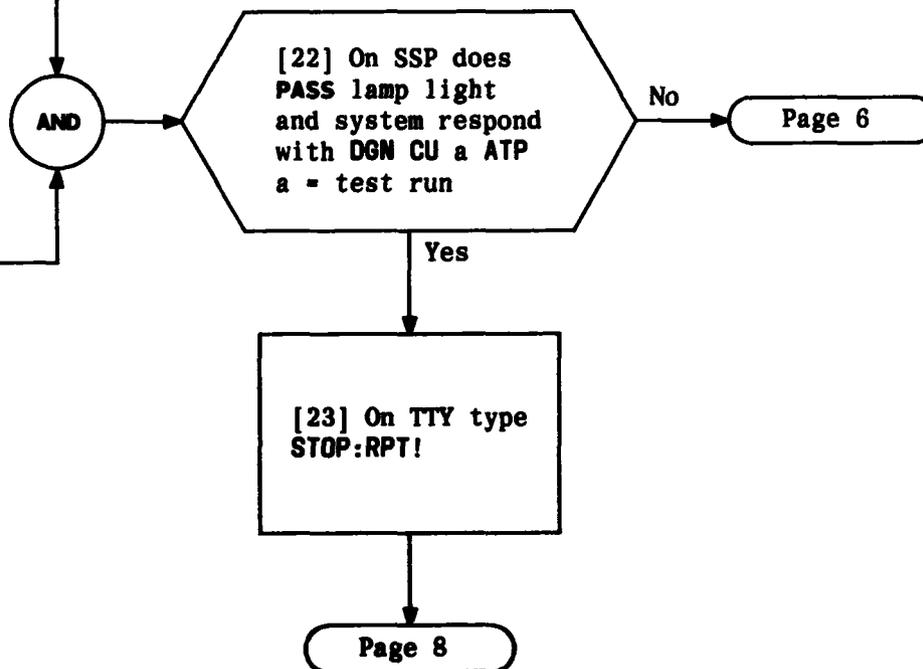
FIG. 2 - Examples of TLM Entries

CLEAR CONTROL UNIT (CU) REMOVED FROM SERVICE

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[20] Replace first off-line processor frame circuit pack listed in TLM-1C900-01 under trouble number [DLP-541]

[21] On SSP depress EXECUTE to repeat diagnostic test

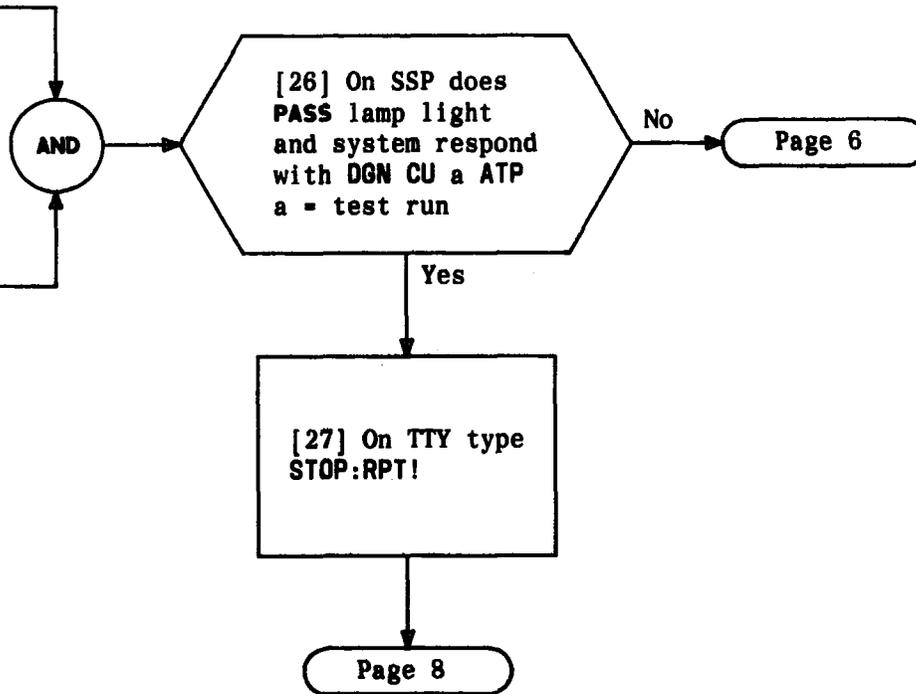


CLEAR CONTROL UNIT (CU) REMOVED FROM SERVICE

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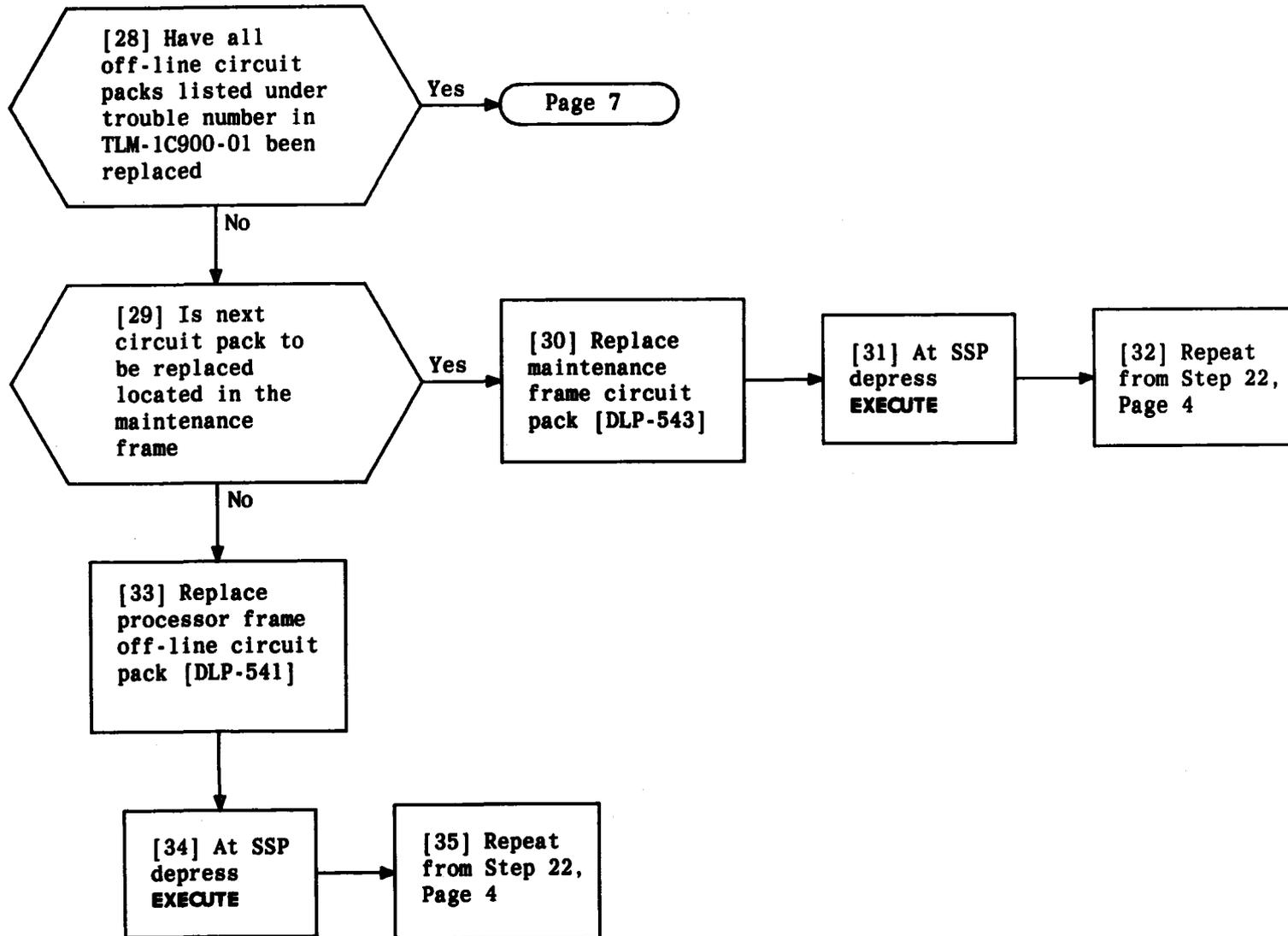
[24] Replace first maintenance frame circuit pack listed in TLM-1C900-01 under trouble number [DLP-543]

[25] Depress EXECUTE to rerun diagnostic test



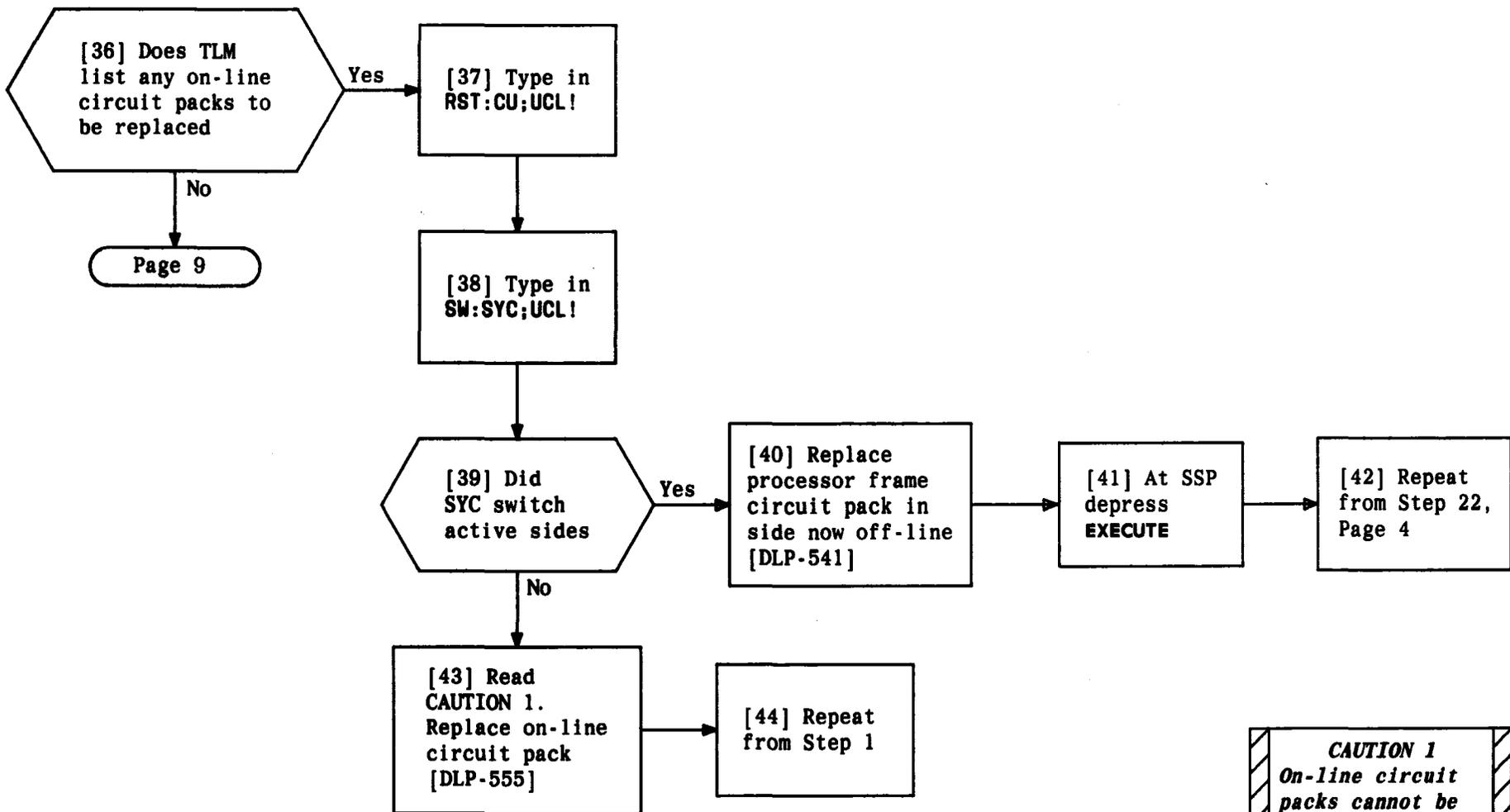
CLEAR CONTROL UNIT (CU) REMOVED FROM SERVICE

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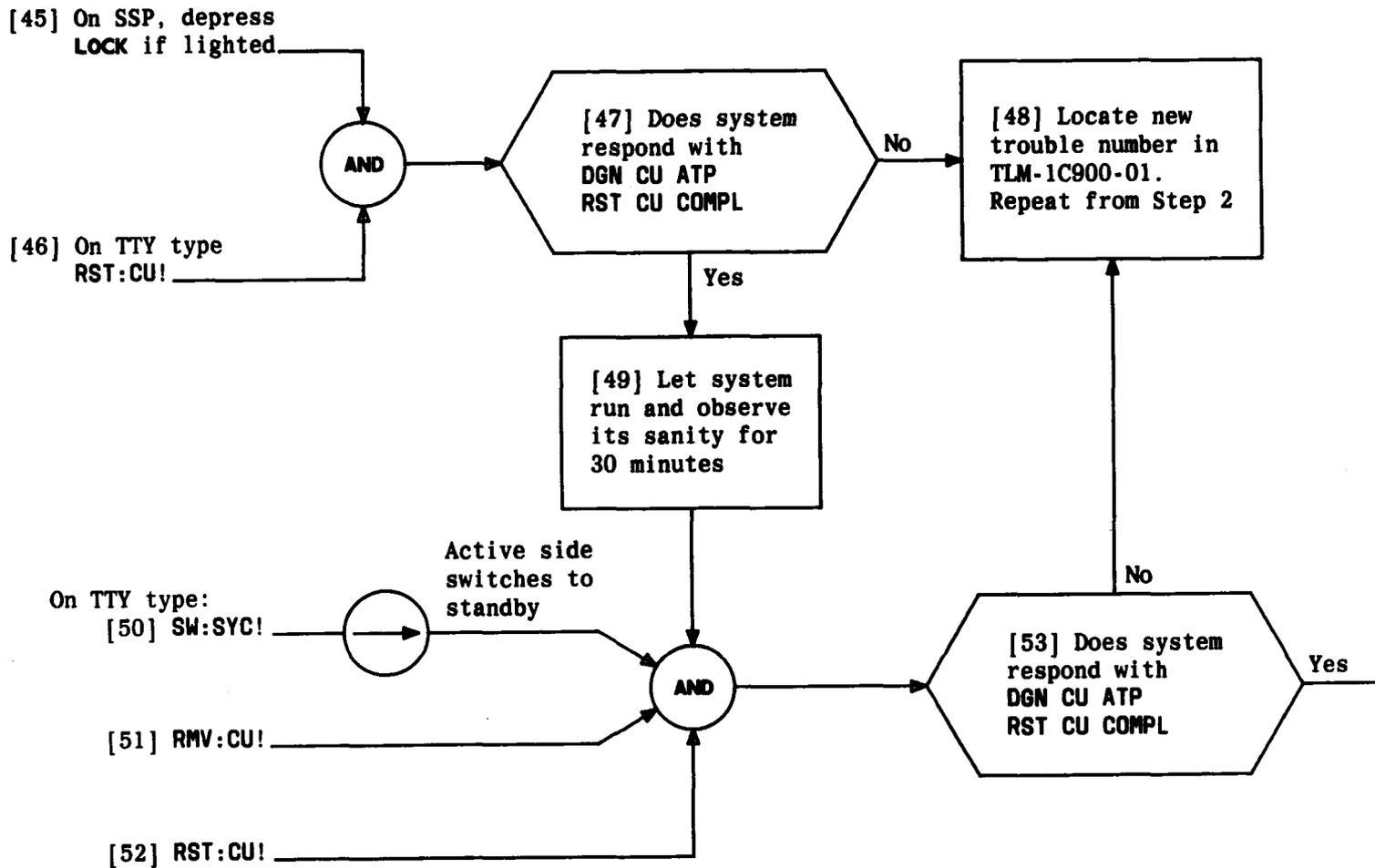
CLEAR CONTROL UNIT (CU) REMOVED FROM SERVICE

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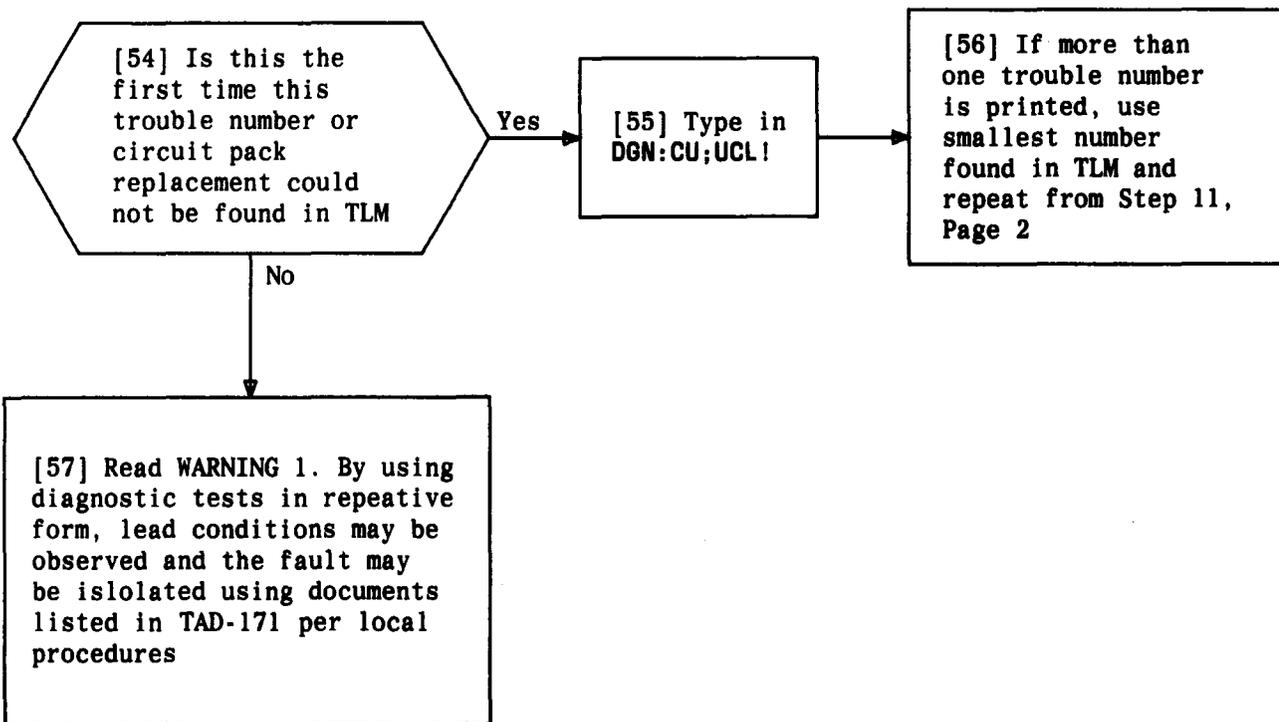
CAUTION 1	
<i>On-line circuit packs cannot be replaced without causing a service loss. Replace only during low traffic periods if possible</i>	
Issue 2	AUG 1984
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CLEAR CONTROL UNIT (CU) REMOVED FROM SERVICE



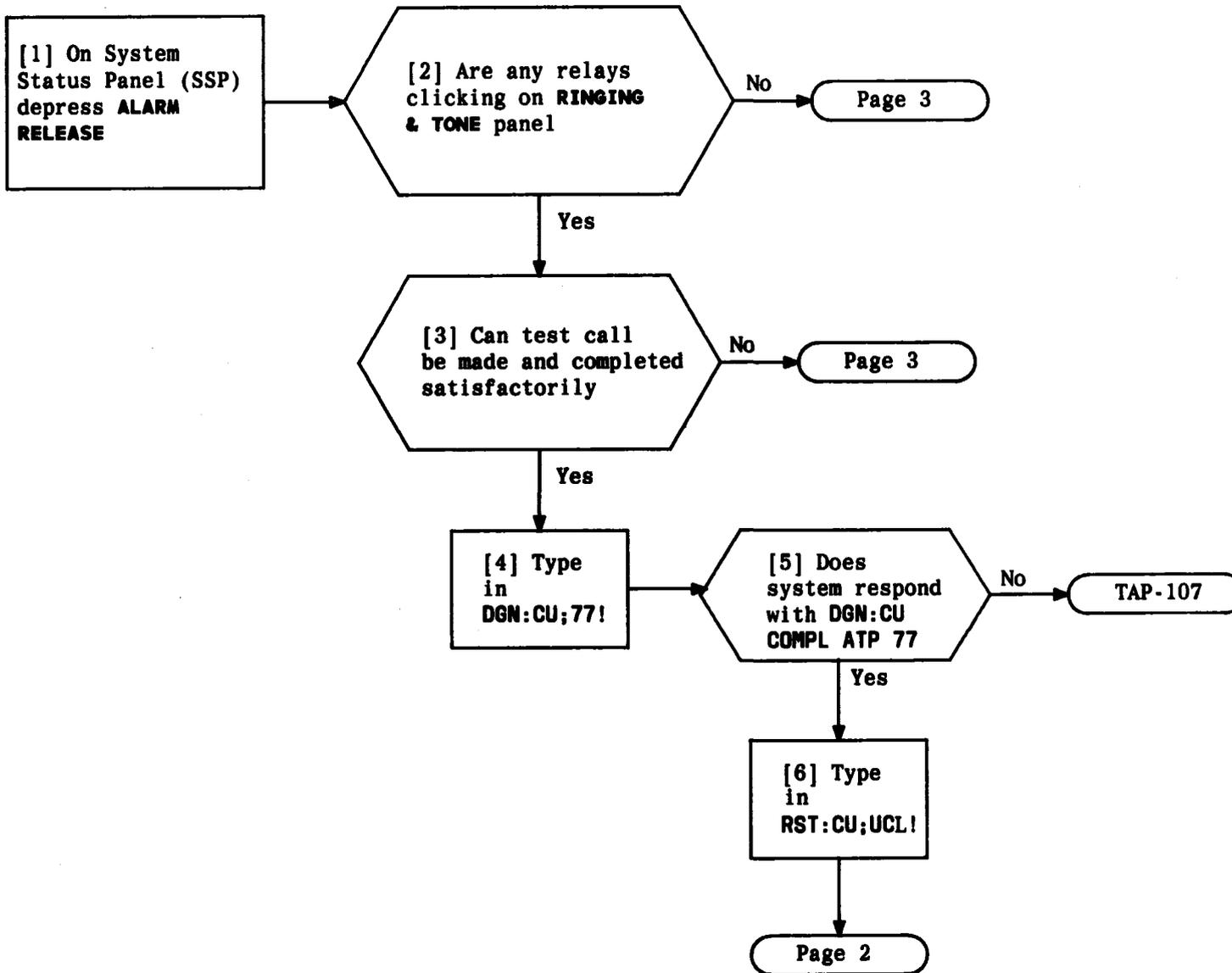
CLEAR CONTROL UNIT (CU) REMOVED FROM SERVICE

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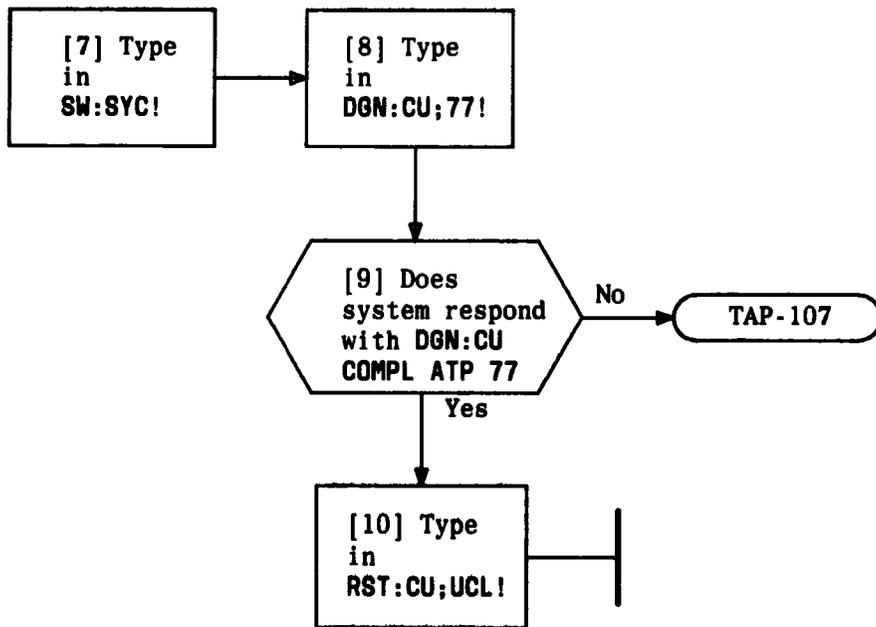
CLEAR CONTROL UNIT (CU) REMOVED FROM SERVICE

WARNING 1	
<i>Running diagnostic tests 37 and 54 in repetitive form may cause equipment damage. Use step form</i>	
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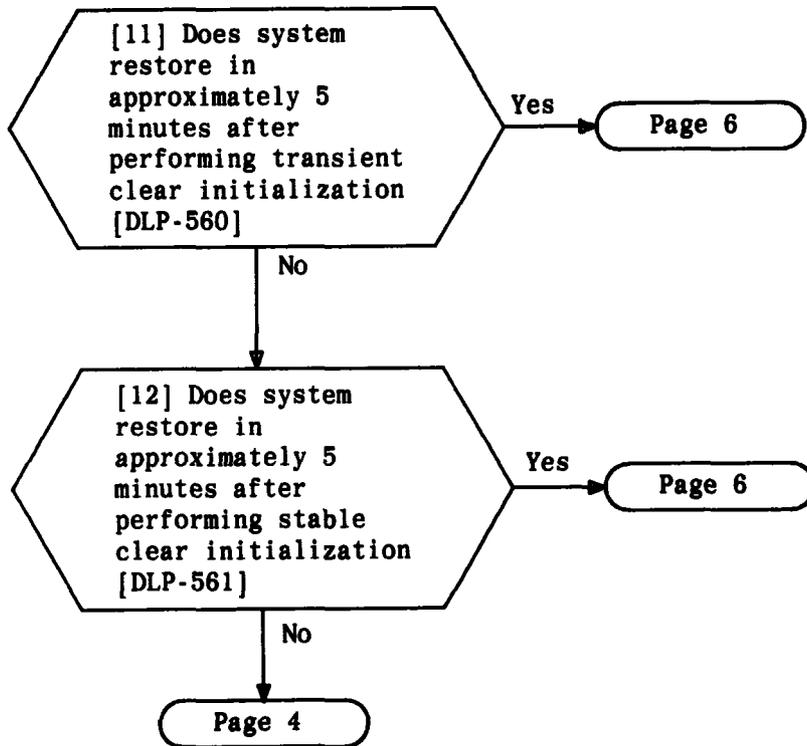
CLEAR PANEL TIME-OUT CRITICAL ALARM

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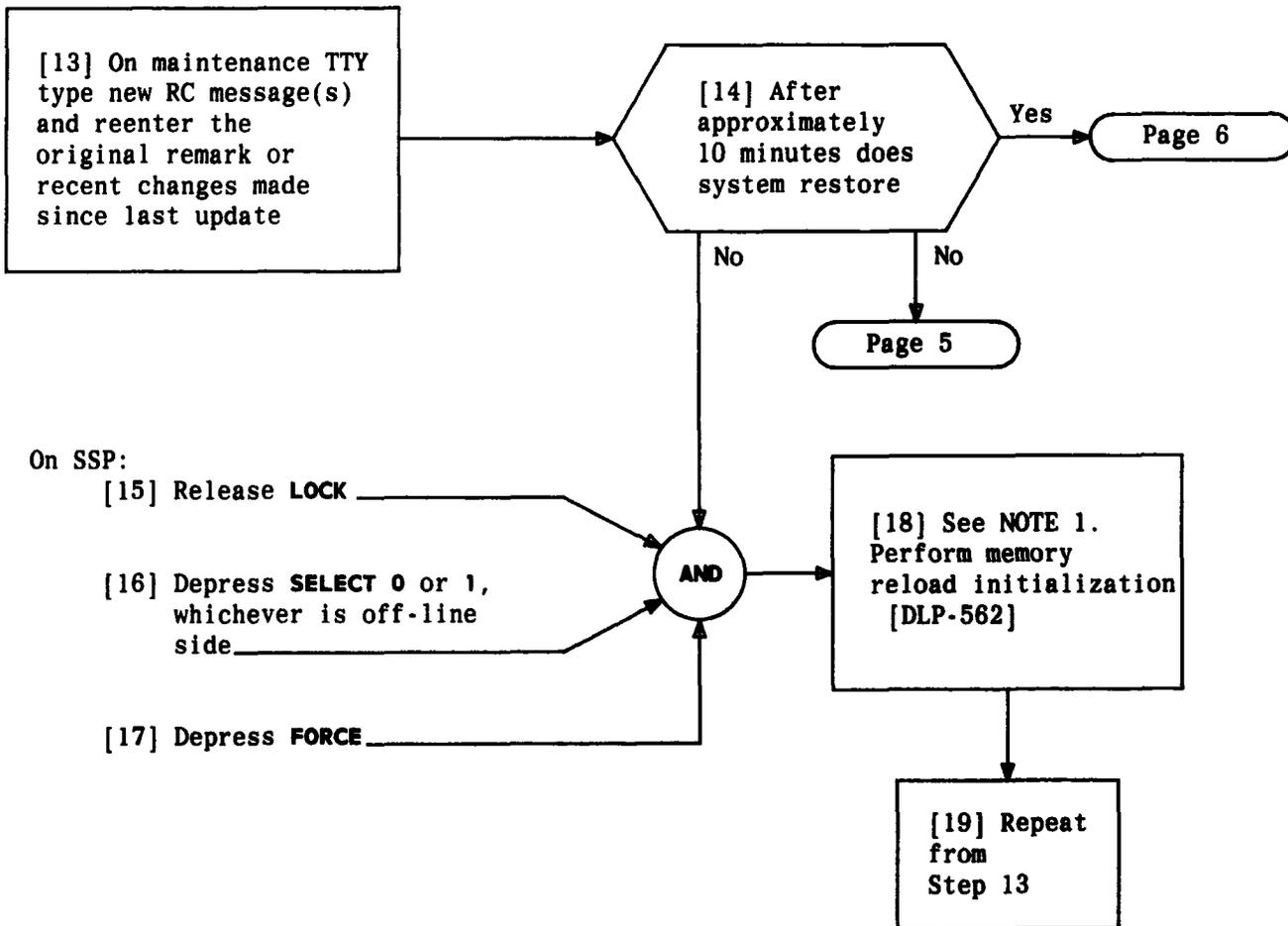
CLEAR PANEL TIME-OUT CRITICAL ALARM

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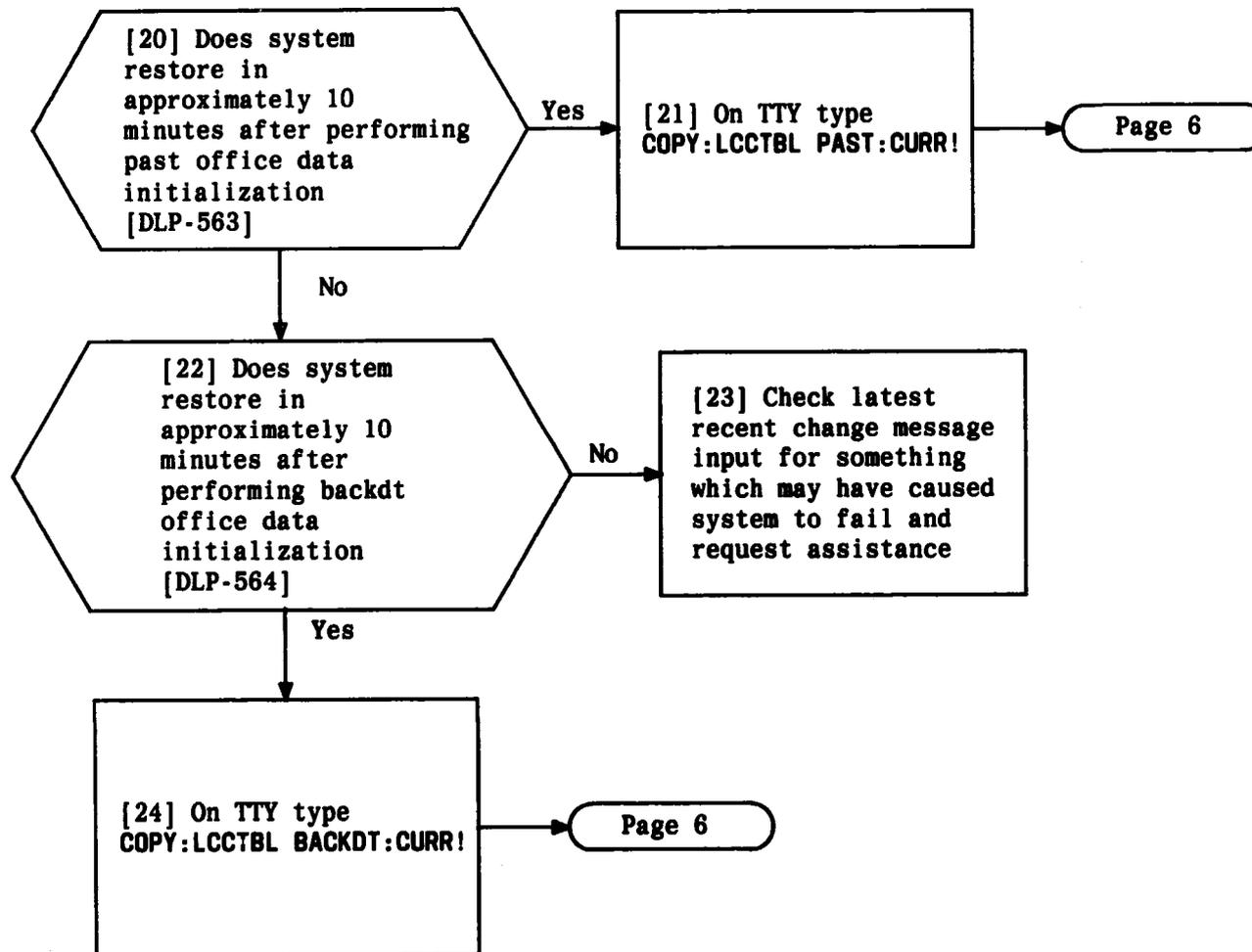
CLEAR PANEL TIME-OUT CRITICAL ALARM

Issue 2	AUG 1984
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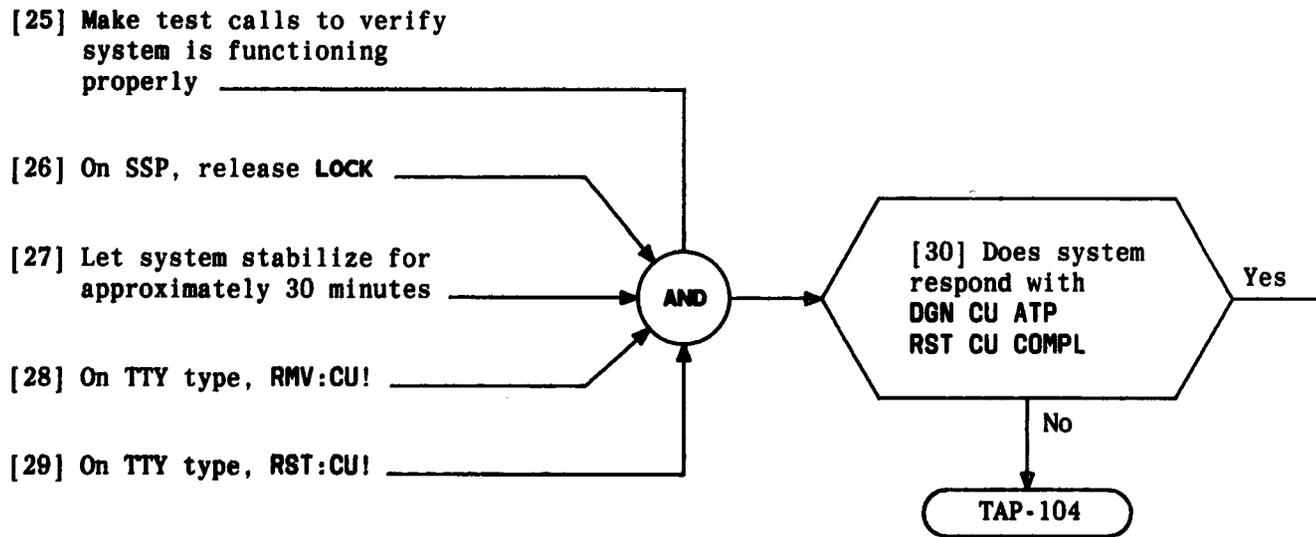
CLEAR PANEL TIME-OUT CRITICAL ALARM

NOTE 1	
Performing memory reload causes the remark files and translation files to disagree	
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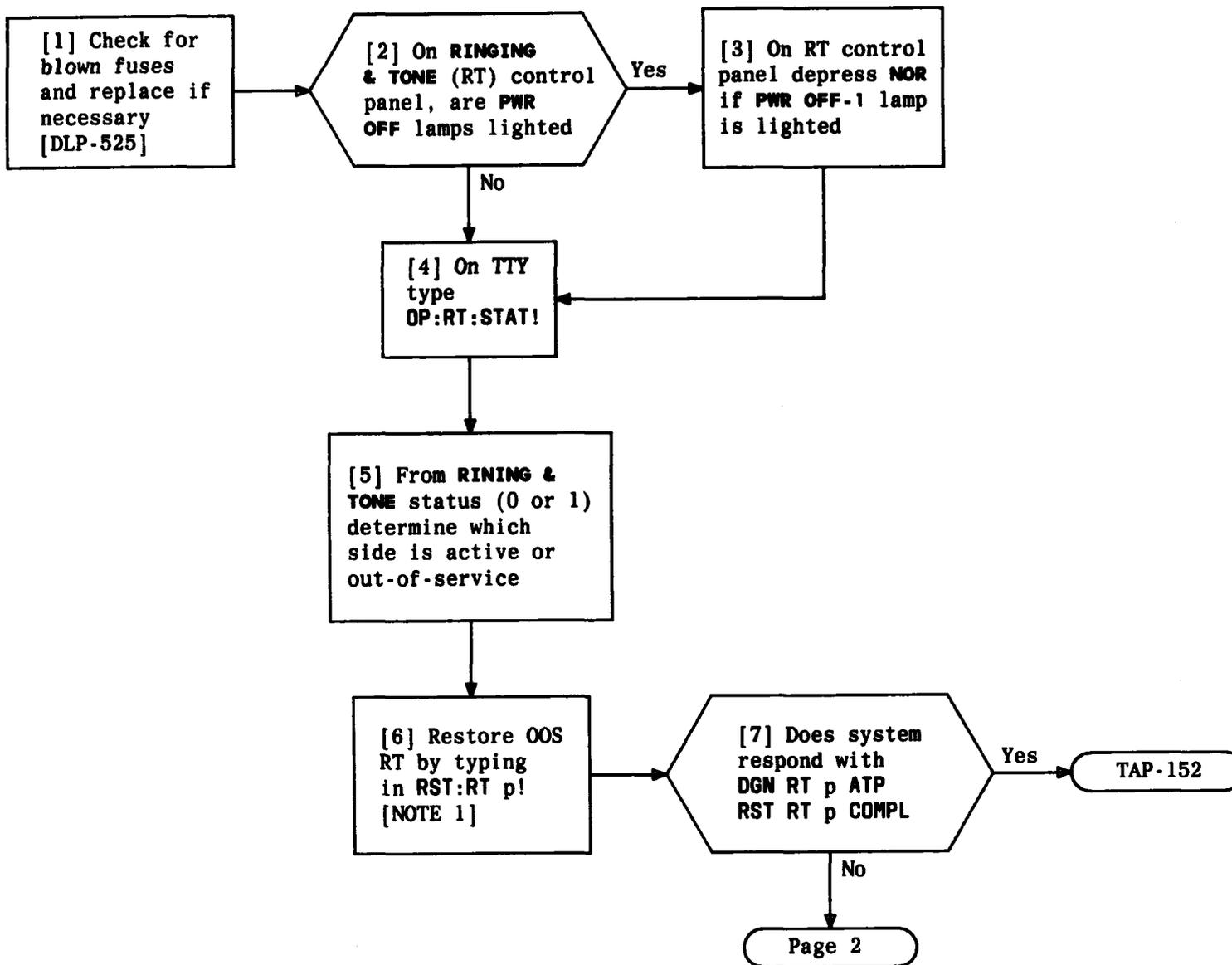
CLEAR PANEL TIME-OUT CRITICAL ALARM

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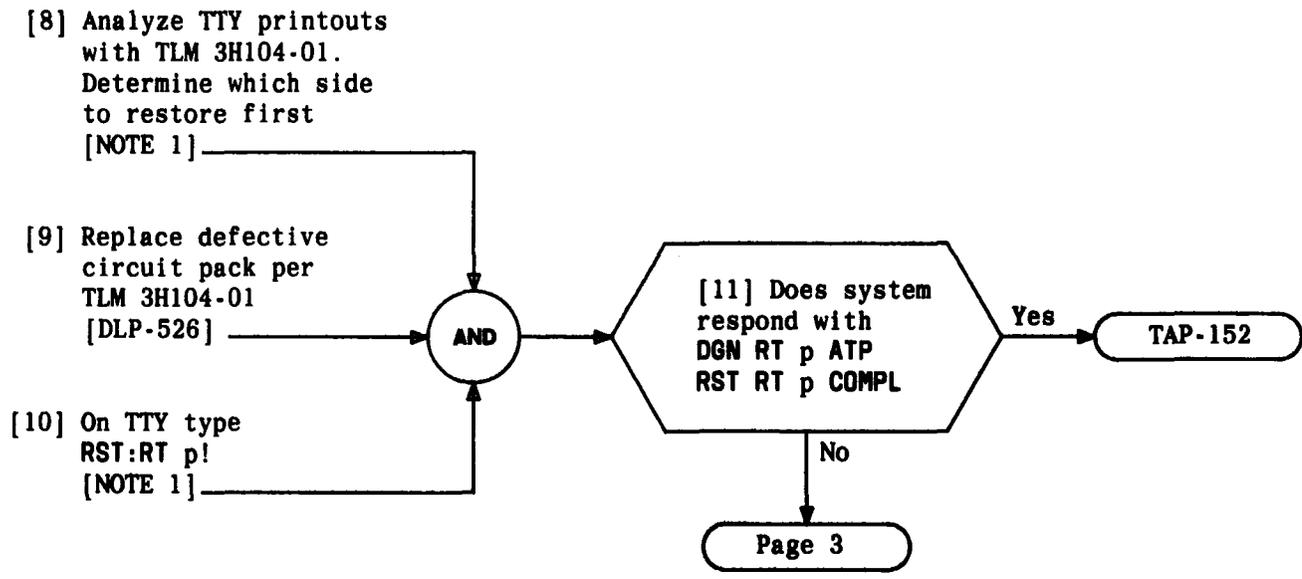
CLEAR PANEL TIME-OUT CRITICAL ALARM

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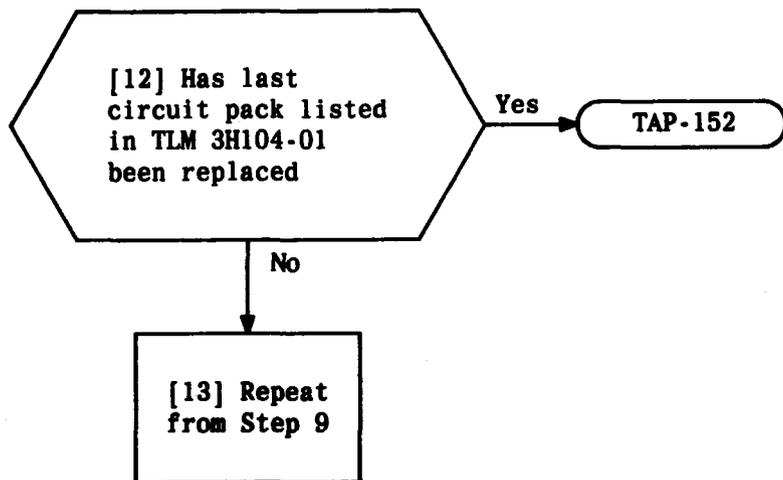
NOTE 1	
On RINGING & TONE plant p = 0 or 1	
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CLEAR MULTIPLE RINGING AND TONE FAULT



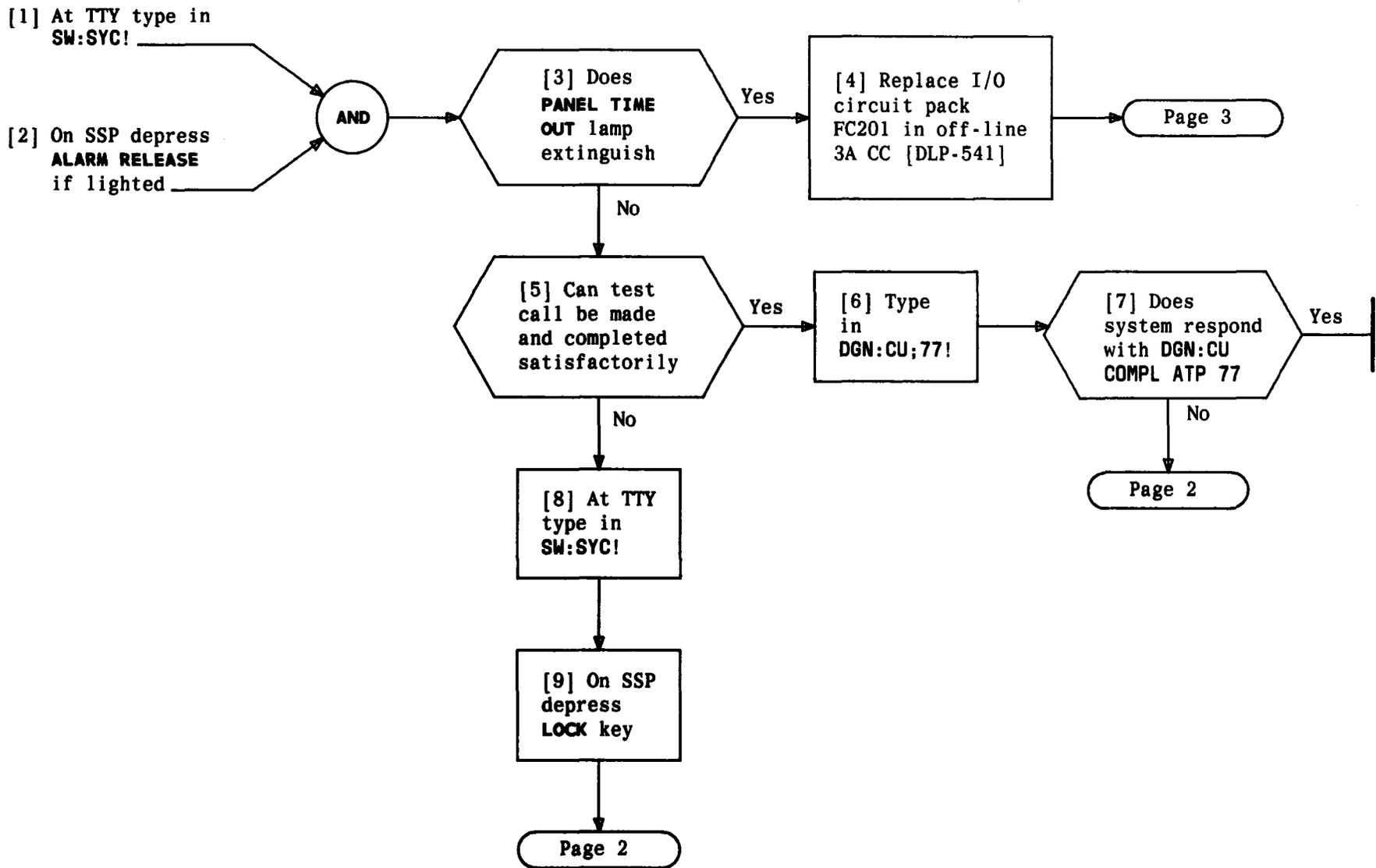
CLEAR MULTIPLE RINGING AND TONE FAULT

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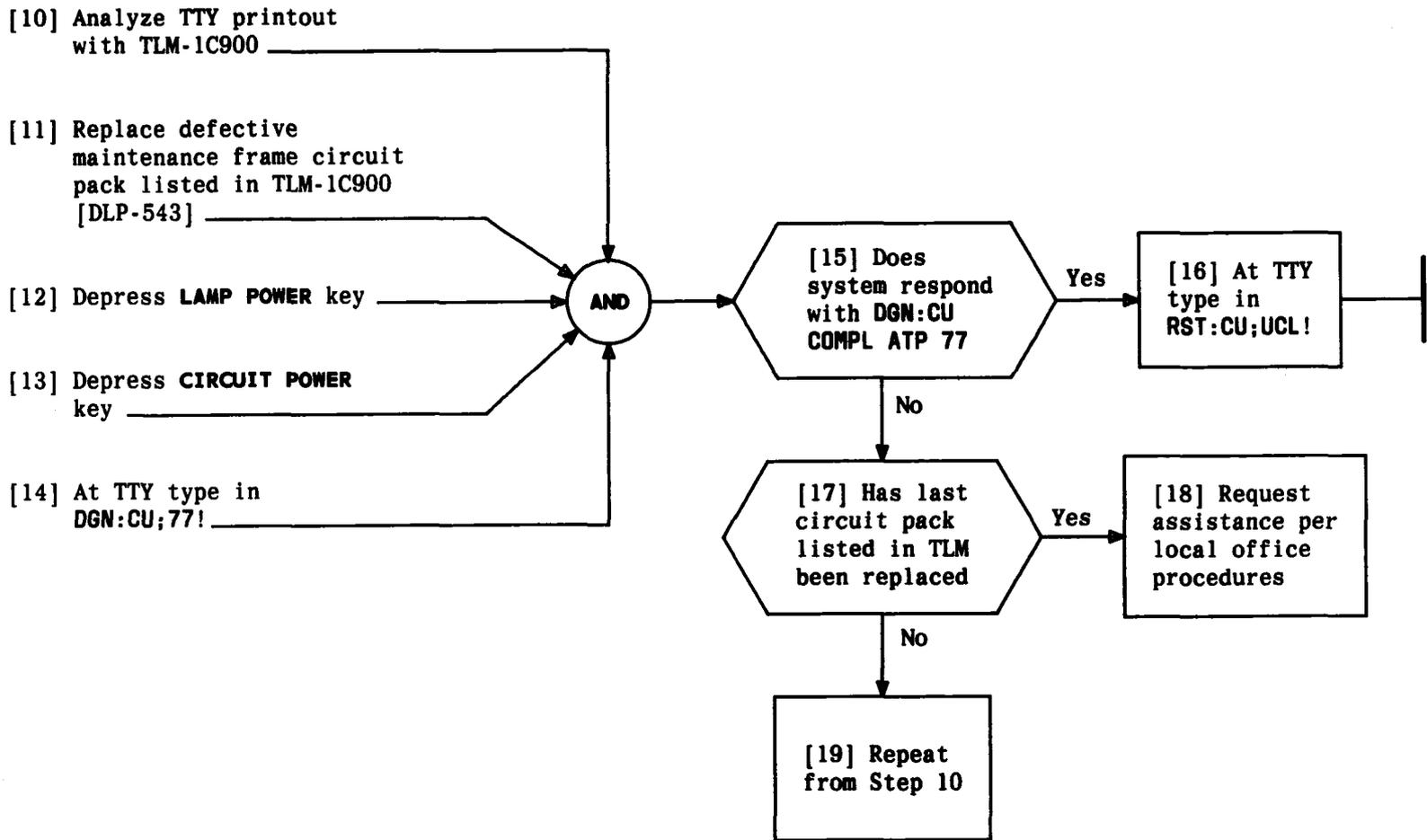
CLEAR MULTIPLE RINGING AND TONE FAULT

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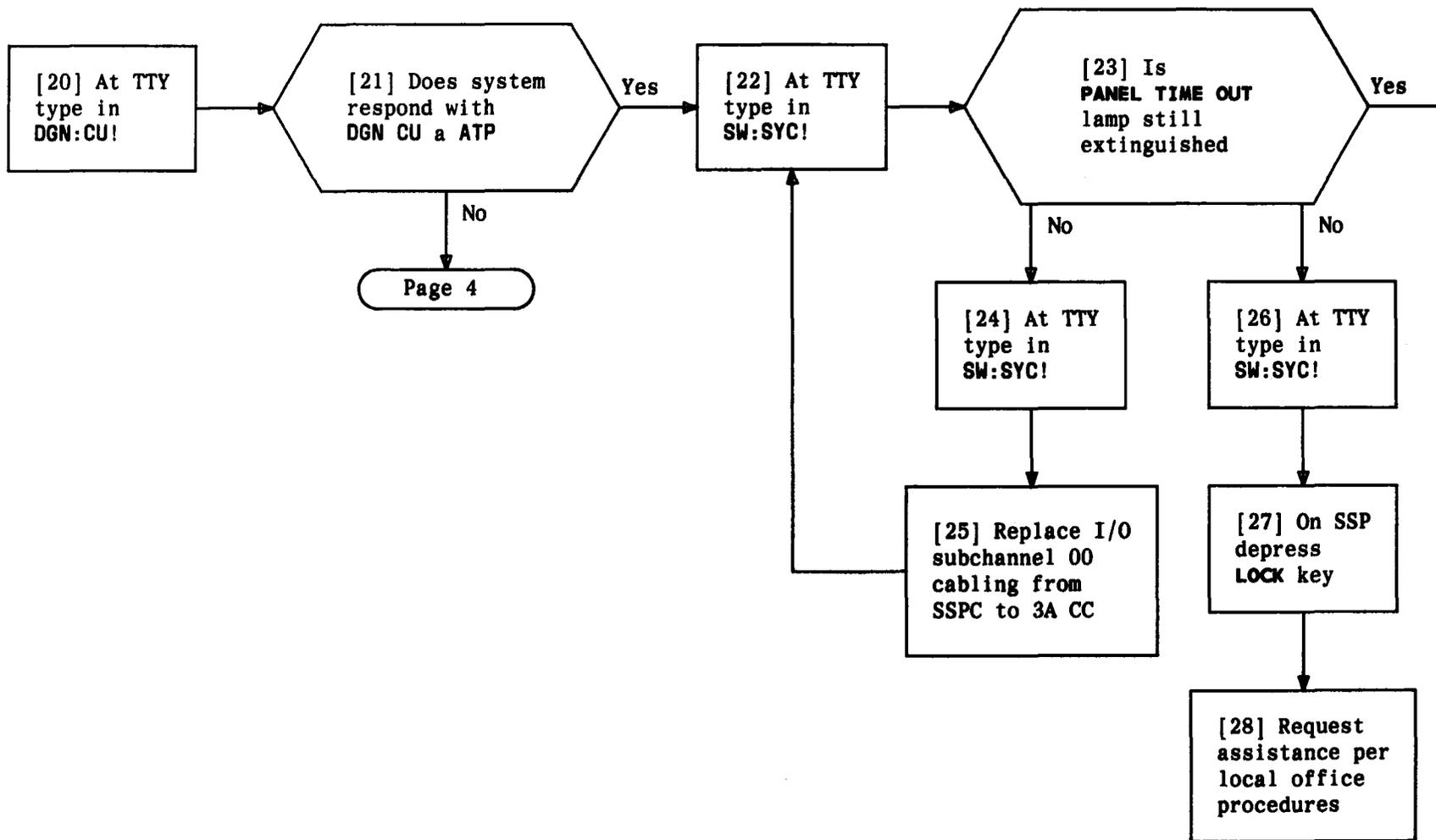
CLEAR SYSTEM STATUS PANEL TROUBLE

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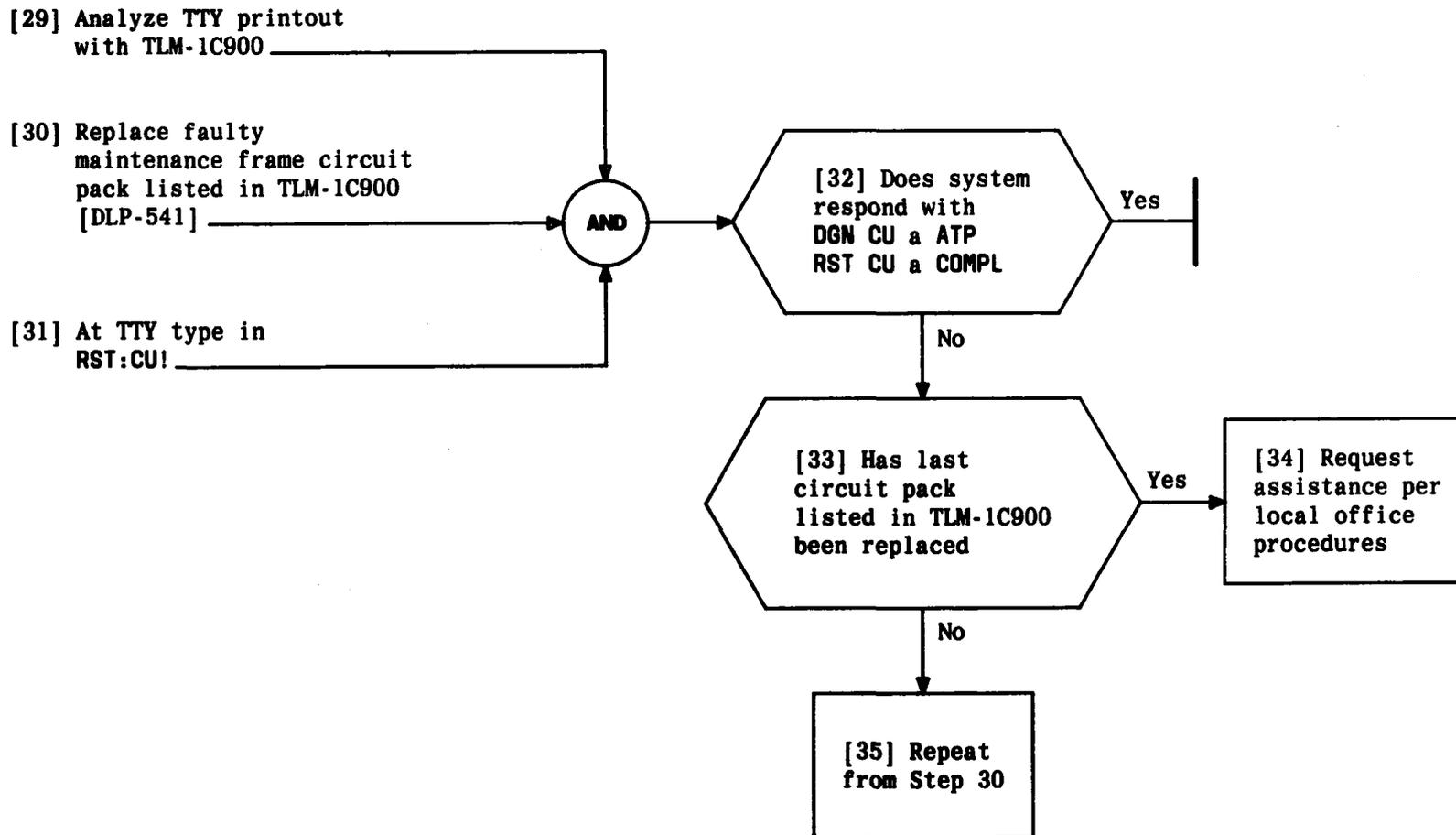
CLEAR SYSTEM STATUS PANEL TROUBLE

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CLEAR SYSTEM STATUS PANEL TROUBLE

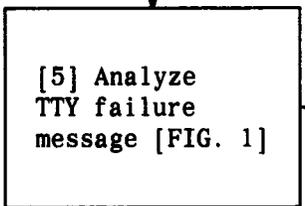
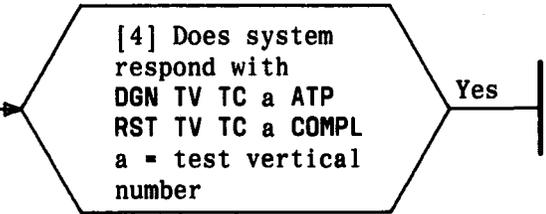
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[1] Replace any blown fuses located at base of miscellaneous power frame

[2] If test vertical is not removed from service, on TTY type RMV:TV t!
[See TABLE A]

[3] On TTY type RST:TV t!



Yes

No

Page 2

TABLE A

- t = One of the following Test Vertical Types
 - TC n = test vertical test circuit
 - TM m = test vertical test multiple
 - JC g = junctor test vertical
 - BLNK g = Wire test vertical
- n = Test Vertical Test Circuit (TVTC)
 - 0 = wire TVTC, low concentrator groups (1-7)
 - 1 = junctor TVTC, low concentrator groups (1-7)
 - 2 = wire TVTC, high concentrator groups (8-15)
 - 3 = junctor TVTC, high concentrator groups (8-15)
- m = Test Vertical Test Multiple (TVTM)
 - 0 = wire TVTM, even numbered concentrator groups
 - 1 = wire TVTM, odd numbered concentrator groups
 - 2 = junctor TVTM, even numbered concentrator groups
 - 3 = junctor TVTM, odd numbered concentrator groups
- g = the concentrator group (1-15) of the link

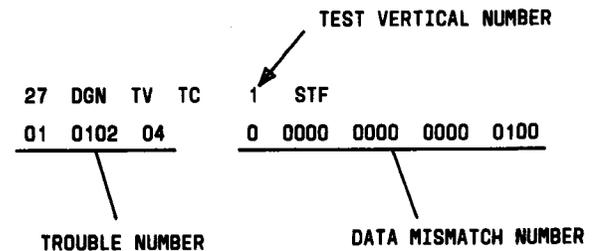
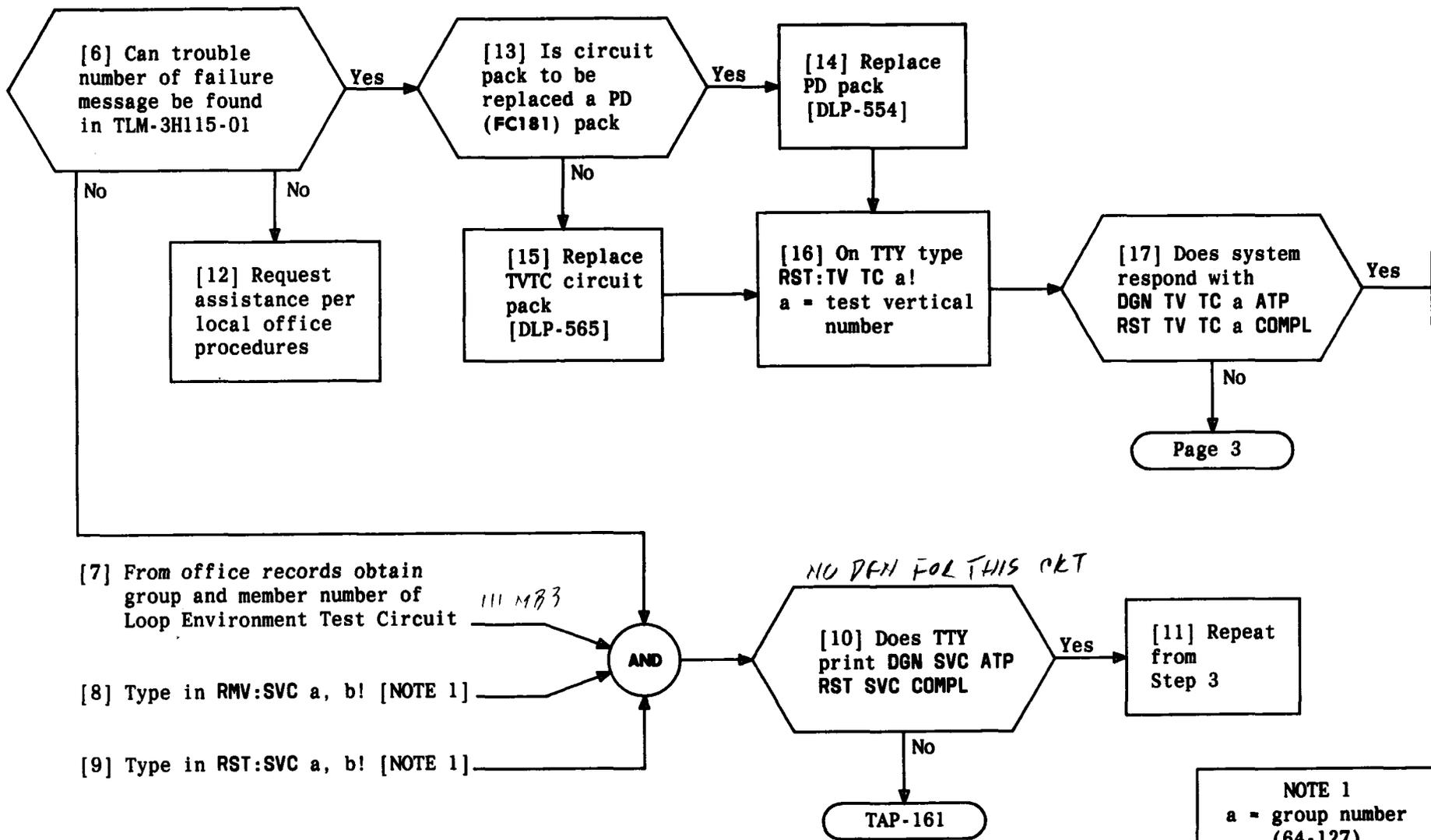


FIG. 1 - Example of TTY Failure Message

CLEAR TEST VERTICAL TEST CIRCUIT TROUBLE REPORT

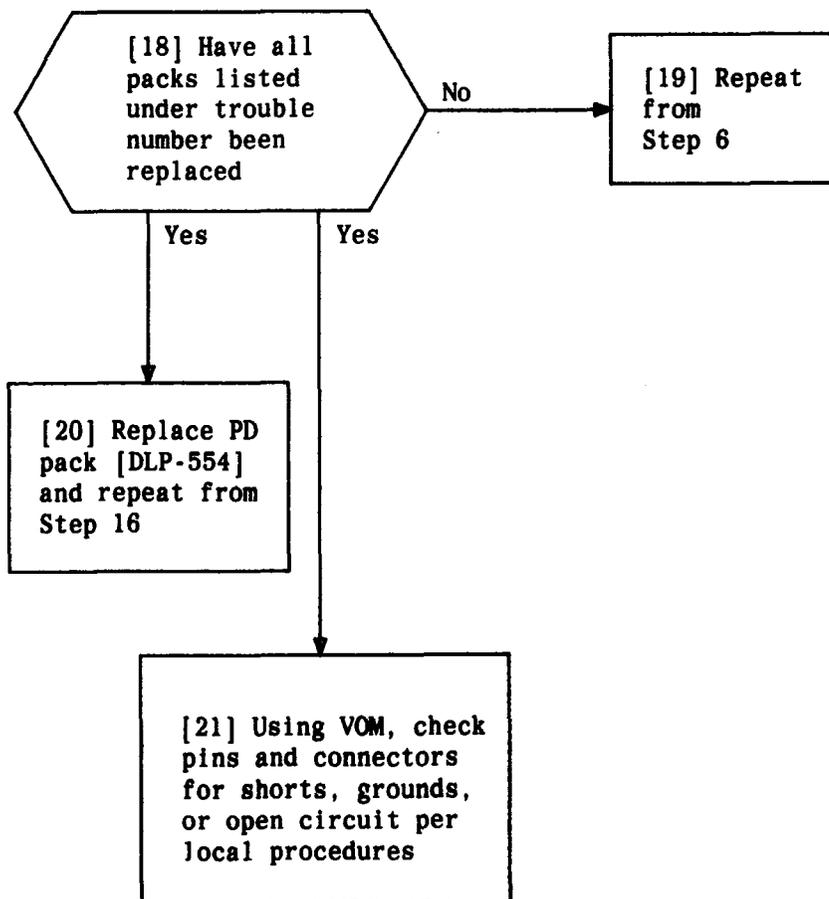
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NOTE 1
 a = group number (64-127)
 b = member number (0-127)

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CLEAR TEST VERTICAL TEST CIRCUIT TROUBLE REPORT



[1] Condition a portable voltmeter to measure 50 volts dc

[2] Connect voltmeter to power unit output jacks (+) V OUT and (-) V OUT [FIG. 1, 2]

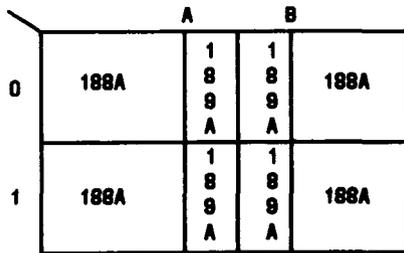


FIG. 1

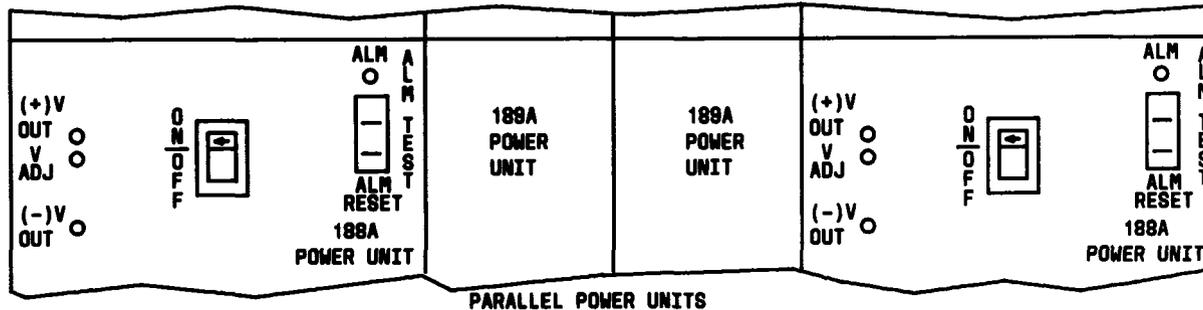
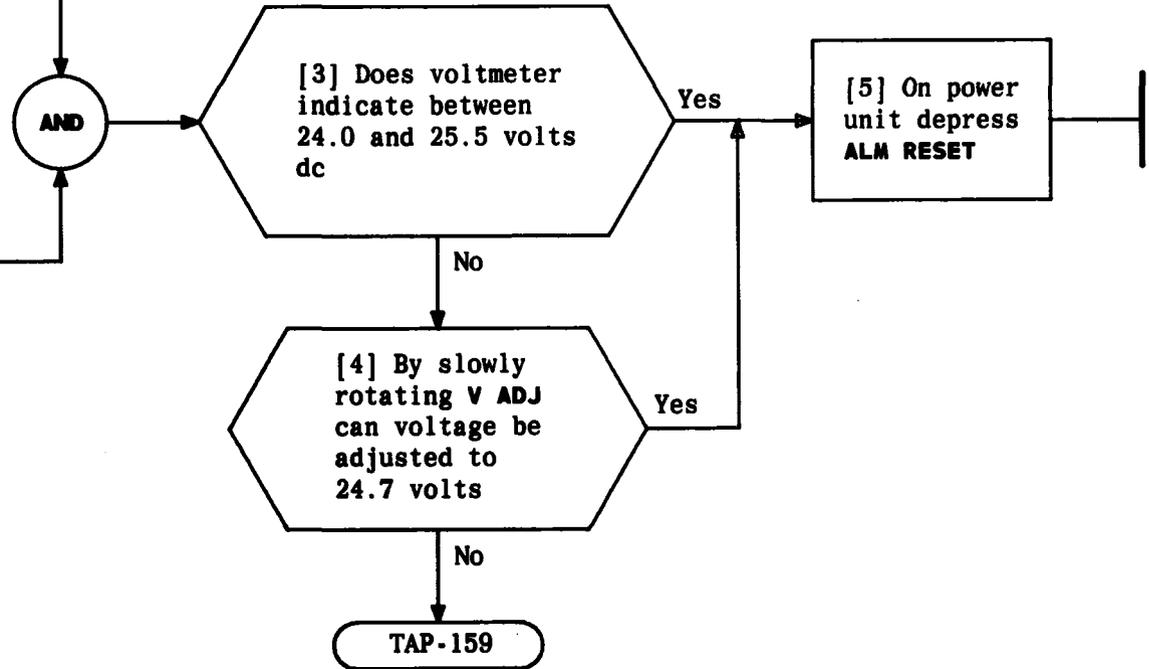
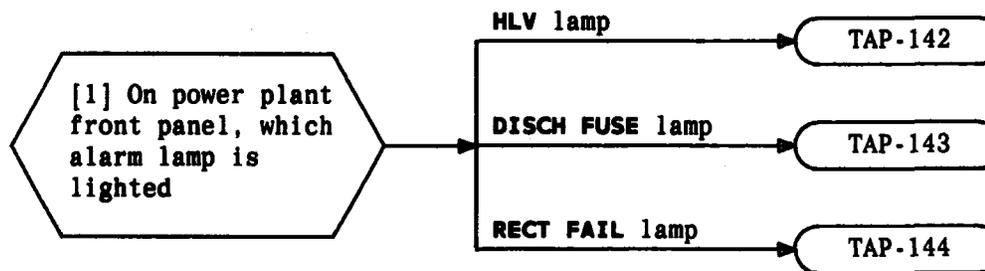


FIG. 2 - 2 of 4 Miscellaneous Power Frame Parallel +24V Power Units

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CLEAR +24 VOLT OUT-OF-LIMIT ALARM



CLEAR 151A POWER PLANT ALARMS

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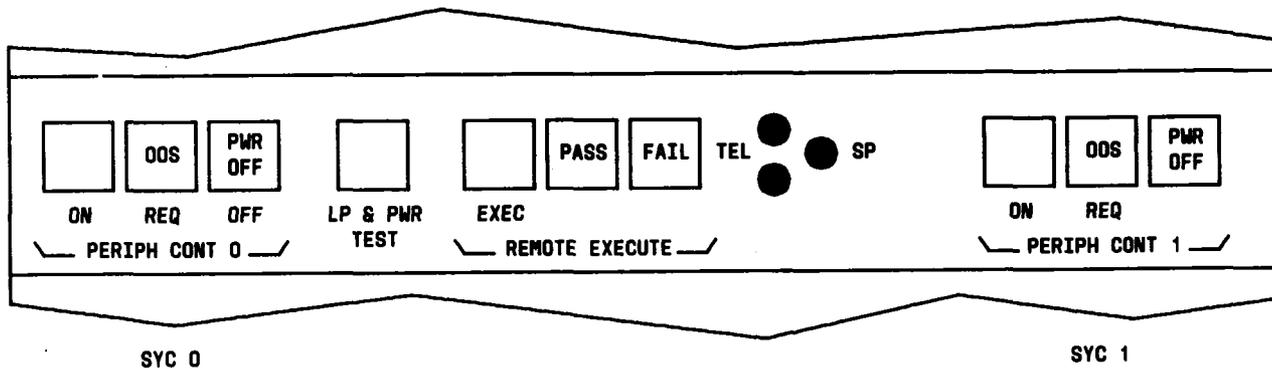
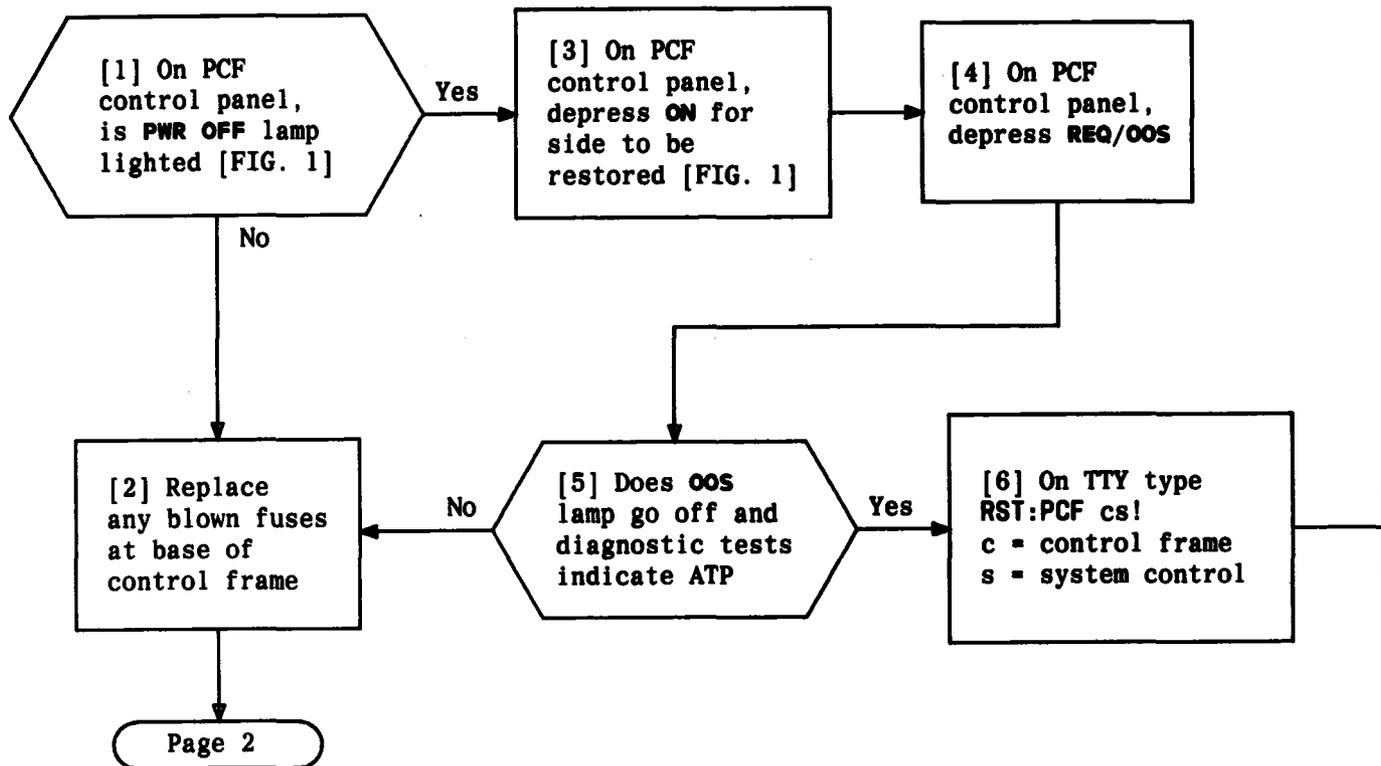
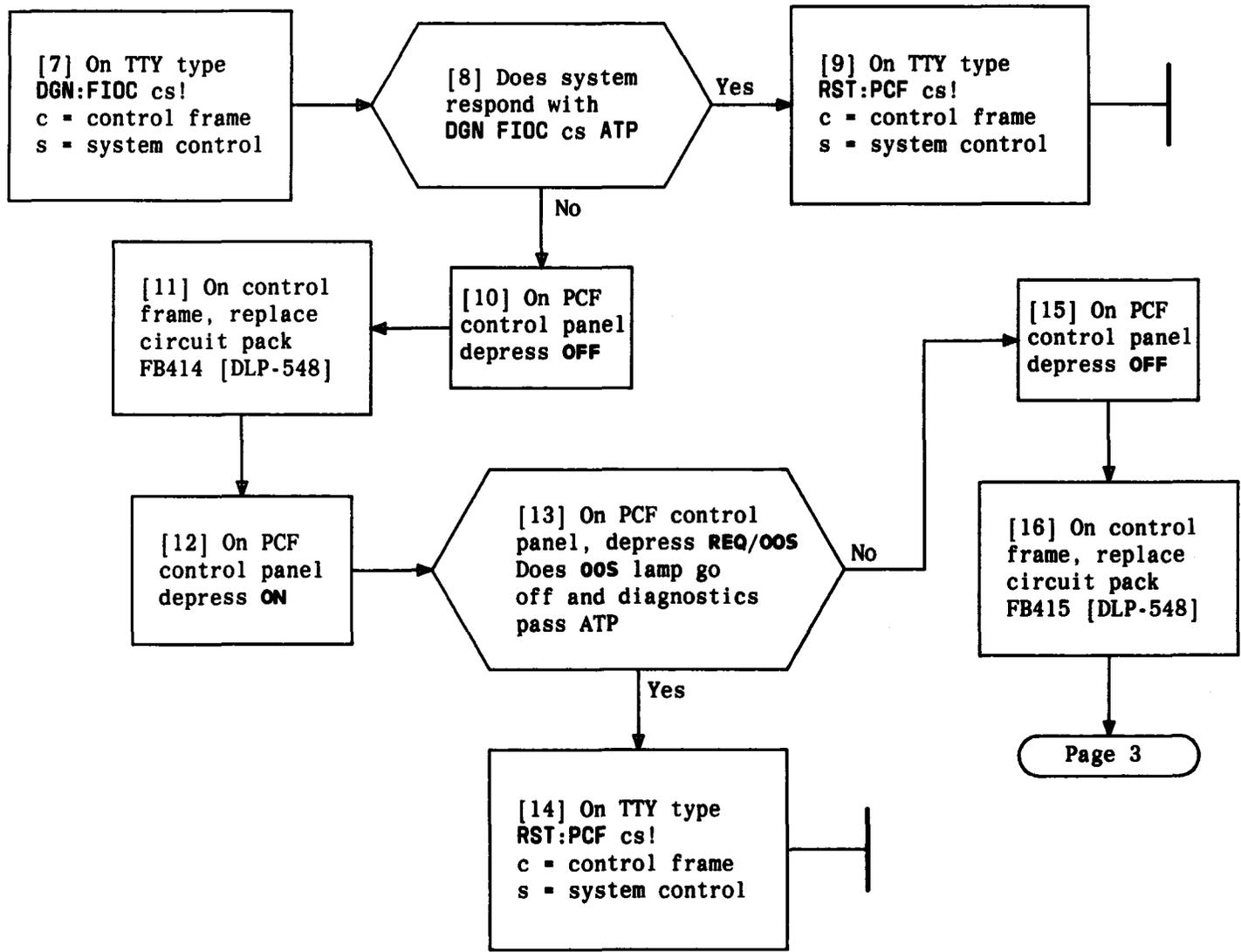


FIG. 1

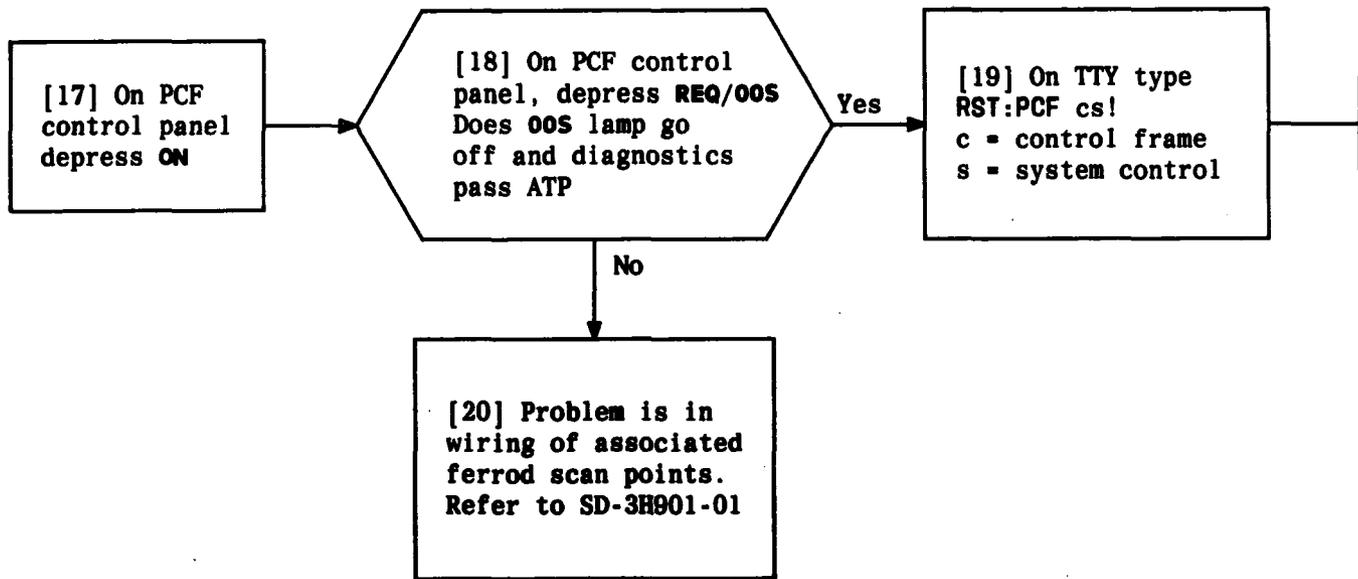
CLEAR POWER REMOVED CONDITION ON PERIPHERAL CONTROL FRAME (PCF)

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CLEAR POWER REMOVED CONDITION ON PERIPHERAL CONTROL FRAME (PCF)

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CLEAR POWER REMOVED CONDITION ON PERIPHERAL CONTROL FRAME (PCF)

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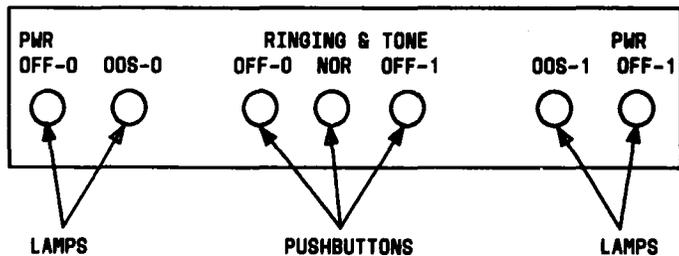
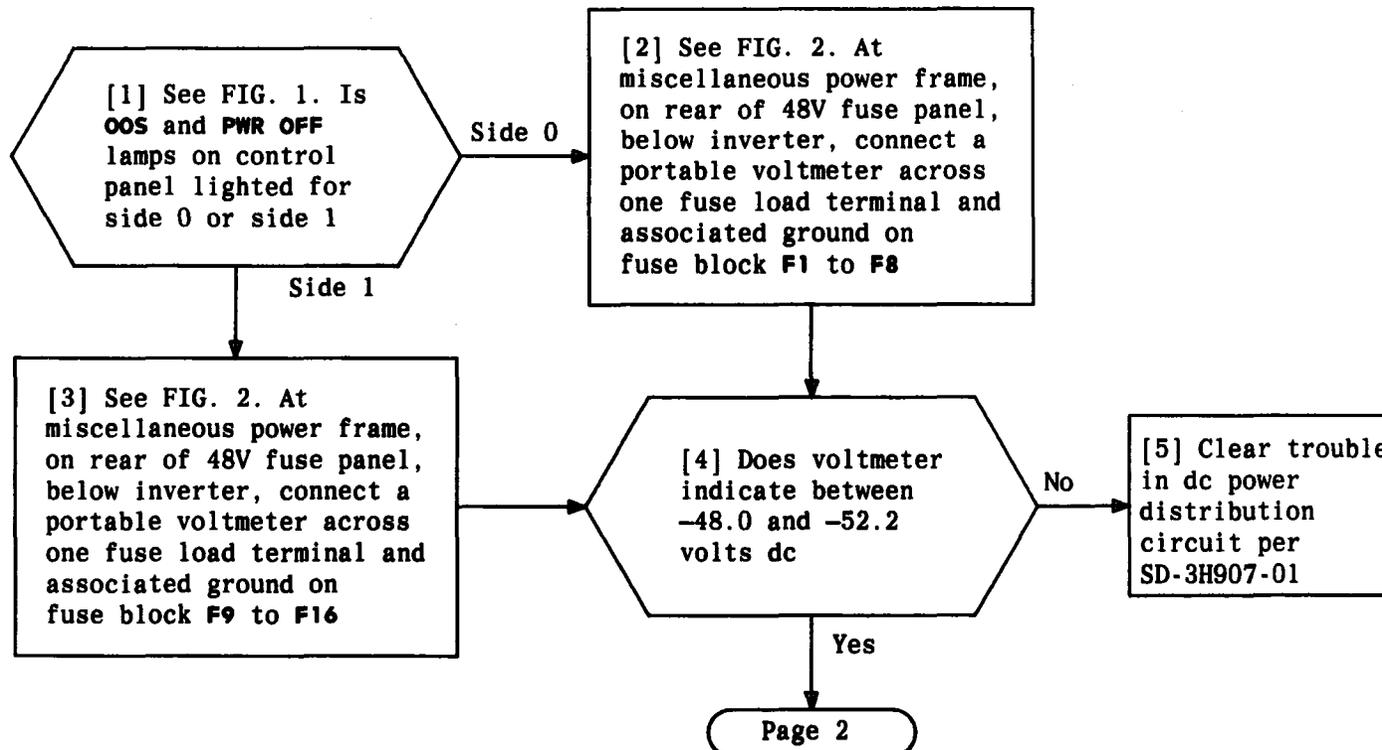


FIG. 1 - Ringing & Tone Panel

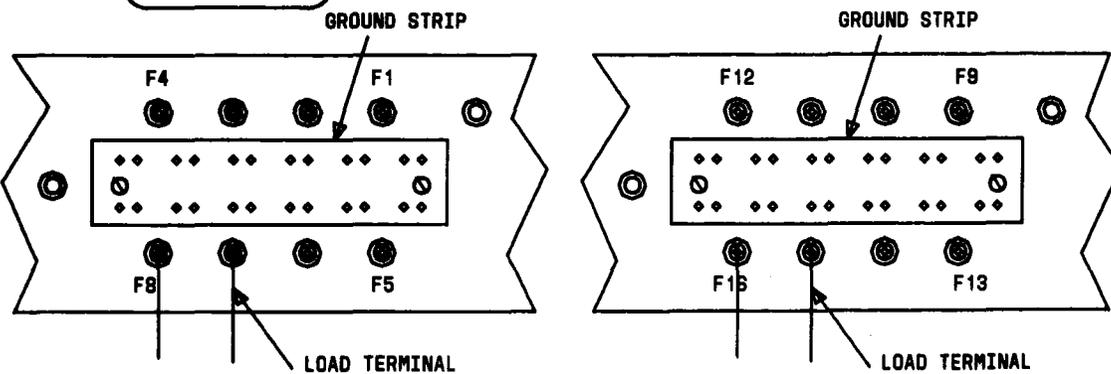
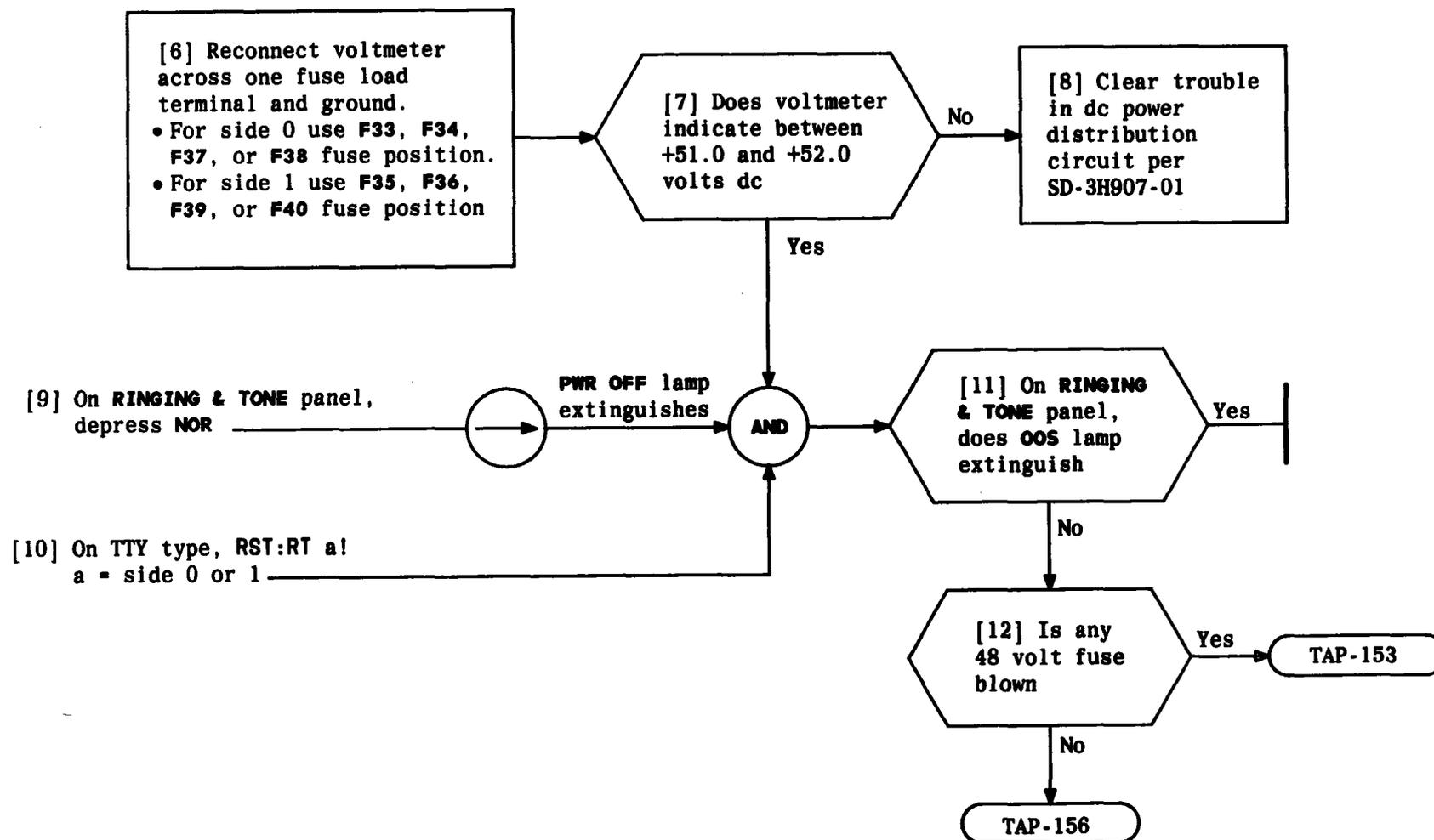


FIG. 2 - Fuse Block - Typical Connection - Rear View

CLEAR POWER REMOVED CONDITION ON RINGING & TONE PLANT

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CLEAR POWER REMOVED CONDITION ON RINGING & TONE PLANT

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At System Status Panel:

[1] Depress **ALARM TRFR**
if lighted

[2] Depress **ALARM RELEASE**

On TTY:

[3] Type **OP:SVC!**

[4] Using printout, type
RST:SVC a,b!
for first circuit
on list [NOTE 1]

AND

[5] Does system
respond with
DGN SVC a,b ATP
RST SVC a,b COMPL

No

[6] Clear
service
circuit trouble
[TAP-161]

Yes

[7] Has last
circuit listed
been restored to
service

Yes

No

[8] On TTY type
RST:SVC a,b! for
next circuit on
printout list
[NOTE 1]

[10] Clear
service
circuit trouble
[TAP-161]

Yes

[9] Does system
respond with
DGN SVC a,b ATP
RST SVC a,b COMPL

No

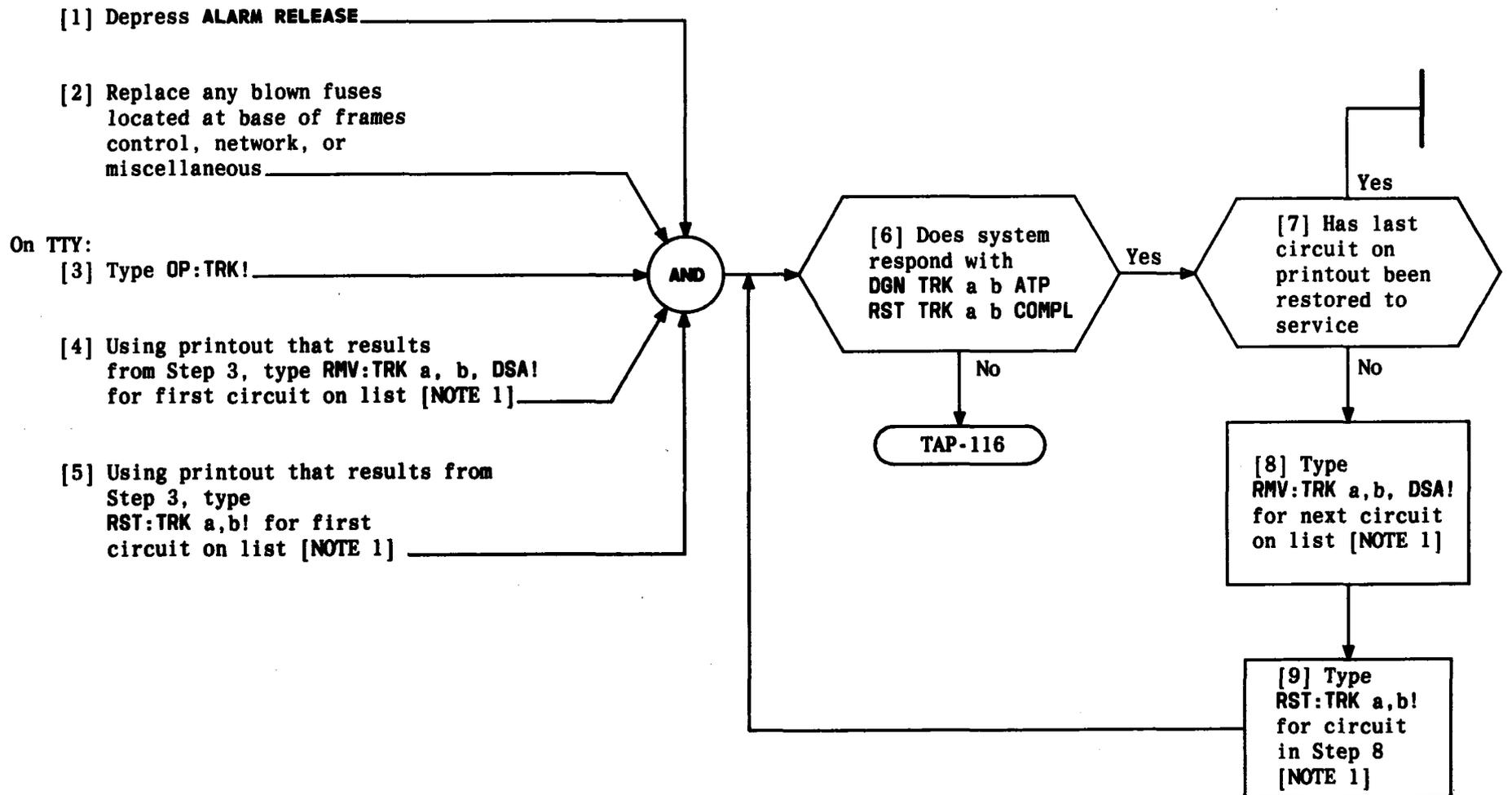
NOTE 1
a = group number
(64-127);
b = member number
(0-127)

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CLEAR SERVICE GROUP OUT OF SERVICE LIMIT ALARM



NOTE 1
 a = group number (128-255)
 b = member number (0-127)
 System will camp on busy trunk for 5 minutes

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CLEAR TRUNK GROUP OUT OF SERVICE LIMIT ALARM

[1] See FIG. 1 and TABLE A.
Analyze TTY printout

[2] Refer to trouble clearing
procedure indicated in
TABLE A

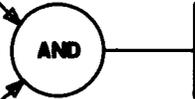


TABLE A		
TROUBLE TYPE	EXPLANATION	TROUBLE CLEARING PROCEDURE
PX	Power Cross	TAP-145
RVF	Restore Verify Failure	TAP-164
LCRV	Line Circuit Restore Verify Failure	TAP-165
STUCK COIN	Stuck Coin Control Error	TAP-166
EA CONT	Continuity Failures	TAP-124
EA RC	Ringing Continuity Failures	TAP-125
EA NWC	Network Controller Errors	TAP-119
EA LLR	Low Leakage Resistance Failures	TAP-163
EA LCO	Line Cut-Off Failures	TAP-164
EA TTR	Touch-Tone Receiver Errors	TAP-170
EA CLC	Coin Line Circuit Failures	TAP-168
EA NCC	No-Coin Control Failures	TAP-169

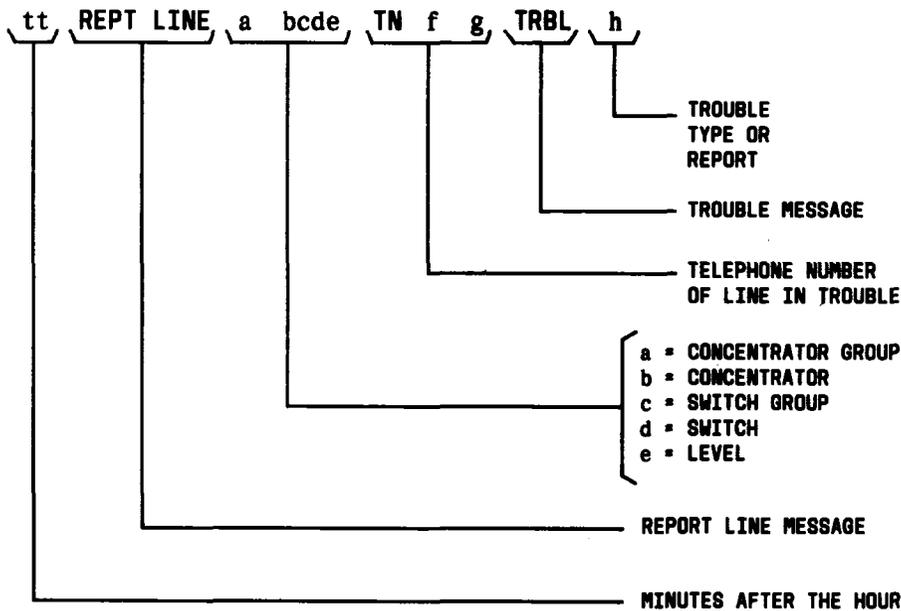
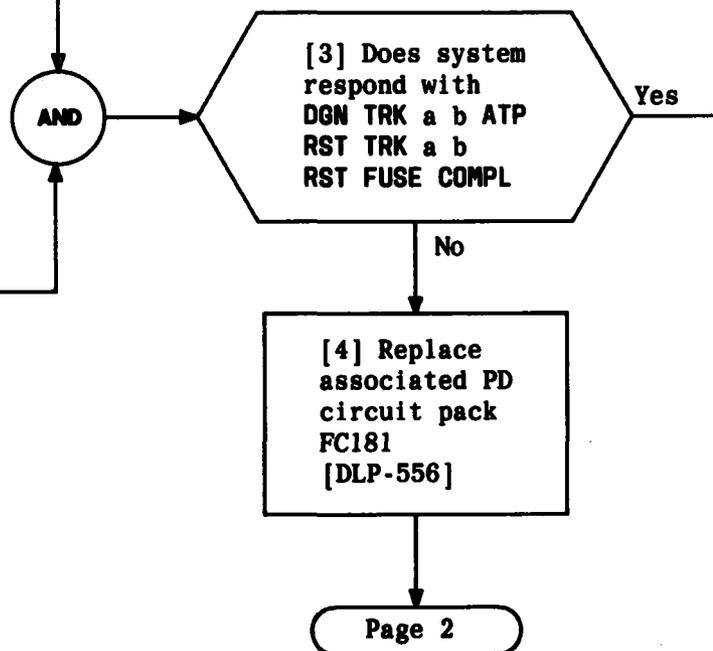


FIG. 1

CLEAR TROUBLE REPORTED ON LINE

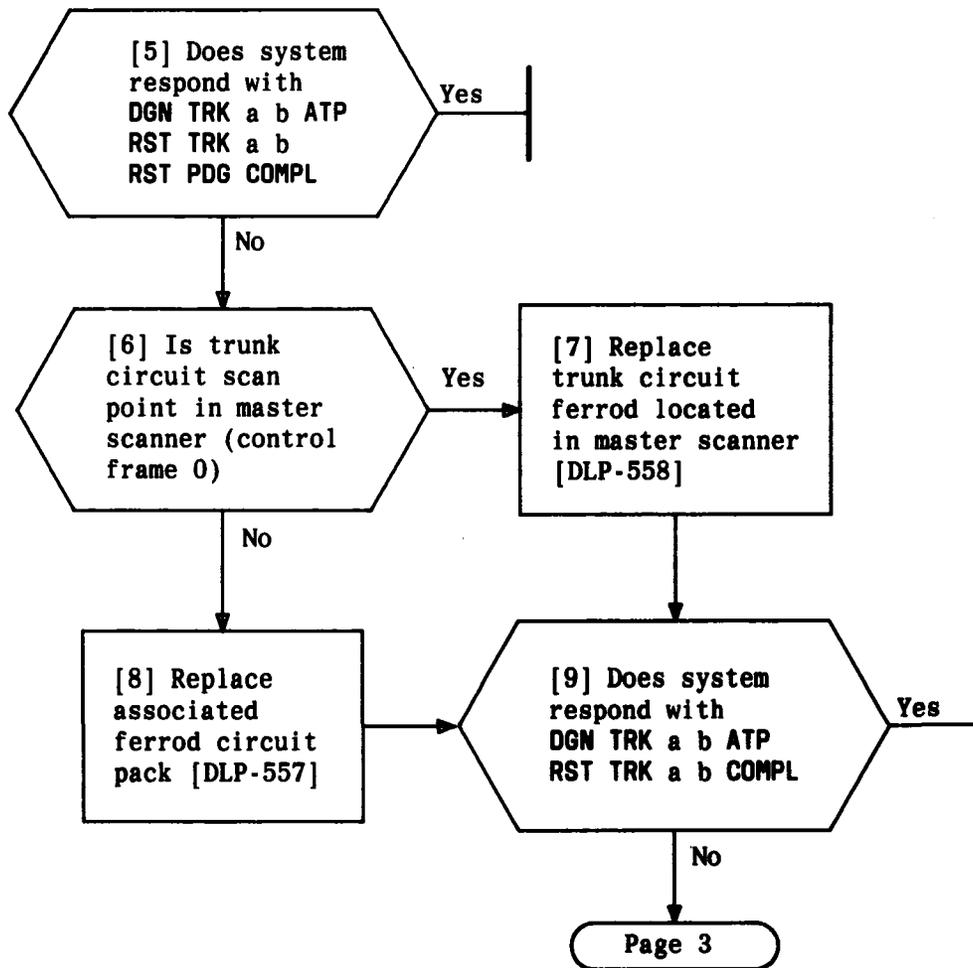
[1] From office records (E-3201-2, Trunk Assignment Table) obtain circuit type and location of pack in equipment frame

[2] Replace trunk circuit pack of trunk in trouble [DLP-552]



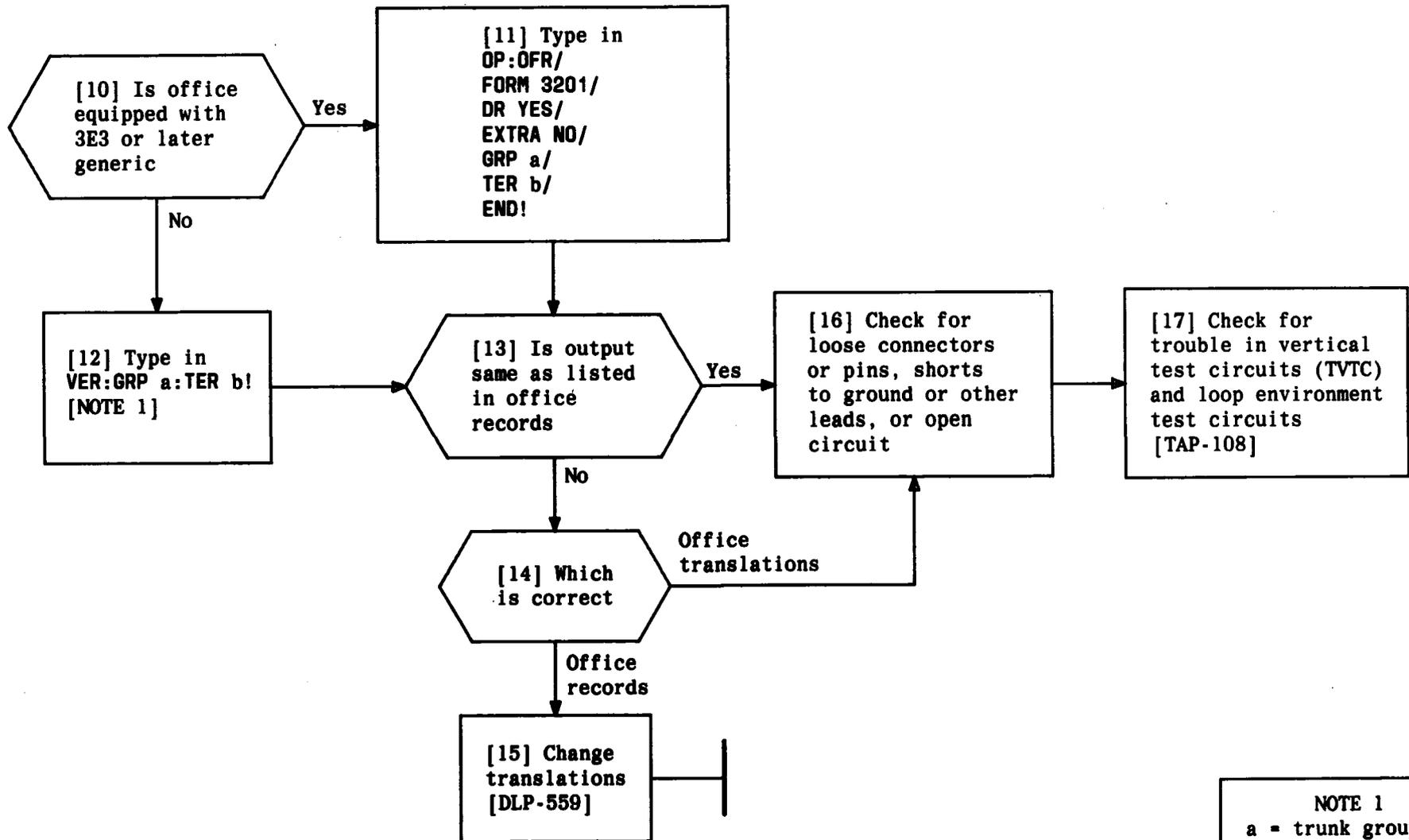
CLEAR TRUNK CIRCUIT TROUBLE

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CLEAR TRUNK CIRCUIT TROUBLE

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NOTE 1	
a - trunk group number 128-255	
b - member number 0-127	
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CLEAR TRUNK CIRCUIT TROUBLE

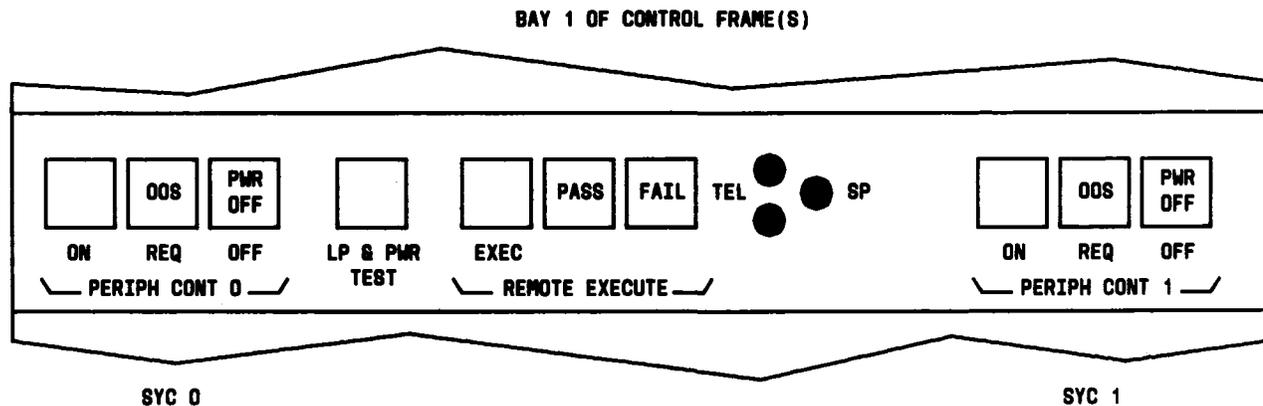
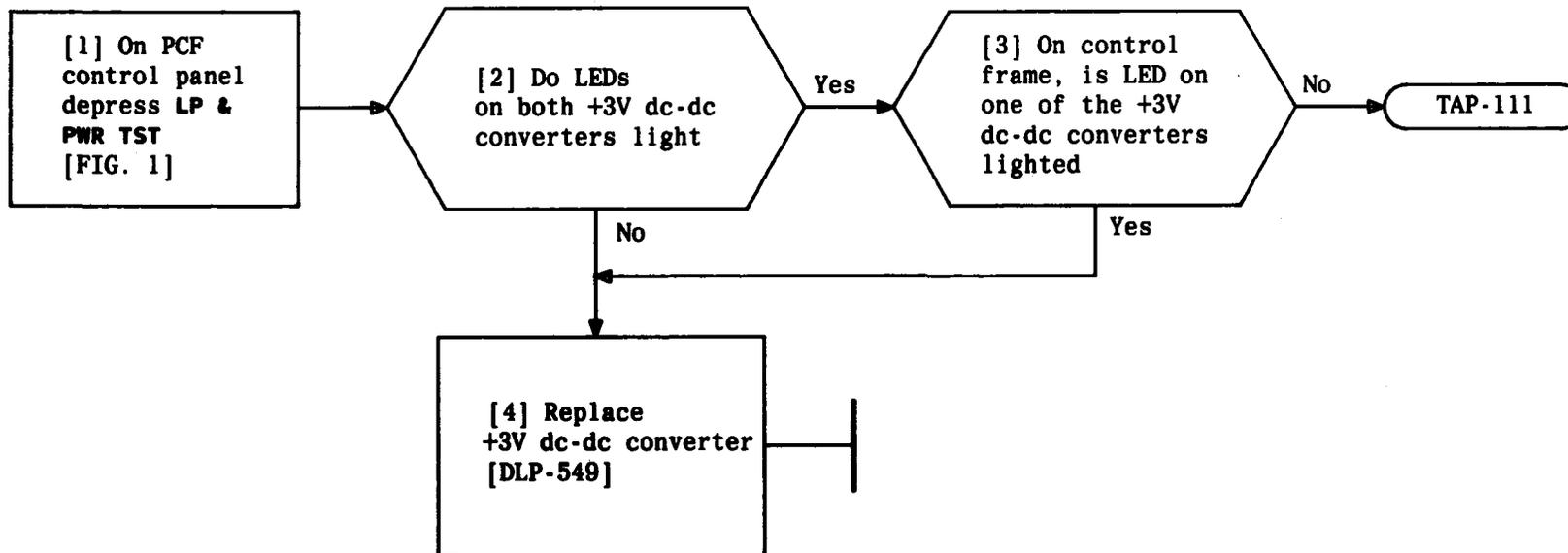


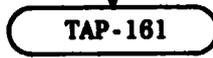
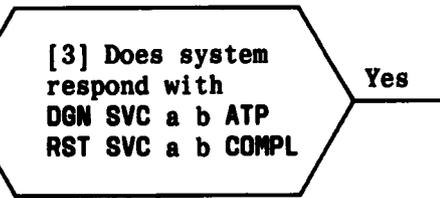
FIG. 1

CLEAR REPORT OF POWER TROUBLE ON PERIPHERAL CONTROL FRAME (PCF)

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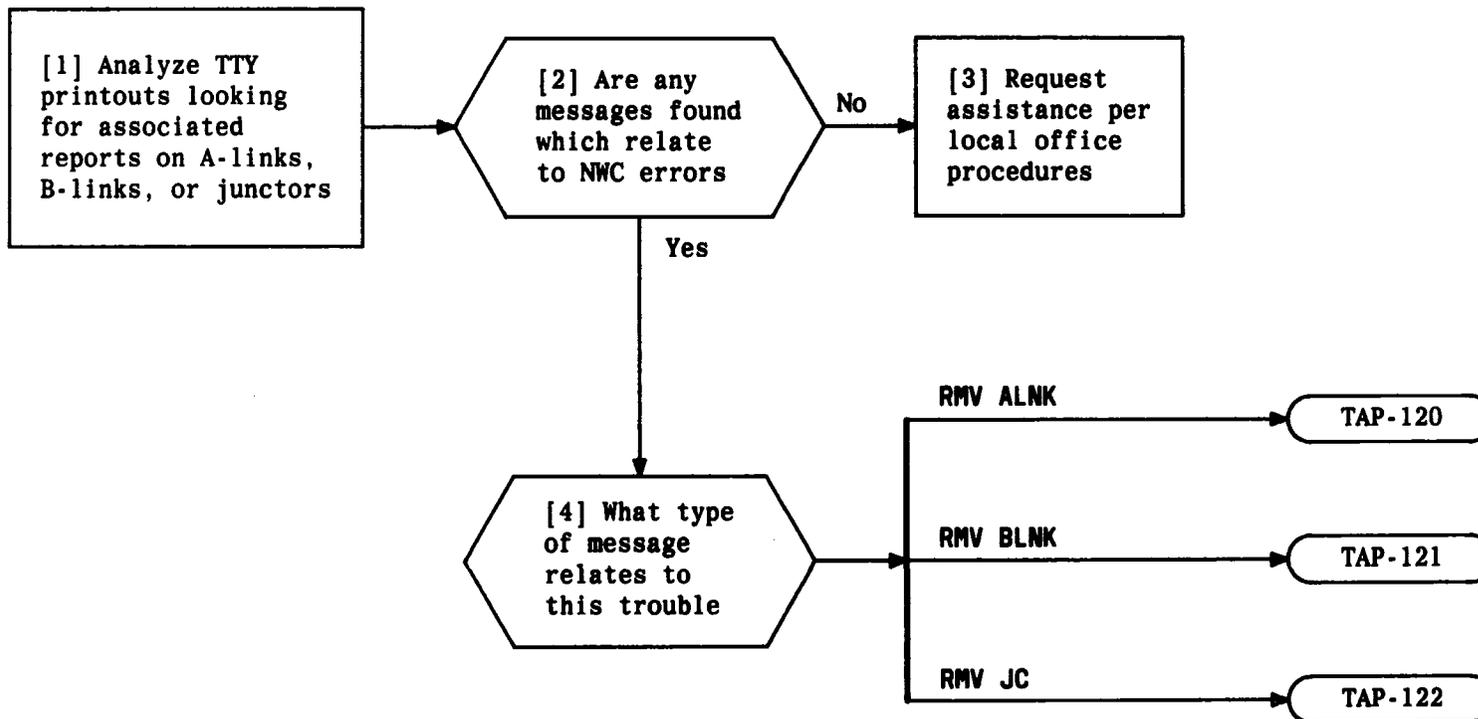
[1] On SSP depress
ALARM RELEASE

[2] On TTY type
RST:SVC a,b!
a = trunk group number (64-127)
b = member number (0-127)



CLEAR SERVICE CIRCUIT REMOVED FROM SERVICE

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CLEAR ERROR ANALYSIS (EA) REPORT OF NETWORK CONTROLLER (NWC) ERRORS ON A LINE

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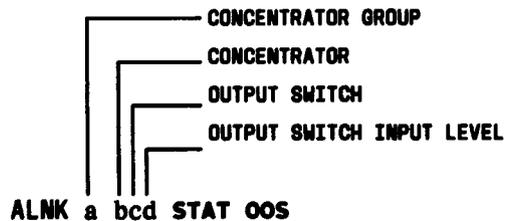
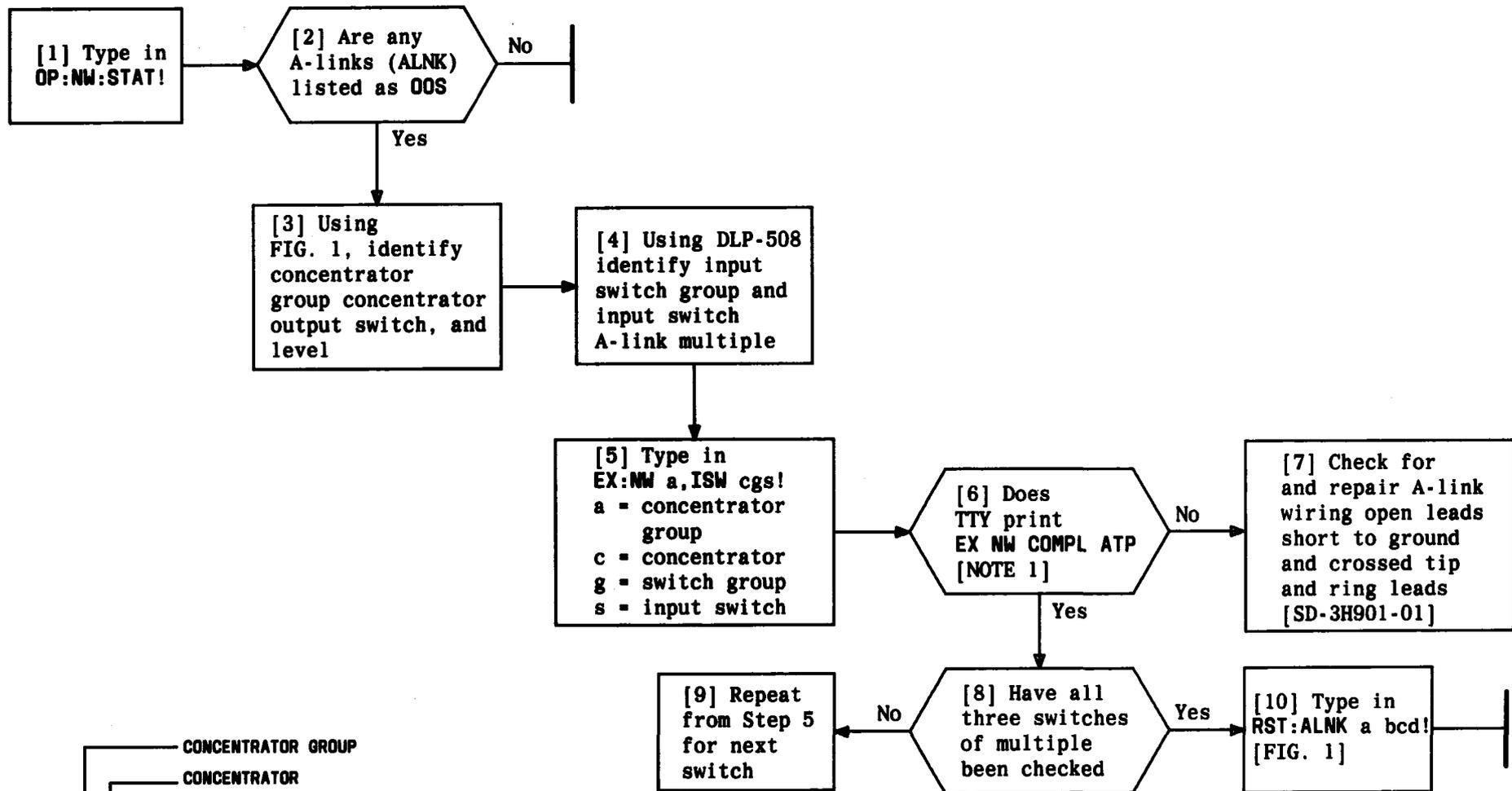
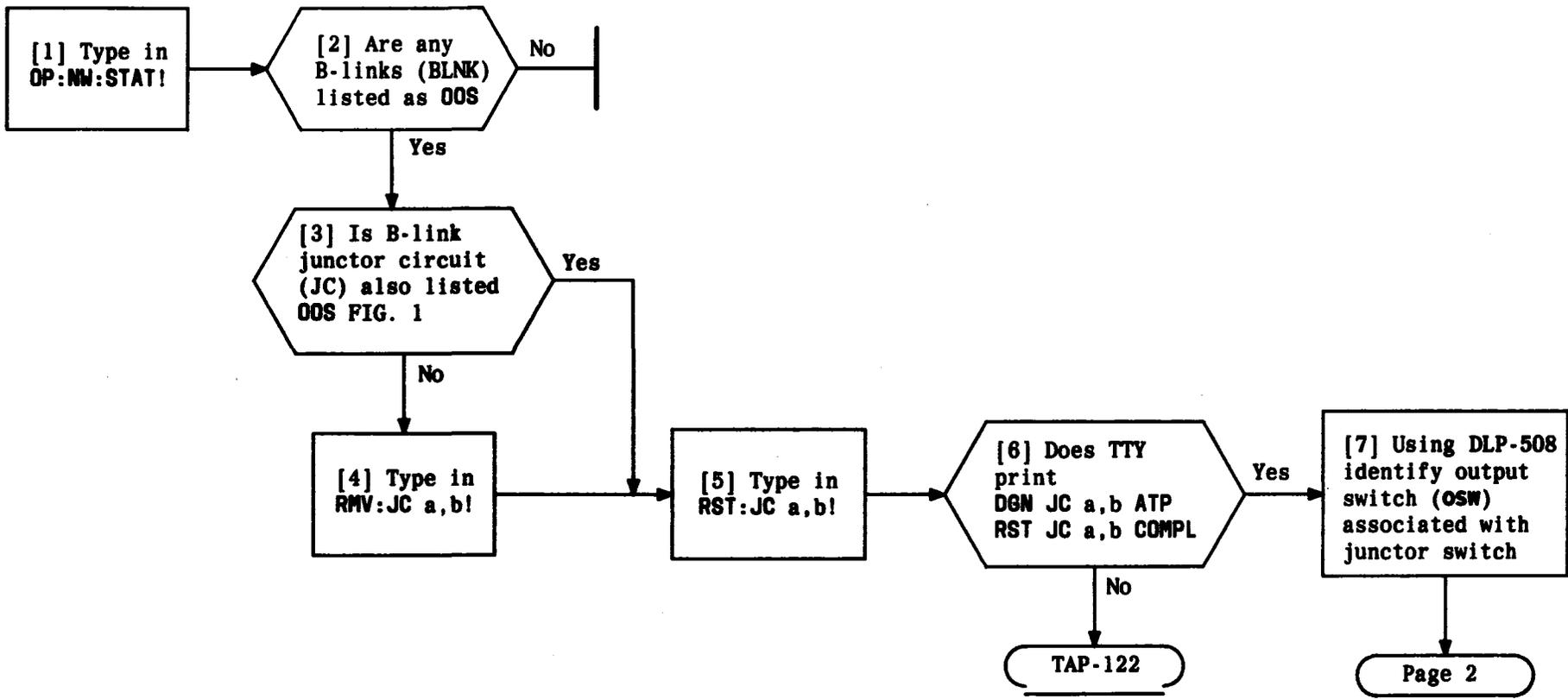


FIG. 1

NOTE 1
Network exercise requires 30 seconds for each switch depending on traffic

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CLEAR A-LINK REMOVED FROM SERVICE



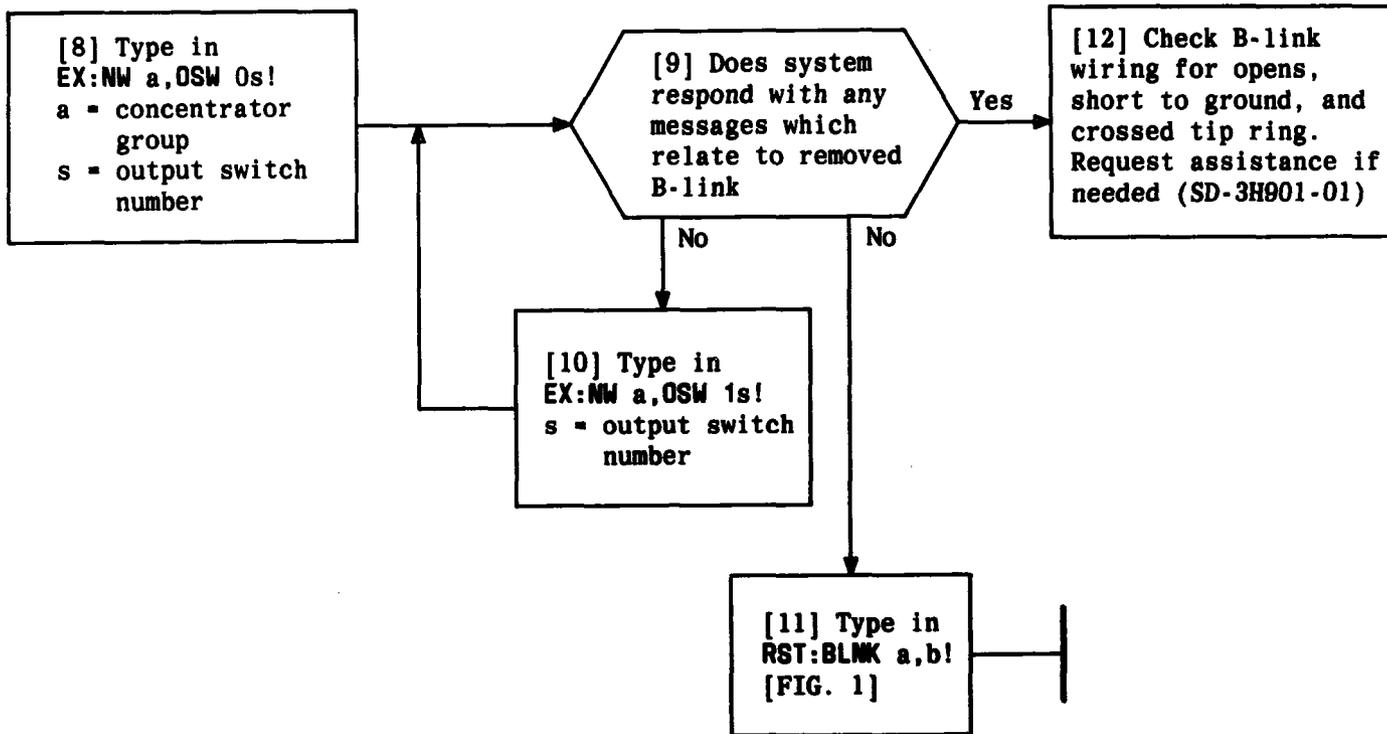
OP NW STAT
 TV STAT COMPL ALL OK
 JC STAT COMPL ALL OK
 BLNK STAT COMPL ALL OK
 ALNK STAT COMPL ALL OK
 OP NW STAT COMPL
 NETWORKS WITH NO FAULTS

OP NW STAT
 TV STAT COMPL ALL OK
 JC a b STAT OOS
 BLNK a b STAT OOS
 ALNK STAT COMPL ALL OK
 OP NW STAT COMPL
 NETWORK WITH B-LINK AND JUNCTOR
 CIRCUIT OUT-OF-SERVICE

FIG. 1

CLEAR B-LINK REMOVED FROM SERVICE

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CLEAR B-LINK REMOVED FROM SERVICE

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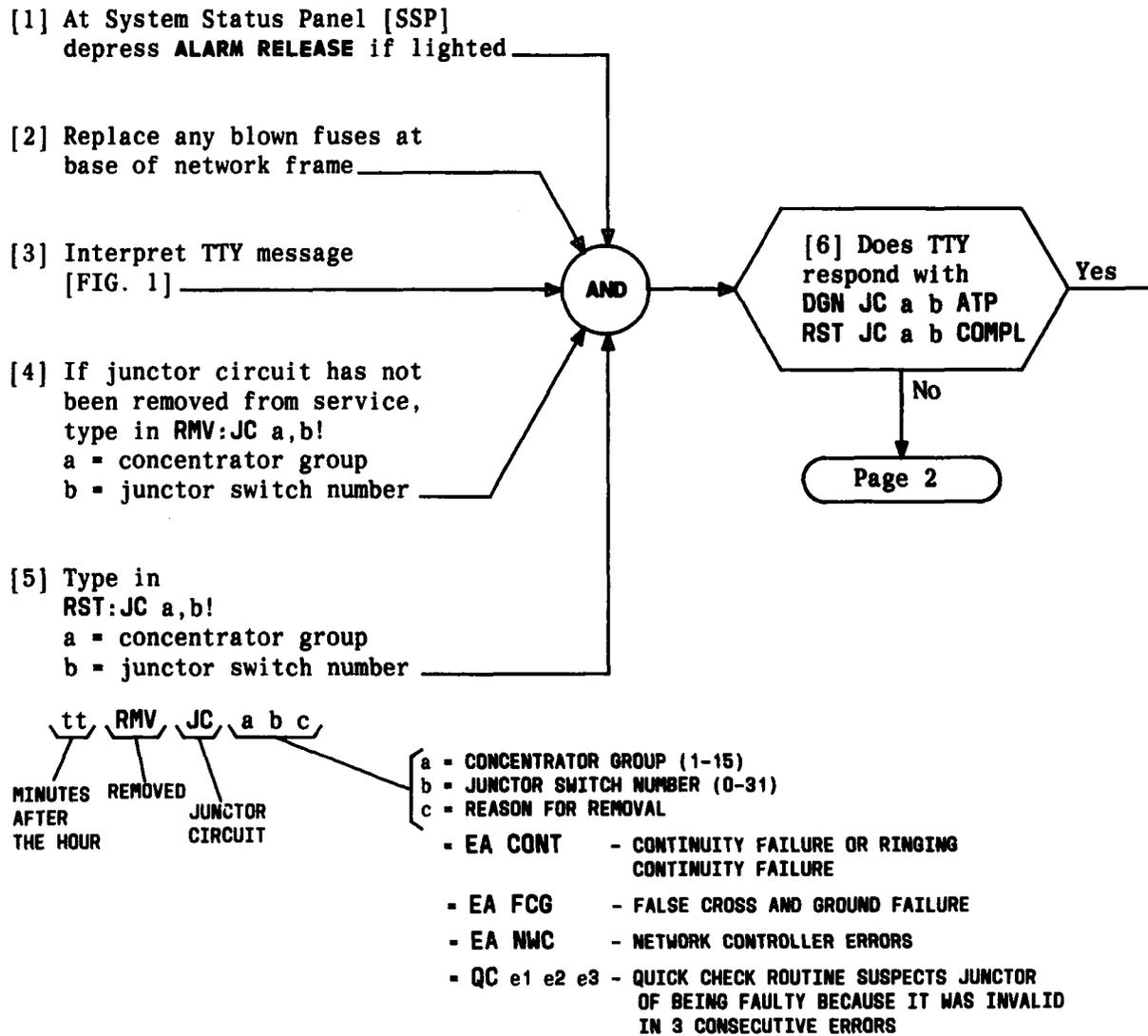
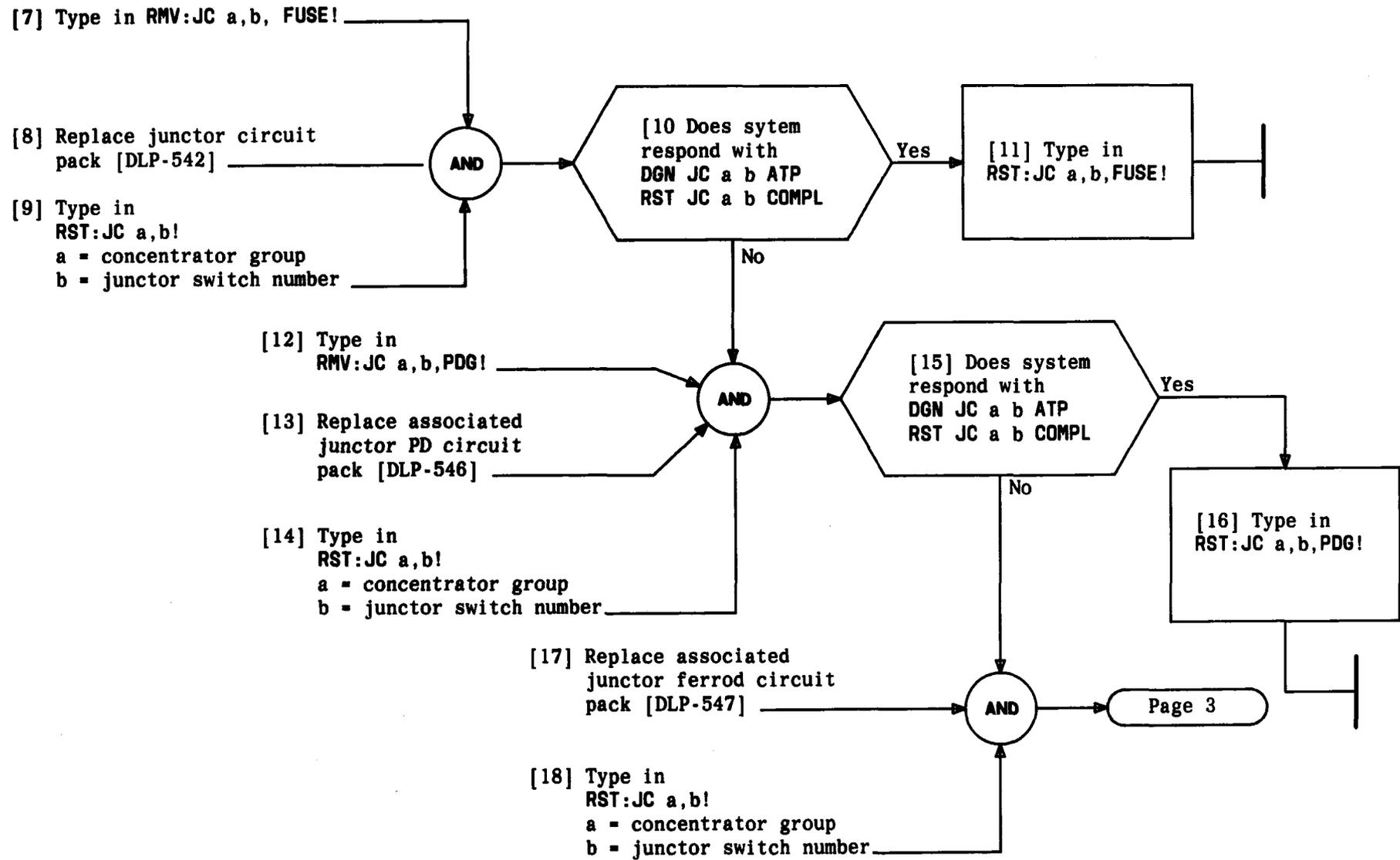


FIG. 1

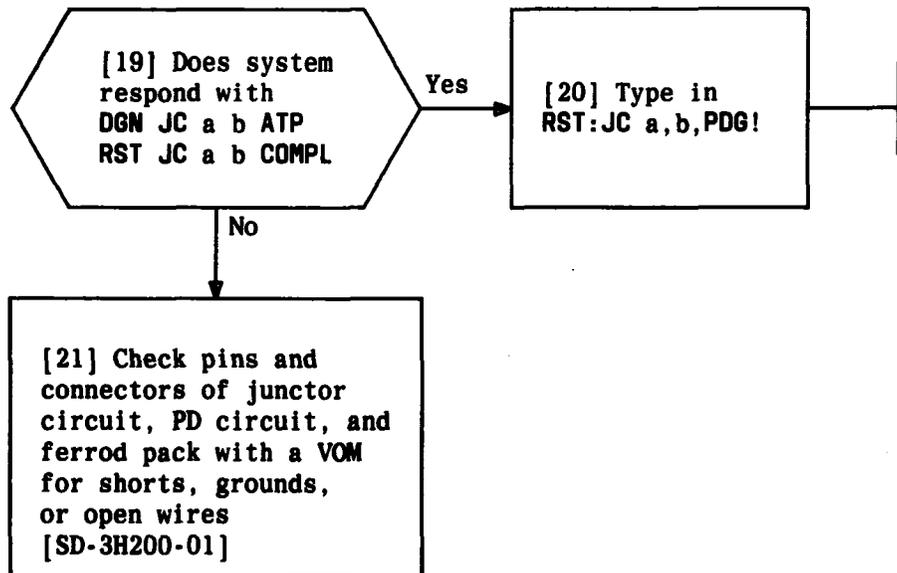
CLEAR JUNCTOR CIRCUIT FAULT

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CLEAR JUNCTOR CIRCUIT FAULT

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CLEAR JUNCTOR CIRCUIT FAULT

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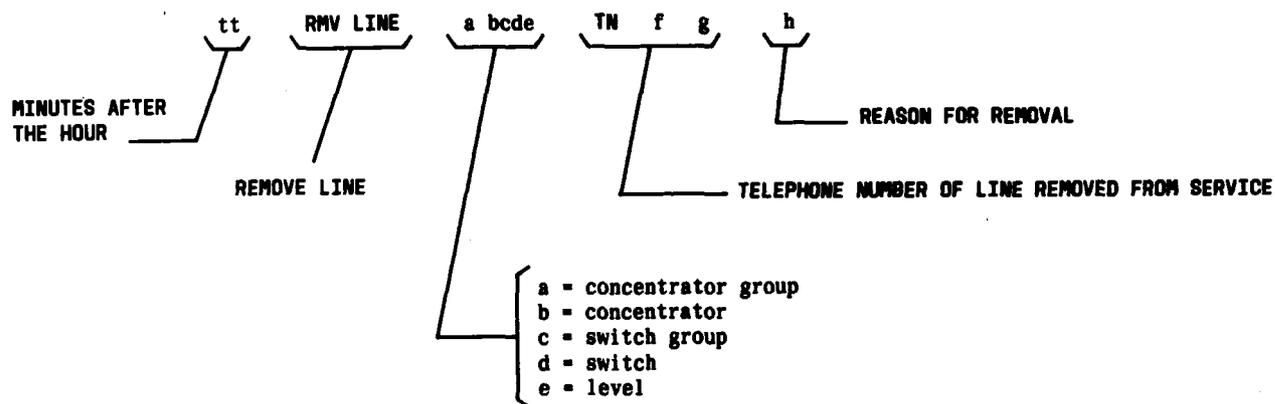
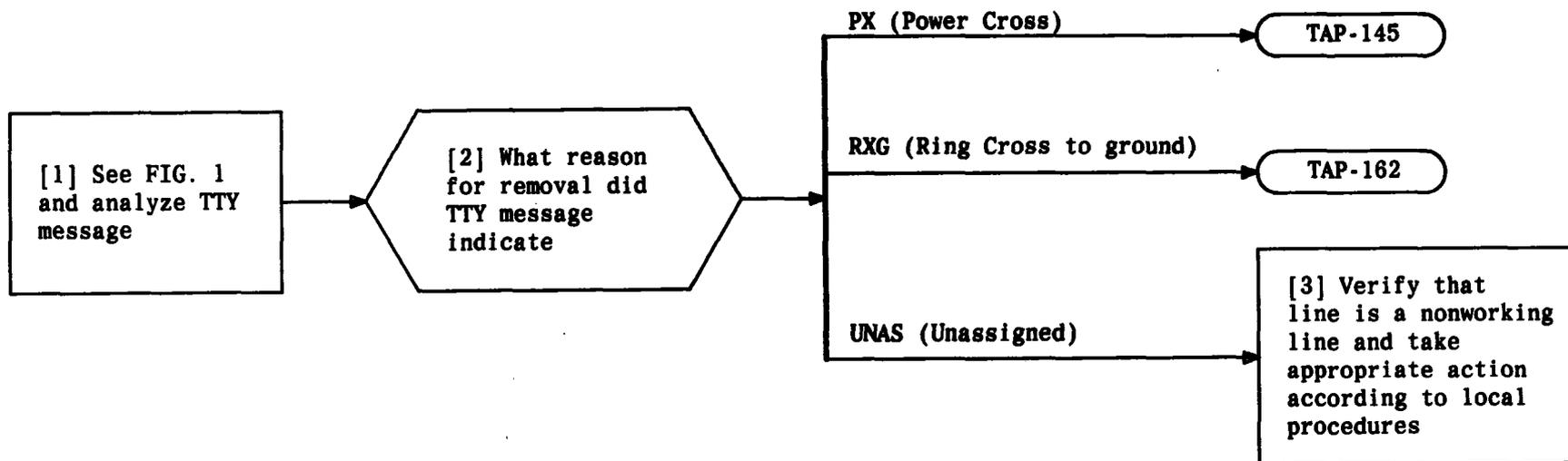
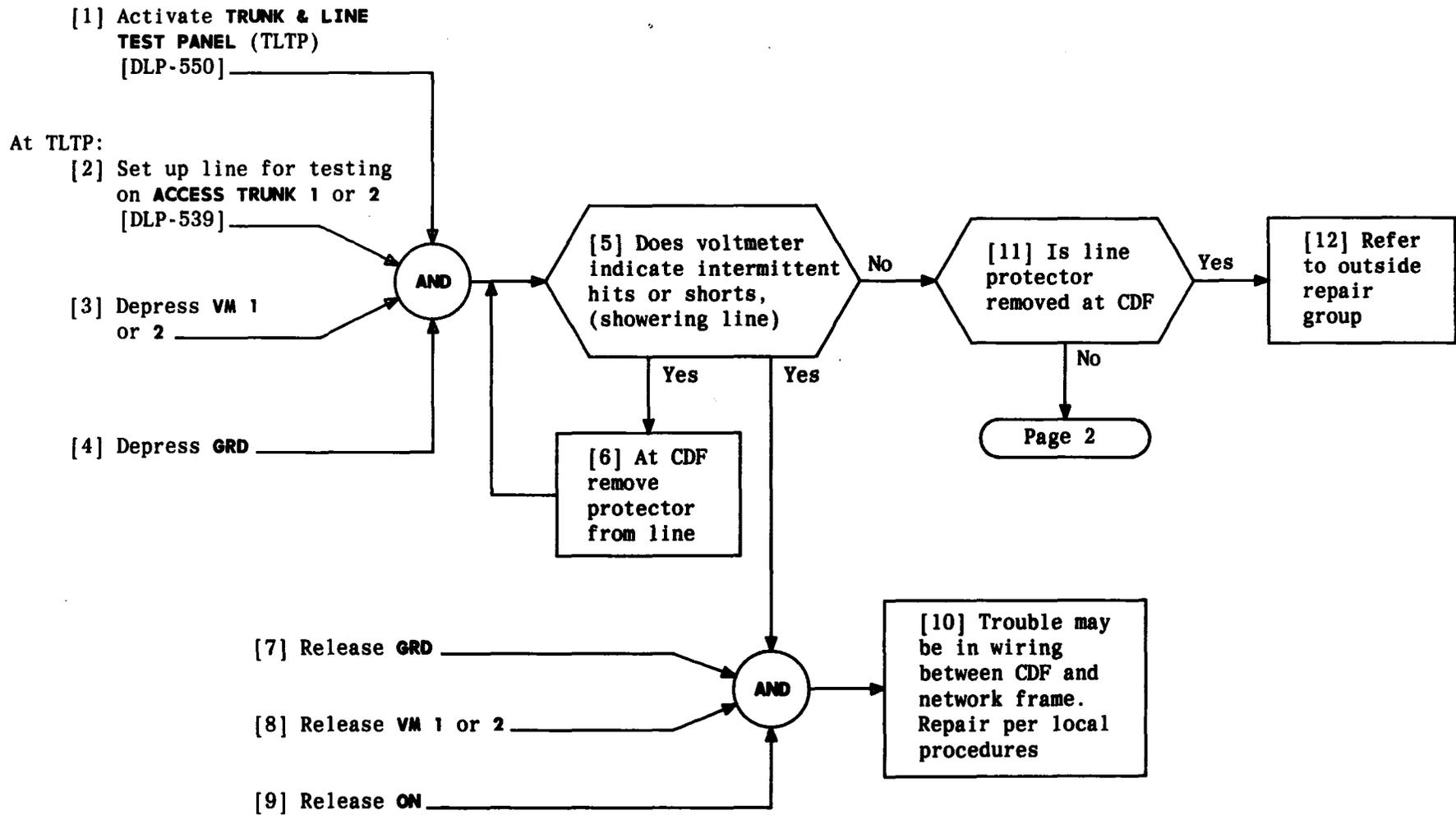


FIG. 1

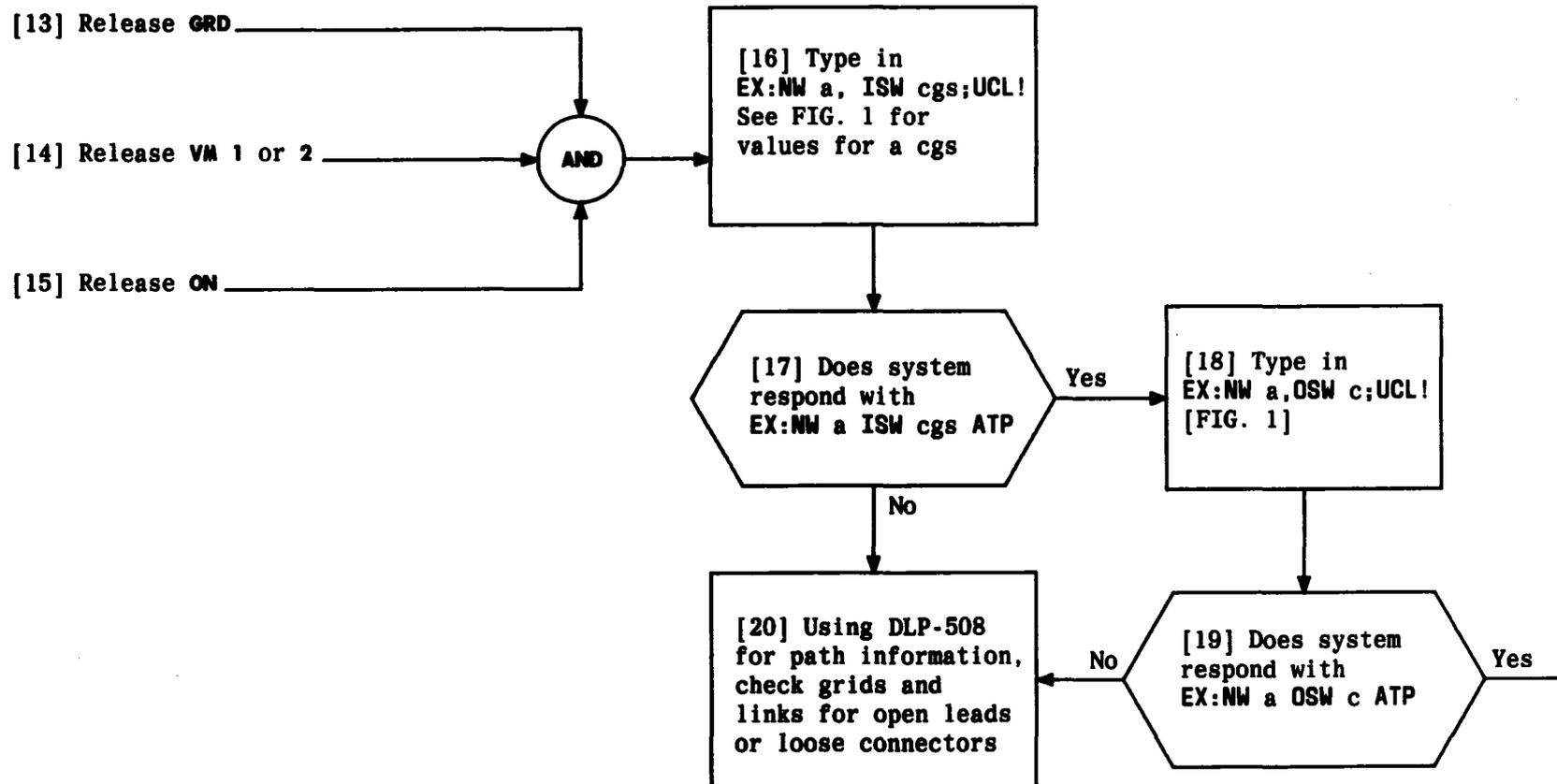
CLEAR TROUBLE ON LINE REMOVED FROM SERVICE

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CLEAR REPORT OF CONTINUITY FAILURE ON A LINE

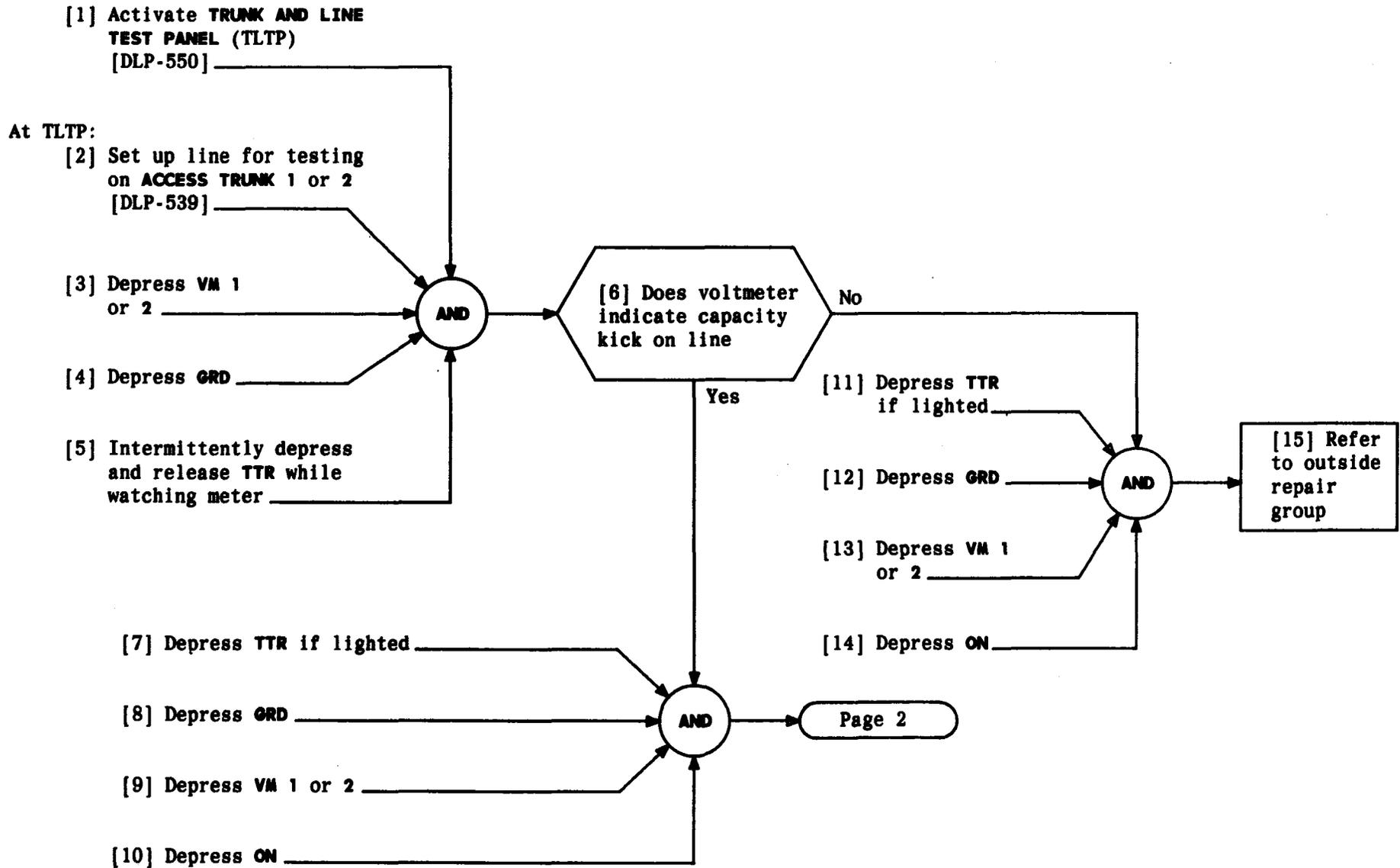
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REPT TRBL CONT LINE a cgs1

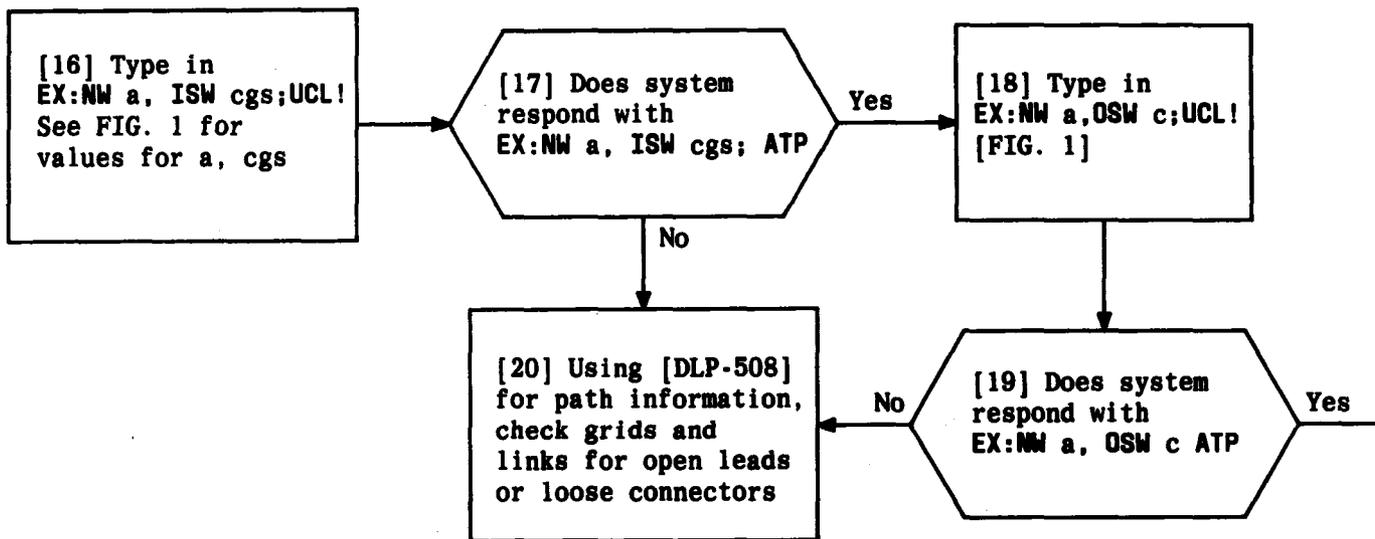
FIG. 1 - Trouble Report Output Message

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CLEAR REPORT OF RINGING CONTINUITY FAILURE ON A LINE

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REPT TRBL RC LINE a cgs1

FIG. 1 - Ringing Continuity Failure
Output Message

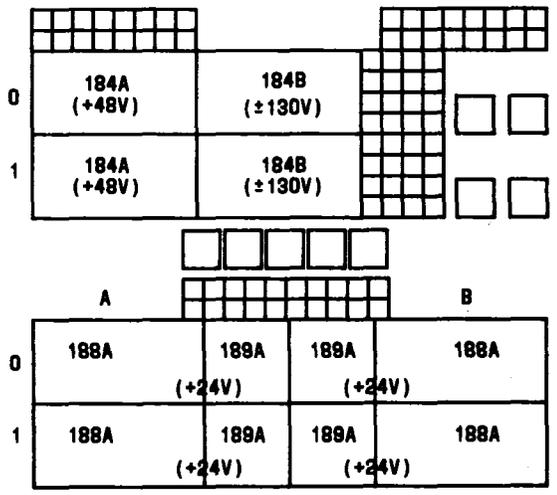
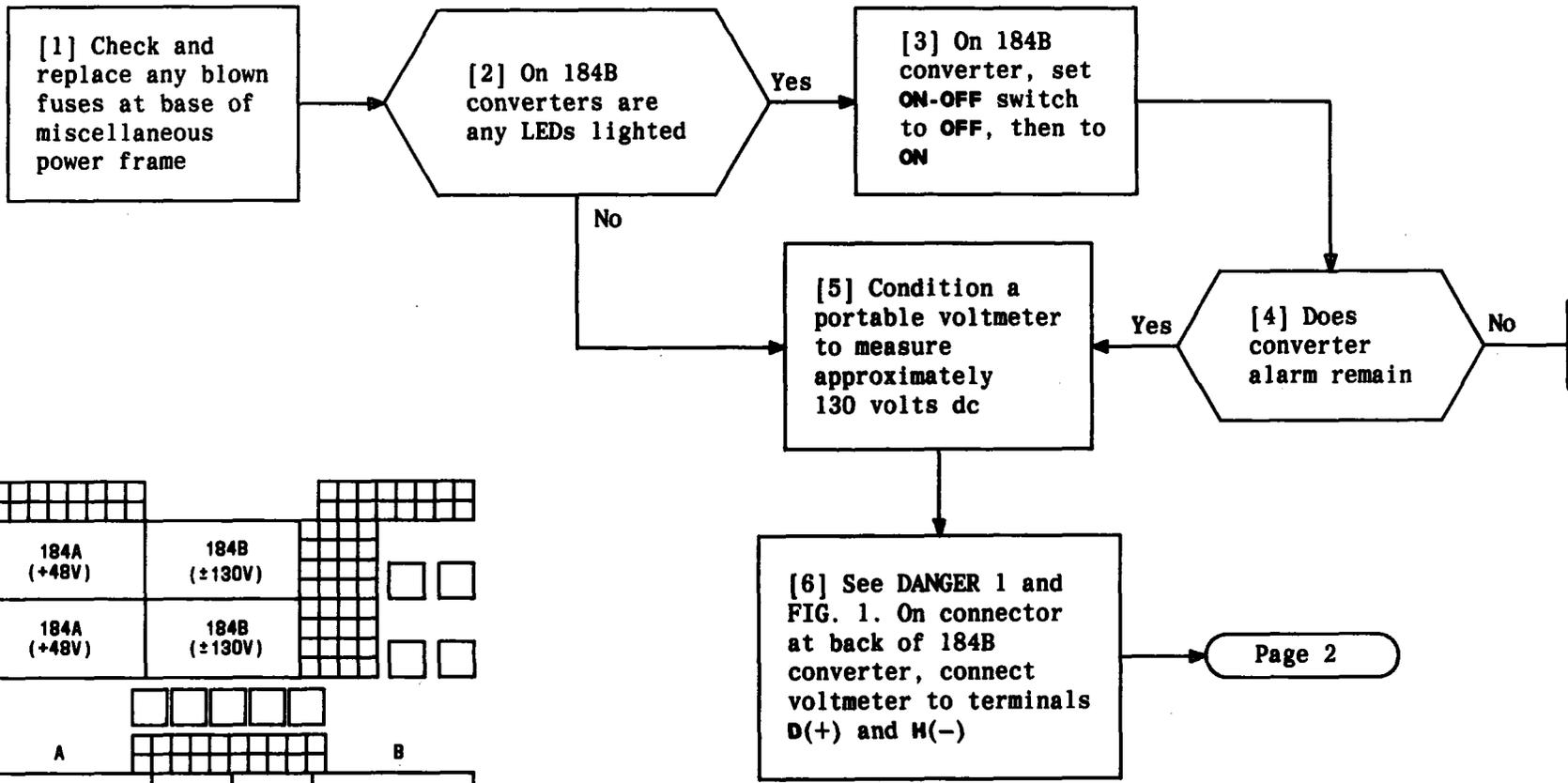
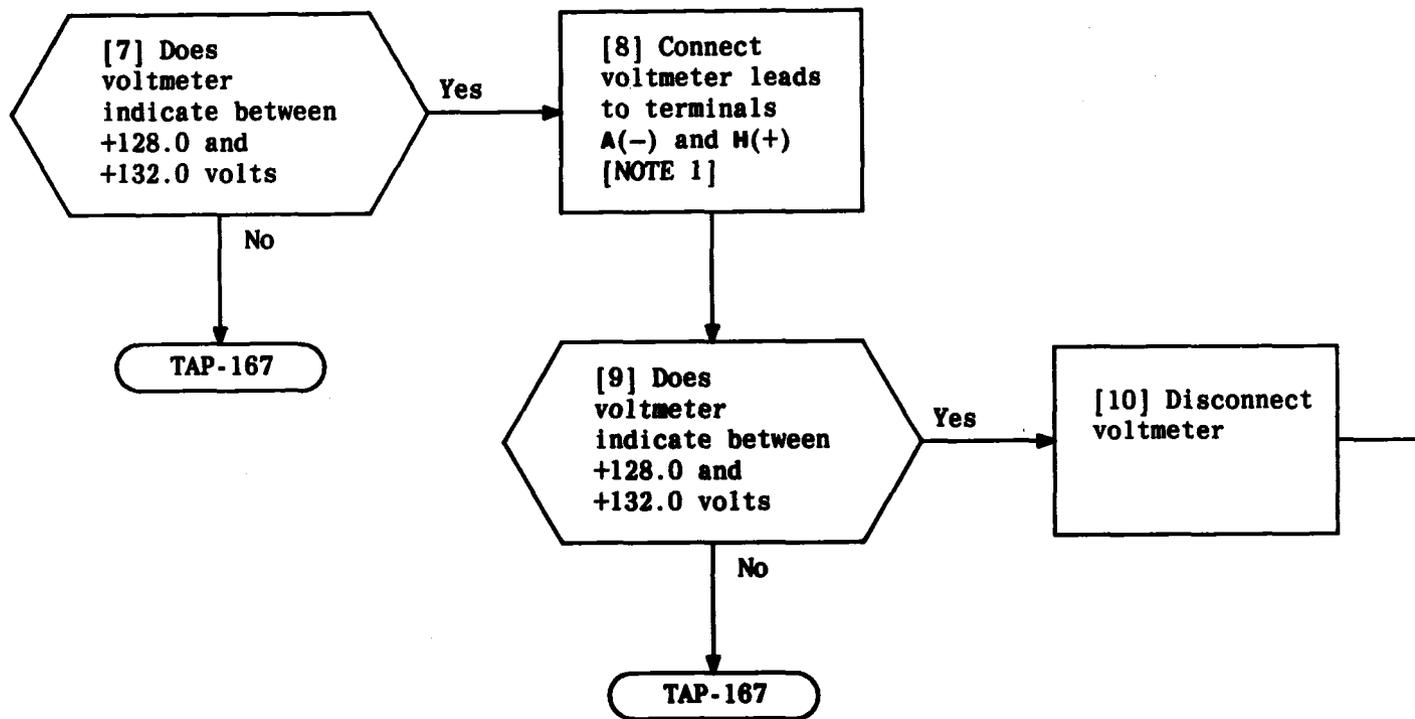


FIG. 1 - Front View of Miscellaneous Power Frame

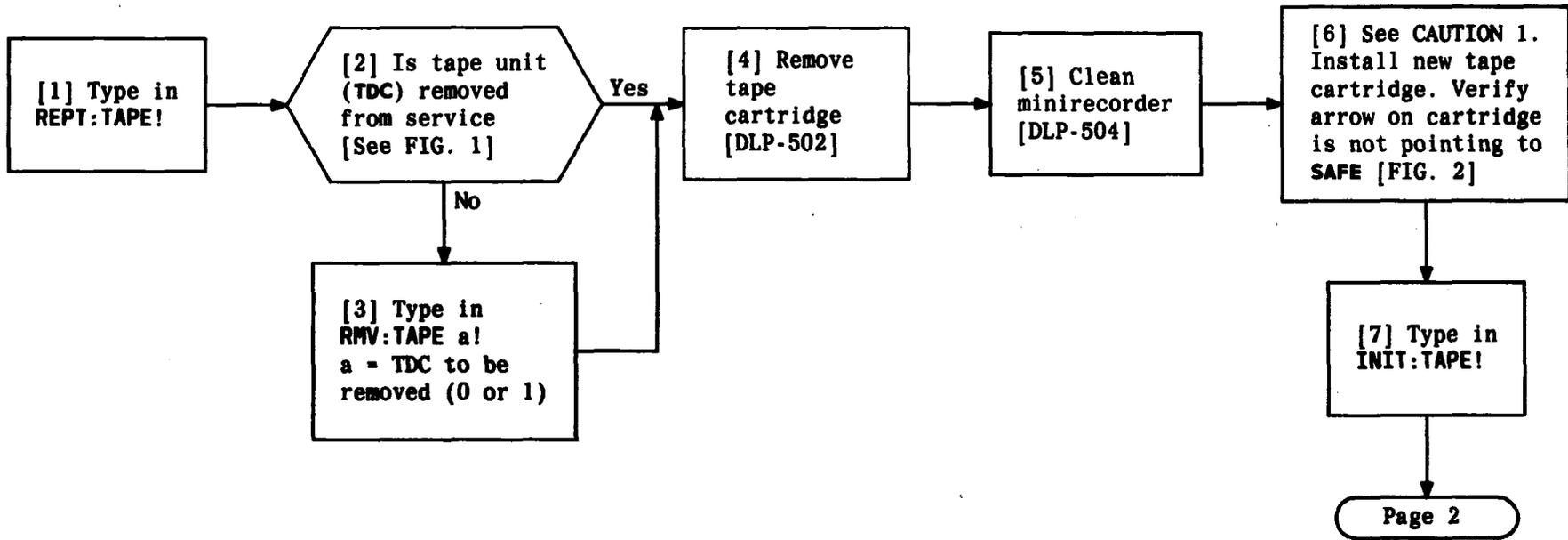
CLEAR ±130 VOLT POWER ALARM

DANGER 1	
<i>Voltages in this circuit exceed 130 volts to ground</i>	
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NOTE 1	
Terminal H is a common return	
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CLEAR ±130 VOLT POWER ALARM



REPT TAPE xxxx bb bb bb bb bb bb
 xxxx = 0000 - NO TDC OUT OF SERVICE
 xxxx = 0001 - TDC 0 OUT OF SERVICE
 xxxx = 0010 - TDC 1 OUT OF SERVICE
 xxxx = 0011 - TDC 0 & 1 OUT OF SERVICE

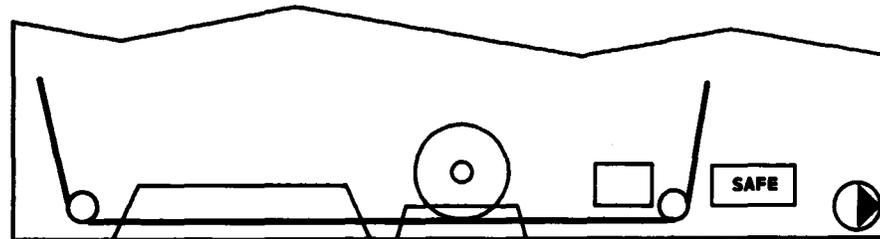
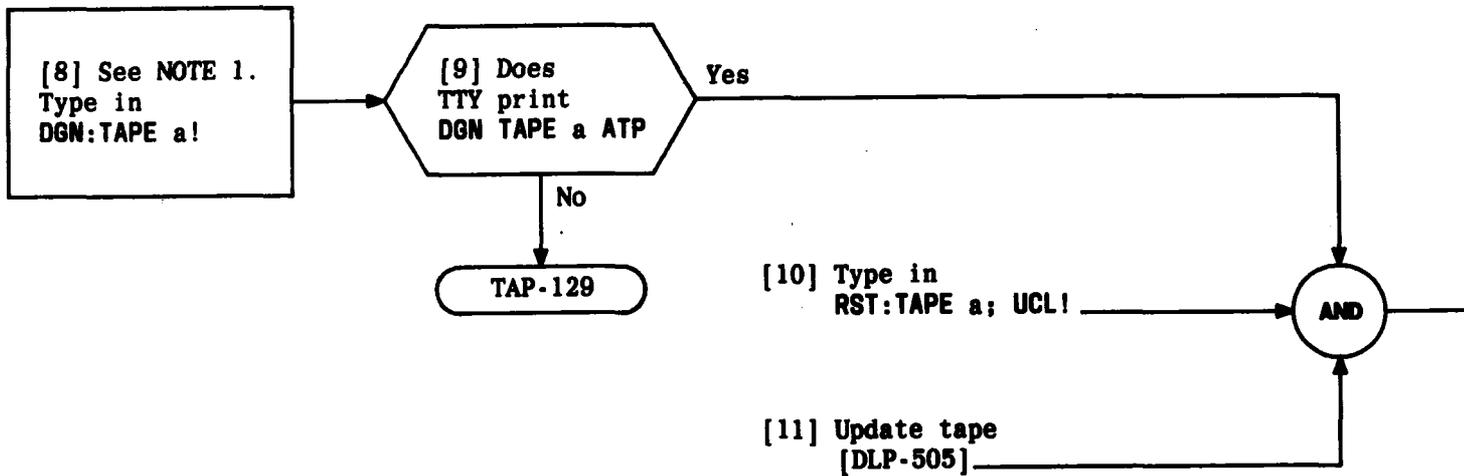


FIG. 2 - Tape Cartridge

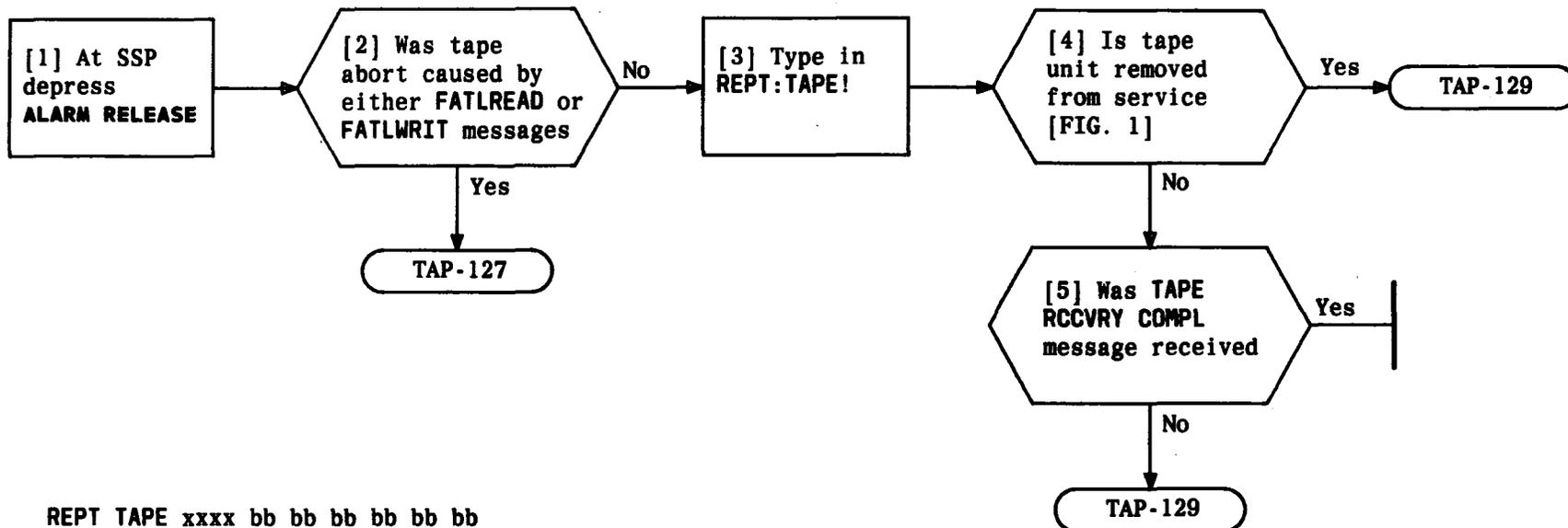
FIG. 1 - Examples of REPT TAPE Output Messages

CAUTION 1	
<i>Replacement tape must be same generic and issue as removed tape</i>	
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CLEAR TAPE DATA CONTROLLER (TDC) FATLREAD/ FATLWRIT TROUBLE



NOTE 1	
In order to diagnose a TDC, a TDC must be in service	
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REPT TAPE xxxx bb bb bb bb bb bb

IF xxxx = 0000, NO TDC OUT OF SERVICE
 IF xxxx = 0001, TDC 0 OUT OF SERVICE
 IF xxxx = 0010, TDC 1 OUT OF SERVICE
 IF xxxx = 0011, TDC 0 AND TDC 1 OUT OF SERVICE

FIG. 1

CLEAR TAPE OPERATION ABORT

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[1] At SSP depress
ALARM RELEASE
if lighted

[2] Type in
REPT:TAPE!

[3] See FIG. 1, NOTE 1.
DGN:TAPE a!
a = 0 or 1

[10] Locate trouble
number in
TLM 4C-709-01

[11] Replace first
listed circuit
pack [DLP-503]

[12] Type in
DGN:TAPE a!
a = 0 or 1
[NOTE 1]

[4] Does TTY
print
DGN TAPE ATP

Yes

No

[5] Type in
SW:SYC!

[6] Type in
DGN:TAPE a!
a = same as in
Step 3 [NOTE 1]

[13] Does
TTY print
DGN TAPE ATP

Yes

No

[15] Is
trouble number
the same

Yes

No

[16] Repeat
from
Step 10

REPT TAPE xxxx bb bb bb bb bb bb
xxxx = 0000 - NO TC OUT OF SERVICE
xxxx = 0001 - TDC 0 OUT OF SERVICE
xxxx = 0010 - TDC 1 OUT OF SERVICE
xxxx = 0011 - TDC 0 & 1 OUT OF SERVICE

FIG. 1

[7] Does TTY
print
DGN TAPE ATP

Yes

No

[8] Type in
RST:TAPE a;UCL!

[9] Update
tape if
replaced
[DLP-505]

Page 3

NOTE 1
A TDC must be in
service

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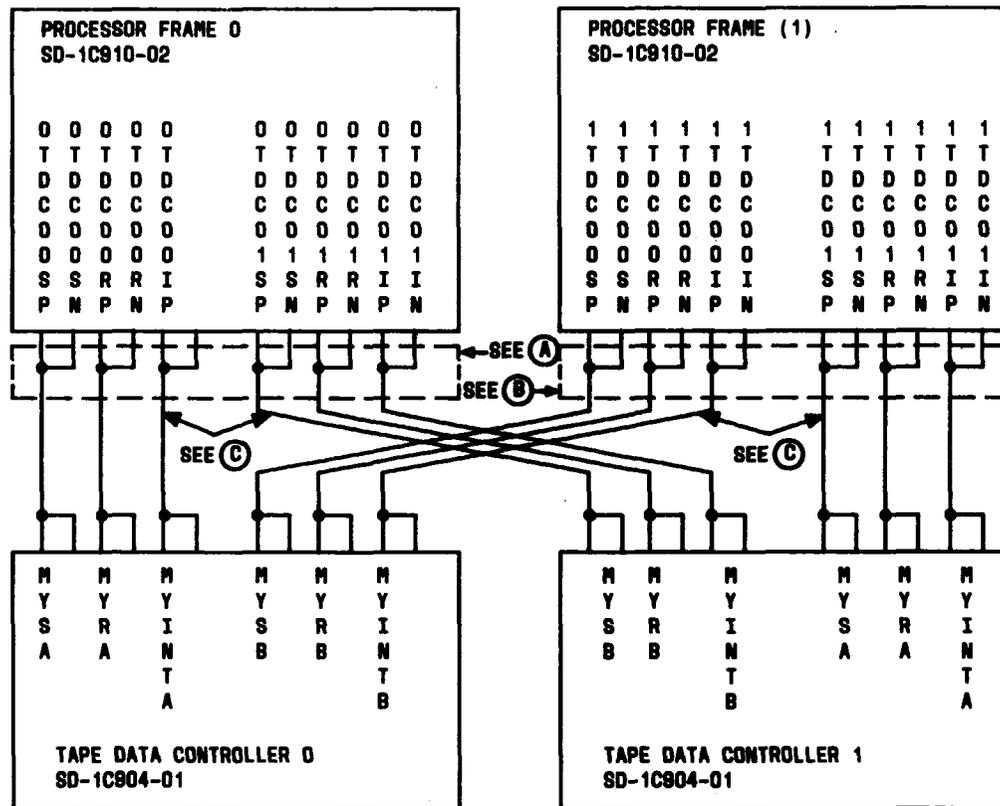
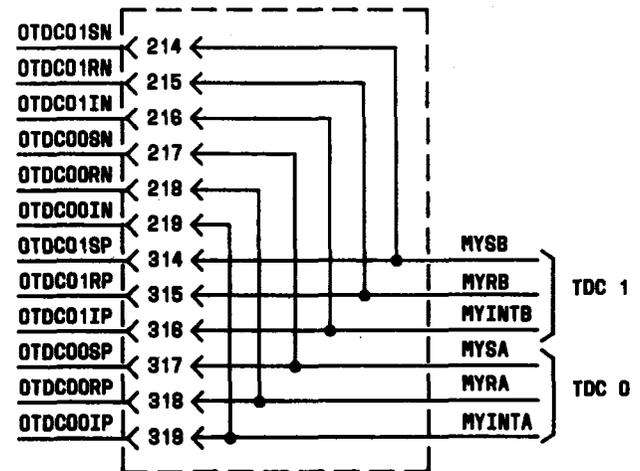
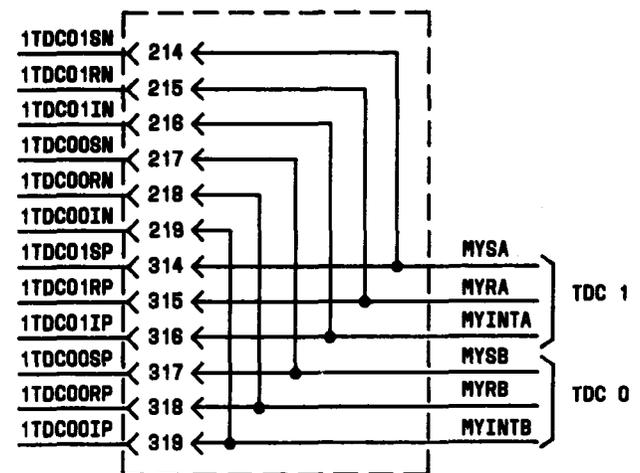


FIG. 2 - Tape Data Controller - 3A CC Cabling

(A) CONNECTOR PIN IDENTIFICATION, PROCESSOR FRAME 0



(B) CONNECTOR PIN IDENTIFICATION, PROCESSOR FRAME 1



(C) CABLING IS 30GA 100R COAX KS-21112,L2

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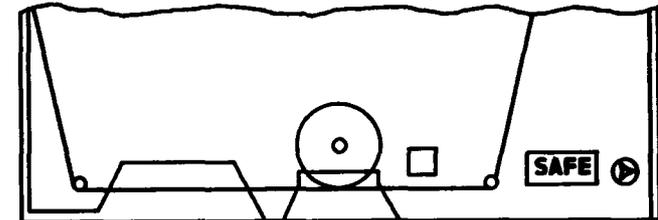
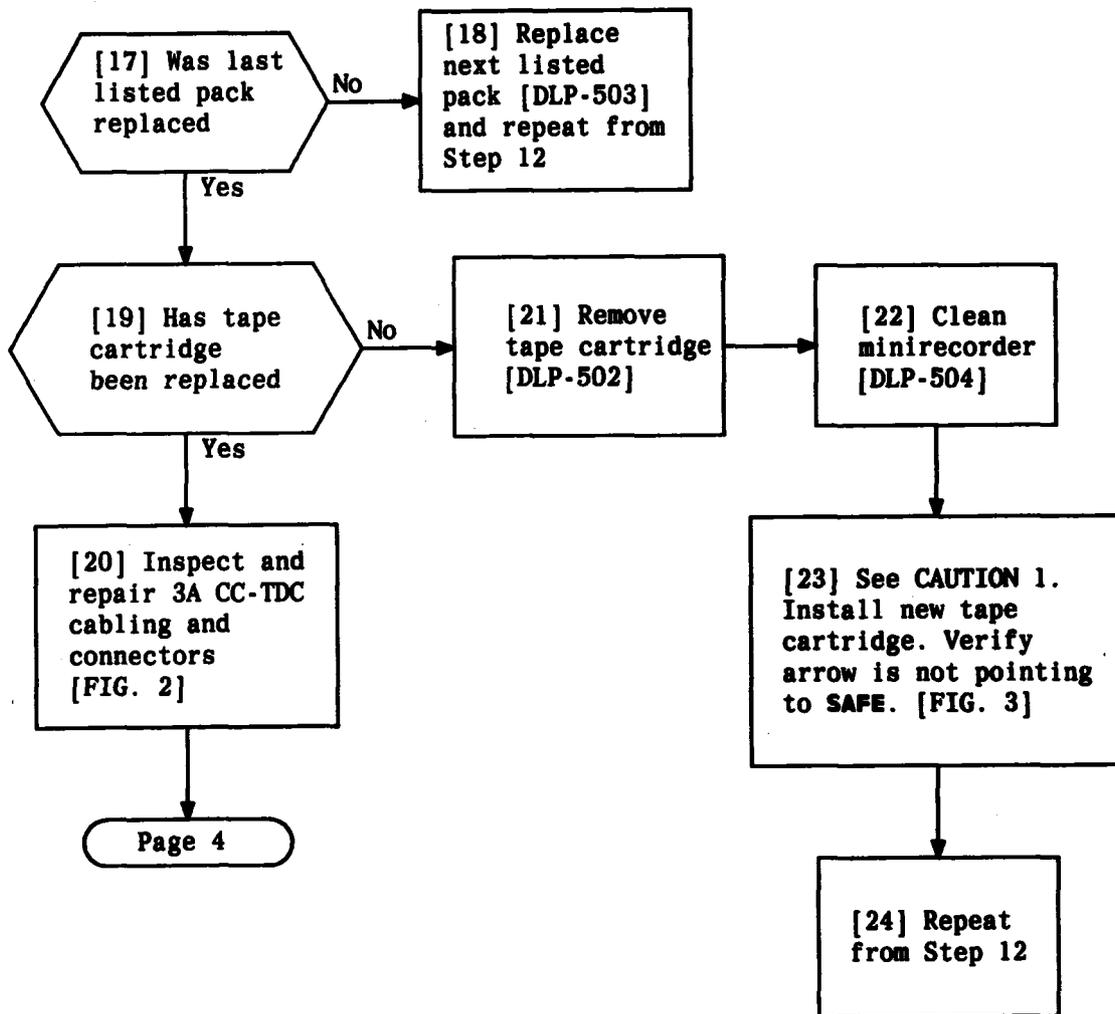
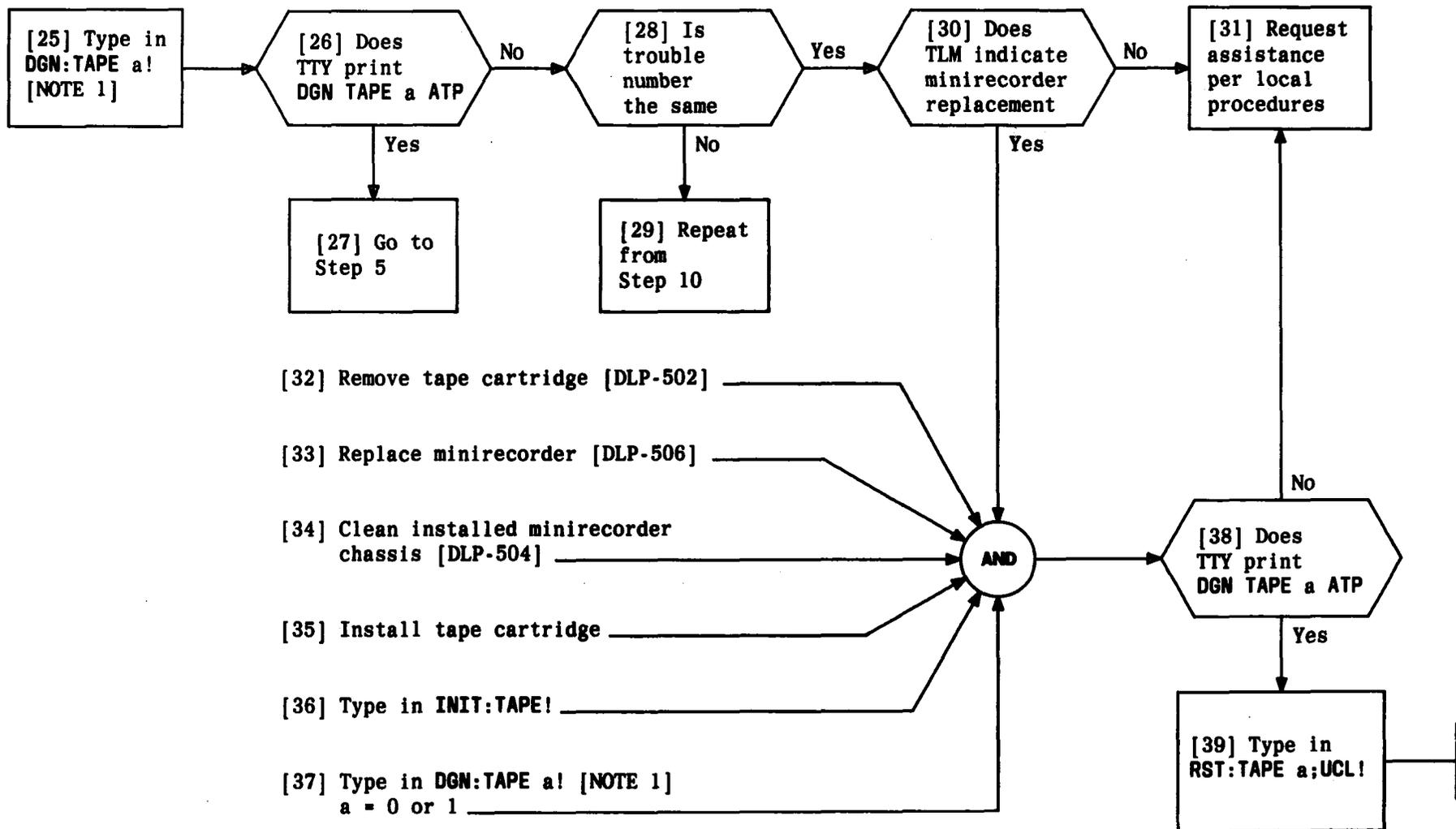


FIG. 3 - Tape Cartridge

CAUTION 1	
<i>Replacement tape must be same generic and issue of faulty tape</i>	
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CLEAR TROUBLE IN TAPE DATA CONTROLLER AND MINIRECORDER

At System Status Panel:

[1] Depress ALARM TRFR if lighted

[2] Depress TTY INIT

[3] Depress ALARM RELEASE if lighted

AND

[4] Is local TTY operational

No

TAP-138

Yes

[5] Is SCC TTY operational

No

TAP-137

Yes

[6] From REPT STAT TTYC message, identify faulty TTYC [FIG. 1]

Page 2

tt REPT STAT TTYC a CHAN = b OOS = cdef INA = ghij

g = 1 IF PORT 3 IS INACTIVE
 h = 1 IF PORT 2 IS INACTIVE
 i = 1 IF PORT 1 IS INACTIVE
 j = 1 IF PORT 0 IS INACTIVE

c = 1 IF PORT 3 IS OUT OF SERVICE
 d = 1 IF PORT 2 IS OUT OF SERVICE
 e = 1 IF PORT 1 IS OUT OF SERVICE
 f = 1 IF PORT 0 IS OUT OF SERVICE

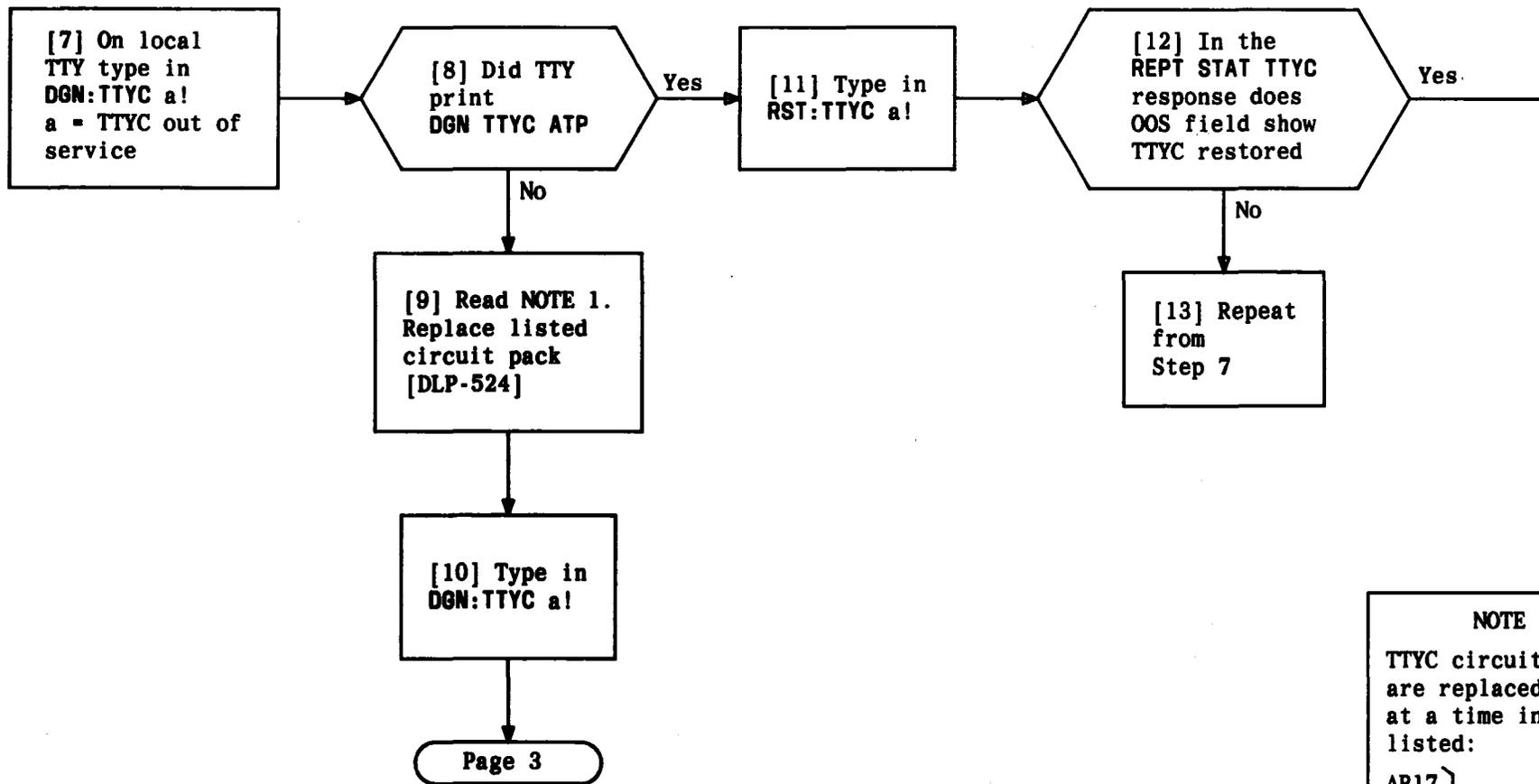
MESSAGE CLASS (0-7)

REPORT STATUS TTY CONTROLLER (0-7)

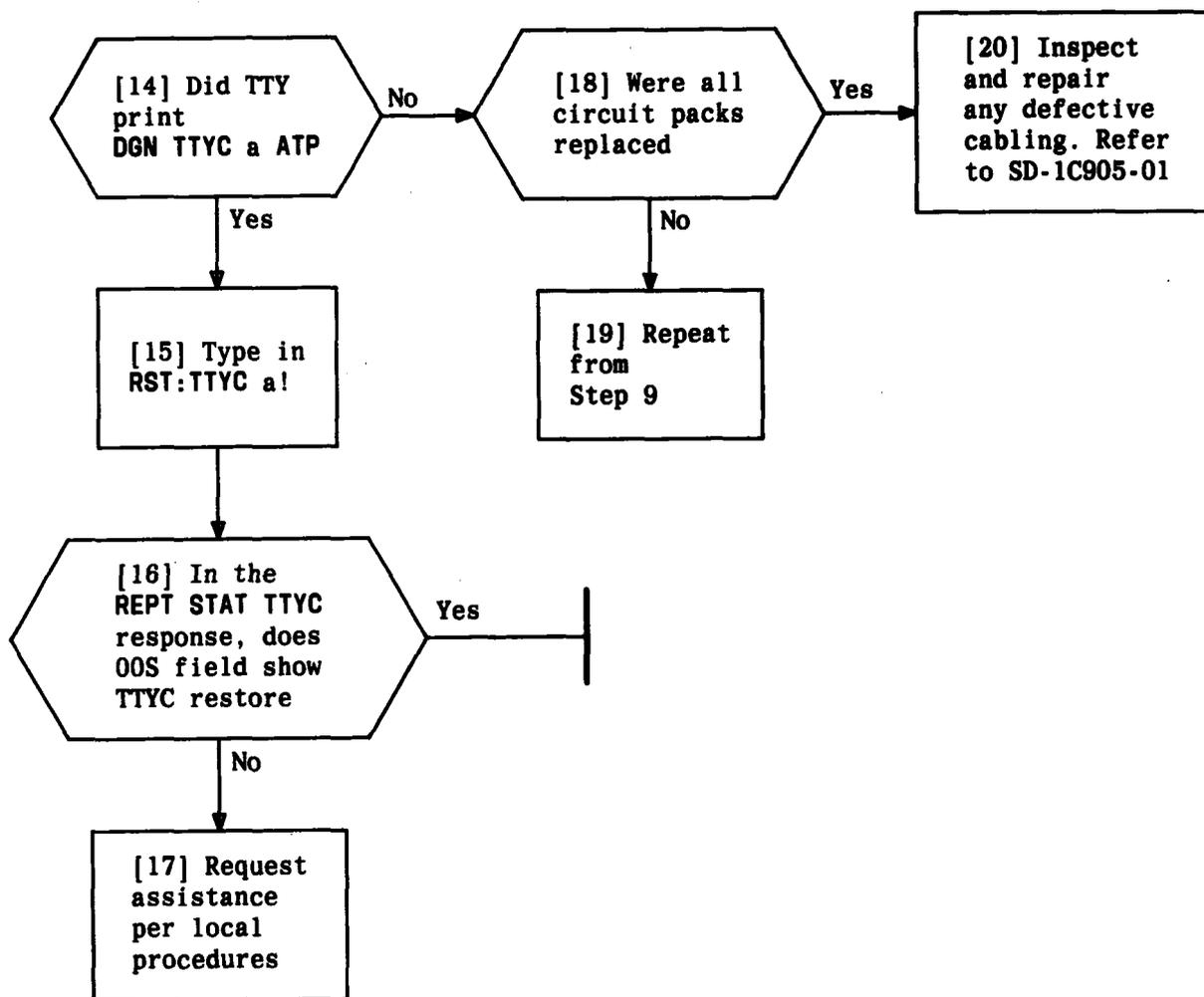
MINUTES AFTER THE HOUR

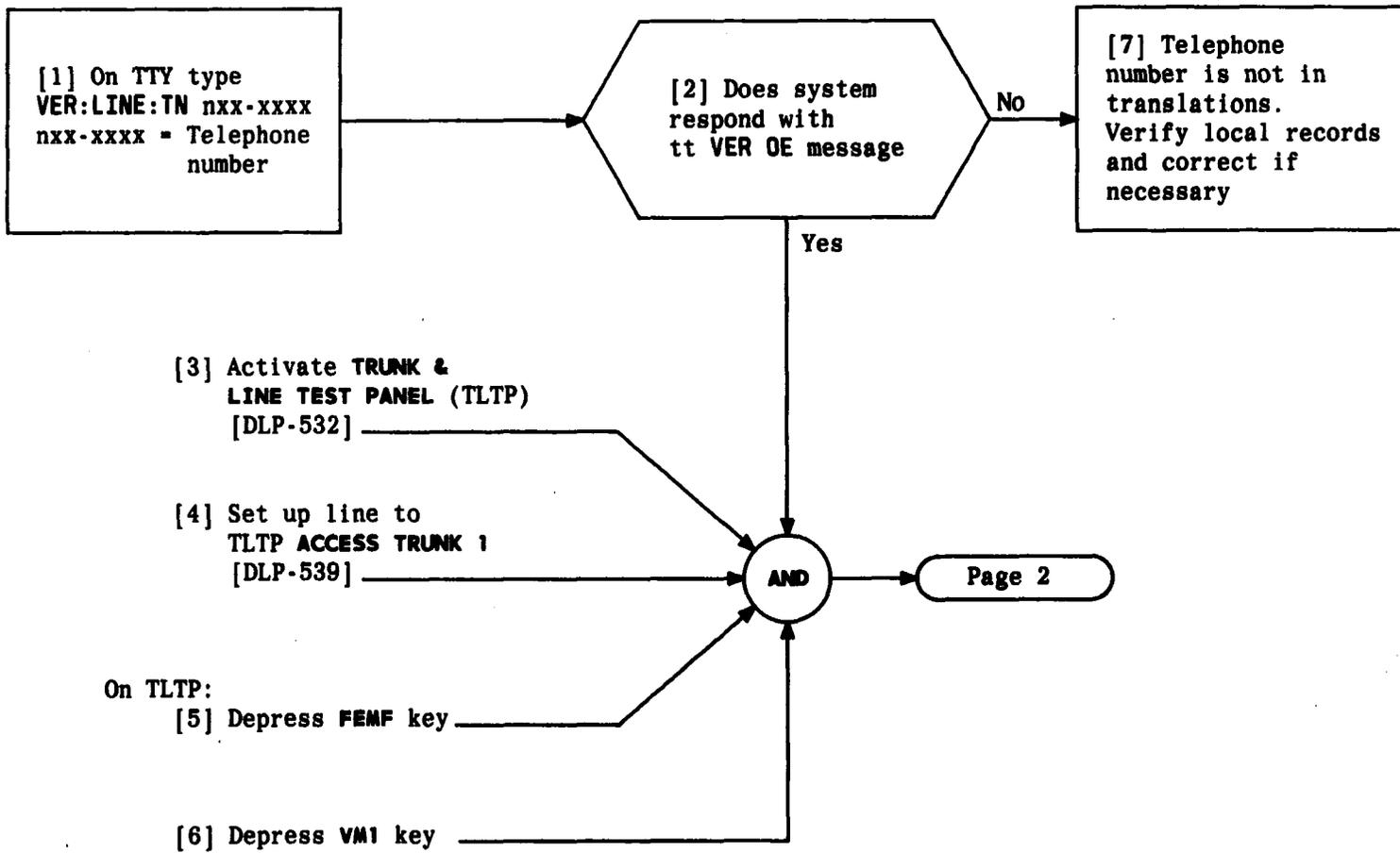
FIG. 1

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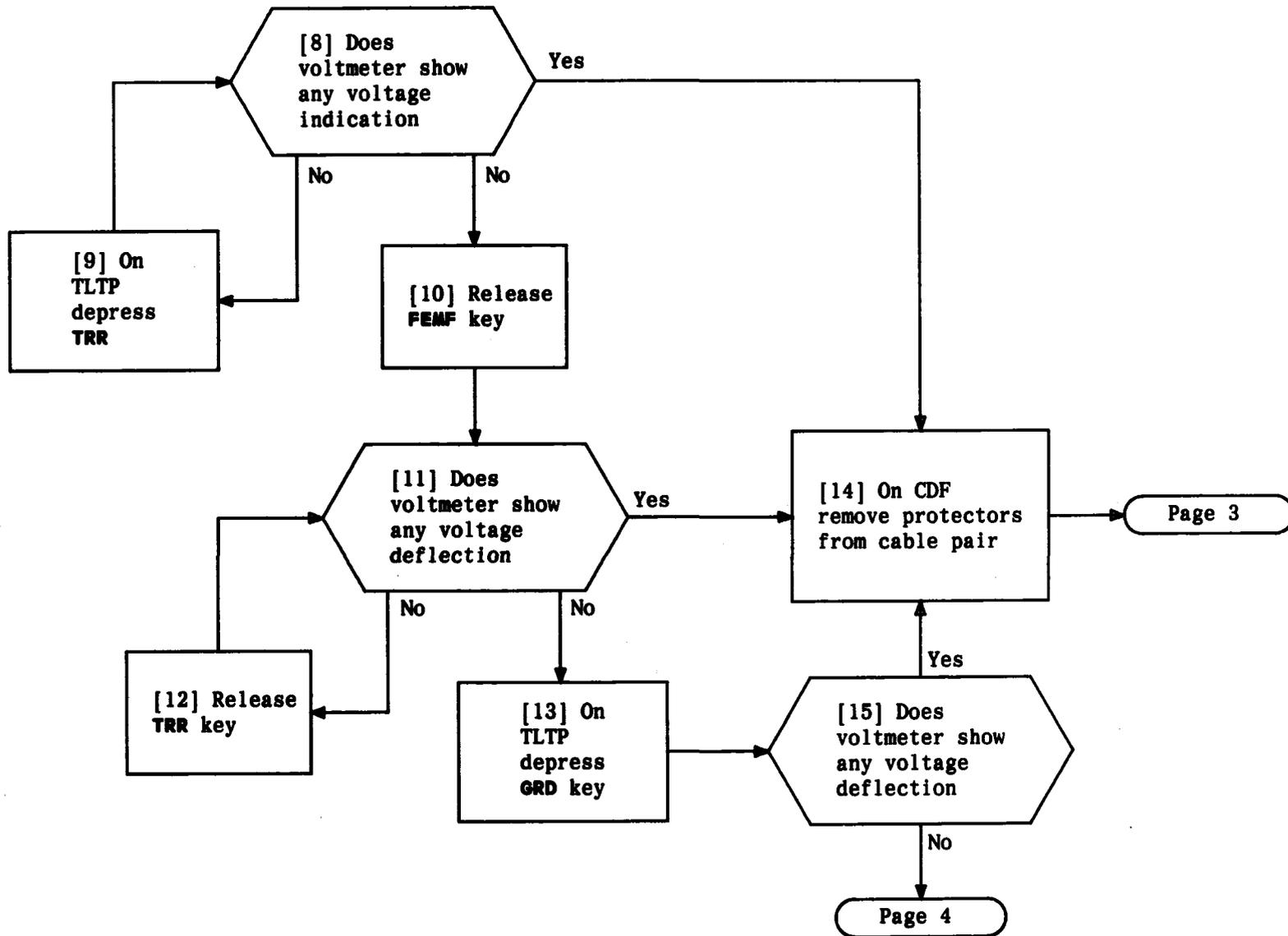
NOTE 1	
TTYC circuit packs are replaced one at a time in order listed:	
AR17 108D	} If equipped
FA1058	
FA1059	
FA1072	
FC200	
FC261	
FB152	
FB494	
FC21	
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CLEAR NO DIAL TONE (NDT) REPORT

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CLEAR NO DIAL TONE (NDT) REPORT

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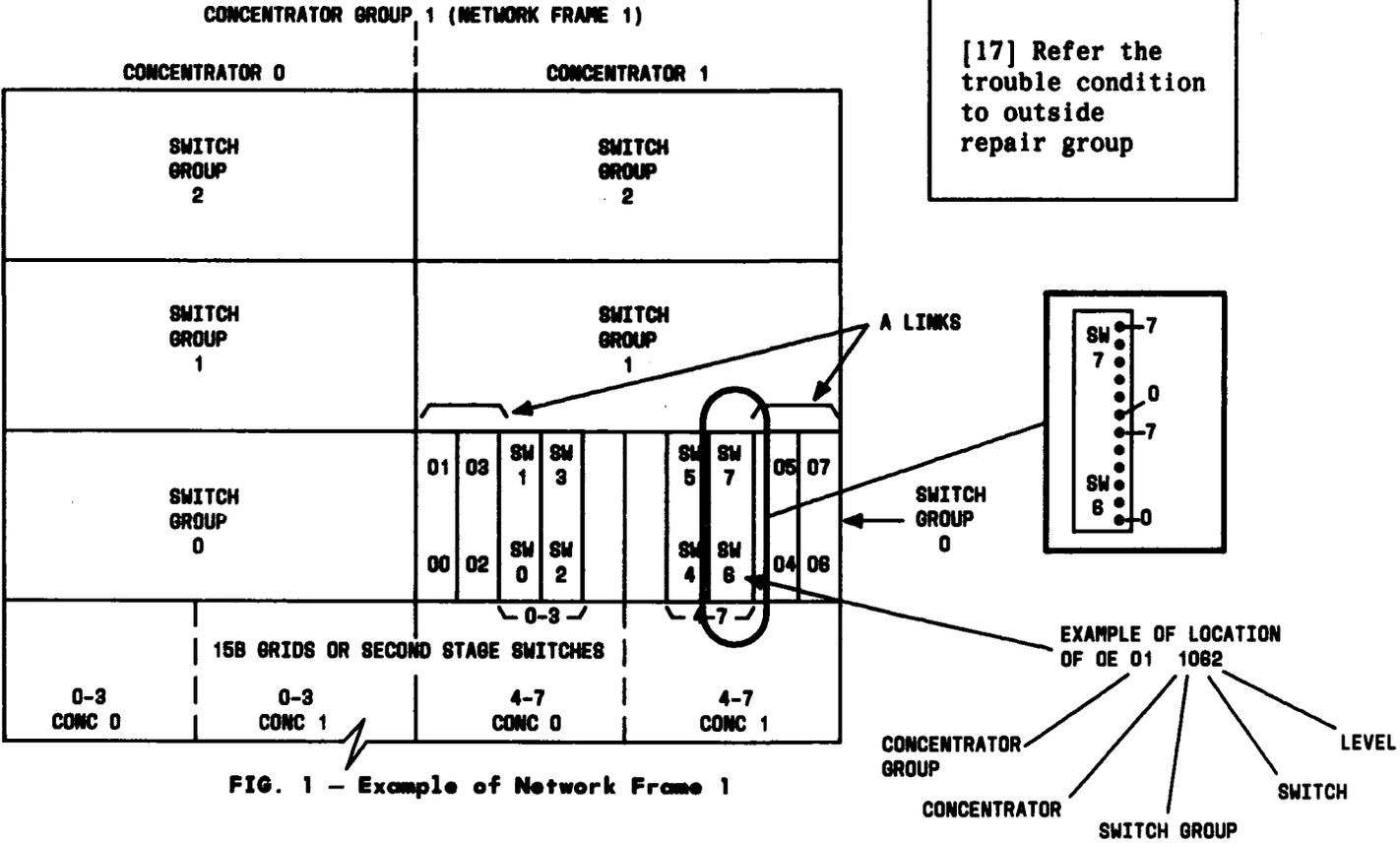
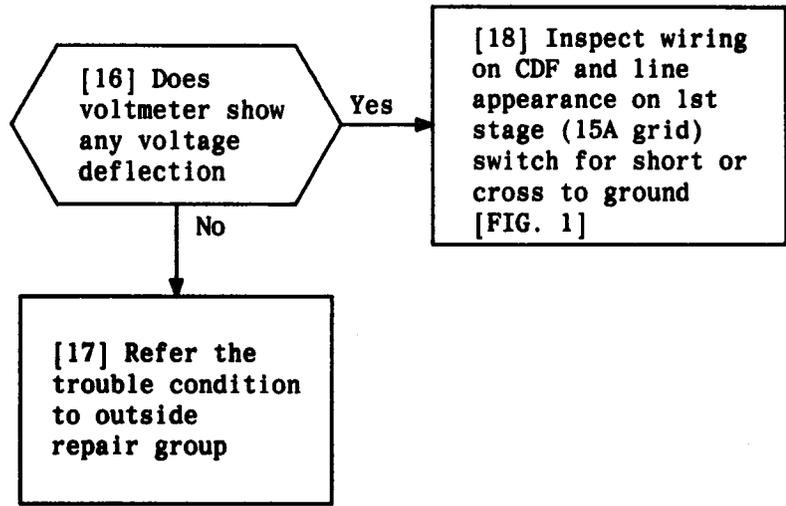


FIG. 1 - Example of Network Frame 1

CLEAR NO DIAL TONE (NDT) REPORT

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[19] On TLTP release
all operated keys

[20] From Step 1 printout,
obtain scan point
number (SP)

[21] Type in STOP:UTIL!

[22] On TTY type
MON:SCAN a,b!
a = scanner
b = scanner row

[23] On CDF short tip
and ring of line

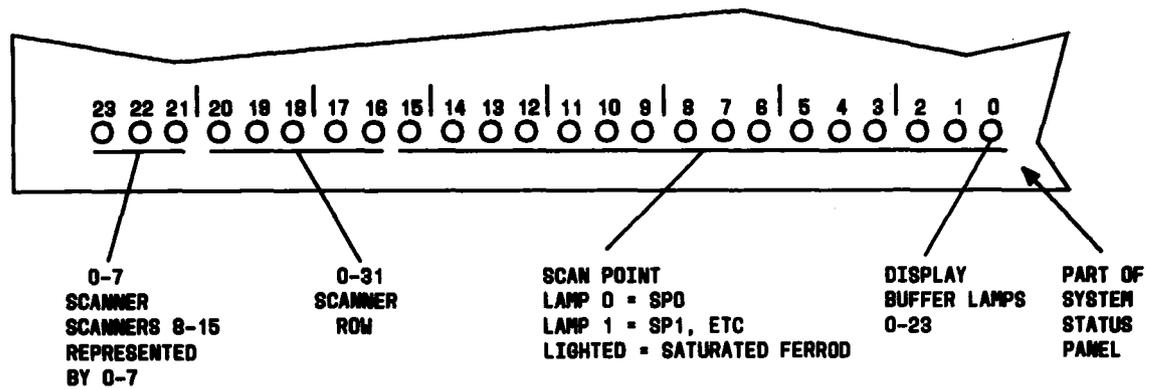


FIG. 2

AND

[24] Does SSP
display buffer
lamp associated
with scan point
light [FIG. 2]

No

[27] On TTY
type
STOP:UTIL!

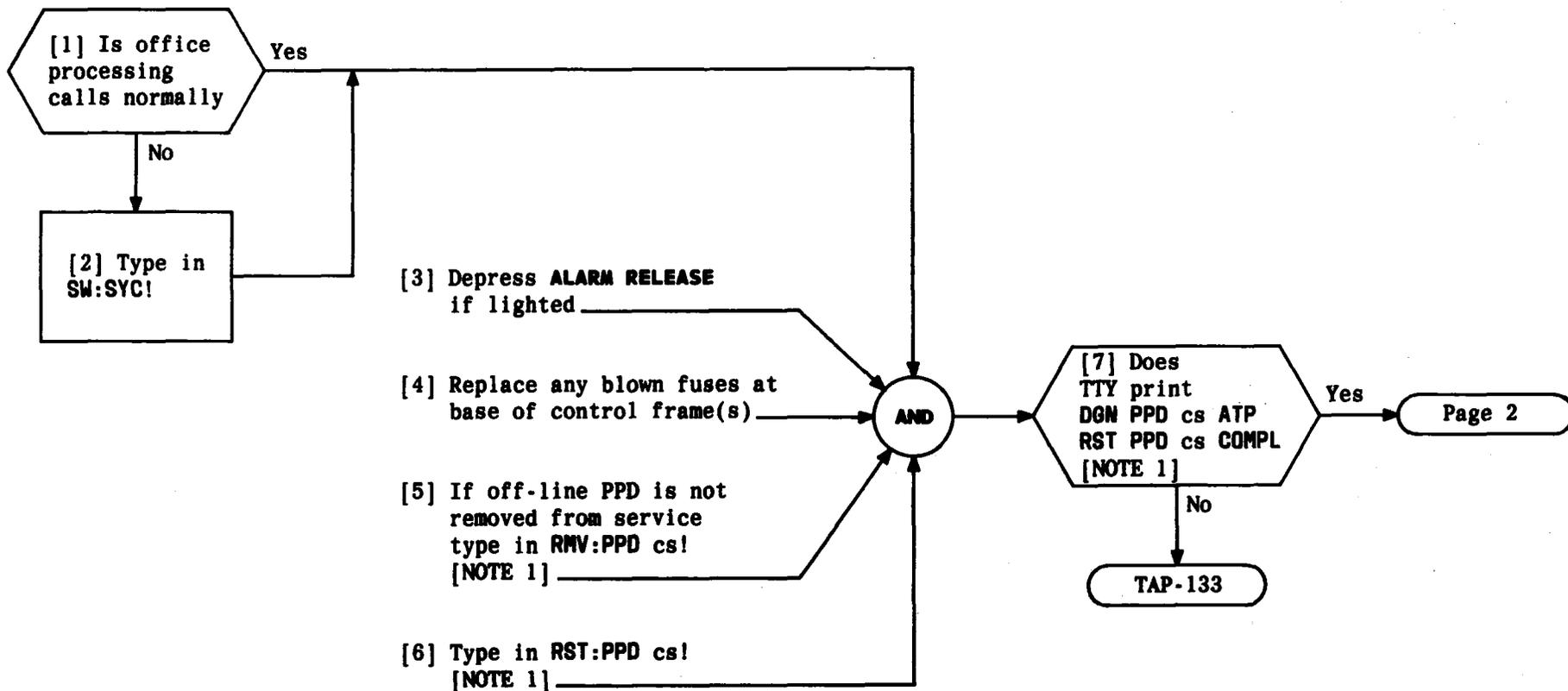
Yes

[25] On TTY
type
STOP:UTIL!

[28] Analyze number of
troubles in this same
15A grid. Per local
procedure reassign
line to a new OE or
replace the 15A grid
[DLP-510]

[26] Verify that
incoming and
outgoing test
calls can be
made on the line

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NOTE 1	
c = control frame	
0-1	
s = off-line system control (SYC)	
0-1	
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CLEAR PERIPHERAL PULSE DISTRIBUTOR (PPD) TROUBLE INDICATION

At TTY type in:

[8] SW:SYC!

[9] RMV:PPD cs!
[NOTE 1, Page 1]

[10] RST:PPD cs!
[NOTE 1, Page 1]

AND

[11] Does
TTY print
DGN PPD cs ATP
RST PPD cs COMPL
[NOTE 1, Page 1]

Yes

No

TAP-133

CLEAR PERIPHERAL PULSE DISTRIBUTOR (PPD) TROUBLE INDICATION

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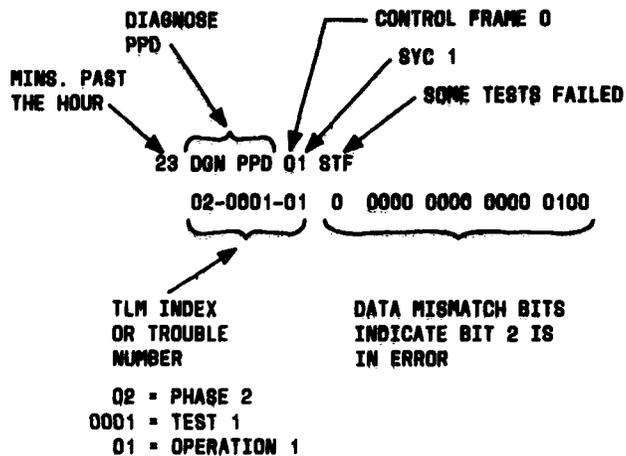
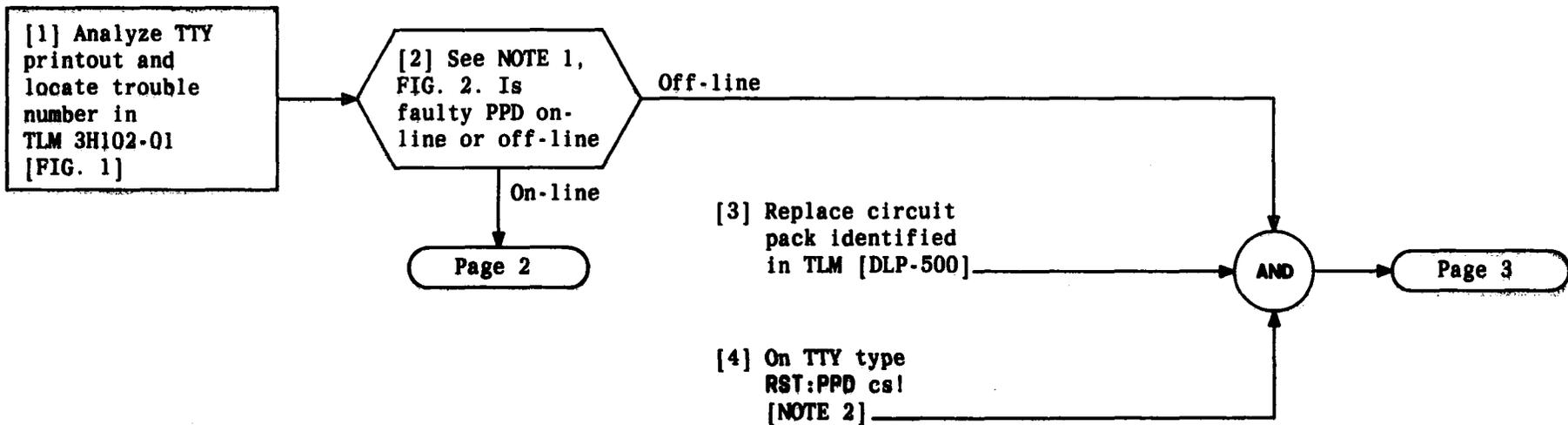


FIG. 1 - Example of Diagnostic Output Message

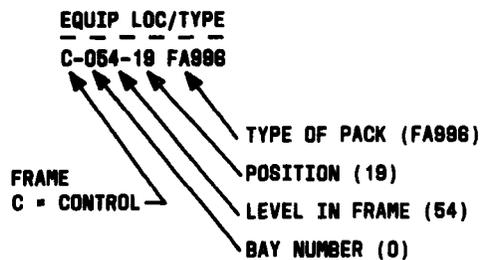


FIG. 2 - Example of TLM Equipment Location Message

NOTES

1. Bay number is not physical location. If bay number = 0, faulty PPD is off-line. If bay number = 1, faulty PPD is on-line (active)
2. c = control frame 0-1
s = off-line system control (SYC) 0-1

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CLEAR PERIPHERAL PULSE DISTRIBUTOR (PPD) CIRCUIT PACK TROUBLE

On TTY type:

[5] RST:PPD cs;UCL!
[NOTE 2, Page 1]

[6] SW:SYC!

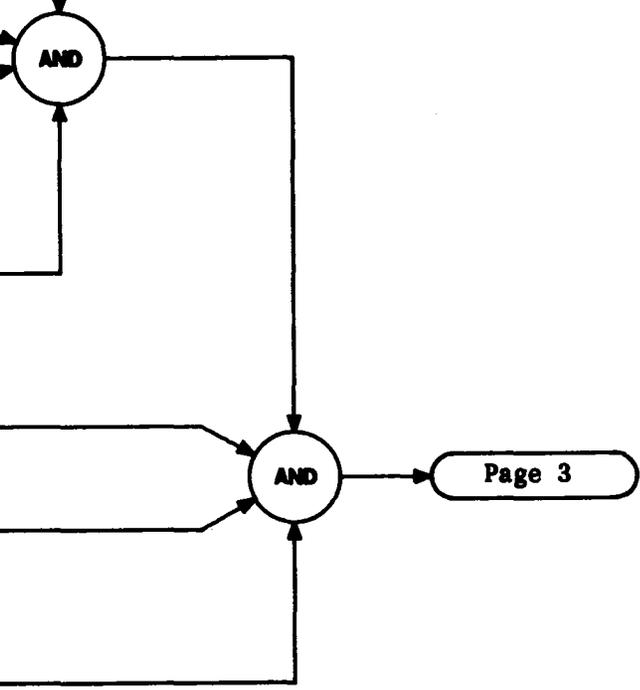
[7] Depress LOCK

[8] Remove off-line
PPD by typing
RMV:PPD cs!
[NOTE 2, Page 1]

[9] Replace circuit
pack identified
by TLM [DLP-500]

[10] Depress LOCK

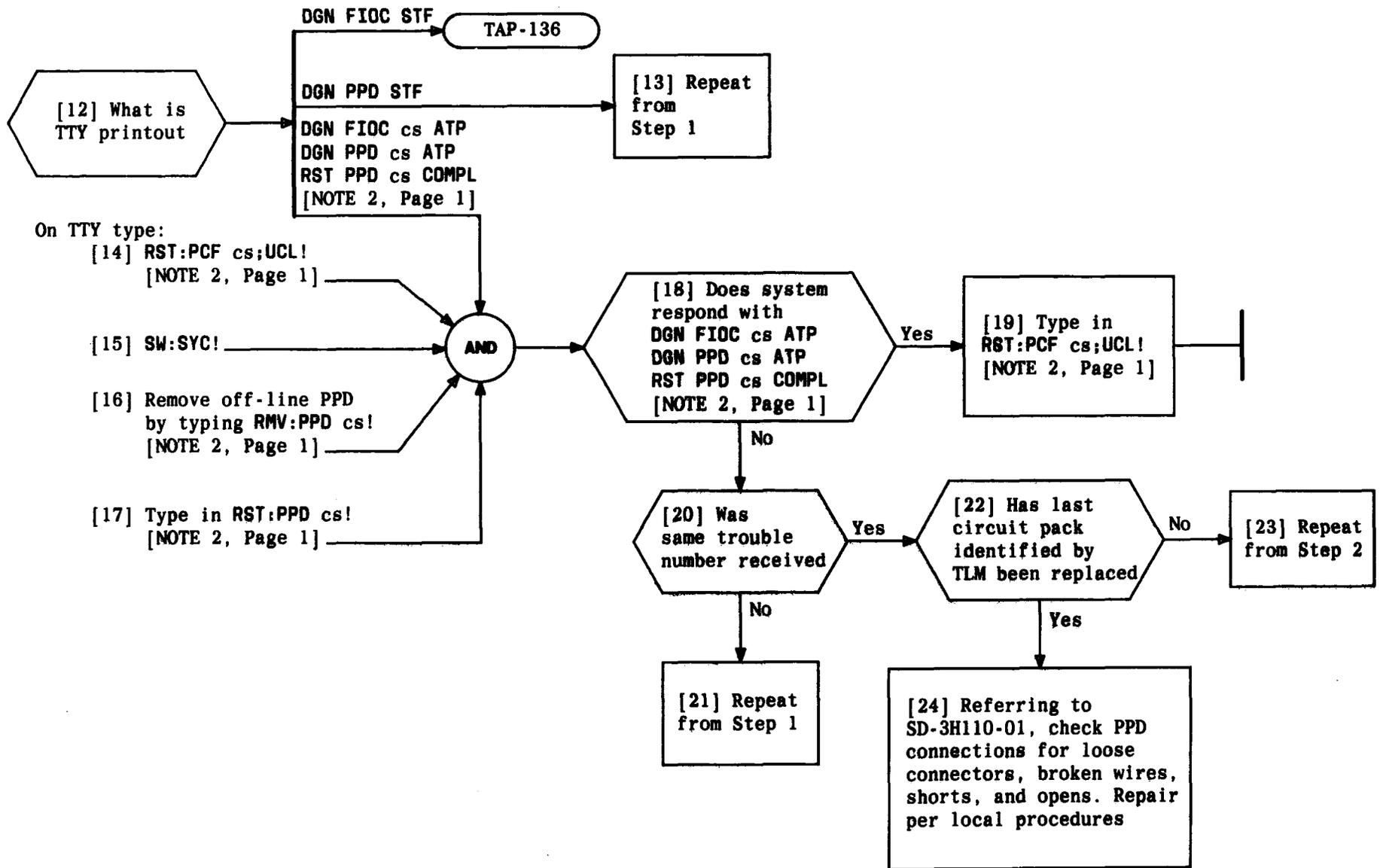
[11] On TTY type
RST:PPD cs!
[NOTE 2, Page 1]



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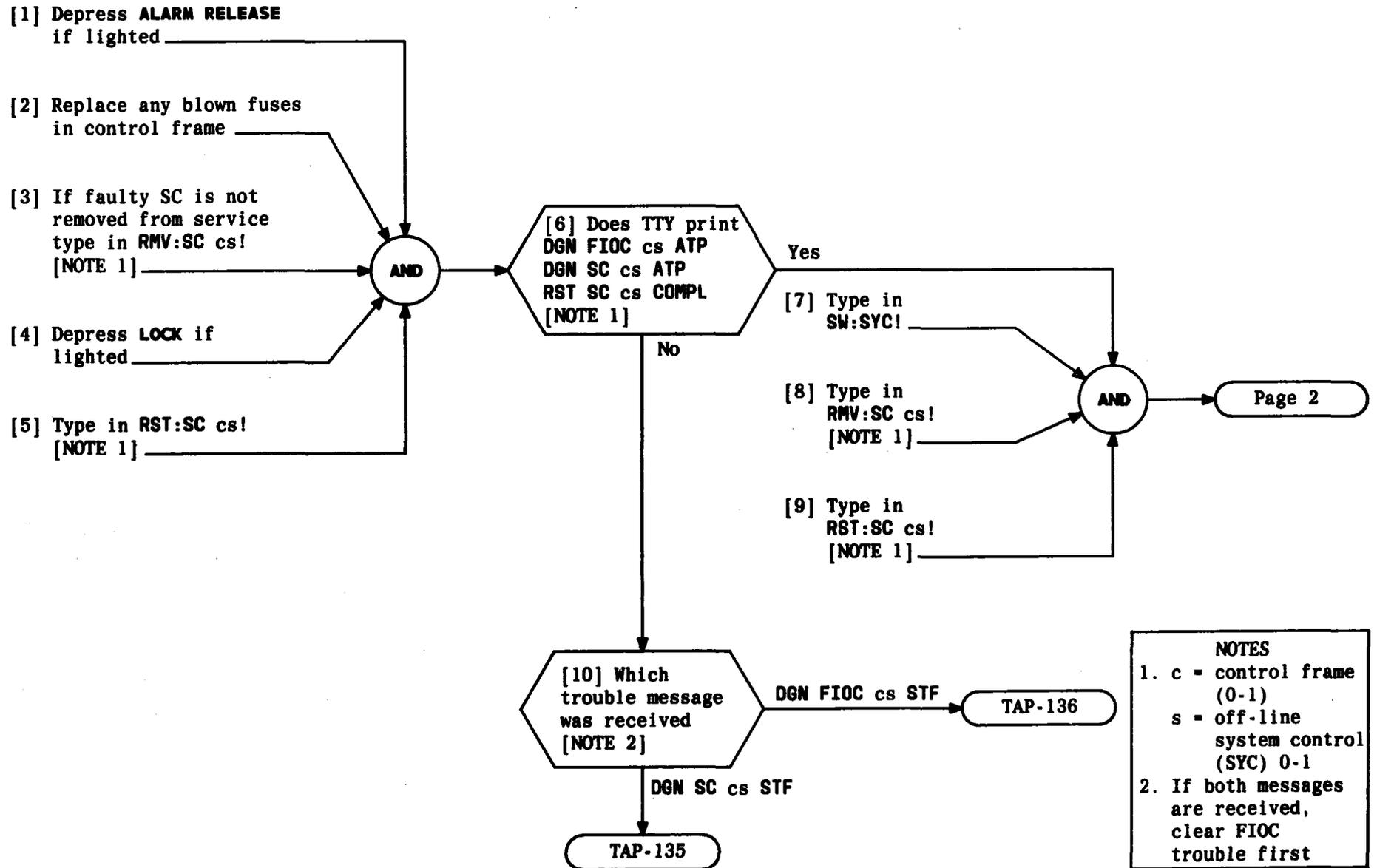
CLEAR PERIPHERAL PULSE DISTRIBUTOR (PPD) CIRCUIT PACK TROUBLE

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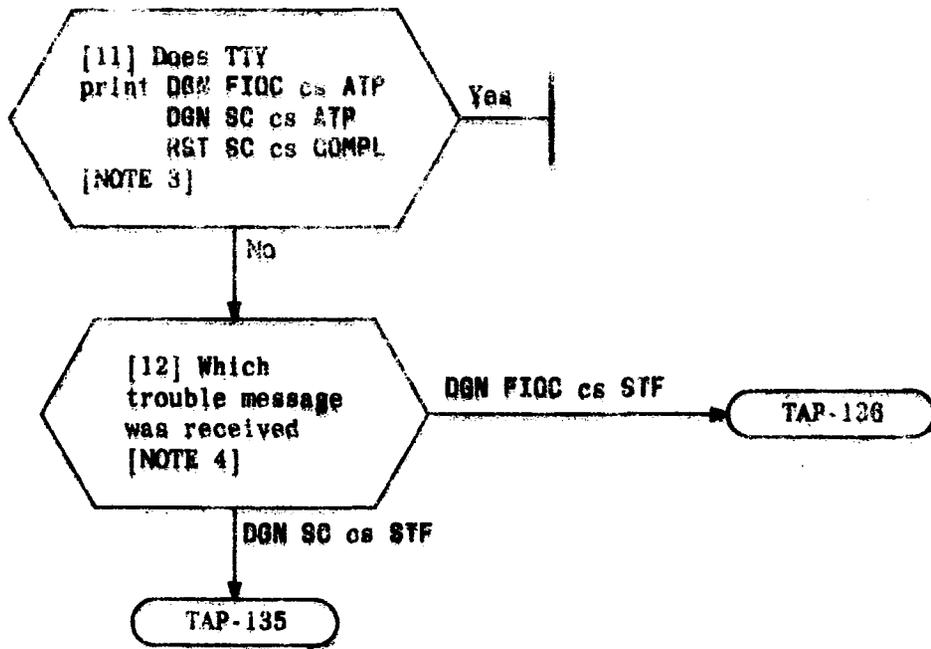
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CLEAR PERIPHERAL PULSE DISTRIBUTOR (PPD) CIRCUIT PACK TROUBLE



NOTES	
1. c = control frame (0-1) s = off-line system control (SYC) 0-1	
2. If both messages are received, clear FIOC trouble first	
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CHECK SCANNER CONTROLLER (SC) TROUBLE INDICATION



CHECK SCANNER CONTROLLER (SC) TROUBLE INDICATION

NOTES	
3. c = control frame 0-1	
s = off-line system control (SYC) 0-1	
4. If both messages are received, clear FIOC trouble first	
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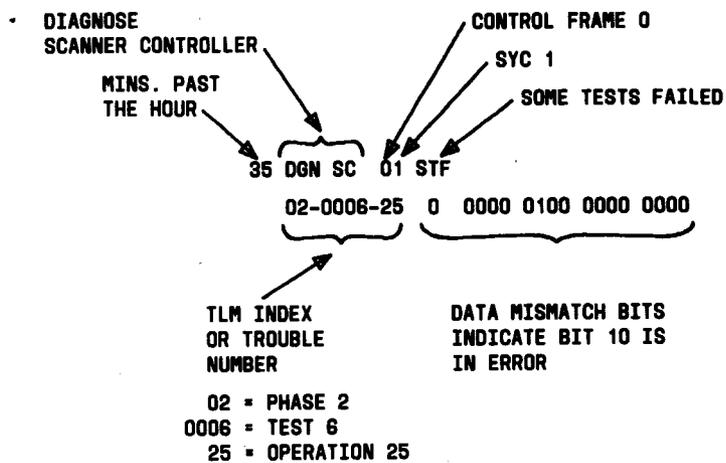
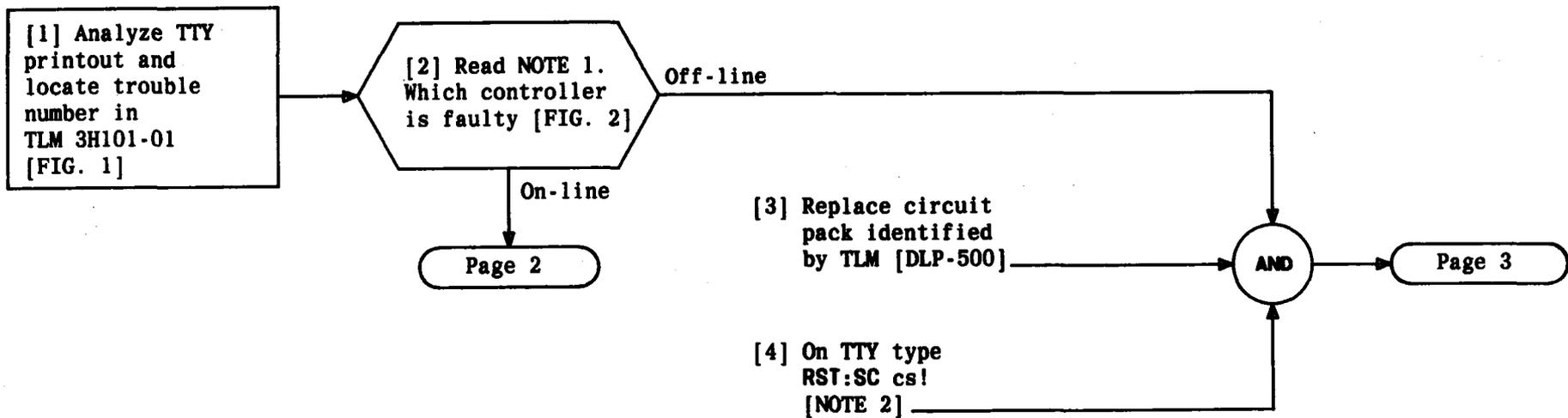


FIG. 1 - Example of Output Message

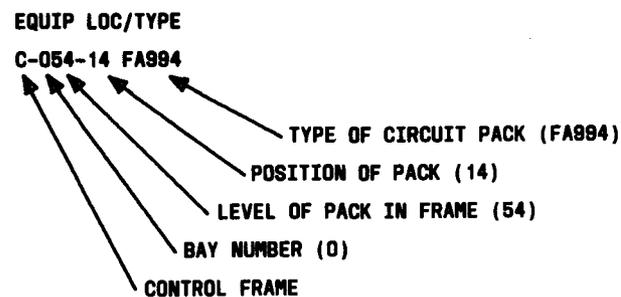


FIG. 2 - Example of TLM Trouble Location

NOTES	
1. Bay number is relative. A bay number of 0 indicates off-line; a 1 indicates on-line	
2. c = control frame 0-1 s = off-line system control (SYC) 0-1	
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CLEAR SCANNER CONTROLLER (SC) CIRCUIT PACK TROUBLE

On TTY type:

[5] RST:PCF cs;UCL!
[NOTE 2, Page 1]

[6] SW:SYC!

[7] Depress LOCK

[8] Remove the off-line
PCF by typing
RMV:SC cs!
RMV:PPD cs!
RMV:NWC cs!
[NOTE 2, Page 1]

[9] Replace circuit
pack identified
by TLM [DLP-500]

[10] Depress LOCK

[11] On TTY type
RST:SC cs!

AND

AND

[12] What is
TTY response
[NOTE 2,
Page 1]

DGN FIOC cs STF

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DGN SC cs STF

[13] Analyze
new trouble
printout and
repeat from
Step 1

DGN FIOC ATP
DGN SC cs ATP
RST SC cs COMPL

Page 3

CLEAR SCANNER CONTROLLER (SC) CIRCUIT PACK TROUBLE

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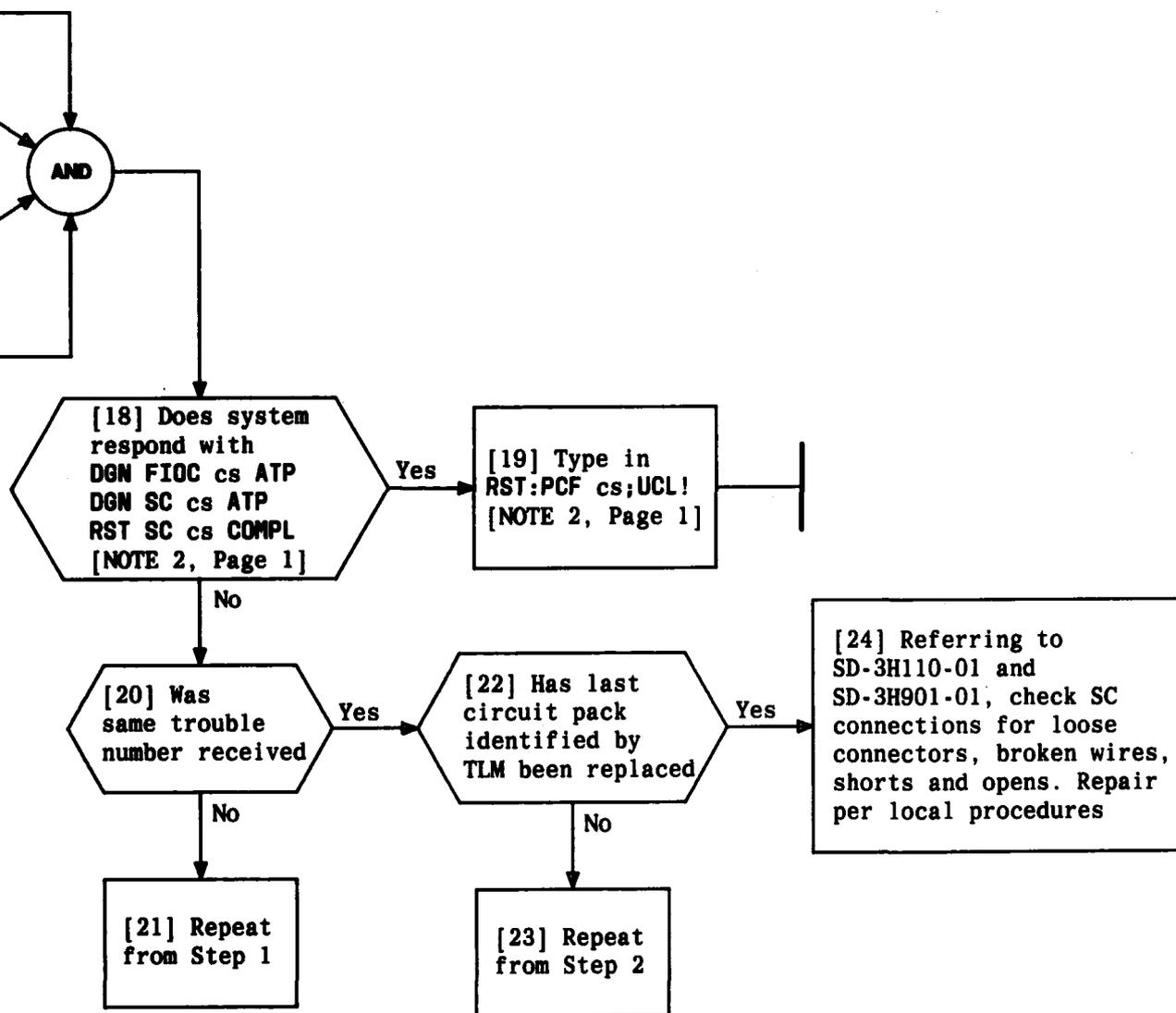
On TTY type:

[14] RST:PCF cs;UCL!
[NOTE 2, Page 1]

[15] SW:SYC!

[16] Remove off-line SC
by typing RMV:SC cs!
[NOTE 2, Page 1]

[17] RST:SC cs!
[NOTE 2, Page 1]



CLEAR SCANNER CONTROLLER (SC) CIRCUIT PACK TROUBLE

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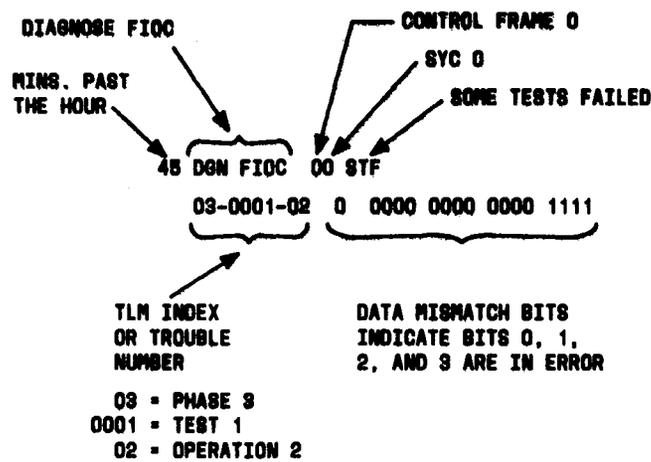
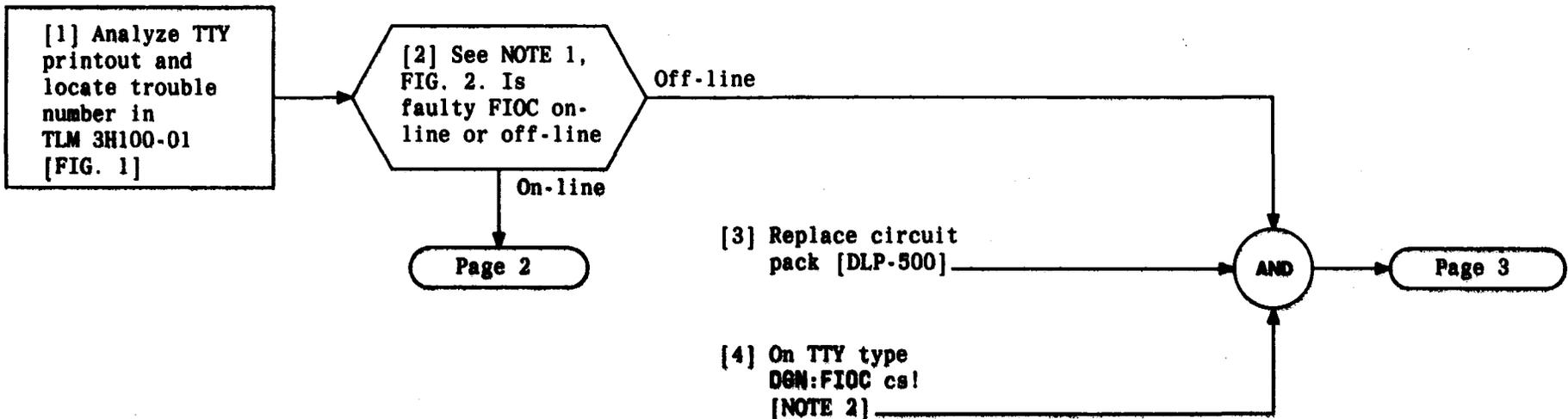


FIG. 1 - Example of Diagnostic Output Message

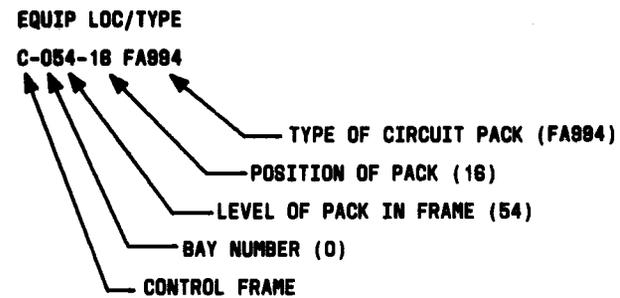


FIG. 2 - Example of Equipment Location Message

NOTES

- For test phases 01-03 (FIG. 1) the bay number refers to on-line (1) or off-line (0) not physical bay location. For test phase 04, the bay number refers to physical location
 0 = bay 0
 1 = bay 1
- c = control frame 0-1
 s = off-line system control (SYC) 0-1

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CLEAR FRAME INPUT/OUTPUT CONTROLLER (FIOC) CIRCUIT PACK TROUBLE

On TTY type:

[5] RST:PCF cs;UCL!
[NOTE 2, Page 1]

[6] SW:SYC!

[7] Depress LOCK if
not lighted

[8] Remove the off-line
SC by typing
RMV:SC cs! [NOTE 2, Page 1]

[9] Replace circuit pack identified
by TLM [DLP-500]

[10] Depress LOCK

[11] On TTY type
DGN:FIOC cs! [NOTE 2, Page 1]

On TTY type:

[14] RST:PCF cs;UCL! [NOTE 2, Page 1]

[15] SW:SYC!

[16] Remove off-line SC
by typing RMV:SC cs! [NOTE 2, Page 1]

[17] DGN:FIOC cs! [NOTE 2, Page 1]

AND

AND

[12] Does system
respond with
DGN FIOC cs ATP

No

[13] Analyze
new trouble
printout and
repeat from
Step 1

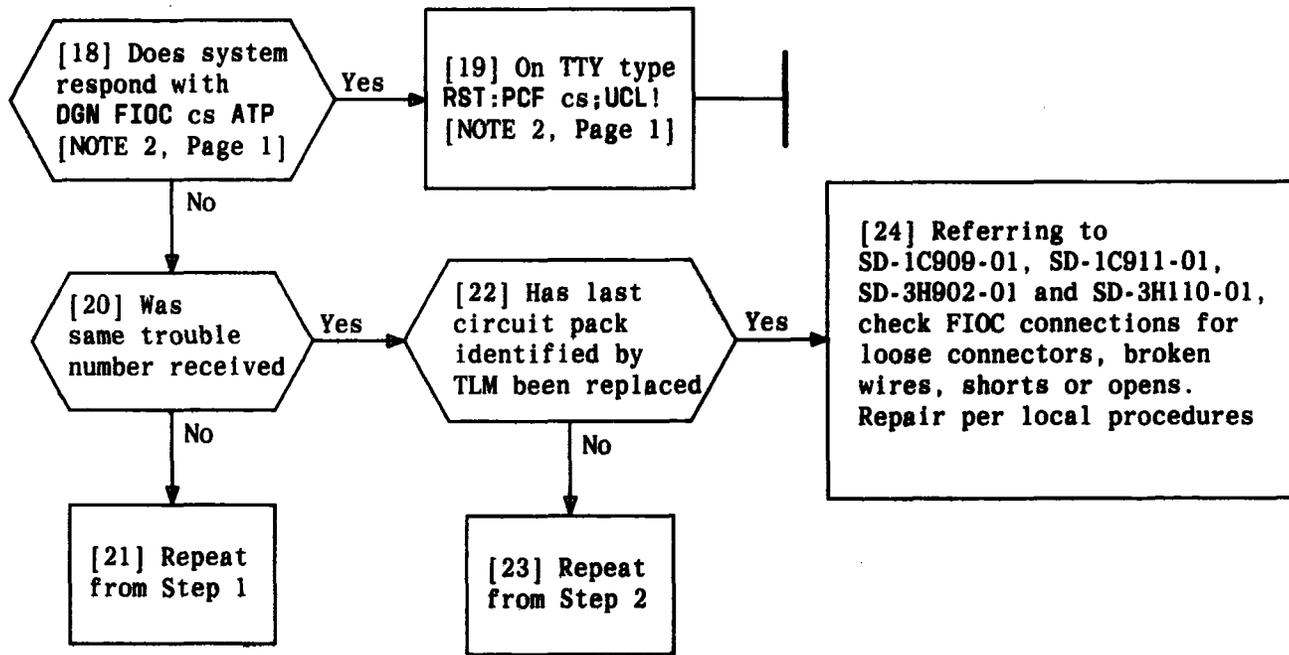
Yes

AND

Page 3

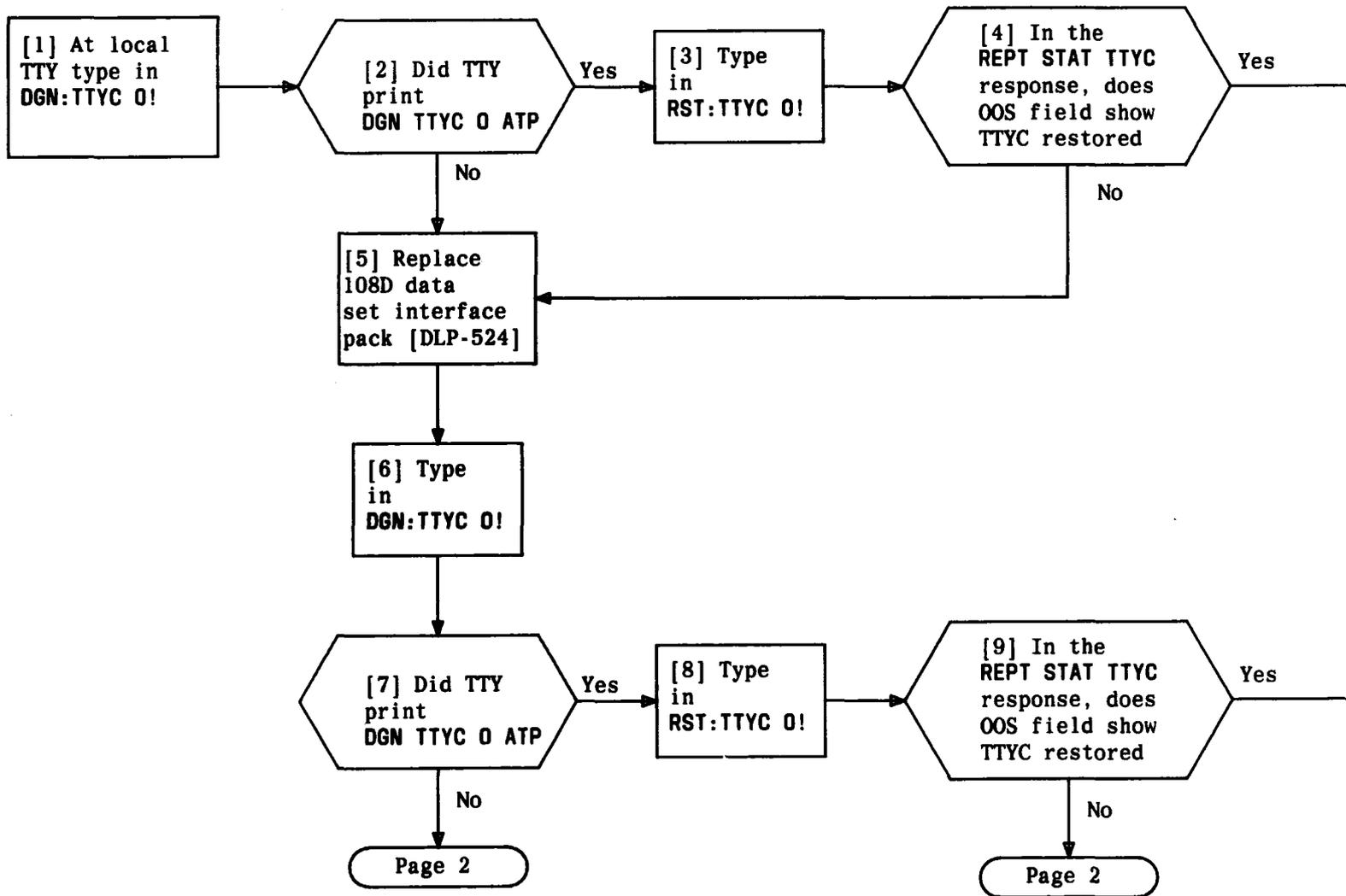
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CLEAR FRAME INPUT/OUTPUT CONTROLLER (FIOC) CIRCUIT PACK TROUBLE



CLEAR FRAME INPUT/OUTPUT CONTROLLER (FIOC) CIRCUIT PACK TROUBLE

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[10] Using local telephone, contact SCC and request replacement of 108D data set interface pack at that end

[11] After SCC replacement type in DGN:TTYC 0!

[12] Did TTY print DGN TTYC 0 ATP

[14] Type in RST:TTYC 0!

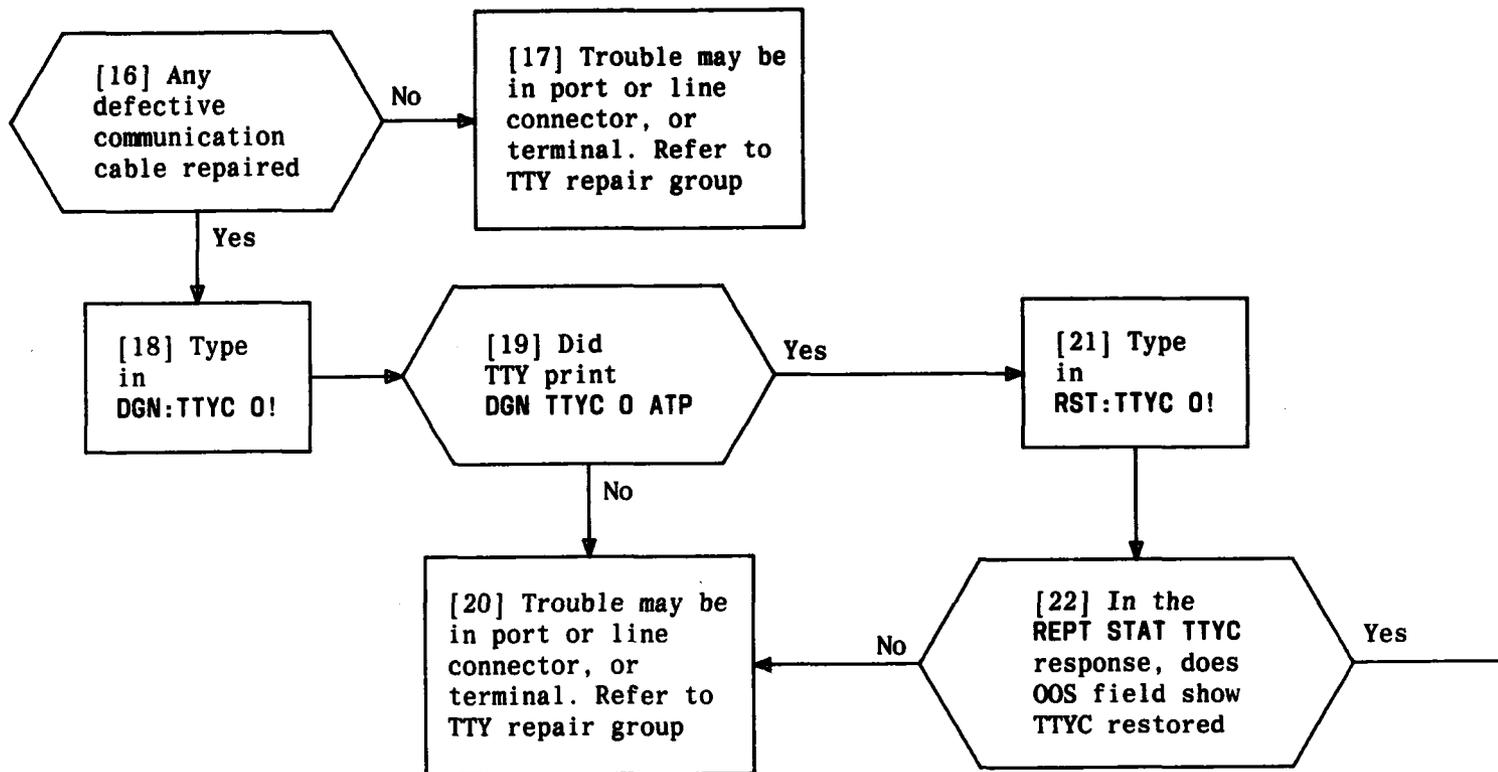
[15] In the REPT STAT TTYC response, does OOS field show TTYC restored

[13] Have SCC personnel inspect and repair possible defective communication link between remote 108D data set and TTY

Page 3

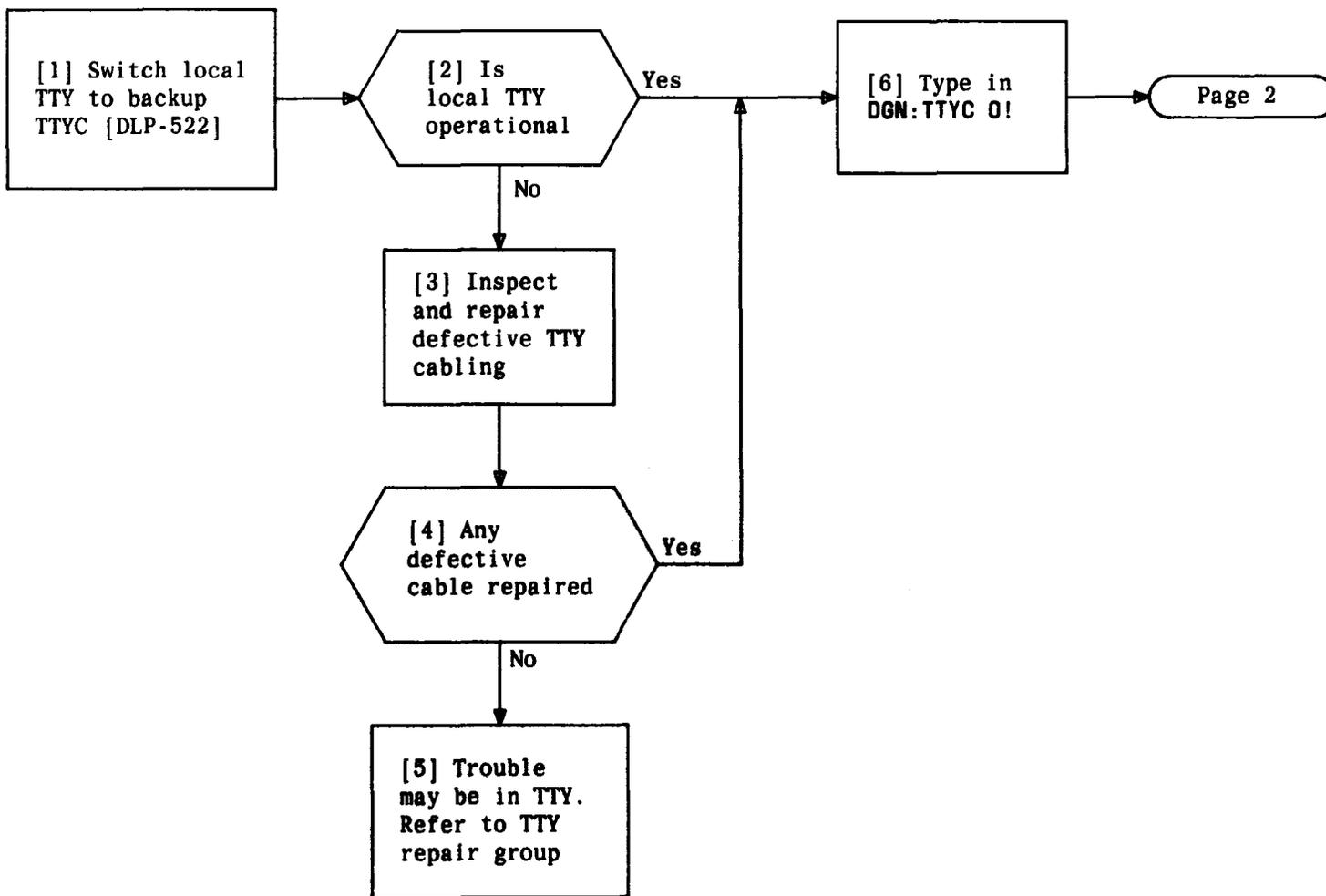
CLEAR REMOVE TELETYPEWRITER CONTROLLER (TTYC 0) TROUBLE

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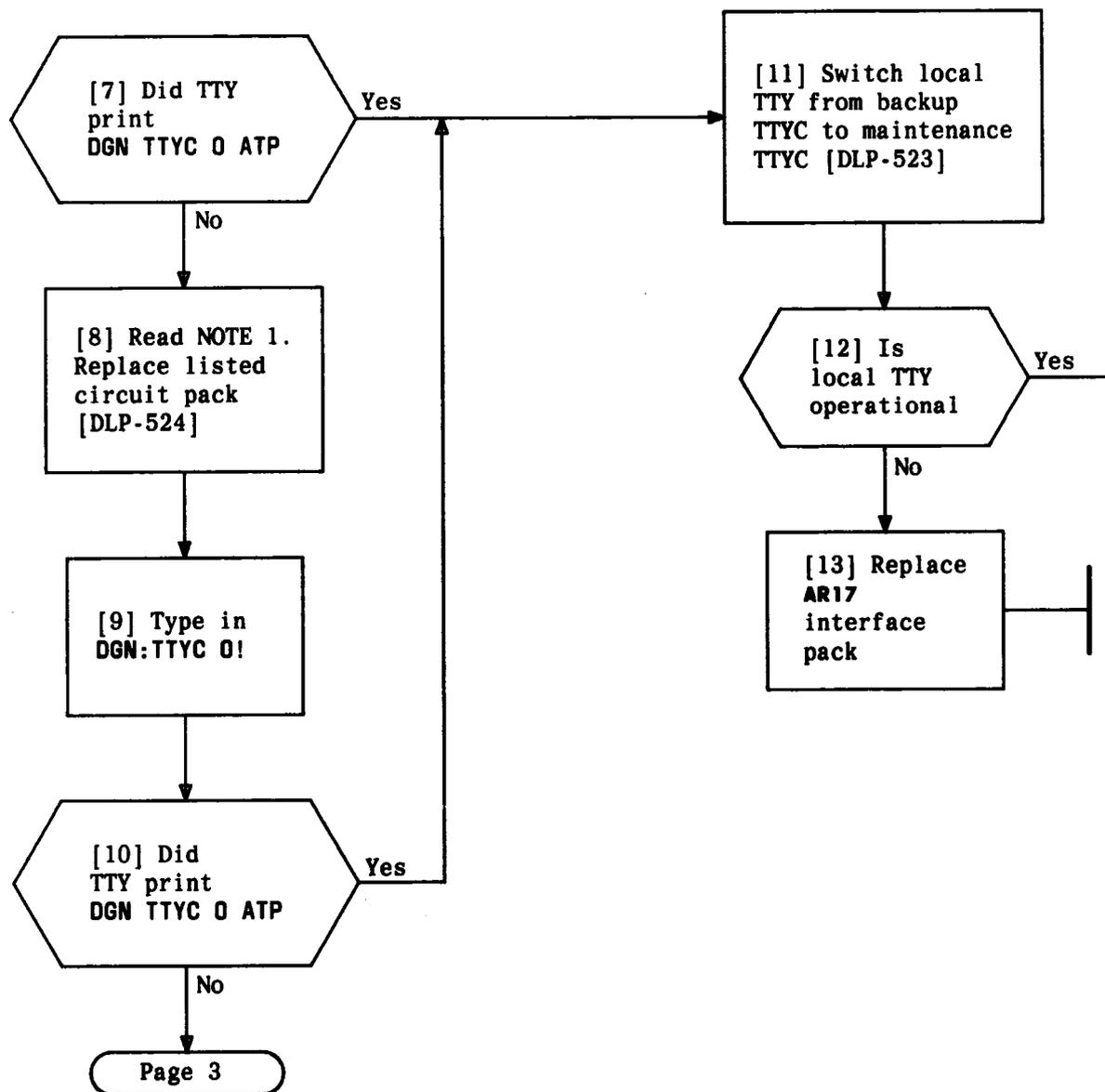
CLEAR REMOTE TELETYPEWRITER CONTROLLER (TTYC 0) TROUBLE

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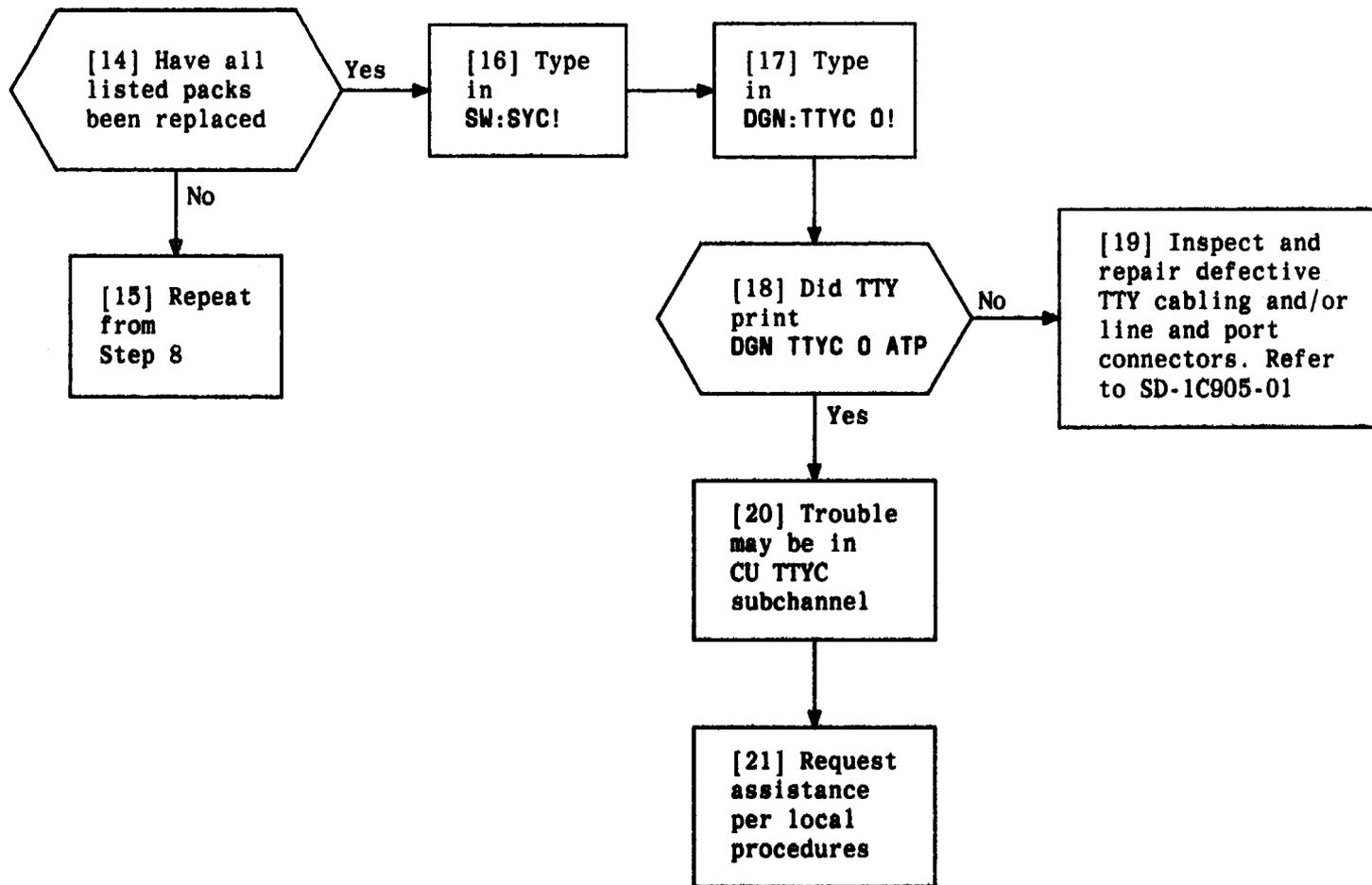


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CLEAR MAINTENANCE TELETYPEWRITER CONTROLLER (TTYC 0) TROUBLE

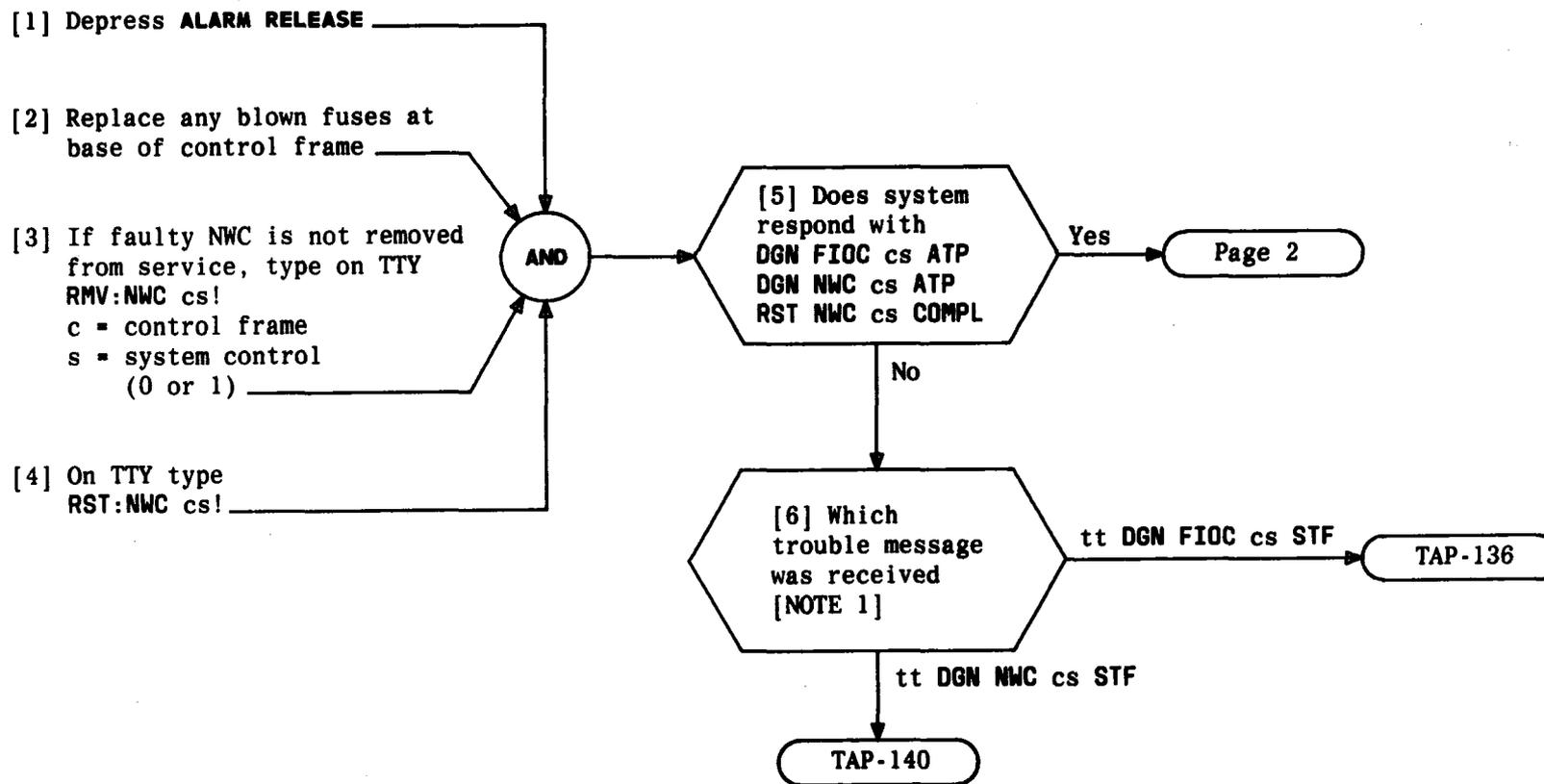


NOTE 1	
TTYC circuit packs are replaced one at a time in order listed	
AR17	} if equipped
108D	
FA1058	
FA1059	
FA1072	
FC200	
FC261	
FB152	
FB494	
FC21	
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CLEAR MAINTENANCE TELETYPEWRITER CONTROLLER (TTYC 0) TROUBLE

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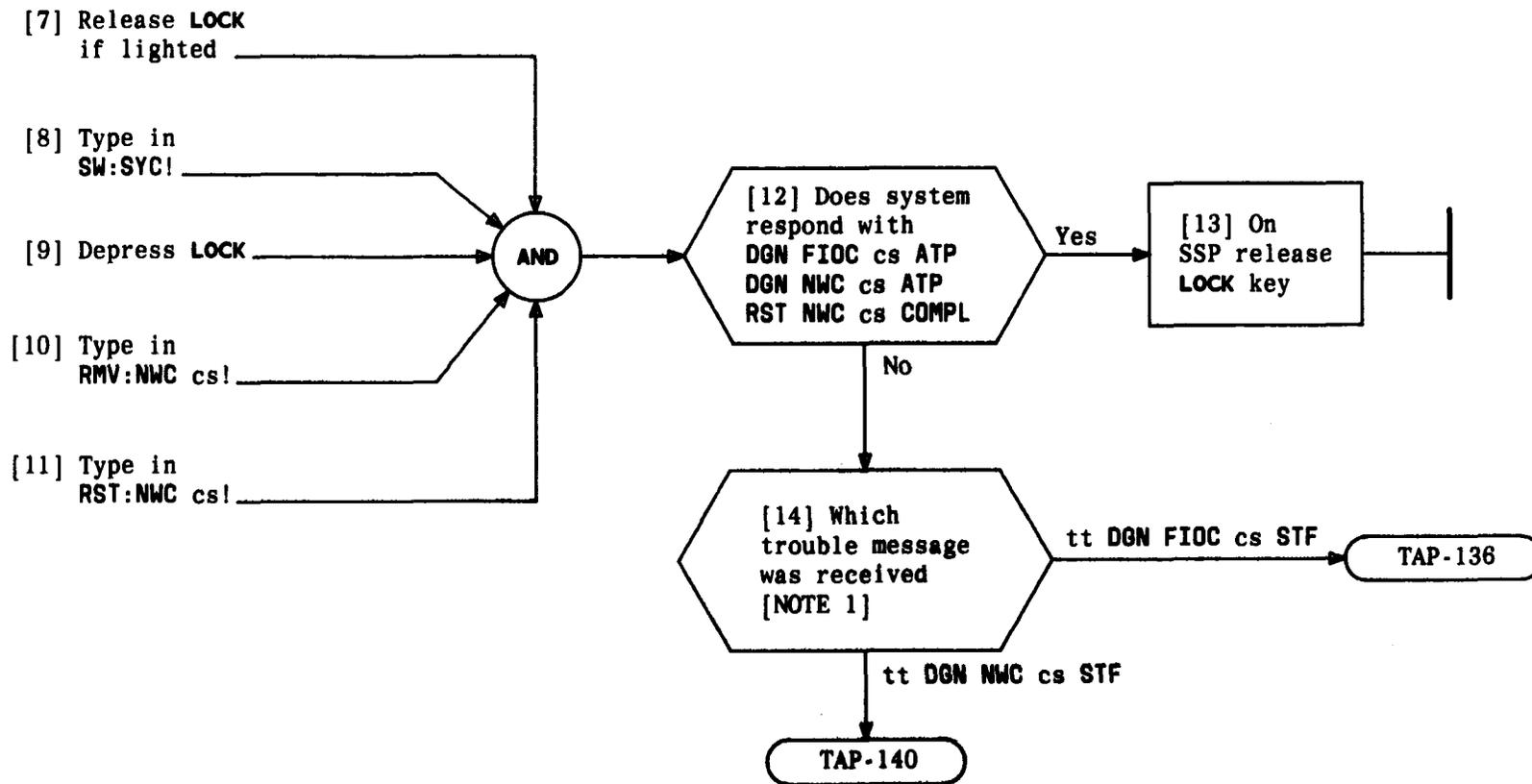


NOTE 1

If both messages are received, clear FIOC trouble first

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CLEAR NETWORK CONTROLLER (NWC) TROUBLE INDICATION



NOTE 1

If both messages are received, clear FIOC trouble first

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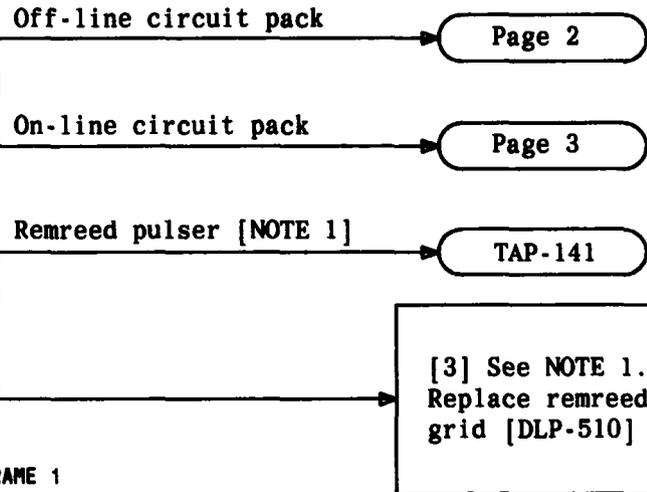
233-143-100	TAP
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CLEAR NETWORK CONTROLLER (NWC) TROUBLE INDICATION

[1] Analyze TTY printout and locate trouble number in TLM 3H103-01 [FIG. 1]

[2] See CAUTION 1. What does TLM indicate to replace [FIG. 2]



NOTE 1
Before replacing network grid or remreed pulser, all plug-in circuit packs should be replaced and PINS inspected for opens, shorts, and grounds

CAUTION 1
Bay number shown in the trouble number can mean two different things.
0 = Off-line system control and may also mean BAY 0.
1 = On-line system control and may also mean Bay 1.
Refer to all notes concerning the trouble number to determine what meaning a particular test is using for bay number. When the frame specified in the trouble number is a network frame, Nx, x is relative. For example, N1 refers to Network Frame 1 if controller is in Control Frame 0 and to Network 8 if controller is in Control Frame 1

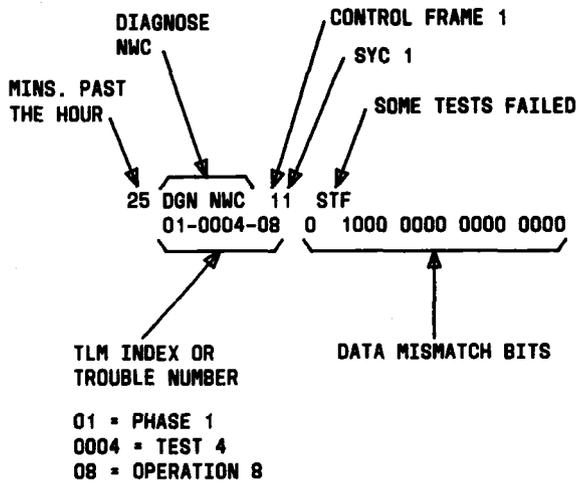


FIG. 1 - Example of Output Message

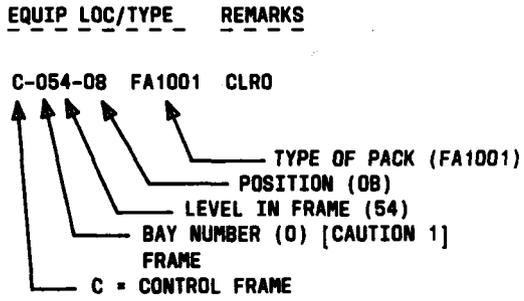


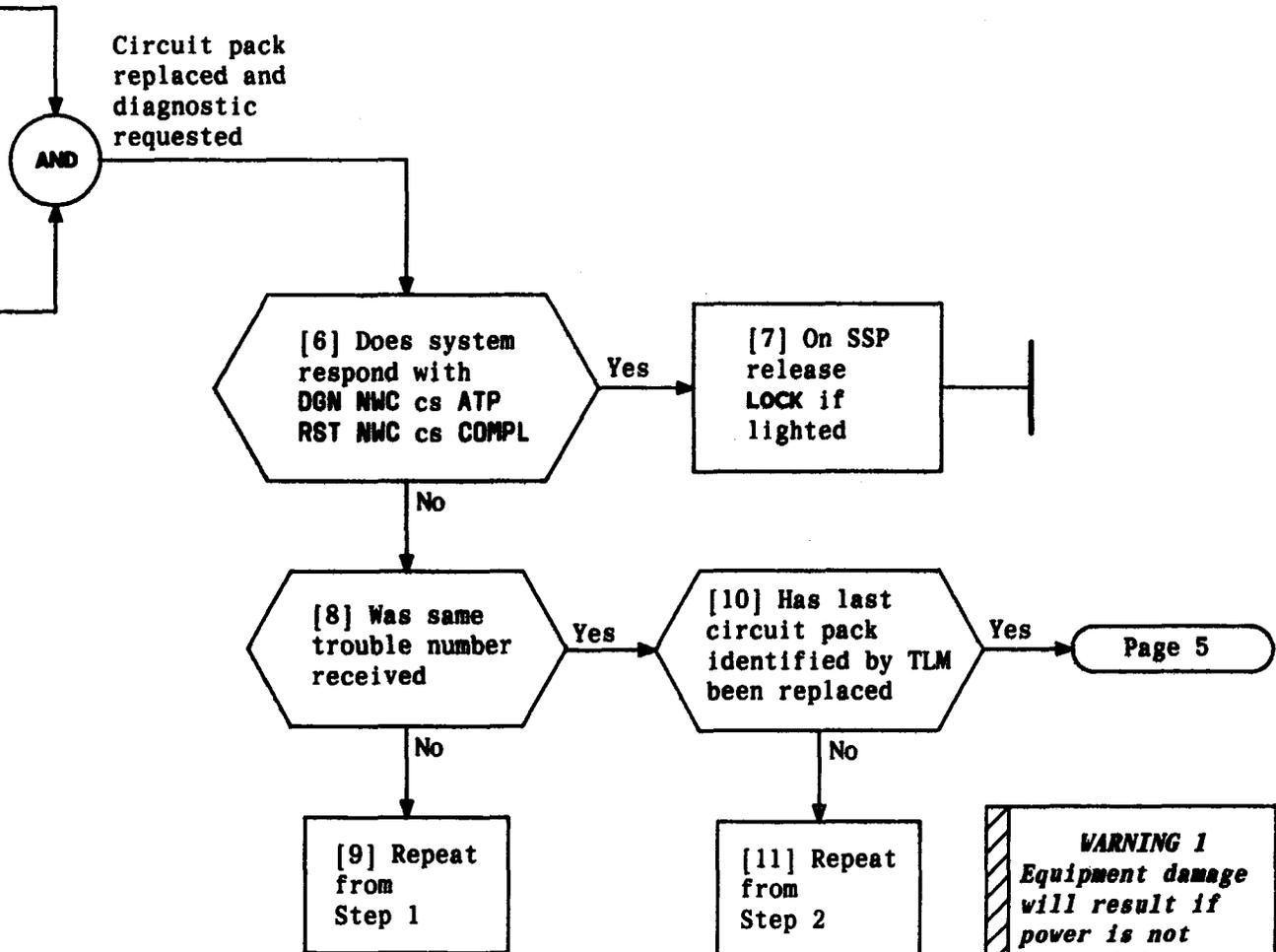
FIG. 2 - Example of Trouble Message

CLEAR NETWORK CONTROLLER (NWC) CIRCUIT PACK TROUBLE

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[4] See WARNING 1. Replace circuit pack [DLP-500]

[5] On TTY type RST:NWC cs!



WARNING 1
Equipment damage will result if power is not removed from peripheral control frame before replacing circuit packs

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CLEAR NETWORK CONTROLLER (NWC) CIRCUIT PACK TROUBLE

On TTY:

[12] Type RST:NWC cs;UCL!
c = control frame
s = system control
(0 or 1)

[13] Release LOCK if
lighted

[14] Type SW:SYC!

[15] Depress LOCK

[16] Remove off-line NWC
RMV:NWC cs!
c = control frame
s = system control
(0 or 1)

[17] See WARNING 1. Replace
circuit pack [DLP-500]

[18] On TTY type
RST:NWC cs!
c = control frame
s = system control (0 or 1)

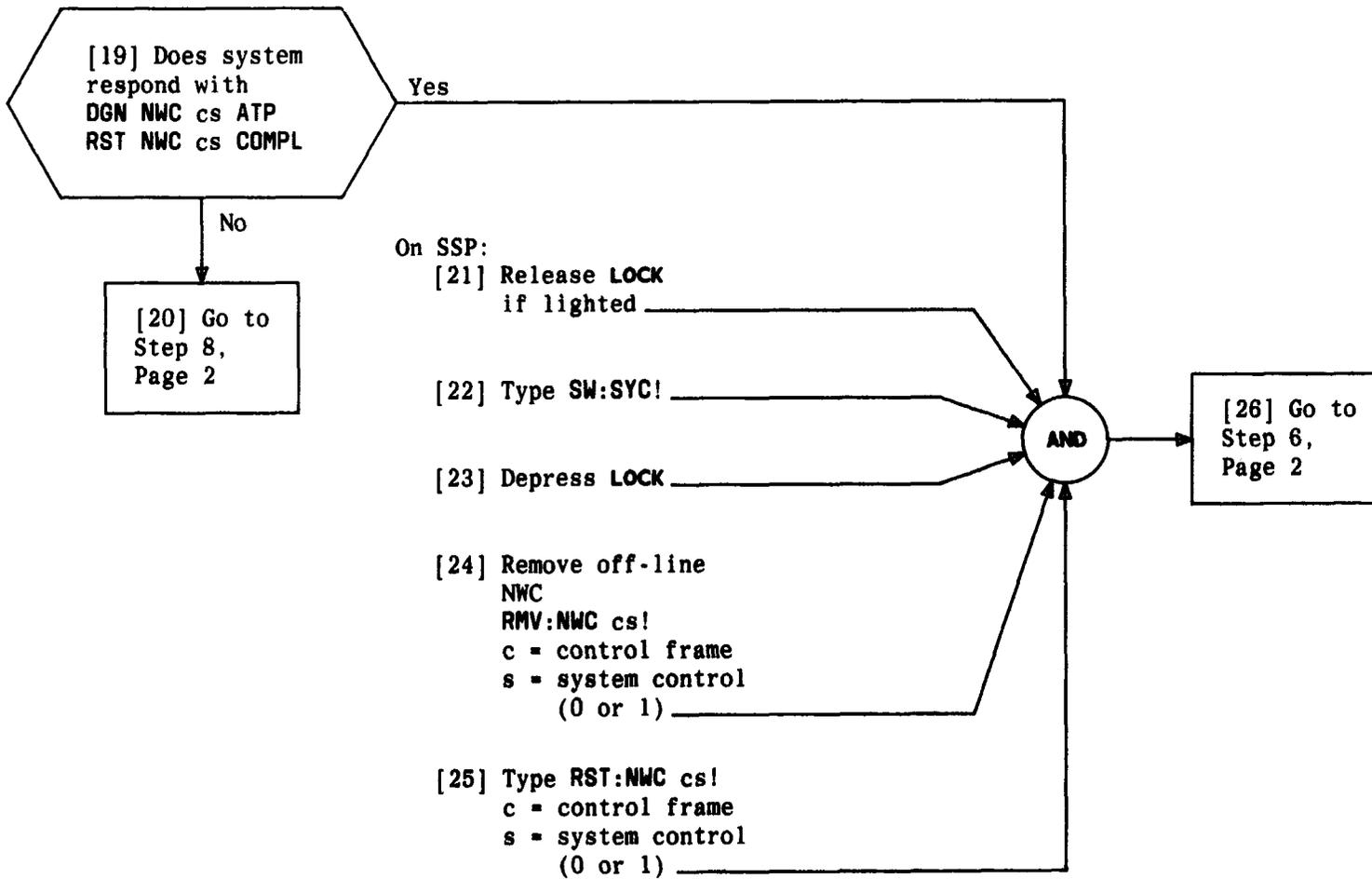
AND

AND

Page 4

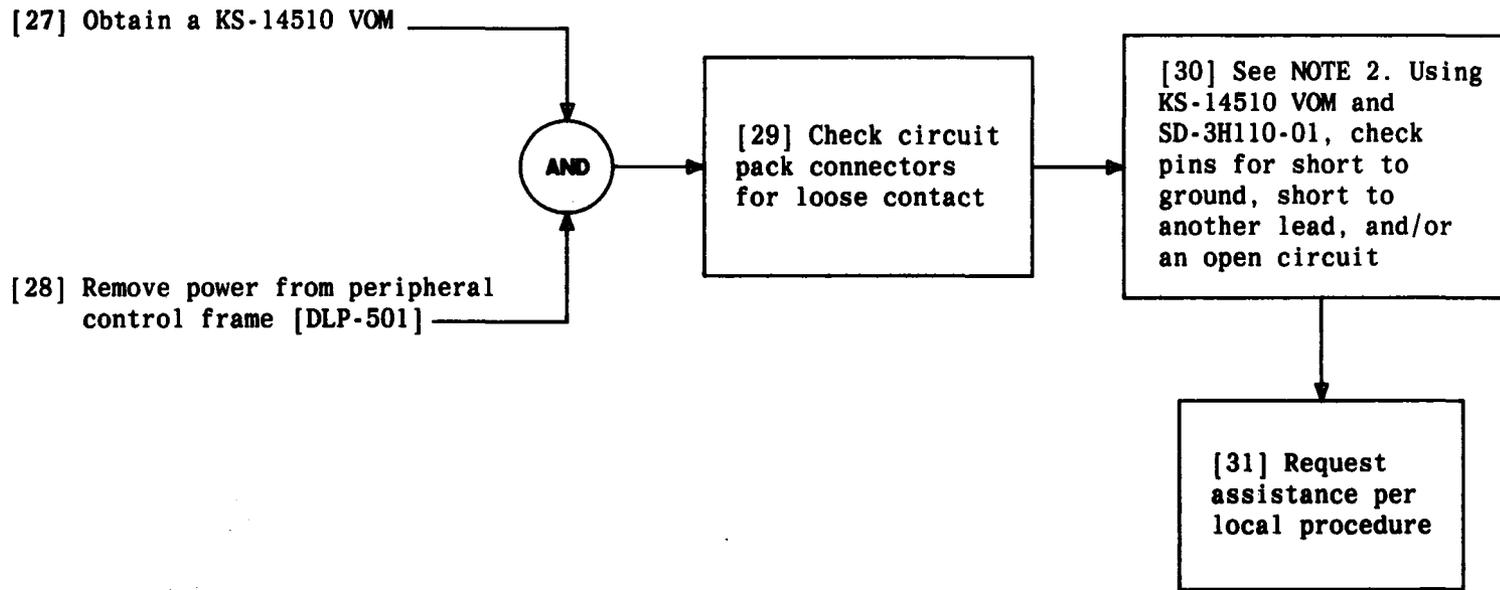
CLEAR NETWORK CONTROLLER (NWC) CIRCUIT PACK TROUBLE

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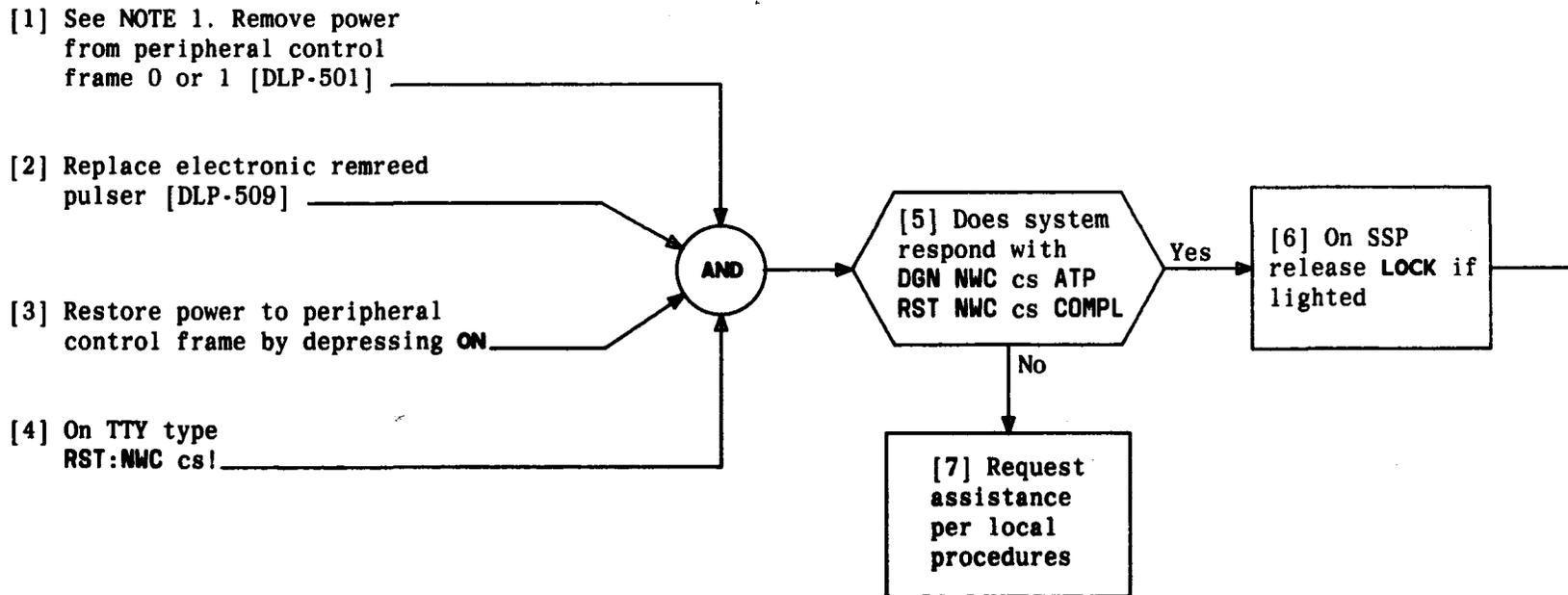


CLEAR NETWORK CONTROLLER (NWC) CIRCUIT PACK TROUBLE

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NOTE 2	
TLM 3H103-01 may provide a list of pins for each trouble number which may be responsible for the circuit failing diagnostic tests	
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NOTE 1
 Before replacing the electronic remreed pulser, all plug-in circuit packs identified by the TLM should be replaced and all PINS inspected for opens, shorts, and grounds

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CLEAR ELECTRONIC REMREED PULSER TROUBLE

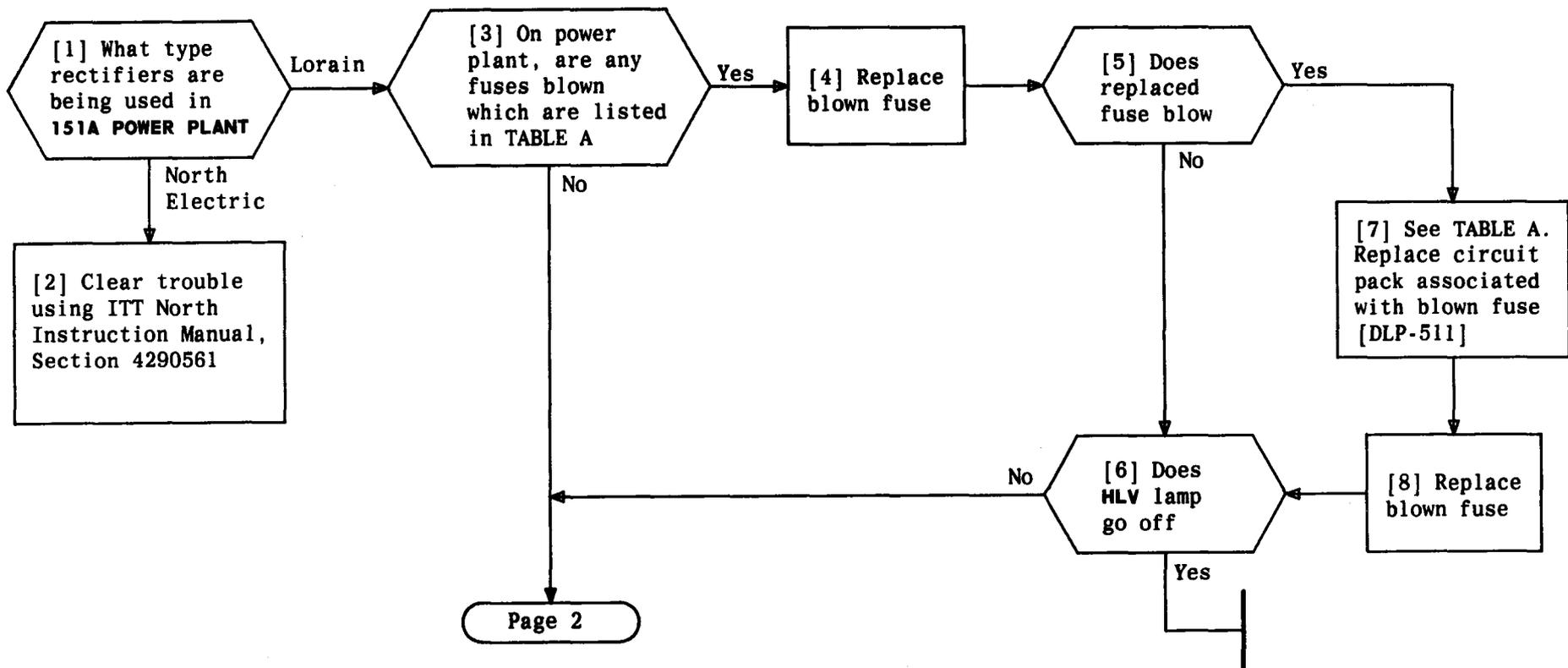
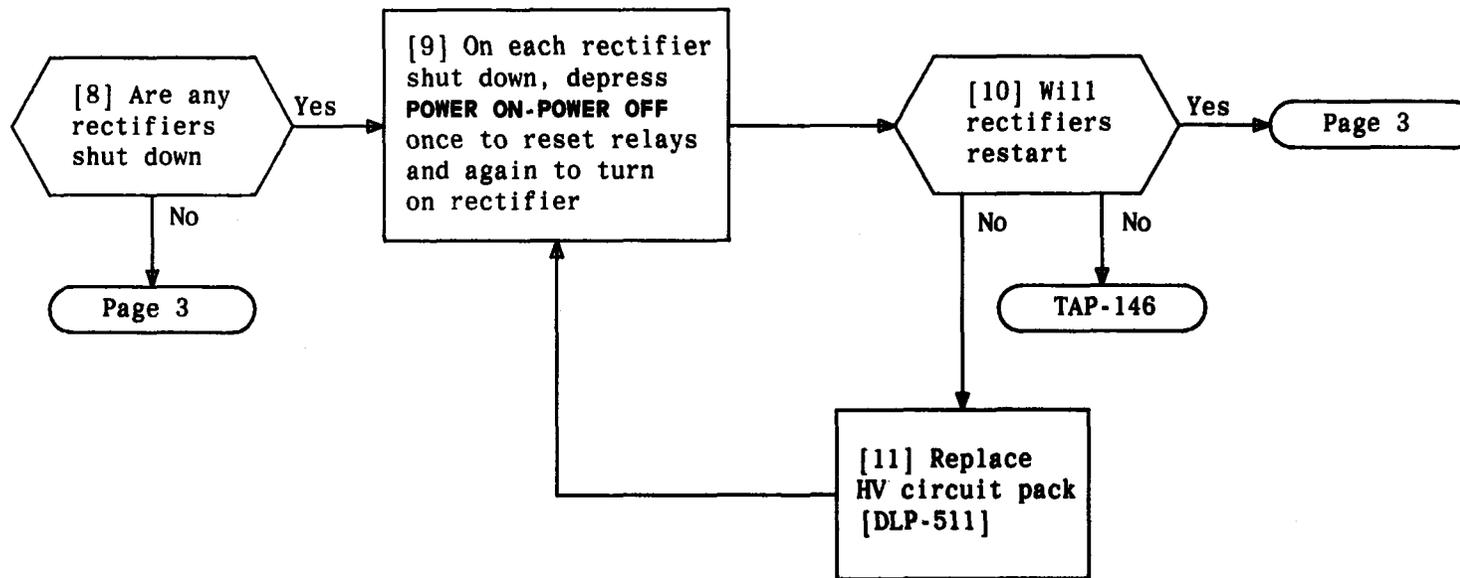


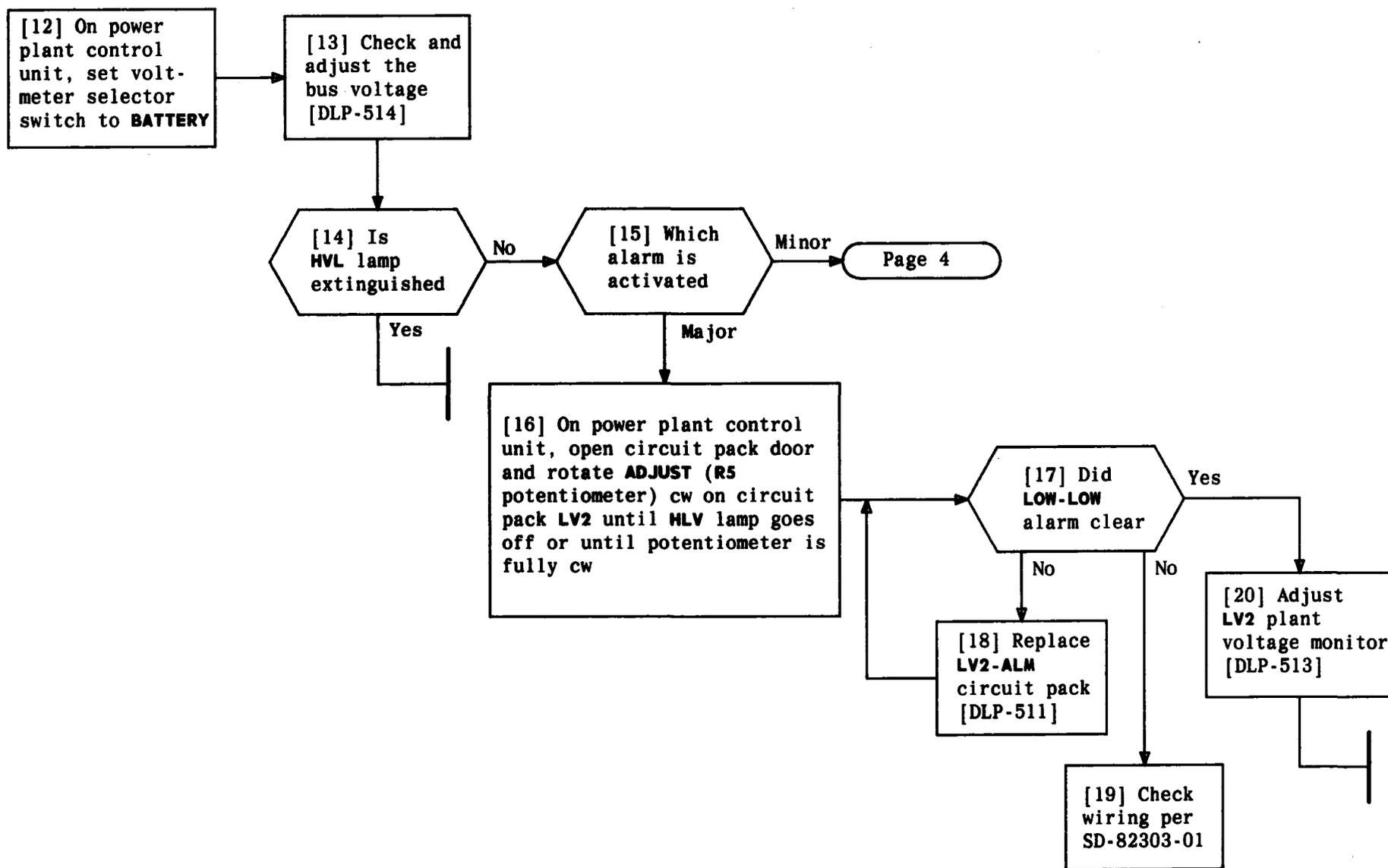
TABLE A	
FUSE	CIRCUIT PACK
HVM (F9)	HV Shutdown
LVB1 (F10)	LV1 ALM
LVB2 (F11)	LV2 ALM

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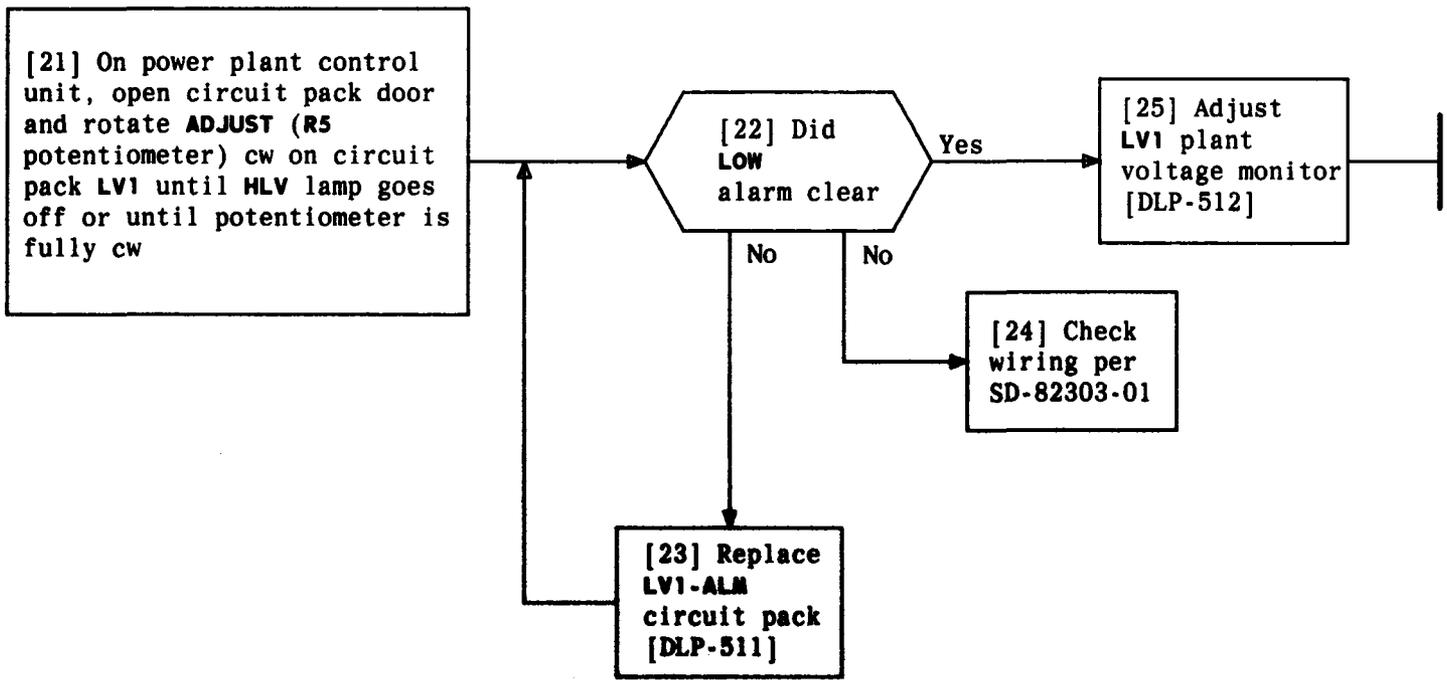
CLEAR HIGH-LOW VOLTAGE (HLV) ALARM

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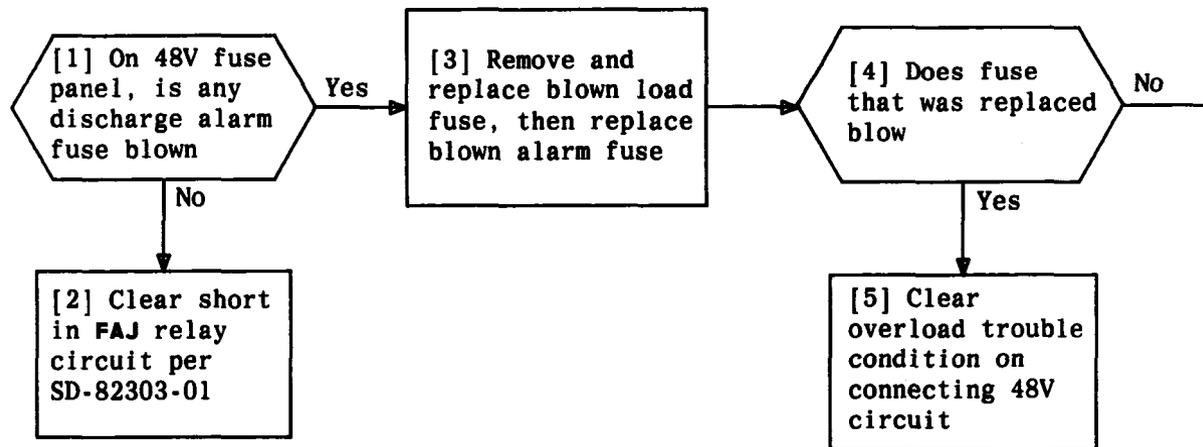
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CLEAR HIGH-LOW VOLTAGE (HLV) ALARM



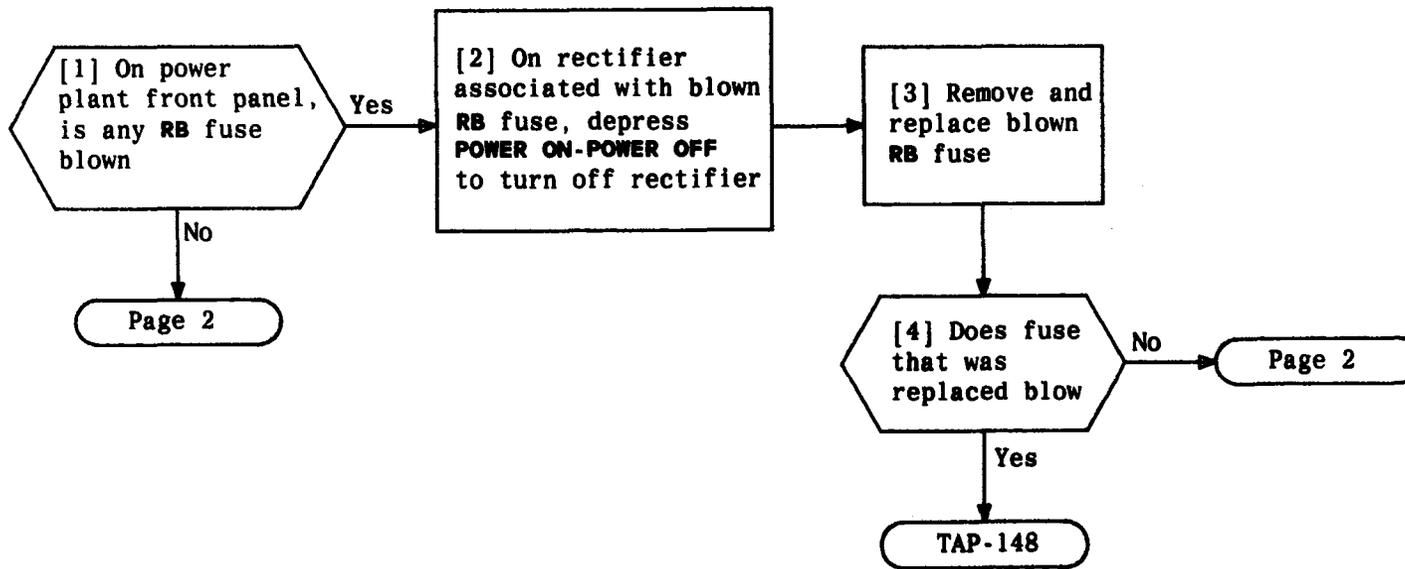
CLEAR HIGH-LOW VOLTAGE (HLV) ALARM

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CLEAR DISCHARGE FUSE ALARM

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CLEAR RECTIFIER FAILURE ALARM

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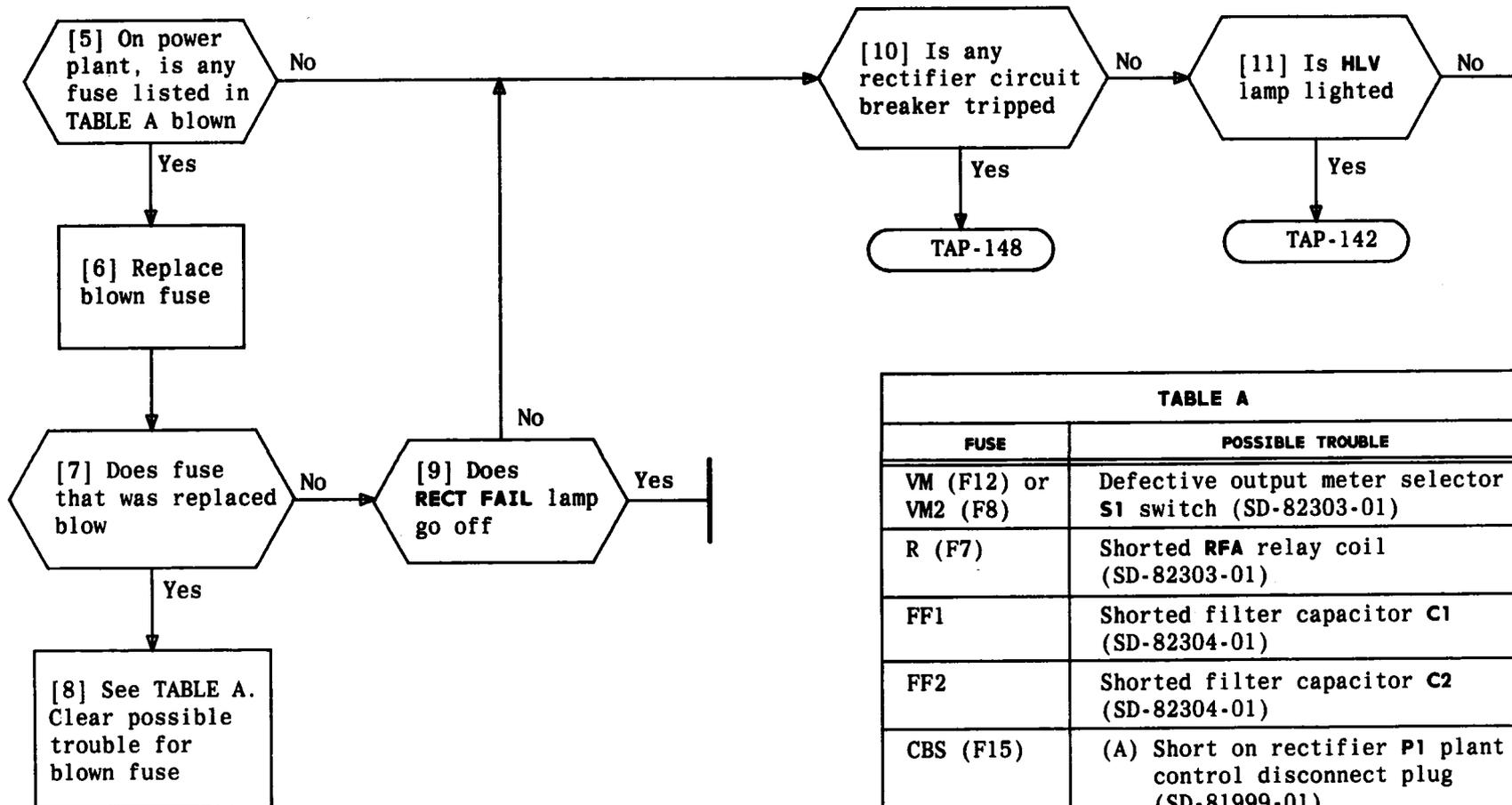
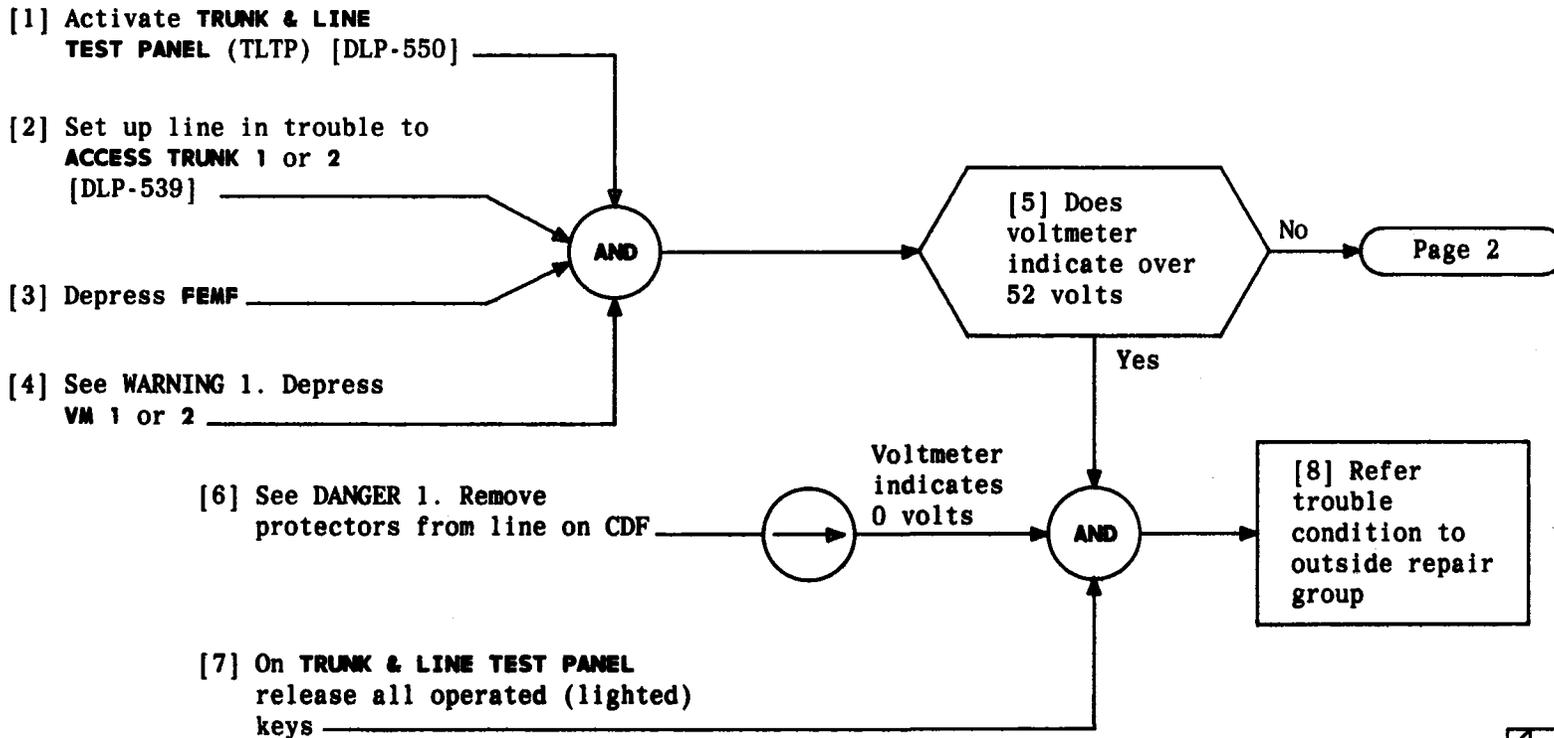


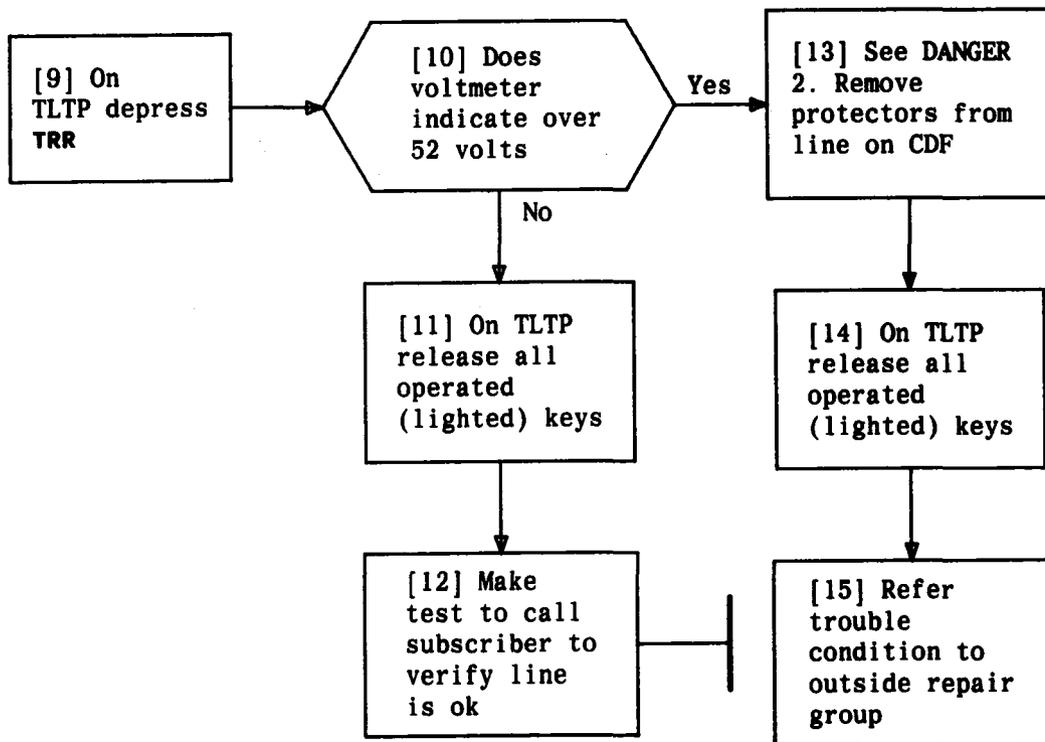
TABLE A	
FUSE	POSSIBLE TROUBLE
VM (F12) or VM2 (F8)	Defective output meter selector S1 switch (SD-82303-01)
R (F7)	Shorted RFA relay coil (SD-82303-01)
FF1	Shorted filter capacitor C1 (SD-82304-01)
FF2	Shorted filter capacitor C2 (SD-82304-01)
CBS (F15)	(A) Short on rectifier P1 plant control disconnect plug (SD-81999-01) (B) Defective CP3 circuit pack in rectifier (SD-81999-01)

CLEAR RECTIFIER FAILURE ALARM



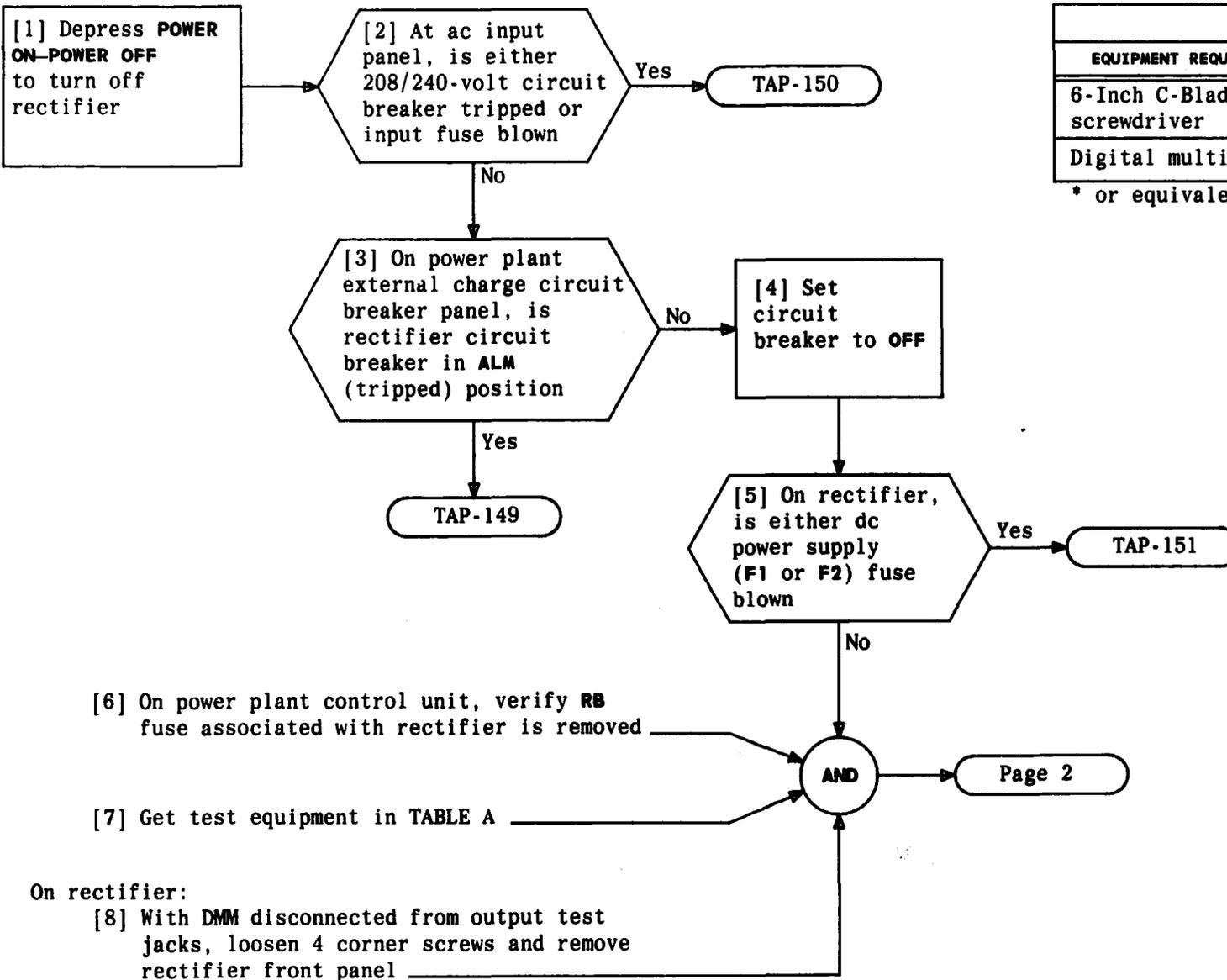
WARNING 1 Subscriber line may have a high ac or dc voltage on it. Do not leave voltmeter connected if needle is pegged against stop	
DANGER 1 Line may have high ac or dc voltage on it	
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CLEAR POWER CROSS INDICATION



CLEAR POWER CROSS INDICATION

DANGER 2 <i>Line may have high ac or dc voltage on it</i>	
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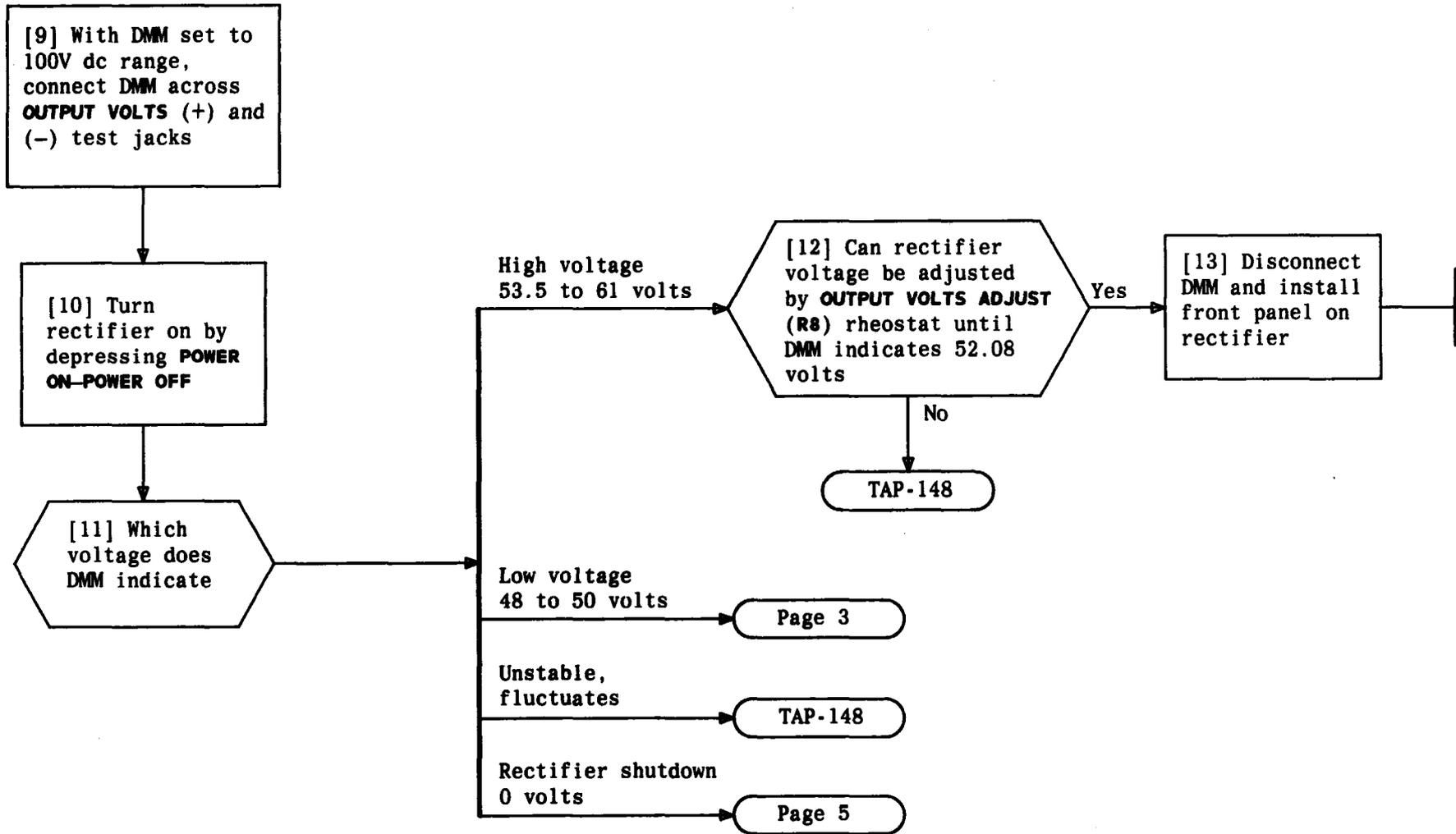


EQUIPMENT REQUIRED	RECOMMENDED TYPE
6-Inch C-Blade screwdriver	-
Digital multimeter	KS-20599 L4*

* or equivalent

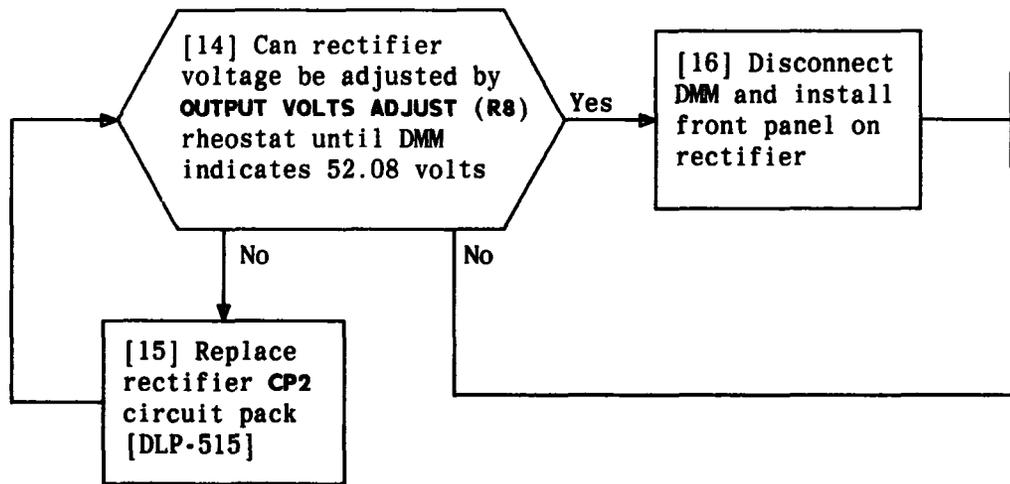
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CLEAR TROUBLE IN LORAIN RECTIFIER VOLTAGE CONTROL CIRCUIT



CLEAR TROUBLE IN LORAIN RECTIFIER VOLTAGE CONTROL CIRCUIT

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On rectifier:

[17] Depress **POWER ON-POWER OFF**

[18] Disconnect DMM from **OUTPUT VOLTS** test jacks

[19] Condition DMM to 1000V ac range

[20] Loosen screws and open rectifier meter panel door

[21] See FIG. 1. At ST3 contactor, connect DMM across terminals L1 and L2 of ST3

AND

AC meter connected at input

Page 4

ST3 CONTACTOR

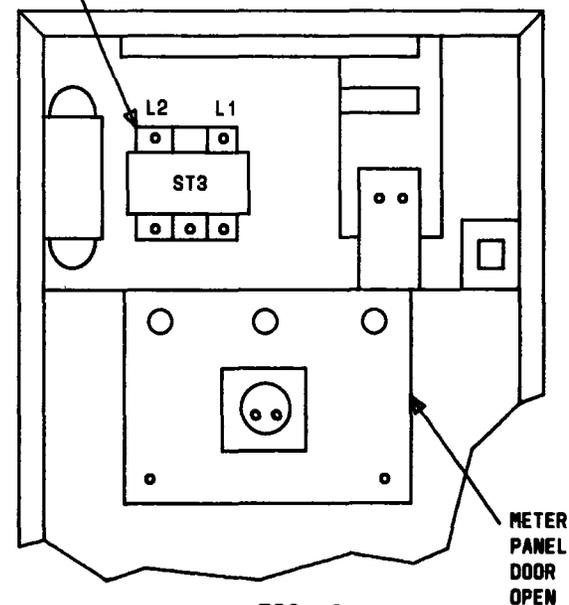


FIG. 1

CLEAR TROUBLE IN LORAIN RECTIFIER VOLTAGE CONTROL CIRCUIT

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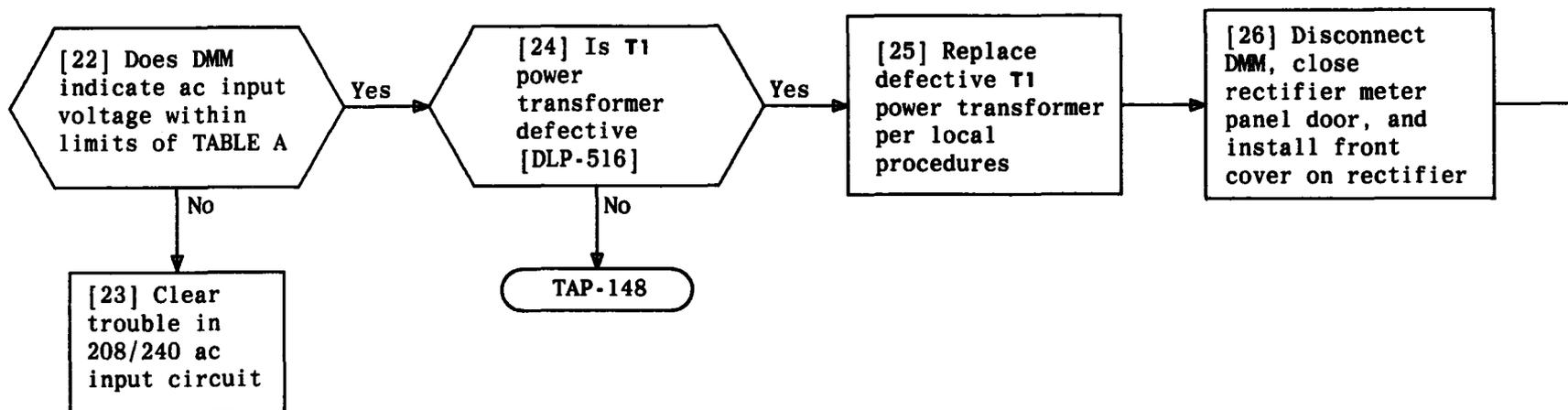
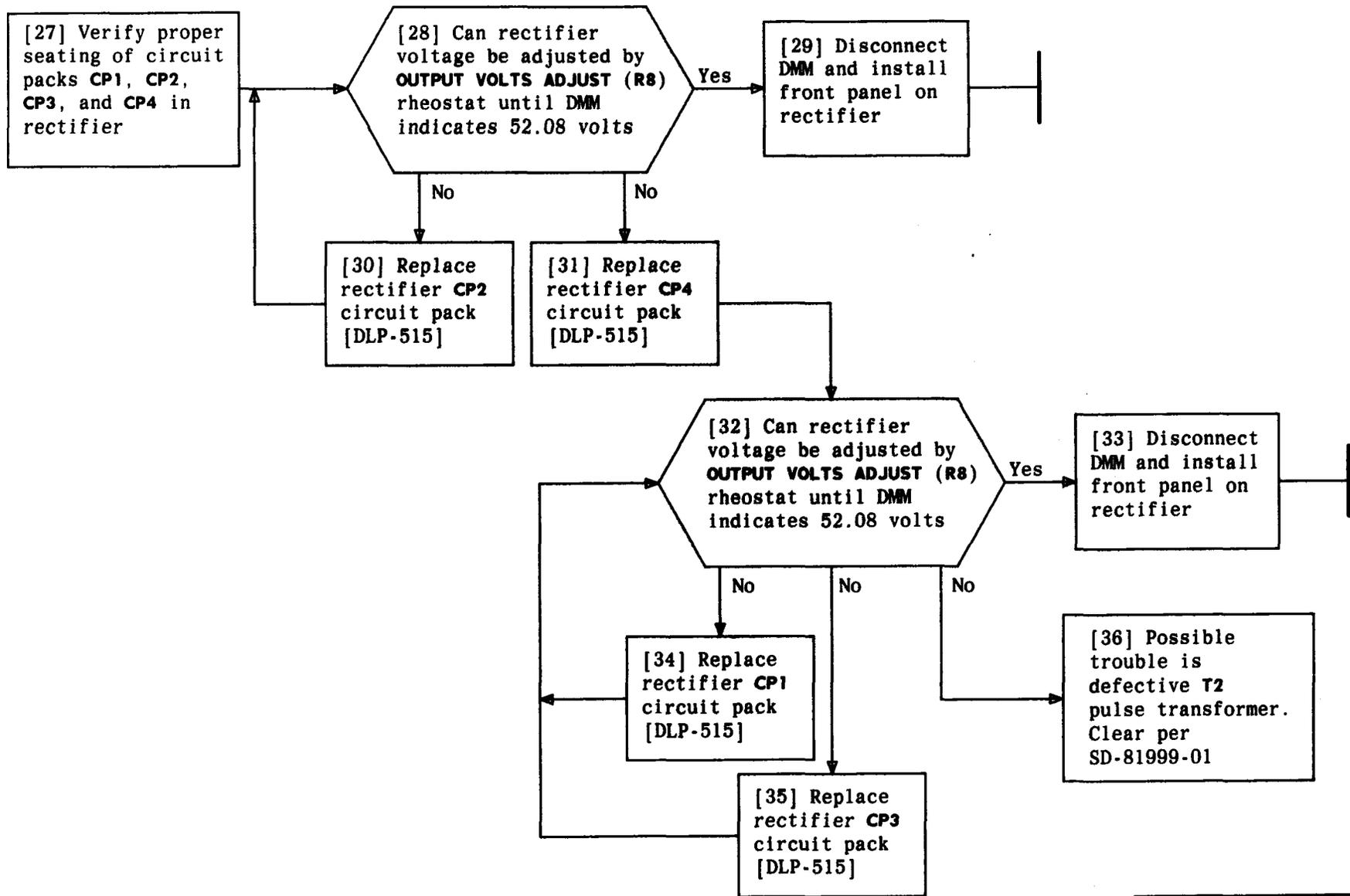


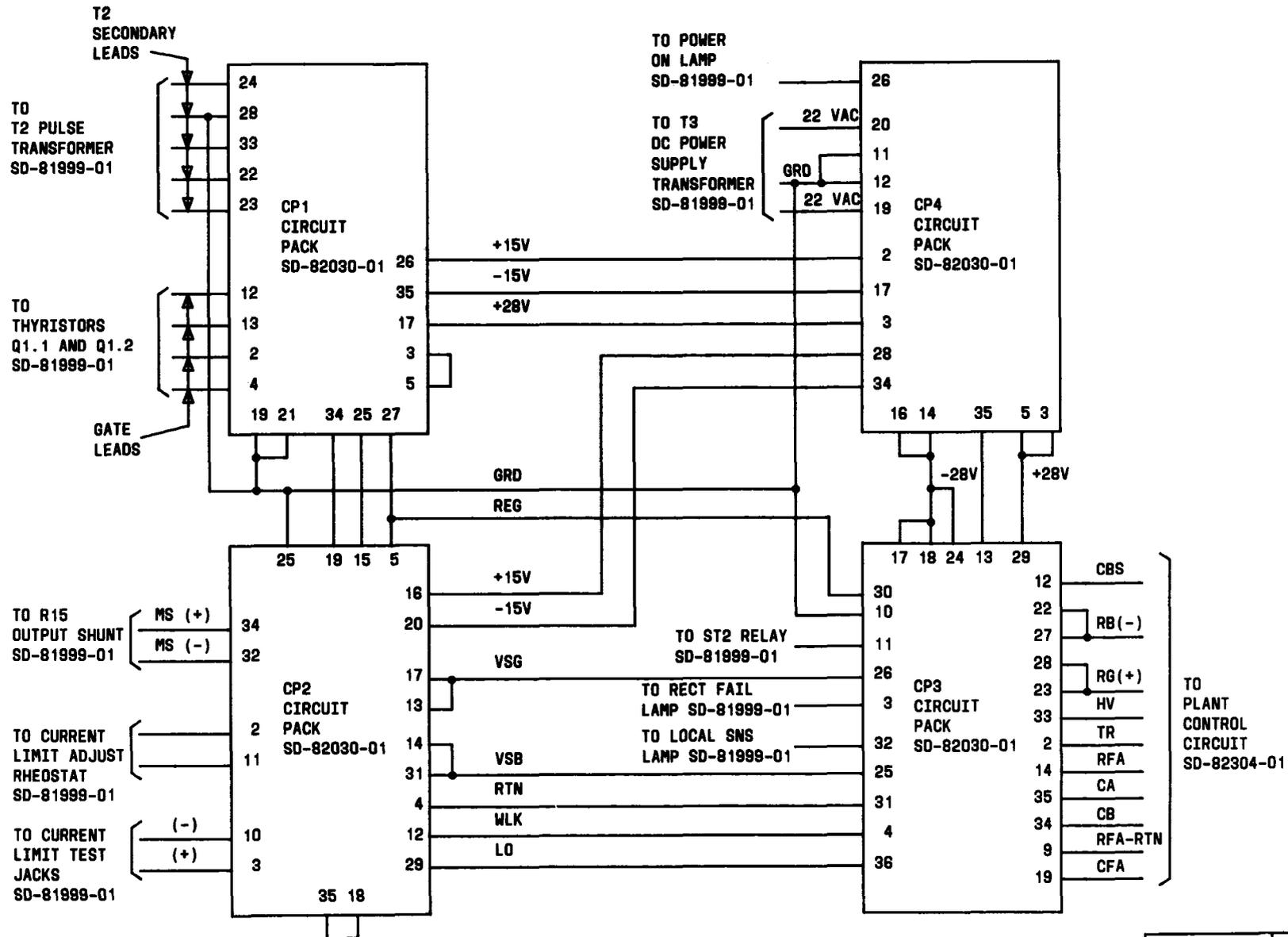
TABLE A	
INPUT VOLTAGE	LIMITS
208	186-221
240	216-253

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CLEAR TROUBLE IN LORAIN RECTIFIER VOLTAGE CONTROL CIRCUIT

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LORAIN RECTIFIER CONTROL CIRCUIT

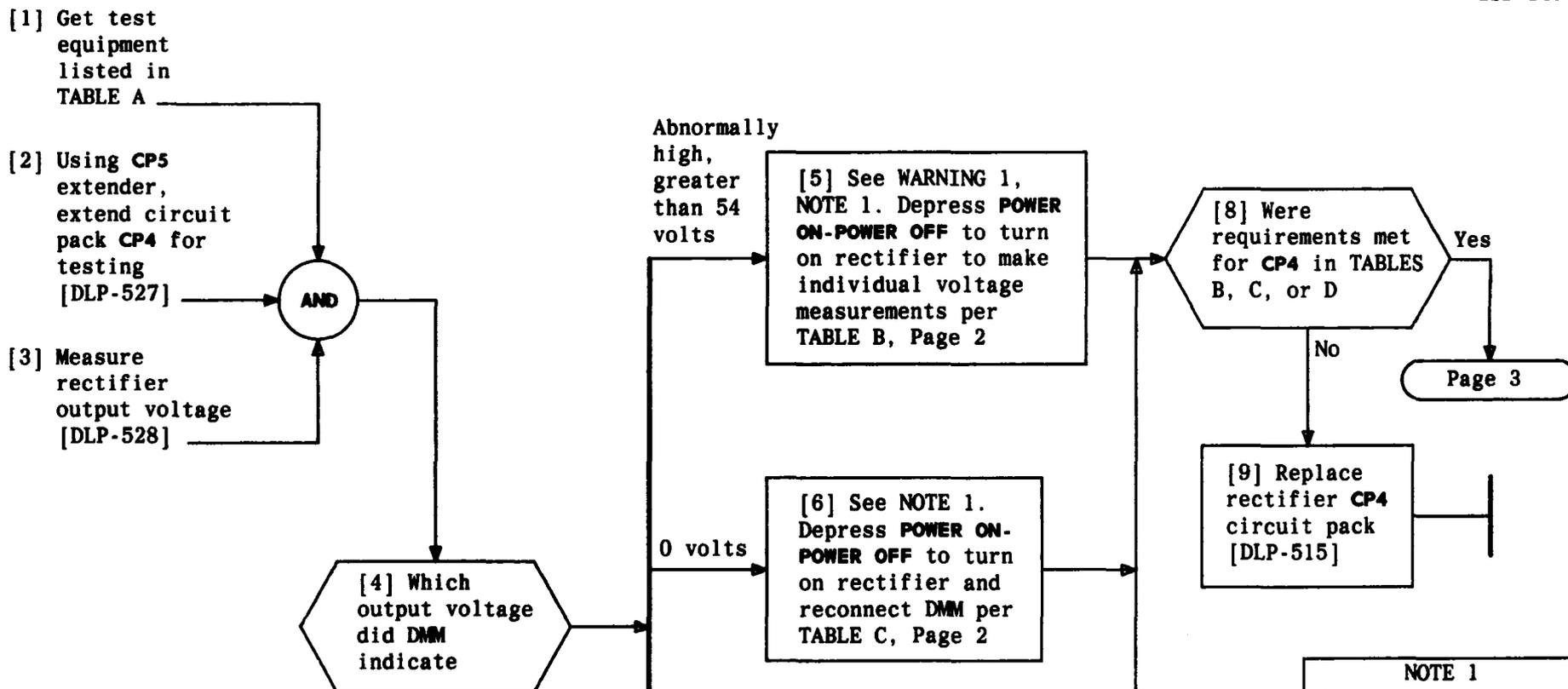


TABLE A	
EQUIPMENT REQUIRED	RECOMMENDED TYPE
Extender board (CP5)	KS-20618 L10
Digital Multimeter (DMM)	KS-20599 L4*
Oscilloscope	Tektronix 545B*
Voltage probe	Tektronix P6006*

* or equivalent

NOTE 1
Measurements are taken from TP12 (GRD) to TP indicated in tables

WARNING 1
Rectifier circuit could be damaged if output voltage is abnormally high for extended period of time

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CLEAR DEFECTIVE LORAIN 48V RECTIFIER CIRCUIT PACK TROUBLE

TABLE B	
TEST CONDITION	EXPECTED INDICATION
TP28 on extender	+13.5 to +16.5 Vdc
TP11 on CP4	-5.0 to -9.0 Vdc
TP8 on CP4	+13.5 to +16.5 Vdc

TABLE D	
TEST CONDITION	EXPECTED INDICATION
TP34 on extender	-13.5 to -16.5 Vdc
TP11 on CP4	-5.0 to -9.0 Vdc
TP8 on CP4	+13.5 to +16.5 Vdc

TABLE C	
TEST CONDITION	EXPECTED INDICATION
TP20 on extender	18 to 22 Vac
TP19 on extender	18 to 22 Vac
TP5 on extender	+22 to +28 Vdc
TP14 on extender	-22 to -28 Vdc
TP3 on extender	+13.5 to +16.5 Vdc
TP16 on extender	-13.5 to -16.5 Vdc
TP28 on extender	+13.5 to +16.5 Vdc
TP34 on extender	-13.5 to -16.5 Vdc
TP11 on CP4	-5.0 to -9.0 Vdc
TP8 on CP4	+13.5 to +16.5 Vdc
TP6 on CP4	-22 to -28 Vdc

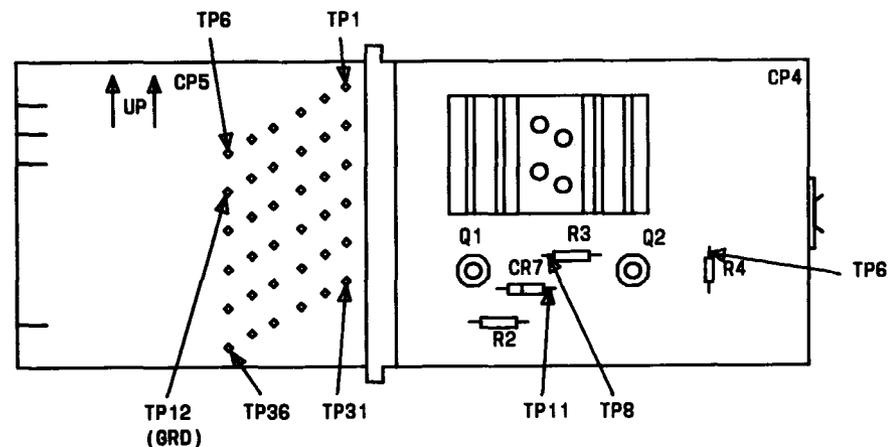
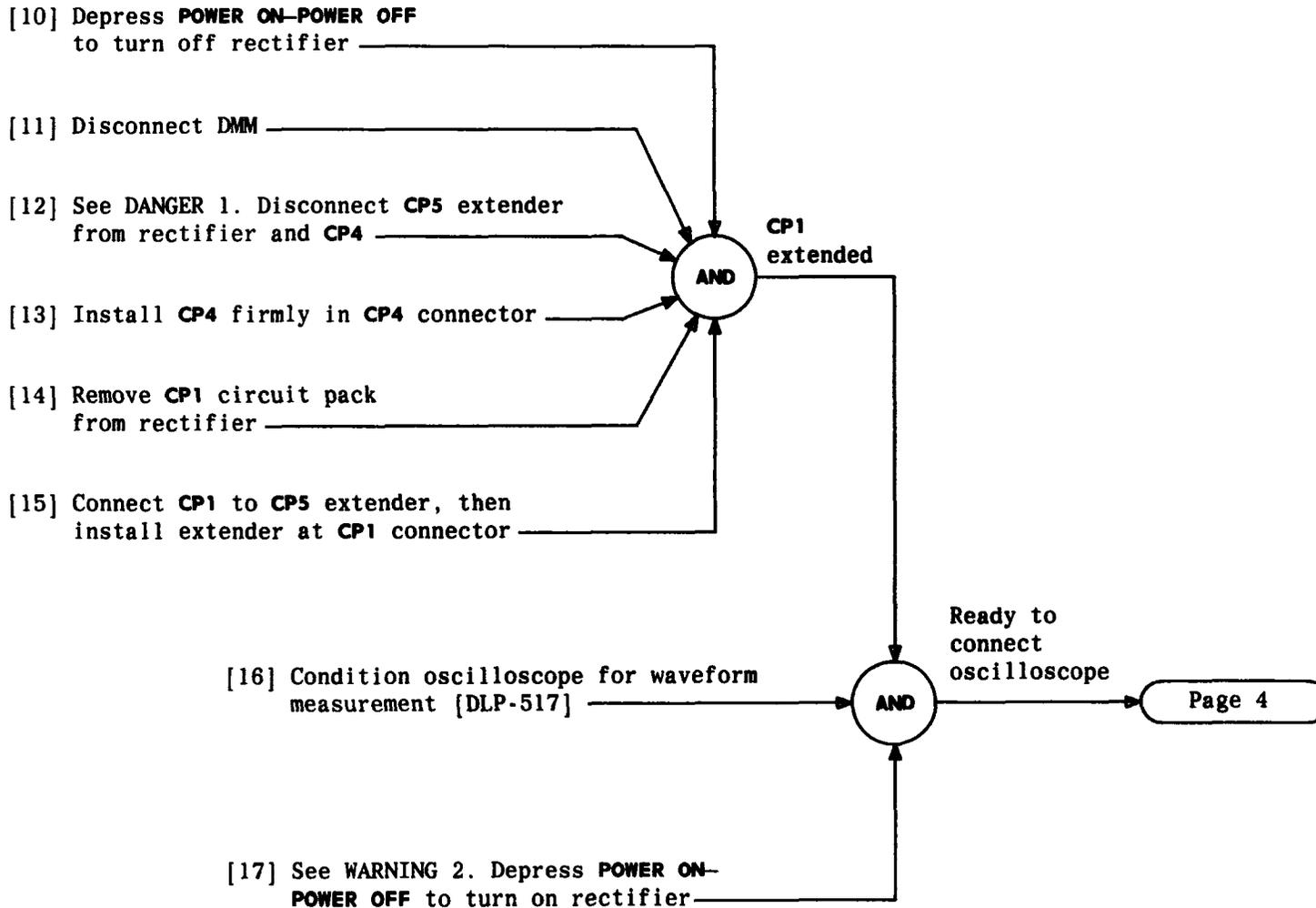


FIG. 1

CLEAR DEFECTIVE LORAIN 48V RECTIFIER CIRCUIT PACK TROUBLE

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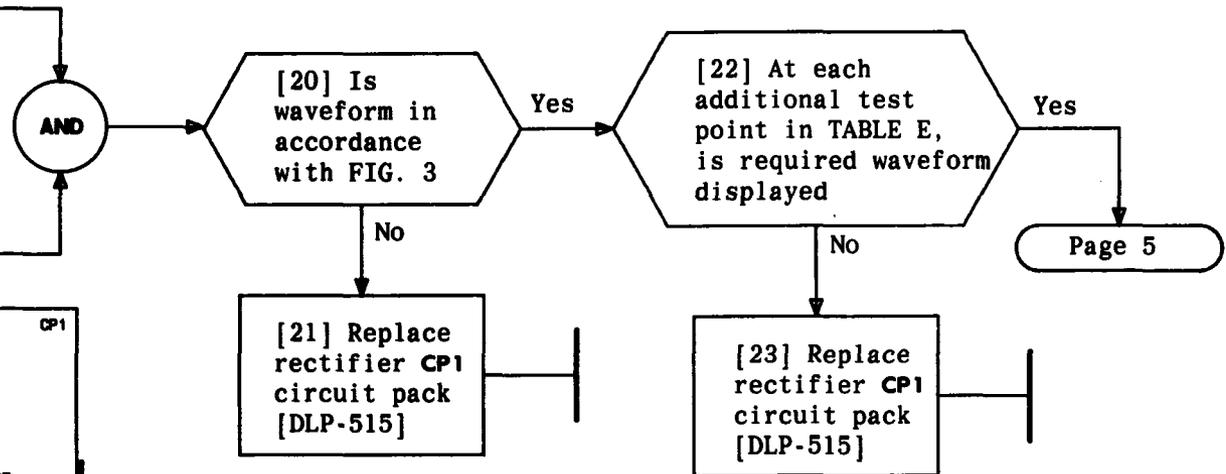
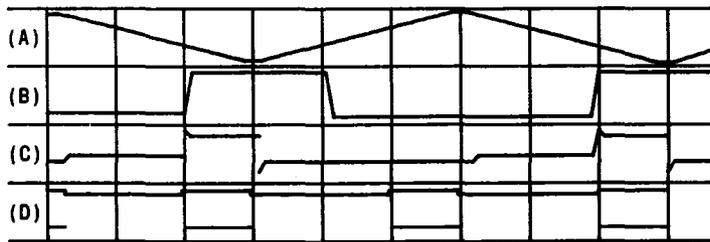
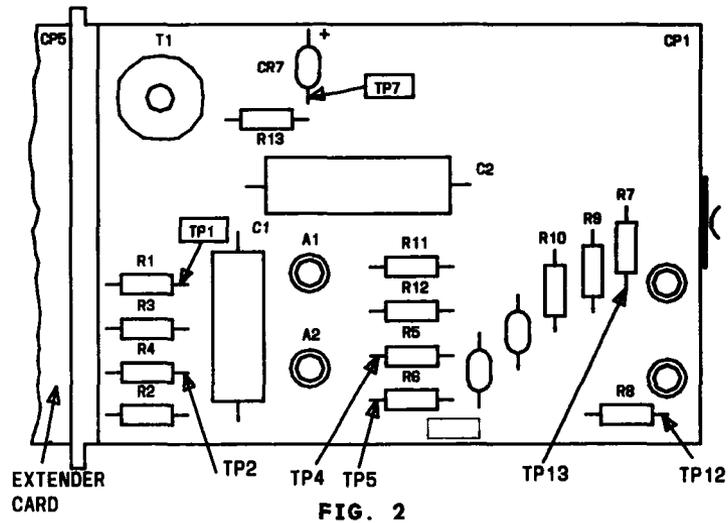


WARNING 2 <i>Rectifier circuit could be damaged if output voltage is abnormally high for extended period of time</i>	
DANGER 1 <i>Voltages inside rectifier cabinet are over 400 volts to ground</i>	
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CLEAR DEFECTIVE LORAIN 48V RECTIFIER CIRCUIT PACK TROUBLE

[18] See DANGER 2, WARNING 3, and FIG. 2.
Connect voltage probe at test point TP1 as given in TABLE E

[19] Observe waveform on oscilloscope



VOLTAGE PROBE CONNECTION	WAVEFORM	VOLTS/CM	VOLTS
TP1 TP2	(A)	5	4 TO 6
TP4 TP5	(B)	50	20 TO 28
TP12 TP13	(C)	50	13.5 TO 16.5
TP7	(D)	50	24 TO 30

WARNING 3

To prevent circuit damage connect only voltage probe to test points. Do not connect ground lead of oscilloscope to rectifier

DANGER 2

Voltages inside rectifier cabinet are over 400 volts to ground

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[24] Depress **POWER ON-POWER OFF**
to turn off rectifier

[25] Disconnect voltage probe

[26] Disconnect **CP5** extender from
rectifier and **CP1**

[27] Install **CP1** firmly in **CP1** connector

[28] Remove **CP2** circuit pack from rectifier

[29] Connect **CP2** to **CP5** extender, then
install extender at **CP2** connector

CP2
extended

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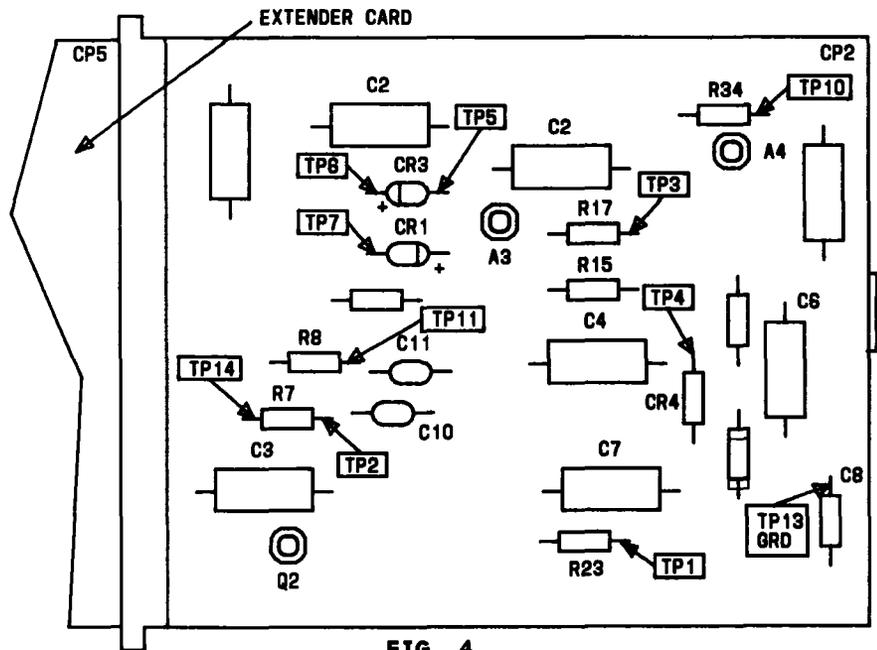


FIG. 4

TABLE F

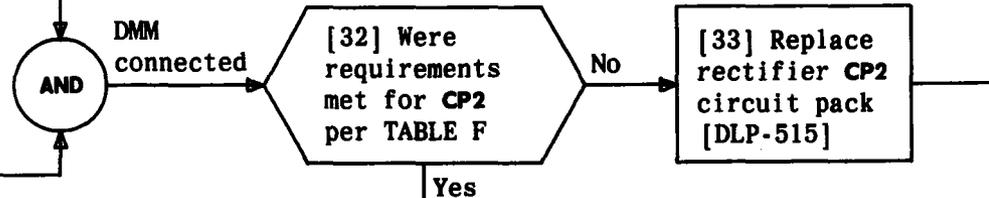
TEST CONDITIONS	EXPECTED INDICATION
TP1	-0.01 to 0.05 VDC
TP2	+13.5 to 16.5 VDC
TP3	-1.6 to 2.0 VDC
TP4	-9.0 to 11.0 VDC
TP5	-10.0 to 14.0 VDC
TP6	-0.1 to 1.5 VDC
TP7	0.0 to 1.0 VDC
TP10	-10.0 to 14.0 VDC
TP11	-13.5 to 16.5 VDC
TP29 on extender	+22.0 to 28.0 VDC
TP14	+8.5 to 9.5 VDC

CLEAR DEFECTIVE LORAIN 48V RECTIFIER CIRCUIT PACK TROUBLE

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[30] See DANGER 3 and WARNING 4.
Depress **POWER ON-POWER OFF**
to turn on rectifier

[31] See FIG. 4, NOTE 2.
Condition DMM to
check dc voltages
on CP2 per TABLE F



[32] Were requirements met for CP2 per TABLE F

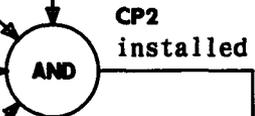
[33] Replace rectifier CP2 circuit pack [DLP-515]

[34] Depress **POWER ON-POWER OFF**
to turn off rectifier

[35] Disconnect DMM

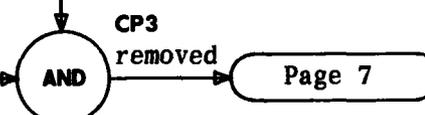
[36] Disconnect CP5 extender from rectifier and CP2

[37] Install CP2 firmly in CP2 connector



[38] At commercial ac input power panel, place circuit breaker associated with rectifier to OFF

[39] At rectifier, remove CP3 circuit pack



NOTE 2
Measurements taken from TP13 (GRD) to TP indicated in TABLE F

WARNING 4
Rectifier circuit could be damaged if output voltage is abnormally high for extended period of time

DANGER 3
Voltages inside rectifier cabinet are over 400 volts to ground

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[40] On CP3 [FIG. 5], verify connection of jumper wire between pins B1 to C1, and pins B2 to C2

[41] Connect CP3 to CP5 extender

[42] Place CP3 with extender on suitable insulated test surface

[43] Condition DMM to $K\Omega \times 1$ range

[44] Condition DMM to check continuity on CP3 per TABLE G

DMM connected

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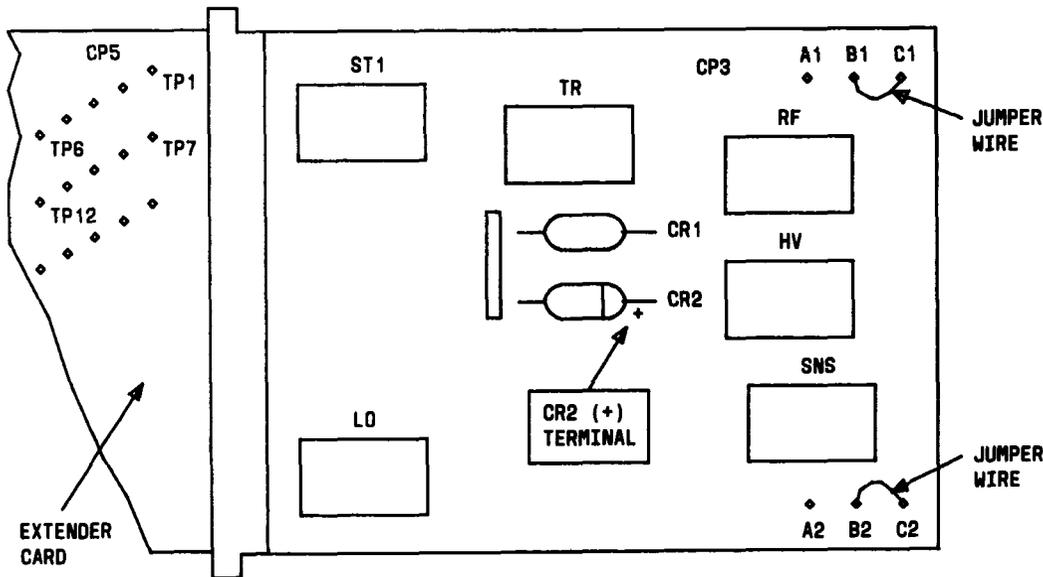


FIG. 5

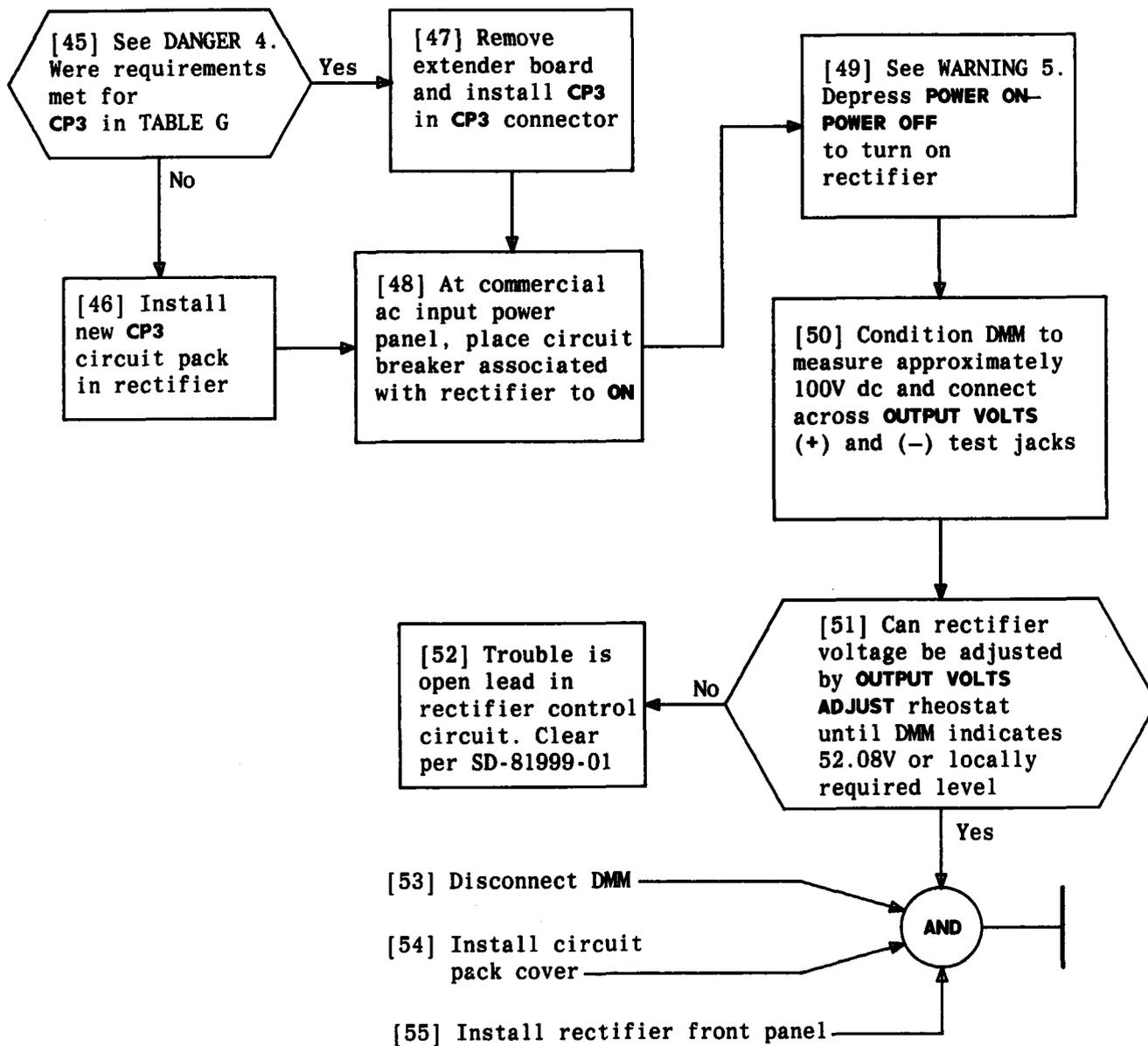
TABLE G			
TEST CONDITION	EXPECTED INDICATION		
	RELAY	RELAY RELEASED	RELAY MANUALLY OPERATED *
TP10 TO TP4	ST1	SHORT	OPEN
TP10 TO TP14		SHORT	OPEN
TP10 TO TP11		OPEN	SHORT
TP12 TO TP3		SHORT	OPEN
TP17 TO (+) TERMINAL OF CR2 ON CR3 [FIG. 5]	RF	OPEN	SHORT
TP3 TO TP12 **		OPEN	SHORT
TP10 TO TP14 **		OPEN	SHORT
TP18 TO (+) TERMINAL OF CR2 ON CP3 [FIG. 5]	HV	OPEN	SHORT
TP10 TO TP26	SNS	SHORT	OPEN
TP24 TO TP25		SHORT	OPEN
TP30 TO TP31		SHORT	OPEN
TP32 TO TP29		SHORT	OPEN
TP26 TO TP28		OPEN	SHORT
TP25 TO TP27		OPEN	SHORT
TP34 TO TP35	LO	OPEN	SHORT

* Relay is manually operated by pressing downward on relay armature

**Both ST1 and TR relays must be manually operated for this test

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CLEAR DEFECTIVE LORAIN 48V RECTIFIER CIRCUIT PACK TROUBLE



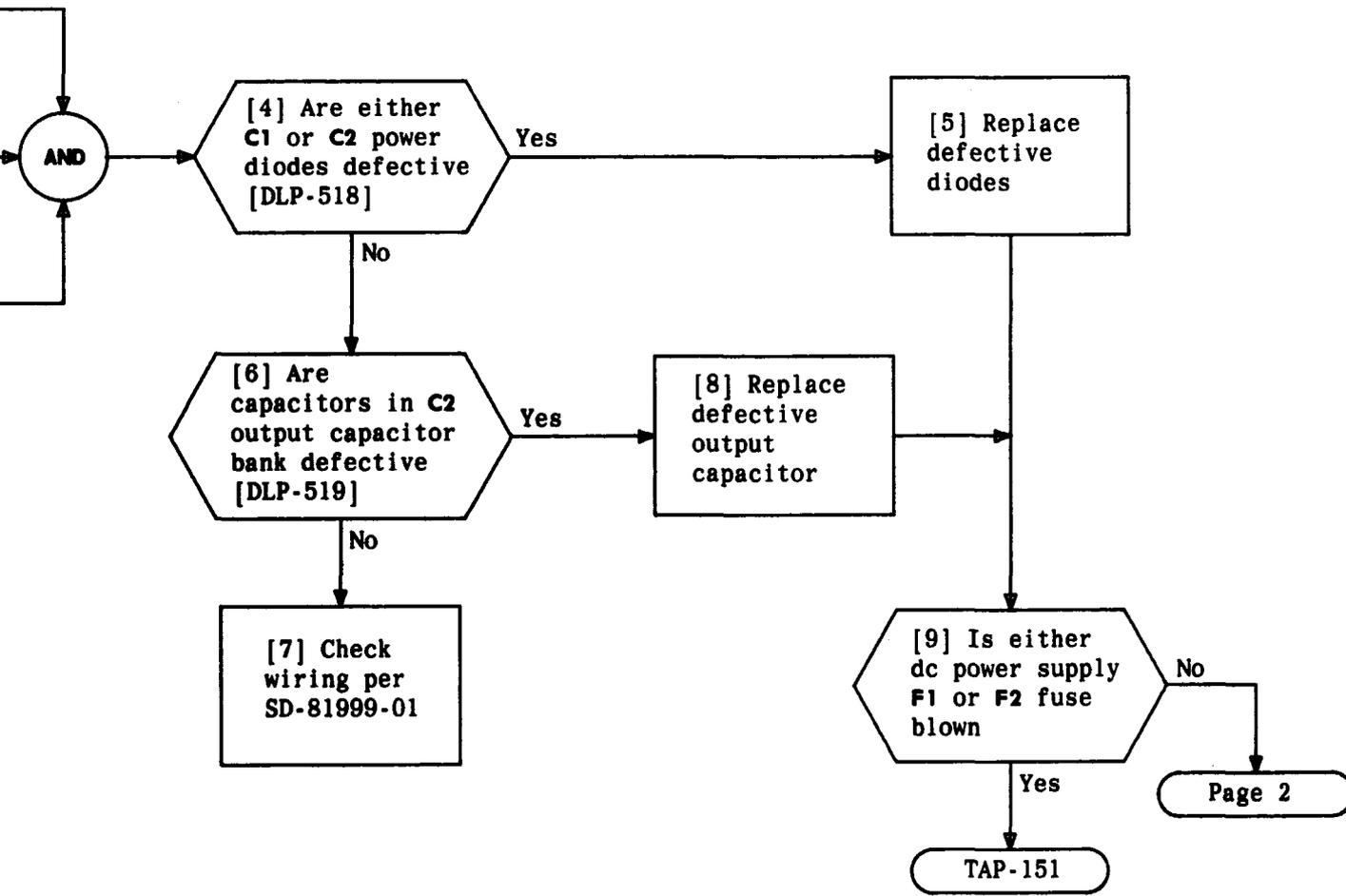
WARNING 5	
<i>Rectifier circuit could be damaged if output voltage is abnormally high for extended period of time</i>	
DANGER 4	
<i>Voltages inside rectifier cabinet are over 400 volts to ground</i>	
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CLEAR DEFECTIVE LORAIN 48V RECTIFIER CIRCUIT PACK TROUBLE

[1] At external charge circuit breaker panel, set rectifier circuit breaker to OFF

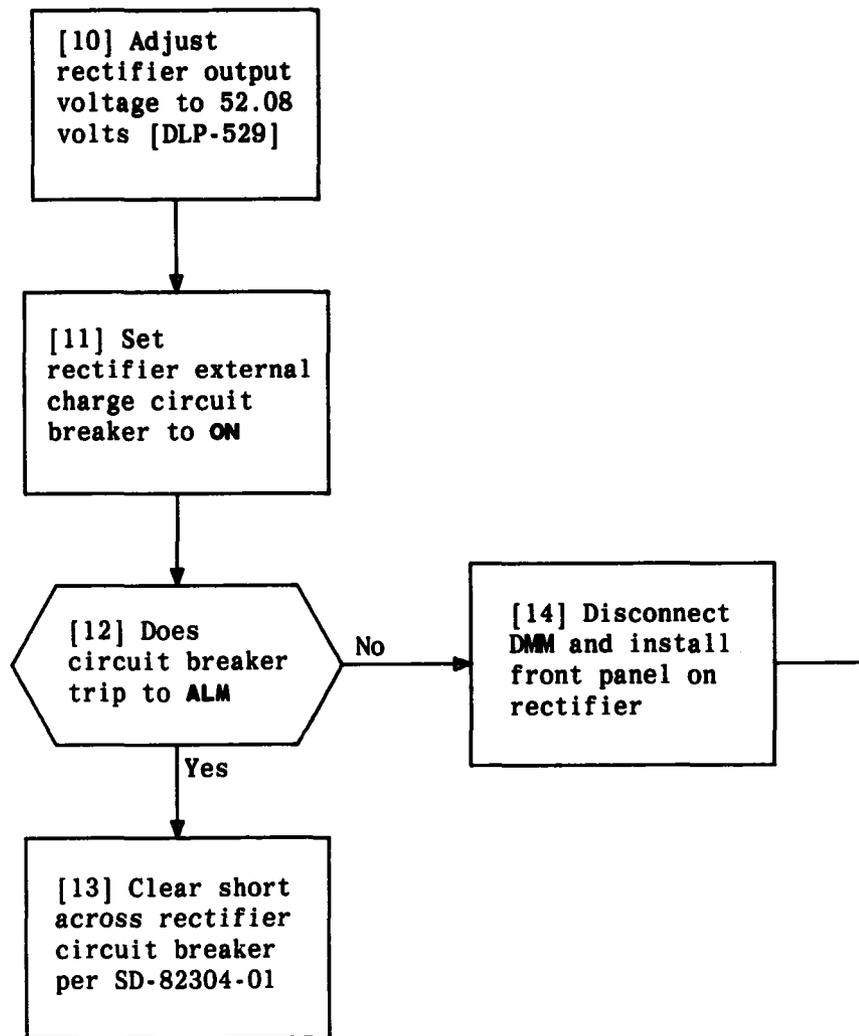
[2] At ac service cabinet, remove 208/240 volt ac input fuse

[3] Loosen 4 corner screws and remove front panel from rectifier



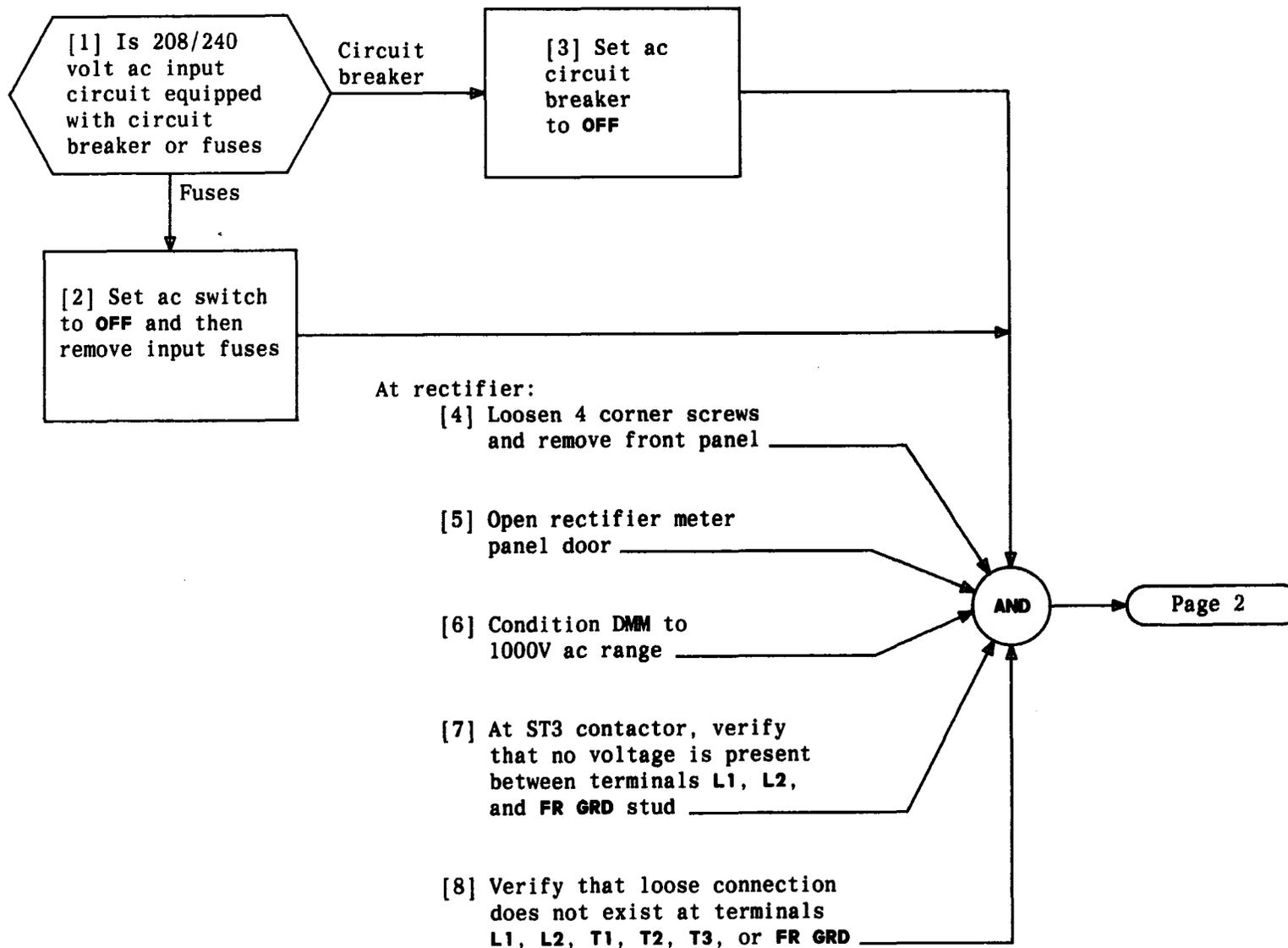
CLEAR TRIPPED EXTERNAL CHARGE CIRCUIT BREAKER

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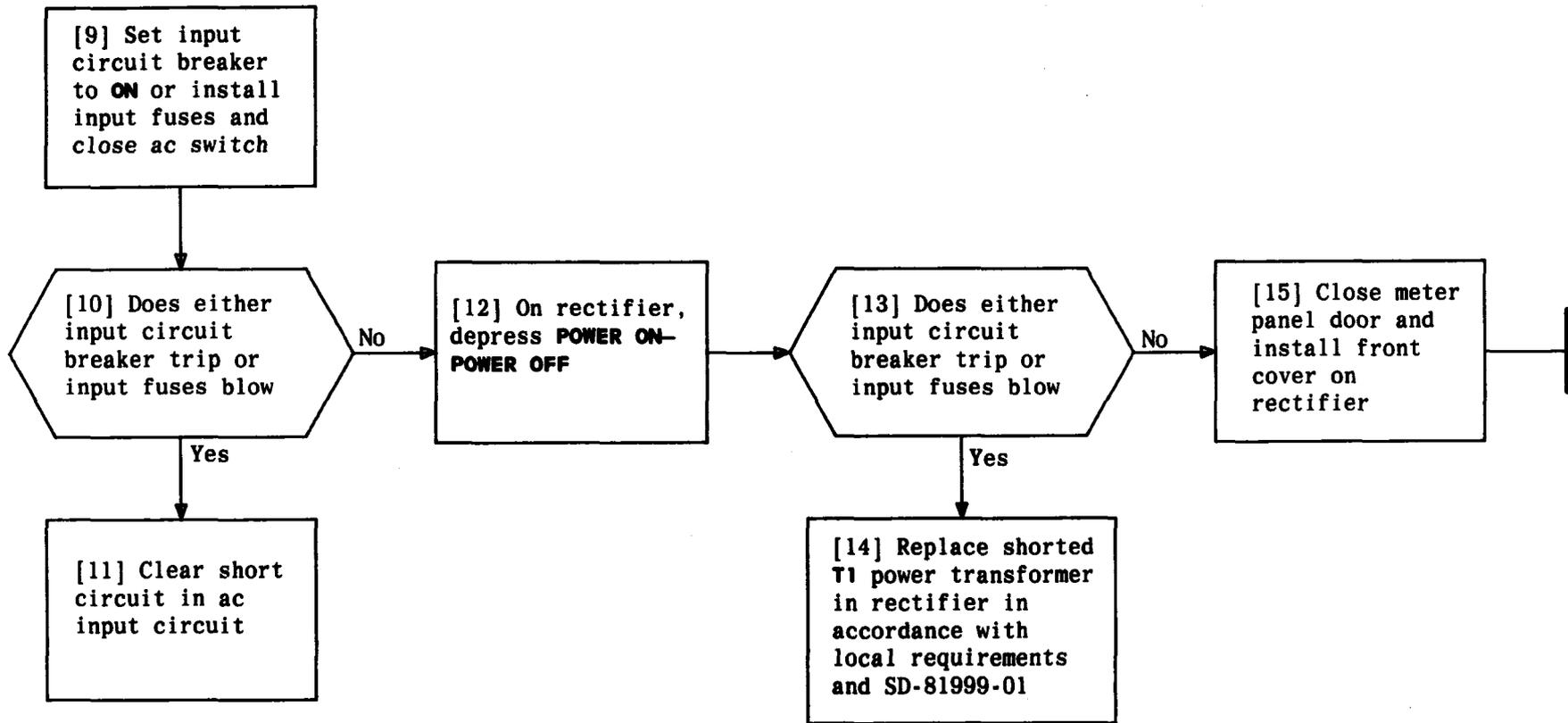
CLEAR TRIPPED EXTERNAL CHARGE CIRCUIT BREAKER

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CLEAR TROUBLE IN RECTIFIER AC INPUT CIRCUIT

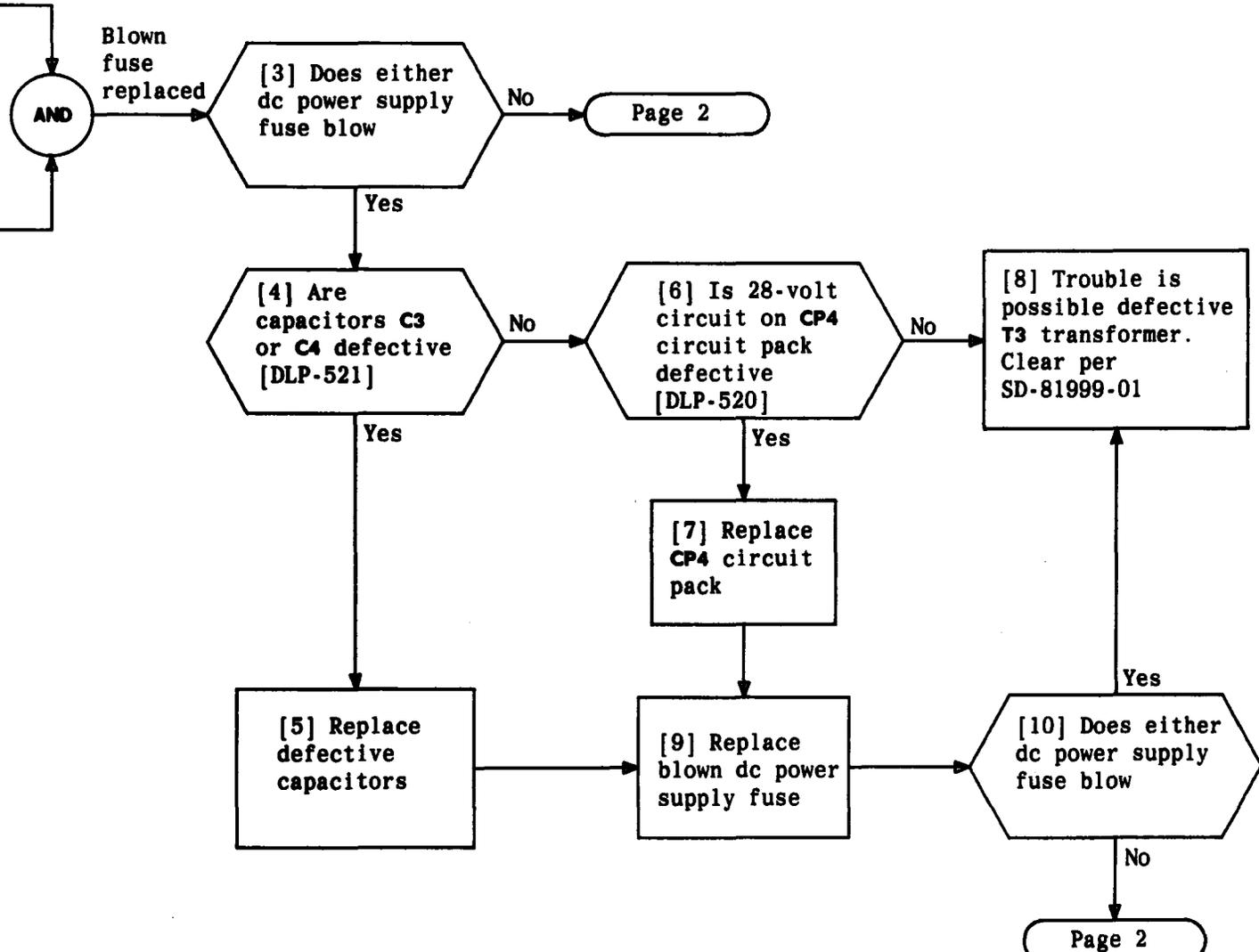


CLEAR TROUBLE IN RECTIFIER AC INPUT CIRCUIT

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[1] Loosen 4 corner screws
and remove rectifier
front panel

[2] Replace blown dc
power supply fuse



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CLEAR BLOWN DC POWER SUPPLY FUSE

[11] Condition DMM to 100V ac range

[12] At T3 transformer, connect DMM across terminals as given in TABLE A

TABLE A		
DMM CONNECTION AT T3 TRANSFORMER		DMM INDICATION
208 Volt input	Terminals 1 and 2	186 to 221 volts ac
240 Volt input	Terminals 1 and 3	216 to 253 volts ac

TABLE B	
DMM CONNECTION AT T3 TRANSFORMER	DMM INDICATION
Terminals 7 and 8	18 to 22 volts ac
Terminals 8 and 9	18 to 22 volts ac

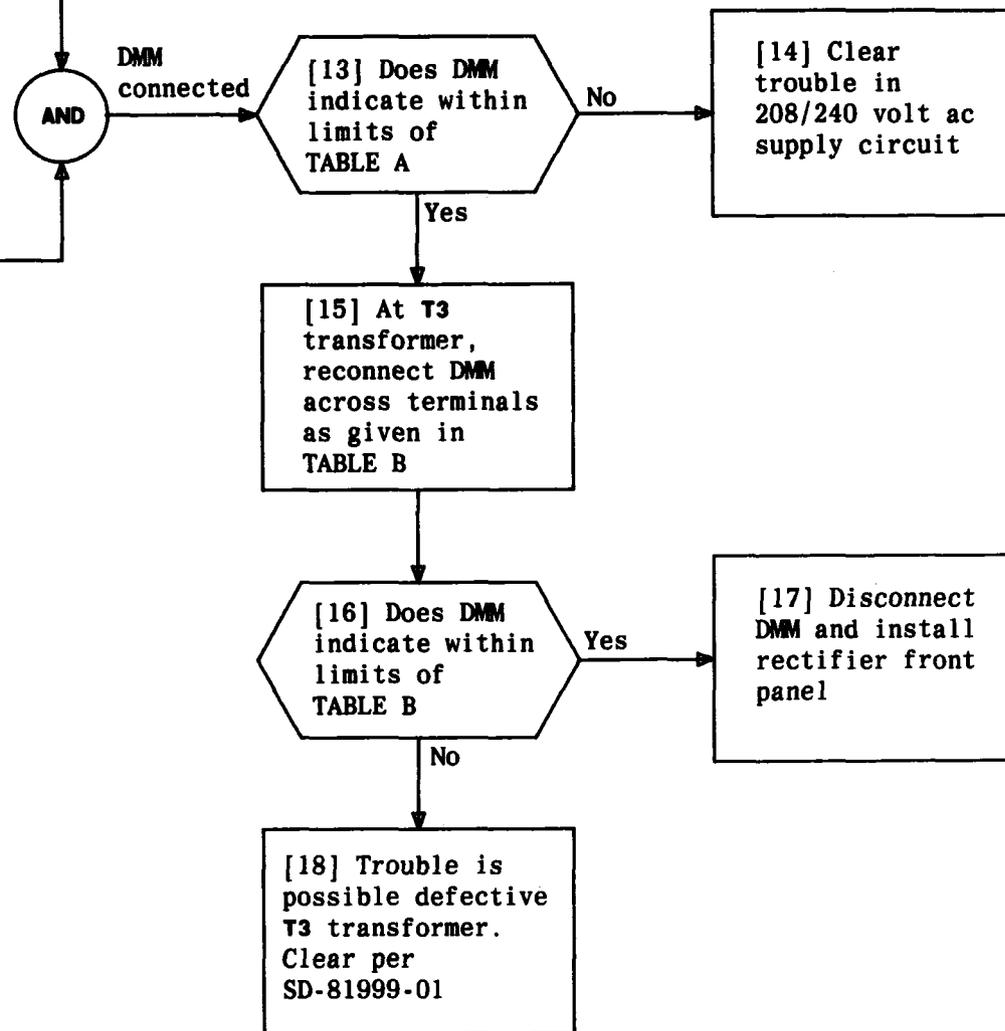


TABLE A		
TEXT PHRASE IN OCTAL	MEANING	TROUBLE CLEARING PROCEDURE
000001	Manually OFF	TAP-172
000002	Fuse Alarm	TAP-153
000004	Inverter Failure	TAP-154
000010	TTLV - Dial Tone Low Voltage	TAP-156
000020	BTLV - Low Tone Low Voltage	TAP-156
000040	ARLV - Audible Ring Low Voltage	TAP-156
000100	HTLV - High Tone Low Voltage	TAP-156
000200	MTLV - Call Waiting Low Tone	TAP-156
000400	Ground	TAP-173
001000	+48V Converter	TAP-159
002000	+48V Converter	TAP-159
004000	+48V Converter	TAP-159
010000	Interrupter failure	TAP-174
020000	Bus transfer to the network	TAP-174
040000	RT failed diagnostics	TAP-175

TABLE B					
SIDE 0		SIDE 1		MEANING	TROUBLE CLEARING PROCEDURE
ROW	POINT	ROW	POINT		
22	03	16	11	Manually OFF	TAP-172
22	04	16	12	Fuse Alarm	TAP-153
22	05	16	13	Inverter Failure	TAP-154
22	06	16	14	TTLV - Dial Tone Low Voltage	TAP-156
22	07	16	15	BTLV - Low Tone Low Voltage	TAP-156
23	03	17	11	ARLV - Audible Ring Low Voltage	TAP-156
23	04	17	12	HTLV - High Tone Low Voltage	TAP-156
23	05	17	13	MTLV - Call Waiting Low Tone	TAP-156
22	06	17	14	Ground	TAP-173
NONDUPLICATED					
ROW	POINT				
17	04		ROH Failure		DLP-537
18	04		Ring Distribution Fuse Alarm		TAP-153

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ANALYZE TTY TROUBLE MESSAGE FOR RINGING AND TONE PLANT

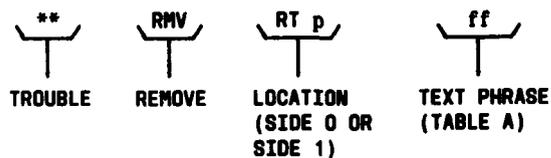
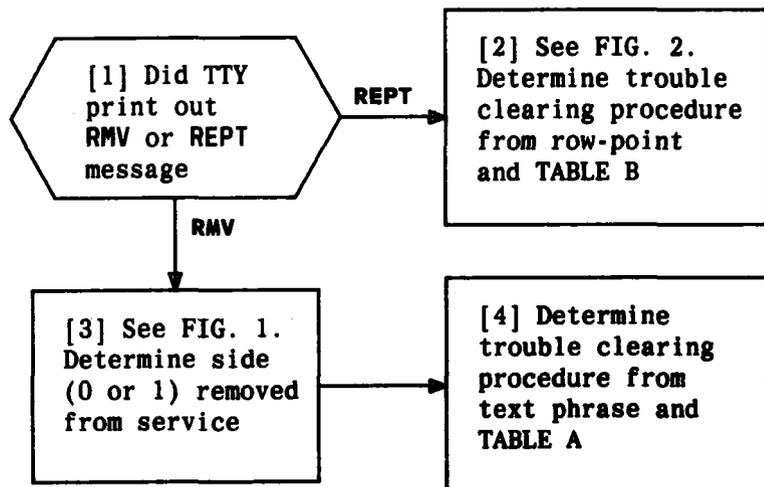


FIG. 1

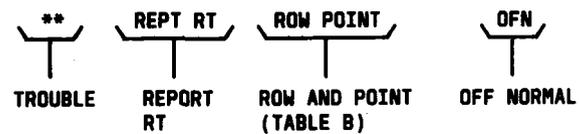
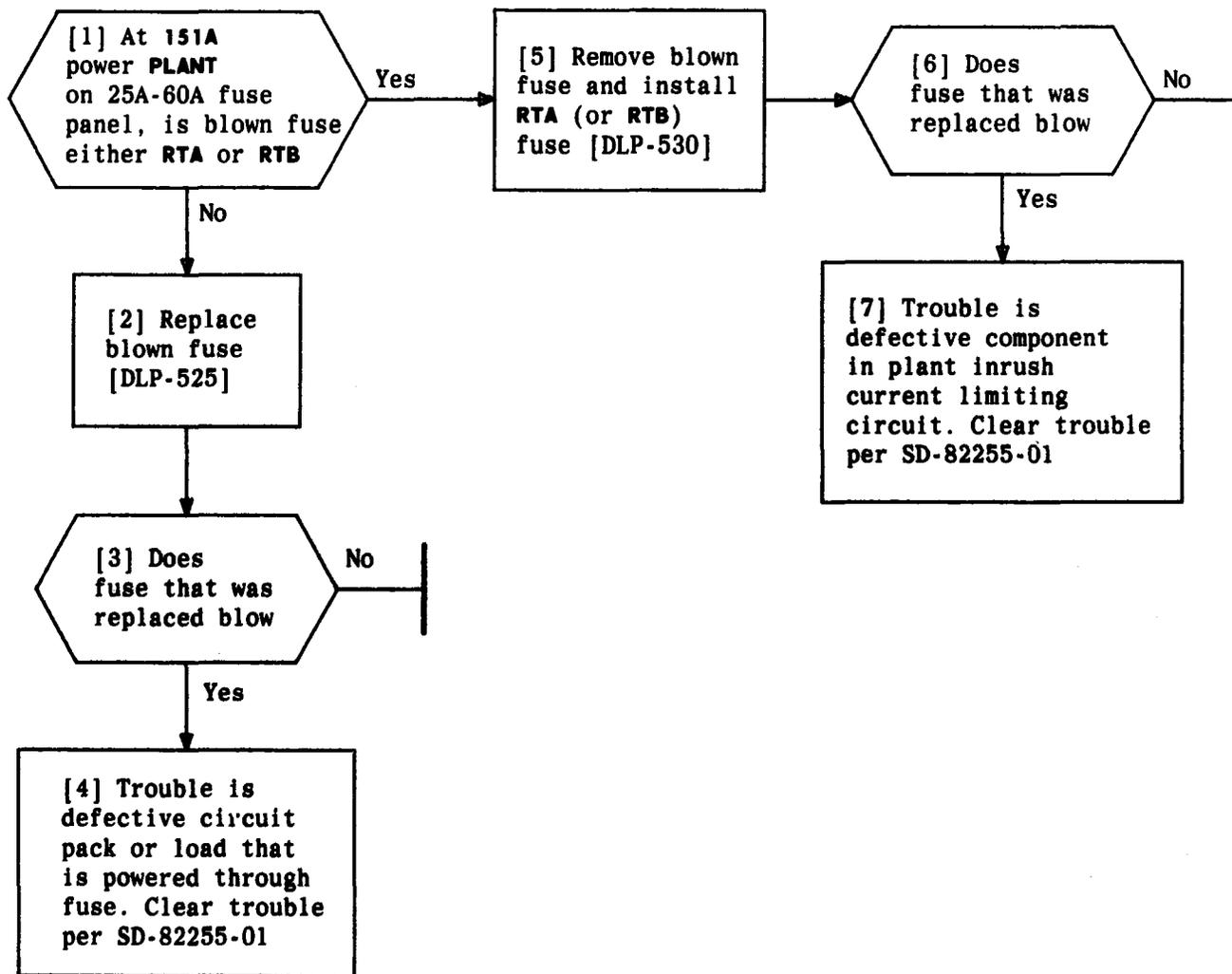
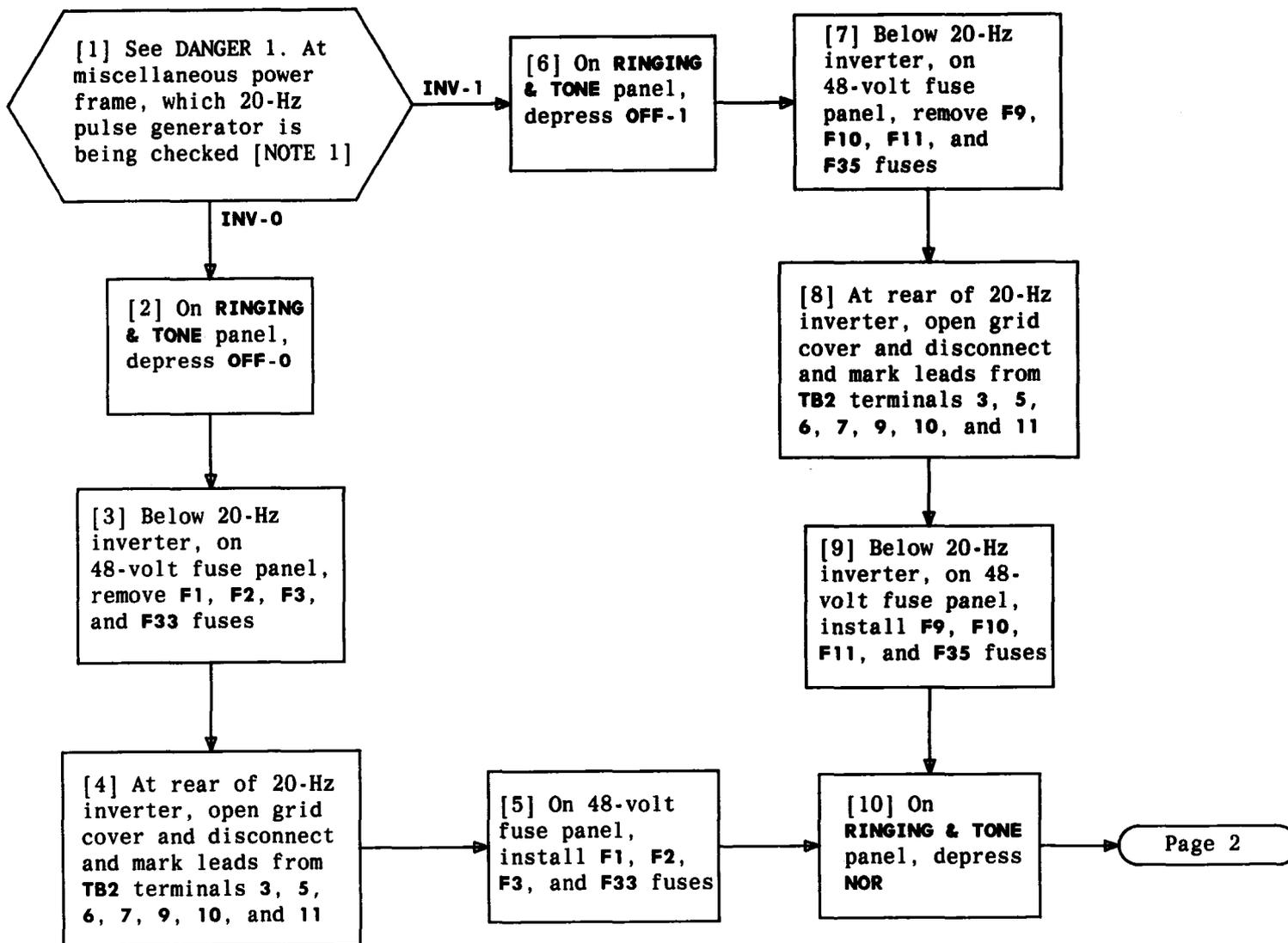


FIG. 2



CLEAR BLOWN FUSE IN RINGING & TONE PLANT

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NOTE 1	
TTY printout will indicate which RT is out-of-service	
DANGER 1 <i>Voltages inside inverter cabinet are over 200 volts to ground</i>	
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CLEAR TROUBLE IN 20-HZ PULSE GENERATOR

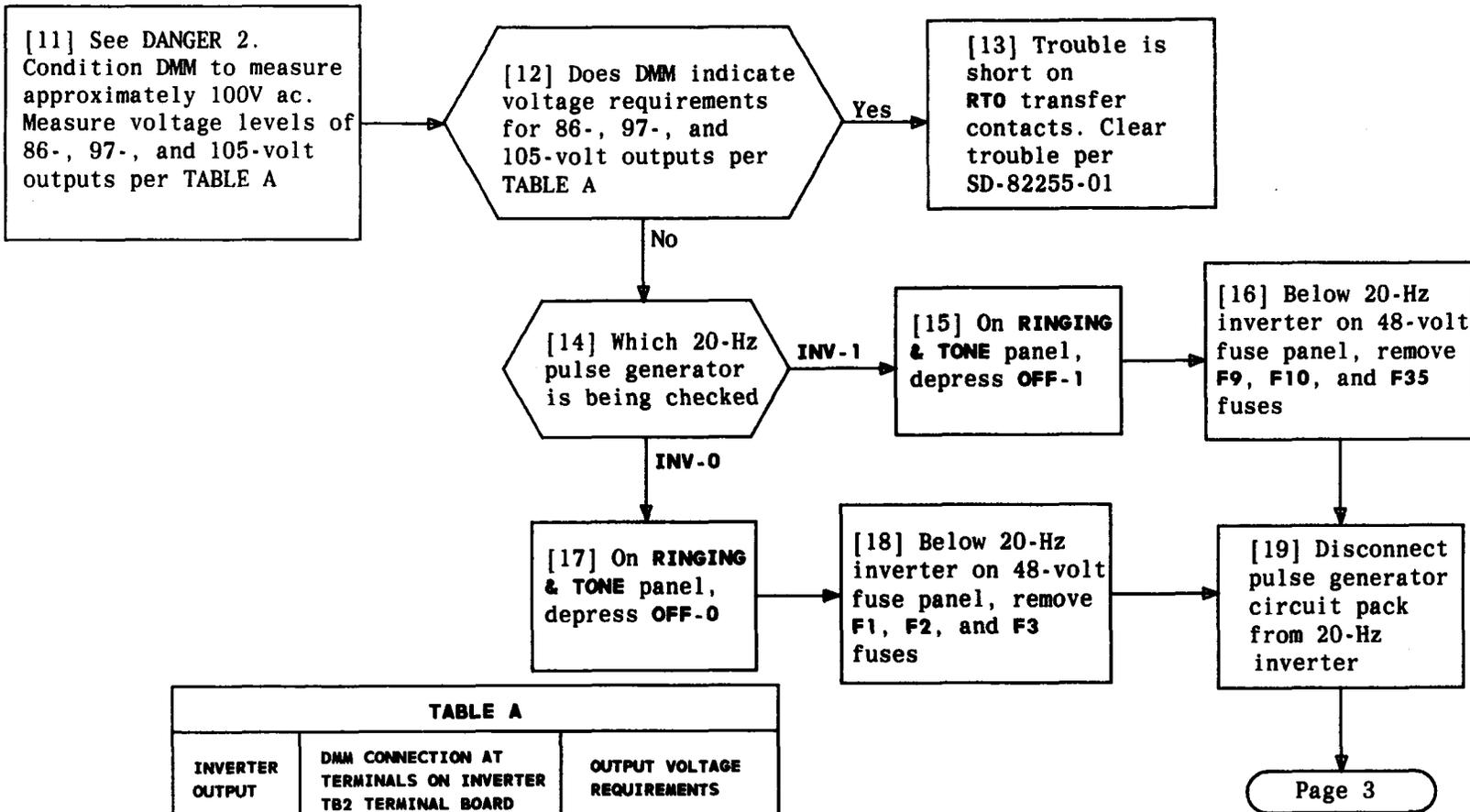


TABLE A		
INVERTER OUTPUT	DMM CONNECTION AT TERMINALS ON INVERTER TB2 TERMINAL BOARD	OUTPUT VOLTAGE REQUIREMENTS
86(A)	8 and 9	84.5 to 88.0
86(B)	4 and 5	
97(A)	8 and 10	94.5 to 101.0
97(B)	4 and 6	
105(A)	8 and 11	103.0 to 110.0
105(B)	4 and 5	
105(C)	1 and 3	

DANGER 2	
<i>Voltages inside inverter cabinet are over 200 volts to ground</i>	
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CLEAR TROUBLE IN 20-HZ PULSE GENERATOR

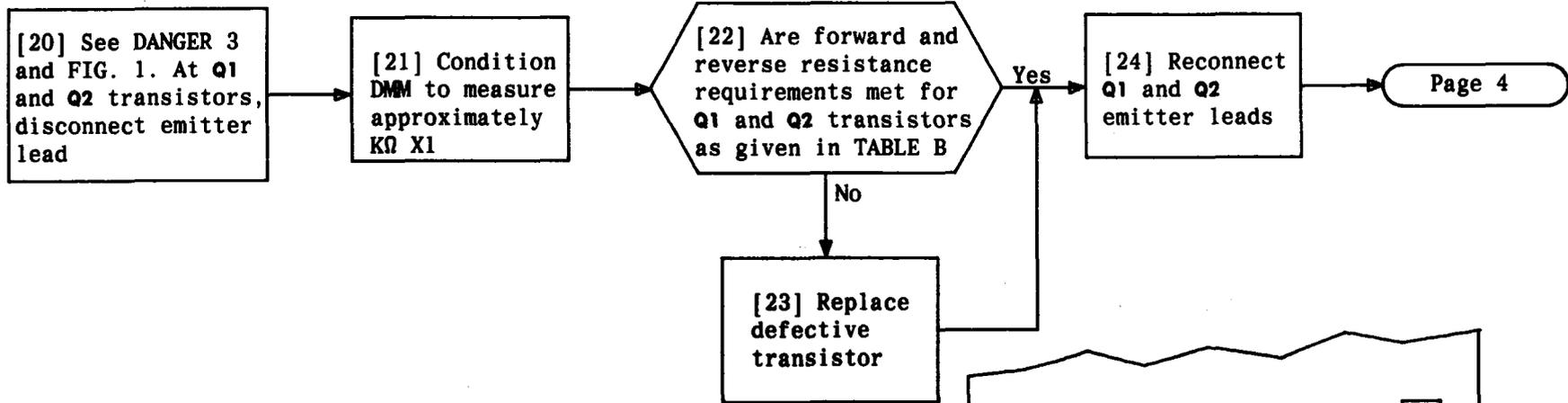


TABLE B	
DMM CONNECTION ACROSS TRANSISTOR TERMINAL	DMM INDICATION REQUIREMENT
Emitter to collector	High resistance in forward and reverse direction
Emitter to base	High resistance in one direction and low resistance in opposite direction
Collector to base	

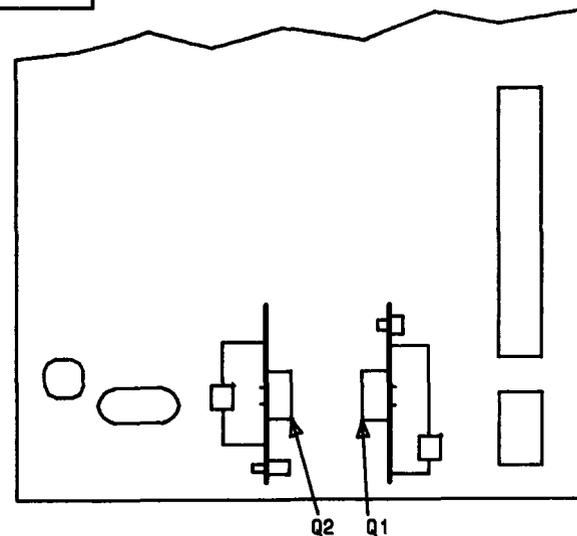


FIG. 1

DANGER 3	
<i>Voltages inside inverter cabinet are over 200 volts to ground</i>	
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[25] See DANGER 4 and FIG. 2. Disconnect one lead from CR2, CR3, CR4, and CR5

[26] Are forward and reverse resistance requirements met for CR2, CR3, CR4, and CR5 as given in TABLE C

Yes

[28] Reconnect leads at CR2, CR3, CR4, and CR5

[27] Replace defective diode

[29] Replace pulse generator circuit pack with new circuit pack and install in inverter [NOTE 2]

TABLE C	
DMM CONNECTION ACROSS DIODE TERMINALS	DMM INDICATION REQUIREMENT
Anode to cathode	High resistance in one direction and low resistance in opposite direction
Cathode to anode	

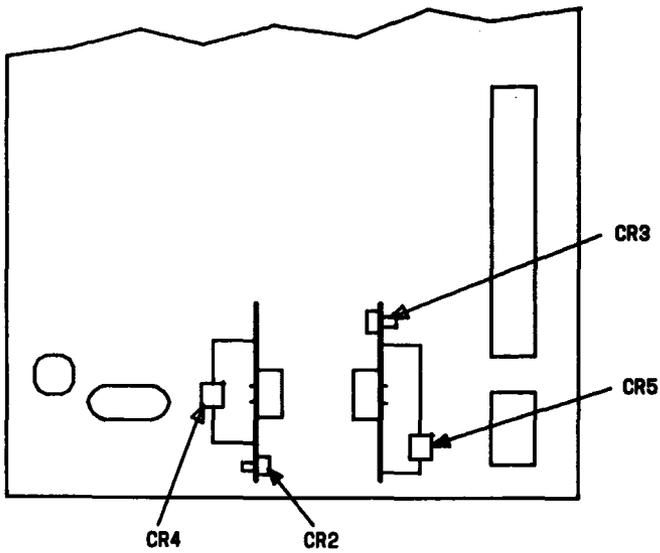


FIG. 2

[30] Which 20-Hz pulse generator is being checked

INV-1

[31] At 48-volt fuse panel, install F9, F10, and F35 fuses

INV-0

[32] At 48-volt fuse panel, install F1, F2, and F33 fuses

[33] On RINGING & TONE panel, depress NOR

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NOTE 2
Trouble clearing procedure requires original circuit pack be returned to unit if replacement does not correct trouble

DANGER 4
Voltages inside inverter cabinet are over 200 volts to ground

CLEAR TROUBLE IN 20-HZ PULSE GENERATOR

[34] See DANGER 5. Condition DMM to measure approximately 100 volts ac

[35] Does DMM indicate voltage requirements for 86-, 92-, and 105-volt outputs as given in TABLE D

Yes

[37] Disconnect DMM

No

[36] Trouble is defective ferroresonant circuit. Replace pulse generator [DLP-531]

[38] Condition frequency counter [FIG. 3]

[39] Does frequency counter indicate between 19.95 and 20.05 Hz when connected across inverter TB2 terminal 8 and 9

No

[40] Trouble is defective ferroresonant circuit. Replace pulse generator [DLP-531]

Yes

[41] Disconnect frequency counter

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TABLE D		
INVERTER OUTPUT	DMM CONNECTION AT TERMINALS ON INVERTER TB2 TERMINAL BOARD	OUTPUT VOLTAGE REQUIREMENTS
86(A) 86(B)	8 and 9 4 and 5	84.5 to 88.0
97(A) 97(B)	8 and 10 4 and 6	94.5 to 101.0
105(A) 105(B) 105(C)	8 and 11 4 and 5 1 and 3	103.0 to 110.0

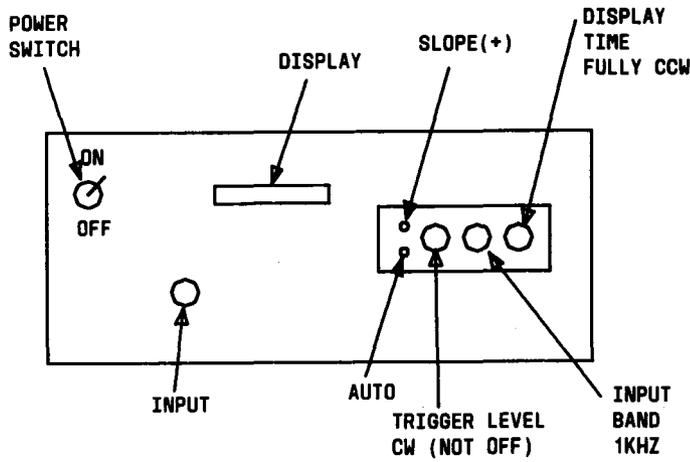


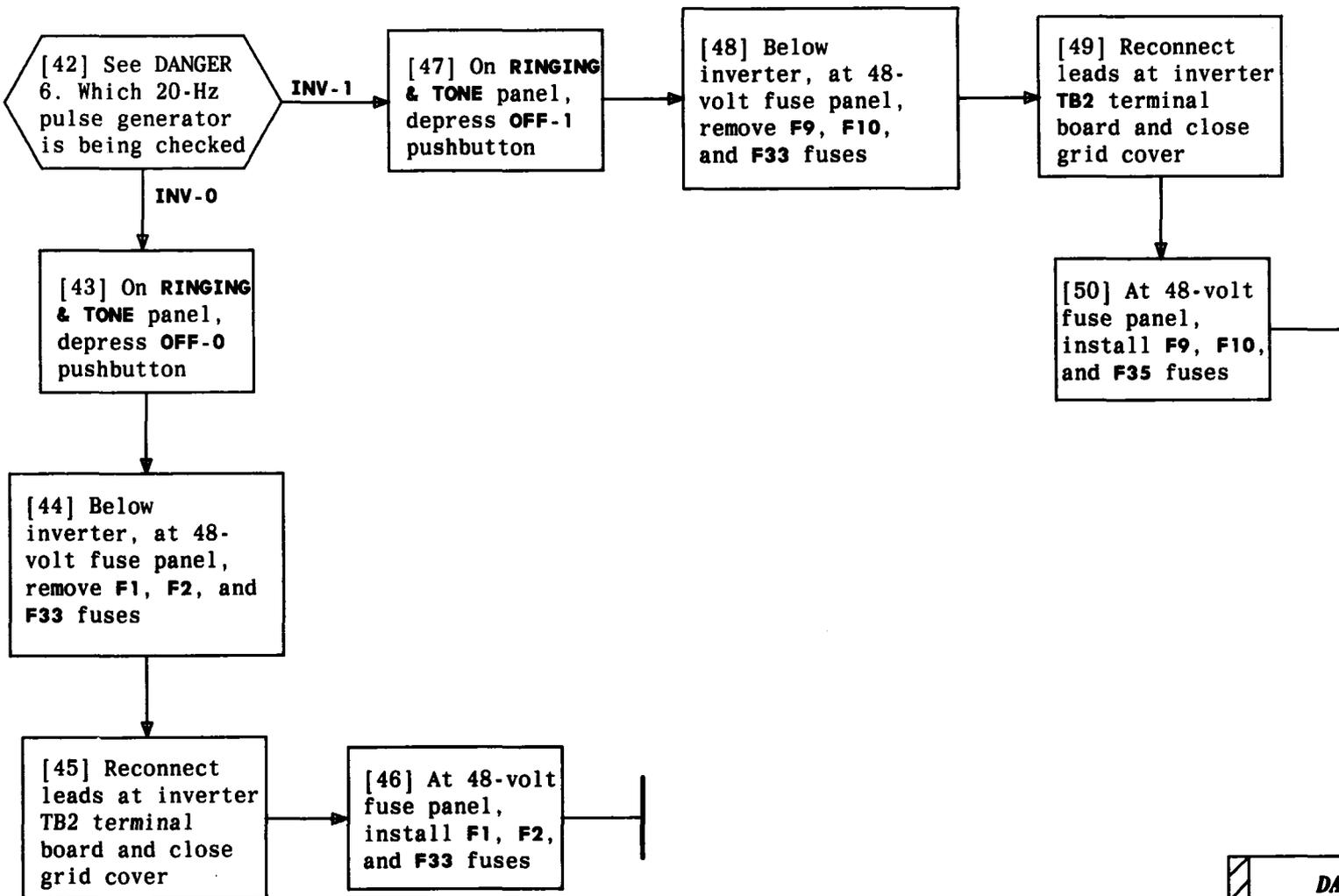
FIG. 3

CLEAR TROUBLE IN 20-HZ PULSE GENERATOR

DANGER 5

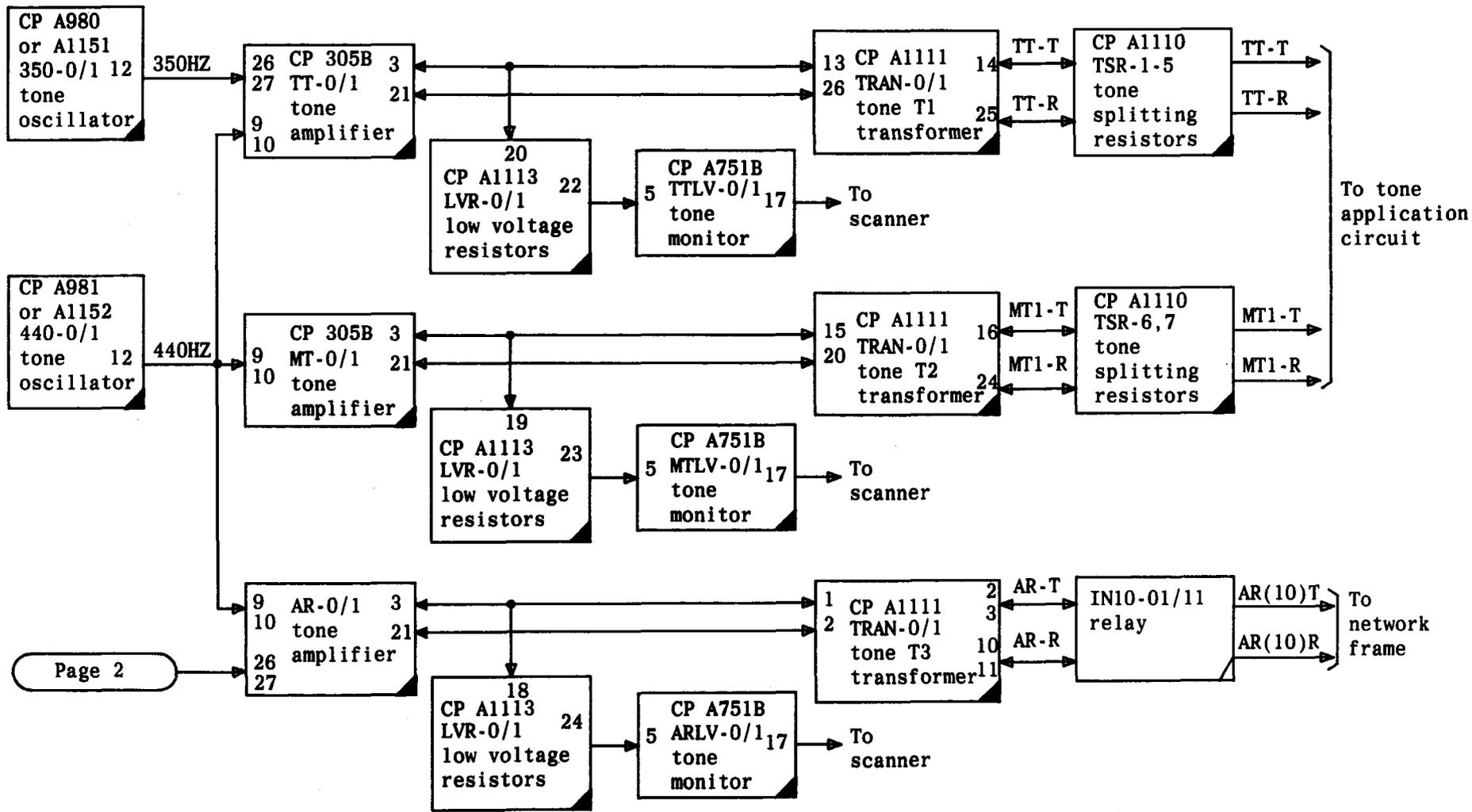
Voltages inside inverter cabinet are over 200 volts to ground

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DANGER 6	
<i>Voltages inside inverter cabinet are over 200 volts to ground</i>	
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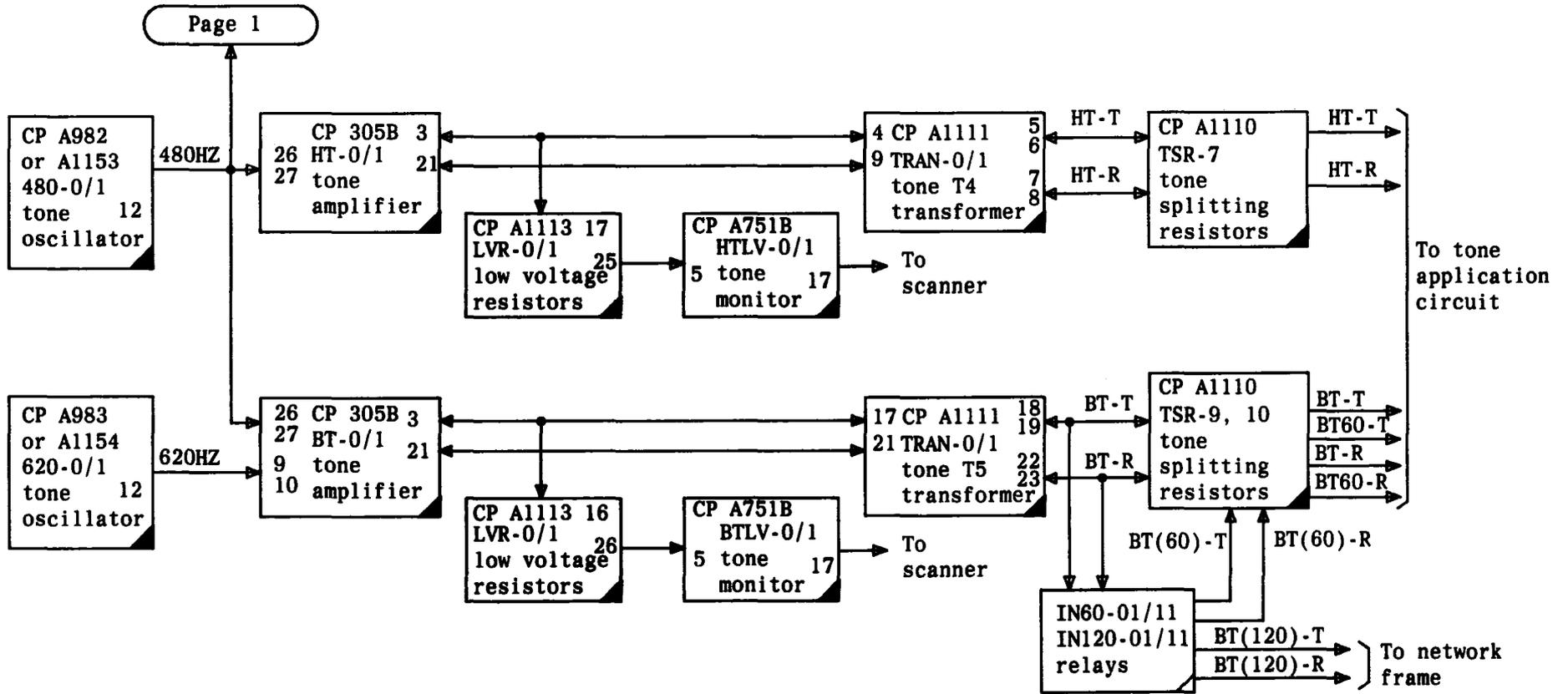
CLEAR TROUBLE IN 20-HZ PULSE GENERATOR

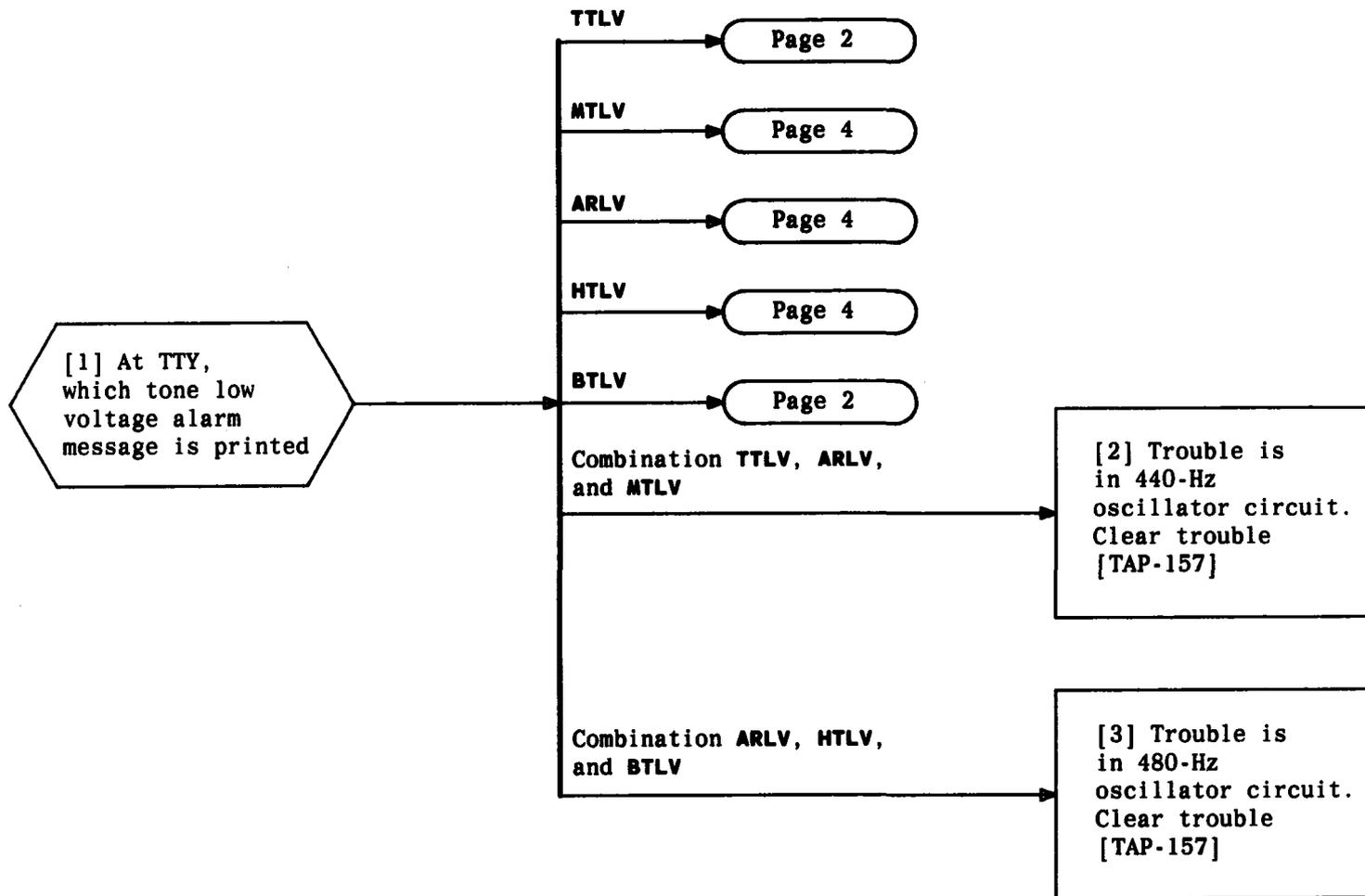


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TONE GENERATION

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CLEAR TONE FAULT

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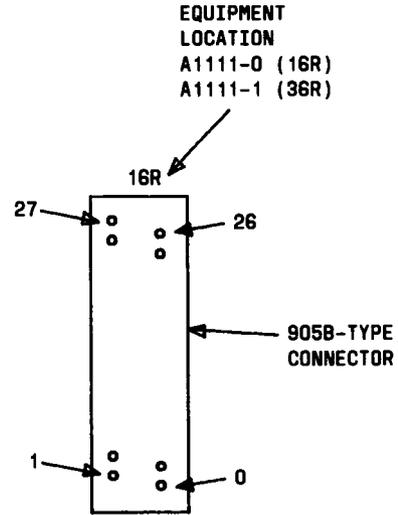
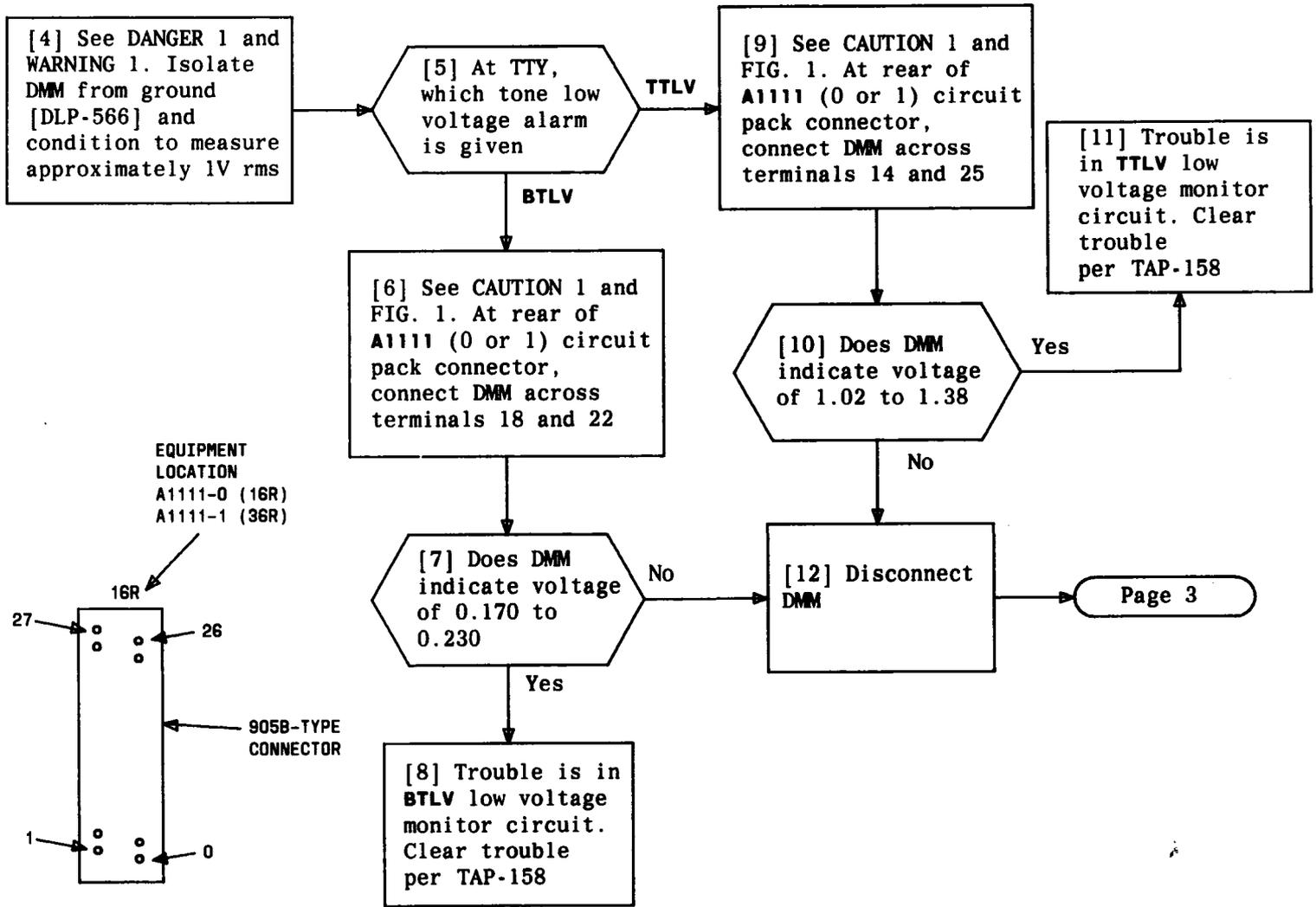
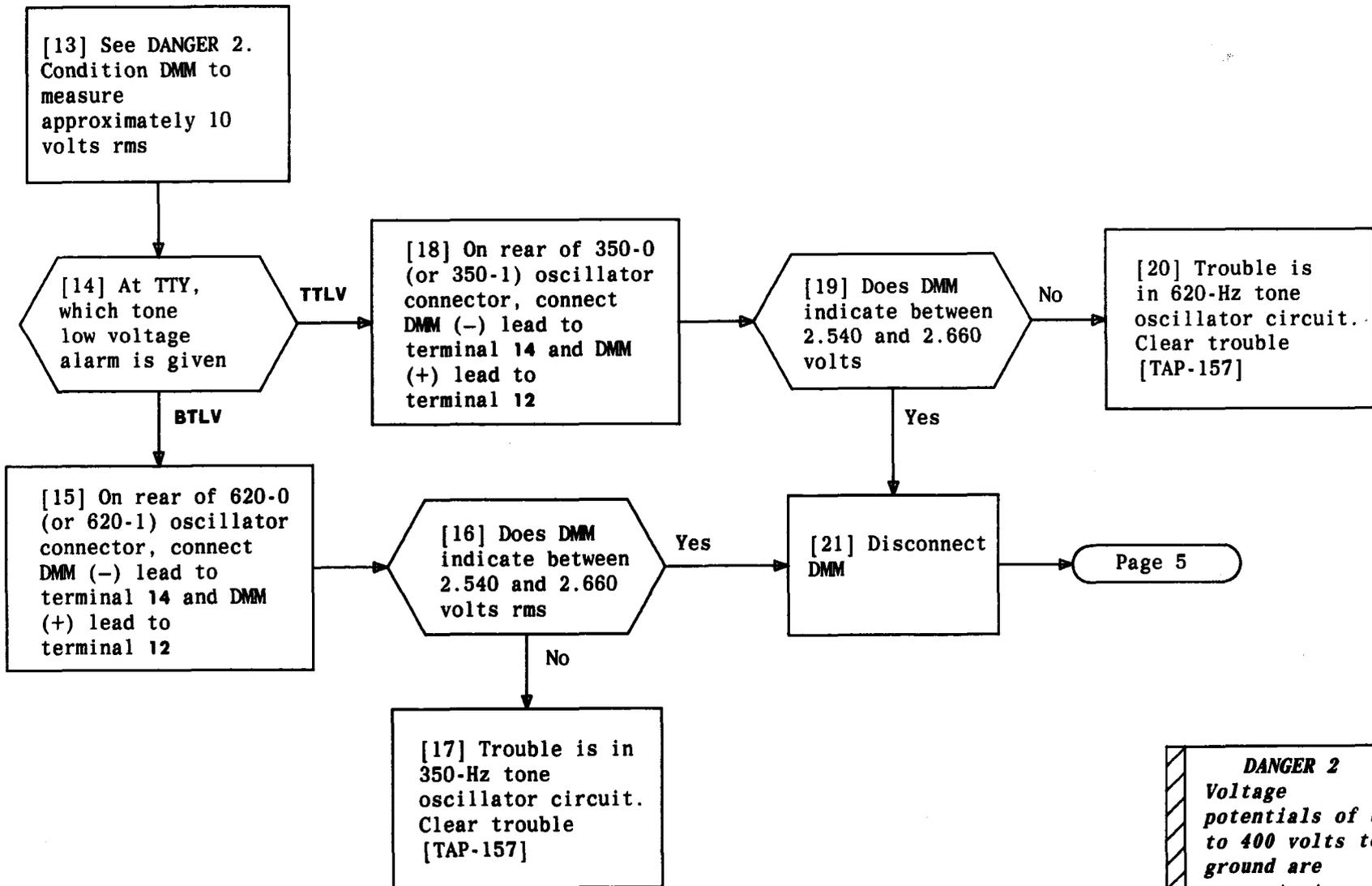


FIG. 1 - A1111 Connector - Rear View

CLEAR TONE FAULT

WARNING 1 <i>Erroneous reading and damage to equipment may result if DMM is not isolated from ground</i>	
CAUTION 1 <i>Tone voltages to be measured are complex ac waveforms. A <u>True RMS</u> indicating voltmeter is required to accurately adjust voltage levels. Peak and average ac voltmeters produce inaccurate readings</i>	
DANGER 1 <i>Voltage potentials of up to 400 volts to ground are present at rear of plant</i>	
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DANGER 2
Voltage potentials of up to 400 volts to ground are present at rear of plant

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CLEAR TONE FAULT

[22] See DANGER 3 and WARNING 2. Condition to measure approximately 1V rms

[23] See CAUTION 2. At rear of A1111 (0 or 1) circuit pack connector, connect DMM at terminals in TABLE A for low voltage alarm that is given

[24] Does DMM indicate voltage level in TABLE A

Yes

[25] Trouble is in low voltage monitor circuit. Clear trouble for voltage alarm that is given per TAP-158

No

[26] Disconnect DMM

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TABLE A		
tone low voltage alarm	DMM CONNECTION AT A1111 CONNECTOR	VOLTAGE RANGE-VOLTS RMS
MTLV	16 and 24	0.408 to 0.552
ARLV	2 and 10	0.306 to 0.414
HTLV	5 and 7	0.246 to 0.334

<p>WARNING 2 Erroneous reading and damage to equipment may result if DMM is not isolated from ground</p>	
<p>CAUTION 2 Tone voltages to be measured are complex ac waveforms. A <u>True RMS</u> indicating voltmeter is required to accurately adjust voltage levels. Peak and average ac voltmeters produce inaccurate readings</p>	
<p>DANGER 3 Voltage potentials of up to 400 volts to ground are present at rear of plant</p>	
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CLEAR TONE FAULT

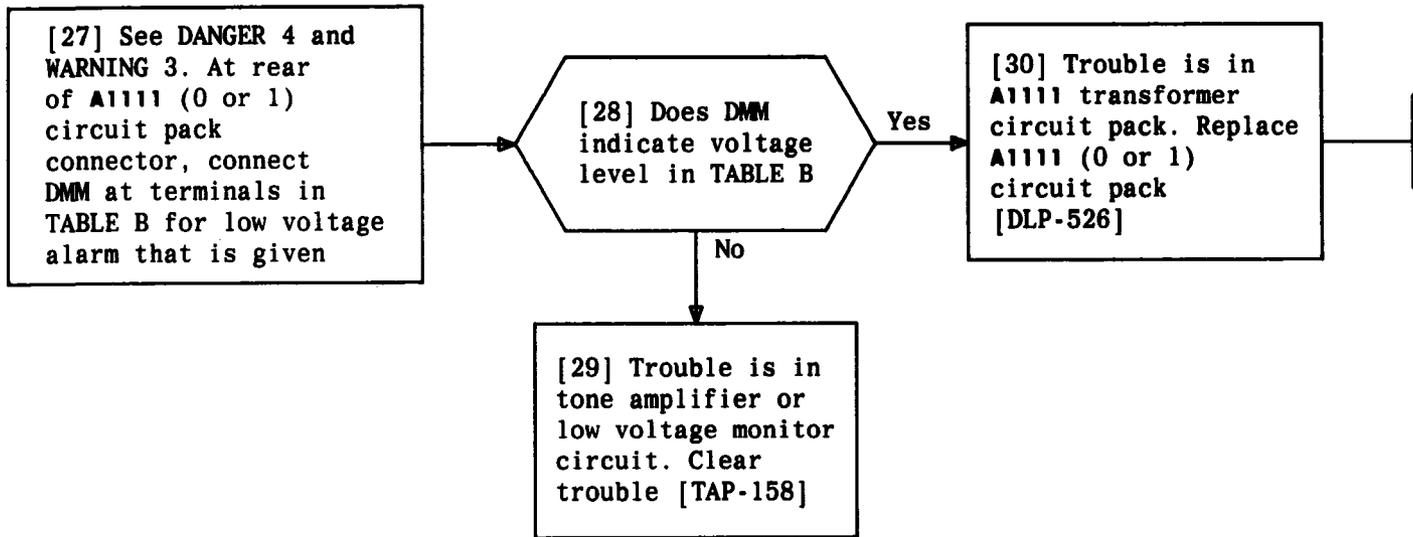


TABLE B		
tone low voltage alarm	DMM CONNECTION AT A1111 CONNECTOR	VOLTAGE RANGE-VOLTS RMS
TTLV	13 and 26(GRD)	4.35 to 4.65
MTLV	15 and 20(GRD)	4.35 to 4.65
ARLV	1 and 12(GRD)	4.35 to 4.65
HTLV	4 and 9(GRD)	4.35 to 4.65
BTLV	17 and 21(GRD)	4.35 to 4.65

WARNING 3	
<i>DMM(-) lead must be connected to terminal designated GRD as given in TABLE C</i>	
DANGER 4	
<i>Voltage potentials of up to 400 volts to ground are present at rear of plant</i>	
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CLEAR TONE FAULT

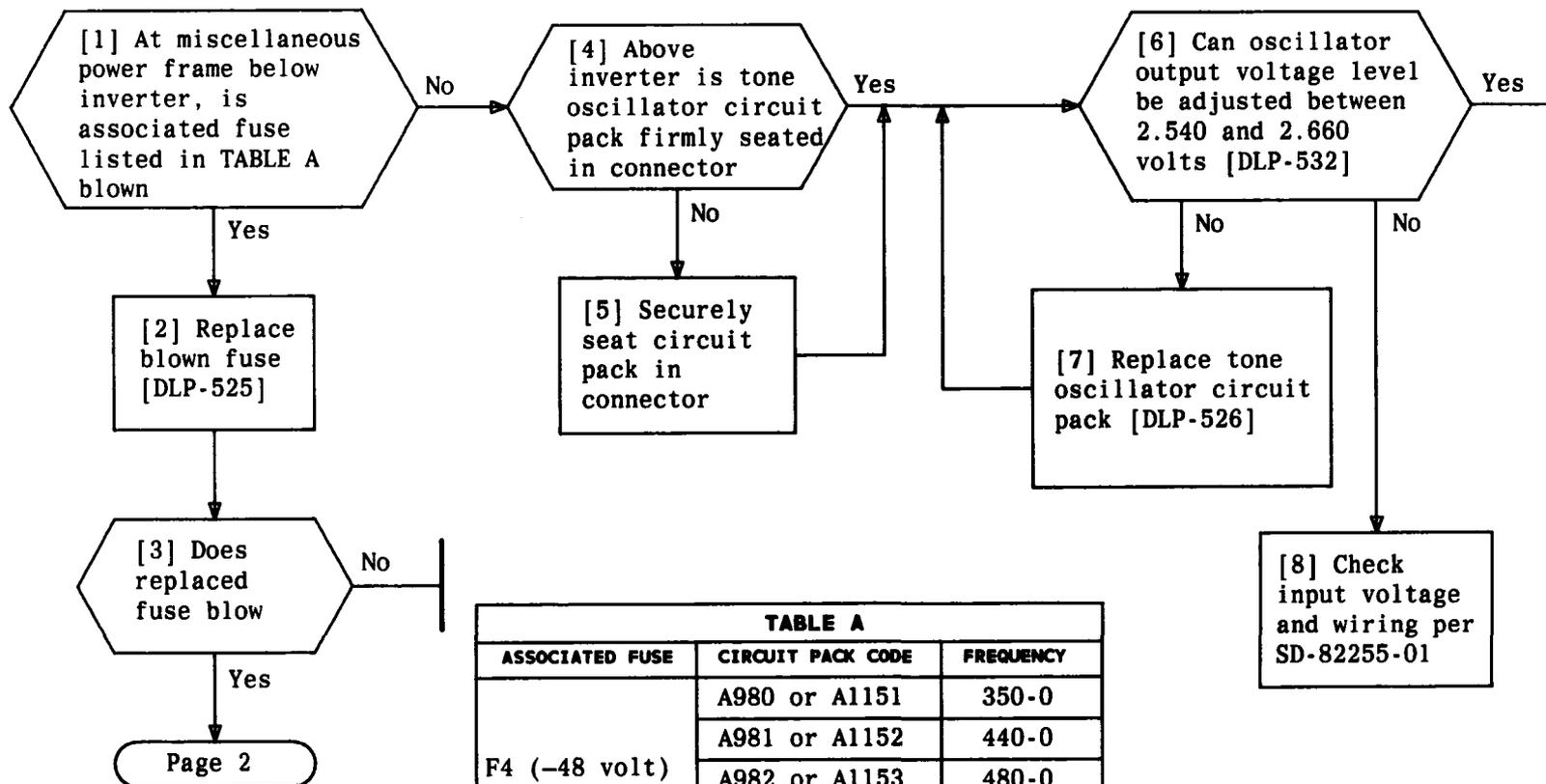
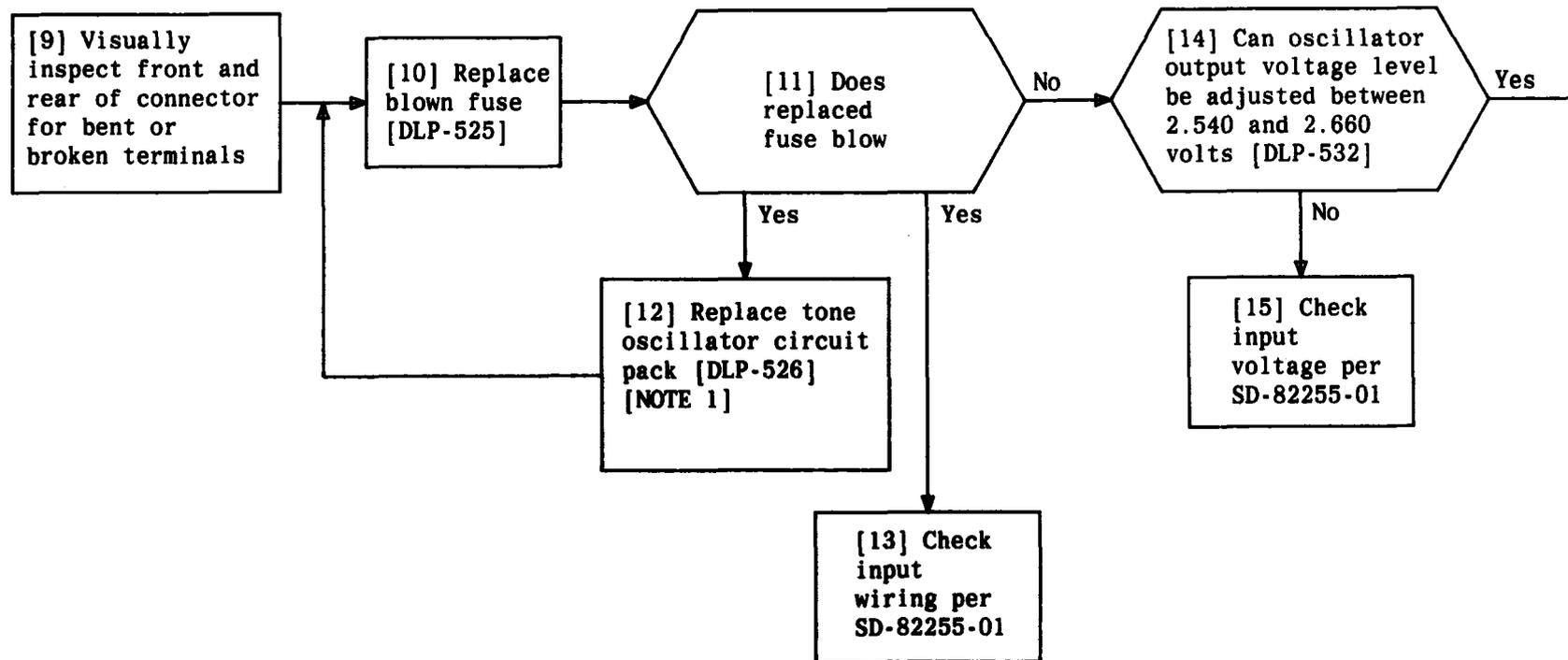


TABLE A		
ASSOCIATED FUSE	CIRCUIT PACK CODE	FREQUENCY
F4 (-48 volt)	A980 or A1151	350-0
	A981 or A1152	440-0
	A982 or A1153	480-0
	A983 or A1154	620-0
F12 (-48 volt)	A980 or A1151	350-0
	A981 or A1152	440-0
	A982 or A1153	480-0
	A983 or A1154	620-0

CLEAR TONE OSCILLATOR TROUBLE



CLEAR TONE OSCILLATOR TROUBLE

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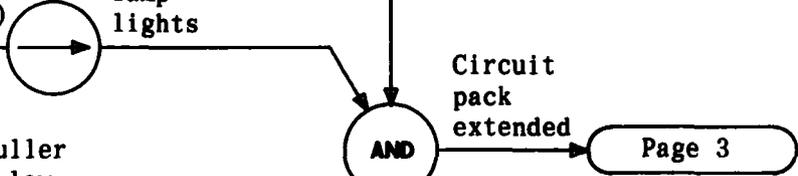
[1] See WARNING 1 and CAUTION 1.
Obtain equipment in TABLE A

[2] See NOTE 1. At MP frame on RINGING & TONE panel, depress OFF-0 (or OFF-1) pushbutton

PWR OFF lamp lights

[3] See FIG. 1 and NOTE 2. Use 723B circuit pack puller to remove amplifier and low voltage monitor circuit packs for tone being checked

[4] Use 158A circuit pack adapters to extend amplifier circuit pack and low voltage monitor circuit group



NOTES
 1. Information enclosed in parentheses refers to side 0 or to side 1
 2. For example, remove TT-0 amplifier and TTLV-0 monitor for TT tone on side 0

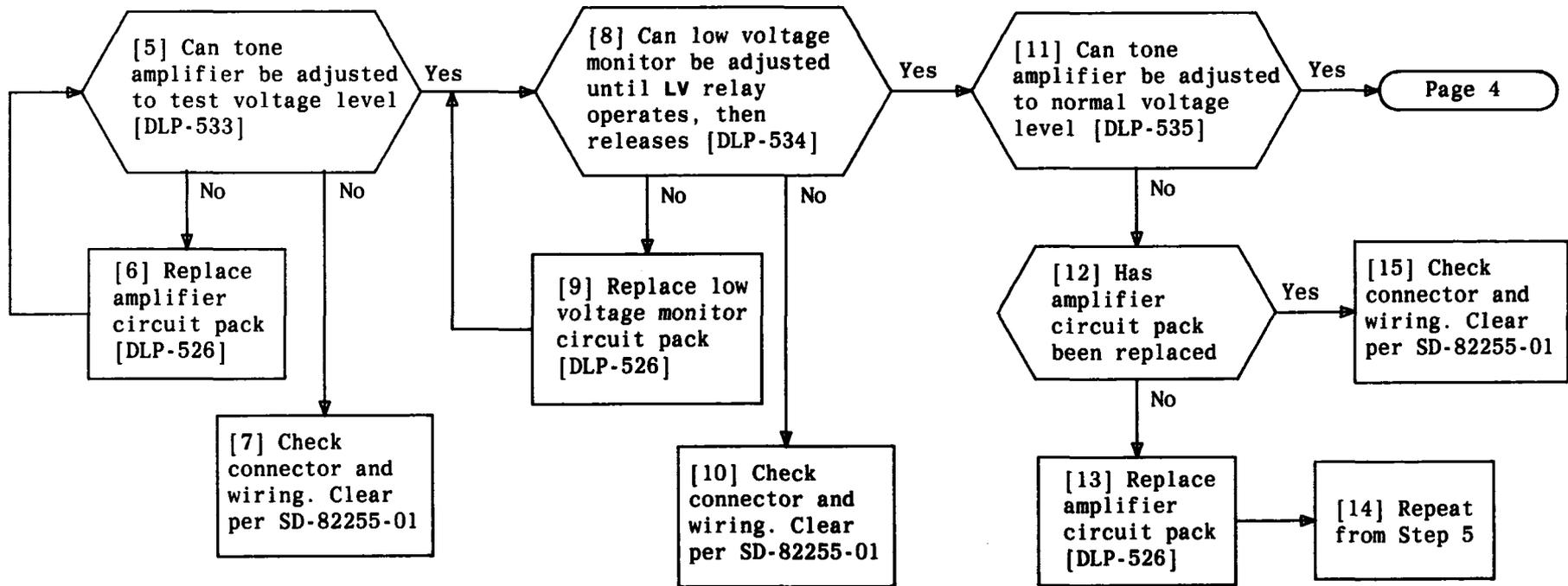
WARNING 1
Erroneous reading and damage to equipment may result if DMM is not isolated from ground

CAUTION 1
Tone voltages to be measured are complex ac waveforms. A True RMS indicating voltmeter is required to accurately adjust voltage levels. Peak and average ac voltmeters produce inaccurate readings

TABLE A	
EQUIPMENT REQUIRED	RECOMMENDED TYPE
Digital multimeter (DMM)	Hickok Model 3310 (ITE-5356)*†
Circuit pack puller	723B tool†
Circuit pack extender	158A adapter†
Jewelers screwdriver	R1005 tool†
(2) Connecting clips	EZ hook†
* DMM must be true RMS	
† Or equivalent	

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CLEAR TROUBLE – TONE AMPLIFIER AND LOW VOLTAGE MONITOR CIRCUIT



CLEAR TROUBLE-TONE AMPLIFIER AND LOW VOLTAGE MONITOR CIRCUIT

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[16] Remove extended amplifier and low voltage monitor circuit packs from plant

[17] Disconnect 158A adapter and return amplifier and low voltage monitor circuit pack to plant

[18] On RINGING & TONE panel, depress NOR

PWR OFF lamp extinguished

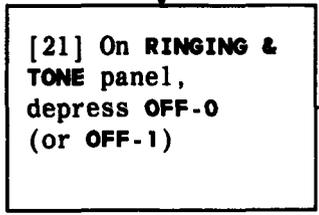
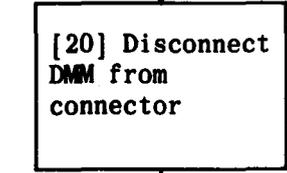
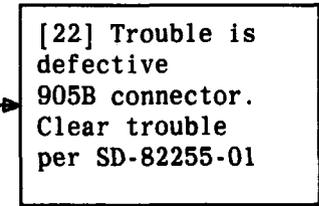
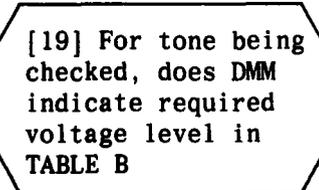


TABLE B	
TONE	OUTPUT VOLTAGE LEVEL OF TONE - VOLTS RMS
TT	1.176 to 1.224
AR	0.353 to 0.367
BT	0.196 to 0.204
MT	0.442 to 0.518
HT	0.267 to 0.313

[19] For tone being checked, does DMM indicate required voltage level in TABLE B

No

[22] Trouble is defective 905B connector. Clear trouble per SD-82255-01

Yes

[20] Disconnect DMM from connector

[21] On RINGING & TONE panel, depress OFF-0 (or OFF-1)

CLEAR TROUBLE-TONE AMPLIFIER AND LOW VOLTAGE MONITOR CIRCUIT

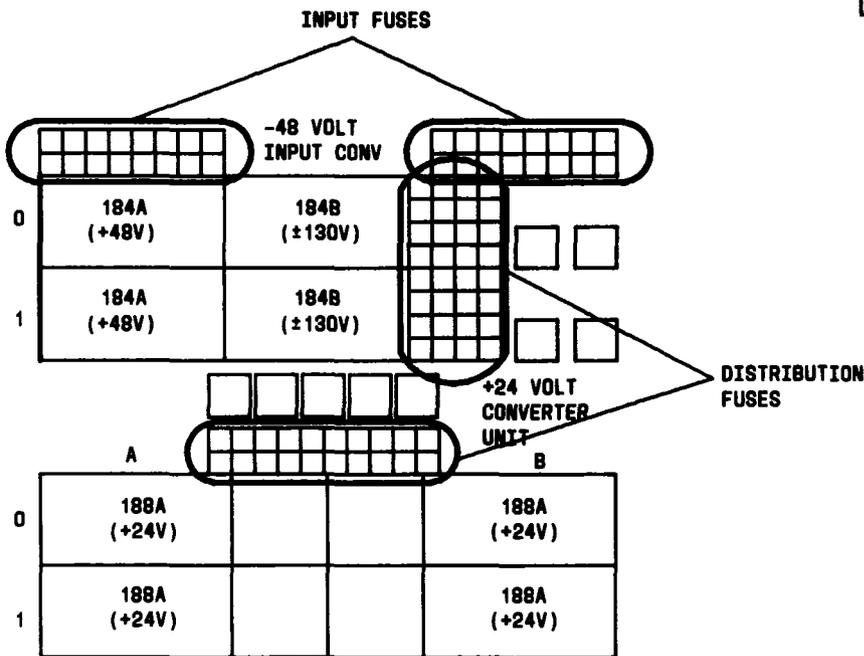
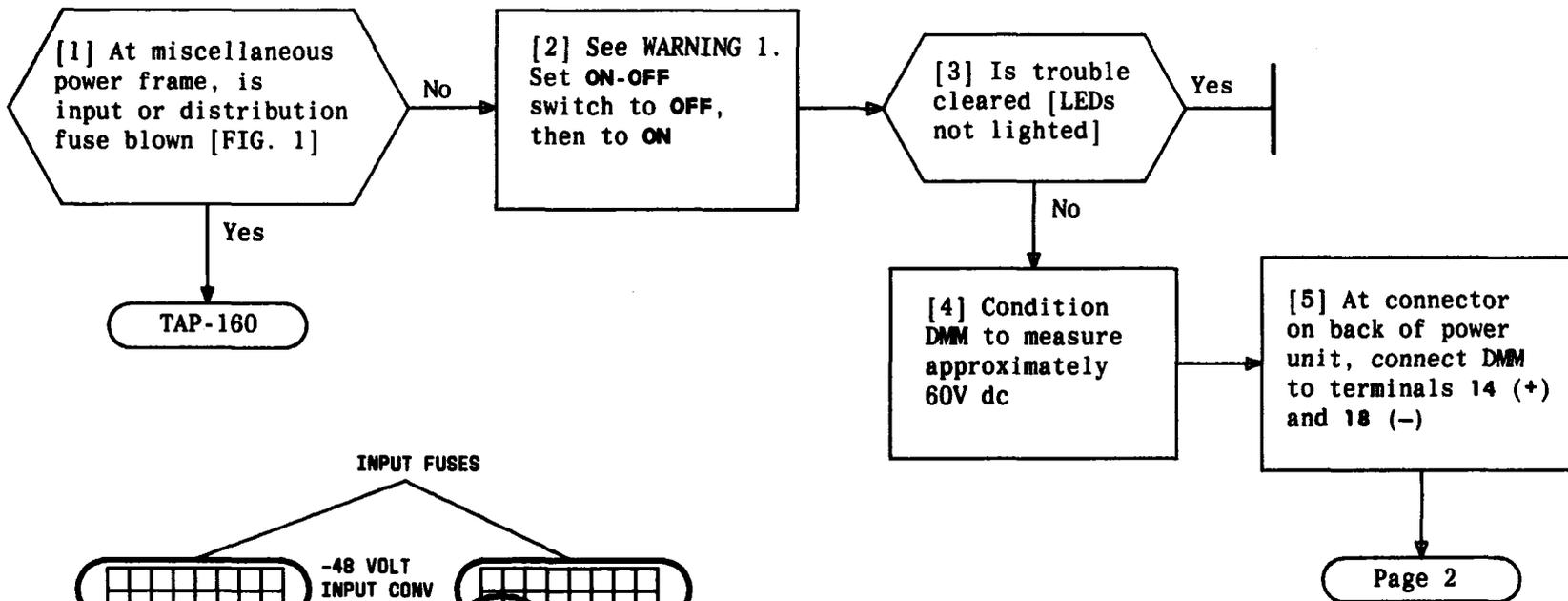
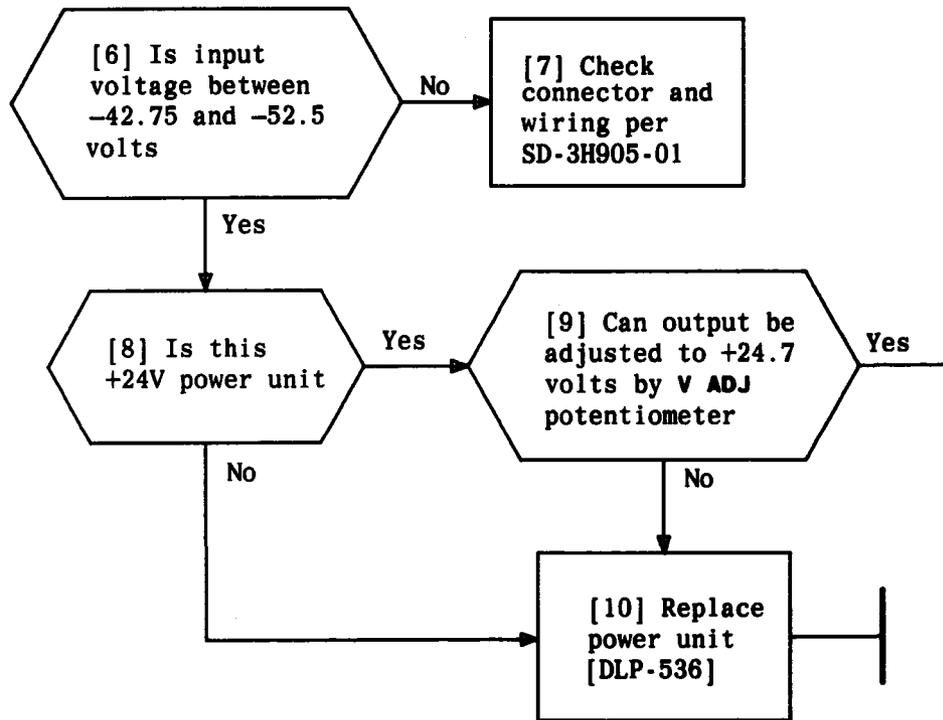


FIG. 1 - Top of Miscellaneous Power Frame

CLEAR POWER UNIT NO-OUTPUT CONDITION

WARNING 1	
<i>If power is removed from TDCs with tape inserted on on-line SYC, service loss may result</i>	
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CLEAR POWER UNIT NO-OUTPUT CONDITION

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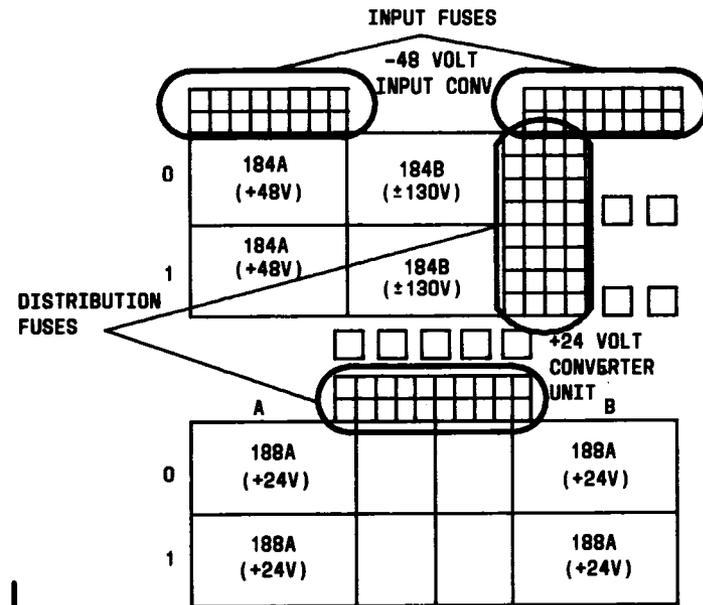
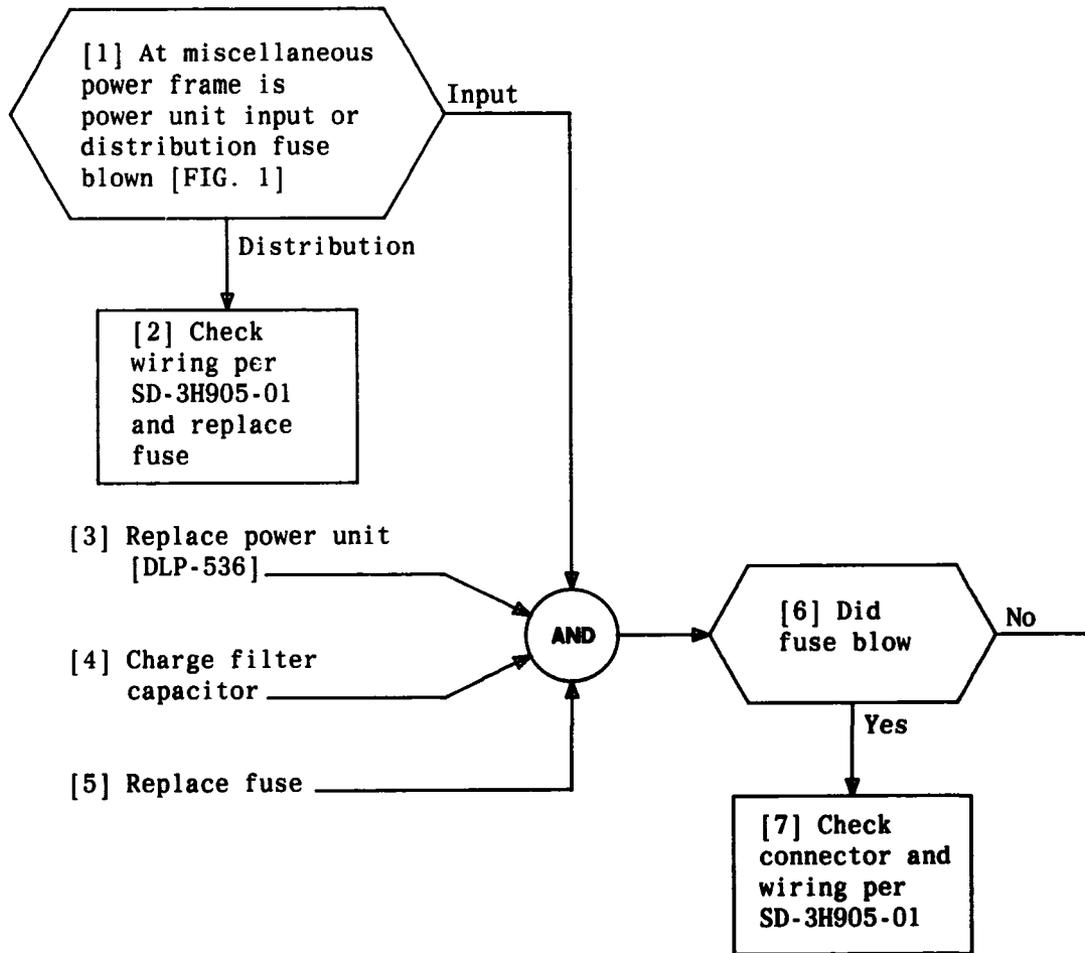


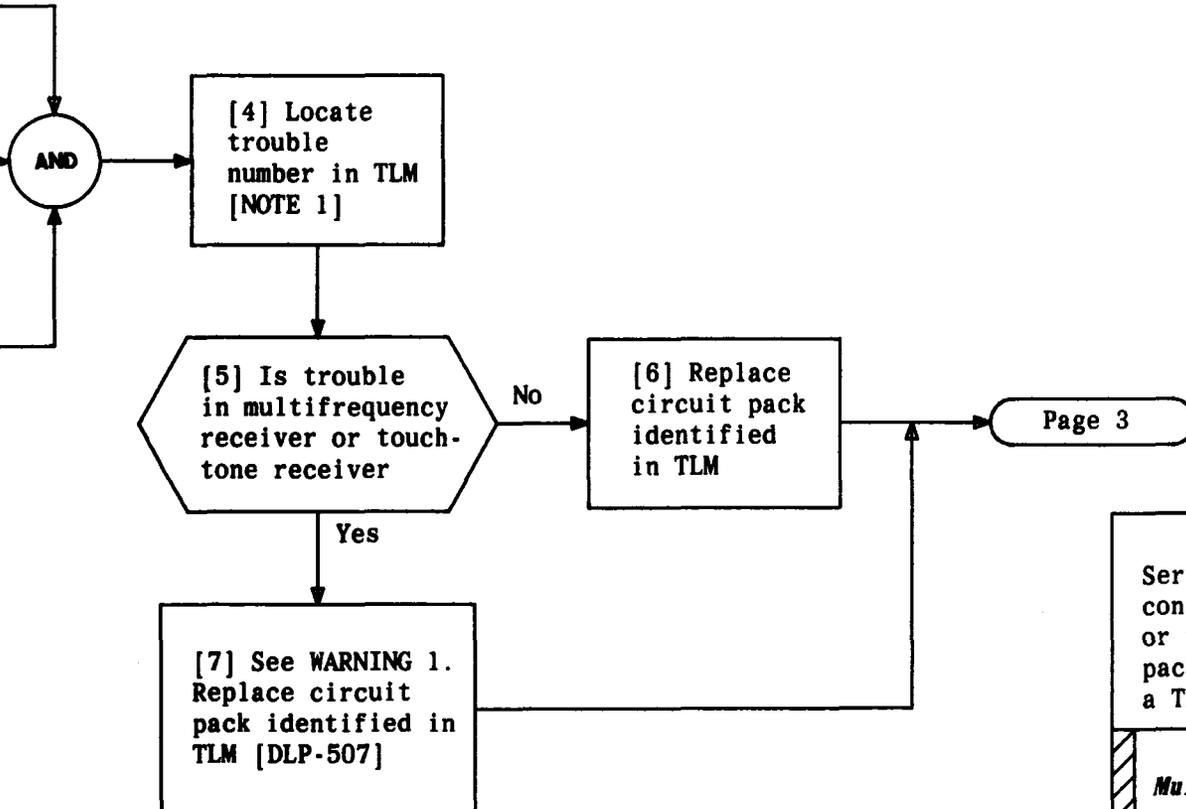
FIG. 1 - Top of Miscellaneous Power Frame

TABLE A			
CIRCUIT	CIRCUIT PACKS	TLM	SD
Customer dial pulse receiver	FB367	3H111-01	3H410-01
Touch-Tone receiver	A118, A120 A121, A122 A123, A124 A944, A1025	3H111-01	3H410-01
Superimposed ringing	FB375, FB376	3H112-01	3H406-01
Regular ringing	FB358	3H110-01	3H410-01
Dial pulse transmitter	FB403	3H110-01	3H405-01
Multifrequency transmitter	FB362, FB363 FB364	3H114-01	3H404-01
Multifrequency receiver	A152, A260 A263, A264 A265, A266	3H113-01	1C490-01 3H402-01
Coin control	FB423	3H110-01	3H411-01
Tone or recorded announcement	FB383	3H110-01	3H411-01
Tone presence detector	FB501, FB502		3H520-01
Continuity and polarity test	FB500	3H110-01	3H520-01
Transmission test termination test	FB504		3H520-01
MW and Transmission environment test	FB505, FB506 FB507, FB508 FB509		3H520-01
Touch-Tone receiver test	FB526, FB527 FB528, FB529	3H111-01	3H520-01
Dial pulse receiver test	FB501, FB502		3H520-01
Loop environment test	FB510		3H520-01

[1] From TTY printout determine member and group number

[2] From office records determine circuit type

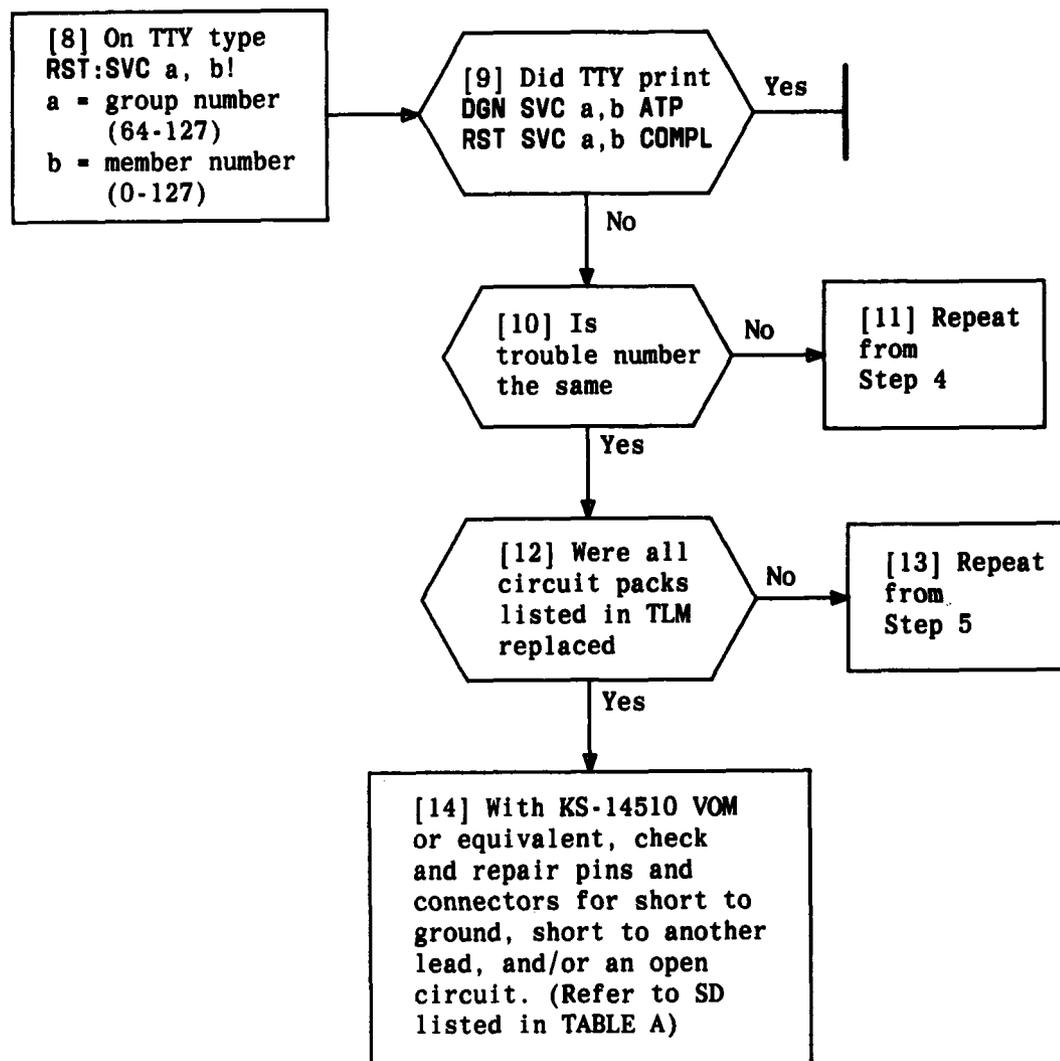
[3] Obtain TLM and replacement circuit pack(s) [TABLE A]

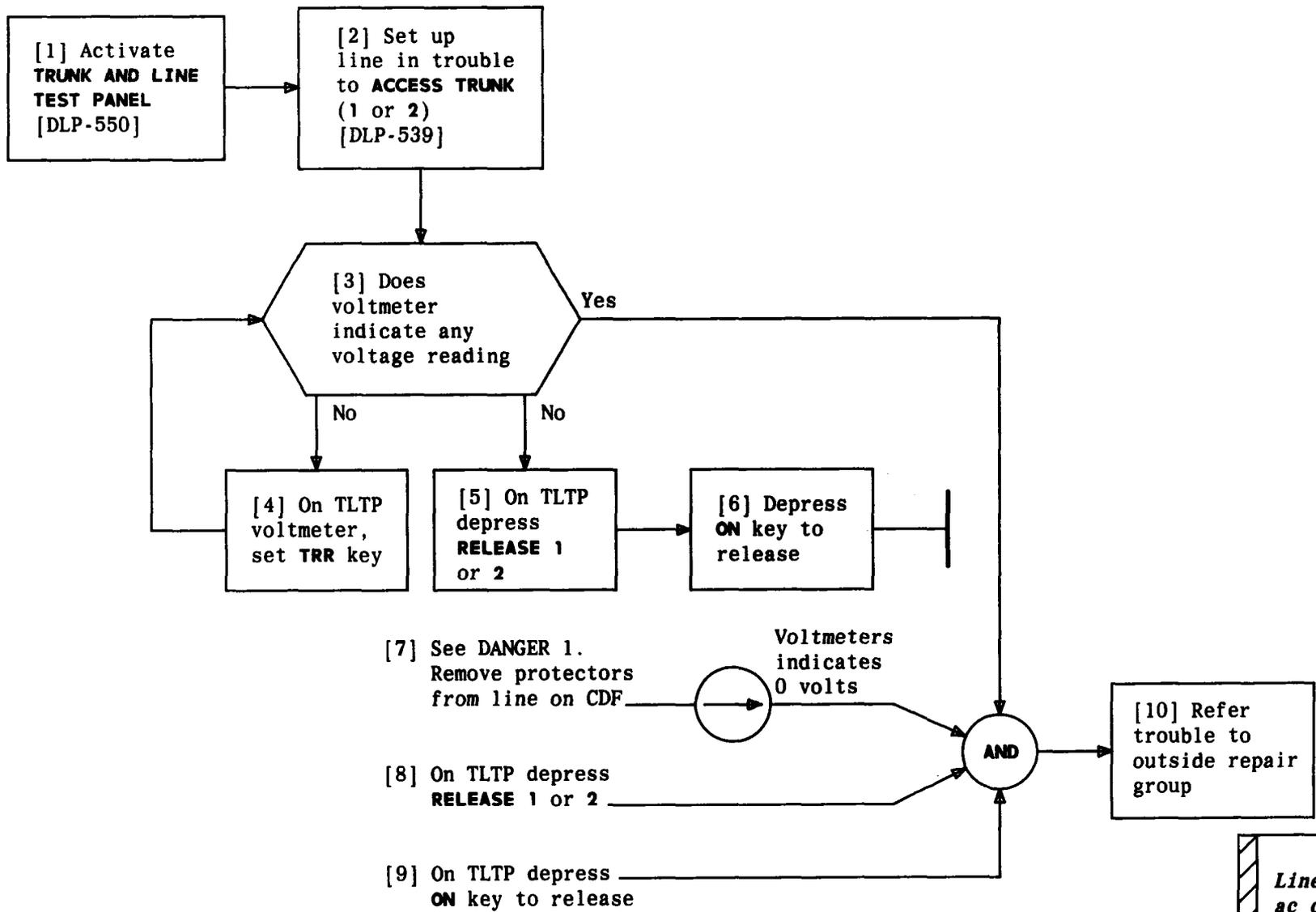


NOTE 1
Service circuits consisting of one or two circuit packs may not have a TLM listing

WARNING 1
Multifrequency receiver and touch-tone receiver circuit packs may be damaged if power is not removed before circuit pack removal or replacement

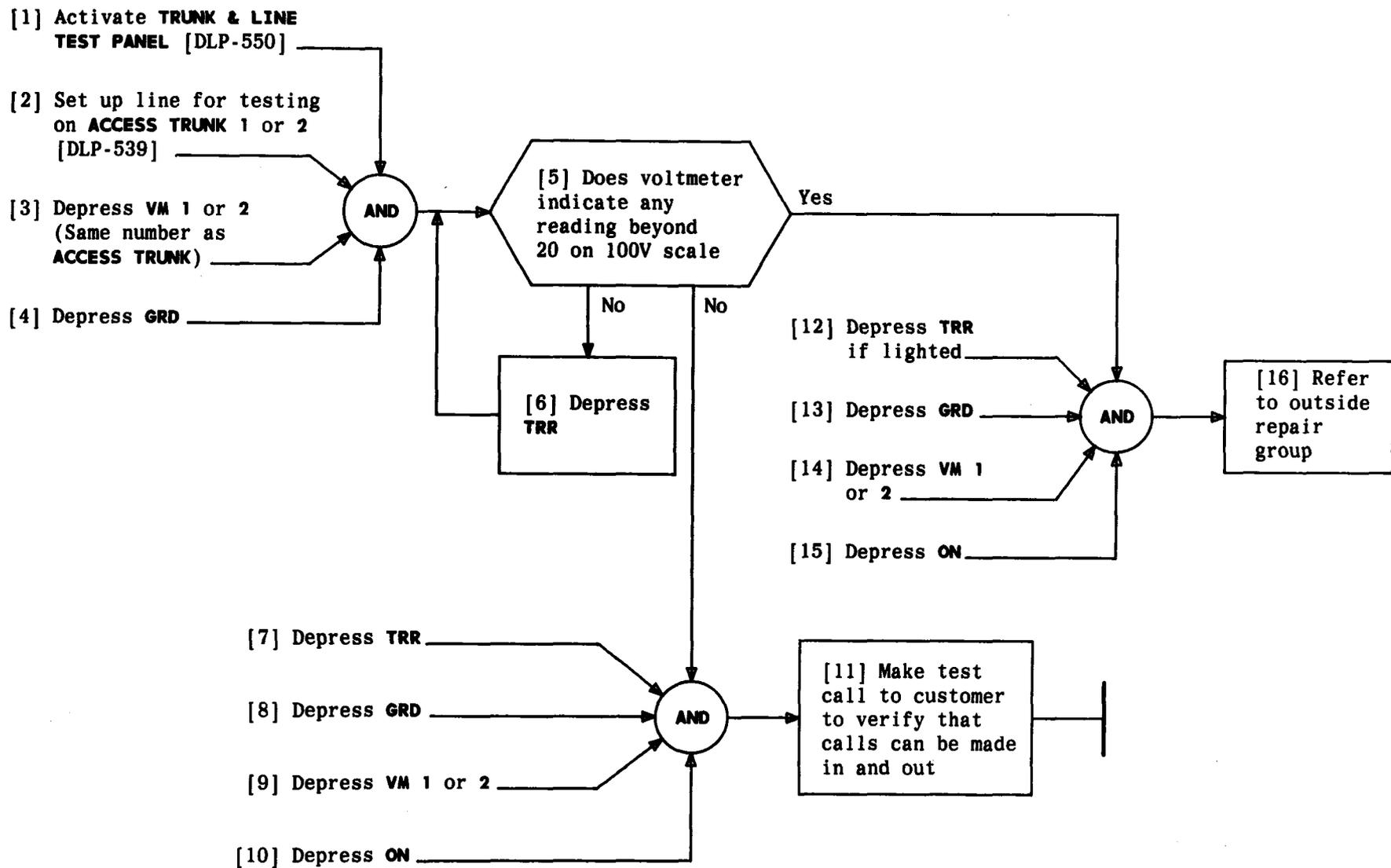
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DANGER 1 <i>Line may have ac or dc voltage on it</i>	
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CLEAR RING CROSS TO GROUND FAULT



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CLEAR REPORT OF LOW LEAKAGE RESISTANCE FAILURE ON A LINE

[1] Type in VER:LINE/
OE a cgs1 /
END!
to obtain scan point
number (SPN)

[2] Type in MON:SCAN a, b!
a = scanner number (0-15)
b = scan row (0-31)

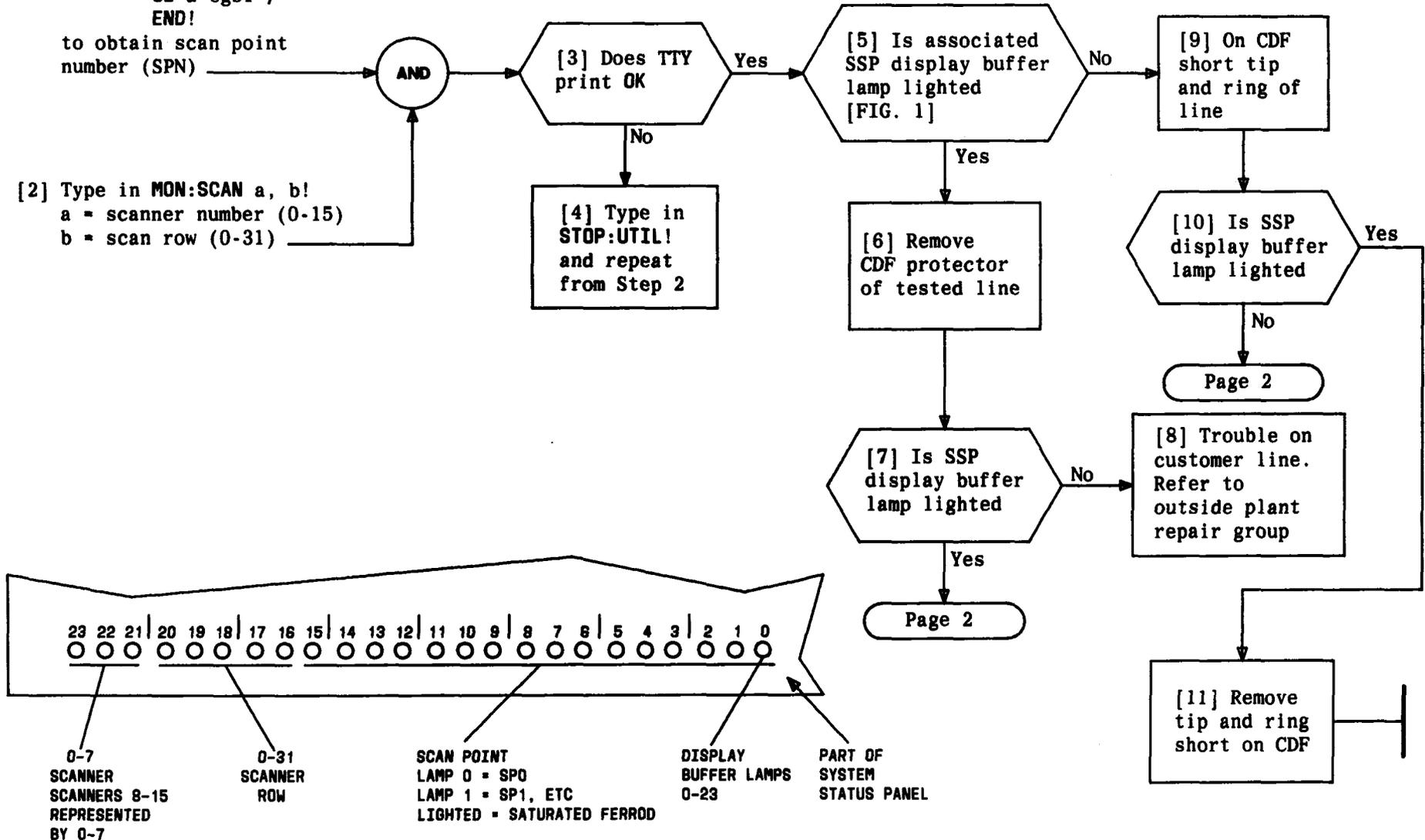
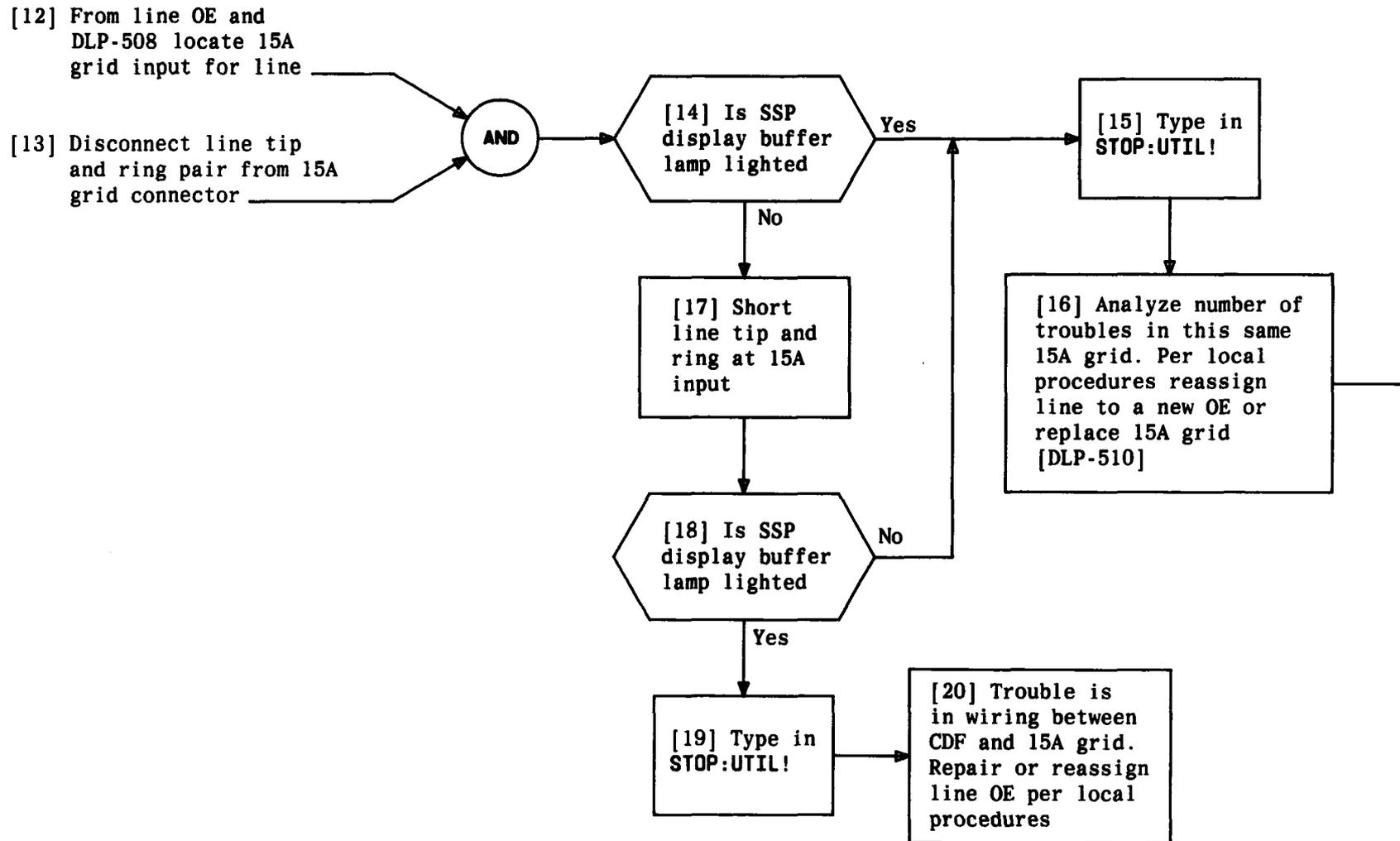


FIG. 1

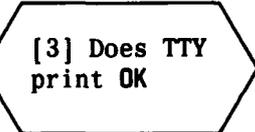
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CLEAR RESTORE VERIFY OR LINE CUT-OFF FAILURE REPORT

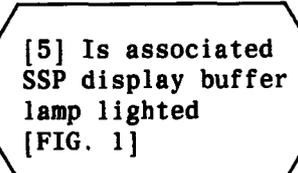


[1] Type in VER:LINE/
 OE a cgs1/
 END!
 to obtain scan point
 number (SPN)

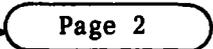
[2] Type in MON:SCAN a, b!
 a = scanner number (0-15)
 b = scan row (0-31)



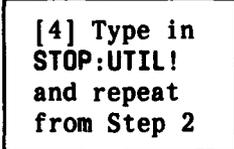
Yes



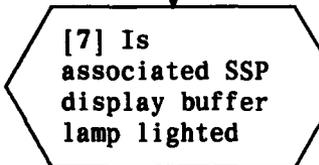
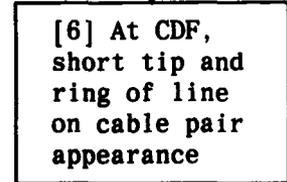
Yes



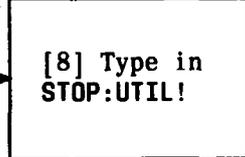
No



No



Yes



No

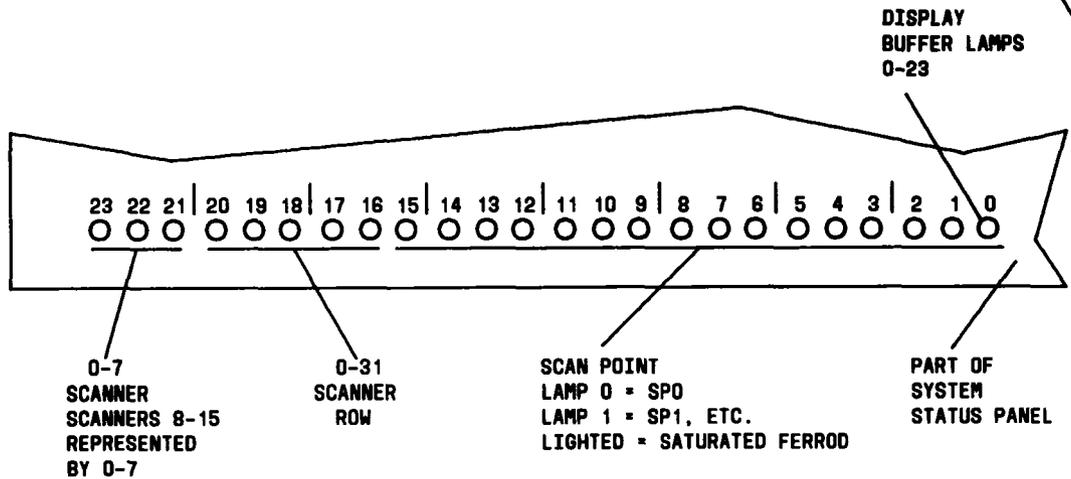
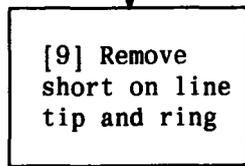
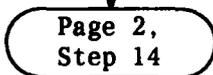
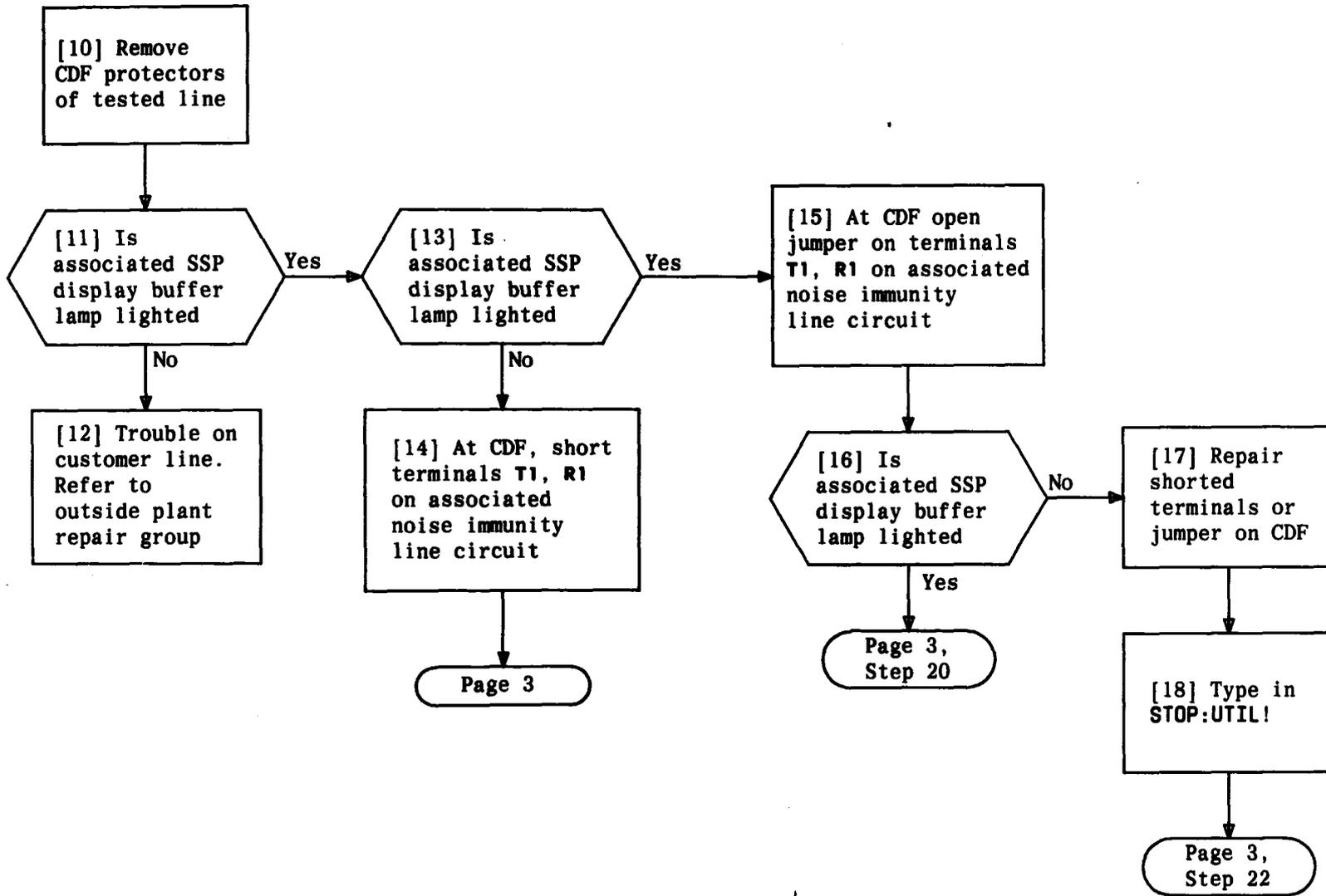


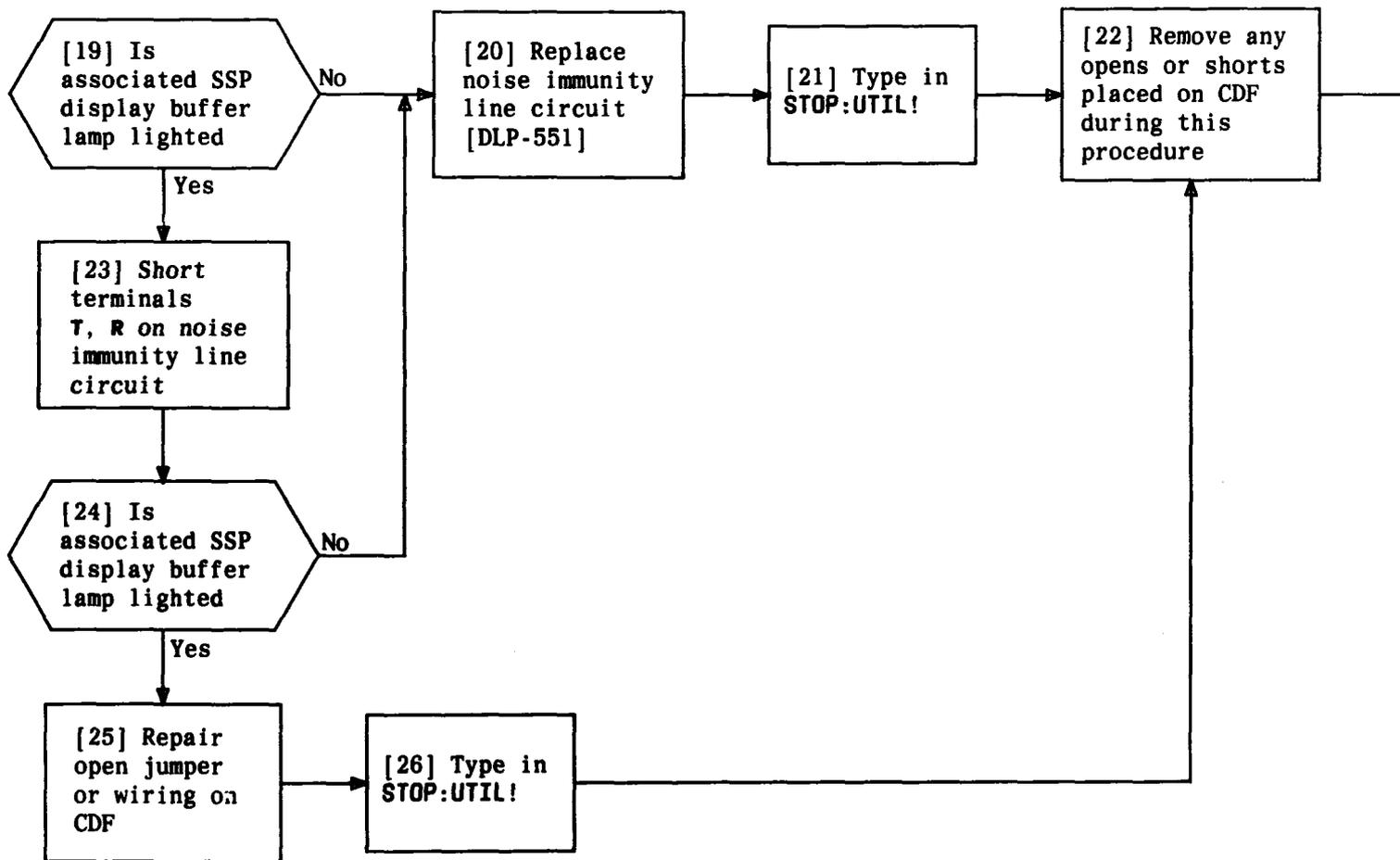
FIG. 1

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CLEAR LINE CIRCUIT RESTORE VERIFY FAILURE REPORT

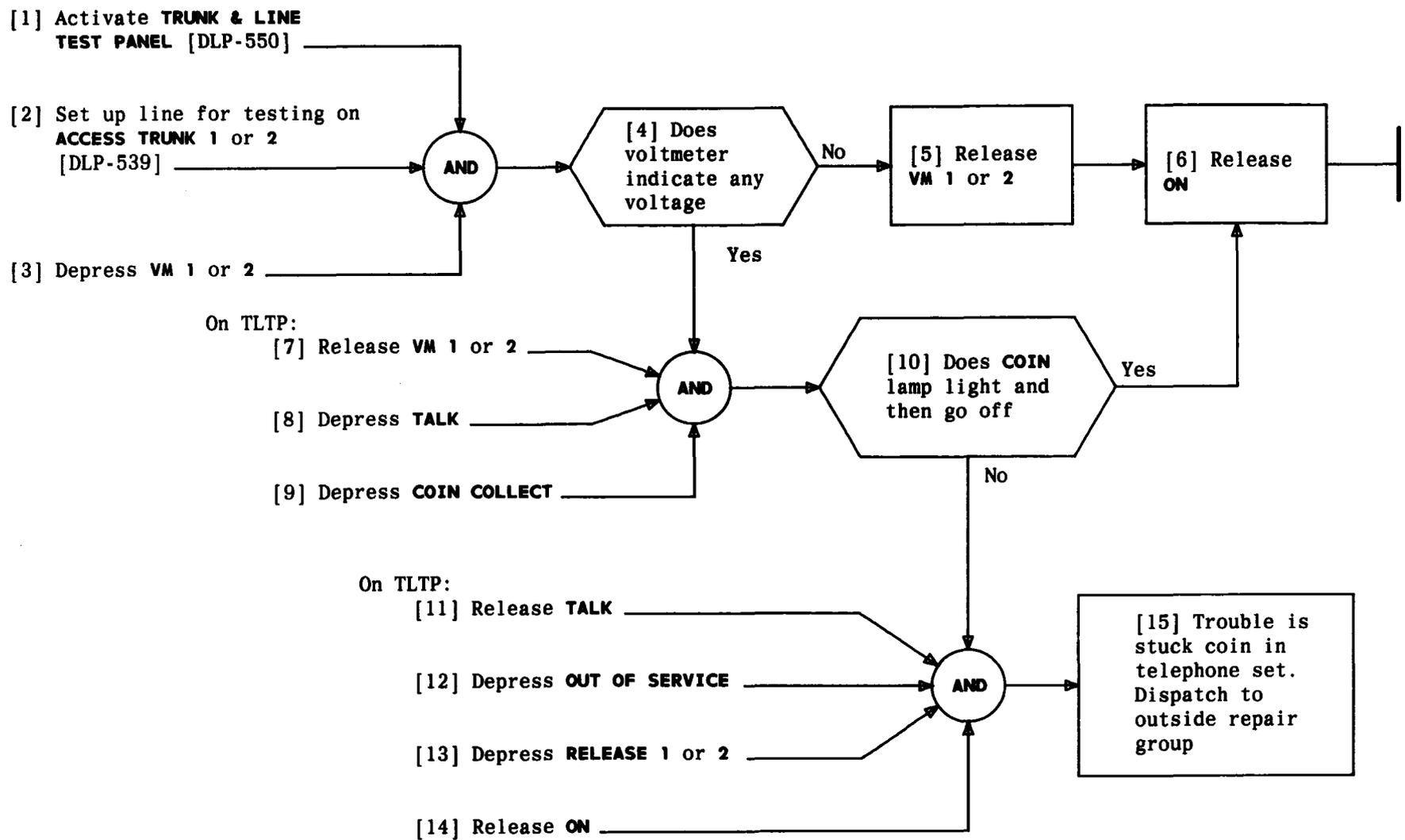


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CLEAR LINE CIRCUIT RESTORE VERIFY FAILURE REPORT

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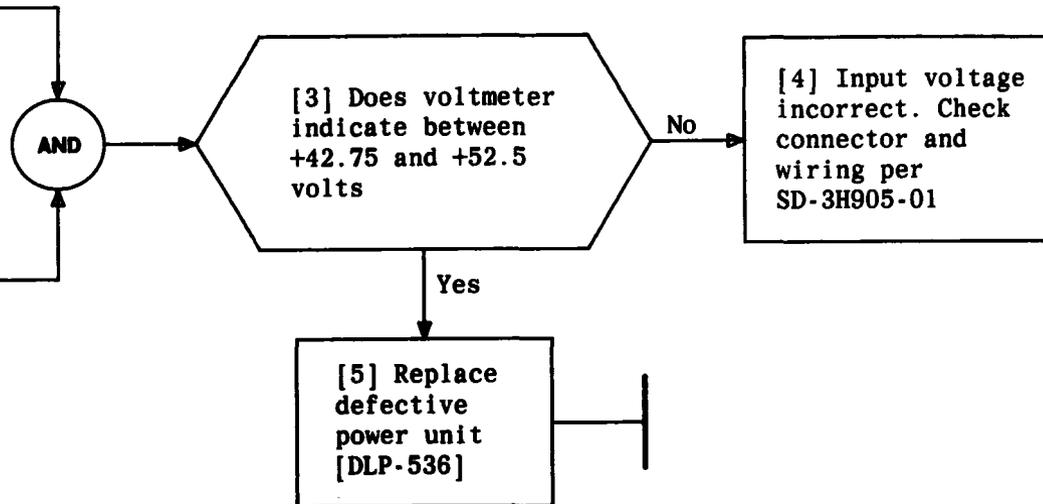


CLEAR REPORT OF STUCK COIN

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[1] Condition a portable
voltmeter to measure
approximately 60 volts dc.

[2] At connector on back side
of power unit, connect
voltmeter leads to terminals
14 (+) and 18 (-)



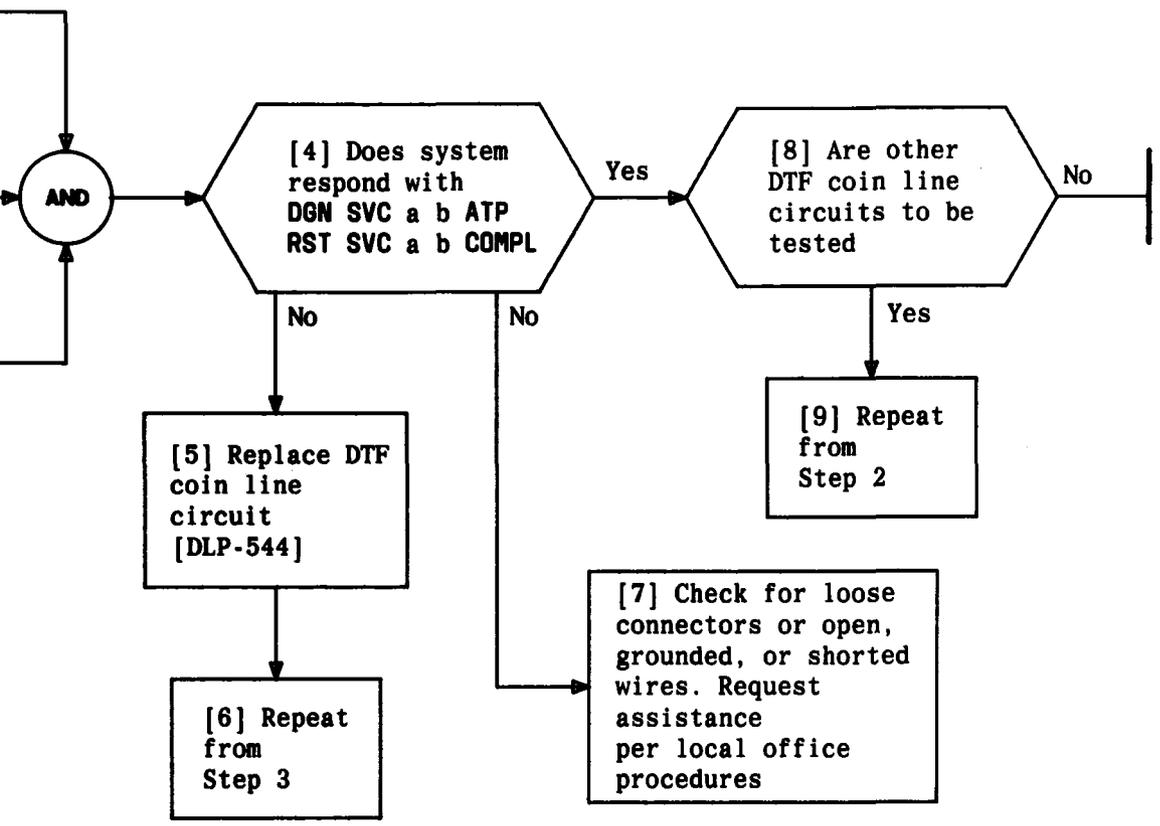
CLEAR NO VOLTAGE OUTPUT CONDITION OF POWER UNIT

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[1] From office records,
Form 3201, obtain
group and member
numbers of all Dial Tone
First [DTF] coin line circuits

[2] On TTY type
RMV:SVC a,b!
a = group number (64-127)
b = member number (0-127)

[3] On TTY type
RST:SVC a,b!



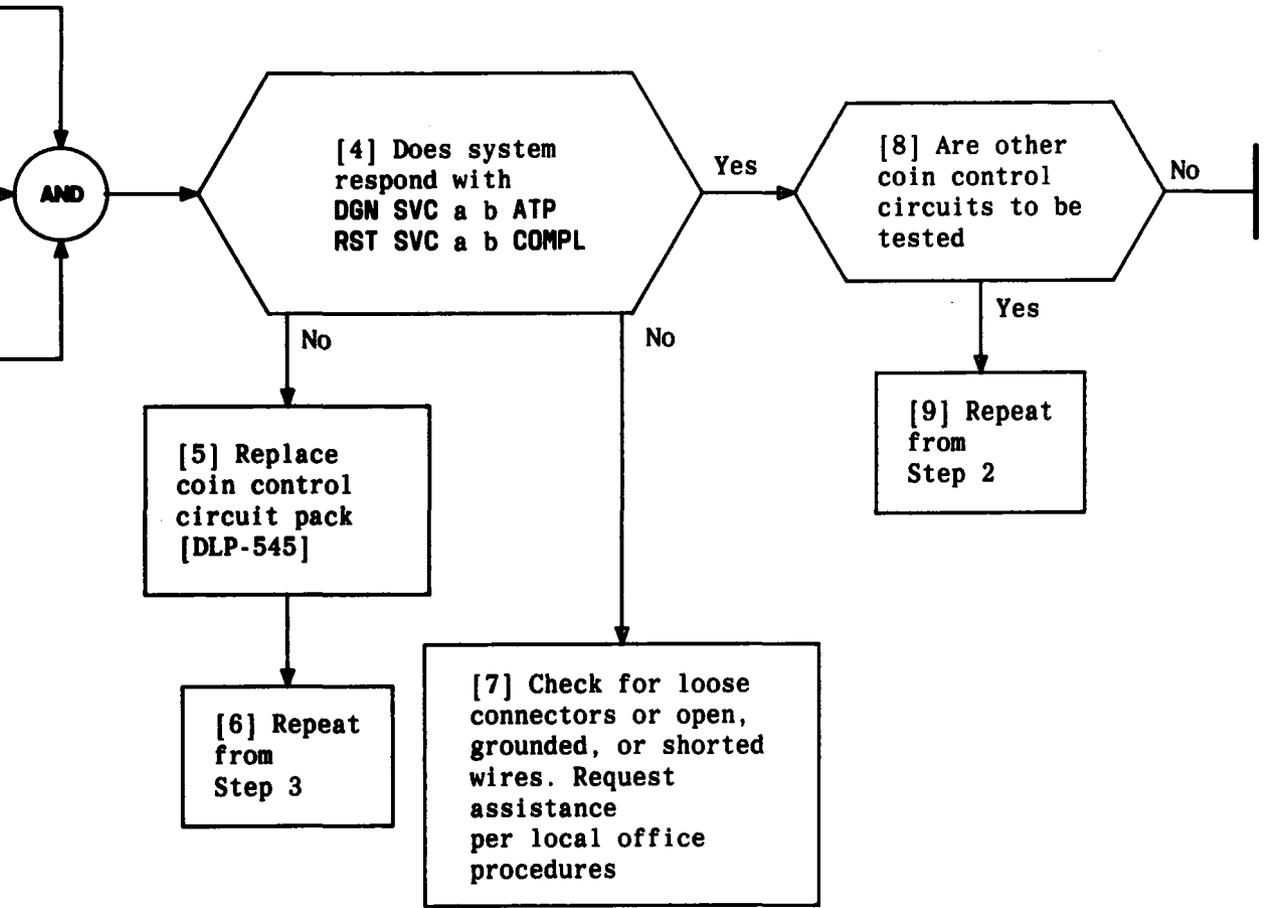
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CLEAR REPORT OF DIAL TONE FIRST COIN LINE CIRCUIT FAILURE

[1] From office records, Form 3201, obtain group and member numbers of all coin control circuits

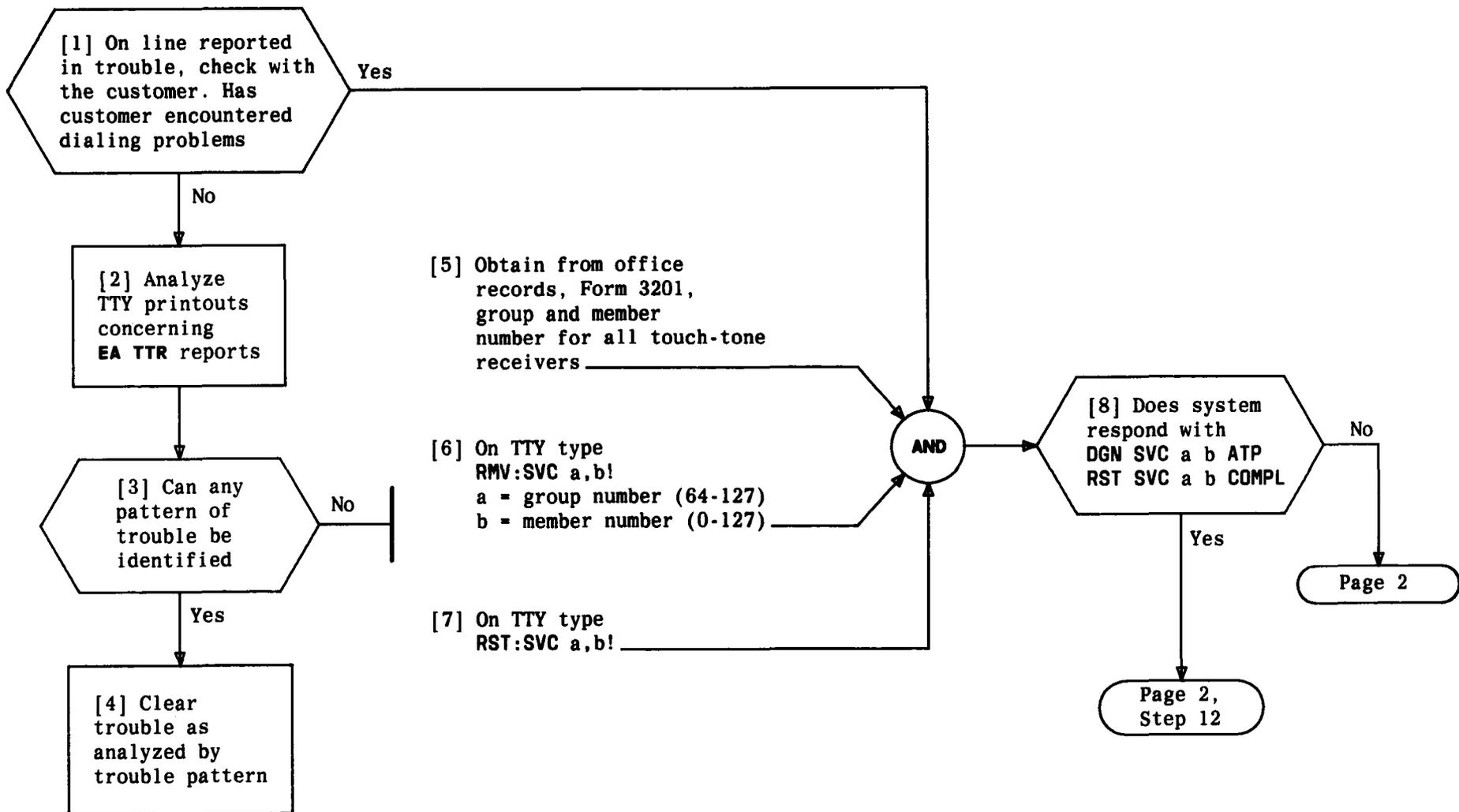
[2] On TTY type
 RMV:SVC a,b!
 a = group number (64-127)
 b = member number (0-127)

[3] On TTY type
 RST:SVC a,b!



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CLEAR REPORT OF COIN CONTROL CIRCUIT FAILURE

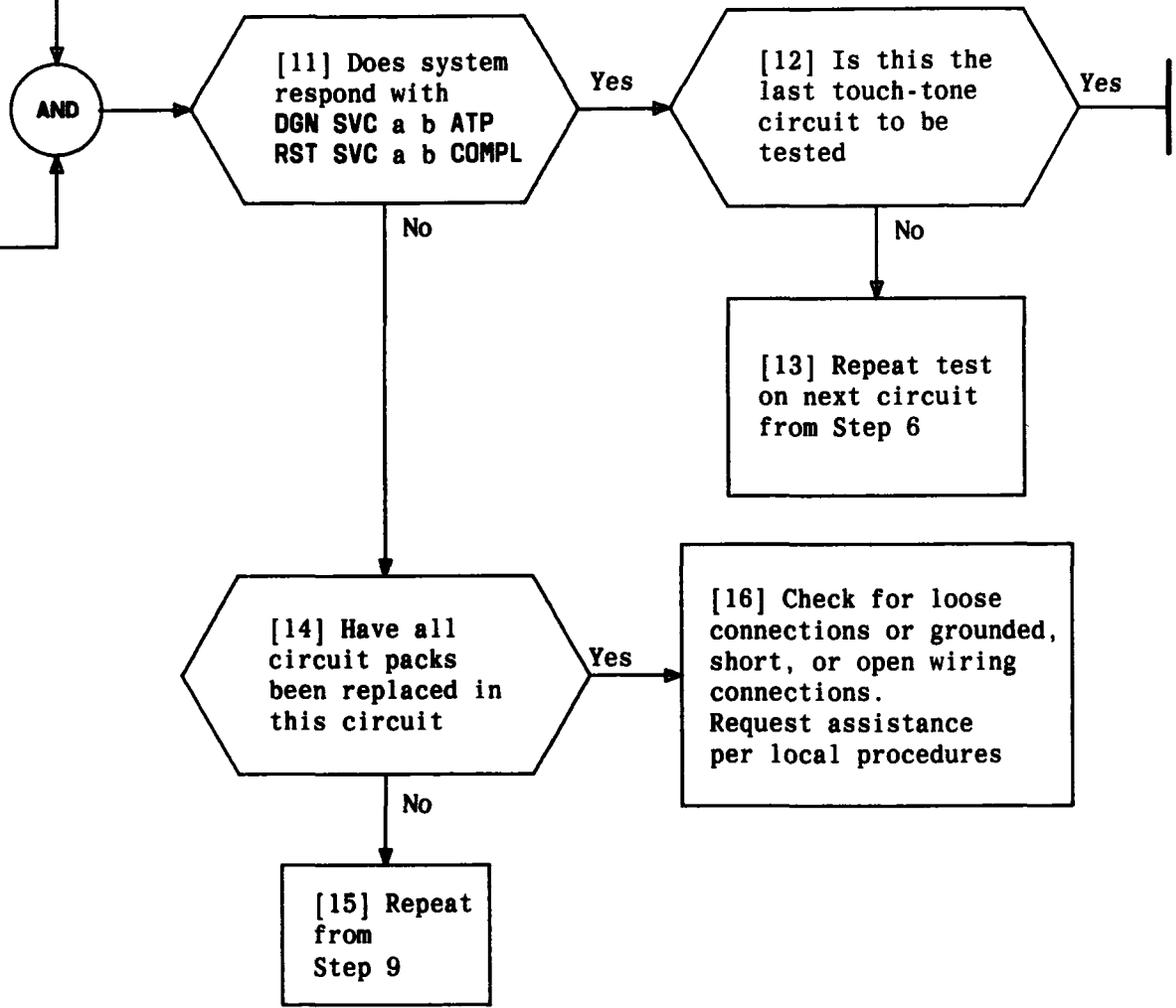


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CLEAR REPORT OF TOUCH-TONE RECEIVER ERRORS

[9] Replace circuit pack per TLM-3H111-01 [DLP-507]

[10] On TTY type
RST:SVC a,b!
a = group number
b = member number



CLEAR REPORT OF TOUCH-TONE RECEIVER ERRORS

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<u>DIAGNOSTIC TEST PROGRAMS</u>			
TEST NO.			
1	CDGMCH	MAINTENANCE CHANNEL	PR-1C912-32
2		GATING BUS	
3		CLOCK	
4		INITIALIZATION	
5	CDGTO	"TO" FIELD DECODER	PR-1C913-32
6		"FROM" FIELD DECODER	
7	CDGMLT	MULTIPLE "FROM" CROSSPOINTS	PR-1C914-32
8		MULTIPLE "TO" CROSSPOINTS	
9	CDGREG	GENERAL REGISTER GATING	PR-1C915-32
10		SPECIAL REGISTER GATING	
11	CDGMIC	MICRO STORE CONTENT	PR-1C916-32
12	CDGFN	FUNCTION REGISTER (DML)	PR-1C917-32
13		ADDER	
14		DML COMPARITOR	
15		BOOLEAN FUNCTIONS	
16		FIND LOW ZERO	
17		ROTATE	
18		PACK AND UNPACK	
19	CDGMC1	MICROCONTROL	PR-1C919-32
20		MICROCONTROL PT 2	
21		MICROCONTROL PT 3	
22		MICROCONTROL PT 4	
23	CDSPA1	DS FLIP-FLOP	PR-1C920-32
24		PA PLUS 1 ADDER	
25	CDGMSQ	STORE BUS CONTROLLER PT 1	PR-1C921-32
26		MAIN STORE BUS	
27	CDGSIO	MAIN STORE I/O ACCESS TO OFF-LINE STORE	PR-1C922-32
28		MAIN STORE-MAINTENANCE ORDERS	
29	CDGSMX	MAIN STORE MULTIPLEXOR	PR-1C923-32
30		MAIN STORE MULTIPLEXOR	
31		MAIN STORE MULTIPLEXOR	
32		MAIN STORE MULTIPLEXOR	
33	CDGSBS	MAIN STORE BUS - COMMANDS	PR-1C924-32
34		MAIN STORE BUS - ADDRESS	
35		MAIN STORE BUS - DATA	
36		MAIN STORE BUS - CONTROL	
37	CDGSCP	NORMAL SELECT SIGNAL TO FANOUT BOARDS	PR-1C934-32
38		DATA PARITY CHECK	
39		REFRESH SELECT	
40		ADDRESS SIGNAL	
41	CDGSFA	MAIN STORE FANOUT ADDRESS PARITY	PR-1C925-32
42		MAIN STORE FANOUT ADDRESS SIGNALS THRU MEMORY MODULES	
43		ADDRESS PARITY CHECKERS	
44		ADDRESS PARITY CHECKERS	
45	CDGSFB	MAIN STORE FANOUT BOARDS	PR-1C926-32
46		MAIN STORE FANOUT BOARDS	
47		MAIN STORE FANOUT BOARDS	
48		MAIN STORE FANOUT BOARDS	
49	CDGSWP	MAIN STORE WRITE PROTECT	PR-1C927-32
50		MAIN STORE WRITE PROTECT	
51		MAIN STORE WRITE PROTECT	
52	CDGSON	INTERPROCESSOR STORE BUS	PR-1C928-32
53	CDGSDF	MAIN STORE CONTROLLER DATA TEST	PR-1C935-32
54		MAIN STORE CONTROLLER DATA TEST	
55		MAIN STORE CONTROLLER DATA TEST	
56		MAIN STORE CONTROLLER DATA TEST	

CU DIAGNOSTIC PROGRAM NAMES, PR NUMBERS, AND FUNCTIONS

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DIAGNOSTIC TEST PROGRAMS

TEST NO.

57	CDGSD	MAIN STORE MEMORY MODULE TEST PATTERN (0)	PR-1C929-32
58		MAIN STORE MEMORY MODULE TEST PATTERN (1)	
59		MAIN STORE MEMORY MODULE TEST PATTERN (2)	
60		MAIN STORE MEMORY MODULE TEST PATTERN (3)	
61		MAIN STORE MEMORY MODULE TEST PATTERN (4)	
62		MAIN STORE MEMORY MODULE TEST PATTERN (5)	
63		MAIN STORE MEMORY MODULE TEST PATTERN (6)	
64		MAIN STORE MEMORY MODULE TEST PATTERN (7)	
65	CDGMI	MICROINTERPRET	PR-1C930-32
66		MULTIPLE MISC. XPOINTS	
67		DML PARITY GENERATOR	
68		GATING BUS PARITY CHECKER	
69		IB X AND Y FIELD PARITY GENERATOR	
70	CDGNTI	PROGRAM TIMER-TIMING COUNTER	PR-1C931-32
71		INTERRUPT	
72		ADDRESS MATCHER	
73		DATA MATCHER	
74		I/O TEST	
75	CSTATS	SYSTEM STATES 1	PR-1C932-32
76		SYSTEM STATES 2 (PROGRAM TIMER TIMEOUT)	
77		SYSTEM STATUS PANEL TEST	
78	CDGDSR	DOUBLE STORE READ	PR-1C911-32
79		DUMMY	

SCHEMATIC DRAWING
SD-1C900-01

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CU DIAGNOSTIC PROGRAM NAMES, PR NUMBERS, AND FUNCTIONS

[1] On miscellaneous power frame, check for blown fuses and replace if necessary

[2] On TTY type
OP:RT!

[3] On TTY type
RST:RT p!
[NOTE 1]

AND

[4] Does system respond with
DGN RT p ATP
RST RT p COMPL

Yes

No

[5] See FIG. 1.
Analyze TTY printout
with TLM-3H104-01

[6] Replace power unit [DLP-536]

[7] On TTY type
RST:RT p!

AND

[8] Does system respond with
DGN RT p ATP
RST RT p COMPL

Yes

No

[9] Request assistance per local office procedures. Trouble may be in relay contacts, loose connections, broken wire or relay covers. Refer to SD-3H905-01 and SD-82255-01

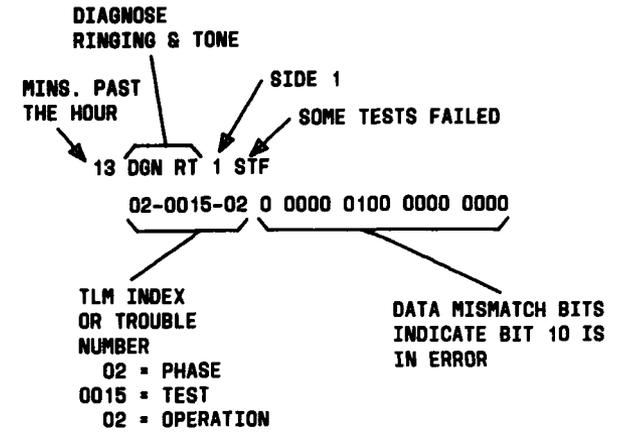


FIG. 1

NOTE 1	
On RINGING & TONE plant	
p = side 0 or 1	
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CLEAR MANUALLY OFF FAULT

On System Status Panel:

[1] Depress **ALARM RELEASE**

[2] On TTY type **OP:RT!**

[3] On TTY type **RST:RT p!**
p = side 0 or 1

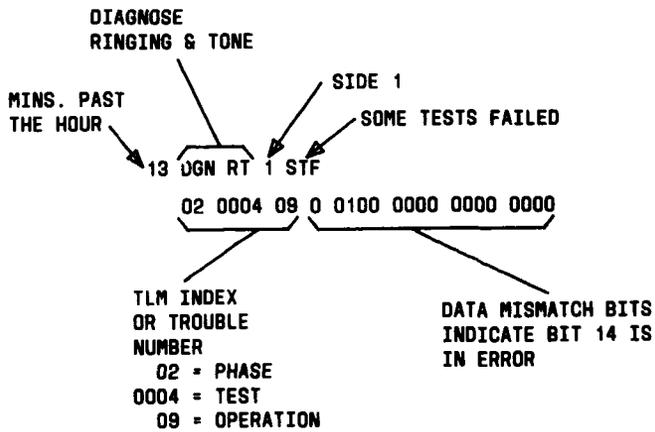
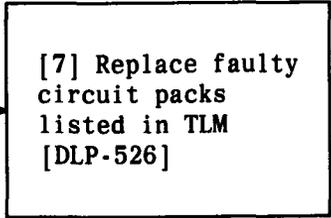
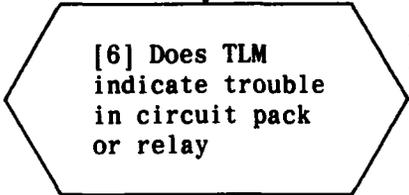
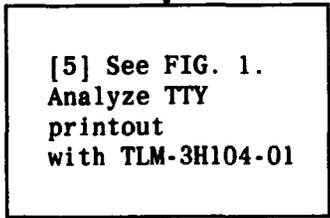
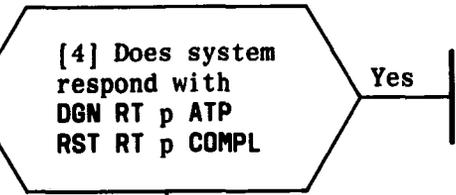


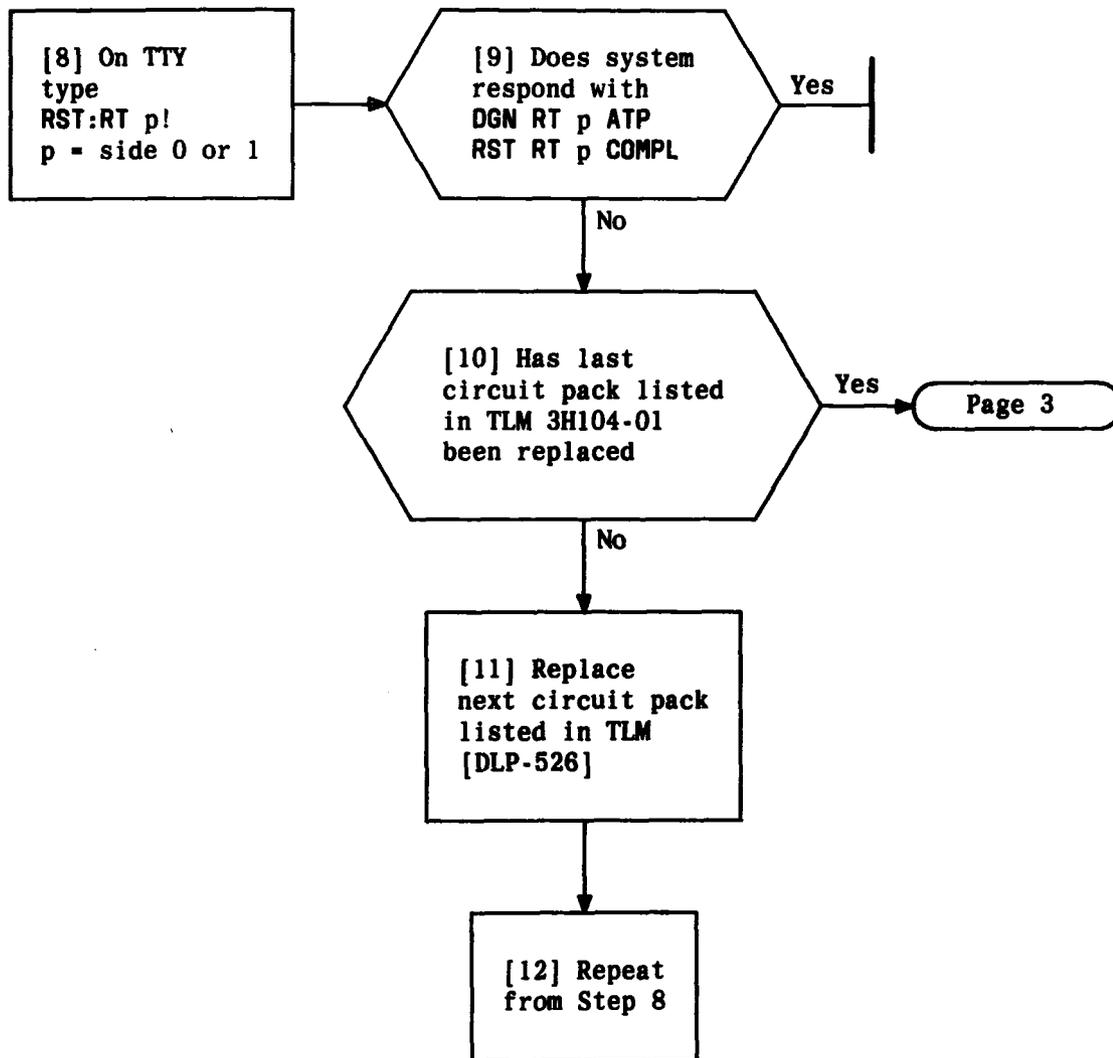
FIG. 1

CLEAR GROUND FAULT

Relay
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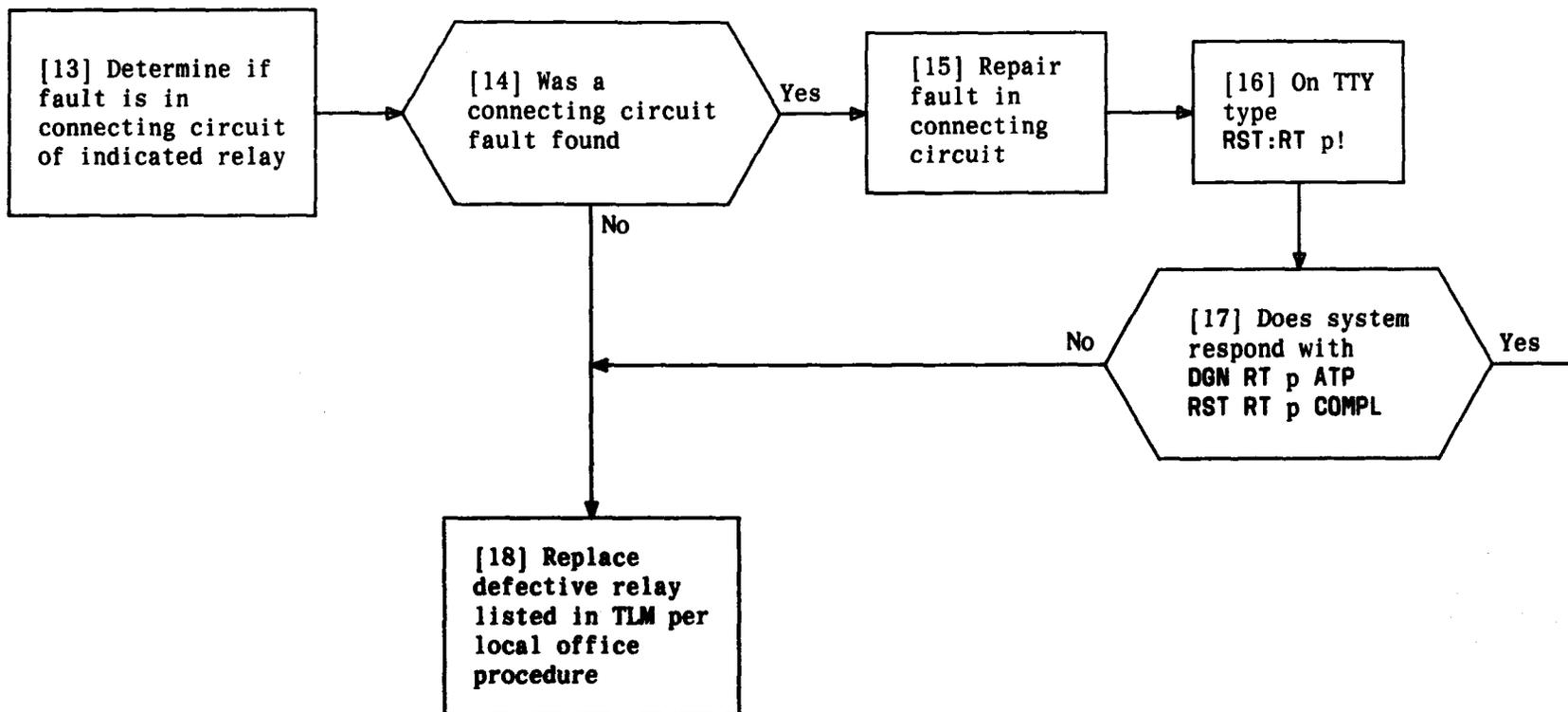
Circuit pack
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CLEAR GROUND FAULT

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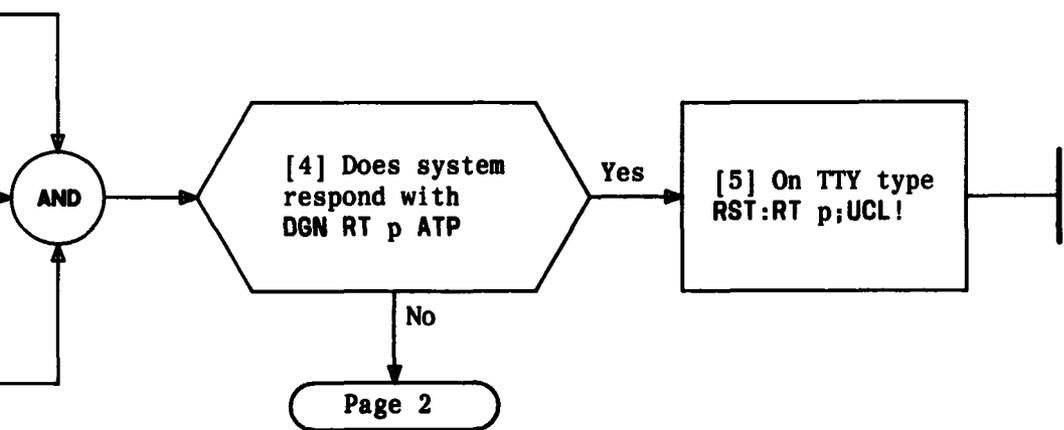
CLEAR GROUND FAULT

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[1] Check for blown fuses and replace if necessary [DLP-525]

[2] On TTY type OP:RT!

[3] Diagnose OOS RT by typing in DGN:RT p;UCL! [NOTE 1]



NOTE 1	
On RINGING & TONE plant	
p = side 0 or 1	
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CLEAR INTERRUPTER AND BUS TRANSFER FAILURES

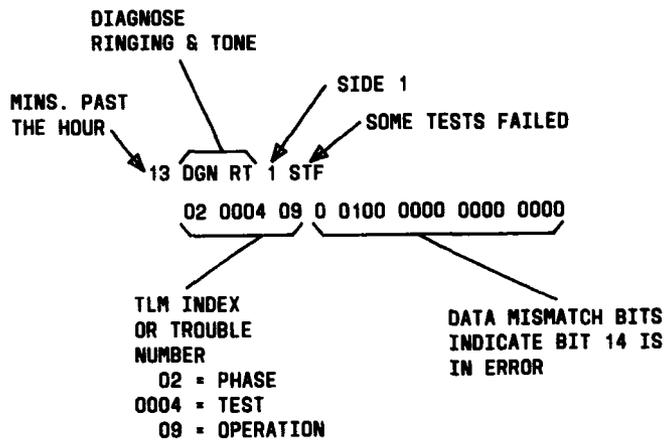
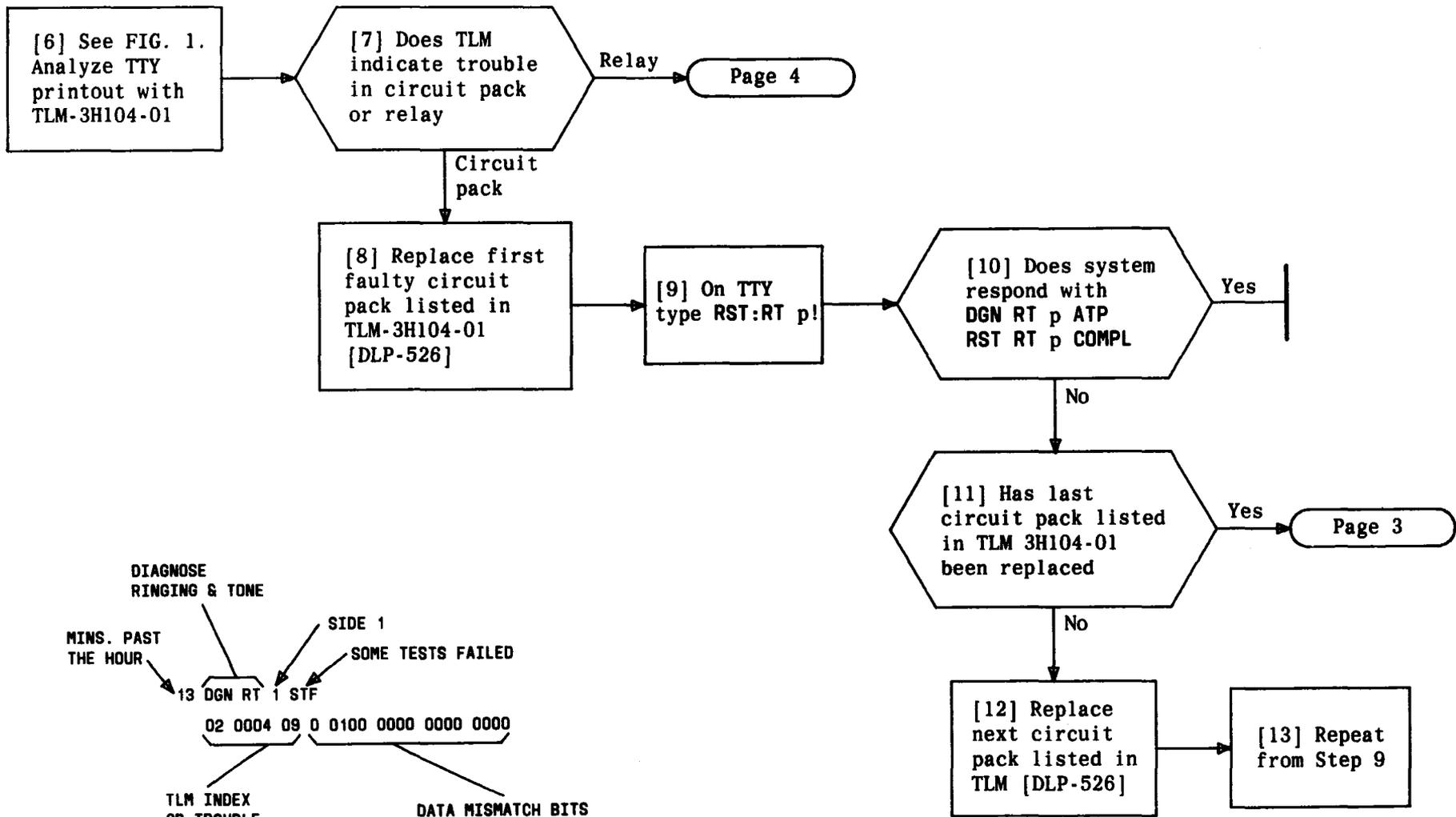


FIG. 1

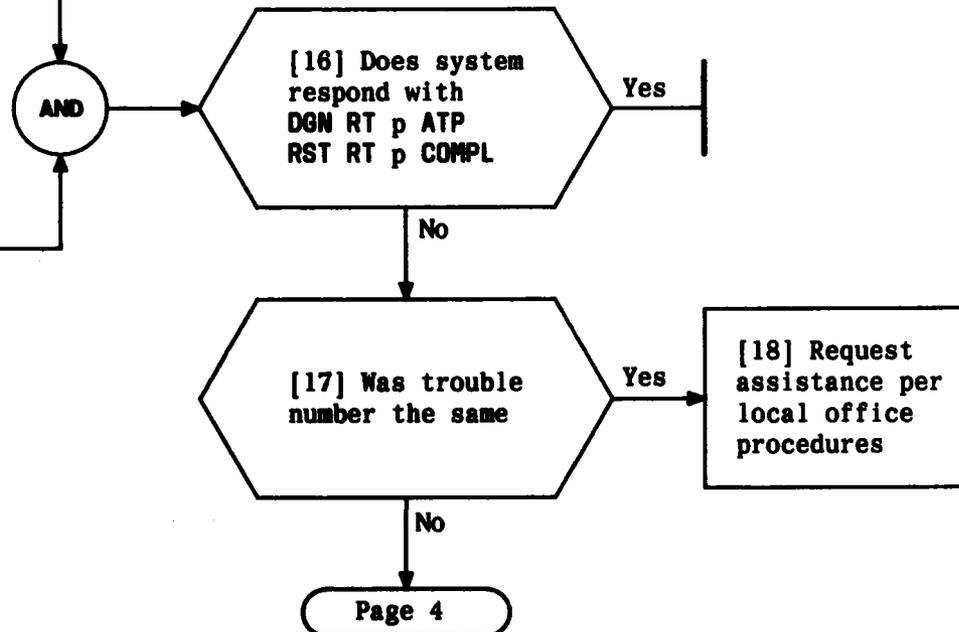
CLEAR INTERRUPTER AND BUS TRANSFER FAILURES

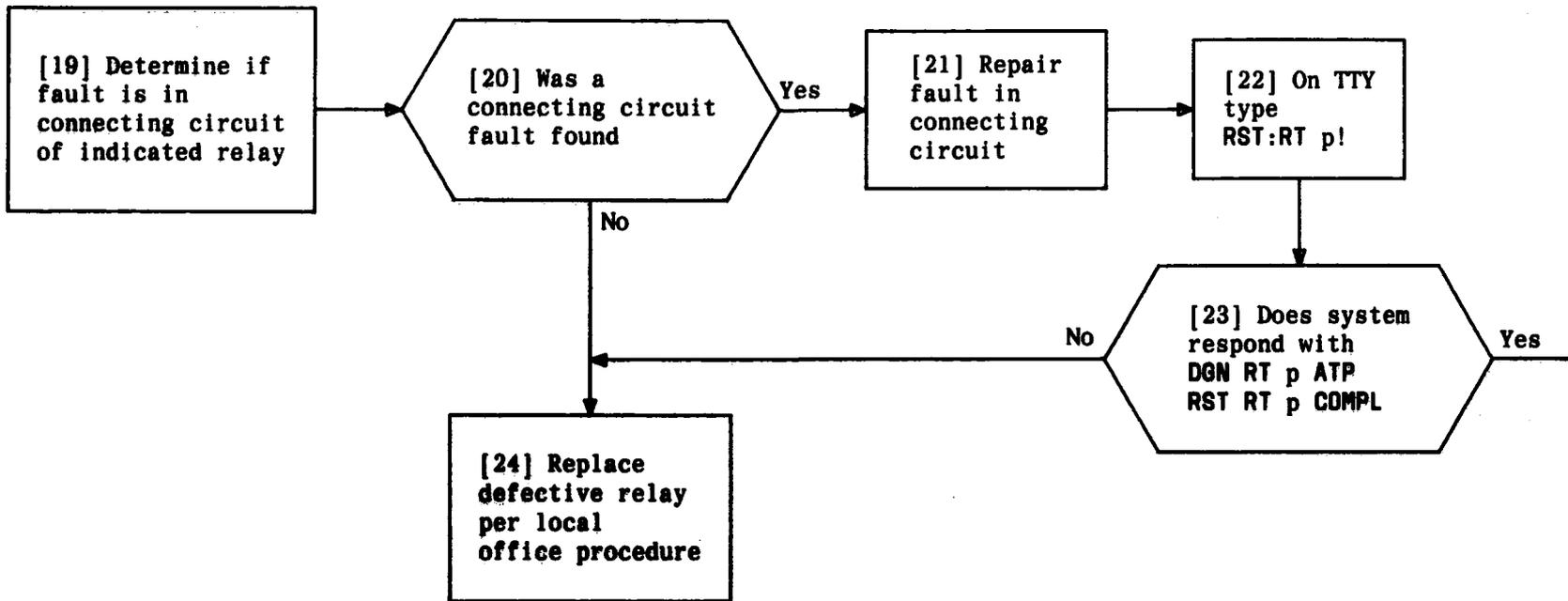
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On Control Frame:

[14] Replace associated
PD circuit pack
FC181 [DLP-567]

[15] On TTY type
RST:RT p!





On System Status Panel:

[1] Depress **ALARM
RELEASE**

[2] On TTY type
OP:RT!

[3] On TTY type
DGN:RT p;UCL!
[NOTE 1]

[6] Analyze TTY printout
with TLM-3H104-01

[7] Replace defective
circuit pack per
TLM-3H104-01
[DLP-526]

[8] On TTY type
RST:RT p!
[NOTE 1]

[4] Did TTY
print out
DGN RT p ATP

[5] On TTY type
RST:RT p;UCL!
[NOTE 1]

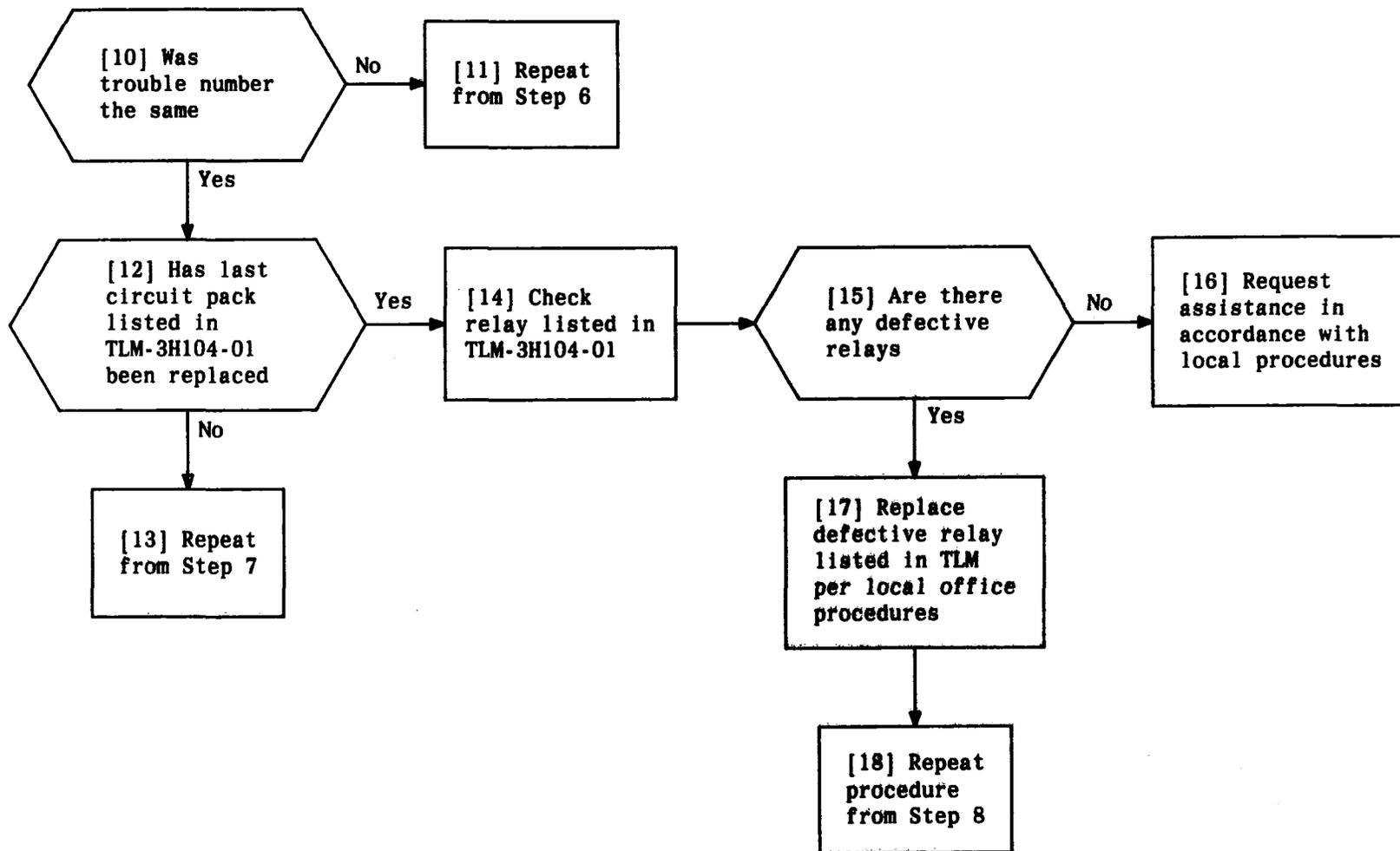
[9] Does system
respond with
DGN RT p ATP
RST RT p COMPL
[NOTE 1]

Page 2

NOTE 1
On **RINGING & TONE**
plant
p = side 0 or 1

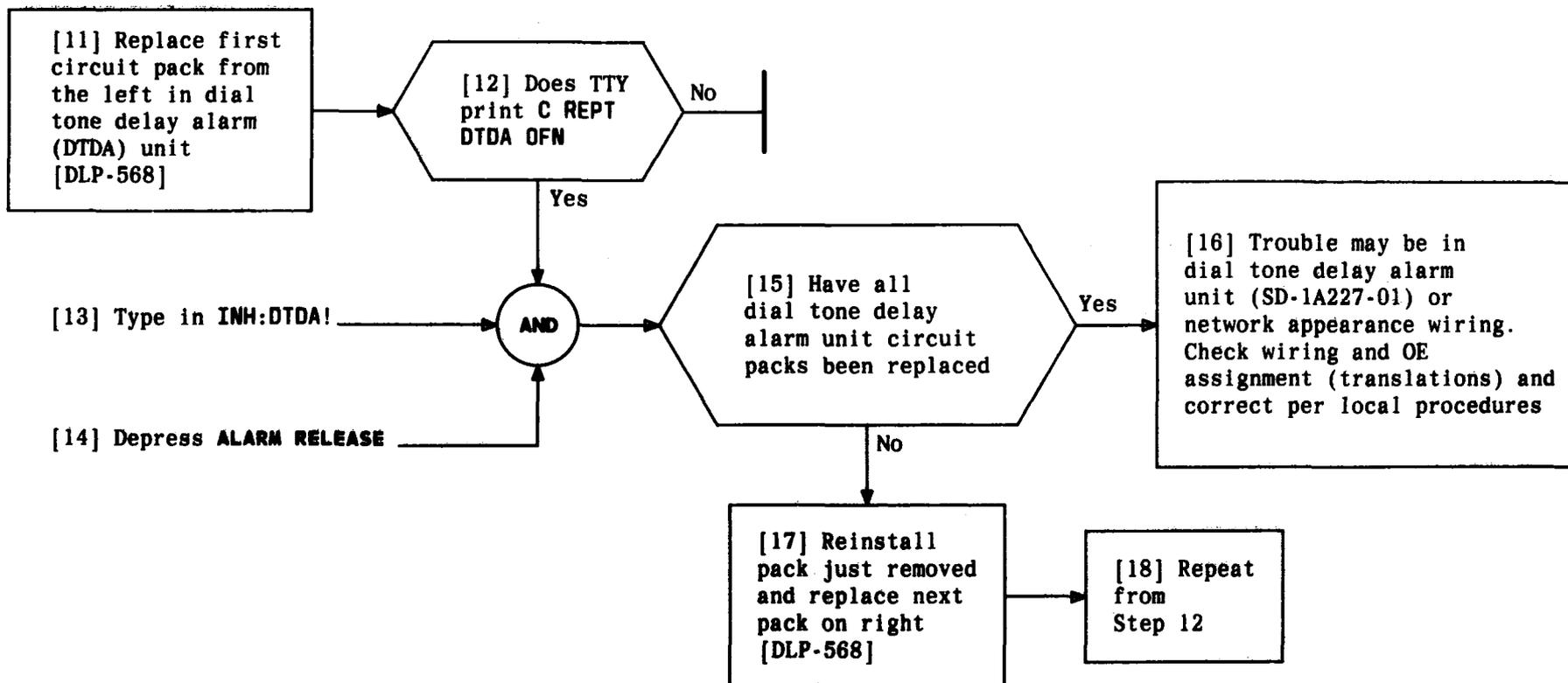
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CLEAR RINGING AND TONE DIAGNOSTIC FAILURES



CLEAR RINGING AND TONE DIAGNOSTIC FAILURES

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CLEAR DIAL TONE DELAY ALARM (DTDA)

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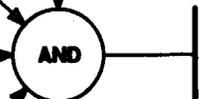
[1] See WARNING 1. Remove power from peripheral control frame [DLP-501]

[2] Visually examine replacement pack for component damage, contact scratches, or any other imperfections

[3] Remove pack that is to be replaced from frame unit

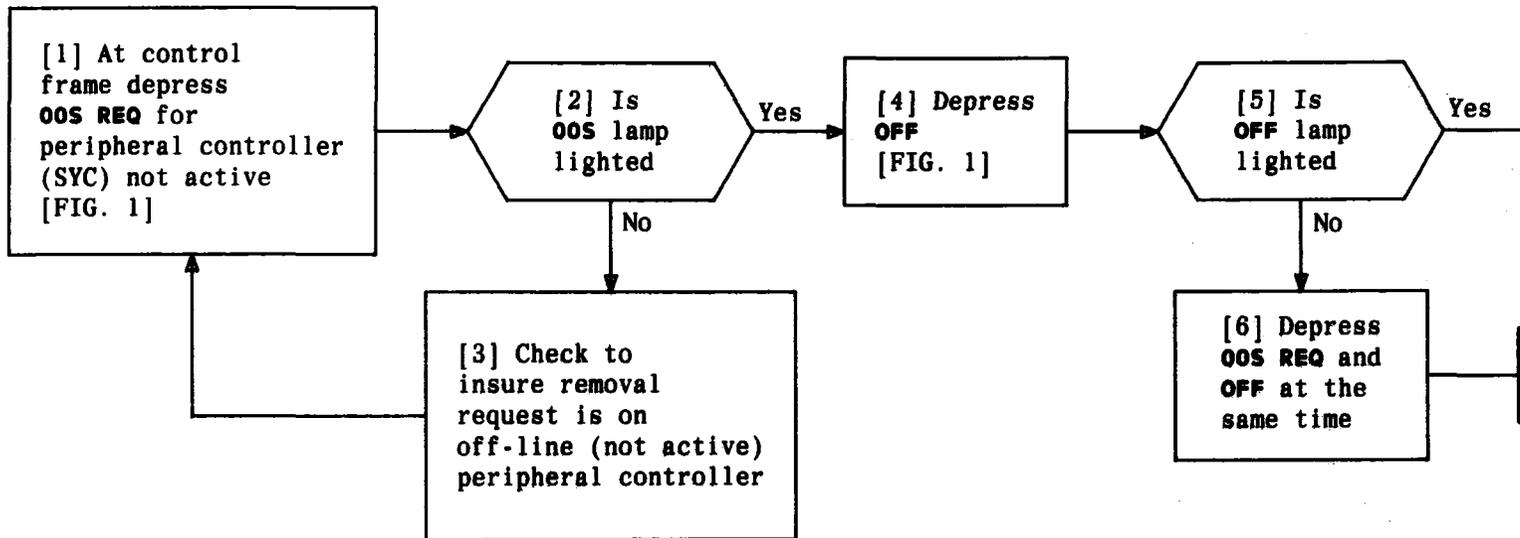
[4] See WARNING 1. Install new circuit pack

[5] Depress ON to restore power



WARNING 1 <i>Equipment damage will result if power is not removed before circuit pack is installed</i>	
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REPLACE CIRCUIT PACK IN PERIPHERAL CONTROL FRAME



BAY 1 OF CONTROL FRAME(S)

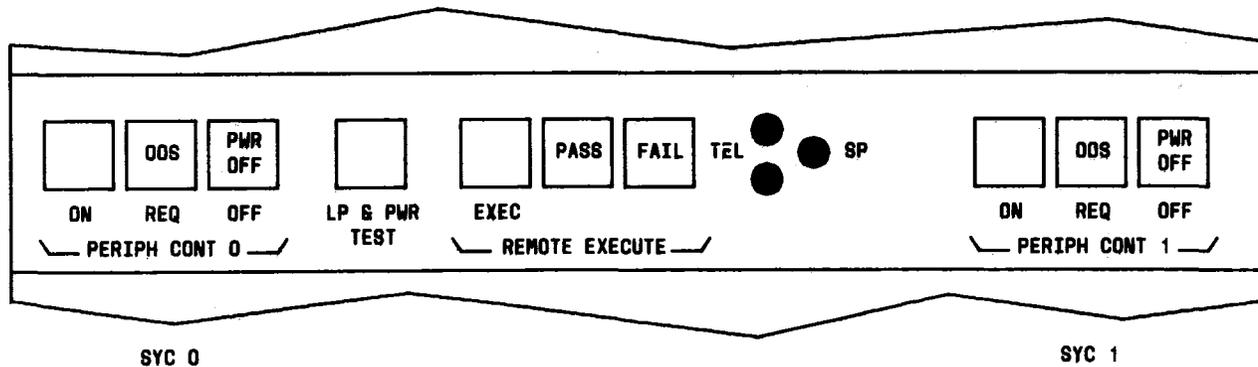


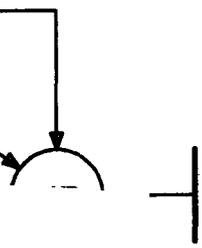
FIG. 1

REMOVE POWER FROM PERIPHERAL CONTROL FRAME

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[1] At cartridge tape transport (minirecorder) depress REW [FIG. 1, NOTE 1]

[2] Wait for tape motion to cease



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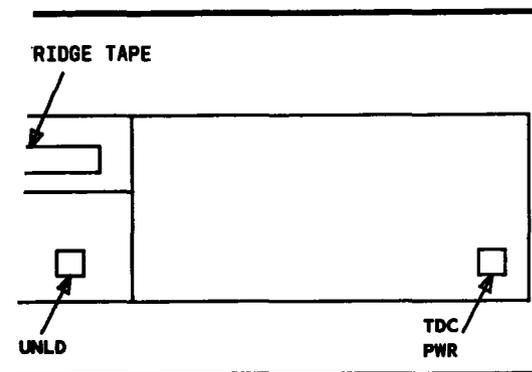


FIG. 1

NOTE 1	
Tape unit must be out of service	
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REMOVE CARTRIDGE FROM CARTRIDGE TAPE TRANSPORT (MINIRECORDER)

[1] Visually examine replacement circuit pack(s) for component damage, contact scratches, or other imperfections which may be potential sources of trouble

[2] Remove tape cartridge from minirecorder [DLP-502]

[3] Depress TDC POWER to remove power

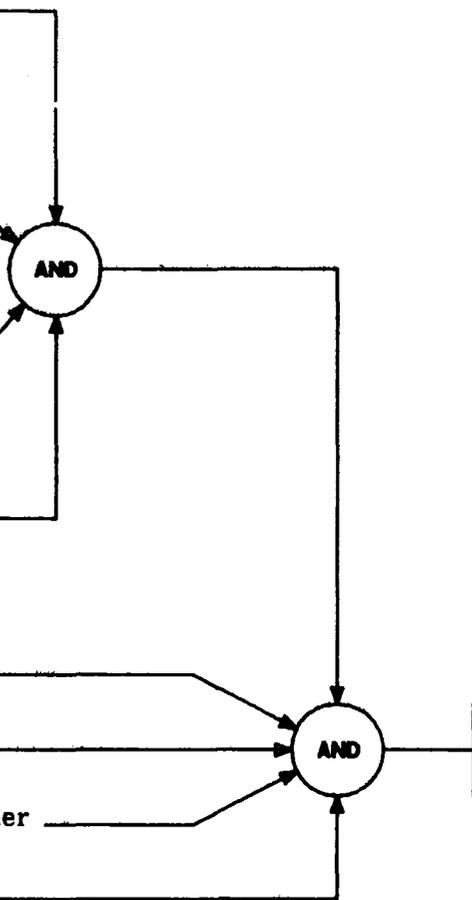
[4] Remove faulty circuit pack from apparatus mounting

[5] Insert replacement pack into apparatus mounting

[6] Depress TDC POWER to restore power

[7] Insert tape cartridge in minirecorder

[8] At TTY type INIT:TAPE!



REPLACE TAPE DATA CONTROLLER CIRCUIT PACK

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- [1] Obtain cleaning equipment [TABLE A]
- [2] Lightly moisten cloth with cleaning solvent
- [3] Read CAUTION. Carefully clean head and baseplate assembly, EOT/BOT sensors, and cartridge sensor microswitches [FIG. 1]
- [4] Clean capstan [NOTE 1]
- [5] Wipe head and baseplate assembly clean with a dry cloth
- [6] Using vacuum cleaner, remove all loose dust on, around, and inside minirecorder

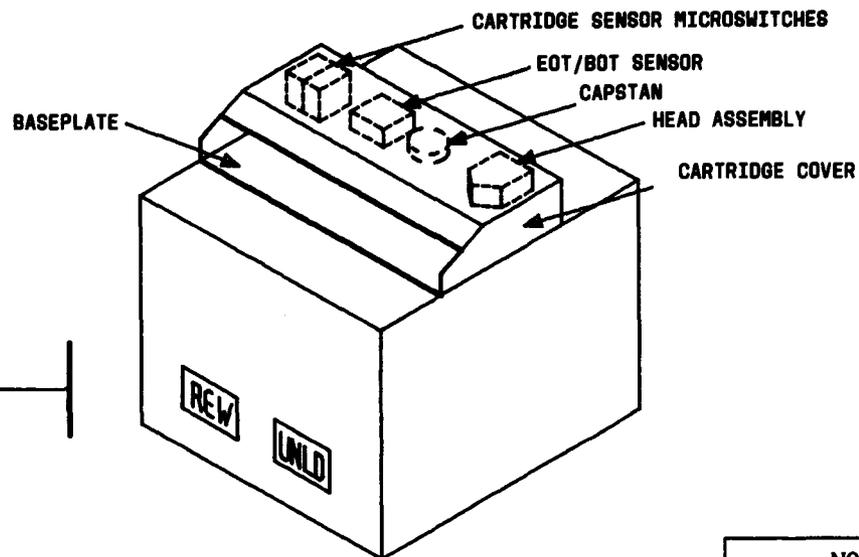


FIG. 1

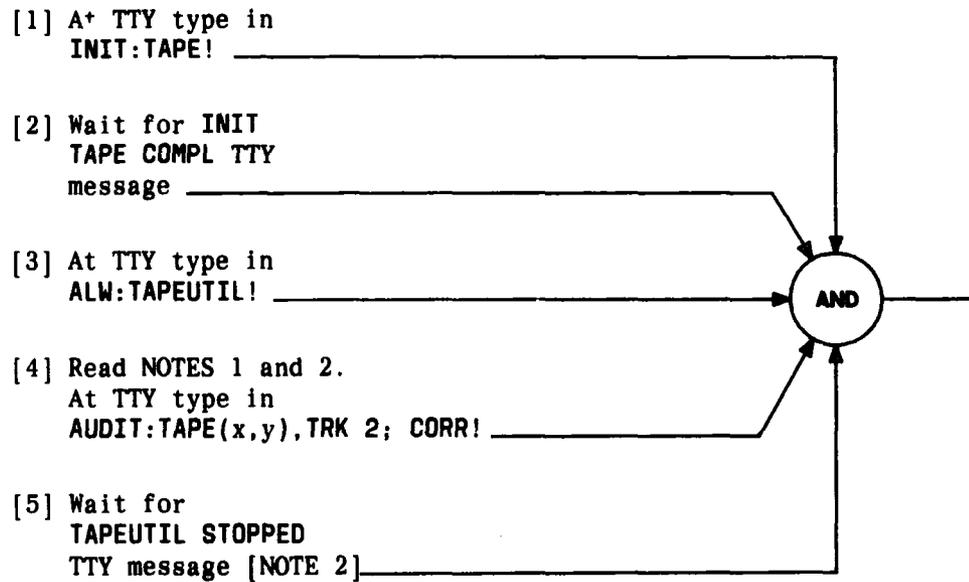
TABLE A	
EQUIPMENT REQUIRED	RECOMMENDED TYPE
Cloth	KS-2423
Cleaning solvent	94% isopropyl alcohol (91% isopropyl alcohol will work, also a cleaning pad)
Vacuum cleaner	KS-14377, L5
Orange stick	

NOTE 1
Lightly depressing the right cartridge sensor microswitch with orange stick will spin the capstan

CAUTION
When cleaning CTT, care should be exercised not to touch with bare hands or otherwise contaminate drive capstan, EOT/BOT sensors, light window, cartridge sensor microswitches, or magnetic tape

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CLEAN MINIRECORDER HEAD ASSEMBLY AND CHASSIS



UPDATE TAPE CARTRIDGE

NOTES	
1. In AUDIT:TAPE message, x = TDC containing master tape, y = TDC containing tape to be updated	
2. Tape audit procedure requires approximately 2.5 hours to complete. Other multiscan functions are not possible during procedure	
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- [1] Depress **TDL POWER** to remove power
- [2] Remove connectors **J5** and **J6** from rear of CTT
- [3] Remove eight mounting screws which secure CTT to TDC
- [4] Carefully remove CTT through front of frame
- [5] Remove mounting flanges from defective CTT
- [6] Install mounting flanges on new CTT
- [7] Install CTT from front of frame
- [8] Replace eight mounting screws
- [9] Replace **J5** and **J6**
- [10] Depress **TDC POWER** to restore power

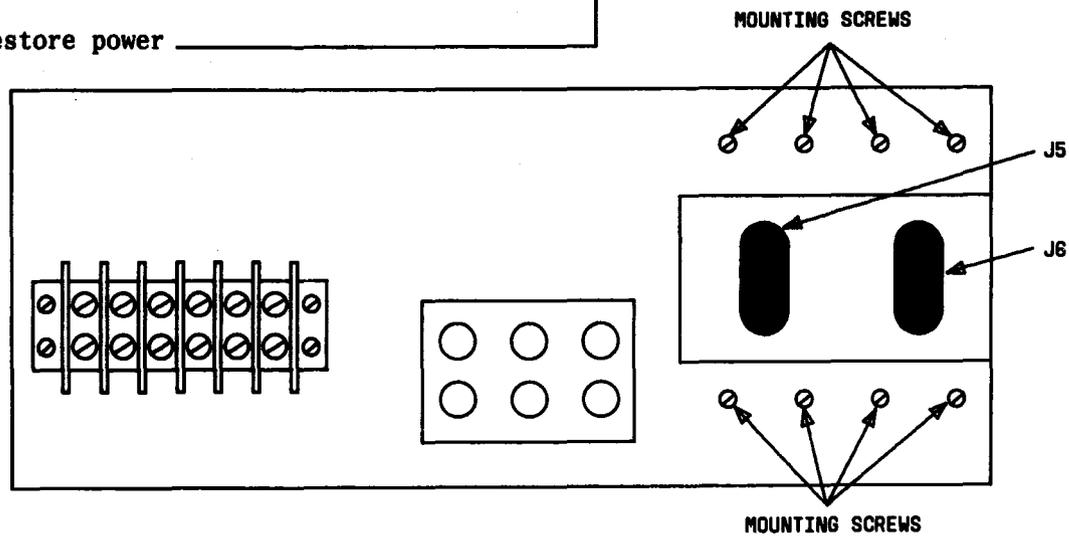


FIG. 1 - Rear View of CTT

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REPLACE CARTRIDGE TAPE TRANSPORT (MINIRECORDER)

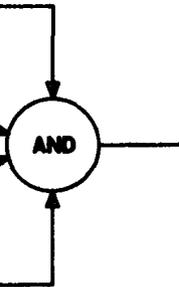
At miscellaneous frame

[1] Set **PWR OFF** for associated circuit

[2] Remove circuit pack

[3] Install new circuit pack

[4] Release **PWR OFF** for associated circuit



**REPLACE MULTIFREQUENCY RECEIVER OR
TOUCH-TONE RECEIVER CIRCUIT PACK**

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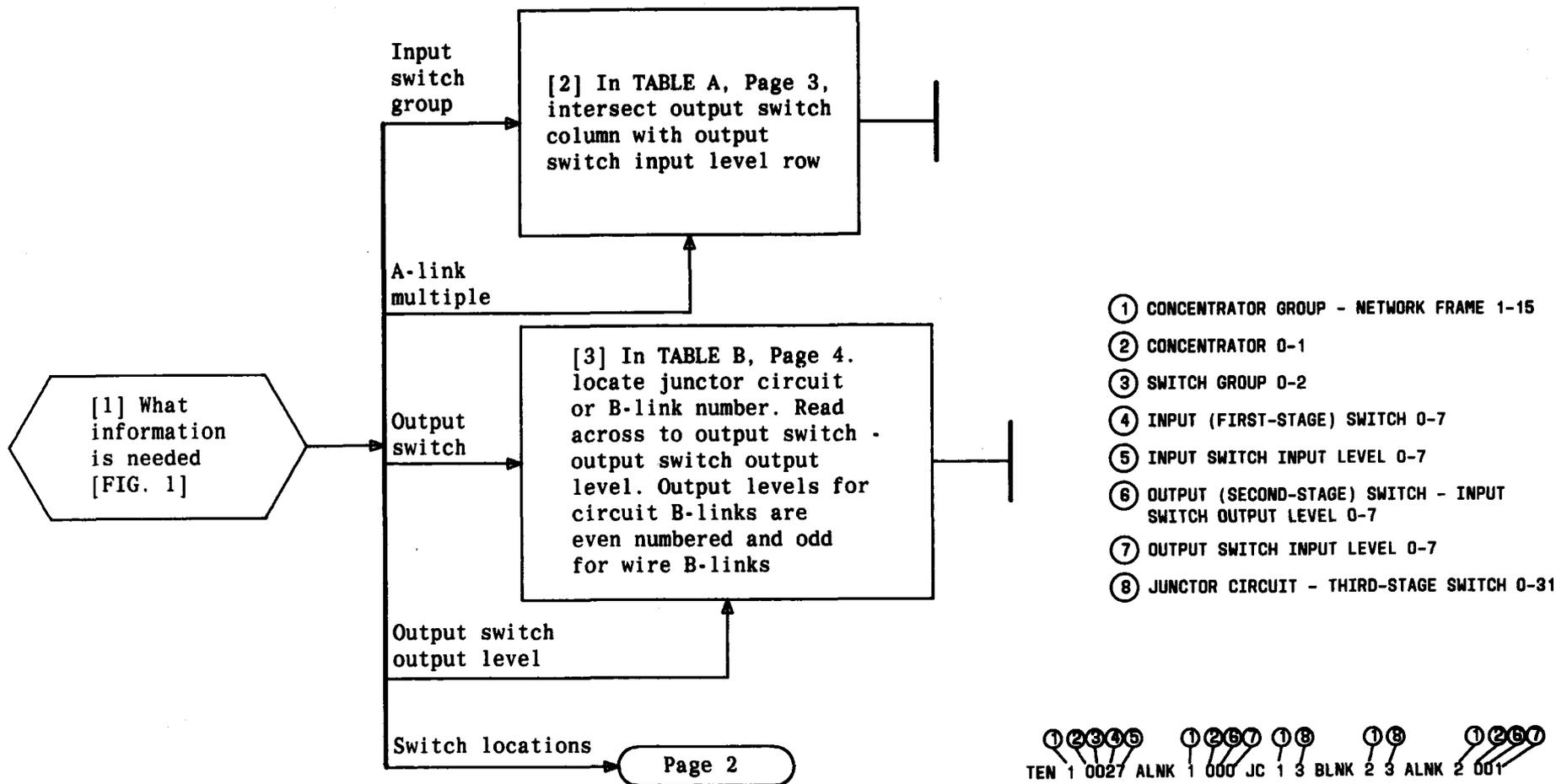
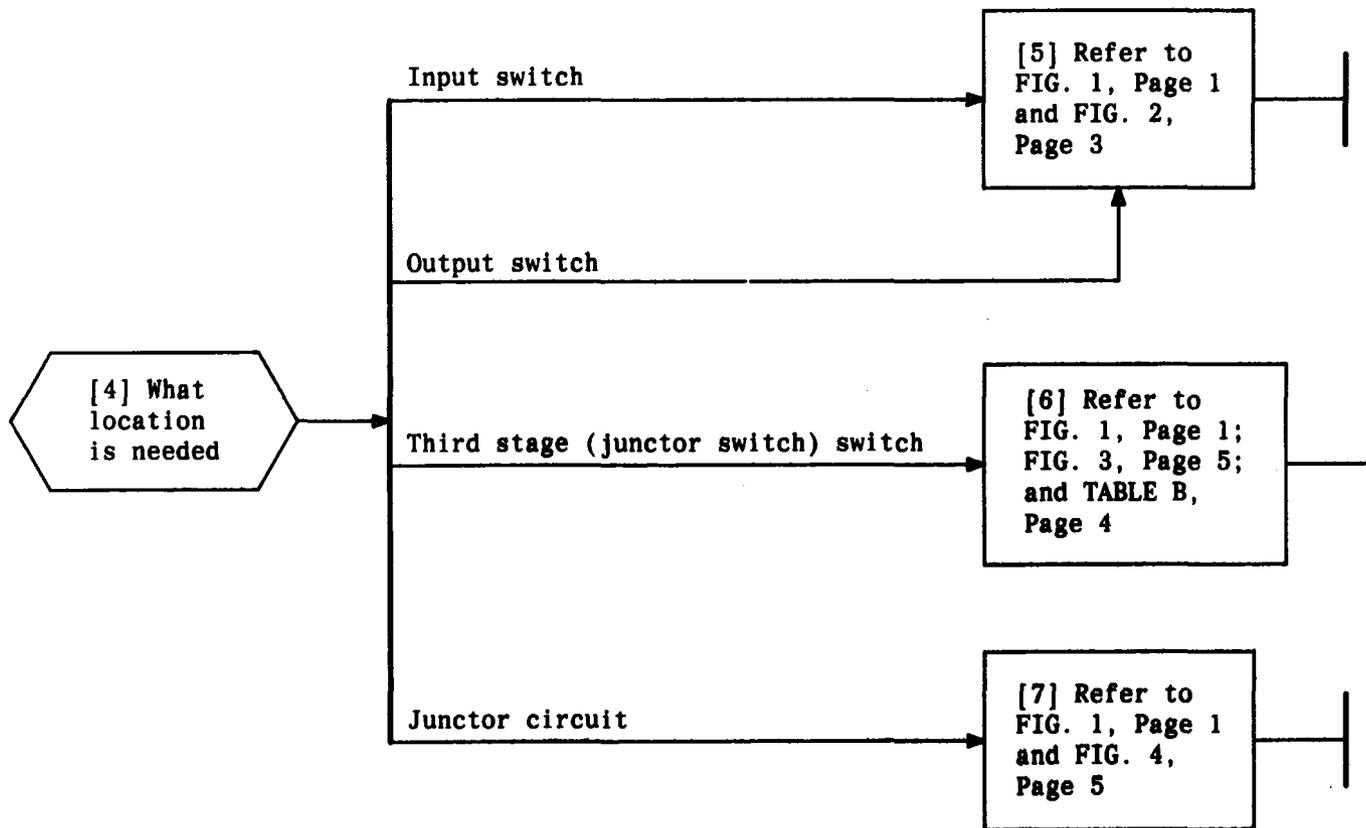


FIG. 1

IDENTIFY AND LOCATE NETWORK LINKS, SWITCHES, AND JUNCTORS

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IDENTIFY AND LOCATE NETWORK LINKS, SWITCHES, AND JUNCTORS

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TABLE A								
OSW NUMBER AND ISW OUTPUT LEVEL								
0	1	2	3	4	5	6	7	OSWIL
0-0	0-1	0-2	0-3	0-3	0-2	0-1	0-0	0
0-1	0-3	0-3	0-3	0-7	0-5	0-4	0-8	
0-2	0-4	0-6	0-5	1-0	1-7	1-7	1-7	
1-0	1-0	1-2	1-1	1-3	1-2	1-1	1-0	1
1-1	1-3	1-3	1-3	1-7	1-5	1-4	1-6	
1-2	1-4	1-6	1-5	2-0	2-7	2-7	2-7	
2-0	2-0	2-2	2-1	0-0	0-7	0-7	0-7	2
2-1	2-3	2-3	2-3	2-3	2-0	2-1	2-6	
2-2	2-4	2-6	2-5	2-7	2-5	2-4	2-6	
0-3	0-2	0-1	0-0	0-1	0-0	0-0	0-1	3
1-3	1-2	1-1	1-0	1-2	1-3	1-2	1-5	
2-3	2-2	2-1	2-0	2-4	2-1	2-6	2-2	
0-4	0-1	0-0	0-2	0-2	0-3	0-2	0-5	4
0-5	0-6	0-5	0-4	1-4	1-1	1-6	1-2	
0-6	0-7	0-7	0-7	2-5	2-4	2-3	2-3	
1-4	1-1	1-0	1-2	0-4	0-1	0-6	0-2	5
1-5	1-6	1-5	1-4	1-5	1-4	1-3	1-3	
1-6	1-7	1-7	1-7	2-6	2-6	2-5	2-4	
2-4	2-1	2-0	2-2	0-5	0-4	0-3	0-3	6
2-5	2-6	2-5	2-4	1-6	1-6	1-5	1-4	
2-6	2-7	2-7	2-7	2-1	2-0	2-0	2-1	
0-7	0-5	0-4	0-6	0-6	0-6	0-5	0-4	7
1-7	1-5	1-4	1-6	1-1	1-0	1-0	1-1	
2-7	2-5	2-4	2-6	2-2	2-3	2-2	2-5	

- ③ SWITCH GROUP 0-2
- ④ INPUT SWITCH 0-7
- ⑥ OUTPUT SWITCH-INPUT SWITCH OUTPUT LEVEL 0-7
- ⑦ OUTPUT SWITCH INPUT LEVEL

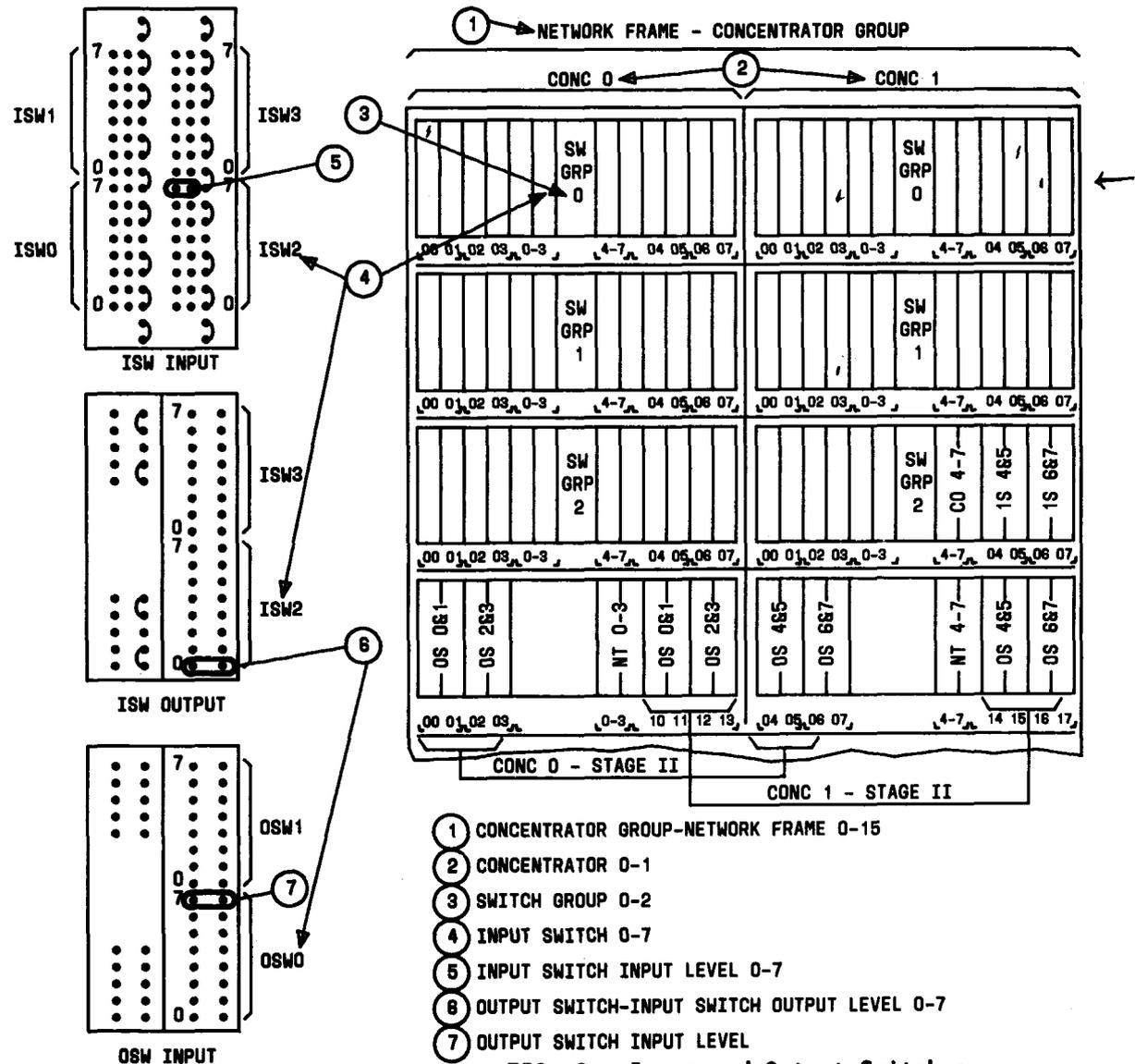


FIG. 2 - Input and Output Switches

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TABLE B						
B-LINK S III SW JC	SAME* OTHER	15C GRID SWITCH NO.	JUNCTOR CIRCUIT		WIRE CIRCUIT	
			OSW	OL	OSW	OL
0		0		0		1
1	SG0L	1	0	2	3	3
2		2		4		5
3		3		6		7
4		4		0		1
5	SG2L	5	1	2	2	3
6		6		4		5
7		7		6		7
8	SG0H	0		0		1
9	SG2H	1	2	2	1	3
10		2		4		5
11		3		6		7
12		4		0		1
13		5		2		3
14	6	4	5			
15	7	6	7			
16	SG1L SG3L	0	4	0	7	1
17		1		2		3
18		2		4		5
19		3		6		7
20		4		0		1
21	5	2	3			
22	6	4	5			
23	7	6	7			
24	SG1H SG3H	0	6	0	5	1
25		1		2		3
26		2		4		5
27		3		6		7
28		4		0		1
29	5	2	3			
30	6	4	5			
31	7	6	7			

* SWITCH GROUPS SG0L, SG0H, SG1L AND SG1H OF "SAME" CONTROL FRAME (FO - NETWORK FRAMES 1-7, F1 - NETWORK FRAMES 8-15) ARE MULTIPLIED TO SWITCH GROUP SG2L, SG2H, SG3L, AND SG3H OF "OTHER" CONTROL FRAME (FO - NETWORK FRAMES 8-15, F1 - NETWORK FRAMES 1-7). IF ONLY ONE CONTROL FRAME IS INSTALLED, SWITCH GROUPS SG2L, SG2H, SG3L AND SG3H ARE NOT INSTALLED

- ⑧ JUNCTOR CIRCUIT - THIRD-STAGE SWITCH
- ⑨ OUTPUT SWITCH OUTPUT LEVEL
- ⑩ THIRD-STAGE SWITCH GROUP

TEN 1 0027 ALNK 1 000 JC 1 3 BLNK 2 3 ALNK 2 001

IDENTIFY AND LOCATE NETWORK LINKS, SWITCHES, AND JUNCTORS

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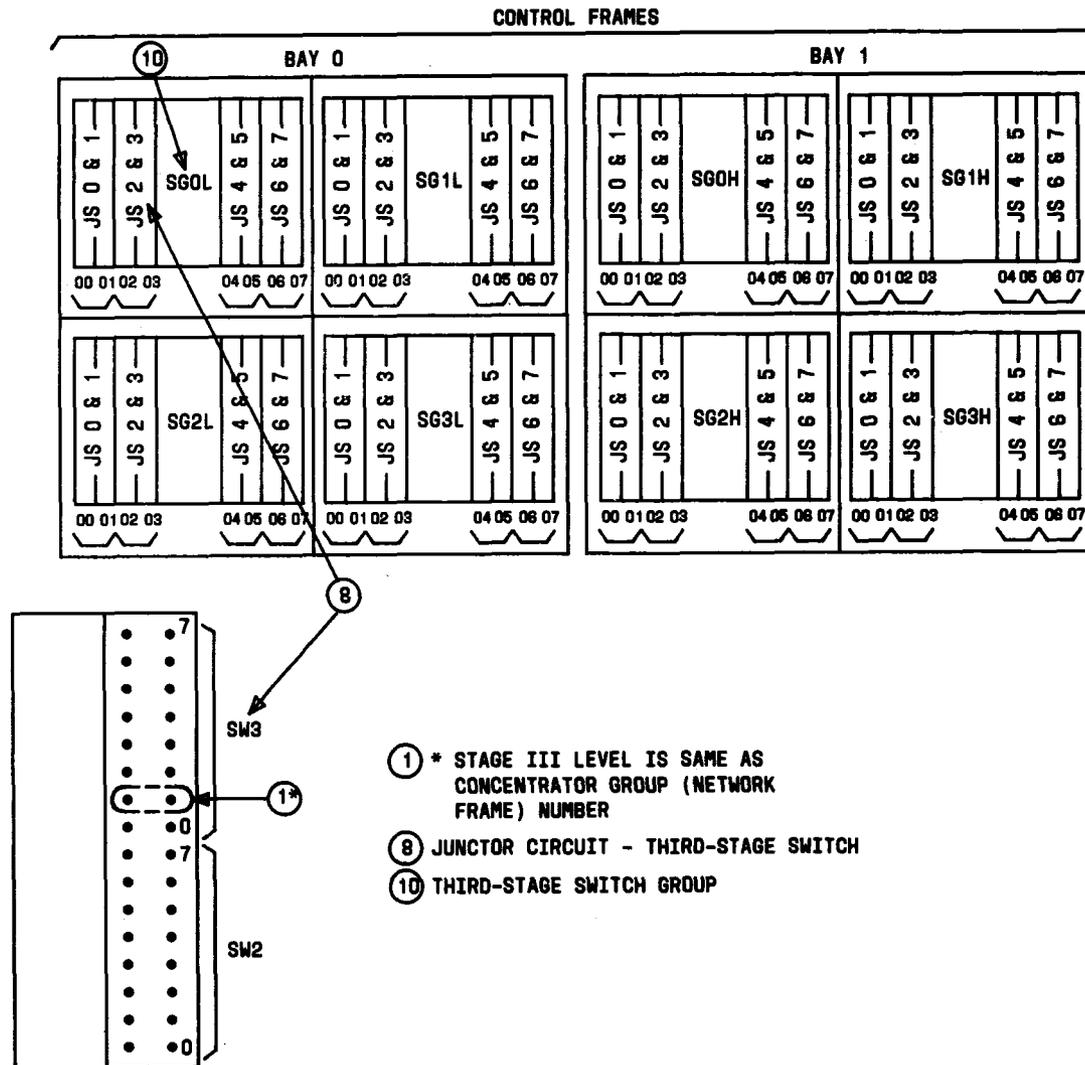


FIG. 3 - Third-Stage Switch

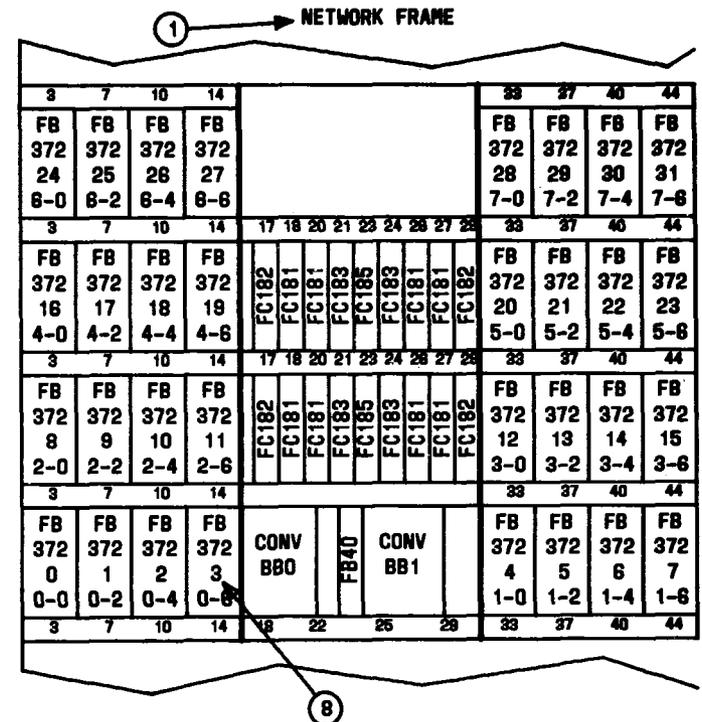


FIG. 4 - Junctor Circuits

IDENTIFY AND LOCATE NETWORK LINKS, SWITCHES, AND JUNCTORS

[1] Remove pulser fuses.
See NOTE 1 and TABLE A,
Page 2 [SD-3H907-01]

[2] On back side of bay
remove connector plug
from remreed pulser

[3] See CAUTION 1. Remove
four mounting screws
which hold pulser in
bay

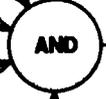
[4] Remove pulser from bay

[5] Place new pulser in bay

[6] Replace mounting screws

[7] Replace connector plug

[8] Replace pulser fuse



NOTE 1
On -48V power
frame remove
pilot fuse
first, then
15A fuse

CAUTION 1
*If bay is full of
equipment and
prevents
handling pulser
from back side
of bay, two
persons will be
needed when
mounting screws
are removed*

TABLE A					
FUSE PLN	BUS	POS NO.	STAMPING		FUSE TYPE
			UPPER FUSE CARD OF FS CAP. AND NO.	LOWER FUSE CARD OF FS CAP. AND NO.	
2	A	23	CONT 0 PULSER	15A	ABS
		24	CONT 1 PULSER	15A	
	B	31	CONT 0 PULSER	15A	ABS
		32	CONT 1 PULSER	15A	

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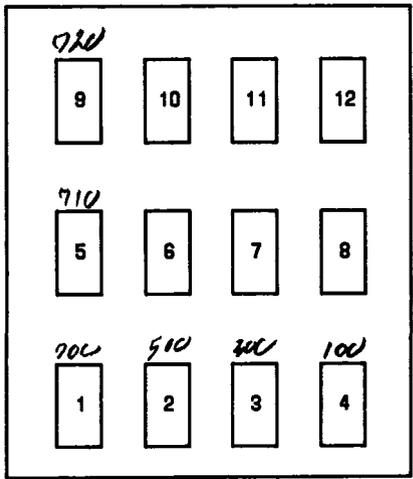
REPLACE ELECTRONIC REMREED PULSER IN CONTROL FRAME

2 10

① ENABLE
 ② STABLE
 ③ INIT EXEC

TABLE A	
GRID TYPE	TTY MESSAGE FOR GRID REMOVAL
15A	RMV:GRID a ISW bc!
15B	RMV:GRID a OSW d!
15C	RMV:GRID a JSW e!
a = concentrator group (1 - 15) b = concentrator (0 - 1) c = switch group (0 - 2) d = output switch number (0 - 7) e = junctor number (0 - 31)	

TABLE B		
15A GRID UNIT	FRAME EQUIPMENT LOCATION	REMOVE FUSES
Concentrator 0 Switch 0	058-10	0A0, 0A1 0A2, 0A3
Concentrator 0 Switch 1	065-10	0B0, 0B1 0B2, 0B3
Concentrator 0 Switch 2	072-10	0C0, 0C1 0C2, 0C3
Concentrator 1 Switch 0	058-33	1A0, 1A1 1A2, 1A3
Concentrator 1 Switch 1	065-33	1B0, 1B1 1B2, 1B3
Concentrator 1 Switch 2	072-33	1C0, 1C1 1C2, 1C3



MULTIPIN CONNECTORS
 1-4 = PULSING PATHS, SHOULD BE REMOVED FIRST, 1 TO 4
 5 = DISCONNECTS SCANNER, REMOVE NEXT

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 206
 955 6118

FIG. 1

REPLACE REMREED GRID

[1] See WARNING 1. On TTY type message to remove grid [TABLE A]

[2] If 15A grid is being replaced, remove fuses on network frame [TABLE B] [SD-3H901-01]

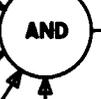
[3] On rear side of grid, remove multipin connectors in order, 1 through 12, as shown in FIG. 1, tagging each connector

[4] On front side of grid, remove multipin connectors [order of removal not important]

[5] Remove two mounting screws securing grid to equipment frame

[6] Remove grounding straps (if applicable)

[7] Carefully remove grid from frame



Grid removed from equipment frame

Page 3

WARNING 1 <i>Equipment damage can result if all plug-in circuit packs identified by TLN are not replaced and all PINs inspected for opens, shorts, and grounds before replacing network grid</i>	
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REPLACE REMREED GRID

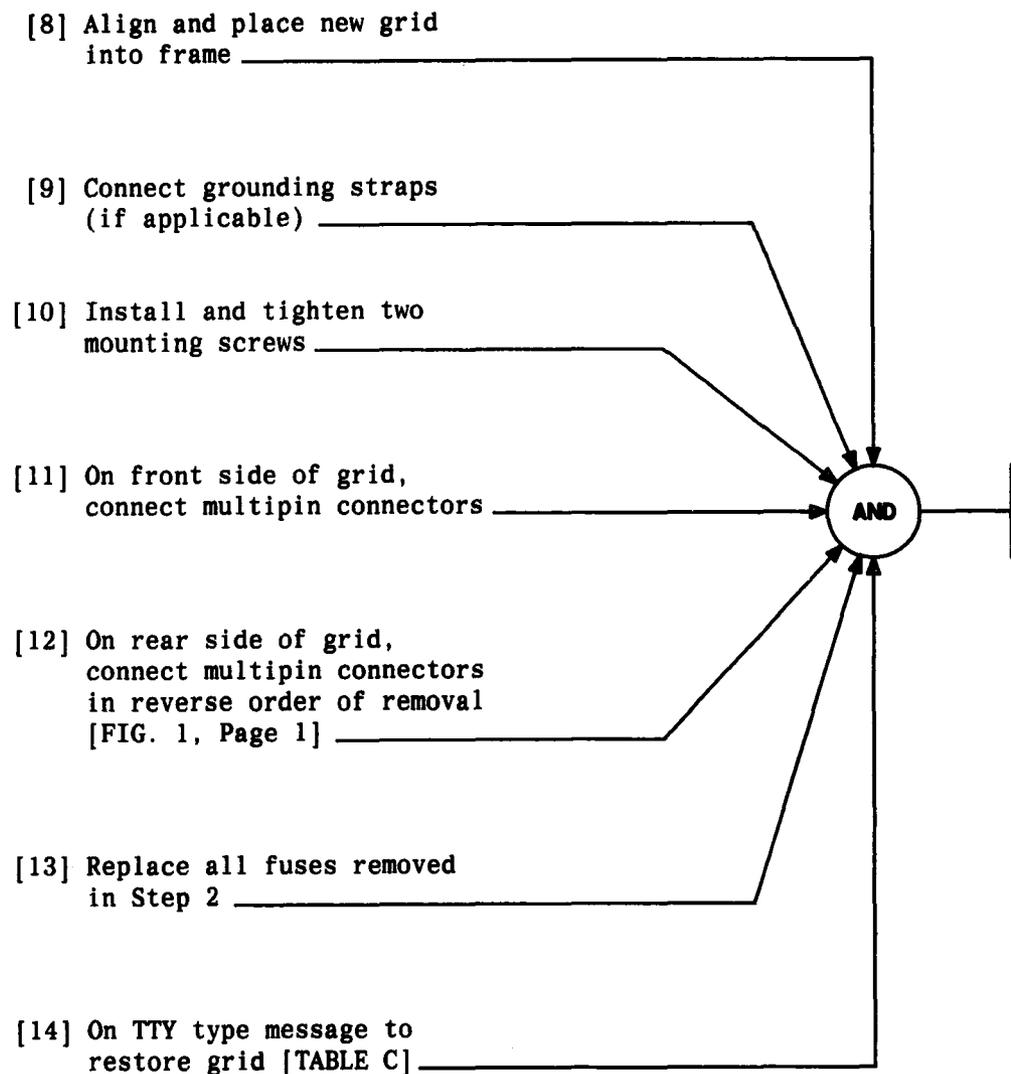


TABLE C	
GRID TYPE	TTY MESSAGE FOR GRID RESTORAL
15A	RST:GRID a ISW bc!
15B	RST:GRID a OSW d!
15C	RST:GRID a JSW e!
a = concentrator group (1 - 15) b = concentrator (0 - 1) c = switch group (0 - 2) d = output switch number (0 - 7) e = junctor number (0 - 31)	

REPLACE REMREED GRID

[1] See TABLE A and FIG. 1.
Remove fuses associated
with circuit pack to be
replaced

[2] Remove desired circuit
pack from connector

[3] If HV circuit pack is
being replaced, set S1
and S2 switches to NOR

[4] Install replacement
circuit pack firmly
in connector

[5] Reinstall fuses
removed in Step 1

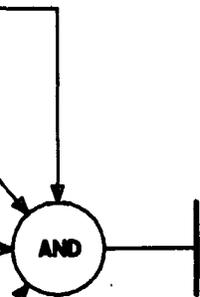


TABLE A	
CIRCUIT PACK	FUSE
LV1 ALM	LVB1 (F10)
LV2 ALM	LVB2 (F11)
HV SHUTDOWN	CBS (F15) HVM (F9)

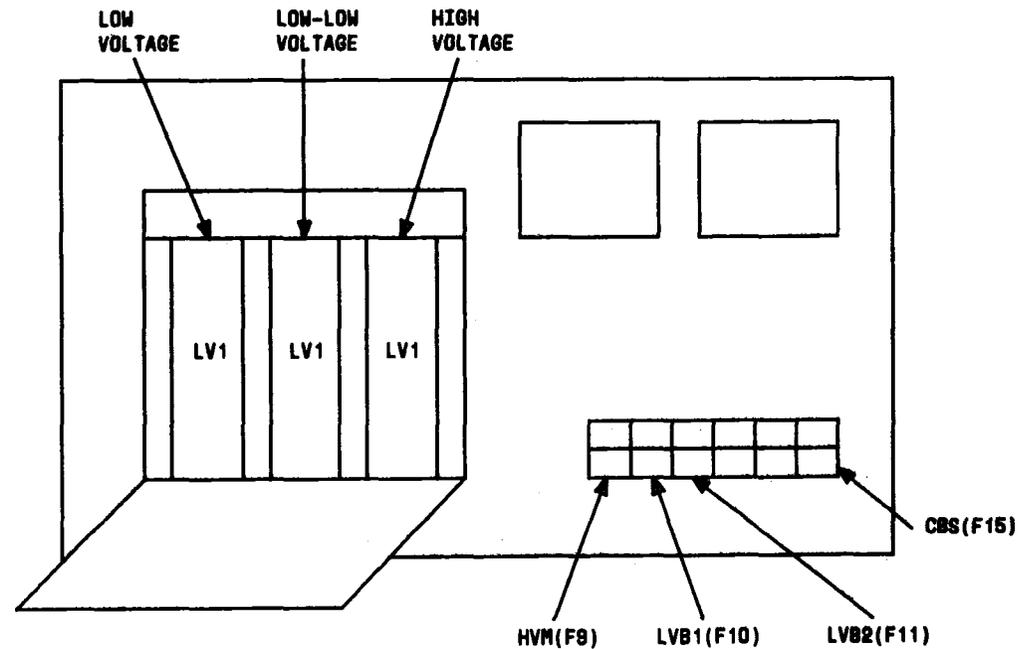


FIG. 1

REPLACE 151A POWER PLANT CONTROL CIRCUIT PACK

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At 151A POWER PLANT control unit [FIG. 1]:

[1] See NOTE 1. Open circuit pack door and rotate LV-ADJ potentiometer fully ccw

Minor Alarm turns off, HLV lamp goes out

[2] Set LV-CAL switch to CAL

[3] Set plant voltmeter selector switch to LV ADJ & TST

[4] On LV1 circuit pack, rotate VOLT ADJ potentiometer fully cw

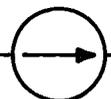
[5] Rotate LV-ADJ potentiometer cw until plant voltmeter indicates 50.75 volts

[6] Slowly rotate VOLT ADJ potentiometer ccw until minor alarm just turns on

[7] Rotate LV-ADJ potentiometer fully ccw

[8] Set LV-CAL switch to BAT

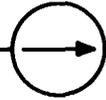
[9] At SSP depress ALARM RELEASE



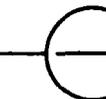
Ready to adjust LV1



LV1 adjusted



HLV lamp lights



HLV lamp goes out, minor alarm turns off

LV1 CIRCUIT PACK

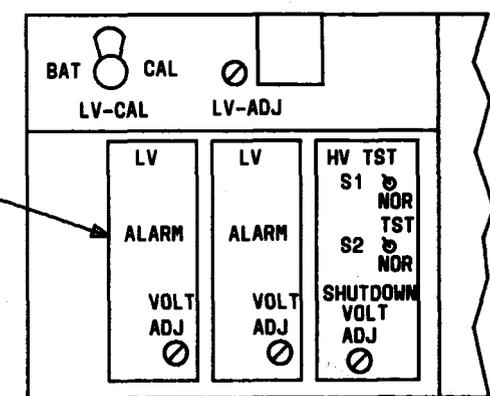
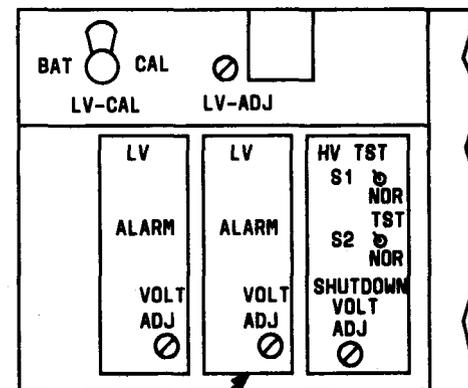
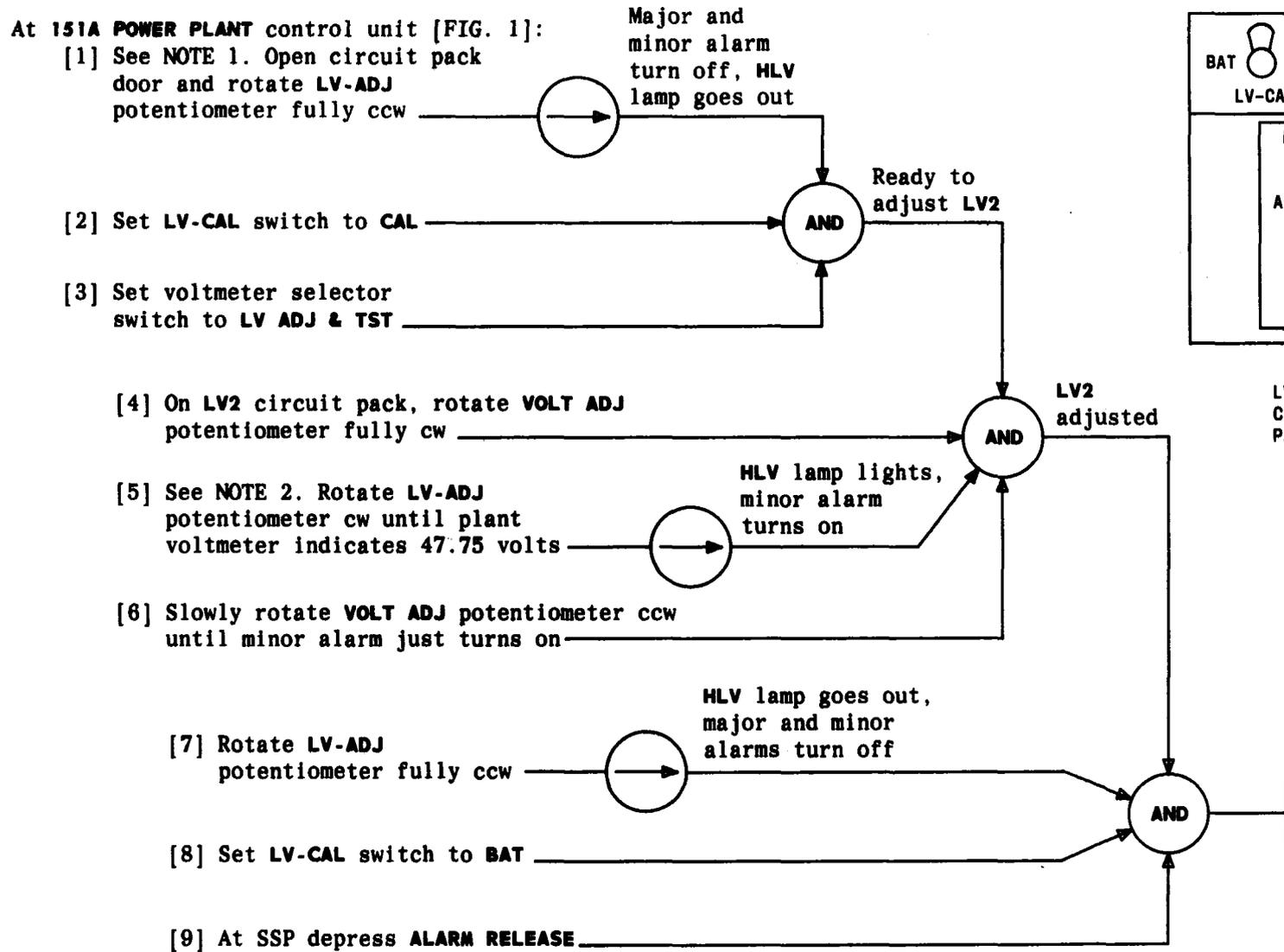


FIG. 1

NOTE 1
 LV-ADJ is a 10-turn potentiometer equipped with ratchet slip at end of travel

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ADJUST LV1 PLANT VOLTAGE MONITOR



LV2
CIRCUIT
PACK

FIG. 1

NOTES

1. LV-ADJ is a 10-turn potentiometer not equipped with stop
2. At approximately 50.75 volts, LV1 low monitor should turn on to light HLV lamp and turn on minor alarm

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ADJUST LV2 PLANT VOLTAGE MONITOR

SUMMARY

See NOTES 1 and 2. In battery and discharge position, DMM should indicate 52.08 volts dc at VM CAL test jacks. Ammeter on each rectifier should indicate some load current.

NOTES

1. Rectifiers are not required to share plant load equally
2. Charge voltage is determined by local requirements. Refer to office records for exact setting. In absence of local requirements, charge voltage is at a level that produces 52.08V dc measured at battery bus

[1] Condition DMM to measure approximately 100V dc

[2] At 151A POWER PLANT control unit [FIG. 1] connect DMM at VM CAL (+) and (-) test jacks

[3] Set plant voltmeter selector switch to BATTERY

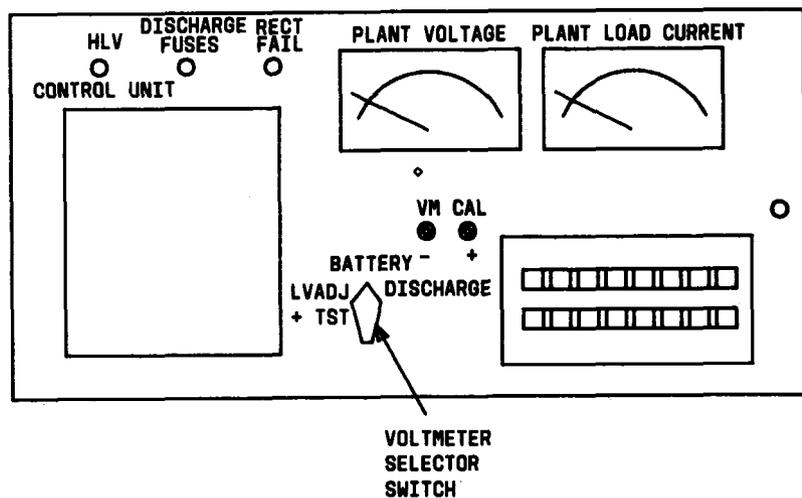
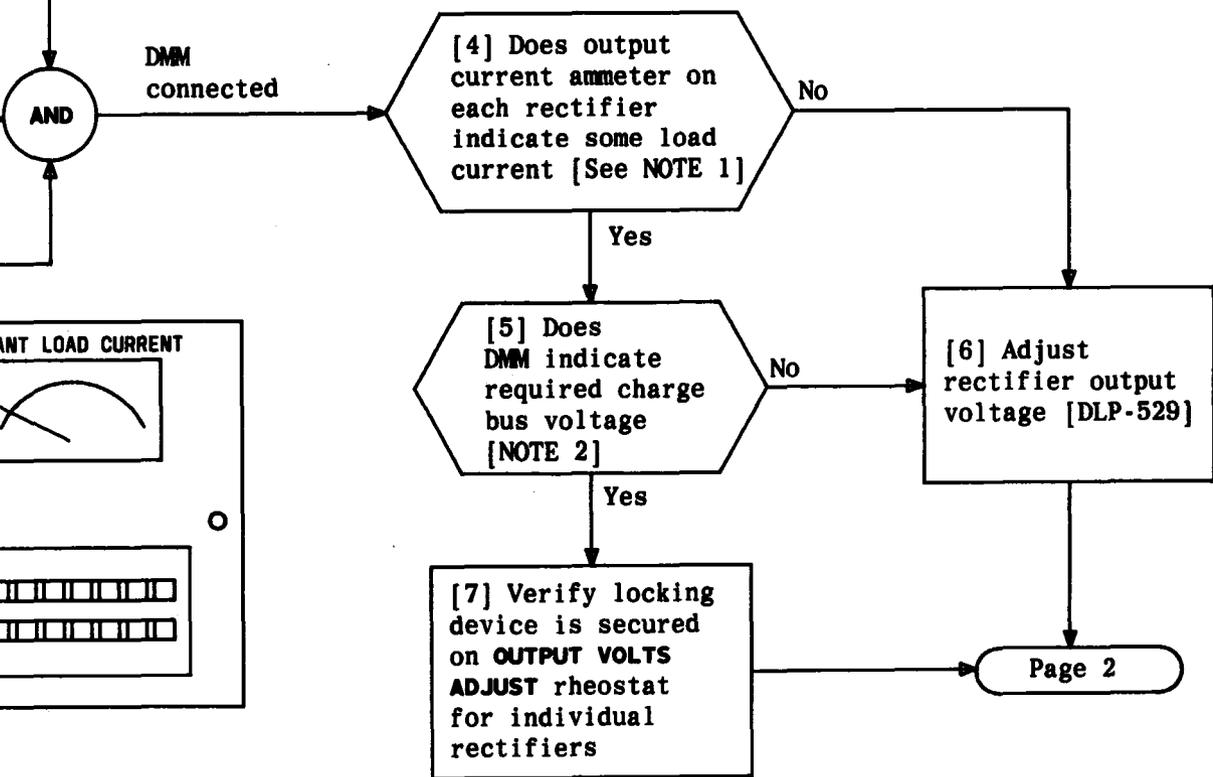
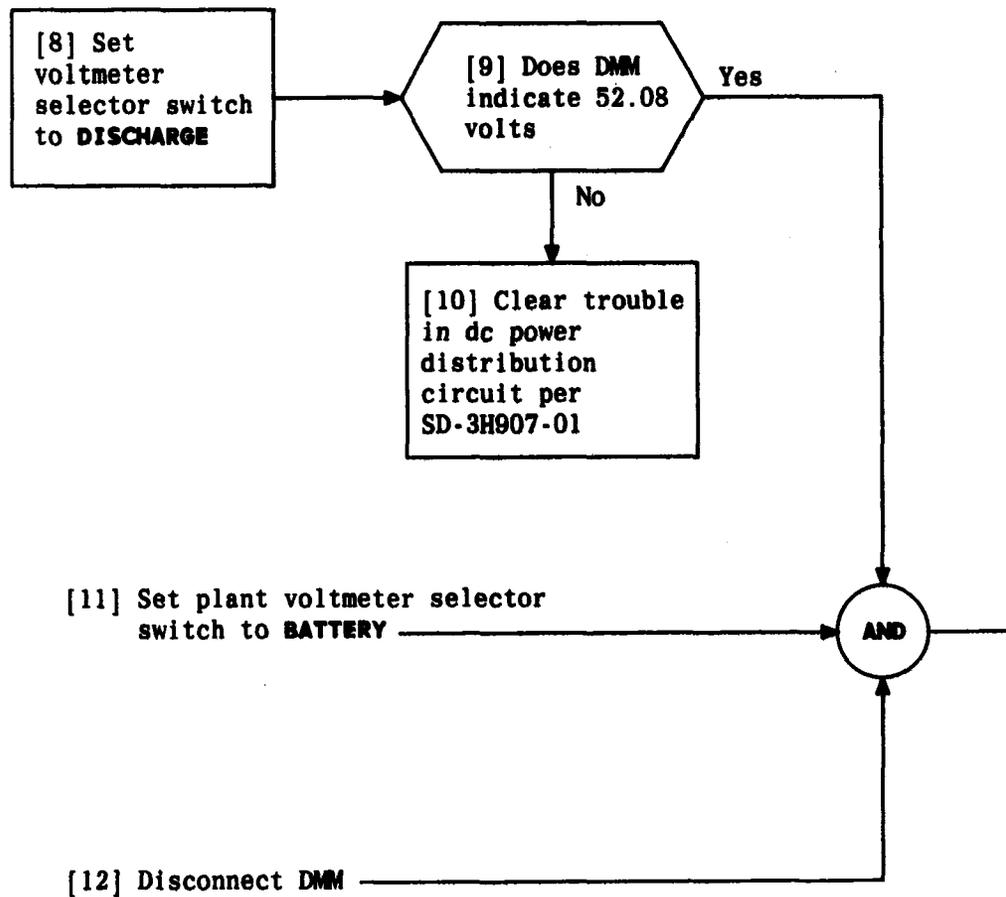


FIG. 1



CHECK BATTERY BUS VOLTAGE AND 48V RECTIFIER OUTPUT CURRENT

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**CHECK BATTERY BUS VOLTAGE AND 48V
RECTIFIER OUTPUT CURRENT**

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[1] At 151A POWER PLANT on 48V rectifier [FIG. 1], depress **POWER ON-POWER OFF** to turn off rectifier

[2] Loosen screws and remove front panel from rectifier

[3] Remove circuit pack cover

[4] Remove circuit pack from connector

[5] Install replacement circuit pack firmly in connector

[6] Install circuit pack cover

[7] Install front panel on rectifier

[8] Depress **POWER ON-POWER OFF** to turn on rectifier

Circuit pack removed

AND

AND

DC POWER SUPPLY FUSES

POWER ON-POWER OFF PUSHBUTTON

CIRCUIT PACK COVER

CP4

CP3

CP1

CP2

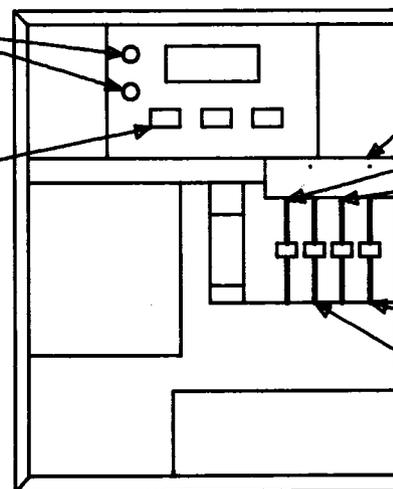


FIG. 1

REPLACE LORAIN 48V RECTIFIER CIRCUIT PACK

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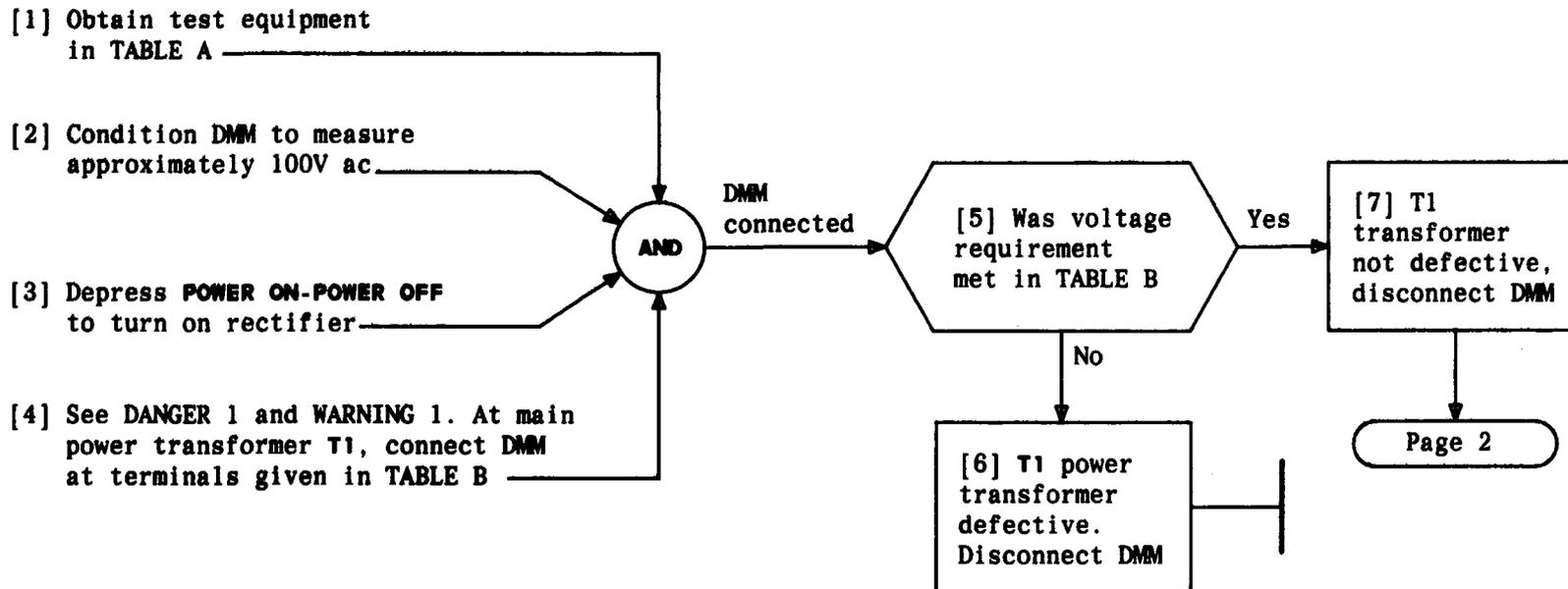


TABLE A	
EQUIPMENT REQUIRED	RECOMMENDED TYPE
Digital multimeter (DMM)	KS-20499L4*
Oscilloscope	Tektronix 545B*
Voltage probe	Tektronix P6006*
*Or equivalent	

TABLE B	
DMM CONNECTION AT TERMINALS OF T1 TRANSFORMER	DMM INDICATION
4 and 5	35 to 39V ac
5 and 6	35 to 39V ac

WARNING 1 <i>Rectifier circuit could be damaged if voltage is abnormally high for extended period of time</i>	
DANGER 1 <i>Voltages inside rectifier cabinet are over 400 volts to ground</i>	
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CHECK LORAIN T1 POWER TRANSFORMER

[8] Condition oscilloscope for voltage measurement [DLP-517]

[9] See DANGER 1 and WARNING 2. AT T1 power transformer terminals, connect voltage probe as given in TABLE C

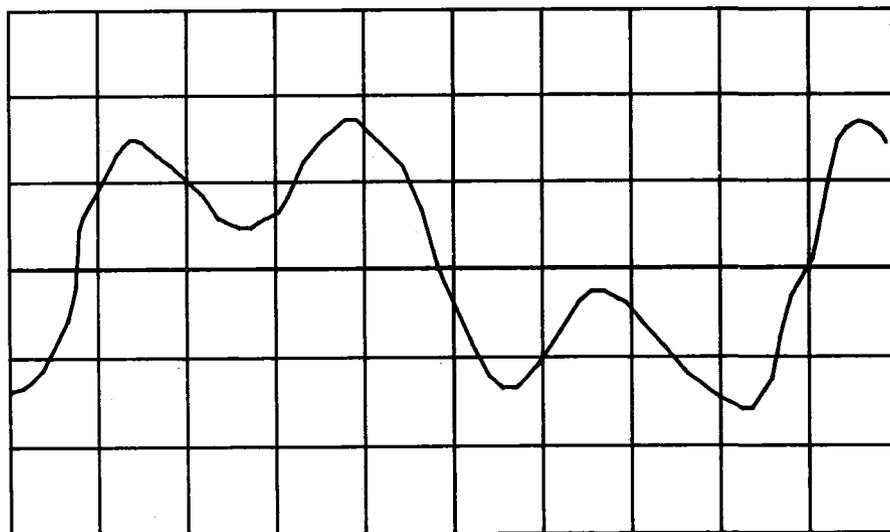
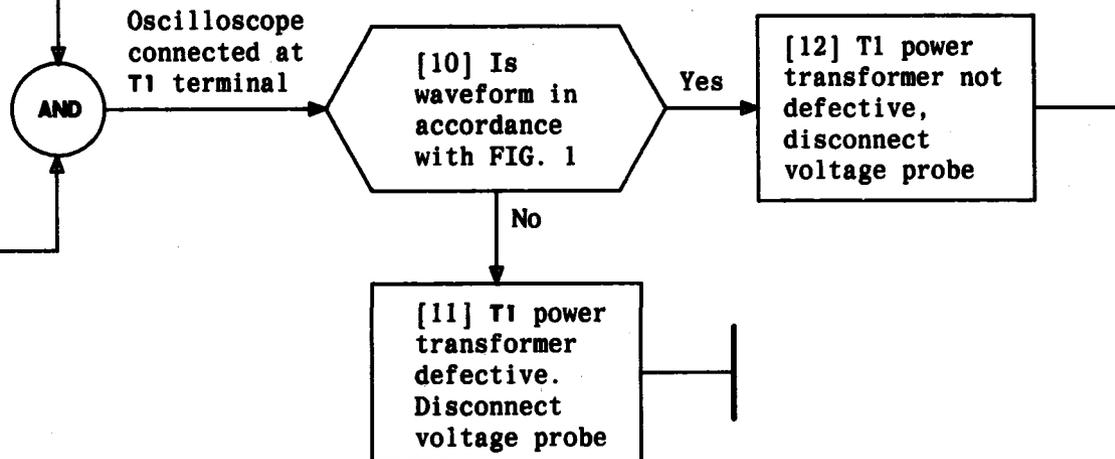


FIG. 1 - Waveform - T1 Transformer Output

TABLE C	
VOLTAGE PROBE CONNECTION AT T1 TRANSFORMER	WAVEFORM
Terminal 4	FIG. 1
Terminal 6	FIG. 1

WARNING 2
To prevent circuit damage do not connect ground lead from oscilloscope to any part of rectifier

DANGER 1
Voltages inside rectifier cabinet are over 400 volts to ground

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CHECK LORAIN T1 POWER TRANSFORMER

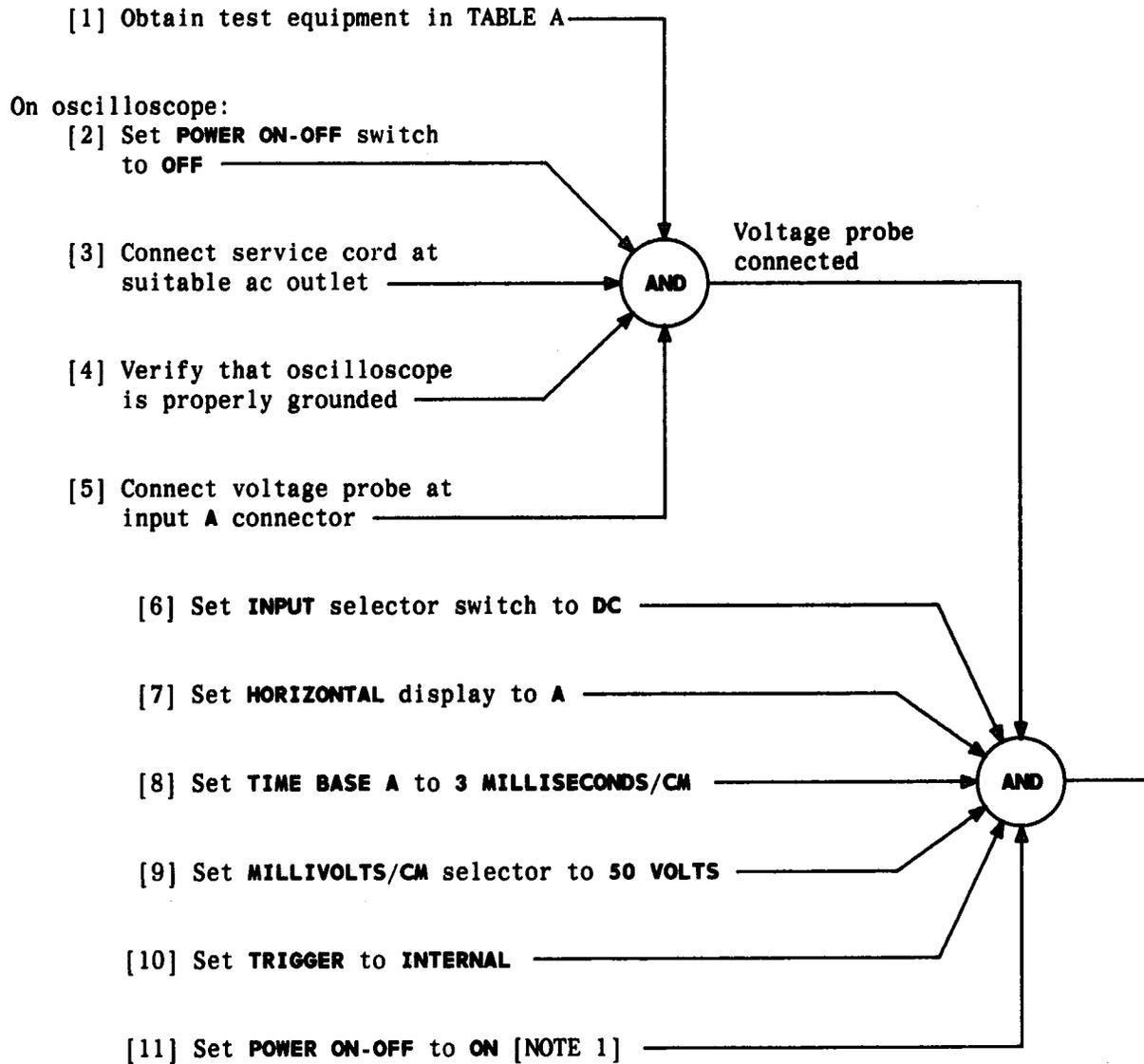


TABLE A	
EQUIPMENT REQUIRED	RECOMMENDED TYPE
Oscilloscope	Tektronix 545B
Voltage probe	Tektronix P6006

NOTE 1
 After voltage probe is connected in test circuit, adjustment of sweep control may be required to display waveform

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CONDITION OSCILLOSCOPE TO TEST RECTIFIER

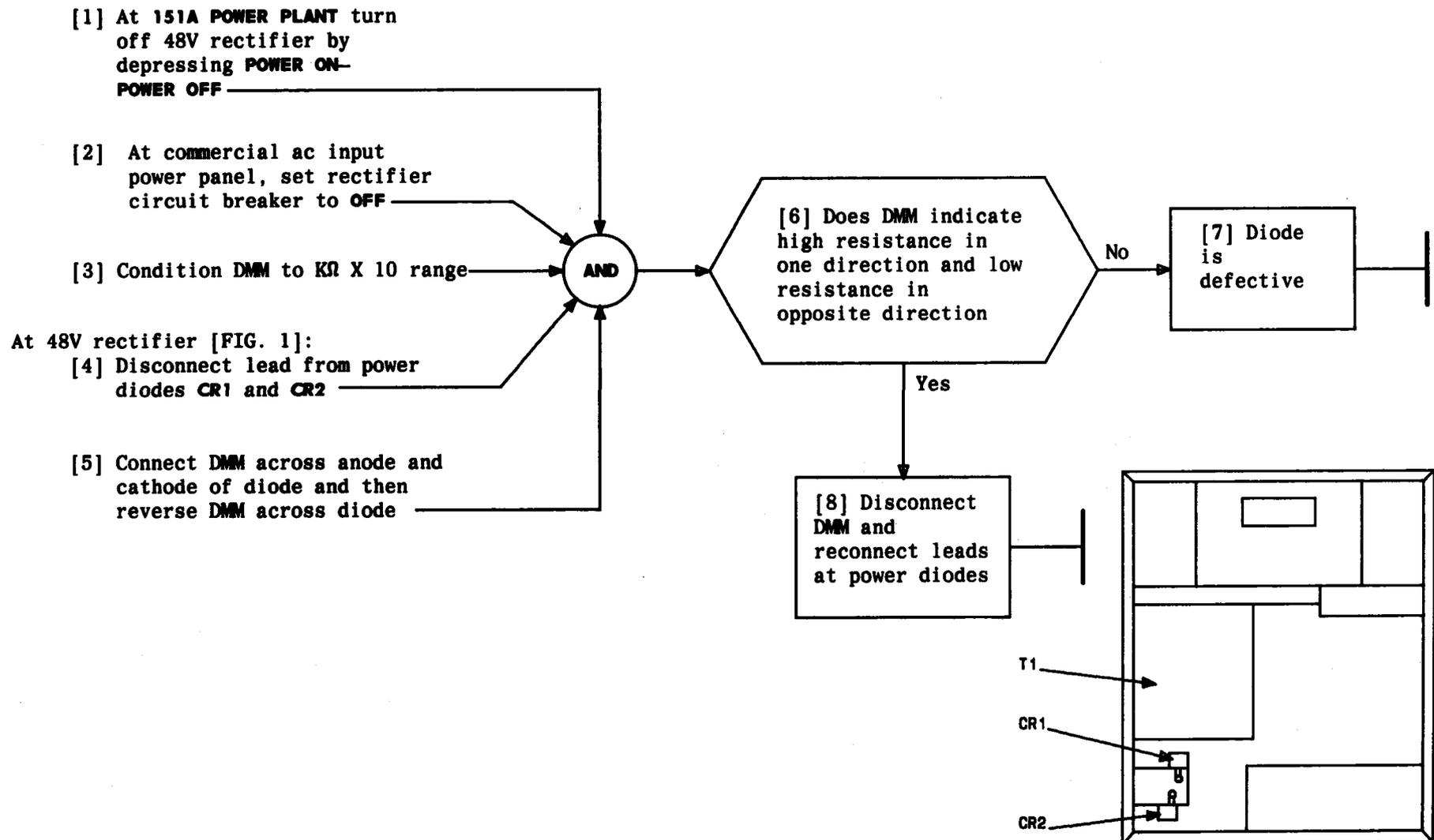


FIG. 1

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CHECK 48V RECTIFIER POWER DIODES (CR1 AND CR2)

[1] At 151A POWER PLANT on external charge circuit breaker/rect panel, set 48V rectifier circuit breaker to OFF

[2] At commercial ac input power panel, set rectifier circuit breaker to OFF

At rectifier C2 output capacitor bank [see DANGER 1 and FIG. 1]:

[3] Remove cover from capacitor bank bus bars

[4] Obtain 100-ohm, 10-watt resistor and temporarily connect resistor across filter capacitor POS and NEG bus bars

[5] Disconnect capacitor fuse wires F4.1 through F4.6

[6] With DMM set on $K\Omega \times 10$ range, observe proper polarity and connect DMM across capacitor POS and NEG bus bars

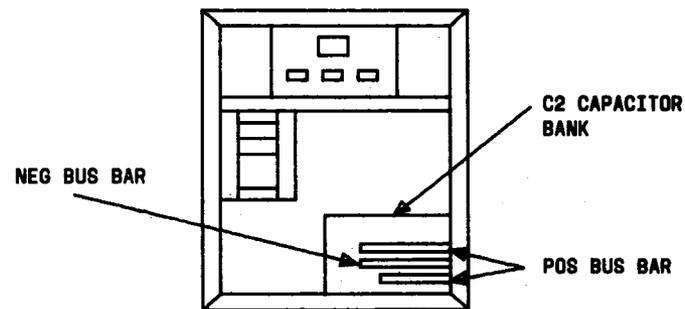
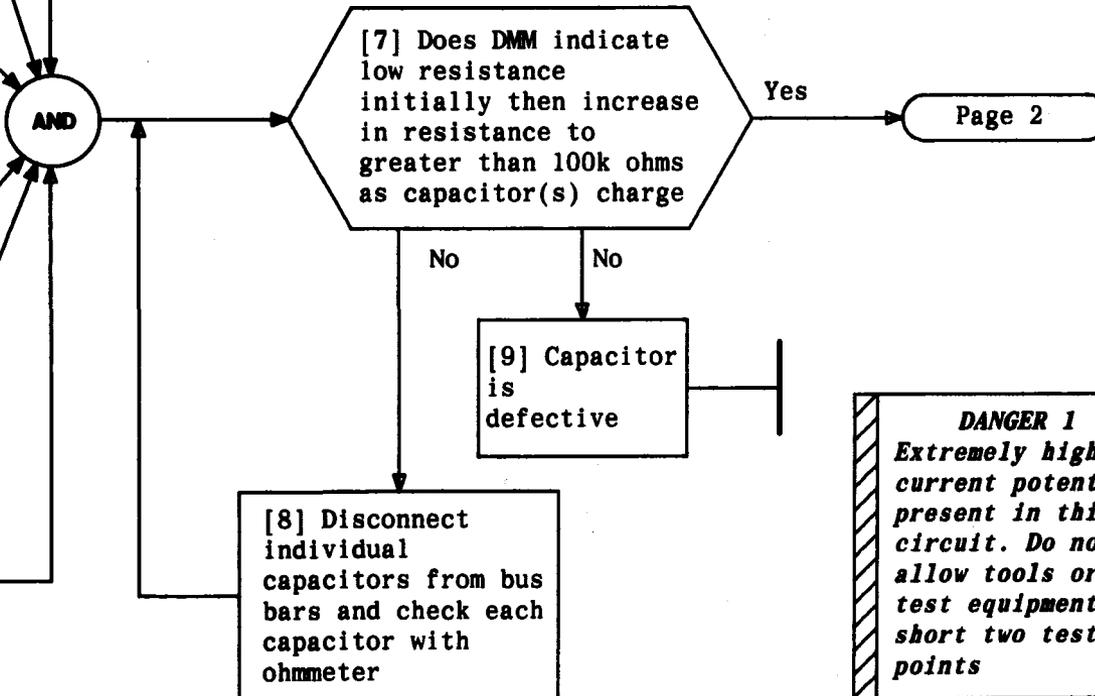


FIG. 1



DANGER 1
Extremely high current potential present in this circuit. Do not allow tools or test equipment to short two test points

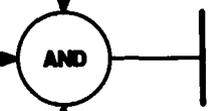
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CHECK OUTPUT FILTER CAPACITOR BANK

[10] Disconnect DMM and verify all capacitor leads are connected

[11] Verify that F4.1 through F4.6 fuse wires are not defective, then reconnect fuse wires

[12] Install cover at capacitor bank bus bar



CHECK OUTPUT FILTER CAPACITOR BANK

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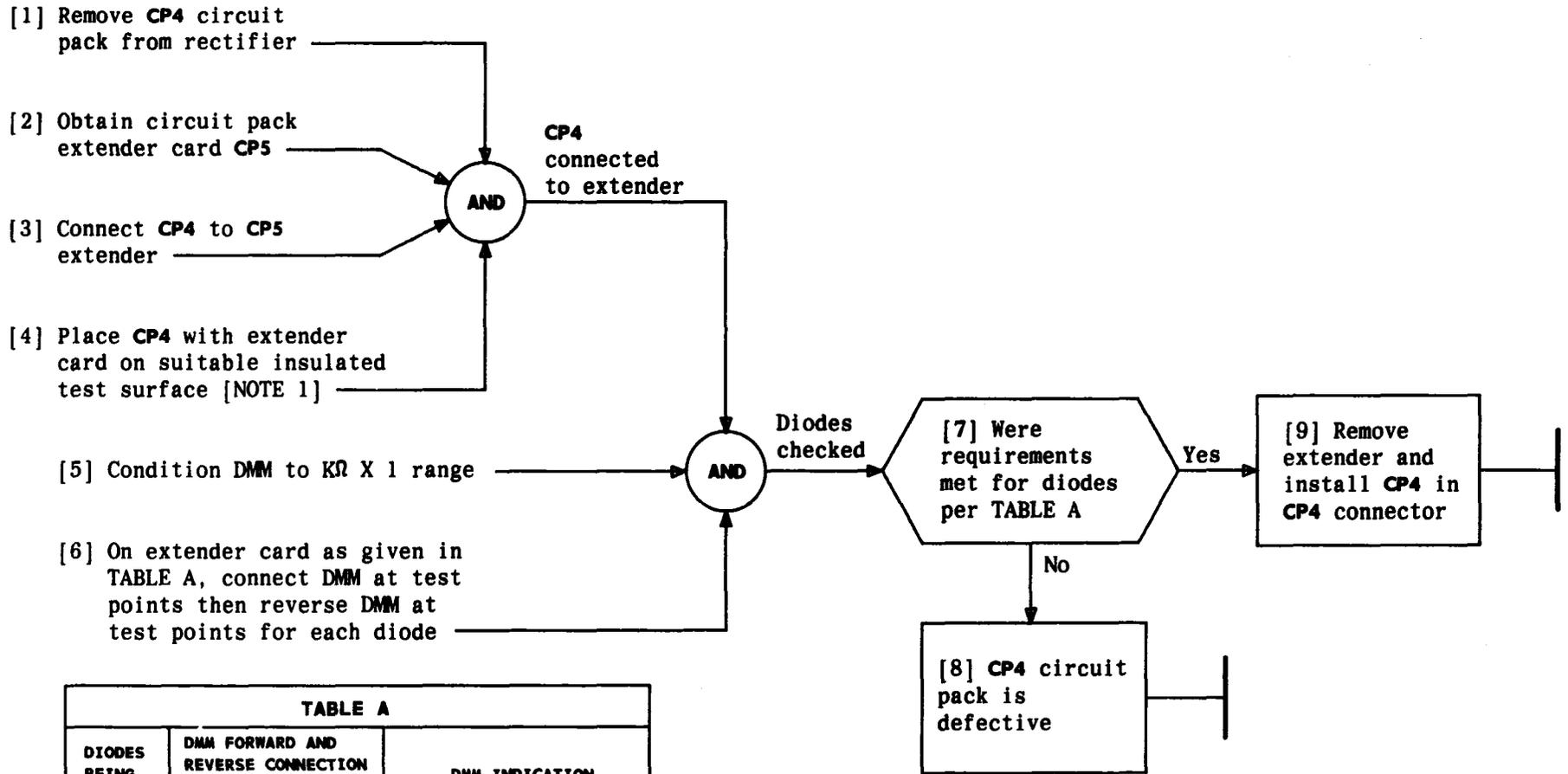


TABLE A		
DIODES BEING CHECKED	DMM FORWARD AND REVERSE CONNECTION AT TEST POINTS ON EXTENDER CARD	DMM INDICATION
CR1	TP20 to TP5	Low resistance in one direction and high resistance in opposite direction
CR2	TP5 to TP19	
CR3	TP19 to TP14	
CR4	TP14 to TP20	

NOTE 1
 CP4 is tested disconnected from rectifier

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CHECK 28-VOLT CIRCUIT ON CP4 CIRCUIT PACK

[1] At commercial ac input power panel, set rectifier circuit breaker to OFF

[2] At 151A POWER PLANT 48V rectifier, remove both dc power supply fuses

[3] See DANGER 1. Wait minimum 3 minutes for filter capacitors to discharge

[4] See FIG. 1. Label and disconnect leads from terminals of C3 and C4 capacitors

[5] Get 100-ohm, 10-watt resistor and temporarily connect resistor across terminals of C3 and then across C4 capacitors

C3 and C4 disconnected and discharged

[6] With DMM set on $K\Omega \times 10$ range, observe polarity and connect DMM across C3 terminals

[7] Does DMM indicate low resistance initially, then increase in resistance to greater than 100k ohms as capacitor charges

No

[8] C3 capacitor is defective

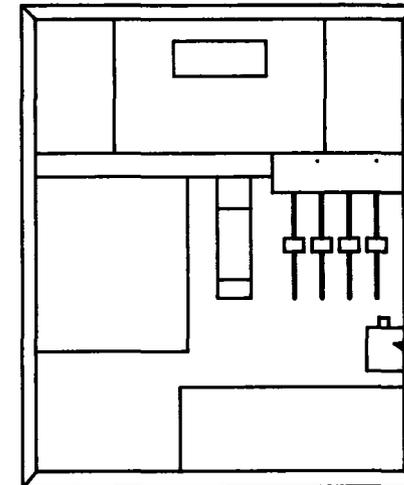


FIG. 1

Page 2

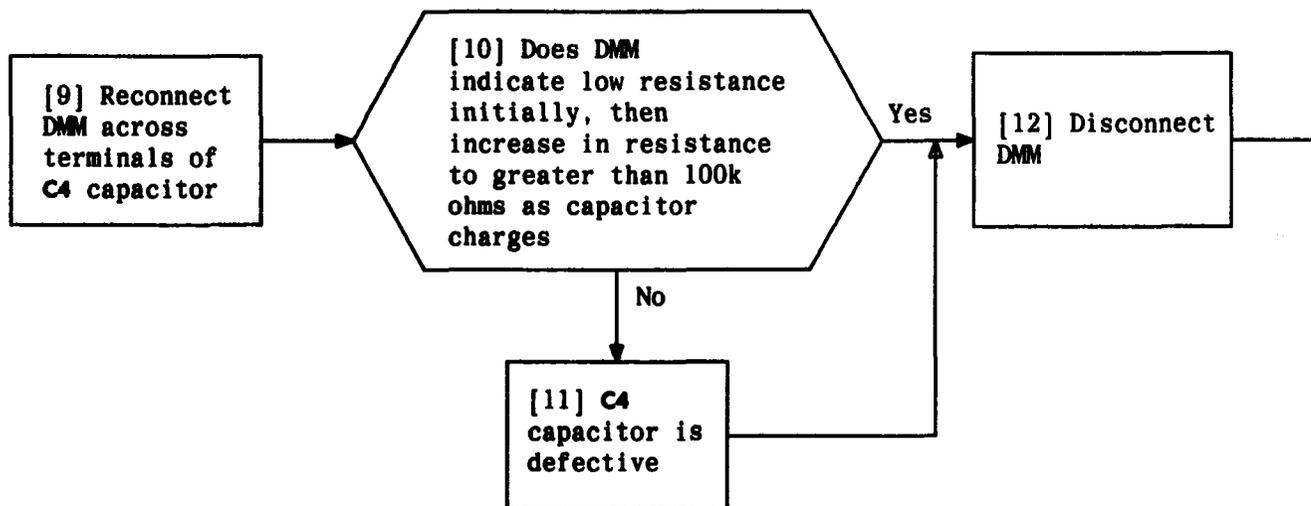
DANGER 1
Extremely high current potential present in this circuit. Do not allow tools or test equipment to short two test points

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CHECK CAPACITORS C3 AND C4



CHECK CAPACITORS C3 AND C4

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- [1] Set all TTY switches to OFF
- [2] At TTYC 0 depress TTYC PWR & RESET to remove power [FIG. 1, 2]
- [3] At TTYC 1 depress TTYC PWR & RESET to remove power [FIG. 1, 2]
- [4] Remove interface pack AR17 from port 0 of TTYC 0. See NOTE 1. [FIG. 1, 2]
- [5] Insert AR17 interface pack into TTYC 1 port 0 [FIG. 1]
- [6] Disconnect local TTY from TTYC 0 port 0 connection [FIG. 1, 2]
- [7] Connect local TTY to TTYC 1 port 0 connection [FIG. 1, 2]
- [8] At TTYC 0 and TTYC 1 depress TTYC PWR & RESET to restore power [FIG. 1]
- [9] Set TTY switch to ON or LINE
- [10] Depress TTY INIT

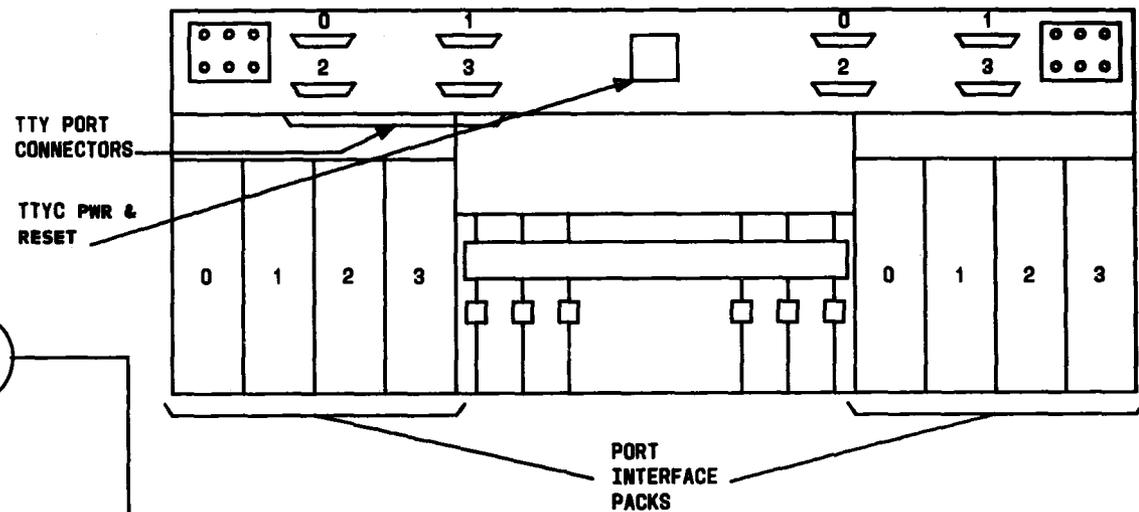


FIG. 1 - Teletypewriter Control Unit

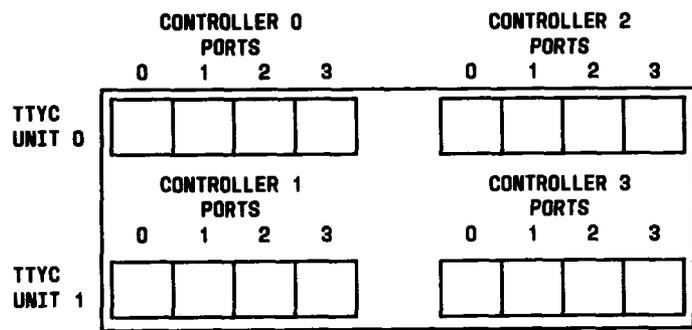


FIG. 2 - TTY Controller Configuration

NOTE 1
AR17 interface pack must be removed from any unused port

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SWITCH LOCAL TELETYPEWRITER FROM MAINTENANCE TTY CONTROLLER (TTYC 0) TO BACKUP TTY CONTROLLER (TTYC 1)

- [1] Set all TTY switches to OFF
- [2] At TTYC 0 and TTYC 1 depress TTYC PWR & RESET to remove power [FIG. 1, 2]
- [3] Remove AR17 interface pack from TTYC 1, port 0. See NOTE 1. [FIG. 1, 2]
- [4] Insert AR17 interface pack in TTYC 0, port 0 [FIG. 1]
- [5] Disconnect local TTY from TTYC 1, port 0 [FIG. 1, 2]
- [6] Connect local TTY to TTYC 0, port 0 [FIG. 1, 2]
- [7] At TTYC 0 and TTYC 1 depress TTYC PWR & RESET to restore power [FIG. 1]
- [8] Set TTY switch to ON or LINE
- [9] Depress TTY INIT

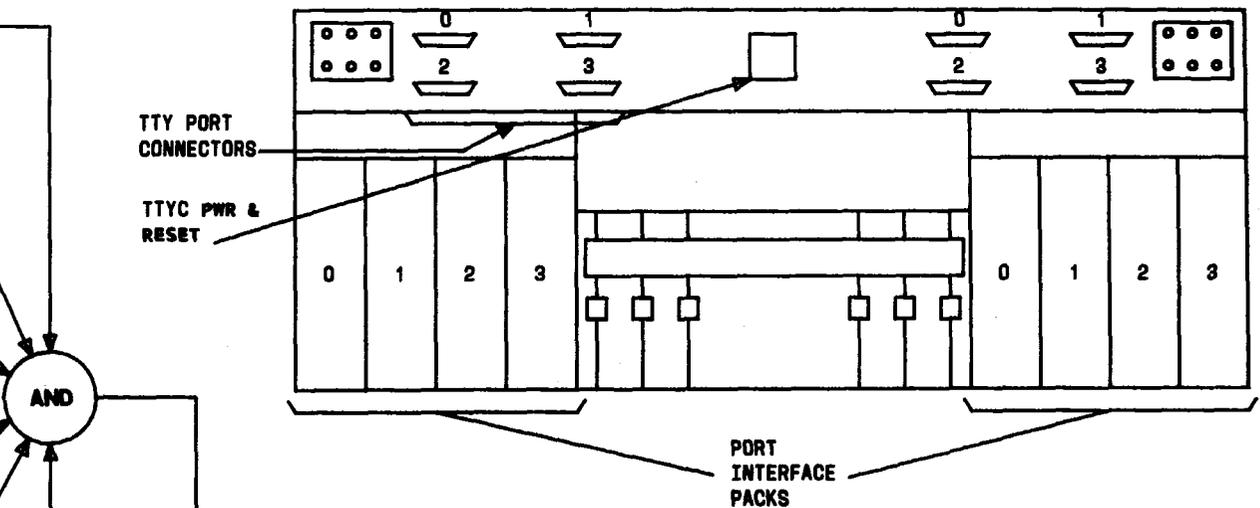


FIG. 1 - Teletypewriter Control Unit

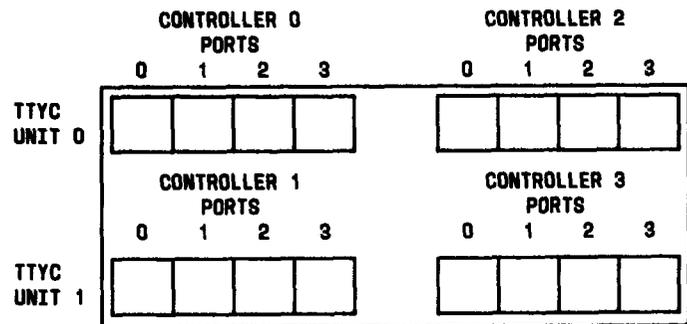


FIG. 2 - TTY Controller Configuration

NOTE 1
 AR17 interface pack must be removed from any unused port

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SWITCH LOCAL TELETYPEWRITER FROM BACKUP TTY CONTROLLER (TTYC 1) TO MAINTENANCE TTY CONTROLLER (TTYC 0)

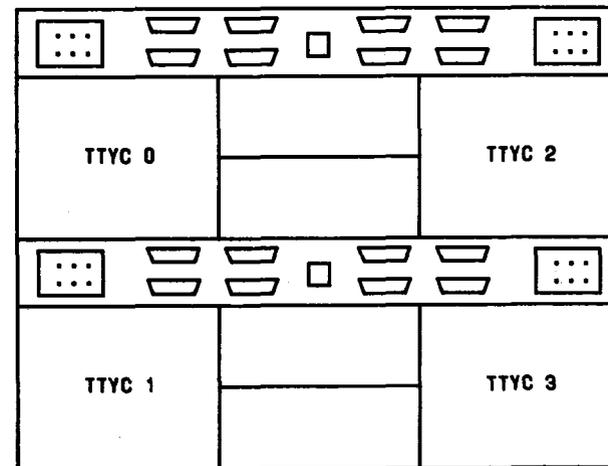
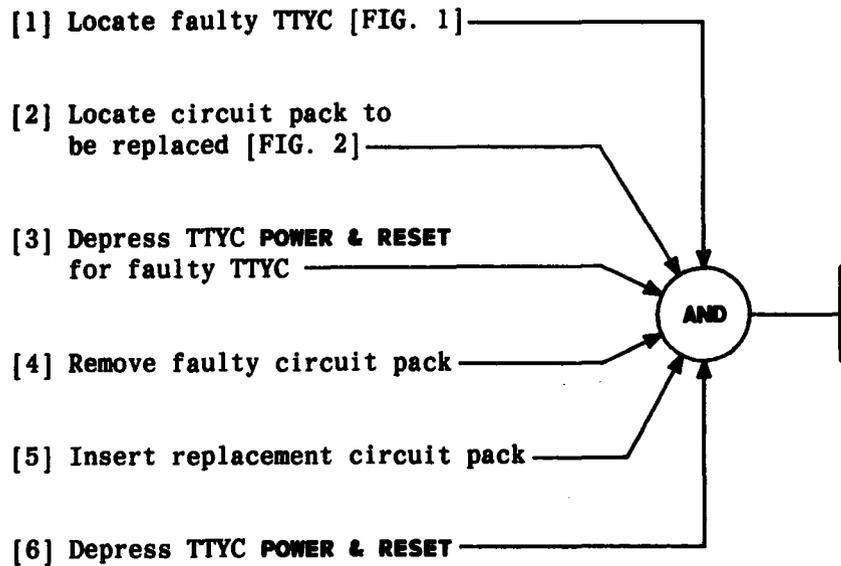


FIG. 1 - Typical TTYC Layout

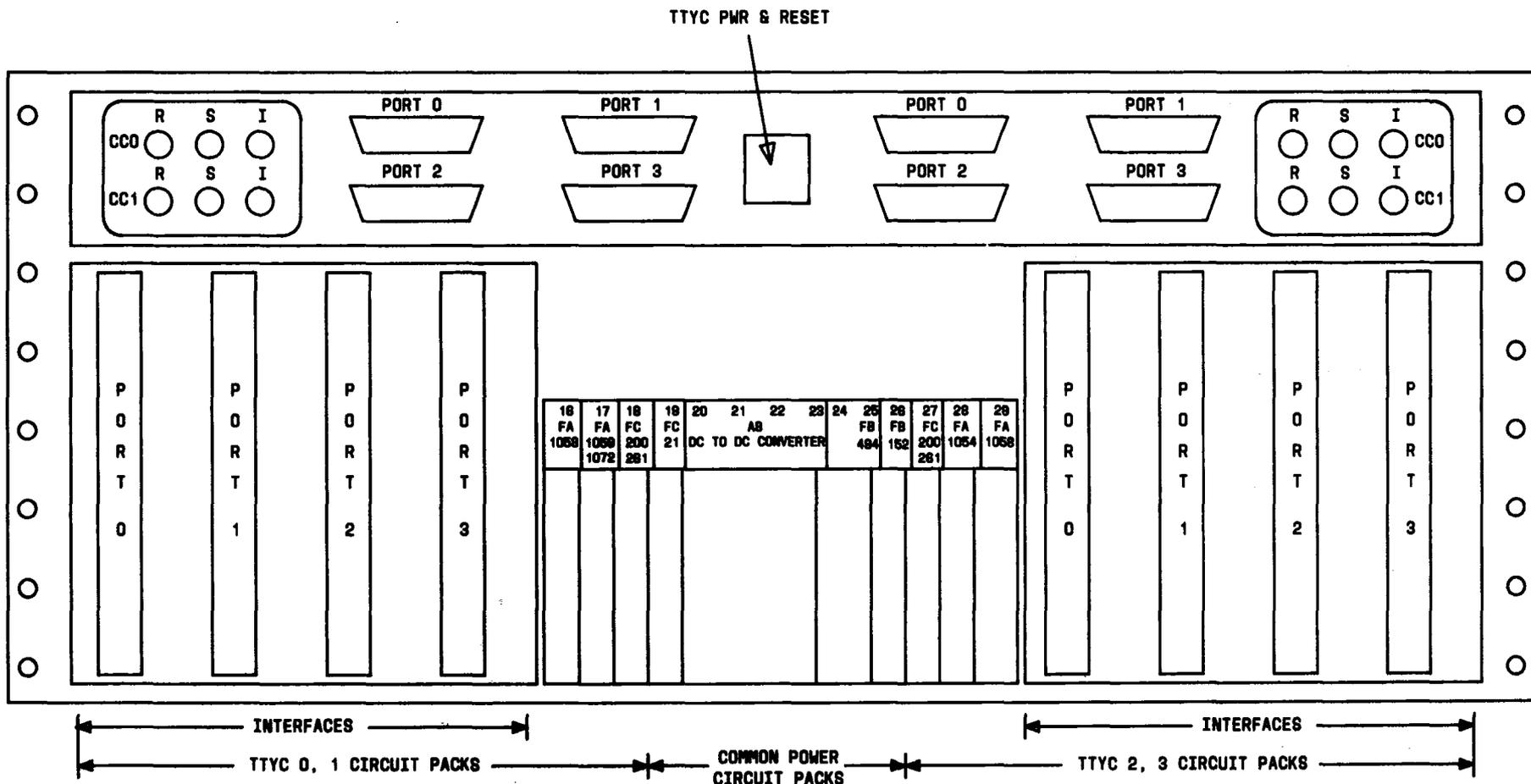
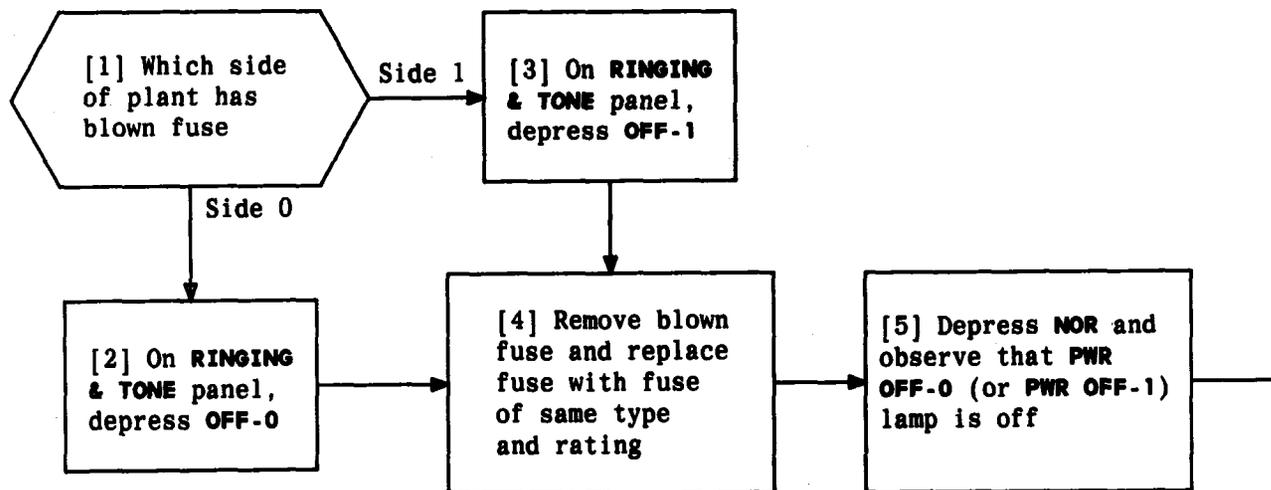


FIG. 2

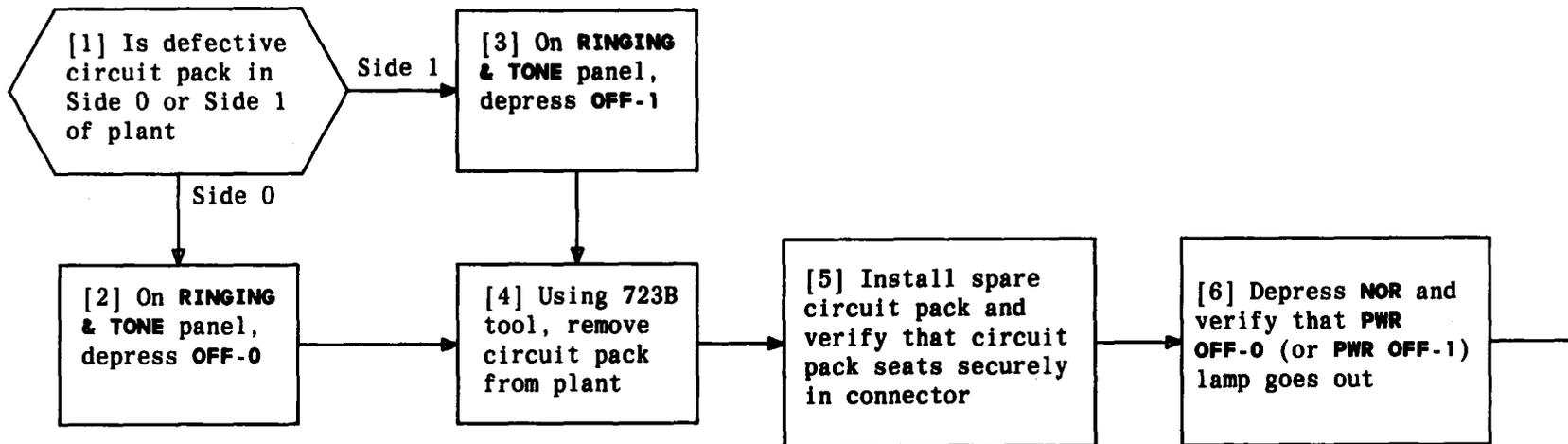
REPLACE TELETYPEWRITER CONTROLLER CIRCUIT PACKS

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REPLACE BLOWN FUSE IN RINGING & TONE PLANT

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REPLACE CIRCUIT PACK IN RINGING AND TONE PLANT

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[1] At 151A POWER PLANT, turn off 48V rectifier by depressing **POWER ON-POWER OFF** and remove rectifier front panel

[2] Remove RB fuse associated with rectifier from plant

[3] Set **EXTERNAL-CHARGE** circuit breaker associated with rectifier to **OFF**

[4] See DANGER 1. Remove circuit pack cover and CP4 circuit pack from rectifier

[5] Connect CP4 to CP5 extender board

[6] Observe arrows and UP stamping on CP5 extender, then install extender at CP4 connector

AND

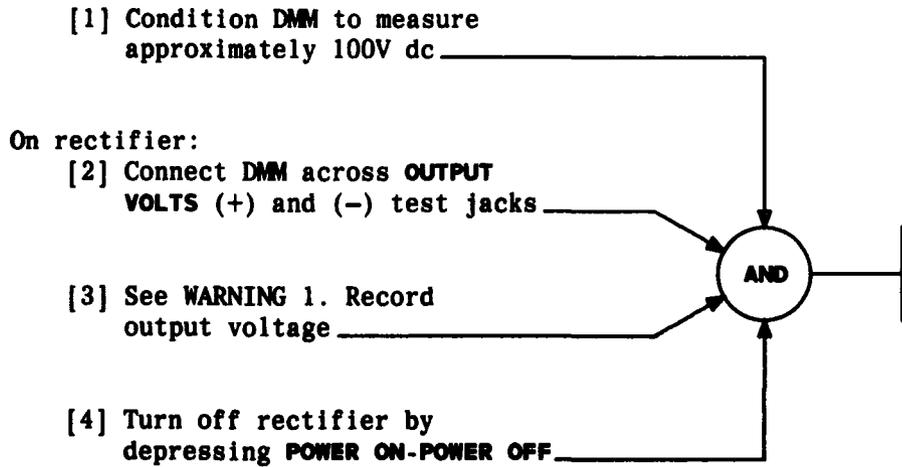
[7] Replace RB fuse removed in Step 2

[8] Depress **POWER ON/POWER OFF** to turn rectifier on

AND

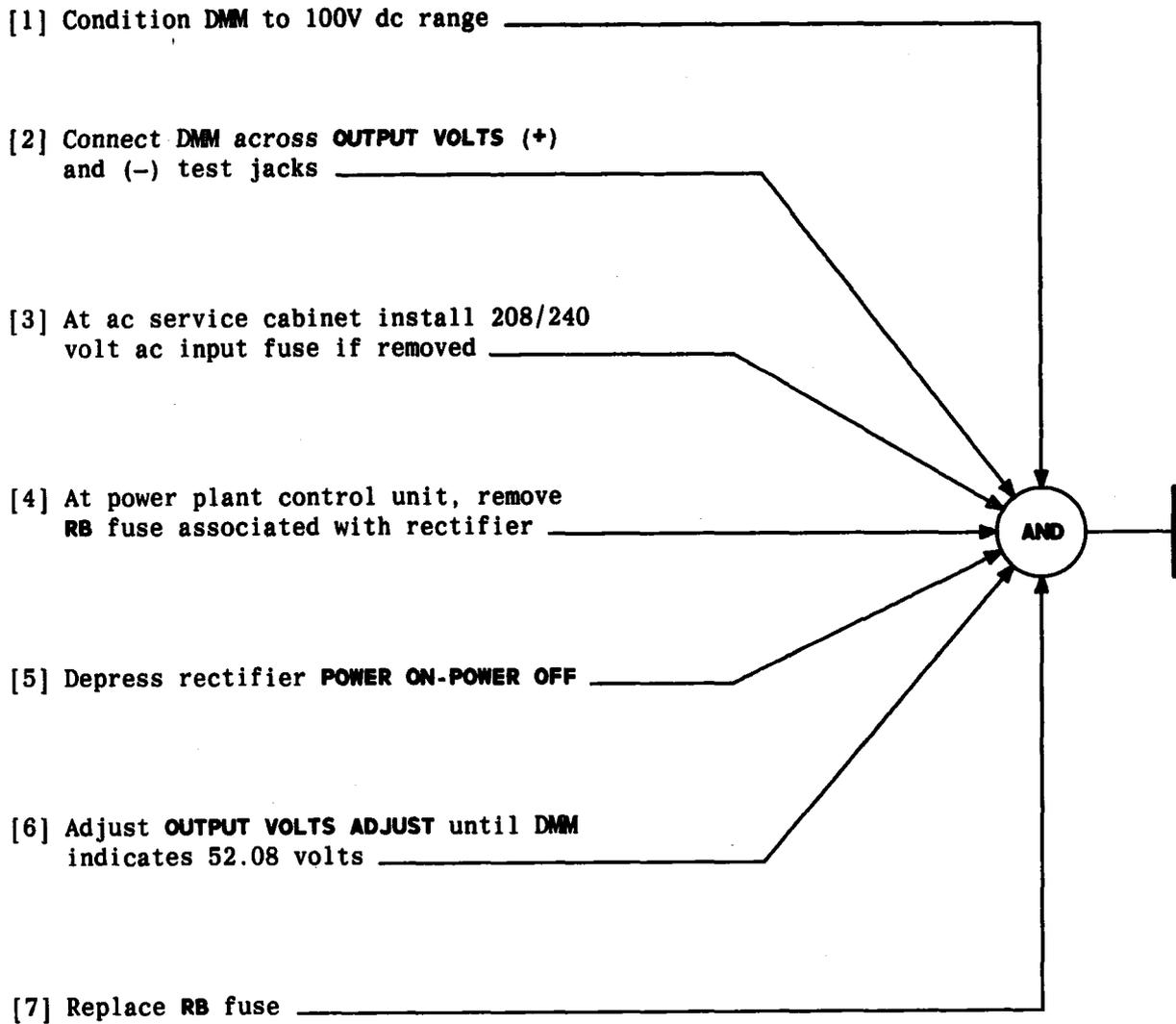
EXTEND LORAIN CIRCUIT PACK CP4 FOR TEST

DANGER 1	
<i>Voltages inside rectifier cabinet are over 400 volts to ground</i>	
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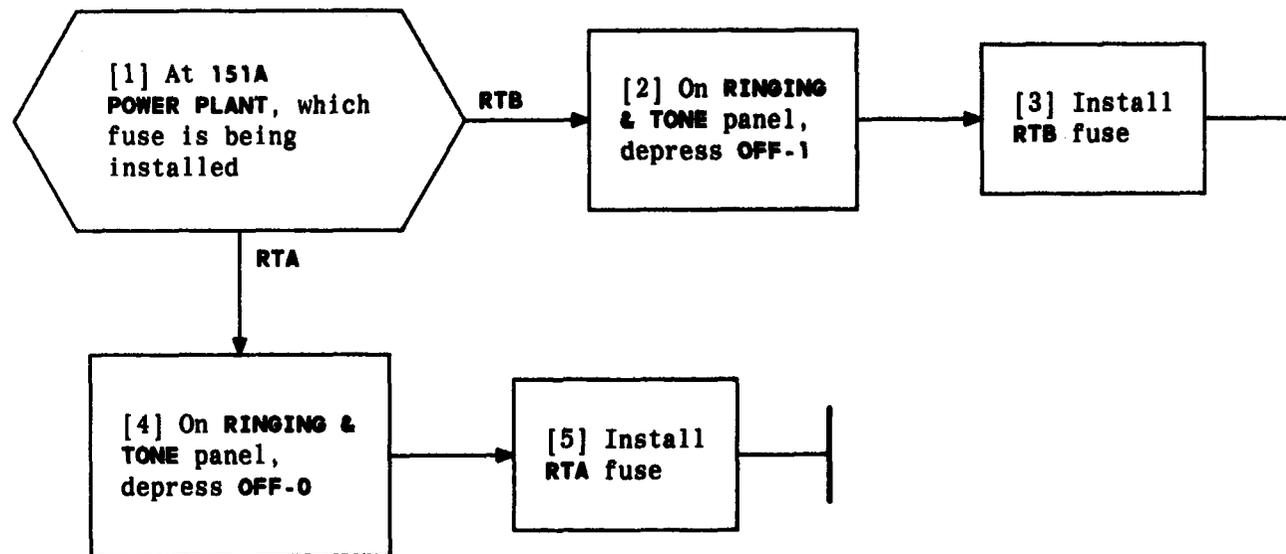
WARNING 1	
<i>Rectifier circuit could be damaged if output voltage is abnormally high for extended period of time</i>	
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MEASURE RECTIFIER OUTPUT VOLTAGE



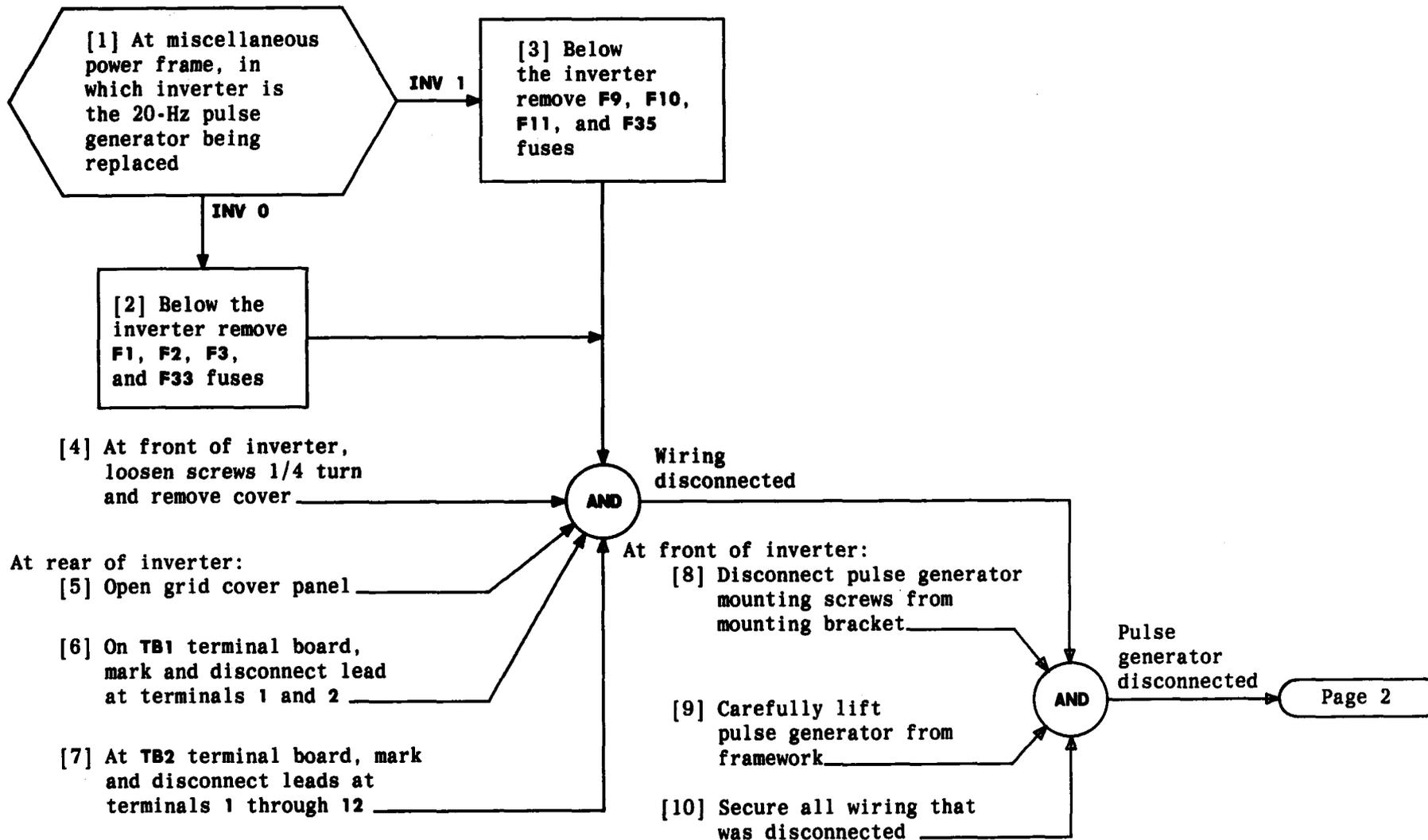
ADJUST RECTIFIER OUTPUT VOLTAGE

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INSTALL RTA OR RTB FUSE

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REPLACE 20-HZ PULSE GENERATOR

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At front of inverter:

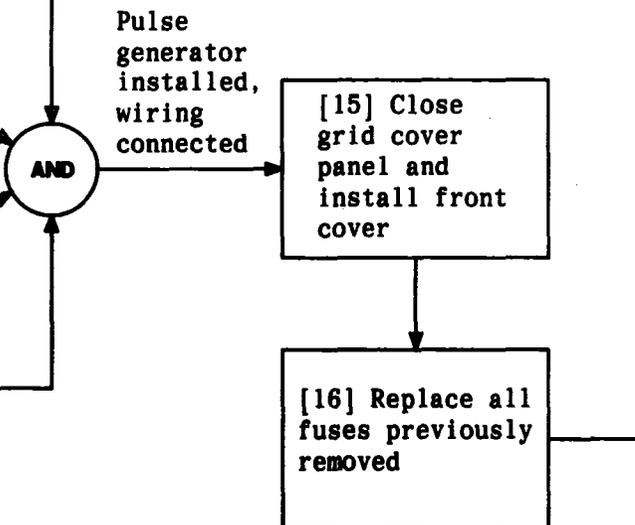
[11] Carefully position and align replacement pulse generator to framework

[12] Install pulse generator mounting screws

At rear of inverter:

[13] At TB2 terminal board, reconnect leads at terminals 1 through 12

[14] At TB1 terminal board, reconnect leads at terminals 1 and 2



REPLACE 20-HZ PULSE GENERATOR

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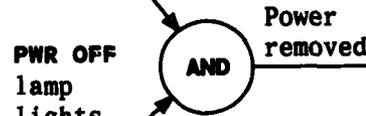
[1] Obtain test equipment in TABLE A

At miscellaneous power frame:

[2] See NOTE 1. On RINGING & TONE panel, depress OFF-0 (or OFF-1)

[3] Using 723B circuit pack puller, remove oscillator circuit pack being adjusted [FIG. 1]

[4] Connect oscillator circuit pack to 158A adapter, then install adapter in circuit pack connector



Oscillator extended

Page 2

TABLE A	
EQUIPMENT REQUIRED	RECOMMENDED TYPE
Digital Multimeter (DMM)	Hickok Model 3310 (ITE-5356)*†
Circuit pack puller	723B tool†
Circuit pack extender	158A adapter†
Jewelers screwdriver	R1005 tool†
(2) Connecting clips	EZ Hook†
* DMM must be true RMS and isolated from ground † or equivalent	

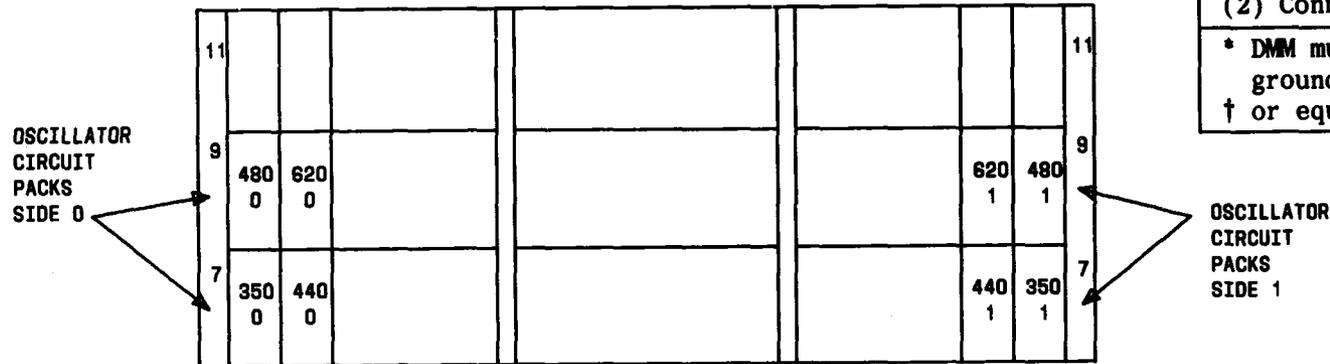


FIG. 1

NOTE 1	
Information enclosed in parentheses refers to Side 0 or Side 1	
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ADJUST OSCILLATOR VOLTAGE LEVEL

[5] See WARNING 1. Isolate DMM from ground [DLP-566] and condition to measure approximately 10V rms

[6] See DANGER 1, DANGER 2, CAUTION 1, WARNING 2, and FIG. 2. At rear of plant, connect DMM across oscillator circuit pack connector terminals 12 and 14 (GRD)

[7] On RINGING & TONE panel, depress NOR pushbutton

[8] On oscillator circuit pack, adjust potentiometer in TABLE B until DMM indicates 2.60 volts

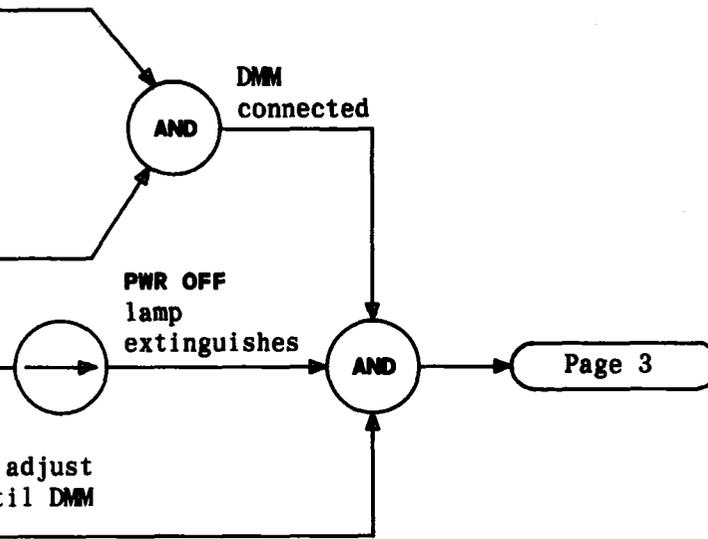


TABLE B		
OSCILLATOR CIRCUIT PACK	CIRCUIT PACK LOCATION	VOLTAGE ADJUST POTENTIOMETER
350-0	0-7-3	R10 for A980 R3 for A1151
350-1	0-7-48	
440-0	0-7-5	R10 for A981 R3 for A1152
440-1	0-7-46	
480-0	0-9-3	R10 for A982 R3 for A1153
480-1	0-9-48	
620-0	0-9-5	R10 for A983 R3 for A1154
620-1	0-9-46	

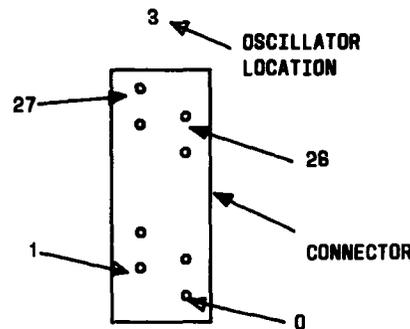


FIG. 2 - Oscillator Connector - Rear View

WARNINGS

1. Erroneous reading and damage to equipment may result if DMM is not isolated from ground
2. DMM(-) lead must be connected to terminal 14 on oscillator connector

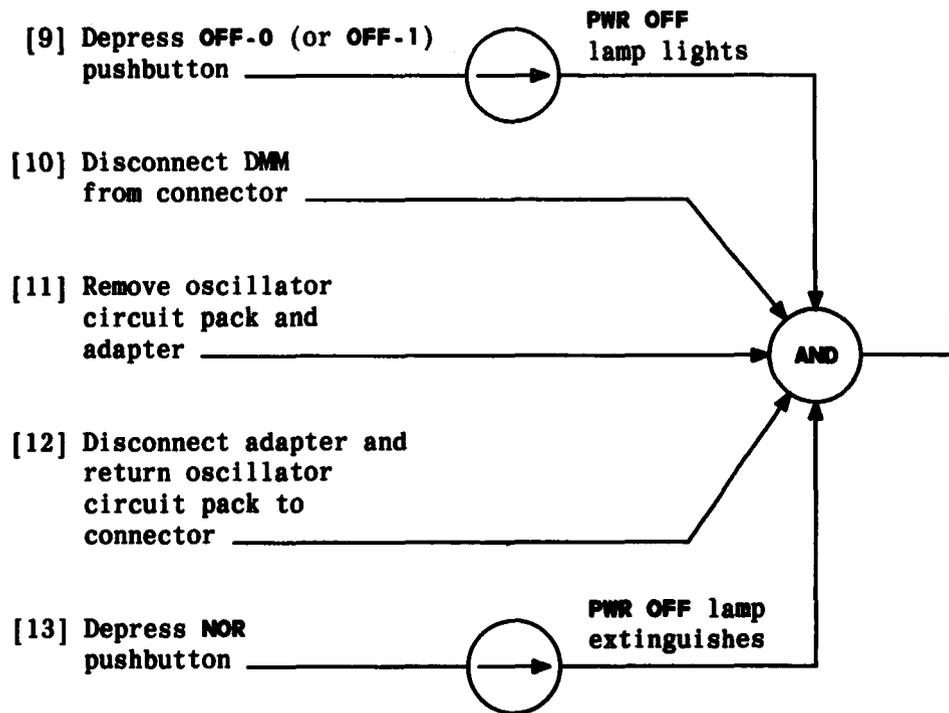
CAUTION 1

Tone voltages to be measured are complex ac waveforms. A True RMS indicating voltmeter is required to accurately adjust voltage levels. Peak and average ac voltmeters produce inaccurate readings.

DANGERS

1. Voltage potentials of up to 400 volts to ground are present at rear of plant
2. Isolation of DMM from ground creates potential hazard. Avoid bodily contact between test meter and other components, conductors, or ground

ADJUST OSCILLATOR VOLTAGE LEVEL



ADJUST OSCILLATOR VOLTAGE LEVEL

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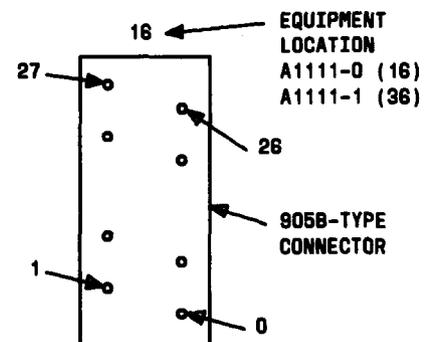
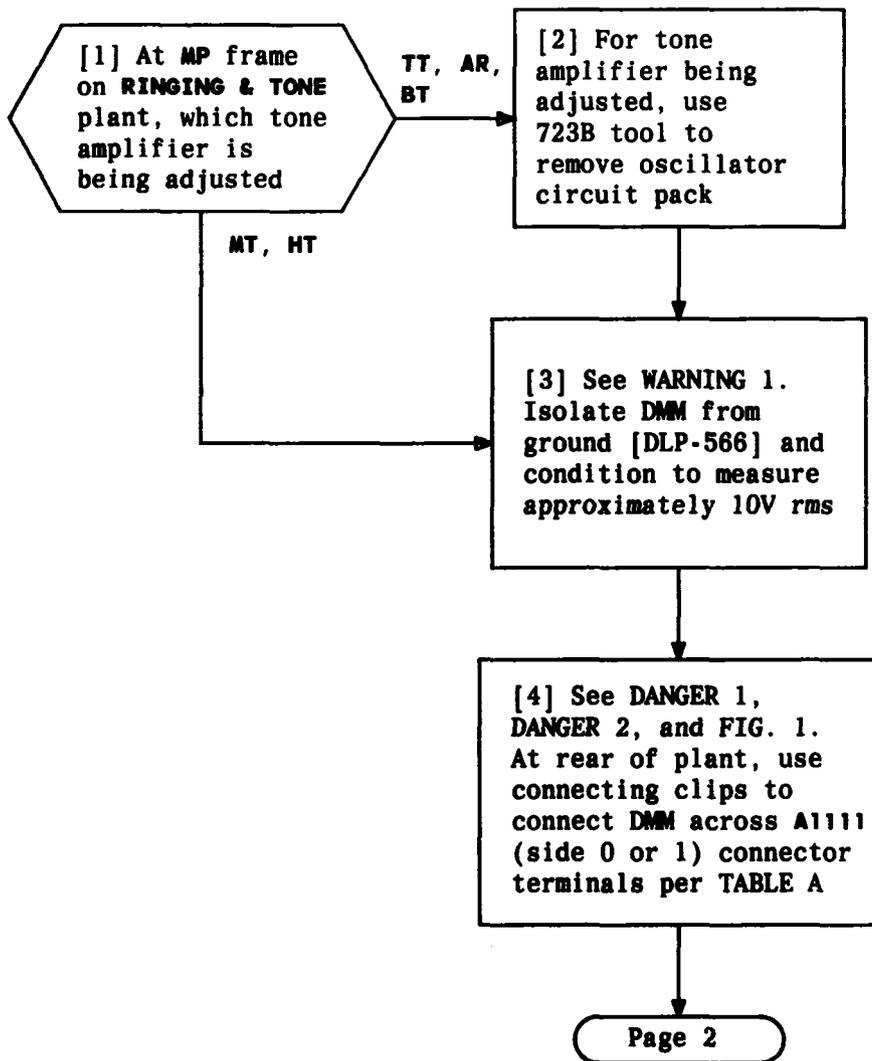


FIG. 1 - A1111 Connector - Rear View

WARNING 1 <i>Erroneous reading and damage to equipment may result if DMM is not isolated from ground</i>	
DANGERS	
<ol style="list-style-type: none"> 1. Voltage potentials of up to 400 volts to ground are present at rear of plant 2. Isolation of DMM from ground creates potential hazard. Avoid bodily contact between test meter and other components, conductors, or ground 	
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ADJUST TONE AMPLIFIER TO TEST VOLTAGE LEVEL

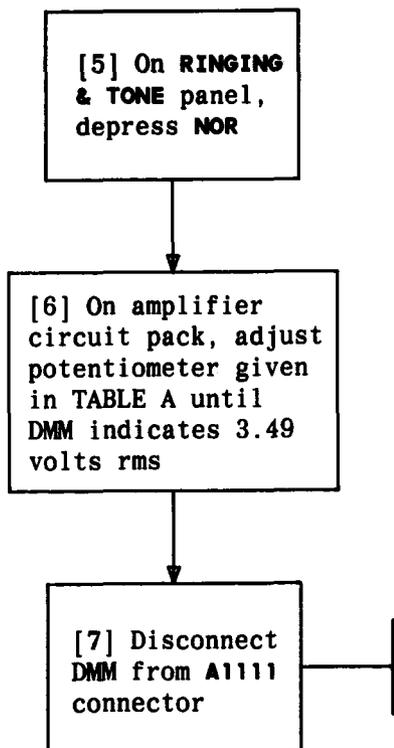


TABLE A				
TONE AMPLIFIER BEING ADJUSTED	OSCILLATOR CIRCUIT PACK TO BE REMOVED		CONNECTION OF DMM ACROSS TERMINALS OF CPA1111 TRAN CONNECTOR	VOLTAGE ADJUST POTENTIOMETER
	FREQUENCY	CODE		
TTLV	350	A980 or A1151	13 and 26	ADJ-2 (R4)
ARLV	440	A981 or A1152	1 and 12	ADJ-1 (R3)
BTLV	480	A982 or A1153	17 and 21	ADJ-2 (R4)
MTLV	*		15 and 20	ADJ-2 (R4)
HTLV	*		4 and 9	ADJ-1 (R3)

* No oscillator circuit pack is removed

ADJUST TONE AMPLIFIER TO TEST VOLTAGE LEVEL

[1] On A751A or B circuit pack, rotate LV ADJ potentiometer fully ccw and observe low voltage relay is released or LED lights [FIG. 1]

[2] Very slowly rotate LV ADJ cw until low voltage relay operates or LED extinguishes

[3] Very slowly rotate LV ADJ ccw until low voltage relay just releases or LED lights

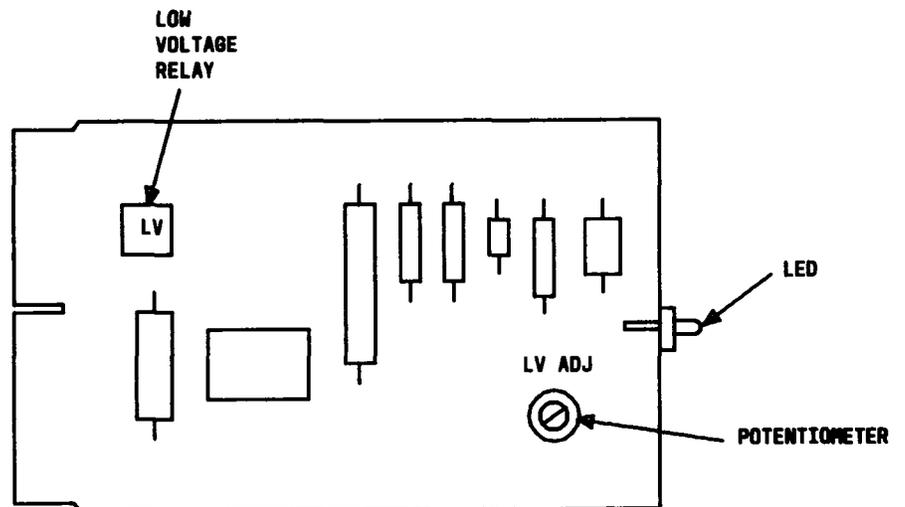
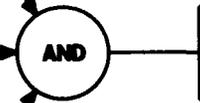
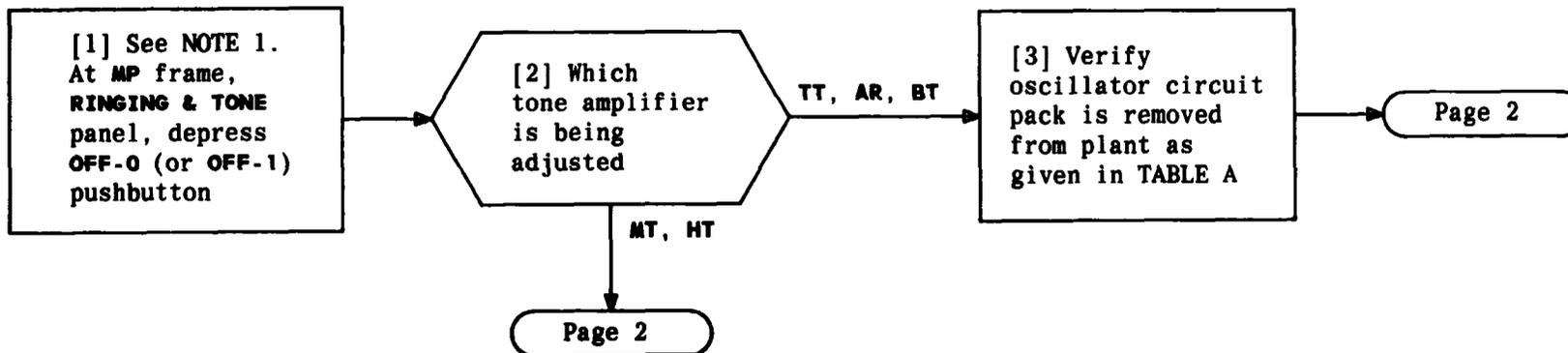


FIG. 1

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ADJUST LOW VOLTAGE MONITOR



TONE AMPLIFIER	OSCILLATOR CIRCUIT PACK THAT IS REMOVED		CONNECTION OF DMM ACROSS TERMINALS OF CPA1111 TRAN CONNECTOR	POTENTIOMETER TO BE ADJUSTED	VOLTAGE LEVEL - VOLTS RMS †
	FREQUENCY	CODE			
TT	350	A980 or A1151	14 and 25	ADJ-2 (R4)	0.850
AR	440	A981 or A1152	2 and 10	ADJ-1 (R3)	0.255
BT	480	A982 or A1153	18 and 22	ADJ-2 (R4)	0.1414
MT	*		16 and 24	ADJ-2 (R4)	0.480
HT	*		5 and 7	ADJ-1 (R3)	0.290

* No oscillator circuit pack is removed

† True RMS meter must be used

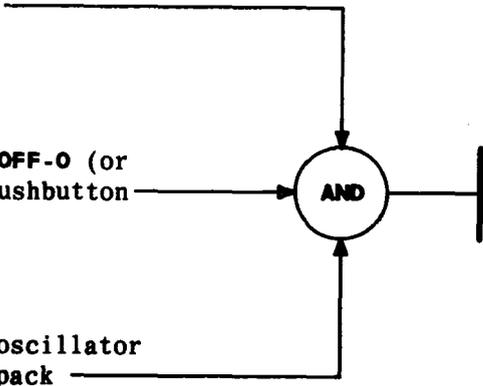
NOTE 1	
Information enclosed in parentheses refers to Side 0 or to Side 1	
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ADJUST TONE AMPLIFIER TO NORMAL VOLTAGE LEVEL

[13] On 305 amplifier circuit pack, adjust potentiometer given in TABLE B until DMM indicates voltage in TABLE B

[14] Depress OFF-0 (or OFF-1) pushbutton

[15] Install oscillator circuit pack



ADJUST TONE AMPLIFIER TO NORMAL VOLTAGE LEVEL

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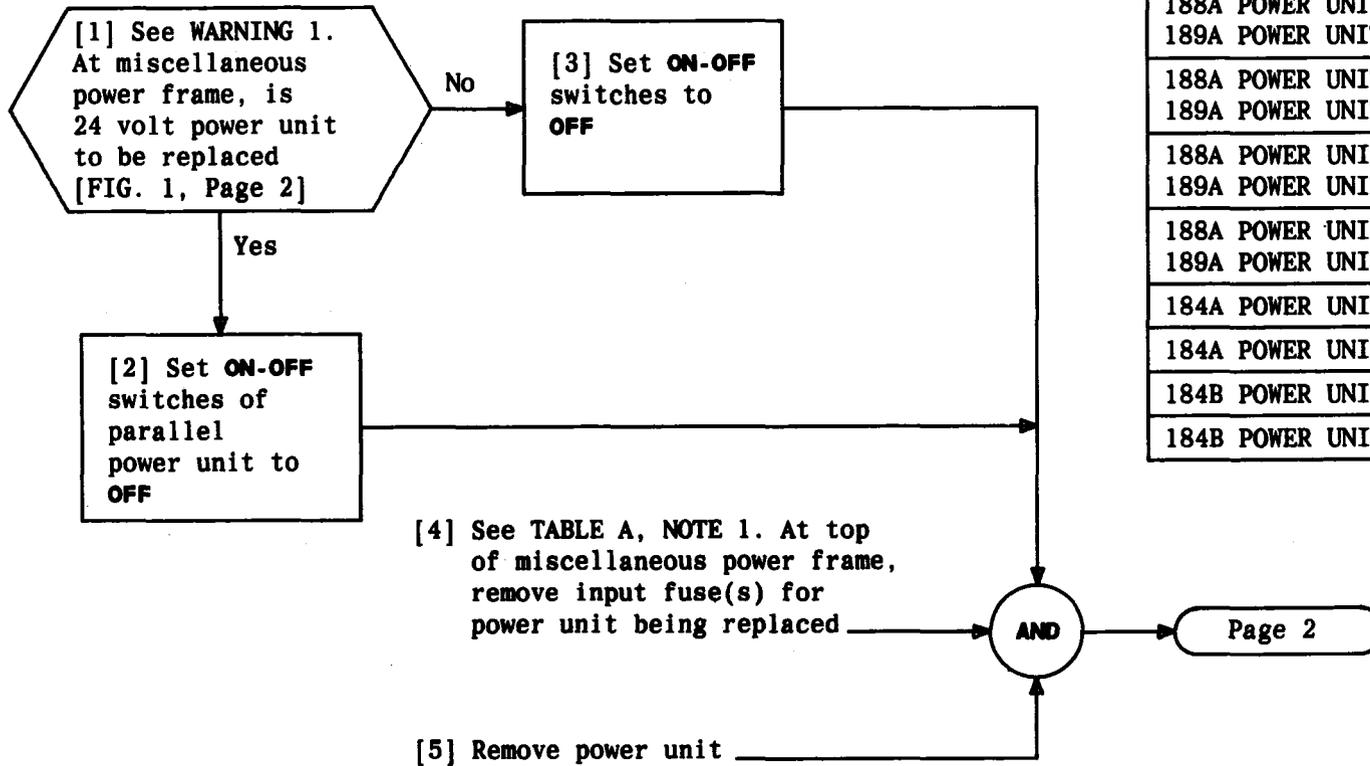


TABLE A INPUT FUSES		
POWER UNIT	CONVERTER	FUSE
188A POWER UNIT 189A POWER UNIT	+24 CONVA(0) [a]	1ABS0 1CV0
188A POWER UNIT 189A POWER UNIT	+24 CONVB(0) [b]	2ABS0 2CV0
188A POWER UNIT 189A POWER UNIT	+24 CONVA(1) [c]	1ABS1 1CV1
188A POWER UNIT 189A POWER UNIT	+24 CONVB(1) [d]	2ABS1 2CV1
184A POWER UNIT	+48 CONV(0) [e]	D0
184A POWER UNIT	+48 CONV(1) [f]	D1
184B POWER UNIT	±130 CONV(0) [g]	C0
184B POWER UNIT	±130 CONV(1) [h]	C1

NOTE 1
Remove (CV) fuse first and replace last

WARNING 1
Service loss and tape damage may result if both tape cartridges are not removed from TDC, and off-line SYNC is not in STANDBY

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REPLACE 184A, 184B, 188A, OR 189A POWER UNIT

[6] Install and firmly seat new power unit

[7] Insert input fuse(s) [NOTE 1]

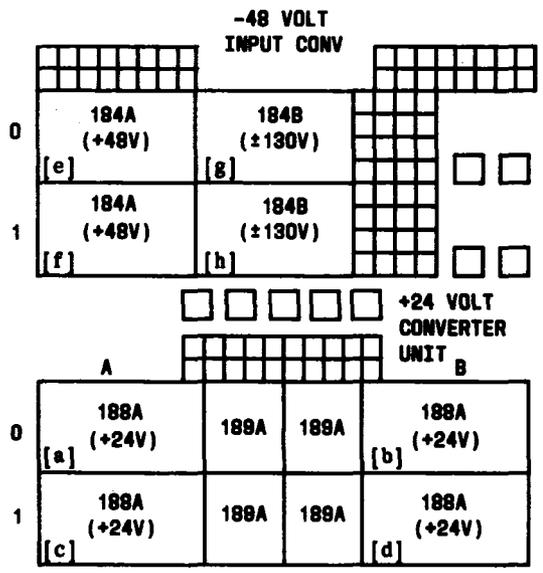
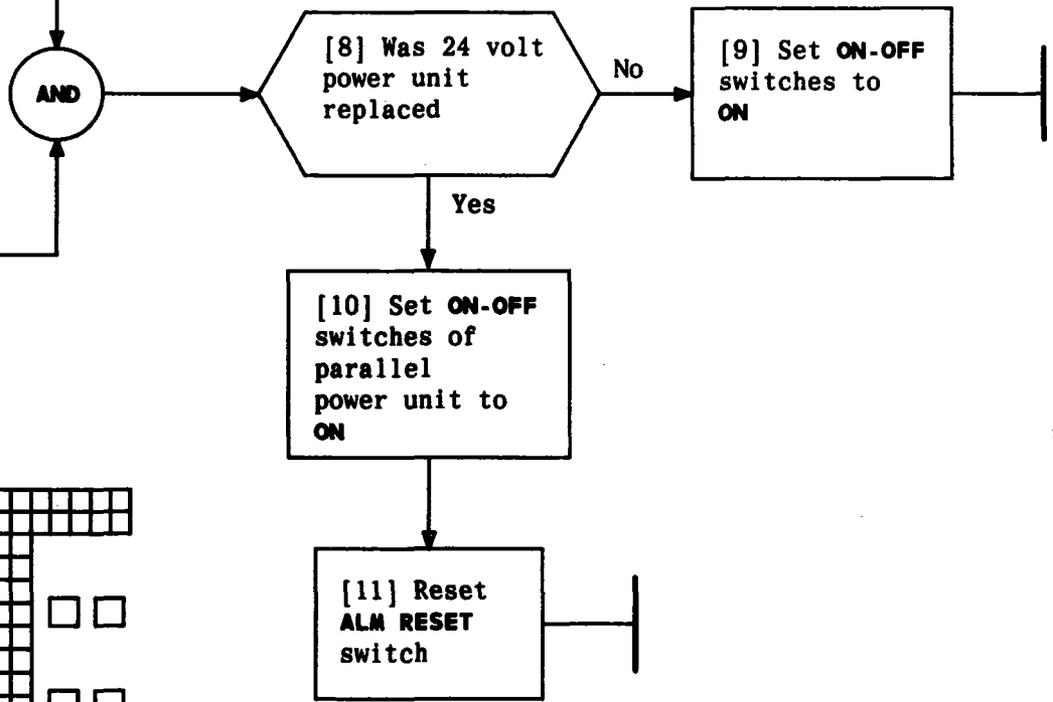


FIG. 1

REPLACE 184A, 184B, 188A, OR 189A POWER UNIT

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SUMMARY

See CAUTION 1 and WARNING 1. At 400A T GEN connect 3A NOISE MEASURING SET across terminals 17 and 26 on TB1 terminal board. Meter should indicate 10 ± 1 dB_rn. Repeat across terminals 26 and 27

- [1] Obtain test equipment in TABLE A

On 3A NOISE MEASURING SET:

- [2] Connect two test leads with 241A plugs at IN jacks
 [3] Rotate FUNCTION switch to 900 NM
 [4] Set DAMP-NORM switch to NORM
 [5] Rotate DBRN switch to 85
 [6] Plug in 497A NETWORK to 3KC FLAT WTG position
 [7] Connect GRD terminal to ground

At MP frame on 400A T GEN:

- [8] Remove front cover
 [9] See CAUTION 1 and WARNING 1. At right of 400A T GEN, connect 3A NOISE MEASURING SET at terminals 17 and 26

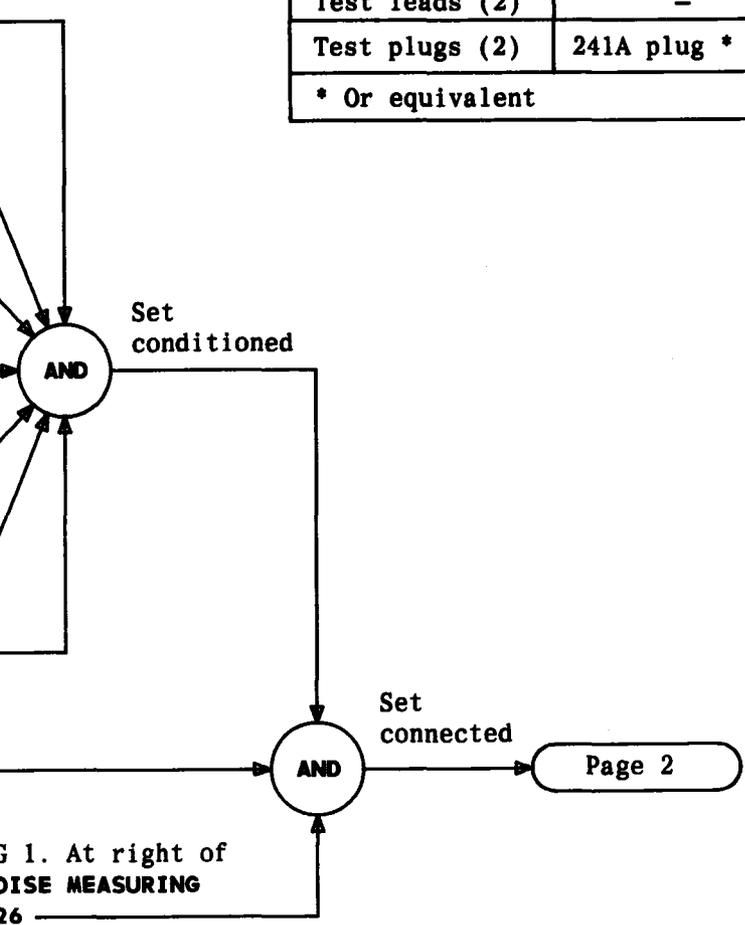
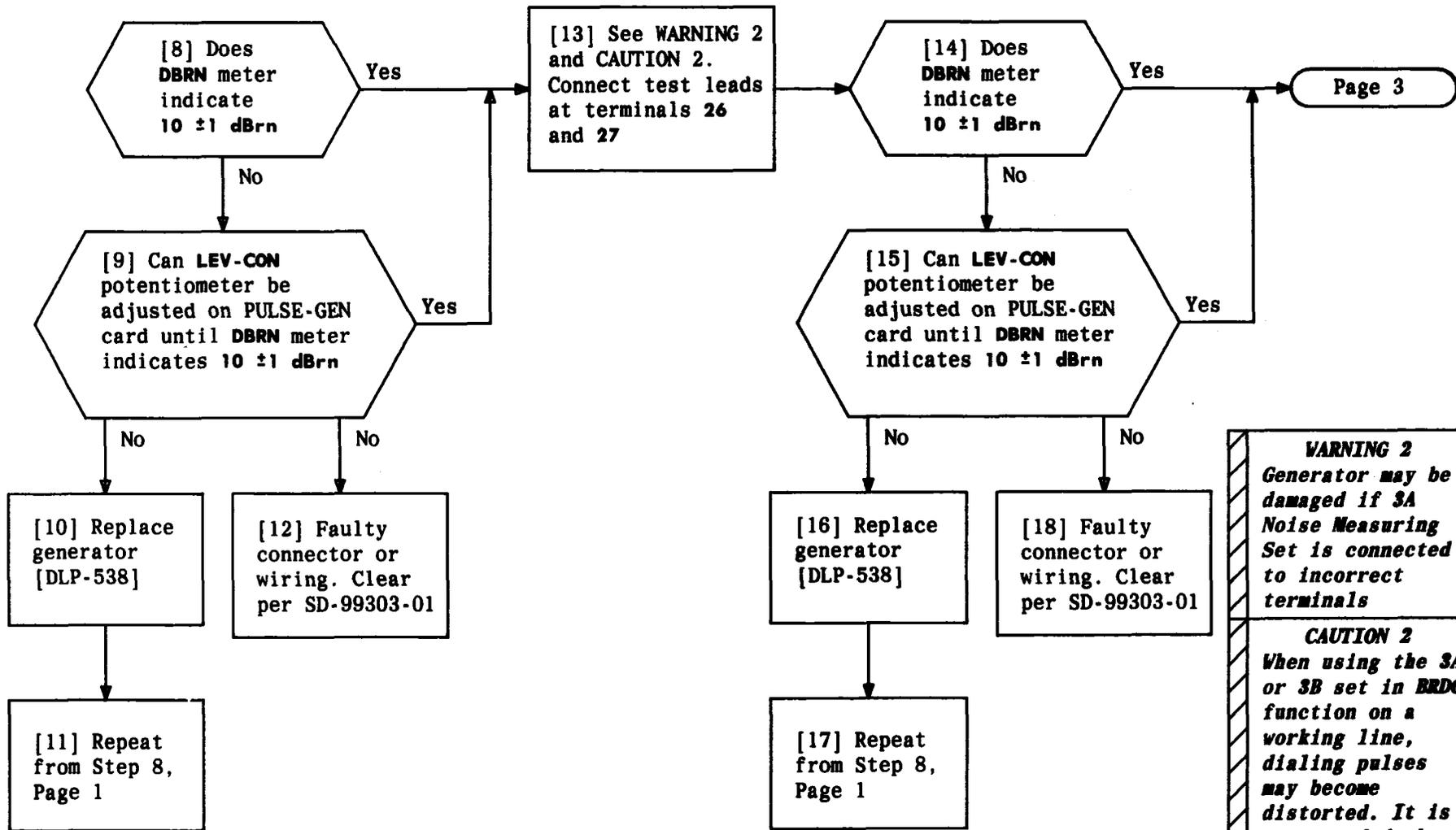


TABLE A

EQUIPMENT REQUIRED	RECOMMENDED TYPE
Noise measuring set	J94003A 3A noise measuring set*
Test leads (2)	-
Test plugs (2)	241A plug *
* Or equivalent	

WARNING 1
 Generator may be damaged if 3A NOISE MEASURING SET is connected to incorrect terminal

CAUTION 1
 When using the 3A or 3B set in BRDG function on a working line, dialing pulses may become distorted. It is recommended that the set be connected to the line no longer than necessary

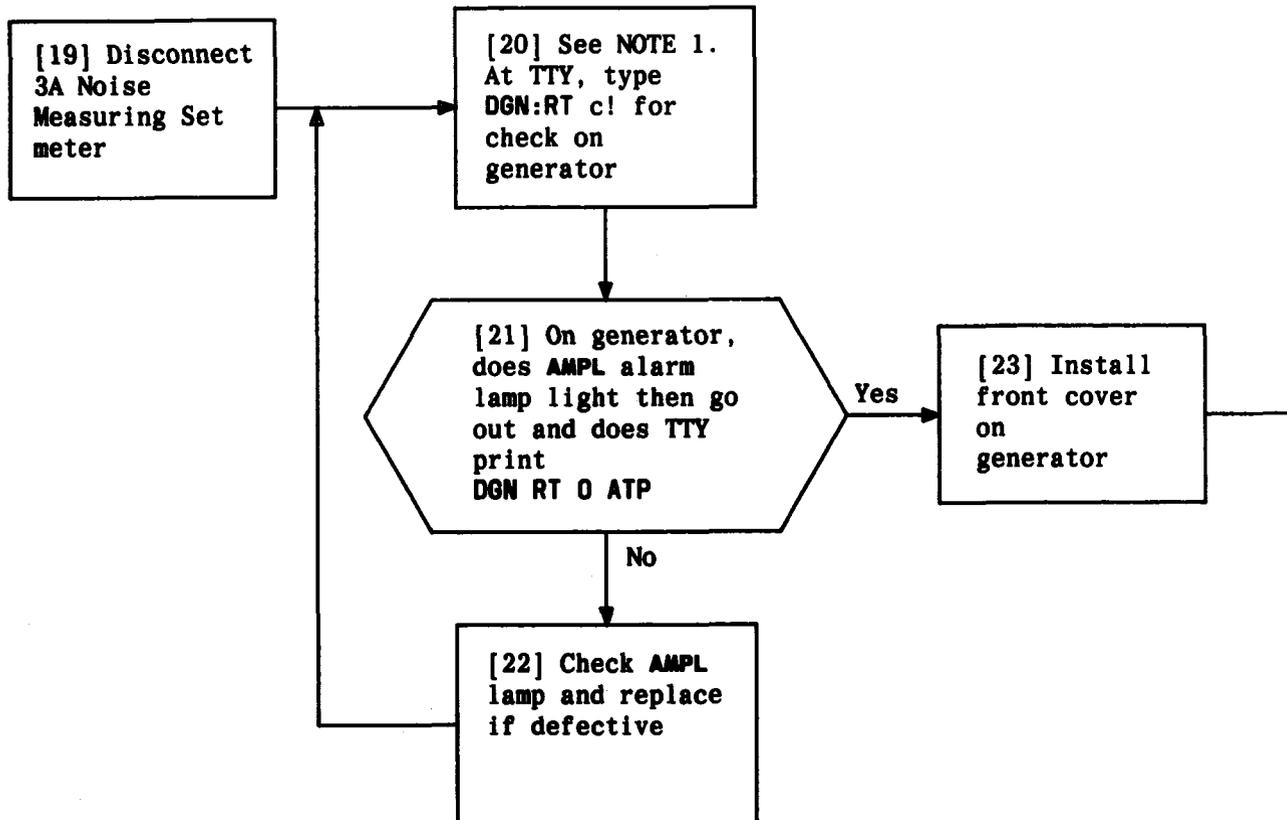


WARNING 2
Generator may be damaged if 3A Noise Measuring Set is connected to incorrect terminals

CAUTION 2
When using the 3A or 3B set in BRDG function on a working line, dialing pulses may become distorted. It is recommended that the set be connected to the line no longer than necessary

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CHECK AND ADJUST 400A TONE GENERATOR



NOTE 1	
Diagnostic for either side 0 or side 1 will initiate diagnostics on 400A tone generator	
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CHECK AND ADJUST 400A TONE GENERATOR

[1] At miscellaneous power frame below inverter, remove F26 and F18 fuses

[2] On 400A T GEN terminal board TB1, mark and disconnect leads at terminals 17, 26, 27, 36, 41, 44, 47, and 48

Wiring disconnected



At rear of 400A T GEN [FIG. 1]:

[3] Remove 4 mounting bolts and insulated bushings that bolt generator to mounting bracket

Generator removed



[4] Carefully remove generator from front of framework

[5] Secure all wiring that was disconnected

[6] Carefully position and align replacement generator to mounting bracket

[7] Install generator mounting bolts and insulated bushings



[8] At TB1 terminal board, reconnect leads at terminals 17, 26, 27, 36, 41, 44, 47, and 48

[9] Install F26 and F18 fuses

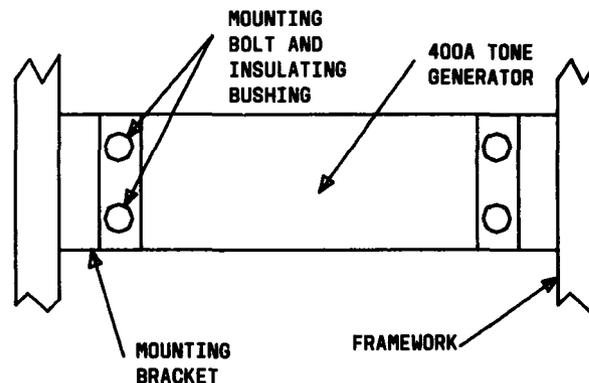
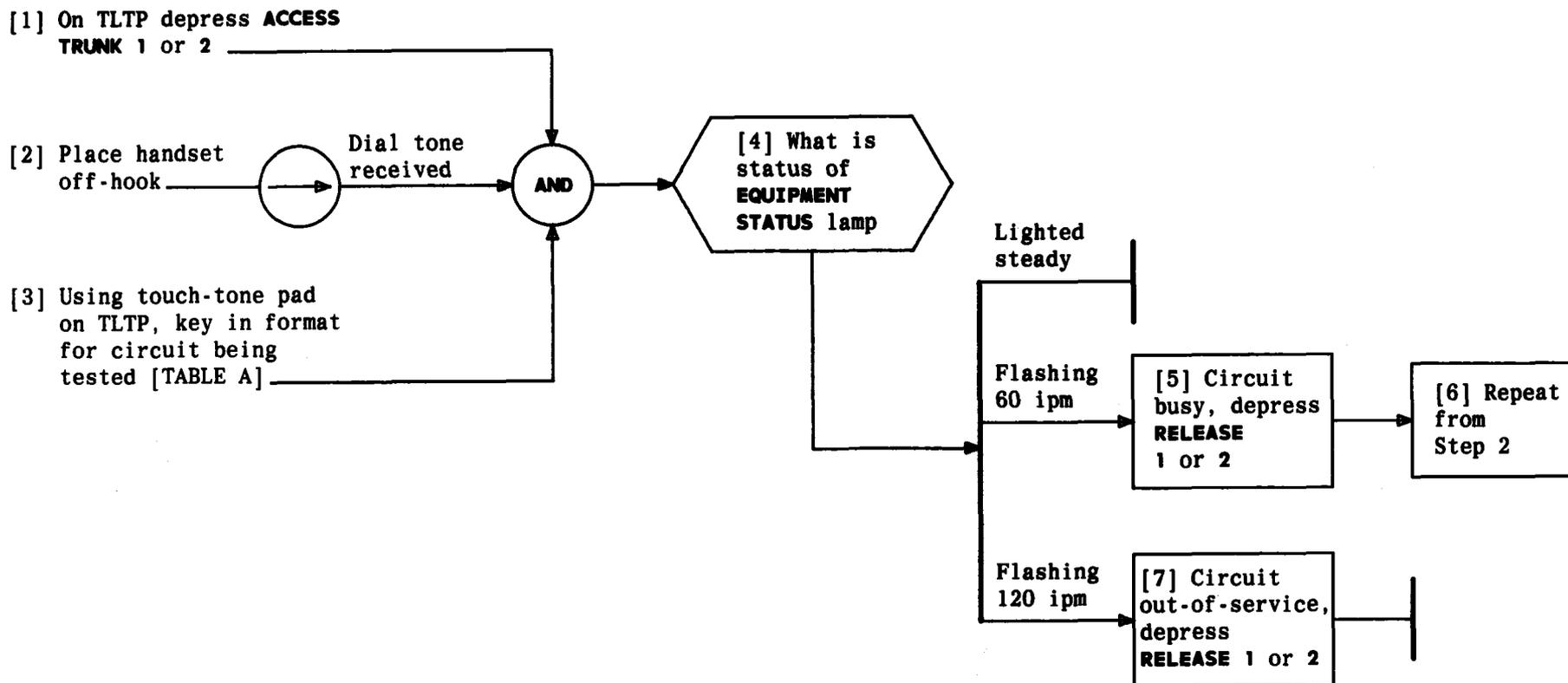


FIG. 1 - 400A Tone Generator - Rear View

REPLACE 400A TONE GENERATOR

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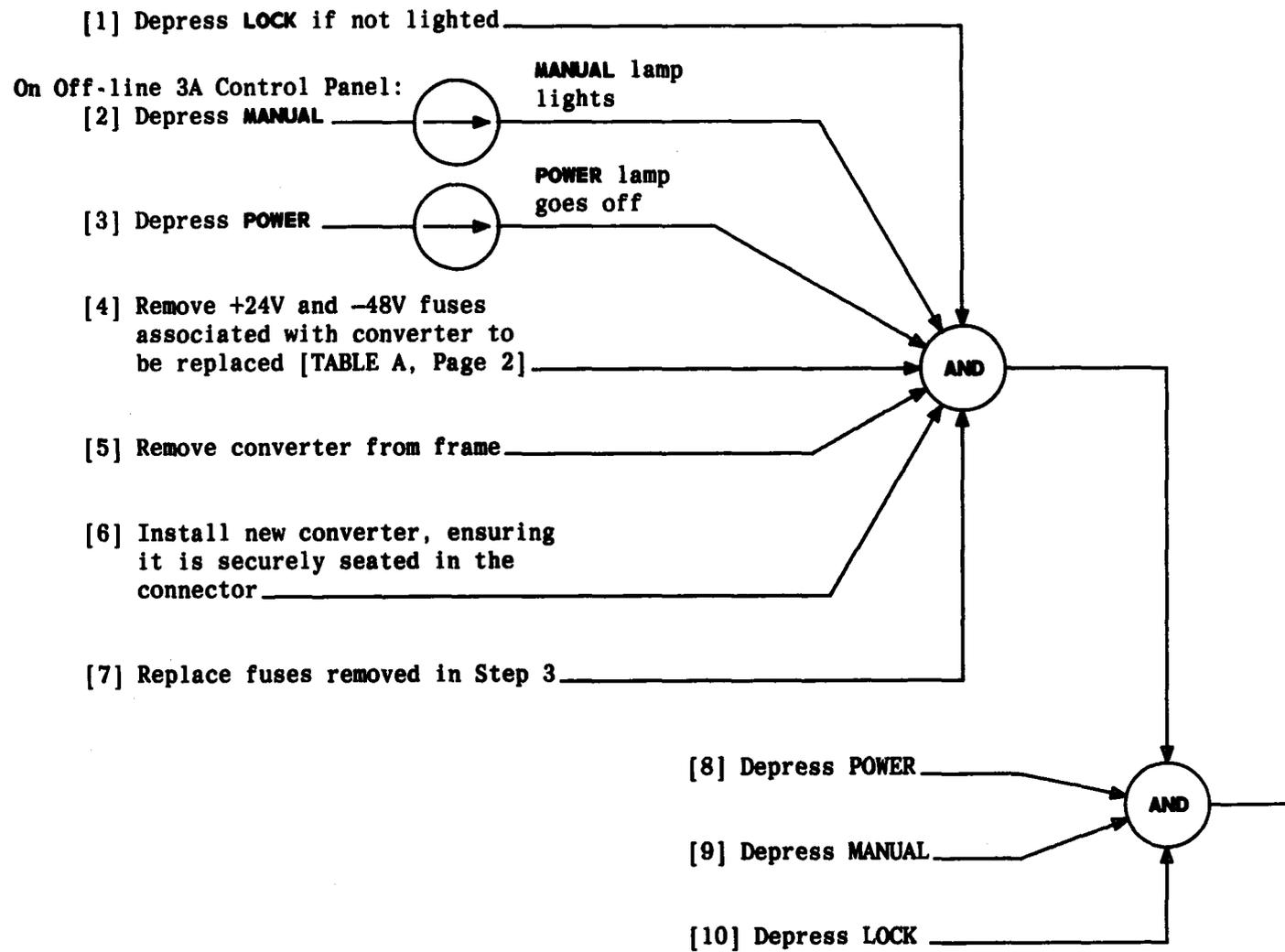
SET UP TRUNK AND LINE TEST PANEL (TLTP) FOR TESTING

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TABLE A						
ASSIGNED DIALING CODES						
TYPE OF CIRCUIT	KEYING FORMAT					
Trunk Circuit	1	TGN	MEMN	#		
Trunk Circuit With Outpulsing	1	TGN	MEMN	*	Wait for dial tone	Dial digits # to be outpulsed
Service and Test Circuits	1	TGN	MEMN	#		
Service Circuit With More Than One Port	1	TGN	MEMN	Number of port to be tested (0,1, or 2)	#	
Tone and Announcement Circuit	1	TGN	MEMN	#		
Subscriber Line	2	Directory Number		#		
Junctor	3	CGN	JSN	#		
Trunk to #5 XBAR ACD (with/without SF units)	6	TGN	MEMN	*	Wait for dial tone	1/0 [†] #
		TGN	Trunk Group Number	3 Digits	Prefix with zeros if necessary	
		MEMN	Member Number	3 Digits		
		CGN	Concentrator Group Number	2 Digits		
		JSN	Junctor Switch Number	2 Digits		
		*	Eleventh Button on Touch-Tone Pad			
		#	Twelfth Button on Touch-Tone Pad			
	[†] : 1 = with SF Unit 0 = without SF Unit					

SET UP TRUNK AND LINE TEST PANEL (TLTP) FOR TESTING

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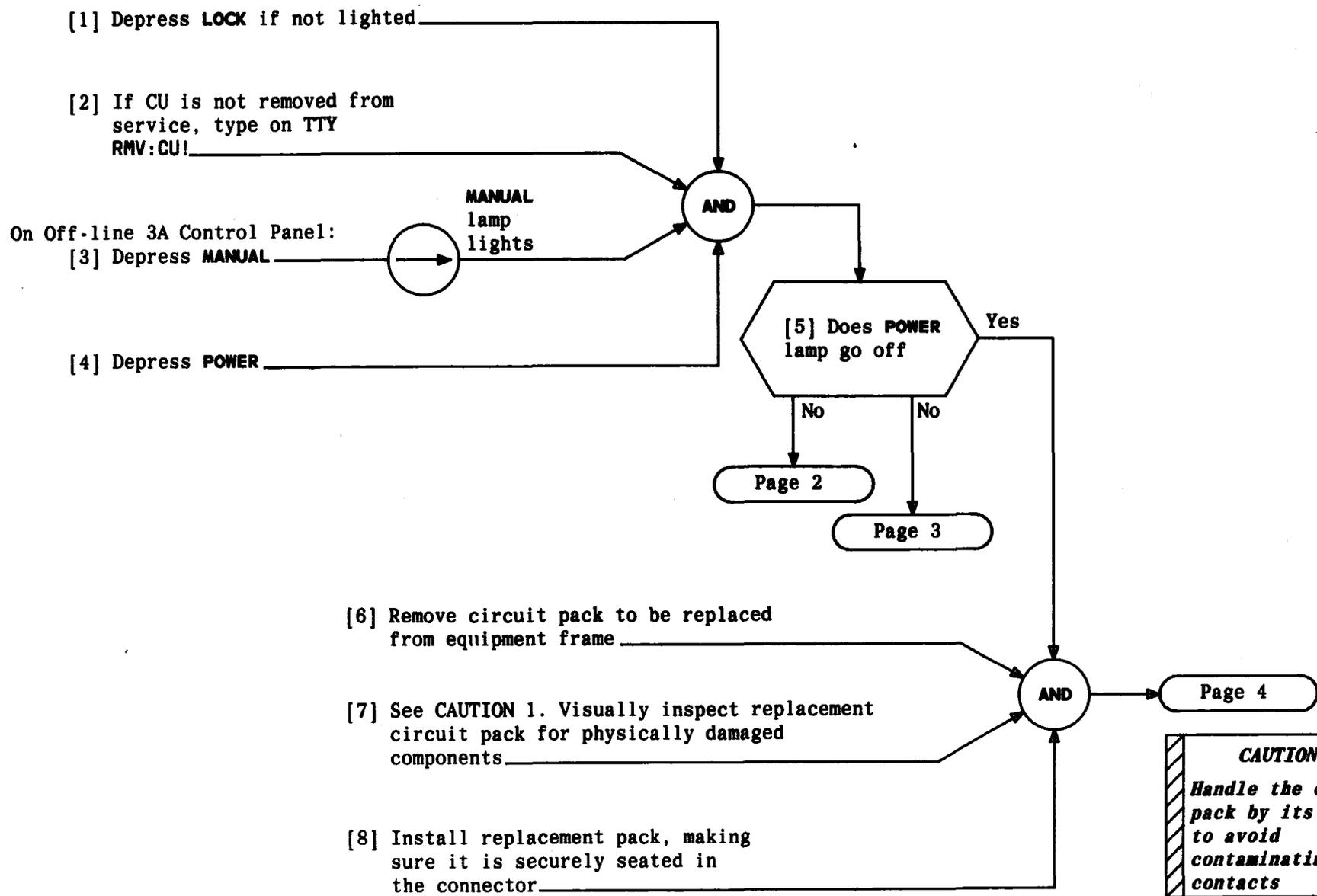
REPLACE DEFECTIVE CONVERTER IN PROCESSOR FRAME

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TABLE A									
CONV. OUTPUT DESIG.	+3V PM054D	+3V PM054C	+5V PM061C	+3V PM054A	+3V PM054B	+5V PM061D	+3V PM058D	+3V PM054F	+3V PM054E
+24V fuse	AA11	AA5	AA5	AA5	AA5	AA12	AA12	AA12	AA12
-48V fuse	A0	A1	A1	A1	A1	A2	A2	A2	A2
EQUIP. LOCATION	10-04	10-09	10-14	10-19	10-24	10-29	10-34	10-38	10-42
CONV. OUTPUT DESIG.	+3V PM058A	+3V PM058E	+5V PM061A	+3V PM062C	+3V PM062A	+5V PM061B	+3V PM062B	+3V PM058F	+3V PM058C
+24V fuse	AA11	AA10, AA6	AA6	AA6	AA6	AA4	AA4	AA4	AA4
-48V fuse	A0	A3	A3	A3	A3	A4	A4	A4	A4
EQUIP. LOCATION	06-05	06-09	06-14	06-19	06-24	06-29	06-34	06-38	06-42
CONV. OUTPUT DESIG.	+5V PM039A	+3V PM058B							
+24V fuse	AA10	AA10							
-48V fuse	A0	A0							
EQUIP. LOCATION	02-05	02-09							

REPLACE DEFECTIVE CONVERTER IN PROCESSOR FRAME

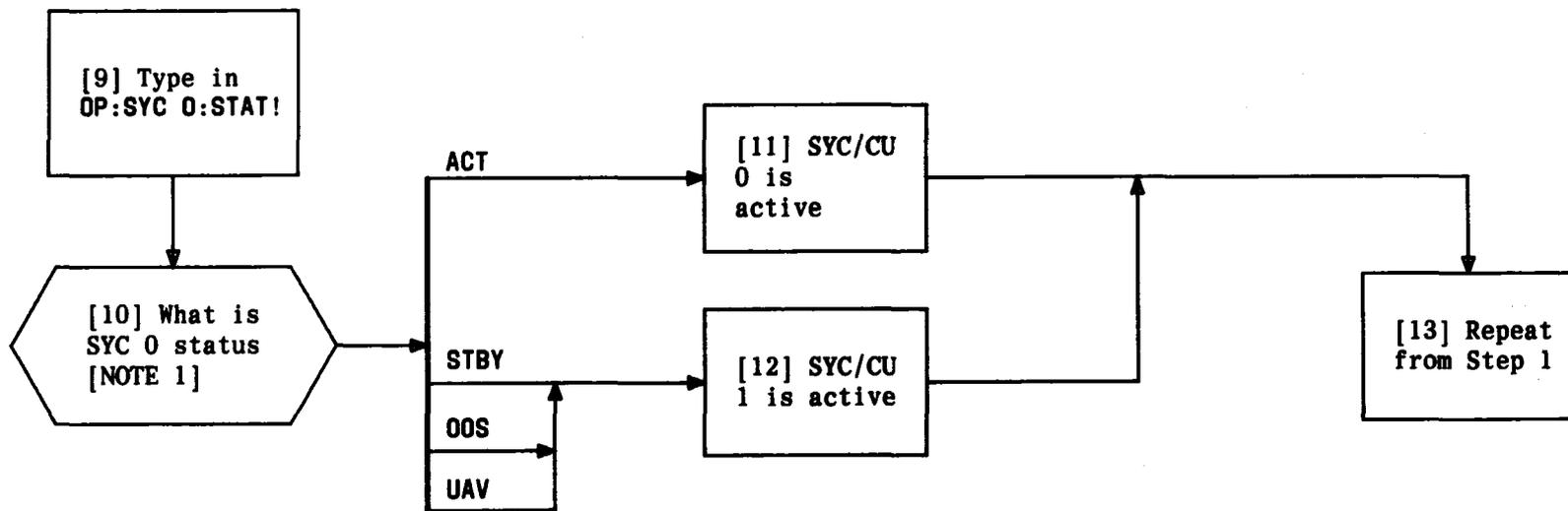
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CAUTION 1
Handle the circuit pack by its edges to avoid contaminating its contacts

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REPLACE CIRCUIT PACK IN PROCESSOR FRAME

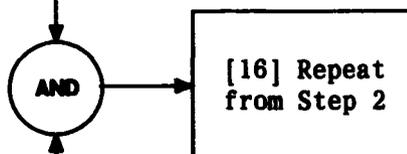


NOTE 1	
A CU is OOS when either the CU or peripheral controller (SC, NWC, PPD and/or FIOC) are removed from service. A CU is UAV when any of the above have power removed or LOCK and/or FORCE SELECT are lighted	
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REPLACE CIRCUIT PACK IN PROCESSOR FRAME

[14] See CAUTION 2. Determine which side appears to be off-line _____

[15] Open the off-line 3A Control Panel and set TEST MODE key located on rear side of panel door to TEST _____

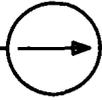


CAUTION 2 <i>If off-line 3A CC cannot be determined, the system may initialize during this procedure. If possible wait for low traffic period before continuing</i>	
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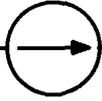
REPLACE CIRCUIT PACK IN PROCESSOR FRAME

On Off-Line 3A CC:

[17] Depress **POWER**



[18] Depress **MANUAL**



MANUAL
extinguishes

[19] If **TEST** key is in
TEST (up) position,
set to **NORM** (down)
position

[20] Depress
LOCK



REPLACE CIRCUIT PACK IN PROCESSOR FRAME

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[1] Remove associated fuses located at base of frame [TABLES A and B]

[2] Remove junctor circuit pack from frame [FIG. 1]

[3] Install new circuit pack, ensuring it is securely seated in the connector

[4] Replace fuses removed in Step 2



TABLE A	
JUNCTOR CIRCUIT PACK	ASSOCIATED FUSES
00 - 03	SJ0, BJ0
04 - 07	SJ1, BJ1
08 - 11	SJ2, BJ4
12 - 15	SJ3, BJ5
16 - 19	SJ4, BJ2
20 - 23	SJ5, BJ3
24 - 27	SJ6, BJ6
28 - 31	SJ7, BJ7

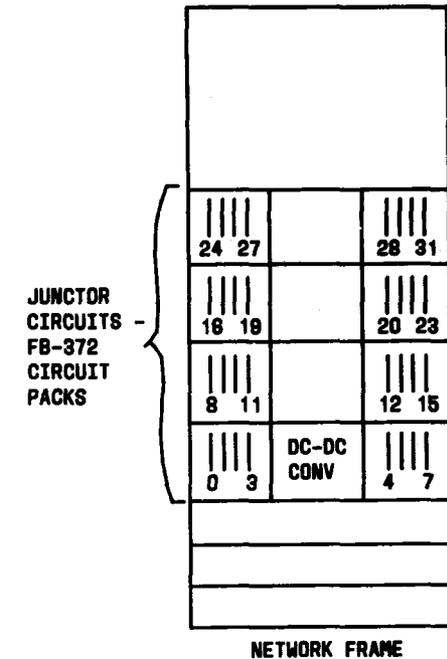
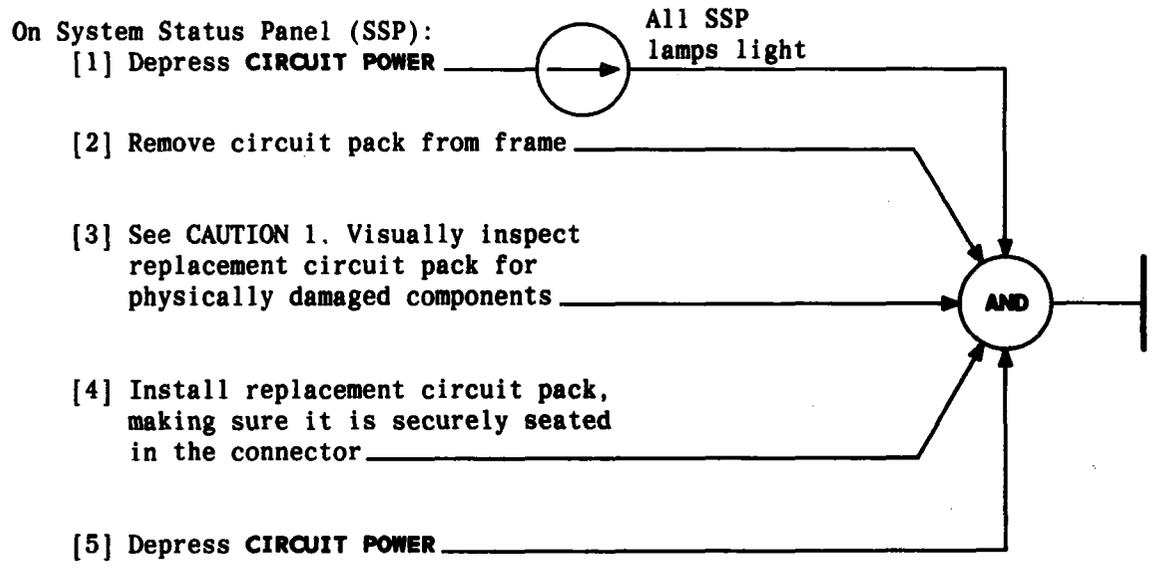


FIG. 1

TABLE B																					
PHYSICAL LAYOUT OF FUSES AT BASE OF FRAME																					
0A2	0A3	0B2	0B3	0C2	0C3	SJ1	SJ5	ST1	ST5	SCD1		LT	SPD1	SPD5	TT1	TT5	BF1		BCD1	BJ1	BJ5
1A2	1A3	1B2	1B3	1C2	1C3	SJ3	SJ7	ST3	SRR1	SCD3			SPD3	SPD7	TT3	TRR1	FF1		BCD3	BJ3	BJ7
0A0	0A1	0B0	0B1	0C0	0C1	SJ0	SJ4	ST0	ST4	SRR2	SCD2	MC	SPD0	SPD4	TT0	TT4	TRR2	FF0	BCD0	BJ0	BJ4
1A0	1A1	1B0	1B1	1C0	1C1	SJ2	SJ6	ST2	SRR0	SCD0			SPD2	SPD6	TT2	TRR0	BF0		BCD2	BJ2	BJ6



CAUTION 1
Handle circuit pack by the edges to avoid contaminating contacts

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REPLACE CIRCUIT PACK IN MAINTENANCE FRAME

[1] From office records Form 3201
obtain Dial Tone First coin line
circuit and its associated
equipment frame location

[2] Remove circuit pack [FB428]
from equipment frame

[3] Visually inspect replacement
circuit pack for component
damage

[4] Install equipment circuit pack,
ensuring it is securely seated
in the connector



REPLACE DIAL TONE FIRST COIN LINE CIRCUIT PACK

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[1] From office records, Form 3201, obtain trunk group, member number, and equipment frame location of coin control circuit to be replaced

[2] If circuit has not been removed from service, type on TTY, RMV:SVC a,b!
a = trunk group
b = member number

[3] Remove associated fuse located at base of frame [TABLE A]

[4] Remove circuit pack [FB423] from equipment frame

[5] Visually inspect replacement circuit pack for component damage

[6] Install replacement circuit pack in equipment frame

[7] Replace fuses removed in Step 3

COIN CONTROL CIRCUIT PACK	FRAME LOCATION	FUSE
0	144-03	CC0
1	144-07	CC1
2	144-10	CC2
3	144-14	CC3

AND

REPLACE COIN CONTROL CIRCUIT PACK

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[1] Remove associated fuses located at base of frame [TABLES A and B]

[2] Remove PD circuit pack [FC-181] from frame location [TABLE A]

[3] Install new circuit pack, ensuring it is securely seated in the connector

[4] Replace fuses removed in Step 2

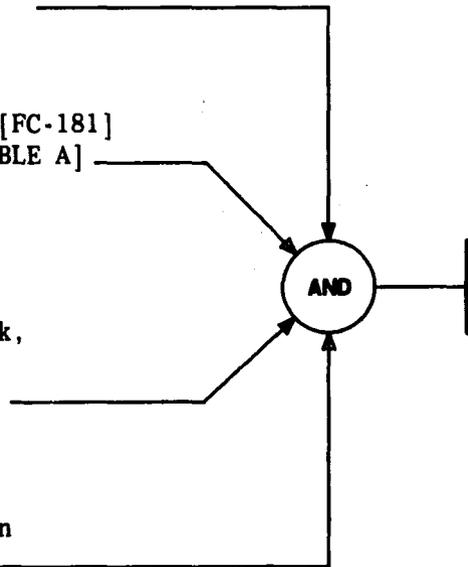


TABLE A				
JUNCTOR CIRCUIT	ASSOCIATED PD PACK FC-181	PACK LOCATION IN EQUIP. FRAME		FUSE
		LEVEL	POSITION	
00 - 03	PRPHDC0	36	18	SPD0
04 - 07	PRPHDC1	36	20	SPD1
08 - 11	PRPHDC2	36	26	SPD2
12 - 15	PRPHDC3	36	27	SPD3
16 - 19	PRPHDC4	40	18	SPD4
20 - 23	PRPHDC5	40	20	SPD5
24 - 27	PRPHDC6	40	26	SPD6
28 - 31	PRPHDC7	40	27	SPD7

TABLE B																					
PHYSICAL LAYOUT OF FUSES AT BASE OF FRAME																					
OA2	OA3	OB2	OB3	OC2	OC3	SJ1	SJ5	ST1	ST5	SCD1		LT	SPD1	SPD5	TT1	TT5	BF1		BCD1	BJ1	BJ5
1A2	1A3	1B2	1B3	1C2	1C3	SJ3	SJ7	ST3	SRR1	SCD3			SPD3	SPD7	TT3	TRR1	FF1		BCD3	BJ3	BJ7
OA0	OA1	OB0	OB1	OC0	OC1	SJ0	SJ4	ST0	ST4	SRR2	SCD2	MC	SPD0	SPD4	TT0	TT4	TRR2	FF0	BCD0	BJ0	BJ4
1A0	1A1	1B0	1B1	1C0	1C1	SJ2	SJ6	ST2	SRR0	SCD0			SPD2	SPD6	TT2	TRR0	BF0		BCD2	BJ2	BJ6

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[1] Determine other junctors to be removed from service before pulling ferrod pack [TABLE A]

[2] Remove associated fuses located at base of frame [TABLES A and B]

[3] Remove ferrod circuit pack [FC-182] from frame location [TABLE A]

[4] Install new circuit pack, ensuring it is securely seated in the connector

[5] Replace fuses removed in Step 3

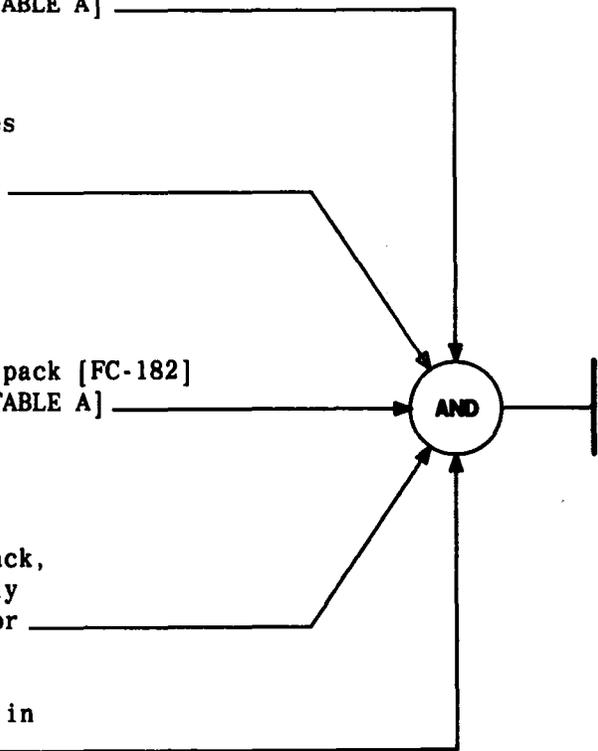


TABLE A				
JUNCTOR CIRCUIT	ASSOCIATED FERROD PACK FC-182	PACK LOCATION IN EQUIP. FRAME		FUSES
		LEVEL	POSITION	
00 - 03 08 - 11	FRDSCA0	36	17	BJ0, BJ4
04 - 07 12 - 15	FRDSCA3	36	29	BJ1, BJ5
16 - 19 24 - 27	FRDSCA4	40	17	BJ2, BJ6
20 - 23 28 - 31	FRDSCA7	40	29	BJ3, BJ7

TABLE B																					
PHYSICAL LAYOUT OF FUSES AT BASE OF FRAME																					
0A2	0A3	0B2	0B3	0C2	0C3	SJ1	SJ5	ST1	ST5	SCD1		LT	SPD1	SPD5	TT1	TT5	BF1		BCD1	BJ1	BJ5
1A2	1A3	1B2	1B3	1C2	1C3	SJ3	SJ7	ST3	SRR1	SCD3			SPD3	SPD7	TT3	TRR1	FF1		BCD3	BJ3	BJ7
0A0	0A1	0B0	0B1	0C0	0C1	SJ0	SJ4	ST0	ST4	SRR2	SCD2	MC	SPD0	SPD4	TT0	TT4	TRR2	FF0	BCD0	BJ0	BJ4
1A0	1A1	1B0	1B1	1C0	1C1	SJ2	SJ6	ST2	SRR0	SCD0			SPD2	SPD6	TT2	TRR0	BF0		BCD2	BJ2	BJ6

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REPLACE FERROD CIRCUIT PACK ASSOCIATED WITH JUNCTOR CIRCUIT

On Control Frame:

[1] See FIG. 1. Depress **REQ/OOS** for side to be removed from service

[2] Depress **PWR OFF** [FIG. 1]

[3] Remove circuit pack to be replaced [TABLE A]

[4] Visually inspect replacement circuit pack for component damage

[5] Install replacement pack in equipment frame, ensuring it is securely seated in the connector.

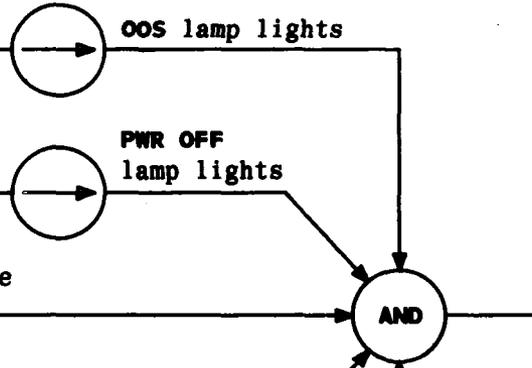


TABLE A			
CIRCUIT PACK	SYC	PACK LOCATION IN CONTROL FRAME	
		LEVEL	POSITION
FB414	0	144	03
FB415	0	144	07
FB414	1	144	33
FB415	1	144	37

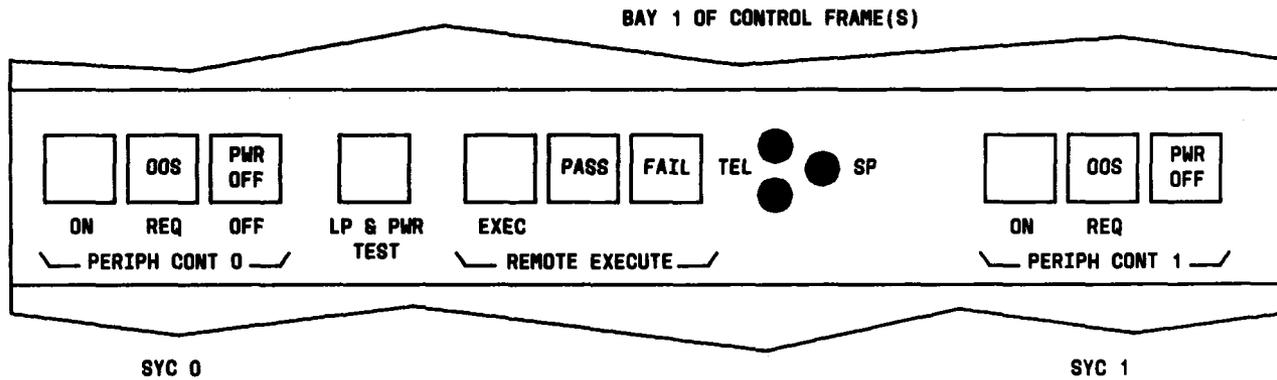


FIG. 1

REPLACE POWER SEQUENCING CIRCUIT PACKS IN CONTROL FRAME

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On Control Frame:

[1] See FIG. 1. Depress **REQ** for side to be removed from service

[2] Depress **OFF** [FIG. 1]

[3] Remove fuses from base of control frame for converter to be replaced [TABLE A]

[4] Remove converter to be replaced

[5] Visually inspect replacement circuit pack for component damage

[6] Install replacement pack in equipment frame, ensuring it is securely seated in the connector

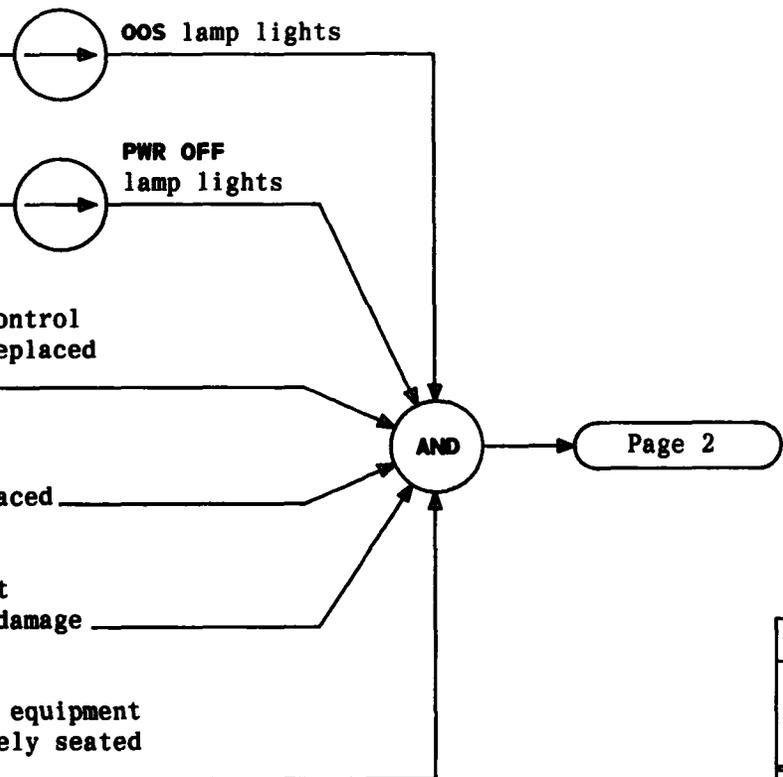


TABLE A			
CONVERTER	EQUIP. LOCATION		FUSES
	LEVEL	POS.	
+3 volt converter side 0	062	38	CVHA, CVLA
	062	43	
+3 volt converter side 1	162	38	CVHB, CVLB
	162	43	

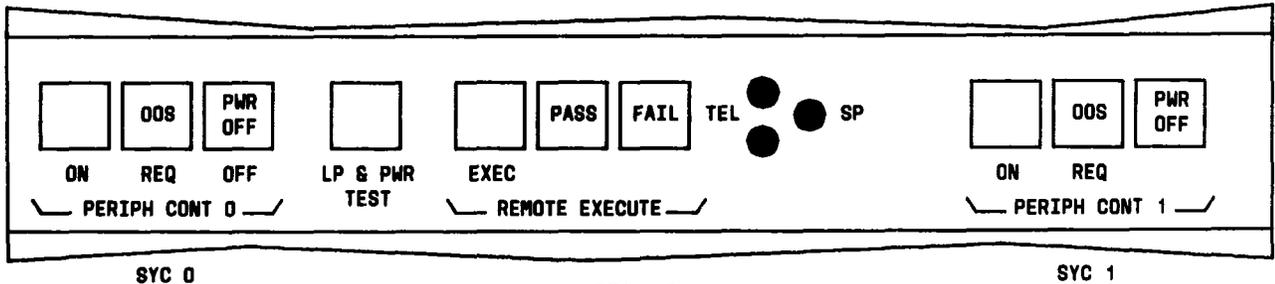
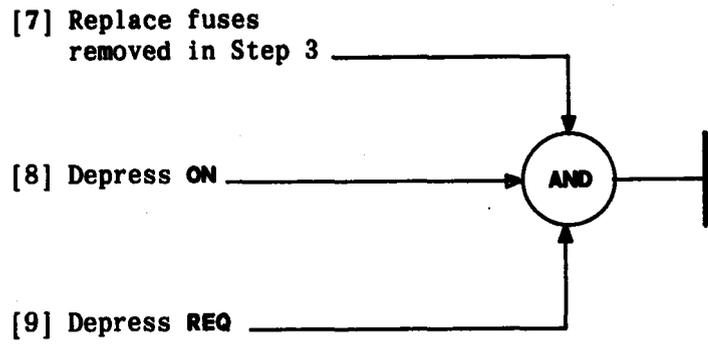


FIG. 1

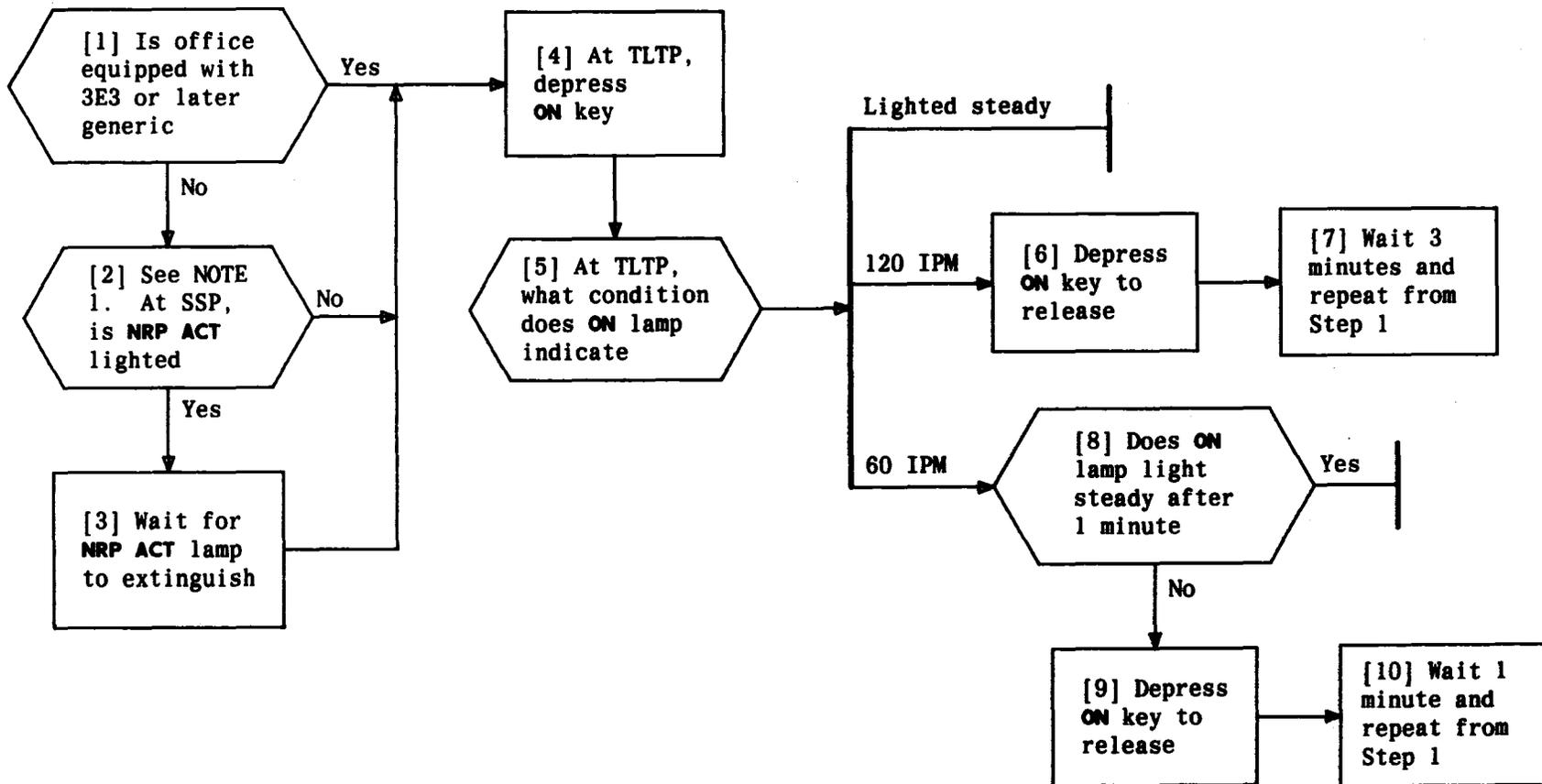
REPLACE +3V DC-DC CONVERTER IN THE CONTROL FRAME

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REPLACE +3V DC-DC CONVERTER IN CONTROL FRAME

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NOTE 1
 On some SSP vintages,
 the NRP ACT lamp may
 be labeled as SPARE

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ACTIVATE TRUNK AND LINE TEST PANEL (TLTP)

[1] From office records, obtain Noise Immunity Line circuit number and associated equipment frame location

[2] Remove Noise Immunity Line circuit pack from equipment frame [TABLE A]

[3] Visually inspect replacement circuit pack for component damage

[4] Install replacement pack ensuring it is securely seated in the connector

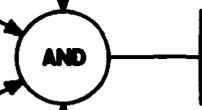
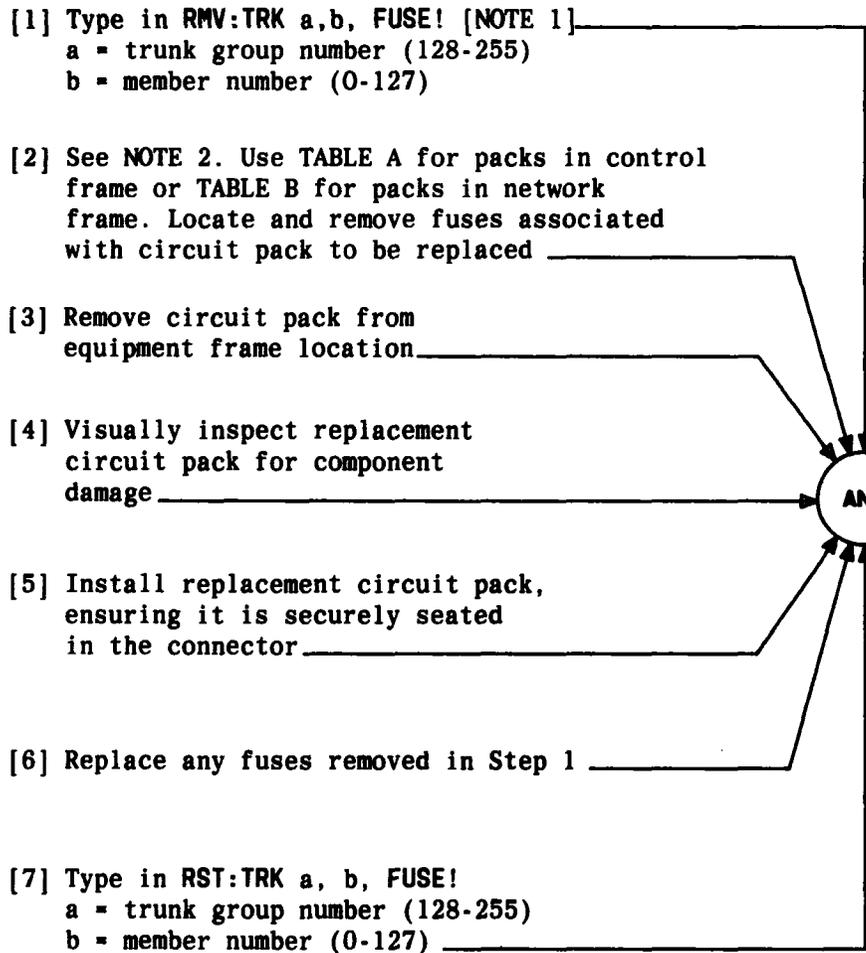


TABLE A	
NOISE IMMUNITY LINE CIRCUIT	
PACK NUMBER	TYPE CIRCUIT
FB407	Loop start
FB408	Ground start

REPLACE NOISE IMMUNITY LINE CIRCUIT PACK



NOTES	
1. System will camp on busy trunk before giving up on removal request. To remove trunk without checking for busy, use UCL option (this may cause service loss on trunk)	
2. Trunk circuits located in a miscellaneous frame are assigned locally. Use office records to determine location of all associated circuit packs	
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REPLACE TRUNK CIRCUIT AND ASSOCIATED CIRCUIT PACKS

TABLE A																													
TRUNK CIRCUITS LOCATED ON A CONTROL FRAME - SD-3H902-01 SHEET D2																													
TRUNK CKT	TRUNK CIRCUIT LOCATION		TRUNK CKT FUSES	PD PACK	PD PACK LOCATION		PD PACK FUSE	FERROD PACK	FERROD PACK LOCATION		FERROD PACK FUSE																		
	LEVEL	POSITION			LEVEL	POSITION			LEVEL	POSITION																			
00 01 02 03	118	03 07 10 14	SSA0, TSA0	PDG04	136	05	PD02	MFS6	022	26	None																		
04 05 06 07		18 22 25 29										SSB0, TSB0	PDG06	136	06	PD03	MFS6	022	26	None									
08 09 10 11		33 37 40 44																			SSA1, TSA1	PDG08	136	09	PD04	MFS6	022	26	None
12 13 14 15		03 07 10 14																											
16 17 18 19	18 22 25 29	SSB3, TSB1	PDG06	136	06	PD03	MFS6	022	26	None																			
20 21 22 23	33 37 40 44										SSA5, TSA3	PDG08	136	09	PD04	MFS6	022	26	None										

REPLACE TRUNK CIRCUIT AND ASSOCIATED CIRCUIT PACKS

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TABLE B											
TRUNK CIRCUITS LOCATED ON A NETWORK FRAME - SD-3H901-01 SHEET D2											
TRUNK CKT	TRUNK CIRCUIT LOCATION		TRUNK CKT FUSES	PD PACK	PD PACK LOCATION		PD PACK FUSE	FERROD PACK	FERROD PACK LOCATION		FERROD PACK FUSE
	LEVEL	POSITION			LEVEL	POSITION			LEVEL	POSITION	
00	024	03	ST0, TT0	PRPHDC0	036	18	SPD0	FRDSCA6	040	24	None
01		07									
02		10						FRDSCA6	040	24	None
03		14									
04	024	18	ST1, TT1	PRPHDC1	036	20	SPD1	FRDSCA6	040	24	None
05		22									
06		25						FRDSCA6	040	24	None
07		29									
08	024	33	ST2, TT2	PRPHDC2	036	26	SPD2	FRDSCA6	040	24	None
09		37									
10		40						FRDSCA6	040	24	None
11		44									
12	028	03	ST3, TT3	PRPHDC3	036	27	SPD3	FRDSCA6	040	24	None
13		07									
14		10						FRDSCA6	040	24	None
15		14									
16	028	18	ST4, TT4	PRPHDC4	040	18	SPD4	FRDSCA6	040	24	None
17		22									
18		25						FRDSCA6	040	24	None
19		29									
20	028	33	ST5, TT5	PRPHDC5	040	20	SPD5	FRDSCA6	040	24	None
21		37									
22		40						FRDSCA6	040	24	None
23		44									

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REPLACE TRUNK CIRCUIT AND ASSOCIATED CIRCUIT PACKS

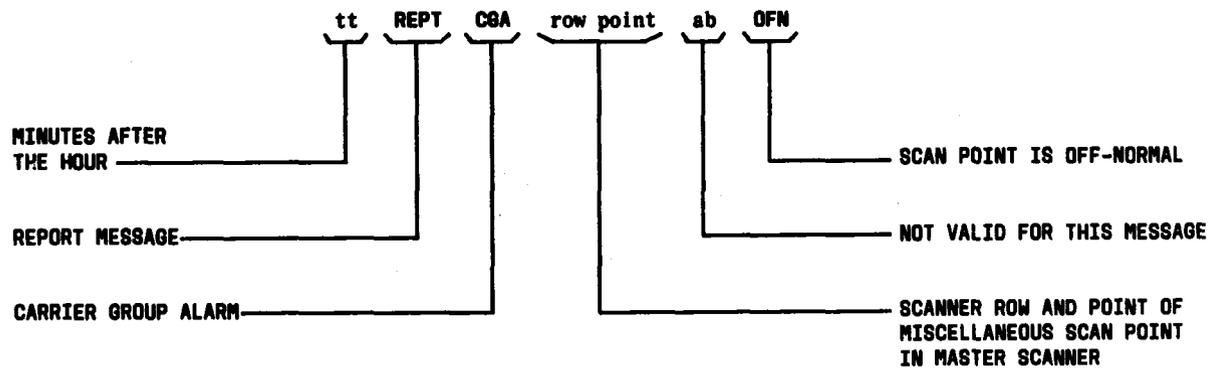
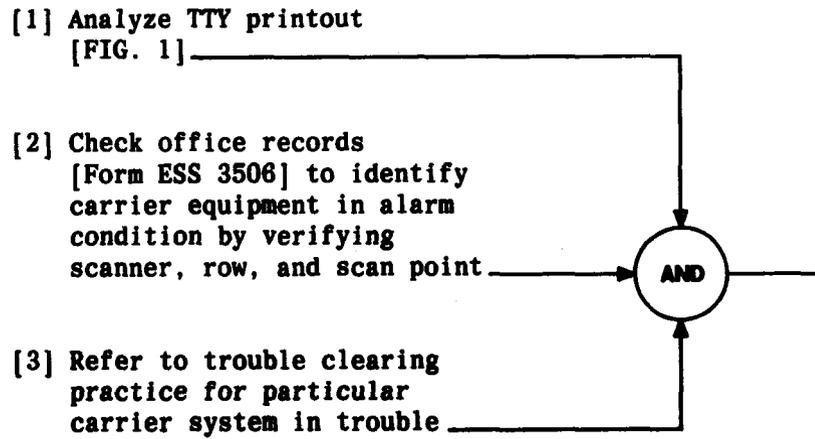


FIG. 1

ANALYZE CARRIER GROUP ALARM

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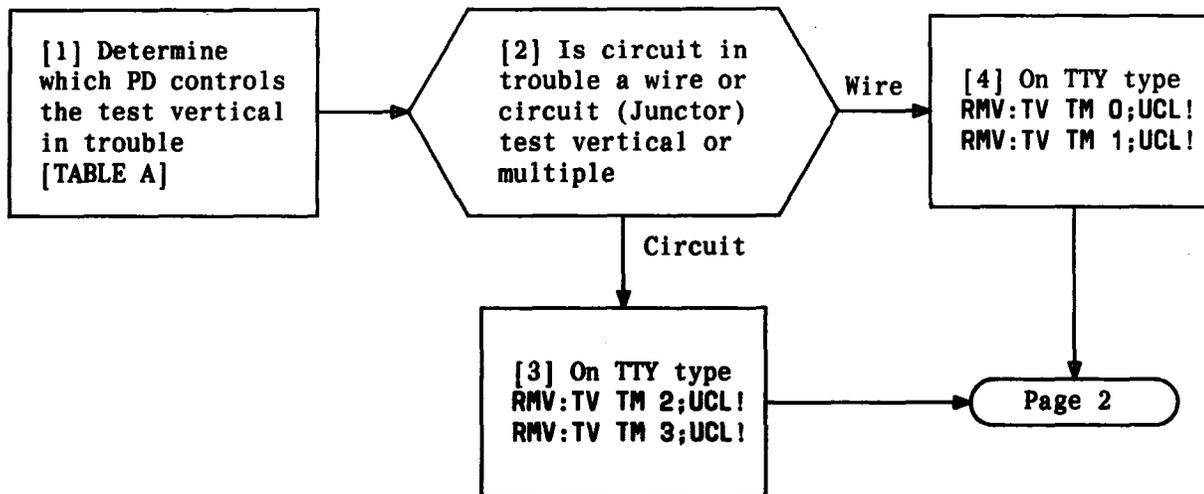
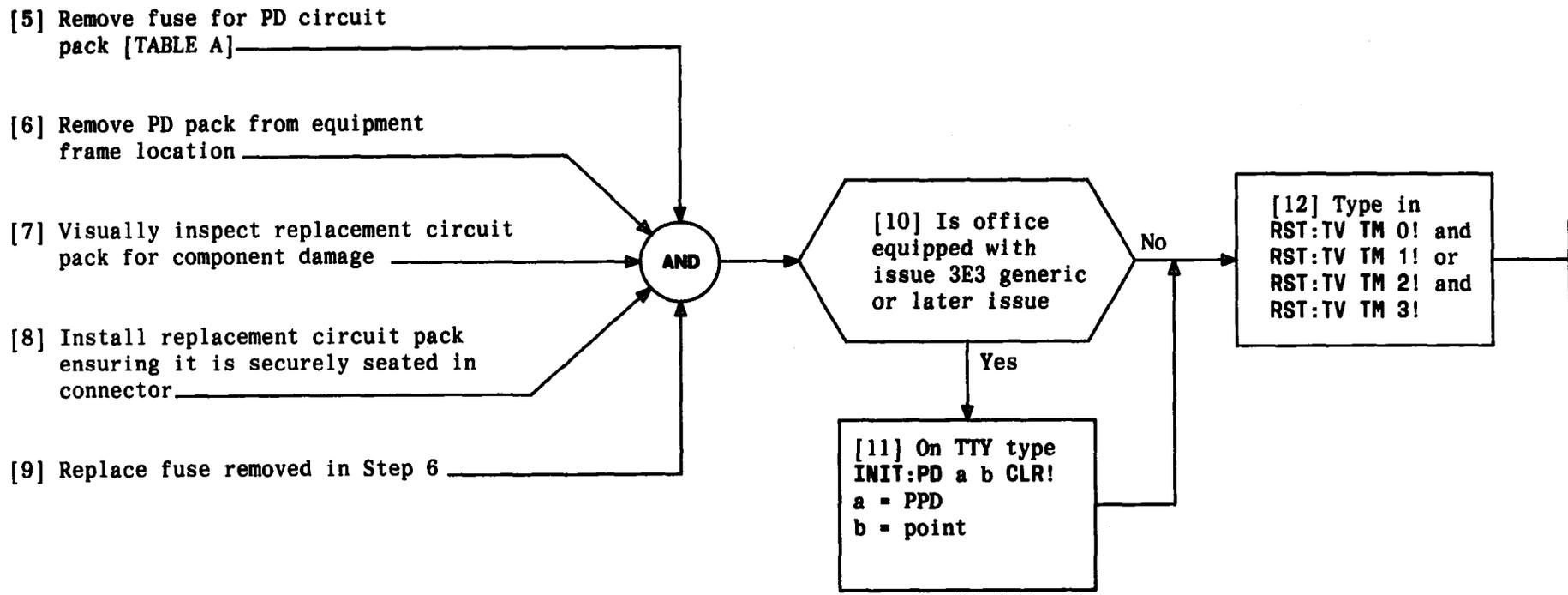


TABLE A					
PERIPHERAL DECODER			PERIPHERAL DECODER POINT FOR:	FUSE DESIGNATION	
LOCATION	PPD	POINT		FRAME	NAME
C-144-09	0	252	Wire test vertical points on control frame 0	CONTROL	TVPD0
C-144-09	1	252	Wire test vertical points on control frame 1		TVPD0
C-144-09	0	253	Wire test multiple even/odd select		TVPD0
C-144-09	1	253	Wire test multiple test circuit point		TVPD0
C-144-39	0	254	Circuit test vertical points on control frame 0		TVPD1
C-144-39	1	254	Circuit test vertical points on control frame 1		TVPD1
C-144-39	0	255	Circuit test multiple even/odd select		TVPD1
C-144-39	1	255	Circuit test multiple test circuit point		TVPD1
					CONTROL

REPLACE TEST VERTICAL PD CIRCUIT PACK

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REPLACE TEST VERTICAL PD CIRCUIT PACK

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[1] Read CAUTION 1. Obtain circuit packs listed in TLM _____

[2] Depress on-line POWER if not lighted _____

[3] Depress **MANUAL** on both controllers _____

[4] Set **TEST MODE** key to **TEST** (up) position on both controllers _____

[5] Depress **LOCK** if not lighted _____

On On-Line Controller [FIG. 1, Page 2]

[6] Set **REGISTER SELECT** to **SPECIAL** _____

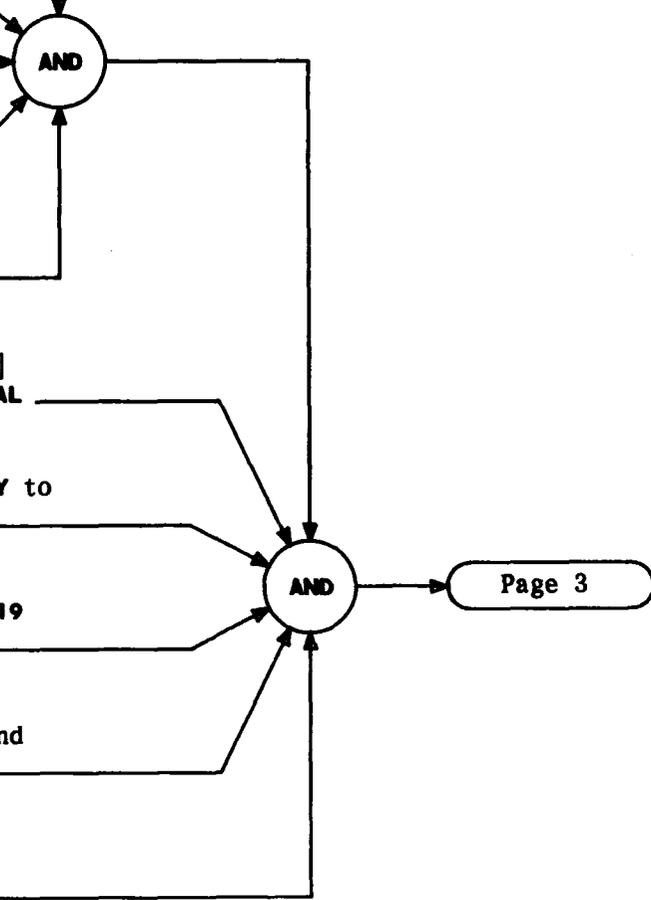
[7] Set **REGISTER LOAD** and **DISPLAY** to up position _____

[8] Set **LOAD AND DISPLAY** keys 0-19 to up position _____

[9] Set **REGISTER SELECT** keys 1 and 2 to up position _____

On both Controllers

[10] Set **HALT** key to up position _____



Page 3

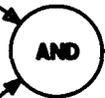
CAUTION 1 <i>On-line circuit packs cannot be replaced without causing a service loss. Replace only during low traffic periods if possible</i>	
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REPLACE CIRCUIT PACK IN ON-LINE (ACTIVE) CONTROL UNIT

[11] On off-line 3A CC momentarily set **EXECUTE** key to up position

[12] Read CAUTION 2. On on-line 3A CC momentarily set **EXECUTE** key to up position

Call processing stopped; on-line 3A CC SAR set to octal 3777777



On On-Line 3A CC

[13] Read NOTE 1. Depress and hold **RESET CIRCUITS** key

[14] Remove faulty circuit pack

[15] Install replacement circuit pack

[16] Release **RESET CIRCUITS** key



Circuit pack replaced

Page 4

NOTE 1
Power is not removed and **RESET CIRCUITS** key is held while circuit pack is changed

CAUTION 2
This step will stop call processing (**PANEL TIMEOUT**) for remainder of procedure

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REPLACE CIRCUIT PACK IN ON-LINE (ACTIVE) CONTROL UNIT

At both 3A CCs:

[17] Set **HALT** keys to down position

[18] Momentarily set **EXECUTE** keys to up position

[19] Set **TEST MODE** keys to down position

[20] Depress **MANUAL** keys

MANUAL
extinguishes

[21] Set all panel keys to down position

[22] Depress **LOCK**

AND

REPLACE CIRCUIT PACK IN ON-LINE (ACTIVE) CONTROL UNIT

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[1] Read NOTE 1. Type in
RMV:TRK a,b, PDG!
a = trunk group number (128-255)
b = member number (0-127)

[2] Use TABLE A for PD packs
located in control frame
or TABLE B for PD circuit
packs located in network
frame. Locate and remove
fuse associated with PD pack

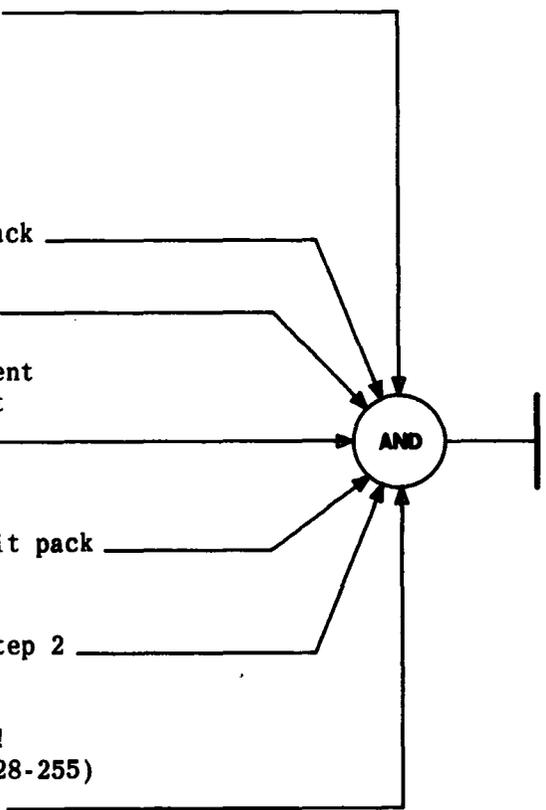
[3] Remove PD pack

[4] Visually inspect replacement
circuit pack for component
damage

[5] Install replacement circuit pack

[6] Replace fuse removed in Step 2

[7] Type in RST:TRK a, b, PDG!
a = trunk group number (128-255)
b = member number (0-127)



NOTE 1	
System will camp on busy circuits before aborting removal request. To remove circuits without checking for busy, use UCL option (this may cause service loss)	
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REPLACE TRUNK CIRCUIT PERIPHERAL DECODER CIRCUIT PACKS

TABLE A																	
TRUNK CIRCUITS LOCATED ON CONTROL FRAME - SD-3H902-01 SHEET D2																	
TRUNK CKT	TRUNK CIRCUIT LOCATION		TRUNK CKT FUSES	PD PACK	PD PACK LOCATION		PD PACK FUSE										
	LEVEL	POSITION			LEVEL	POSITION											
00 01 02 03	118	03 07 10 14	SSA0, TSA0	PDG04	136	05	PD02										
04 05 06 07		18 22 25 29						SSB0, TSB0	PDG06	136	06	PD03					
08 09 10 11		33 37 40 44											SSA1, TSA1	PDG08	136	09	PD04
12 13 14 15		03 07 10 14															
16 17 18 19	18 22 25 29	SSB3, TSB1	PDG06	136	06	PD03											
20 21 22 23	33 37 40 44						SSA5, TSA3	PDG08	136	09	PD04						

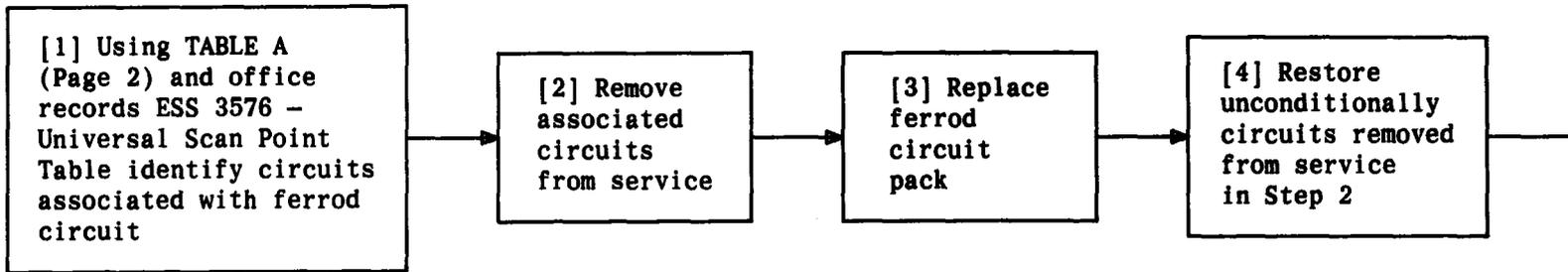
REPLACE TRUNK CIRCUIT PERIPHERAL DECODER CIRCUIT PACKS

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TABLE B																	
TRUNK CIRCUITS LOCATED ON A NETWORK FRAME - SD-3H901-01 SHEET D2																	
TRUNK CKT	TRUNK CIRCUIT LOCATION		TRUNK CKT FUSES	PD PACK	PD PACK LOCATION		PD PACK FUSE										
	LEVEL	POSITION			LEVEL	POSITION											
00 01 02 03	024	03 07 10 14	ST0, TT0	PRPHDC0	036	18	SPD0										
04 05 06 07		18 22 25 29						ST1, TT1	PRPHDC1	036	20	SPD1					
08 09 10 11		33 37 40 44											ST2, TT2	PRPHDC2	036	26	SPD2
12 13 14 15		03 07 10 14															
16 17 18 19	18 22 25 29	ST4, TT4	PRPHDC4	040	18	SPD4											
20 21 22 23	33 37 40 44						ST5, TT5	PRPHDC5	040	20	SPD5						

REPLACE TRUNK CIRCUIT PERIPHERAL DECODER CIRCUIT PACKS

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REPLACE TRUNK CIRCUIT UNIVERSAL SCANNER FERROD CIRCUIT PACK

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TABLE A				
NETWORK FAME TRUNK CIRCUIT - FERROD CIRCUIT - ASSOCIATED CIRCUITS SCAN POINTS				
FERROD CIRCUIT		TRUNK CIRCUIT		ASSOCIATED SCAN POINTS
PACK	LOCATION	CIRCUIT NO.	LOCATION	(ROW POINT)
FRDSCA5	040-21	02	024-10	3006, 3007 3106, 3107
		03	024-14	
		06	024-25	
		07	024-29	
		10	024-40	
		11	024-44	
		14	028-10	
		15	028-14	
		18	028-25	
		19	028-29	
		22	028-40	
23	028-44			
FRDSCA6	040-24	00	024-3	2806, 2807 2906, 2907
		01	024-7	
		04	024-18	
		05	024-22	
		08	024-33	
		09	024-37	
		12	028-3	
		13	028-7	
		16	028-18	
		17	028-22	
		20	028-33	
21	028-37			

REPLACE TRUNK CIRCUIT UNIVERSAL SCANNER FERROD CIRCUIT PACK

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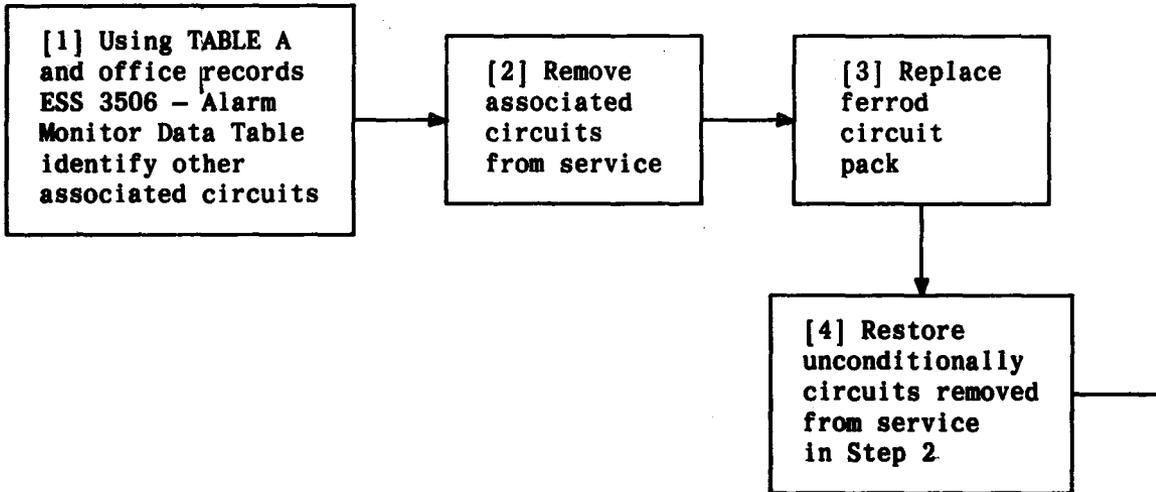


TABLE A				
SCAN POINTS		FERROD CIRCUIT		
ROW	COLUMNS	NUMBER	TYPE	LOCATION
28	00-07	MSF6	FC183	022-26
29	00-07			
28	08-15	MSF22	FC183	018-26
29	08-15			
30	00-07	MSF7	FC183	022-27
31	00-07			
30	08-15	MSF23	FC183	018-27
31	08-15			

[1] At TTY, using TABLE A,
type:

```

RC:CKT/
TYP CHG/
GRP nnn /
TER mmm /
OE gg cws i/
DP p ddd t/
SP ss rr pp/
DSP ss rr pp/
EQL tffbjjq/
TOC nnnnn/
CKT nn/
END!

```

Always required

Changes only
need be
entered

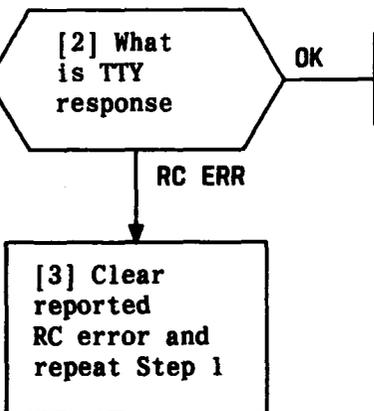
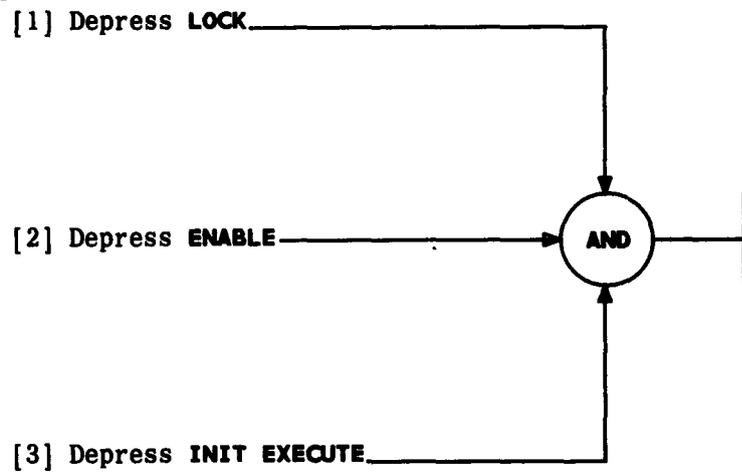


TABLE A	
VARIABLE	DEFINITION
nnn	Group Number
mmm	Member Number
gg	Concentrator Group
c	Concentrator
w	Switch Group
s	Switch
i	Level on Switch
p	Peripheral Pulse Distributor
ddd	Peripheral Decoder
t	Triplet
ss	Scanner Number
rr	Scanner Row
pp	Point in Scanner Row
t	Type of Frame
ff	Frame Number
b	Bay Number
jj	Level
qq	Position
nnnnn	Trunk Order Code
nn	Circuit Code

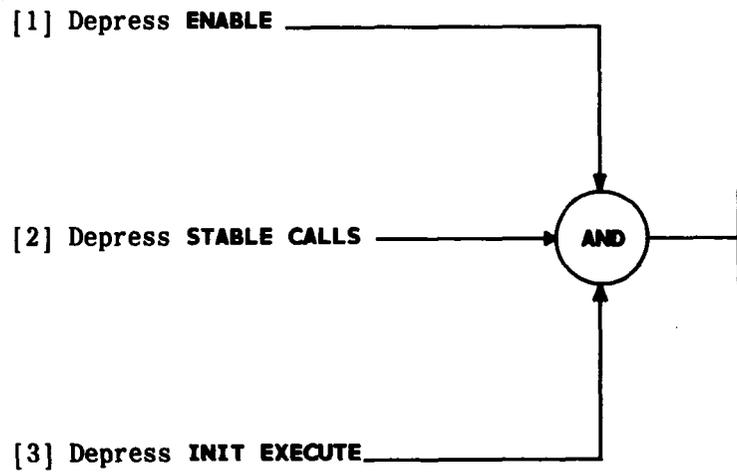
On SSP:



PERFORM A TRANSIENT CLEAR INITIALIZATION

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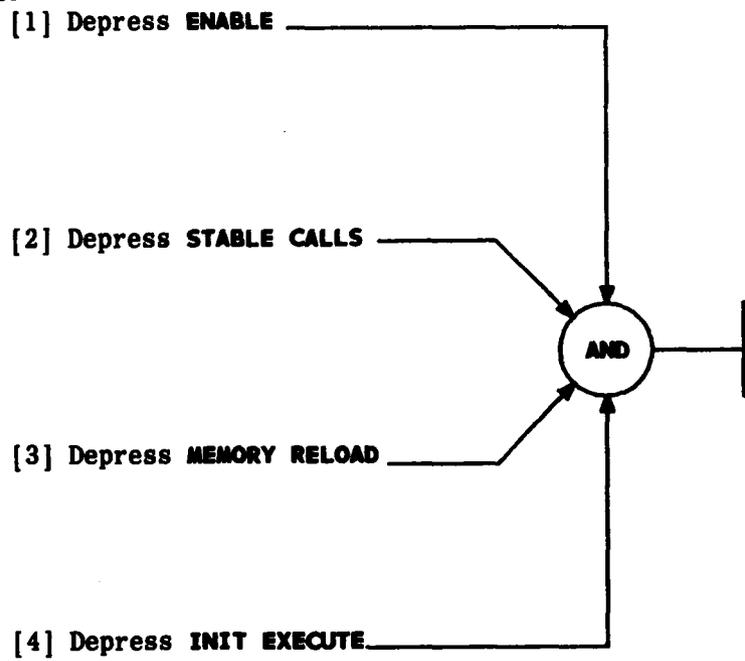
On SSP:



PERFORM A STABLE CLEAR INITIALIZATION

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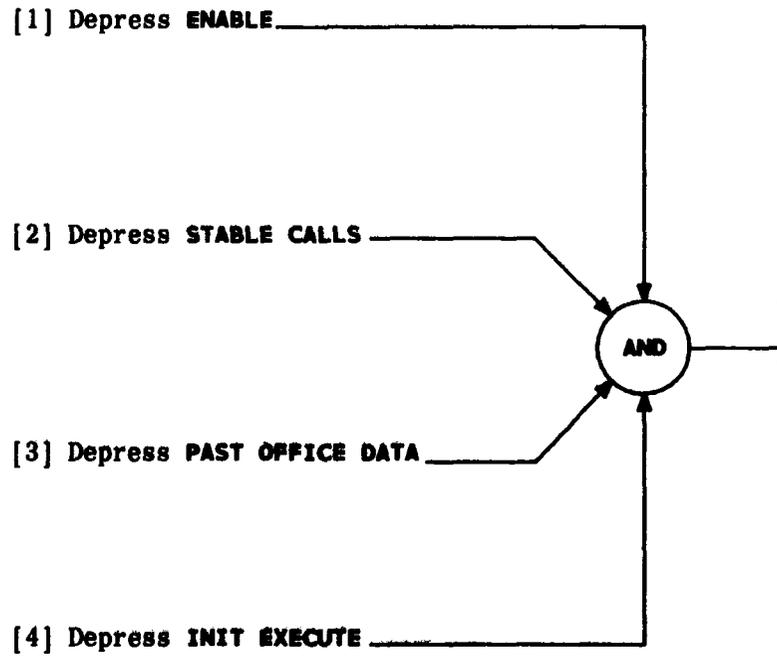
On SSP:



PERFORM A MEMORY RELOAD INITIALIZATION

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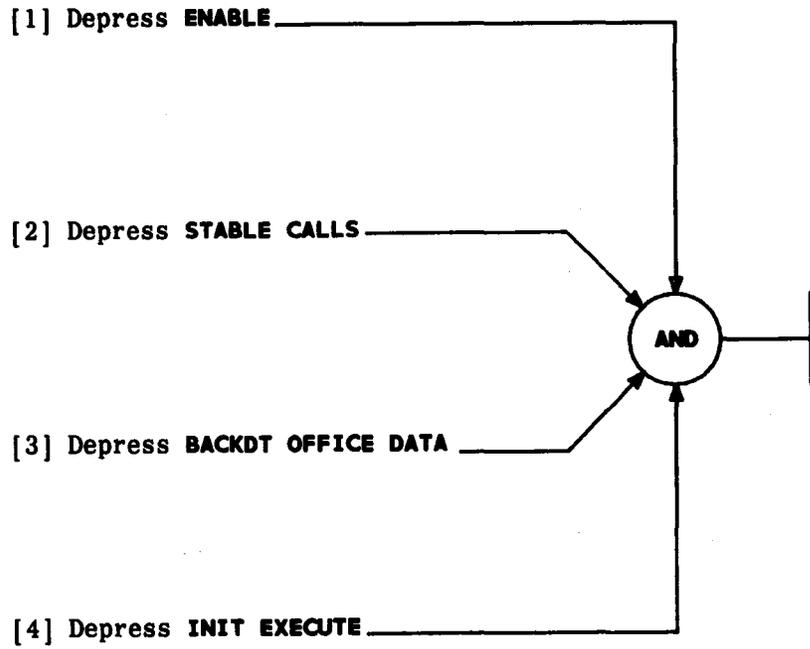
On SSP:



PERFORM A PAST OFFICE DATA INITIALIZATION

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On SSP:



PERFORM A BACKDT OFFICE DATA INITIALIZATION

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[1] Remove fuses for faulty test vertical test circuit
[TABLE A]

[2] Replace circuit pack identified in TLM
[TABLE B, FIG. 1]

[3] Install fuses removed in Step 1

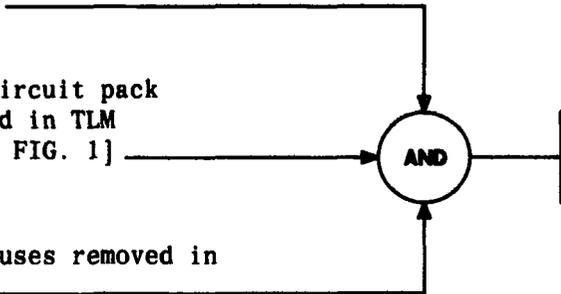


TABLE A								
CONTROL FRAME 0					CONTROL FRAME 1			
	CIRCUIT 0		CIRCUIT 1		CIRCUIT 2		CIRCUIT 3	
FUNCTION	FUSE	LOCATION	FUSE	LOCATION	FUSE	LOCATION	FUSE	LOCATION
48V	TVA	C-108-25	TVB	C-106-25	TVA	C-108-25	TVB	C-106-25
24V	PWCA	C-009-26	PWCB	C-107-38	PWCA	C-009-26	PWCB	C-107-25
130V	-F1	MP-76-33	-F2	MP-72-33	-F1	MP-76-33	-F2	MP-72-33
130V Converter		MP-78-18		MP-74-18		MP-78-18		MP-74-18

C = Control frame MP = Miscellaneous power frame

TABLE B			
TEST CKT #	PACK TYPE	CONTROL FRAME	PACK POSITION
0	FB420	0	10
	FB422	0	14
1	FB420	0	37
	FB422	0	33
2	FB420	1	10
	FB422	1	14
3	FB420	1	37
	FB422	1	33

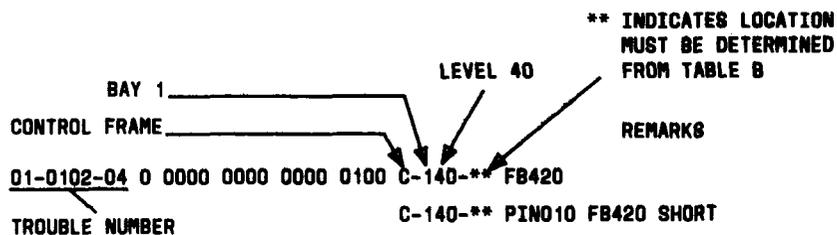


FIG. 1 - Example of TLM Trouble Message

REPLACE TEST VERTICAL TEST CIRCUIT CIRCUIT PACK

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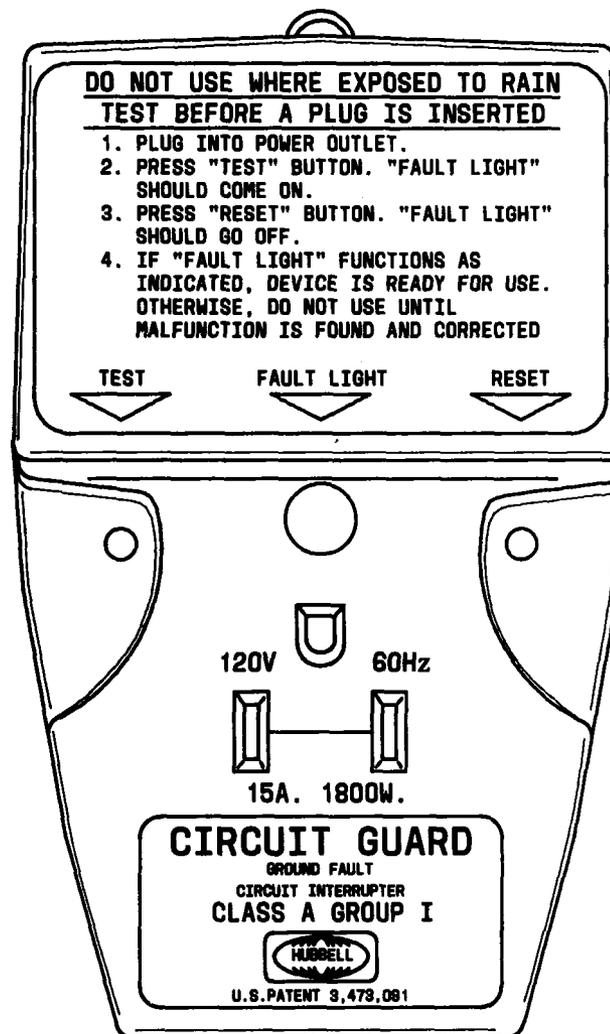
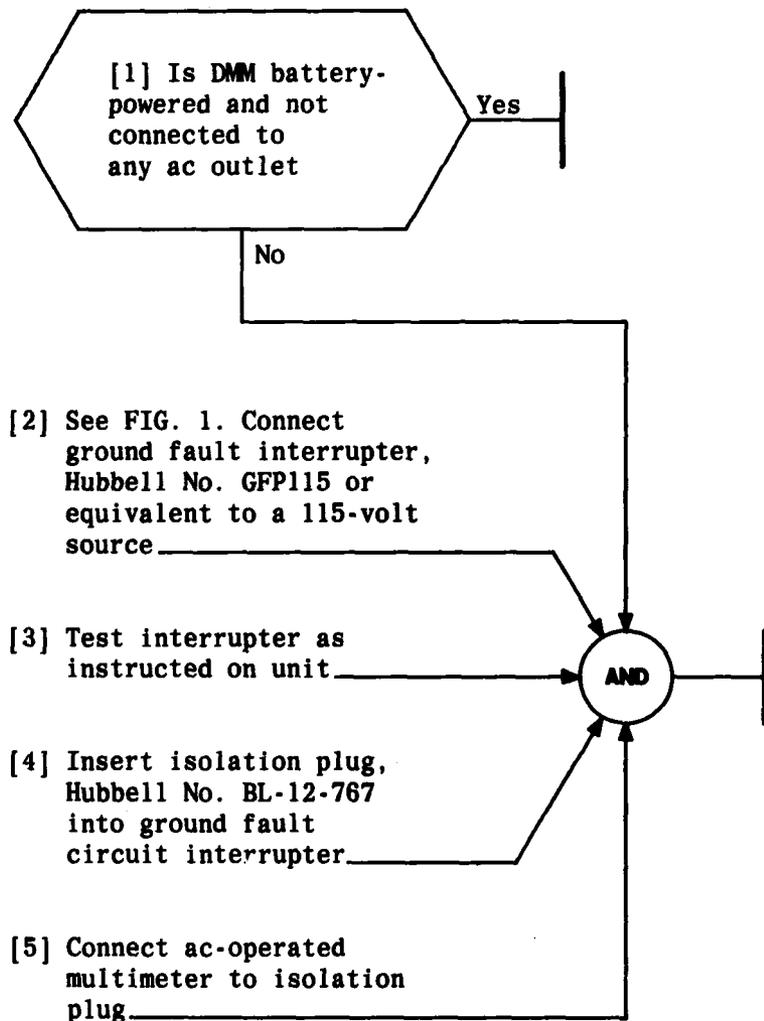


FIG. 1

ISOLATE AC-OPERATED MULTIMETER

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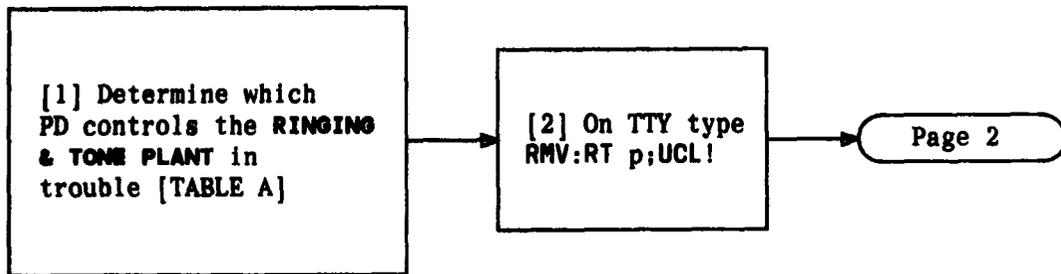


TABLE A				
PERIPHERAL DECODER				
CPS DESIG.	EQUIPMENT LOCATION	FUSE	PAIRS	PD CKT.
PDG24	136-24	PD-12	248	24
			249	25
PDG26	136-26	PD-13	250	26
			251	27

REPLACE RINGING AND TONE PD CIRCUIT PACK

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[3] Verify that side (0 or 1) of control frame associated with PD circuit pack to be replaced is off-line.
If not, type on TTY, SW:SYC!

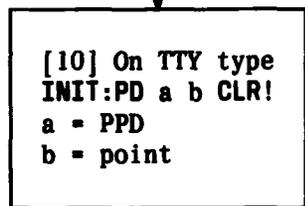
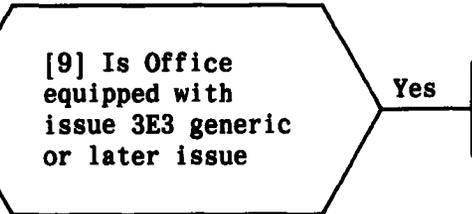
[4] Remove fuse for PD circuit pack [TABLE A]

[5] Remove PD pack from equipment frame location

[6] Visually inspect replacement circuit pack for component damage

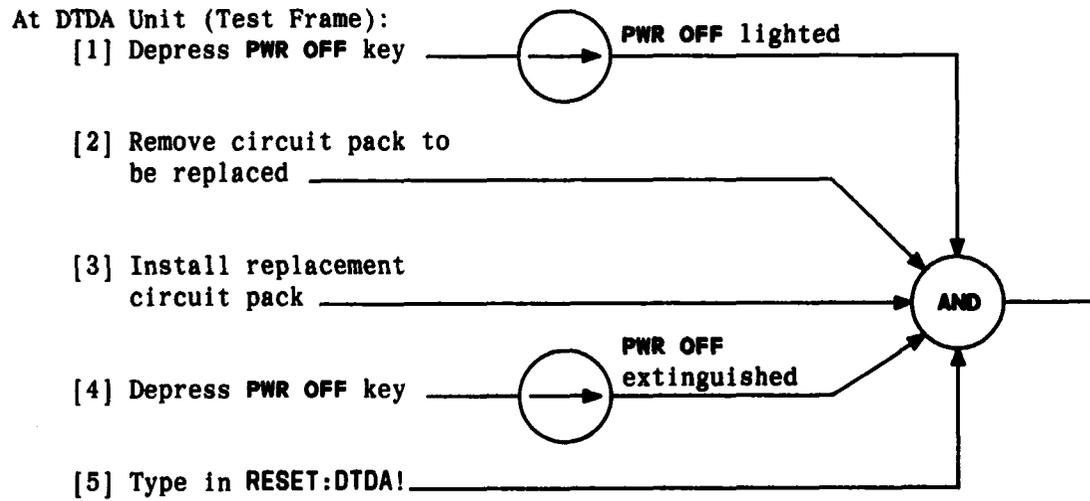
[7] Install replacement circuit pack ensuring it is securely seated in connector

[8] Replace fuse removed in Step 4



REPLACE RINGING AND TONE PD CIRCUIT PACK

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REPLACE DIAL TONE DELAY ALARM UNIT CIRCUIT PACK

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ITEM	ISSUE	ITEM	ISSUE	ITEM	ISSUE	ITEM	ISSUE	ITEM	ISSUE	ITEM	ISSUE
TPG-000		TAP-132		TAP-167		DLP-525		DLP-560			
IXL-001		TAP-133		TAP-168		DLP-526		DLP-561			
• NTP-002		TAP-134		TAP-169		DLP-527		DLP-562			
TAD-100		TAP-135		TAP-170		DLP-528		DLP-563			
TAP-101		TAP-136		TAD-171		DLP-529		DLP-564			
TAP-102		TAP-137		TAP-172		DLP-530		DLP-565			
TAP-103		TAP-138		TAP-173		DLP-531		DLP-566			
TAP-104		TAP-139		TAP-174		DLP-532		DLP-567			
TAP-105		TAP-140		TAP-175		DLP-533		DLP-568			
TAP-106		TAP-141		TAP-176		DLP-534		CKL-891			
TAP-107		TAP-142		DLP-500		DLP-535		TNG-893			
TAP-108		TAP-143		DLP-501		DLP-536		DPL-895			
TAP-109		TAP-144		DLP-502		DLP-537					
TAP-110		TAP-145		DLP-503		DLP-538					
TAP-111		TAP-146		DLP-504		DLP-539					
TAP-112		TAP-147		DLP-505		DLP-540					
TAP-113		TAP-148		DLP-506		DLP-541					
TAP-114		TAP-149		DLP-507		DLP-542					
TAP-115		TAP-150		DLP-508		DLP-543					
TAP-116		TAP-151		DLP-509		DLP-544					
TAP-117		TAP-152		• DLP-510		DLP-545					
TAP-118		TAP-153		DLP-511		DLP-546					
TAP-119		TAP-154		DLP-512		DLP-547					
TAP-120		ISD-155		DLP-513		DLP-548					
TAP-121		TAP-156		DLP-514		DLP-549					
TAP-122		TAP-157		DLP-515		DLP-550					
TAP-123		TAP-158		DLP-516		DLP-551					
TAP-124		TAP-159		DLP-517		DLP-552					
TAP-125		• TAP-160		DLP-518		DLP-553					
TAP-126		TAP-161		DLP-519		DLP-554					
TAP-127		TAP-162		DLP-520		DLP-555					
TAP-128		TAP-163		DLP-521		DLP-556					
TAP-129		TAP-164		DLP-522		DLP-557					
TAP-130		TAP-165		DLP-523		DLP-558					
TAP-131		TAP-166		DLP-524		DLP-559					

• REVISED OR ADDED ITEM

□ CANCELED ITEM

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233-143-100 | CKL

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CHECKLIST

This book is called a Task Oriented Practice or "TOP". It is a programmed document that gives step-by-step instructions to enable you to do a job (or task). A TOP can be a very useful aid in doing your everyday work if you use it correctly.

An important thing to remember about TOP is that it is a programmed document giving step-by-step instructions to do a job. Since the instructions are given in the order that they must be done, you cannot enter a procedure except at the beginning. You *must* do the step-by-step instructions in the order given. Failure to follow the instructions in the proper order may cause service interruptions.

Another thing to remember about TOP is that it contains all the instructions that you need to do a job. If you are experienced on a particular job, TOP will provide you with just that information you need to do the job. If you are doing the job for the first time, you will be given step-by-step instructions with enough detail so that you will not have to guess or remember where to find the necessary details. Remember that TOP can provide you with just that information you need regardless of your experience in doing a job.

The work that you do can be classified into two broad job categories - *Trouble Clearing* and *Non Trouble Clearing*. This is how TOP defines these two types of work:

Trouble Clearing

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 or in responding to an office alarm, a trouble report, or an abnormal TTY printout, etc.

Non Trouble Clearing

Non trouble clearing is simply what it says - that work you do which is not connected with trouble clearing. This type is work that you do to accept a system after it has been installed, turn up a system for service, maintain a system according to a controlled maintenance plan, etc.

Now glance briefly at the front cover. In the upper right corner is a 9-digit number which identifies the volume. Near the center is the title of the volume which tells you something about the contents, such as the system (or subsystem) name and perhaps what kind of jobs are included in the volume. Next is the decision-action-logic diagram which directs you either to this training package or to 001 depending on your ability to use TOP.

Now turn to FIG. 1 which shows a typical page of 001. In the lower left is the title, "TASK INDEX LIST" which tells you something about this list, such as it is a listing of tasks arranged in alphabetical order. This list is actually a listing of the tasks included in the volume. The tasks are listed in alphabetical order and permuted on key words to simplify locating a task. On the right side of the page is a column of reference numbers under the heading "THEN GO TO." To use this list, locate the job to be done and turn to the reference number in the "THEN GO TO" column.

Now assume that you have been assigned the task of performing a system test on a system covered by a TOP. On 001 in FIG. 1, locate the job "System Test." Notice that this entry tells you to go to NTP-016 (Non Trouble Procedure) under the "THEN GO TO" column. Next you will have to locate the procedure, NTP-016. All procedures in a TOP are arranged in numerical sequence. In actual use of TOP, you would simply turn to the procedure. Look over

FIND YOUR JOB IN THE LIST BELOW	THEN GO TO
Alert; External - Horn, Ringer, Etc. - Remove	NTP-028
Amplifiers; Channel - Recorded Announcement Frame - Test	NTP-009
AR03 PWR ALM RA bb - bb = 16-30	TAP-105
BR00 LED - Does Not Light - Correct	TAP-117
Bridging Controller; Trunk - J1C015MB - Replace	DLP-572
Channel Amplifiers - Recorded Announcement Frame - Test	NTP-009
Drum Wiper - Common Systems Recorded Announcement Frame - Inspect	NTP-010
Extended Station Capability - Nonkey Set Only - Reported Failure	TAP-123
External Alert - Horn, Ringer, Etc. - Remove	NTP-028
Interchange Two Working Station Numbers	NTP-081
LED; BR00 - Does Not Light - Correct	TAP-117
Loudspeaker Paging - Add	NTP-059
Loudspeaker; - Remove	NTP-006
Station Capability; Extended - Nonkey Set Only - Reported Failure	TAP-123
System Test - Perform	NTP-016
Trunk Bridging Controller - J1C015MB - Replace	DLP-572
TTY Printout - AR03 PWR ALM RA bb - bb = 16-30	TAP-105
Wiper; Drum - Common Systems Recorded Announcement Frame - Inspect	NTP-010

TASK INDEX LIST (Contd)	Issue 1	DEC 1980
	123-456-789	IXL
	PAGE 2 of 2	001

FIG. 1

HOW TO USE TOP

the following example which shows a typical page of NTP-016. Note that the items are numbered in the left column. They **must** be completed in that order. You will also note that in item 2 there are some lettered (A, B, C) items. These lettered items are optional ways to do an item, that is you only have to do one of the lettered items.

Remember that this procedure gives you all the items that must be done and the order in which they must be done to complete the job. If you know how to do an item, you should go ahead and do it without going to the referenced details

in the "FOR DETAILS, GO TO" column. If, on the other hand, you need additional details on how to do the item, then you should turn to the procedure listed in the "FOR DETAILS, GO TO" column. In either case, after completing an item, you should continue with the next item.

A TOP is designed so that you have to read only what is necessary to get your job done. If you know how to do an item, look no further for the "how to" information - just do the item and go on to the next item. This idea is called "bypassing" in TOP. In addition to not having to

DO THE ITEMS BELOW IN THE ORDER LISTED		FOR DETAILS, GO TO
1	Obtain Support Apparatus Listed Below: • Hewlett-Packard 3531A Transmission Measuring Set • 2P4C Patching Cord	-
2	Place SEC/SEB in Off-Line Mode	-
	A. If in On-Line Mode, Change System From On-Line to Off-Line	DLP-509
	B. If Powered Down, Condition System for Off-Line Operation as Follows:	-
	1. Power up Minicomputer	DLP-503
	2. Power up Line Printer	DLP-528
	3. Power up Maintenance Terminal	DLP-510
7	Run Computer Display Terminal Test for All Positions	DLP-513
8	Mount Tape	DLP-500
PERFORM SYSTEM TEST		Issue 1 DEC 1980
		123-456-789 NTP
		PAGE 1 of 4 016

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look further for details, three other ways of "bypassing" are provided in TOP to help you bypass reading information you already know (see FIG. 2):

Summary Statement

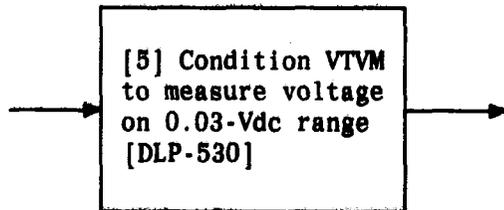
A summary statement is used with a procedure to tell you briefly how to do the procedure and what type measurement or result can be observed. If you can do the procedure after reading the summary, go ahead and do it without reading any further. Simple procedures may not have summaries.

Result Statement

A result statement may be used in a flow-charted procedure along with the AND symbol. If, after reading the results statement, you know how to do the action indicated, go ahead and do it without reading the steps associated with the AND symbol.

Support Procedures

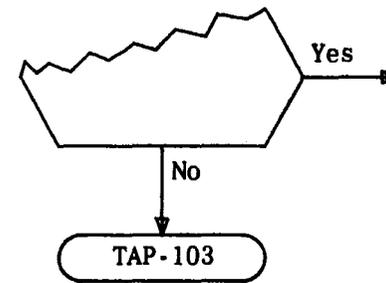
When you see the following kind of reference in TOP it refers to a support procedure:
The support procedure [DLP-530] (Detailed Level Procedure) provides the information on how to



operate the VTVM. Here again, if you already know how to operate the VTVM, go ahead and do it without looking up any further information.

Now assume that you are doing a system test on a system covered by a TOP. In the process of doing this test you are instructed to mount a tape. For the purposes of this example, assume that you do not know how to mount the tape and must look up additional details. Figure 2 on Page 5 shows you examples of bypassing that can be used. Take a few moments to examine this figure and make sure you understand the techniques of bypassing.

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



This reference to TAP-103 (Trouble Analysis Procedure) indicates that the equipment is not operating correctly, and that you should refer to TAP-103 and clear this trouble condition. After clearing the trouble, you should reenter the flowchart at the beginning (Step 1).

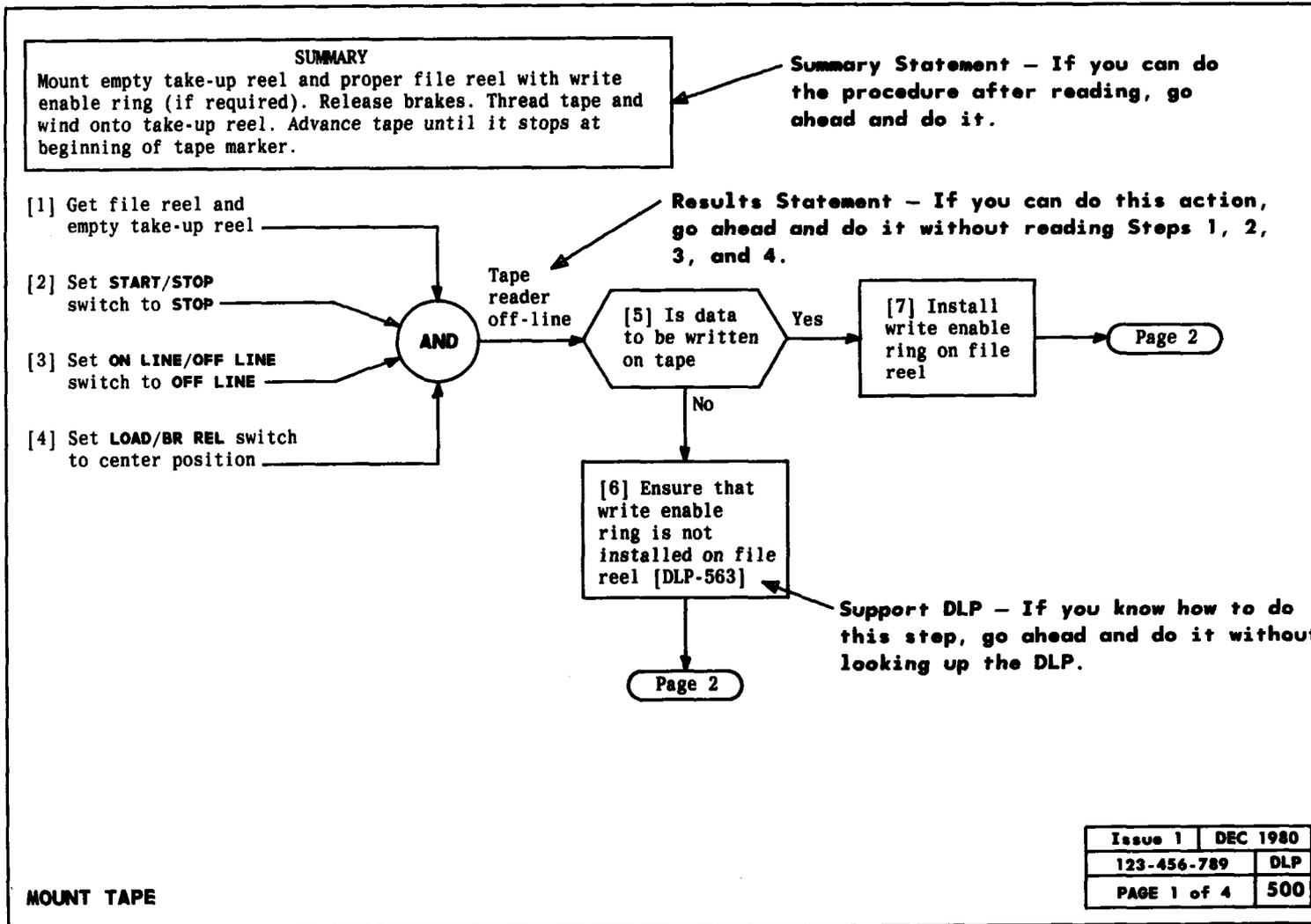
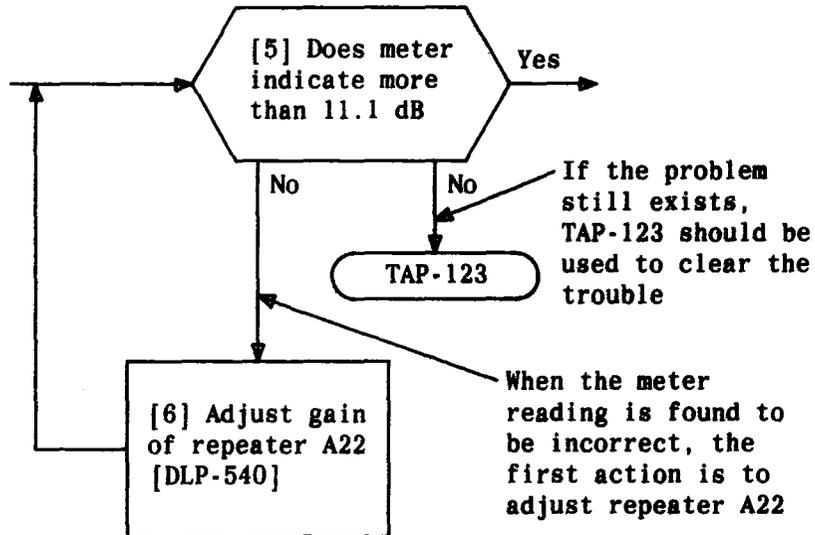


FIG. 2

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

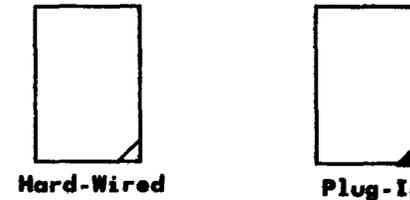


Trouble-clearing information in TOP is used basically the same way as non trouble-clearing information. When an alarm or trouble report requires you to troubleshoot a system covered by a TOP, the TASK INDEX LIST (IXL-001) is the place to start. After locating your job on IXL-001 you will be referenced to a Trouble Analysis Procedure (TAP) to find the information to aid in the location of the trouble. The TAP may reference to other information, such as Trouble Analysis Data (TAD) or Isolation Diagram (ISD) as an aid in the trouble-clearing process.

Now assume that you have to clear a major alarm on a terminal in a system covered by a TOP. Figure 3 on Page 7 shows how to access and how to use trouble-clearing information.

HOW TO USE TOP

A TOP shows hard-wired and plug-in units on Isolation Diagrams (ISD) in the following manner:



Always do a job safely. Below are three things you should heed in TOP:

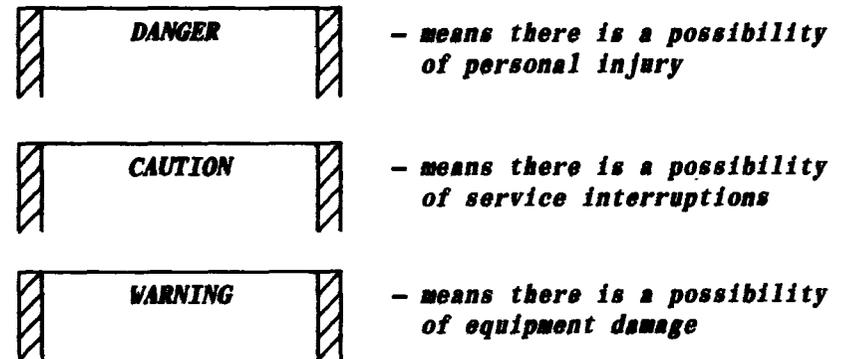


TABLE A on Page 8 shows some of the more important symbols and definitions.

While using TOP, if you find errors, or if a procedure is inadequate or missing, call the TOP HOTLINE number shown on the front cover. Your comments are greatly needed to help prepare better documentation. Comments may also be forwarded using form E3973 which is available through your company.

Now that you know how to use TOP, return to IXL-001 and find the job you need to do.

	TNS
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FIND YOUR JOB IN THE LIST BELOW THEN GO TO						
Alert; External - Horn, Ringer, Etc. - Remove	NTP-028						
Alarm - Major - Clear	TAP-109						
TTY Printout - AR03 PWR ALM RA bb - bb = 16-30	TAP-105						
Wiper; Drum - Common Systems Recorded Announcement Frame	NTP-010						
<table border="1"> <tr> <td>Issue 1</td> <td>DEC 1980</td> </tr> <tr> <td>123-456-789</td> <td>IXL</td> </tr> <tr> <td>PAGE 2 of 2</td> <td>001</td> </tr> </table>		Issue 1	DEC 1980	123-456-789	IXL	PAGE 2 of 2	001
Issue 1	DEC 1980						
123-456-789	IXL						
PAGE 2 of 2	001						
TASK INDEX LIST (Contd)							

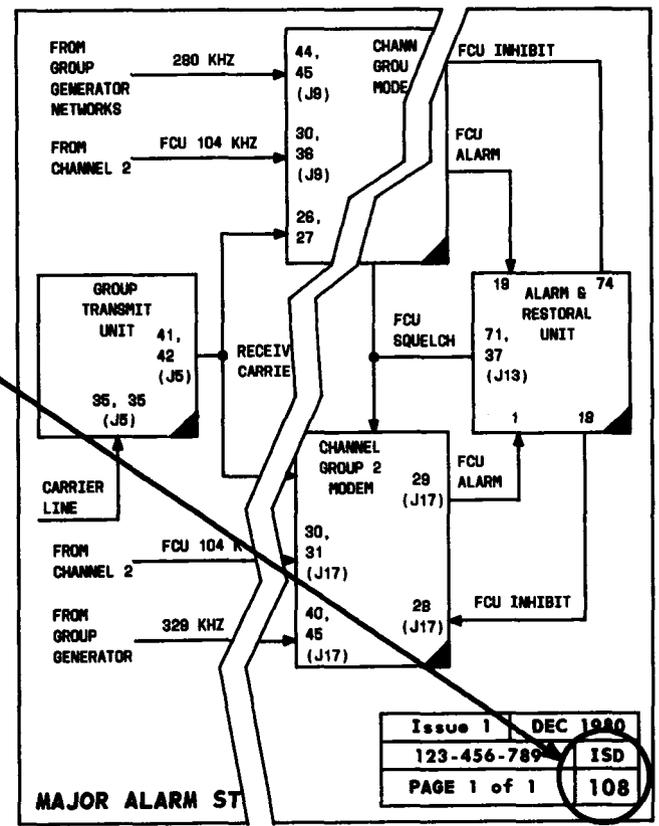
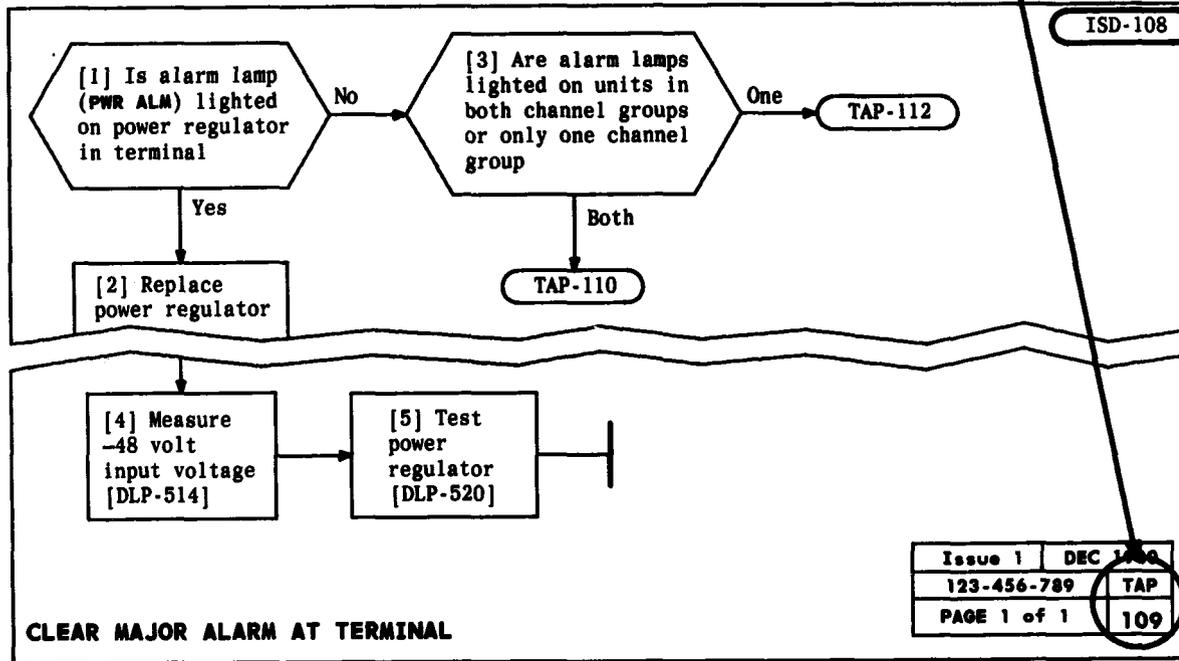
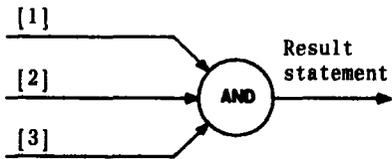
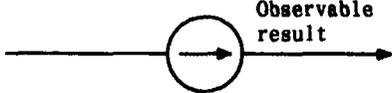
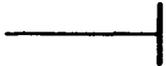


FIG. 3

HOW TO USE TOP

TABLE A IMPORTANT TOP SYMBOLS AND DEFINITIONS	
SYMBOL	DEFINITION
	<p>The AND operation symbol is used where the successful completion of a group of instructions accomplishes a meaningful result that can be defined. The symbol indicates that each input instruction must be performed in the order given to accomplish the output (result statement). In instances where results cannot be defined, results statements are not provided.</p>
	<p>The flow-through symbol relates graphically a single instruction to the expected observable result(s).</p>
	<p>The end-of-procedure symbol denotes that the procedure has been completed.</p>
	<p>The reference bubble symbol indicates an exit from a page (either to a continuation page or to trouble-clearing data) or indicates the starting point of a procedure.</p>
<p>Acceptance (NTP-002)</p>	<p>Acceptance gives an overview of the acceptance techniques and facilities.</p>
<p>Maintenance Philosophy (TAD-100)</p>	<p>The maintenance philosophy, when provided, gives an overview of the considerations designed into the trouble-clearing procedures.</p>
<p>Checklist (CKL-891)</p>	<p>The checklist reflects the volume content (inventory) at any given time, the issue identifier of each data element therein, those data elements revised and/or added, and those data elements deleted from a previous issue.</p>
<p>Documentation Plan (DPL-895)</p>	<p>The documentation plan gives a bird's-eye view of all the TOP volumes covering a system. This plan can help you to quickly determine the correct volume.</p>

**3ESS SWITCH
TOP DOCUMENTATION**

3ESS Switch	
Office Equipment	233-142-100
Routine Data	
Acceptance Data	
Company Order Data	
Remote Office Test Line	233-142-110
Acceptance Data	
System Trouble Clearing	233-143-100
Power Equipment	233-144-100
Routine Data	
Acceptance Data	