

Task Oriented Practice
(TOP)

AUXILIARY DATA SYSTEMS

1A PROCESSOR

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FIND YOUR JOB IN THE LIST BELOW THEN GO TO

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FIND YOUR JOB IN THE LIST BELOW THEN GO TO

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TASK INDEX LIST

FIND YOUR JOB IN THE LIST BELOW THEN GO TO

TTY Printout - DGN:DUS a:TUC b PH c STF
 ANALY:TLPFILE:DUS a SUMMARY DATA
 QUEUE ACCESS DENIED: DATA NOT RETAINED: CODE 0004 TAP-107

TTY Printout - DGN:DUS a:TUC b PH c STF
 ANALY:TLPFILE:DUS a SUSPECTED FAULTY EQUIPMENT
 NOTE column does not contain NOTE 2 TAP-101

TTY Printout - DGN:DUS a:TUC b PH c STF
 ANALY:TLPFILE:DUS a SUSPECTED FAULTY EQUIPMENT
 NOTE column contains NOTE 2
 Fuse blown TAP-132

TTY Printout - DGN:DUS a:TUC b PH c STF
 ANALY:TLPFILE:DUS a SUSPECTED FAULTY EQUIPMENT
 NOTE column contains NOTE 2
 No fuse blown TAP-136

TTY Printout - DGN:DUS a:TUC b PH c STF
 ANALY:TLPFILE:DUS a
 CURRENT TLP SEARCH ABORTED TAP-108

TTY Printout - DGN:DUS a:TUC b PH c STF
 ANALY:TLPFILE:DUS a TLP
 WARNING: VERSION x DOES NOT MATCH VERSION y TAP-109

TTY Printout - DGN: DUS a:TUC b PH c STF
 ANALY:TLPFILE:DUS a TLP
 TLP TAPE ACQUISITION ERROR
 MOUNT TAPE WITH FILE ID=f TAP-110

TTY Printout - DGN:DUS a:TUC b PH c STF
 REPT:TAPE MUST BE MOUNTED FOR FUNCTION TLP TAP-111

TTY Printout - DGN:TUC a:DUS b PH c STF
 ANALY:TLPFILE:TUC a NULL PACK TEST GENERATED TAP-104

TTY Printout - DGN:TUC a:DUS b PH c STF
 ANALY:TLPFILE:TUC a SUMMARY DATA
 QUEUE ACCESS DENIED: DATA NOT RETAINED: CODE 0001 TAP-112

TASK INDEX LIST

FIND YOUR JOB IN THE LIST BELOW THEN GO TO

TTY Printout - DGN:TUC a:DUS b PH c STF
 ANALY:TLPFILE:TUC a SUMMARY DATA
 QUEUE ACCESS DENIED: DATA NOT RETAINED: CODE 0002 TAP-106

TTY Printout - DGN:TUC a:DUS b PH c STF
 ANALY:TLPFILE:TUC a SUMMARY DATA
 QUEUE ACCESS DENIED: DATA NOT RETAINED: CODE 0004 TAP-107

TTY Printout - DGN:TUC a:DUS b PH c STF
 ANALY:TLPFILE:TUC a TLP
 CURRENT TLP SEARCH ABORTED TAP-108

TTY Printout - DGN:TUC a:DUS b PH c STF
 ANALY:TLPFILE:TUC a SUSPECTED FAULTY EQUIPMENT
 NOTE column does not contain NOTE 2 TAP-102

TTY Printout - DGN:TUC a:DUS b PH c STF
 ANALY:TLPFILE:TUC a SUSPECTED FAULTY EQUIPMENT
 NOTE column contains NOTE 2
 Fuse blown TAP-132

TTY Printout - DGN:TUC a:DUS b PH c STF
 ANALY:TLPFILE:TUC a SUSPECTED FAULTY EQUIPMENT
 NOTE column contains NOTE 2
 No fuse blown TAP-135

TTY Printout - DGN:TUC a:DUS b PH c STF
 ANALY:TLPFILE:TUC a TLP
 WARNING: VERSION x DOES NOT MATCH VERSION y TAP-109

TTY Printout - DGN:TUC a:DUS b PH c STF
 ANALY:TLPFILE:TUC a ABORTED TAP-108

TTY Printout - DGN:TUC a:DUS b PH c STF
 ANALY:TLPFILE:TUC a TLP
 TLP TAPE ACQUISITION ERROR
 MOUNT TAPE WITH FILE ID=f TAP-110

TTY Printout - DGN:TUC a:DUS b PH c STF
 REPT:TAPE MUST BE MOUNTED FOR FUNCTION TLP TAP-111

TASK INDEX LIST

FIND YOUR JOB IN THE LIST BELOW THEN GO TO

Voltage Levels; Capstan Diagnostic Assembly – Tape Transport – Check NTP-019
 Voltage Levels; Capstan Servo Assembly – Tape Transport – Check NTP-018
 Voltages – DC-to-DC Converter – Check DLP-514
 Write Enable Ring Sensing Fault – Clear TAP-130

TASK INDEX LIST

No acceptance test procedures are required for this frame.
Readiness of frame to become part of working system was
established by successful completion of Installation
Handbook test procedures.

ACCEPTANCE

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

	<i>CAUTION: If Function Assigned to Tape Unit Controller (TUC) Is AMA (Active or Standby), Perform This Task at a Later Date</i>	
1	Obtain Support Apparatus: <ul style="list-style-type: none"> • KS-6232 Lubricating Oil • KS-2423 Twill Cloth 	—
2	At TTY, Type OP:DUSTATUS!	—
3	If TUC Function Is Other Than Unassigned (UNA), Type CLR:ADSFUNC a! Where a = Function Assigned to TUC	—
4	At TUC Power Switch, Rotate ROS/OFF Switch Clockwise to ROS <i>Response: OS</i> and OFF NORM Lamps Light	—
5	Open Tape Transport Cover Door and Pull Interlock Switch Plunger Out to Override Position	—
6	Depress LOCAL/REMOTE Pushbutton to Obtain LOCAL Lighted Condition	—
7	If Tape Is Mounted on Tape Transport, Demount Tape	DLP-513
8	Lubricate Door Hinges	DLP-507
9	If Tape Is To Be Mounted, Perform the Following:	—
	1. Mount Tape on Tape Transport	DLP-512
	2. Depress LOCAL/REMOTE Pushbutton to Obtain REMOTE Lighted Condition	—
10	Gently Close Tape Transport Cover Door	—
11	At TUC Power Switch, Rotate ROS/OFF Switch Counterclockwise to Normal Position <i>Response: OS</i> and OFF NORM Lamps Go Off	—
12	If Tape Was Mounted, Perform One of the Following to Set TUC Function:	—
	A. At TUC, Depress Appropriate Function Pushbutton	—
	B. At TTY, Type SET:TUC a;FUNCTION b! Where a = TUC Member Number; b = Function To Be Assigned to TUC	—

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

	<i>CAUTION: If Function Assigned to Tape Unit Controller (TUC) Is AMA (Active or Standby), Perform This Task at a Later Date</i>	
1	Obtain Support Apparatus: <ul style="list-style-type: none"> • KS-2423 Twill Cloth • KS-20406,L1 Cleaner Solvent • KS-14377,L5 Vacuum Cleaner • KS-14377,L3 Flexible Nozzle • KS-21808 Magnifier Lamp 	—
2	At TTY, Type OP:DUSTATUS!	—
3	If TUC Function Is Other Than Unassigned (UNA), Type CLR:ADSFUNC a! Where a = Function To Be Assigned to TUC	—
4	At TUC Power Switch, Rotate ROS/OFF Switch Clockwise to ROS <i>Response: OS</i> and OFF NORM Lamps Light	—
5	Open Tape Transport Cover Door and Pull Interlock Switch Plunger Out to Override Position	—
6	Depress LOCAL/REMOTE Pushbutton to Obtain LOCAL Lighted Condition	—
7	If Tape Is Mounted on Tape Transport, Demount Tape	DLP-513
8	Check Tension on Tape Guide Assemblies	DLP-547
9	Mount Blank Tape on Tape Transport	DLP-512
10	Check Reels and Hubs for Wobble	DLP-525
11	Check Tape Travel on Tape Transport	DLP-508
12	Demount Blank Tape on Tape Transport	DLP-513
13	Check Tape Heads	DLP-524
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DO THE ITEMS BELOW IN THE ORDER LISTED FOR DETAILS, GO TO

14	If Precision Tape Guide Assembly Spring Washers Were Compressed During Inspection (Spools Moved Axially), or Precision Plate Components or Precision Tape Guide Assemblies Were Replaced, Perform the Following:	-
	1. Obtain Support Apparatus: <ul style="list-style-type: none"> • Tektronix Oscilloscope (7000) or Equivalent • Test Pack (Skew Alignment Tool 814A) • Alignment Tape KS-20315,L1 • Blank Tape • Write Enable Ring • Card Extender 826A or 826B 	-
	2. Check Read Pulse Widths, Tape Transport	DLP-540
	3. Check Read Head Alignment, Tape Transport	DLP-509
	4. Check Write and Erase Head Alignments, Tape Transport	DLP-542
	5. If Write Head Required Alignment, Repeat From Item 14-2	-
15	Clean Tape Path	DLP-526
16	If Tape Is To Be Mounted, Perform the Following:	-
	1. Mount Tape on Tape Transport	DLP-512
	2. Depress LOCAL/REMOTE Pushbutton to Obtain REMOTE Lighted Condition	-
17	Gently Close Tape Transport Cover Door	-
18	At TUC Power Switch, Rotate ROS/OFF Switch Counterclockwise to Normal Position <i>Response: OS</i> and <i>OFF NORM</i> Lamps Go Off	-
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DO THE ITEMS BELOW IN THE ORDER LISTED FOR DETAILS, GO TO

19	If Tape Was Mounted, Perform One of the Following to Set TUC Function:	-
	A. At TUC, Depress Appropriate Function Pushbutton	-
	B. At TTY, Type SET:TUC a;FUNCTION b! Where a = TUC Member Number; b = Function To Be Assigned to TUC	-

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

	<i>CAUTION: If Function Assigned to Tape Unit Controller (TUC) Is AMA (Active or Standby), Perform This Task at a Later Date</i>	
1	Obtain Support Apparatus: <ul style="list-style-type: none"> • Tektronic Oscilloscope (7000) or Equivalent • Test Pack (Skew Alignment Tool 814A) • Alignment Tape KS-20315,L1 • Blank Tape • Write Enable Ring • Card Extender 826A or 826B 	—
2	At TTY, Type OP:DUSTATUS!	—
3	If TUC Function Is Other Than Unassigned (UNA), Type CLR:ADSFUNC a! Where a = Function Assigned to TUC	—
4	At TUC Power Switch, Rotate ROS/OFF Switch Clockwise to ROS <i>Response: OS</i> and OFF NORM Lamps Light	—
5	Open Tape Transport Cover Door and Pull Interlock Switch Plunger Out to Override Position	—
6	Depress LOCAL/REMOTE Pushbutton to Obtain LOCAL Lighted Condition	—
7	If Tape Is Mounted on Tape Transport, Demount Tape	DLP-513
8	Check Read Pulse Widths, Tape Transport	DLP-540
9	Check Read Head Alignment, Tape Transport	DLP-509
10	Check Write and Erase Head Alignments, Tape Transport	DLP-542
11	If Write Head Required Alignment, Repeat From Item 8	—
12	If Tape Is To Be Mounted, Perform the Following:	—
	1. Mount Tape on Tape Transport	DLP-512
	2. Depress LOCAL/REMOTE Pushbutton to Obtain REMOTE Lighted Condition	—
13	Gently Close Tape Transport Cover Door	—
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DO THE ITEMS BELOW IN THE ORDER LISTED FOR DETAILS, GO TO

14	At TUC Power Switch, Rotate ROS/OFF Switch Counterclockwise to Normal Position <i>Response: OS and OFF NORM Lamps Go Off</i>	-
15	If Tape Was Mounted, Perform One of the Following to Set TUC Function:	-
	A. At TUC, Depress Appropriate Function Pushbutton	-
	B. At TTY, Type SET:TUC a;FUNCTION b! Where a = TUC Member Number; b = Function To Be Assigned to TUC	-

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

	<i>CAUTION: If Function Assigned to Tape Unit Controller (TUC) Is AMA (Active or Standby), Perform This Task at a Later Date</i>	
1	At TTY, Type OP:DUSTATUS!	—
2	If TUC Function Is Other Than Unassigned (UNA), Type CLR:ADSFUNC a! Where a = Function Assigned to TUC	—
3	At TUC Power Switch, Rotate ROS/OFF Switch Clockwise to ROS <i>Response: OS</i> and OFF NORM Lamps Light	—
4	Open Tape Transport Cover Door and Pull Interlock Switch Plunger Out to Override Position	—
5	Depress LOCAL/REMOTE Pushbutton to Obtain LOCAL Lighted Condition	—
6	If Tape Is Mounted on Tape Transport, Demount Tape	DLP-513
7	Check Capstan Speed, Tape Transport	DLP-510
8	If Tape Is To Be Mounted, Perform the Following:	—
	1. Mount Tape on Tape Transport	DLP-512
	2. Depress LOCAL/REMOTE Pushbutton to Obtain REMOTE Lighted Condition	—
9	Gently Close Tape Transport Cover Door	—
10	At TUC Power Switch, Rotate ROS/OFF Switch Counterclockwise to Normal Position <i>Response: OS</i> and OFF NORM Lamps Go Off	—
11	If Tape was Mounted, Perform One of the Following to Set TUC Function:	—
	A. At TUC, Depress Appropriate Function Pushbutton	—
	B. At TTY, Type SET:TUC a;FUNCTION b! Where a = TUC Member Number; b = Function To Be Assigned to TUC	—

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

	<i>CAUTION: If Function Assigned to Tape Unit Controller (TUC) Is AMA (Active or Standby), Perform This Task at a Later Date</i>	
1	At TTY, Type OP:DUSTATUS!	—
2	If TUC Function Is Other Than Unassigned (UNA), Type CLR:ADSFUNC a! Where a = Function Assigned to TUC	—
3	At TUC Power Switch, Rotate ROS/OFF Switch Clockwise to ROS <i>Response: OS</i> and OFF NORM Lamps Light	—
4	Open Tape Transport Cover Door and Pull Interlock Switch Plunger Out to Override Position	—
5	Depress LOCAL/REMOTE Pushbutton to Obtain LOCAL Lighted Condition	—
6	If Tape Is Mounted on Tape Transport, Demount Tape	DLP-513
	NOTE: Recommend That BOT and EOT Markers be Approximately 300 Feet Apart	—
7	Mount Blank Tape on Tape Transport	DLP-512
8	Check Operation of Tape Transport Using Local Mode Switches	DLP-511
9	Demount Blank Tape on Tape Transport	DLP-513
10	If Tape Is To Be Mounted, Perform the Following:	—
	1. Mount Tape on Tape Transport	DLP-512
	2. Depress LOCAL/REMOTE Pushbutton to Obtain REMOTE Lighted Condition	—
11	Gently Close Tape Transport Cover Door	—
12	At TUC Power Switch, Rotate ROS/OFF Switch Counterclockwise to Normal Position <i>Response: OS</i> and OFF NORM Lamps Go Off	—
13	If Tape Was Mounted, Perform One of the Following to Set TUC Function:	—
	A. At TUC, Depress Appropriate Function Pushbutton	—
	B. At TTY, Type SET:TUC a;FUNCTION b! Where a = TUC Member Number; b = Function To Be Assigned to TUC	—

**CHECK TAPE TRANSPORT OPERATION USING LOCAL MODE SWITCHES,
TAPE UNIT FRAME**

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

	<i>CAUTION: If Function Assigned to Tape Unit Controller (TUC) Is AMA (Active or Standby), Perform This Task at a Later Date</i>	
1	Obtain Support Apparatus: <ul style="list-style-type: none"> • 6-inch Scale (R-8550 or Equivalent) • 4-inch E Screwdriver 	—
2	At TTY, Type OP:DUSTATUS!	—
3	If TUC Function Is Other Than Unassigned (UNA), Type CLR:ADSFUNC a! Where a = Function Assigned to TUC	—
4	At TUC Power Switch, Rotate ROS/OFF Switch Clockwise to ROS <i>Response: OS and OFF NORM Lamps Light</i>	—
5	Depress ROS/OFF Switch <i>Response: PWR OFF Lamp Lights</i>	—
6	Inspect Supply and Take-up Reel Motor Brushes, Tape Transport	DLP-515
7	At TUC Power Switch, Depress and Hold ON Pushbutton for 2 Seconds <i>Response: PWR OFF Lamp Goes Off</i>	—
8	Rotate ROS/OFF Switch Counterclockwise to Normal Position <i>Response: OS and OFF NORM Lamps Go Off</i>	—
9	Perform One of the Following to Set TUC Function:	—
	A. At TUC, Depress Appropriate Function Pushbutton	—
	B. At TTY, Type SET:TUC a;FUNCTION b! Where a = TUC Member Number; b = Function To Be Assigned to TUC	—

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

	<i>CAUTION: If Function Assigned to Tape Unit Controller (TUC) Is AMA (Active or Standby), Perform This Task at a Later Date</i>	
1	Obtain Support Apparatus: <ul style="list-style-type: none"> • Tektronic Oscilloscope (7000) or Equivalent • Test Pack (Skew Alignment Tool 814A) • Alignment Tape KS-20315,L1 • Blank Tape • Write Enable Ring • Card Extender 826A or 826B 	—
2	At TTY, Type OP:DUSTATUS!	—
3	If TUC Function Is Other Than Unassigned (UNA), Type CLR:ADSFUNC a! Where a = Function Assigned to TUC	—
4	At TUC Power Switch, Rotate ROS/OFF Switch Clockwise to ROS <i>Response: OS and OFF NORM Lamps Light</i>	—
5	Open Tape Transport Cover Door and Pull Interlock Switch Plunger Out to Override Position	—
6	Depress LOCAL/REMOTE Pushbutton to Obtain LOCAL Lighted Condition	—
7	If Tape Is Mounted on Tape Transport, Demount Tape	DLP-513
8	Replace Read, Write, or Erase Head	DLP-522
9	Check Read Pulse Widths, Tape Transport	DLP-540
10	Check Read Head Alignment, Tape Transport	DLP-509
11	Check Write and Erase Head Alignments, Tape Transport	DLP-542
12	If Write Head Required Alignment, Repeat From Item 9	—
13	If Tape Is To Be Mounted, Perform the Following:	—
	1. Mount Tape on Tape Transport	DLP-512
	2. Depress LOCAL/REMOTE Pushbutton to Obtain REMOTE Lighted Condition	—
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DO THE ITEMS BELOW IN THE ORDER LISTED FOR DETAILS, GO TO

14	Gently Close Tape Transport Cover Door	-
15	At TUC Power Switch, Rotate ROS/OFF Switch Counterclockwise to Normal Position <i>Response: OS and OFF NORM Lamps Go Off</i>	-
16	If Tape Was Mounted, Perform One of the Following to Set TUC Function:	-
	A. At TUC, Depress Appropriate Function Pushbutton	-
	B. At TTY, Type SET:TUC a;FUNCTION b! Where a = TUC Member Number; b = Function To Be Assigned to TUC	-

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

	<i>CAUTION: If Function Assigned to Tape Unit Controller (TUC) Is AMA (Active or Standby), Perform This Task at a Later Date</i>	
1	At TTY, Type OP:DUSTATUS!	—
2	If TUC Function Is Other Than Unassigned (UNA), Type CLR:ADSFUNC a! Where a = Function Assigned to TUC	—
3	At TUC Power Switch, Rotate ROS/OFF Switch Clockwise to ROS <i>Response: OS</i> and OFF NORM Lamps Light	—
4	Open Tape Transport Cover Door and Pull Interlock Switch Plunger Out to Override Position	—
5	Depress LOCAL/REMOTE Pushbutton to Obtain LOCAL Lighted Condition	—
6	If Tape Is Mounted on Tape Transport, Demount Tape	DLP-513
7	Replace Circuit Pack, Tape Transport	DLP-502
8	If Circuit Pack CP10 Was Replaced, Check Capstan Diagnostic Assembly Voltage Levels	DLP-535
9	If Circuit Pack CP2, CP3, CP10, CP11, or CP14 Was Replaced, Perform the Following:	—
	1. Check Capstan Speed, Tape Transport	DLP-510
	2. Check Capstan Servo Assembly Voltage Levels	DLP-534
10	If Tape Is To Be Mounted, Perform the Following:	—
	1. Mount Tape on Tape Transport	DLP-512
	2. Depress LOCAL/REMOTE Pushbutton to Obtain REMOTE Lighted Condition	—
11	Gently Close Tape Transport Cover Door	—
12	At TUC Power Switch, Rotate ROS/OFF Switch Counterclockwise to Normal Position <i>Response: OS</i> and OFF NORM Lamps Go Off	—
13	If Tape Was Mounted, Perform One of the Following to Set TUC Function:	—
	A. At TUC, Depress Appropriate Function Pushbutton	—
	B. At TTY, Type SET:TUC a;FUNCTION b! Where a = TUC Member Number; b = Function To Be Assigned to TUC	—

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

	<i>CAUTION: If Function Assigned to Tape Unit Controller (TUC) Is AMA (Active or Standby), Perform This Task at a Later Date</i>	
1	Obtain ADS Test Tape or Blank Tape	—
2	At TTY, Type OP:DUSTATUS!	—
3	If TUC Function Is Other Than Unassigned (UNA), Type CLR:ADSFUNC a! Where a = Function Assigned to TUC	—
4	Type RMV:TUC a! Where a = TUC Member Number <i>Response:</i> RMV:TUC a COMPLETED; OS Lamp Lights	—
5	At TUC Power Switch, Rotate ROS/OFF Switch Clockwise to ROS <i>Response:</i> OFF NORM Lamp Lights	—
6	Open Tape Transport Cover Door and Pull Interlock Switch Plunger Out to Override Position	—
7	Depress LOCAL/REMOTE Pushbutton to Obtain LOCAL Lighted Condition	—
8	If Tape Is Mounted on Tape Transport, Demount Tape	DLP-513
9	At TUC Power Switch, Rotate ROS/OFF Switch Counterclockwise to Normal Position <i>Response:</i> OFF NORM Lamp Goes Off	—
10	Mount ADS Test Tape (If Available) or Blank Tape (With Write Permit Ring Installed) on Tape Transport	DLP-512
11	At TTY, Type RST:TUC a! Where a = TUC Member Number <i>Response:</i> RST:TUC a COMPLETED; OS Lamp Goes Off	—
12	Depress LOCAL/REMOTE Pushbutton to Obtain REMOTE Lighted Condition	—
13	Gently Close Tape Transport Cover Door	—
14	At TTY, Type SET:TUC a;FUNCTION DGN! Where a = TUC Member Number	—
15	Perform One of the Following to Allow Tape To Be Processed:	—
	A. If Blank Tape Was Mounted, Type ALW:TUC a:RW,WVH,VSN ADSTST! Where a = TUC Member Number	—
	B. If ADS Test Tape Was Mounted, Type ALW:TUC a:RW! Where a = TUC Member Number	—

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

16	Type DGN:DUS a:TUC b,PH 93! Where a = DUS Member; b = TUC Member Number <i>Response:</i> DGN:DUS a:TUC b,PH 93 COMPLETED ATP or CATP	-
17	Type RST:DUS a;UCL! Where a = DUS Member Number <i>Response:</i> RST:DUS a COMPLETED	-
18	Repeat Steps 17 and 18 for Other Data Unit Selector (DUS)	-
19	Open Tape Transport Cover Door and Pull Interlock Switch Plunger Out to Override Position	-
20	Depress LOCAL/REMOTE Pushbutton to Obtain LOCAL Lighted Condition	-
21	Demount ADS Tape on Tape Transport	DLP-513
22	If Tape Is To Be Mounted, Perform the Following:	-
	1. Mount Tape on Tape Transport	DLP-512
	2. Depress LOCAL/REMOTE Pushbutton to Obtain REMOTE Lighted Condition	-
	3. Perform One of the Following to Set TUC Function:	-
	A. At TUC, Depress Appropriate Function Pushbutton	-
	B. At TTY, Type SET:TUC a;FUNCTION b! Where a = TUC Member Number; b = Function To Be Assigned to TUC	-
23	Gently Close Tape Transport Cover Door	-

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

	<i>CAUTION: If Function Assigned to Tape Unit Controller (TUC) Is AMA (Active or Standby), Perform This Task at a Later Date</i>	
1	Obtain ADS Test Tape or Blank Tape	-
2	At TTY, Type OP:DUSTATUS!	-
3	If TUC Function Is Other Than Unassigned (UNA), Type CLR:ADSFUNC a! Where a = Function Assigned to TUC	-
4	Type RMV:TUC a! Where a = TUC Member Number <i>Response: RMV:TUC a COMPLETED; OS Lamp Lights</i>	-
5	At TUC Power Switch, Rotate ROS/OFF Switch Clockwise to ROS <i>Response: OFF NORM Lamp Lights</i>	-
6	Open Tape Transport Cover Door and Pull Interlock Switch Plunger Out to Override Position	-
7	Depress LOCAL/REMOTE Pushbutton to Obtain LOCAL Lighted Condition	-
8	If Tape Is Mounted on Tape Transport, Demount Tape	DLP-513
9	At TUC Power Switch, Rotate ROS/OFF Switch Counterclockwise to Normal Position <i>Response: OFF NORM Lamp Goes Off</i>	-
10	Mount ADS Test Tape (If Available) or Blank Tape (With Write Permit Ring Installed) on Tape Transport	DLP-512
11	At TTY, Type RST:TUC a! Where a = TUC Member Number <i>Response: RST:TUC a COMPLETED; OS Lamp Goes Off</i>	-
12	If Blank Tape Was Mounted, Generate Diagnostic Test Tape	DLP-518
13	Depress LOCAL/REMOTE Pushbutton to Obtain REMOTE Lighted Condition	-
14	Gently Close Tape Transport Cover Door	-
	(Continued on Page 2)	

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

15	At TTY, Type SET:TUC a;FUNCTION DGN! Where a = TUC Member Number	-
16	Perform One of the Following to Allow Tape To Be Processed:	-
	A. If Blank Tape Was Mounted, Type ALW:TUC a:RW,WVH,VSN ADSTST! Where a = TUC Member Number	-
	B. If ADS Test Tape Was Mounted, Type ALW:TUC a:RW! Where a = TUC Member Number	-
17	Perform One of the Following to Initiate TUC Diagnostics:	-
	A. Data Unit Community 0, Type DGN:TUC a:PH 81-83! Where a = TUC Member Number	-
	B. Data Unit Community 1, Type DGN:TUC a:PH 91-93! Where a = TUC Member Number	-
18	Type RST:TUC a! Where a = TUC Member Number <i>Response:</i> RST:TUC a COMPLETED; OS Lamp Goes Off	-
19	Open Tape Transport Cover Door and Pull Interlock Switch Plunger Out to Override Position	-
20	Depress LOCAL/REMOTE Pushbutton to Obtain LOCAL Lighted Condition	-
21	Demount Tape On Tape Transport	DLP-513
22	If Tape Is To Be Mounted, Perform the Following:	-
	1. Mount Tape on Tape Transport	DLP-512
	2. Depress LOCAL/REMOTE Pushbutton to Obtain REMOTE Lighted Condition	-
	3. Perform One of the Following to Set TUC Function:	-
	A. At TUC, Depress Appropriate Function Pushbutton	-
	B. At TTY, Type SET:TUC a;FUNCTION b! Where a = TUC Member Number; b = Function To Be Assigned to TUC	-
23	Gently Close Tape Transport Cover Door	-

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

1	If Pack to be Replaced Is Located at 80-38 Through 80-45 or 80-63 Through 80-69; At TTY, Type RMV:AUB a! Where a = 0 if DUS Is in File Store Frame 0 or 2, or 1 if DUS Is in File Store Frame 1 or 3 <i>Response:</i> RMV:AUB a COMPLETED	-
2	At DUS Power Switch, Rotate ROS/OFF Switch Clockwise to ROS <i>Response:</i> OS and OFF NORM Lamps Light	-
3	Replace Circuit Pack, Data Unit Selector (DUS)	DLP-500
4	At DUS Power Switch, Rotate ROS/OFF Switch Counterclockwise to Normal Position <i>Response:</i> OS and OFF NORM Lamps Go Off	-
5	If Auxiliary Bus Was Removed From Service, Perform the Following:	-
	1. At TTY, Type RST:AUB a! Where a = 0 or 1 <i>Response:</i> RST:AUB a COMPLETED	-
	2. Type RST:DUS a! Where a = DUS Member Number <i>Response:</i> RST:DUS a COMPLETED	-
	3. Type RST:FS a! Where a = FS Member Number <i>Response:</i> RST:FS a COMPLETED	-

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

1	If Pack To Be Replaced Is Coded FC12 or FC13 ; at TTY, Type RMV:DUS a! Where a = 0 if Pack Location Is 80-16, 18, 20, 22, 24, 26, 28, 31, 33, 35, or 1 if Pack Location Is 80-17, 19, 21, 23, 25, 27, 29, 32, 34, 36 <i>Response:</i> RMV:DUS a COMPLETED	-
2	At TUC Power Switch, Rotate ROS/OFF Switch Clockwise to ROS <i>Response:</i> OS and OFF NORM Lamps Light	-
3	Replace Circuit Pack, Tape Unit Controller (TUC)	DLP-501
4	At TUC Power Switch, Rotate ROS/OFF Switch Counterclockwise to Normal Position <i>Response:</i> OS and OFF NORM Lamps Go Off	-
5	If DUS Was Removed From Service; At TTY, Type RST:DUS a! Where a = 0 or 1 <i>Response:</i> RST:DUS a COMPLETED	-

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

1	At DUS Power Switch, Rotate ROS/OFF Switch Clockwise to ROS <i>Response: OS and OFF NORM Lamps Light</i>	-
2	Replace DUS DC-to-DC Converter	DLP-538
3	At DUS Power Switch, Rotate ROS/OFF Switch Counterclockwise to Normal Position <i>Response: OS and OFF NORM Lamps Go Off</i>	-

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

	<p><i>CAUTION 1: If Function Assigned to Tape Unit Controller (TUC) Is AMA (Active or Standby), Perform This Task at a Later Date</i></p> <p>NOTE 1: Brake on Late Model Motors Is Assembled with Permanent Pin; Making Field Replacement of Brake Impracticable. Replacement of Reel Drive Motor Assembly Is Required</p>	-
1	<p>Obtain Support Apparatus:</p> <ul style="list-style-type: none"> • Allen Wrench 5/64-inch • Magnetic Brake L502574 	-
2	At TTY, Type OP:DUSTATUS!	-
3	If TUC Function Is Other Than Unassigned (UNA), Type CLR:ADSFUNC a! Where a = Function Assigned to TUC	-
4	At TUC Power Switch, Rotate ROS/OFF Switch Clockwise to ROS <i>Response: OS</i> and OFF NORM Lamps Light	-
5	Open Tape Transport Cover Door and Pull Interlock Switch Plunger Out to Override Position	-
6	Depress LOCAL/REMOTE Pushbutton to Obtain LOCAL Lighted Condition	-
7	If Tape Is Mounted on Tape Transport, Demount Tape	DLP-513
8	Replace Reel Motor Brake	DLP-532
9	If Tape Is To Be Mounted, Perform the Following:	-
	1. Mount Tape on Tape Transport	DLP-512
	2. Depress LOCAL/REMOTE Pushbutton to Obtain REMOTE Lighted Condition	-
10	Gently Close Tape Transport Cover Door	-
11	At TUC Power Switch, Rotate ROS/OFF Switch Counterclockwise to Normal Position <i>Response: OS</i> and OFF NORM Lamps Go Off	-
12	If Tape Was Mounted, Perform One of the Following to Set TUC Function:	-
	A. At TUC, Depress Appropriate Function Pushbutton	-
	B. At TTY, Type SET:TUC a;FUNCTION b! Where a = TUC Member Number; b = Function To Be Assigned to TUC	-

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

	<i>CAUTION 1: If Function Assigned to Tape Unit Controller (TUC) Is AMA (Active or Standby), Perform This Task at a Later Date</i>	—
1	Obtain Support Apparatus: <ul style="list-style-type: none"> • Heat Sink Compound C-2471 • Capstan Motor Assembly L-502558 	—
2	At TTY, Type OP:DUSTATUS!	—
3	If TUC Function Is Other Than Unassigned (UNA), Type CLR:ADSFUNC a! Where a = Function Assigned to TUC	—
4	At TUC Power Switch, Rotate ROS/OFF Switch Clockwise to ROS <i>Response: OS</i> and OFF NORM Lamps Light	—
5	Open Tape Transport Cover Door and Pull Interlock Switch Plunger Out to Override Position	—
6	Depress LOCAL/REMOTE Pushbutton to Obtain LOCAL Lighted Condition	—
7	If Tape Is Mounted on Tape Transport, Demount Tape	DLP-513
8	Replace Capstan Motor Assembly	DLP-537
9	Check Capstan Speed, Tape Transport	DLP-510
10	If Tape Is To Be Mounted, Perform the Following:	—
	1. Mount Tape on Tape Transport	DLP-512
	2. Depress LOCAL/REMOTE Pushbutton to Obtain REMOTE Lighted Condition	—
11	Gently Close Tape Transport Cover Door	—
12	At TUC Power Switch, Rotate ROS/OFF Switch Counterclockwise to Normal Position <i>Response: OS</i> and OFF NORM Lamps Go Off	—
13	If Tape Was Mounted, Perform One of the Following to Set TUC Function:	—
	A. At TUC, Depress Appropriate Function Pushbutton	—
	B. At TTY, Type SET:TUC a;FUNCTION b! Where a = TUC Member Number; b = Function To Be Assigned to TUC	—

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

	<i>CAUTION: If Function Assigned to Tape Unit Controller (TUC) Is AMA (Active or Standby), Perform This Task at a Later Date</i>	—
1	At TTY, Type OP:DUSTATUS!	—
2	If TUC Function Is Other Than Unassigned (UNA), Type CLR:ADSFUNC a! Where a = Function Assigned to TUC	—
3	At TUC Power Switch, Rotate ROS/OFF Switch Clockwise to ROS <i>Response: OS and OFF NORM Lamps Light</i>	—
4	Open Tape Transport Cover Door and Pull Interlock Switch Plunger Out to Override Position	—
5	Depress LOCAL/REMOTE Pushbutton to Obtain LOCAL Lighted Condition	—
6	If Tape Is Not Mounted on Tape Transport, Mount Blank Tape	DLP-512
7	Check Capstan Servo Assembly Voltage Levels	DLP-534
8	If Blank Tape Was Mounted, Demount Tape on Tape Transport	DLP-513
9	If Tape Is To Be Mounted, Perform the Following:	—
	1. Mount Tape on Tape Transport	DLP-512
	2. Depress LOCAL/REMOTE Pushbutton to Obtain REMOTE Lighted Condition	—
10	Gently Close Tape Transport Cover Door	—
11	At TUC Power Switch, Rotate ROS/OFF Switch Counterclockwise to Normal Position <i>Response: OS and OFF NORM Lamps Go Off</i>	—
12	If Tape Was Mounted, Perform One of the Following to Set TUC Function:	—
	A. At TUC, Depress Appropriate Function Pushbutton	—
	B. At TTY, Type SET:TUC a;FUNCTION b! Where a = TUC Member Number; b = Function To Be Assigned to TUC	—

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

	<i>CAUTION: If Function Assigned to Tape Unit Controller (TUC) Is AMA (Active or Standby), Perform This Task at a Later Date</i>	—
1	At TTY, Type OP:DUSTATUS!	—
2	If TUC Function Is Other Than Unassigned (UNA), Type CLR:ADSFUNC a! Where a = Function Assigned to TUC	—
3	At TUC Power Switch, Rotate ROS/OFF Switch Clockwise to ROS <i>Response: OS</i> and OFF NORM Lamps Light	—
4	Open Tape Transport Cover Door and Pull Interlock Switch Plunger Out to Override Position	—
5	Depress LOCAL/REMOTE Pushbutton to Obtain LOCAL Lighted Condition	—
6	If Tape Is Not Mounted on Tape Transport, Mount Blank Tape	DLP-512
7	Check Capstan Diagnostic Assembly Voltage Levels	DLP-535
8	If Blank Tape Was Mounted, Demount Tape on Tape Transport	DLP-513
9	If Tape Is To Be Mounted, Perform the Following:	—
	1. Mount Tape on Tape Transport	DLP-512
	2. Depress LOCAL/REMOTE Pushbutton to Obtain REMOTE Lighted Condition	—
10	Gently Close Tape Transport Cover Door	—
11	At TUC Power Switch, Rotate ROS/OFF Switch Counterclockwise to Normal Position <i>Response: OS</i> and OFF NORM Lamps Go Off	—
12	If Tape Was Mounted, Perform One of the Following to Set TUC Function:	—
	A. At TUC, Depress Appropriate Function Pushbutton	—
	B. At TTY, Type SET:TUC a;FUNCTION b! Where a = TUC Member Number; b = Function To Be Assigned to TUC	—

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

	<i>CAUTION: If Function Assigned to Tape Unit Controller (TUC) Is AMA (Active or Standby), Perform This Task at a Later Date</i>	—
1	At TTY, Type OP:DUSTATUS!	—
2	If TUC Function Is Other Than Unassigned, Type CLR:ADSFUNC a! Where a = Function Assigned to TUC	—
3	At TUC Power Switch, Rotate ROS/OFF Switch Clockwise to ROS <i>Response: OS</i> and OFF NORM Lamps Light	—
4	Open Tape Transport Cover Door and Pull Interlock Switch Plunger Out to Override Position	—
5	Depress LOCAL/REMOTE Pushbutton to Obtain LOCAL Lighted Condition	—
6	If Tape Is Mounted on Tape Transport, Demount Tape	DLP-513
7	Replace DC-to-DC Converter	DLP-517
8	If Tape Is To Be Mounted, Perform the Following:	—
	1. Mount Tape on Tape Transport	DLP-512
	2. Depress LOCAL/REMOTE Pushbutton to Obtain REMOTE Lighted Condition	—
9	Gently Close Tape Transport Cover Door	—
10	At TUC Power Switch, Rotate ROS/OFF Switch Counterclockwise to Normal Position <i>Response: OS</i> and OFF NORM Lamps Go Off	—
11	If Tape Was Mounted, Perform One of the Following to Set TUC Function:	—
	A. At TUC, Depress Appropriate Function Pushbutton	—
	B. At TTY, Type SET:TUC a;FUNCTION b! Where a = TUC Member Number; b = Function To Be Assigned to TUC	—

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

1	At TTY, Type OP:DUSTATUS!	-
2	If Tape Unit Controller (TUC) Function Is Other Than Unassigned (UNA), Type CLR:ADSFUNC a! Where a = Function Assigned to TUC	-
3	At TUC, Depress REQ DMT Pushbutton <i>Response: OK DMT</i> Lamp Lights	-
4	Open Tape Transport Cover Door and Pull Interlock Switch Plunger Out to Override Position	-
5	Depress LOCAL/REMOTE Pushbutton to Obtain LOCAL Lighted Condition	-
6	Demount Tape on Tape Transport	DLP-513
7	Gently Close Tape Transport Cover Door	-

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

1	Obtain Support Apparatus: <ul style="list-style-type: none"> • Twill Cloth KS-2423 • Cleaner Solvent KS-20406,L1 • Vacuum Cleaner KS-14377,L5 • Flexible Nozzle KS-14377,L3 	—
2	If Tape Transport Cover Door Is Not Open, Open Cover Door and Pull Interlock Switch Plunger Out to Override Position	—
3	Depress LOCAL/REMOTE Pushbutton to Obtain LOCAL Lighted Condition	—
4	Clean Tape Path	DLP-526
5	Mount Tape on Tape Transport	DLP-512
6	Check Reels and Hubs for Wobble	DLP-525
7	Depress REWIND Pushbutton <i>Response: REWIND</i> Lamp Lights; Tape Rewinds to BOT Marker and Stops	—
8	Depress LOCAL/REMOTE Pushbutton to Obtain REMOTE Lighted Condition	—
9	Gently Close Tape Transport Cover Door	—
10	Perform One of the Following to Set TUC Function:	—
	A. At TUC, Depress Appropriate Function Pushbutton	—
	B. At TTY, Type SET:TUC a;FUNCTION b! Where a = TUC Member Number; b = Function To Be Assigned to TUC	—

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

	<i>CAUTION: If Function Assigned to Tape Unit Controller (TUC) Is AMA (Active or Standby), Perform This Task at a Later Date</i>	—
1	At TTY, Type OP:DUSTATUS!	—
2	If TUC Function Is Other Than Unassigned, Type CLR:ADSFUNC a! Where a = Function Assigned to TUC	—
3	At TUC Power Switch, Rotate ROS/OFF Switch Clockwise to ROS <i>Response: OS</i> and OFF NORM Lamps Light	—
4	Open Tape Transport Cover Door and Pull Interlock Switch Plunger Out to Override Position	—
5	Depress LOCAL/REMOTE Pushbutton to Obtain LOCAL Lighted Condition	—
6	If Tape Is Mounted on Tape Transport, Demount Tape	DLP-513
7	Replace DC-to-DC Converter	DLP-549
8	If Tape Is To Be Mounted, Perform the Following:	—
	1. Mount Tape on Tape Transport	DLP-512
	2. Depress LOCAL/REMOTE Pushbutton to Obtain REMOTE Lighted Condition	—
9	Gently Close Tape Transport Cover Door	—
10	At TUC Power Switch, Rotate ROS/OFF Switch Counterclockwise to Normal Position <i>Response: OS</i> and OFF NORM Lamps Go Off	—
11	If Tape Was Mounted, Perform One of the Following to Set TUC Function:	—
	A. At TUC, Depress Appropriate Function Pushbutton	—
	B. At TTY, Type SET:TUC a;FUNCTION b! Where a = TUC Member Number; b = Function To Be Assigned to TUC	—

GENERAL

The maintenance philosophy contained in this volume is based on the design of equipment hardware, diagnostic software, and test equipment employed. Procedures are intended to aid personnel in performing routine maintenance and trouble-clearing tasks. The degree to which these procedures accomplish this depends on input and feedback from the user. Additions, corrections, and improvements to the data are encouraged. Manufacturer, engineering, and software documentation such as I/O manuals, SDs, PRs, etc. are referred to where applicable rather than duplicating that information in the TOP. Some portions of those documents may be used in procedures, but only as examples for explanation. Test equipment (oscilloscopes, voltmeters, etc) and parameters involved in circuits being tested, adjusted, or checked are usually prescribed. Setup and method of operation is not described unless it is unusual or unique. When procedures are affected by differences in hardware and/or software, the procedure will address the differences when possible. Where extensive differences exist, separate procedures will be provided and referenced according to SD, J-spec, or option. When a procedure does not address differences, it will apply to all versions and options of the equipment.

IXL PHILOSOPHY

The IXL is structured to provide access to procedures pertinent to symptoms identified. Power problems are sensed by scan points that generate a minor alarm. It is assumed that the user can locate the frame with the power fault that was automatically powered down (1A power switch with **PWR OFF** lamp lighted and **OFF NORM** lamp off) by following the aisle pilot lights or by reading the REPT:PA printout. The precise structure of the message is given in the Input/Output (I/O) message manuals. Symptoms described in the IXL reflect the assumptions above, and

indicate other conditions that are observable at the frame that would enable the user to access the proper trouble-clearing procedure. These conditions are: fuse blown, lighted LEDs on converters, and power function circuit packs.

In general, logic circuit failures cause the fault recovery program to request a diagnostic program. This method of requesting the diagnostic program includes the TLP option. The IXL reflects this in the **ANALY:TLPFILE** messages listed. All **ANALY:TLPFILE** messages other than those listed with a notation of **SUSPECTED FAULTY EQUIPMENT** or **NULL PACK TEST GENERATED** pertain to problems in generating a TLP **SUSPECTED FAULTY EQUIPMENT** list. The IXL will reference the appropriate procedure that will attempt to correct the problem. If successful in generating a suspected faulty equipment list, those messages will reference the appropriate procedure that will attempt to clear the trouble using the list. If not successful, the procedure will then reference the next level of trouble-clearing, raw data analysis. This level is an alternative to the first and most common trouble-clearing approach.

TAP PHILOSOPHY

When documenting a procedural approach to trouble clearing, certain assumptions are made. It is assumed that one fault is being cleared at a time. When directing the user to perform an action, it is assumed that he performs that action correctly. Similarly, when directed to make replacements, the replacement part is always assumed to be good. Equipment used for testing, both built-in (hardware and software) and commercial, is assumed to be good.

These assumptions and the fact that trouble-clearing procedures are designed for faults with consistent fault

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signatures provide procedures with a clean straightline approach to trouble clearing. It is possible that some faults will not present a consistent fault signature or TLP pack list. If this occurs, then the DGN should be repeated a number of times and the most consistent signature and list should be used following the same general approach provided in the procedures. This repetitive DGN method should be used each time to determine if there is any change in the fault signature when any corrective action is taken unless that action resulted in clearing the problem.

Trouble-clearing TAPs provided for diagnostic failures are provided on three levels. Level one addresses what to do with a software-generated TLP **SUSPECTED FAULTY EQUIPMENT** list and provides a step-by-step procedure for replacing circuit packs one at a time, and analyzing the results. This level is straightforward and requires some familiarity with the equipment (descriptive and theory BSPs), TTY techniques, and diagnostic printouts.

The second level of trouble clearing is accessed from the first level TAP when the TLP-generated **SUSPECTED FAULTY EQUIPMENT** list has been exhausted without clearing the problem. It may also be accessed directly from the IXL or any of the TAPs that produce a **NULL PACK TEST GENERATED** response. This level is known as raw data analysis and describes what to do with the summary and supplemental data printed either with or instead of the **SUSPECTED FAULTY EQUIPMENT** list. It is expected that this will lead to an identification of faulty circuits within the SD and possibly additional suspect circuit packs not previously identified. This level of trouble clearing is more complex and requires knowledge of the equipment, TTY techniques and printouts, and SDs, PRs, etc.

The third level of trouble clearing is signal tracing using interactive diagnostics. This procedure is

accessible only from the previous level and uses information derived in the performance of that procedure. This level of trouble clearing requires an increase in the capabilities cited in the first two levels and requires additional knowledge and skill in the setup and use of test equipment (oscilloscopes, voltmeters, etc).

Another method of trouble clearing that may be used is interrupt analysis. Procedures provided for analyzing interrupts are for recurring interrupts. Therefore, a history of the time between interrupts is essential when replacing suspect circuit packs and analyzing the results. Enough time should be allowed between replacement of suspect packs for interrupt to recur. Should this be the wrong circuit pack, then the probability is high that the interrupt will occur again with the same symptoms. If interrupt recurs, the next most suspect circuit pack should be replaced. Before changing circuit packs, diagnostics should be run with ATP expected. If diagnostics produce:

ATP – The most suspect circuit pack is the first pack on list obtained by analysis of interrupt.

STF – The most suspect circuit pack is the pack that appears on both TLP **SUSPECTED FAULTY EQUIPMENT** list and list obtained by analysis of interrupt.

ALTERNATE MEHTODS

The more knowledgeable and experienced personnel may access TOP documents at a point in trouble clearing when analysis is completed (faulty component determined) and only repair or replacement is required. In many instances, access to these procedures may be obtained by locating procedural data provided on the Task Index List. Most DLPs are designed to support TAPs and NTPs with preconditioning and system restoration steps covered in those level procedures (TAPs,

NTPs). Therefore, access to data (DLPs) on a hunt-and-find basis is a threat to equipment operation and may compound trouble-clearing problems.

EQUIPMENT TEST LIST

This is a list of tasks recommended for preventive maintenance. Information on this list is arranged in the following order from left to right: frequency, title, and procedure number

1A PROCESSOR; TAPE FRAME, DUS
FOR ALL UNITS

W	INSPECT AND CLEAN TAPE PATH	004
W	CHECK OPERATION OF TAPE TRANSPORT	007
M	TUC DEMAND DIAGNOSTIC - PH 81-83, 91-93	012
6M	CHECK READ, WRITE AND ERASE HEADS	005
6M	CHECK CAPSTAN SPEED	006
6M	CHECK CAPSTAN AND DIAGNOSTIC ASSEMBLE VOLTAGE LEVELS, TAPE TRANSPORT	019
6M	TEST LAMPS ON POWER SWITCH	506
6M	TEST POWER ALARM CIRCUITS TAPE UNIT CONTROLLER.	543
6M	TEST POWER ALARM CIRCUIT DATA UNIT SELECTOR	546
12M	INSPECT REEL MOTOR BRUSHES	008

OPERATIONAL FEATURES, SELECT ONE CATEGORY

1A ESS SWITCH

12M	CHECK VOLTAGES AT CAPSTAN SERVO ASSEMBLY	018
12M	CHECK DC-TO-DC CONVERTER VOLTAGES	514

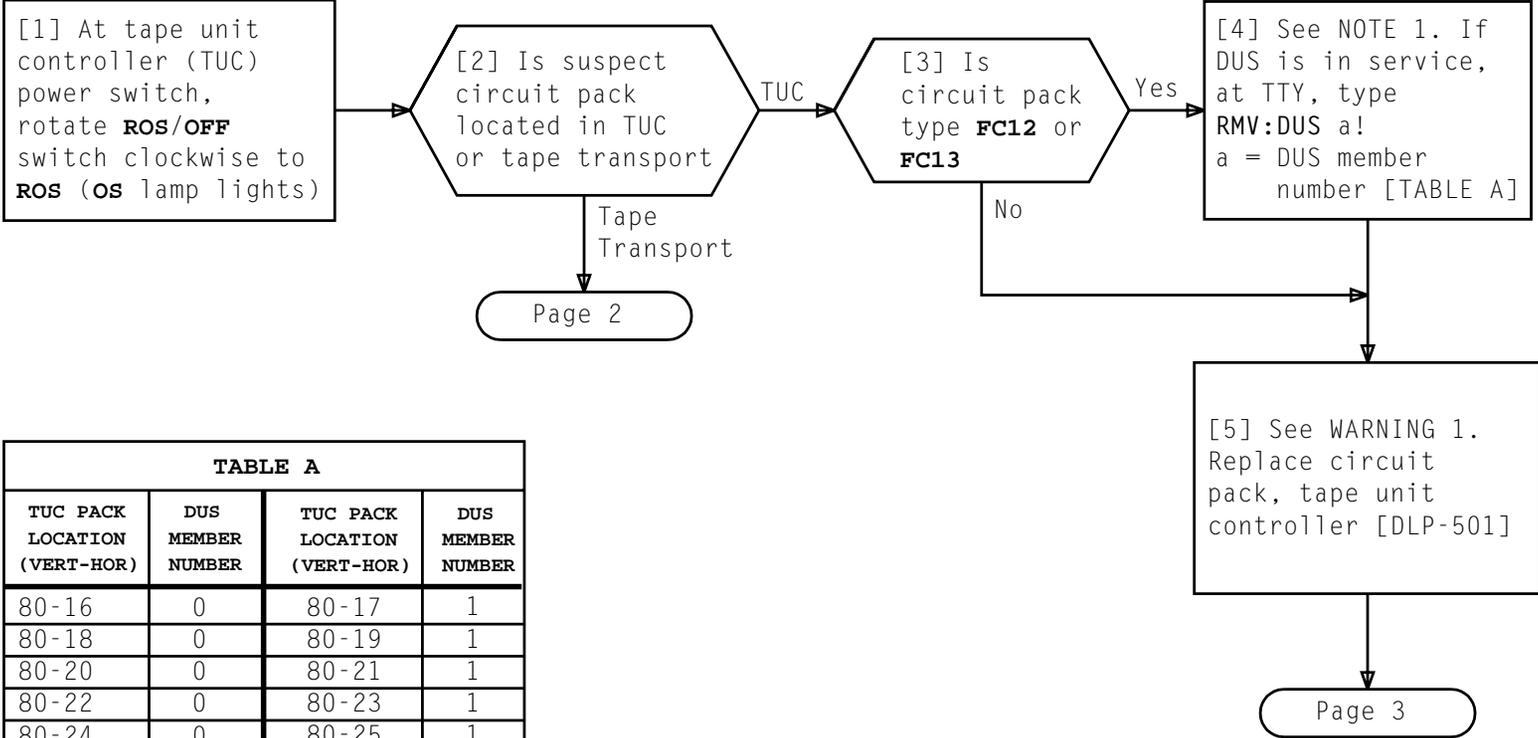
4 ESS SWITCH

M	DIAGNOSE DATA UNIT SELECTORS (DEMAND PHASE 93)	011
---	---------------------------------------------------	-----

SUMMARY

Replace each circuit pack on TLP suspected faulty equipment list beginning with first pack. After each replacement, check diagnostic results to determine if trouble is cleared. If failure recurs, reinsert original pack. Repeat procedure

for each succeeding pack on list until trouble is cleared. If trouble is not cleared, clear tape unit controller diagnostic failure by analyzing raw data and replacing suspect packs [TAP-104]



TUC PACK LOCATION (VERT-HOR)	DUS MEMBER NUMBER	TUC PACK LOCATION (VERT-HOR)	DUS MEMBER NUMBER
80-16	0	80-17	1
80-18	0	80-19	1
80-20	0	80-21	1
80-22	0	80-23	1
80-24	0	80-25	1
80-26	0	80-27	1
80-28	0	80-29	1
80-31	0	80-32	1
80-33	0	80-34	1
80-35	0	80-36	1

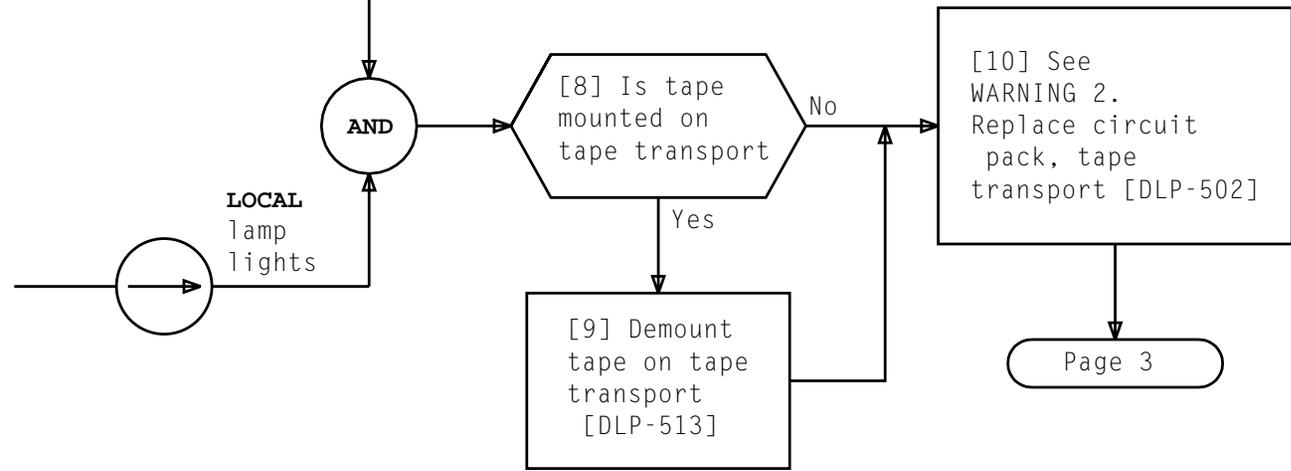
NOTE 1
It may be necessary to restore mate DUS before removal of selected DUS using RST:DUS a! message

WARNING 1
Red designation marker at pack indicates fuse removal required to replace pack

CLEAR TAPE UNIT CONTROLLER DIAGNOSTIC FAILURE BY REPLACING PACKS ON TLP SUSPECTED FAULTY EQUIPMENT LIST

[6] Open tape transport cover door and pull interlock switch plunger out to override position

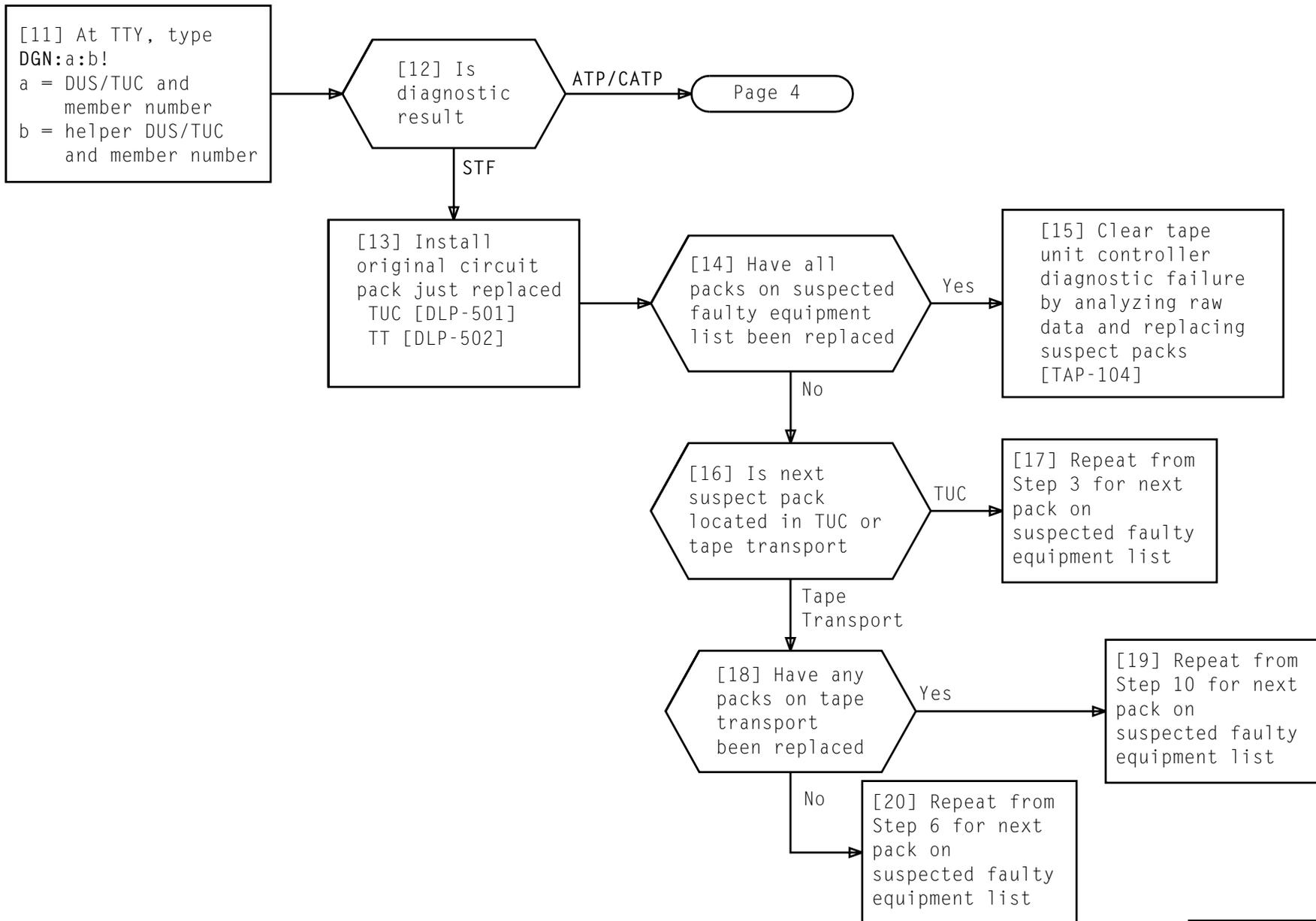
[7] Depress **LOCAL/REMOTE** pushbutton to obtain **LOCAL** lighted condition



WARNING 2
Red designation marker at pack indicates fuse removal required to replace pack

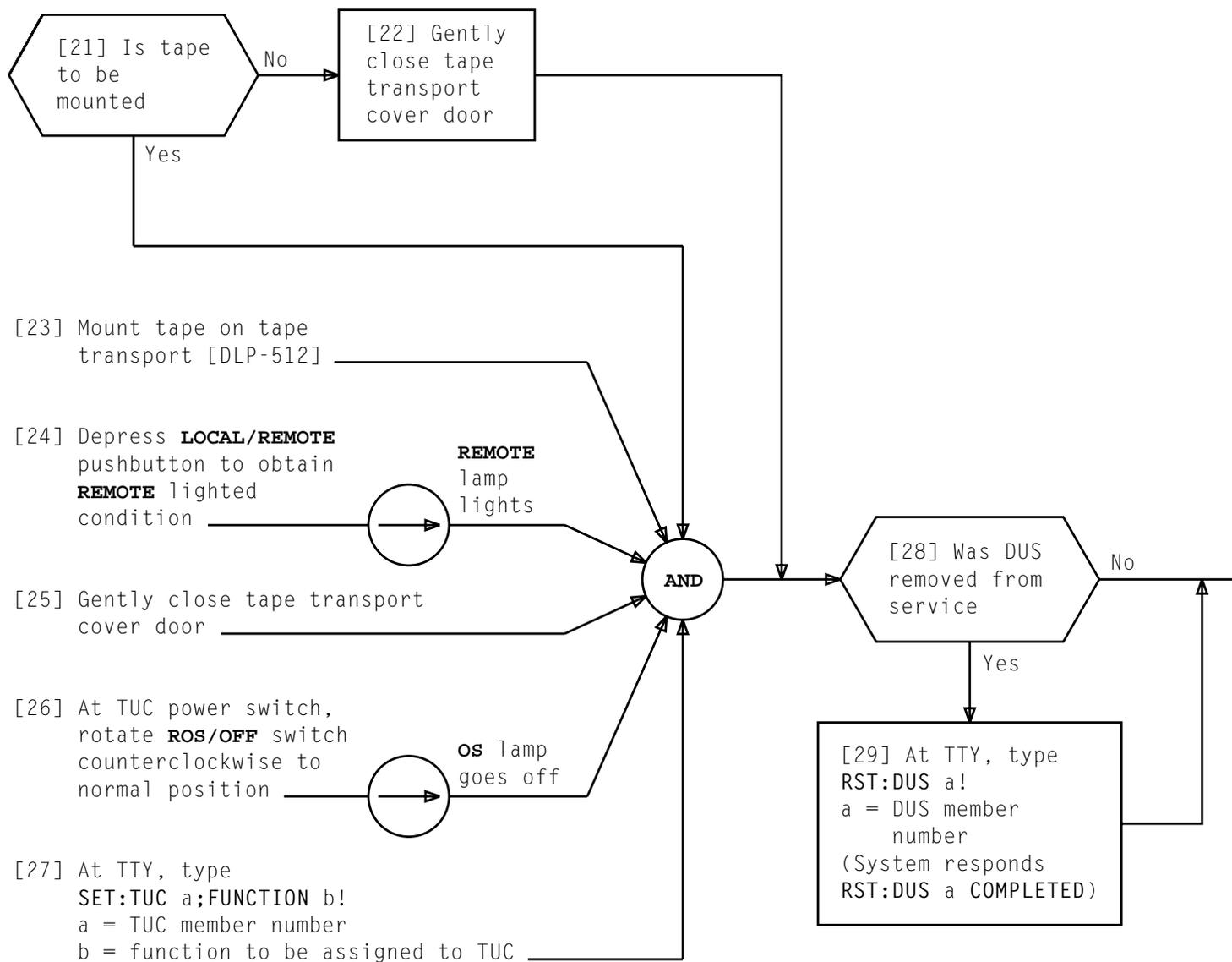
CLEAR TAPE UNIT CONTROLLER DIAGNOSTIC FAILURE BY REPLACING PACKS ON TLP SUSPECTED FAULTY EQUIPMENT LIST

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**CLEAR TAPE UNIT CONTROLLER DIAGNOSTIC FAILURE BY REPLACING PACKS
ON TLP SUSPECTED FAULTY EQUIPMENT LIST**

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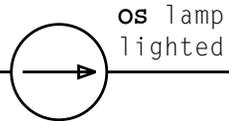
CLEAR TAPE UNIT CONTROLLER DIAGNOSTIC FAILURE BY REPLACING PACKS ON TLP SUSPECTED FAULTY EQUIPMENT LIST

SUMMARY

Identify list of suspect circuit packs by analyzing raw data. Replace each pack identified beginning with first pack. After each replacement, check diagnostic results to determine if trouble is cleared. If failure recurs,

reinsert original pack. Repeat procedure for each succeeding pack on list until trouble is cleared. If trouble is not cleared, clear diagnostic failure by looping over first failing test and signal tracing [TAP-105]

[1] At DUS power switch, ensure **ROS/OFF** switch is rotated clockwise to **ROS**



[2] Identify list of suspect circuit packs by analyzing raw data [DLP-504]

AND

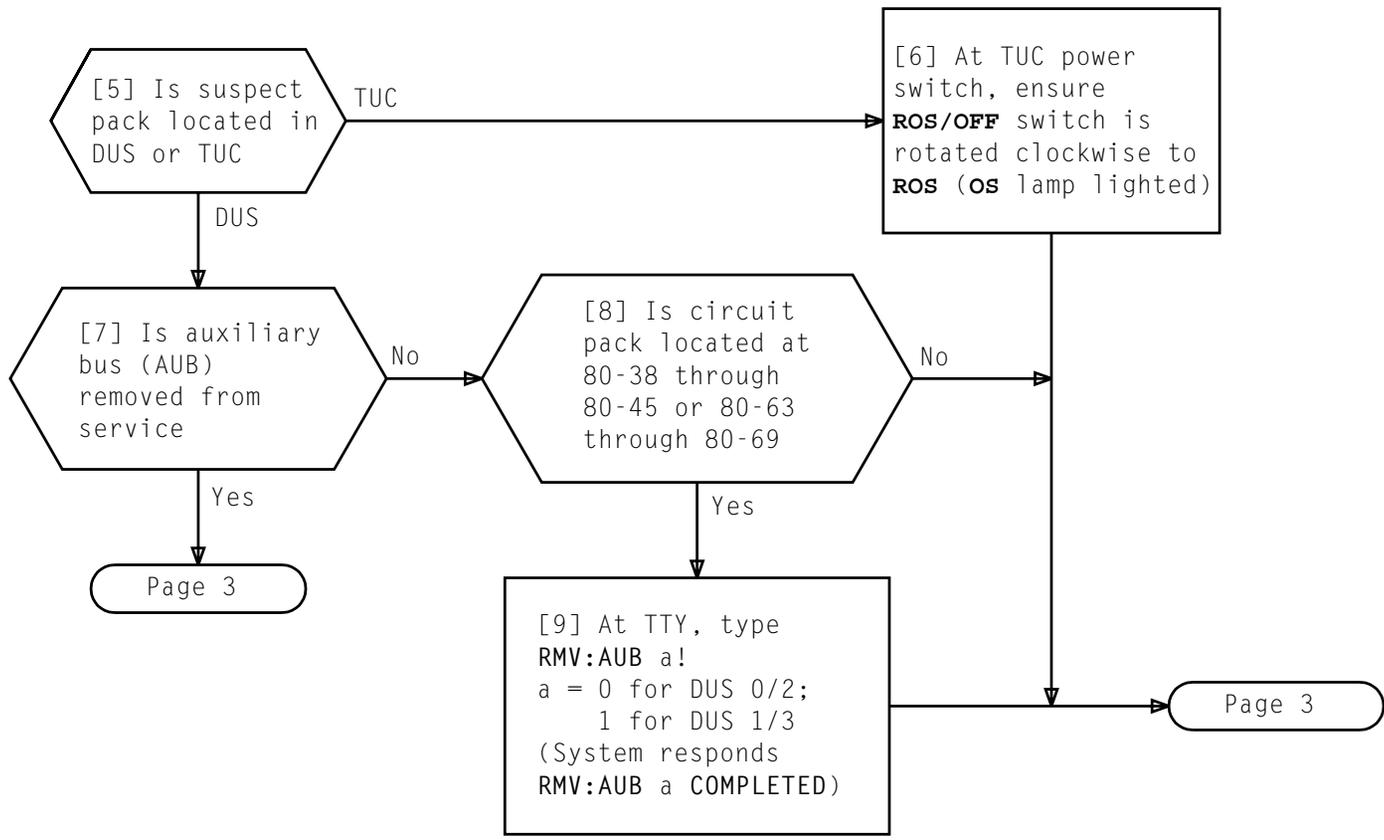
[3] Have all suspect packs on list been previously replaced

Yes

[4] Clear diagnostic failure by looping over first failing test and signal tracing [TAP-105]

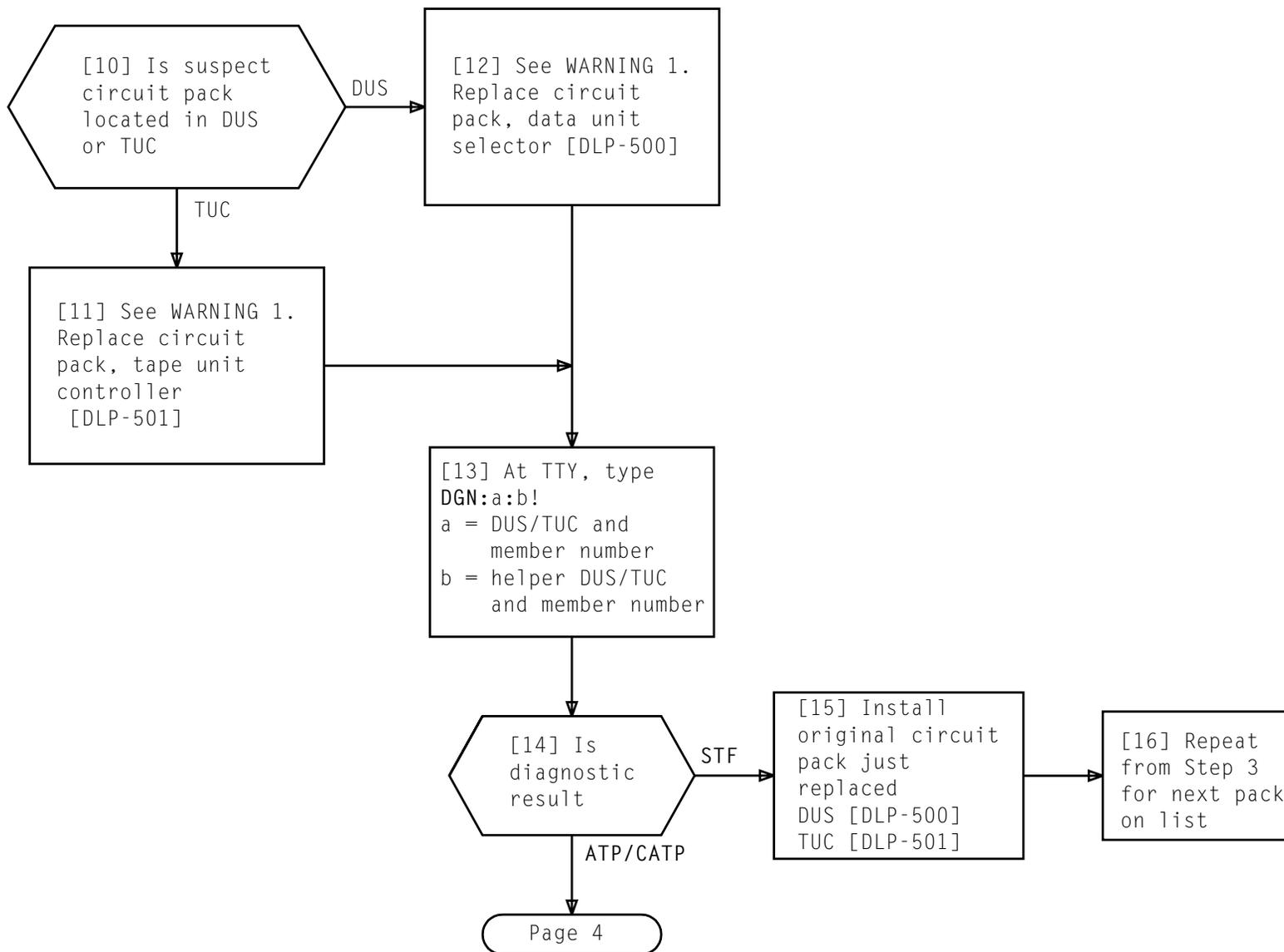
Page 2

CLEAR DATA UNIT SELECTOR DIAGNOSTIC FAILURE BY ANALYZING RAW DATA AND REPLACING SUSPECT PACKS



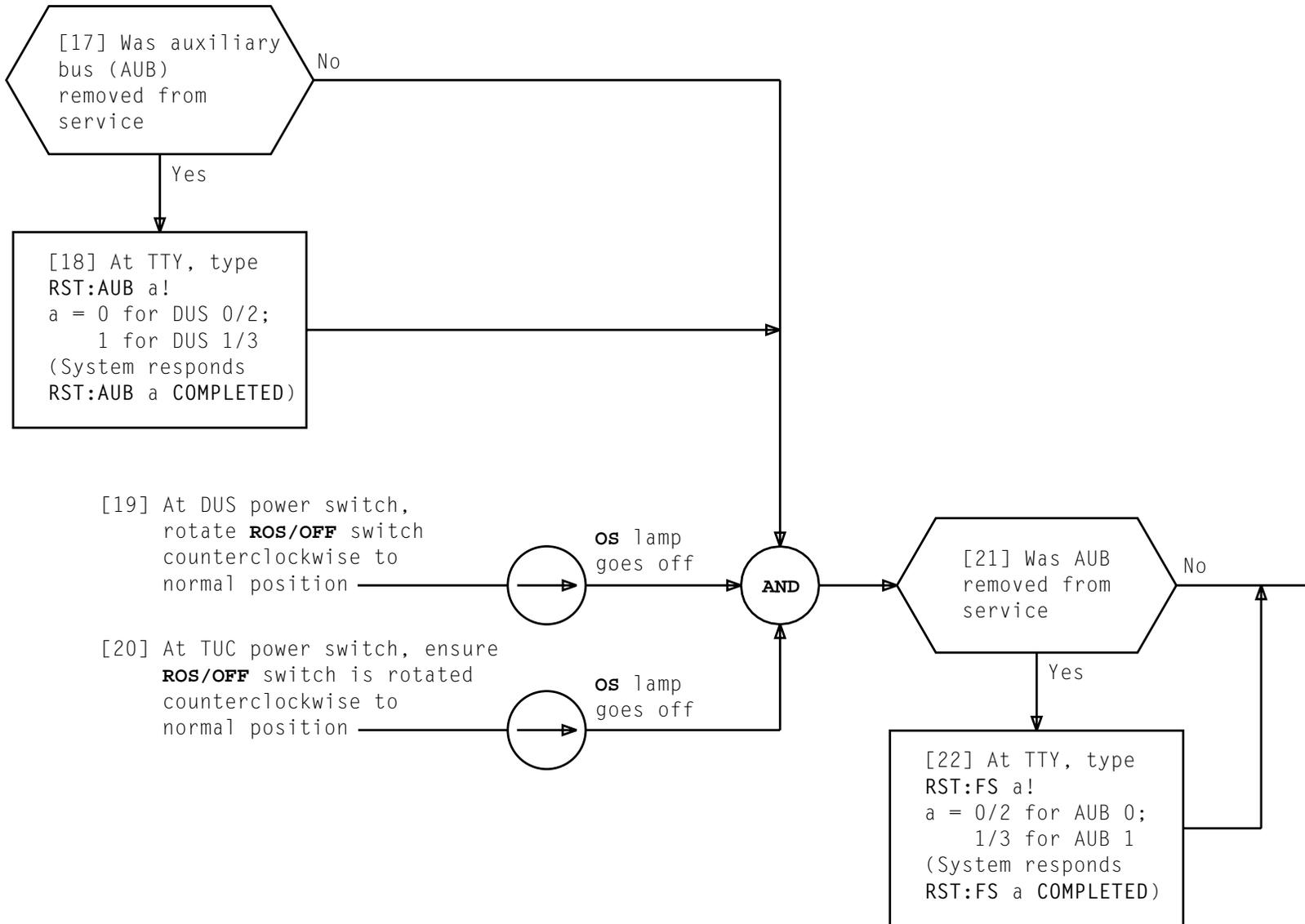
CLEAR DATA UNIT SELECTOR DIAGNOSTIC FAILURE BY ANALYZING RAW DATA AND REPLACING SUSPECT PACKS

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WARNING 1
Red designation marker at pack indicates fuse removal required to replace pack

CLEAR DATA UNIT SELECTOR DIAGNOSTIC FAILURE BY ANALYZING RAW DATA AND REPLACING SUSPECT PACKS



**CLEAR DATA UNIT SELECTOR DIAGNOSTIC FAILURE BY
ANALYZING RAW DATA AND REPLACING SUSPECT PACKS**

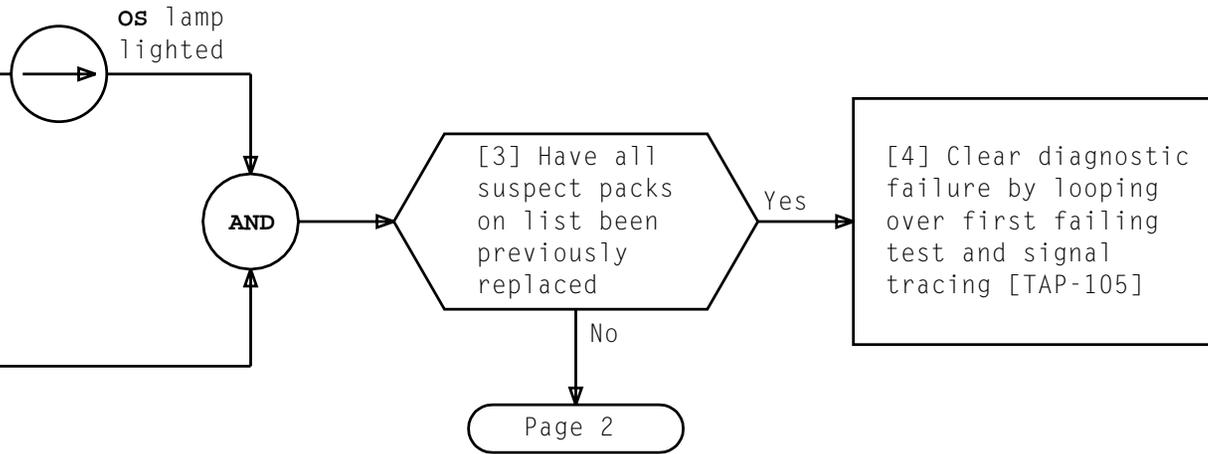
SUMMARY

Identify list of suspect circuit packs by analyzing raw data. Replace each pack identified beginning with first pack. After each replacement, check diagnostic results to determine if trouble is cleared. If failure recurs,

reinsert original pack. Repeat procedure for each succeeding pack on list until trouble is cleared. If trouble is not cleared, clear diagnostic failure by looping over first failing test and signal tracing [TAP-105]

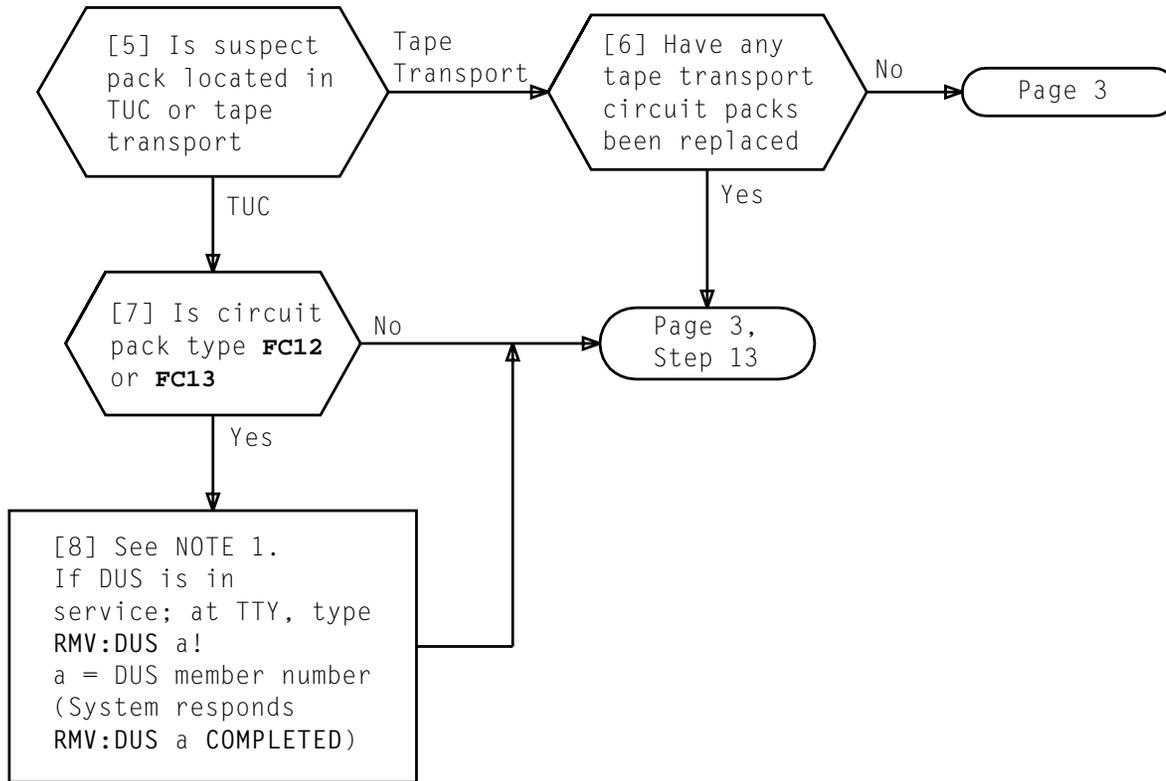
[1] At tape unit controller (TUC) power switch, ensure **ROS/OFF** switch is rotated clockwise to **ROS**

[2] Identify list of suspect circuit packs by analyzing raw data [DLP-504]



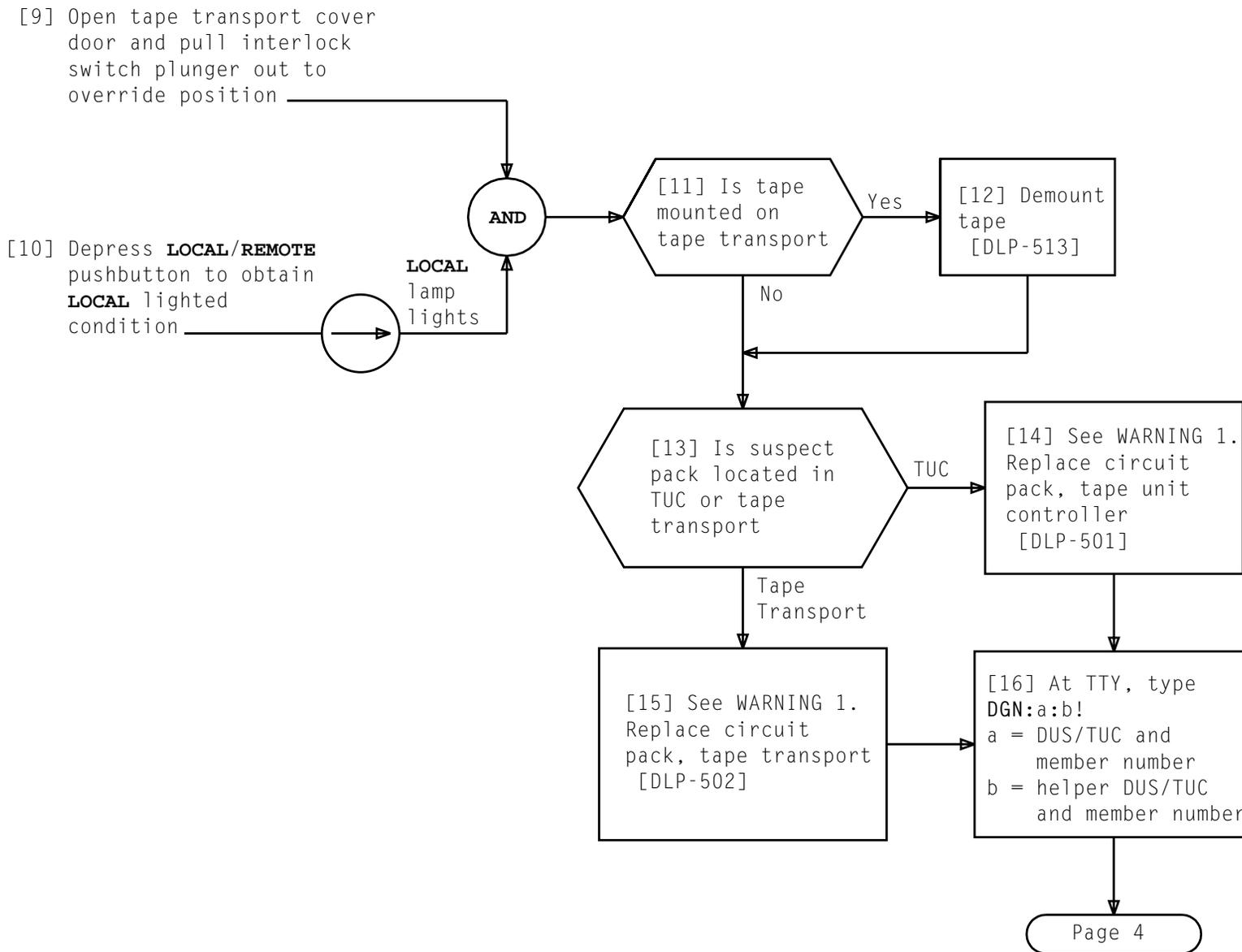
**CLEAR TAPE UNIT CONTROLLER DIAGNOSTIC FAILURE
BY ANALYZING RAW DATA AND REPLACING SUSPECT PACKS**

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NOTE 1	
It may be necessary to restore mate DUS before removing selected DUS using RST:DUS a! message	
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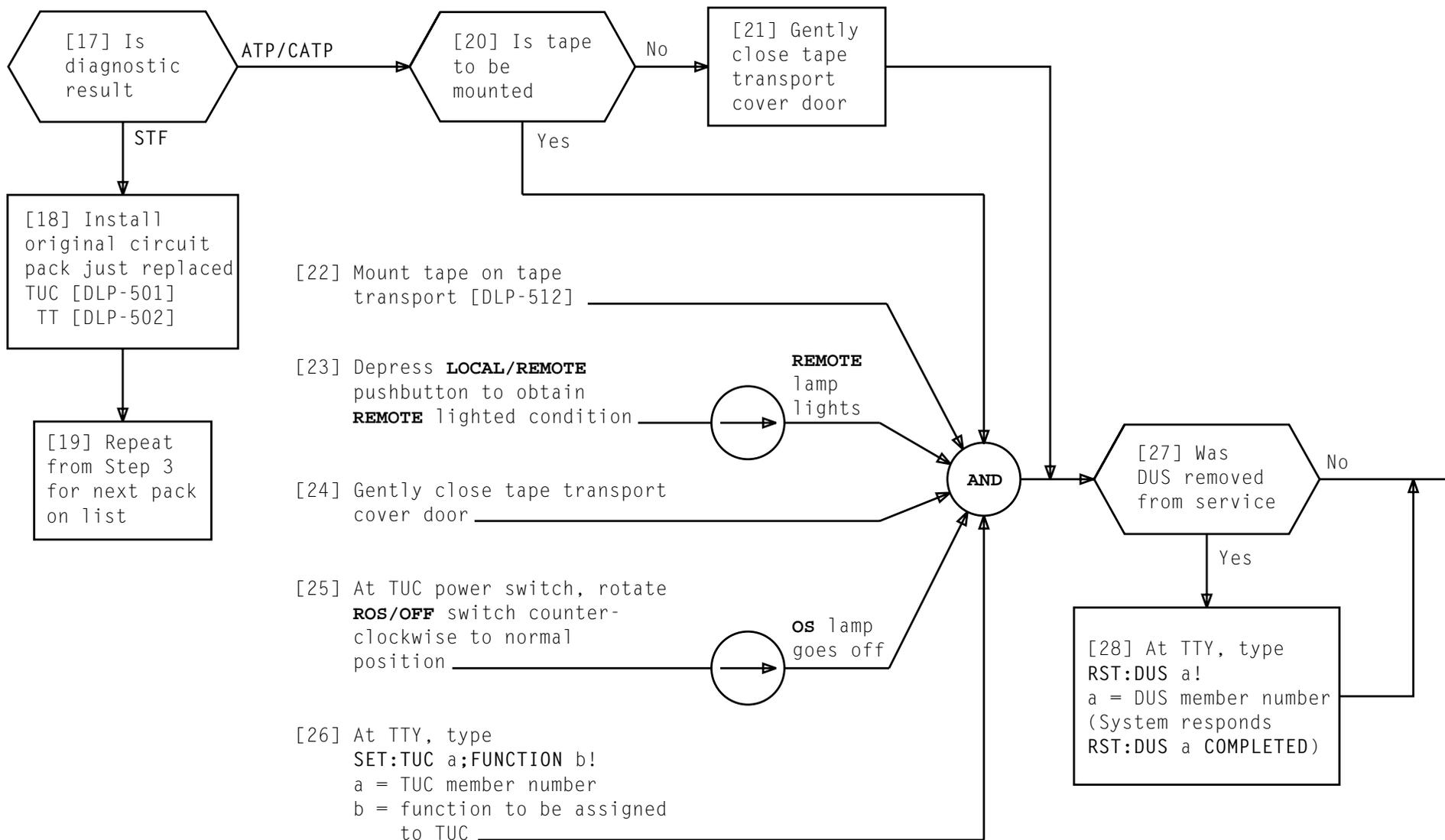
**CLEAR TAPE UNIT CONTROLLER DIAGNOSTIC FAILURE
BY ANALYZING RAW DATA AND REPLACING SUSPECT PACKS**



WARNING 1
Red designation marker at pack indicates fuse removal required to replace pack

**CLEAR TAPE UNIT CONTROLLER DIAGNOSTIC FAILURE
 BY ANALYZING RAW DATA AND REPLACING SUSPECT PACKS**

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**CLEAR TAPE UNIT CONTROLLER DIAGNOSTIC FAILURE
BY ANALYZING RAW DATA AND REPLACING SUSPECT PACKS**

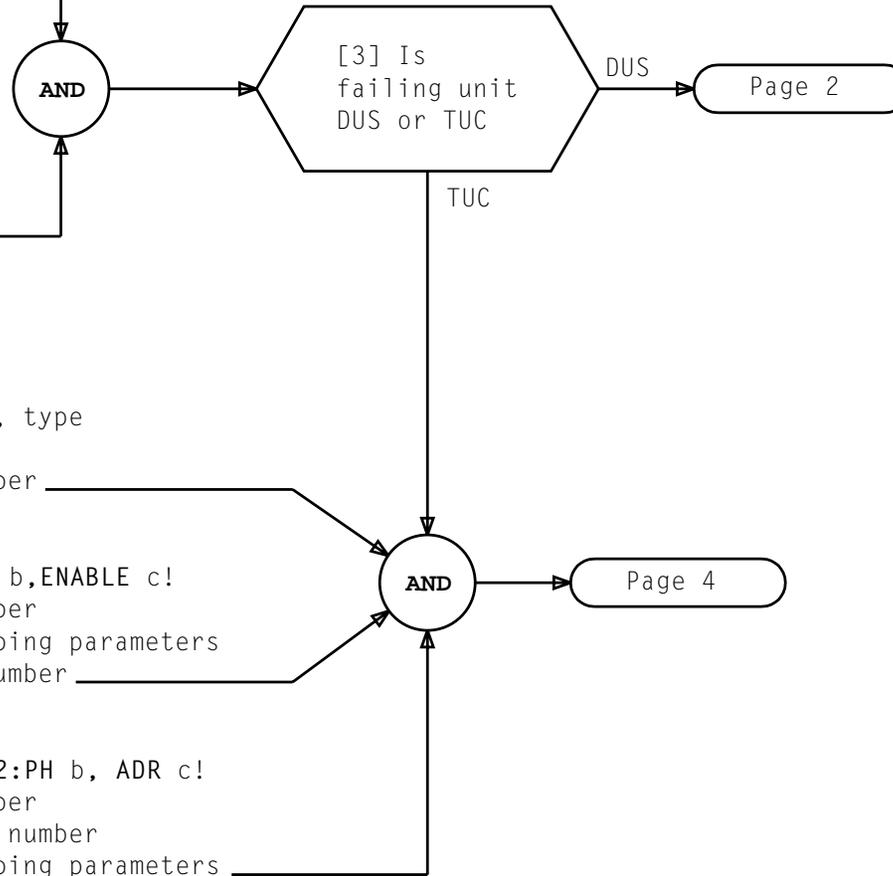
[1] Obtain and power up
oscilloscope allowing
period for stabilization

[2] Determine looping
parameters for failing
phase [DLP-505]

[4] See NOTE 1. At TTY, type
EX:TUC a;START!
a = TUC member number

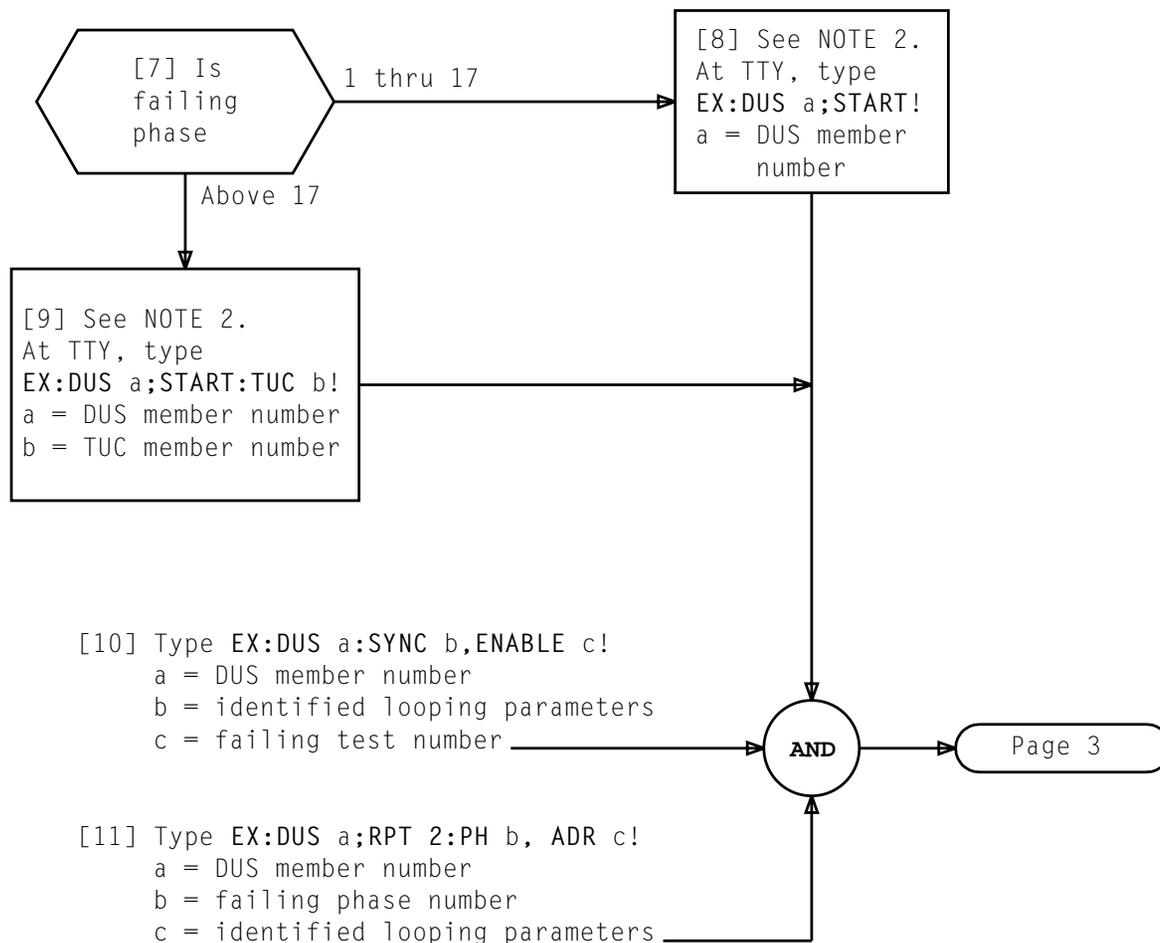
[5] Type EX:TUC a:SYNC b,ENABLE c!
a = TUC member number
b = identified looping parameters
c = failing test number

[6] Type EX:TUC a;RPT 2:PH b, ADR c!
a = TUC member number
b = failing phase number
c = identified looping parameters



NOTE 1	
To discontinue looping condition, identify MACLI MTCE SUBCLASS assigned to frame under test by typing OP:MACLI,CLASS MTCE! then type STOP:MACLI,CLASS MTCE,SUBCLASS a! a = subclass assigned to frame under test	
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CLEAR DIAGNOSTIC FAILURE BY LOOPING OVER FIRST FAILING TEST AND SIGNAL TRACING



NOTE 2
 To discontinue looping condition, identify MACLI MTCE SUBCLASS assigned to frame under test by typing
 OP:MACLI,CLASS MTCE!
 then type
 STOP:MACLI,CLASS MTCE,SUBCLASS a!
 a = subclass assigned to frame under test

CLEAR DIAGNOSTIC FAILURE BY LOOPING OVER FIRST FAILING TEST AND SIGNAL TRACING

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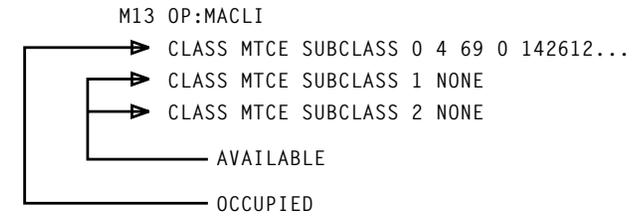
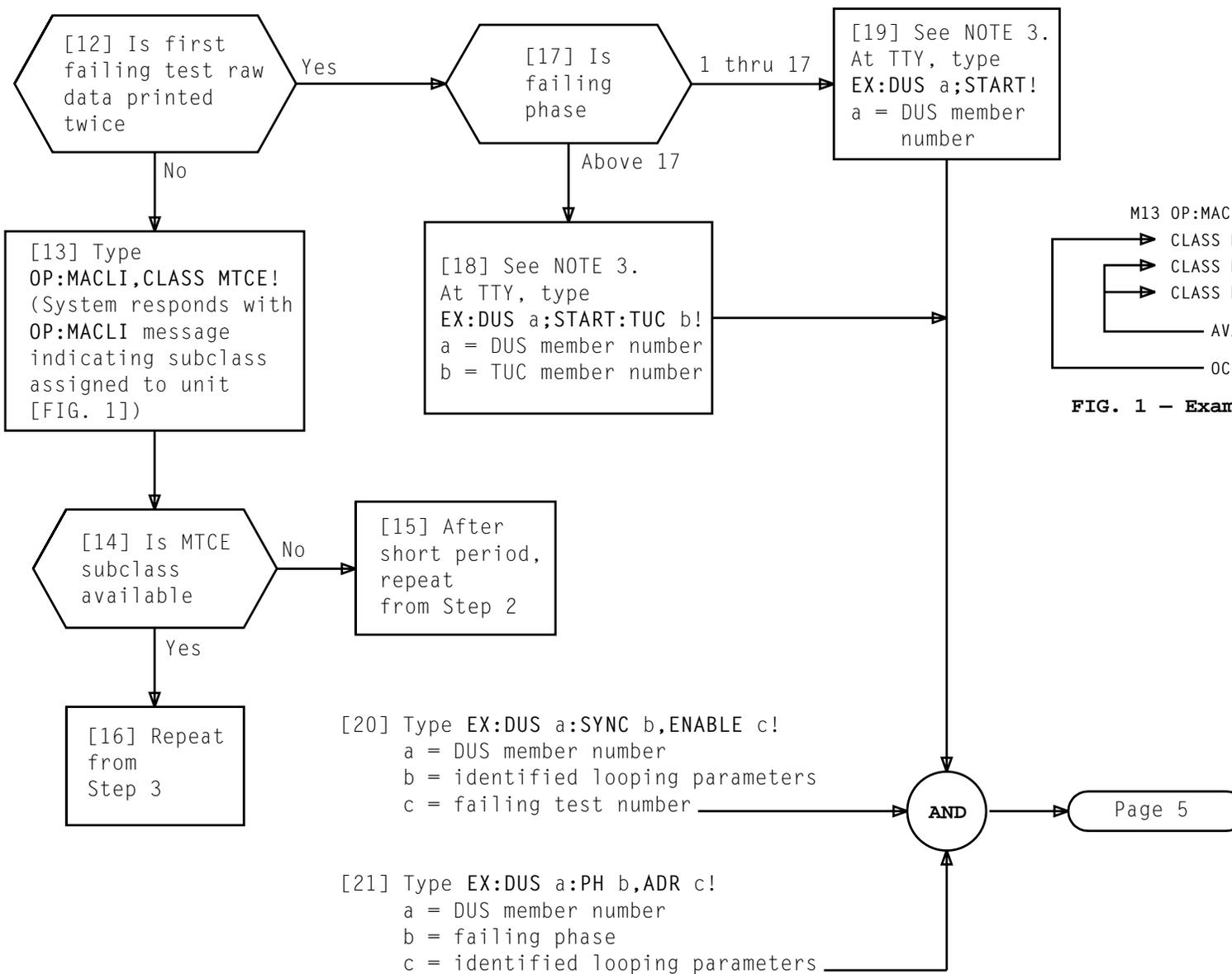


FIG. 1 - Example of MACLI Output Message

NOTE 3
To discontinue looping condition, identify MACLI MTCE SUBCLASS assigned to frame under test by typing OP:MACLI, CLASS MTCE! then type STOP:MACLI, CLASS MTCE, SUBCLASS a! a = subclass assigned to frame under test

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CLEAR DIAGNOSTIC FAILURE BY LOOPING OVER FIRST FAILING TEST AND SIGNAL TRACING

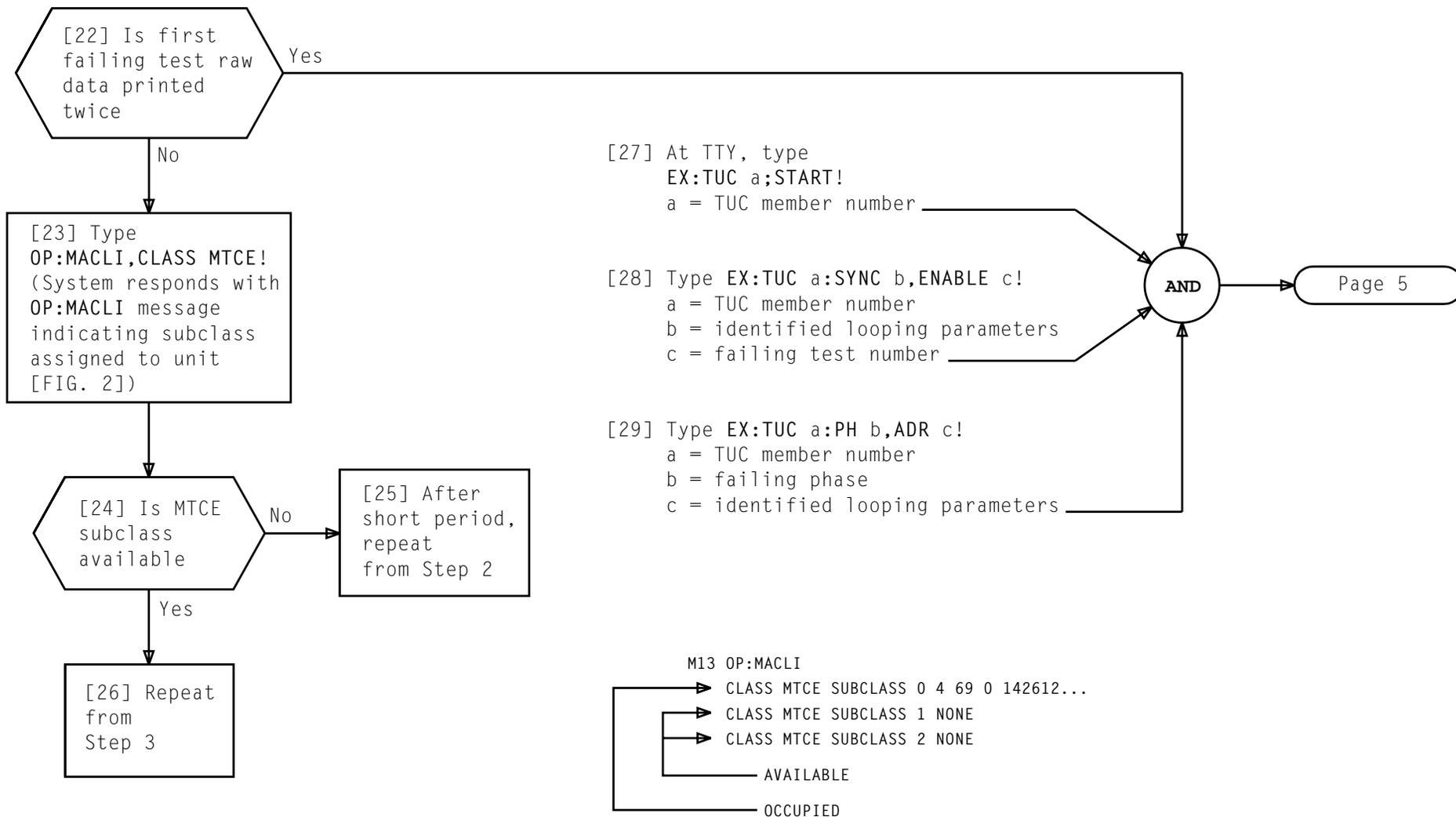


FIG. 2 - Example of MA CLI Output Message

[30] Set up scope for signal tracing using external sweep trigger

[31] Connect external sweep trigger to appropriate terminal [FIG. 3]

[32] Display sweep trigger and adjust for SYNC pulse display

[33] Using raw data analysis information, DUS/TUC SD, CD, PK, and circuit pack data, trace signal path of failing bits to isolate and clear fault

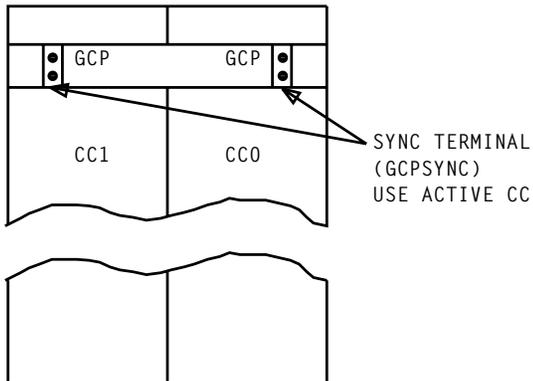
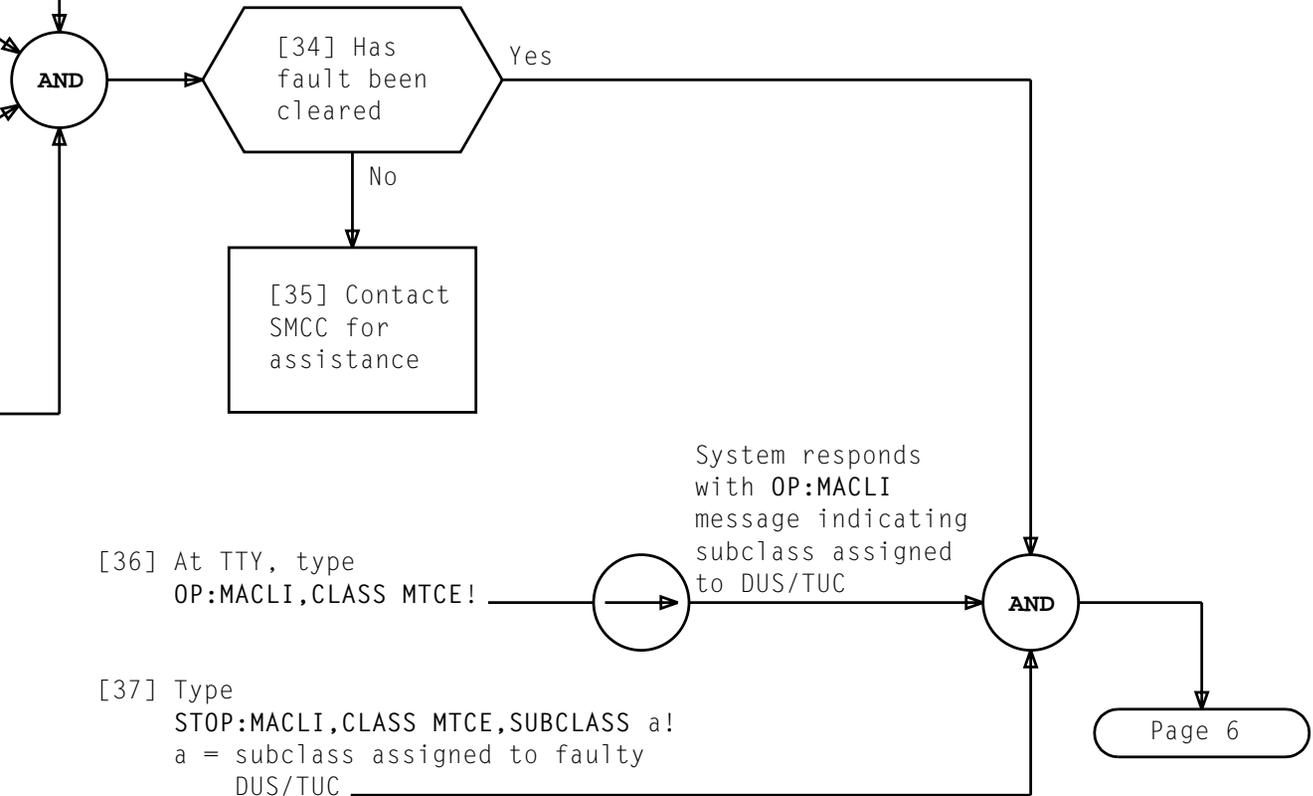
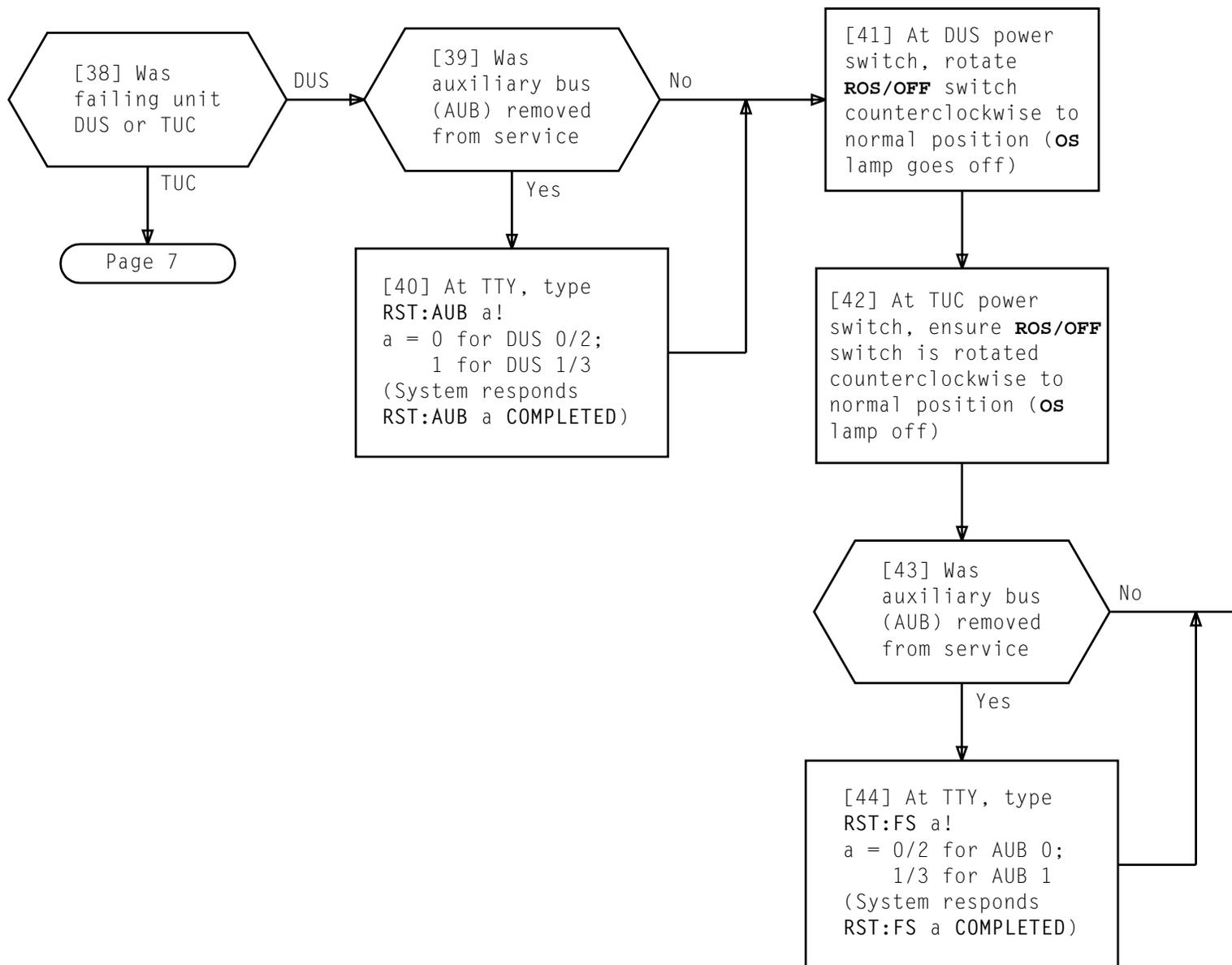


FIG. 3 - SYNC Terminal Location



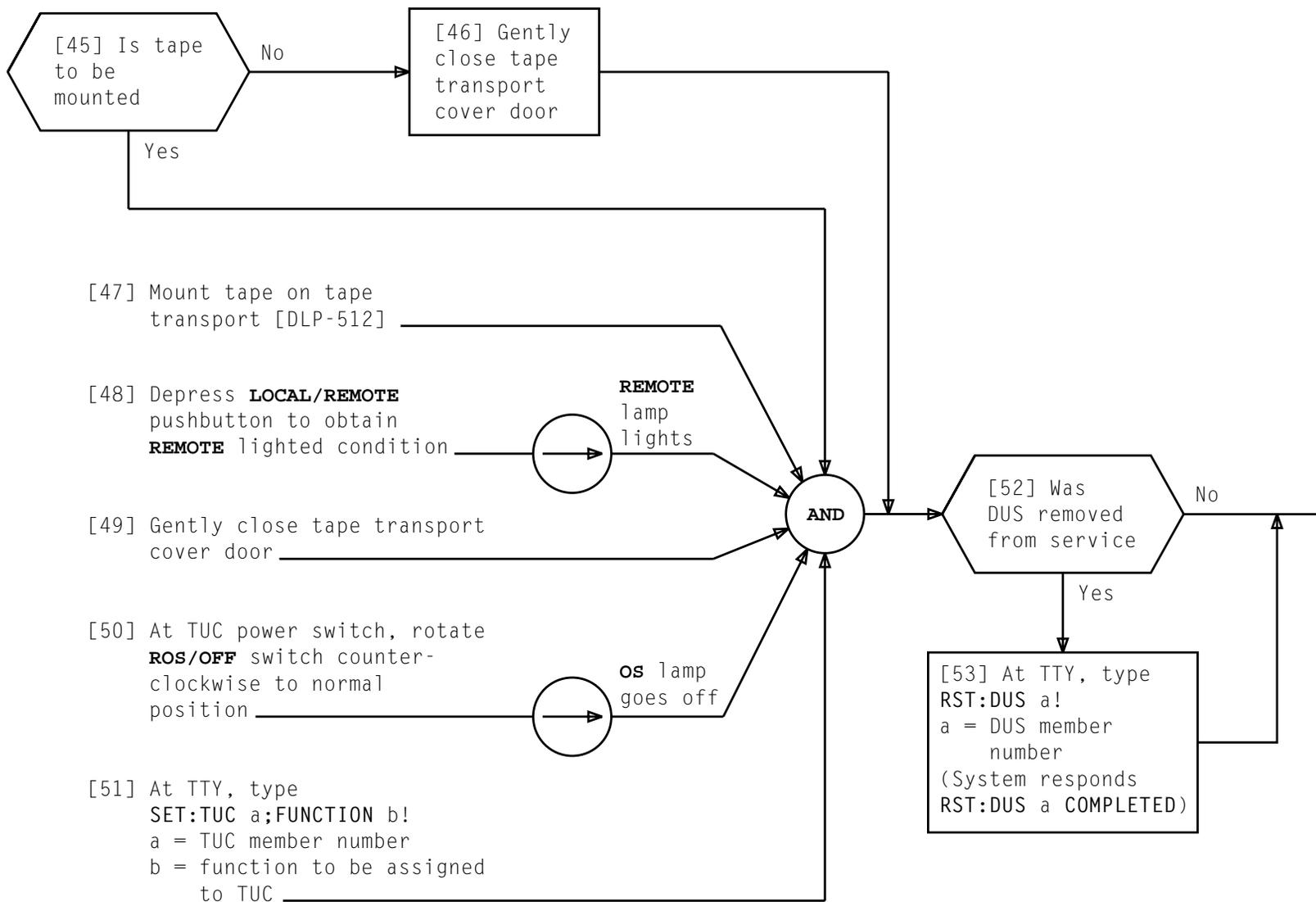
CLEAR DIAGNOSTIC FAILURE BY LOOPING OVER FIRST FAILING TEST AND SIGNAL TRACING

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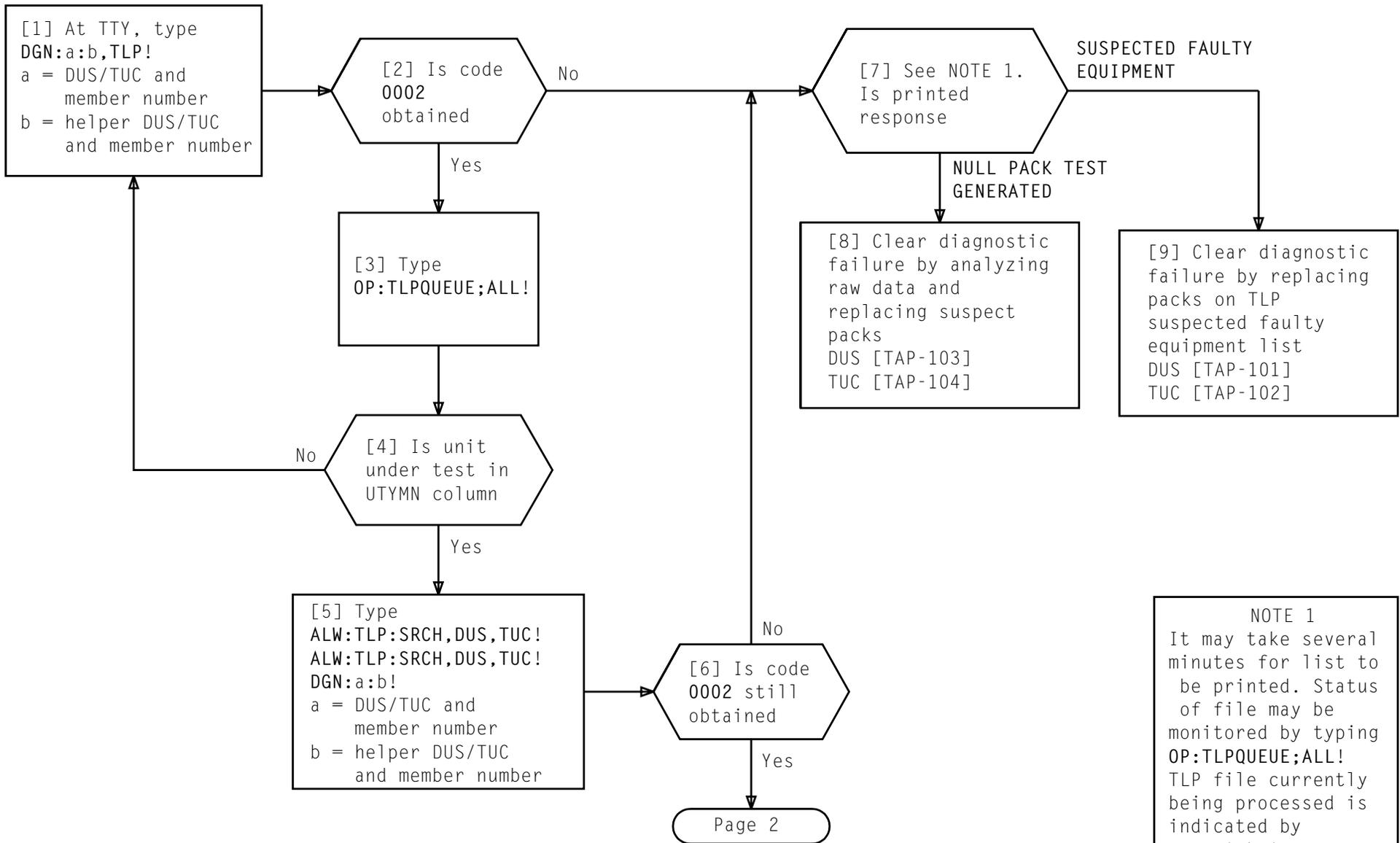


CLEAR DIAGNOSTIC FAILURE BY LOOPING OVER FIRST FAILING TEST AND SIGNAL TRACING

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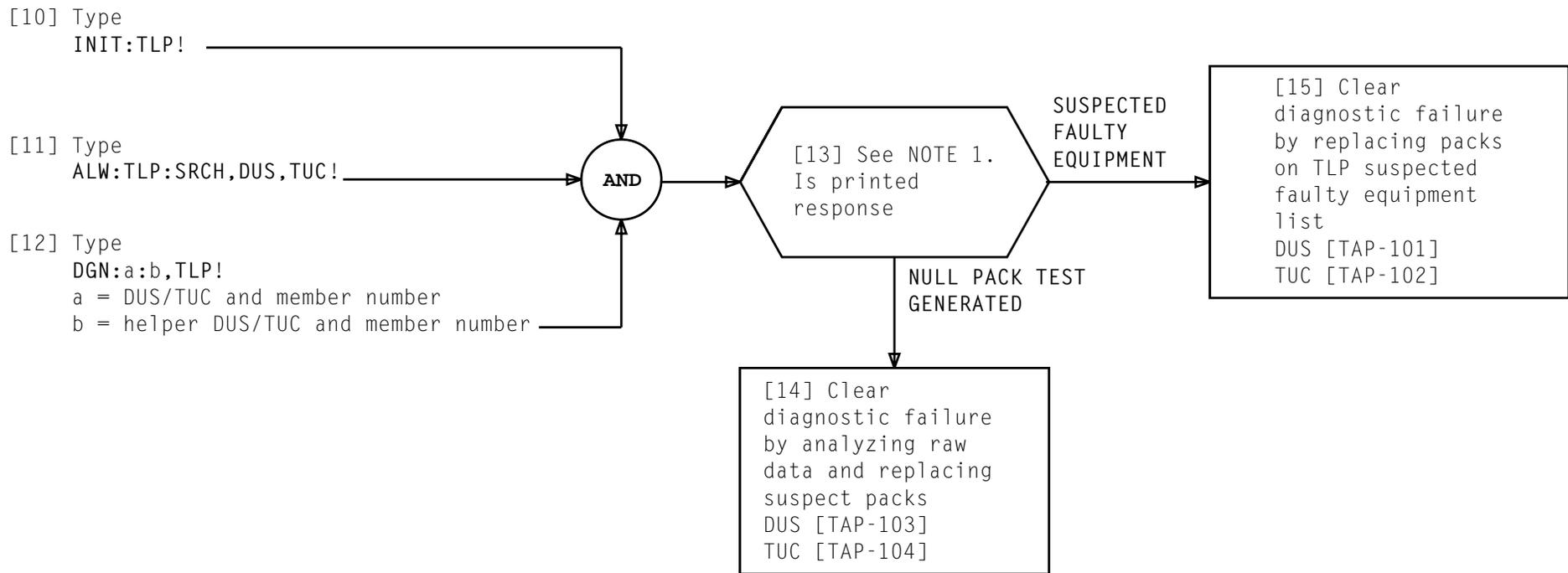
CLEAR DIAGNOSTIC FAILURE BY LOOPING OVER FIRST FAILING TEST AND SIGNAL TRACING



NOTE 1
It may take several minutes for list to be printed. Status of file may be monitored by typing OP:TLPQUEUE;ALL! TLP file currently being processed is indicated by asterisk in priority column

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CLEAR DIAGNOSTIC FAILURE, TLP QUEUE BLOCKAGE



CLEAR DIAGNOSTIC FAILURE, TLP QUEUE BLOCKAGE

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At TTY:

[1] Type

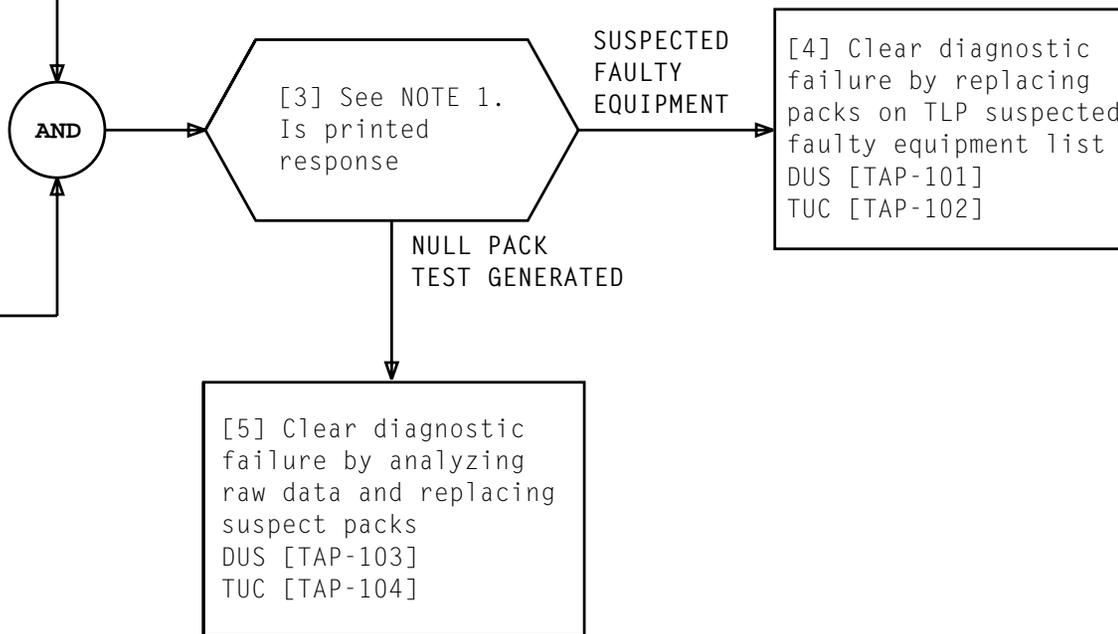
ALW:TLP:DUS,TUC!

[2] Type

DGN:a:b,TLP!

a = DUS/TUC and
member number

b = helper DUS/TUC and
member number



NOTE 1

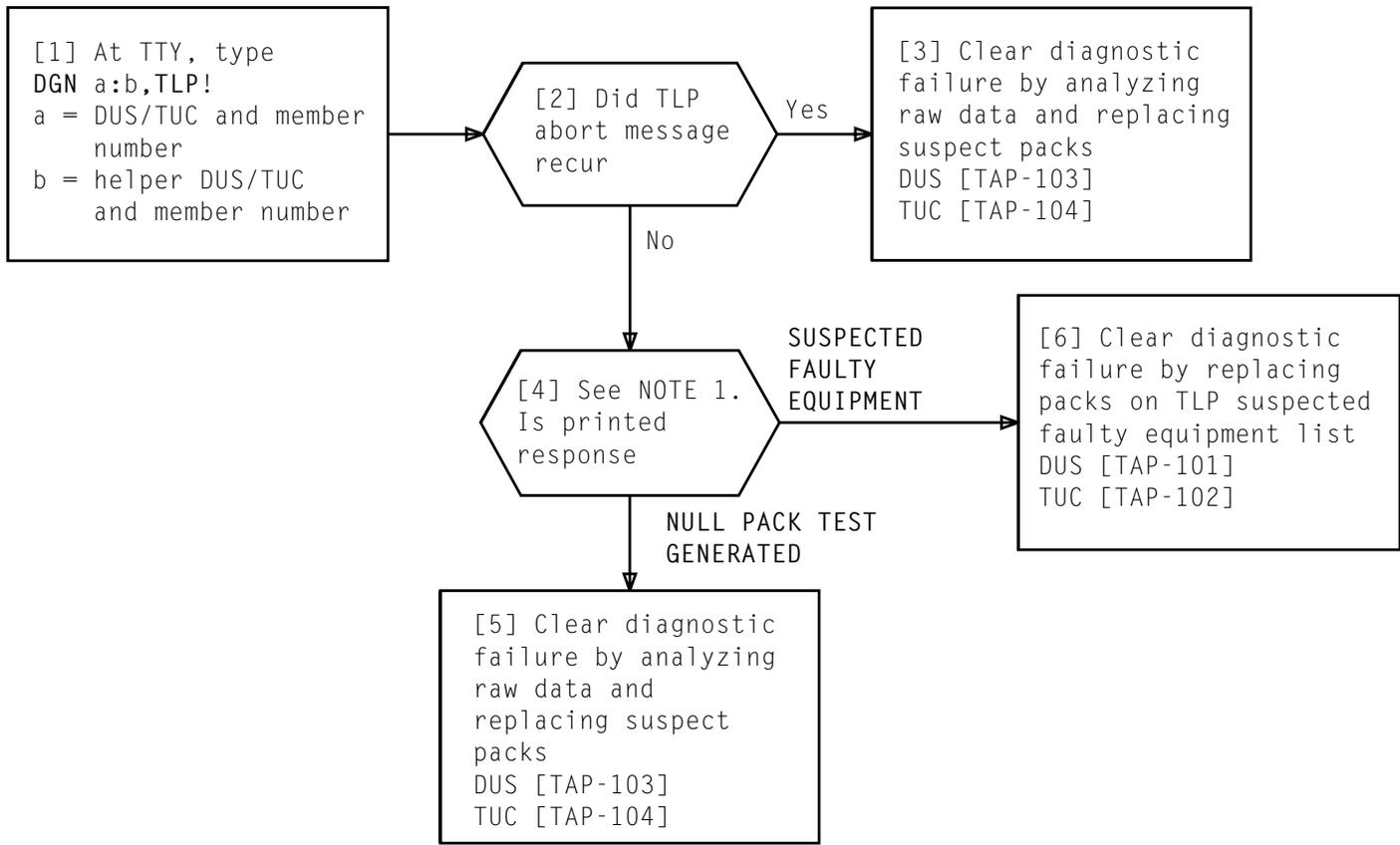
It may take several minutes for list to be printed. Status of file may be monitored by typing
OP:TLPQUEUE;ALL!
TLP file currently being processed is indicated by asterisk in priority column

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CLEAR DIAGNOSTIC FAILURE, TLP INHIBIT



NOTE 1
It may take several minutes for list to be printed. Status of file may be monitored by typing
OP:TLPQUEUE;ALL!
TLP file currently being processed is indicated by asterisk in priority column

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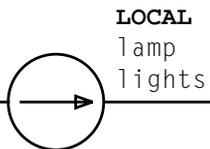
CLEAR DIAGNOSTIC FAILURE, TLP ABORT

[1] TLP tape being used is not correct issue for this generic. Obtain correct TLP tape

[2] At TTY, type CLR:ADSFUNC TLP!

[3] Open tape transport cover door and pull interlock switch plunger out to override position

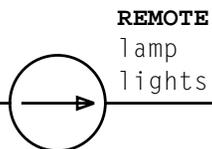
[4] Depress **LOCAL/REMOTE** pushbutton to obtain **LOCAL** lighted condition



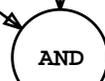
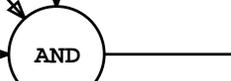
[5] Demount tape on tape transport [DLP-513]

[6] Mount correct tape on tape transport [DLP-512]

[7] Depress **LOCAL/REMOTE** pushbutton to obtain **REMOTE** lighted condition



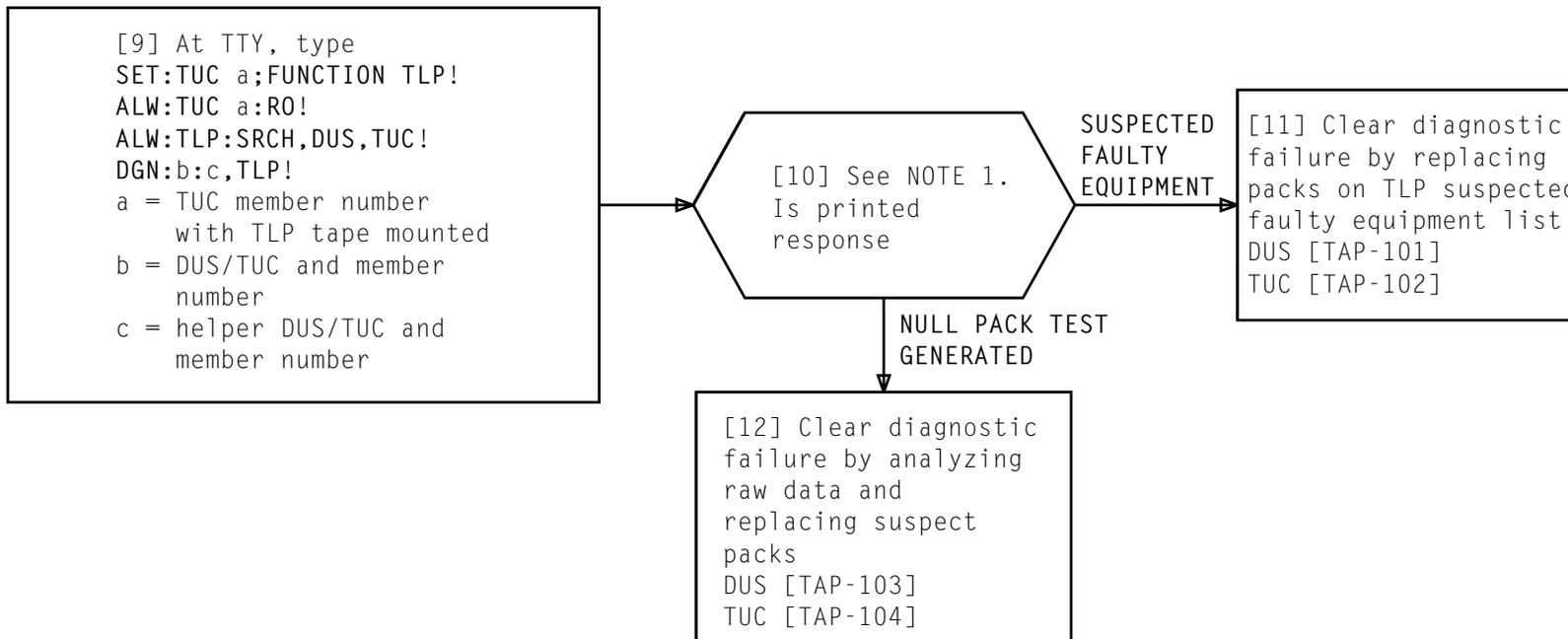
[8] Gently close tape transport cover door



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CLEAR DIAGNOSTIC FAILURE, TLP TAPE VERSION X DOES NOT MATCH VERSION Y

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NOTE 1
It may take several minutes for list to be printed. Status of file may be monitored by typing
OP:TLPQUEUE;ALL!
TLP file currently being processed is indicated by asterisk in priority column

**CLEAR DIAGNOSTIC FAILURE, TLP TAPE VERSION X DOES NOT MATCH
VERSION Y**

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[1] TLP tape being used does not contain proper data file.
Obtain correct TLP tape

[2] At TTY, type CLR:ADSFUNC TLP!

[3] Open tape transport cover door and pull interlock switch plunger out to override position

[4] Depress **LOCAL/REMOTE** pushbutton to obtain **LOCAL** lighted condition

LOCAL
lamp
lights

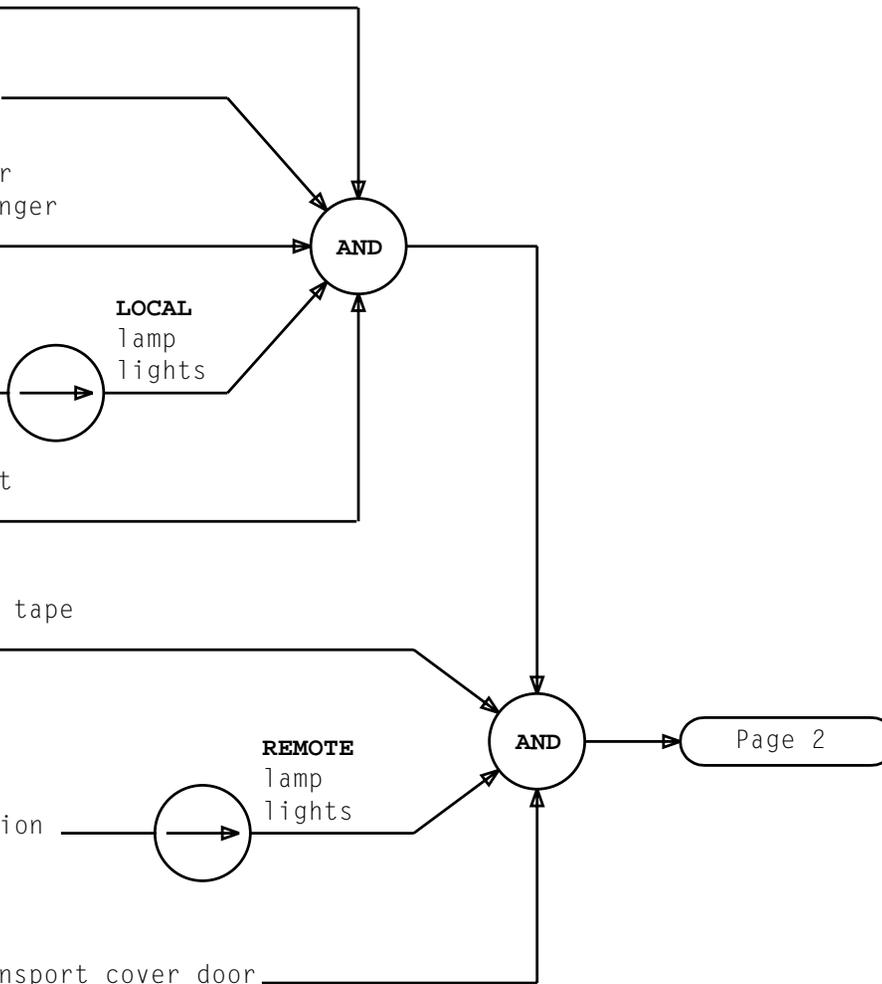
[5] Demount tape on tape transport [DLP-513]

[6] Mount correct tape on tape transport [DLP-512]

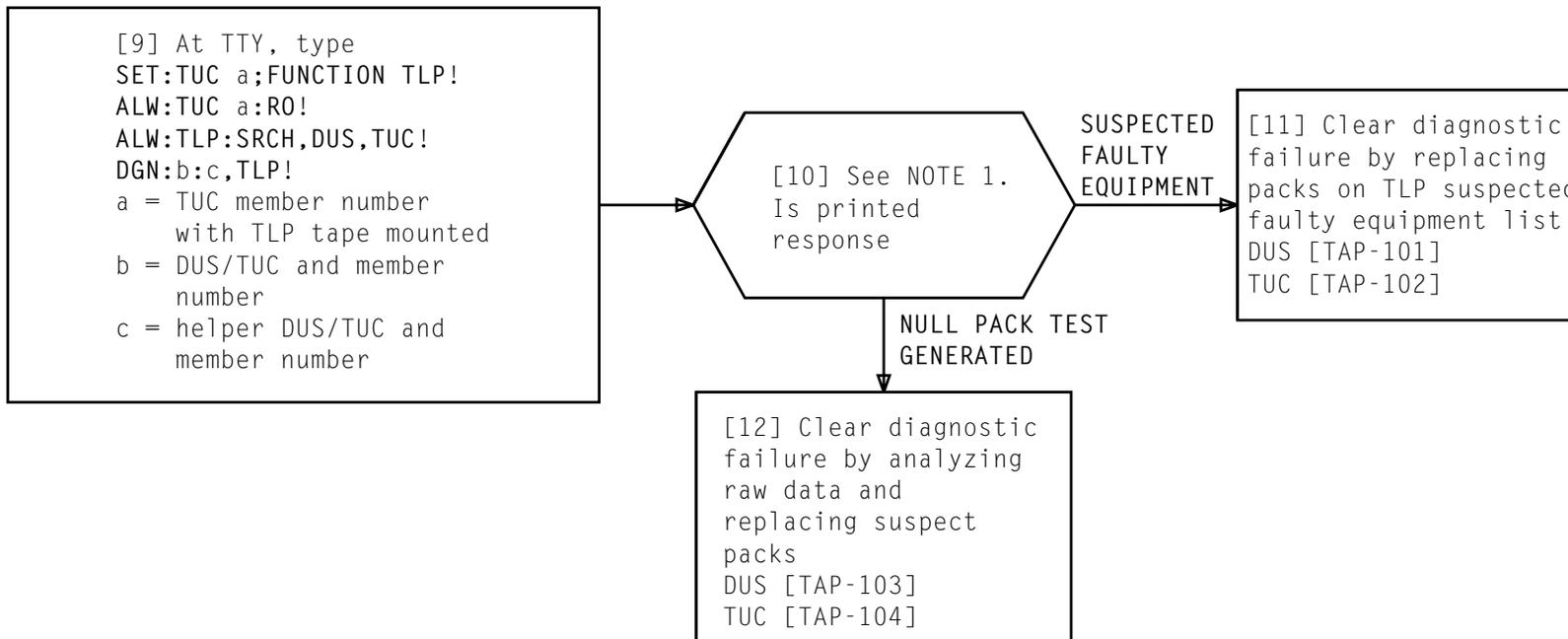
[7] Depress **LOCAL/REMOTE** pushbutton to obtain **REMOTE** lighted condition

REMOTE
lamp
lights

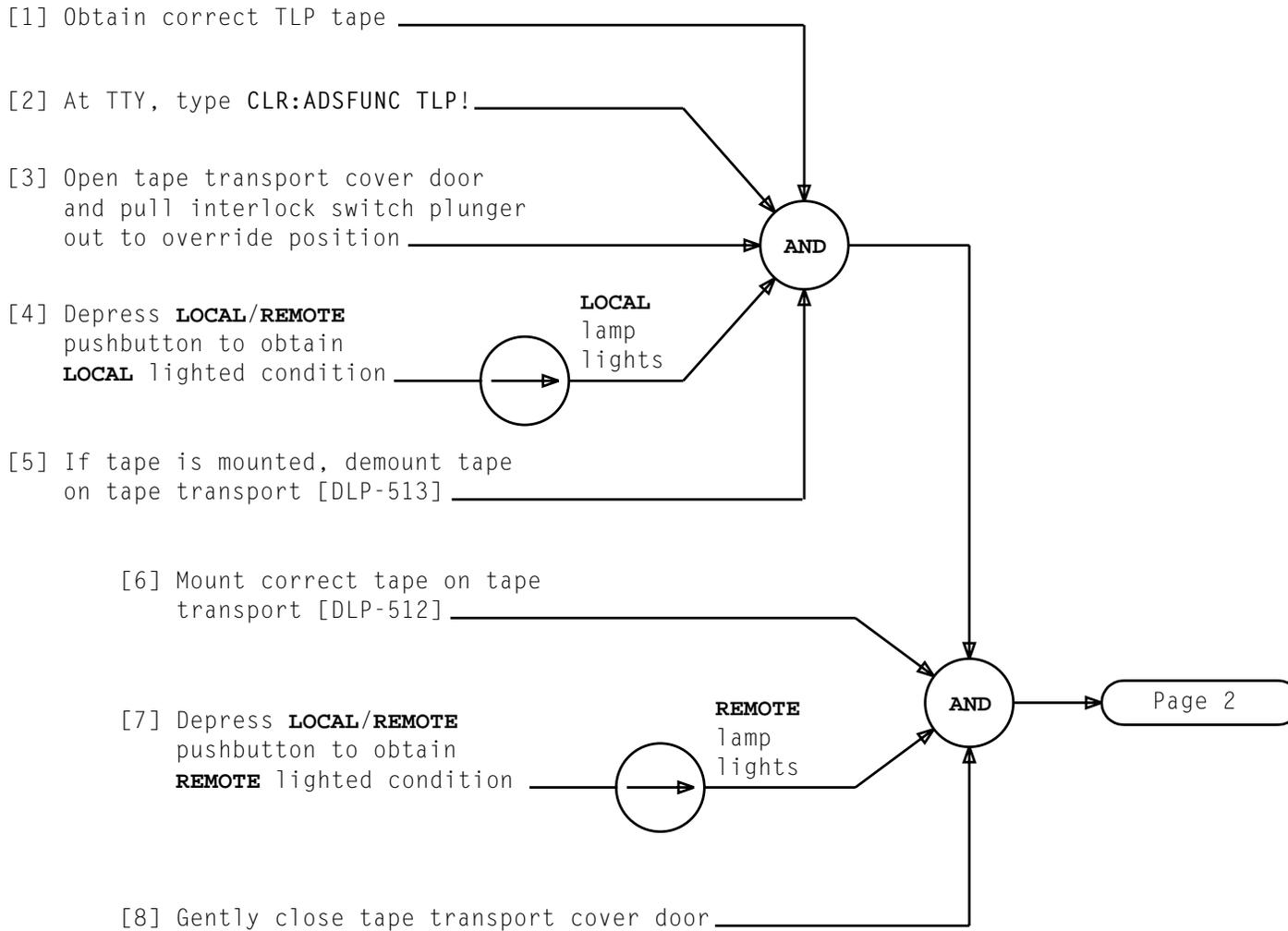
[8] Gently close tape transport cover door



CLEAR DIAGNOSTIC FAILURE, TLP TAPE ACQUISITION ERROR



NOTE 1	
It may take several minutes for list to be printed. Status of file may be monitored by typing OP:TLPQUEUE;ALL! TLP file currently being processed is indicated by asterisk in priority column	
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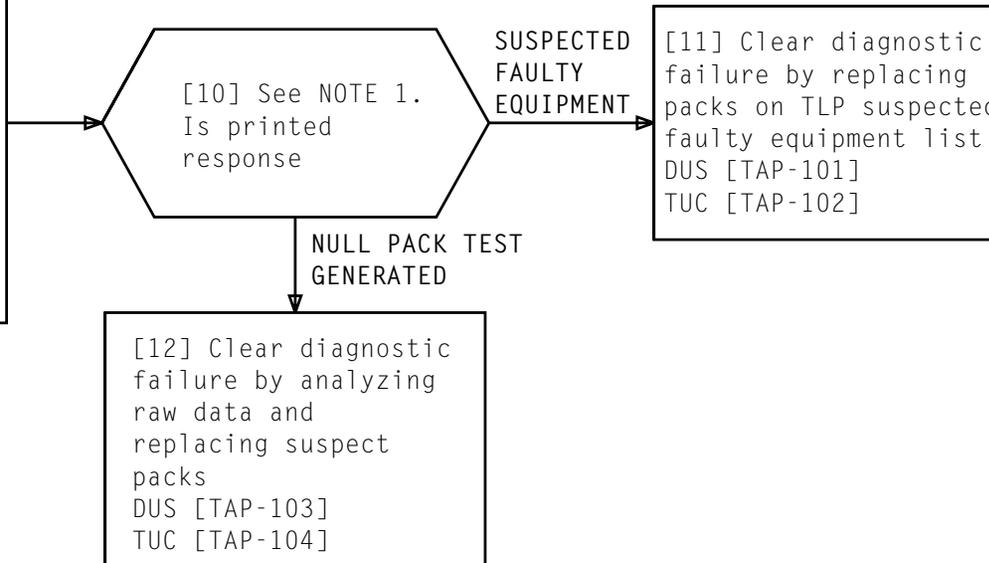
CLEAR DIAGNOSTIC FAILURE, TLP TAPE NOT MOUNTED

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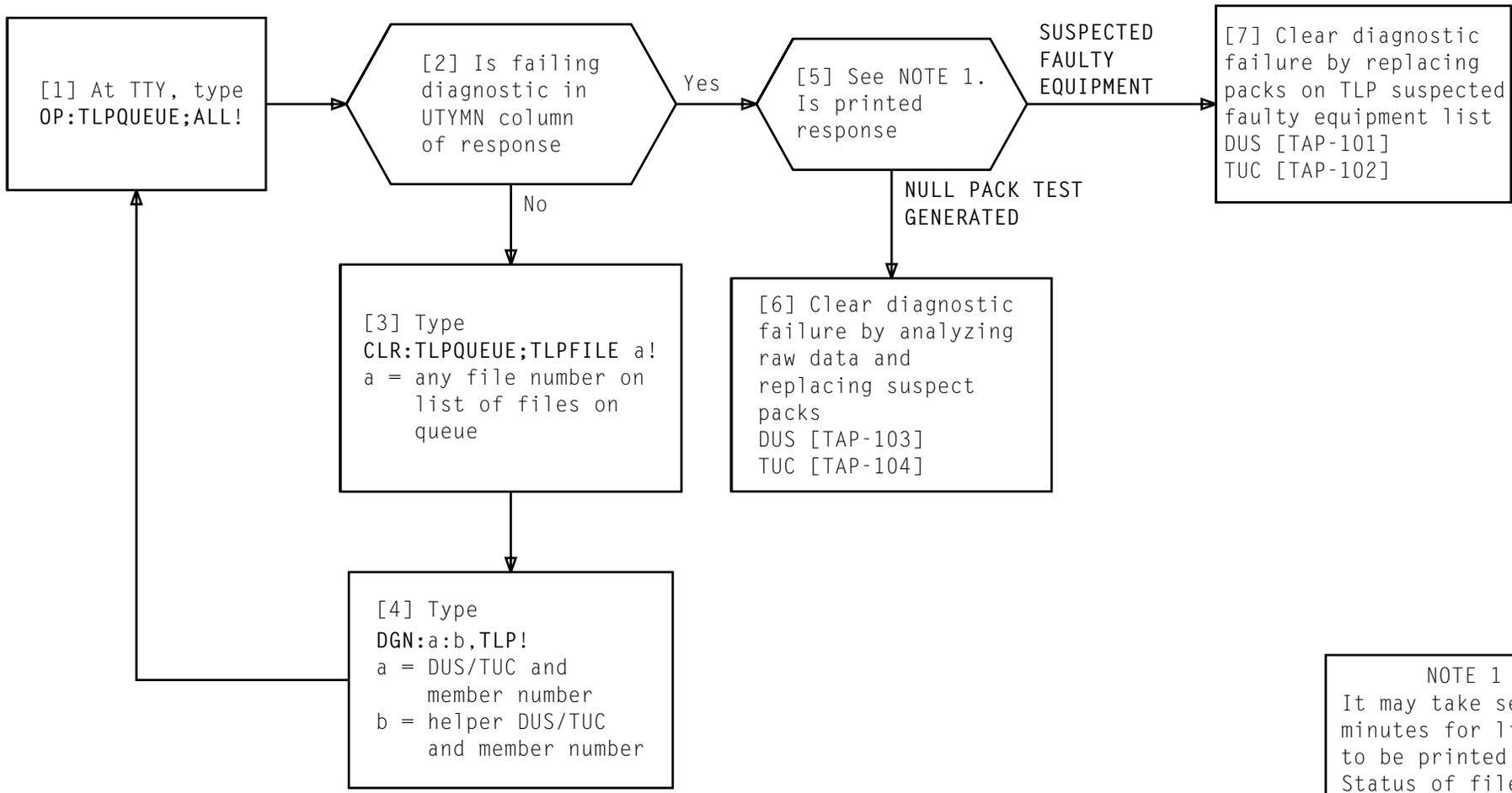
[9] At TTY, type
SET:TUC a;FUNCTION TLP!
ALW:TUC a:RO!
ALW:TLP:SRCH,DUS,TUC!
DGN:b:c,TLP!
a = TUC member number
  with TLP tape mounted
b = DUS/TUC and member
  number
c = helper DUS/TUC and
  member number

```



NOTE 1	
It may take several minutes for list to be printed. Status of file may be monitored by typing OP:TLPQUEUE;ALL! TLP file currently being processed is indicated by asterisk in priority column	
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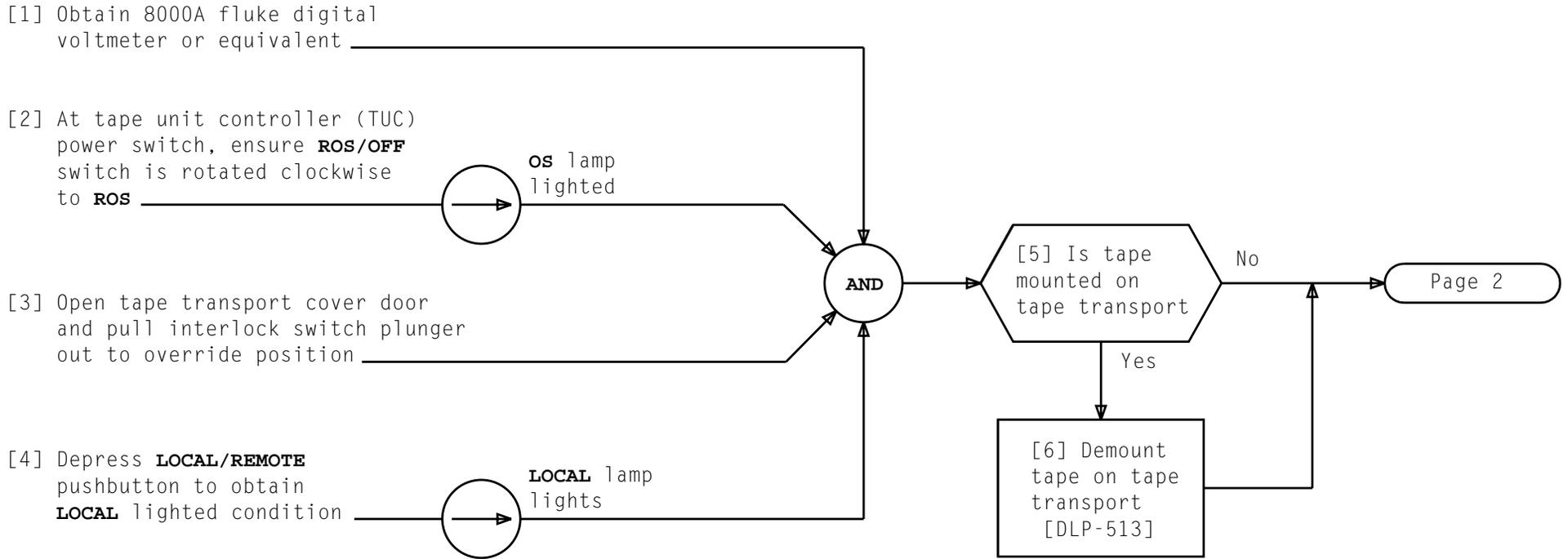
CLEAR DIAGNOSTIC FAILURE, TLP TAPE NOT MOUNTED



NOTE 1
It may take several minutes for list to be printed. Status of file may be monitored by typing
OP:TLPQUEUE;ALL!
TLP file currently being processed is indicated by asterisk in priority column

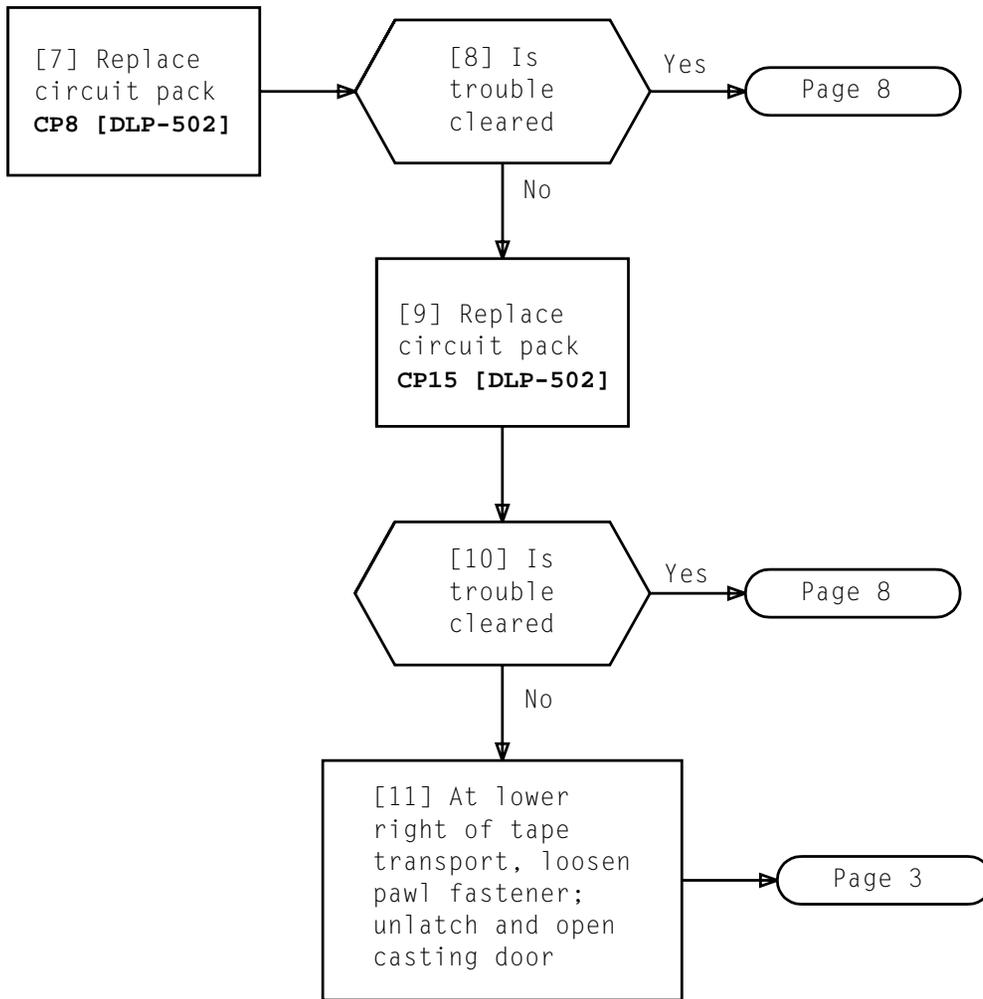
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CLEAR DIAGNOSTIC FAILURE, TLP DISK QUEUE FULL



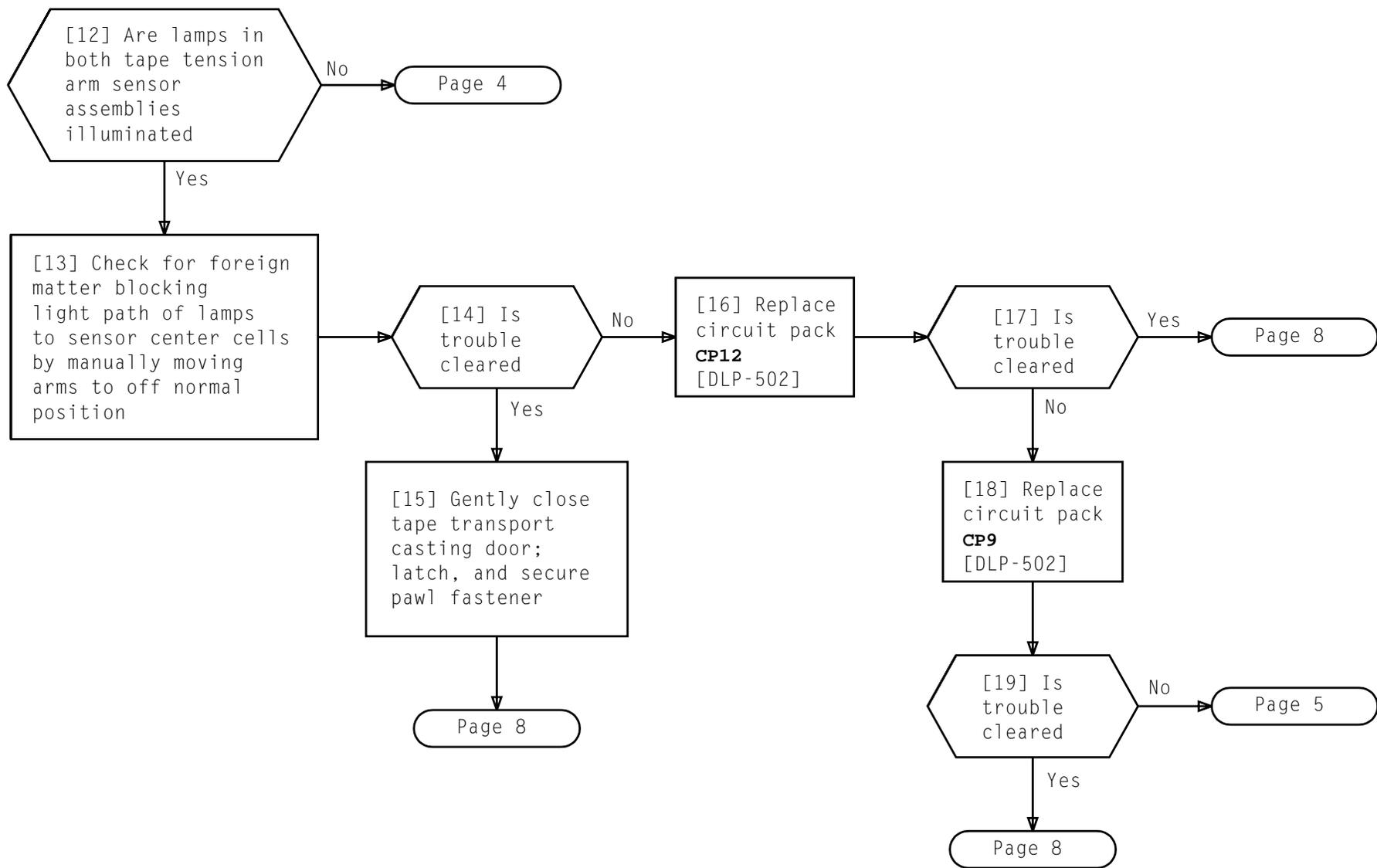
CLEAR READY MODE NOT ATTAINABLE FAULT

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CLEAR READY MODE NOT ATTAINABLE FAULT

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CLEAR READY MODE NOT ATTAINABLE FAULT

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[20] See WARNING 1. At DC-to-DC converter, open cover door and set **ON/OFF** switch to **OFF**

[21] Manually move arms to off-normal position

[22] At rear of casting door, replace unlighted sensor lamps (GE-381 or equivalent) [FIG. 1]

[23] At DC-to-DC converter, set **ON/OFF** switch to **ON** and close cover door

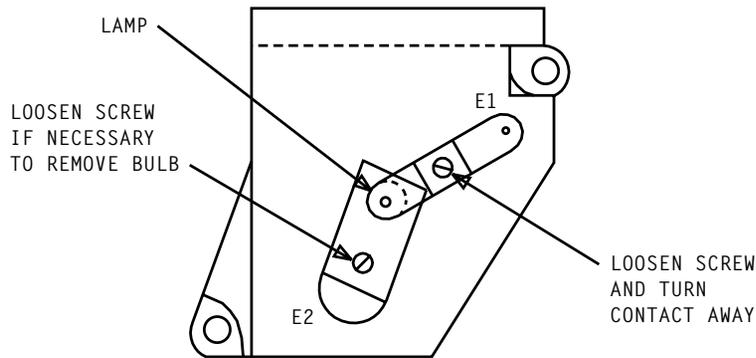
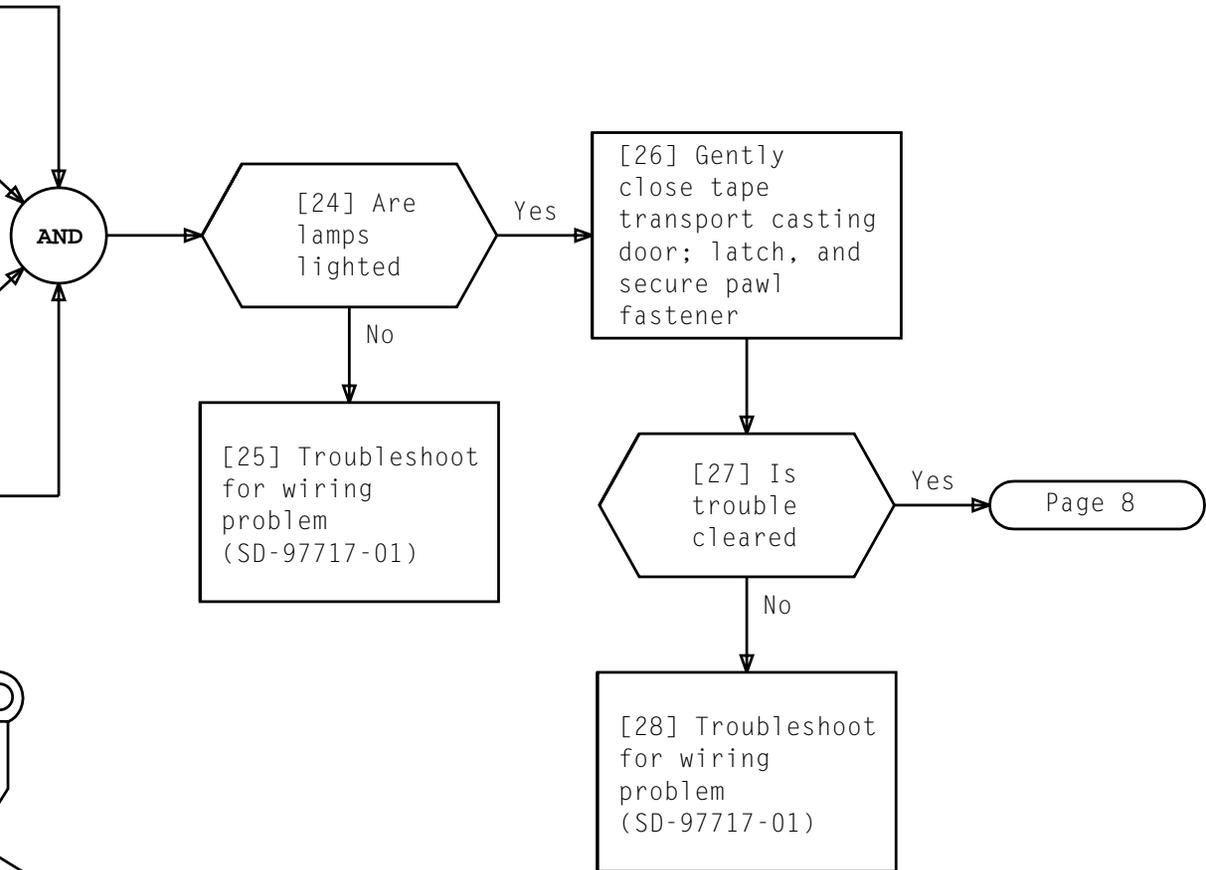


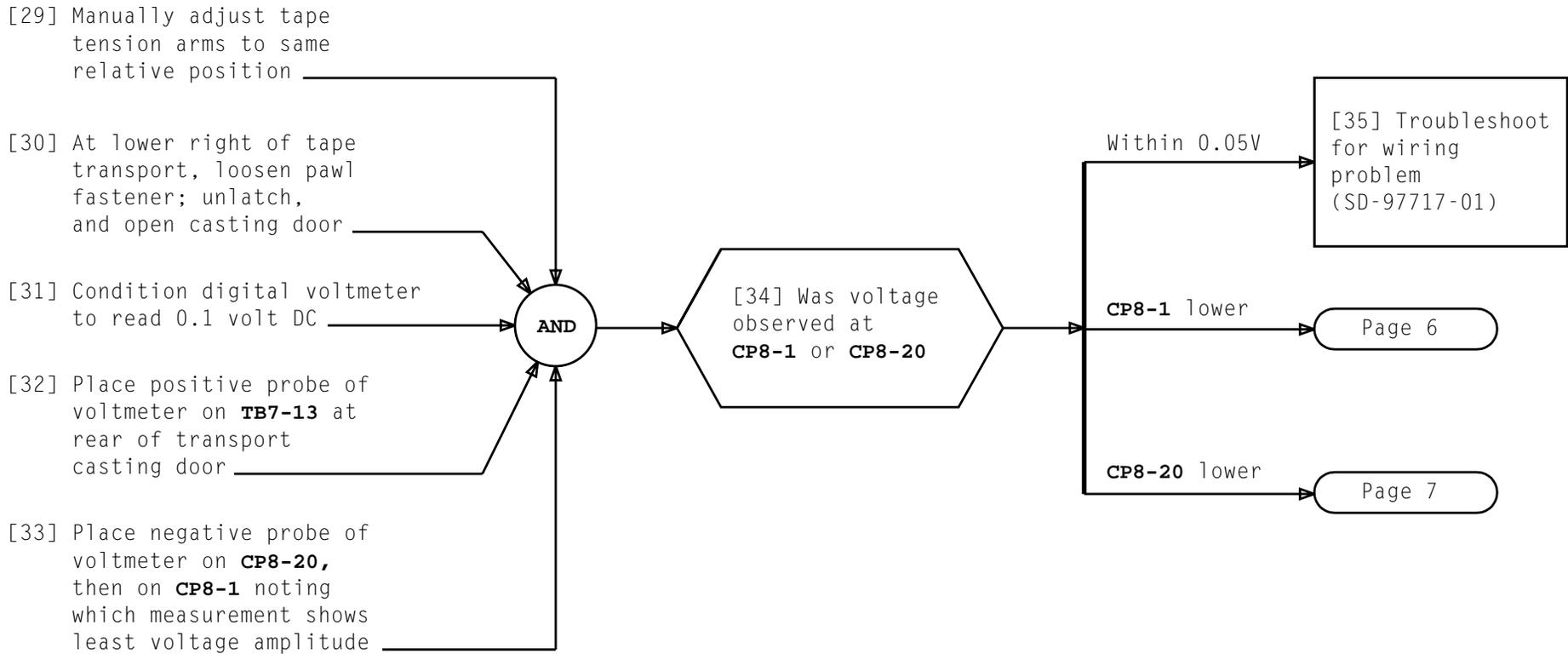
FIG. 1 - Tape Tension Arm Sensor Assembly



WARNING 1
When DC-to-DC converter is turned off, tape reel motors will spin uncontrolled

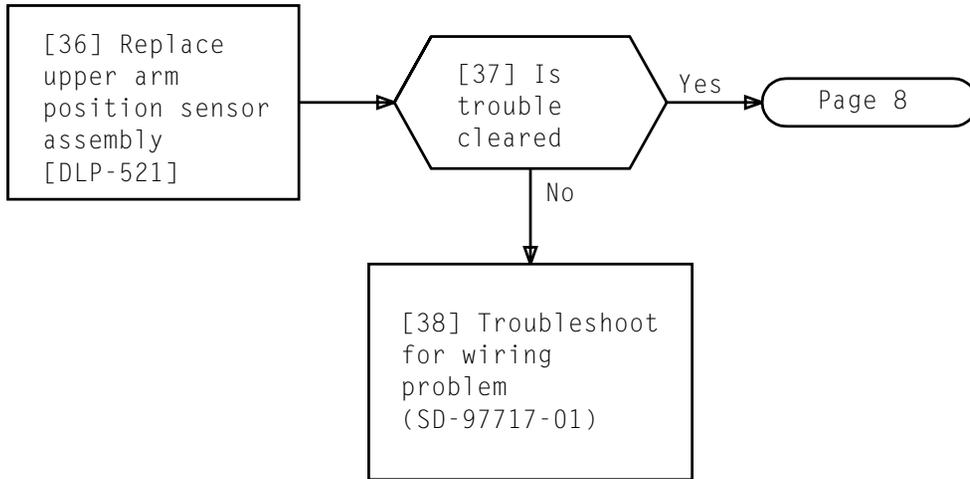
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CLEAR READY MODE NOT ATTAINABLE FAULT



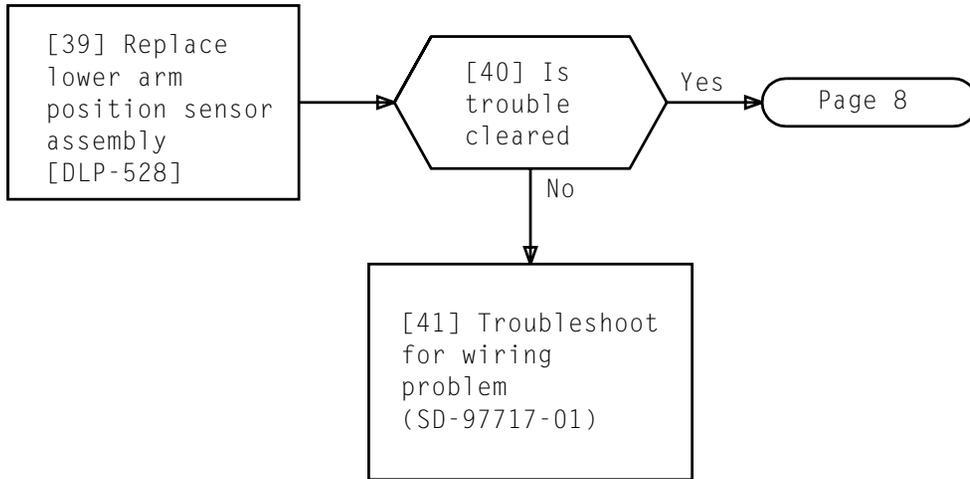
CLEAR READY MODE NOT ATTAINABLE FAULT

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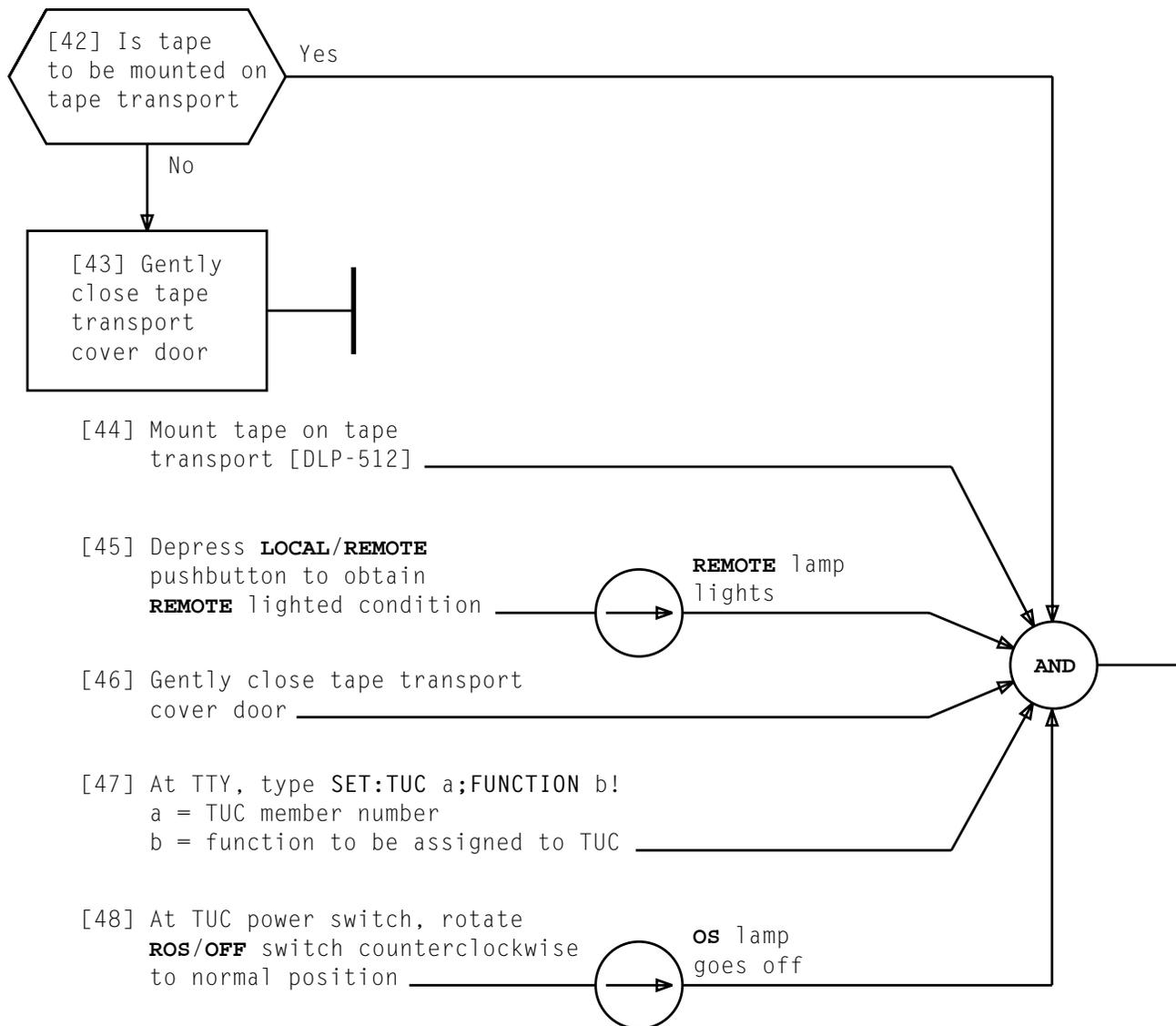
CLEAR READY MODE NOT ATTAINABLE FAULT

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CLEAR READY MODE NOT ATTAINABLE FAULT

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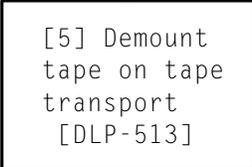
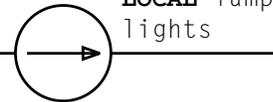
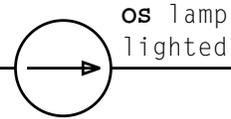
CLEAR READY MODE NOT ATTAINABLE FAULT

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[1] At tape unit controller (TUC) power switch, ensure **ROS/OFF** switch is rotated clockwise to **ROS**

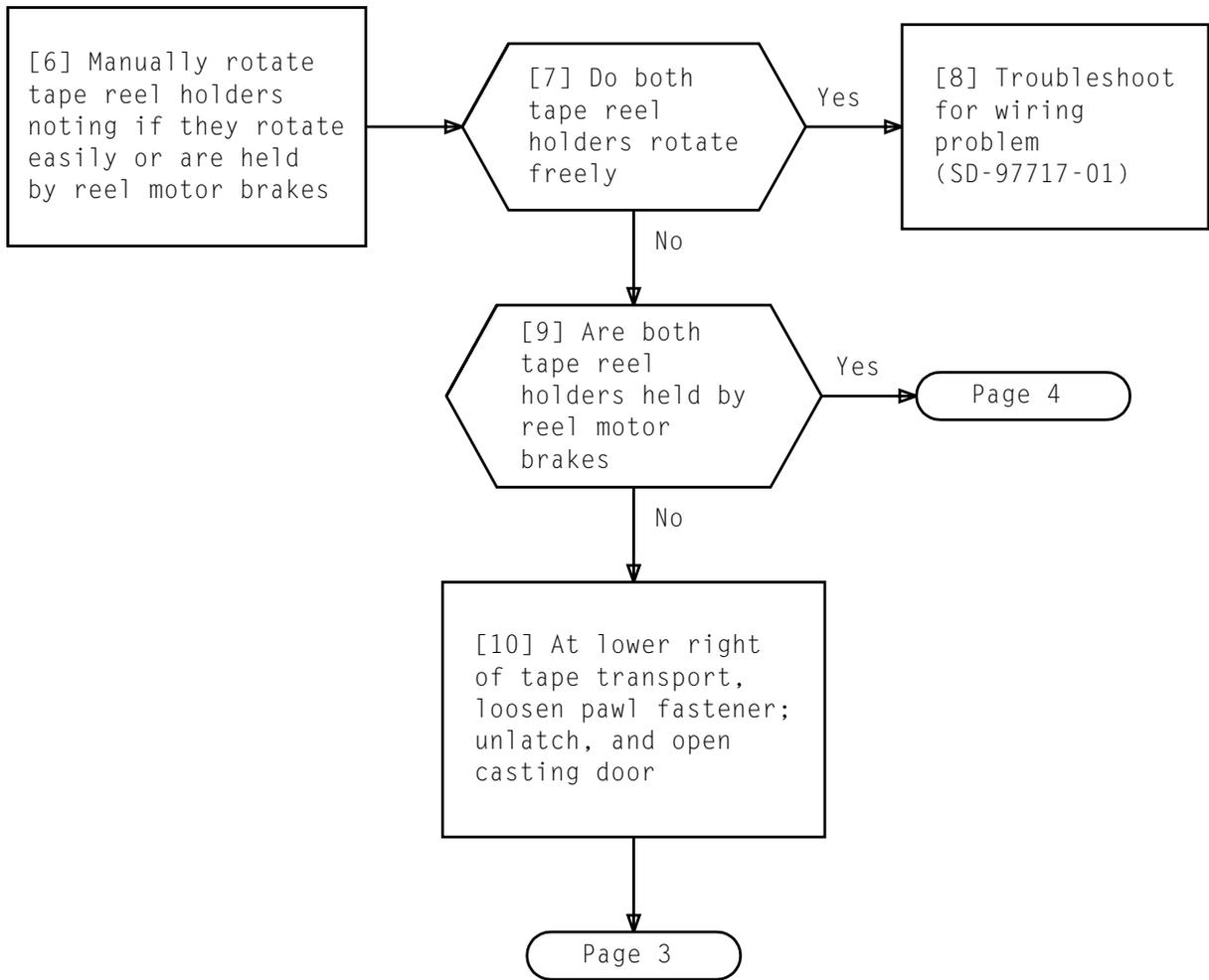
[2] Open tape transport cover door and pull interlock switch plunger out to override position

[3] Depress **LOCAL/REMOTE** pushbutton to obtain **LOCAL** lighted condition



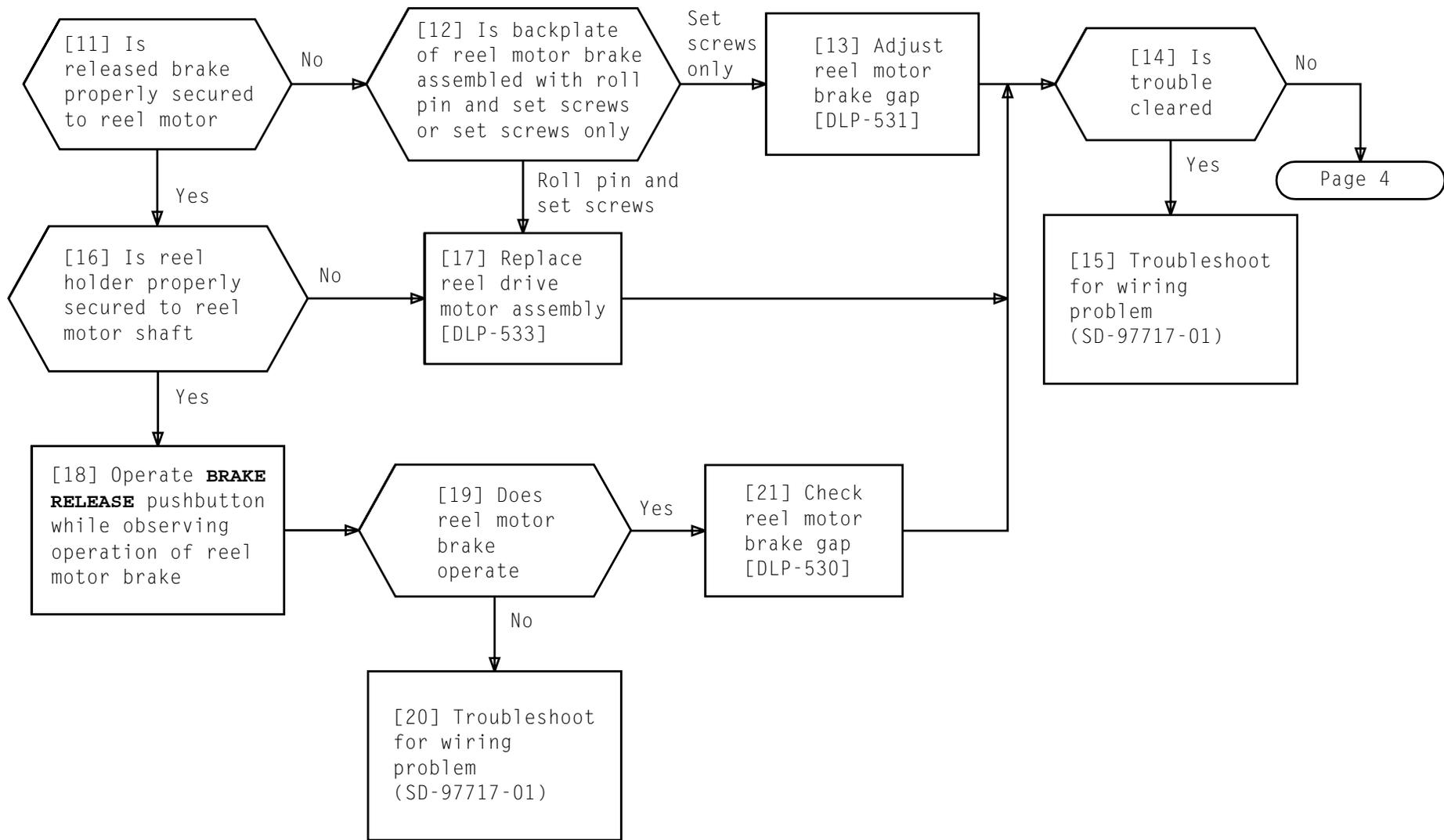
CLEAR REEL MOTOR BRAKE FAULT

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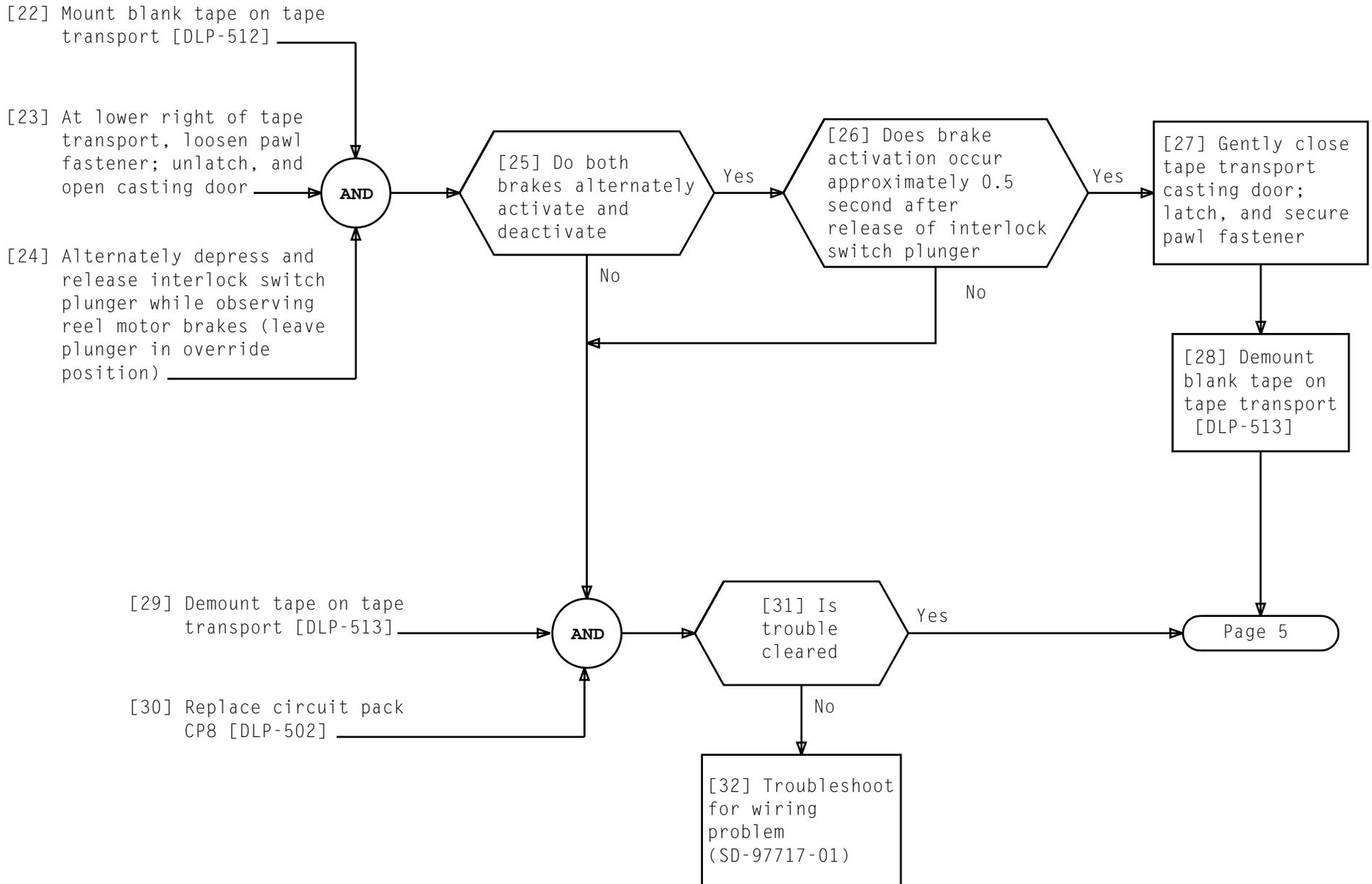
CLEAR REEL MOTOR BRAKE FAULT

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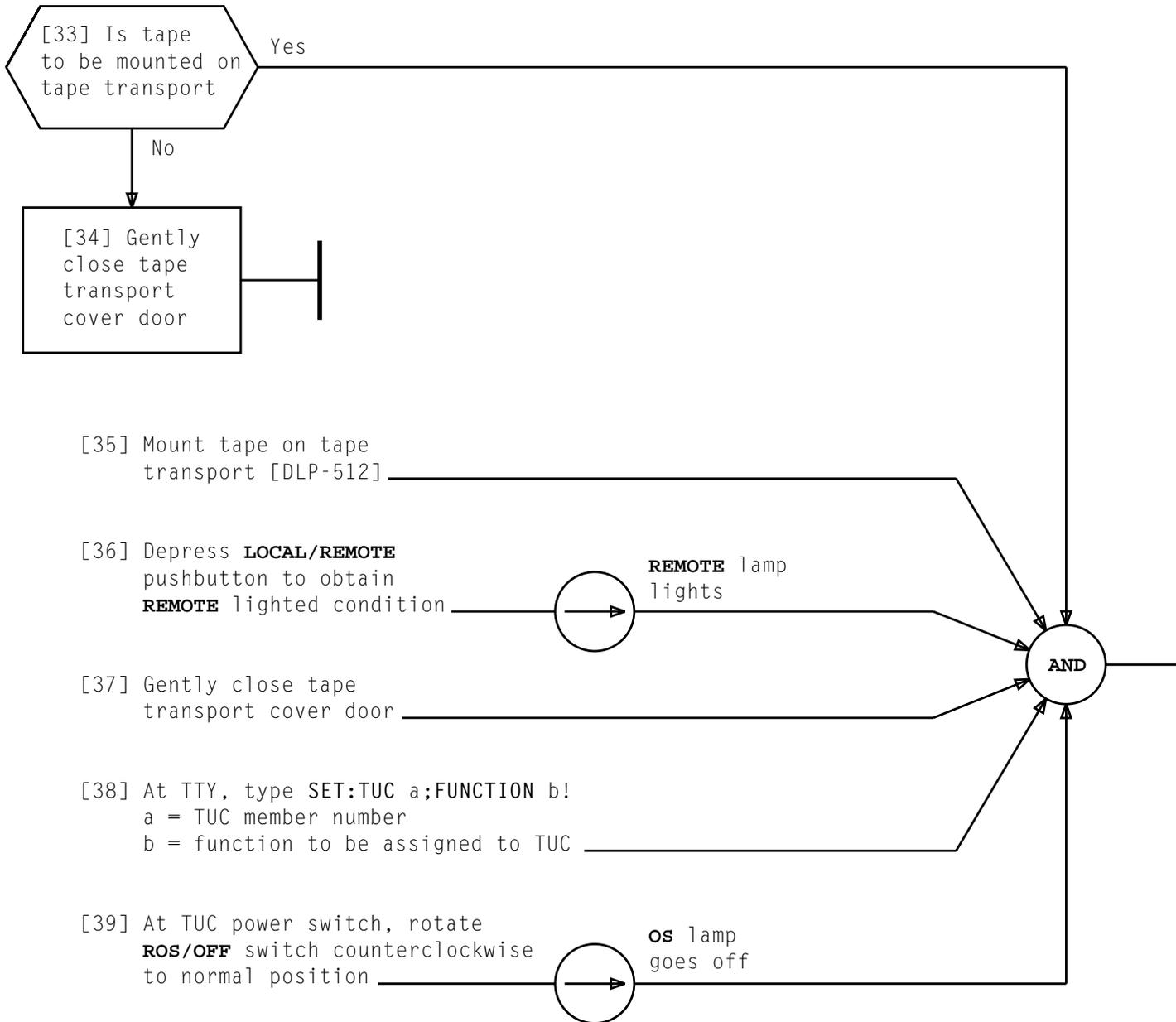
CLEAR REEL MOTOR BRAKE FAULT

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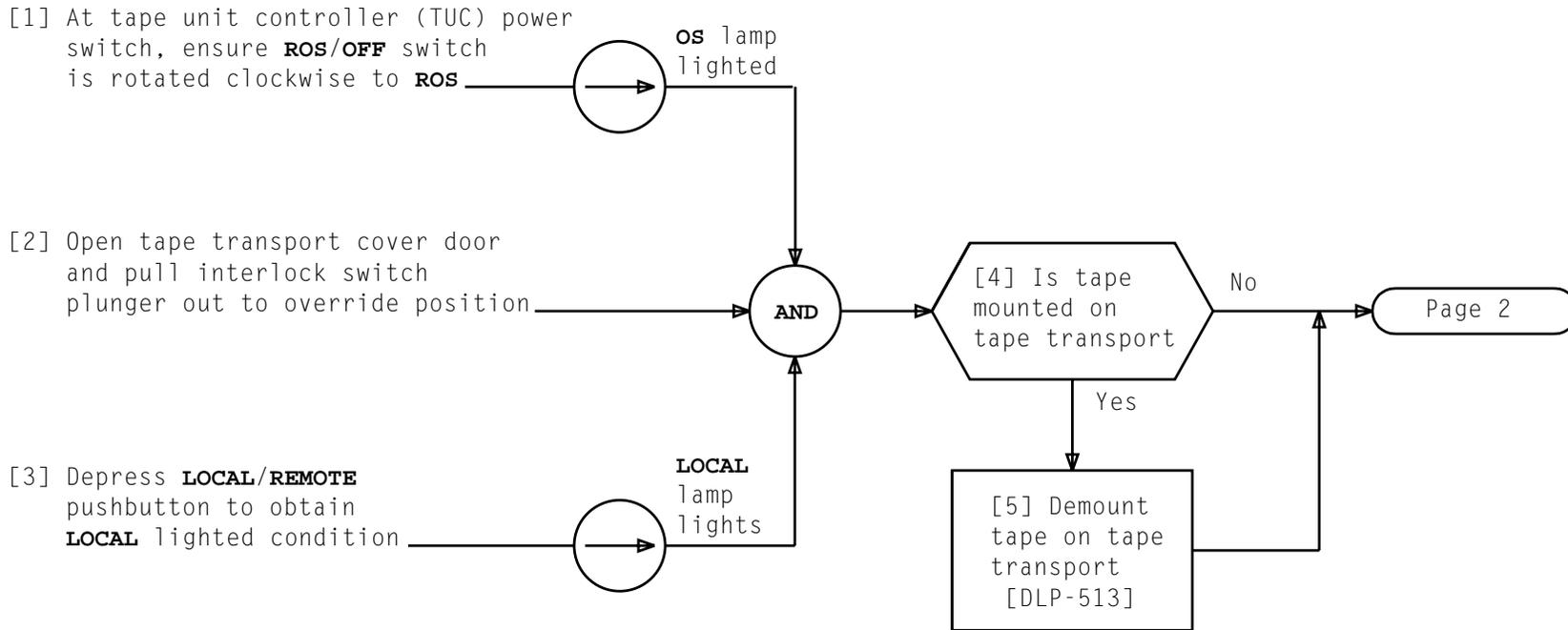
CLEAR REEL MOTOR BRAKE FAULT

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CLEAR REEL MOTOR BRAKE FAULT

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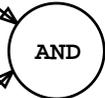


CLEAR ARMS WILL NOT HOLD TAPE TENSION FAULT

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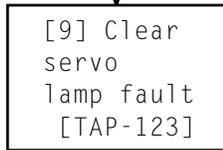
[6] At lower right of tape transport, loosen pawl fastener; unlatch, and open casting door

[7] Inspect upper and lower servo lamps



Yes

No



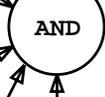
[10] Gently close tape transport casting door; latch, and secure pawl fastener

[11] Obtain blank tape

[12] With hub of upper reel holder in counterclockwise position, mount tape on upper reel holder

[13] Rotate hub of upper reel holder clockwise to lock tape reel securely

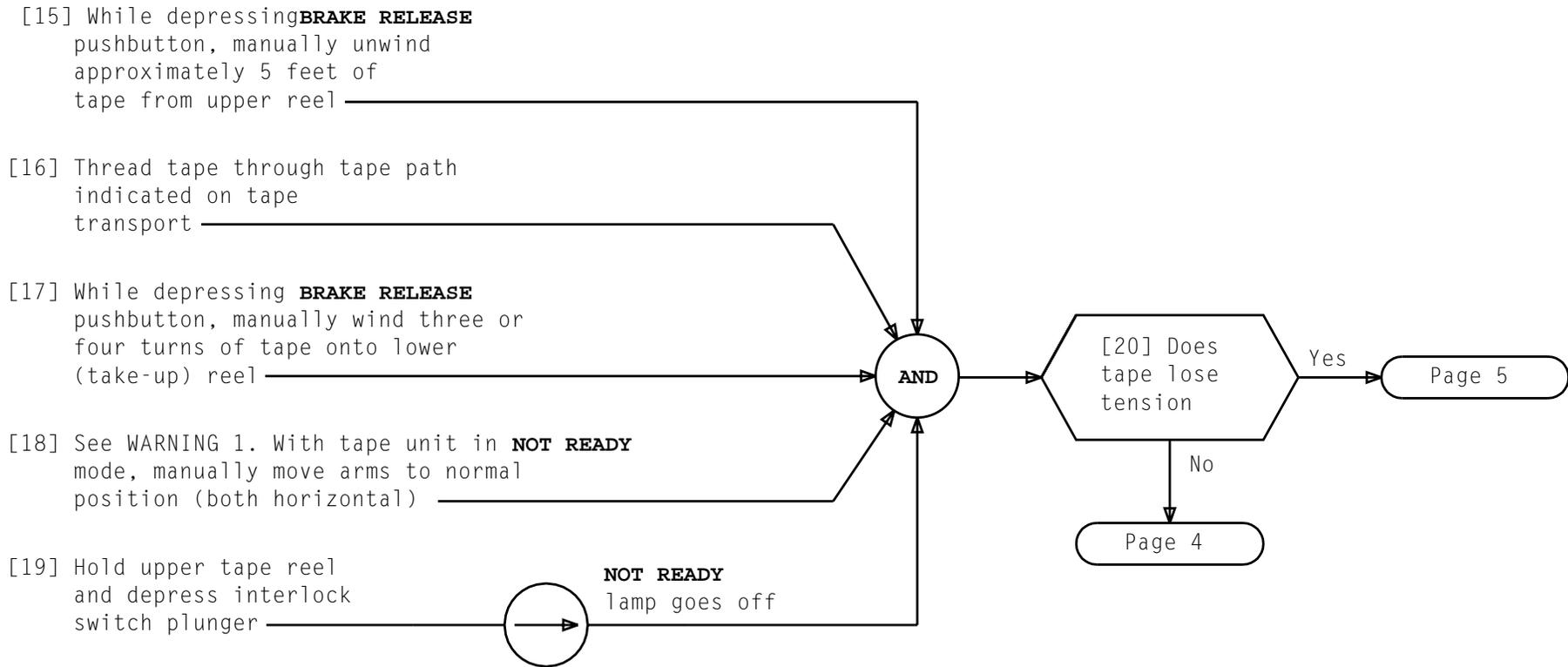
[14] Ensure lower (take-up) reel is same size or larger than tape reel mounted



Page 3

CLEAR ARMS WILL NOT HOLD TAPE TENSION FAULT

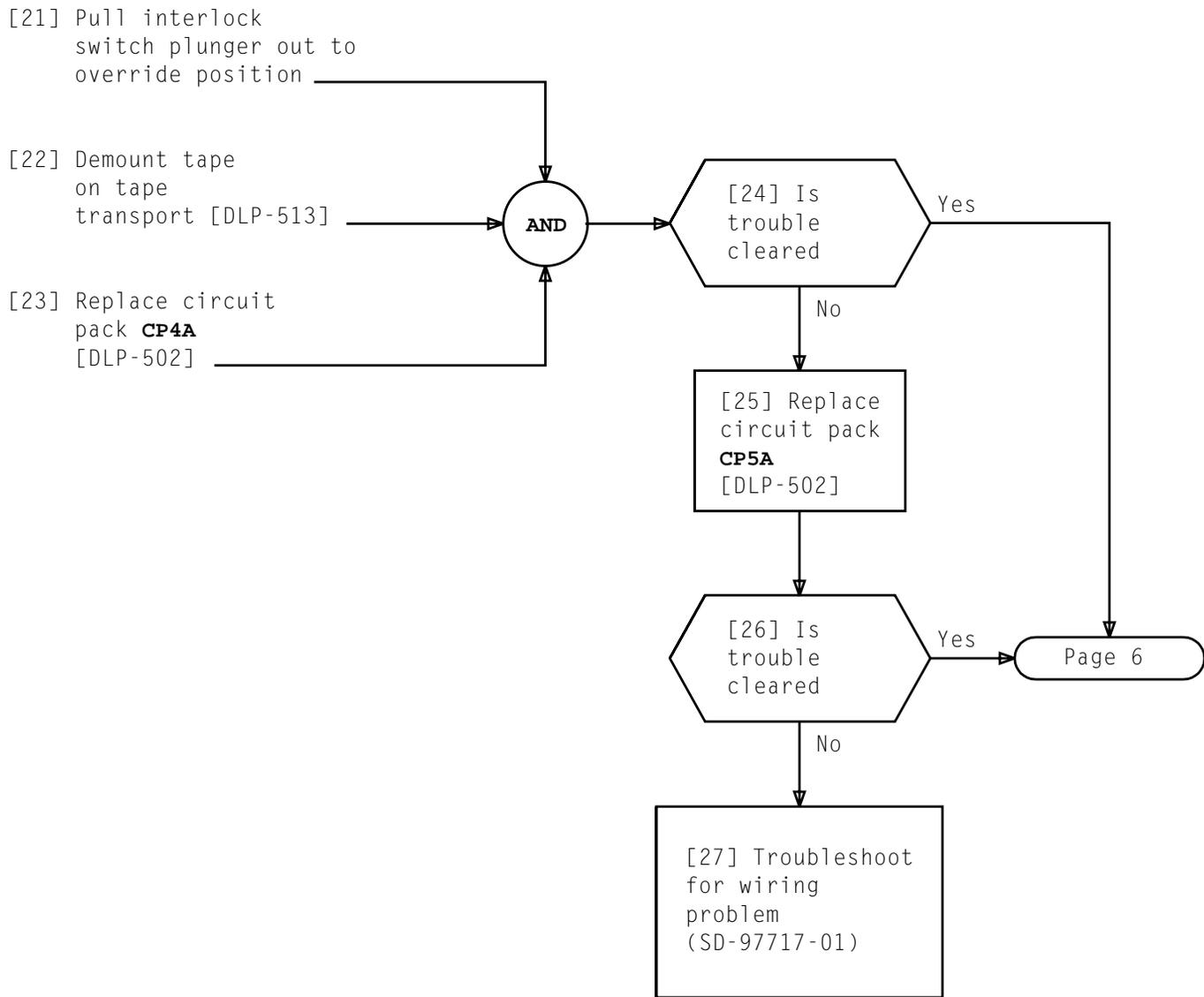
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WARNING 1
 Do not touch any surface that comes in contact with tape. Body oil will contaminate polyester base magnetic tape

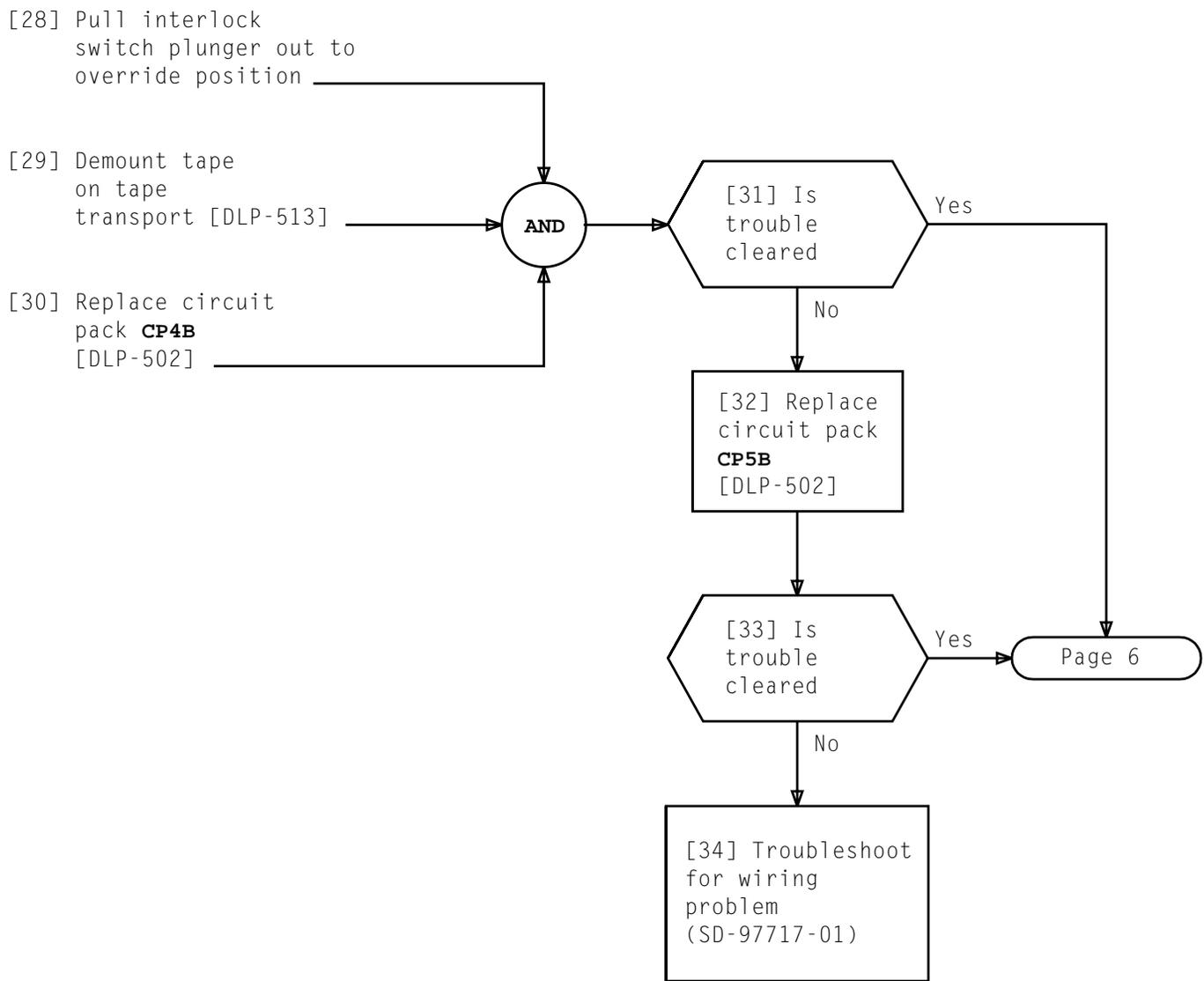
CLEAR ARMS WILL NOT HOLD TAPE TENSION FAULT

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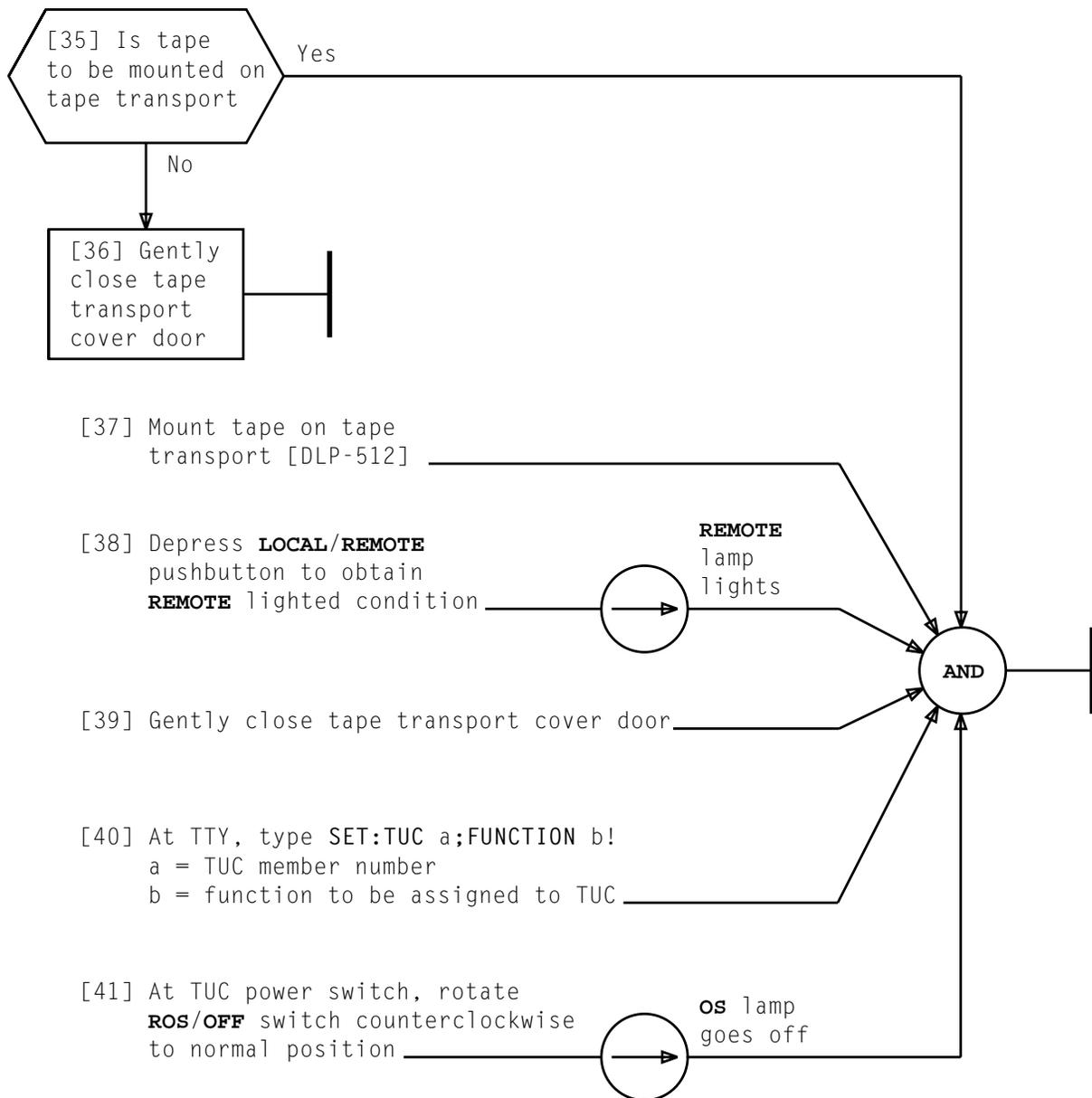
CLEAR ARMS WILL NOT HOLD TAPE TENSION FAULT

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CLEAR ARMS WILL NOT HOLD TAPE TENSION FAULT

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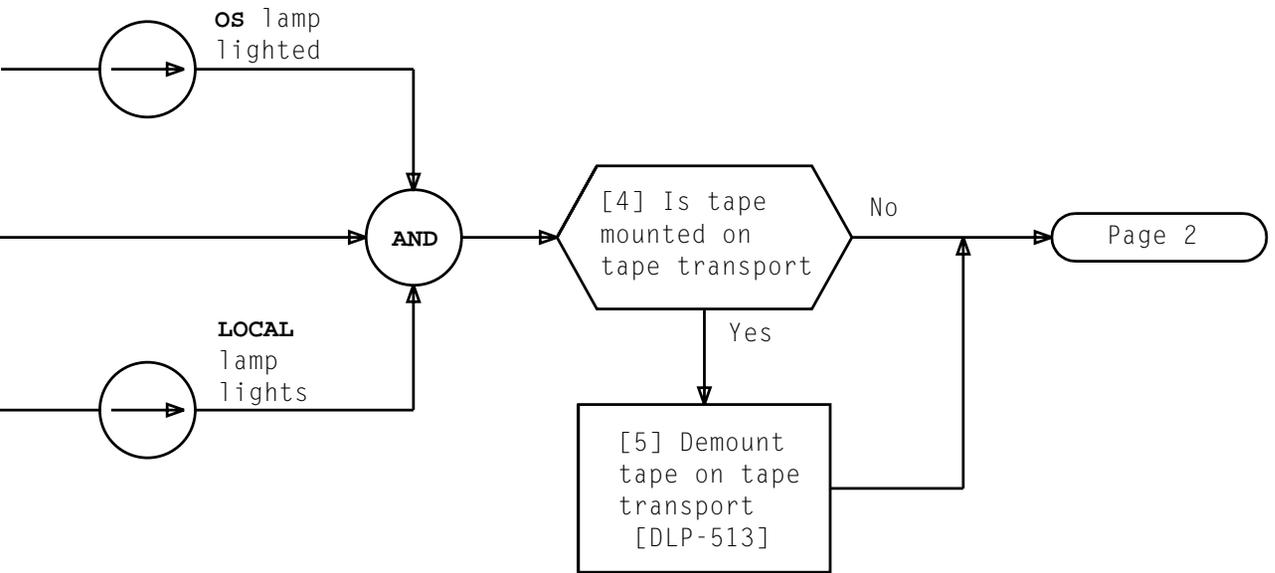
CLEAR ARMS WILL NOT HOLD TAPE TENSION FAULT

Issue 6	OCT 1988
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[1] At tape unit controller (TUC) power switch, ensure **ROS/OFF** switch is rotated clockwise to **ROS**

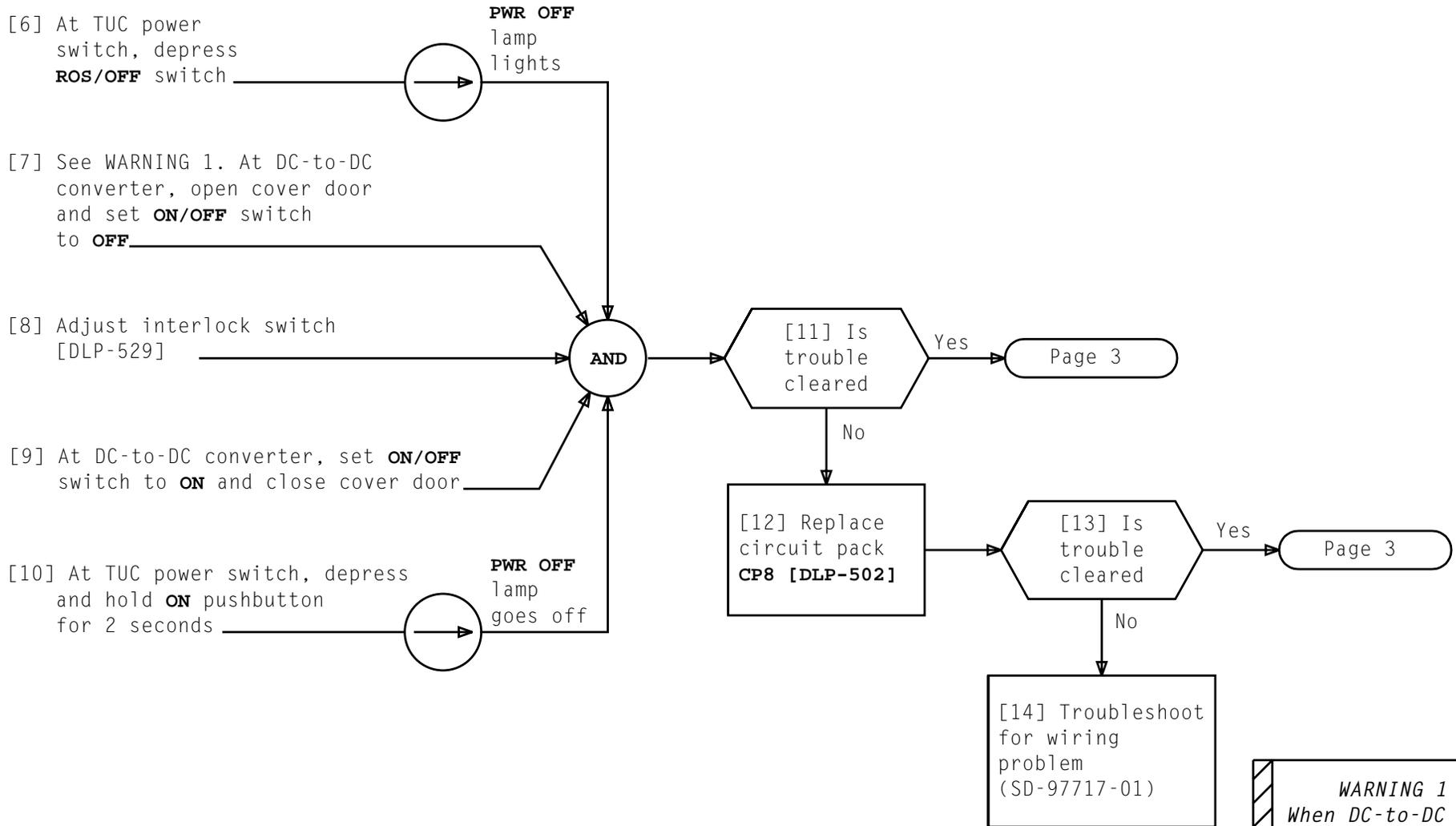
[2] Open tape transport cover door and pull interlock switch plunger out to override position

[3] Depress **LOCAL/REMOTE** pushbutton to obtain **LOCAL** lighted condition



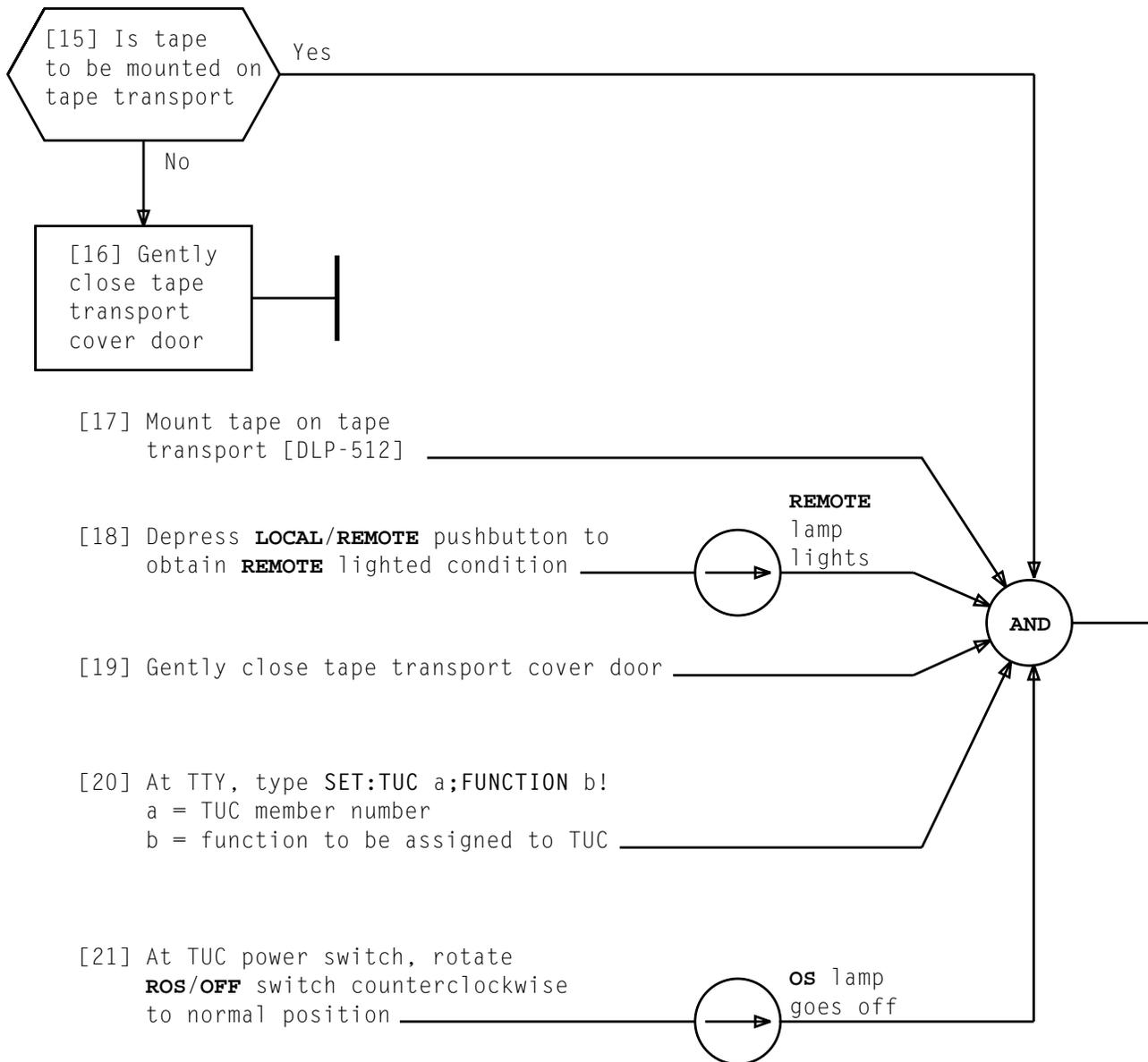
CLEAR DOOR INTERLOCK FAULT

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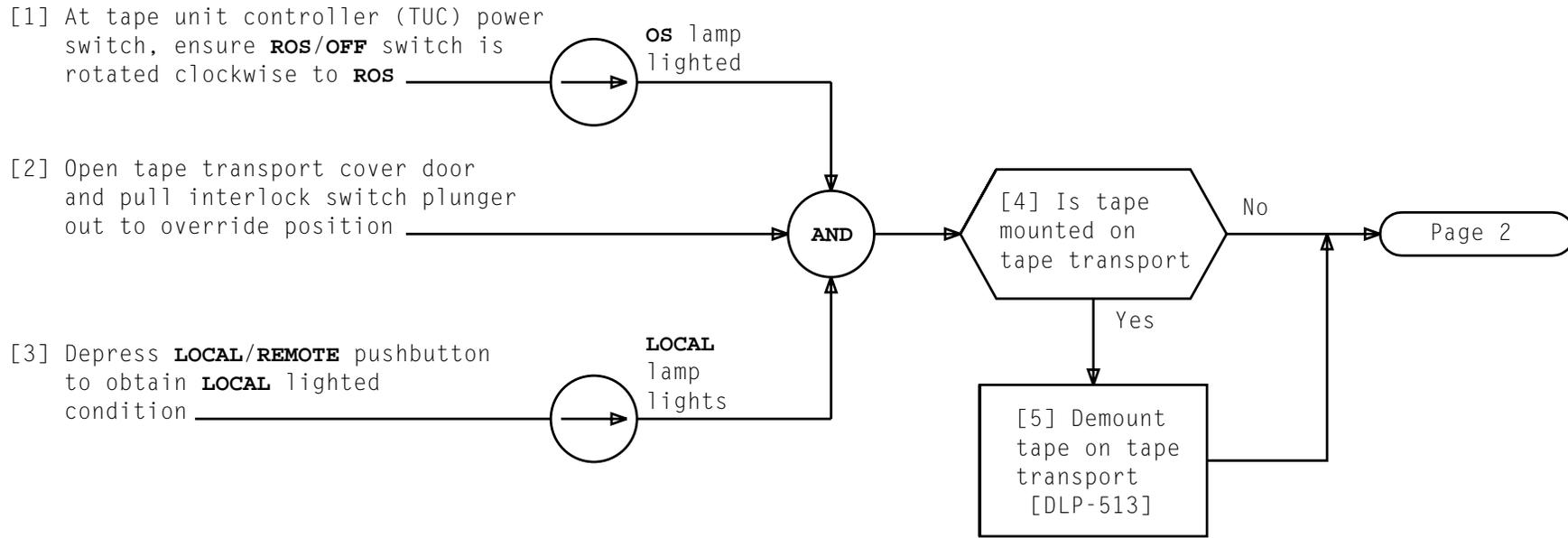
WARNING 1
 When DC-to-DC converter is turned off, tape reel motors will spin uncontrolled

CLEAR DOOR INTERLOCK FAULT



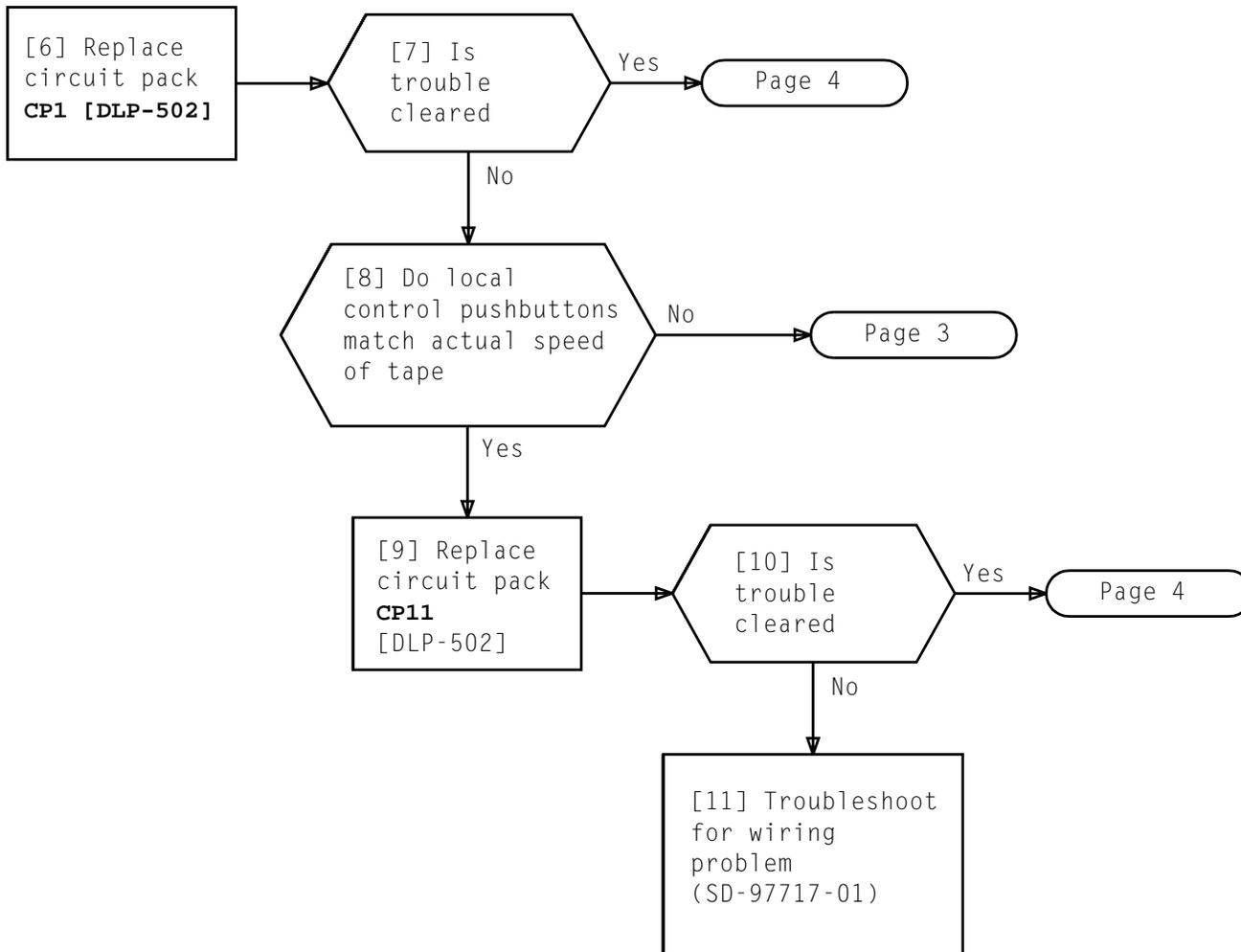
CLEAR DOOR INTERLOCK FAULT

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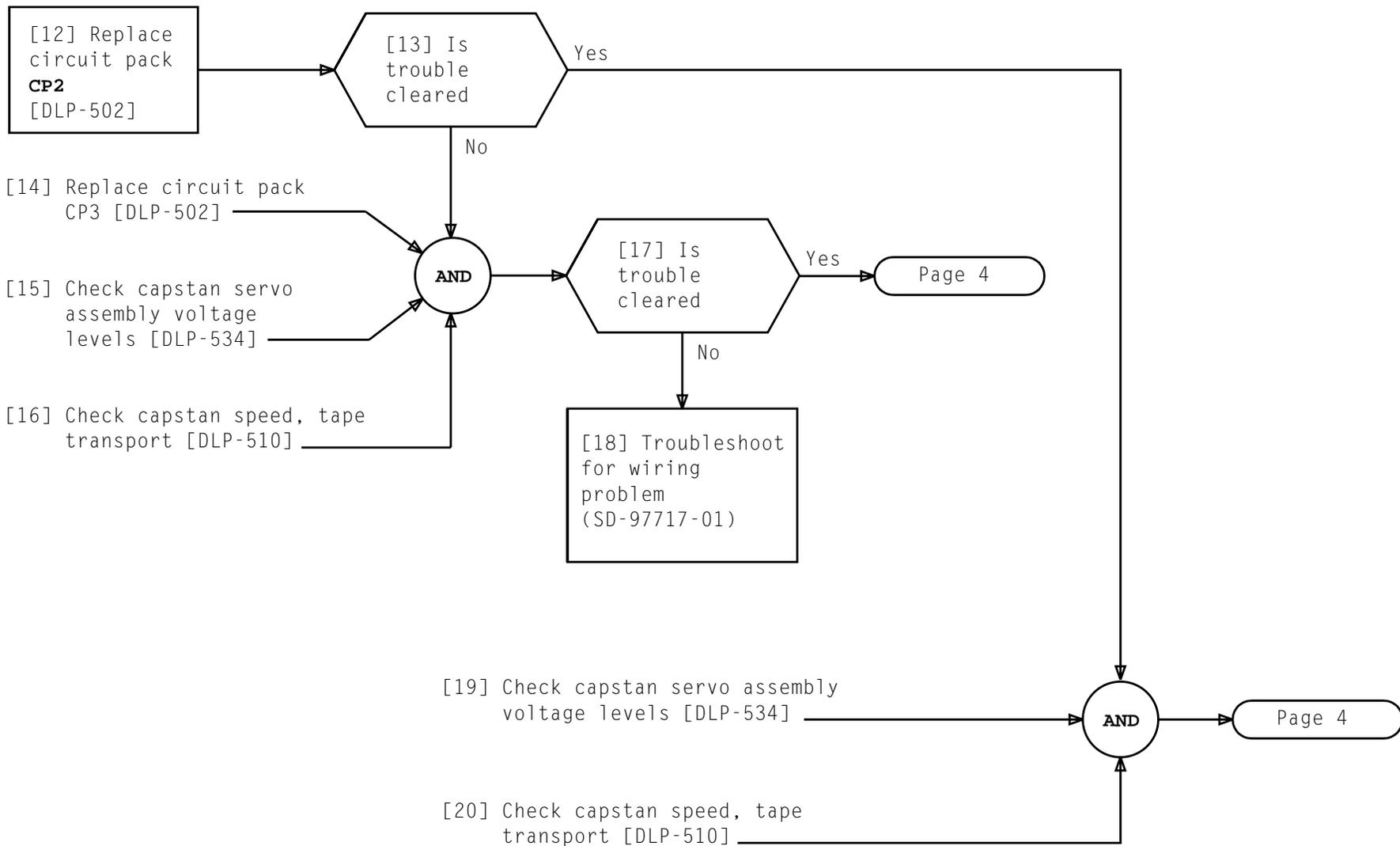
CLEAR CAPSTAN WILL NOT SWITCH SPEED FAULT

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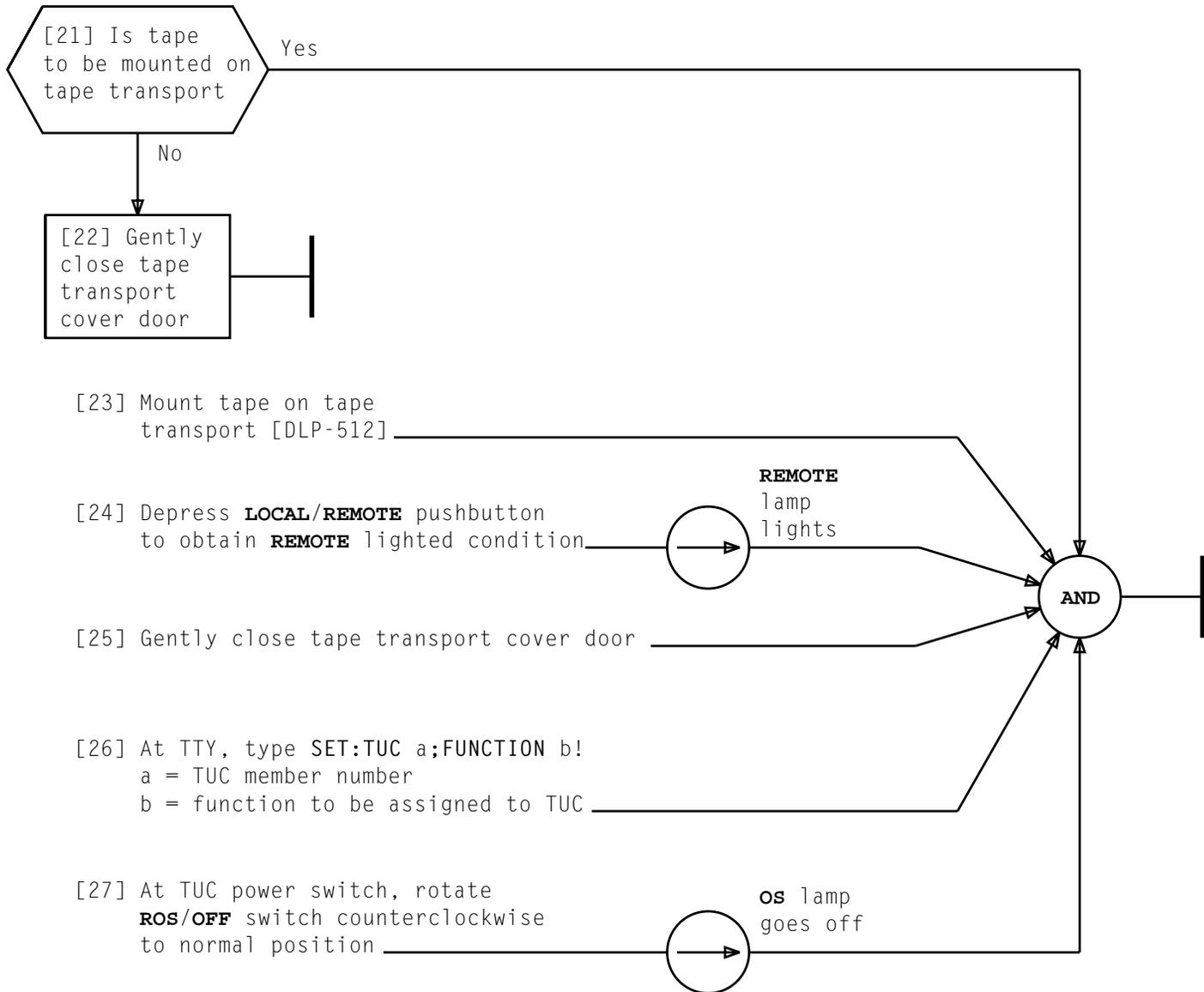
CLEAR CAPSTAN WILL NOT SWITCH SPEED FAULT

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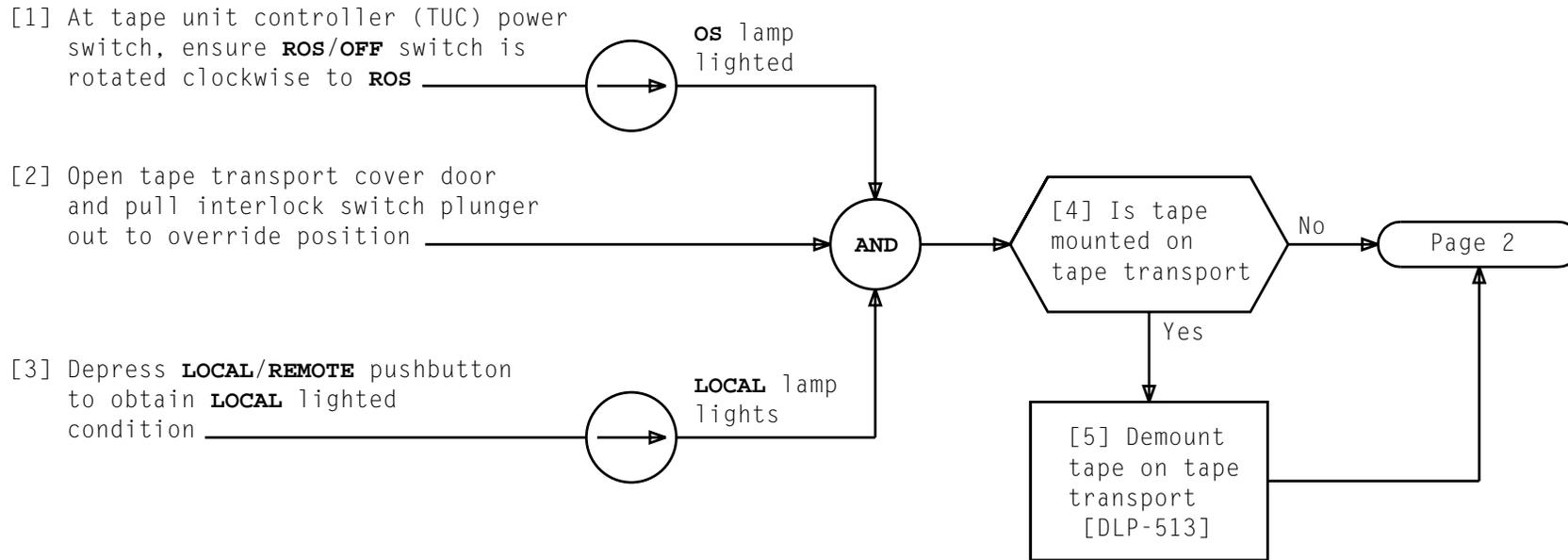
CLEAR CAPSTAN WILL NOT SWITCH SPEED FAULT

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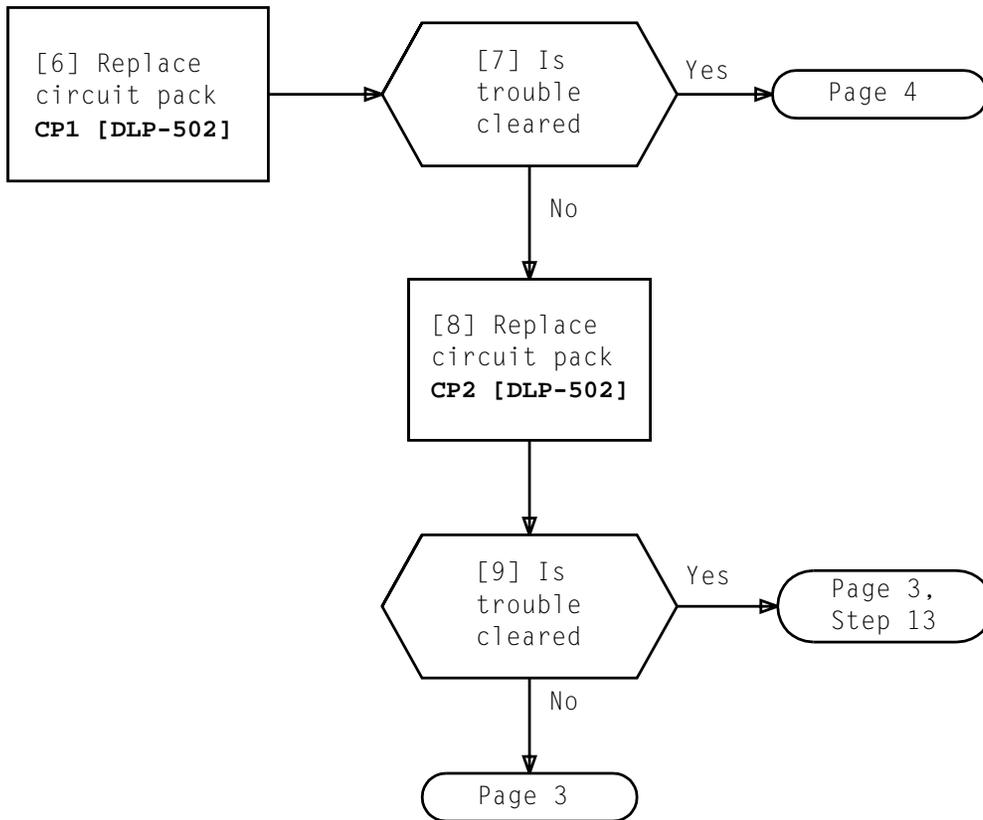
CLEAR CAPSTAN WILL NOT SWITCH SPEED FAULT

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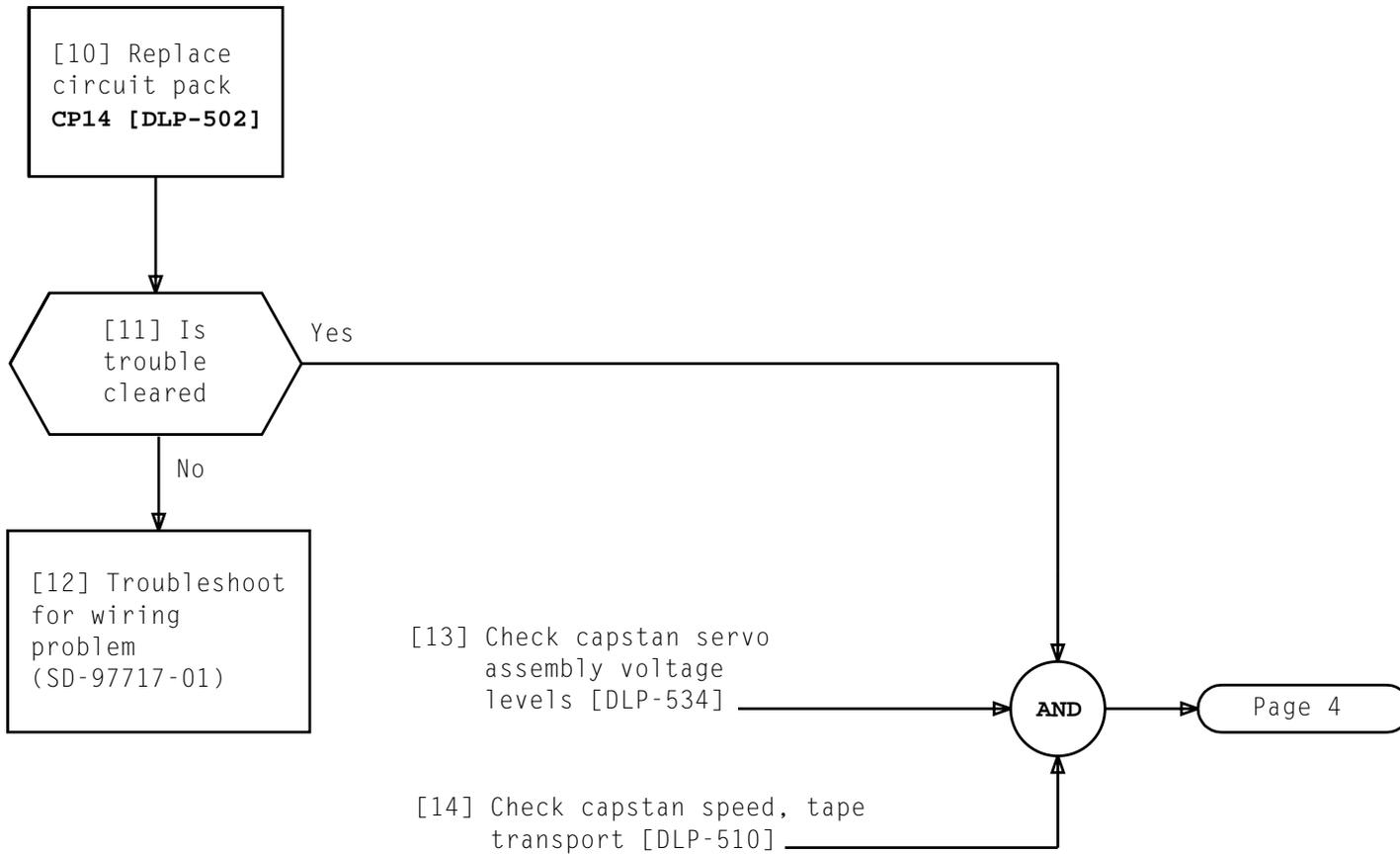
CLEAR CAPSTAN ROTATES IN ONE DIRECTION FAULT

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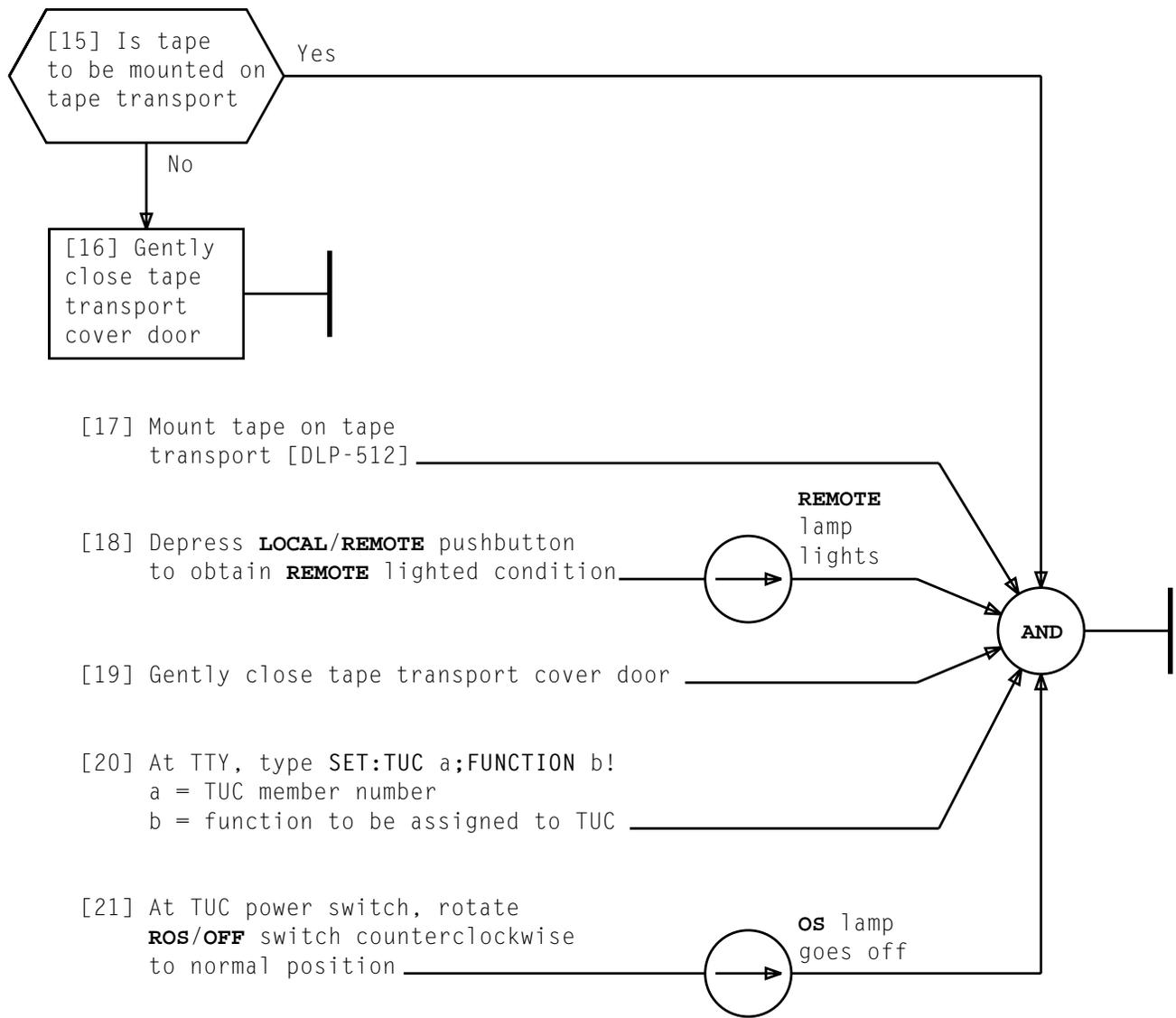
CLEAR CAPSTAN ROTATES IN ONE DIRECTION FAULT

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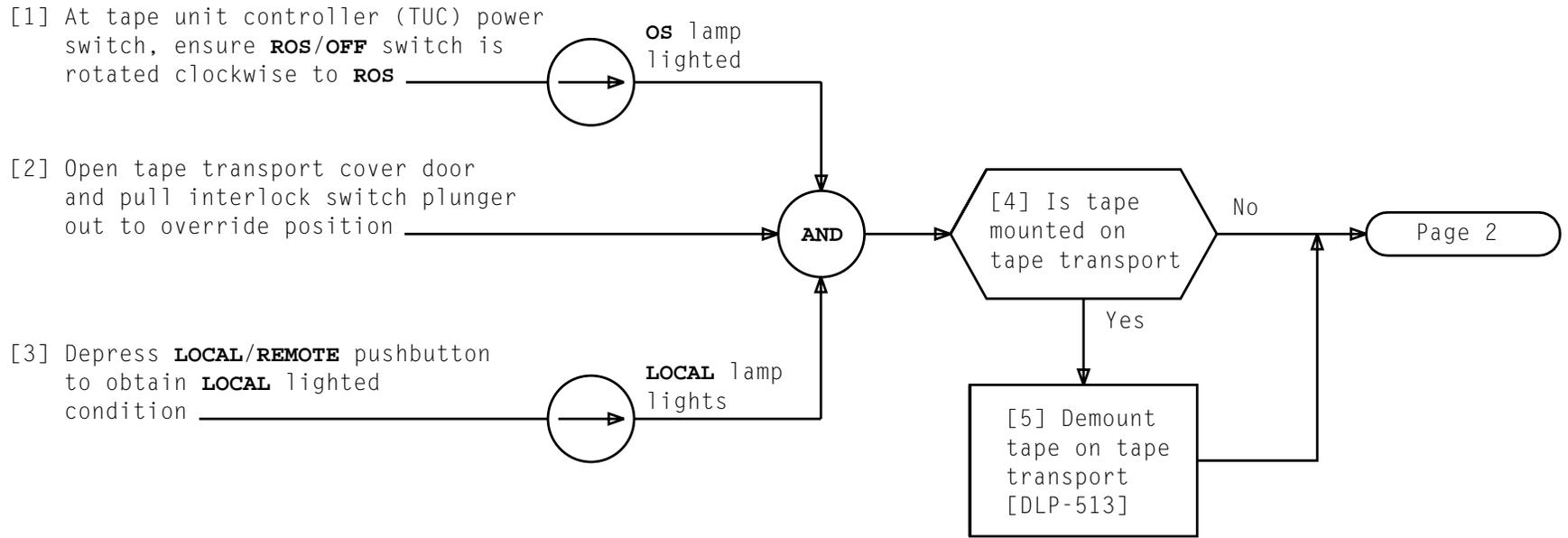
CLEAR CAPSTAN ROTATES IN ONE DIRECTION FAULT

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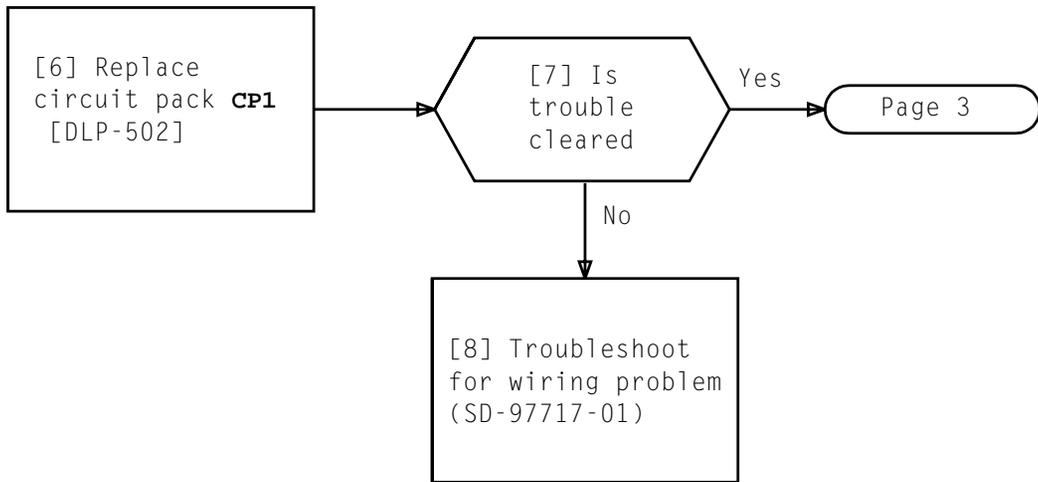
CLEAR CAPSTAN ROTATES IN ONE DIRECTION FAULT

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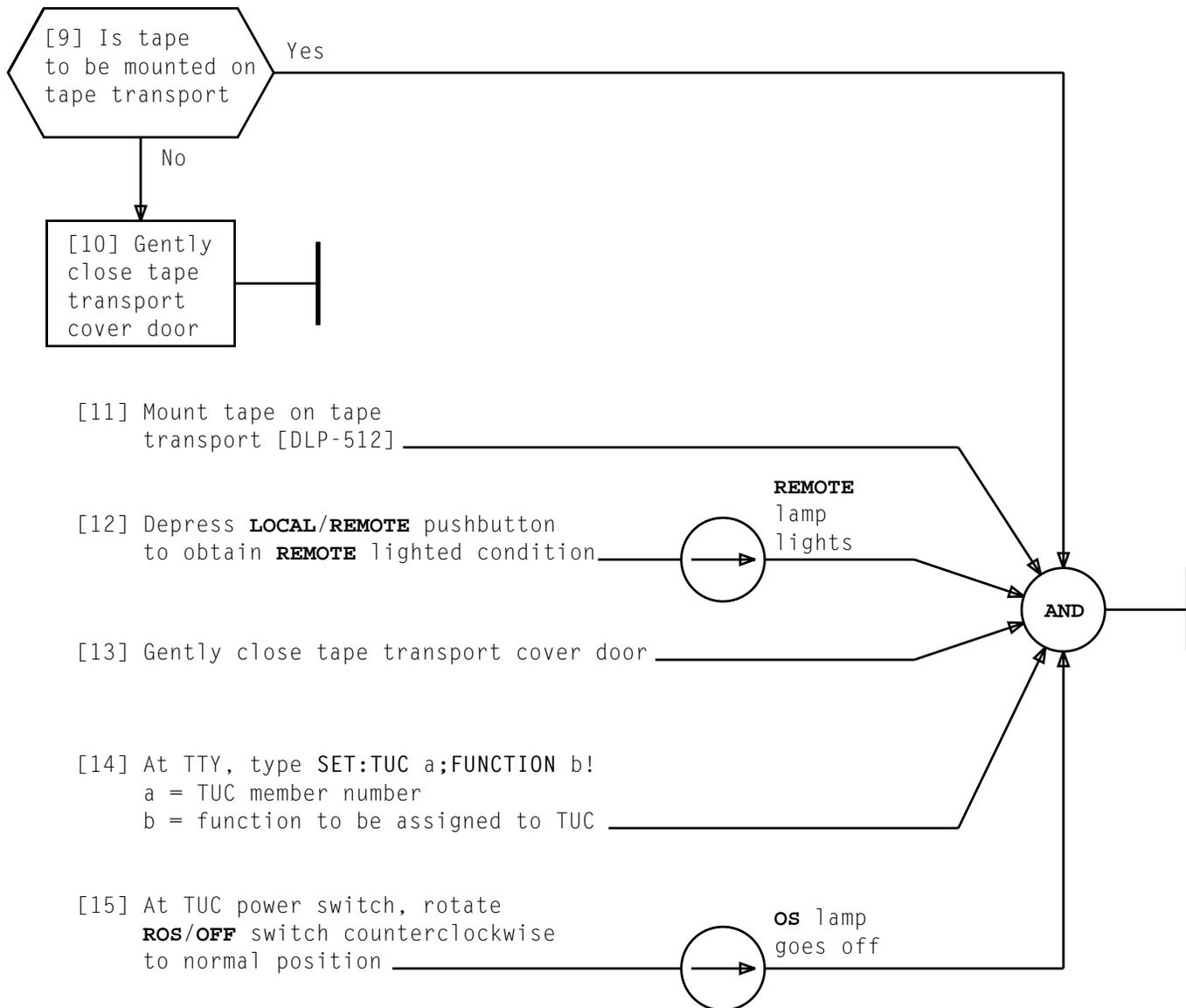
CLEAR LOCAL/REMOTE SWITCHING FAULT

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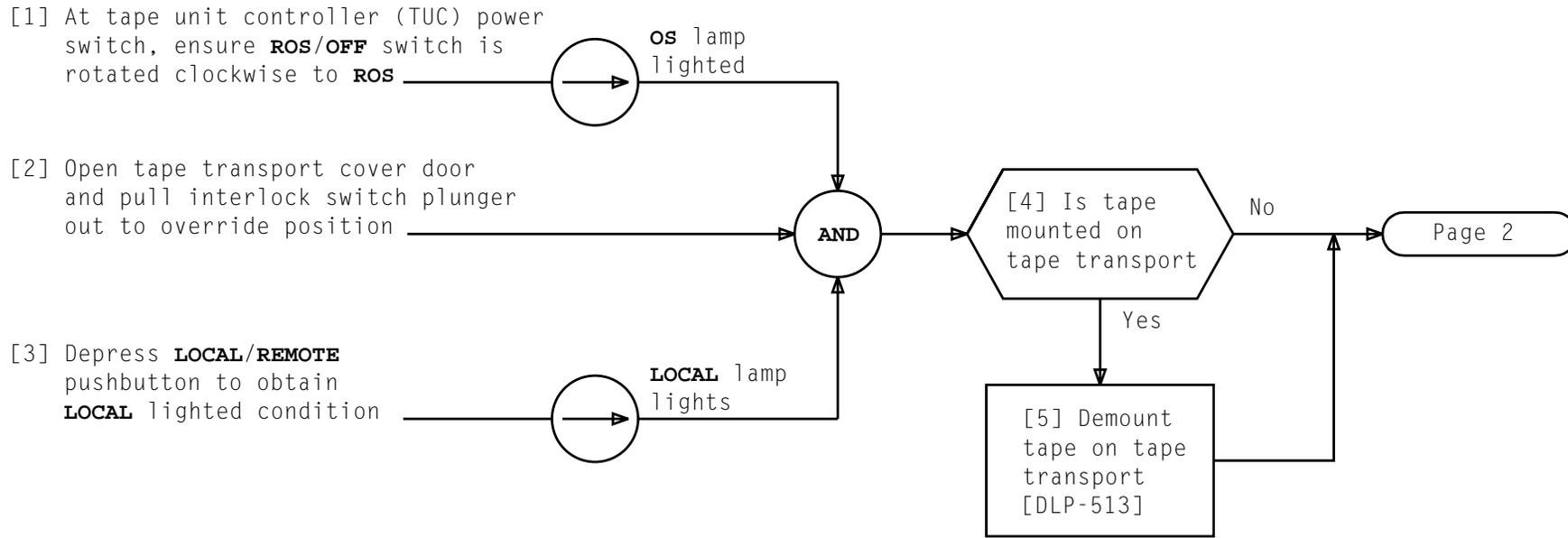


CLEAR LOCAL/REMOTE SWITCHING FAULT

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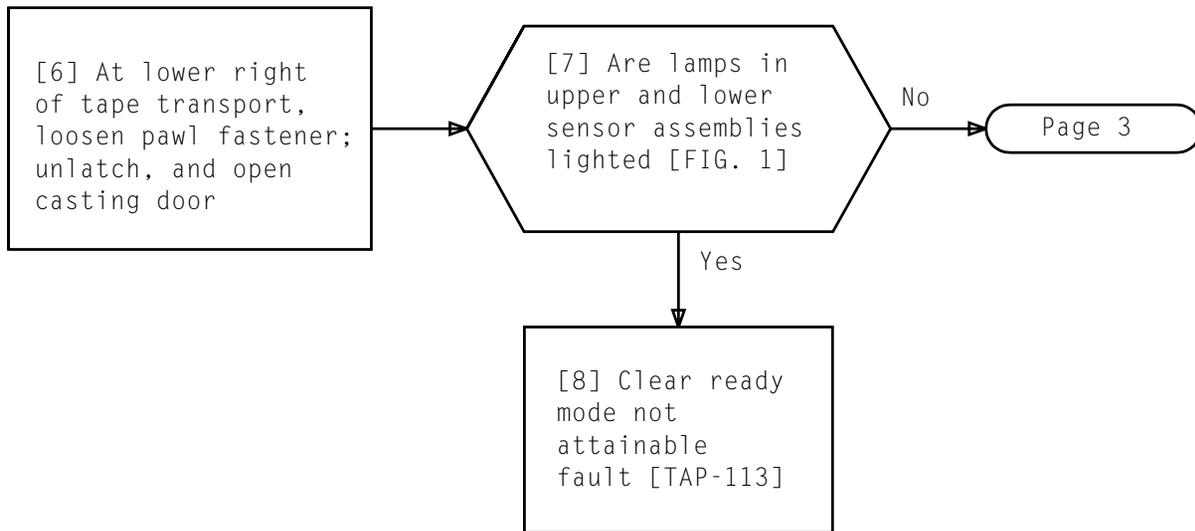


CLEAR LOCAL/REMOTE SWITCHING FAULT



CLEAR SERVO LAMP FAULT

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[9] See WARNING 1. At DC-to-DC converter, open cover door and set **ON/OFF** switch to **OFF**

[10] Manually move arms to off-normal position

[11] At rear of casting door, replace unlighted sensor lamps (GE-381 or absolute equivalent) [FIG. 1]

[12] At DC-to-DC converter, set **ON/OFF** switch to **ON** and close cover door

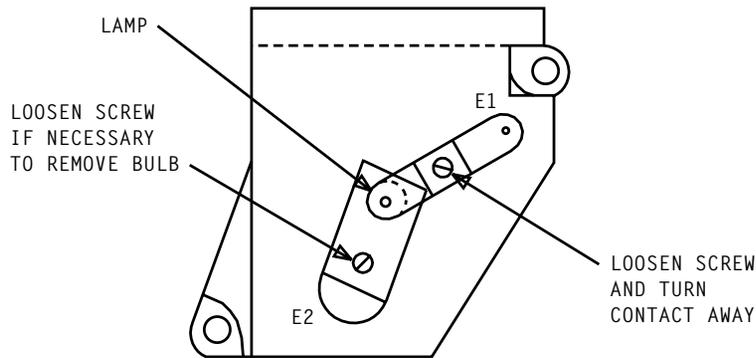
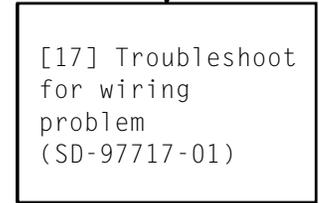
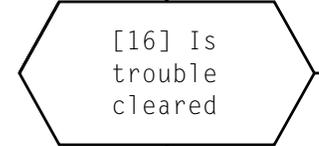
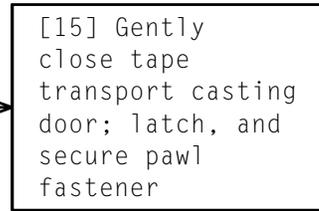
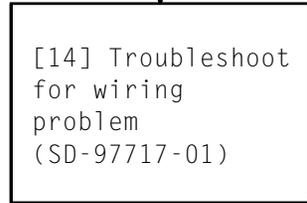
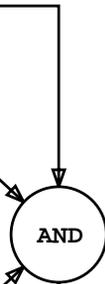
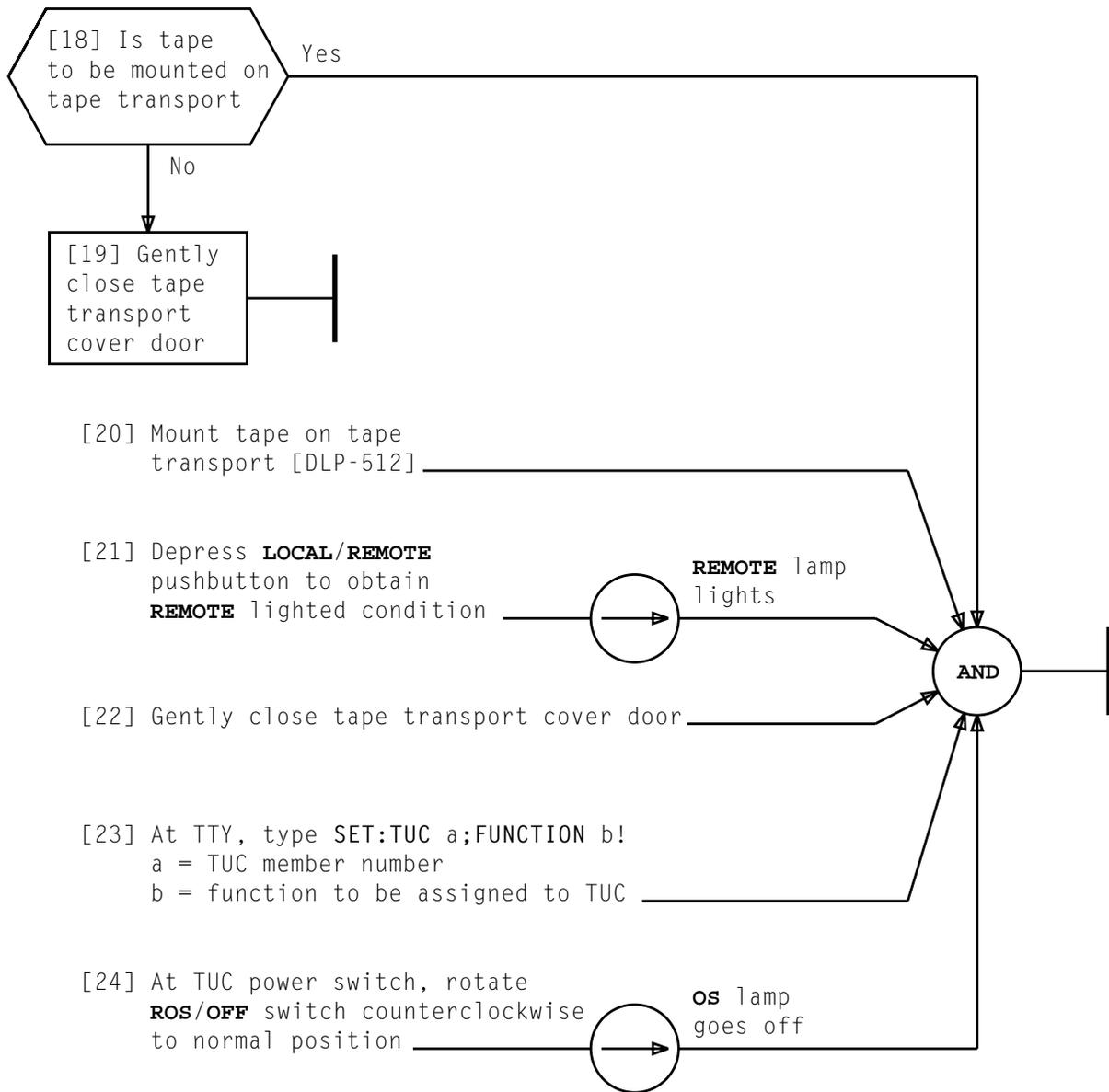


FIG. 1 - Tape Tension Arm Sensor Assembly

WARNING 1
When DC-to-DC converter is turned off, tape reel motors will spin uncontrolled

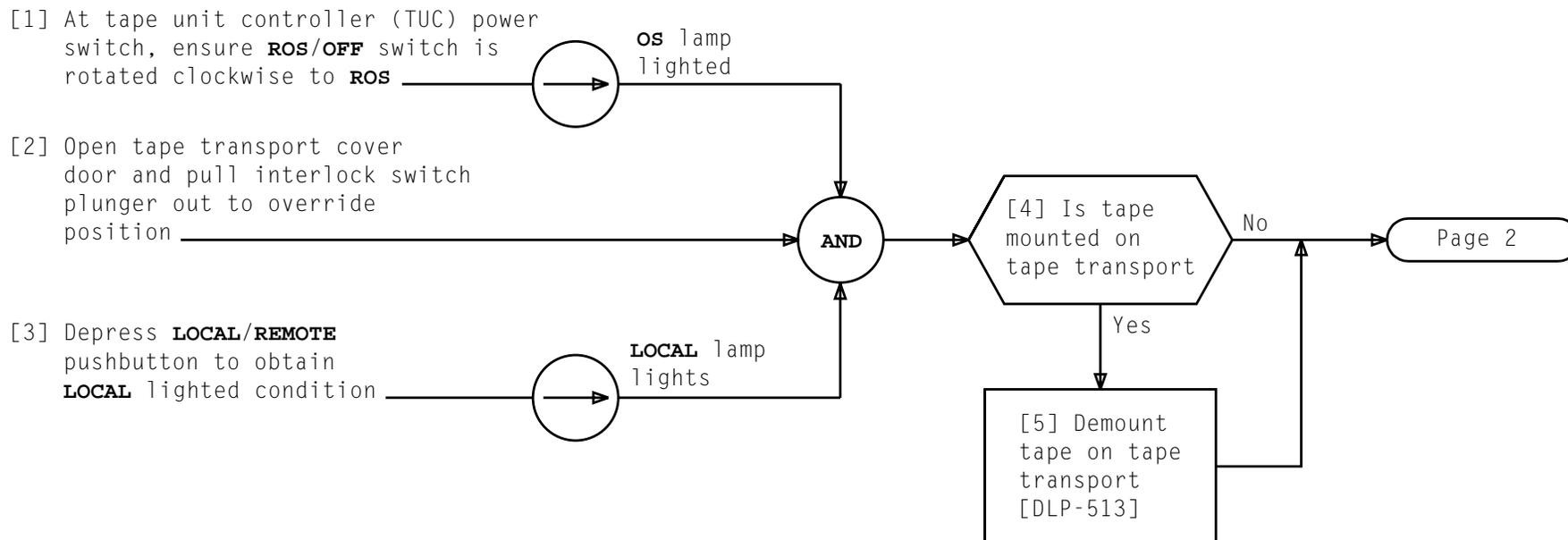
CLEAR SERVO LAMP FAULT

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CLEAR SERVO LAMP FAULT

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CLEAR CAPSTAN ACCELERATION FAULT

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- [6] Obtain support apparatus [TABLE A]
- [7] Mount blank tape on tape transport [DLP-512]
- [8] Check tape travel on tape transport [DLP-508]
- [9] Demount blank tape on tape transport [DLP-513]

AND

- [10] Clean tape path [DLP-526]
- [11] Check read pulse widths [DLP-540]
- [12] Check read head alignment [DLP-509]
- [13] Check write and erase head alignments [DLP-542]

AND

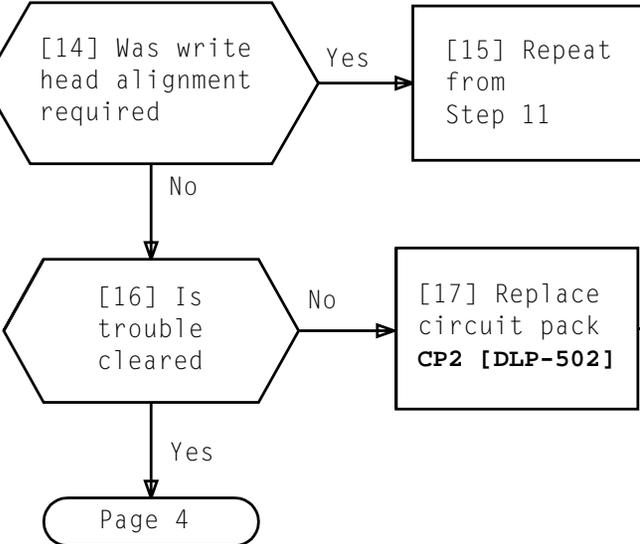
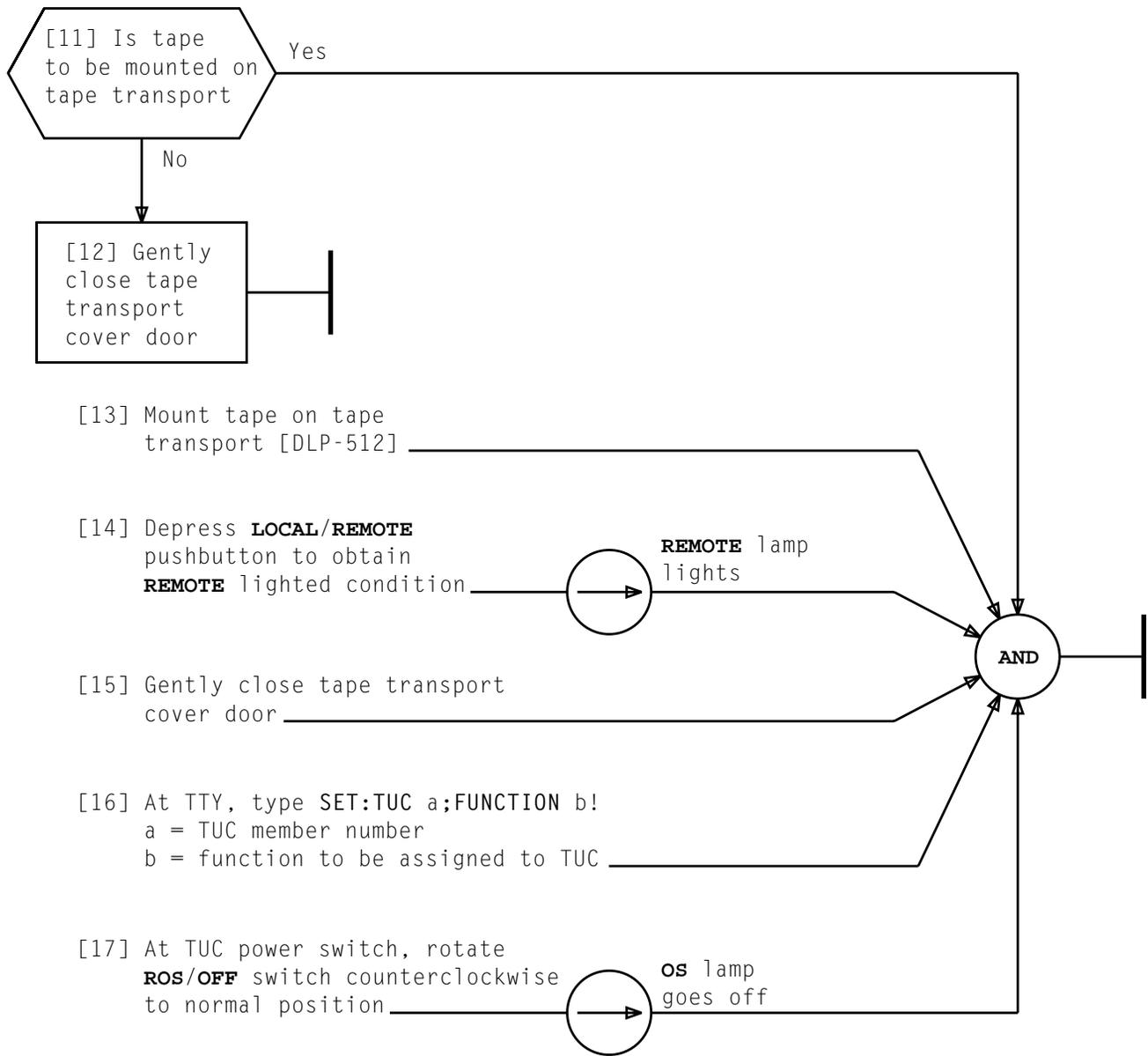


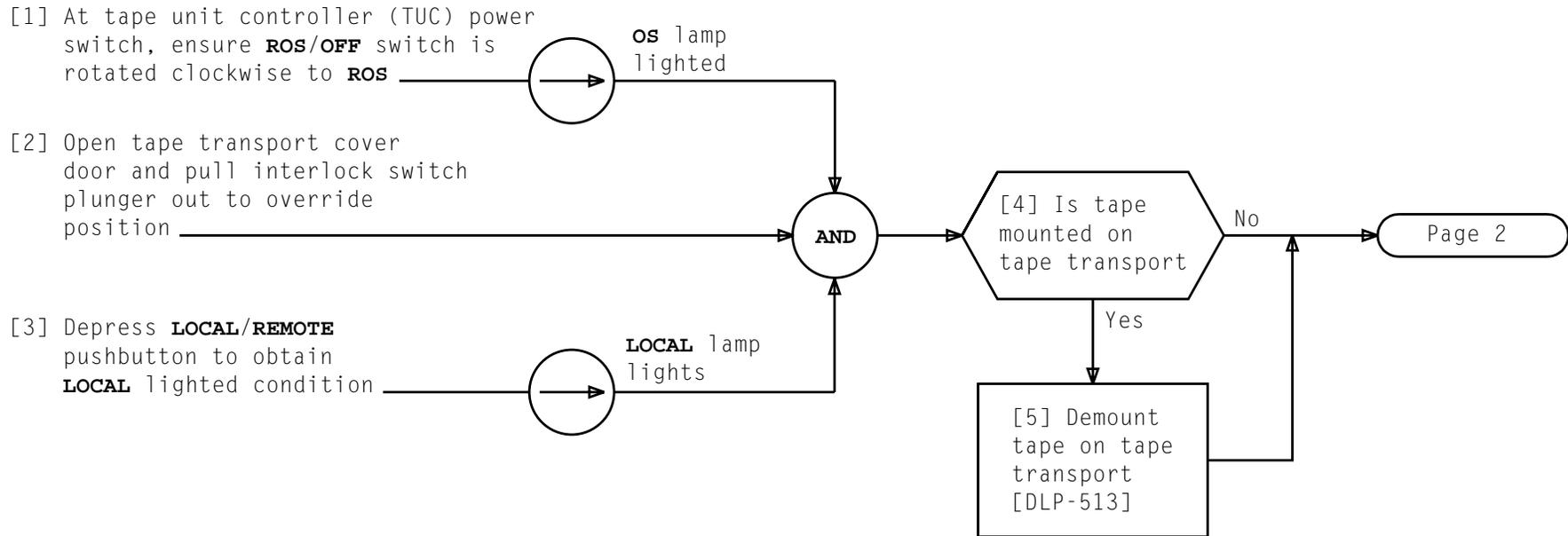
TABLE A			
COMMON NAME	PART NUMBER	COMMON NAME	PART NUMBER
Tektronix oscilloscope	7000 or equivalent	Card extender	826A or 826B
		Twill cloth	KS-2423
Test pack	Skew Alignment Tool 814A	Cleaner solvent	KS-20406,L1
		Vacuum cleaner	KS-14377,L5
Alignment tape	KS-20315,L1	Flexible nozzle	KS-14377,L3
Blank tape	-		
Write enable ring	-		

CLEAR CAPSTAN ACCELERATION FAULT



CLEAR EOT/BOT SENSOR FAULT OR FAILURE TO RETURN TO LOAD POINT FAULT

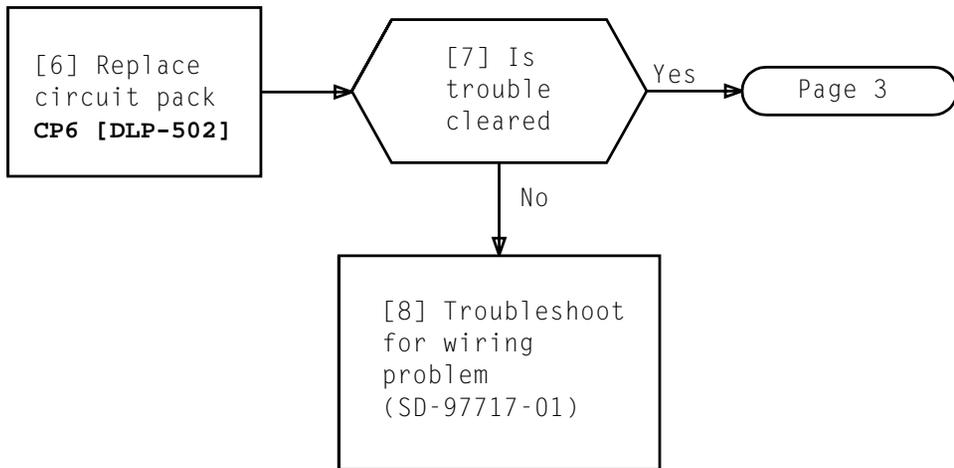
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CLEAR TAPE REEL LOADED/UNLOADED INDICATION FAULT

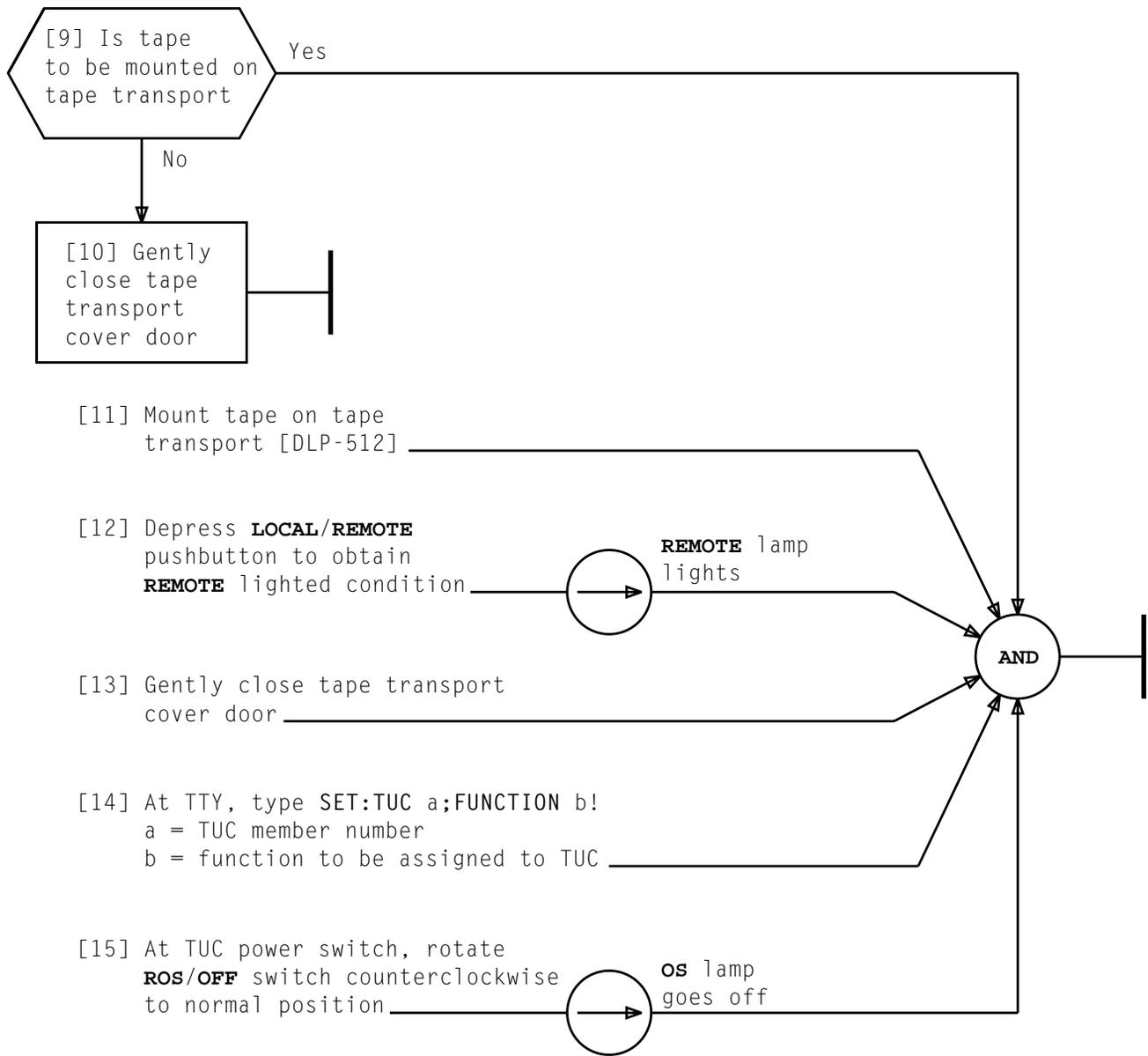
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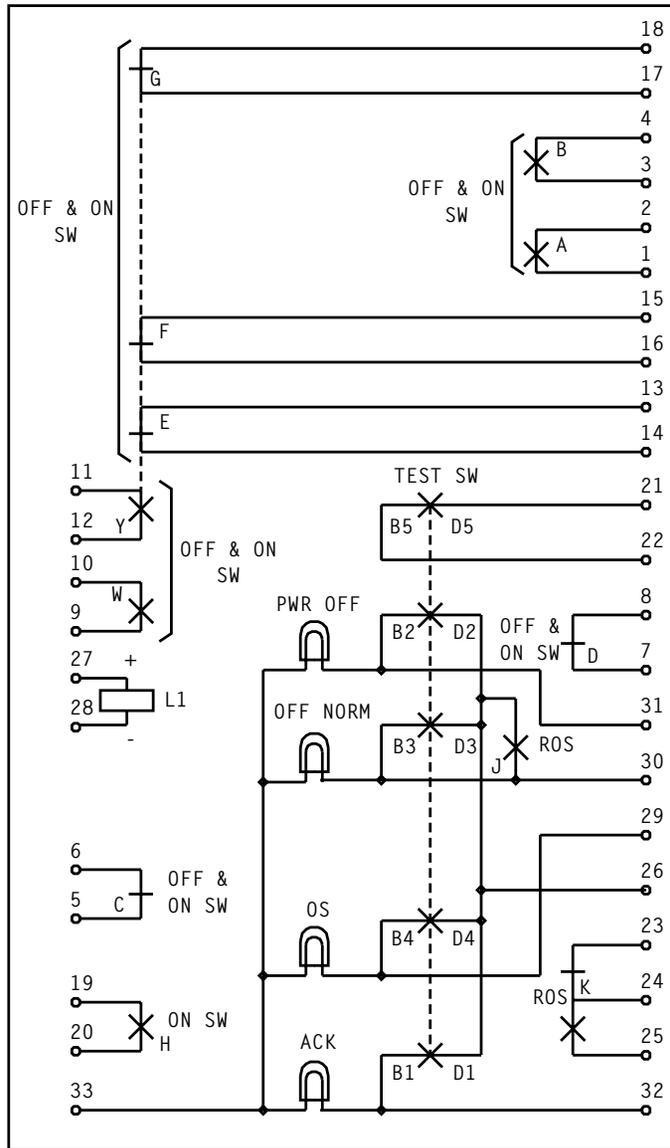
CLEAR TAPE REEL LOADED/UNLOADED INDICATION FAULT

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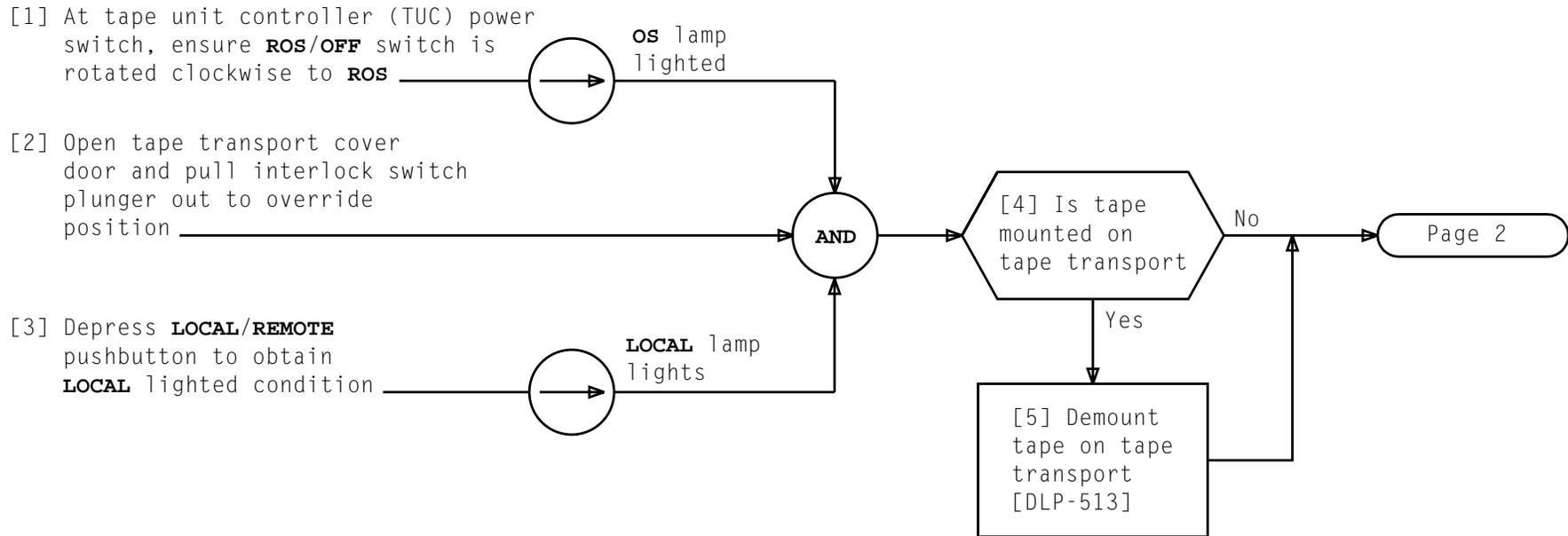
CLEAR TAPE REEL LOADED/UNLOADED INDICATION FAULT

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POWER SWITCH (KS-20738)

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CLEAR READ, WRITE, OR ERASE HEAD FAULT

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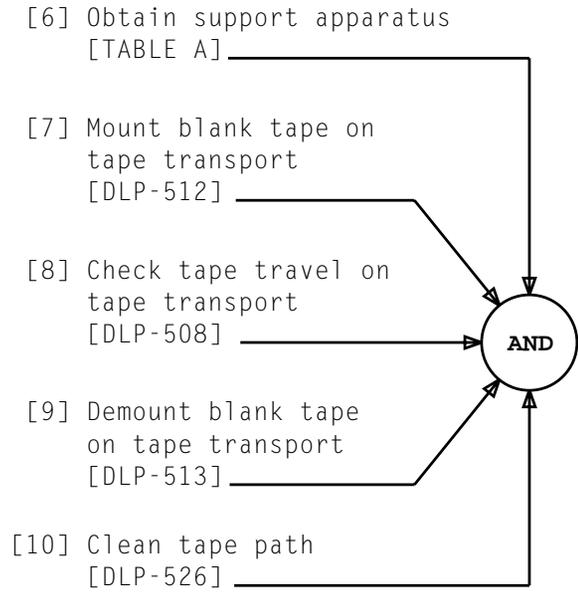
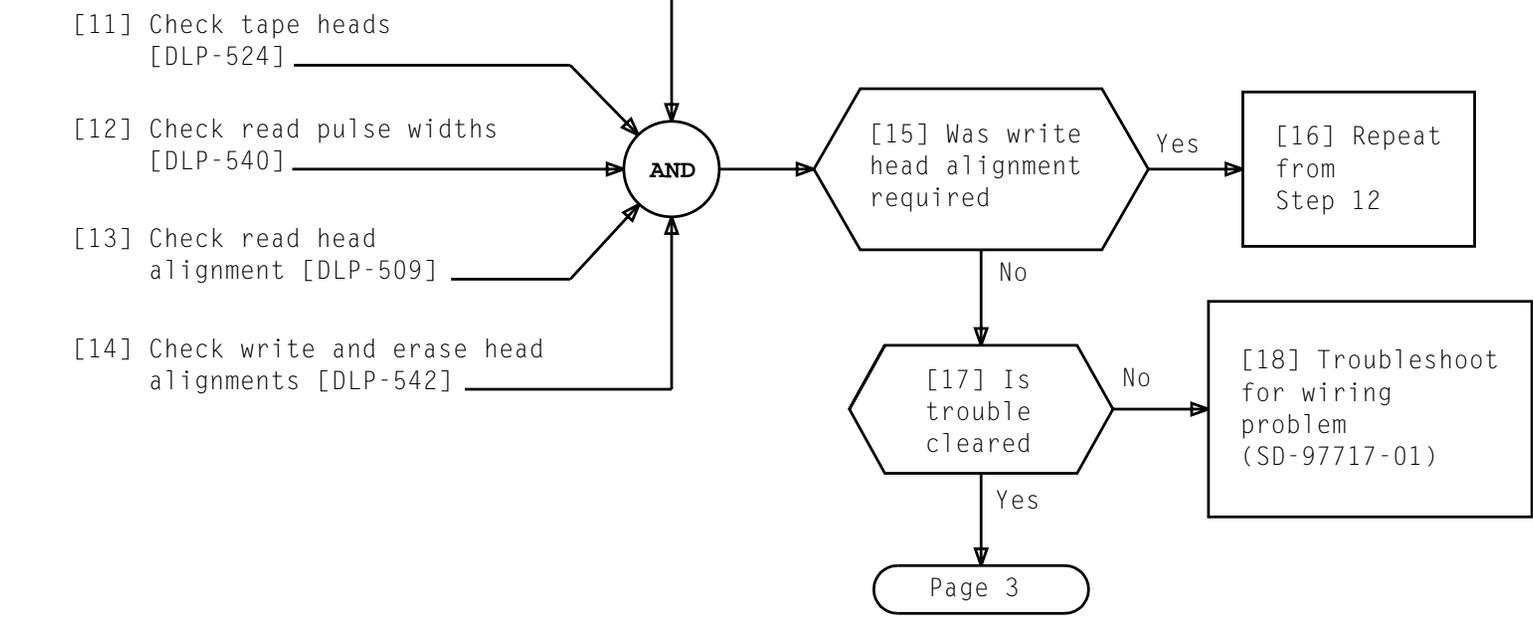
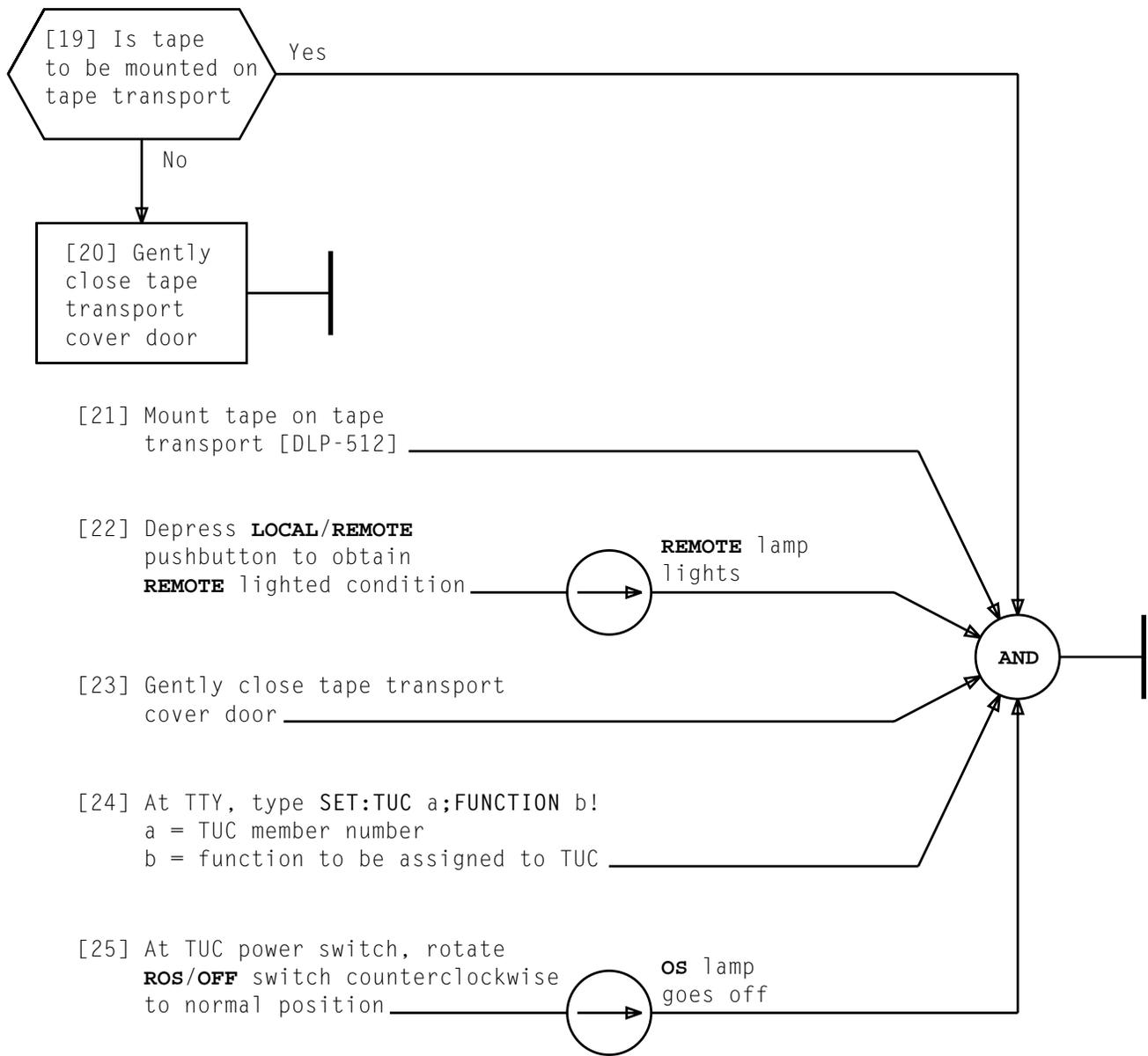


TABLE A			
COMMON NAME	PART NUMBER	COMMON NAME	PART NUMBER
Tektronix oscilloscope	7000 or equivalent	Card extender	826A or 826B
		Magnifier lamp	KS-21808
Test pack	Skew Alignment Tool 814A	Twill cloth (white, 9-inch)	KS-2423
		Cleaner solvent	KS-20406,L1
Alignment tape	KS-20315,L1	Vacuum cleaner	KS-14377,L5
Blank tape	-	Flexible nozzle	KS-14377,L3
Write enable ring	-		

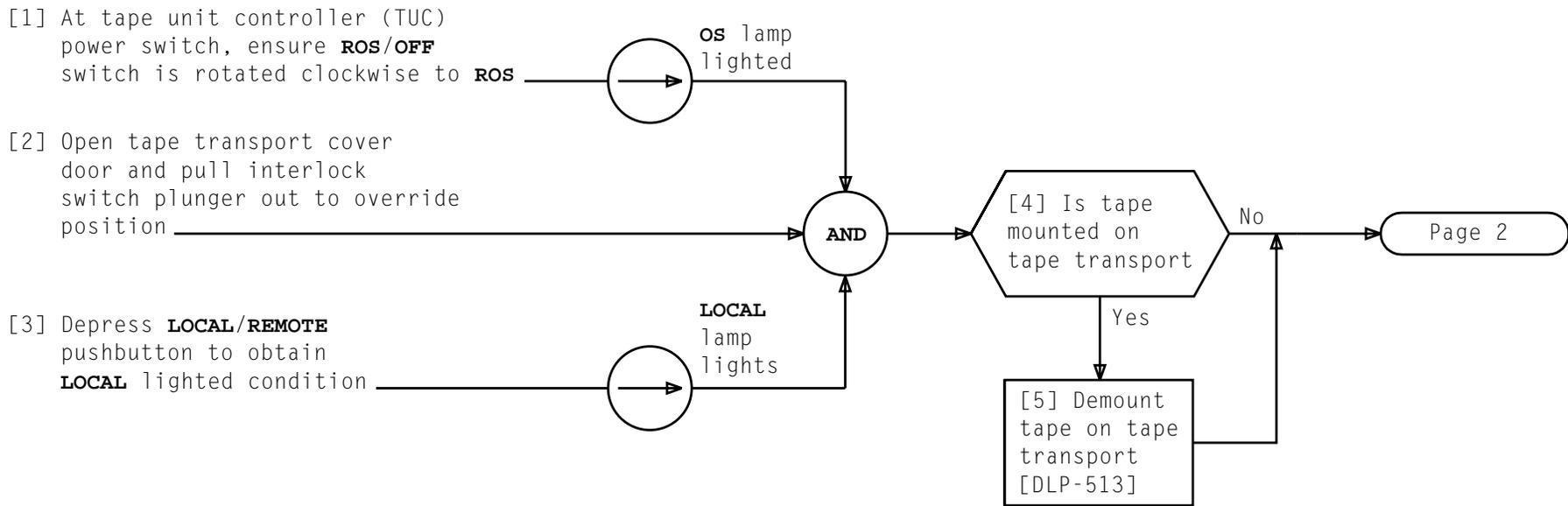


CLEAR READ, WRITE, OR ERASE HEAD FAULT



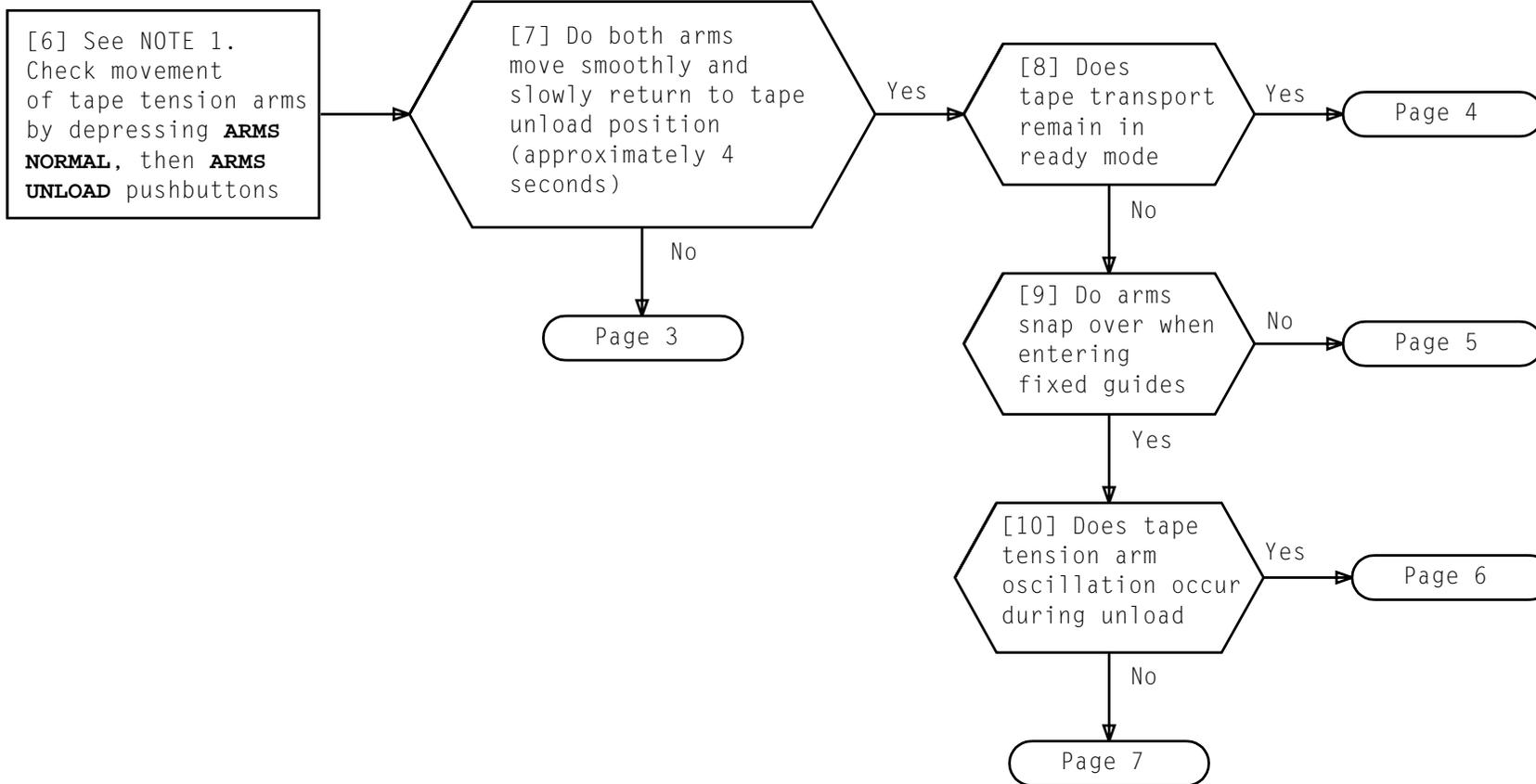
CLEAR READ, WRITE, OR ERASE HEAD FAULT

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CLEAR TAPE UNLOAD FAULT

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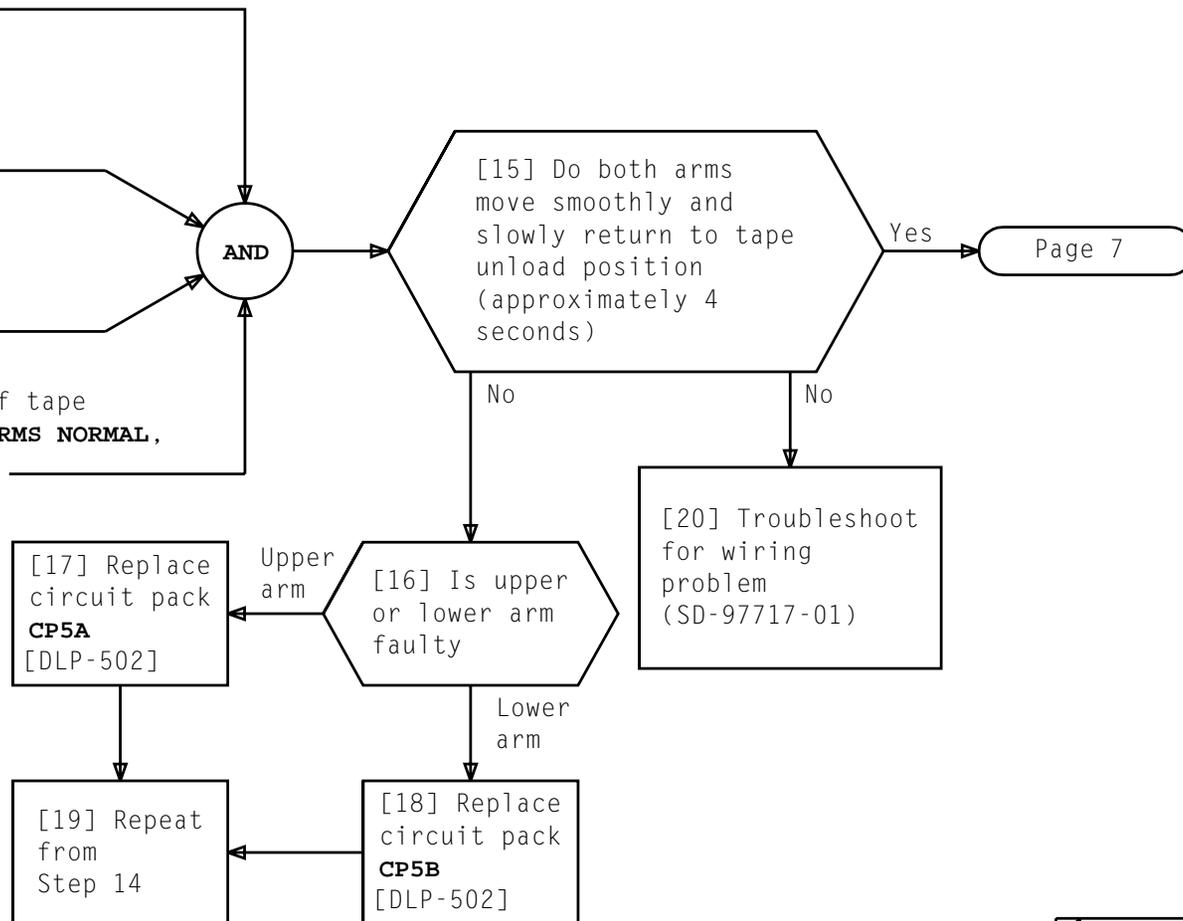
NOTE 1	
It may be necessary to prevent travel of tape tension arms to tape break position	
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[11] See WARNING 1. At DC-to-DC converter, open cover door and set **ON/OFF** switch to **OFF**

[12] At DC-to-DC converter fuse panel, check all fuses and replace as necessary

[13] At DC-to-DC converter, set **ON/OFF** switch to **ON** and close cover door

[14] See NOTE 2. Check movement of tape tension arms by depressing **ARMS NORMAL**, then **ARMS UNLOAD** pushbuttons



WARNING 1
When DC-to-DC converter is turned off, tape reel motors will spin uncontrolled

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CLEAR TAPE UNLOAD FAULT

[21] Replace circuit pack
CP8 [DLP-502]

[22] See NOTE 2. Check movement of
tape tension arms by depressing
ARMS NORMAL, then **ARMS
UNLOAD** pushbuttons

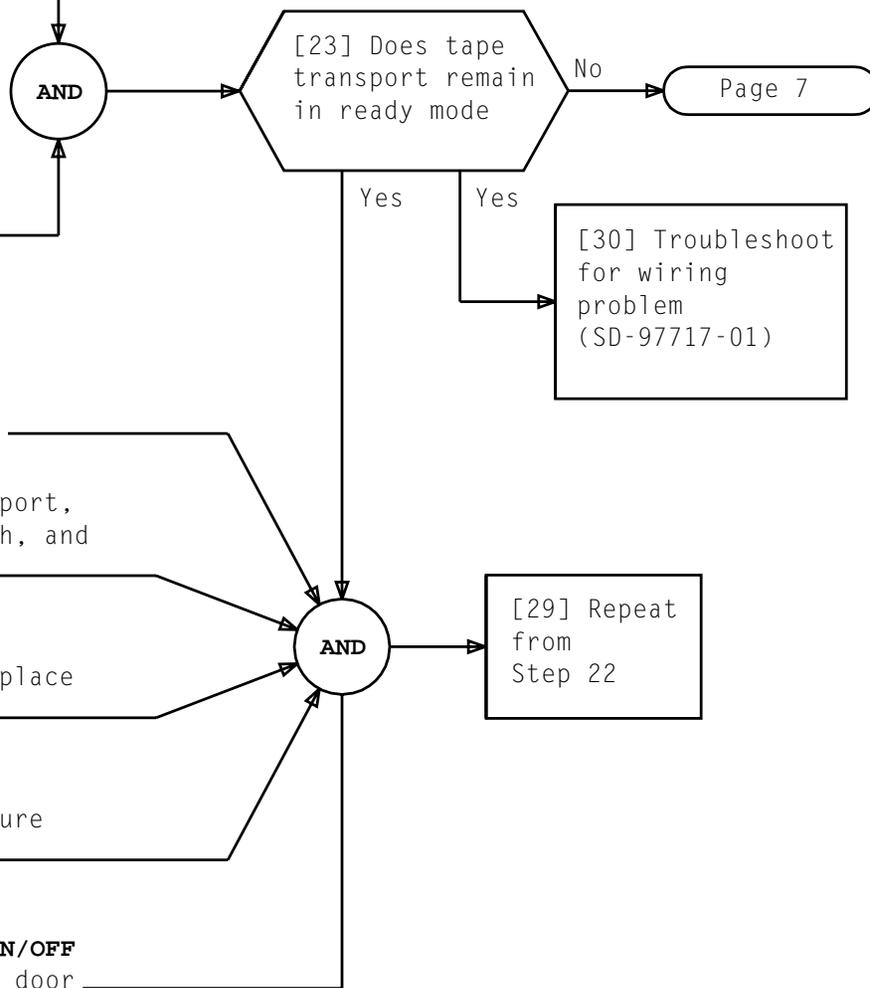
[24] See WARNING 2. At DC-to-DC
converter, open cover door
and set **ON/OFF** switch to **OFF**

[25] At lower right of tape transport,
loosen pawl fastener; unlatch, and
open casting door

[26] Inspect arm position sensor
assembly mask for damage. Replace
if required

[27] Gently close tape transport
casting door; latch, and secure
pawl fastener

[28] At DC-to-DC converter, set **ON/OFF**
switch to **ON** and close cover door



NOTE 2

It may be necessary to prevent travel of tape tension arms to tape break position

WARNING 2
When DC-to-DC converter is turned off, tape reel motors will spin uncontrolled

CLEAR TAPE UNLOAD FAULT

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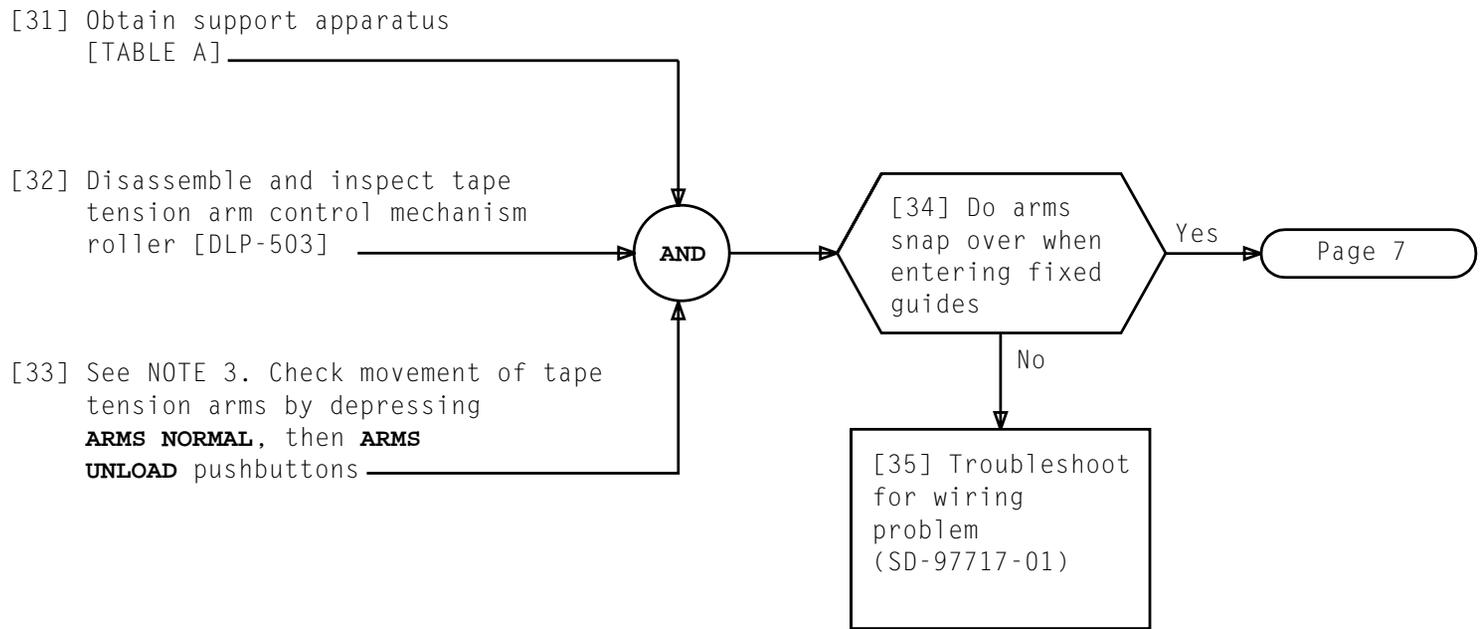
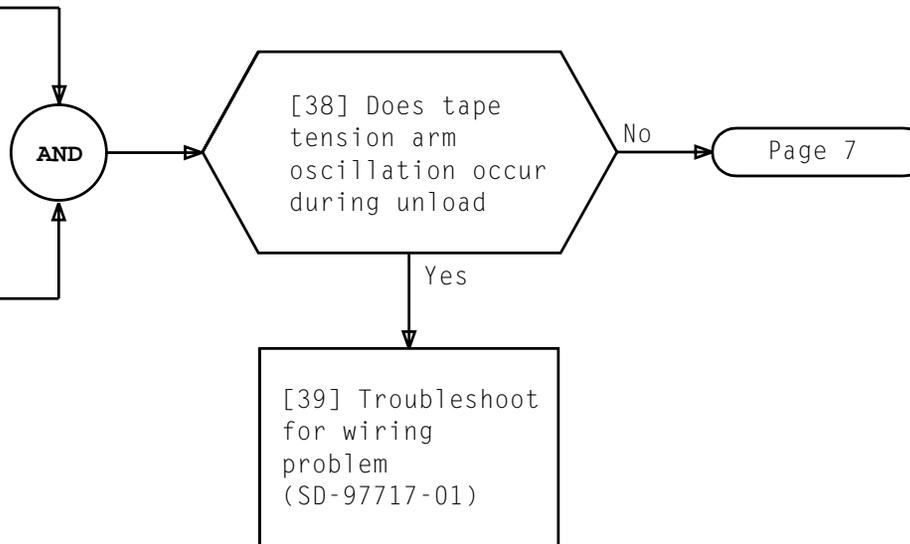


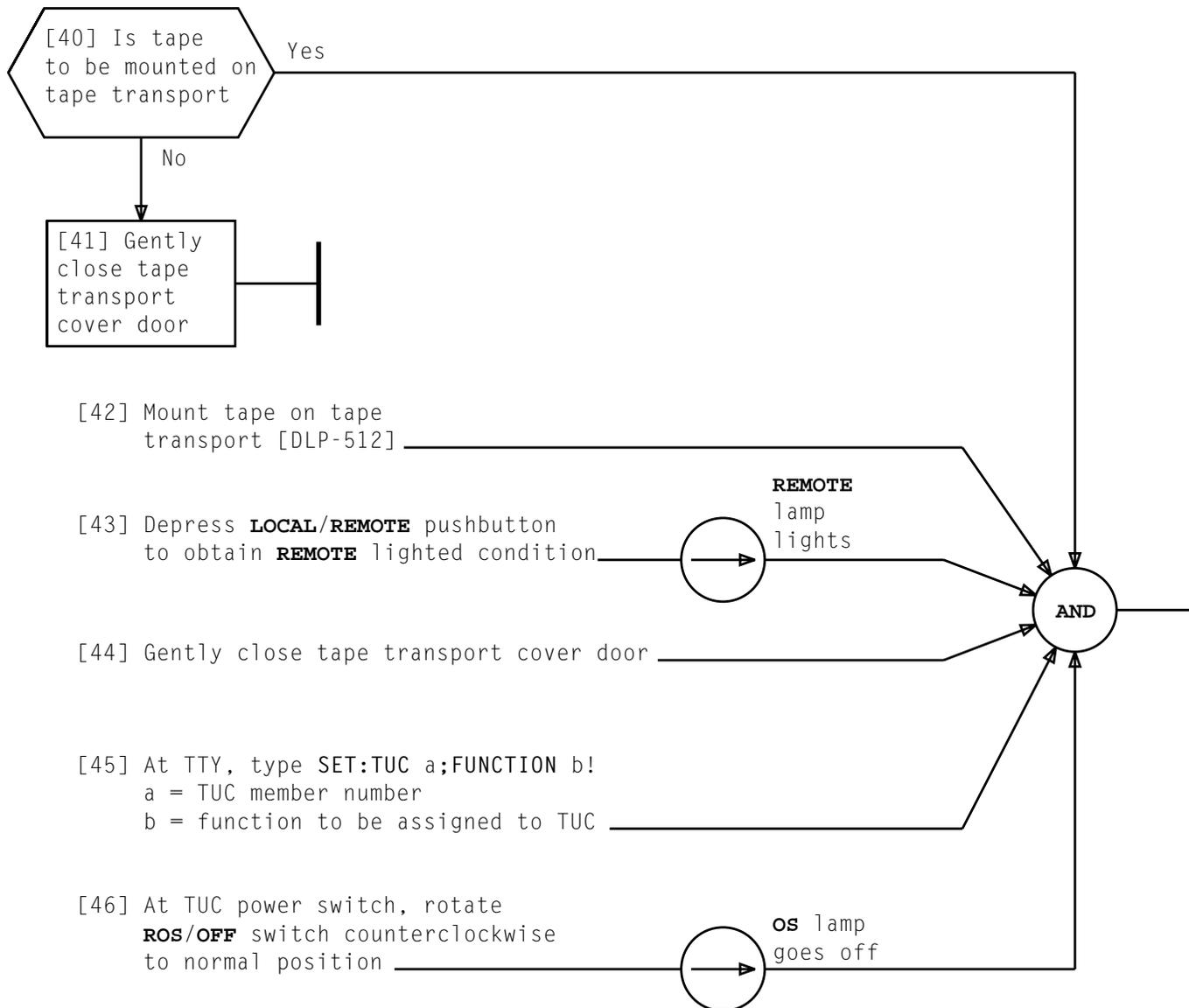
TABLE A	
COMMON NAME	PART NUMBER
Twill cloth	KS-2423
Cleaner solvent	KS-20406,L1

[36] Replace circuit pack **CP12**
[DLP-502]

[37] See NOTE 3. Check movement of tape
tension arms by depressing
ARMS NORMAL, then **ARMS**
UNLOAD pushbuttons



NOTE 3	
It may be necessary to prevent travel of tape tension arms to tape break position	
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CLEAR TAPE UNLOAD FAULT

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[1] At tape unit controller (TUC) power switch, ensure **ROS/OFF** switch is rotated clockwise to **ROS**

OS lamp lighted

[2] Open tape transport cover door and pull interlock switch plunger out to override position

[3] Depress **LOCAL/REMOTE** pushbutton to obtain **LOCAL** lighted condition

LOCAL lamp lights

AND

[4] Is tape mounted on tape transport

No

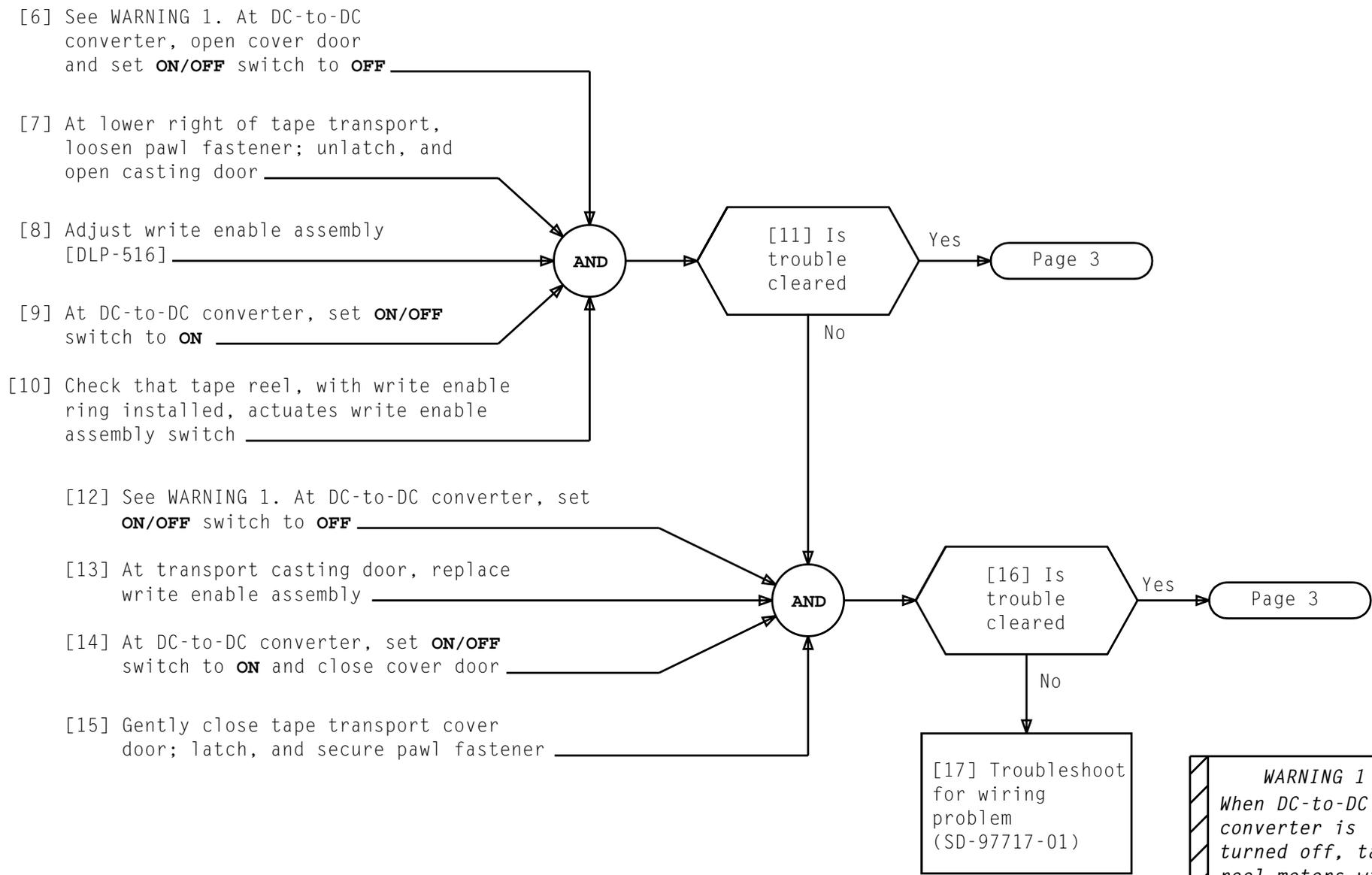
Yes

[5] Demount tape on tape transport [DLP-513]

Page 2

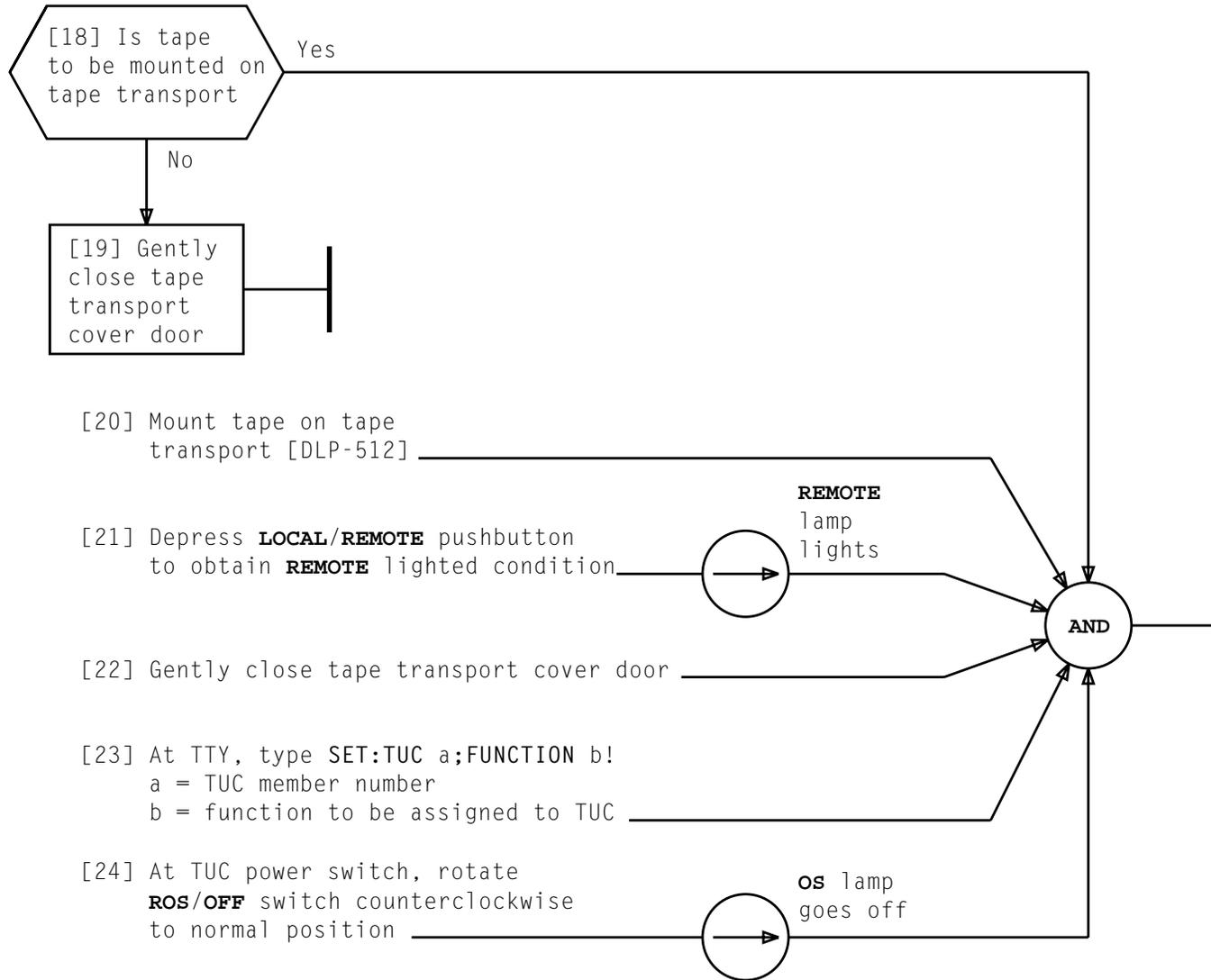
CLEAR WRITE ENABLE RING SENSING FAULT

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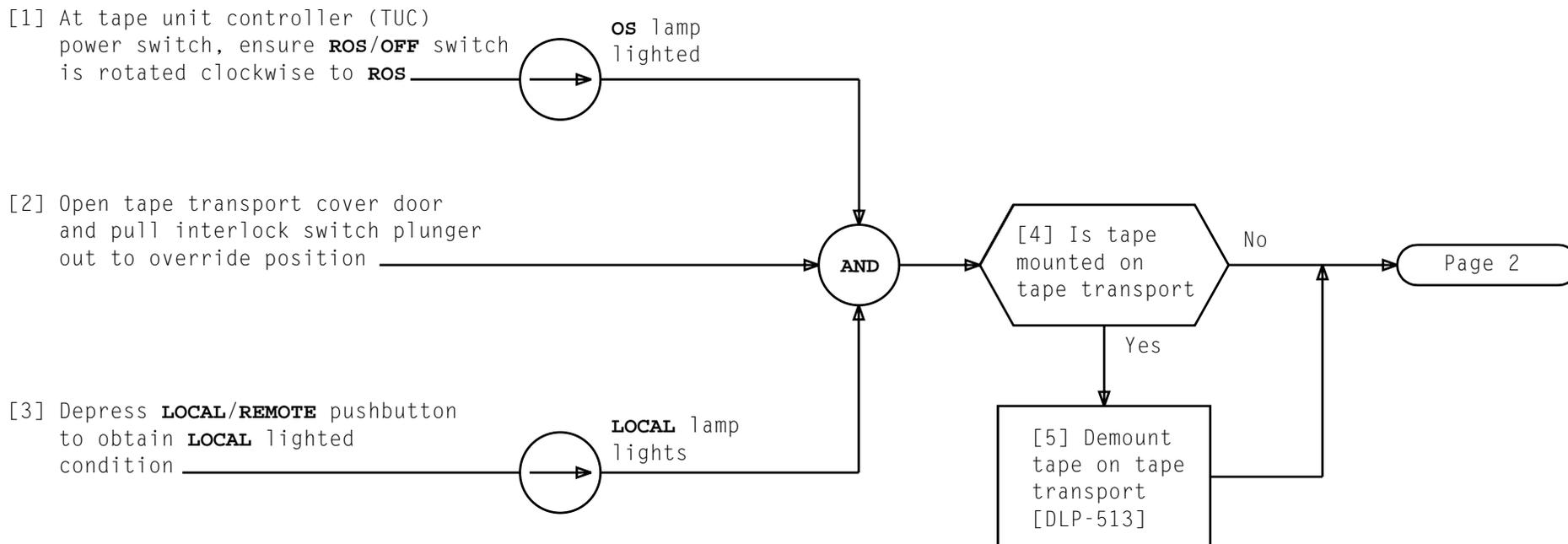
WARNING 1
 When DC-to-DC converter is turned off, tape reel motors will spin uncontrolled

CLEAR WRITE ENABLE RING SENSING FAULT



CLEAR WRITE ENABLE RING SENSING FAULT

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CLEAR MAGNETIC TAPE PACK PROBLEM

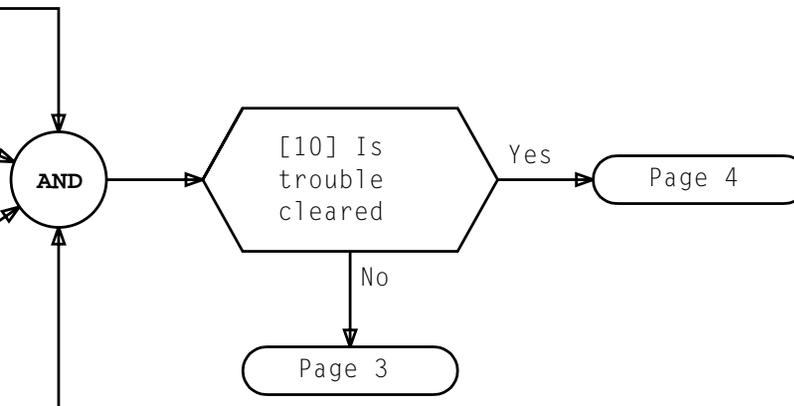
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[6] See WARNING 1. Ensure that all tape guides and tape tension arms are not bent or deformed, are normally secure, and rotate freely in both directions. Repair or replace damaged components if necessary

[7] Mount blank tape on tape transport [DLP-512]

[8] Observe tape reels during fast forward and rewind operation. Replace damaged or deformed tape reels if necessary

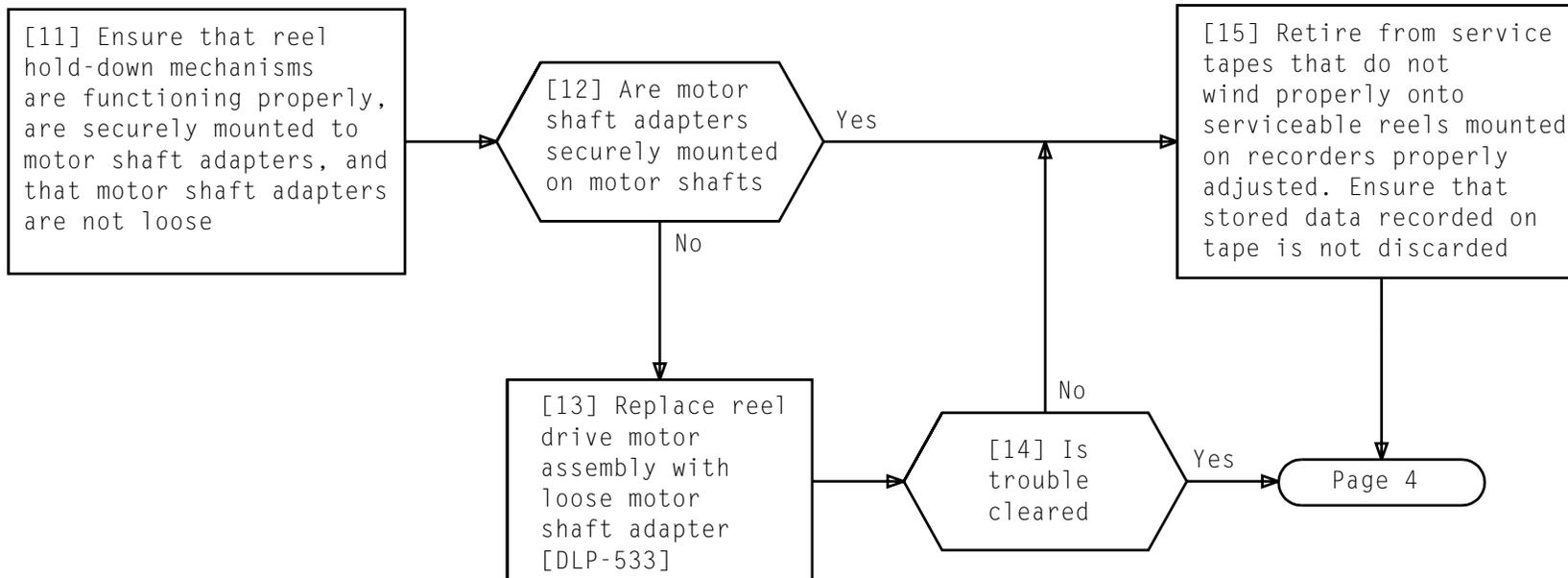
[9] Demount blank tape on tape transport [DLP-513]

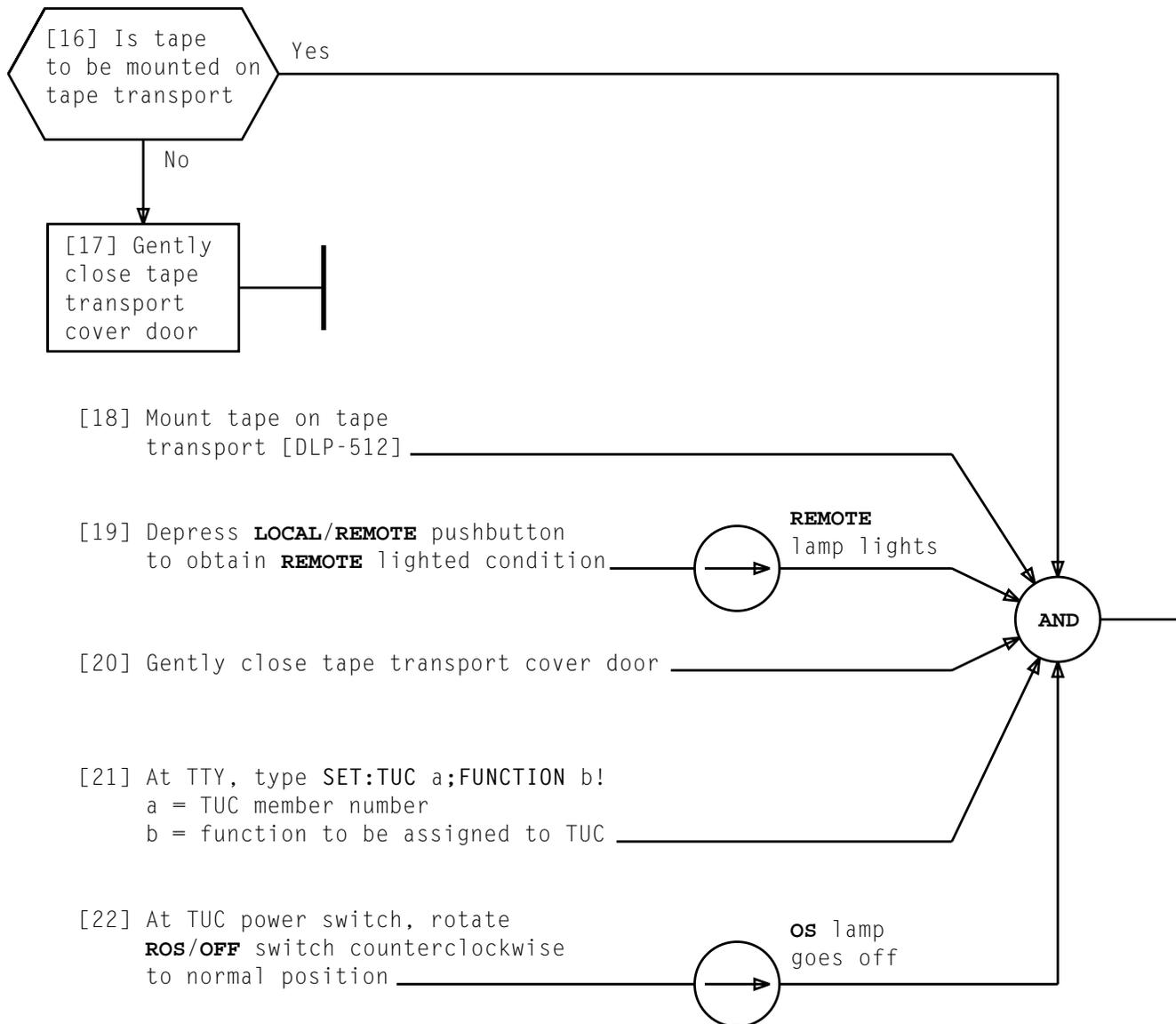


WARNING 1
 Do not touch surfaces that come in contact with tape. Body oil will contaminate polyester base magnetic tape

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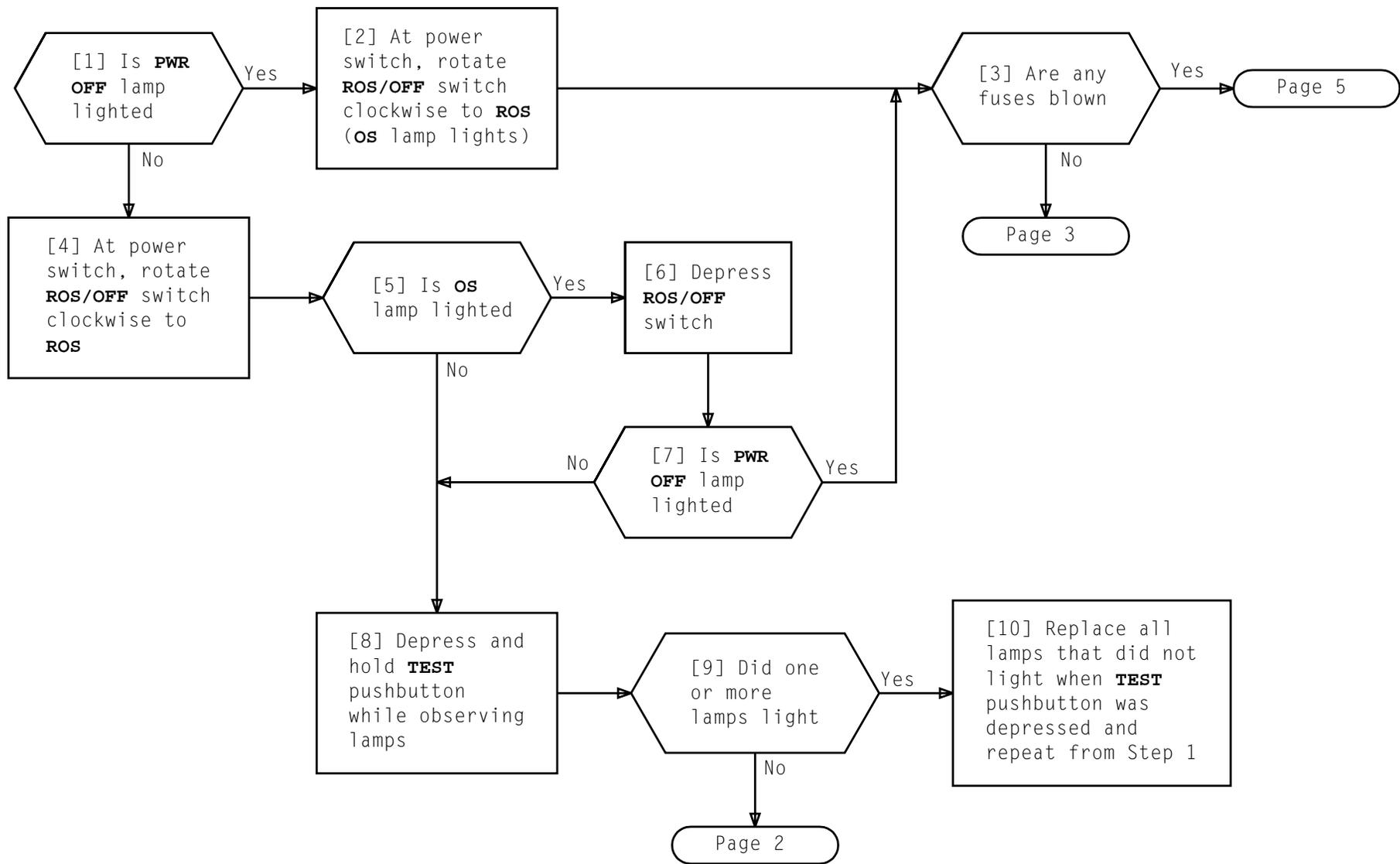
CLEAR MAGNETIC TAPE PACK PROBLEM





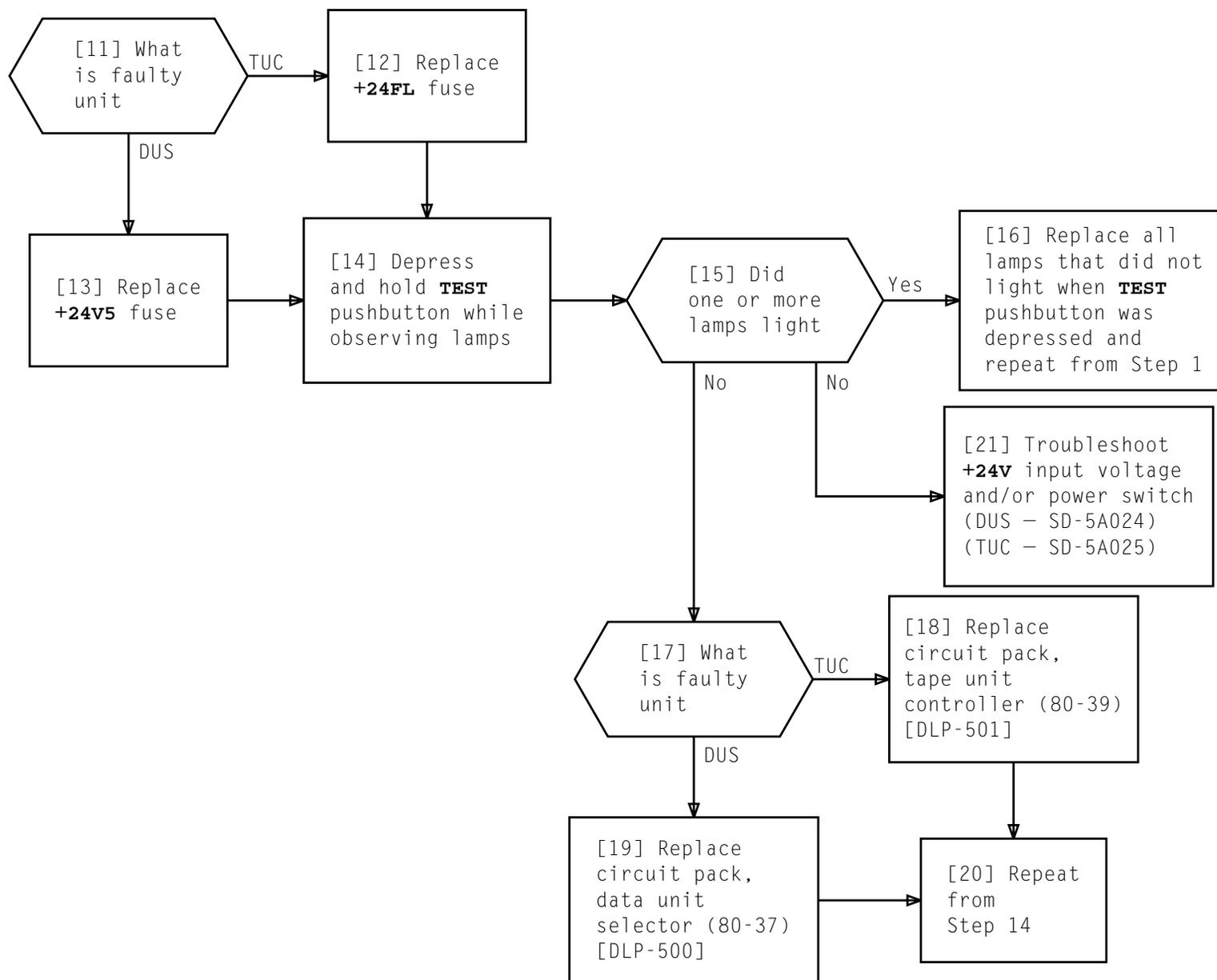
CLEAR MAGNETIC TAPE PACK PROBLEM

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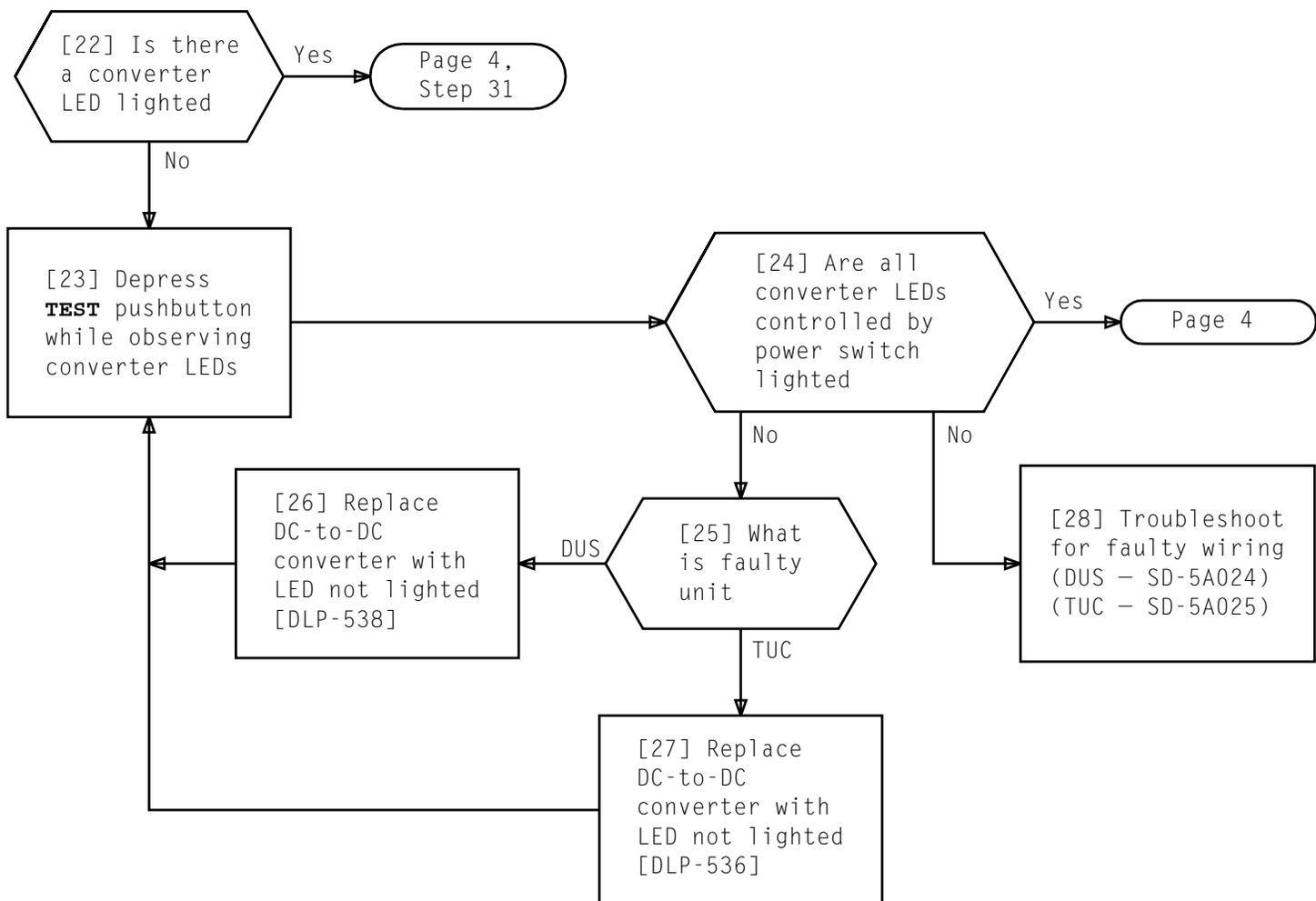
CLEAR POWER PROBLEM, DATA UNIT SELECTOR/TAPE UNIT CONTROLLER

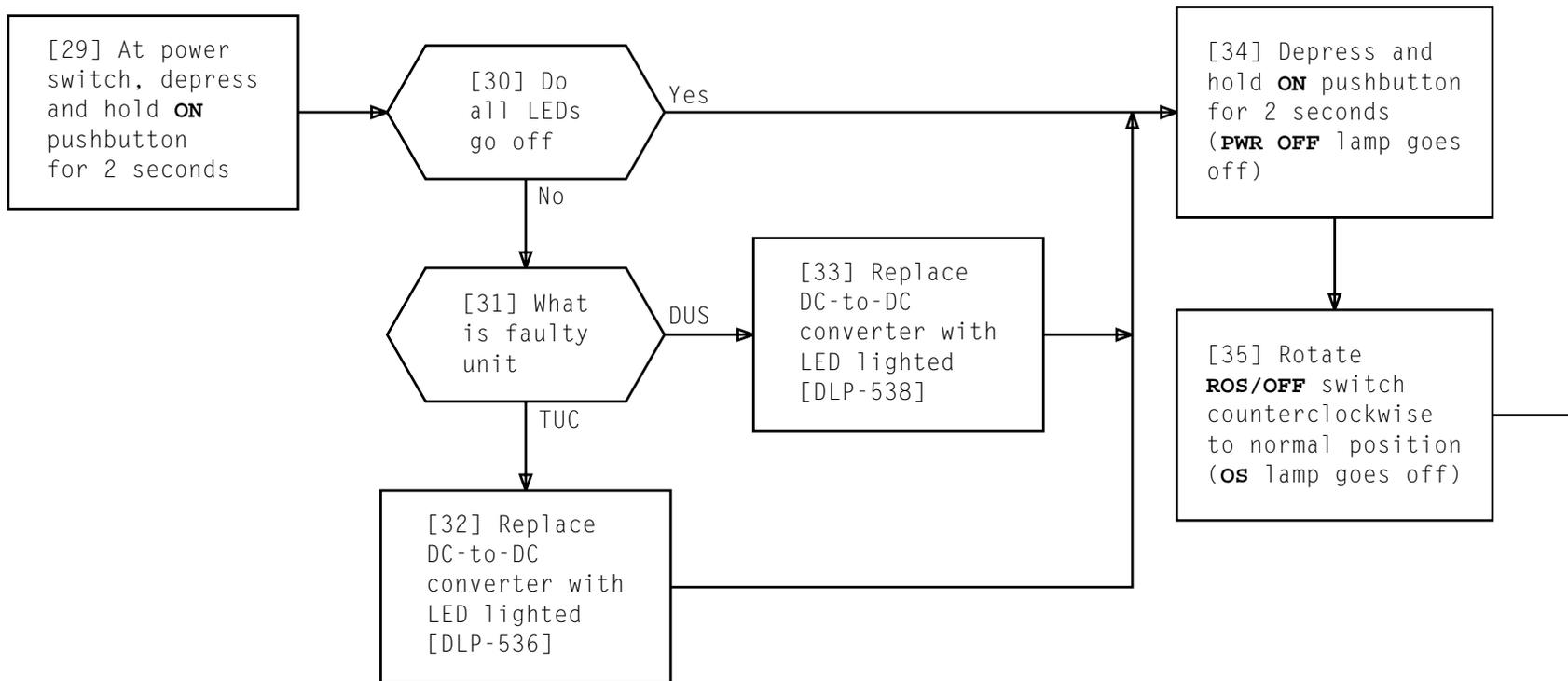
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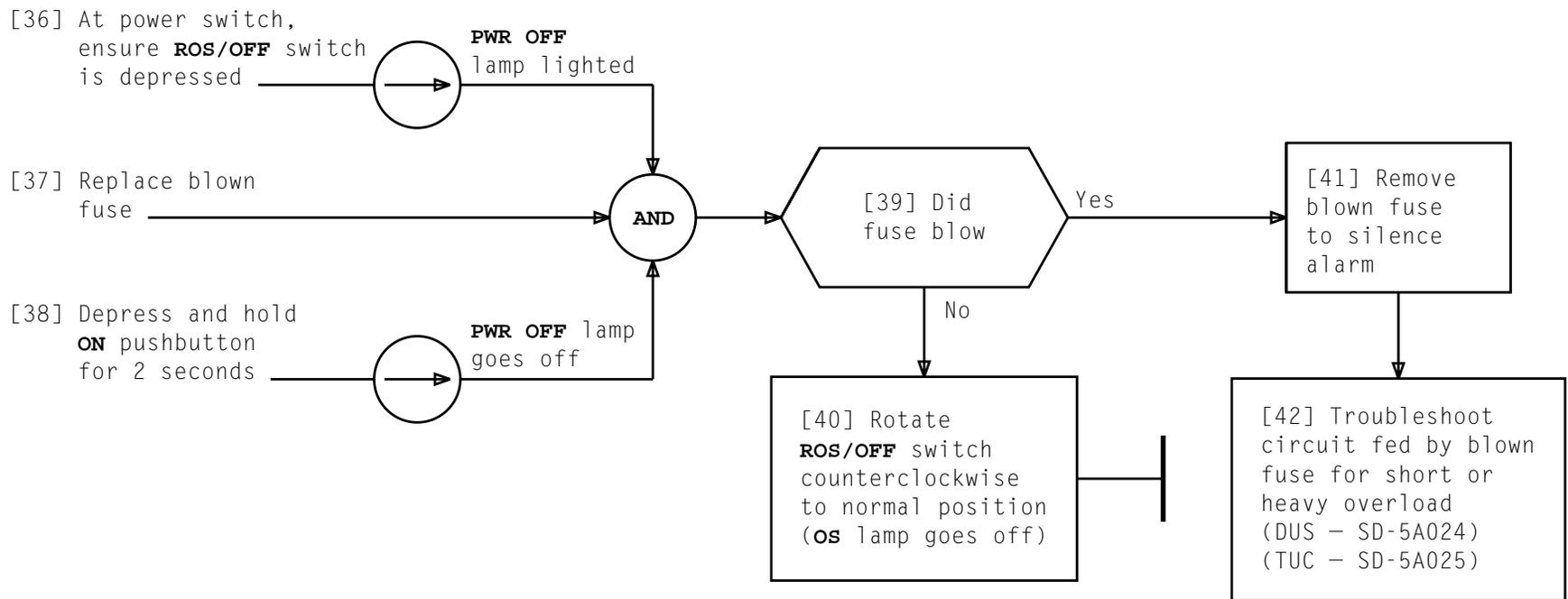


CLEAR POWER PROBLEM, DATA UNIT SELECTOR/TAPE UNIT CONTROLLER

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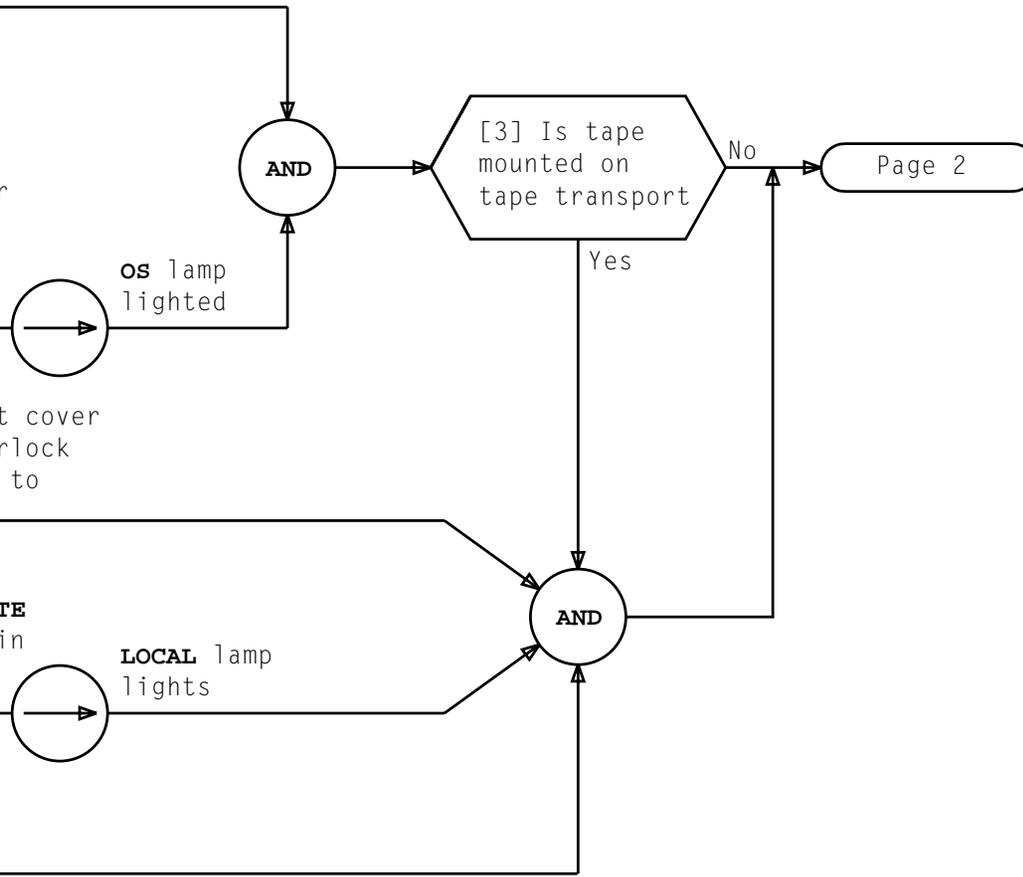
[1] Obtain 8000A fluke digital voltmeter or equivalent

[2] At tape unit controller (TUC) power switch, ensure **ROS/OFF** switch is rotated clockwise to **ROS**

[4] Open tape transport cover door and pull interlock switch plunger out to override position

[5] Depress **LOCAL/REMOTE** pushbutton to obtain **LOCAL** lighted condition

[6] Demount tape on tape transport [DLP-513]



CLEAR DC-TO-DC CONVERTER FAULT, TAPE TRANSPORT

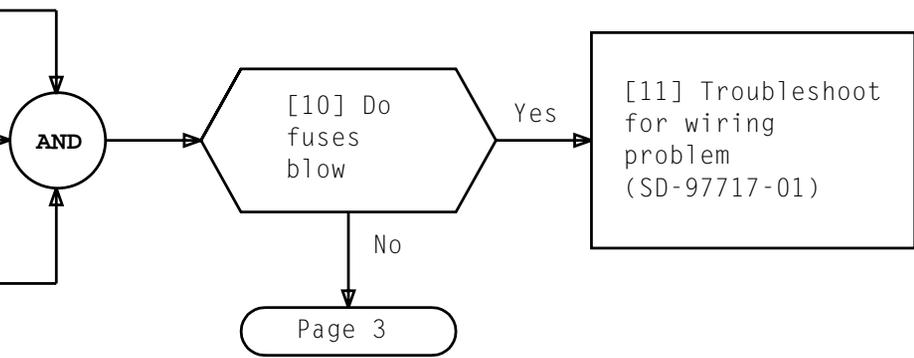
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At DC-to-DC converter:

[7] See WARNING 1. Open cover door and set **ON/OFF** switch to **OFF**

[8] Check fuses and replace any that have blown

[9] Set **ON/OFF** switch to **ON**



*WARNING 1
When DC-to-DC converter is turned off, tape reel motors will spin uncontrolled*

CLEAR DC-TO-DC CONVERTER FAULT, TAPE TRANSPORT

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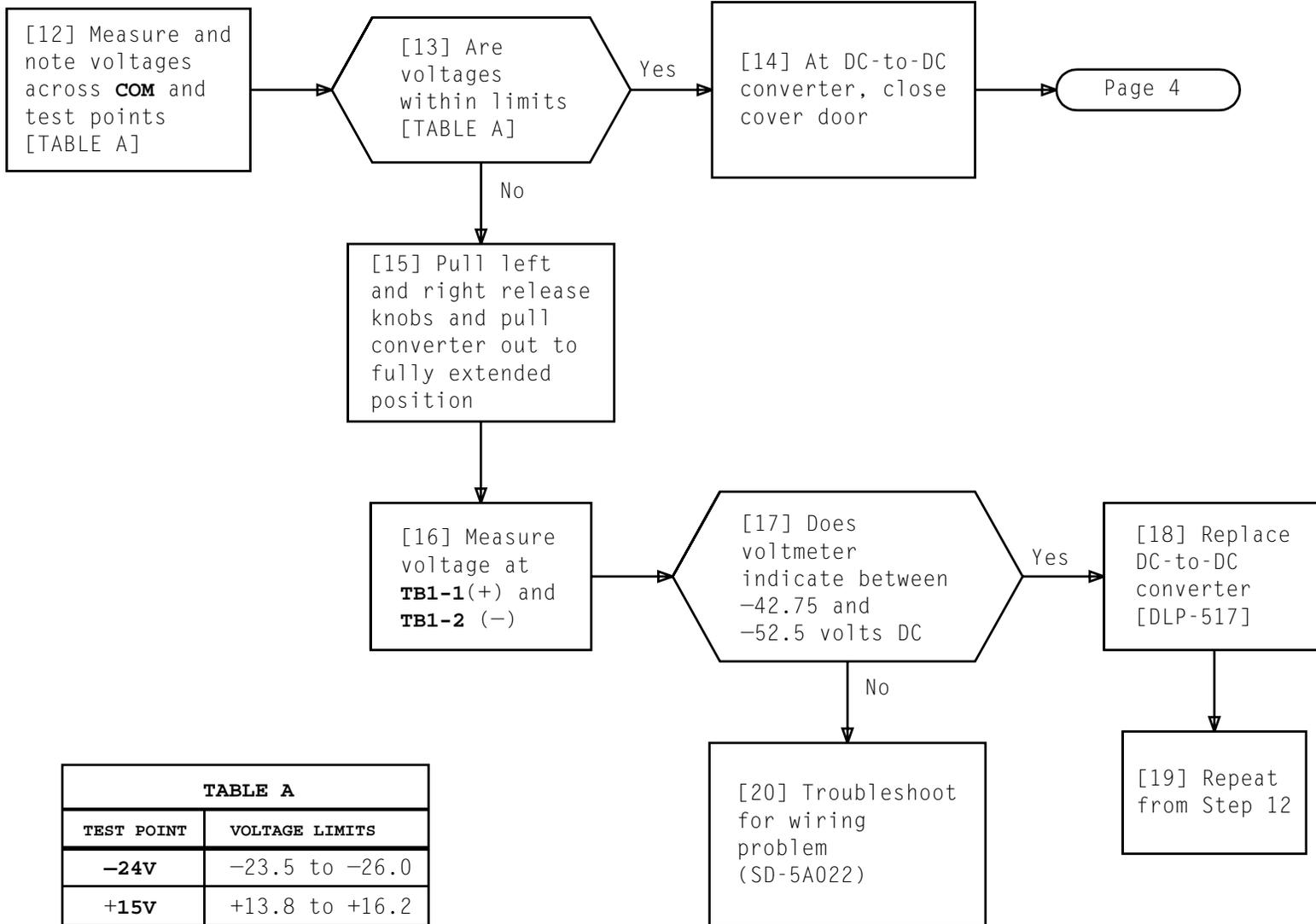
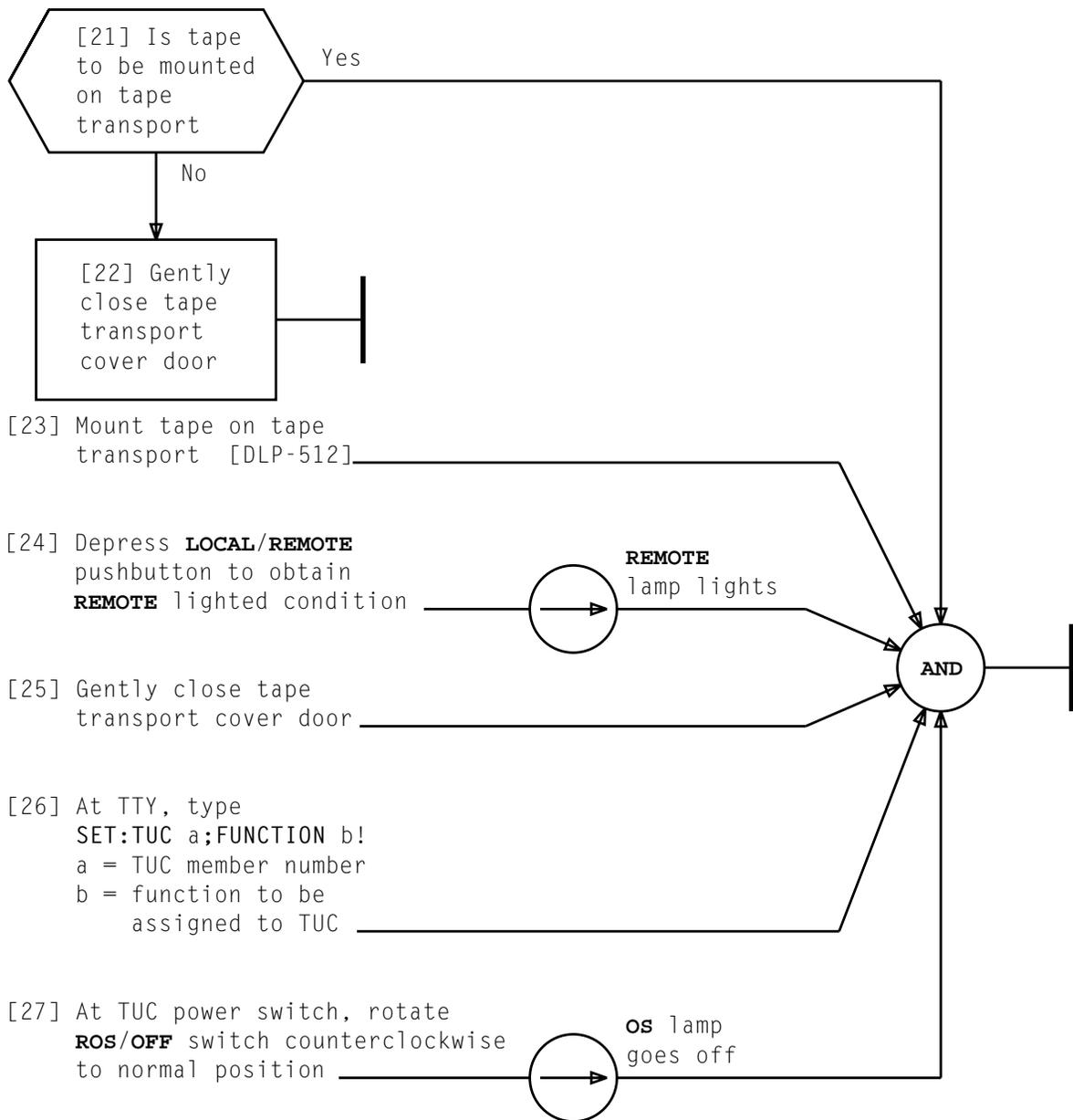


TABLE A	
TEST POINT	VOLTAGE LIMITS
-24V	-23.5 to -26.0
+15V	+13.8 to +16.2
+5V	+4.8 to +5.8
-15V	-13.8 to -16.2

CLEAR DC-TO-DC CONVERTER FAULT, TAPE TRANSPORT



CLEAR DC-TO-DC CONVERTER FAULT, TAPE TRANSPORT

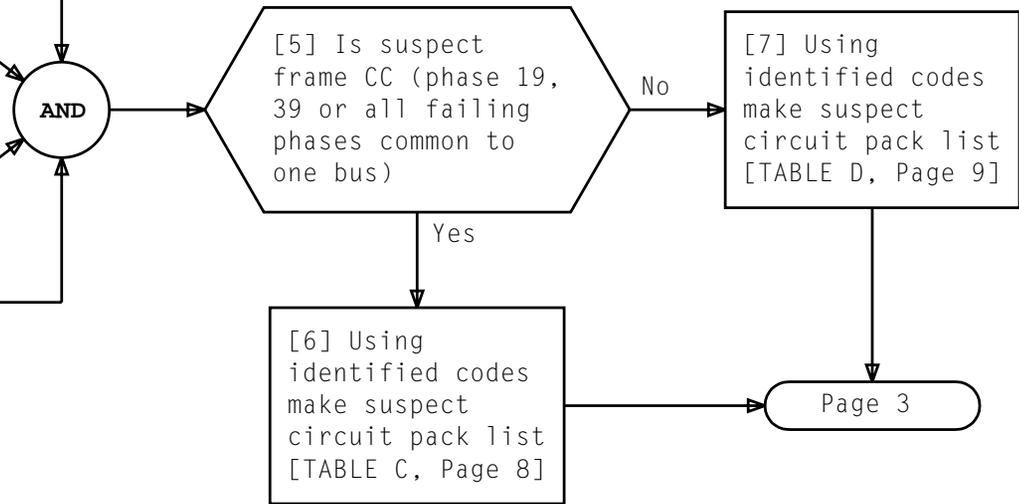
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[1] Using DGN:AUB output message [FIG. 1], identify failing phases and suspect auxiliary units (AU) [TABLE A]

[2] Convert mismatch data of first failing test to binary

[3] Using failing phase, test numbers, and set bits (set = 1), identify suspect circuit pack codes [TABLE B, Pages 5, 6, and 7]

[4] At TTY, type RMV:AUB a!
a = failing bus number



PHASE NUMBER	SUSPECT UNIT	AUB NUMBER
11	FS 0	0
12	FS 2	0
17	DUS 0	0
18	DUS 2	0
19	All even numbered AUs	0
31	FS 1	1
32	FS 3	1
37	DUS 1	1
38	DUS 3	1
39	All odd numbered AUs	1

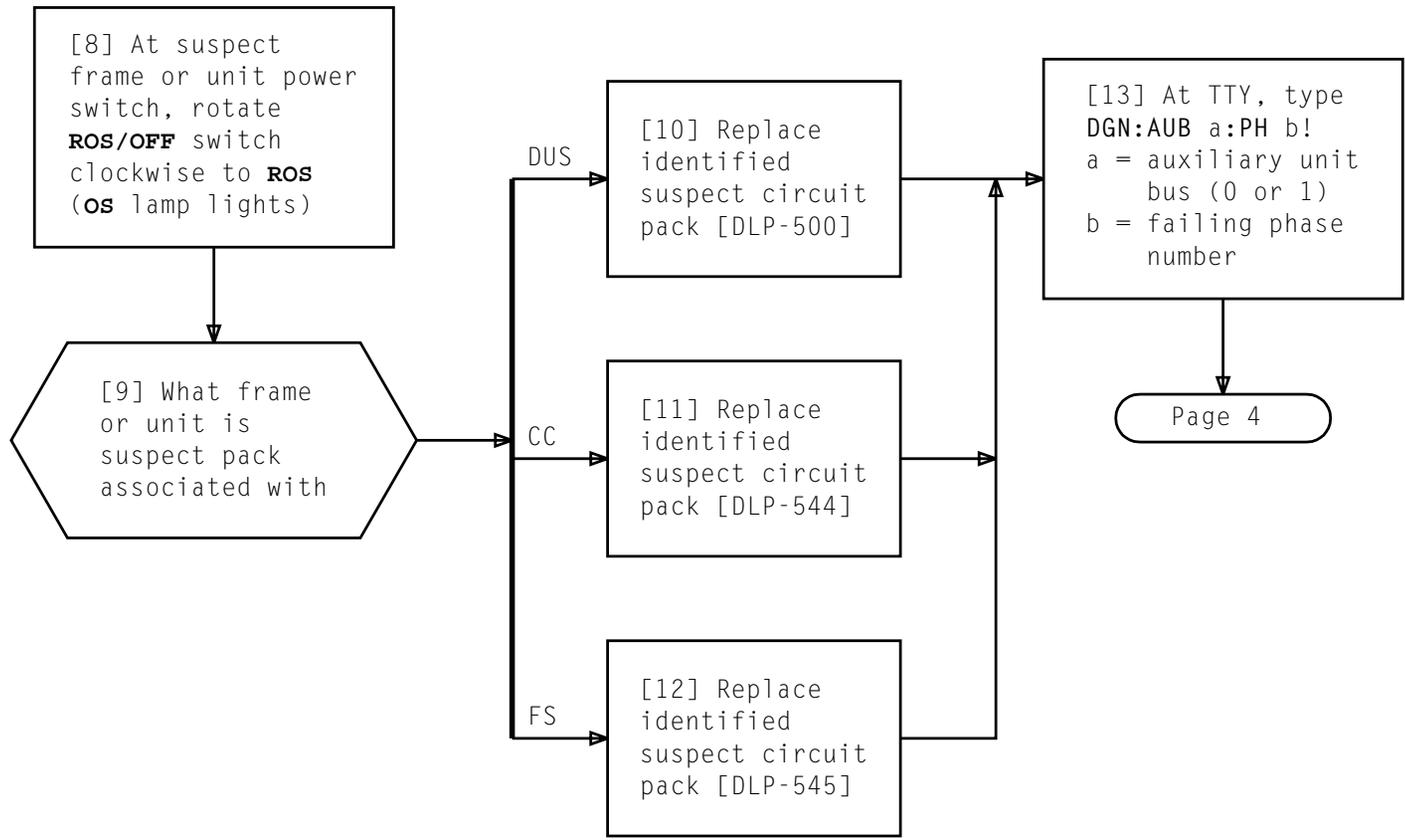
```

DGN:AUB a PH b c d
TEST     MISMATCH SUPPLEMENTARY DATA
ee       ffffffff  gggggggg    gggggggg

a = Bus number (0 or 1)
b = Phase number
c = Diagnostic results
d = Optional field that appears when results
   are not ATP
e = Failing test number
f = Bits that are in error
g = Supplemental data concerning failing test

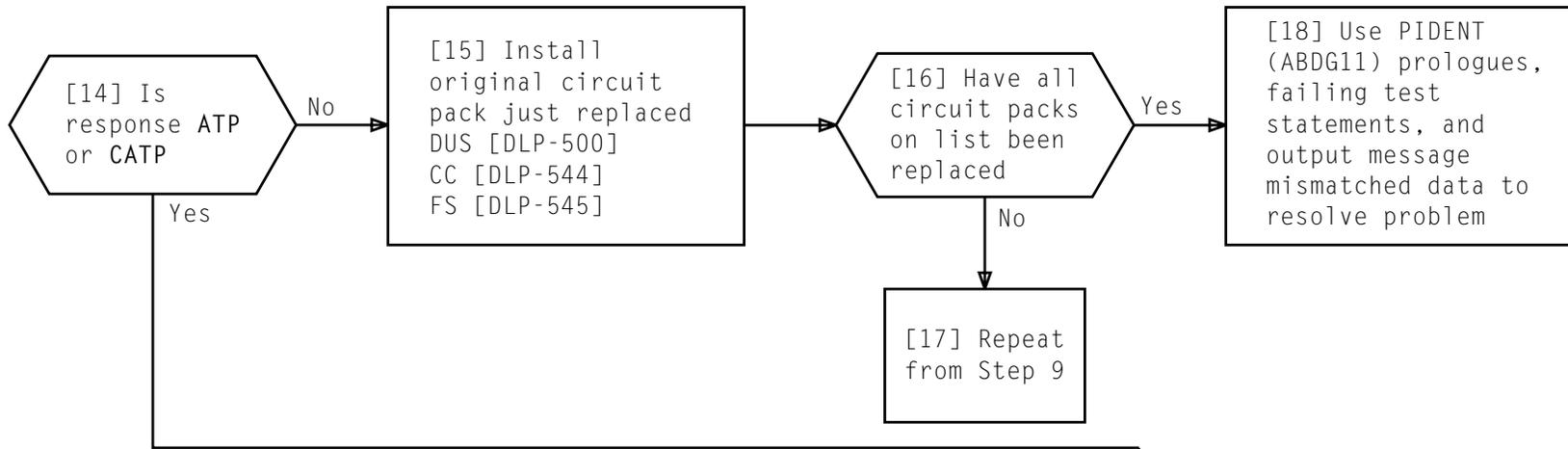
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FIG. 1 - Explanation of Output Format for Raw Data Diagnostics



CLEAR AUXILIARY UNIT BUS (AUB) DIAGNOSTIC FAILURE

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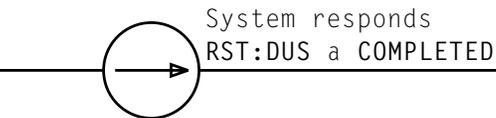


At TTY:

[19] Type RST:AUB a!
a = AUB number (0 or 1)



[20] Type RST:DUS a!
a = 0, 2 if AUB 0 was restored; 1, 3 if AUB 1 was restored



[21] Type RST:FS a!
a = 0, 2 if AUB 0 was restored; 1, 3 if AUB 1 was restored

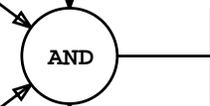
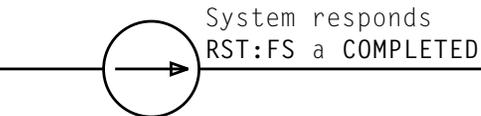


TABLE B CONVERSION FROM TEST NUMBER TO CIRCUIT PACK CODE																			
TEST NUMBER	MISMATCH BIT NUMBER					BUS GROUP	TEST NUMBER	MISMATCH BIT NUMBER					BUS GROUP	TEST NUMBER	MISMATCH BIT NUMBER				BUS GROUP
	21	20	19	18	6			21	20	19	18	6			7	17	22	23	
000	C	ABC	A	A	—	ADDRESS	029	ABC	B	A	A	—	ADDRESS	057	—	B	DEFG	G	WRITE
001	↓	↓	↓	↓	↓	↓	030	↓	↓	↓	↓	↓	↓	064	↓	↓	↓	↓	↓
002	↓	↓	↓	↓	↓	↓	031	↓	↓	↓	↓	↓	↓	065	↓	↓	↓	↓	↓
003	↓	↓	↓	↓	↓	↓	032	↓	↓	↓	↓	↓	↓	072	↓	↓	↓	↓	↓
004	↓	↓	↓	↓	↓	↓	033	↓	↓	↓	↓	↓	↓	073	↓	↓	↓	↓	↓
005	↓	↓	↓	↓	↓	↓	034	↓	↓	↓	↓	↓	↓	080	↓	↓	↓	↓	↓
006	C	↓	↓	↓	↓	↓	035	↓	↓	↓	↓	↓	↓	081	↓	↓	↓	↓	↓
007	B	↓	↓	↓	↓	↓	036	ABC	B	↓	↓	↓	↓	082	↓	↓	↓	↓	↓
008	↓	↓	↓	↓	↓	↓	037	BC	A	↓	↓	↓	↓	083	↓	↓	↓	↓	↓
009	↓	↓	↓	↓	↓	↓	038	↓	↓	↓	↓	↓	↓	084	↓	↓	↓	↓	↓
010	↓	↓	↓	↓	↓	↓	039	BC	↓	↓	↓	↓	↓	091	↓	↓	↓	↓	↓
011	↓	↓	↓	↓	↓	↓	040	ABC	A	↓	↓	↓	↓	092	↓	↓	↓	↓	↓
012	↓	↓	↓	↓	↓	↓	041	AC	BC	↓	↓	↓	↓	099	↓	↓	↓	↓	↓
013	↓	↓	↓	↓	↓	↓	042	↓	↓	↓	↓	↓	↓	100	↓	↓	↓	↓	↓
014	↓	↓	↓	↓	↓	↓	043	↓	↓	↓	↓	↓	↓	107	↓	↓	↓	↓	↓
015	B	ABC	↓	↓	↓	↓	044	↓	↓	↓	↓	↓	↓	108	↓	↓	↓	↓	↓
016	A	BC	↓	↓	↓	↓	045	↓	↓	↓	↓	↓	↓	109	↓	↓	↓	↓	↓
017	ABC	ABC	↓	↓	↓	↓	046	↓	↓	↓	↓	↓	↓	110	↓	↓	↓	↓	↓
018	↓	↓	↓	↓	↓	↓	047	↓	↓	↓	↓	↓	↓	111	↓	↓	↓	↓	↓
019	↓	↓	↓	↓	↓	↓	048	AC	↓	↓	↓	↓	↓	118	↓	↓	↓	↓	↓
020	↓	ABC	↓	↓	↓	↓	049	AB	↓	↓	↓	↓	↓	119	↓	↓	↓	↓	↓
021	↓	C	↓	↓	↓	↓	050	↓	↓	↓	↓	↓	↓	126	↓	↓	↓	↓	↓
022	↓	↓	↓	↓	↓	↓	051	↓	↓	↓	↓	↓	↓	127	↓	↓	↓	↓	↓
023	↓	↓	↓	↓	↓	↓	052	↓	↓	↓	↓	↓	↓	134	↓	↓	↓	↓	↓
024	↓	↓	↓	↓	↓	↓	053	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
025	↓	↓	↓	↓	↓	↓	054	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
026	↓	↓	↓	↓	↓	↓	055	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
027	↓	↓	↓	↓	↓	↓	056	AB	BC	A	A	A	ADDRESS	↓	↓	↓	↓	↓	↓
028	ABC	C	A	A	—	ADDRESS								↓	↓	↓	↓	↓	↓

(TABLE B continued on Page 6)

CLEAR AUXILIARY UNIT BUS (AUB) DIAGNOSTIC FAILURE

TABLE B (Contd)														
CONVERSION FROM TEST NUMBER TO CIRCUIT PACK CODE														
TEST NUMBER	MISMATCH BIT NUMBER				BUS GROUP	ODD TEST NUMBER	MISMATCH BIT NUMBER			BUS GROUP	EVEN TEST NUMBER	MISMATCH BIT NUMBER		BUS GROUP
	7	17	22	23			23-16	15-8	7-0			21	20	
135	—	B	DEFG	D	WRITE	189	J	K	L	REPLY	190	H	H	REPLY
136	↓	↓	↓	D	↓	191	↓	↓	↓	↓	192	↓	↓	↓
137	↓	↓	DEFG	DEFG	↓	193	↓	↓	↓	↓	194	↓	↓	↓
138	↓	↓	G	↓	↓	195	↓	↓	↓	↓	196	↓	↓	↓
↓	↓	↓	↓	↓	↓	197	↓	↓	↓	↓	198	↓	↓	↓
145	↓	↓	G	↓	↓	199	↓	↓	↓	↓	200	↓	↓	↓
146	↓	↓	F	↓	↓	201	↓	↓	↓	↓	202	↓	↓	↓
↓	↓	↓	↓	↓	↓	203	↓	↓	↓	↓	204	↓	↓	↓
153	↓	↓	F	↓	↓	205	↓	↓	↓	↓	206	↓	↓	↓
154	↓	↓	E	↓	↓	207	↓	↓	↓	↓	208	↓	↓	↓
↓	↓	↓	↓	↓	↓	209	↓	↓	↓	↓	210	↓	↓	↓
161	↓	↓	E	↓	↓	211	↓	↓	↓	↓	212	↓	↓	↓
162	↓	↓	D	↓	↓	213	↓	↓	↓	↓	214	↓	↓	↓
163	↓	↓	D	↓	↓	215	↓	↓	↓	↓	216	↓	↓	↓
164	—	↓	DEFG	DEFG	↓	217	↓	↓	↓	↓	218	↓	↓	↓
165	D	↓	↓	G	↓	219	↓	↓	↓	↓	220	↓	↓	↓
↓	↓	↓	↓	↓	↓	221	↓	↓	↓	↓	222	↓	↓	↓
172	↓	↓	↓	G	↓	223	↓	↓	↓	↓	224	↓	↓	↓
173	↓	↓	↓	F	↓	225	↓	↓	↓	↓	226	↓	↓	↓
↓	↓	↓	↓	↓	↓	227	↓	↓	↓	↓	228	↓	↓	↓
180	↓	↓	↓	F	↓	229	↓	↓	↓	↓	230	↓	↓	↓
181	↓	↓	↓	E	↓	231	↓	↓	↓	↓	232	↓	↓	↓
↓	↓	↓	↓	↓	↓	233	↓	↓	↓	↓	234	↓	↓	↓
188	D	B	DEFG	E	WRITE	235	↓	↓	↓	↓	236	↓	↓	↓
						237	↓	↓	↓	↓	238	↓	↓	↓
						239	↓	↓	↓	↓	240	↓	↓	↓
						241	↓	↓	↓	↓	242	↓	↓	↓
						243	↓	↓	↓	↓	244	↓	↓	↓
						245	J	K	L	REPLY	246	H	H	REPLY

(TABLE B continued on Page 7)

CLEAR AUXILIARY UNIT BUS (AUB) DIAGNOSTIC FAILURE

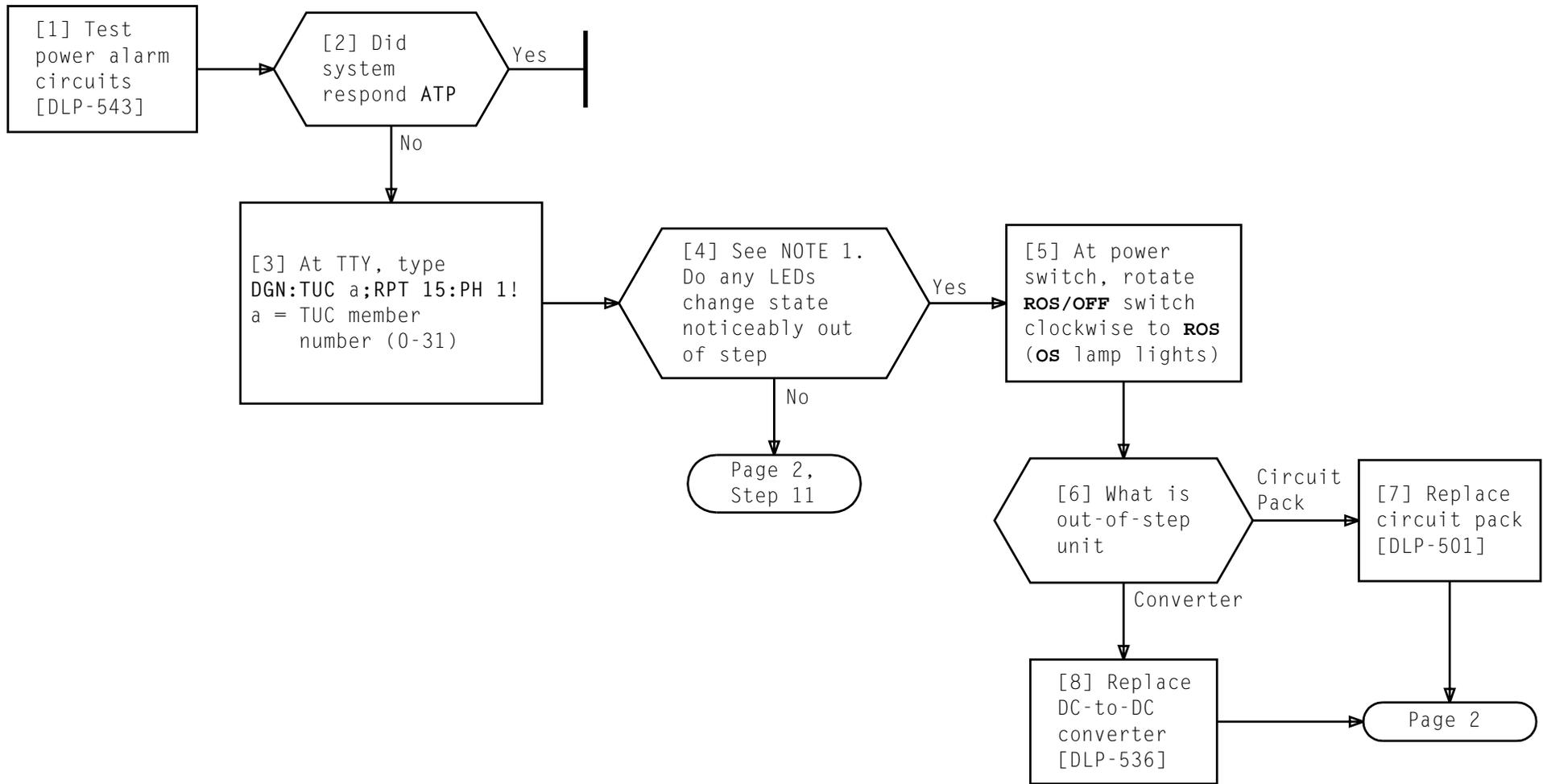
TABLE B (Contd)
CONVERSION FROM TEST NUMBER TO CIRCUIT PACK CODE

TEST NUMBER	MISMATCH BIT NUMBER	BUS GROUP	ODD TEST NUMBER	MISMATCH BIT NUMBER			BUS GROUP	EVEN TEST NUMBER	MISMATCH BIT NUMBER	BUS GROUP	TEST NUMBER	MISMATCH BIT NUMBER	BUS GROUP
	0			24-22	0								
				21-16	15-8	7-0							
247	H	CONTROL	261	V	U	T	STORE ADDRESS	262	VW	STORE ADDRESS	313	*XY	CONTROL
248	H	↓	263	↓	↓	↓	↓	264	↓	↓	314	↓	↓
249	M	↓	265	↓	↓	↓	↓	266	↓	↓	315	↓	↓
250	M	↓	267	↓	↓	↓	↓	268	↓	↓	316	↓	↓
251	NPQR	↓	269	↓	↓	↓	↓	270	↓	↓	317	*XY	CONTROL
252	↓	↓	271	↓	↓	↓	↓	272	↓	↓	318	D	WRITE
253	↓	↓	273	↓	↓	↓	↓	274	↓	↓	319	D	WRITE
254	↓	↓	275	↓	↓	↓	↓	276	↓	↓	320	D	WRITE
255	↓	↓	277	↓	↓	↓	↓	278	↓	↓			
256	↓	↓	279	↓	↓	↓	↓	280	↓	↓			
257	↓	↓	281	↓	↓	↓	↓	282	↓	↓			
258	NPQR	↓	283	↓	↓	↓	↓	284	↓	↓			
259	S	↓	285	↓	↓	↓	↓	286	↓	↓			
260	NPQR	CONTROL	287	↓	↓	↓	↓	288	↓	↓			
			289	↓	↓	↓	↓	290	↓	↓			
			291	↓	↓	↓	↓	292	↓	↓			
			293	↓	↓	↓	↓	294	↓	↓			
			295	↓	↓	↓	↓	296	↓	↓			
			297	↓	↓	↓	↓	298	↓	↓			
			299	↓	↓	↓	↓	300	↓	↓			
			301	↓	↓	↓	↓	302	↓	↓			
			303	↓	↓	↓	↓	304	↓	↓			
			305	↓	↓	↓	↓	306	↓	↓			
			307	↓	↓	↓	↓	308	↓	↓			
			309	↓	↓	↓	↓	310	↓	↓			
			311	V	U	T	STORE ADDRESS	312	VW	STORE ADDRESS			

* X IS FOR BUS 0
Y IS FOR BUS 1

TABLE C CONVERSION FROM CIRCUIT PACK CODE TO CC CIRCUIT PACK LOCATION							
CIRCUIT PACK CODE	CIRCUIT PACK LOCATION	BUS	CIRCUIT PACK TYPE	CIRCUIT PACK CODE	CIRCUIT PACK LOCATION	BUS	CIRCUIT PACK TYPE
	CC				CC		
A	030-34	0	FC11	L	030-25	0	FC28
	030-55	1	FC11		030-47	1	FC28
B	030-33	0	FC11	M	030-23	0	FC28
	030-54	1	FC11		030-45	1	FC28
C	030-32	0	FC11	N	030-30	-	FC28
	030-53	1	FC11		030-30	-	FC28
D	030-16	0	FC11	Q	030-57	-	FC28
	030-40	1	FC11		030-57	-	FC28
E	030-15	0	FC11	S	030-47	-	FC28
	030-39	1	FC11		030-21	0	FC28
F	030-14	0	FC11	T	030-43	1	FC28
	030-38	1	FC11		030-21	0	FC28
G	030-13	0	FC11	U	030-43	1	FC28
	030-37	1	FC11		030-23	0	FC28
H	030-28	0	FC28	V	030-45	1	FC28
	030-49	1	FC28		030-23	0	FC28
J	030-27	0	FC28	W	030-23	0	FC28
	030-49	1	FC28		030-45	1	FC28
K	030-25	0	FC28	X	076-53	0	AUCD20
	030-47	1	FC28		076-56	1	AUCD20

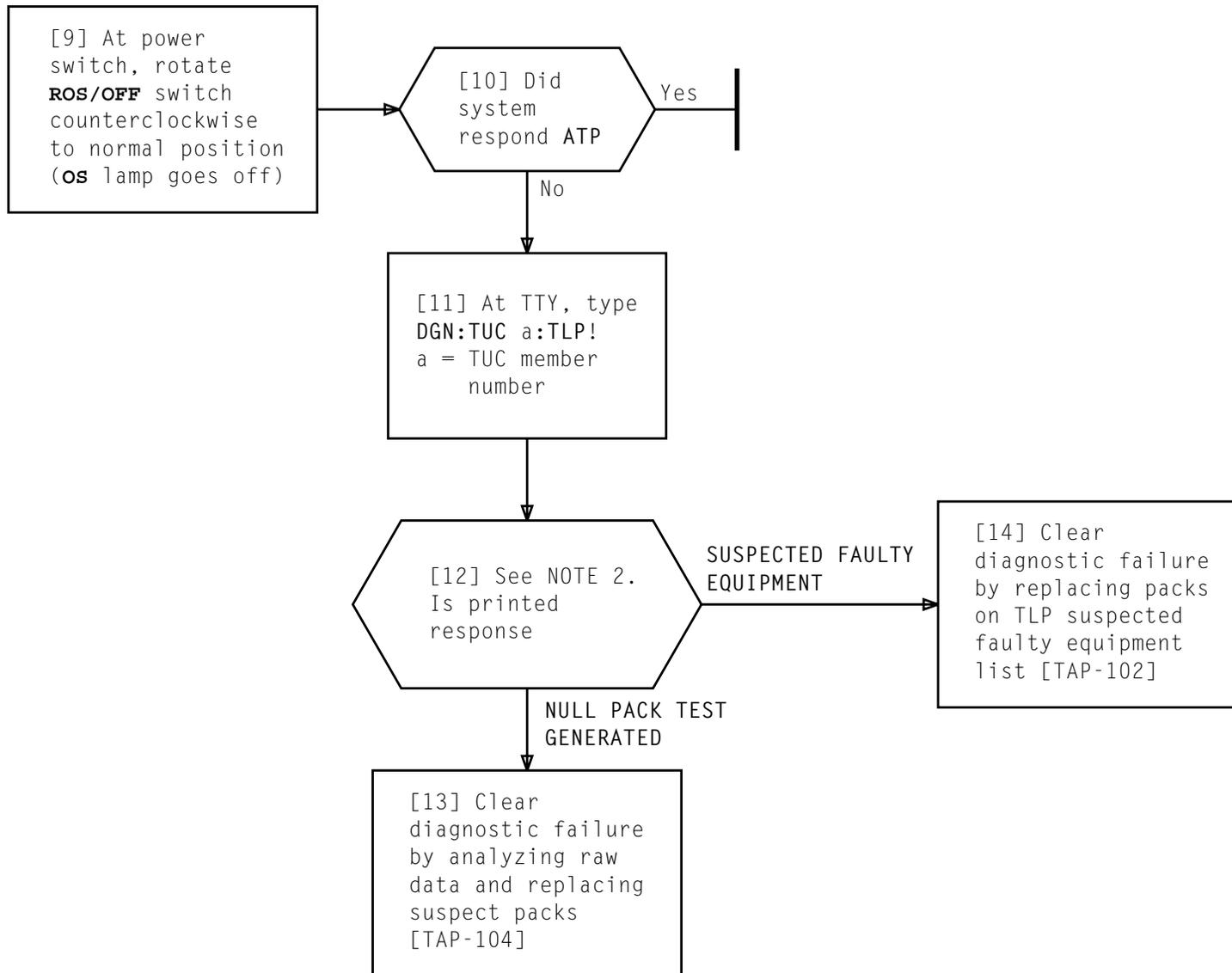
TABLE D CONVERSION FROM CIRCUIT PACK CODE TO FS, OR DUS CIRCUIT PACK LOCATION								
CIRCUIT PACK CODE	CIRCUIT PACK LOCATION		CIRCUIT PACK TYPE	CIRCUIT PACK CODE	CIRCUIT PACK LOCATION		BUS	CIRCUIT PACK TYPE
	FS	DUS			FS	DUS		
A	180-07	080-63	FC10	N	180-36	—	—	FC11
B	180-06	080-64	FC10	P	—	080-38	—	FC11
C	180-05	080-65	FC10	Q	180-36	—	—	FC11
D	180-04	080-66	FC10	R	—	080-38	—	FC11
E	180-03	080-67	FC10	S	180-41	080-42	—	FC11
F	180-02	080-68	FC10	T	180-42	080-41	—	FC11
G	180-01	080-69	FC10	U	180-43	080-40	—	FC11
H	180-41	080-42	FC11	V	180-44	080-39	—	FC11
J	180-40	080-43	FC11	W	180-41	080-42	—	FC11
K	180-39	080-44	FC11	X	180-13	080-47	0	FC16
L	180-38	080-45	FC11	Y	180-14	080-46	1	FC16
M	—	080-39	FC11					



NOTE 1
Normally, LEDs will not all change state simultaneously

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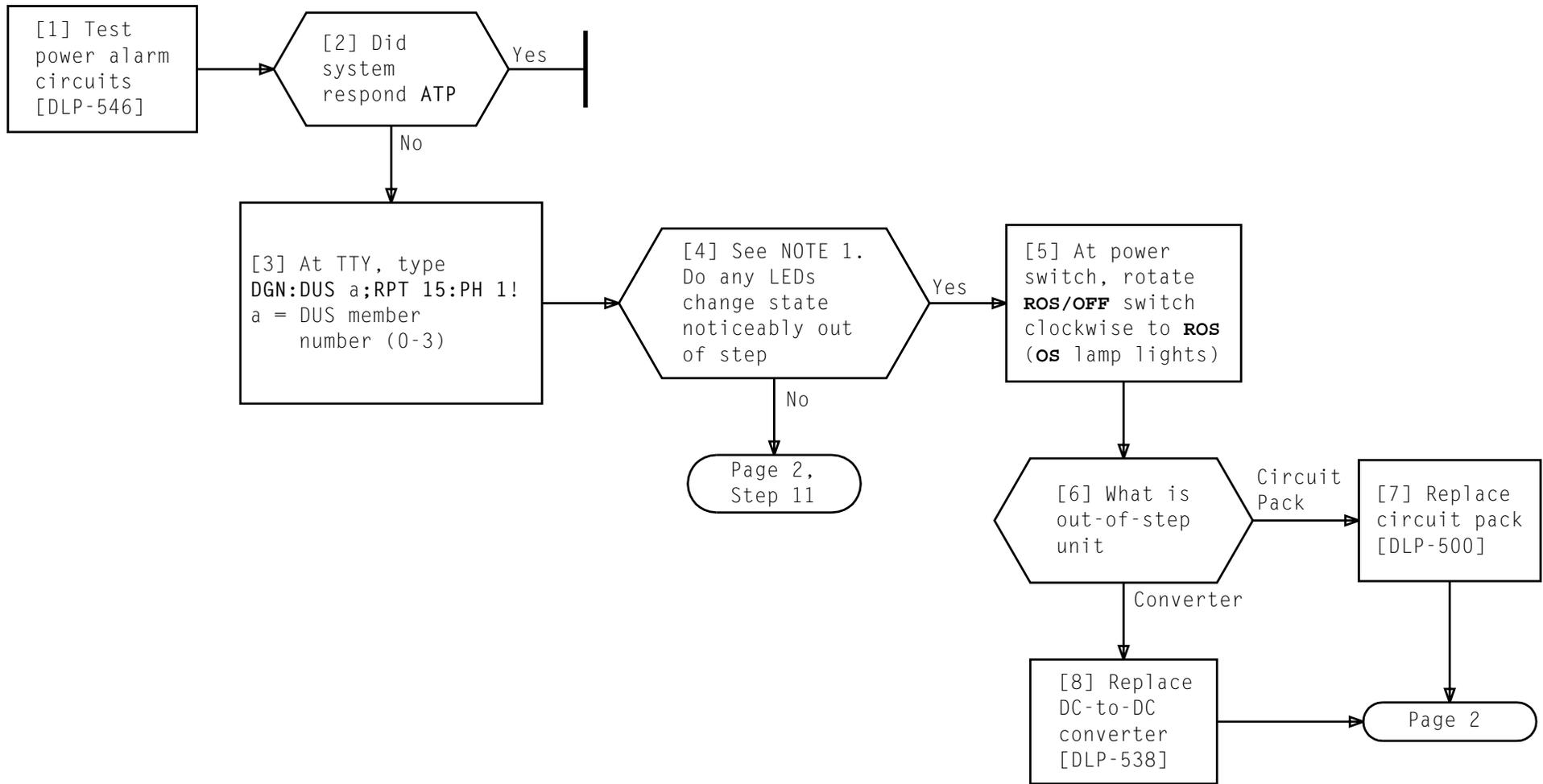
CLEAR AUTOMATIC POWER MONITOR TEST FAILURE, TAPE UNIT CONTROLLER



NOTE 2
 It may take several minutes for list to be printed. Status of file may be monitored by typing OP:TLPQUEUE;ALL! TLP file currently being processed is indicated by asterisk in priority column

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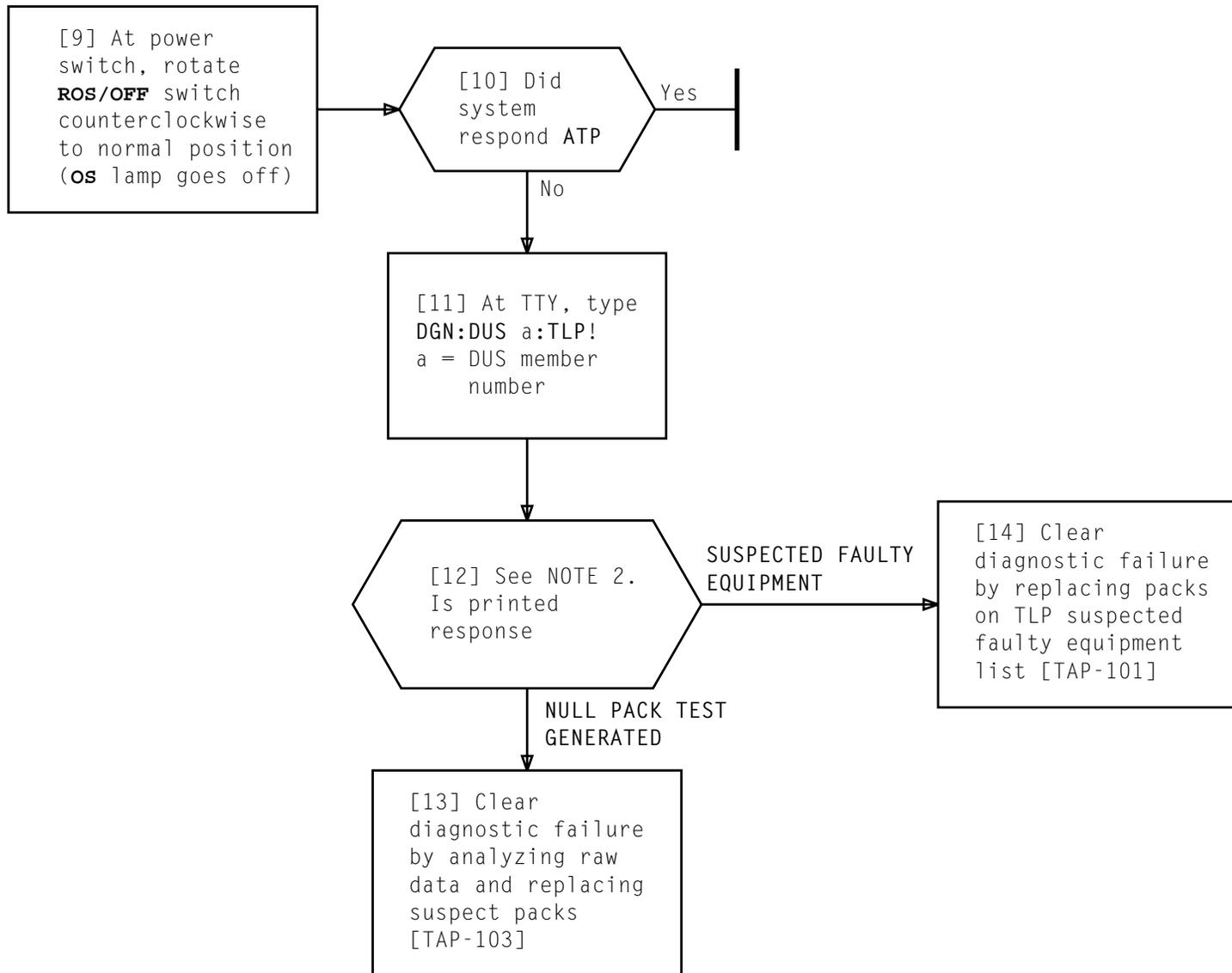
CLEAR AUTOMATIC POWER MONITOR TEST FAILURE, TAPE UNIT CONTROLLER



NOTE 1
Normally, LEDs will not all change state simultaneously

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CLEAR AUTOMATIC POWER MONITOR TEST FAILURE, DATA UNIT SELECTOR



NOTE 2
 It may take several minutes for list to be printed. Status of file may be monitored by typing
OP:TLPQUEUE;ALL!
 TLP file currently being processed is indicated by asterisk in priority column

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CLEAR AUTOMATIC POWER MONITOR TEST FAILURE, DATA UNIT SELECTOR

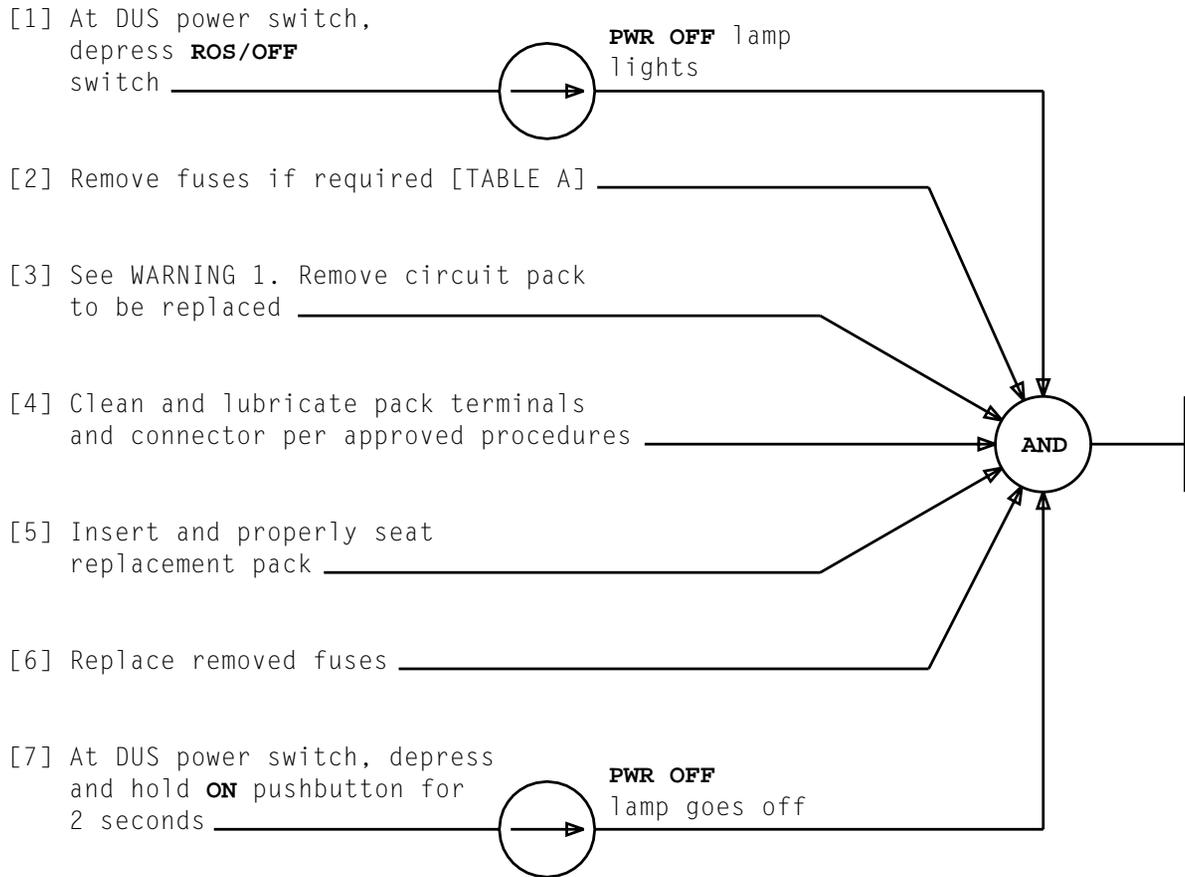


TABLE A		
PACK LOCATION	FUSE	
	NAME	LOCATION
80-37	+24-V5	77-4
	+24-V7	77-4
76-42, 43, 45, 47	+24-V6	77-4

WARNING 1
 A ground antistatic wrist strap (R-4987 or equivalent) must be worn when handling circuit packs. The wrist strap must be connected to a ground common to CP ground. When appropriate wrist strap is not available, always touch grounded (exposed) metal before handling CP in any manner. Never hand an unprotected CP to an ungrounded person or touch component, leads connector pins

REPLACE CIRCUIT PACK, DATA UNIT SELECTOR (DUS)

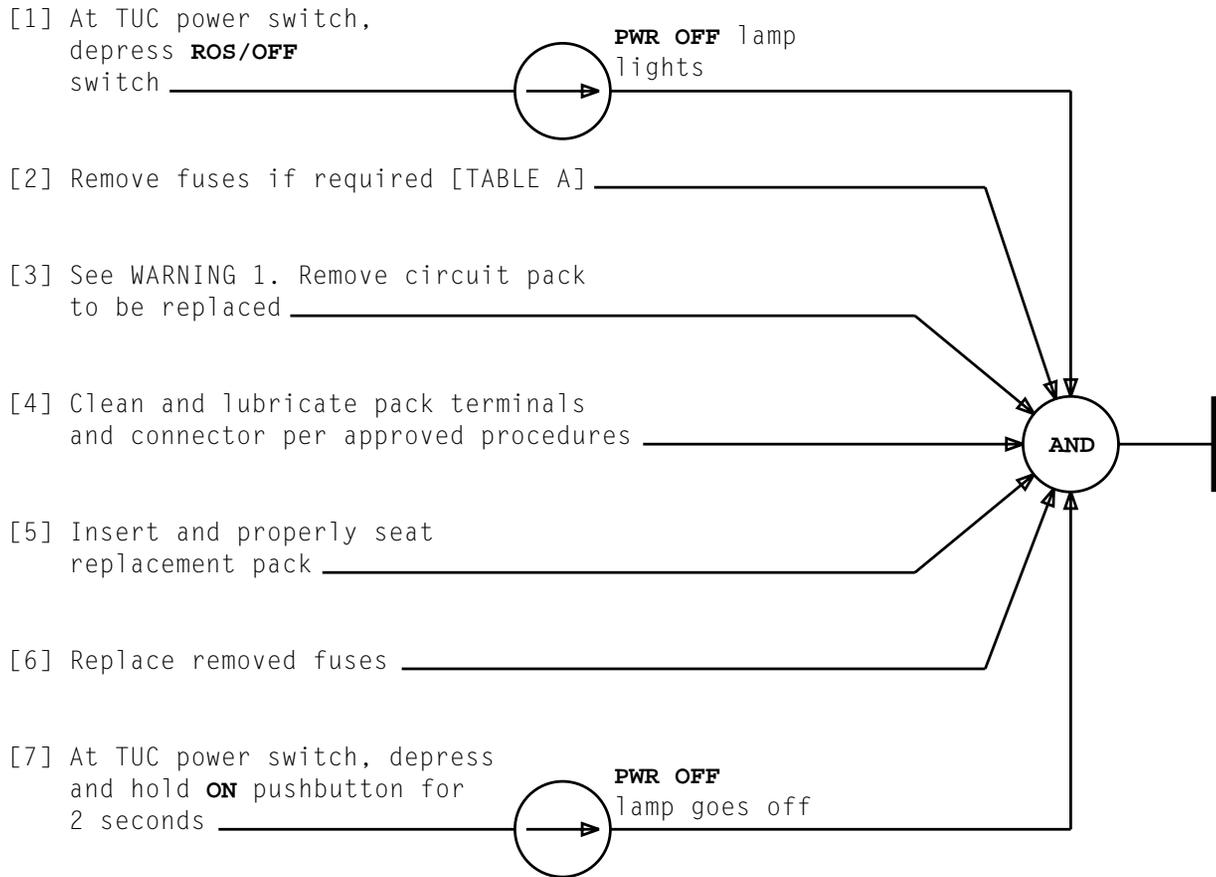


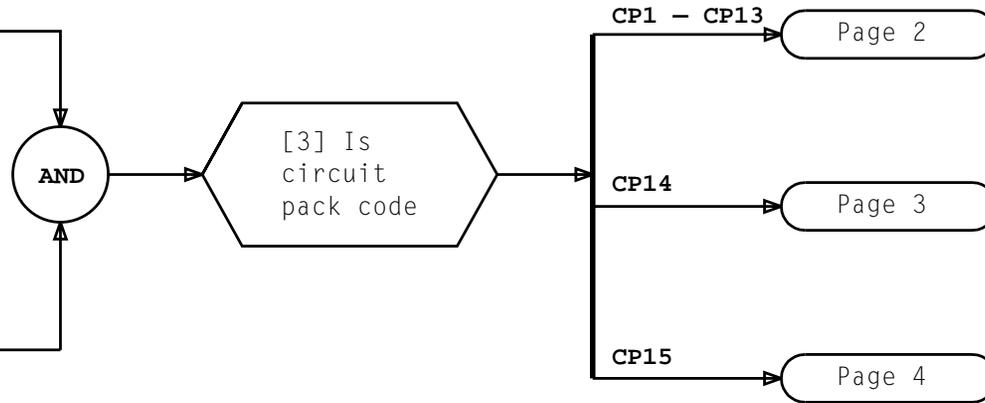
TABLE A		
PACK LOCATION	FUSE	
	NAME	LOCATION
80-39	+24V-FL	68-6
	+24V-V3	68-8
72-40, 80-40 76-11 to 76-13, 76-37, 39, 40	+24V-V3	68-8

WARNING 1
A ground antistatic wrist strap (R-4987 or equivalent) must be worn when handling circuit packs. This wrist strap must be connected to a ground common to CP ground. When appropriate wrist strap is not available, always touch grounded (exposed) metal before handling CP in any manner. Never hand an unprotected CP to an ungrounded person or touch component, leads connector pins

REPLACE CIRCUIT PACK, TAPE UNIT CONTROLLER (TUC)

[1] See WARNING 1. At DC-to-DC converter, open cover door and set **ON/OFF** switch to **OFF**

[2] See WARNING 2. If tape transport casting door is not open, at lower right loosen pawl fastener, unlatch, and open casting door

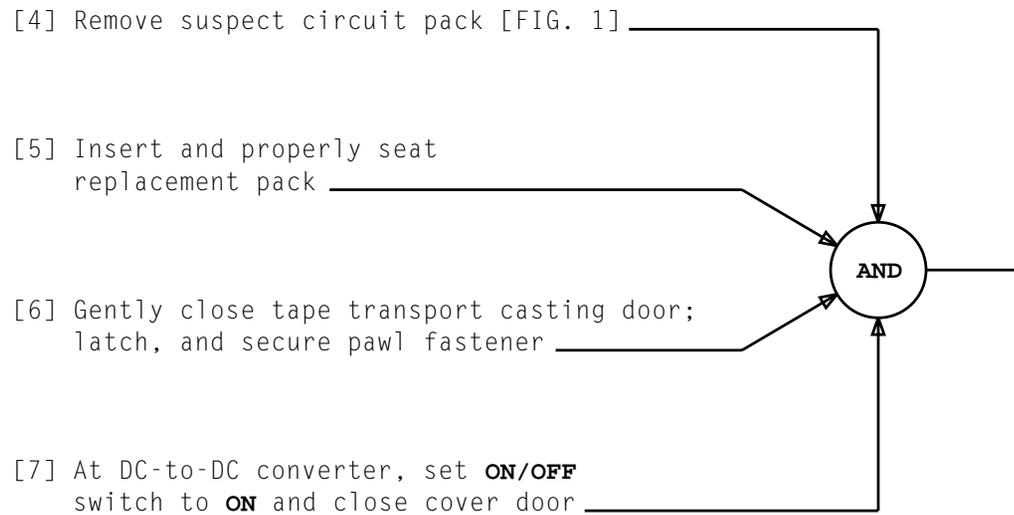


WARNINGS

1. When DC-to-DC converter is turned off, tape reel motors will spin uncontrolled
2. A ground antistatic wrist strap (R-4987 or equivalent) must be worn when handling circuit packs. The wrist strap must be connected to a ground common to CP ground. When appropriate wrist strap is not available, always touch grounded (exposed) metal before handling CP in any manner. Never hand an un-protected CP to an ungrounded person or touch component, leads connector pins

REPLACE CIRCUIT PACK, TAPE TRANSPORT

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CP1 A/B	CP6	CP7	CP8	CP2	CP3	CP13	CP5A	CP4A
	CP9	CP10	CP11	-	CP12	-	CP5B	CP4B

FIG. 1 - Circuit Pack Locations, CP1 - CP13

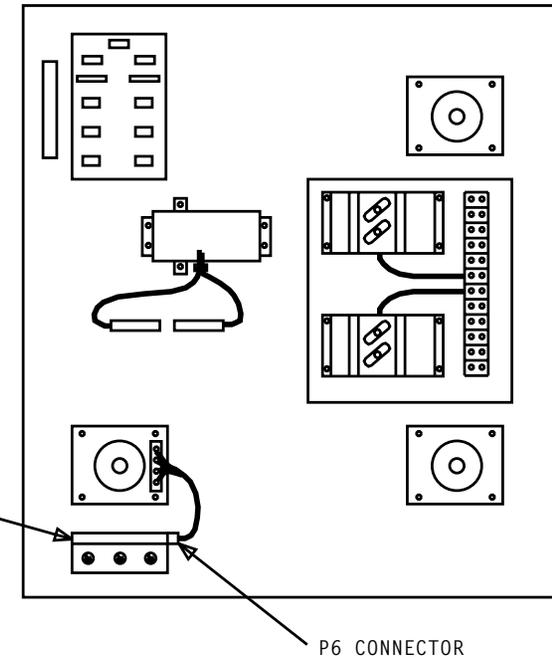
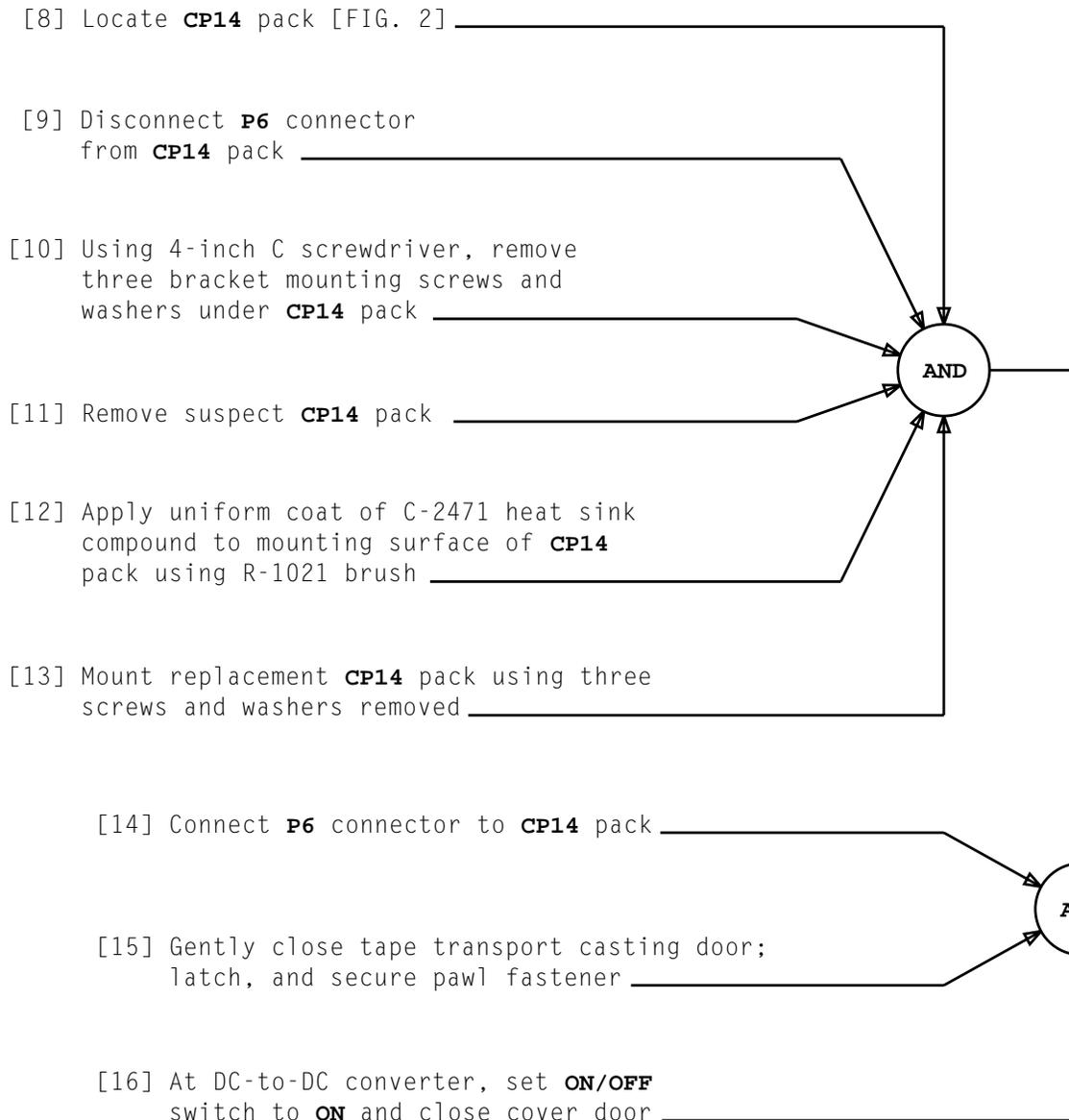


FIG. 2 - CP14 Pack Location - Tape Transport Casting Door (Rear View)

REPLACE CIRCUIT PACK, TAPE TRANSPORT

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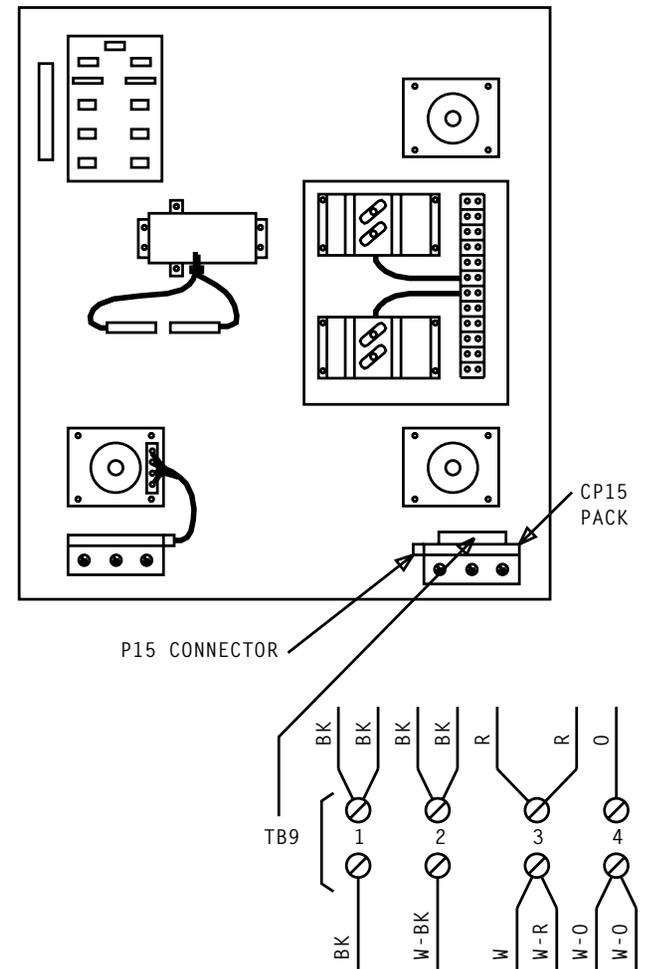
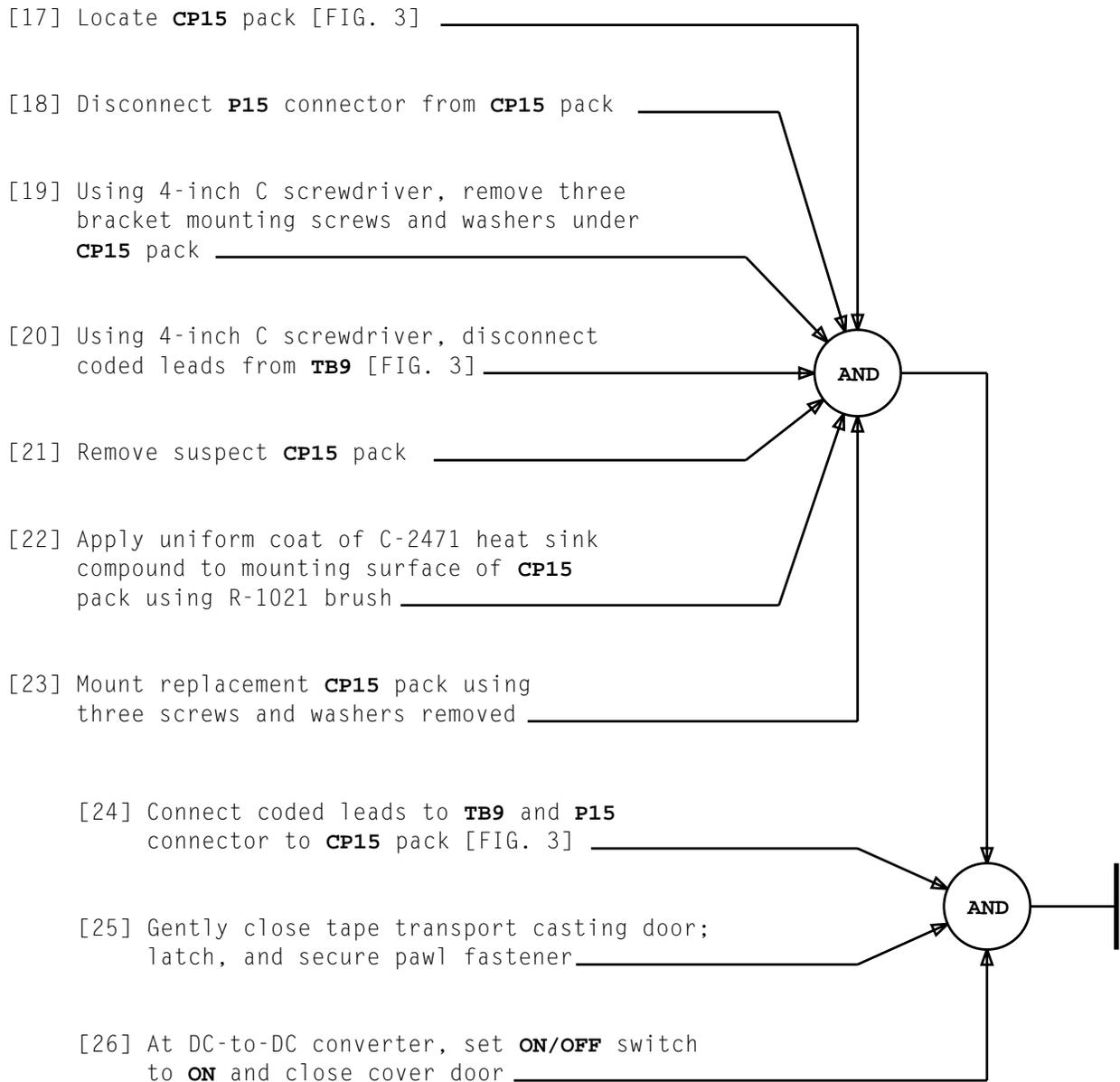


FIG. 3 - CP15 Pack and TB9 Location - Tape Transport Casting Door (Rear View)

REPLACE CIRCUIT PACK, TAPE TRANSPORT

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WARNING: When DC-to-DC converter is turned off, tape reel motors will spin uncontrolled

1. At DC-to-DC converter, open cover door and set **ON/OFF** switch to **OFF**

WARNING: Do not hold tension arms by tape guide assemblies

2. Carefully move tape tension arms from tape unload position, and bring to gentle stop against opposite bumper (tape break position)
3. At lower right of tape transport, loosen pawl fastener; unlatch, and open casting door
4. At rear of transport casting door, remove extension spring that interconnects upper and lower tape tension arm control mechanisms
5. Remove spring holder and roller from appropriate cam assembly
6. Check roller for binding that may prevent arm from locking in place. Inspect roller for nicks and excessive wear. Replace if necessary
7. Clean roller and cam assembly using twill cloth dampened with cleaner solvent
8. Reassemble spring holder and cam assembly

9. Install extension spring

10. Manually check operation of arms. Observe smooth motion of spring and roller arms

11. Gently close tape transport casting door; latch, and secure pawl fastener

12. At DC-to-DC converter, set **ON/OFF** switch to **ON** and close cover door

End of procedure

DISASSEMBLE AND INSPECT TAPE TENSION ARM CONTROL MECHANISM ROLLER, TAPE TRANSPORT

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[1] Identify failing phase on printout [FIG. 1]

[2] Identify program listing (PR) for failing phase [TABLE A]

[3] Obtain PR and locate first failing test [FIG. 2]

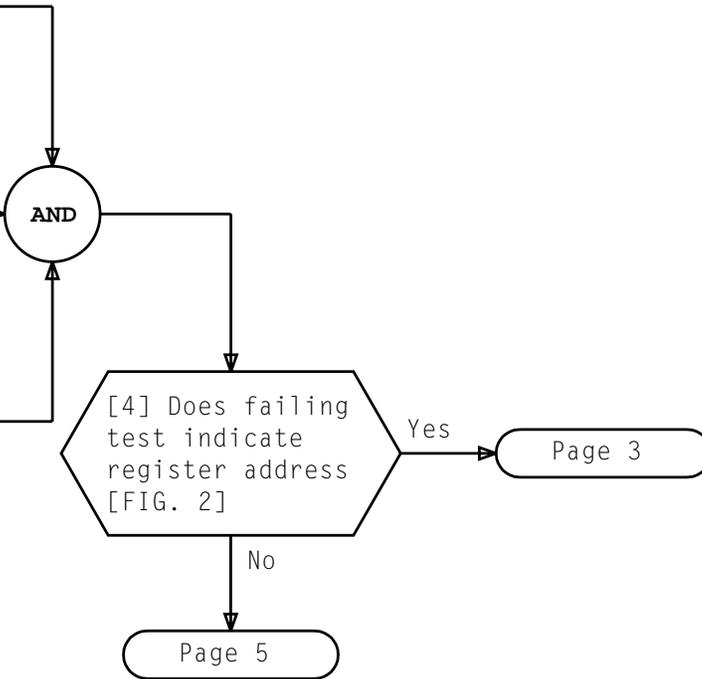


TABLE A				
DUS DIAG PHASE NUMBER	TUC DIAG PHASE NUMBER		ADDG PIDENT	PR
	HELPER DUS ON AUB 0	HELPER DUS ON AUB 1		
Control	Control		ADDG00	5A508
PH01	PH01 (No helper)		ADDG01	734
PH11	—	—	ADDG11	504
PH12	—	—	ADDG12	505
PH13	—	—	ADDG13	506
PH14	—	—	ADDG14	507
PH15	—	—	ADDG15	508
PH16	—	—	ADDG16	509
PH17	—	—	ADDG17	510
—	PH21	PH31	ADDG21	511
PH22	PH22	PH32	ADDG22	512
PH23	PH23	PH33	ADDG23	513
PH24	PH24	PH34	ADDG24	514
PH25	PH25	PH35	ADDG25	515
—	PH41	PH51	ADDG41	516
—	PH42	PH52	ADDG42	517
—	PH43	PH53	ADDG43	518
—	PH44	PH54	ADDG44	519
—	PH45	PH55	ADDG45	520
—	PH46	PH56	ADDG46	521
—	PH61	PH71	ADDG61	522
—	PH81	PH91	ADDG91	523
—	PH82	PH92	ADDG92	524
PH93	PH83	PH93	ADDG93	525
PH99	—	—	ADDG99	738

```

FIRST FAILING TEST
M 56 DGN: TUC 4 PH 21 STF (1,00000000////////// 00000000//////////) MSG IP
TEST MISMATCH SUPPLEMENTARY DATA
23 00000060 00000001//////////
#569
  
```

FIG. 1 - Example of Failing Phase Message

IDENTIFY LIST OF SUSPECT CIRCUIT PACKS BY ANALYZING RAW DATA

```

CLOCK OUT OF SYNC FF TEST SET - DUS 0 HELPER (PH21)                20:20:30    11/02/76    ****
                                                                ADDG21    02    03
-002-  01  #          ADDRESS = 21 DATA = 00000102
5280.  03  #
5290.  04  # THE DUC CLOCK HAS THREE TESTABLE CONTROL FF'S
5300.  05  #
5310.  06  # THE INHIBIT CLOCK OUT OF SYNC FF IS SET BY EITHER A HLBO OR HLB1, AND
5320.  07  # RESET BY A HLCS FOLLOWED BY A DUS SYNC PULSE.
5330.  08  #
5340.  09          TUCMWRITE WORD(TU1HLBO),DATA(0)
243 00 01406010          -002- 10          DATA 1 = 0.9 = 0(30).2 = IDG_UNUSED.6 = A(TU1HLBO).6 = 1DGTUCMWRIT
                                                                E
-002- 12          ADDRESS = 60 DATA = 00000000
5350.  14          DL1SKPTST SKIP=1
-003- 15 #*****
-003- 16 #*
-003- 17 #* TEST 22
-003- 18 #*
-003- 19 #*****
243 00 30000136          -002- 20          DATA 6 = 0(30).12 = IDGDTJUMP
5370.  21          TUCMWRITE WORD(TU1HLBS),DATA(0)
243 00 01407110          -002- 22          DATA 1 = 0.9 = 0(30).2 = IDG_UNUSED.6 = A(TU1HLBO).6 = 1DGTUCMWRIT
                                                                E
-002- 24          ADDRESS = 71 DATA = 00000000
5380.  26          DUSMREAD ITEM(DS1HLIC00S),EXPECT(M(DS1HLIC00S))
-003- 27 #*****
-003- 28 #*
-003- 29 #* TEST 23
-003- 30 #*
-003- 31 #*****
243 00 40111211          -002- 32          DATA 1 = 1.1 = 0.9 = 0(4).7 = A(DS1HLIC00S).6 = 1DGDUSMREAD
5370.  33 #          ADDRESS = 112 MASK = 00000020 EXPECT = 00000020

```

PHASE

MODE = DUS READ

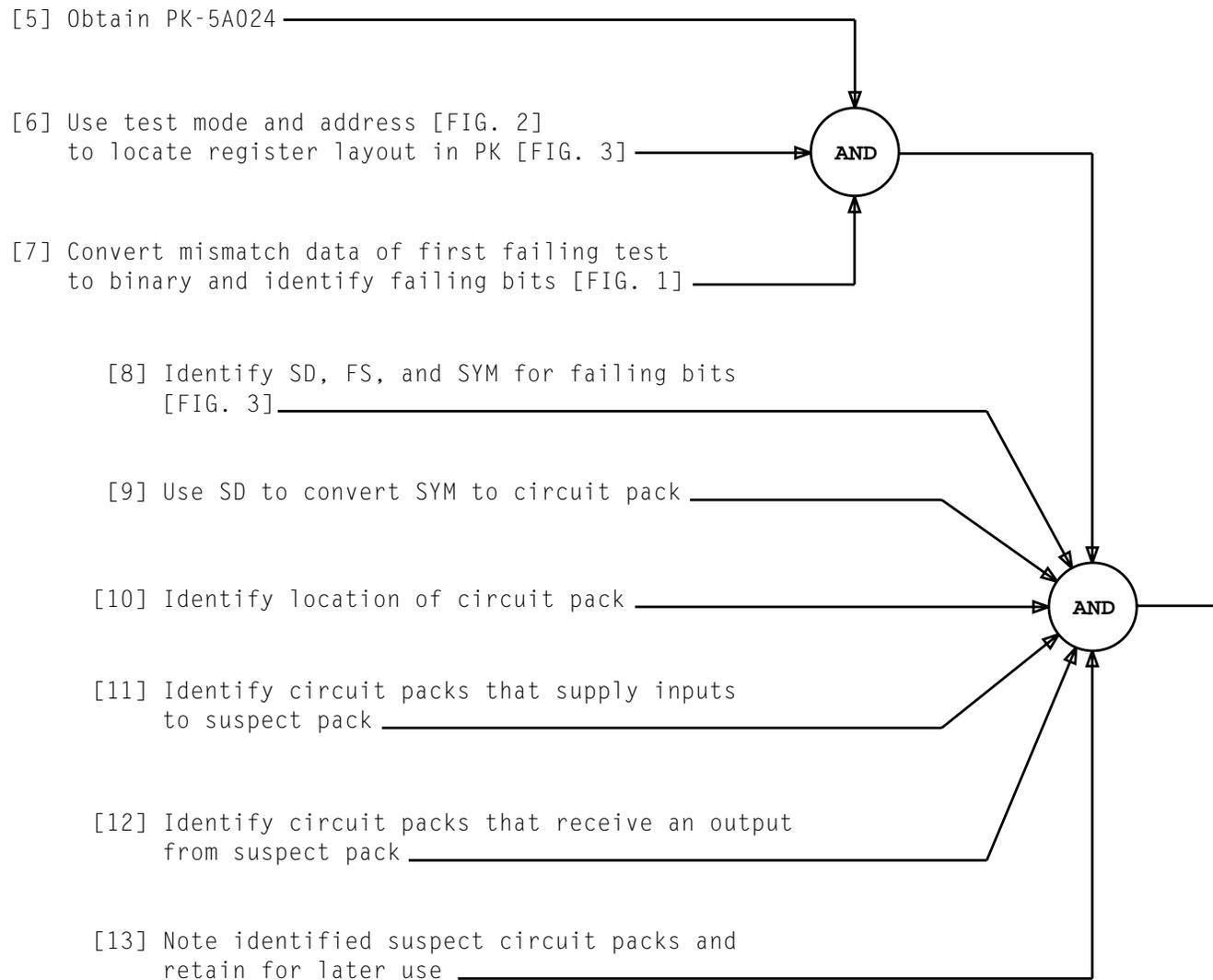
FAILING TEST

ADDRESS = 112

FIG. 2 - Example of Program Listing for Failing Test

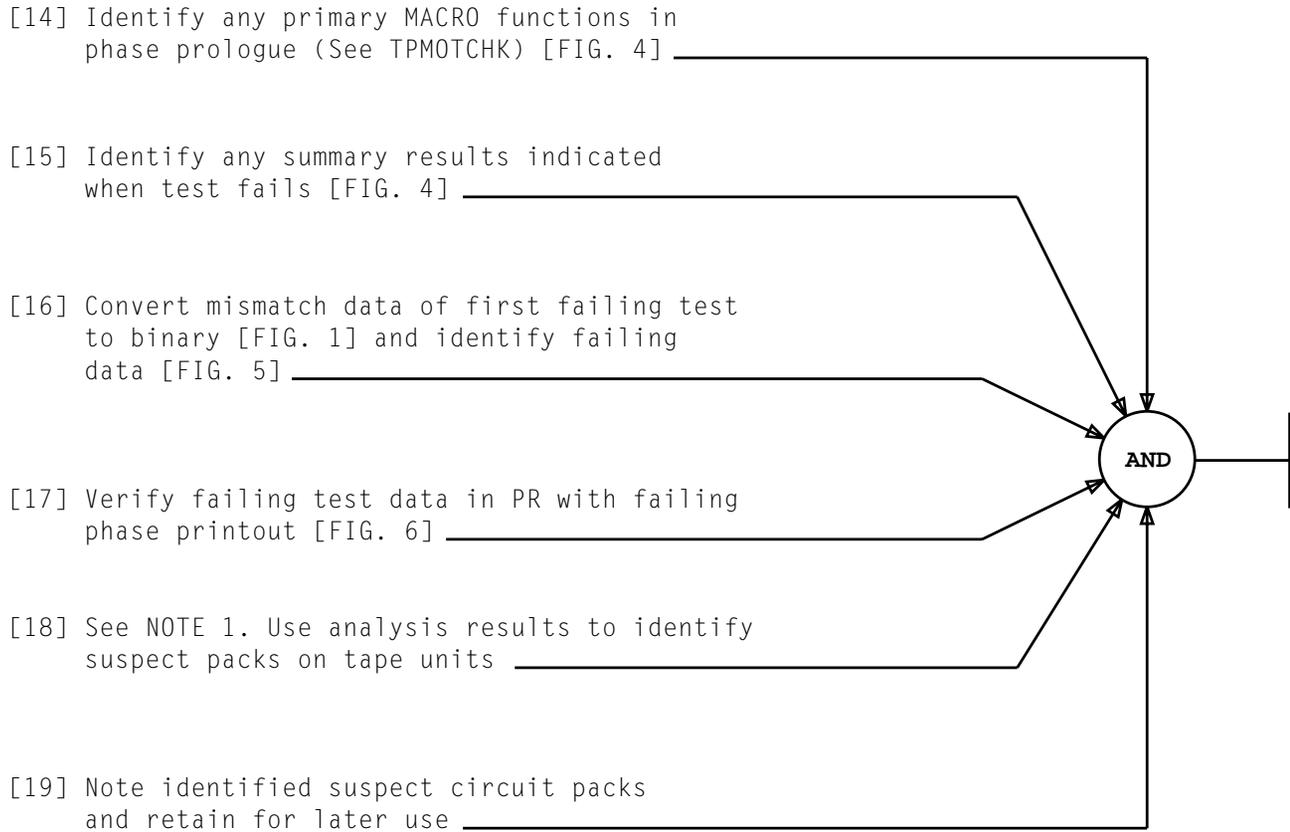
IDENTIFY LIST OF SUSPECT CIRCUIT PACKS BY ANALYZING RAW DATA

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IDENTIFY LIST OF SUSPECT CIRCUIT PACKS BY ANALYZING RAW DATA

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NOTE 1
 In example shown [FIG. 1], analysis indicates suspect transport units or packs as follows:

- Dirty capstan drive wheel
- Bad spot on tape used
- Faulty capstan drive assembly
- **CP2, CP11, CP3, CP14**

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IDENTIFY LIST OF SUSPECT CIRCUIT PACKS BY ANALYZING RAW DATA

```

41 # FUNCTION
42 #
0010 43 # THIS PHASE TESTS THE ABILITY OF THE TUC AND TAPE TRANSPORT
0020 44 # TO PERFORM VARIOUS TAPE MOTION, READ, AND WRITE FUNCTIONS.
0030 45 # THIS PHASE IS RUN AS PART OF THE AUTOMATIC TUC DIAGNOSIS,
0040 46 # AND THE TESTS WILL BE EXECUTED UNDER THE AUTOMATIC MODE
0050 47 # ONLY IF ALL PREVIOUS PHASES WERE RUN AND WERE ATP. THIS
0060 48 # PHASE WILL BE RUN ONLY IF THE TAPE MOUNTED ON THE TUC IS:

```

PRIMARY MACRO

```

320 01 # TPMOTCHK MACRO IS USED EXTENSIVELY IN ADD61. IT PERFORMS MANY CHECKS ON THE TUC
330 02 # BASED ON G-LEVEL TIMING. A BRIEF DESCRIPTION FOLLOWS:
340 03 # AT 00 MS: TPMOTCHK WRITES THE SPECIFIED COMMAND INTO THE COMMAND REGISTER.
350 04 # AT 06 MS: TPMOTCHK READS THE TTS TRANSPORT CONTROL BITS 8 THROUGH 12 FOR STATES
360 05 # SPECIFIED IN TTS EXPECT AND THE REWINDING INDICATOR BIT 6 FOR RESET. IF NOT
370 06 # AS EXPECTED, TRANSPORT IS STOPPED FIVE WAYS. OUTPUT FAILING BITS WITH
380 07 # SUPPLEMENTAL DATA = 00000000 TO INDICATE COMMAND DID NOT START CORRECTLY.

```

SUMMARY RESULTS

```

550 24 # AT COMPLETION: TTS TAPE MOTION INDICATOR BITS 3, 4, 5, 6 ARE READ. ONLY THE
560 25 # STOPPED BIT, BIT 5, IS EXPECTED TO BE SET. IF THESE BITS ARE NOT AS
570 26 # EXPECTED, TRANSPORT IS STOPPED FIVE WAYS. OUTPUT
580 27 # FAILING BITS WITH SUPPLEMENTAL DATA = 00000001 TO INDICATE THE COMMAND
590 28 # DID NOT COMPLETE IN THE SPECIFIED TIME.
600 29 # FIVE WAYS TPMOTCHK STOPS THE TRANSPORT ON AN ERROR CONDITION ARE:
610 30 # 1. CLEAR THE COMMAND REGISTER AND WRITE THE STOP COMMAND.
620 31 # 2. CLEAR THE MIS REGISTER AND SET THE TIME-OUT INDICATOR.
630 32 # 3. CLEAR THE MAINT REGISTER AND SET SUPPRESS TAPE MOTION.
640 33 # 4. CLEAR THE TTS REGISTER AND SET STOP/START AND PARK/NORMAL.
650 34 # 5. SEND THE HOTLINE POWER UP ADDRESS.
660 35 # READS OF TUC REGISTERS AFTER A FAILING TPMOTCHK ARE USELESS FOR THE ABOVE FIVE REASONS.
670 36 # A DLIETERM MACRO FOLLOWS THE TPMOTCHKS TO TERMINATE THE PHASE.

```

FIG. 4 - Example of PR Prologue

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```

29275. 07 #
29280. 08 # PROCEDURE:
29285. 09 #
29290. 10 # SEND REVERSE LOCATE EOF COMMAND AND THEN STOP COMMAND.
29295. 11 # TAPE SHOULD STOP WITH HEADS ON INTER BLOCK GAP BETWEEN DATA BLOCK THREE AND DATA BLOCK FIVE.
29295.1000 12 #

```

```

ADG61
DUS=1(ADG 71)

```

```

29370. 27 #
29375. 28 # TERMINATION STRATEGY: TERMINATE PHASE ON TAPE MOTION FAILURE.
29380. 29 #

```

PRIMARY
MACRO

```

3 00 00034024      29620.  41      OUTFOR 1DGNOPAGE
                   29625.  42      DL1TFZAP
                   -002-  43      DATA  8 = 1DG_UNUSED.5 = 1DG_UNUSED.6 = 1DGCCNTLPGM
                   29630.  44      TPOTCHK COMMAND(M(TUIREVEOF)),TTSEXPCT(M(TUILOWSPD,TUIBSYIDL,TUIREVM
                                OT.TUITTRDY)),CMPLTIME(MSEC(140)),DELYSTOP
3 00 24000033      -002-  46      DATA  3 = 0(2).15 = M(TUIREVEOF).6 = 1DGTPMOTCHK
3 00 00002421      -002-  47      DATA  11 = 0.13 = M(TUILOWSPD,TUIBSYIDL,TUIREVMOT,TUITTRDY)
3 00 00000214      -002-  48      DATA  10 = 0.14 = 140

```

```

003- 01 #*****
003- 02 #*
003- 03 # TEST 6159
003- 04 #*
003- 05 #*****
                   29634.  06      DL1ETERM TESTFAIL,LABEL(PH61CLEANUP),YESTERM
3 00 00232224      -002-  07      DATA  5 = 1DG_UNUSED.1 = 0.1 = 0.1 = 1.5 = 1DGTRM.1 = 1.2 =
                                1DG_UNUSED.1 = 1.1 = 0.6 = 1DGCCNTLPGM
3 00 00002151      -002-  09      DATA  24 = PH61CLEANUP-*

```

FIG. 5 - Examples of PR Showing Failed Data

MODE=TUC READ
ADDRESS=C42

TUC/TT STATUS REGISTER

10:04:02
09/15/76

COMPOOL MNEMONIC = TTS
SD5A024-01 SD5A025-01

GATEOUT ENABLE = SELTTSRO

BIT	OP	FUNCTION NAME	COMPOOL ALIAS	SD FS/SYM	LEAD DESIG	CPS REG/GATE NAME	DESCRIPTION	NOTE
00		TTRDY		25 11/1	B000	TTTSR000	TT READY	
01		BOT		25 11/1	B010	TTTSR010	BOT PRESENT	
02		BOT		25 11/1	B020	TTTSR020	BOT PRESENT	
03		FWMOT		25 11/1	B030	TTTSR030	FORWARD MOTION	
04	←	REVMOT		25 11/1	B040	TTTSR040	REVERSE MOTION	IN MISMATCH EXAMPLE SET = SHOULD NOT BE RESET = SHOULD NOT BE
05	←	STOPPED		25 11/1	B050	TTTSR050	STOPPED MOTION	
06		REWIND		25 11/1	B060	TTTSR060	REWINDING	
07		LRCEQZ		25 11/1	B070	OB070	LRC EQUAL ZERO	
08		BSYIDL		25 11/2	B080	TTTS08	BUSY/IDLE	
09		PRKNOR		25 11/2	B090	TTT9MR09	PARK/NORMAL	
10		LOWSPD		25 11/2	B100	TTTS1011(A)	LOW SPEED	
11		FWDREV		25 11/2	B110	TTTS1011(B)	FORWARD/REVERSE MOTION	
12		STPSTRT		25 11/3	B120	TTTSR12	STOP/START	
13							UNUSED RESPONSE	
14		CAPMOT		25 11/3	B140	TTTS1415(A)	ENABLE CAPSTAN MOTION INDICATOR	
15							UNUSED RESPONSE	
16		ACTIVE		25 11/3	B160	TTTS1617(A)	ACTIVE	
17		STDBY		25 11/3	B170	TTTS1617(B)	STANDBY	
18		SB2		25 11/4	B180	TTTS1819(A)	READ ONLY/READ-WRITE	
19		ROBW		25 11/4	B190	TTTS1819(B)	FILE OPEN/CLOSED	
20		FILEOC		25 11/4	B200	TTTS2021(A)	ACKNOWLEDGE DEMOUNT REQUEST	
21		DEMROST		25 11/4	B210	TTTS2021B	OK TO DEMOUNT	
22		OKDEMNT		25 11/4	B220	TT22M118	UNUSED RESPONSE	
23								

FIG. 6 - Example of TTS Register Layout

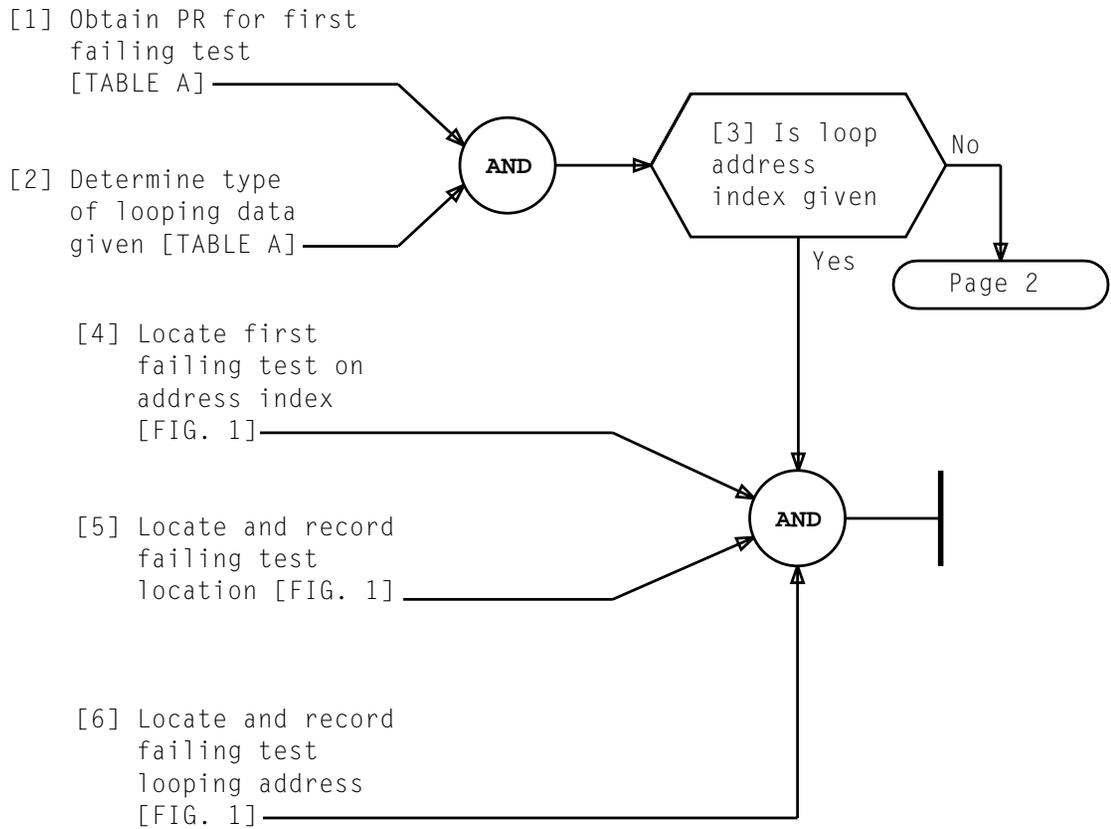


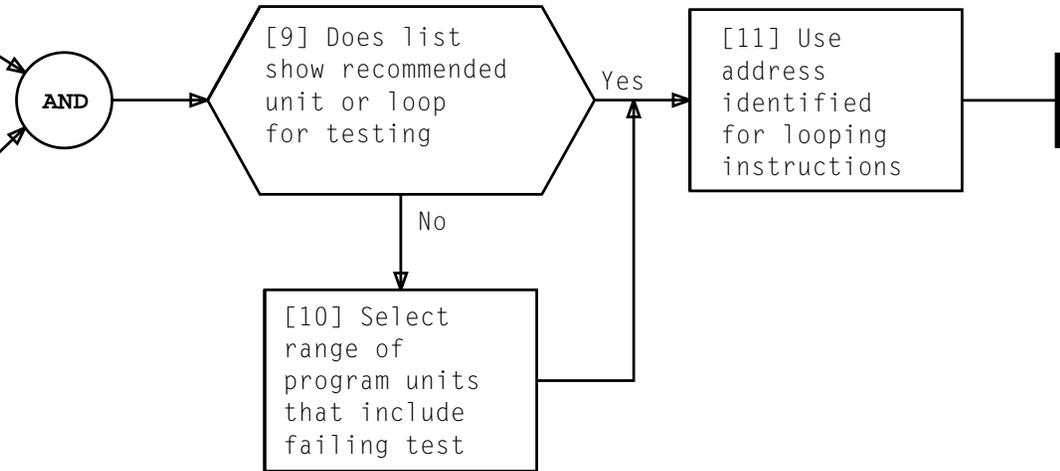
TABLE A				
DUS DIAG PHASE NUMBER	TUC DIAG PHASE NUMBER		ADDG PIDENT	PR*
	HELPER DUS ON AUB 0	HELPER DUS ON AUB 1		
CONTROL	CONTROL		ADDG00	5A503a
PH01	PH01(NO HELPER)		ADDG01	5A734b
PH11	—	—	ADDG11	5A504b
PH12	—	—	ADDG12	5A505b
PH13	—	—	ADDG13	5A506b
PH14	—	—	ADDG14	5A507b
PH15	—	—	ADDG15	5A508b
PH16	—	—	ADDG16	5A509b
PH17	—	—	ADDG17	5A510b
—	PH21	PH31	ADDG21	5A511b
PH22	PH22	PH32	ADDG22	5A512b
PH23	PH23	PH33	ADDG23	5A513b
PH24	PH24	PH34	ADDG24	5A514b
PH25	PH25	PH35	ADDG25	5A515b
—	PH41	PH51	ADDG41	5A516b
—	PH42	PH52	ADDG42	5A517b
—	PH43	PH53	ADDG43	5A518b
—	PH44	PH54	ADDG44	5A519b
—	PH45	PH55	ADDG45	5A520b
—	PH46	PH56	ADDG46	5A521b
—	PH61	PH71	ADDG61	5A522c
—	PH81	PH91	ADDG91	5A523c
—	PH82	PH92	ADDG92	5A524c
PH93	PH83	PH93	ADDG93	5A525c
PH99	—	—	ADDG99	5A738b

* Type of looping data by PR:
a = no looping data
b = loop address index
c = loop guidelines

DETERMINE LOOPING PARAMETERS

[7] Identify program unit for failing test
in PR (upper left hand of page)

[8] Locate program unit and
recommended loops in PR
[FIG. 2]



TEST NUMBER INDEX		DATA TABLE TEST LOCATION AND SEGMENT LOOP ADDRESS INDEX								
-002-	01	ADDG15 02 03								
-002-	02									
-002-	03									
-002-	04									
-002-	05									
-002-	06									
-002-	07	TEST	LOC	LOOPING ADR	TEST	LOC	LOOPING ADR	TEST	LOC	LOOPING ADR
-002-	08									
-002-	09	0000	00017	00002-00102	0001	00021	00002-00102	0002	00023	00002-00102
-002-	10	0003	00025	00002-00102	0004	00027	00002-00102	0005	00033	00002-00102
-002-	11	0006	00037	00002-00102	0007	00042	00002-00102	0008	00052	00002-00102
-002-	12	0009	00057	00002-00102	0010	00064	00002-00102	0011	00071	00002-00102
-002-	13	0012	00076	00002-00102	0013	00111	00002-00102	0014	00116	00002-00102
-002-	14	0015	00123	00102-00210	0016	00130	00102-00210	0017	00136	00102-00210
-002-	15	0018	00144	00102-00210	0019	00152	00102-00210	0020	00157	00102-00210
-002-	16	0021	00165	00102-00210	0022	00173	00102-00210	0023	00200	00102-00210
-002-	17	0024	00204	00102-00210	0025	00224	00102-00210	0026	00225	00102-00210
-002-	18	0027	00231	00210-00262	0028	00234	00210-00262	0029	00237	00210-00262
-002-	19	0030	00242	00210-00262	0031	00245	00210-00262	0032	00250	00210-00262
-002-	20	0033	00253	00210-00262	0034	00256	00210-00262	0035	00266	00210-00262
-002-	21	0036	00271	00262-00352	0037	00274	00262-00352	0038	00277	00262-00352

FIG. 1 - Example of Loop Address Index

LOOPING INFORMATION

12:39:23 10/22/77 ****

ADDG61 C2 04

01 # a list of recommended loops in terms of program units, TEST NUMBERS, AND LOOP BOUNDARY
 02 # ADDRESSES IS PROVIDED. ALTHOUGH MANY LOOPS ARE POSSIBLE, A RECOMMENDED LOOP IS ONE THAT WILL
 03 # (1) NOT RUN OUT OF TAPE BY TRYING TO GO BEYOND BOT OR EOT, AND (2) WILL NOT HAVE TEST FAILURES
 04 # AS A RESULT OF THE LOOP ITSELF. TEST FAILURES CAN BE CAUSED BY LOOPING IF LOOP BOUNDARIES
 05 # ARE POORLY CHOSEN. INCOMPATIBILITY AMONG THE PROGRAM UNITS OF THE LOOP (REGARDING INFORMATION
 06 # ON TAPE, TAPE POSITION, AND TIME ALLOWED TO COMPLETE A TAPE MOTION OPERATION) IS THE MAIN REASON
 07 # FOR TEST FAILURES AS A RESULT OF LOOPING.
 08 #

09 # PROGRAM UNITS:

RECOMMENDED LOOPS:

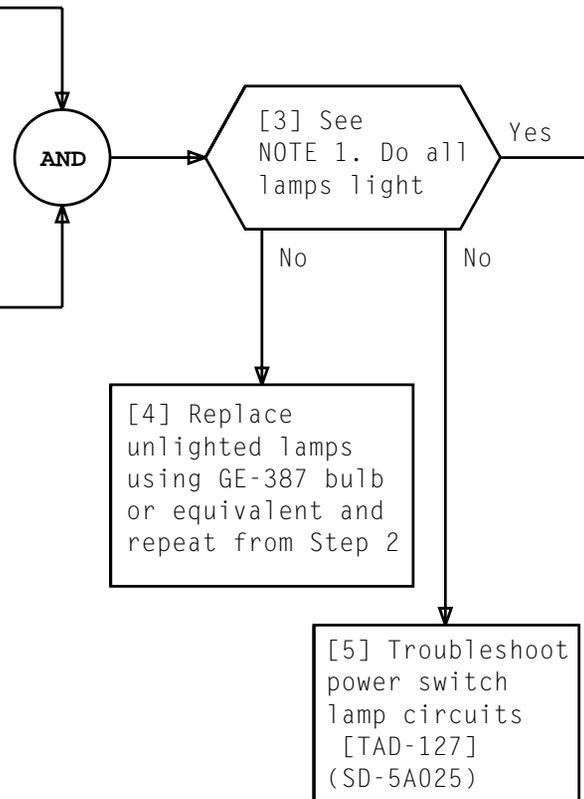
10 #		
11 # 01 THROUGH 03	-----	TESTS 0000-0016 LOOPING ADR 00137-00337
12 # 04 THROUGH 07	-----	TESTS 0017-0034 LOOPING ADR 00377-00560
13 # 05 THROUGH 06	-----	TESTS 0021-0030 LOOPING ADR 00432-00526
14 # 06 THROUGH 09	-----	TESTS 0026-0042 LOOPING ADR 00470-00644
15 # 09 THROUGH 26	-----	TESTS 0039-2307 LOOPING ADR 00612-02224
16 # 10 THROUGH 11	-----	TESTS 0043-0057 LOOPING ADR 00644-00772
17 # 10 THROUGH 35	-----	TESTS 0043-4518 LOOPING ADR 00644-03117
18 # 11 THROUGH 12	-----	TESTS 0052-0245 LOOPING ADR 00732-01062
19 # 11 THROUGH 12	LESS MEMCHECKS -----	TESTS 0052-0065 LOOPING ADR 00732-01053
20 # 13 THROUGH 14	-----	TESTS 0246-0262 LOOPING ADR 01062-01213
21 # 14 THROUGH 15	-----	TESTS 0257-0450 LOOPING ADR 01153-01307
22 # 14 THROUGH 15	LESS MEMCHECKS -----	TESTS 0257-0270 LOOPING ADR 01153-01272
23 # 16 THROUGH 17	-----	TESTS 0451-0469 LOOPING ADR 01307-01443
24 # 17 THROUGH 18	-----	TESTS 0464-0657 LOOPING ADR 01403-01537
25 # 17 THROUGH 18	LESS MEMCHECKS -----	TESTS 0464-0477 LOOPING ADR 01403-01522
26 # 19 THROUGH 20	-----	TESTS 0658-0674 LOOPING ADR 01537-01706

FIG. 2 - Example of Looping Guidelines

At power switch:

[1] Ensure **ROS/OFF** switch is rotated counterclockwise to normal position

[2] Depress and hold **TEST** pushbutton



NOTE 1
REQ DMT lamp
does not light

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At tape transport:

[1] Apply one drop of oil to each cover door hinge and cover door latch hinge [FIG. 1]

[2] Operate door latch and cover door on hinges

[3] Remove excessive oil using twill cloth

[4] Apply one drop of oil to each casting door hinge [FIG. 1]

[5] At lower right, loosen pawl fastener; unlatch, and open casting door [FIG. 1]

[6] Operate casting door on hinges and remove excessive oil using twill cloth

[7] Gently close casting door; latch, and secure pawl fastener

AND

Page 2

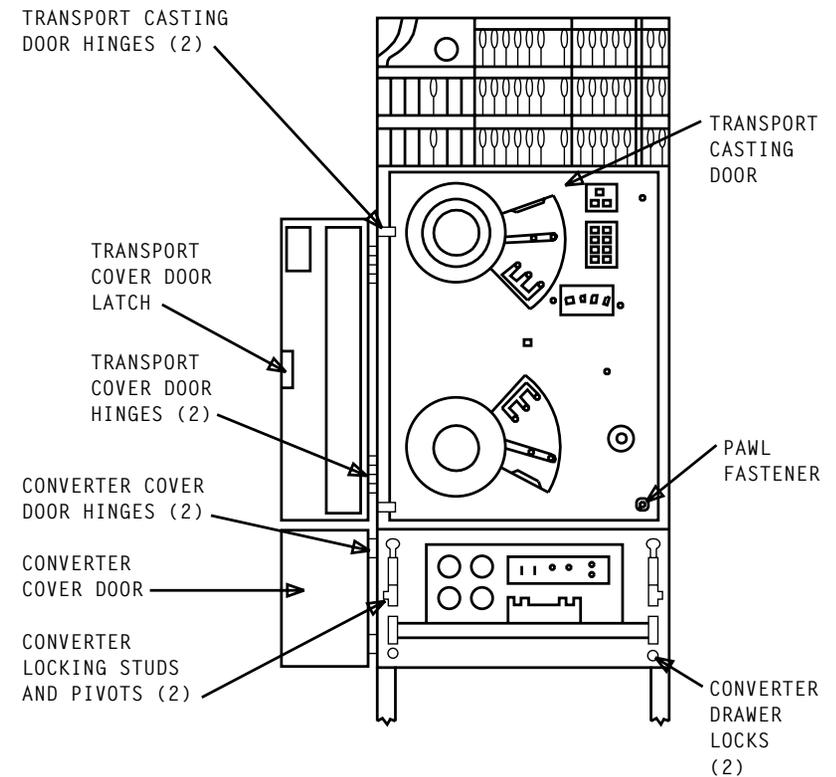


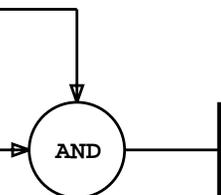
FIG. 1 - Tape Unit Frame
(Front View)

LUBRICATE DOOR HINGES

[8] At DC-to-DC converter, open cover door [FIG. 1]

[9] Apply one drop of oil to each cover door hinge

[10] Operate cover door on hinges and remove excessive oil using twill cloth; close cover door



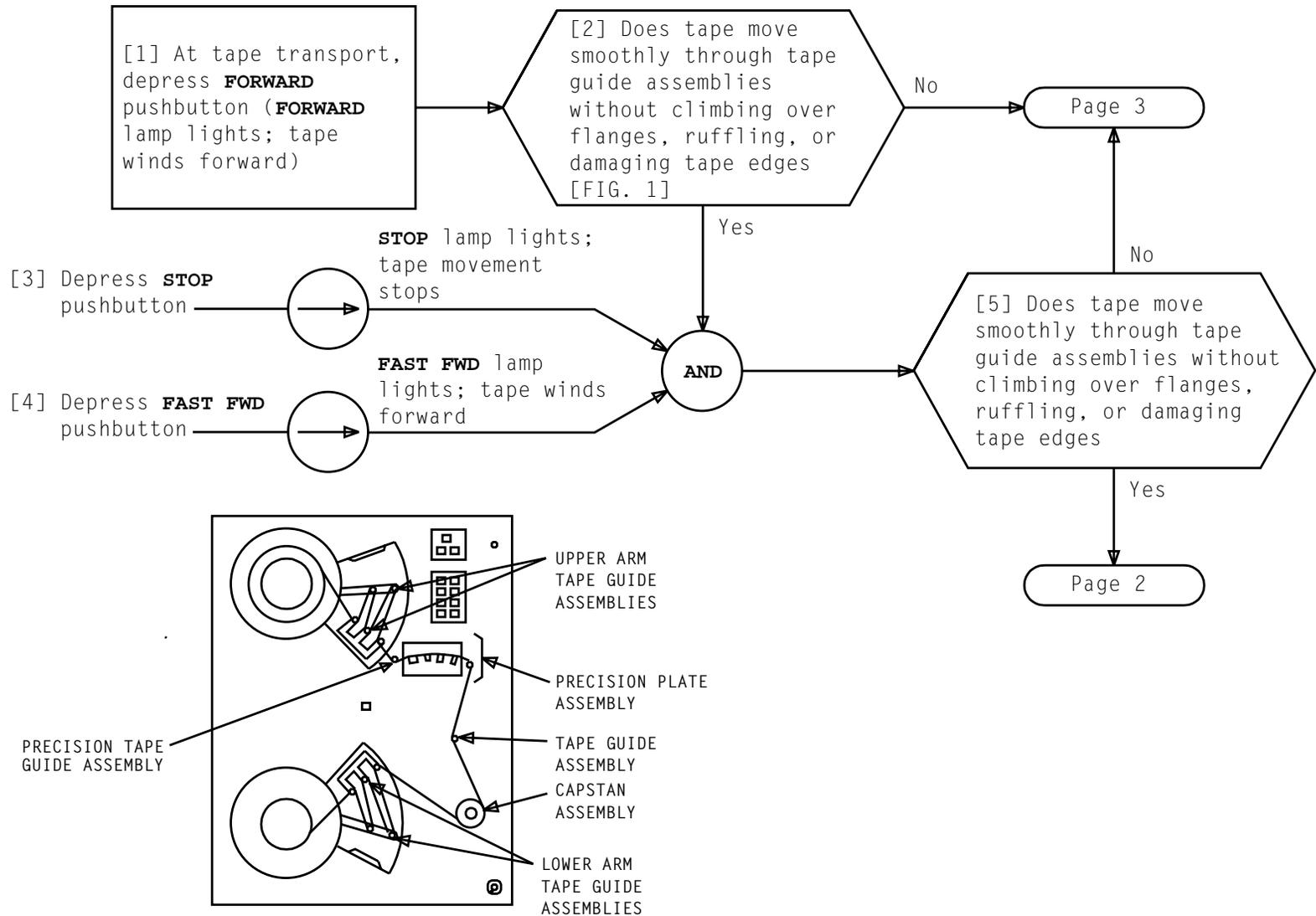
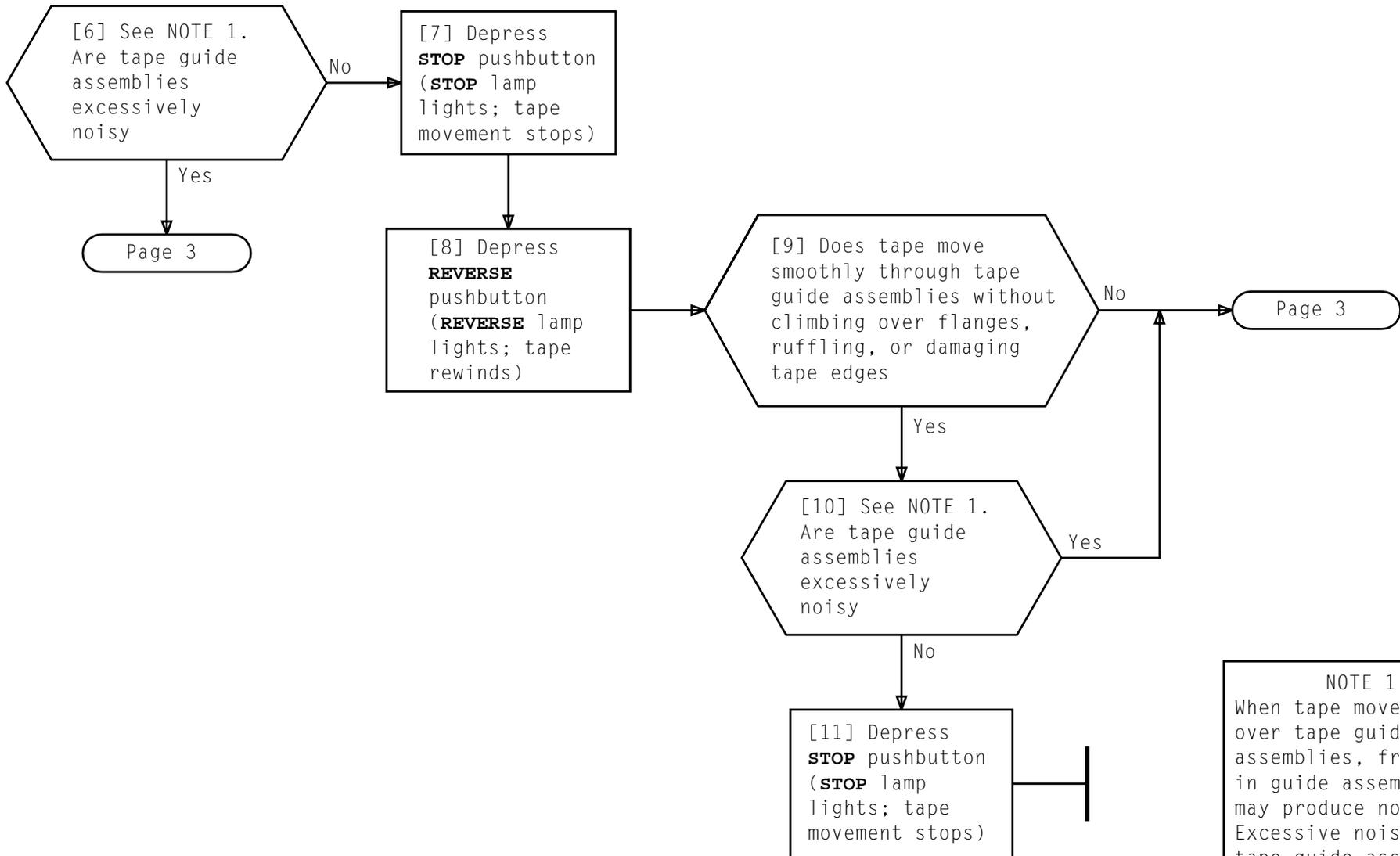


FIG. 1 - Tape Transport - Front View
With Cover Door Open

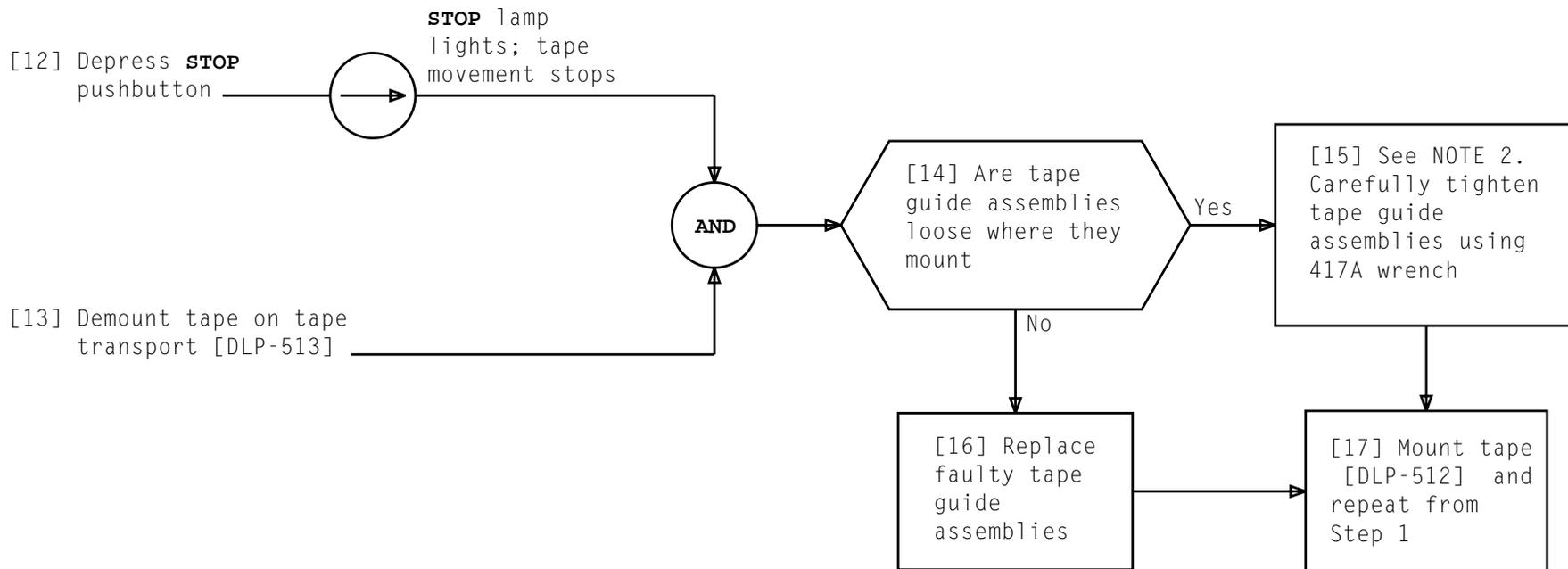
CHECK TAPE TRAVEL ON TAPE TRANSPORT

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NOTE 1
When tape moves over tape guide assemblies, friction in guide assemblies may produce noise. Excessive noise of tape guide assembly may not be related to tape transport problems

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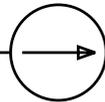
NOTE 2	
It may be necessary to grind off half the thickness on large end of 417A wrench	
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[1] On test pack,
set MODE switch **R-W-E** to **R**

[2] Condition oscilloscope to 1-volt/cm,
5-microsecond/cm, chopped mode,
and SYNC to channel 1

[3] On test pack, connect channel 1
of oscilloscope to test point **2** and
channel 2 to test point **0**

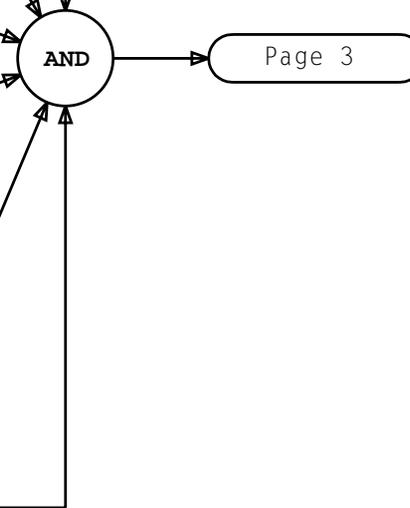
[4] See NOTE 1. At tape transport,
depress **FORWARD** pushbutton



FORWARD lamp lights;
tape winds forward

[5] See NOTES 2 and 3. Determine pulse
difference (static skew) of displayed
pulses by comparing trailing edge of
channel 2 pulse to trailing edge of
channel 1 pulse (ignore leading edge
of pulses) [FIG. 1]

[6] Record read head pulse difference
[DLP-541]



NOTES

1. Take pulse difference readings only when tape transport is in **FORWARD** mode
2. Pulse difference steps may jitter. If so, maximum pulse difference should be noted
3. If trailing edge of channel 2 pulse occurs before trailing edge of channel 1 pulse, difference is expressed as positive; if it occurs after, difference is expressed as negative

CHECK READ HEAD ALIGNMENT, TAPE TRANSPORT

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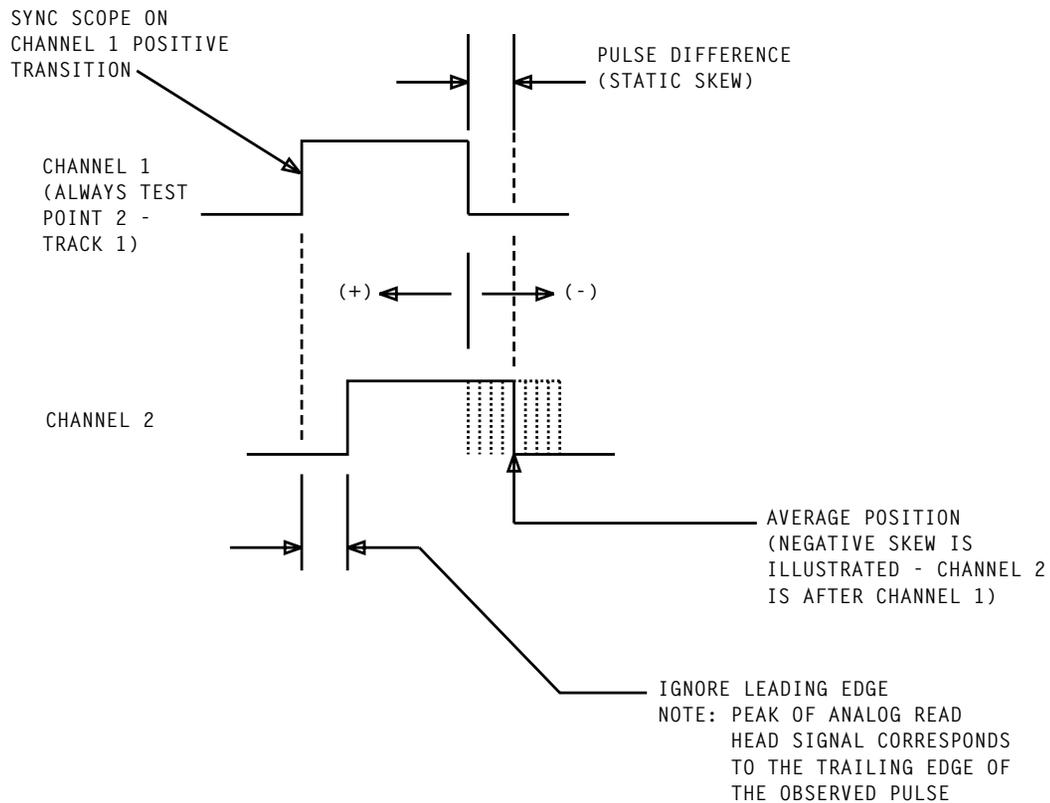


FIG. 1 - Example of Pulse Difference (Static Skew)

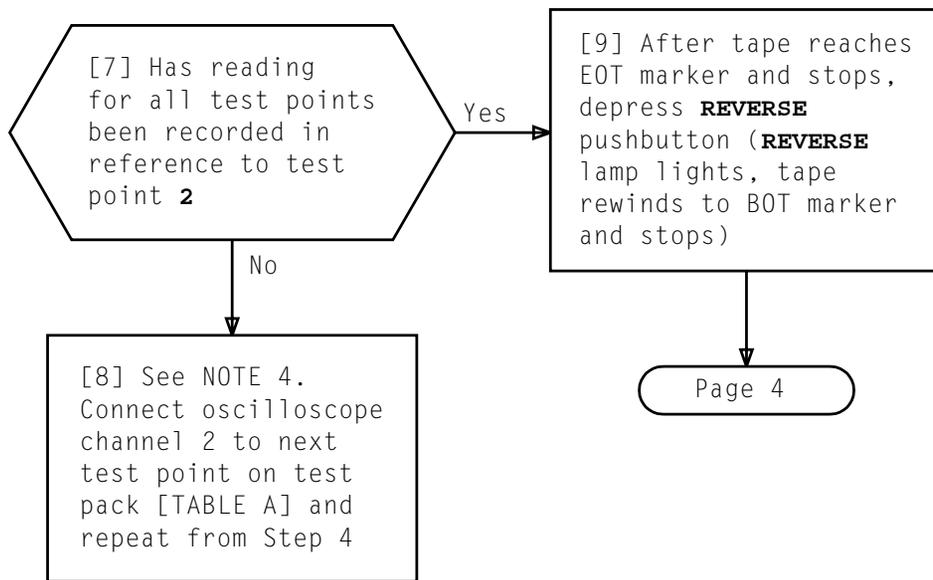
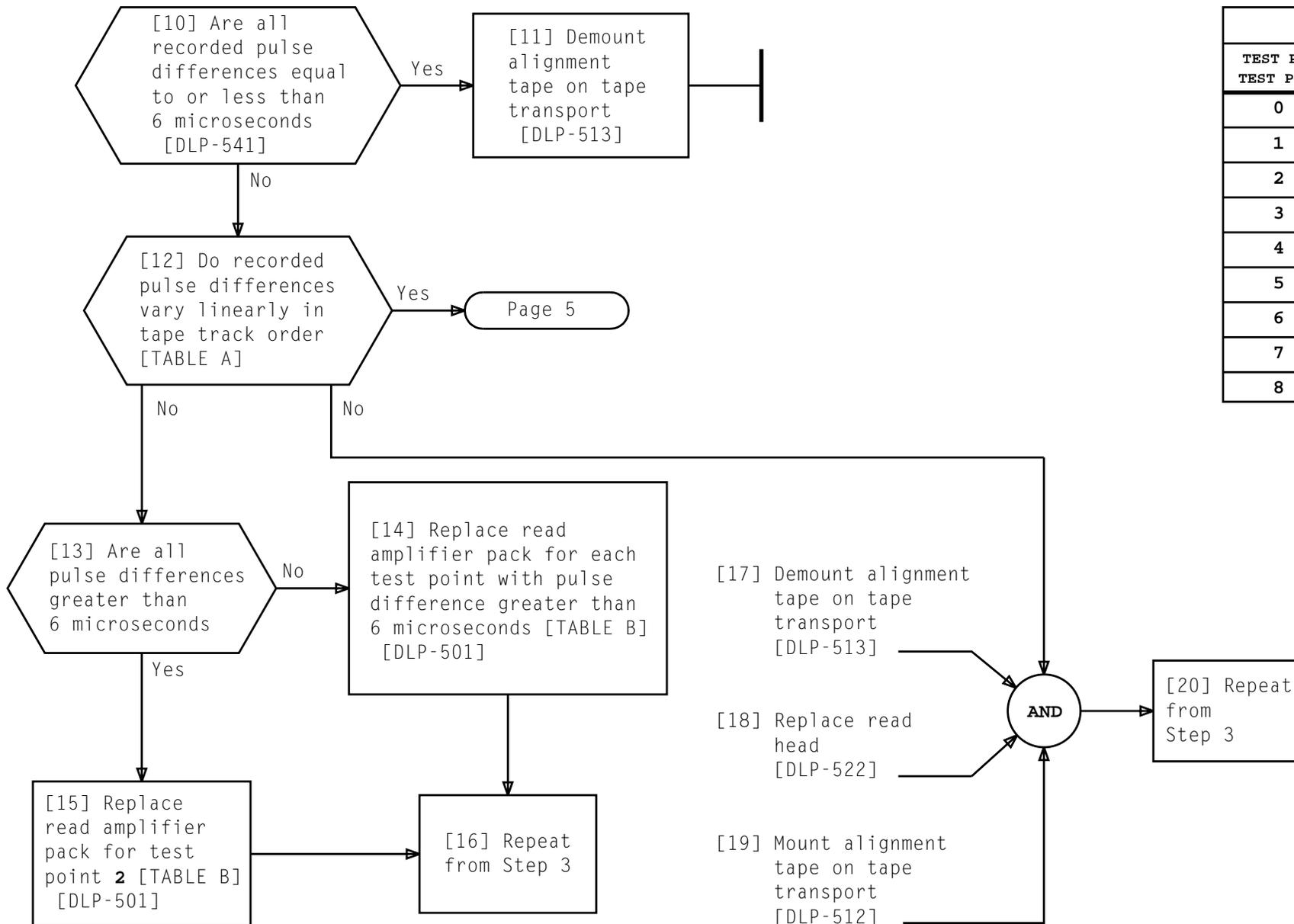


TABLE A	
TEST PACK TEST POINT	TAPE TRACK
0	2
1	8
2	1
3	9
4	3
5	5
6	6
7	7
8	4

NOTE 4 Comparing test points 3 and 2 will normally give greatest difference	
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CHECK READ HEAD ALIGNMENT, TAPE TRANSPORT

TABLE B	
TEST PACK TEST POINT	READ AMPL PACK LOC
0	72-12
1	72-13
2	72-14
3	72-16
4	72-17
5	72-18
6	72-19
7	72-20
8	72-21

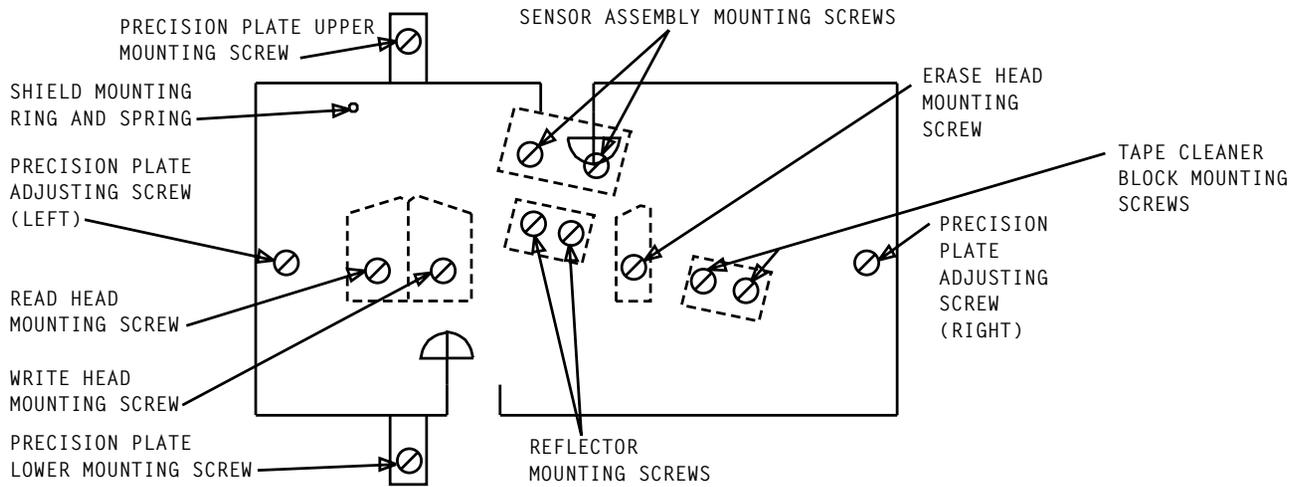
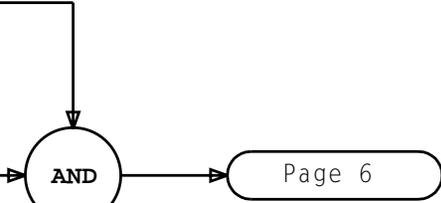


CHECK READ HEAD ALIGNMENT, TAPE TRANSPORT

[21] See NOTE 5. Connect channel 2 to test point 3

[22] At lower right of tape transport, loosen pawl fastener; unlatch, and open casting door

[23] See WARNING 1. Check component mounting screws and upper and lower mounting screws of precision plate for snugness [FIG. 2]



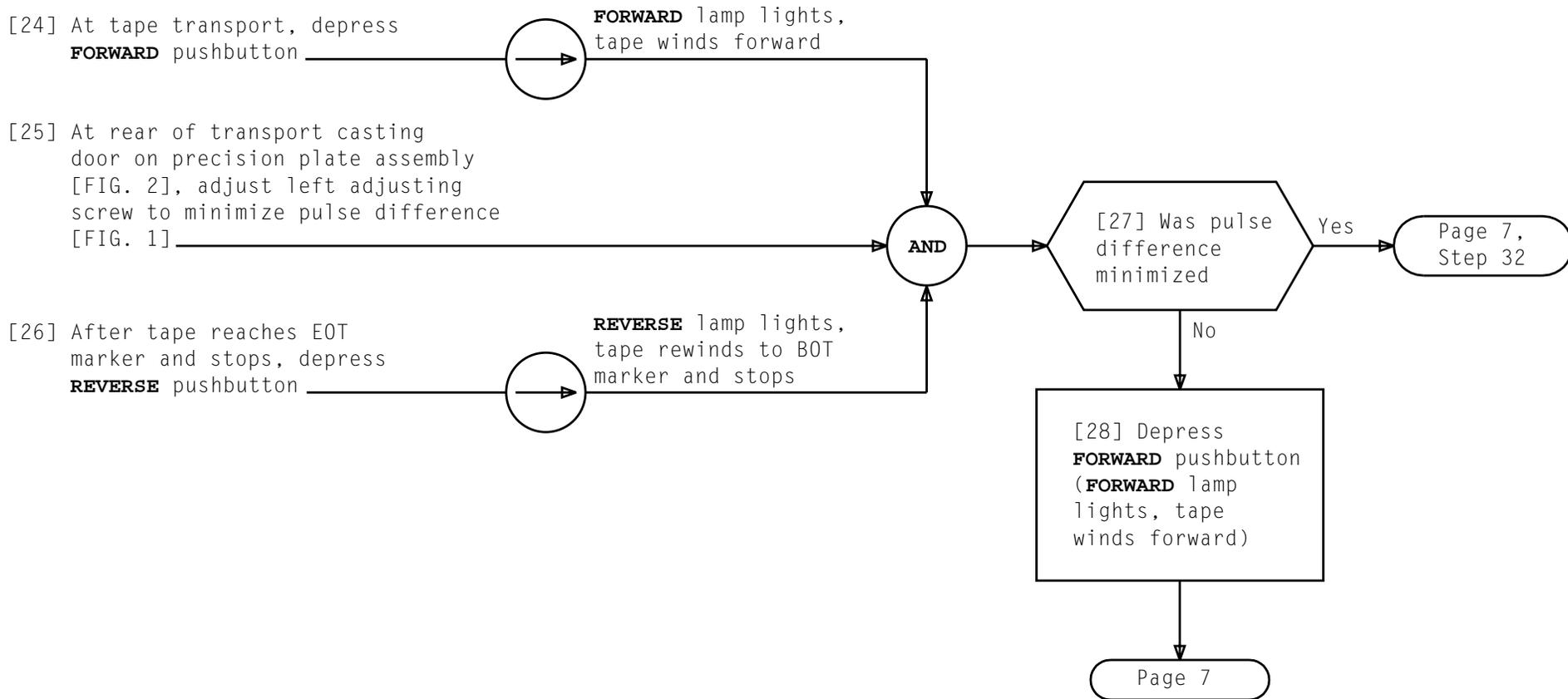
**FIG. 2 - Precision Plate Assembly-Rear View
Showing Component Mounting Screws**

NOTE 5
Adjusting right or left precision plate adjusting screw affects all nine tape tracks

WARNING 1
Screws associated with precision plate are small and strip or break easily. Tighten carefully

CHECK READ HEAD ALIGNMENT, TAPE TRANSPORT

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CHECK READ HEAD ALIGNMENT, TAPE TRANSPORT

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At rear of transport casting door
on precision plate assembly:

[29] Back out left or both precision
plate adjusting screws until plate
and screwhead are separated by
approximately 3/16 inch [FIG. 3]

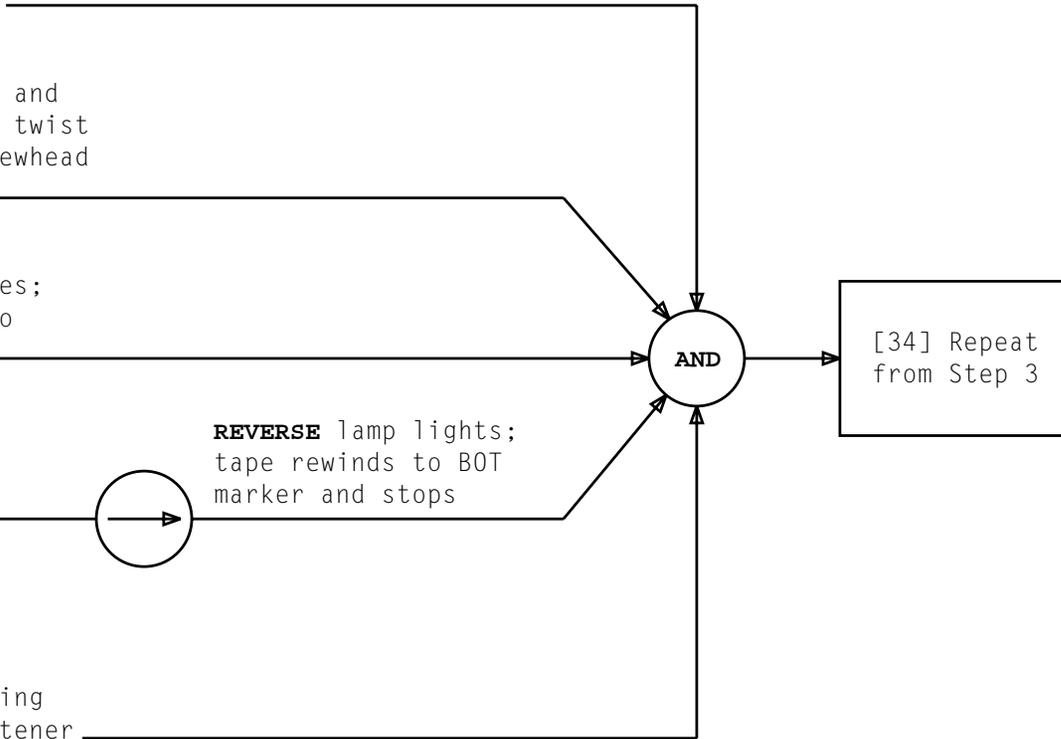
[30] Insert screwdriver between plate and
casting on right side and gently twist
screwdriver using adjustment screwhead
as stop [FIG. 3]

[31] Repeat Steps 29 and 30 three times;
then tighten adjustment screws to
contact precision plate

[32] After tape reaches EOT marker
and stops, depress **REVERSE**
pushbutton

REVERSE lamp lights;
tape rewinds to BOT
marker and stops

[33] Gently close tape transport casting
door; latch, and secure pawl fastener



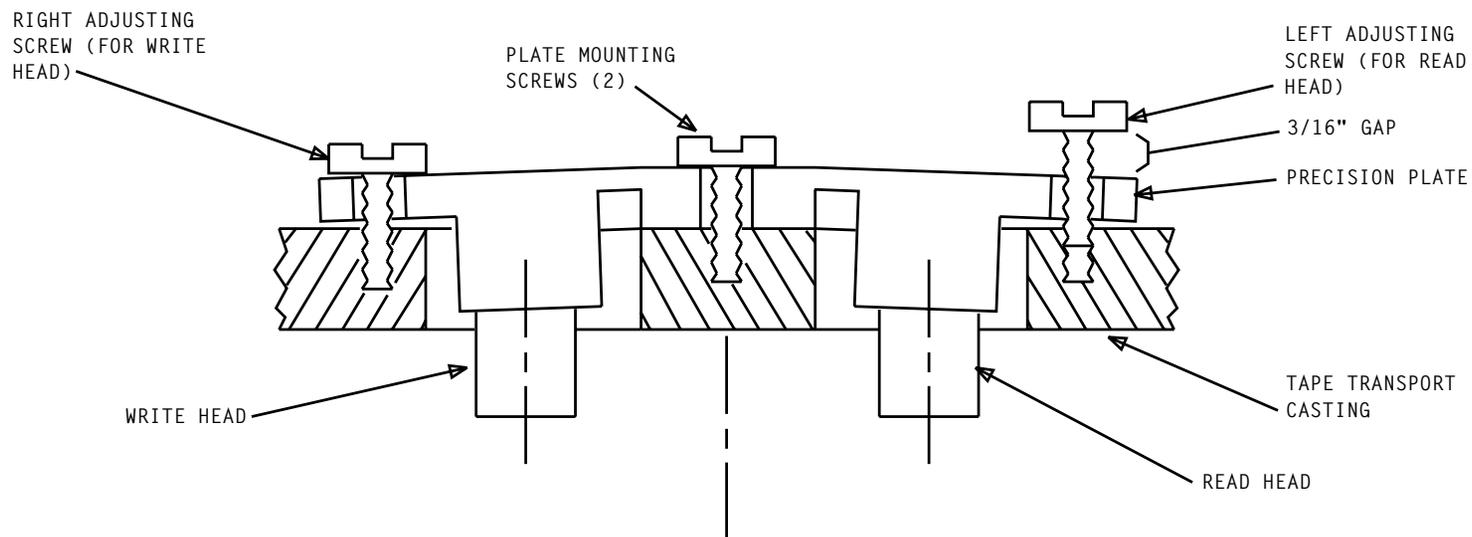


FIG. 3 - Cross Section View of Flexed Precision Plate Assembly

[1] Obtain support apparatus [TABLE A]

[2] At TUC power switch, depress **ROS/OFF** switch

PWR OFF
lamp
lights

[3] At rear of tape unit frame, remove **J10** connector from **P10**

[4] At DC-to-DC converter, open cover door and set **ON/OFF** switch to **OFF**

[5] At lower right of tape transport, loosen pawl fastener; unlatch, and open casting door

[6] At rear of transport casting door, remove **CP2** pack from printed circuit board chassis

[7] Insert and properly seat **CP2** pack into card extender and insert card extender assembly into location from which **CP2** pack was removed

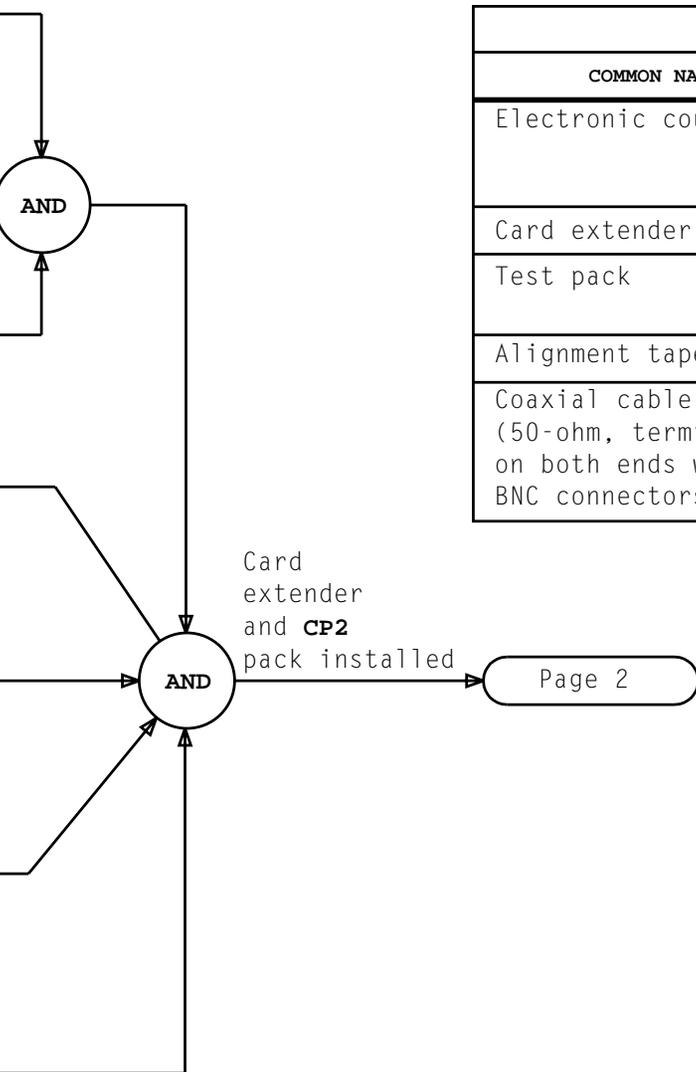


TABLE A	
COMMON NAME	PART NUMBER
Electronic counter	HP-5345A or equivalent
Card extender	L-502681
Test pack	Skew alignment Tool 814A
Alignment tape	KS-20315,L1
Coaxial cable (50-ohm, terminated on both ends with BNC connectors)	-

CHECK CAPSTAN SPEED, TAPE TRANSPORT

[8] At TUC, insert and properly seat test pack (072-34)

[9] On test pack, set MODE switch **R-W-E** to **R**

[10] Connect electronic counter to 115V AC power source and allow period for stabilization

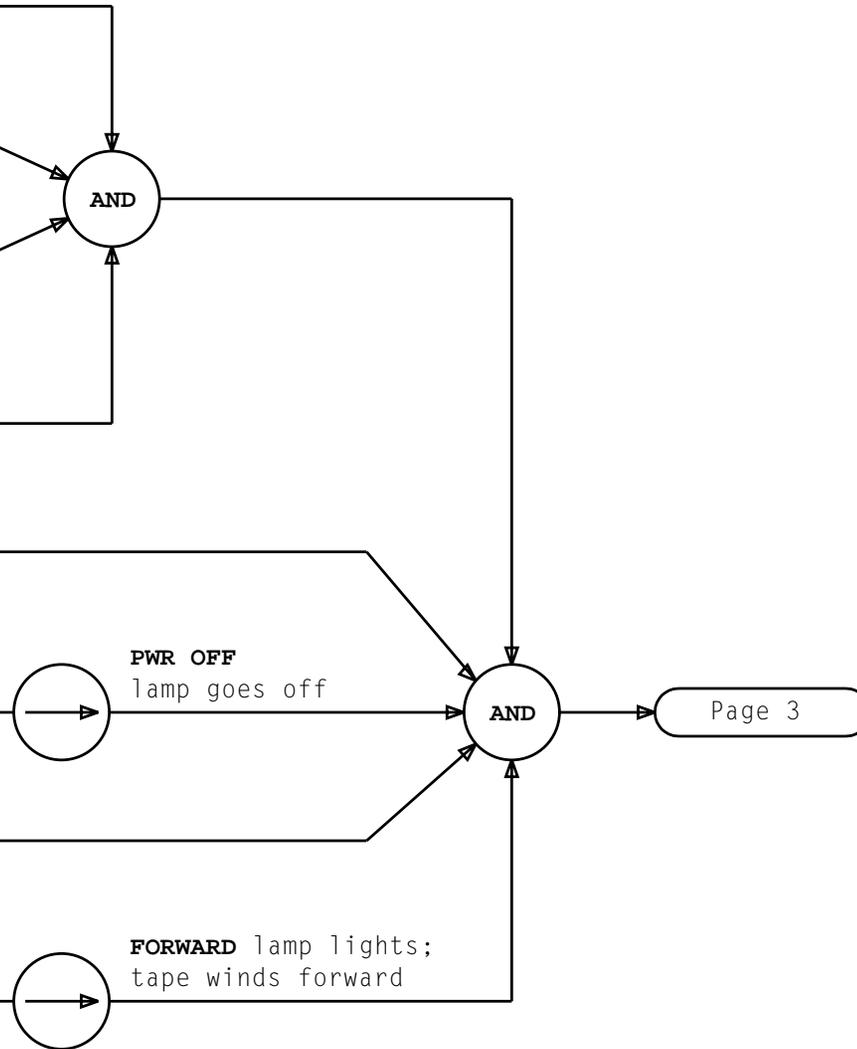
[11] Connect coaxial cable with BNC connectors to electronic counter and BNC connector on test pack

[12] At DC-to-DC converter, set **ON/OFF** switch to **ON**

[13] At TUC power switch, depress and hold **ON** pushbutton for 2 seconds

[14] Mount alignment tape on tape transport [DLP-512]

[15] Depress **FORWARD** pushbutton and observe electronic counter



CHECK CAPSTAN SPEED, TAPE TRANSPORT

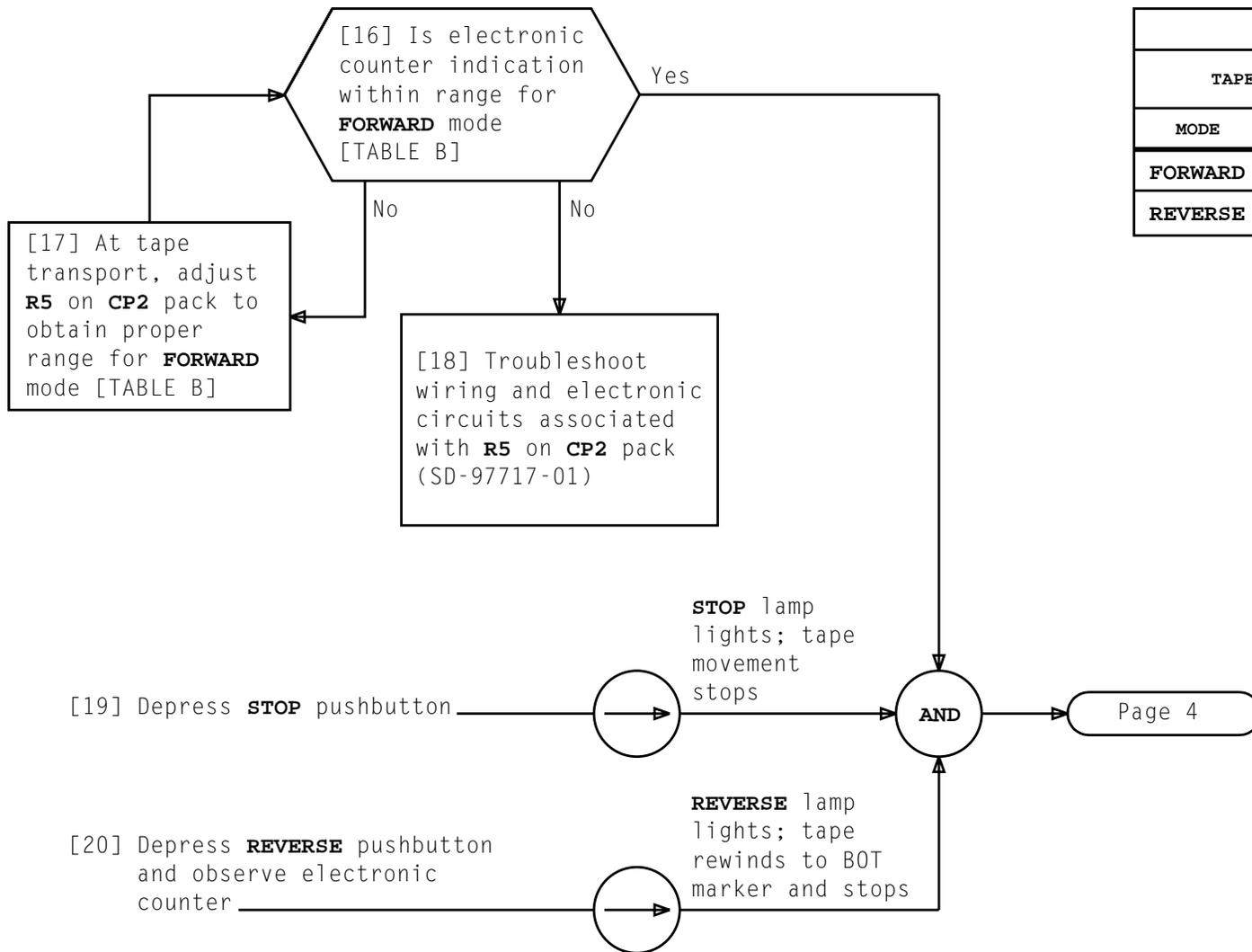
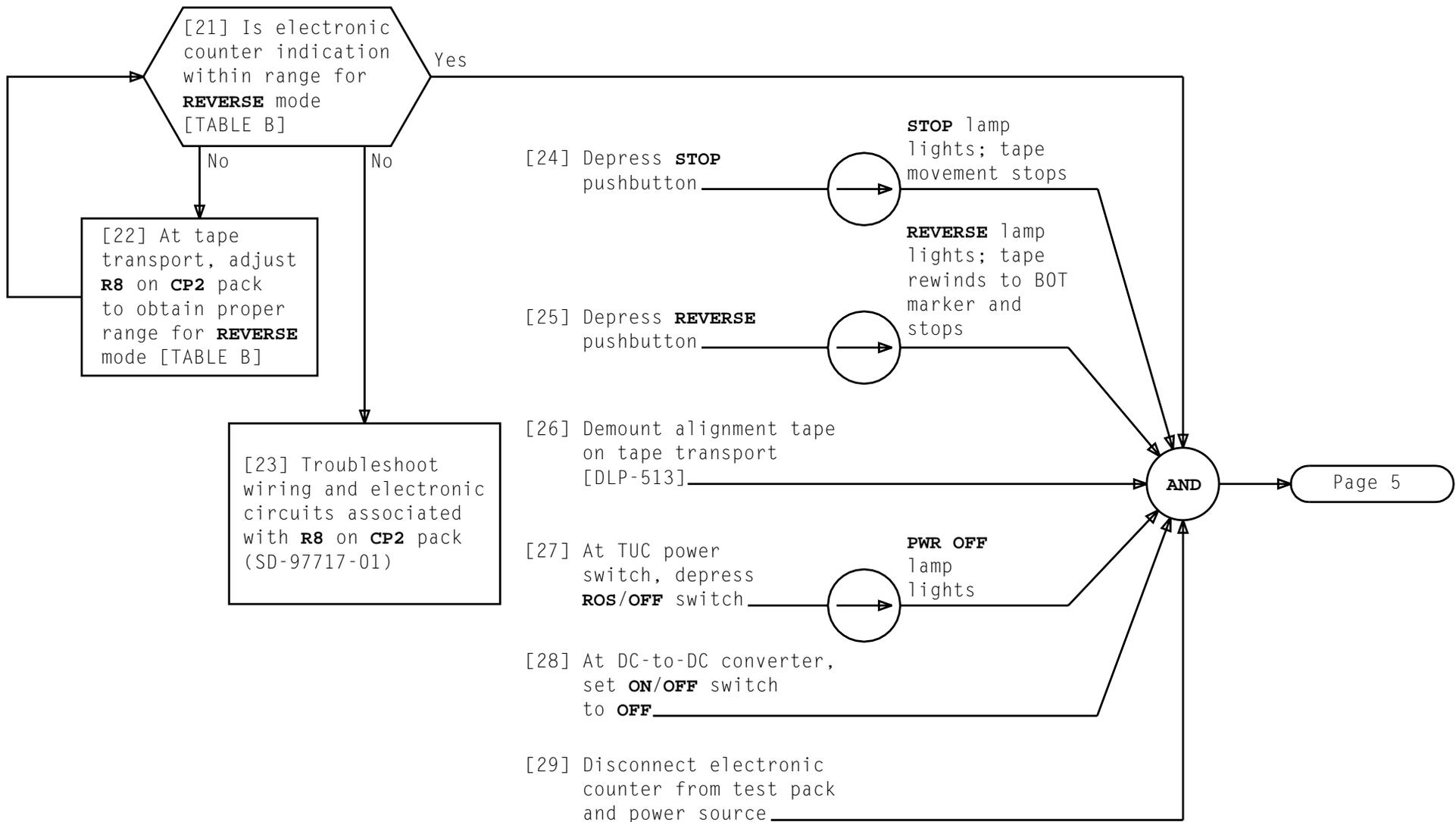


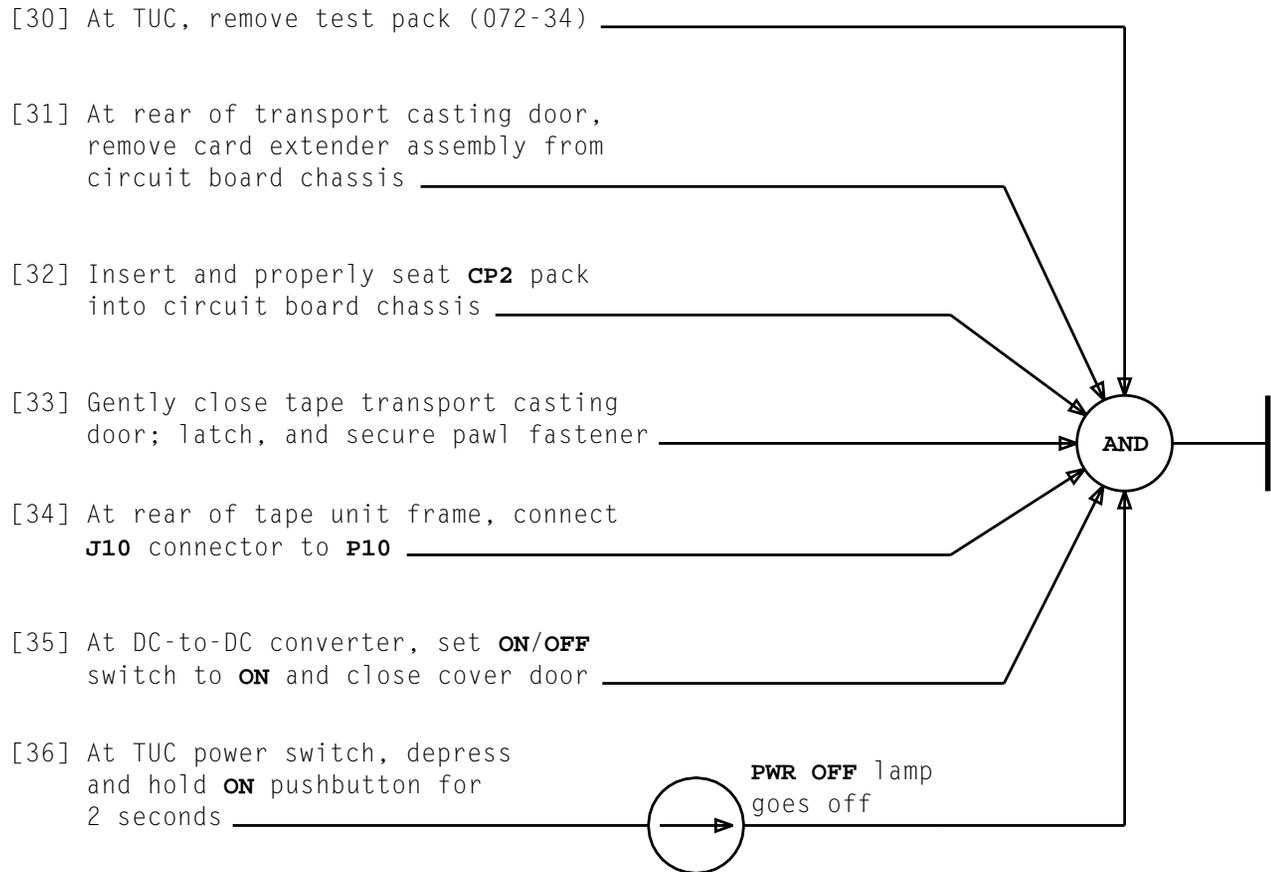
TABLE B		
TAPE TRANSPORT		ELECTRONIC COUNTER INDICATION
MODE	TAPE SPEED	
FORWARD	24.8 IPS	4952 to 4968 Hz
REVERSE	24.8 IPS	4952 to 4968 Hz

CHECK CAPSTAN SPEED, TAPE TRANSPORT



CHECK CAPSTAN SPEED, TAPE TRANSPORT

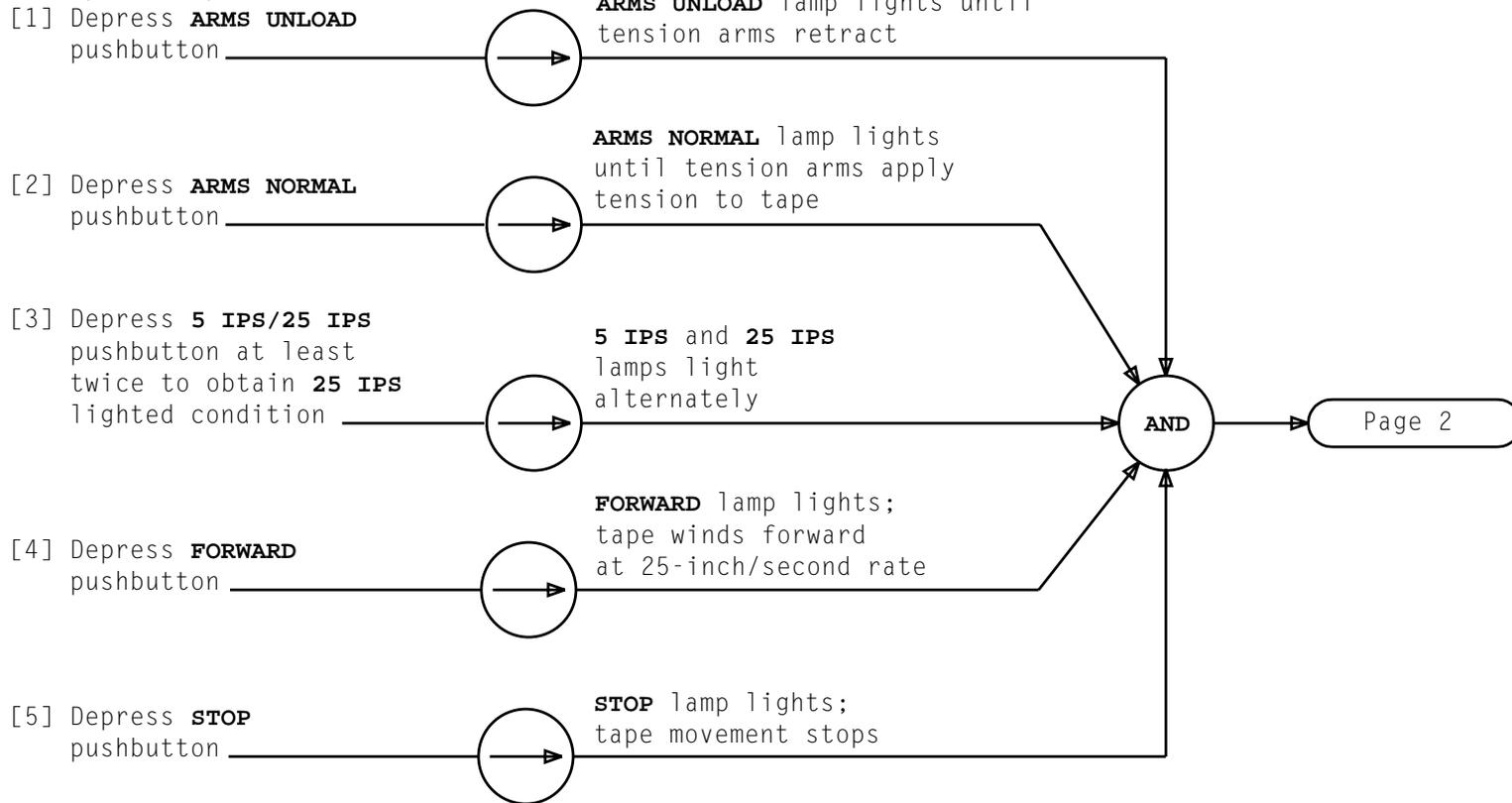
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CHECK CAPSTAN SPEED, TAPE TRANSPORT

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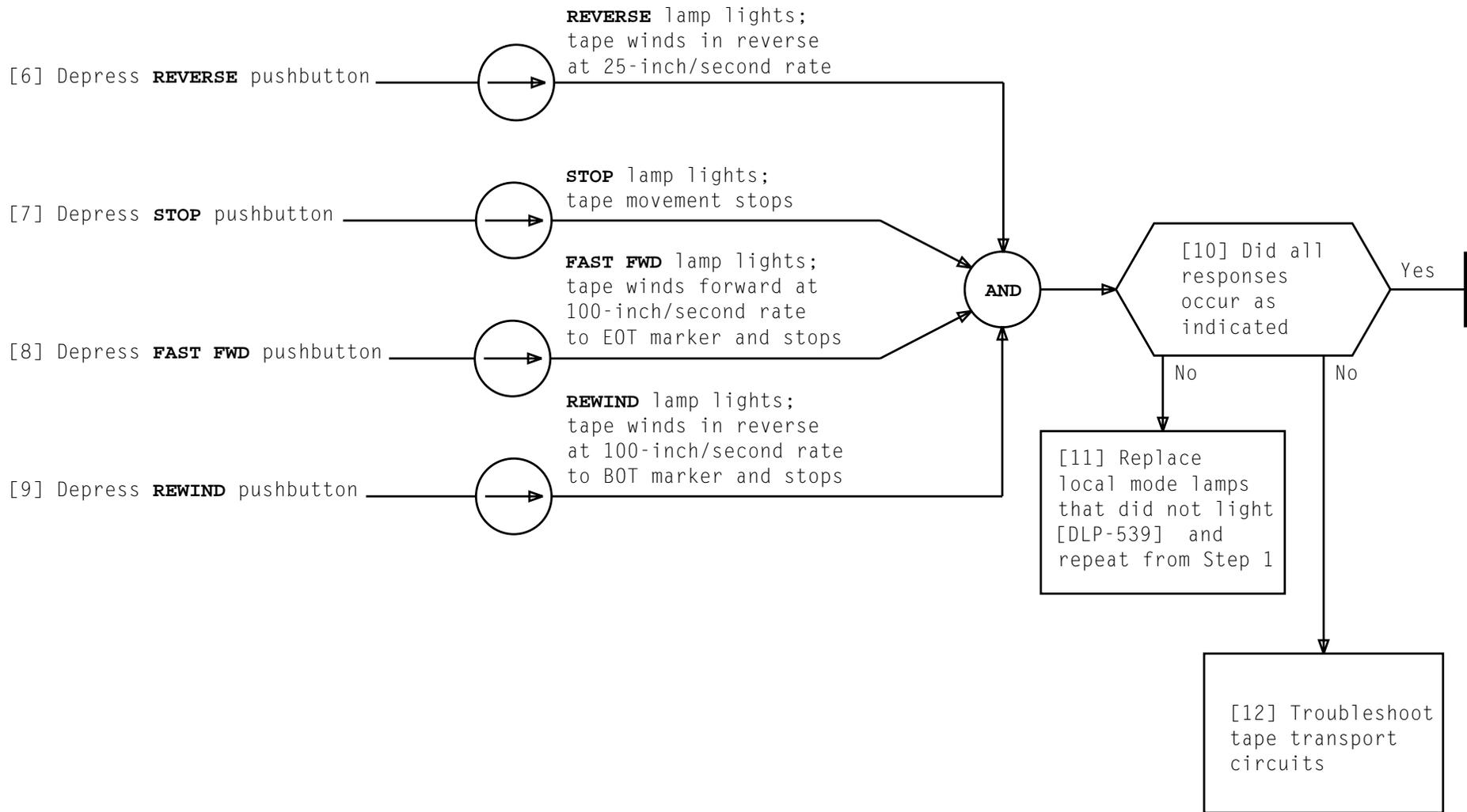
At tape transport:



CHECK OPERATION OF TAPE TRANSPORT USING LOCAL MODE SWITCHES

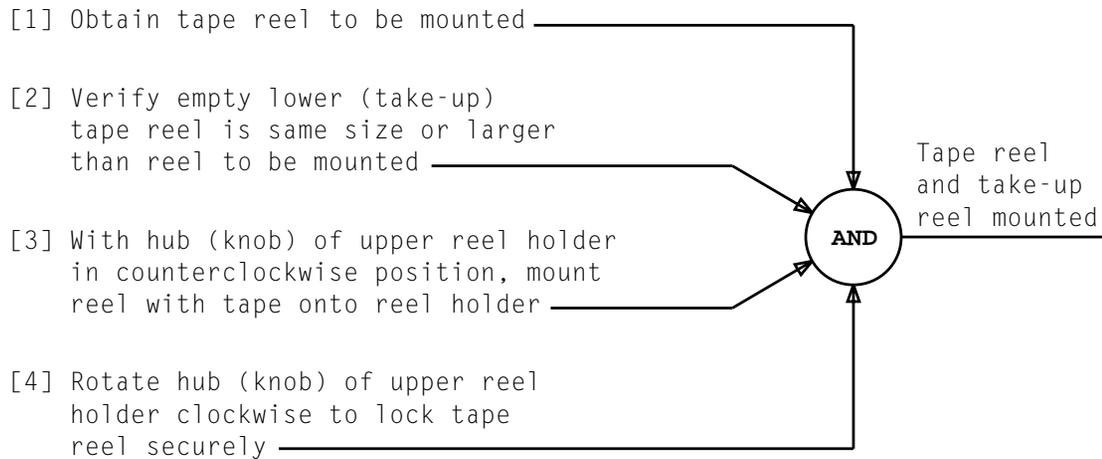
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CHECK OPERATION OF TAPE TRANSPORT USING LOCAL MODE SWITCHES

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[5] See WARNING 1. While depressing **BRAKE RELEASE** pushbutton, manually unwind approximately 5 feet of tape and release **BRAKE RELEASE** pushbutton

[6] See WARNING 2. Thread tape through tape path indicated on tape transport

[7] See NOTE 1. Start tape on lower (take-up) reel making sure tape is not twisted

NOTE 1
To start tape on take-up reel, it may help to moisten tape end (moistened fingers) and stick tape to reel axle

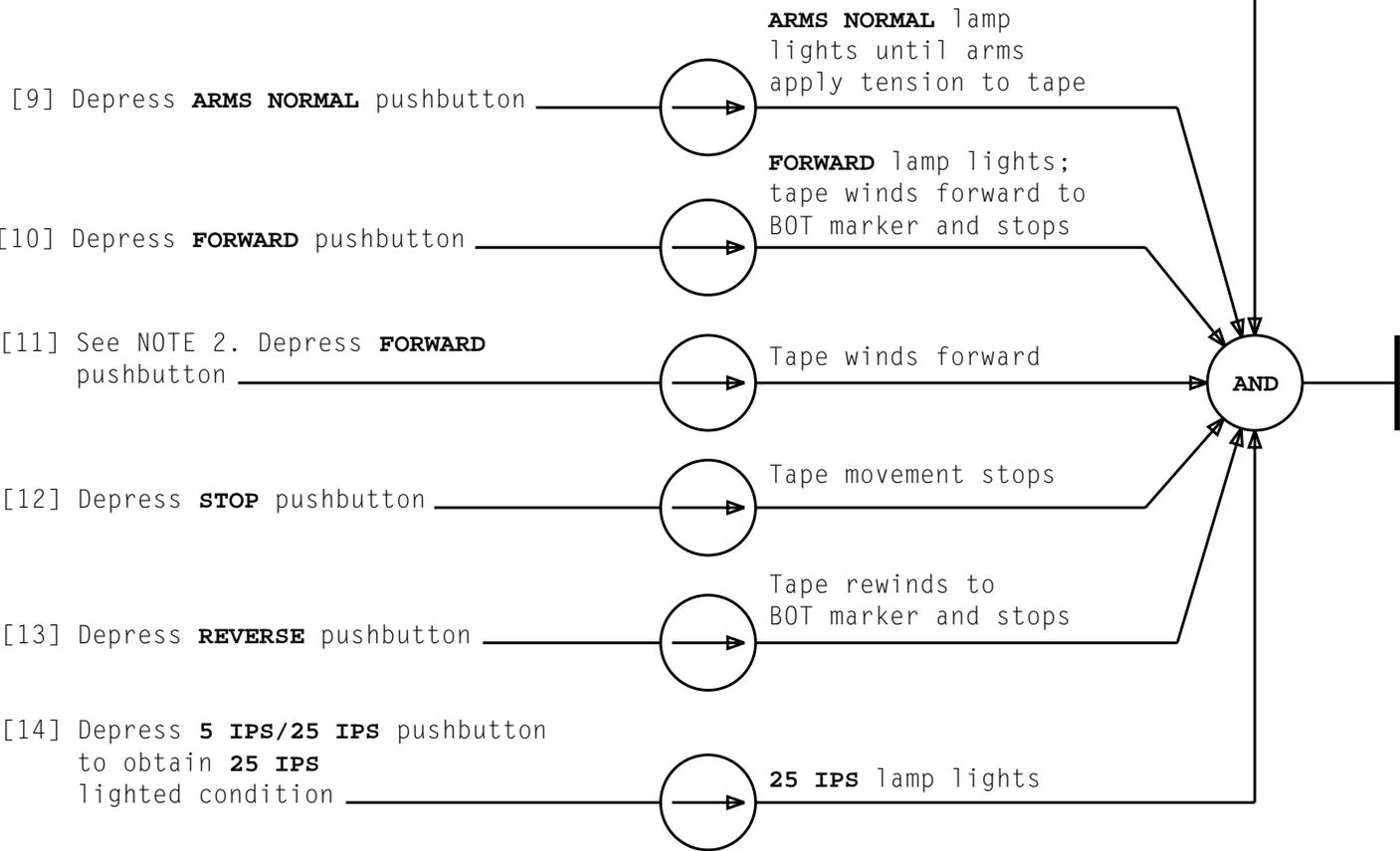
WARNINGS

1. Contamination of tape by contact with floor will damage tape heads
2. Do not touch tape head surfaces; body oil will contaminate tape

MOUNT TAPE ON TAPE TRANSPORT

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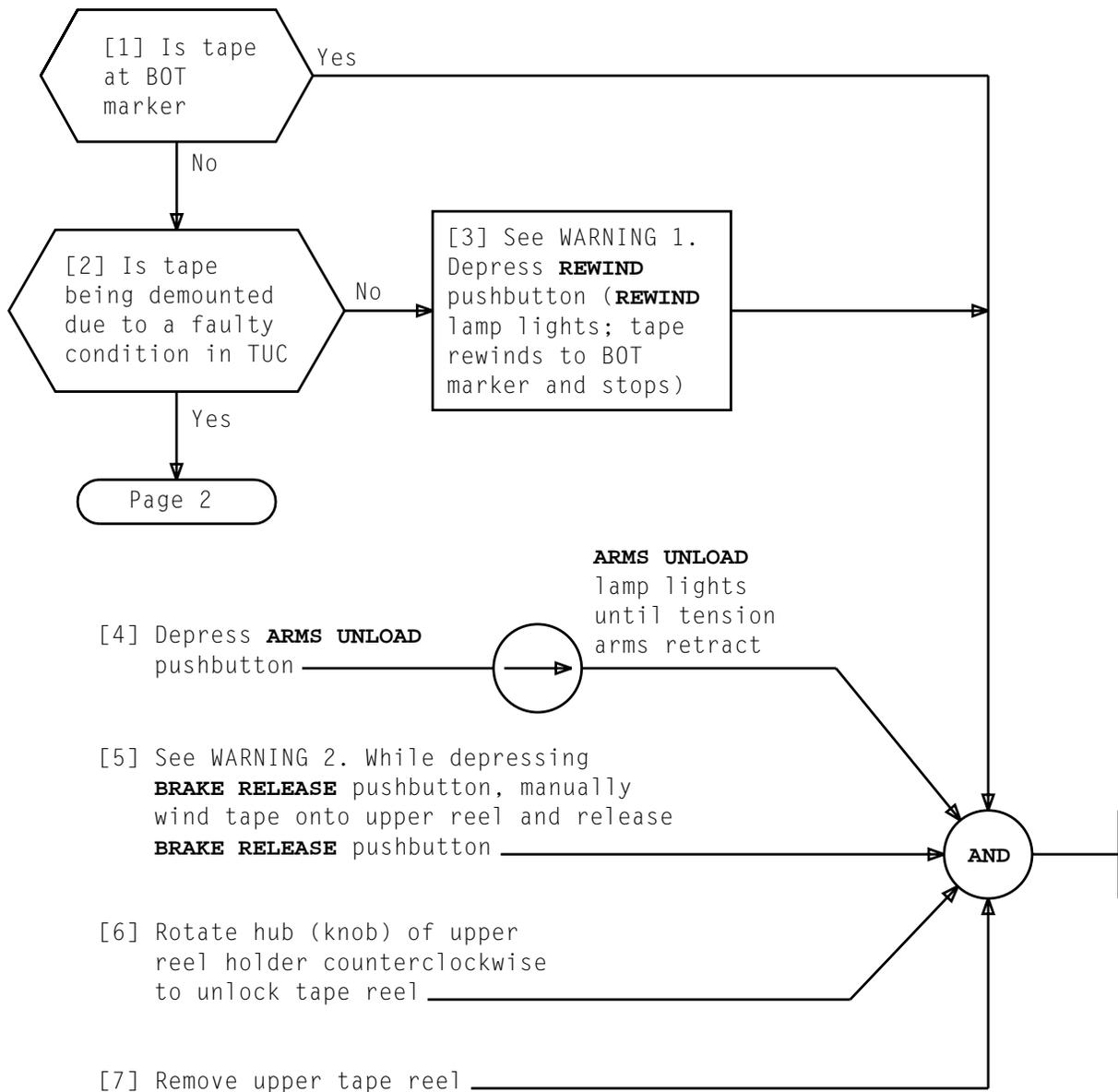
[8] See WARNING 3. While depressing **BRAKE RELEASE** pushbutton, manually wind lower (take-up) reel three or four turns and release **BRAKE RELEASE** pushbutton



NOTE 2
Steps 11, 12, and 13 cause BOT marker to be approached from recorded area of tape

WARNING 3
If tape is not properly aligned along rollers and guides or is too loose, it may be damaged

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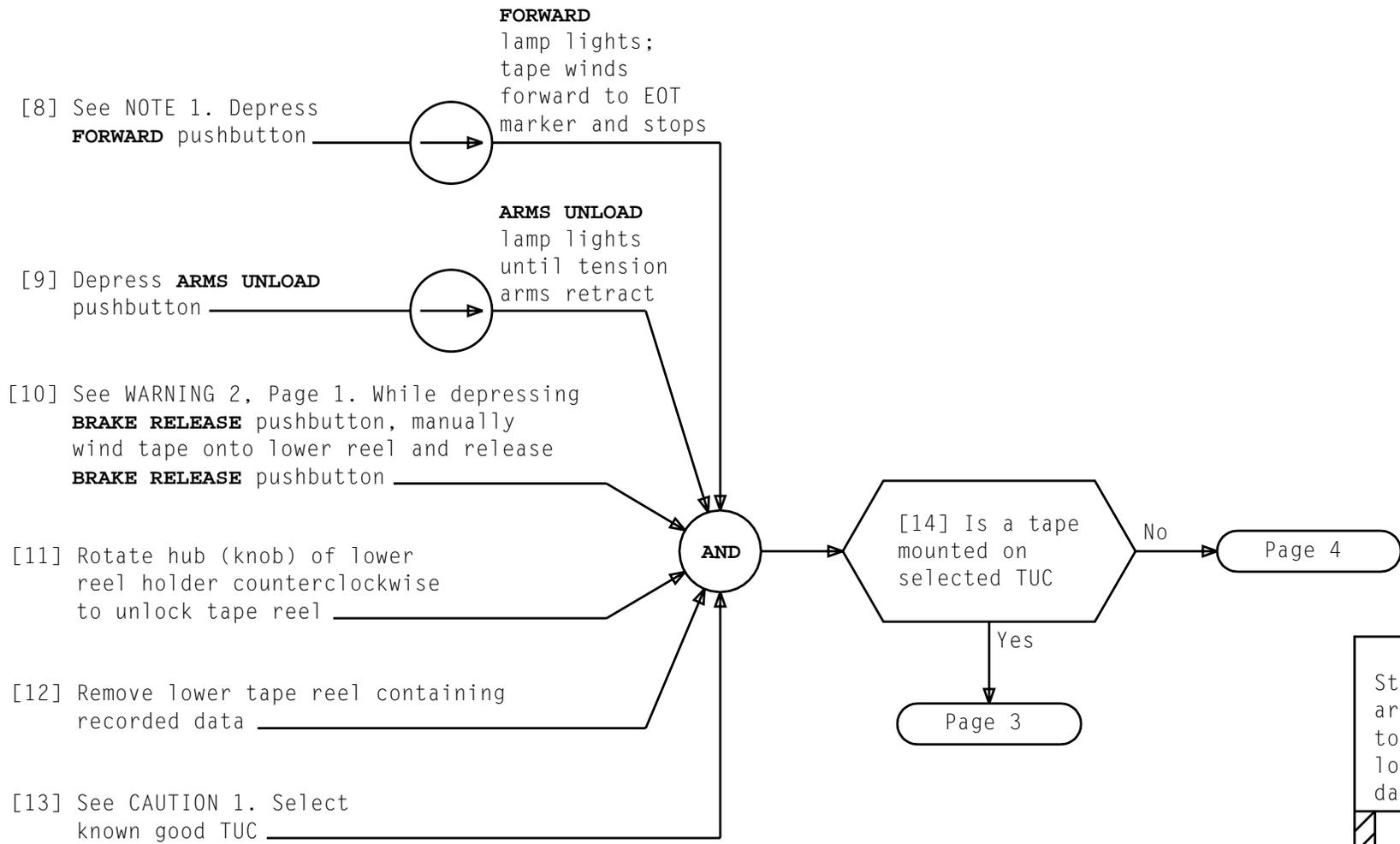


WARNINGS

1. If alignment tape is mounted, use **REVERSE** pushbutton to rewind tape
2. Pulling or dragging last 5 feet of tape across heads may contaminate heads

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DEMOUNT TAPE ON TAPE TRANSPORT

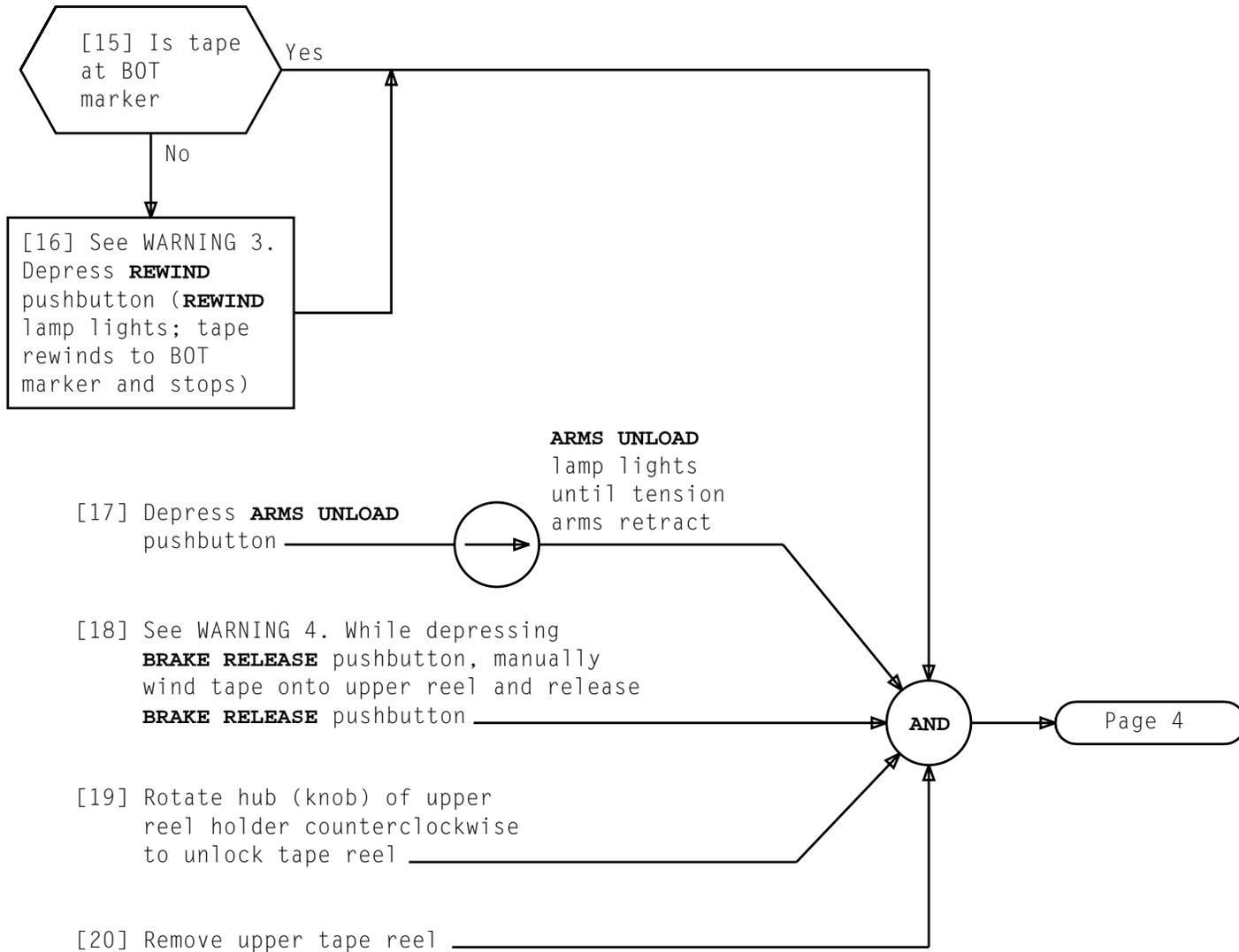


NOTE 1
Steps 8 through 37 are being performed to prevent possible loss of recorded data

CAUTION 1
If function assigned to selected TUC is AMA (active or standby) perform remaining steps at a later date

DEMOUNT TAPE ON TAPE TRANSPORT

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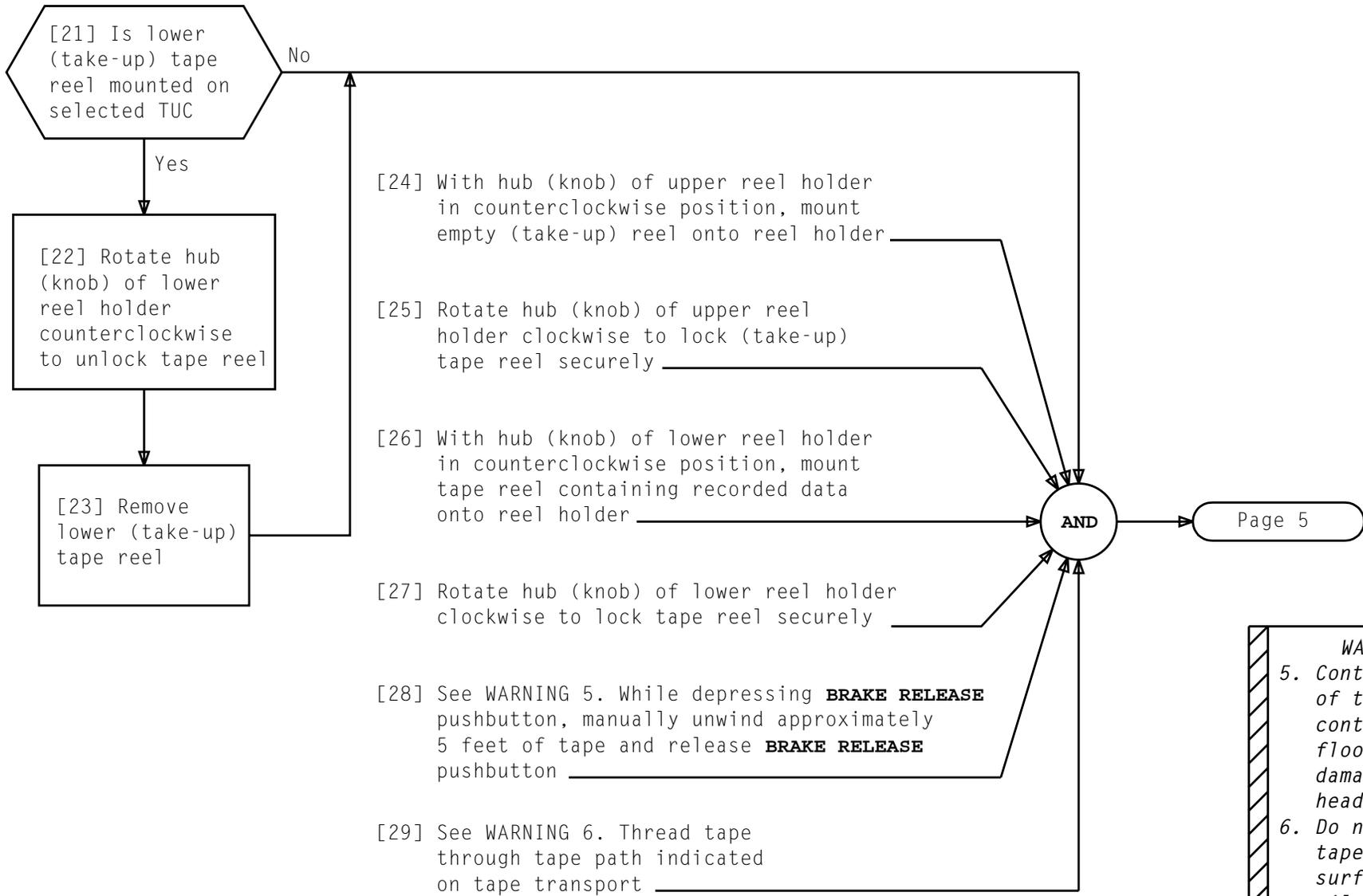
WARNINGS

3. If alignment tape is mounted, use **REVERSE** pushbutton to rewind tape

4. Pulling or dragging last 5 feet of tape across heads may contaminate heads

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DEMOUNT TAPE ON TAPE TRANSPORT



WARNINGS

5. Contamination of tape by contact with floor will damage tape heads
6. Do not touch tape head surfaces; body oil will contaminate tape

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DEMOUNT TAPE ON TAPE TRANSPORT

[30] See NOTE 2. Start tape on upper (take-up) reel making sure tape is not twisted _____

[31] See WARNING 7. While depressing **BRAKE RELEASE** pushbutton, manually wind upper (take-up) reel three or four turns and release **BRAKE RELEASE** pushbutton _____

[32] Depress **ARMS NORMAL** pushbutton _____

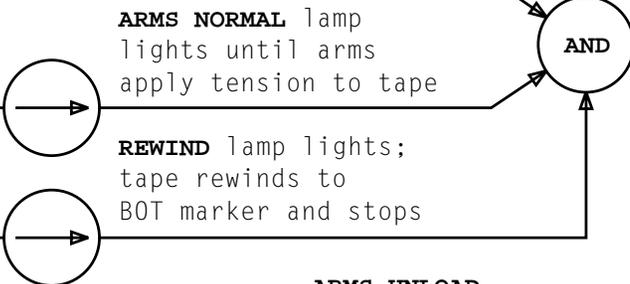
[33] Depress **REWIND** pushbutton _____

[34] Depress **ARMS UNLOAD** pushbutton _____

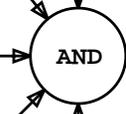
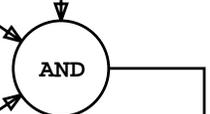
[35] See WARNING 8. While depressing **BRAKE RELEASE** pushbutton, manually wind tape onto upper reel and release **BRAKE RELEASE** pushbutton _____

[36] Rotate hub (knob) of upper reel holder counterclockwise to unlock tape reel _____

[37] Remove upper tape reel _____



ARMS UNLOAD lamp lights until tension arms retract



NOTE 2
To start tape on take-up reel, it may help to moisten tape end (moistened fingers) and stick tape to reel axle

WARNINGS
7. If tape is not properly aligned along rollers and guides or is too loose, it may be damaged
8. Pulling or dragging last 5 feet of tape across heads may contaminate heads

DEMOUNT TAPE ON TAPE TRANSPORT

[1] Obtain 8000A fluke digital voltmeter or equivalent (allow 5 minutes for stabilization)

[2] See DANGER 1. At DC-to-DC converter, open cover door

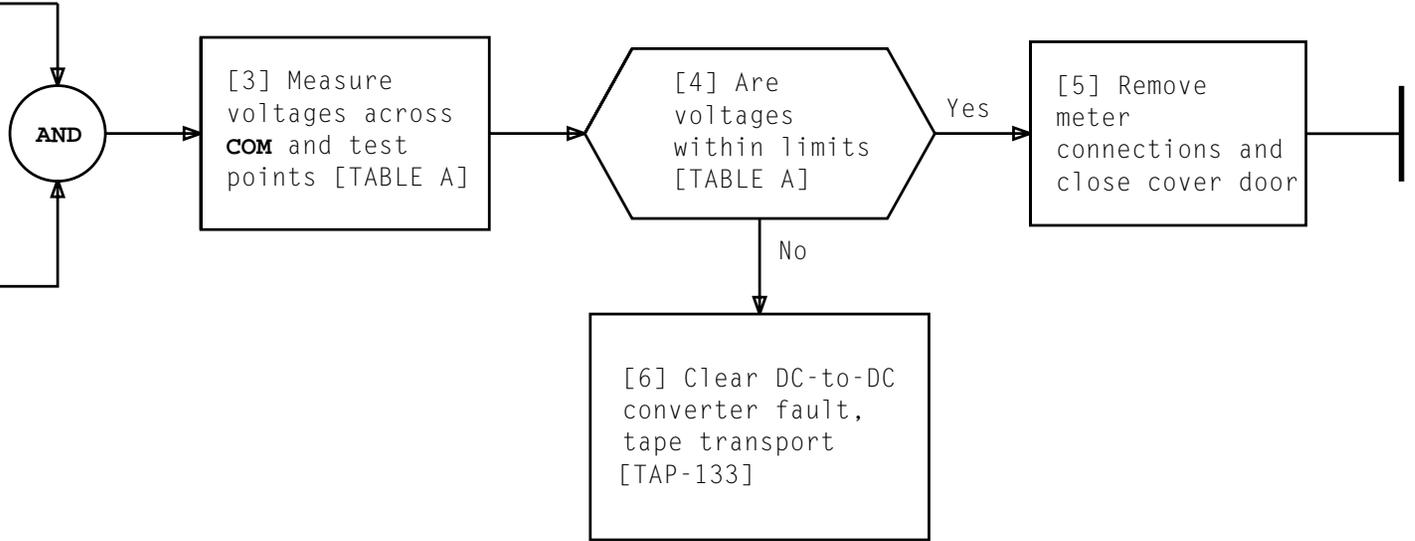


TABLE A	
TEST POINT	VOLTAGE LIMITS
-24V	-23.5 to -26.0
+15V	+13.8 to +16.2
+5V	+4.8 to +5.8
-15V	-13.8 to -16.2

*DANGER 1
High DC current
exists on
DC-to-DC
converter
terminals*

CHECK DC-TO-DC CONVERTER VOLTAGES

At tape unit frame:

[1] Open converter cover door and set **ON/OFF** switch to **OFF**

[2] Close converter cover door and open tape transport cover door

[3] At lower right of tape transport, loosen pawl fastener; unlatch, and open casting door

[4] See NOTE 1. Using 4-inch screwdriver, remove reel motor brush cap [FIG. 1]

[5] See WARNING 1. Withdraw brush from motor noting brush orientation

[6] Using 6-inch scale, measure brush length

AND

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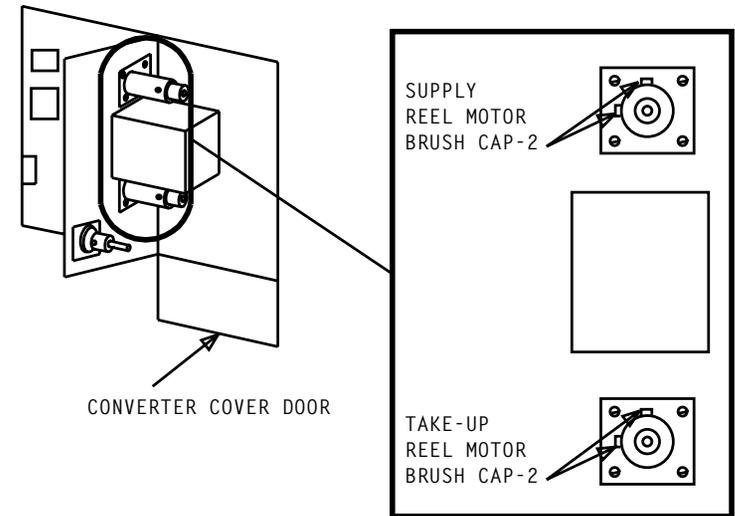


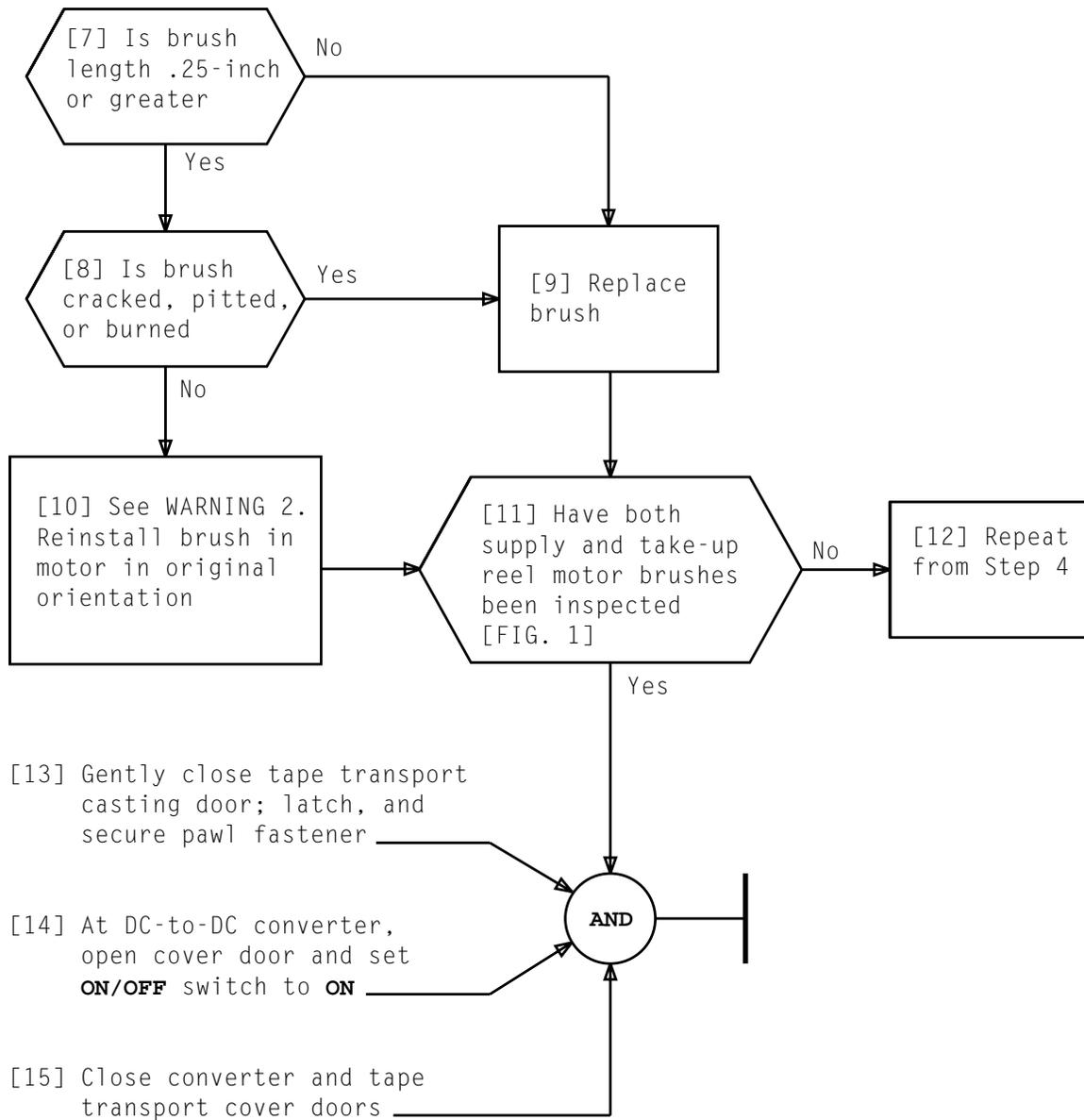
FIG. 1 - Tape Transport Casting Door (Rear View)

NOTE 1

Access to second brush on take-up reel motor is accomplished by removing four screws and rotating motor 90 degrees

WARNING 1

When brush is reinstalled in motor, it must be oriented as before removal to prevent damage to brush and commutator



WARNING 2
 When brush is reinstalled in motor, it must be oriented as before removal to prevent damage to brush and commutator

INSPECT SUPPLY AND TAKE-UP REEL MOTOR BRUSHES, TAPE TRANSPORT

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1. Carefully loosen two screws securing switch (**S7**) to write enable assembly bracket [FIG. 1]
 2. Depress and hold solenoid plunger to maximum rear position
 3. While holding solenoid plunger, push switch (**S7**) forward until actuating arm is at limit of its travel without bending
 4. Tighten two screws to secure switch (**S7**)
- End of procedure

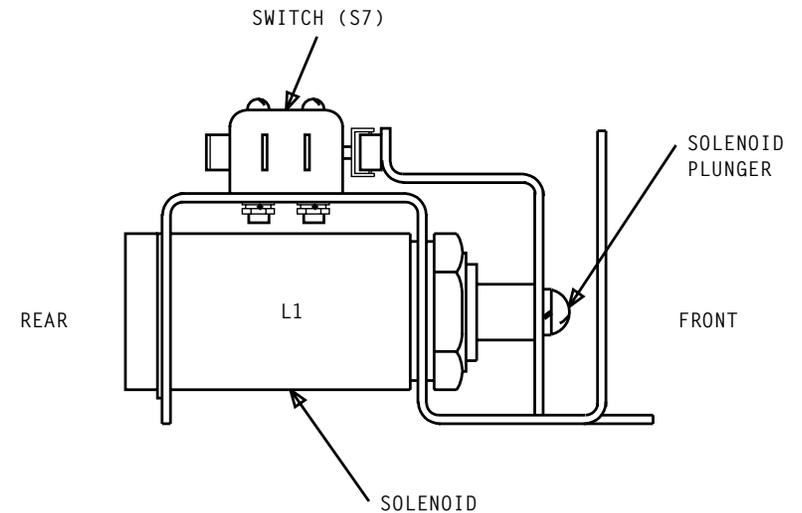


FIG. 1 - Write Enable Assembly

ADJUST WRITE ENABLE ASSEMBLY

Reissued

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[1] See DANGER 1. Obtain replacement DC-to-DC converter

[2] At TUC power switch, depress **ROS/OFF** switch

[3] At DC-to-DC converter, open cover door and set **ON/OFF** switch to **OFF** [FIG. 1]

[4] At Power Distributing (PD) frame, remove -48 volt fuse (refer to office drawings, -48Q lead) for tape unit frame to be repaired

[5] Release converter drawer locks and pull converter out to fully extended position [FIG. 1]

[6] Verify absence of -48 volts across **TB1-1** (+) and **TB1-2** (-) leads [TABLE A]

[7] Disconnect three -48 volt power cable leads [TABLE A]

[8] Remove three cable clamps holding input and output power cables to converter

[9] Unscrew **P1** locking ring and remove **P1** from **J1**

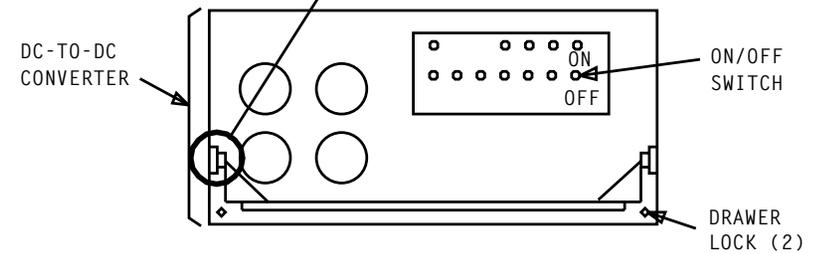
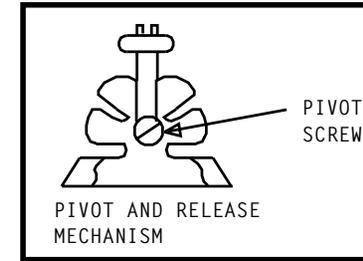
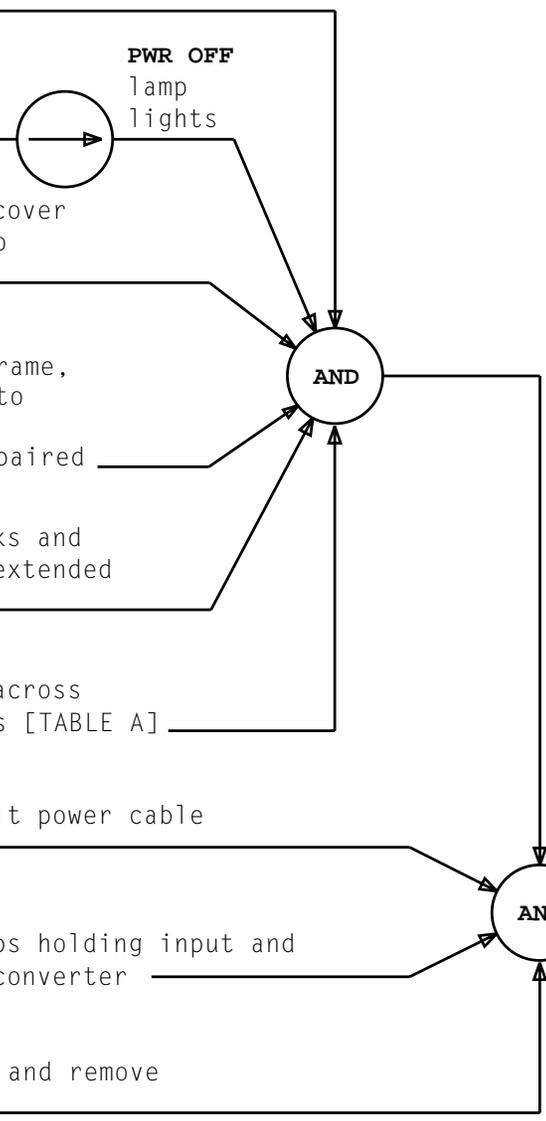


FIG. 1 - DC-to-DC Converter With Cover Door Open

TABLE A	
LEAD IDENTIFICATION	LEAD DESIGNATION
White	TB1-1
Black	TB1-2
Green	FR GRD

DANGER 1
DC-to-DC converter weighs approximately 80 pounds

Revised

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[10] See DANGER 2. Remove screw from each pivot mechanism; tilt converter, remove retaining nut from pivot mechanism slot, and retain hardware [FIG. 1]

[11] See DANGER 2. Lift converter off pivot mechanism

[12] Examine old and new converters for hardware requirements. New converter needs should be supplied by old converter

[13] See DANGER 2. Install replacement converter on pivot mechanism

[14] Install pivot screw and retaining nut removed

[15] At replacement DC-to-DC converter, set **ON/OFF** switch to **OFF**

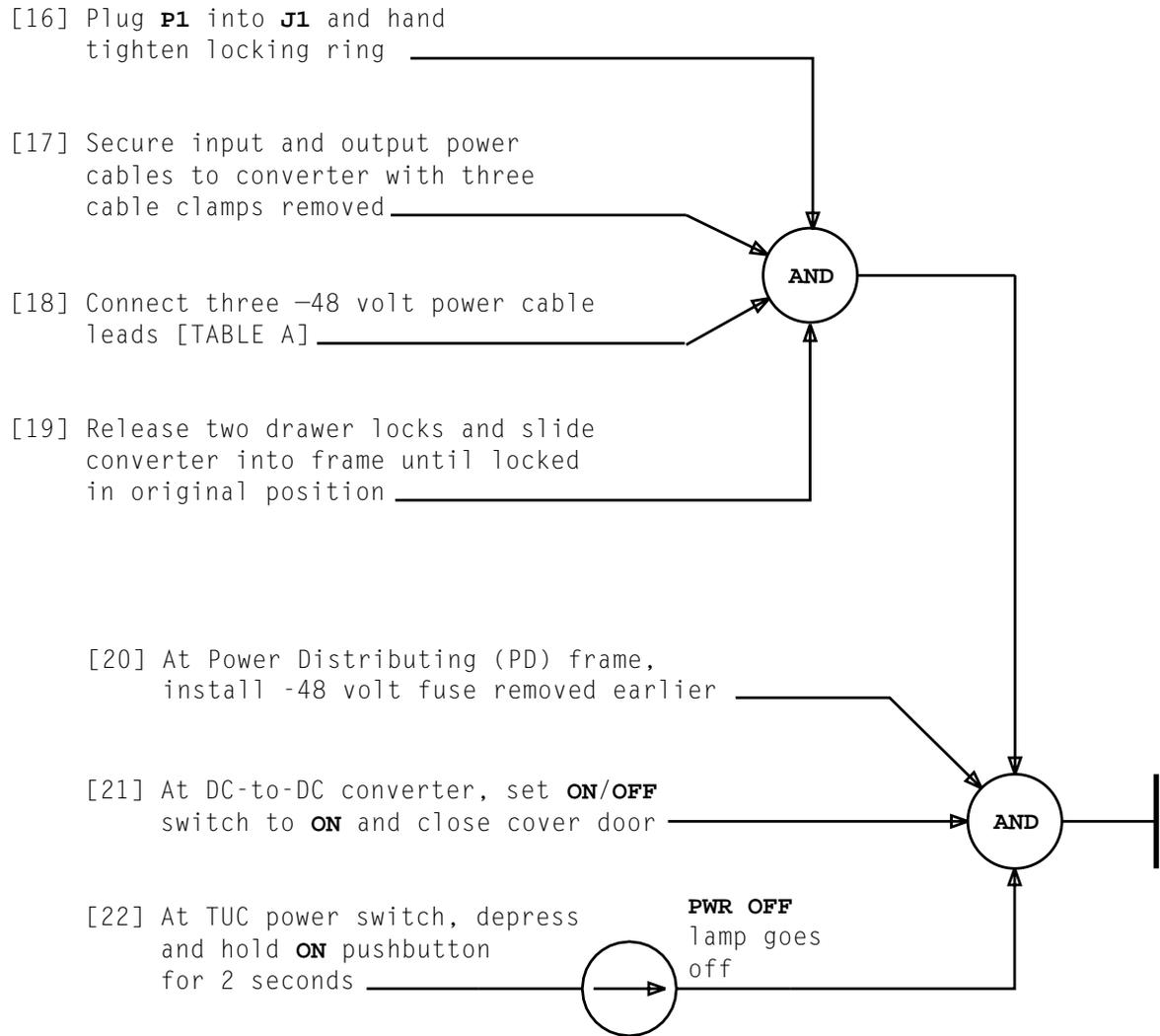
AND

Page 3

*DANGER 2
DC-to-DC
converter weighs
approximately 80
pounds*

Revised

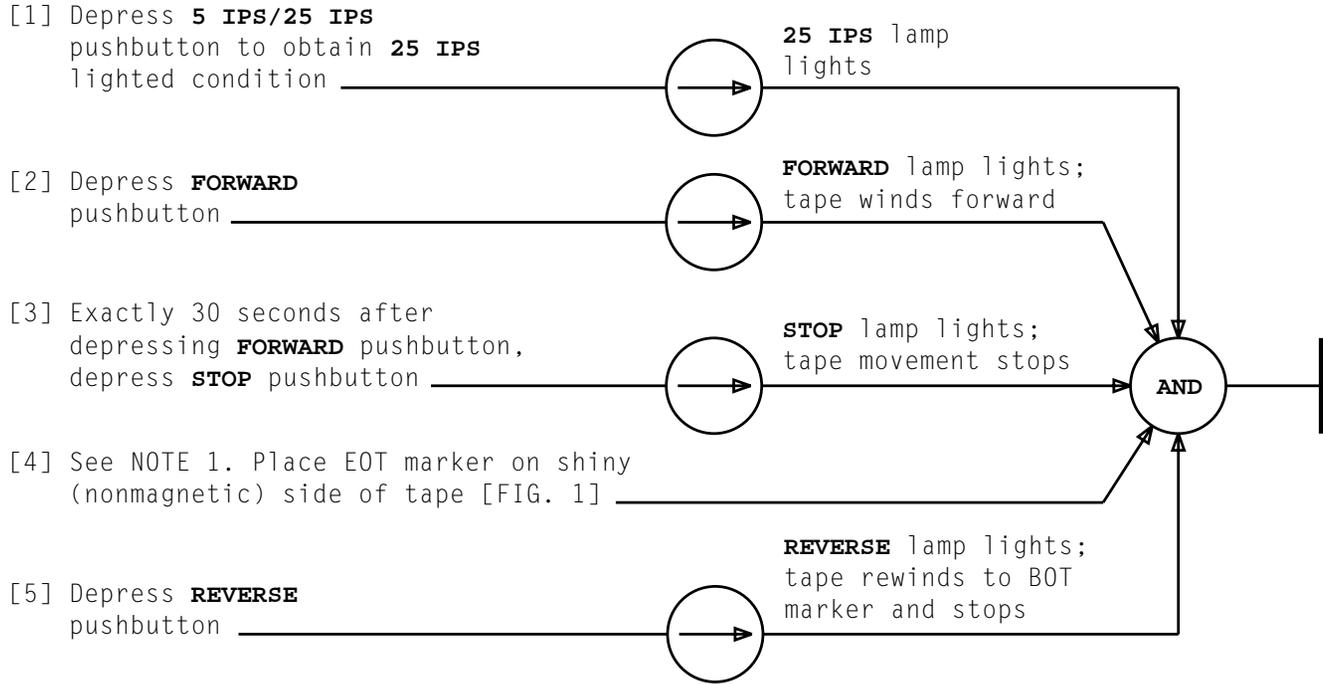
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REPLACE DC-TO-DC CONVERTER UNIT, KS-21104

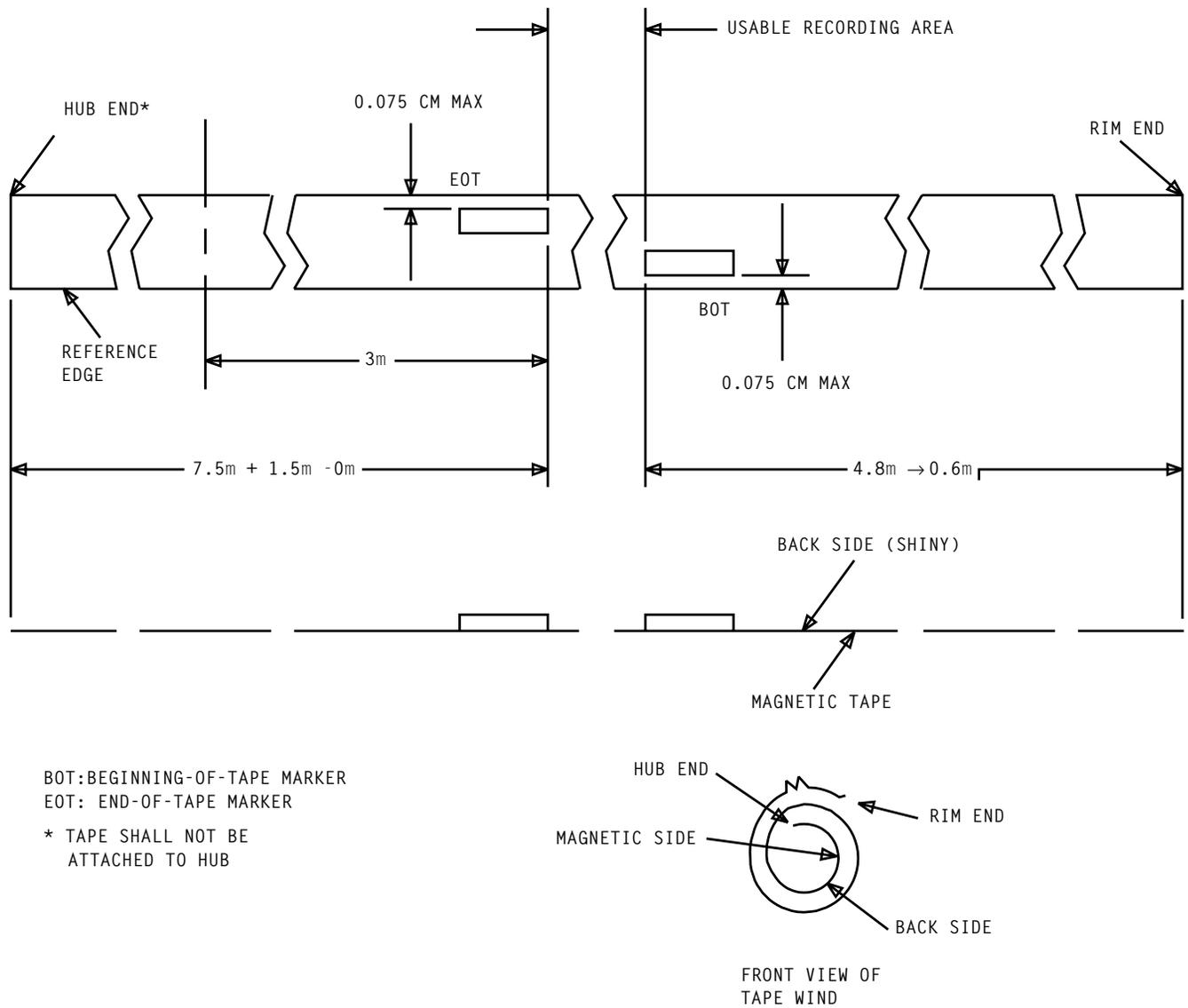
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At tape transport:



NOTE 1
 Markers must not protrude beyond edge of tape and must be free of wrinkles and excessive adhesive. Marker dimensions:
 Length - 2.75cm ±0.5cm (1.1 inch ±0.2 inch)
 Width - 0.475cm ±0.05cm (0.19 inch ±0.02 inch)
 Thickness - 0.002cm (0.0008 inch maximum)

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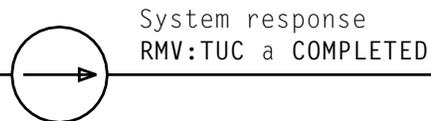


BOT: BEGINNING-OF-TAPE MARKER
 EOT: END-OF-TAPE MARKER

* TAPE SHALL NOT BE ATTACHED TO HUB

FIG. 1 - Placement of Tape Markers on 1/2-Inch Magnetic Tape

- [1] At TTY, type
 RMV:TUC a!
 a = TUC member
 number
 (0-31)



- [2] Remove applicable input power fuses in sequence indicated [TABLE A]

- [3] Remove **24V** fuse at power distribution frame associated with pin 9 of power switch

- [4] Cover apparatus below power switch with drop cloth

- [5] Tag and remove external leads on rear of power switch

- [6] Remove four mounting screws and withdraw switch from front of frame

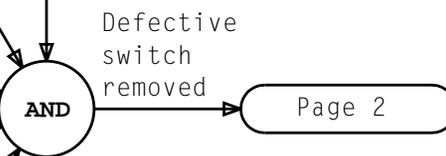


TABLE A INPUT FUSES		
NAME	SEQ IND	FUSE BLOCK LOCATION
+24 S1	*	69-10
+24 V1		
+24 S2	*	
+24 V2		
+24 S3	*	
+24 V3		
-48 V1I	*	69-04
-48 V1		
-48 V2I	*	
-48 V2		

* Sequence indicator identifies those fuses which should be removed first and installed last

REPLACE POWER SWITCH, TAPE UNIT CONTROLLER

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[7] At front of frame, install replacement switch using screws removed

[8] Reconnect external leads to switch terminals

[9] Install pigtail components

[10] Install fuses removed in sequence indicated [TABLE A]

[11] Install **24V** fuse at power distribution frame removed in Step 3

At power switch:

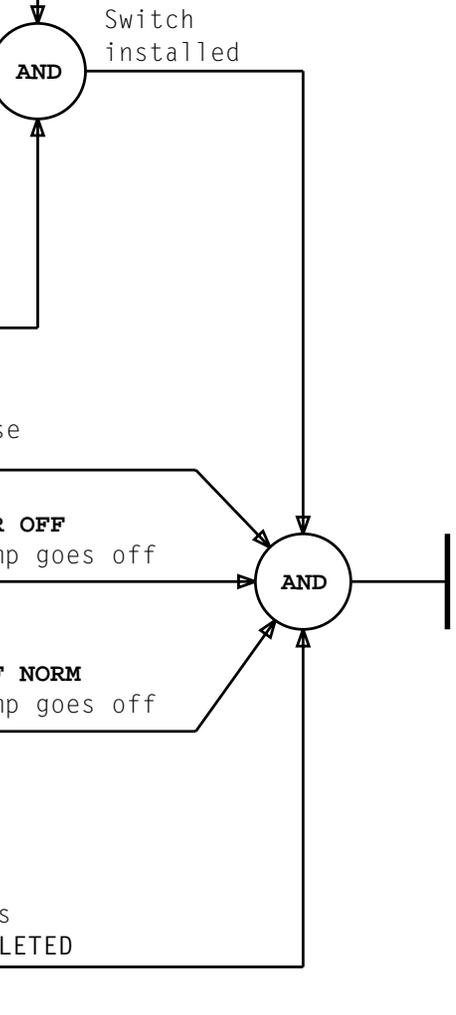
[12] Ensure **ROS/OFF** switch is rotated clockwise to **ROS**

[13] Depress and hold **ON** pushbutton for 2 seconds

[14] Rotate **ROS/OFF** switch counterclockwise to normal position

[15] At TTY, type
RST:TUC a!
a = TUC member
number
(0-31)

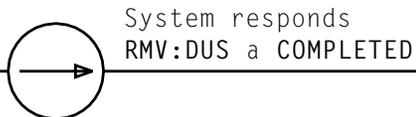
System responds
RST:TUC a COMPLETED



REPLACE POWER SWITCH, TAPE UNIT CONTROLLER

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[1] At TTY, type
 RMV:DUS a!
 a = DUS member number
 (0-3)



[2] Remove applicable input power fuses in
 sequence indicated [TABLE A]

[3] Cover apparatus below power switch
 with drop cloth

[4] Tag and remove external leads
 on rear of power switch

[5] Remove four mounting screws and withdraw
 switch from front of frame

Defective
 switch
 removed



[6] At front of frame, install replacement
 switch using screws removed

[7] Reconnect external leads
 to switch terminals

[8] Install pigtail components

[9] Install fuses removed in sequence
 indicated [TABLE A]

Switch
 installed



REPLACE POWER SWITCH, DATA UNIT SELECTOR

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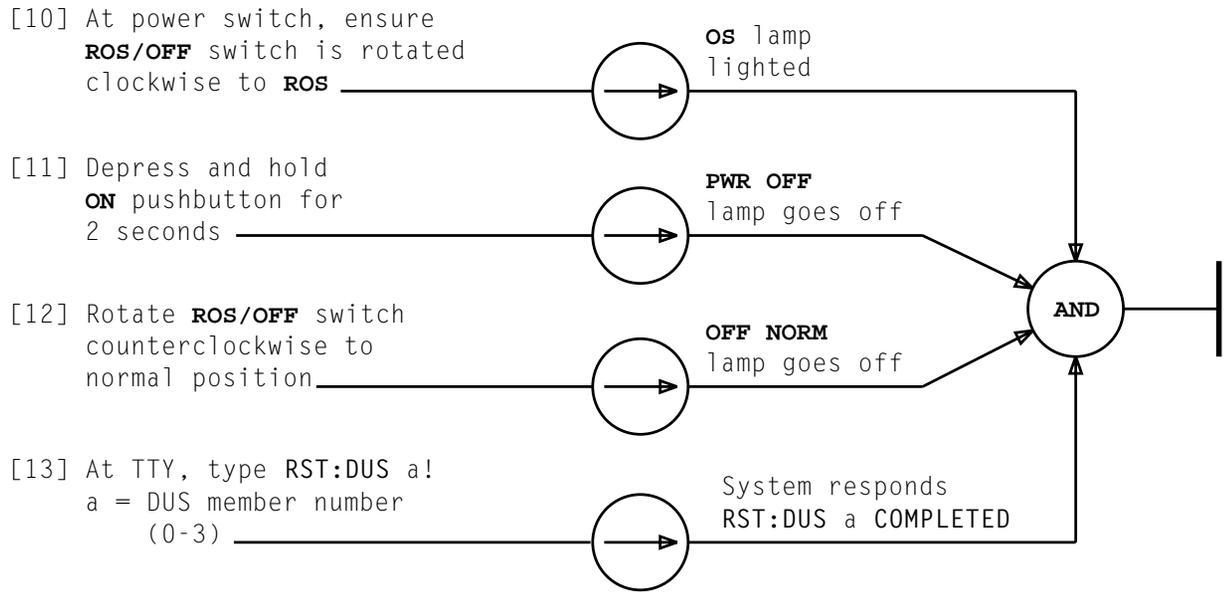


TABLE A

NAME	SEQ IND	FUSE BLOCK LOCATION	NAME	SEQ IND	FUSE BLOCK LOCATION
+24 ST1	*	75-04	+24 V6		77-04
+24 V1		77-04	+24 V7		
+24 ST2	*	75-04	-48 V1I	*	77-10
+24 V2		77-04	-48 V1		
+24 ST3	*	75-04	-48 V2I	*	
+24 V3		77-04	-48 V2		
+24 V5		77-04			

* Sequence indicator identifies those fuses which should be removed first and installed last

REPLACE POWER SWITCH, DATA UNIT SELECTOR

[1] See WARNING 1. At DC-to-DC converter, open cover door and set **ON/OFF** switch to **OFF**

[2] Manually place tape tension arms against stops

[3] At rear of transport casting door, disconnect **J3** connector from upper sensor assembly

[4] Remove two sensor assembly mounting screws

[5] Remove sensor assembly being careful to avoid damaging thin aluminum light shield on reel motor control mechanism cam assembly

Sensor removed

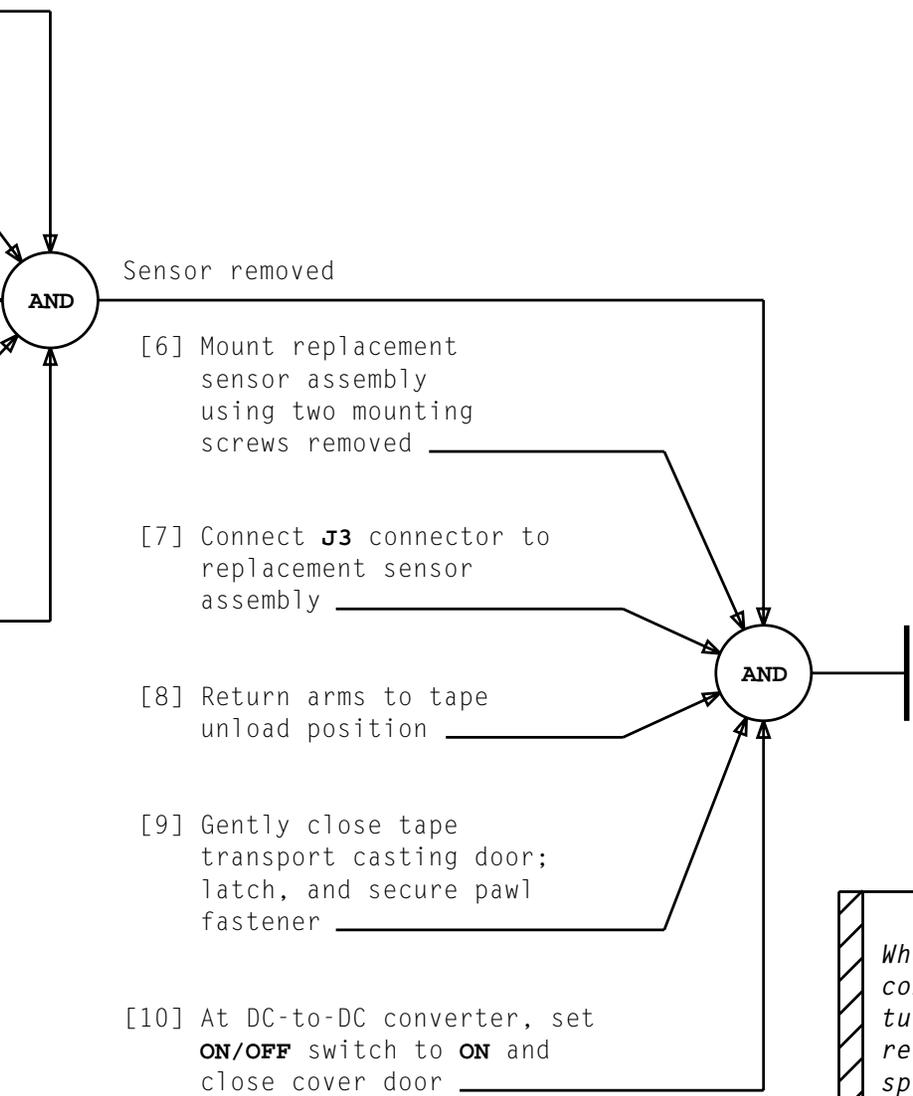
[6] Mount replacement sensor assembly using two mounting screws removed

[7] Connect **J3** connector to replacement sensor assembly

[8] Return arms to tape unload position

[9] Gently close tape transport casting door; latch, and secure pawl fastener

[10] At DC-to-DC converter, set **ON/OFF** switch to **ON** and close cover door



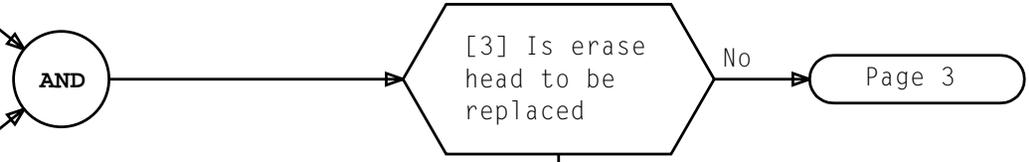
WARNING 1
When DC-to-DC converter is turned off, tape reel motors will spin uncontrolled

REPLACE UPPER ARM POSITION SENSOR ASSEMBLY

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[1] At DC-to-DC converter, open cover door and set **ON/OFF** switch to **OFF**

[2] At lower right of tape transport, loosen pawl fastener; unlatch, and open casting door



[4] Disconnect erase head leads from **TB4** [FIG. 1 and 2]

[5] Support erase head and carefully remove mounting screw [FIG. 3]

[6] Remove erase head, guiding leads through cutaway hole

Erase head removed

[7] Clean mounting surfaces on replacement head and precision plate of burrs and dirt

[8] Guide replacement erase head leads through cutaway hole and position head for mounting

[9] Support erase head and carefully install mounting screw

[10] Connect erase head leads to **TB4** [FIG. 1 and 2]

Erase head mounted

[11] Gently close tape transport casting door; latch, and secure pawl fastener

[12] At DC-to-DC converter, set **ON/OFF** switch to **ON** and close cover door



REPLACE READ, WRITE, OR ERASE HEAD

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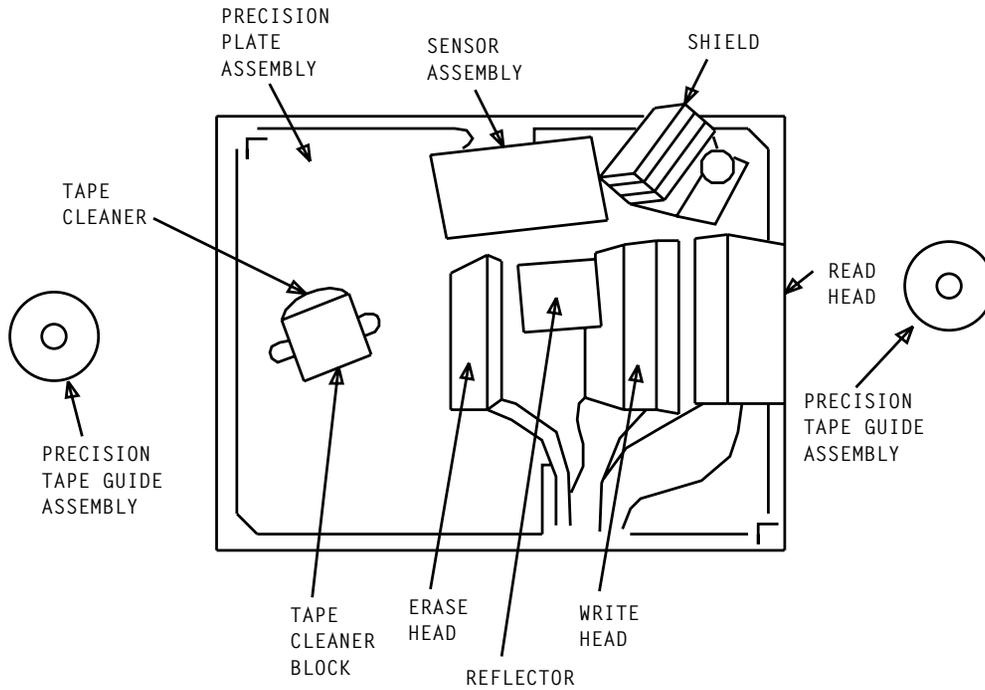


FIG. 1 - Precision Plate and Tape Guide Assemblies

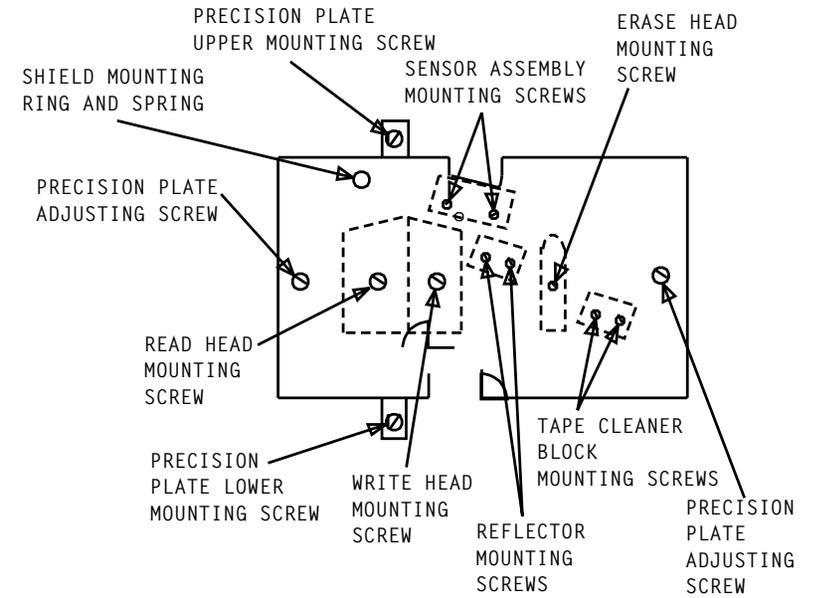


FIG. 3 - Precision Plate Assembly - Rear View Showing Component Mounting Screws

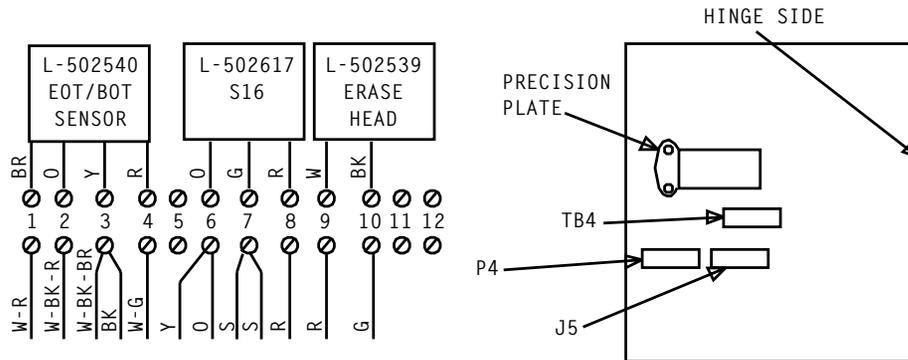


FIG. 2 - TB4 Wiring Diagram and Location (Rear View of Tape Transport Casting Door)

REPLACE READ, WRITE, OR ERASE HEAD

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[13] Remove screw, washer, and cable clamp securing cables of **P4** (write head) and **J5** (read head) [FIG. 2]

[14] Disconnect erase head leads, and BOT/EOT sensor assembly leads from **TB4** [FIG. 2]

[15] Disconnect **P4** (write head) and **J5** (read head) connectors [FIG. 2]

[16] Carefully remove two precision plate adjusting screws [FIG. 3]

[17] Support precision plate assembly while removing lower and upper mounting screws and washers

[18] Gently lift precision plate assembly from tape transport

Precision plate removed

[19] Carefully remove write (or read) head mounting screw at back of precision plate assembly [FIG. 3]

[20] Gently lift write (or read) head outward and remove from precision plate assembly

[21] Clean mounting surfaces on replacement head and precision plate of burrs and dirt

[22] Gently position replacement write (or read) head for mounting on precision plate assembly

[23] Carefully install write (or read) head mounting screw at back of precision plate assembly [FIG. 3]

Removal of head complete

Head mounted on precision plate

Page 4

REPLACE READ, WRITE, OR ERASE HEAD

[24] Carefully position precision plate assembly for mounting on tape transport

[25] Install upper and lower precision plate mounting screws with washers

[26] See WARNING 1. Carefully install two precision plate adjusting screws [FIG. 3]

[27] Connect **P4** (write head) and **J5** (read head) connectors [FIG. 2]

[28] Connect erase head leads, and BOT/EOT sensor assembly leads to **TB4** [FIG. 2]

[29] Install cable clamp, screw, and washer securing cables of **P4** (write head) and **J5** (read head) [FIG. 2]

[30] Gently close tape transport casting door; latch, and secure pawl fastener

[31] At DC-to-DC converter, set **ON/OFF** switch to **ON** and close cover door

Precision plate mounted on tape transport

AND

AND

WARNING 1
Precision plate adjusting screws should only be tightened to point where they make contact with precision plate assembly

REPLACE READ, WRITE, OR ERASE HEAD

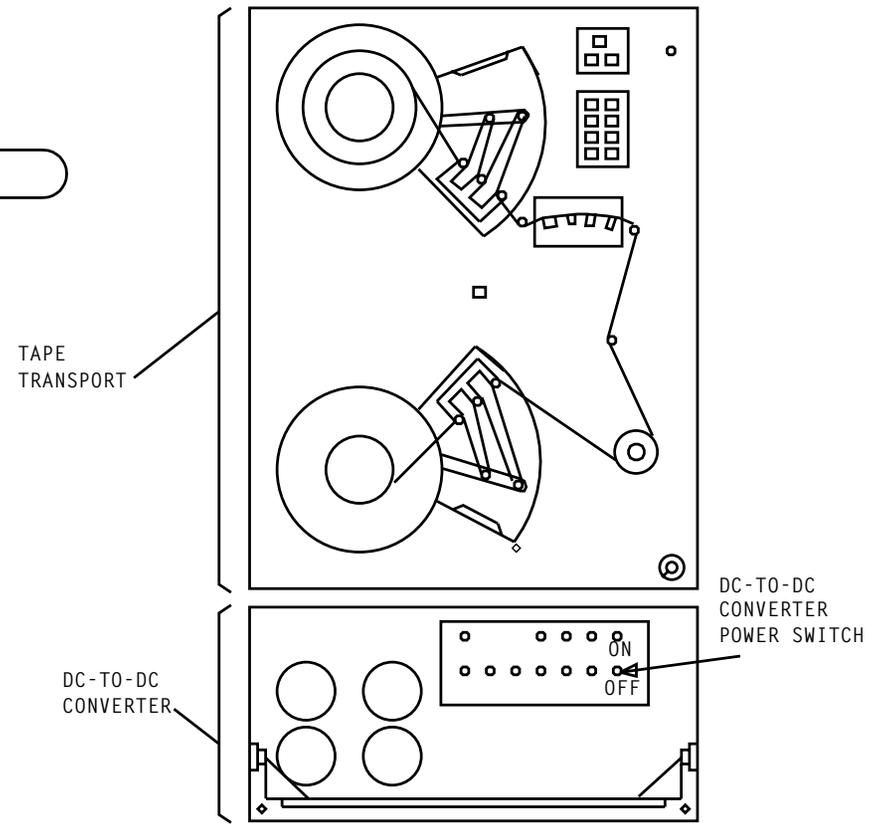
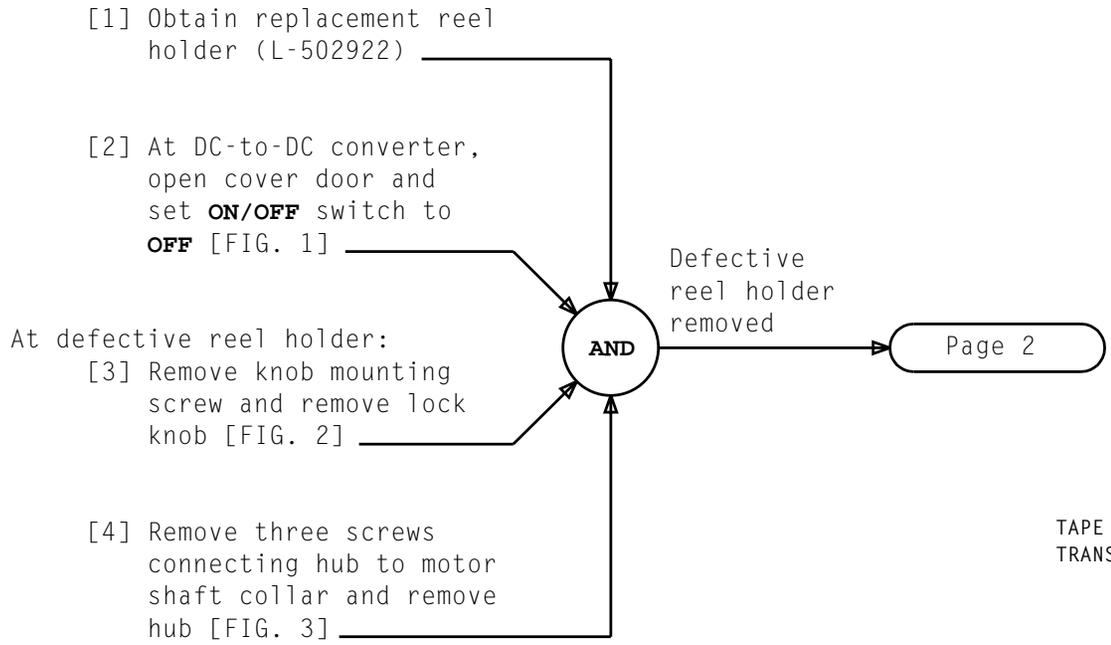


FIG. 1 - Tape Transport and DC-to-DC Converter With Cover Doors Open

REPLACE REEL HOLDER

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[5] On exposed motor shaft collar [FIG. 2],
mount new hub using three screws
removed [FIG. 3]

[6] Align three finger pins [FIG. 2]
of new lock knob with holes in
end of each finger [FIG. 3]

[7] Install knob mounting screw
and tighten securely [FIG. 2]

[8] At DC-to-DC converter, set **ON/OFF**
switch to **ON** and close cover door

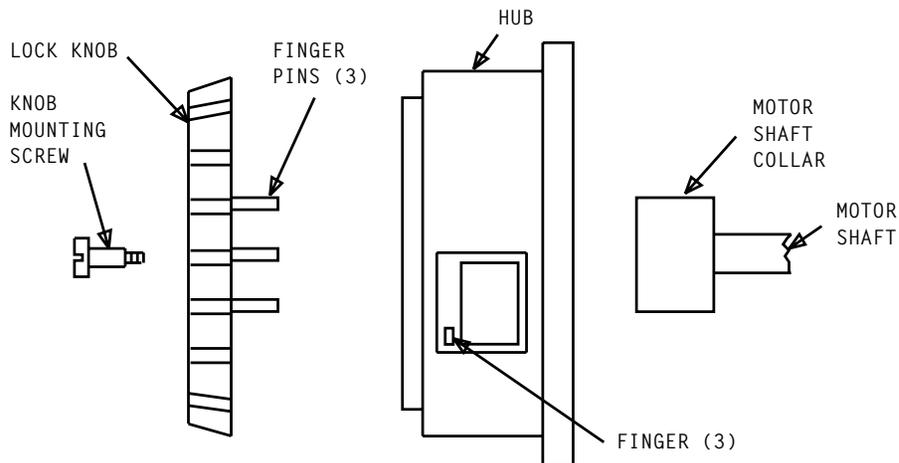
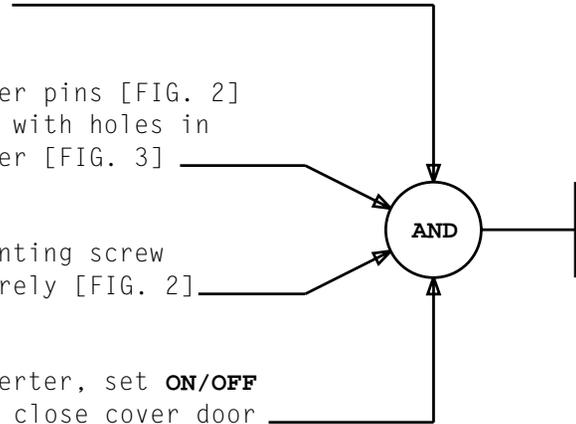


FIG. 2 - Reel Holder - Side View

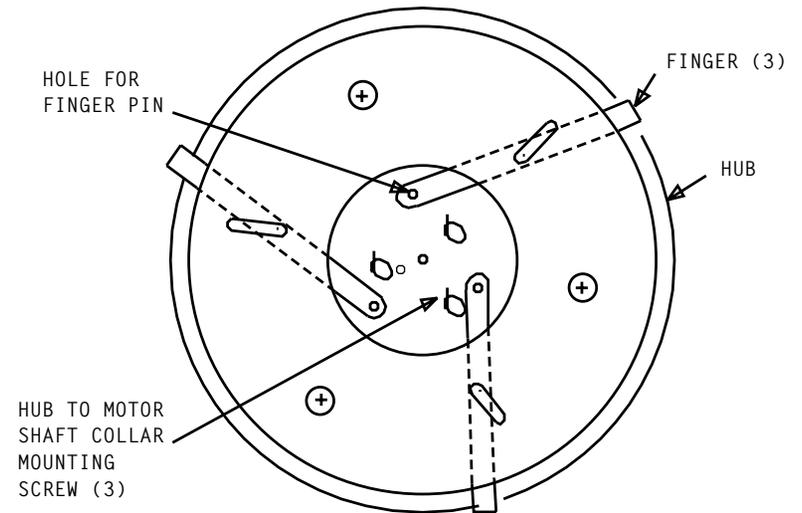


FIG. 3 - Reel Holder Hub (Knob Removed)

REPLACE REEL HOLDER

[1] See WARNING 1.
On precision plate,
rotate shield
clockwise to upward
position [FIG. 1]

[2] Using magnifier
lamp, is tape contact
surface of read or
write head badly
scratched or nicked
[FIG. 2]

[3] See NOTE 1.
Has tape cut a
1/2-inch path along
tape contact
surface of read or
write head [FIG. 2]

Page 2

Yes

No

Yes

No

[4] Is ridge
height greater
than 0.008 inch
(five layers of
tape) [FIG. 2]

No

Yes

[5] Replace
read or write
head [DLP-522]

NOTE 1
It is normal for
magnetic tape to
produce a highly
polished wear area
on each head. Tape
will actually wear
into pole tip area
of head surfaces,
cutting a 1/2-inch
wide path several
thousandths of an
inch deep

WARNING 1
*Shield can rotate
counterclockwise
beyond detent
position contact,
and damage read/
write heads*

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CHECK TAPE HEADS

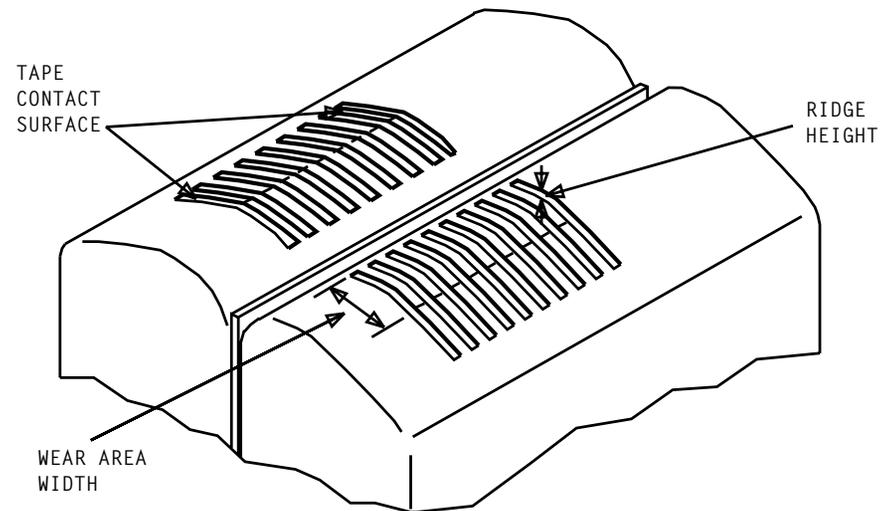
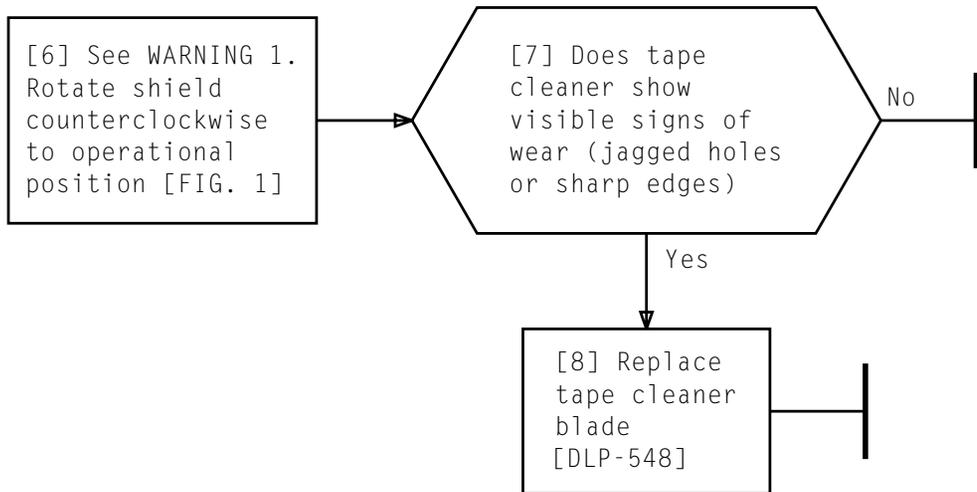


FIG. 2 - Worn Read and Write Heads (Front View)

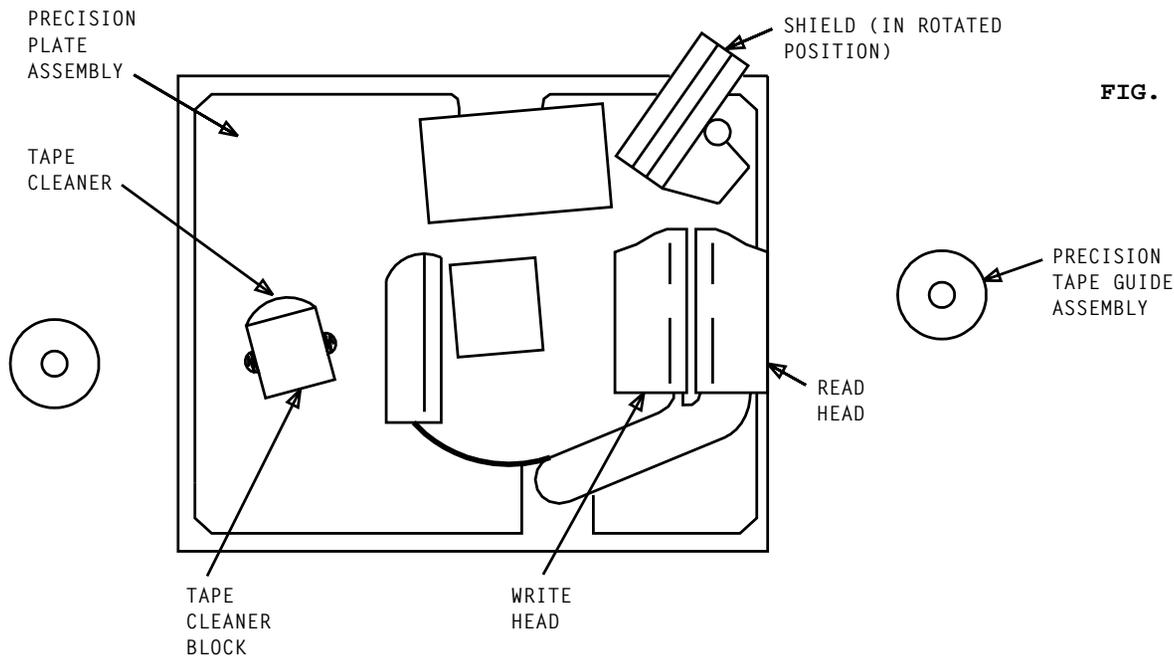
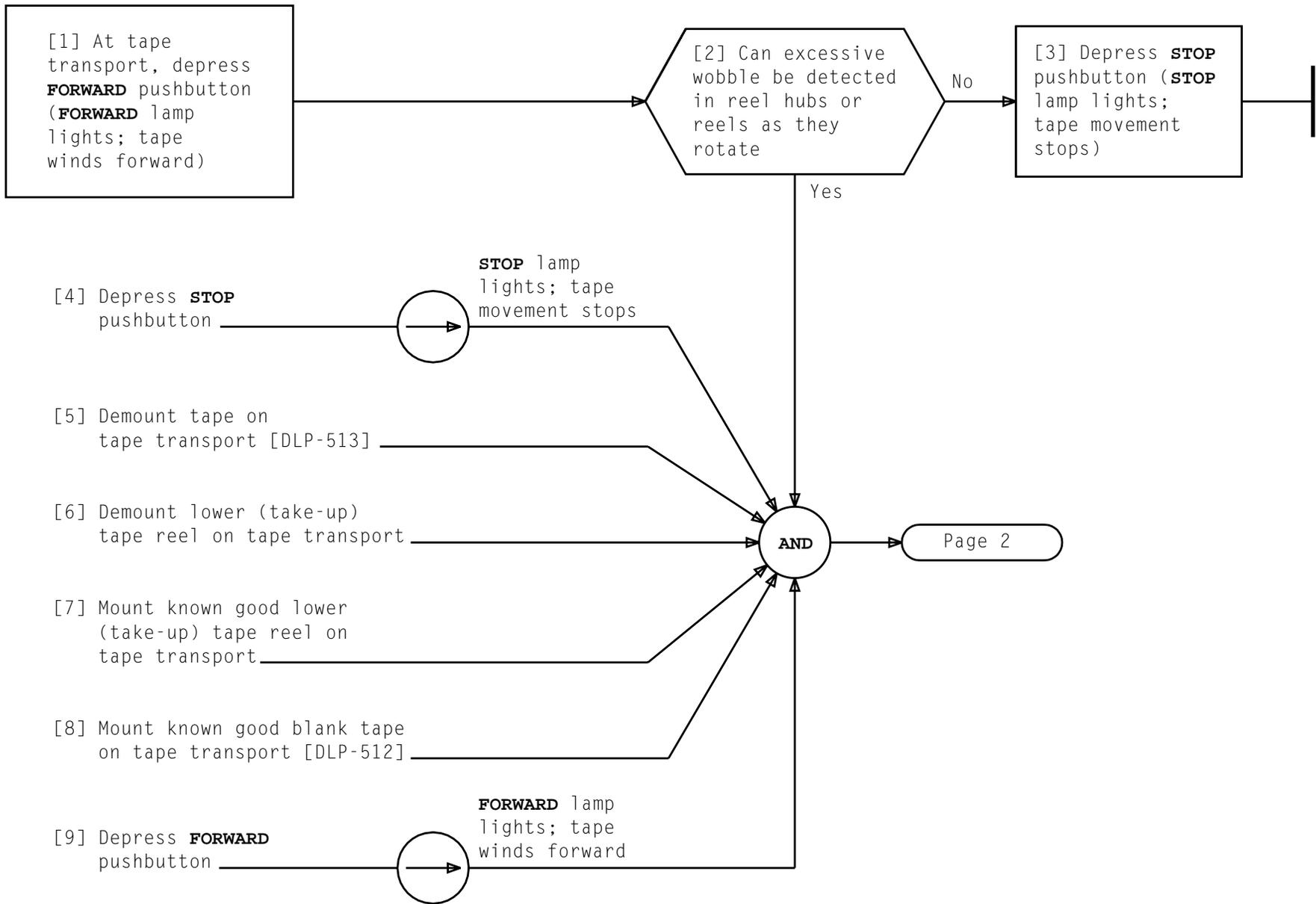


FIG. 1 - Precision Plate and Tape Guide Assemblies

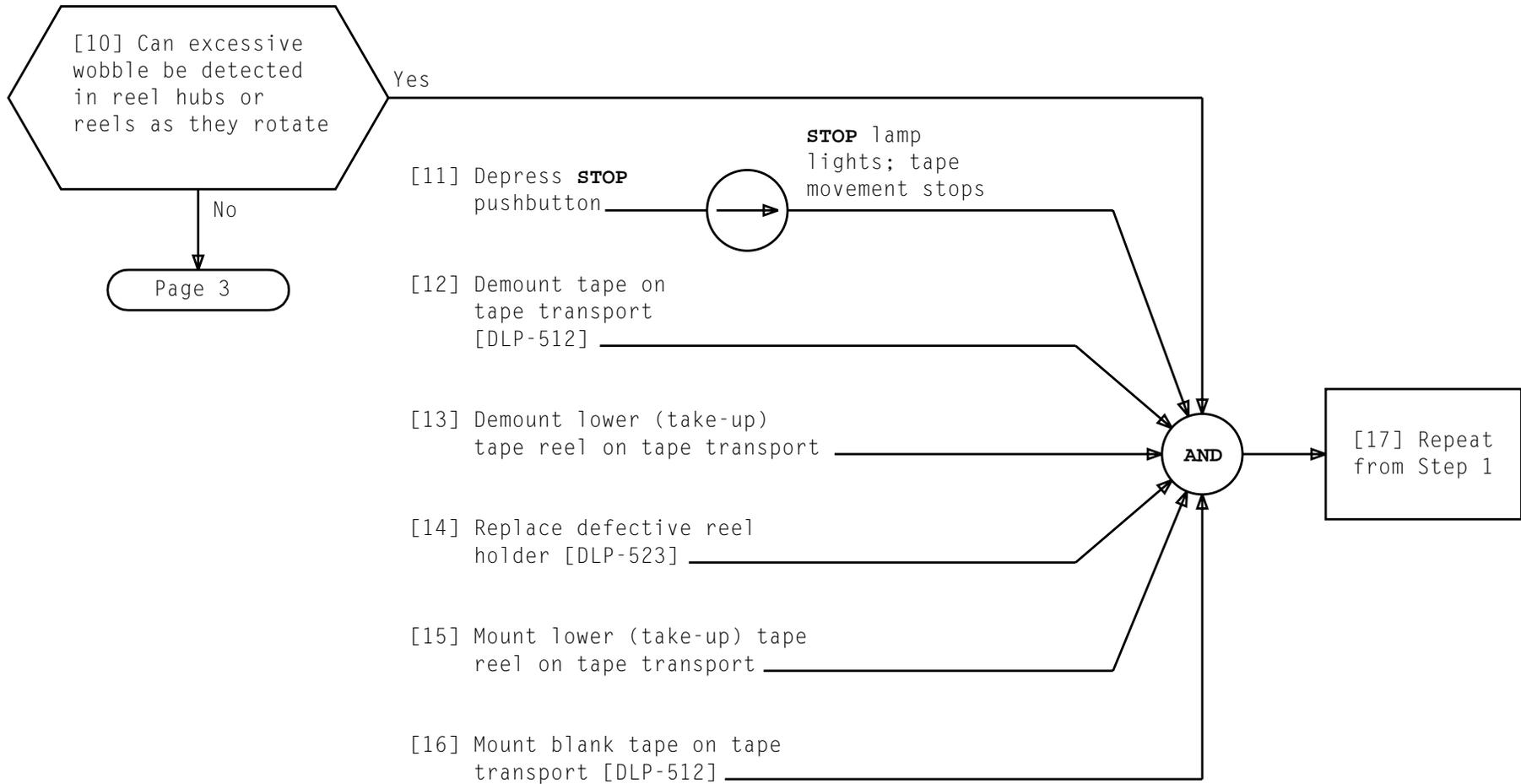
CHECK TAPE HEADS

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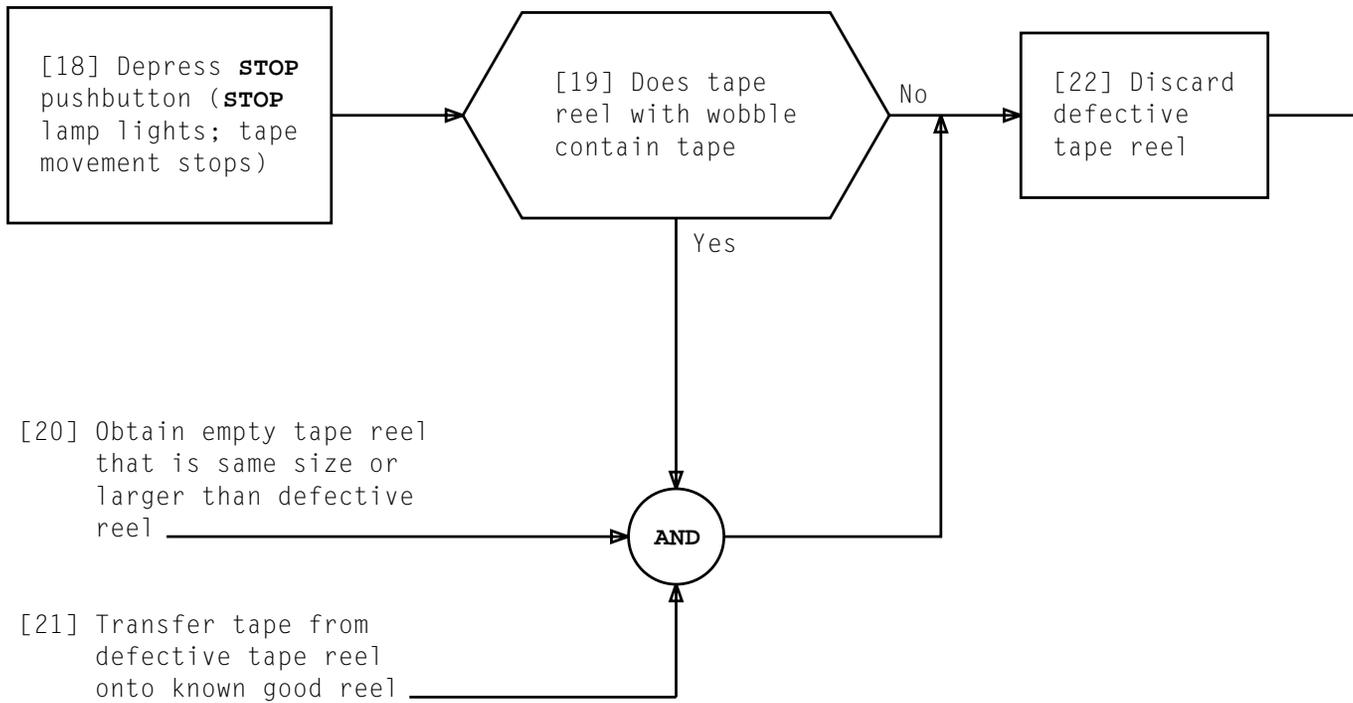
CHECK REELS AND HUBS FOR WOBBLE

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CHECK REELS AND HUBS FOR WOBBLE

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CHECK REELS AND HUBS FOR WOBBLE

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[1] Obtain replacement switch bracket assembly L-502512 (interlock switch assembly)

[2] At tape unit controller (TUC) power switch, rotate **ROS/OFF** switch clockwise to **ROS**

OS lamp lights

PWR OFF lamp lights

[3] Depress **ROS/OFF** switch

[4] At DC-to-DC converter, open cover door and set **ON/OFF** switch to **OFF** [FIG. 1]

[5] Open tape transport cover door

[6] Rotate switch plunger counterclockwise and remove plunger and washer from casting door [FIG. 1]

[7] At lower right of tape transport, loosen pawl fastener; unlatch, and open casting door

[8] At **TB11** (below bracket switch assembly), tag and disconnect interlock switch leads from terminals **1, 2, 4, 5,** and **6** [FIG. 2]

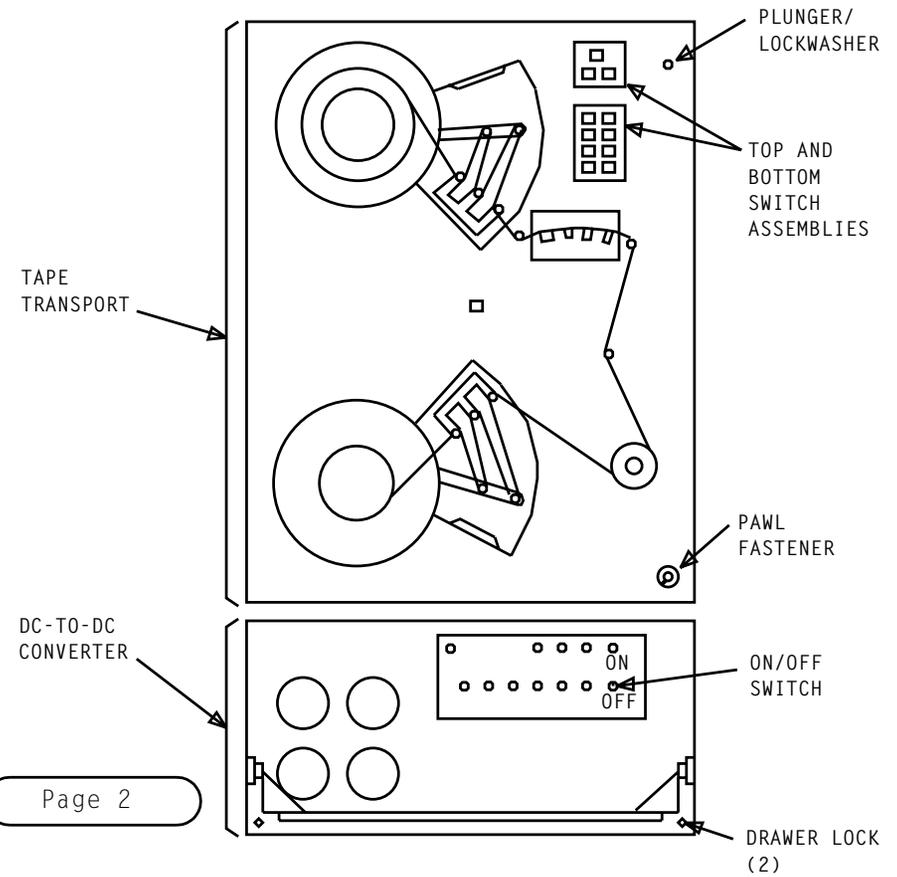
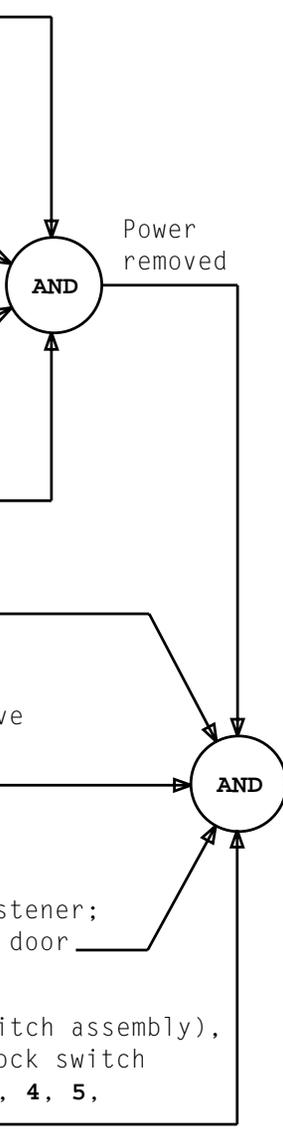


FIG. 1 - Tape Transport and DC-to-DC Converter With Cover Doors Open

REPLACE INTERLOCK SWITCH

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At rear of transport casting door:

[9] Remove two switch bracket mounting screws and lockwashers, and remove switch assembly bracket [FIG. 3]

[10] Remove two switch assembly mounting screws and lockwashers

[11] Mount new interlock switch to switch bracket with two switch assembly mounting screws and lockwashers, but do not tighten

[12] Mount bracket switch assembly to tape transport with two switch bracket mounting screws and lockwashers, but do not tighten

[13] At **TB11**, connect interlock switch leads to terminals and remove tags [FIG. 2]

[14] At front of tape transport, install lockwasher and plunger on new interlock switch and turn plunger clockwise until tight

[15] Position plunger to prevent binding from side to side and tighten switch bracket mounting screws [FIG. 3]

[16] Position plunger to prevent binding from top to bottom and tighten switch assembly mounting screws using right angle screwdriver

[17] Gently close tape transport casting door; latch, and secure pawl fastener

[18] Depress and release interlock switch plunger, leaving in override position

[19] Adjust interlock switch [DLP-529]

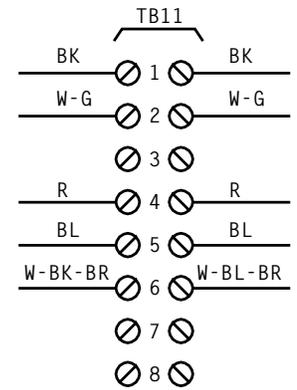
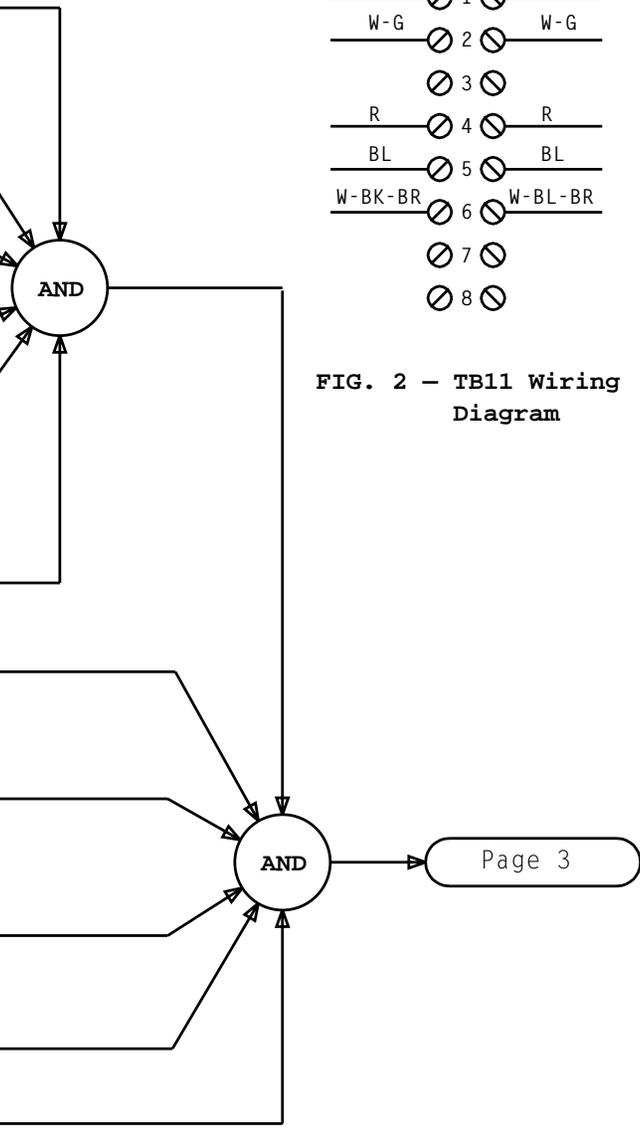


FIG. 2 - TB11 Wiring Diagram



REPLACE INTERLOCK SWITCH

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[20] At DC-to-DC converter, set **ON/OFF** switch to **ON** and close cover door

[21] At TUC power switch, depress and hold **ON** pushbutton for 2 seconds

[22] Rotate **ROS/OFF** switch counterclockwise to normal position

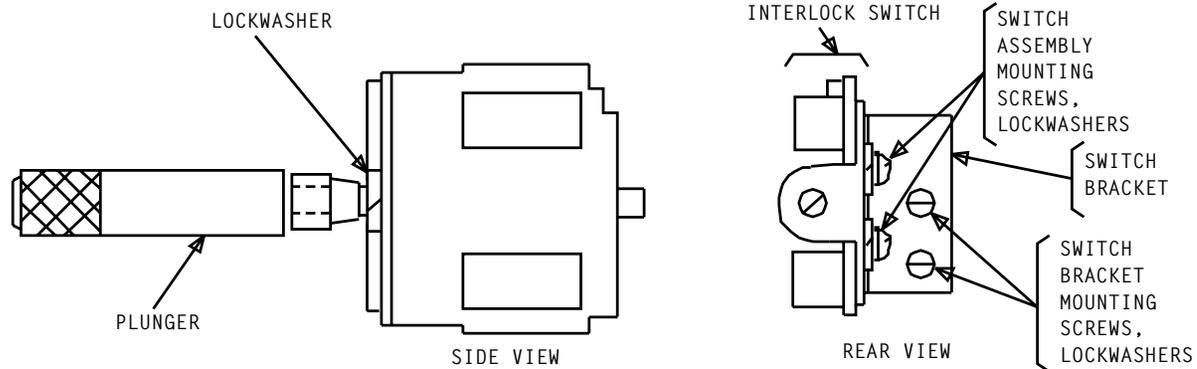
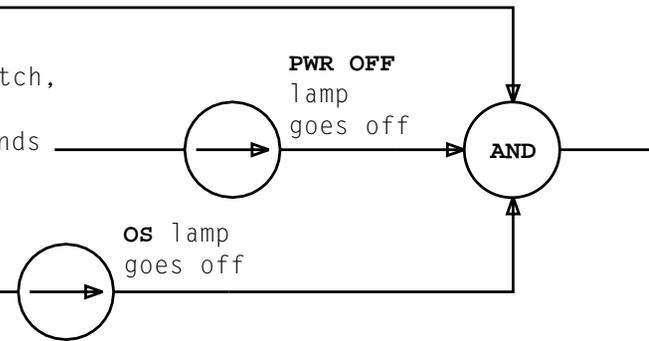


FIG. 3 - Bracket Switch Assembly (L-502512)

REPLACE INTERLOCK SWITCH

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[1] See WARNING 1.
At DC-to-DC converter, open cover door
and set **ON/OFF** switch to **OFF**

[2] Manually place tape tension
arms against stops

[3] At rear of tape transport casting
door, disconnect **J7** connector from
lower sensor assembly

[4] Remove two sensor assembly
mounting screws

[5] Remove sensor assembly being careful
to avoid damaging thin aluminum light
shield on reel motor control mechanism
cam assembly

Sensor removed

[6] Mount replacement sensor
assembly using two
mounting screws removed

[7] Connect **J7** connector to
replacement sensor
assembly

[8] Return arms to tape
unload position

[9] Gently close tape
transport casting door;
latch, and secure pawl
fastener

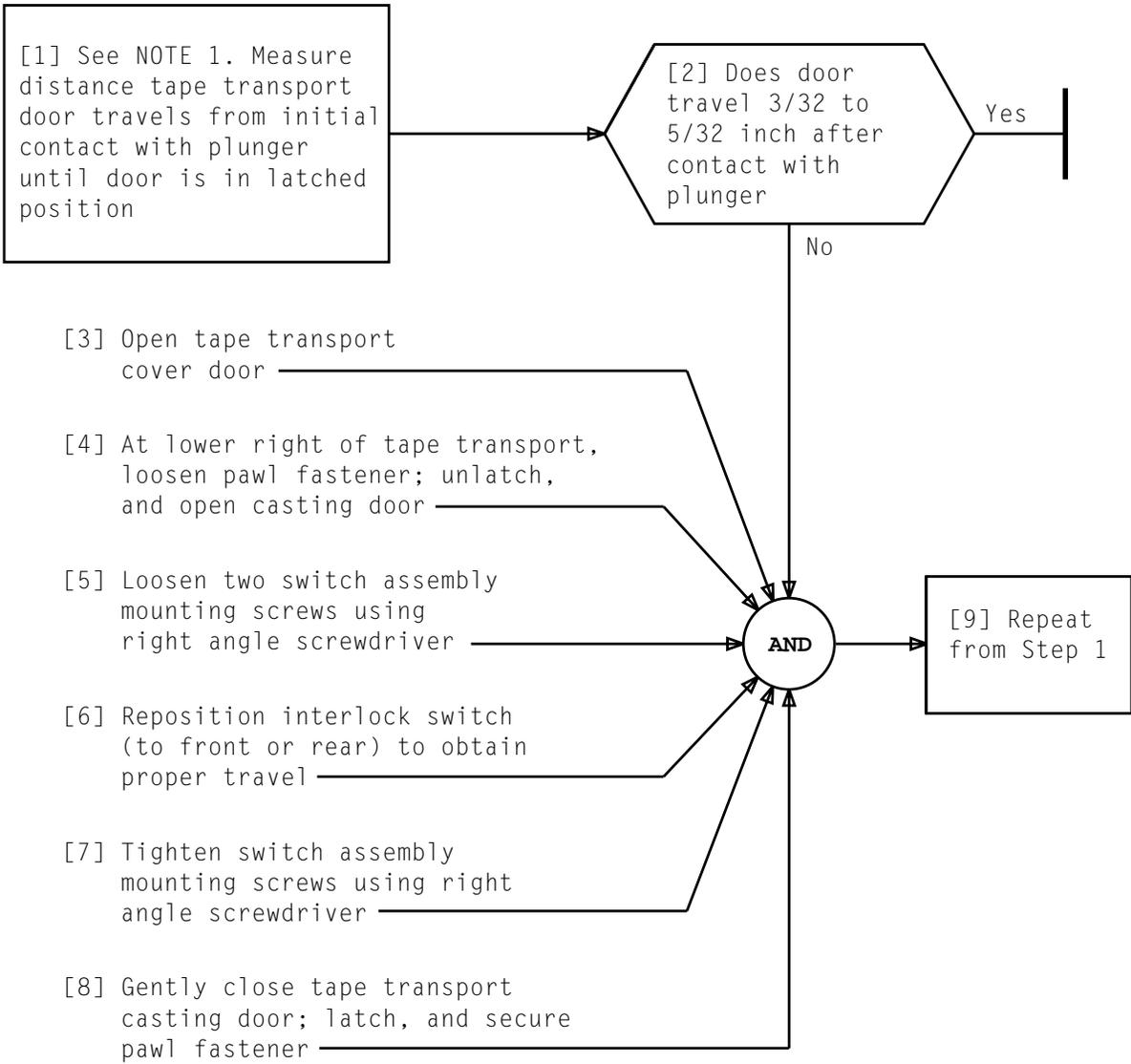
[10] At DC-to-DC converter, set
ON/OFF switch to **ON** and close
cover door



WARNING 1
When DC-to-DC
converter is
turned off, tape
reel motors will
spin uncontrolled

REPLACE LOWER ARM POSITION SENSOR ASSEMBLY

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NOTE 1
 Distance of travel can be measured by placing ruler against bottom switch assembly and to right of **FAST FWD** pushbutton. Contact must be observed between plunger and tape transport cover door through top switch assembly window

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ADJUST INTERLOCK SWITCH

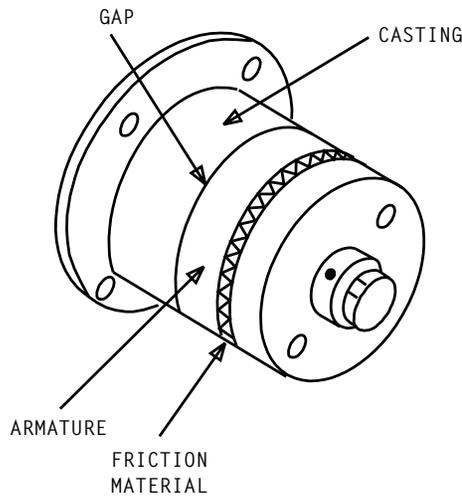
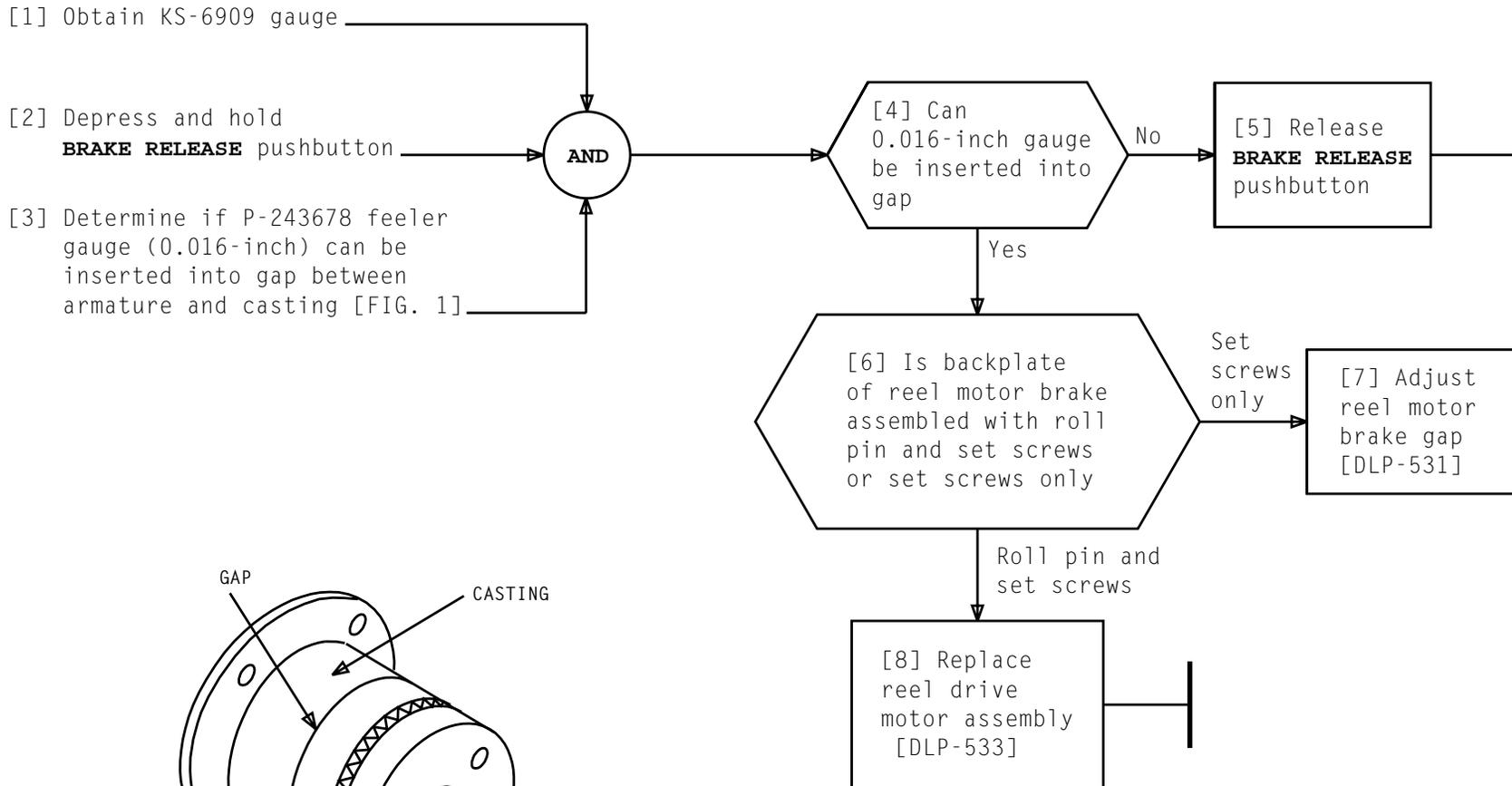


FIG. 1 - Reel Motor Brake

CHECK REEL MOTOR BRAKE GAP

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[1] Obtain support apparatus
[TABLE A]

[2] See DANGER 1. Carefully
loosen setscrews while
holding backplate against
spring pressure [FIG. 1]

[3] Slide backplate away from casting
enough to insert two .010 feeler
gauges (P-243671) in gap between armature
and casting (one on each side of
motor shaft) [FIG. 1]

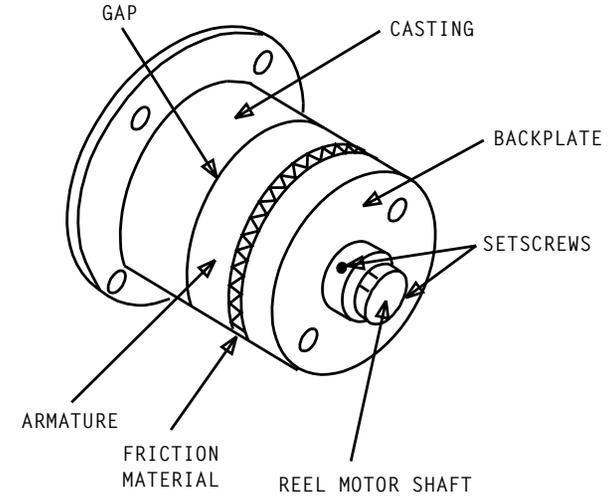
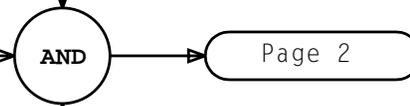


FIG. 1 - Reel Motor Brake

TABLE A	
COMMON NAME	PART NUMBER
5/64-inch Allen wrench	-
Feeler gauge (2)	KS-6909

<i>DANGER 1</i>	
<i>There is approximately 10 pounds of spring pressure against armature and backplate with brake deenergized (BRAKE RELEASE pushbutton released)</i>	
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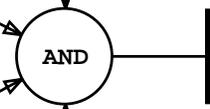
ADJUST REEL MOTOR BRAKE GAP

[4] Depress and hold **BRAKE RELEASE** pushbutton to energized brake (armature, spring, and feeler gauges will be held in place)

[5] While depressing **BRAKE RELEASE** pushbutton, slide backplate against armature but do not apply pressure between armature and backplate [FIG. 1]

[6] Using 5/64-inch allen wrench, tighten both set screws

[7] Release **BRAKE RELEASE** pushbutton to deenergize brake and remove feeler gauges



WARNING: When DC-to-DC converter is turned off, tape reel motors will spin uncontrolled

1. At DC-to-DC converter, open cover door and set **ON/OFF** switch to **OFF**
2. At lower right of tape transport, loosen pawl fastener; unlatch, and open casting door
3. At rear of transport casting door, disconnect two reel motor brake leads from **TB2** or **TB8** as appropriate [FIG. 1]

DANGER: There is approximately 10 pounds of spring pressure against armature and backplate with **BRAKE RELEASE** deenergized (**BRAKE RELEASE** pushbutton not depressed)

4. Carefully loosen setscrews while holding backplate against spring pressure [FIG. 2]
5. Carefully slide backplate armature, and spring off motor shaft (spring pressure will be relieved)
6. Remove four brake mounting screws and washers that secure brake housing to motor housing, and remove brake from reel motor
7. Install replacement brake, and align setscrews on reel motor shaft flats

8. Secure brake housing to reel motor housing using four brake mounting screws and washers removed
 9. Tighten both setscrews securely
 10. Twist reel motor brake leads together (as a pair) and connect to **TB2** or **TB8** as appropriate [FIG. 1]
 11. Remove screws on brake plate, and then remove spacer shims
 12. Gently close tape transport casting door; latch, and secure pawl fastener
 13. At DC-to-DC converter, set **ON/OFF** switch to **ON** and close cover door
- End of procedure

REPLACE REEL MOTOR BRAKE

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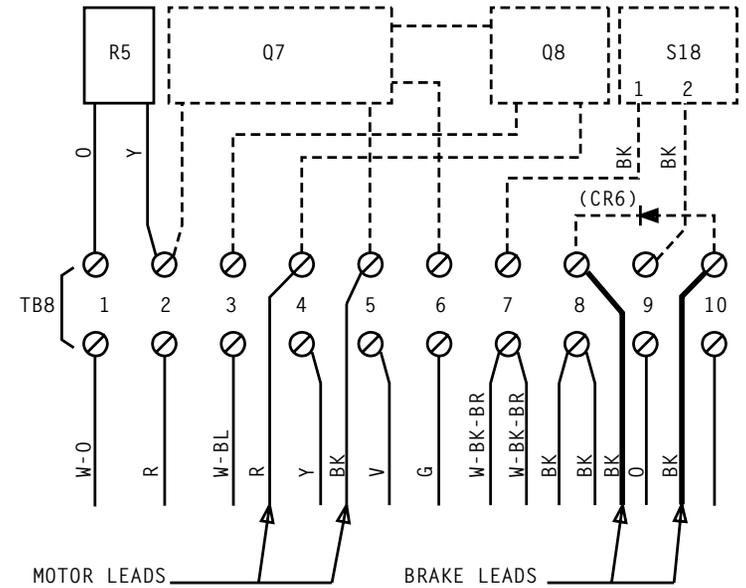
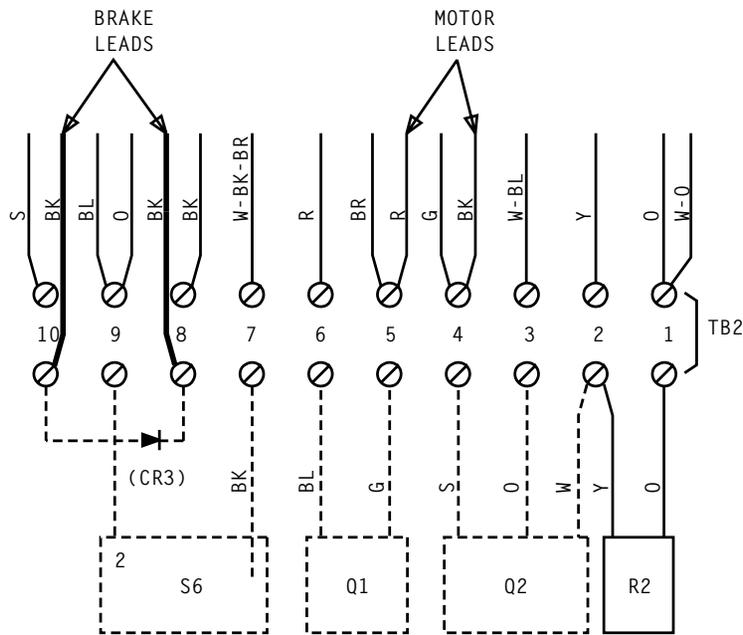


FIG. 1 - Terminal Board Wiring

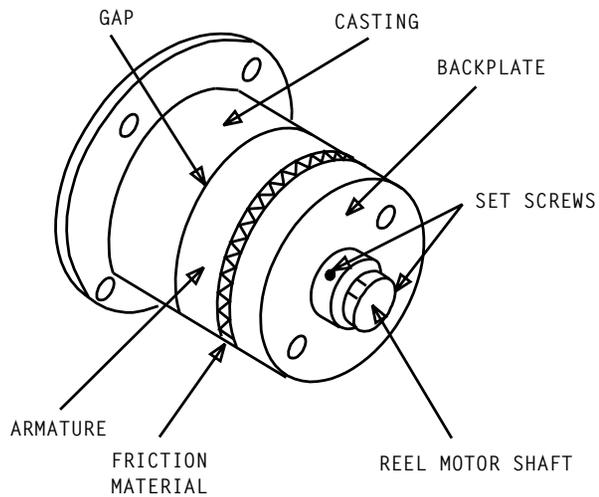


FIG. 2 - Reel Motor Brake

REPLACE REEL MOTOR BRAKE

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TABLE A	
COMMON NAME	PART NUMBER
Compound	C-2471
Brush	R-1021
Reel motor assembly	L-502554

- [1] Obtain support apparatus [TABLE A]
- [2] See WARNING 1. At DC-to-DC converter, open cover door and set **ON/OFF** switch to **OFF**
- [3] At tape transport, remove screw from center of knob and remove knob by lightly pulling outward [FIG. 1]
- [4] See NOTE 1. Remove three flat-head machine screws and pull off reel hub assembly
- [5] If tape transport casting door is not open, at lower right loosen pawl fastener; unlatch, and open casting door
- [6] At rear of transport casting door, disconnect two motor leads and two brake leads from **TB2** or **TB8** as appropriate [FIG. 2]
- [7] See WARNINGS 2 and 3. Remove four reel motor mounting screws and washers and remove motor

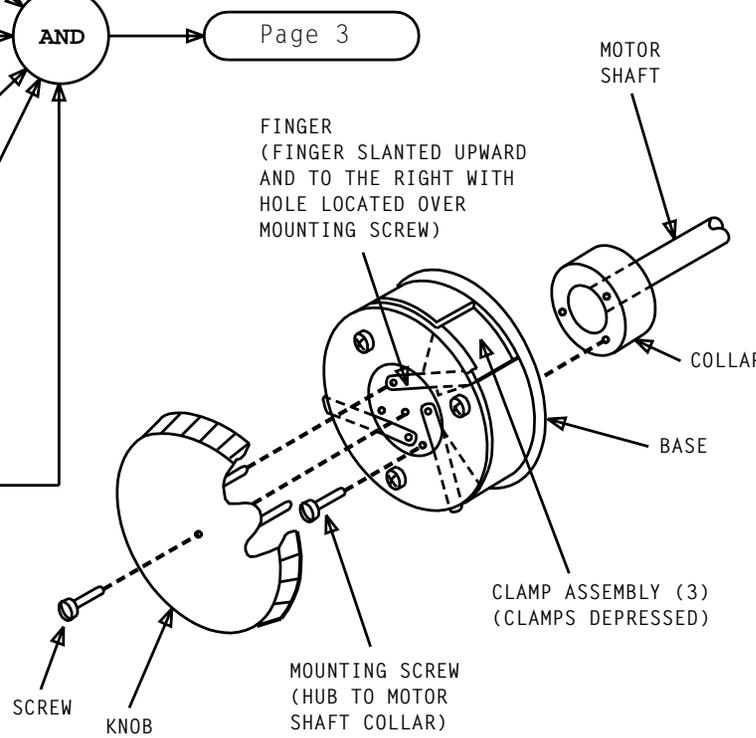


FIG. 1 - Reel Holder

NOTE 1
 Knob removal exposes three flat-head machine screws in center of hub assembly which hold hub assembly to motor shaft collar. All other parts of hub assembly are captive and may be displaced slightly to facilitate removal of three flat-head screws

WARNINGS

1. When DC-to-DC converter is turned off, tape reel motors will spin uncontrolled
2. Do not disturb motor assembly drive shaft collar as faulty tracking of magnetic tape over tape guides will result
3. When removing lower motor, support weight so relays directly under it are not damaged

Page 3

REPLACE REEL DRIVE MOTOR ASSEMBLY

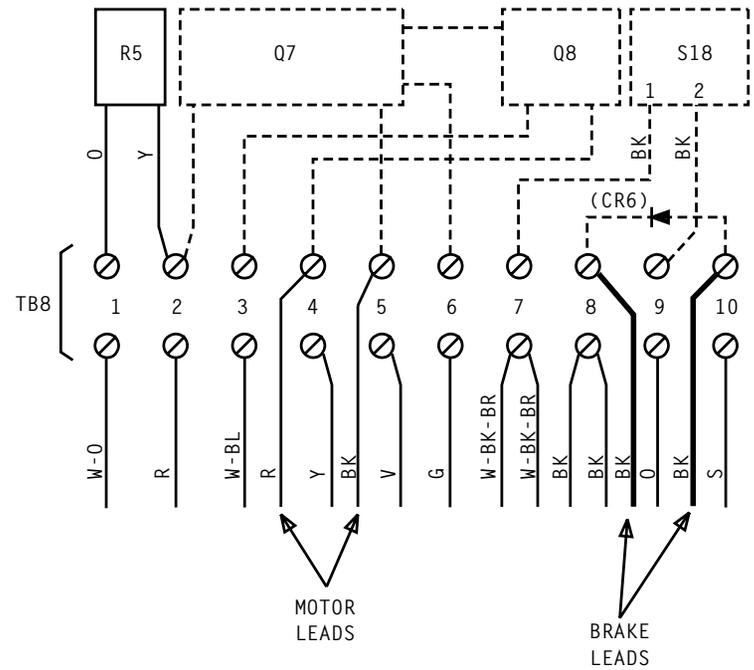
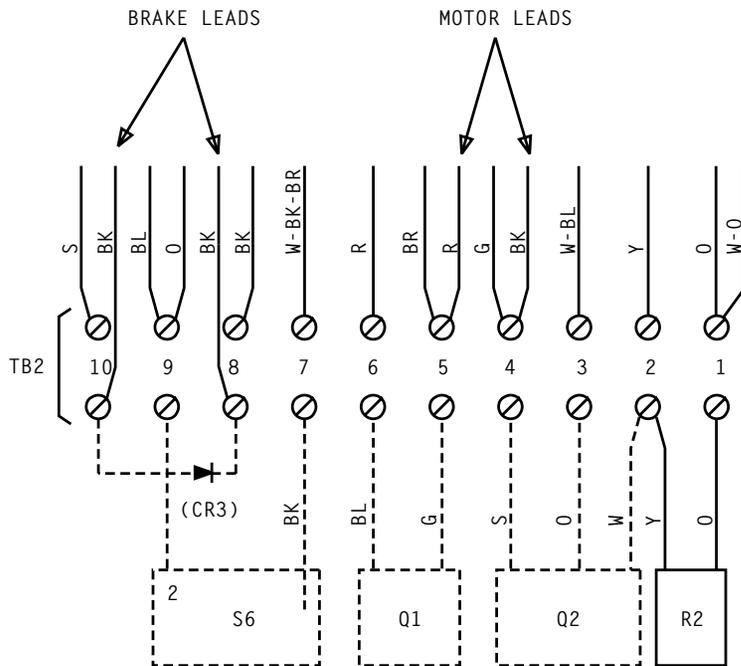


FIG. 2 - Terminal Board Wiring

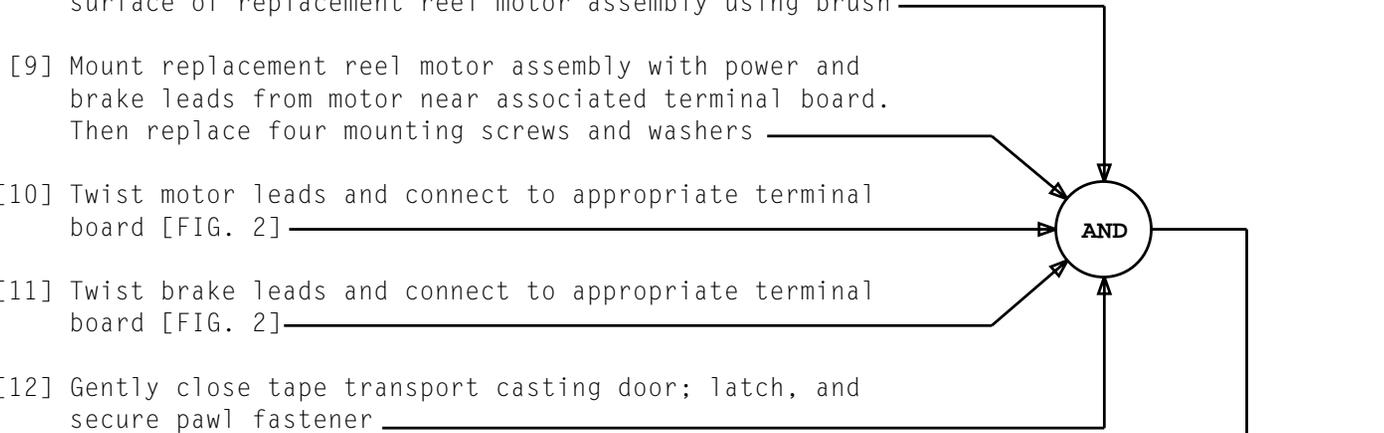
[8] Apply uniform coat of C-2471 heat sink compound to mounting surface of replacement reel motor assembly using brush

[9] Mount replacement reel motor assembly with power and brake leads from motor near associated terminal board. Then replace four mounting screws and washers

[10] Twist motor leads and connect to appropriate terminal board [FIG. 2]

[11] Twist brake leads and connect to appropriate terminal board [FIG. 2]

[12] Gently close tape transport casting door; latch, and secure pawl fastener



At front of tape transport:

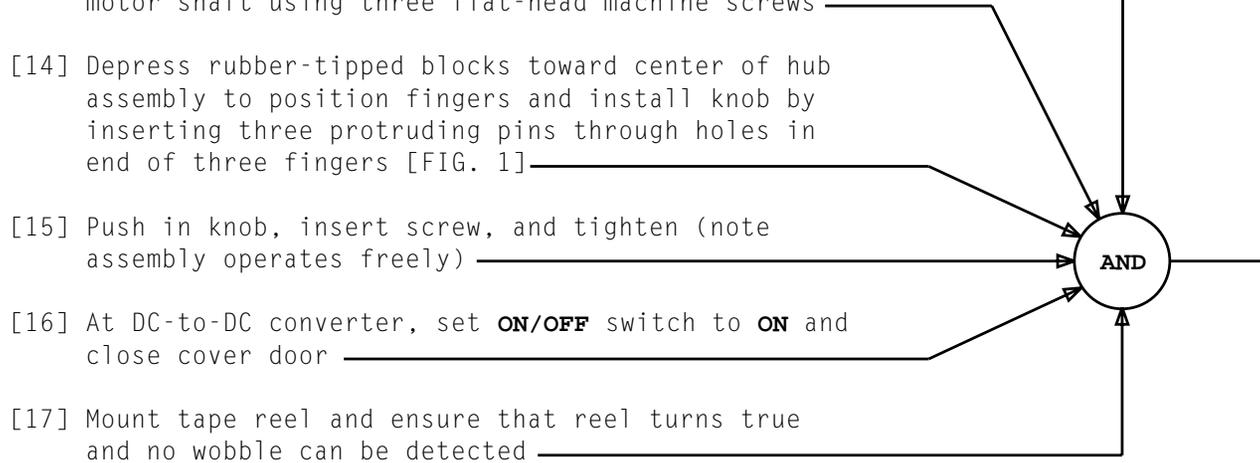
[13] Mount inner reel hub assembly to collar on reel motor shaft using three flat-head machine screws

[14] Depress rubber-tipped blocks toward center of hub assembly to position fingers and install knob by inserting three protruding pins through holes in end of three fingers [FIG. 1]

[15] Push in knob, insert screw, and tighten (note assembly operates freely)

[16] At DC-to-DC converter, set **ON/OFF** switch to **ON** and close cover door

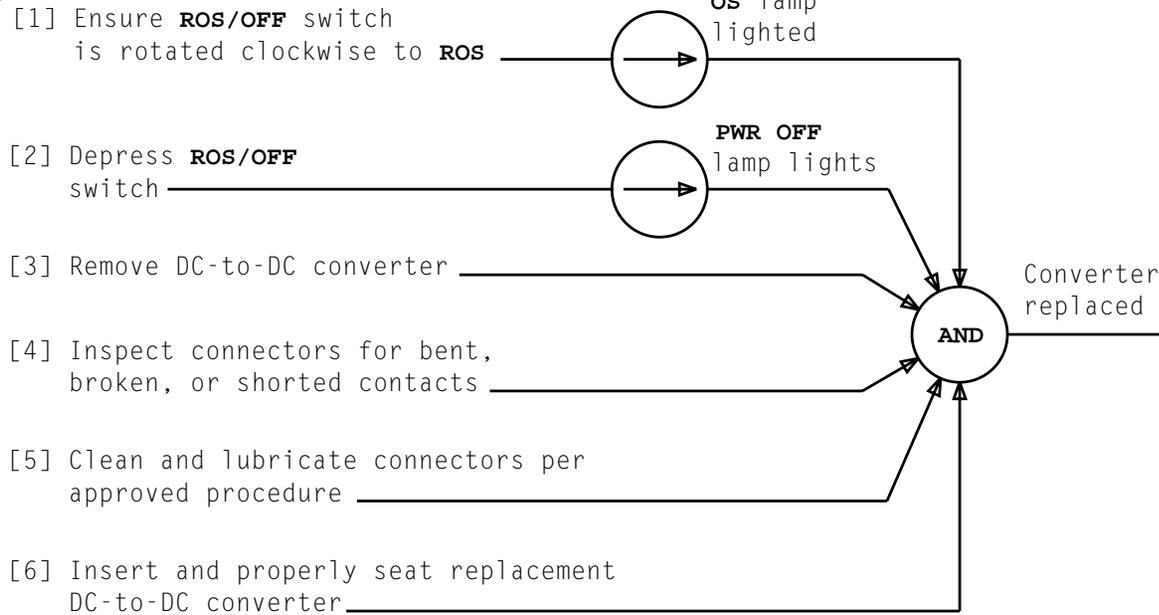
[17] Mount tape reel and ensure that reel turns true and no wobble can be detected



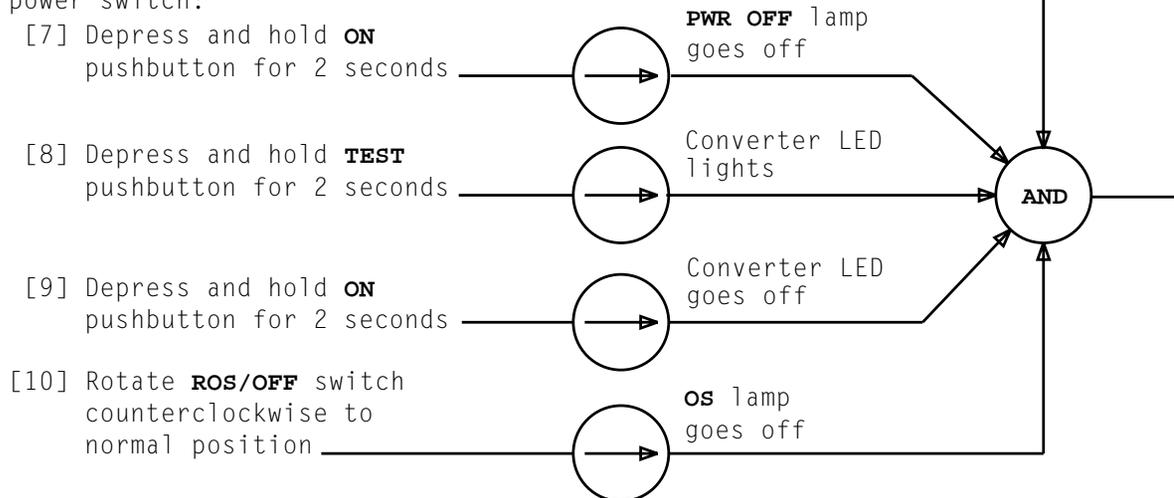
REPLACE REEL DRIVE MOTOR ASSEMBLY

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At power switch (69-17):



At power switch:



REPLACE DC-TO-DC CONVERTER, TAPE UNIT CONTROLLER

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WARNING: When DC-to-DC converter is turned off, tape reel motors will spin uncontrolled

1. At DC-to-DC converter, open cover door and set **ON/OFF** switch to **OFF**
2. At lower right of tape transport, loosen pawl fastener; unlatch, and open casting door
3. At rear of transport casting door, remove three cable assembly leads from **TB5** and two motor leads from **TB6** [FIG. 1]
4. Remove four motor mounting screws and washers, being careful to support capstan motor
5. Carefully guide capstan motor assembly through transport casting door hole
6. Remove all burrs and dirt from mounting surface on transport casting door and from mounting plate of replacement capstan motor
7. Apply uniform coat of heat sink compound to mounting surface of capstan motor
8. Using four mounting screws and washers, mount replacement motor with **TB5** located on top right side of mounting plate

9. Connect three cable assembly leads to **TB5** and two motor leads to **TB6** [FIG. 1]
10. Gently close tape transport casting door; latch, and secure pawl fastener
11. At DC-to-DC converter, set **ON/OFF** switch to **ON** and close cover door

End of procedure

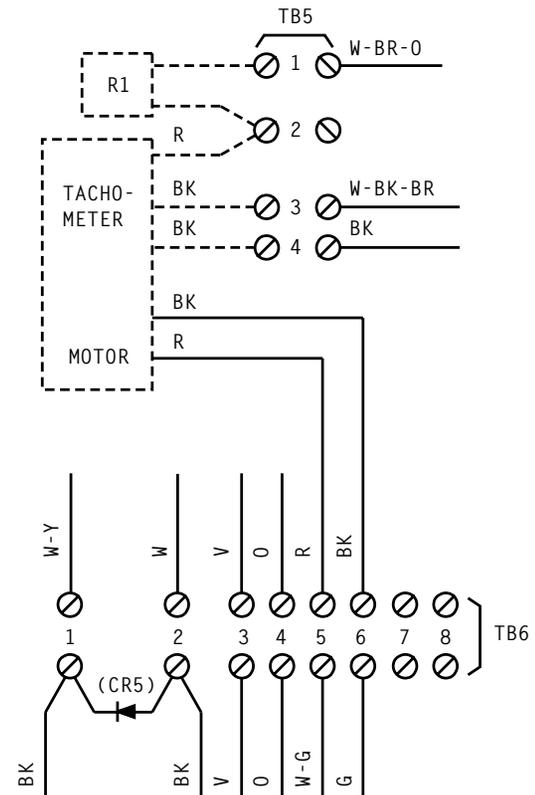


FIG. 1 - Terminal Board Wiring (TB5 and TB6)

REPLACE CAPSTAN MOTOR ASSEMBLY

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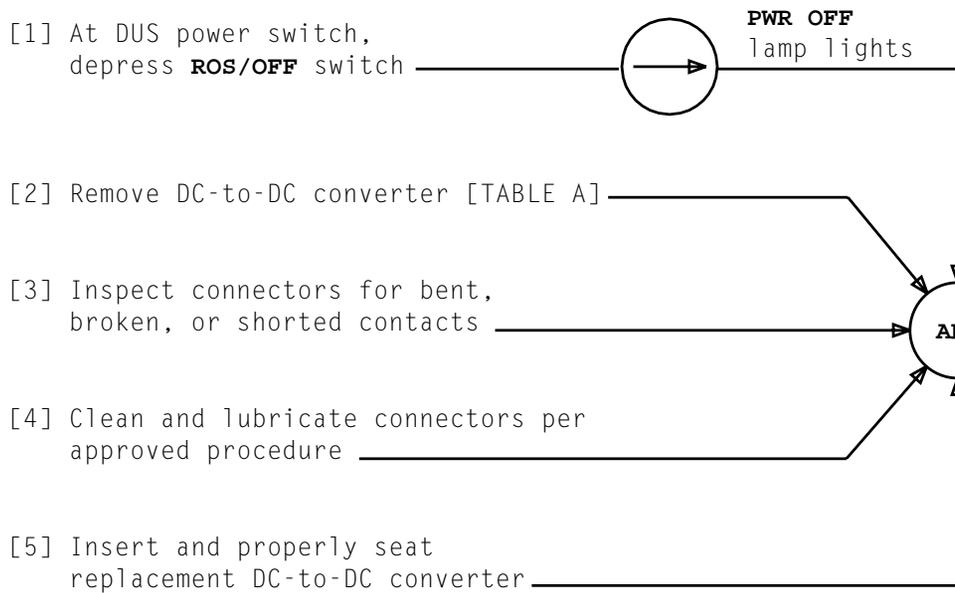
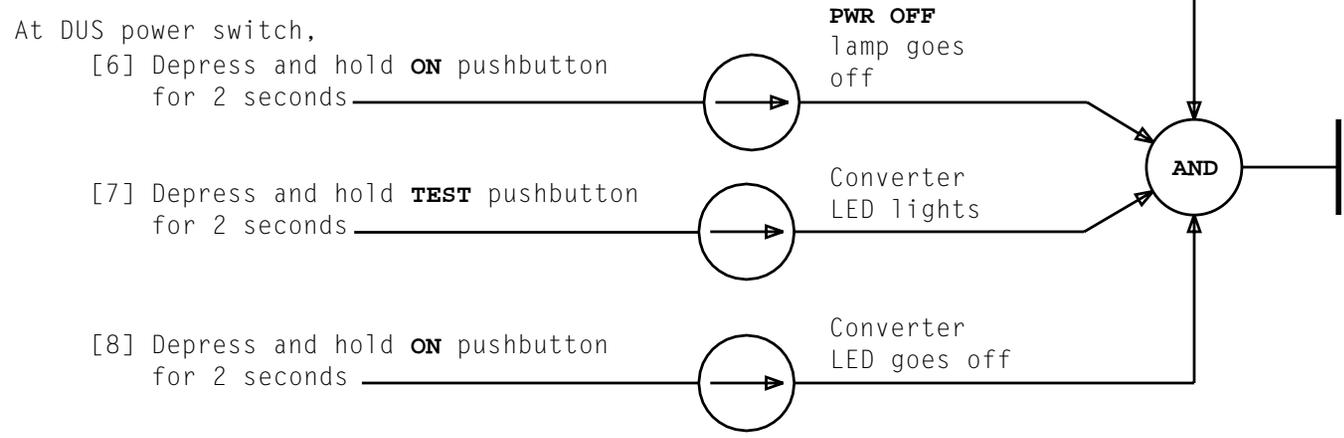


TABLE A		
DC-TO-DC CONVERTER		
NAME	TYPE	LOCATION
+6v DC-DC CONV	J87389H-1	80-20
-3v DC-DC CONV	J87389E-1/2	80-25
+19v DC-DC CONV	106A	80-32
+3v DC-DC CONV	J87389F-1/2	76-24
+3v DC-DC CONV	J87389F-2	76-28
+3v DC-DC CONV	J87389F-1/2	76-32



REPLACE DATA UNIT SELECTOR (DUS) DC-TO-DC CONVERTER

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At tape transport:

[1] Open tape transport cover door and pull interlock switch plunger out to override position

[2] Depress **LOCAL/REMOTE** pushbutton to obtain **LOCAL** lighted condition

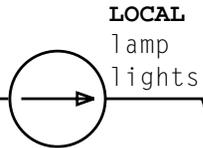
[3] See WARNING 1. At DC-to-DC converter, open cover door and set **ON/OFF** switch to **OFF**

[4] Grasp lamp switch assembly firmly and pull outward until it stops [FIG. 1]

[5] Rotate assembly counterclockwise 90 degrees; gently push inward, and pull out

[6] Remove faulty lamp

[7] Insert replacement lamp into switch assembly (GE-387 bulb or equivalent)



AND

Page 2

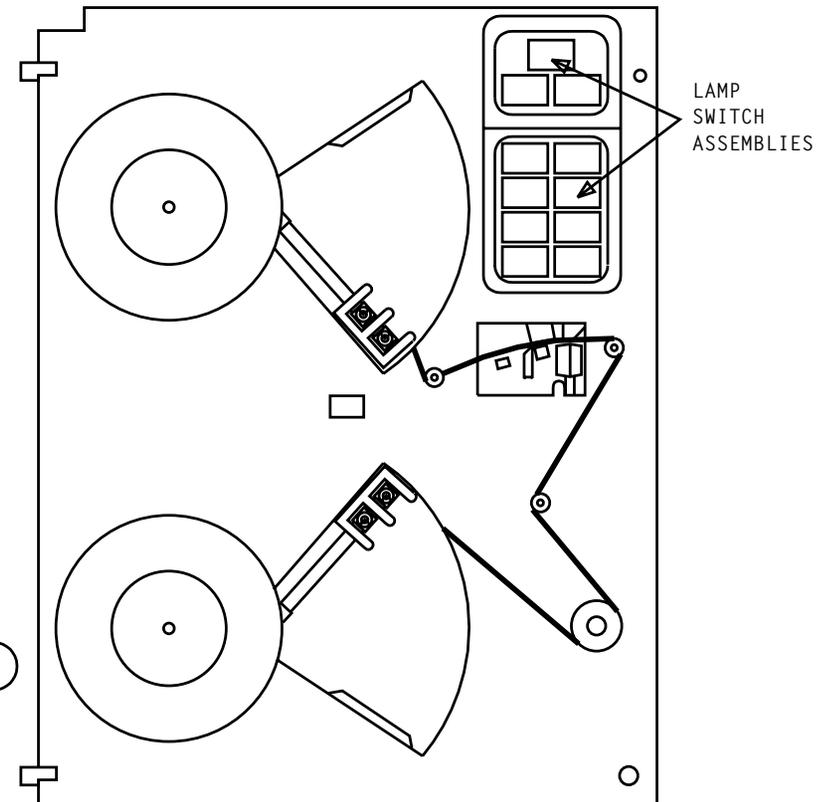


FIG. 1 - Tape Transport (Door Removed)

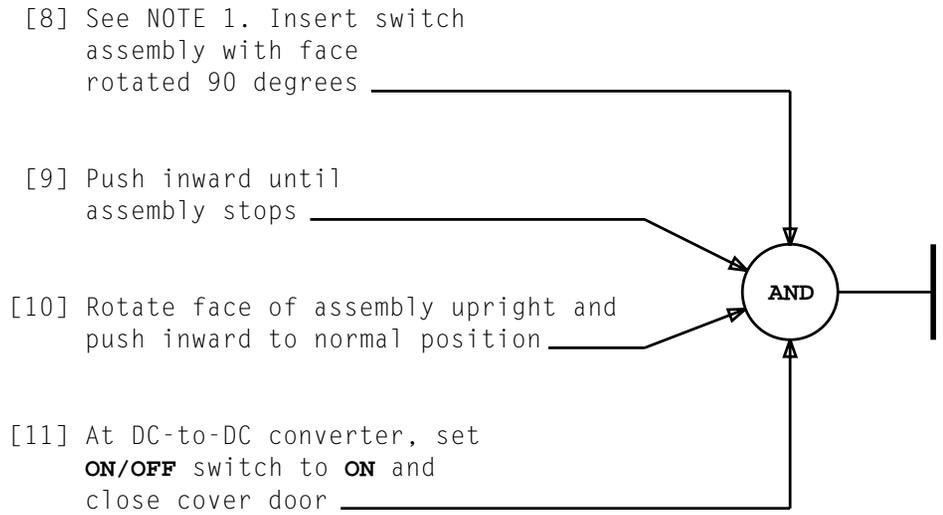
WARNING 1
When DC-to-DC converter is turned off, tape reel motors will spin uncontrolled

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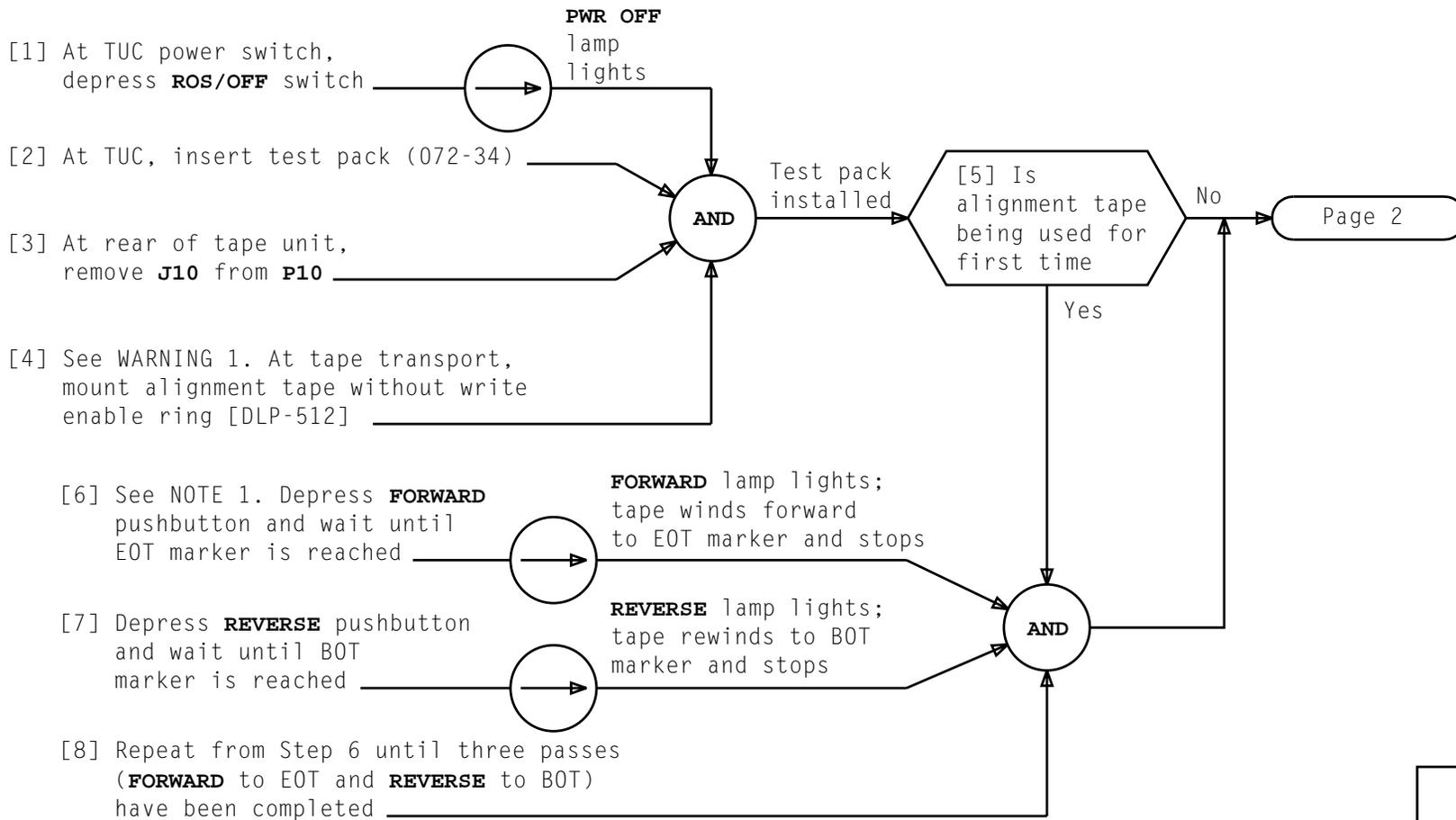
REPLACE LOCAL MODE LAMPS, TAPE TRANSPORT



NOTE 1
 Switch indicator base has alignment slot. Alignment slot must be positioned left to insert switch assembly

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REPLACE LOCAL MODE LAMPS, TAPE TRANSPORT



NOTE 1 Steps 6, 7, and 8 are performed to stabilize pulse amplitudes	
WARNING 1 <i>Alignment tape should not be run in FAST FWD or REWIND modes</i>	
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CHECK READ PULSE WIDTHS, TAPE TRANSPORT

[9] On test pack, set MODE switch
R-W-E to **R**

[10] At TUC power switch, depress and hold
ON pushbutton for 2 seconds

PWR OFF lamp
 goes off

[11] At tape transport, depress
5 IPS/25 IPS pushbutton to
 obtain **25 IPS** lighted condition

25 IPS lamp
 lights

[12] Condition oscilloscope to 1 volt/cm
 and 5 microsecond/cm

[13] On test pack, connect one channel
 of oscilloscope to test point **0**
 [TABLE A]

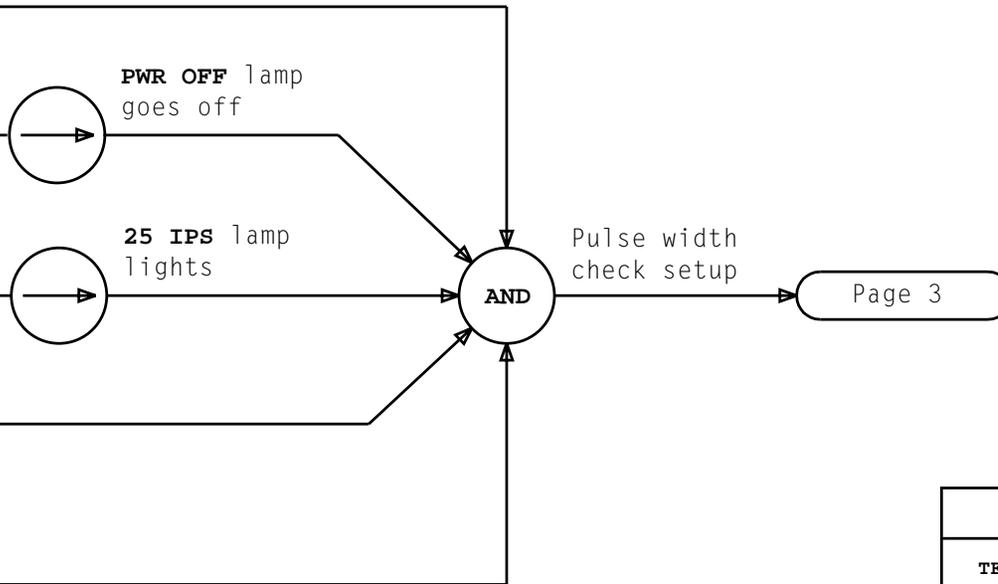
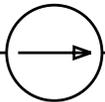


TABLE A	
TEST PACK TEST POINT	TAPE TRACK
0	2
1	8
2	1
3	9
4	3
5	5
6	6
7	7
8	4

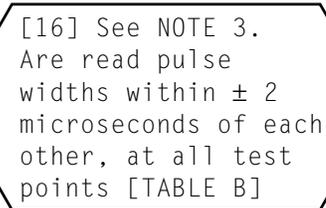
CHECK READ PULSE WIDTHS, TAPE TRANSPORT

[14] At tape transport, depress **FORWARD** pushbutton

FORWARD lamp lights; tape winds forward



[15] See NOTE 2. Measure and record read pulse widths from test points 0 through 8 [DLP-541]



No

Page 4

Yes

[17] After tape reaches EOT marker and stops, depress **REVERSE** pushbutton (**REVERSE** lamp lights; tape rewinds to BOT marker and stops)

TABLE B

ALIGNMENT TAPE SENSITIVITY	READ PULSE WIDTHS RANGE IN MICROSECONDS
70%	15-25
72%	16-26
74%	17-27
76%	18-28
78%	19-29
80%	20-30*
82%	21-31*
84%	22-32*
86%	23-33*
88%	24-34*

* Alignment tapes manufactured by Honeywell (rectangular label) will produce pulse widths approximately one-half to two-thirds of pulse width value listed

NOTES

- Take pulse width readings only when tape transport is in **FORWARD** mode
- Current alignment tapes (rectangular label) with sensitivity rating of 90 percent and above will produce read pulse widths in range of 15 to 25 microseconds. Other 90 percent and above tapes (half-moon label) will produce read pulse widths in range of 24 to 38 microseconds

CHECK READ PULSE WIDTHS, TAPE TRANSPORT

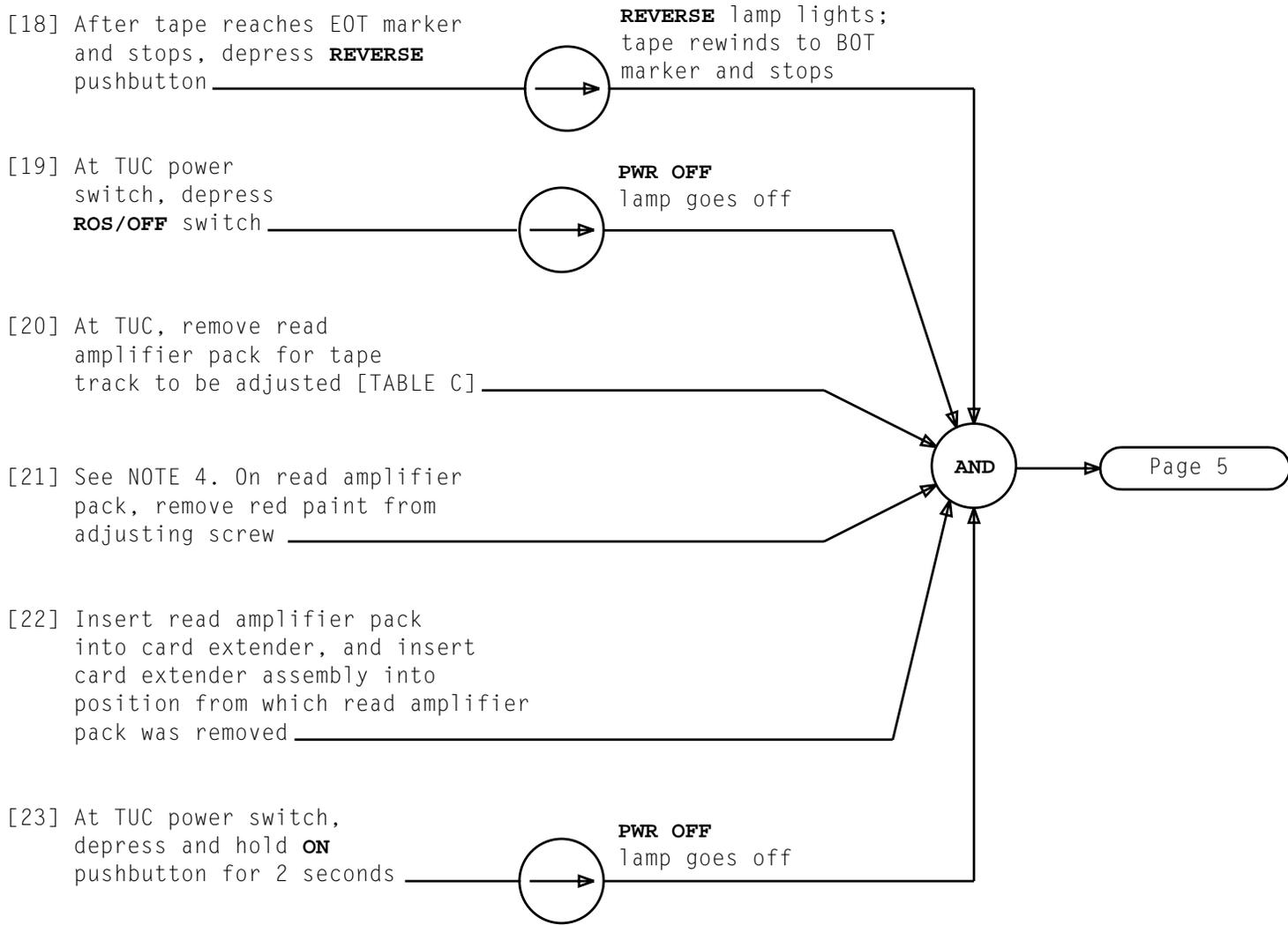


TABLE C		
TAPE TRACK	TEST PACK TEST POINT	READ AMP PACK LOC
2	0	72-12
8	1	72-13
1	2	72-14
9	3	72-16
3	4	72-17
5	5	72-18
6	6	72-19
7	7	72-20
4	8	72-21

NOTE 4
 Adjusting screw is 1-1/2 inches behind front of pack and is covered with red paint that can be chipped off

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CHECK READ PULSE WIDTHS, TAPE TRANSPORT

[24] Connect oscilloscope to test point on test pack (072-34) for tape track to be adjusted

[25] At tape transport, depress **FORWARD** pushbutton

FORWARD lamp lights; tape winds forward

[26] See NOTE 5. On read amplifier pack, adjust screw (clockwise to decrease; counterclockwise to increase) to place pulse width within range and as close to other pulse widths as possible [TABLE B]

[27] After tape reaches EOT marker and stops, depress **REVERSE** pushbutton

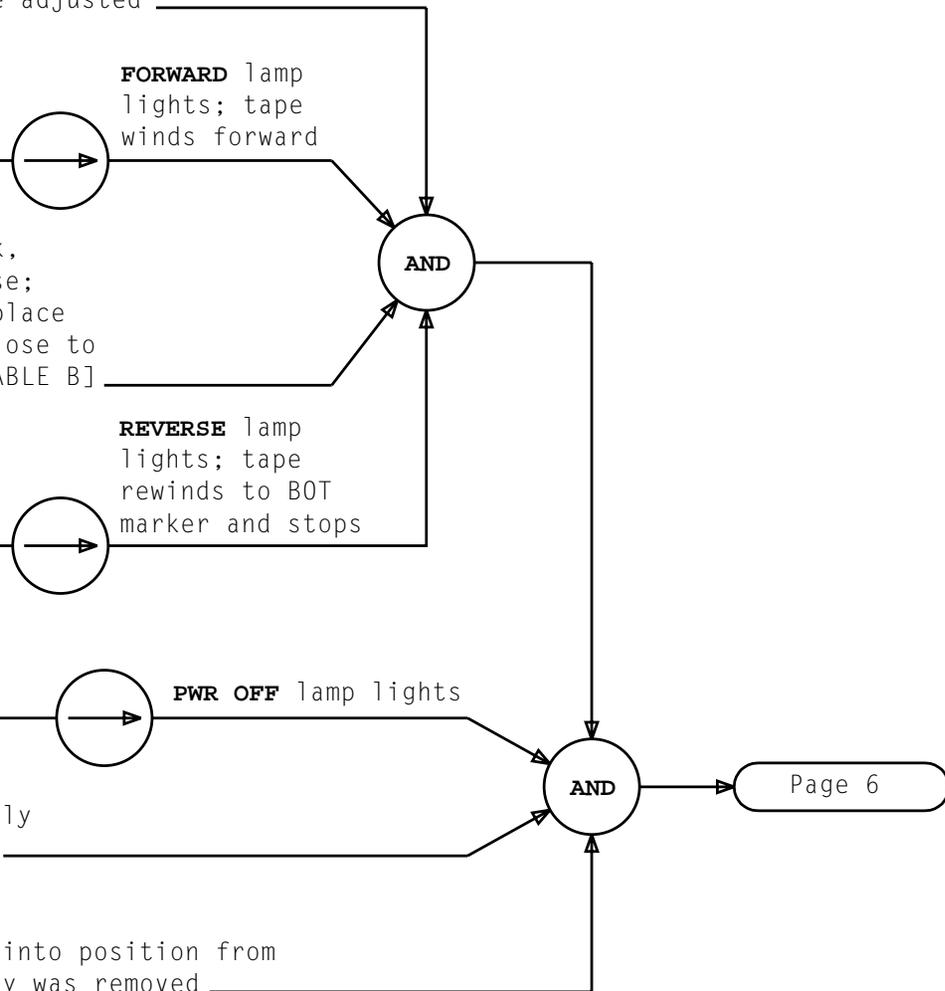
REVERSE lamp lights; tape rewinds to BOT marker and stops

[28] At TUC power switch, depress **ROS/OFF** switch

PWR OFF lamp lights

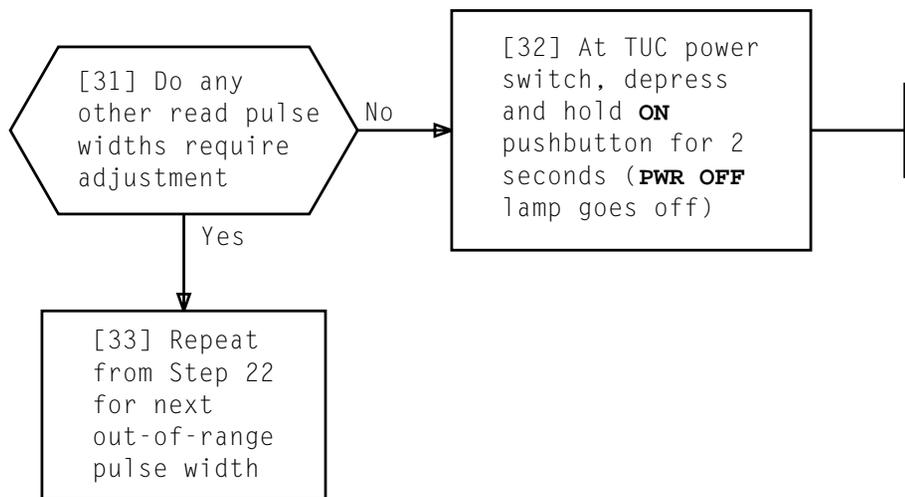
[29] Remove card extender assembly from circuit board chassis

[30] Insert read amplifier pack into position from which card extender assembly was removed



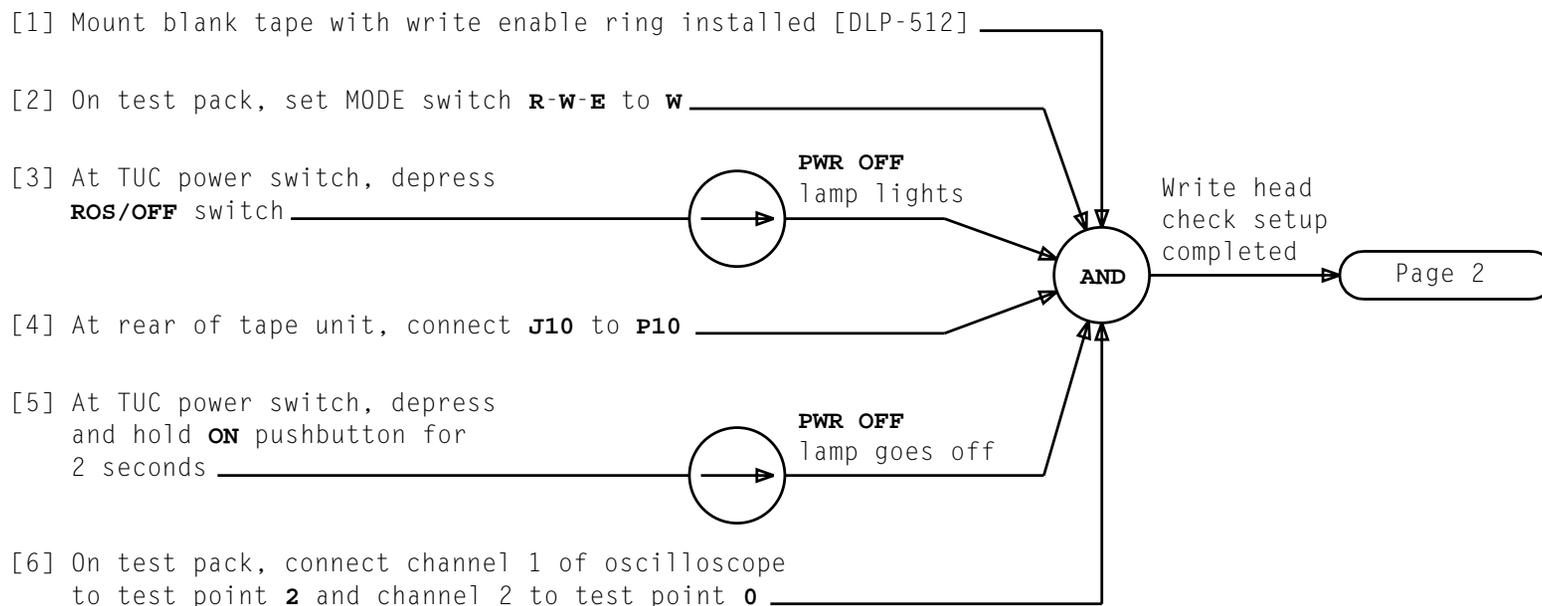
NOTE 5	
If unable to adjust pulse width within range, adjust to closest possible setting	
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CHECK READ PULSE WIDTHS, TAPE TRANSPORT



1. Record determined data on alignment form
[FIG. 1]

End of procedure



[7] See NOTE 1. At tape transport, depress **FORWARD** pushbutton

FORWARD lamp lights;
tape winds forward

[8] See NOTES 2 and 3. Determine pulse difference (static skew) of displayed pulses by comparing trailing edge of channel 2 pulse to trailing edge of channel 1 pulse (ignore leading edge of pulses) [FIG. 1]

[9] Record write head pulse difference [DLP-541]

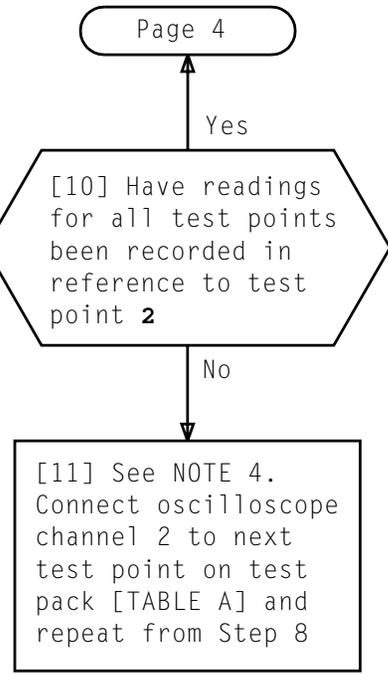
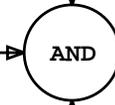
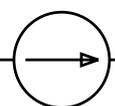


TABLE A	
TEST PACK TEST POINT	TAPE TRACK
0	2
1	8
2	1
3	9
4	3
5	5
6	6
7	7
8	4

- NOTES
1. Take pulse difference readings only when tape transport is in **FORWARD** mode
 2. Pulse difference steps may jitter. If so, maximum pulse difference should be noted
 3. If trailing edge of channel 2 pulse occurs before trailing edge of channel 1 pulse, difference is expressed as positive; if it occurs after, difference is expressed as negative
 4. Comparing test points 3 and 2 will normally give greatest difference

CHECK WRITE AND ERASE HEAD ALIGNMENTS, TAPE TRANSPORT

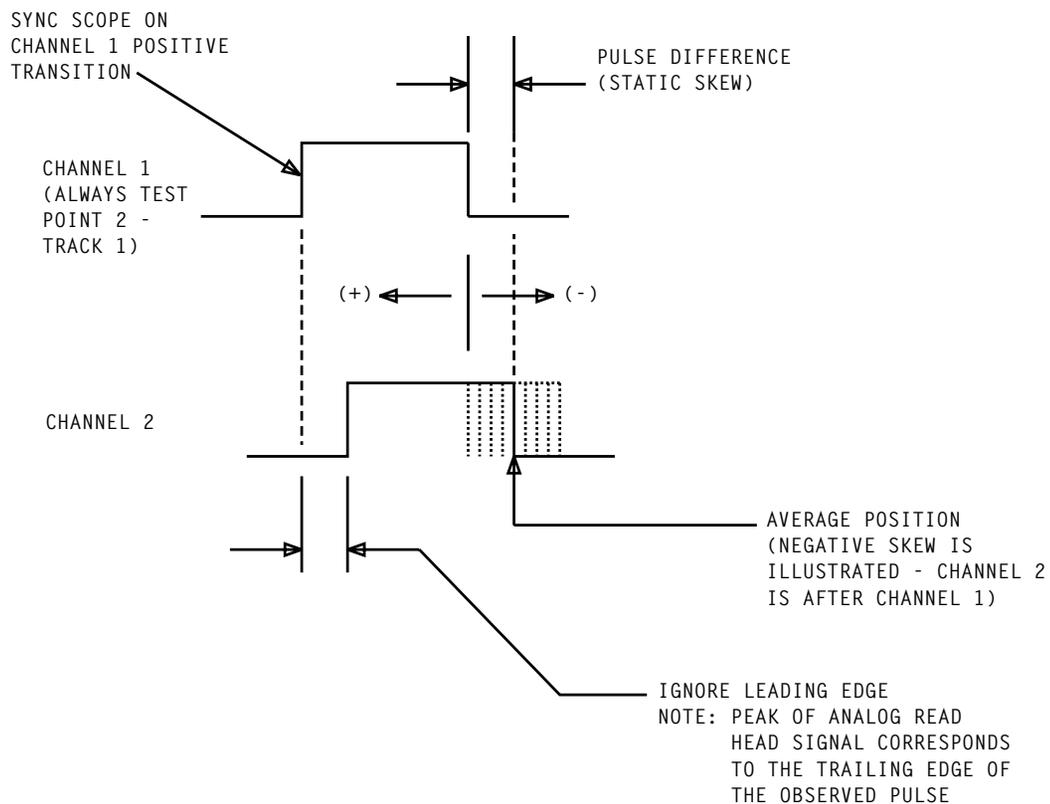
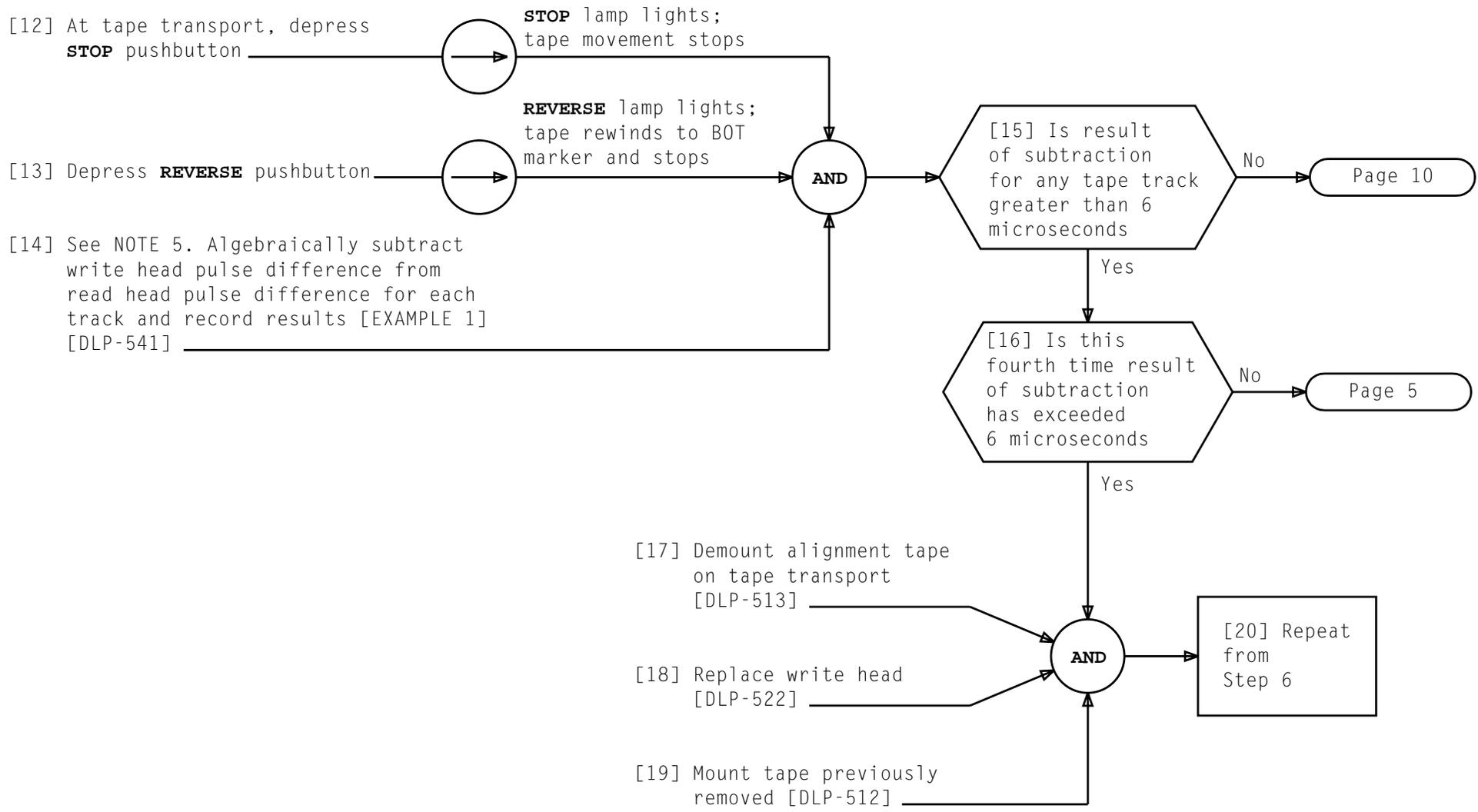


FIG. 1 - Example of Pulse Difference (Static Skew)

NOTE 5
 Note that read head pulse differences vary almost linearly in tape track order from -0.5 for track 2 to -6 microseconds for tape track 9. Write head pulse differences vary almost linearly in tape track order from 0 for track 2 to $+4$ microseconds for track 9

EXAMPLE 1
 Track 7 has a read head pulse difference of -4.5 microseconds and a write head pulse difference of $+2$ microseconds. The algebraic subtraction of the pulse differences will yield a recorded pulse difference of -6.5 microseconds

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CHECK WRITE AND ERASE HEAD ALIGNMENTS, TAPE TRANSPORT

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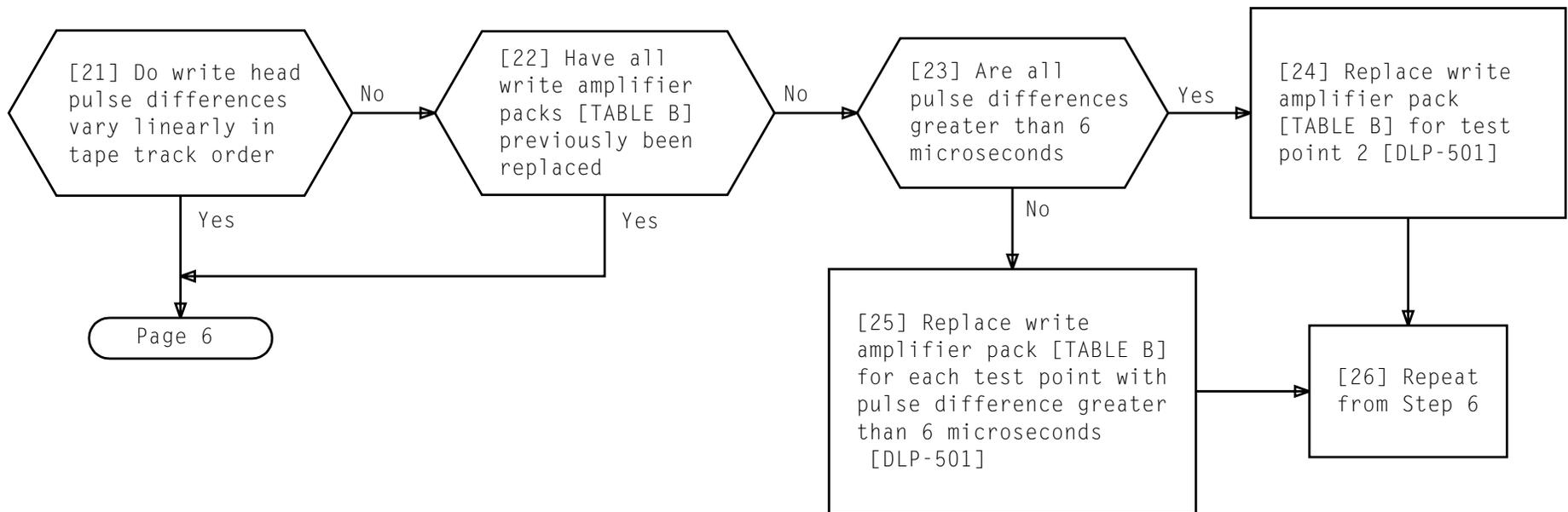


TABLE B	
TEST PACK TEST POINT	WRITE AMP PACK LOC
0	
1	72-36
2	
3	
4	72-37
5	
6	
7	72-38
8	

[27] See NOTE 6. Connect channel 2 to test point 3

[28] At lower right of tape transport, loosen
pawl fastener; unlatch, and open casting door

[29] See WARNING 1. Check component mounting screws and
upper and lower mounting screws of precision
plate for snugness [FIG. 2]

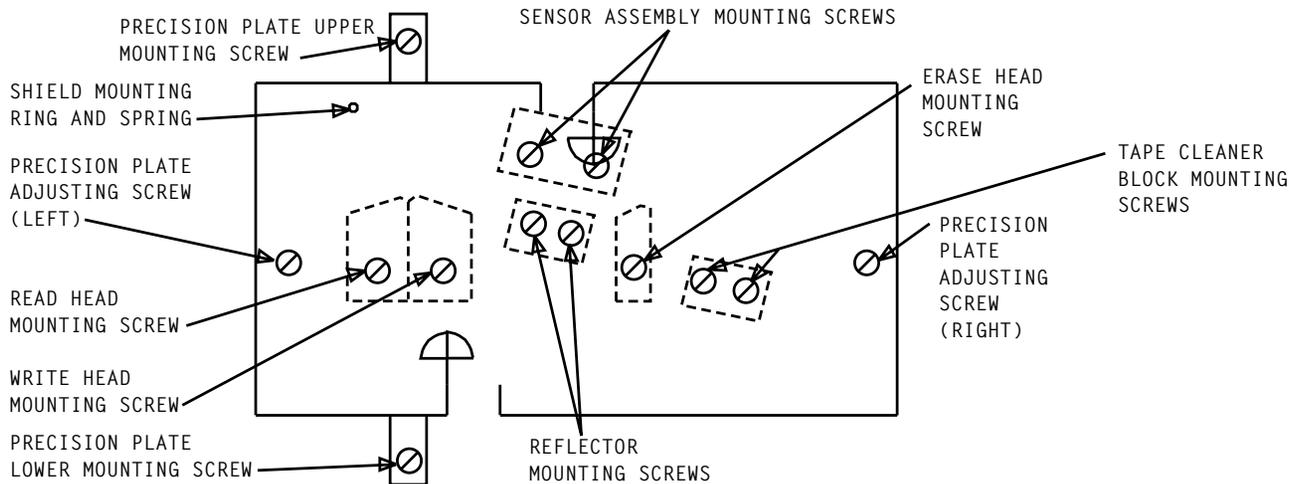
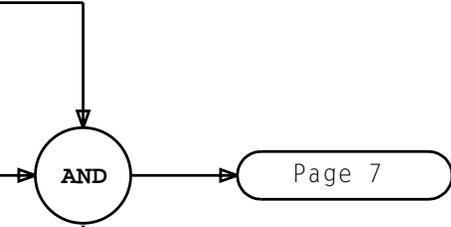


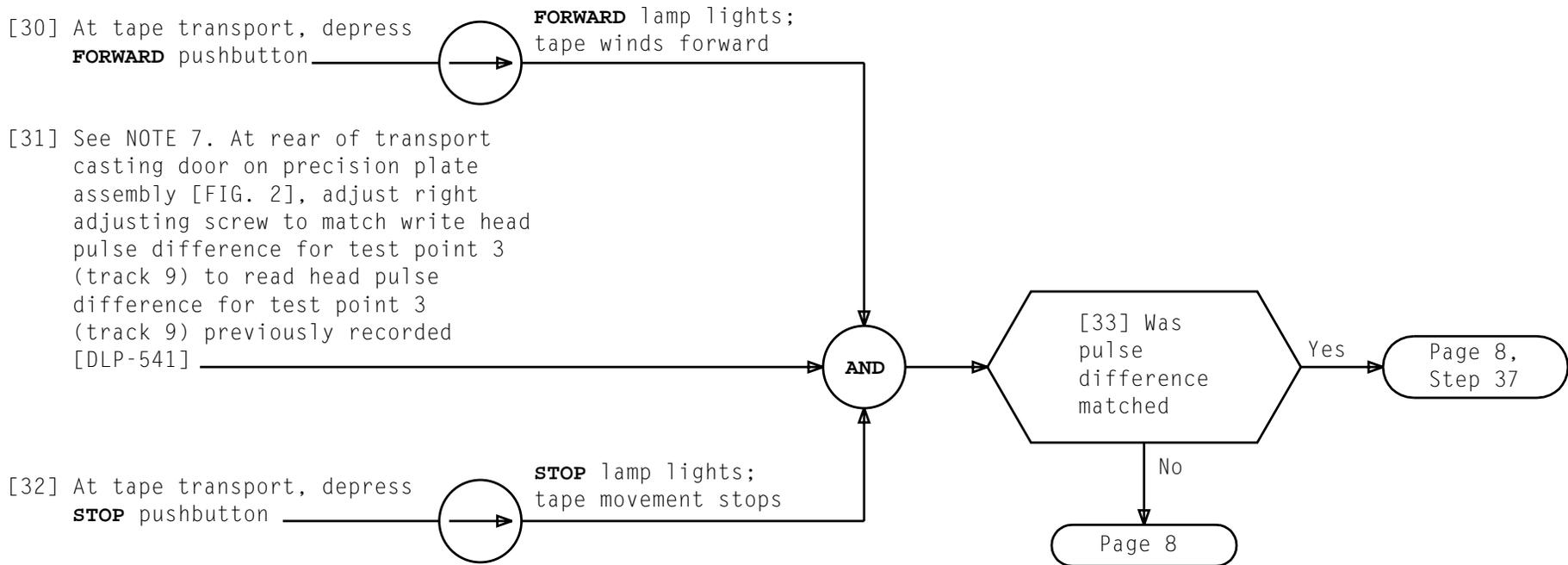
FIG. 2 - Precision Plate Assembly - Rear View
Showing Component Mounting Screws

NOTE 6
Adjusting right or left precision plate adjusting screw affects all nine tape tracks

WARNING 1
Screws associated with precision plate are small and strip or break easily. Tighten carefully

CHECK WRITE AND ERASE HEAD ALIGNMENTS, TAPE TRANSPORT

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NOTE 7	
Adjusting right or left precision plate adjusting screw will affect all nine tape tracks. Therefore, additional read head alignment may be necessary	
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At rear of transport casting door
on precision plate:

[34] See NOTE 7. Back out right or both precision
plate adjusting screws until plate and
screwhead are separated by approximately
3/16 inch [FIG. 3]

[35] Insert screwdriver between plate and
casting on right side and gently twist
screwdriver using adjustment screwhead
as stop [FIG. 3]

[36] Repeat Steps 33 and 34 three times
and then tighten adjustment screws to
contact precision plate

[37] At tape transport, depress **REVERSE**
pushbutton

REVERSE lamp lights;
tape rewinds to BOT
marker and stops

[38] Gently close tape transport casting
door; latch, and secure pawl fastener

AND

[39] Repeat
from Step 6

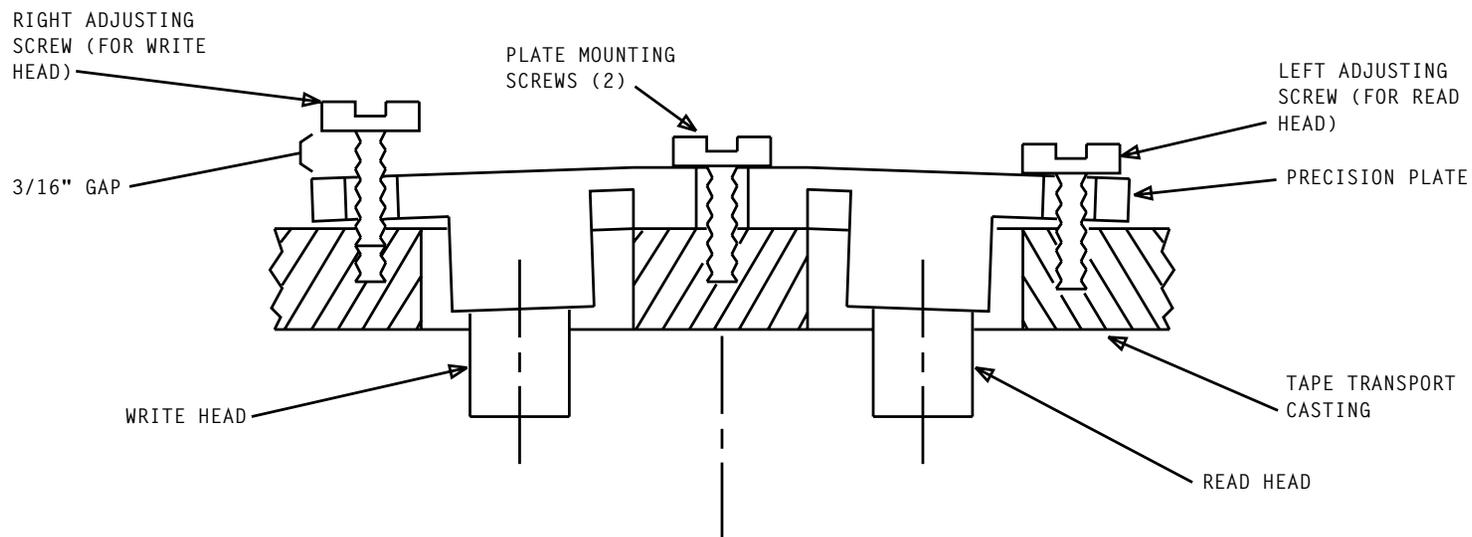
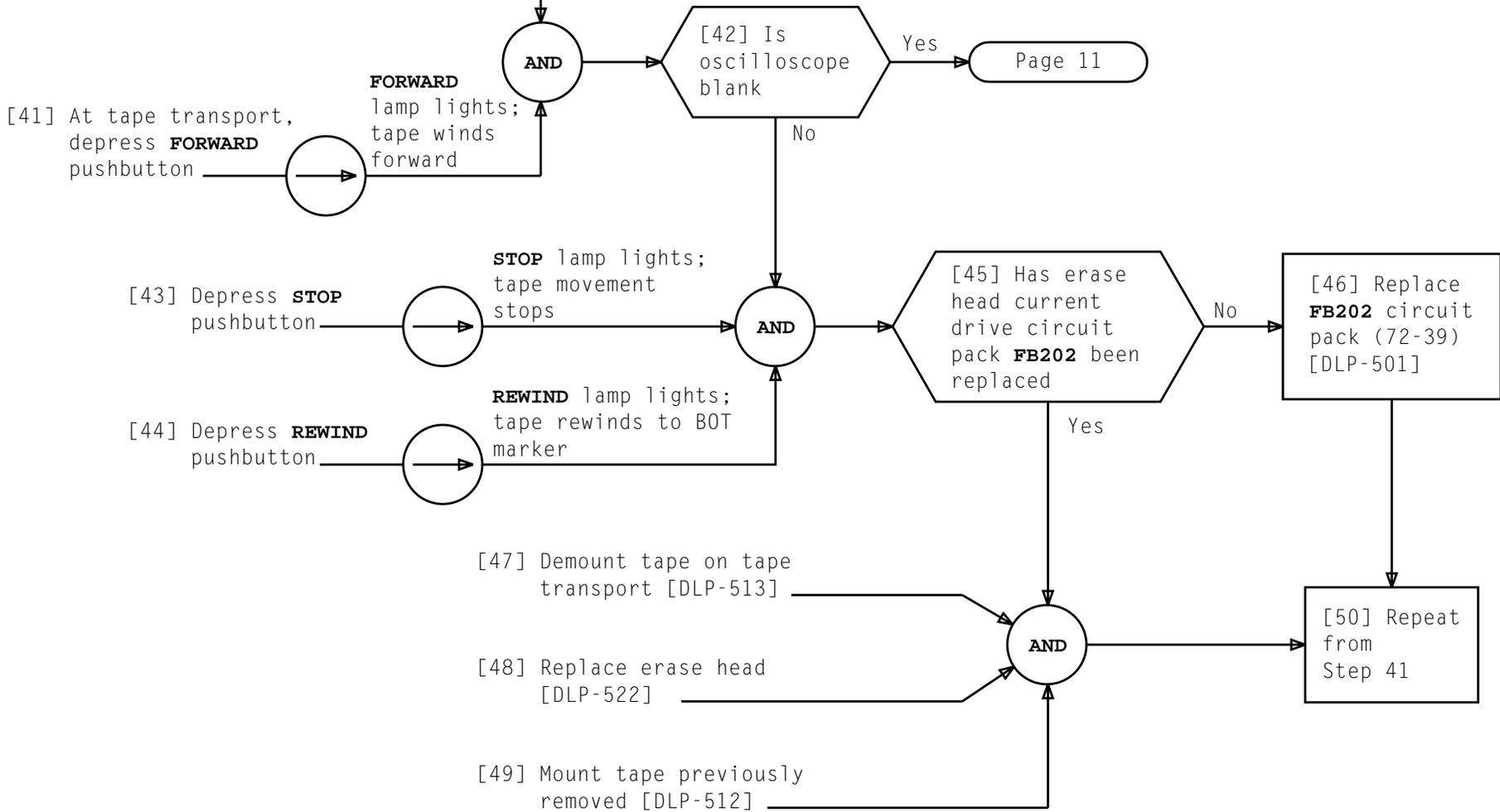


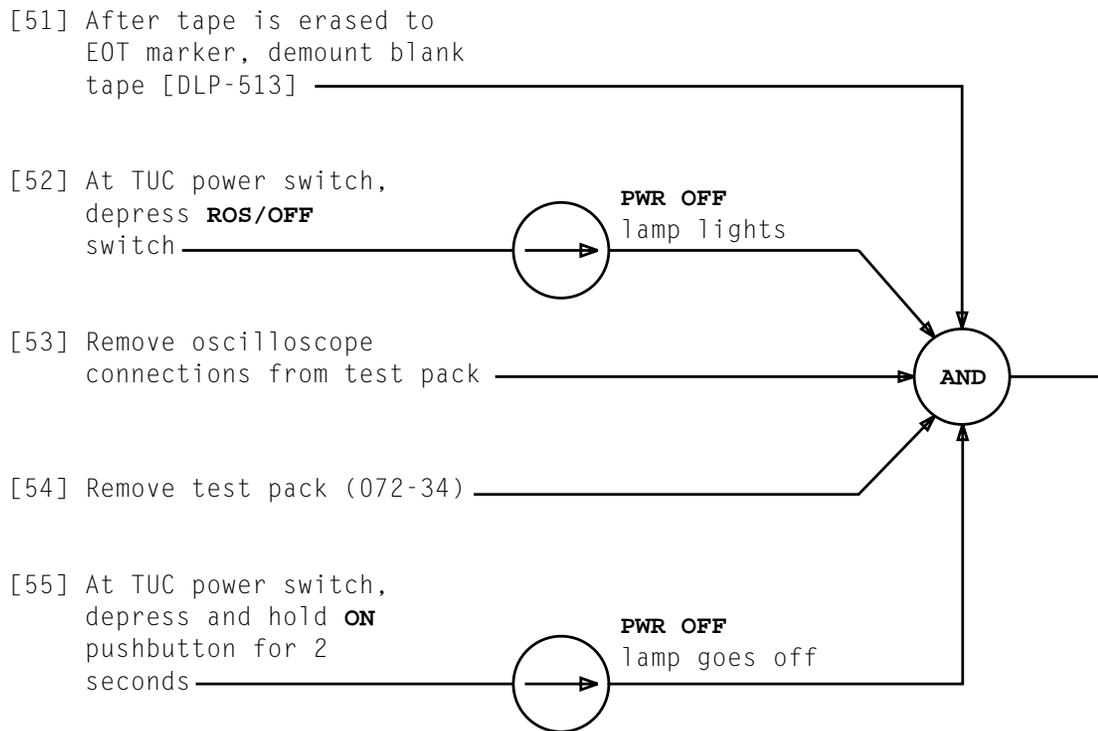
FIG. 3 - Cross Section View of Flexed Precision Plate Assembly

[40] On test pack, set mode switch **R-W-E** to **E** and verify that scope channels 1 and 2 are still connected to test points 1 and 3, respectively



CHECK WRITE AND ERASE HEAD ALIGNMENTS, TAPE TRANSPORT

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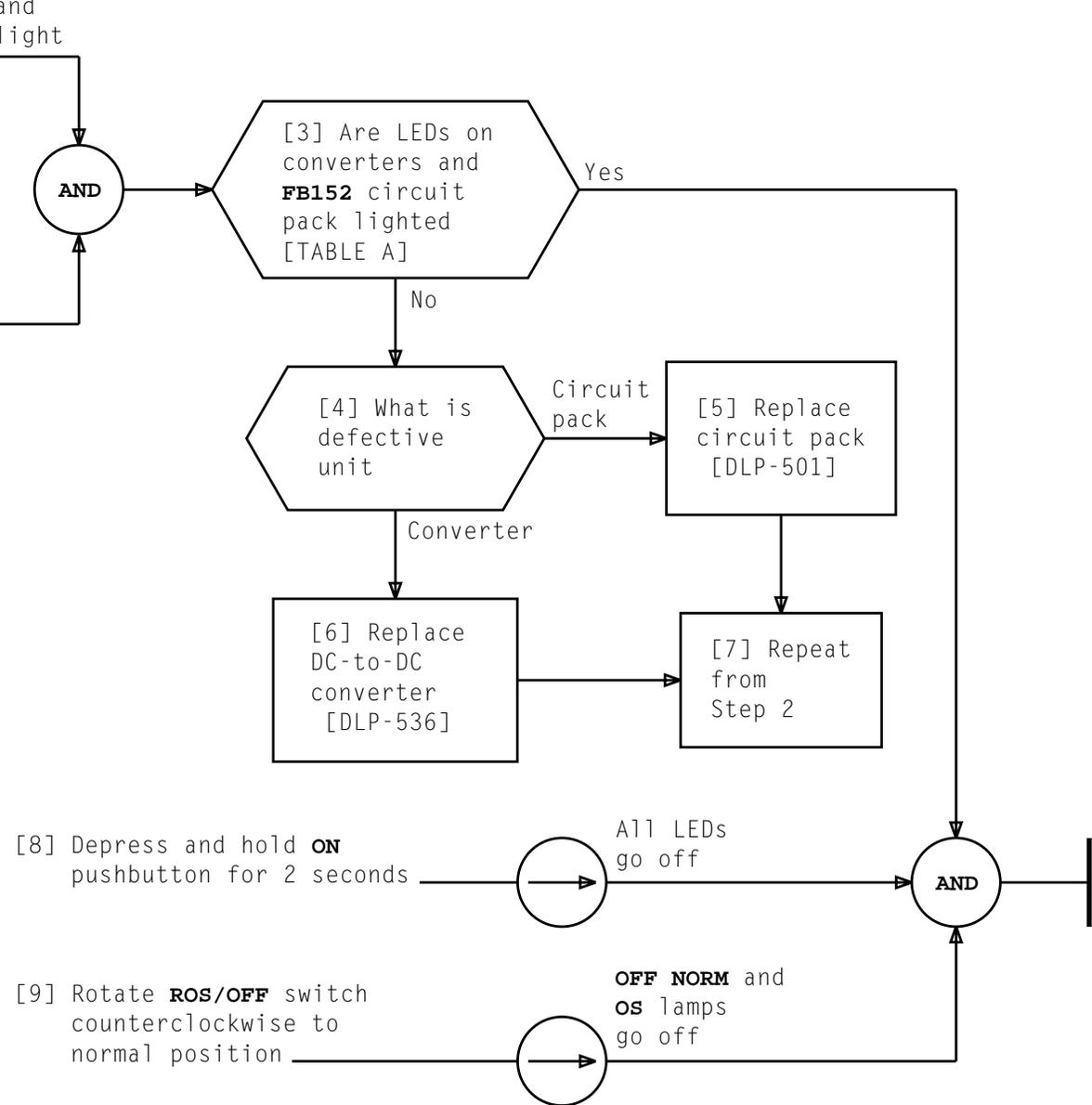
At TUC power switch:

[1] Rotate **ROS/OFF** switch clockwise to **ROS**

OFF NORM and **OS** lamps light

[2] Depress and hold **TEST** pushbutton for 2 seconds

TABLE A	
UNIT	LOCATION
+3V converters	80-42 76-02, 07, 42
-3V converter	72-02
+6V converter	72-07
+3V converter	72-42
FB152 circuit pack	76-12



TEST POWER ALARM CIRCUITS, TAPE UNIT CONTROLLER

At CC power switch:

- [1] Rotate **ROS/OFF** switch counterclockwise to **ROS**

OFF NORM and **OS** lamps light

- [2] Depress **ROS/OFF** switch

PWR OFF lamp lights

- [3] If circuit pack to be replaced is listed in TABLE A or B, remove associated fuse

- [4] Remove circuit pack

- [5] Clean and lubricate pack terminals and connector per approved procedures

- [6] Insert and properly seat replacement pack

- [7] If fuse was removed, install fuse

At CC power switch:

- [8] Depress and hold **ON** pushbutton for 2 seconds

PWR OFF lamp goes off

- [9] Rotate **ROS/OFF** switch counterclockwise to normal position

OFF NORM and **OS** lamps go off

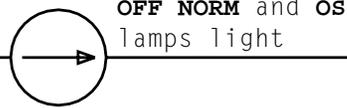
TABLE A NON-BULK POWER CIRCUIT PACKS WITH UNSWITCHED POWER (SD-5A010-01)			
CIRCUIT PACK		FUSE	
TYPE	LOCATION	DESIGNATION	LOCATION
FB5	46-08	+24V-22	21-30
FB152	62-37	+24V-21	
FB153	34-08	+24V-21	
FC23	38-08	+24V-23	

TABLE B BULK POWER CIRCUIT PACKS WITH UNSWITCHED POWER (SD-5A010-02)			
CIRCUIT PACK		FUSE	
TYPE	LOCATION	DESIGNATION	LOCATION
FB153	22-22	24C-02	23-46
FB158	22-29	24C-02	23-46
FB159	22-24	24C-50	21-52
FB161	22-27	24C-02	23-46
FC510	62-05, 62-66, 58-05, 58-66, 54-05, 54-66, 50-05, 50-66, 46-05, 46-66, 42-05, 42-66	24C-11	23-52
FC511	80-05, 80-66, 76-05, 76-66, 72-05, 72-66, 38-05, 38-66, 34-05, 34-66, 30-05, 30-66	24C-11	23-52

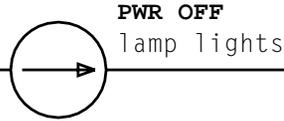
REPLACE CIRCUIT PACK, CENTRAL CONTROL FRAME

At FS power switch (161-21):

[1] Rotate **ROS/OFF** switch
counterclockwise to **ROS**



[2] Depress **ROS/OFF**
switch



Power
removed

[3] If circuit pack to be replaced is located at 80-9
through 80-11 or 80-31, remove **+24A-REF** fuse (162-10)

[4] Remove circuit pack

[5] Clean and lubricate pack terminals
and connector per approved procedures

[6] Insert and properly seat
replacement pack

Circuit
pack
replaced

Page 2

REPLACE CIRCUIT PACK, FILE STORE FRAME

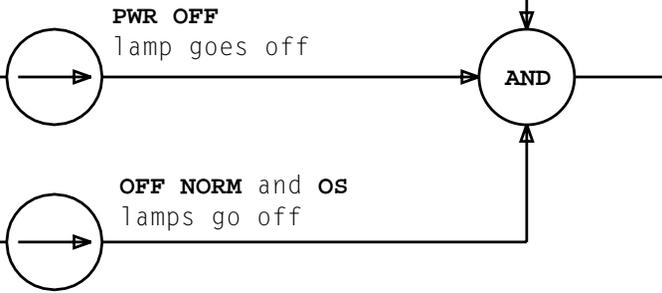
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[7] If fuses were removed,
install fuses

At FS power switch:

[8] Depress and hold **ON** pushbutton
for 2 seconds

[9] Rotate **ROS/OFF** switch
counterclockwise to
normal position



At DUS power switch:

[1] Rotate **ROS/OFF** switch clockwise to **ROS** **OFF NORM** and **OS** lamps light

[2] Depress and hold **TEST** pushbutton for 2 seconds

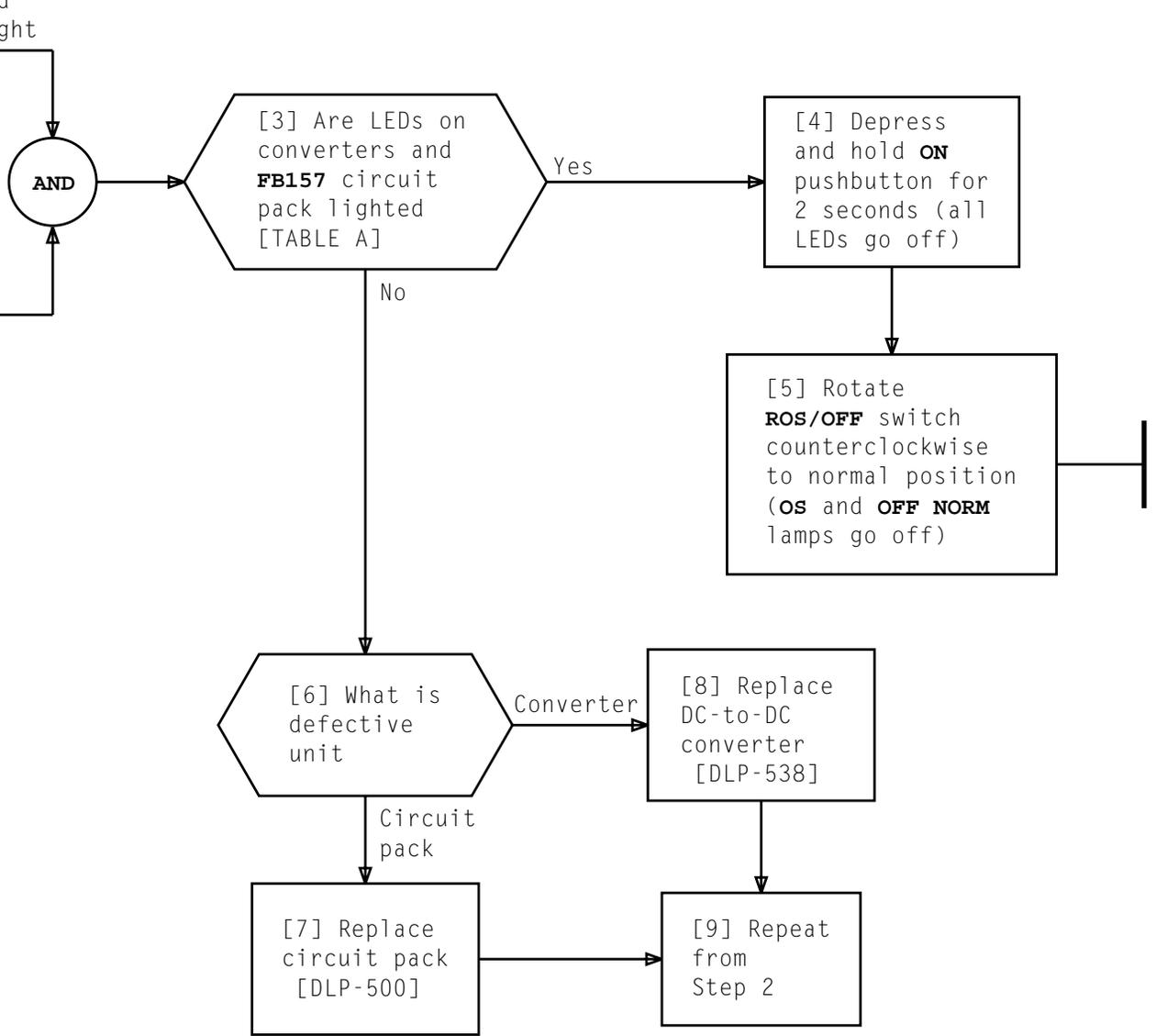
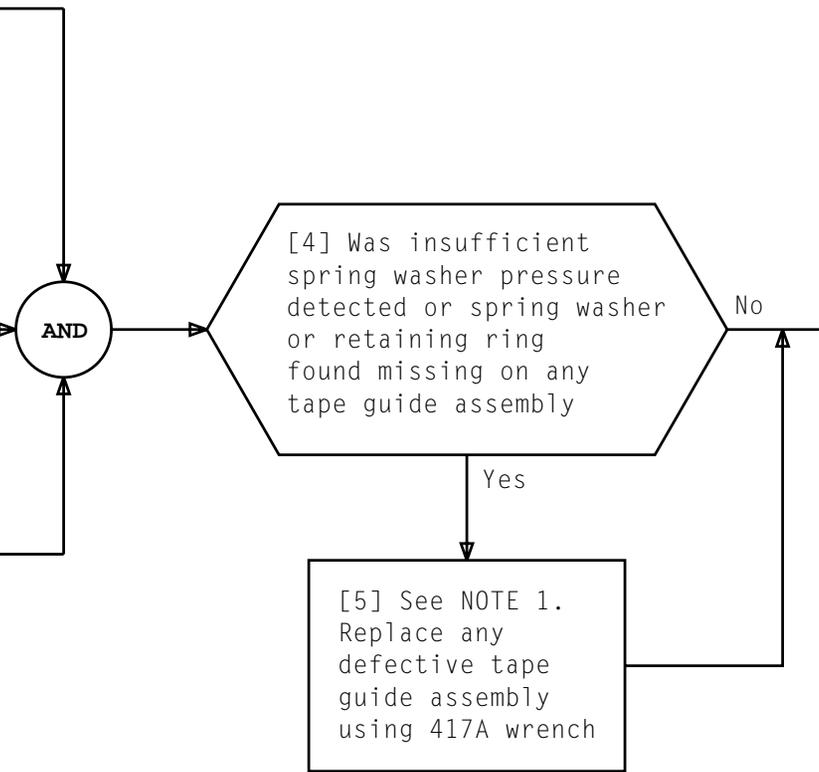


TABLE A	
UNIT	LOCATION
+6V converter	80-20
-3V converter	80-25
+3V converter	76-24, 28, 32
FB157 circuit pack	76-42

[1] Check for missing dark metal spring washer and retaining ring on all tape guide assemblies (particularly both precision tape guides) [FIG. 1]

[2] Check spring washer pressure of all non-precision tape guide assemblies by manually applying outward axial pressure to spools (Do not apply enough pressure to cause axial movement) [FIG. 1]

[3] See CAUTION 1. Without moving spools axially, check spring washer pressure of both precision tape guide assemblies [FIG. 1]



NOTE 1
It may be necessary to grind off half the thickness on large end of 417A wrench

CAUTION 1
Axial movement of precision tape guide assemblies (positioned to right and left of precision plate) can upset tape head alignments

CHECK TENSION ON TAPE GUIDE ASSEMBLIES

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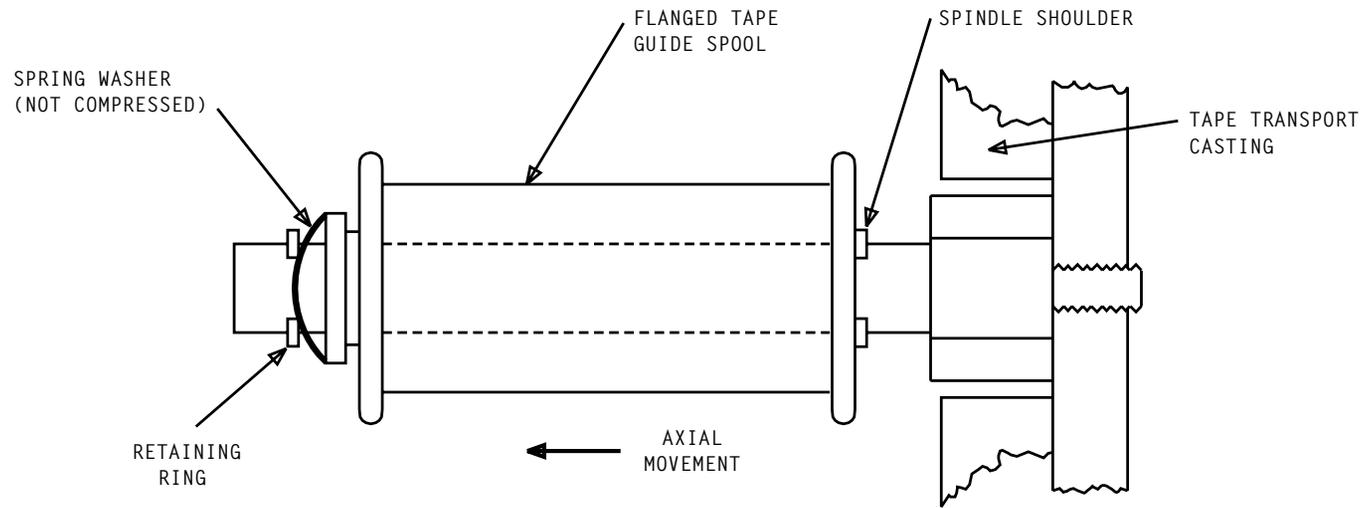


FIG. 1 - Tape Guide Assembly

[1] Obtain replacement tape cleaner blade (L-502537)

[2] At DC-to-DC converter, open cover door and set **ON/OFF** switch to **OFF**

[3] At lower right of tape transport, loosen pawl fastener; unlatch, and open casting door

[4] While supporting tape cleaner block, remove tape cleaner block mounting screws at rear of precision plate assembly [FIG. 1]

[5] Remove tape cleaner blade mounting screws and washers from tape cleaner block

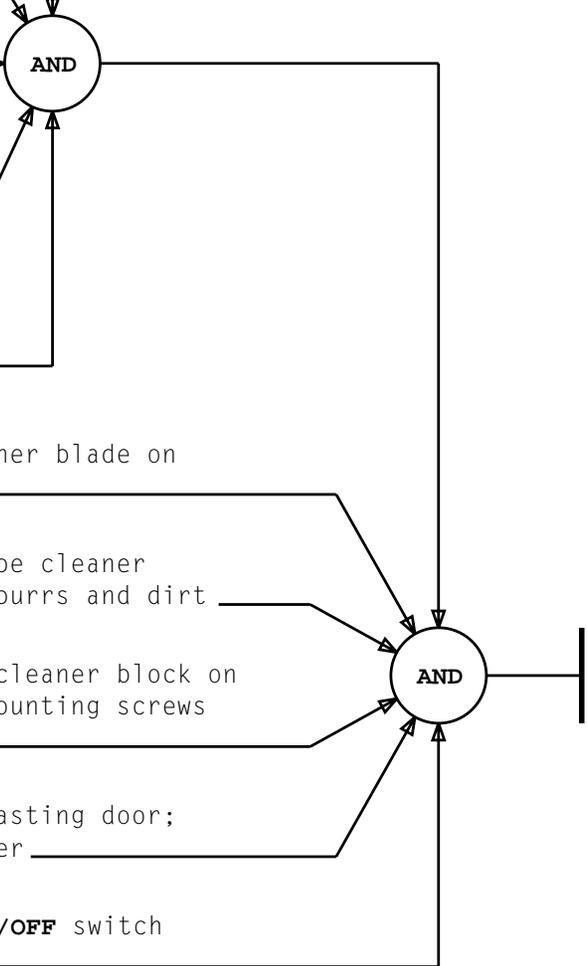
[6] Install replacement tape cleaner blade on tape cleaner block

[7] Clean mounting surfaces of tape cleaner block and precision plate of burrs and dirt

[8] See WARNING 1. Position tape cleaner block on precision plate and install mounting screws removed [FIG. 1]

[9] Gently close tape transport casting door; latch, and secure pawl fastener

[10] At DC-to-DC converter, set **ON/OFF** switch to **ON** and close cover door



WARNING 1
Screws associated with precision plate are small and strip or break easily. Tighten carefully

REPLACE TAPE CLEANER BLADE

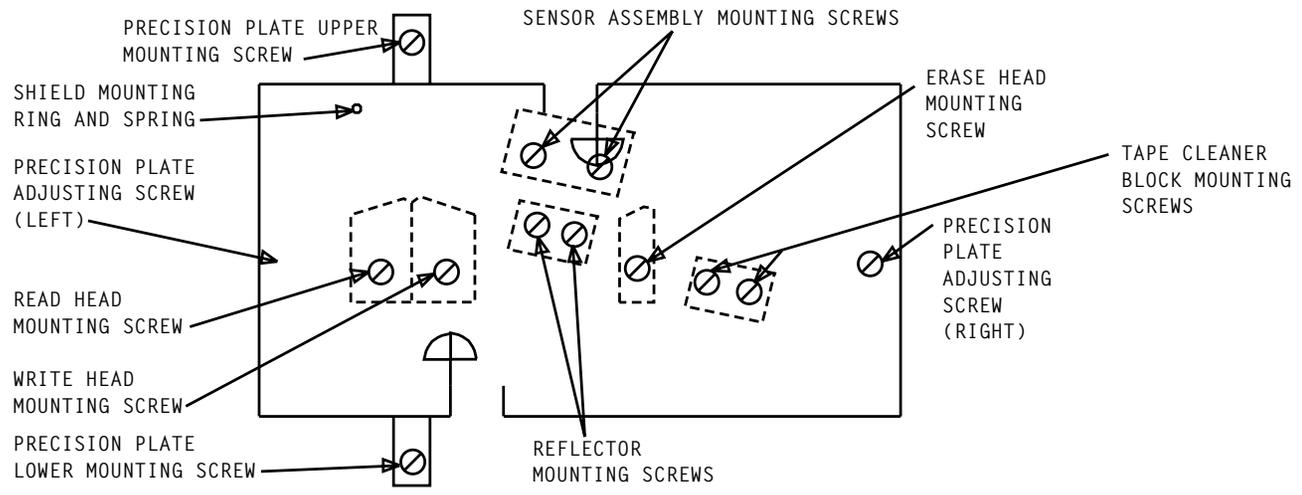


FIG. 1 - Precision Plate Assembly - Rear View
Showing Component Mounting Screws

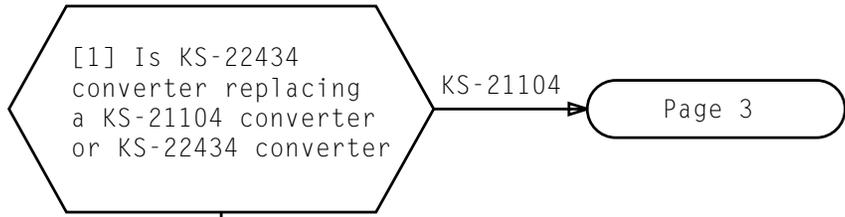
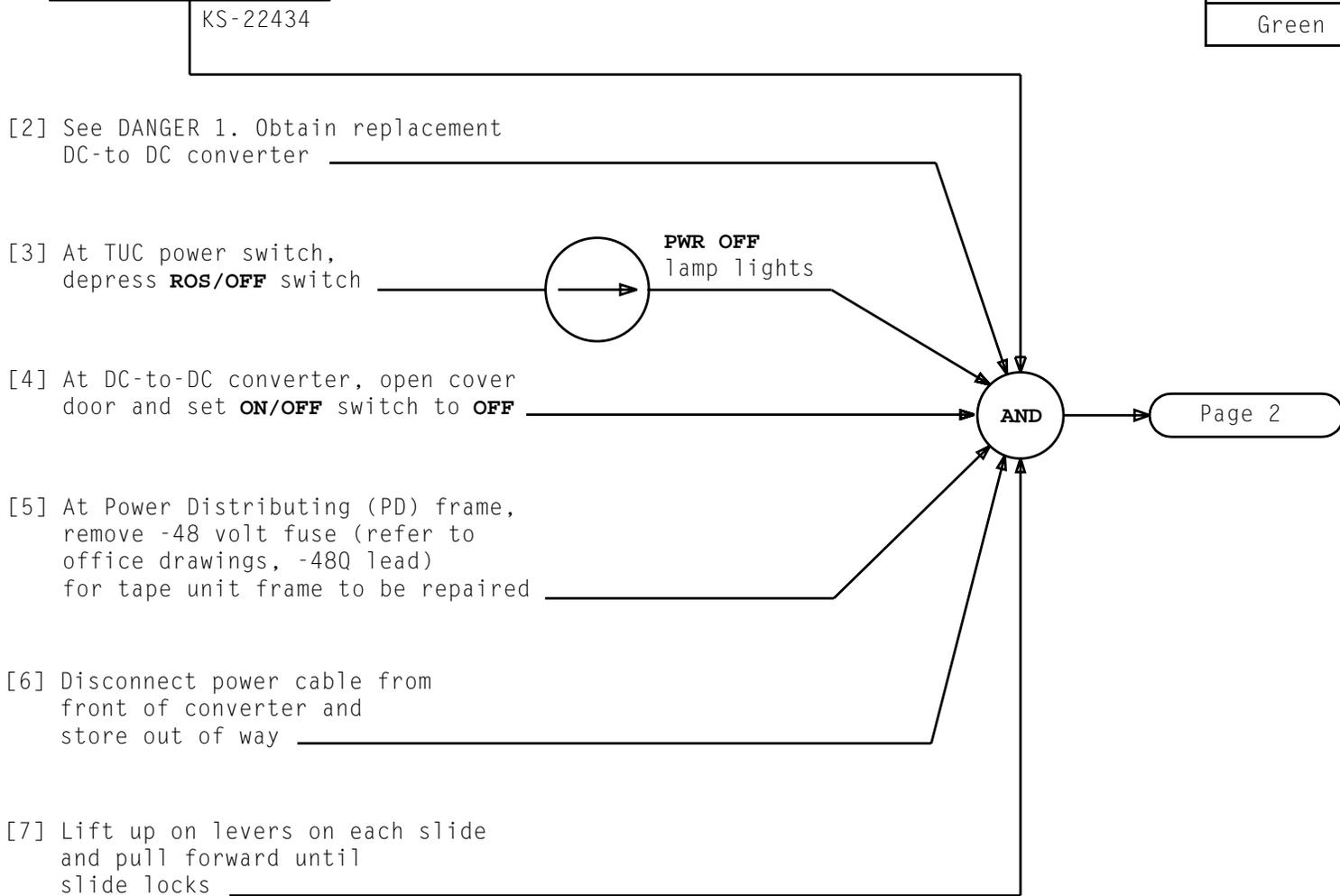


TABLE A	
LEAD IDENTIFICATION	LEAD DESIGNATION
White	TB1 - 1
Black	TB1 - 2
Green	FR GRD



*DANGER 1
DC-to-DC
converter weighs
approximately 80
pounds*

Added

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REPLACE DC-TO-DC CONVERTER UNIT, KS-22434

[8] Verify absence of -48 volts across

TB1-1 (+) and **TB1-2** (-) leads (TABLE A)

[9] At rear of recorder cabinet on **TB1** (FIG. 1)
disconnect three -48 volt power cable leads

[10] Unscrew four mounting screws on each
slide of converter

[11] See DANGER 2. Lift converter up
and out of slides

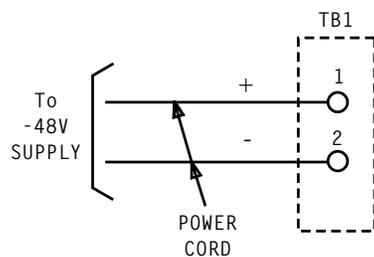
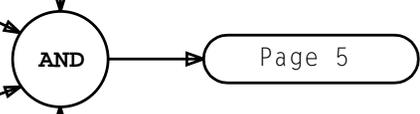


FIG. 1 - KS-22434 Converter Power Cord Connection Diagram

<i>DANGER 2 DC-to-DC converter weighs approximately 80 pounds</i>	
-----------------------------------------------------------------------------------	--

Added

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REPLACE DC-TO-DC CONVERTER UNIT, KS-22434

[12] See DANGER 3. Obtain replacement DC-to-DC converter

[13] At TUC power switch, depress **ROS/OFF** switch

[14] At DC-to-DC converter, open cover door and set **ON/OFF** switch to **OFF** [FIG. 3]

[15] At Power Distributing (PD) frame, remove -48 volt fuse (refer to office drawings, -48Q lead) for tape unit frame to be repaired

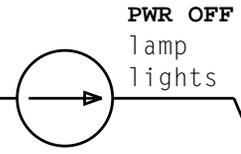
[16] Release converter drawer locks and pull converter out to fully extended position [FIG. 3]

[17] Verify absence of -48 volts across **TB1-1 (+)** and **TB1-2 (-)** leads [TABLE B]

[18] Disconnect three -48 volt power cable leads [TABLE B]

[19] Remove three cable clamps holding input and output power cables to converter

[20] Unscrew **P1** locking ring and remove **P1** from **J1**



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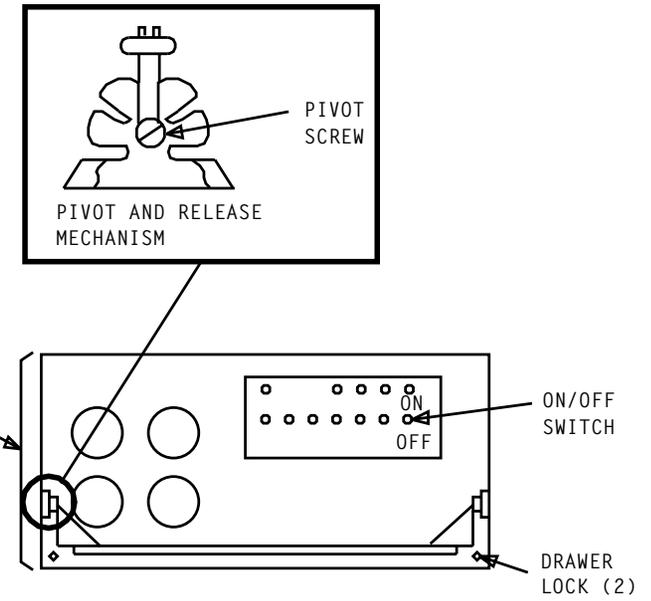


FIG. 3 - DC-to-DC Converter With Cover Door Open

TABLE B	
LEAD IDENTIFICATION	LEAD DESIGNATION
White	TB1-1
Black	TB1-2
Green	FR GRD

DANGER 3
DC-to-DC converter weighs approximately 80 pounds

Added

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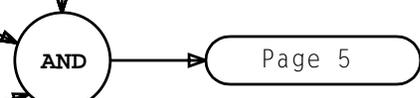
REPLACE DC-TO-DC CONVERTER UNIT, KS-22434

[21] See DANGER 4. Remove screw from each pivot mechanism; tilt converter, remove retaining nut from pivot mechanism slot, and retain hardware [FIG. 1]

[22] See DANGER 4. Lift converter off pivot mechanism

[23] Remove right and left quadrants from slide

[24] Mounting screws removed from quadrants are to be used for mounting converter on slides



REPLACE DC-TO-DC CONVERTER UNIT, KS-22434

<i>DANGER 4 DC-to-DC converter weighs approximately 80 pounds</i>	
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Added

[25] See DANGER 5. Install replacement converter on slides

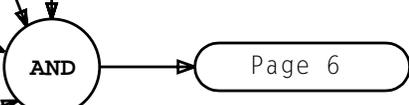
[26] Insert mounting screws into holes and tighten

[27] Connect three -48 volts power leads to **TB1** (FIG. 1)

[28] Connect power cable to front of converter

[29] Depress spring locks on each slide to unlock

[30] Push converter slowly into recorder cabinet until converter stops



*DANGER 5
DC-to-DC
converter weighs
approximately
80 pounds. Two
people are
required to place
converters on
slides*

Added

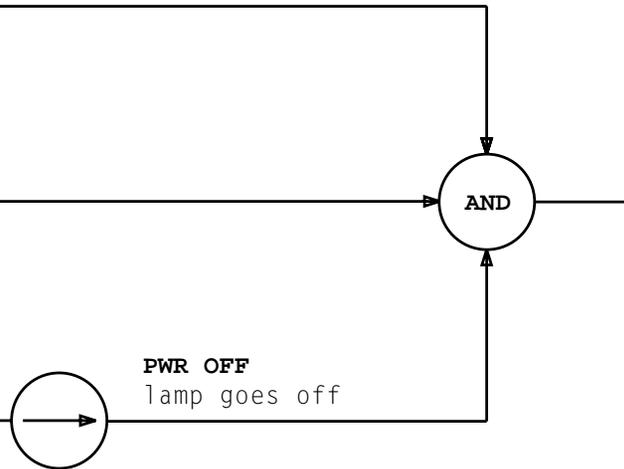
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REPLACE DC-TO-DC CONVERTER UNIT, KS-22434

[31] At Power Distributing (PD) frame,
install -48 volt fuse removed
earlier

[32] At DC-to-DC converter, set **ON/OFF**
switch to **ON** and close cover door

[33] At TUC power switch, depress
and hold **ON** pushbutton
for 2 seconds



REPLACE DC-TO-DC CONVERTER UNIT, KS-22434

Added

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ITEM	ISSUE	ITEM	ISSUE	ITEM	ISSUE	ITEM	ISSUE	ITEM	ISSUE	ITEM	ISSUE
• IXL-001		TAP-112		DLP-510		DLP-545					
NTP-002		TAP-113		DLP-511		DLP-546					
NTP-003		TAP-114		DLP-512		DLP-547					
NTP-004		TAP-115		DLP-513		DLP-548					
NTP-005		<input type="checkbox"/> TAP-116		DLP-514		• DLP-549					
NTP-006		<input type="checkbox"/> TAP-117		DLP-515		• CKL-891					
NTP-007		<input type="checkbox"/> TAP-118		DLP-516		<input type="checkbox"/> TNG-893					
NTP-008		TAP-119		DLP-517		<input type="checkbox"/> DPL-895					
NTP-009		TAP-120		DLP-518							
NTP-010		TAP-121		DLP-519							
NTP-011		TAP-122		DLP-520							
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NTP-014		TAP-125		DLP-523							
NTP-015		TAP-126		DLP-524							
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NTP-019		TAP-130		DLP-528							
NTP-020		TAP-131		DLP-529							
NTP-021		TAP-132		DLP-530							
NTP-022		TAP-133		DLP-531							
NTP-023		TAP-134		DLP-532							
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TAP-104		DLP-502		DLP-537							
TAP-105		DLP-503		DLP-538							
TAP-106		DLP-504		DLP-539							
TAP-107		DLP-505		DLP-540							
TAP-108		DLP-506		DLP-541							
TAP-109		DLP-507		DLP-542							
TAP-110		DLP-508		DLP-543							
TAP-111		• DLP-509		DLP-544							

• REVISED OR ADDED ITEM

CANCELED ITEM

Revised

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CKL

CHECKLIST

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