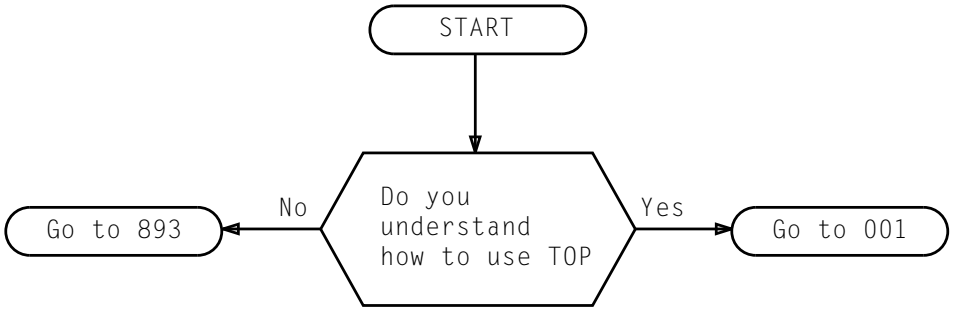
Lucent Technologies
Bell Labs Innovations

Task Oriented Practice (TOP)

4ESS™ Switch
Common Network Interface
Trouble Clearing



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8:00 a.m. - 4:00 p.m. (Eastern)
Call: 1-800-334-0404
Or FAX to: 1-910-727-3043

Issue 2	APR 1998
234-351-120	TPG
TITLE PAGE	000

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***4ESS*™** Switch Customer Information Development Manager 1-800-334-0404

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Developed by:

Lucent Technologies Network Systems for Network Operations/Switching and Access Systems Information Development

Lucent Technologies is the successor to the business and assets of AT&T Network Systems business unit.

How Are We Doing?

Document Title: ***4ESS***™ Switch Common Network Interface

Document No.: 234-351-120 Issue: 2
Date: March 1998

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	Excellent	Good	Fair	Poor	Not Applicable
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FIND YOUR JOB IN THE LIST BELOW . . . . . THEN GO TO

Acceptance NTP-002

Analog Signaling Link; To Service — Add NTP-007

Analog Signaling Link; From Service — Remove NTP-005

Analog Signaling Link Cross-Office, End-to-End, and Loopback Tests — Perform NTP-009

Configuration Data; Signaling Link — Change NTP-008

Cross-Office, End-to-End, and Loopback Tests; Analog Signaling Link — Perform NTP-009

Diagnostic Failure — Aborted — Clear TAP-104

Diagnostic Failure — Signal System 7 (SS7) — By Analyzing Raw Data and Replacing Suspect Packs — Clear TAP-102

Diagnostic Failure — Customer Premise Equipment (CPE) Node — By Analyzing Raw Data and Replacing Suspect Packs — Clear TAP-103

Diagnostic Failure — DLNE/DLN30 — By Analyzing Raw Data and Replacing Suspect Packs — Clear TAP-101

Diagnostic Failure — Ring Peripheral Controller Node (RPCN) — By Analyzing Raw Data and Replacing Suspect Packs — Clear TAP-100

Diagnostics; Node — Perform DLP-524

Digital Service Unit End-To-End Testing — Perform NTP-006

Digital Signaling Link; To Service — Add NTP-003

Digital Signaling Link; From Service — Remove NTP-005

Digital Signaling Link Hardware (DSU, CSU, or DSA) — Change NTP-004

End-to-End Testing; Digital Service Unit — Perform NTP-006

Fan Filter Assembly — Inspect and Clean DLP-506

Fan Unit Assembly — Ring Node Cabinet — Replace DLP-537

FIND YOUR JOB IN THE LIST BELOW	THEN GO TO
Fault; Isolated Node (LN, DLNE/DLN30, or RPCN) — Clear	TAP-106
Fuse; Blown — Analog Facility Access (AFA) Cabinet — Replace	DLP-510
Fuse; Blown — Digital Facility Access (DFA) Cabinet (J3F010A) — Replace	DLP-511
Fuse; Blown — Power Distribution Frame (J86334-B/C) — Replace	DLP-513
Fuse; Blown — Ring Node Cabinet — Replace	DLP-509
Node Data — For All Growth Nodes — Determine	DLP-578
Node Diagnostics — Perform	DLP-524
Node (LN, DLNE/DLN30, or RPCN) Hardware Fault — Clear	TAP-105
Node; on Ring — Include	DLP-508
Node; From Ring — Isolate	DLP-507
Node; From Service — Remove	DLP-540
Node; To Service — Restore	DLP-541
Power Converter; FA — Replace	DLP-514
Ring Transport Error — Analyze	TAP-110
Signaling Link Configuration Data — Change	NTP-008
Signaling Link Failure — Clear	TAP-107
Signaling Link "No Flags" Fault — Clear	TAP-108
Signaling Link State — Change	DLP-525
Signaling Link TIFA Hardware Fault — Clear.	TAP-109

No acceptance test procedures are required for this volume. The readiness of the CNI equipment to become a part of the operating system was established by the successful completion of the CNI installation test procedures.

DO THE ITEMS BELOW IN THE ORDER LISTED . . . . . FOR DETAILS, GO TO		
1	Ensure All Digital Signaling Link Hardware Has Been Installed And Accepted	—
2	Ensure All Link Interface Equipment Configuration Data (ECD) Has Been Loaded	—
3	Ensure Recent Change Activity Specifying Link Configuration Data For Link Node Has Been Completed	—
4	Ensure Both Near-End And Far-End Has Completed Facility Assignment As Specified On Facility Assignment Card	—
5	At MCRT, Verify Associated Link Node Is In ACTIVE State (OP:RING,LNa b! a = Ring Node Group Number (00-63); b = Node Member Number (1-15))	DLP-515
6	At MCRT, Verify Signaling Link Is In UNEQUIPPED or UNAVAILABLE-GROW State (OP:SLK(a,b)! a = Ring Node Group Number (00-63); b = Node Member Number (1-15))	DLP-516
7	Ensure Signaling Link Cabling Connections Exist Between Ring Node Cabinet and Digital Facility Access Cabinet	—
8	At Ring Node Cabinet, Verify Correct Link Interface Is Installed for Signaling Link Being Added	DLP-517
9	At Digital Facility Access (DFA) Cabinet, Perform The Following:	—
	1. Verify Correct Digital Service Unit (DSU), Channel Service Unit (CSU), and Digital Service Adapter (DSA) Is Installed for Signaling Link Being Added	DLP-518
	2. Perform One Of The Following To Verify DSU Options Are Properly Set:	—
	A. Verify AT&T 500B/502B DSU Options	DLP-519
	B. Verify DATATEL DCP3189 DSU Options	DLP-520
	C. Verify AT&T 2556 DSU Options	DLP-521
	3. Verify DSU Is Not In Self-Looped Mode By Ensuring Self-Loop Switch On Faceplate Is In Middle (Unmarked) Position	—
	4. Verify CSU Options Are Properly Set	DLP-522
	5. Verify DSA Options Are Properly Set	DLP-523

DO THE ITEMS BELOW IN THE ORDER LISTED . . . . . FOR DETAILS, GO TO		
10	Perform One of The Following Per Office Classification:	—
	A. For Collocated Offices, Verify Connectivity Between Near-End And Far-End Offices	—
	B. For Non-Collocated Offices, Verify Cabling From Digital Facility Access (DFA) Cabinet To The Carrier Facility And The Carrier End-to-End Lineup Is Complete	—
11	Perform Link Node Diagnostics (**DGN:LN**a b**:TLP!** a = Ring Node Group Number (00-63); b = Node Member Number (1-15))	DLP-524
12	At MCRT, Enter **MON:SLK**(a,b)**;ON!** To Activate Link Monitor (a = Ring Node Group Number(00-63); b = Node Member Number (1-15))	—
13	Change Signaling Link State To UNAVAILABLE-TEST (**CHG:SLK**(a,b)**;TEST!** a = Ring Node Group Number (00-63); b = Node Member Number (1-15))	DLP-525
14	Verify Signaling Link Is In SYNC And PROVED-IN	DLP-526
15	At MCRT, Enter **MON:SLK**(a,b)**;OFF!** To Turn Off Link Monitor (a = Ring Node Group Number (00-63); b = Node Member Number (1-15))	—
16	Request Recent Change Activity Be Completed To Change Link Configuration Data Table And Signaling Link State To AVAILABLE-IS	—

DO THE ITEMS BELOW IN THE ORDER LISTED	FOR DETAILS, GO TO
1 Ensure Replacement Hardware (DSU, CSU, Or DSA) Is Available	—
2 Notify Far-End Office Of Intent To Replace Signaling Link Hardware	—
3 Change Signaling Link State To AVAILABLE-MOOS (CHG:SLK(a,b);MOOS! a = Ring Node Group Number (00-63); b = Node Member Number (1-15))	DLP-525
4 At MCRT, Enter MON:SLK(a,b);ON! To Activate Link Monitor (a = Ring Node Group Number (00-63); b = Node Member Number (1-15))	—
5 Perform One Of The Following To Replace Applicable Signaling Link Hardware:	—
A. Replace Digital Service Unit (DSU)	DLP-527
B. Replace Channel Service Unit (CSU)	DLP-528
C. Replace Digital Service Adapter (DSA)	DLP-529
6 If All Applicable Signal Link Hardware Has Not Been Replaced, Repeat From Item 5	—
7 Perform the Following To Verify Replacement Of Signaling Link Hardware:	—
1. Verify Correct DSU, CSU, And DSA Is Installed For Associated Signaling Link	DLP-518
2. Verify DSU Is Not In Self-Looped Mode by Ensuring Self-Loop Switch on Faceplate Is In Middle (Unmarked) Position	—
3. If DSU Was Replaced, Perform One Of The Following To Verify DSU Options Are Properly Set:	—
A. Verify 500B/502B DSU Options	DLP-519
B. Verify DATATEL DCP3080/3189 DSU Options	DLP-520
C. Verify AT&T 2556 DSU Options	DLP-521
4. If CSU Was Replaced, Verify CSU Options Are Properly Set	DLP-522
5. If DSA Was Replaced, Verify DSA Options Are Properly Set	DLP-523
8 Verify Signaling Link Is In SYNC and PROVED-IN	DLP-526
9 At MCRT, Enter MON:SLK(a,b);OFF! To Turn Off Link Monitor (a = Ring Node Group Number (00-63); b = Node Member Number (1-15))	—
10 Request Recent Change Activity Be Completed To Change Link Configuration Data Table and Signaling Link State To AVAILABLE-IS	—

CHANGE DIGITAL SIGNALING LINK HARDWARE (DSU, CSU, OR DSA)

DO THE ITEMS BELOW IN THE ORDER LISTED		FOR DETAILS, GO TO
1	Ensure Recent Change Activity For Removing Signaling Link Has Been Completed	—
2	Ensure Both Near-End and Far-End Has Completed Work as Specified on Facility Assignment Card	—
3	Verify That No Active Traffic Is Present On Signaling Link (**DUMP:SMEAS**(a,b);**HIST LDAY;SLK**(c,d)**!** a,b = Measurement Names; c = Ring Node Group Number (00-63); d = Node Member Number (1-15))	DLP-530
4	Change Signaling Link State To AVAILABLE-MOOS (**CHG:SLK**(a,b);**MOOS!** a = Ring Node Group Number (00-63); b = Node Member Number (1-15))	DLP-525
5	Request Recent Change Activity To Be Completed To Change Link Configuration Data Table And Signaling Link State To UNEQUIPPED	_

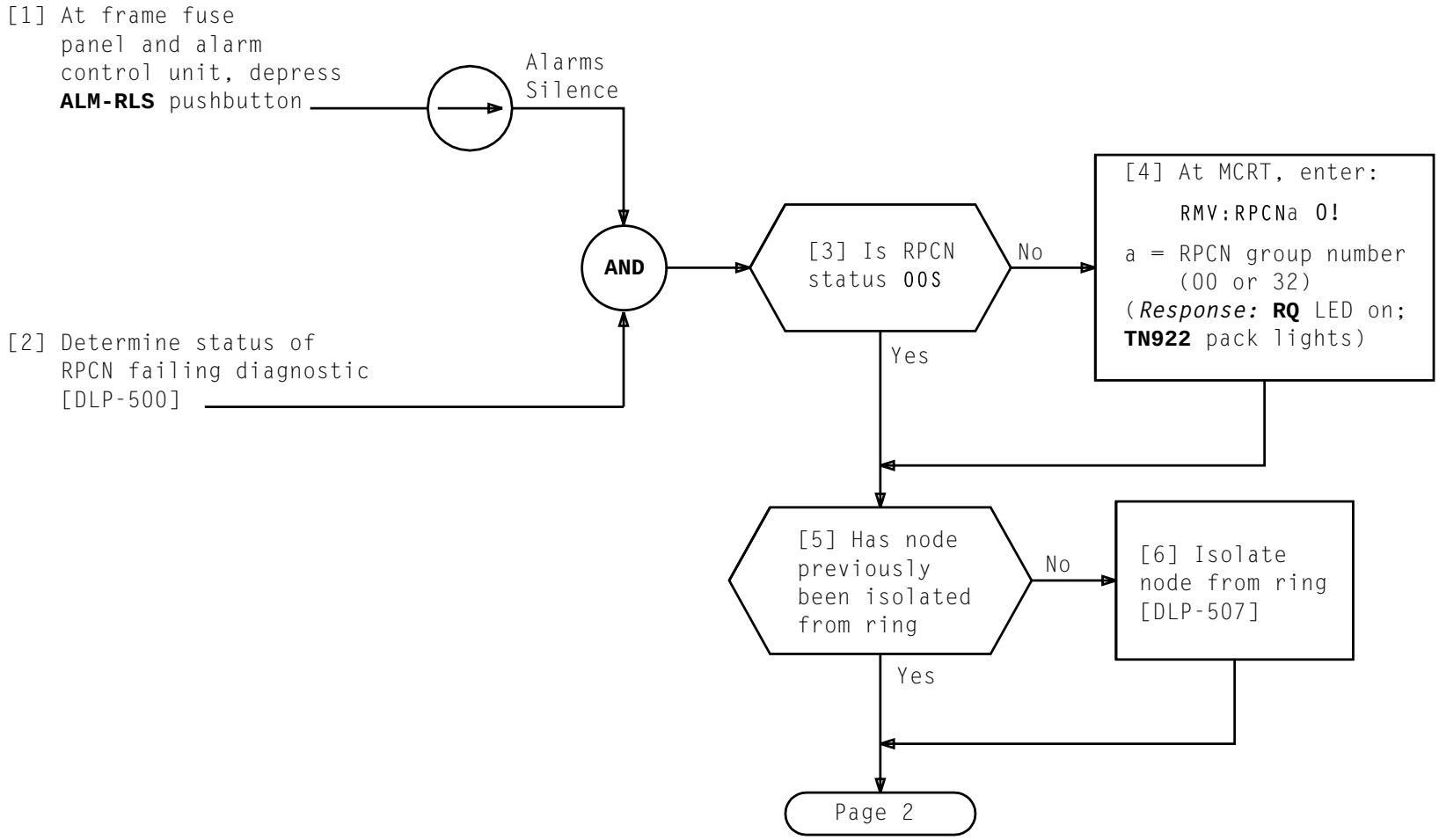
DO THE ITEMS BELOW IN THE ORDER LISTED . . . . . FOR DETAILS, GO TO		
1	Establish Communication Between Near-End And Far-End Office	—
2	Identify DSU Type Being Used At Near-End And Far-End For Associated Signaling Link	—
3	Perform One Of The Following To Complete DSU End-to-End Testing (Near-End to Far-End) for Identified Configurations:	—
	NOTE: No End-To-End Tests Are Possible When A 500B DSU Is Used At Near-End. This Is Due To The 500B DSU Being Unable To Generate An Internal Test Pattern To Be Sent Through The Loop. However, Tests Can Be Completed With The 500B DSU At Far-End. This Is Due To The 500B DSU's Ability To Be Placed In The Remote Loopback Mode.	—
	A. Near-End DATATEL DCP3189 DSU To Far-End AT&T 2556 DSU	DLP-531
	B. Near-End DATATEL DCP3189 DSU To Far-End DATATEL DCP3189 DSU	DLP-532
	C. Near-End DATATEL DCP3189 DSU To Far-End 500B DSU	DLP-533
	D. Near-End AT&T 2556 DSU To Far-End AT&T 2556 DSU	DLP-534
	E. Near-End AT&T 2556 DSU To Far-End DATATEL DCP3189 DSU	DLP-535
	F. Near-End AT&T 2556 DSU To Far-End 500B DSU	DLP-536

DO THE ITEMS BELOW IN THE ORDER LISTED	FOR DETAILS, GO TO
1 Ensure All Analog Signaling Link Hardware Has Been Installed And Accepted	—
2 Ensure Link Interface Equipment Configuration Data (ECD) Has Been Set To **CNI** And **MV** Data Has Been Set to **0x0**	—
3 Ensure Recent Change Activity Specifying Link Configuration Data For Link Node And Logical-To-Physical Signaling Link Assignment Has Been Completed	—
4 Ensure Both Near-End And Far-End Has Completed Facility Assignment As Specified On Facility Assignment Card	—
5 At MCRT, Verify Associated Link Node Is In ACTIVE State (**OP:RING,LN** a b! a = Ring Node Group Number (00-63); b = Node Member Number (1-15))	DLP-515
6 At MCRT, Verify Signaling Link Is In UNAVAILABLE-GROW State (**OP:SLK**(a,b)! a = Ring Node Group Number (00-63); b = Node Member Number (1-15))	DLP-516
7 Ensure Signaling Link Cabling Connections Exist Between Ring Node Cabinet And Analog Facility Access Cabinet	—
8 Request Recent Change Be Performed To Change Link Configuration Data To Place Signaling Link In Self-Looped Condition	—
9 At Ring Node Cabinet, Verify Correct Link Interface Is Installed For Signaling Link Being Added	DLP-517
10 At Analog Facility Access (AFA) Cabinet, Verify Correct Data Set Is Installed For Signaling Link Being Added	DLP-542
11 Verify 2024A/2048A Data Set Options Are Properly Set	DLP-543
12 Verify Cabling From Analog Facility Access (AFA) Cabinet To The Carrier Facility And The Carrier End-to-End Lineup Is Complete	—
13 Perform Node Diagnostics (**DGN:LN**a b:**TLP!** a = Ring Node Group Number (00-63); b = Node Member Number (1-15))	DLP-524
14 At MCRT, Enter **MON:SLK**(a,b);**ON!** To Activate Link Monitor (a = Ring Node Group Number (00-63); b = Node Member Number (1-15))	—
15 Request Recent Changes Be Performed To Change Link Configuration Data To Take Signaling Link Out of Self-Looped Condition	—

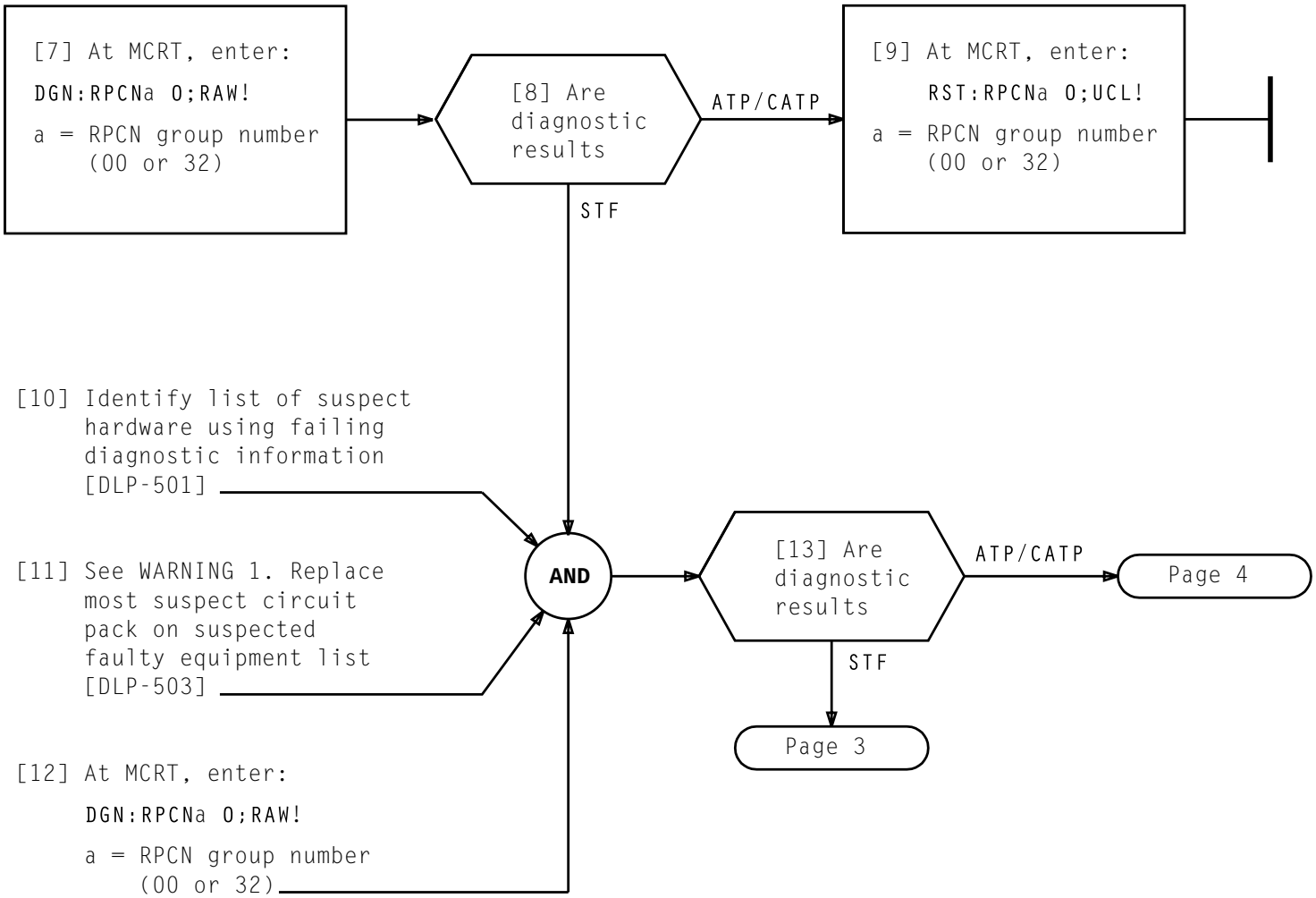
DO THE ITEMS BELOW IN THE ORDER LISTED . . . . . FOR DETAILS, GO TO		
16	Change Signaling Link State To UNAVAILABLE-TEST (**CHG:SLK**(a,b);**TEST!** a = Ring Node Group Number (00-63); b = Node Member Number (1-15))	DLP-525
17	Verify Signaling Link Is In SYNC and PROVED-IN	DLP-526
18	At MCRT, Enter **MON:SLK**(a,b);**OFF!** To Turn Off Link Monitor (a = Ring Node Group Number (00-63); b = Node Member Number (1-15))	_
19	Request Recent Change Activity Be Completed To Change Link Configuration Data Table And Signaling Link State To AVAILABLE-IS	_

DO THE ITEMS BELOW IN THE ORDER LISTED		FOR DETAILS, GO TO
1	Ensure All Affected Offices Have Completed Facility Assignment As Specified On Facility Assignment Card	—
2	Verify Correct Link Interface Is Available For Signaling Link Configuration	DLP-517
3	Change Signaling Link State To AVAILABLE-MOOS (**CHG:SLK(a,b);MOOS!** a = Ring Node Group Number (00-63); b = Node Member Number (1-15))	DLP-525
4	Remove Link Node From Service (**RMV:LNa b!** a = Ring Node Group Number (00-63); b = Node Member Number (1-15))	DLP-540
5	Request Recent Change Activity Be Completed To Perform The Following:	—
	1. Change Signaling Link State To UNAVAILABLE-TEST	—
	2. Change Applicable Link Configuration Data Table Entries	—
6	At MCRT, Enter **MON:SLK(a,b);ON!** To Activate Link Monitor (a = Ring Node Group Number (00-63); b = Node Member Number (1-15))	—
7	Verify Signaling Link Is In SYNC And PROVED-IN	DLP-526
8	At MCRT, Enter **MON:SLK(a,b);OFF!** To Turn Off Link Monitor (a = Ring Node Group Number (00-63); b = Node Member Number (1-15))	—
9	Restore Link Node To Service	DLP-541
10	Request Recent Changes Be Completed To Change Link Configuration Data Table And Signaling Link State To AVAILABLE-IS	—

DO THE ITEMS BELOW IN THE ORDER LISTED		FOR DETAILS, GO TO
1	Ensure Both Near-End and Far-End Has The Following Equipment: • Transmission Impairment Measuring Set (TIMS) • Transmission Measuring Set (TMS) • Two Patch Cords Equipped With WE-type 310 Plugs	–
2	Perform One Of The Following To Complete Desired Signaling Link Test:	–
	A. Cross-Office Test	DLP-544
	B. 1004 Hz Net Loss Test	DLP-545
	C. C-Notched Noise And Noise-To-Noise Test	DLP-546
	D. Single Frequency Interference Test	DLP-547
	E. Peak-To-Average Ratio Test	DLP-548
	F. Impulse Noise, Phase Hits, And Gain Hits Test	DLP-549
	G. Frequency Response Test	DLP-550
	H. Envelope Delay Distortion Test	DLP-551
	I. Non-Linear Distortion Test	DLP-552
3	If All Desired Tests Have Not Been Performed, Repeat From Item 2	–

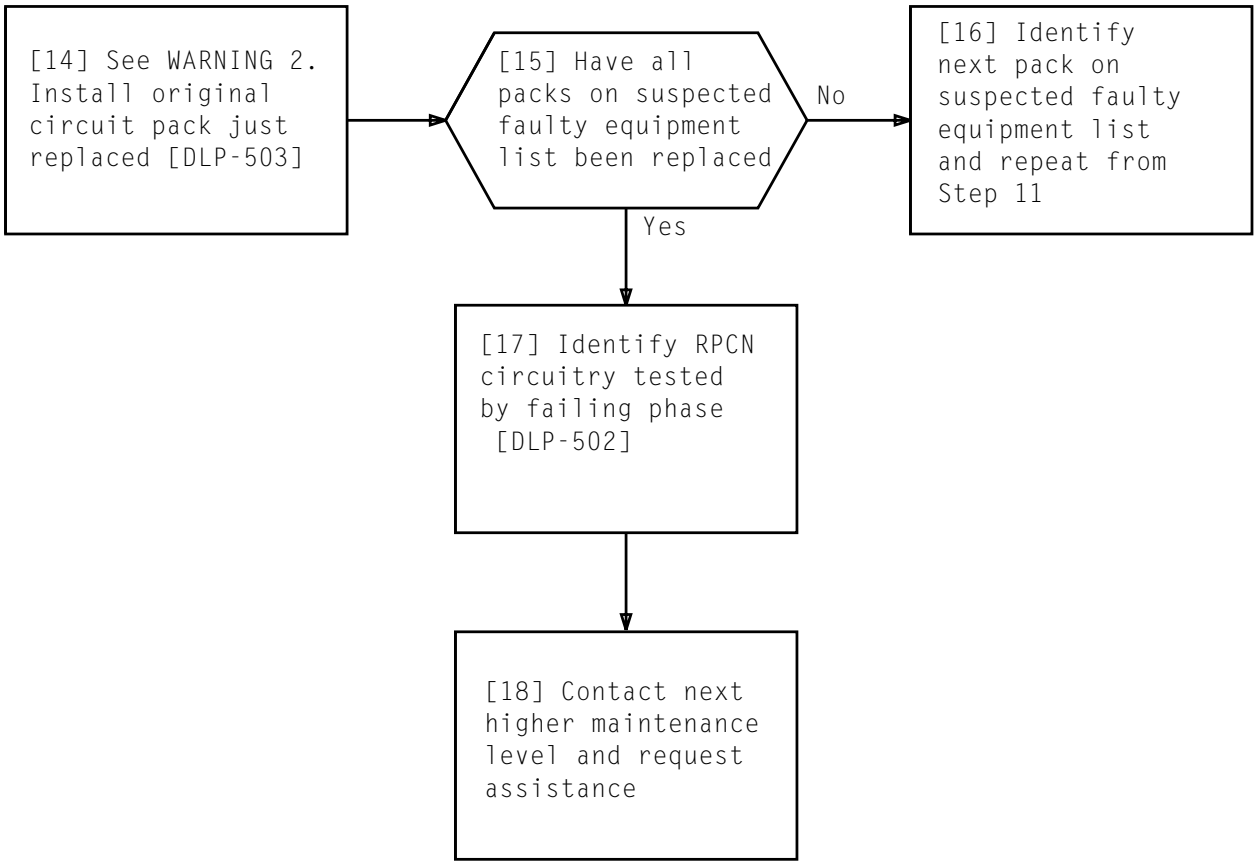


CLEAR DIAGNOSTIC FAILURE BY ANALYZING RAW DATA AND REPLACING SUSPECT PACKS — RING PERIPHERAL CONTROLLER NODE (RPCN)



WARNING 1
Due to circuit pack damage caused by electrostatic discharge, precautions must be taken when handling circuit packs and working in backplane area

CLEAR DIAGNOSTIC FAILURE BY ANALYZING RAW DATA AND REPLACING SUSPECT PACKS — RING PERIPHERAL CONTROLLER NODE (RPCN)



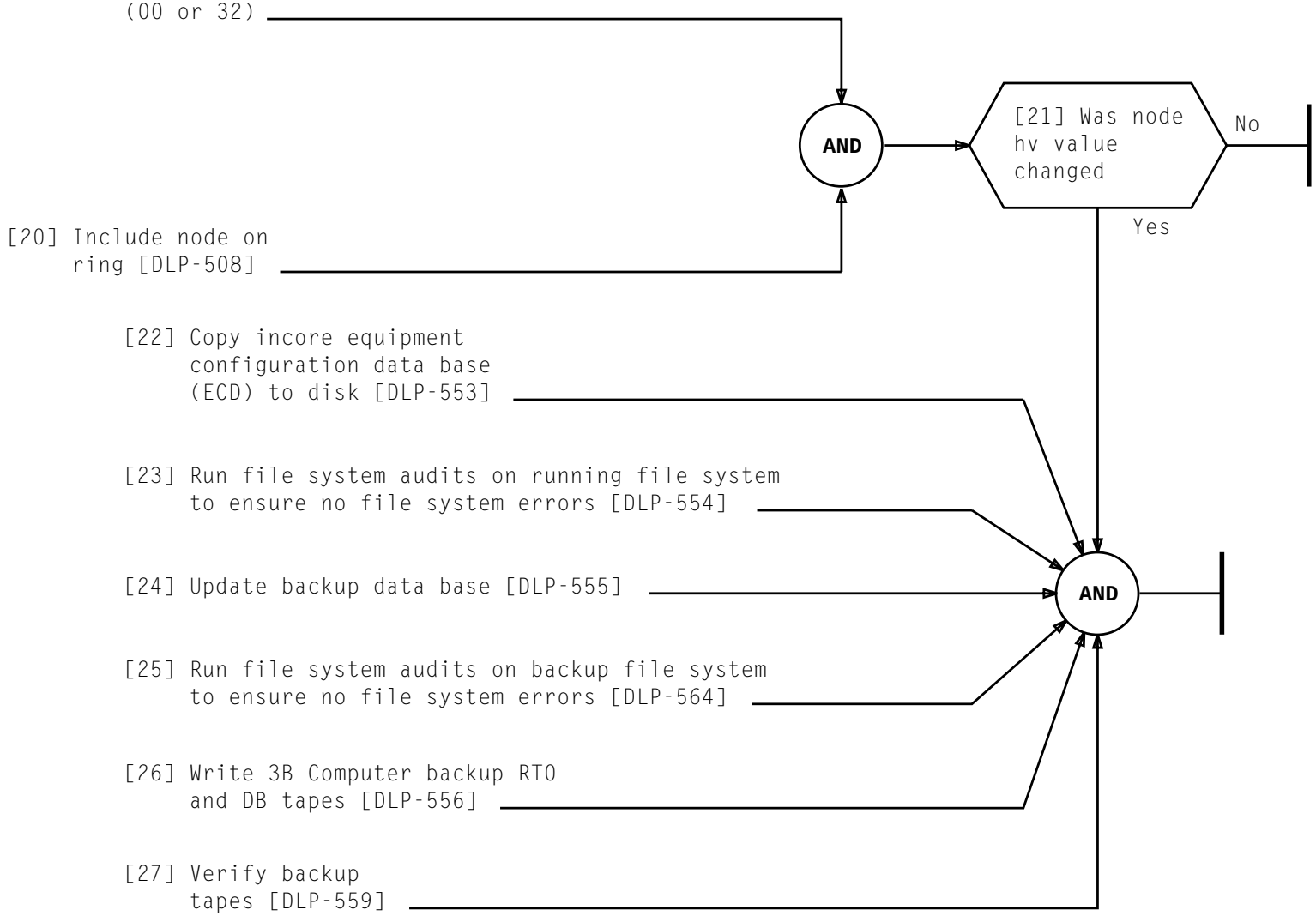
WARNING 2
Due to circuit pack damage caused by electrostatic discharge, precautions must be taken when handling circuit packs and working in backplane area

CLEAR DIAGNOSTIC FAILURE BY ANALYZING RAW DATA AND REPLACING SUSPECT PACKS – RING PERIPHERAL CONTROLLER NODE (RPCN)

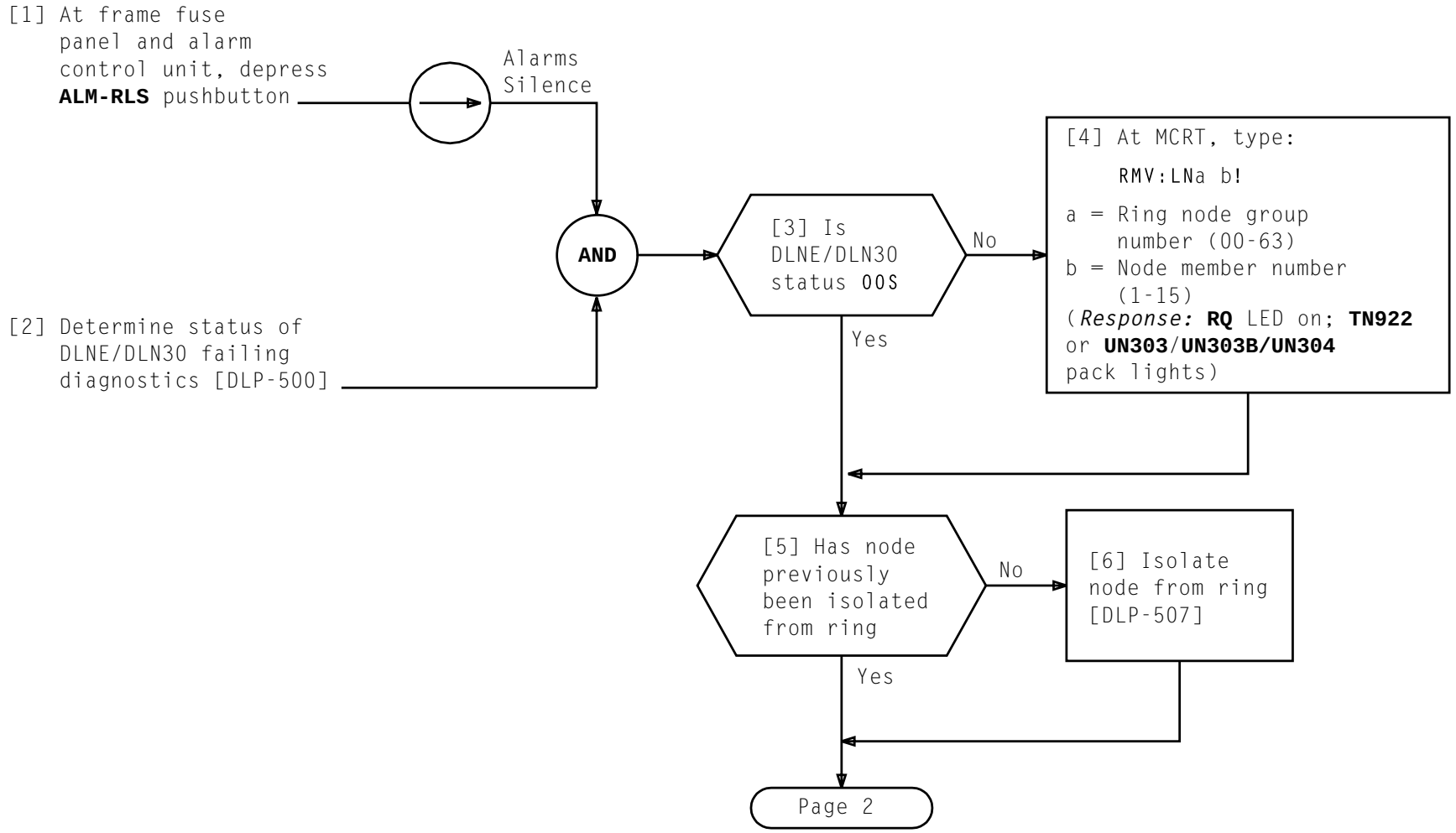
[19] At MCRT, enter:

RST:RPCNa 0;UCL!

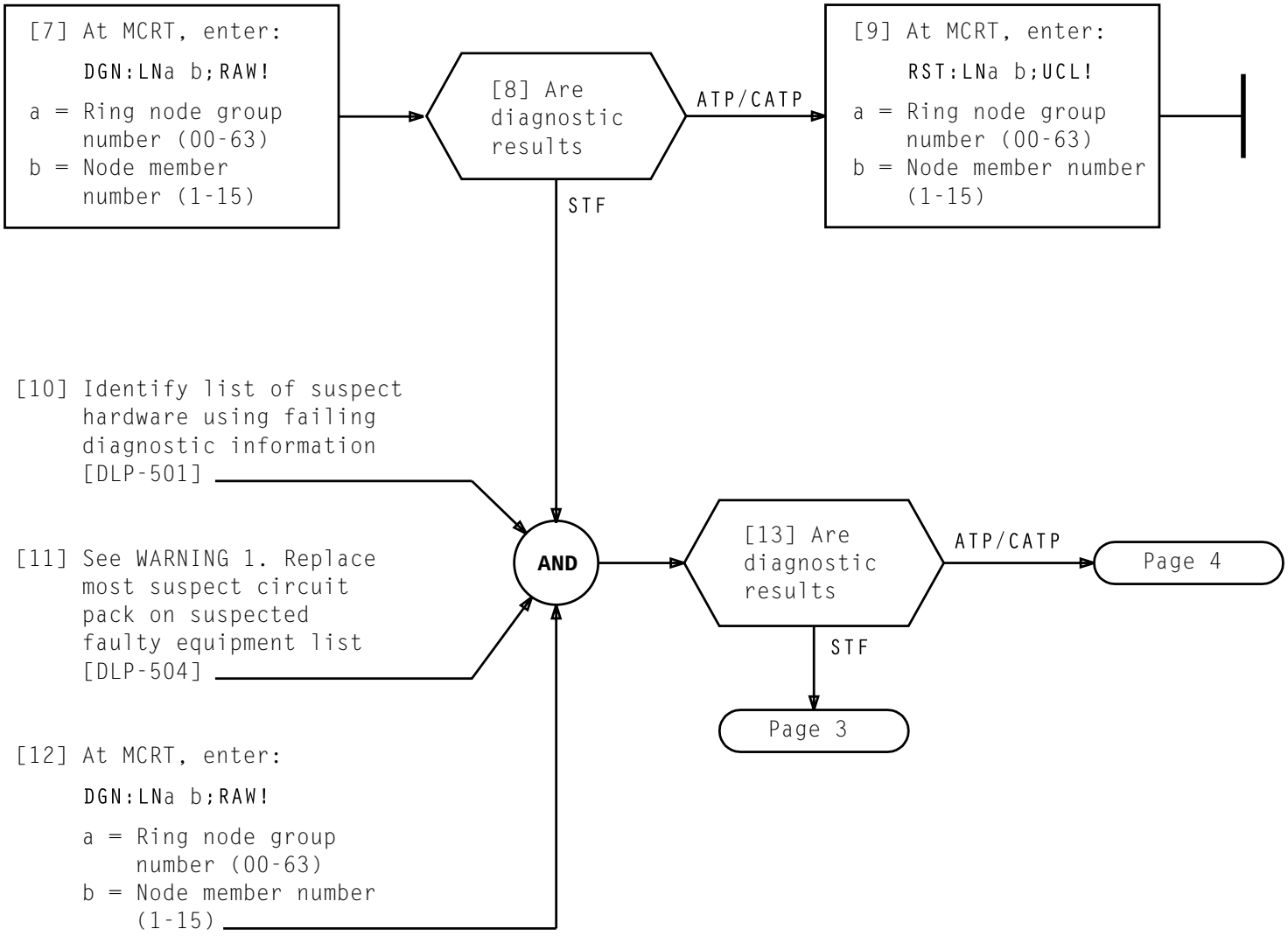
a = RPCN group number
(00 or 32)



CLEAR DIAGNOSTIC FAILURE BY ANALYZING RAW DATA AND REPLACING SUSPECT PACKS — RING PERIPHERAL CONTROLLER NODE (RPCN)

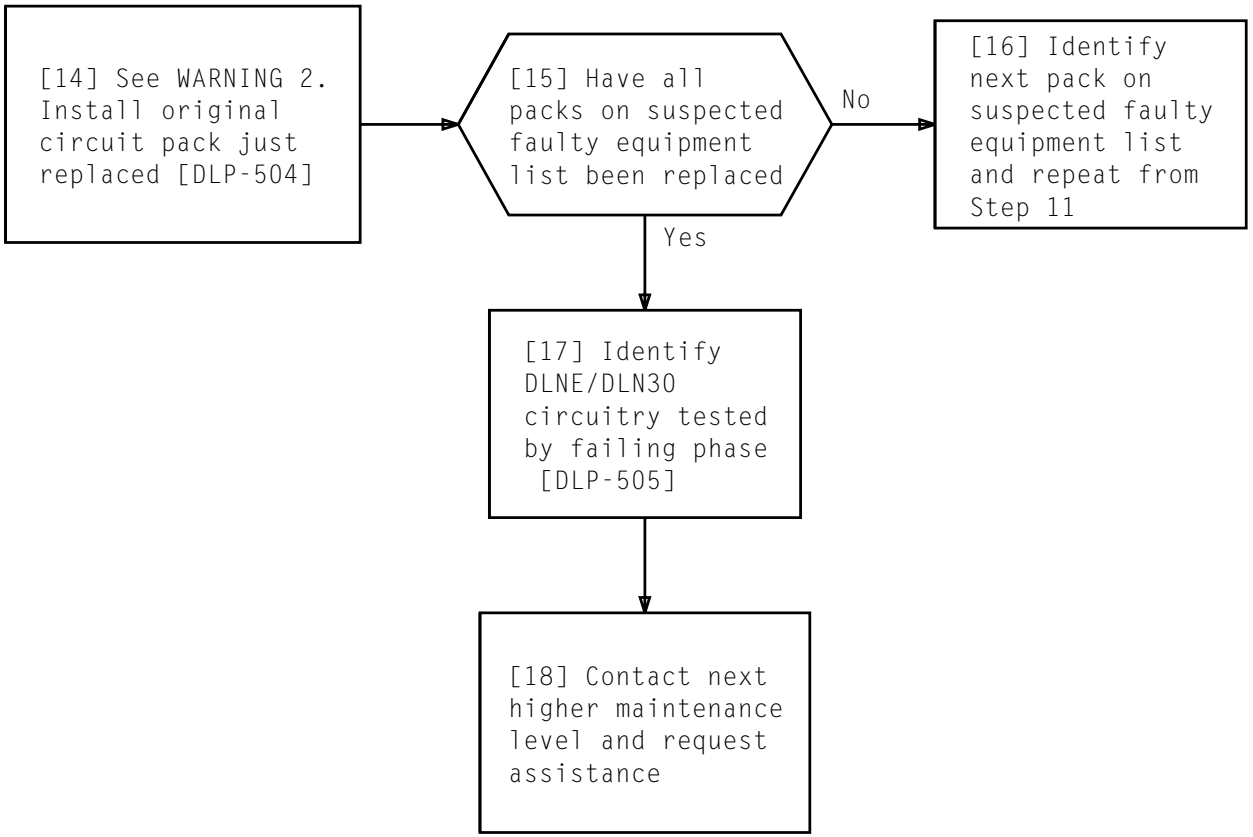


CLEAR DIAGNOSTIC FAILURE BY ANALYZING RAW DATA AND REPLACING SUSPECT PACKS — DLNE/DLN30



WARNING 1
Due to circuit pack damage caused by electrostatic discharge, precautions must be taken when handling circuit packs and working in backplane area

CLEAR DIAGNOSTIC FAILURE BY ANALYZING RAW DATA AND REPLACING SUSPECT PACKS — DLNE/DLN30



WARNING 2
Due to circuit pack damage caused by electrostatic discharge, precautions must be taken when handling circuit packs and working in backplane area

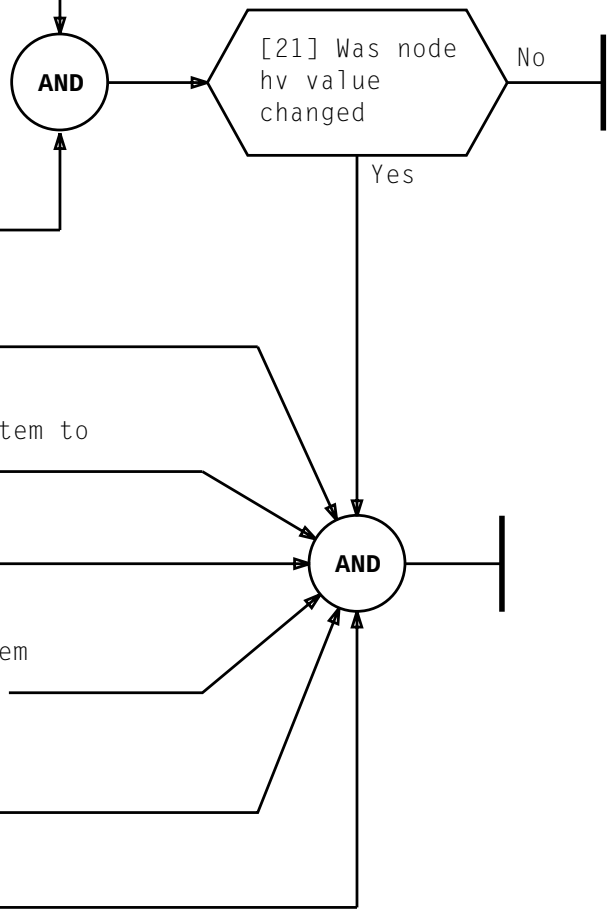
CLEAR DIAGNOSTIC FAILURE BY ANALYZING RAW DATA AND REPLACING SUSPECT PACKS — DLNE/DLN30

[19] At MCRT, enter:

RST:LNa b;UCL!

a = Ring node group number (00-63)
b = Node member number (1-15)

[20] Include node on ring [DLP-508]



[22] Copy incore equipment configuration data data base (ECD) to disk [DLP-553]

[23] Run file system audits on running file system to ensure no file system errors [DLP-554]

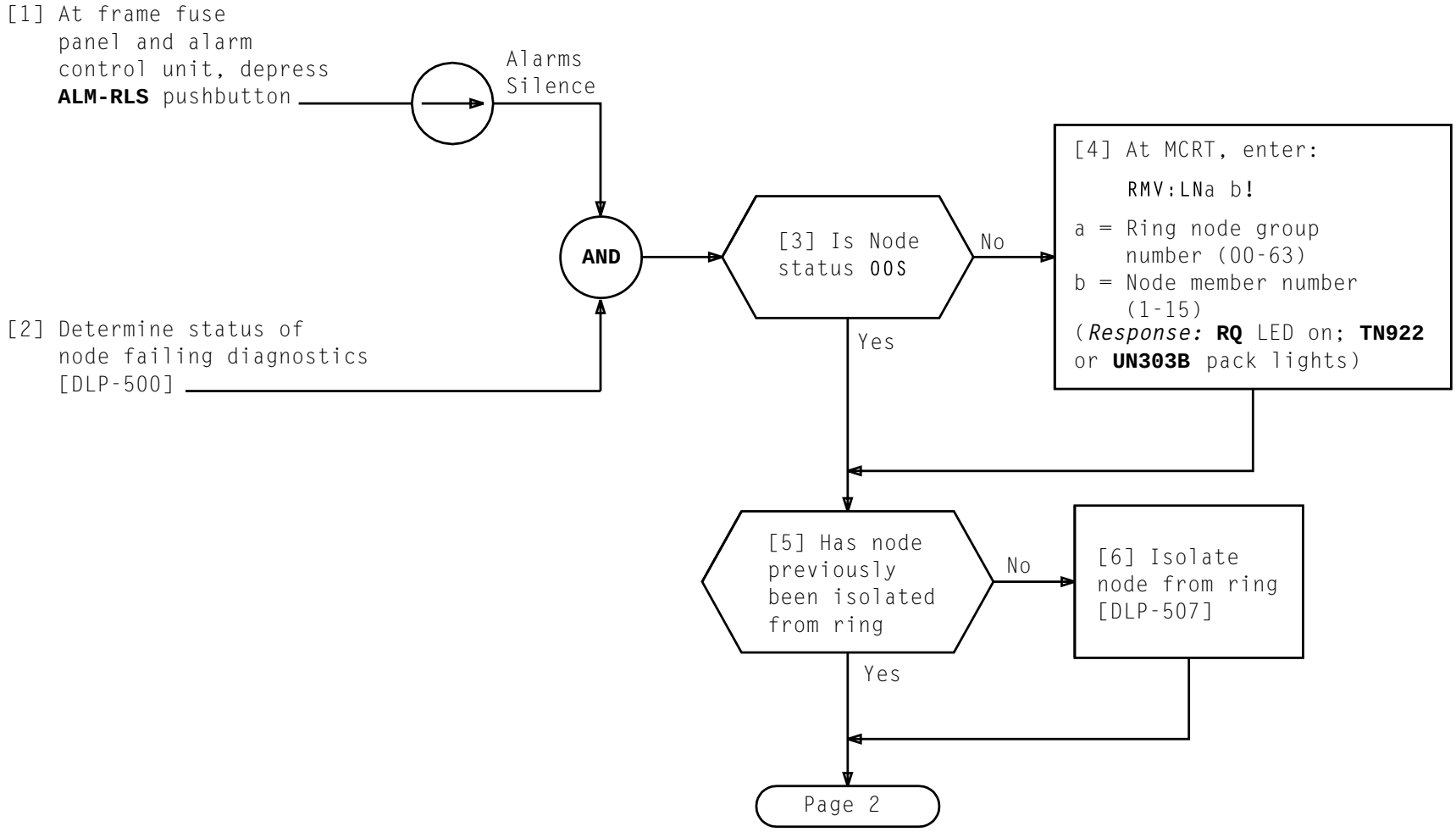
[24] Update backup data base [DLP-555]

[25] Run file system audits on backup file system to ensure no file system errors [DLP-564]

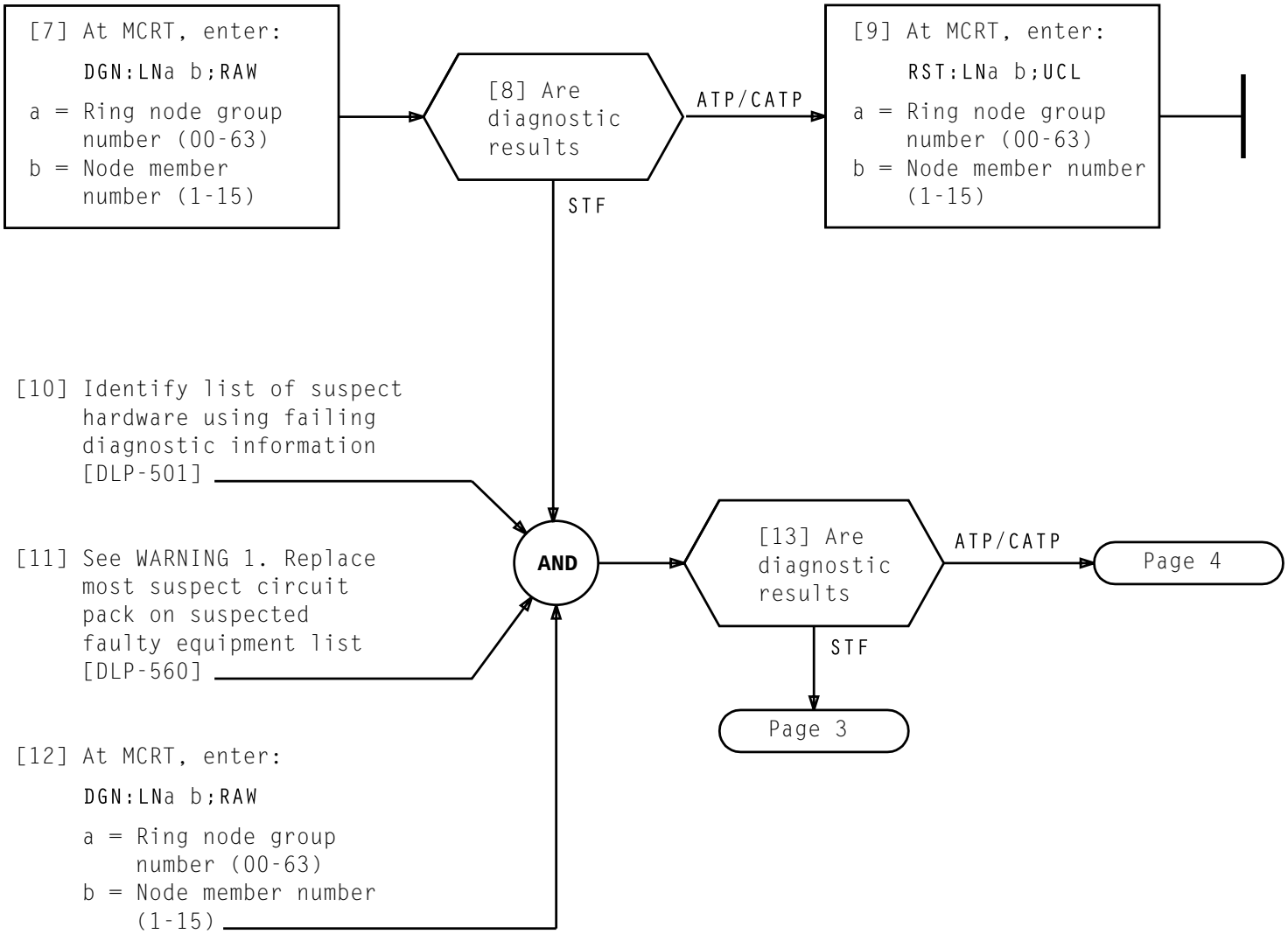
[26] Write 3B Computer backup RTO and DB tapes [DLP-556]

[27] Verify backup tapes [DLP-559]

CLEAR DIAGNOSTIC FAILURE BY ANALYZING RAW DATA AND REPLACING SUSPECT PACKS — DLNE/DLN30

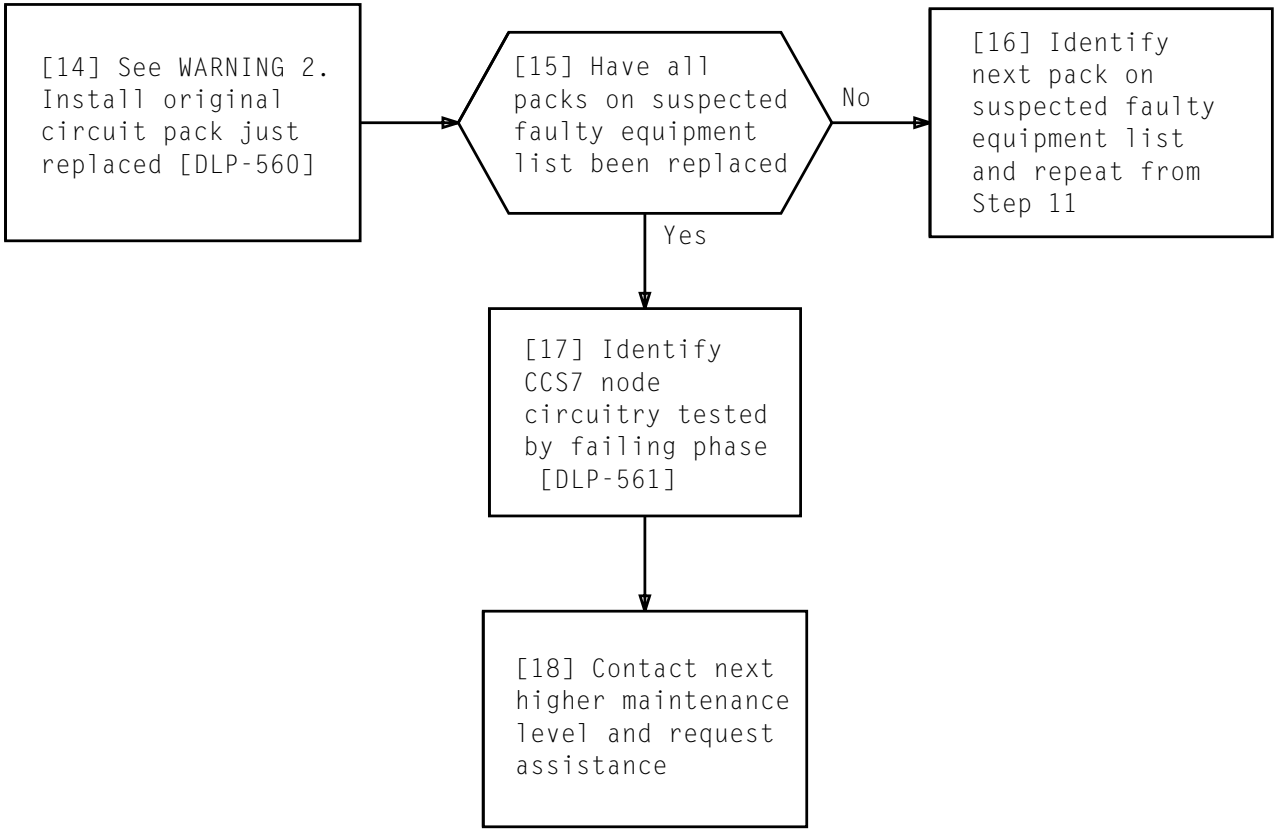


CLEAR DIAGNOSTIC FAILURE BY ANALYZING RAW DATA AND REPLACING SUSPECT PACKS — SIGNAL SYSTEM 7 (SS7) NODE



WARNING 1
Due to circuit pack damage caused by electrostatic discharge, precautions must be taken when handling circuit packs and working in backplane area

CLEAR DIAGNOSTIC FAILURE BY ANALYZING RAW DATA AND REPLACING SUSPECT PACKS — SIGNAL SYSTEM 7 (SS7) NODE



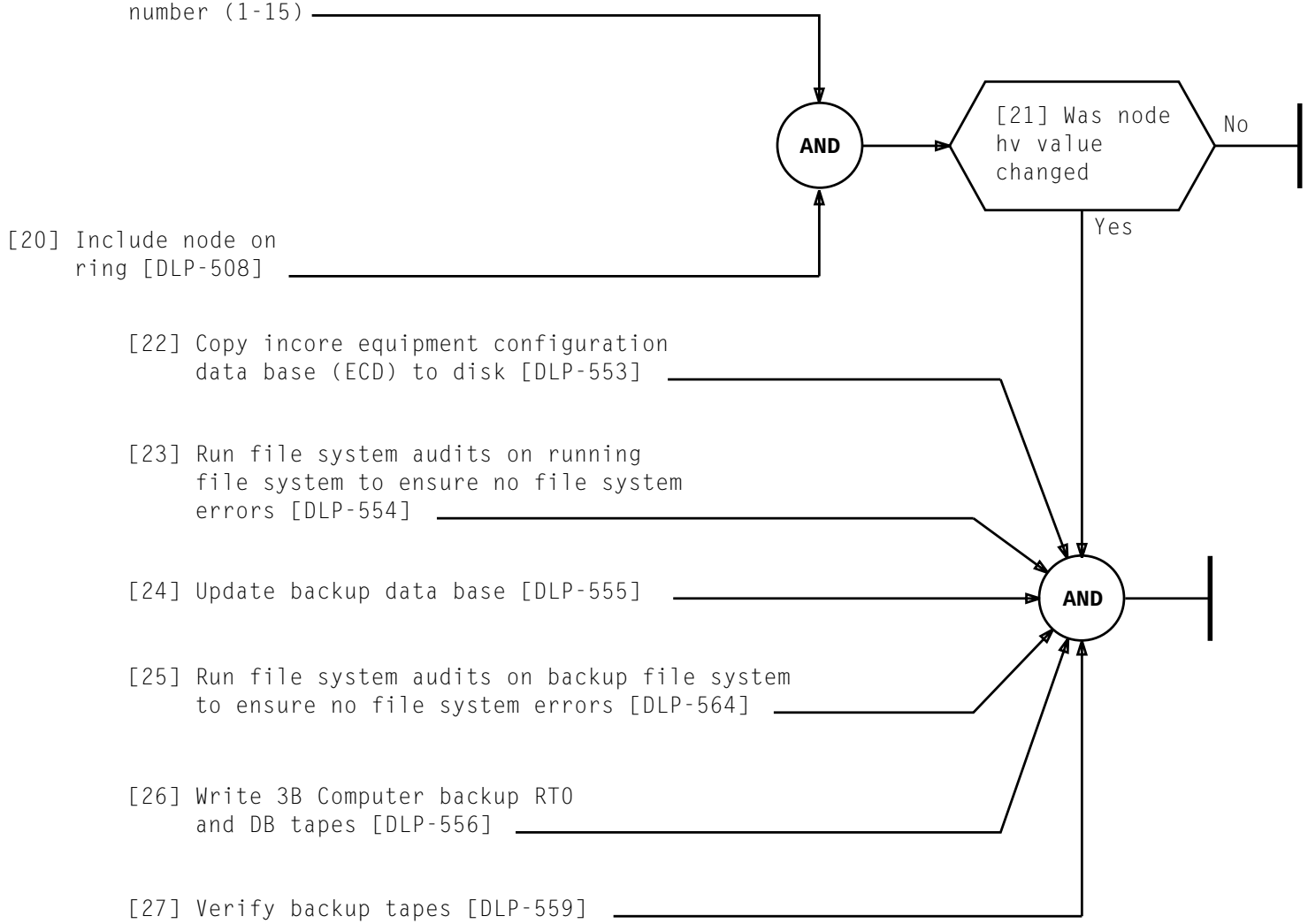
WARNING 2
Due to circuit pack damage caused by electrostatic discharge, precautions must be taken when handling circuit packs and working in backplane area

CLEAR DIAGNOSTIC FAILURE BY ANALYZING RAW DATA AND REPLACING SUSPECT PACKS – SIGNAL SYSTEM 7 (SS7) NODE

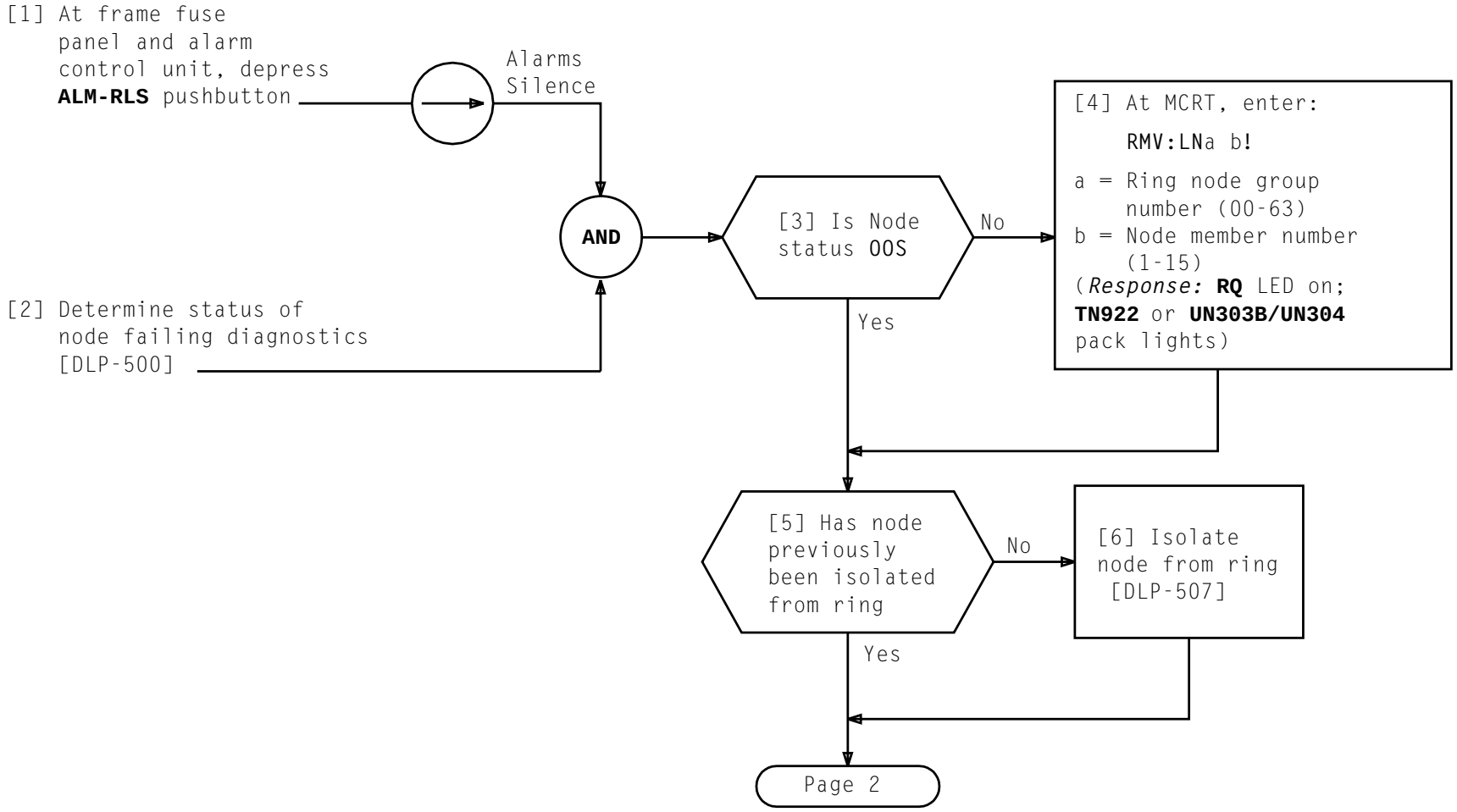
[19] At MCRT, enter:

RST:LNa b;UCL!

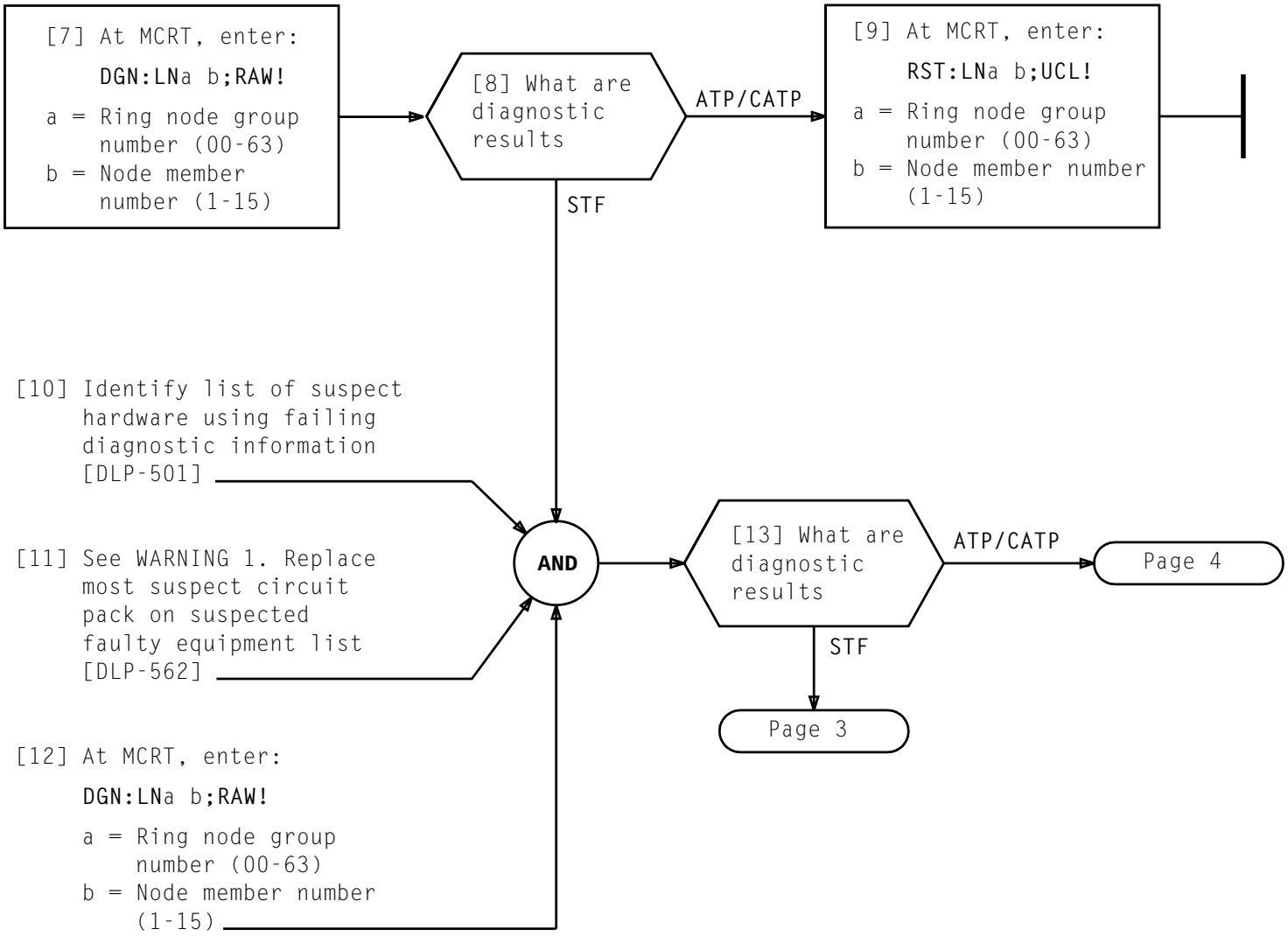
a = Ring node group number (00-63)
b = Node member number (1-15)



CLEAR DIAGNOSTIC FAILURE BY ANALYZING RAW DATA AND REPLACING SUSPECT PACKS — SIGNAL SYSTEM 7 (SS7) NODE

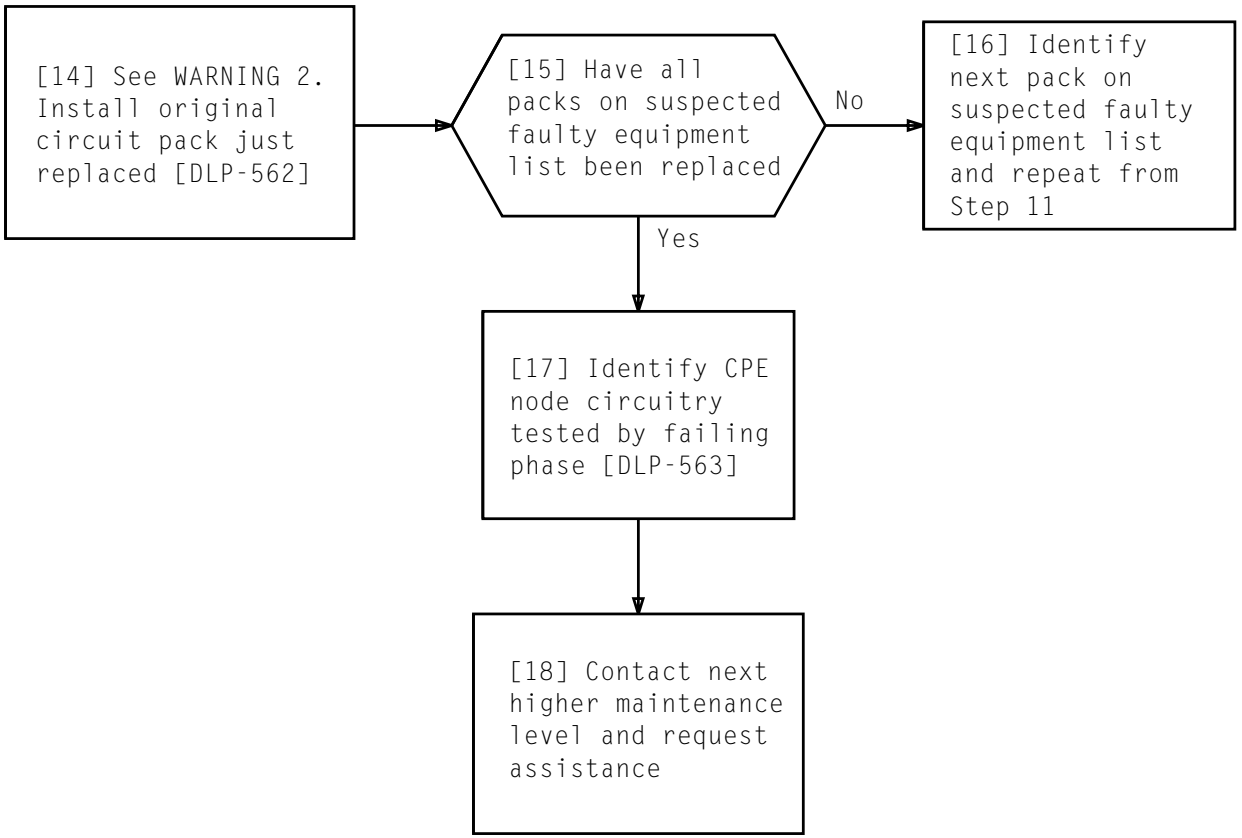


CLEAR DIAGNOSTIC FAILURE BY ANALYZING RAW DATA AND REPLACING SUSPECT PACKS — CUSTOMER PREMISE EQUIPMENT (CPE) NODE



WARNING 1
Due to circuit pack damage caused by electrostatic discharge, precautions must be taken when handling circuit packs and working in backplane area

CLEAR DIAGNOSTIC FAILURE BY ANALYZING RAW DATA AND REPLACING SUSPECT PACKS — CUSTOMER PREMISE EQUIPMENT (CPE) NODE



WARNING 2
Due to circuit pack damage caused by electrostatic discharge, precautions must be taken when handling circuit packs and working in backplane area

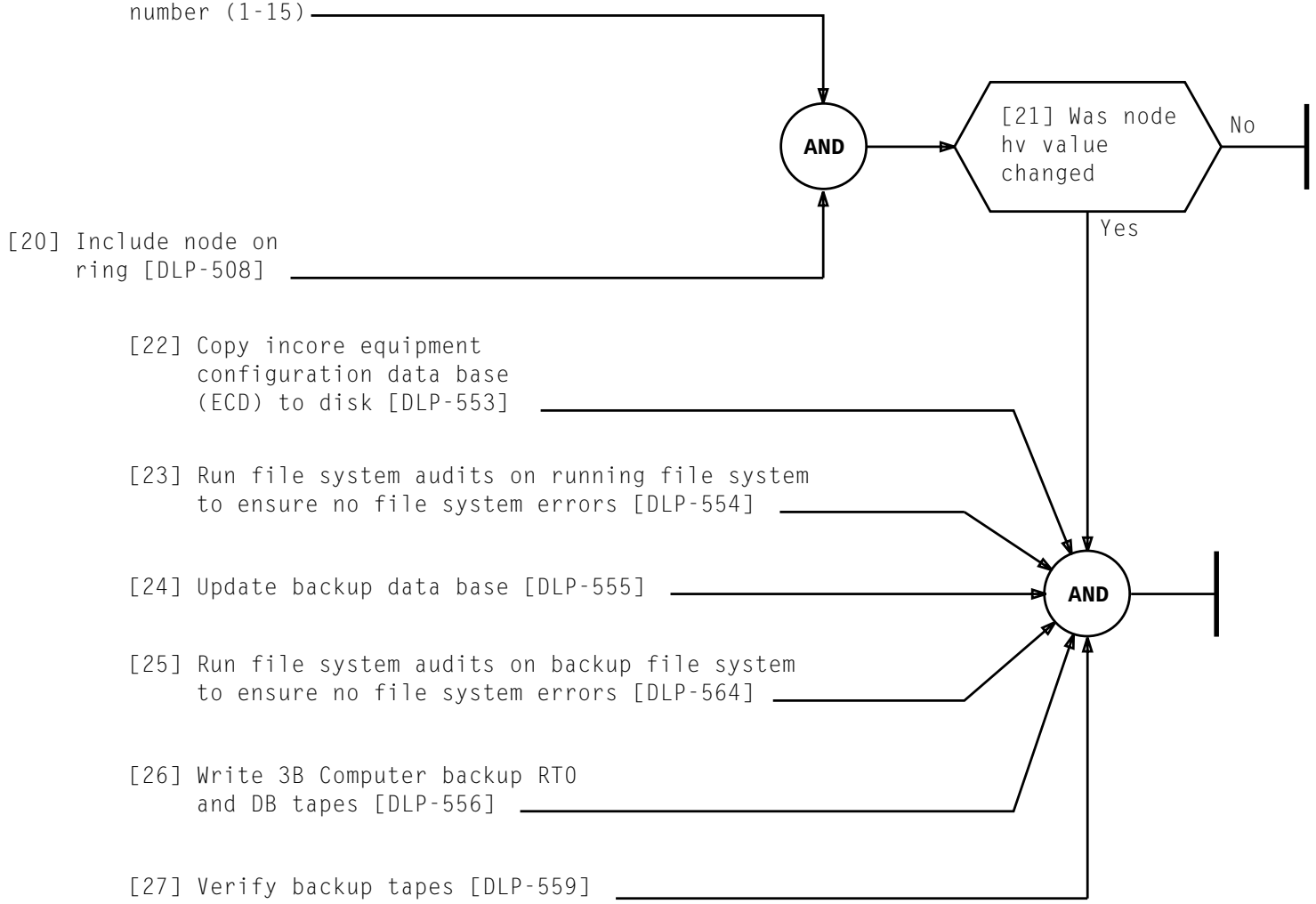
CLEAR DIAGNOSTIC FAILURE BY ANALYZING RAW DATA AND REPLACING SUSPECT PACKS – CUSTOMER PREMISE EQUIPMENT (CPE) NODE

[19] At MCRT, enter:

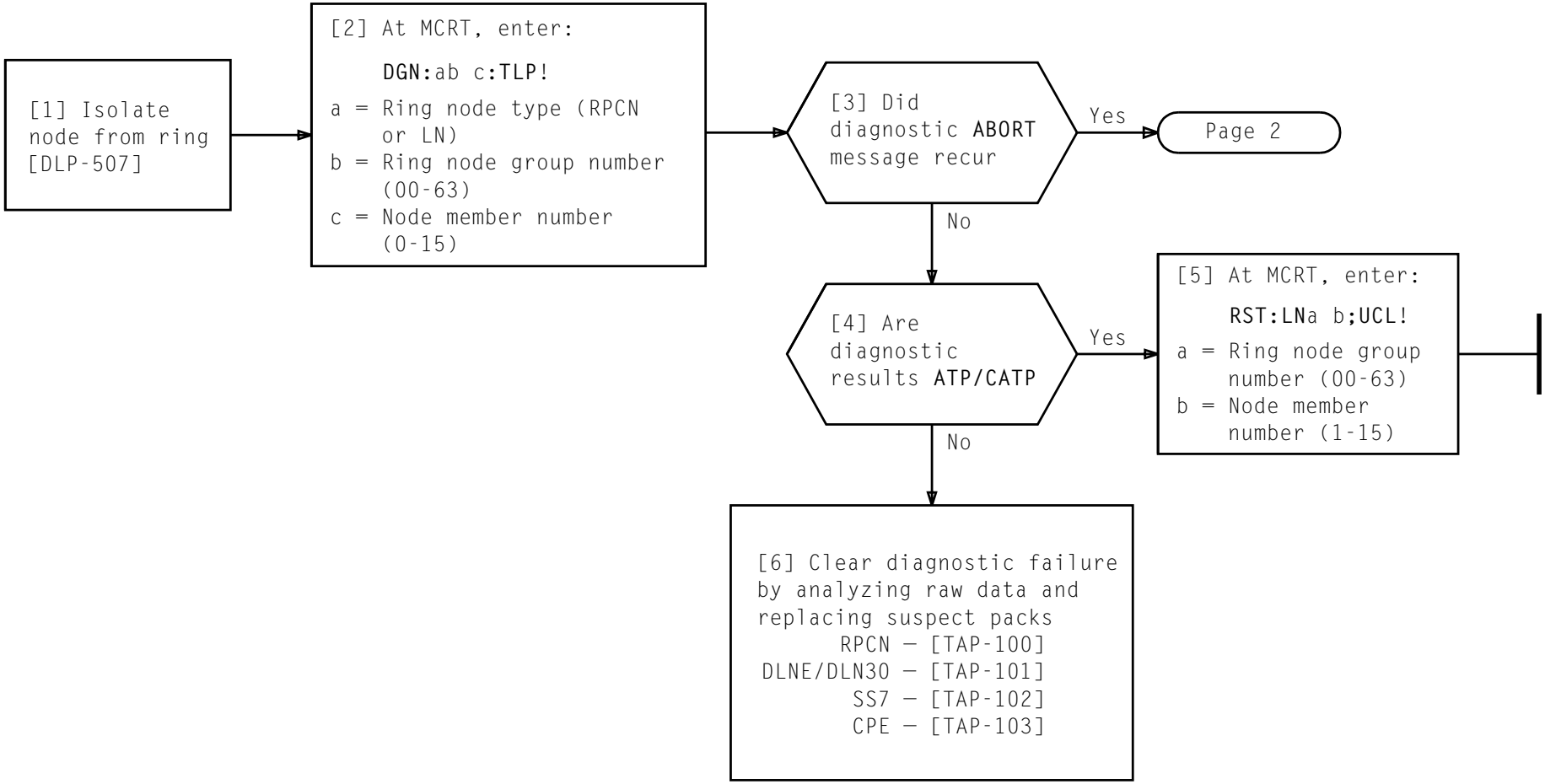
RST:LNa b;UCL!

a = Ring node group number (00-63)

b = Node member number (1-15)



CLEAR DIAGNOSTIC FAILURE BY ANALYZING RAW DATA AND REPLACING SUSPECT PACKS — CUSTOMER PREMISE EQUIPMENT (CPE) NODE



CLEAR DIAGNOSTIC ABORTED FAILURE

[7] Using diagnostic abort message printout [Figure 1], identify and note abort code

[8] Identify and note DATA TABLE PHASE NUMBER and LAST TEST EXECUTED [Figure 1]

[9] Using TABLE A, Page 3, locate identified abort code and note REASON FOR ABORT and any SYSTEM/DRIVER SUPPLEMENTAL DATA provided

AND

[10] Using noted abort code, reason for abort, system/driver supplemental data, data table phase number, and last test executed, contact next higher maintenance support group and analyze aborted diagnostic

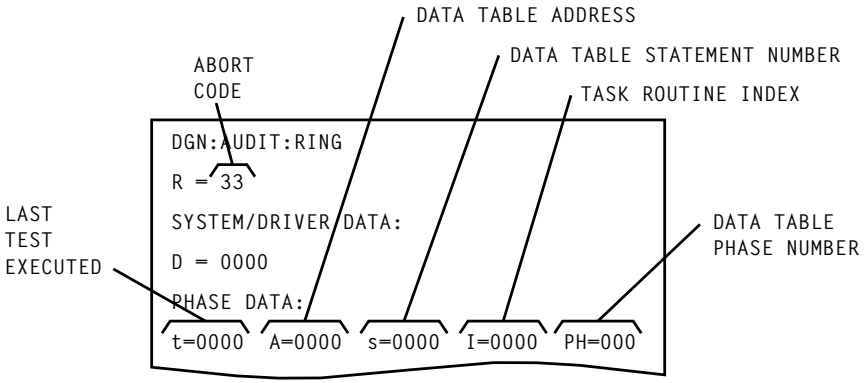


Figure 1 – Example Printout of Diagnostic Abort Message

CLEAR DIAGNOSTIC ABORTED FAILURE

TABLE A		
ABORT CODE	**REASON FOR ABORT**	**SYSTEM/DRIVER SUPPLEMENTAL DATA**
30	Node under test is not isolated	Has no significance
31	Function call to _rgcntl() failed	Return code from _rgcntl()
32	File handling failed in writeifb()	3 — call to creat() failed 4 — call to write() failed 5 — call to close() failed
33	Ring is down. (Not possible to diagnose LN in this state)	Has no significance
34	After write of rac control message, received message from node not being controlled	The NODE_ID of source node in received message
35	_nplreset function call failed	Return code from _nplreset
36	Received message of imm_type IM_NPDAT that was not control type _ONLY	Control code in reply message to read NP memory request
37	Received abort from ring.chng indicating ring is being configured	Has no significance
38	RAC control was not effective	The following specify which RAC control failed: 1 — set inhibit input 2 — clear inhibit input 3 — set force read 4 — clear force read 5 — set force propagate 6 — clear force propagate 7 — program rac reset 8 — clear blockage 9 — disable error interrupt 10 — enable error interrupt
39	Function call to _rgrelay() failed	Return code from _rgrelay()

TABLE A (Contd)		
ABORT CODE	REASON FOR ABORT	SYSTEM/DRIVER SUPPLEMENTAL DATA
41	Open special device file failed	See SYSTEM ERROR CODES [TABLE B, Page 9]
42	SETIO failed	See SYSTEM ERROR CODES [TABLE B, Page 9]
43	Makeseg failed	See SYSTEM ERROR CODES [TABLE B, Page 9]
44	Sendpw failed	See SYSTEM ERROR CODES [TABLE B, Page 9]
45	Execute diagnostic failed	Return code from _nplexec
46	IMS driver operation failed in msgtoport() function call	See IMSDRV Diagnostic Error Codes [TABLE C, Page 12]
48	Msgenab failure	See SYSTEM ERROR CODES [TABLE B, Page 9]
49	Msgdisab failure	See SYSTEM ERROR CODES [TABLE B, Page 9]
4A	_nplread function call failed	Return code from _nplread
4B	_npltest function call failed	Return code from _npltest
4C	Excofl timed out	See SYSTEM ERROR CODES [TABLE B, Page 9]
4D	Open ECD manager failed	See SYSTEM ERROR CODES [TABLE B, Page 9]
4E	Function "ugucbn" failed	See SYSTEM ERROR CODES [TABLE B, Page 9]
4F	PIC microstore size not in ucb	See SYSTEM ERROR CODES [TABLE B, Page 9]
50	Receive wait failed	See SYSTEM ERROR CODES [TABLE B, Page 9]
51	LEXEC function failed	See SYSTEM ERROR CODES [TABLE B, Page 9]
52	E_host of ucb not initialized	See SYSTEM ERROR CODES [TABLE B, Page 9]
53	Lseek function failure	See SYSTEM ERROR CODES [TABLE B, Page 9]
54	Call to _rlgcont failed	Return code from _rglcont
55	Write hardware command to BISO or EISO denied because of illegal hardware command	Has no significance. This is a data table problem
56	Write/read segment too small	See SYSTEM ERROR CODES [TABLE B, Page 9]

TABLE A (Contd)		
ABORT CODE	REASON FOR ABORT	SYSTEM/DRIVER SUPPLEMENTAL DATA
57	Function ugetucb failed	See SYSTEM ERROR CODES [TABLE B, Page 9]
58	Received maintenance message of unexpected type	imm_type in received message
59	NP insane after NP reset	Return code from driver
61	Time-out awaiting reply to recvw() function call	No significance
64	Cannot open data table file	See SYSTEM ERROR CODES [TABLE B, Page 9]
65	Cannot share DCB from DIAMON	See SYSTEM ERROR CODES [TABLE B, Page 9]
66	Error in data table	See SYSTEM ERROR CODES [TABLE B, Page 9]
67	Invalid number of parameters from DIAMON	See SYSTEM ERROR CODES [TABLE B, Page 9]
68	Open spooler failed	See SYSTEM ERROR CODES [TABLE B, Page 9]
6A	Invalid interactive mode command	See SYSTEM ERROR CODES [TABLE B, Page 9]
6C	Open tlpfile failed	See SYSTEM ERROR CODES [TABLE B, Page 9]
6D	Signal: illegal instruction	See SYSTEM ERROR CODES [TABLE B, Page 9]
6E	Signal: bus error	See SYSTEM ERROR CODES [TABLE B, Page 9]
6F	Signal: segment violation	See SYSTEM ERROR CODES [TABLE B, Page 9]
70	Signal: software termination	See SYSTEM ERROR CODES [TABLE B, Page 9]
71	Open message switch failed	Return code from _ims_open
72	ims_ioctl message switch failed	Return code from _ims_ioctl
73	ims_write message switch failed	Return code from _ims_write
74	ims_hdr message switch failed	Return code from _ims_hdr
75	get_mbuf message switch failed	Return code from _get_mbuf
76	ims_read message switch did not return _SUCCESS	Return code from _ims_read

TABLE A (Contd)		
ABORT CODE	**REASON FOR ABORT**	**SYSTEM/DRIVER SUPPLEMENTAL DATA**
77	Time-out occurred. No reply message from message switch in event mode	Has no significance
78	ucb name to node id translation failed or data returned from ring_cnfg indicates more than DB_MAXNODE nodes in isolated segment	0 - bad node name to node id translation 1 - ring.cnfg indicates too many ring nodes
79	Open driver for rpc diagnostics failed	Return code from driver
7A	Lock process in memory from dgndmawt() left insufficient memory for swapping	Has no significance
7B	Least significant byte in ucb HV field is out of range, ie, at least one nibble >= DBIFBMAX. (see db_arrays.h)	NODE_ID corresponding to ucb containing data is out of range
7C	Imsdiag timed out while awaiting a GO event from DIAMON	Has no significance
7D	Node being diagnosed is an iun type and is neither isolated nor does it have an RI minor state of USBL	The nodes RI minor state: 0 = UNTSTD 2 = USBL 1 = FLTY 3 = QUSBL
7E	An excessive number of messages were queued for _DIAGC channel immediately after channel was opened	Has no significance
80	Reply messages to rg_query() were received out of sequence	Next expected sequence number
81	Argument passed to qktst_qu() was out of range. Allowable are 1(BISO) and 2(EISO)	Argument actually passed
82	Request to update RI minor state was not successful	Node id where update was not successful

TABLE A (Contd)		
ABORT CODE	**REASON FOR ABORT**	**SYSTEM/DRIVER SUPPLEMENTAL DATA**
83	An 8-byte message relayed from imsdiag to itself via a double relay through isolated segment was received from proper relay node, but message was not proper length	Number of bytes in received message
84	Imsdiag received an unexpected node type from driver in response to a node-type query message	Node type received: 128 - RPCN 0 - UNEQP node or unknown type
85	The driver rejected the diagnostic test job of the DLN dma	The "result" field in the message returned from the driver: 4 - error found in request message 8 - software which handles the test DLN dma is busy
86	The message sequence number of the message for which the 2 bits pattern is going to be built exceeds the allowed limit	Message sequence number of the message for which the 2 bits pattern is going to be built
87	The home RPCN id for the home RPCN of the relay node is not valid	The home RPCN id for the home RPCN of the relay node
88	The capacity test is aborted by the home RPCN of the relay node	The why_abt code in the reply message from the home RPCN of the relay node for the diagnostic capacity test

TABLE A (Contd)		
ABORT CODE	**REASON FOR ABORT**	**SYSTEM/DRIVER SUPPLEMENTAL DATA**
89	The dg_rcont function was passed an invalid 'cntlcode' argument	The actual 'cntlcode' argument passed to the dg_rcont() function
90	The dg_rcont function was passed an invalid 'racrst' argument	The actual 'racrst' argument passed to the dg_rcont() function
91	The dg_rcont function was passed an invalid 'ring' argument	The actual 'ring' argument passed to the dg_rcont() function

TABLE B
SYSTEM ERROR CODES

CODE	CODE DEFINITION	CODE	CODE DEFINITION
1	Not super-user	24	Too many open files
2	No such file or directory	25	Not a typewriter
3	No such process	26	Test file busy
4	Interrupted system call	27	File too large
5	I/O error	28	No space left on device
6	No such device or address	29	Illegal seek
7	Argument list too long	30	Read-only file system
8	Exec format error	31	Too many links
9	Bad file number	32	Broken pipe
10	No children	33	File is "temped"
11	No more processes	34	Trap to lower execution level kernel process
12	Not enough core	35	No message
13	Permission denied	36	Not allocated
14	Bad address	37	Mount audit failure
15	Block device required	38	Mount umount failed due to current audit
16	Mount device busy	39	First access of logical block
17	File exists	40	Fmove failed
18	Cross-device link	41	No extents
19	No such device	42	Pathname too long
20	Not a directory	43	No entries left
21	Is a directory	44	Invalid operation
22	Invalid argument	45	Failure as a result of an audit
23	File table overflow	46	Disk limp mode indication

TABLE B (Contd)
SYSTEM ERROR CODES

CODE	CODE DEFINITION
47-50	Not used
51	Message type not recognized
52	Cannot find process in process tables
53	Library file does not exist
54	All process slots in use (pstart fail)
55	Insufficient memory for kernel
56	All sides are allocated or there is no swap space left
57	Unable to read a pfile or library file
58	Segment too big for virtual address space available
59	Cannot add a shared segment to a process
60*	FLTRCV: Invalid emt value for this driver PMGR: Incarnation count too big for one process
61*	FLTRCV: Iomap error
62*	FLTRCV: Hardware not oos or reserved PMGR: Can't acquire PCB of terminating process
63*	FLTRCV: Not a pseudo unit PMGR: PMGR faulted, entered fault routine
64*	FLTRCV: Pointer not valid PMGR: NUB faulted, entered fault routine
65*	FLTRCV: No mate unit
66*	FLTRCV: Not a legitimate start UCB
67*	FLTRCV: Bad eqid entry PMGR: Bad ACK resulting from copyseg OST
68*	FLTRCV: Bad search level entry PMGR: Pfile (LDP output) doesn't exist
69*	FLTRCV: Could not find eqid unit
70*	FLTRCV: Unit not out of service PMGR: Can't open dump file
71*	FLTRCV: Unit already reserved
72*	FLTRCV: No idle MDCT entry PMGR: Can't get capability of working directory
73*	FLTRCV: Backup not available PMGR: Unable to close a file
74*	FLTRCV: UCB type incorrect
75*	FLTRCV: Not a "cu" ucb
76*	FLTRCV: Invalid MCH order PMGR: Message from unauthorized process
77*	FLTRCV: Pcpmd driver busy. Try again later PMGR: Created process has segment index overlay
78*	FLTRCV: Micro-assist code in offline slave failed PMGR: Unable to lock shared library in memory
79*	FLTRCV: Pointer not pointing to a ucb PMGR: Shared library already locked in memory
80*	FLTRCV: Invalid pcpmd driver command PMGR: The term has already taken place (by proad)
81*	FLTRCV: Can't fault the driver PMGR: Pfile calls for PAS, no PAS in system

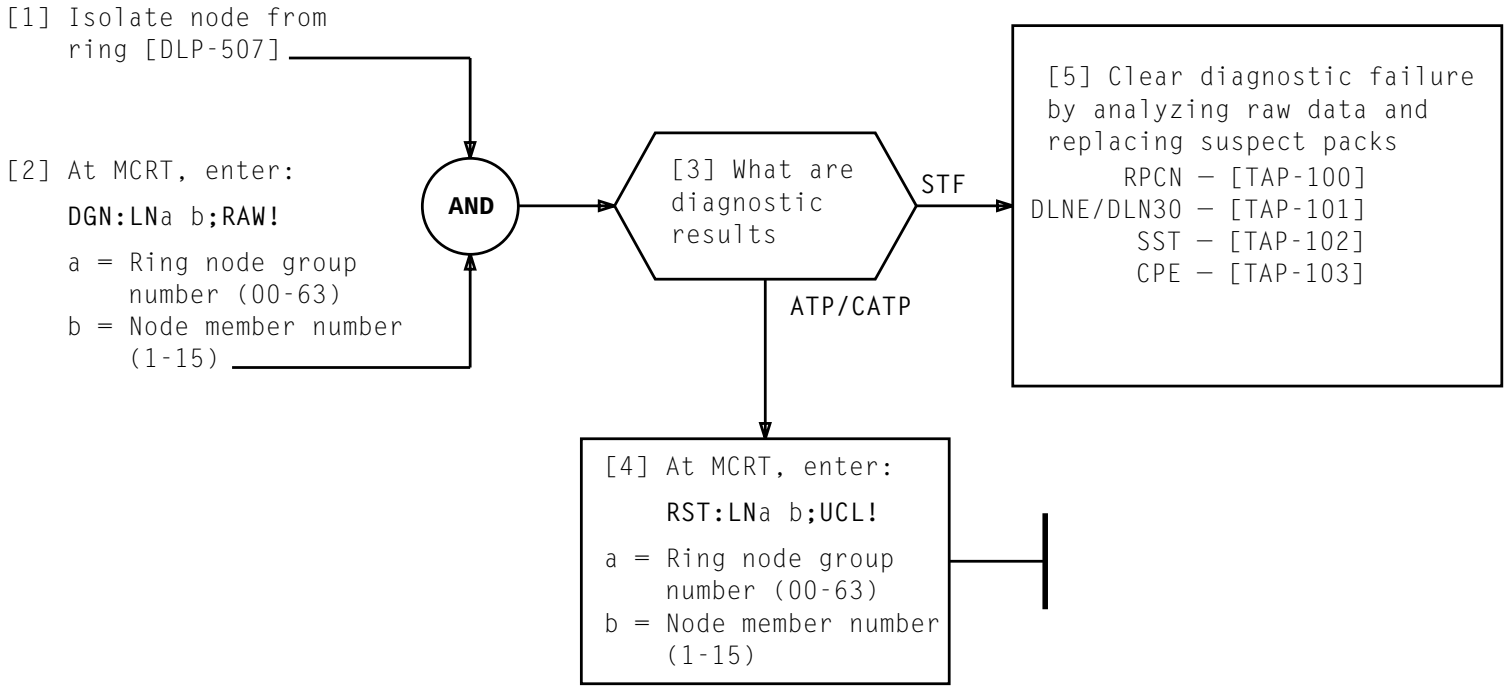
* System error codes 60-87 may be generated by either the process manager or fault recovery software

TABLE B (Contd)
SYSTEM ERROR CODES

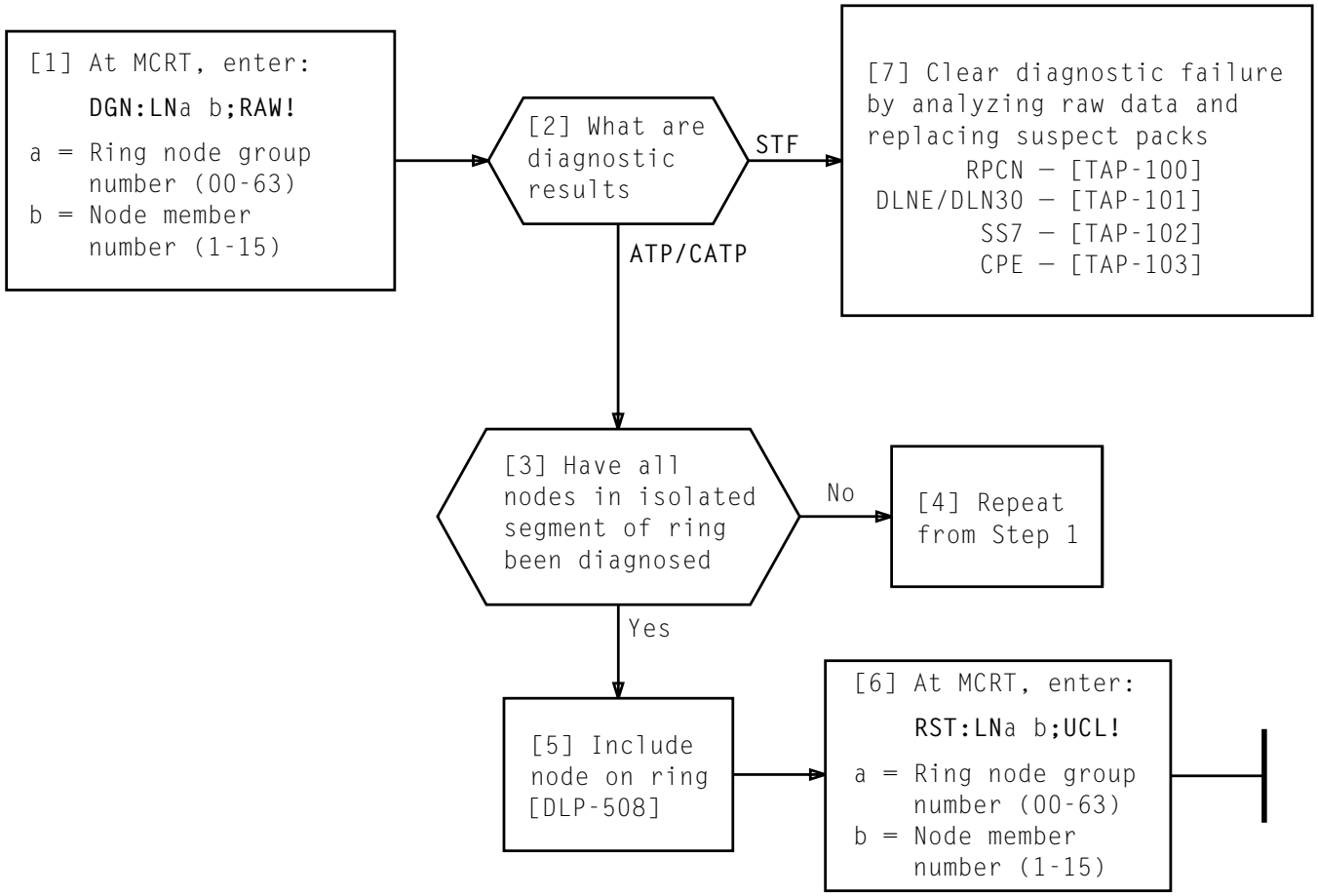
CODE	CODE DEFINITION
82*	FLTRCV: CONFIG fail return PMGR: The fork request failed pcreate - super
83*	FLTRCV: Processor not duplexed PMGR: Can't create because in disk limp mode
84*	FLTRCV: Mate processor not active PMGR: Segid and index do not specify same module
85*	FLTRCV: Invalid argument PMGR: Bad pcb index - when EMM index must be less than partition boundary
86*	FLTRCV: MCH hardware error PMGR: Pfile does not specify pcb segment
87*	FLTRCV: Execmch function didn't process expected number of bytes PMGR: An ack message was lost or delayed
88	Kernel function returned failed
89	Read of off-line CU timed out
90	Parity error in on-line processor
91	Parity failure in off-line processor
92	Data is not same in both processors
93	The on-line processor was specified when off-line was expected
94	Stop DMA routine failed
95	Start DMA routine failed
96	Unequipped Unit Control Block specified or accessed
97	Not a top Unit Control Block
98	No match found
99	Bad tag value
100	Offline CU MRFed
101-119	Not used
120	"lla_nsqrid" function failed
121	"lla_rdget" function failed
122	"lla_uprid" function failed
123	"lla_opnsq" function failed
124	"lla_attrid" function failed
125	"lla_delete" function failed
126	"lla_sinfo" function failed
127	"lla_get" function failed
128	"lla_gtrid" function failed
129	Update bit not set
130	Online CU RID not provided for update
131	No DMA RIDs under CU
132	Online parity error detected by cpblkp instruction
133	Other store time-out during update

* System error codes 60-87 may be generated by either the process manager or fault recovery software

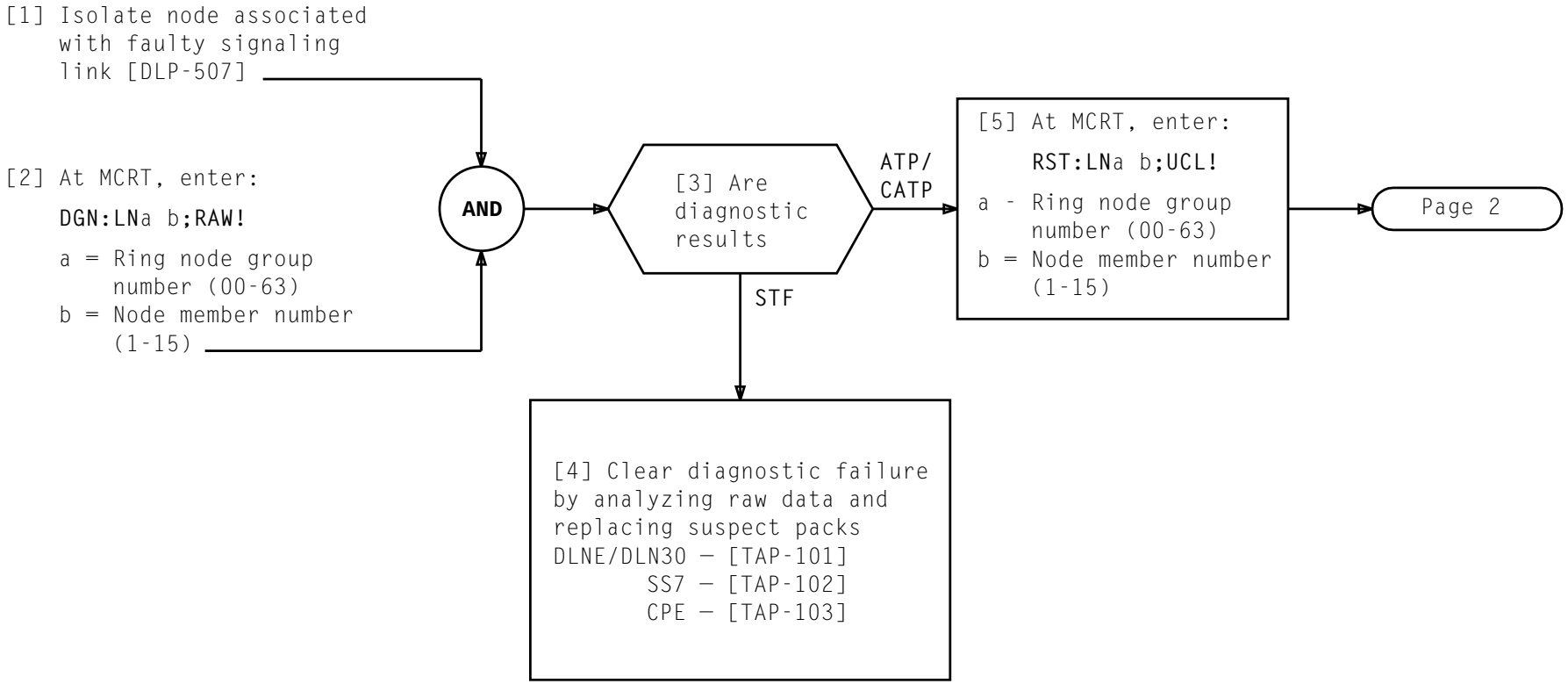
TABLE C IMSDRV DIAGNOSTIC ERROR CODES	
CODE	**CODE DEFINITION**
1	Failed to attach interrupt
2	Failed to detach interrupt
3	Failed to get dma address (getdma failed)
4	Wrong sequence
5	Wrong opercode
6	Wrong node address
7	Driver not open for diagnostics
8	Failed to open since init is in progress
9	Failed to lock segment
A	Failed diagnostics due to other reasons
B	Failed due to time-out
C	Fault code received



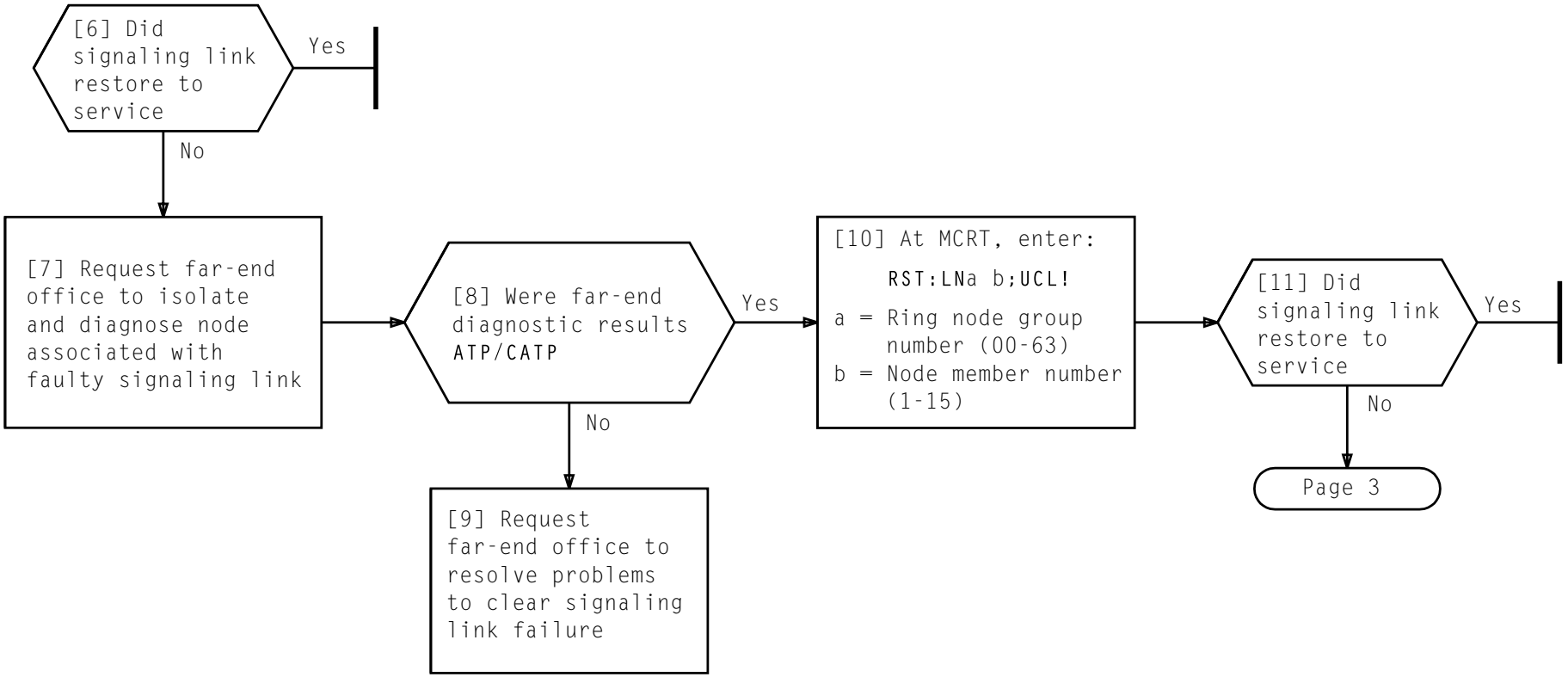
CLEAR NODE (LN, DLNE/DLN30, OR RPCN) HARDWARE FAULT



CLEAR ISOLATED NODE (LN, DLNE/DLN30, OR RPCN) FAULT



CLEAR SIGNALING LINK FAILURE



CLEAR SIGNALING LINK FAILURE

[12] Ensure signaling link cabling connections exist between associated link node and digital service unit (DSU)

[13] Verify correct link interface pack is installed [DLP-517]

[14] Verify correct digital service unit (DSU), channel service unit (CSU), and digital service adapter (DSA) are installed [DLP-518]

[15] Verify DSU options are properly set [TABLE A]

[16] Verify DSU is not in local loop (LL) mode

[17] Verify CSU options are properly set [DLP-522]

[18] Verify DSA options are properly set [DLP-523]

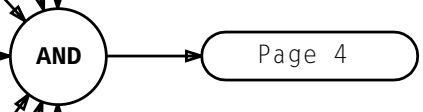


TABLE A	
DSU TYPE	**OPTION SETTING PROCEDURE**
500B/502B	[DLP-519]
DATATEL DCP3189	[DLP-520]
AT&T 2556	[DLP-521]

CLEAR SIGNALING LINK FAILURE

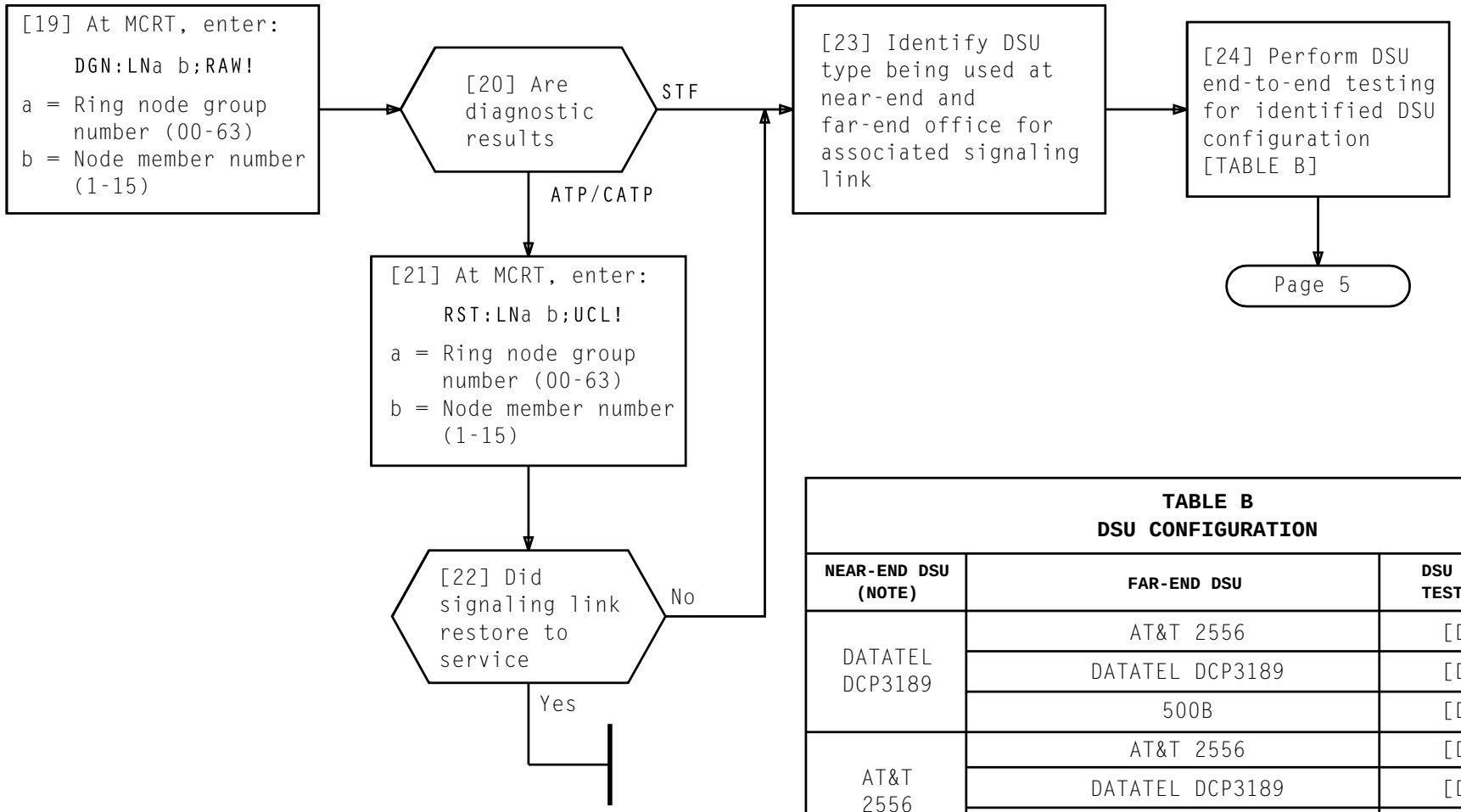
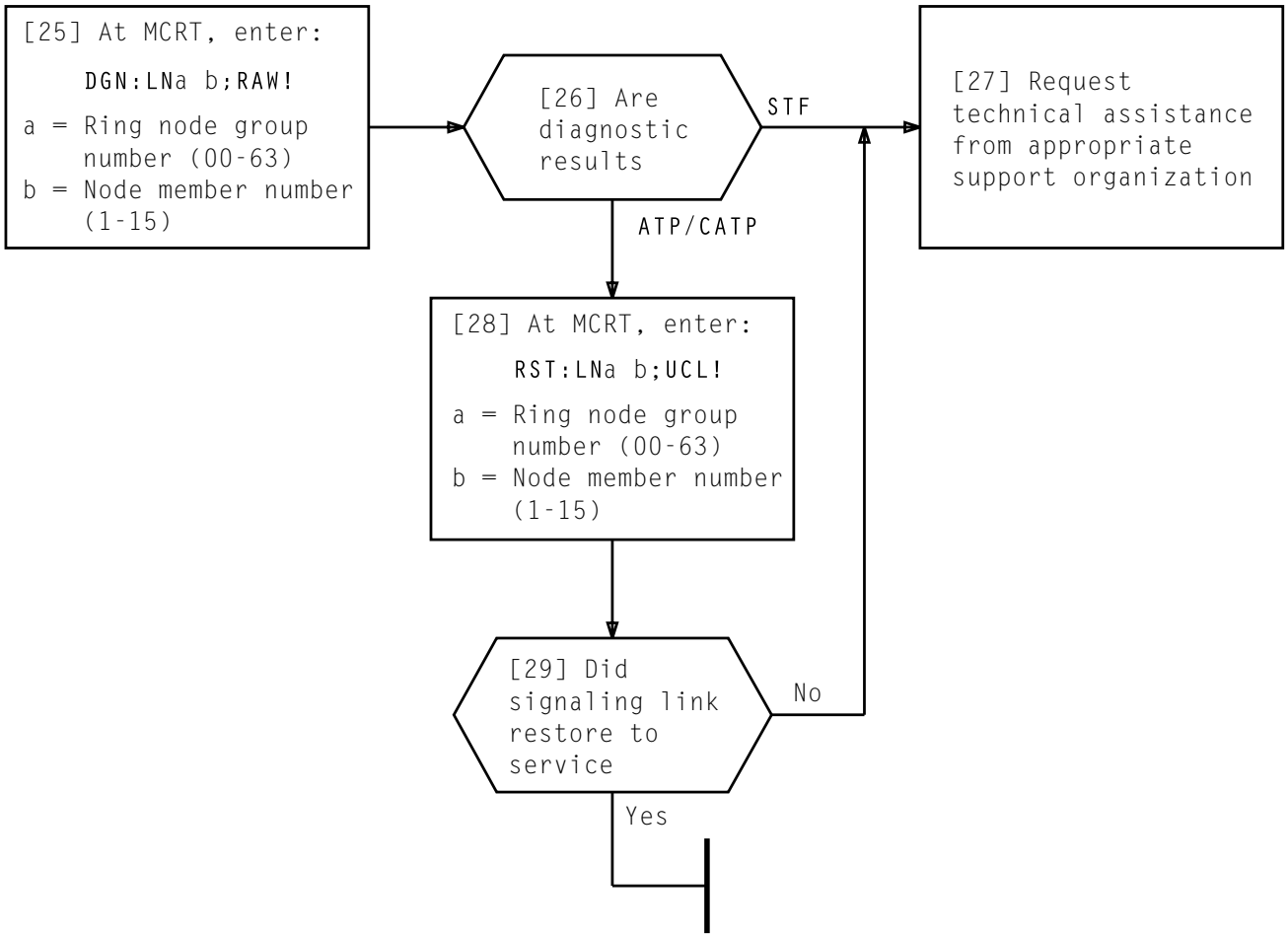


TABLE B
DSU CONFIGURATION

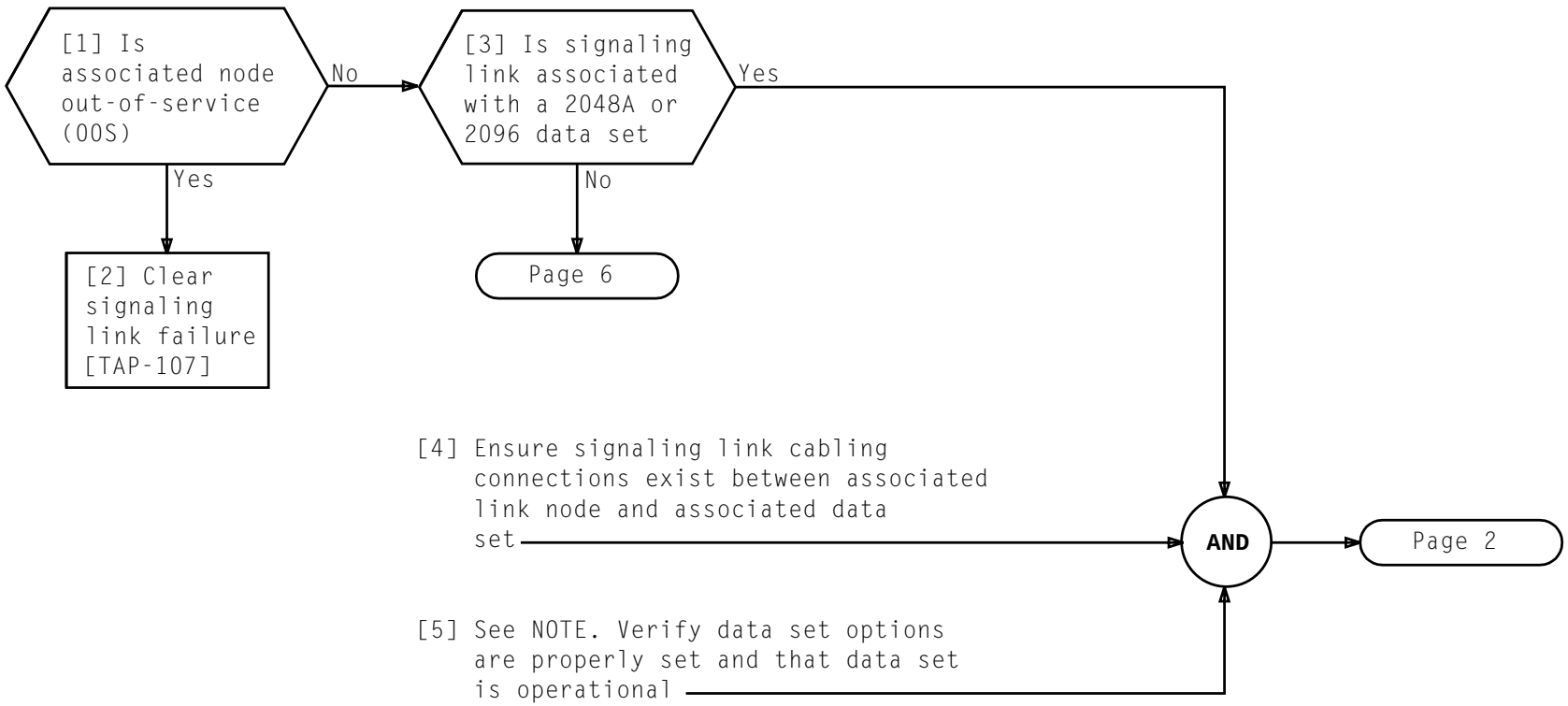
NEAR-END DSU (NOTE)	FAR-END DSU	DSU END-TO-END TEST PROCEDURE
DATATEL DCP3189	AT&T 2556	[DLP-531]
	DATATEL DCP3189	[DLP-532]
	500B	[DLP-533]
AT&T 2556	AT&T 2556	[DLP-534]
	DATATEL DCP3189	[DLP-535]
	500B	[DLP-536]

NOTE: No end-to-end tests possible when 500B DSU is used at near-end. This is due to 500B DSU being unable to generate internal test pattern to be sent through loop. Tests can be completed with 500B DSU at far-end. This is due to 500B DSU's ability to be placed in remote loopback mode.

CLEAR SIGNALING LINK FAILURE

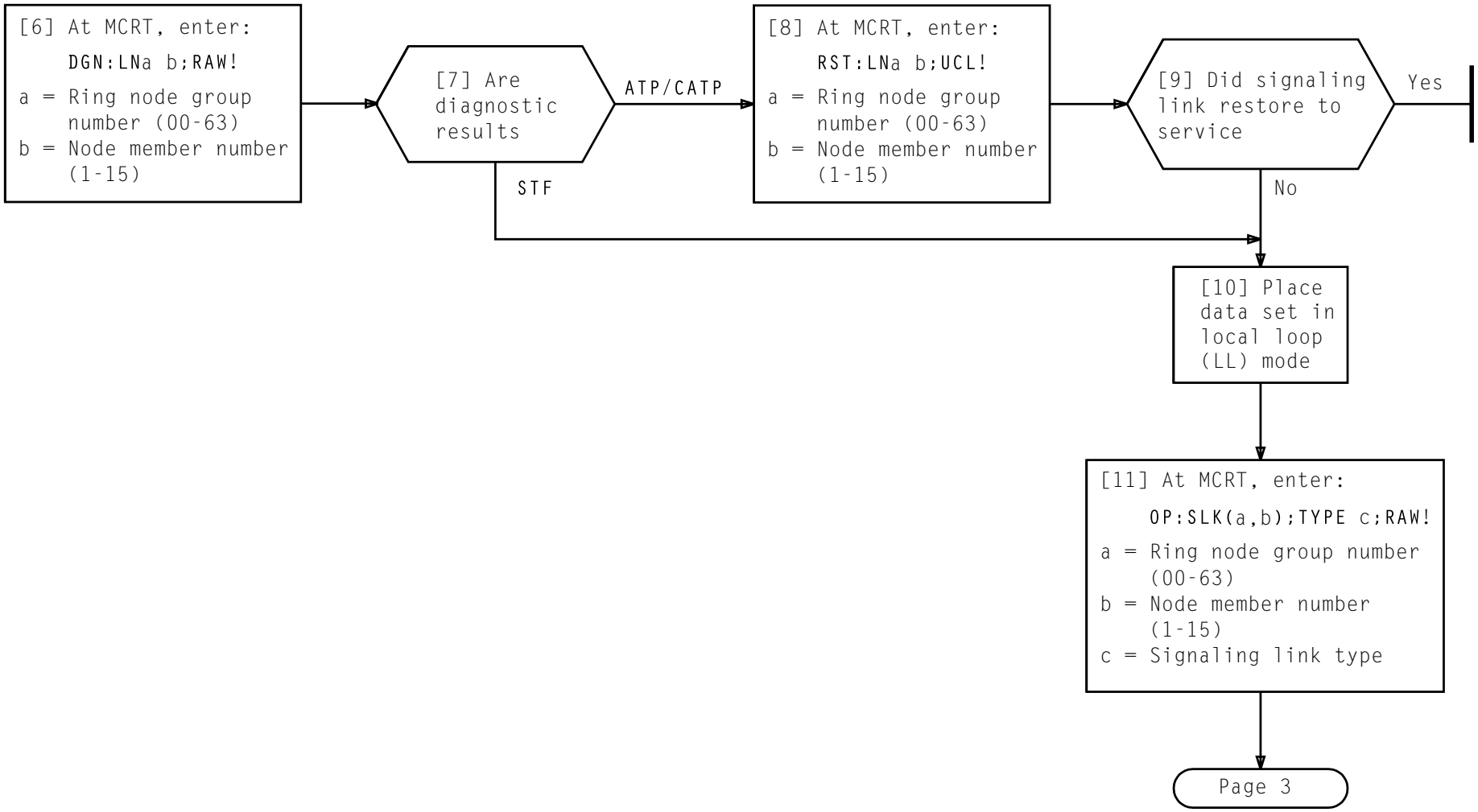


CLEAR SIGNALING LINK FAILURE

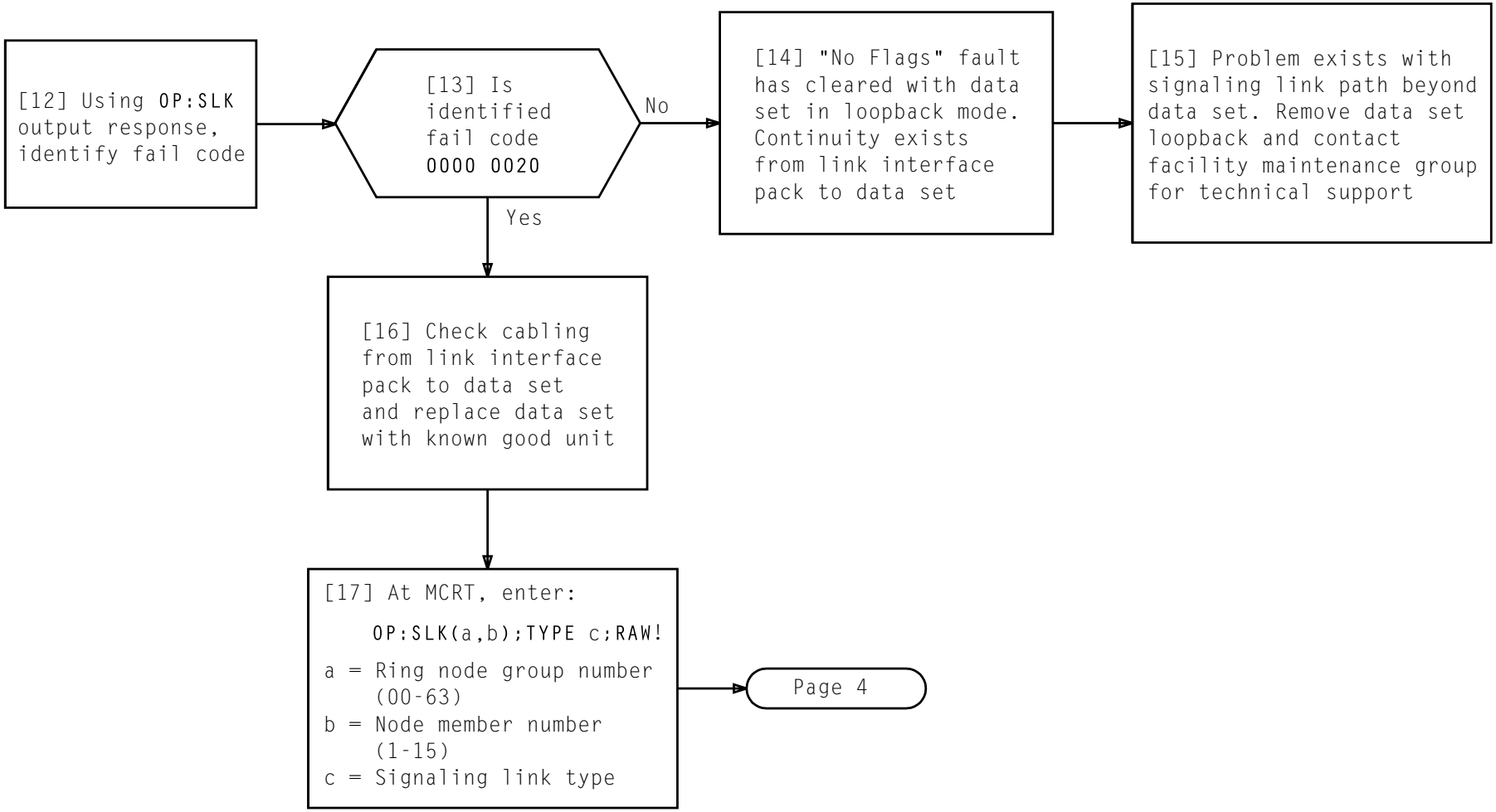


NOTE
AT&T documents 592-040-120 and 592-040-520 provide information for checking data set operations and verifying applicable option settings

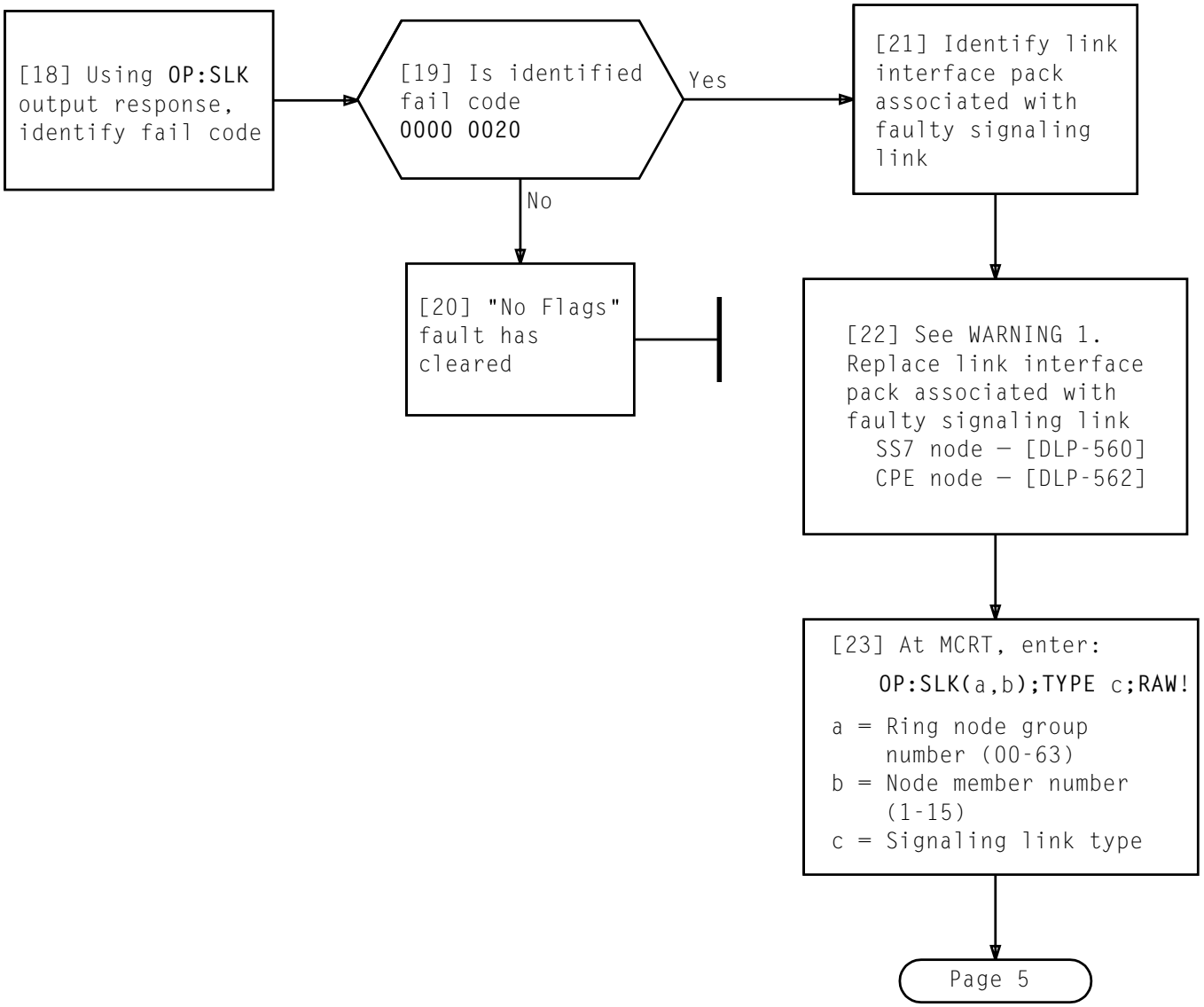
CLEAR SIGNALING LINK "NO FLAGS" FAULT



CLEAR SIGNALING LINK "NO FLAGS" FAULT

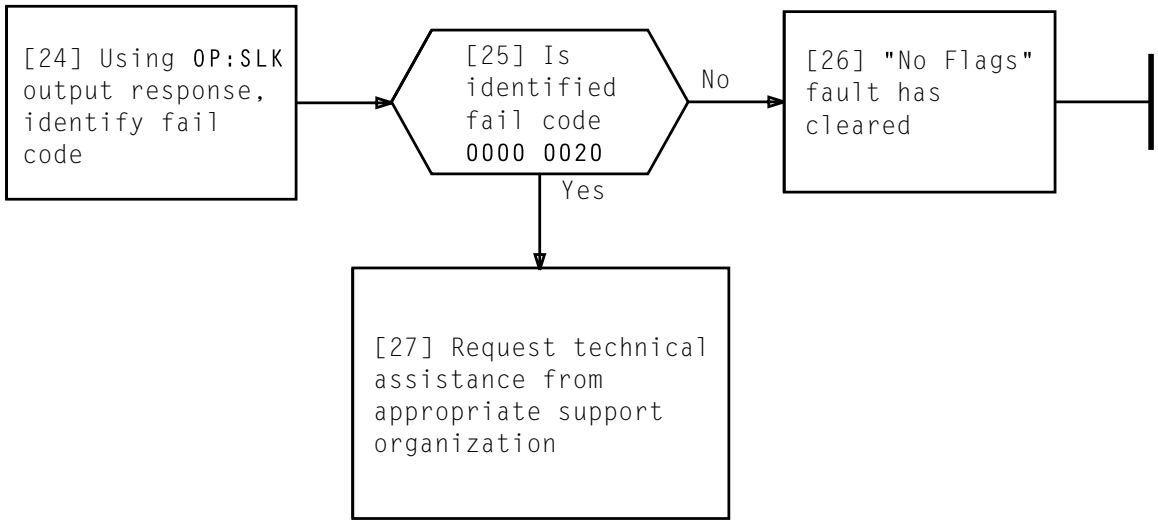


CLEAR SIGNALING LINK "NO FLAGS" FAULT

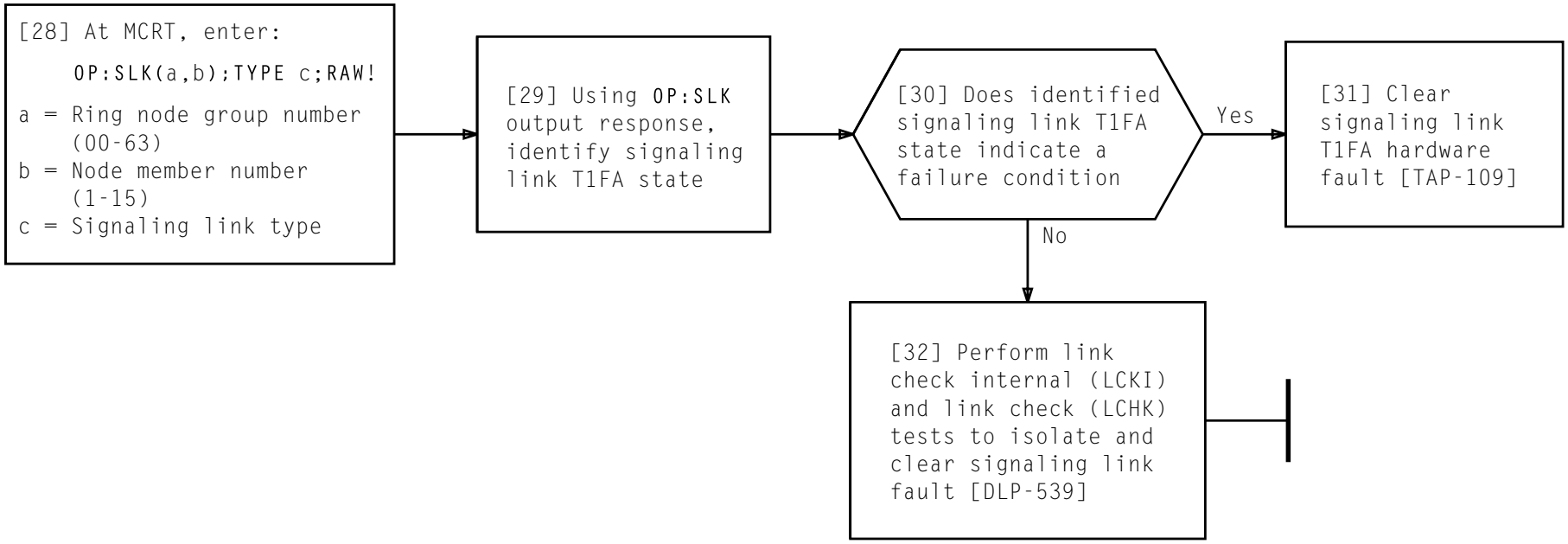


WARNING 1
Replacement of link interface pack causes service interruption to all signaling links associated with link interface. Determine best time to introduce service outage in order to minimize service disruption

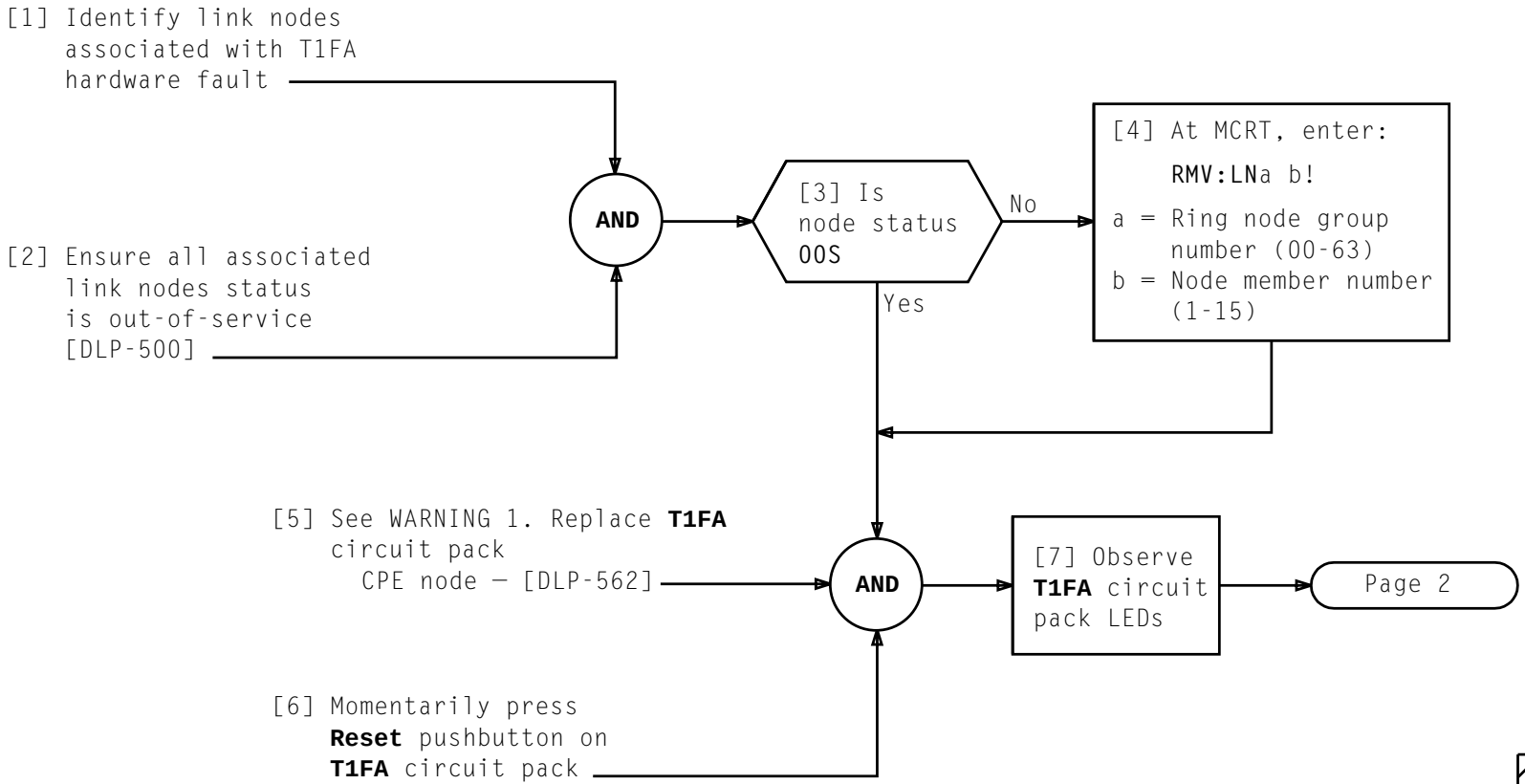
CLEAR SIGNALING LINK "NO FLAGS" FAULT



CLEAR SIGNALING LINK "NO FLAGS" FAULT

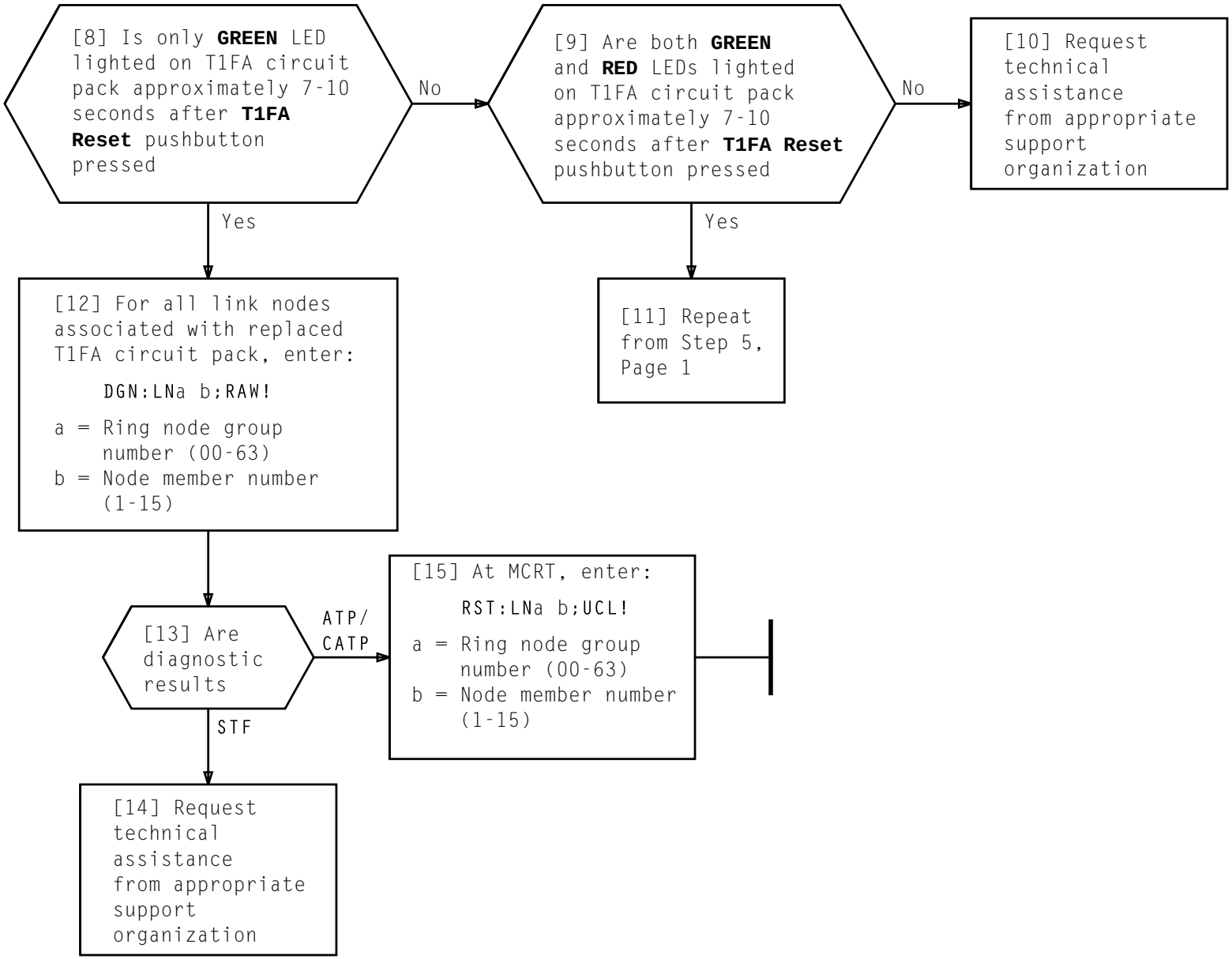


CLEAR SIGNALING LINK "NO FLAGS" FAULT

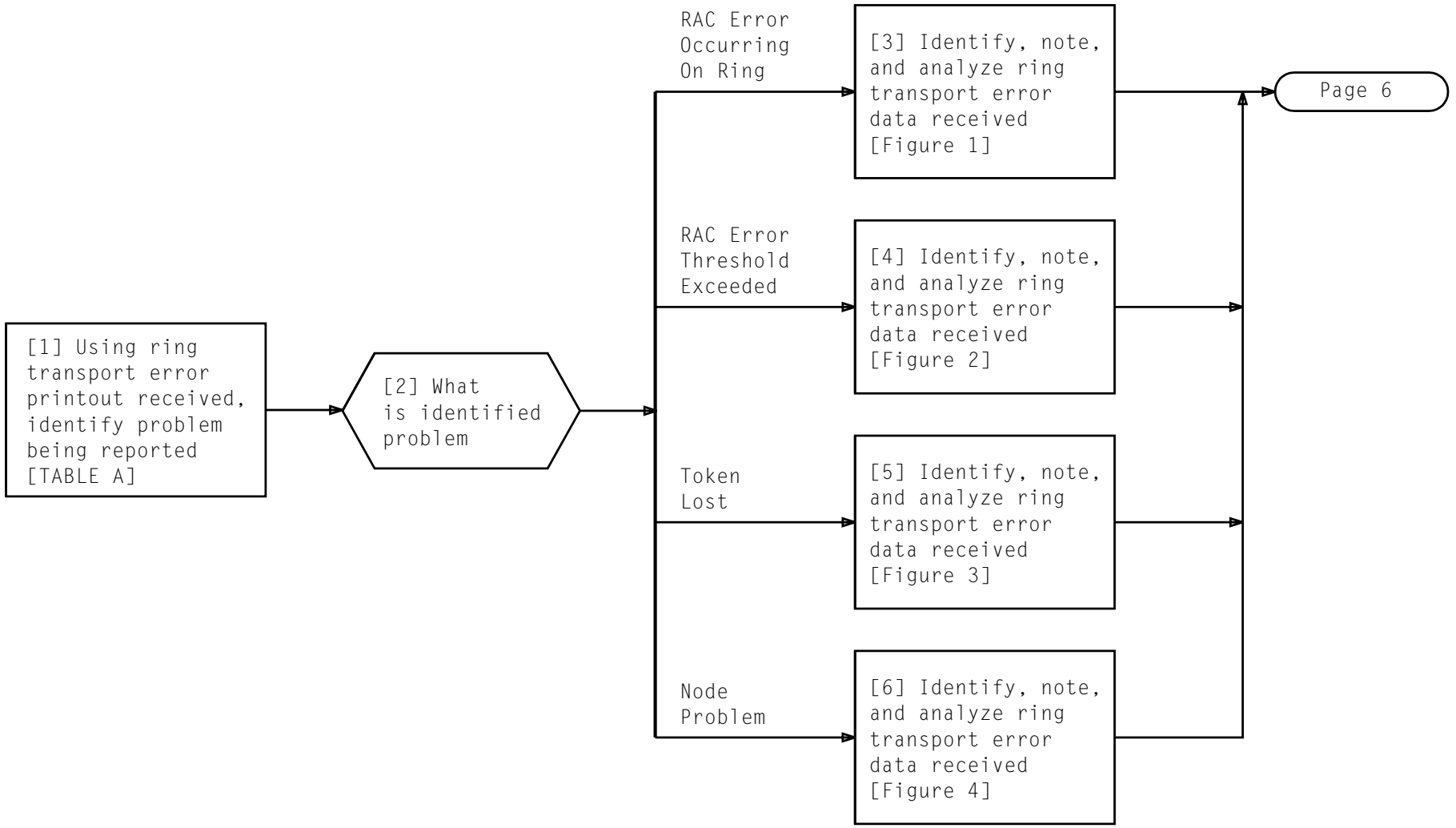


WARNING 1
Replacement of T1FA pack causes service interruption to all signaling links associated with T1FA. Determine best time to introduce service outage in order to minimize service disruption

CLEAR SIGNALING LINK T1FA HARDWARE FAULT



CLEAR SIGNALING LINK T1FA HARDWARE FAULT



ANALYZE RING TRANSPORT ERROR

TABLE A	
RING TRANSPORT ERROR FORMAT	**PROBLEM BEING REPORTED**
FORMAT 1 (Figure 1)	Ring Access Circuit (RAC) errors occurring on ring
FORMAT 2 (Figure 2)	Threshold has been exceeded for types of Ring Access Circuit (RAC) errors being reported
FORMAT 3 (Figure 3)	Token lost due to non-specified reason
FORMAT 4 (Figure 4)	Node problem

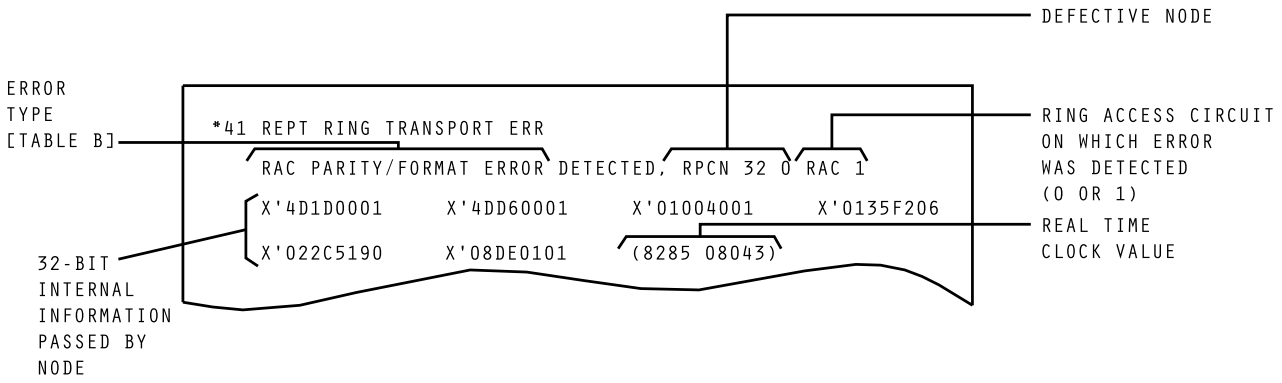


Figure 1 – Sample Printout of Ring Transport Error (Format 1)

TABLE B RING TRANSPORT ERROR TYPES (FORMAT 1)
BLOCKAGE
RAC PARITY/FORMAT ERROR
TRANSIENT RAC ERROR
INTERFAME BUFFER PARITY ERROR
RAC OUTPUT PARITY ERROR
WRITE FORMAT ERROR
READ FORMAT ERROR
READ TOO SHORT ERROR
READ INHIBIT ERROR
SOURCE MATCH
GENERAL RAC ERROR
DEQUEUED TOKEN

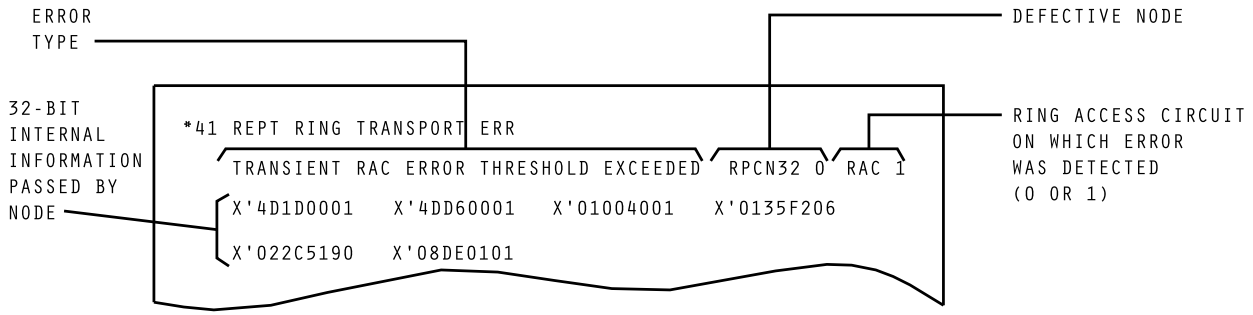


Figure 2 — Sample Printout of Ring Transport Error (Format 2)

Figure 3 — Sample Printout of Ring Transport Error (Format 3)

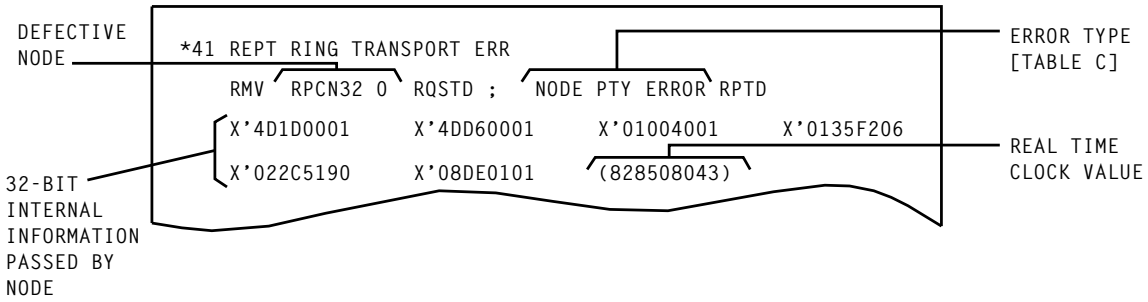
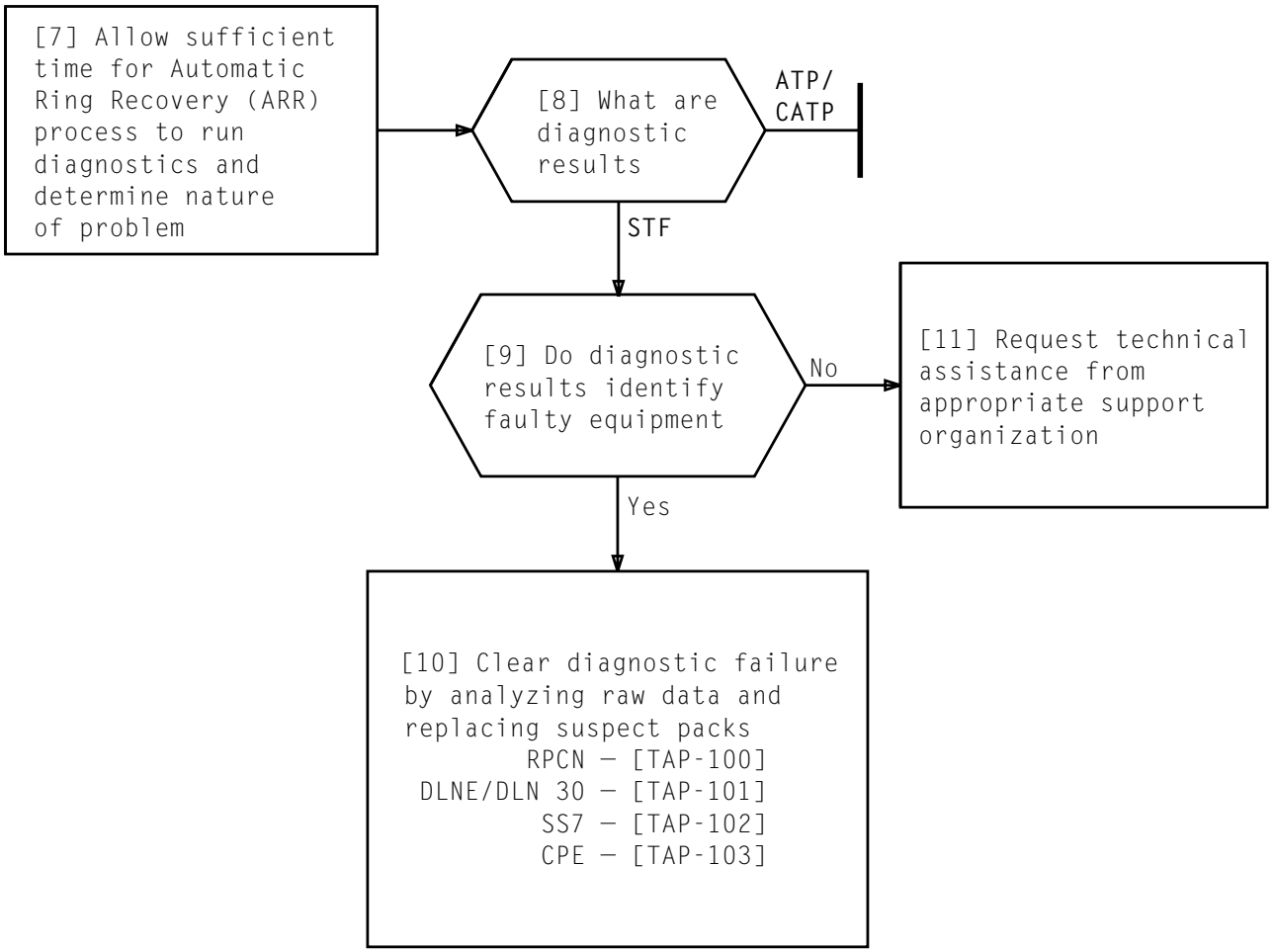


Figure 4 – Sample Printout of Ring Transport Error (Format 4)

TABLE C
RING TRANSPORT ERROR TYPES (FORMAT 4)

SRC MATCH
NAUD FAILURE
NODE PTY ERROR
NODE CKSUM ERROR
RING WRITE FAILURE
RING READ FAILURE
RPC PANIC
UNXPCTD SET QUAR
RAC CONTROL FAILURE
MSG RELAY FAILURE
RING INTERFACE FAILURE
PIO FAILURE
RPC STATE CHANGE FAILURE
RPC ISOLATION
UNXPCTD STATE CHNG MSG



ANALYZE RING TRANSPORT ERROR

[1] At MCRT, enter:
OP:RING;DETD!

System prints status of all equipped ring nodes

AND

[2] On ring node status printout [Figure 1], identify desired node status

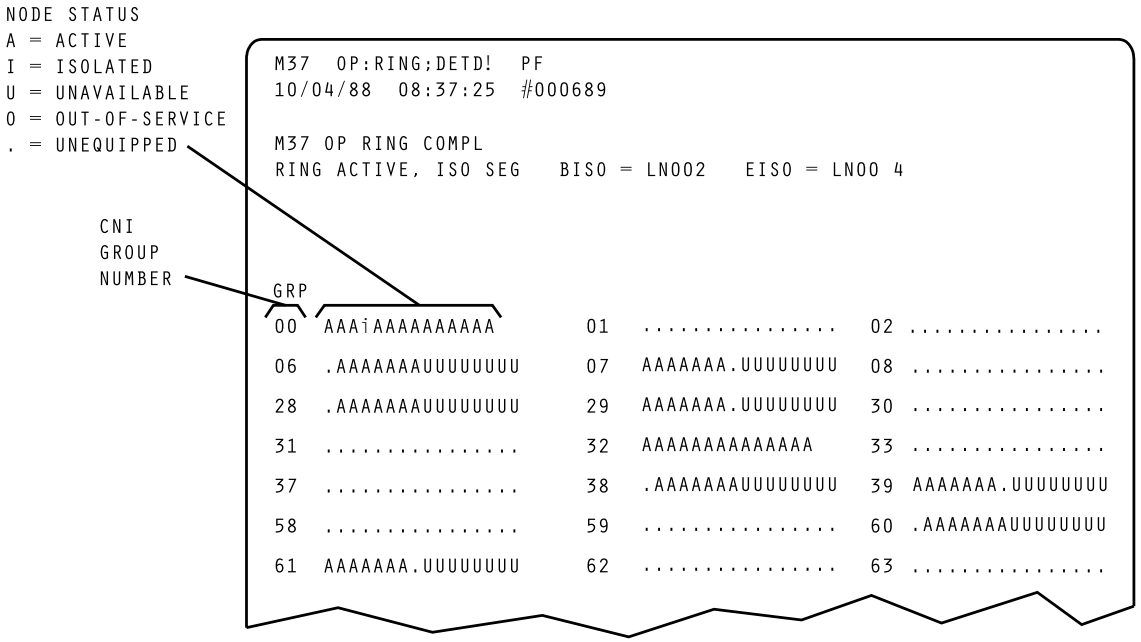
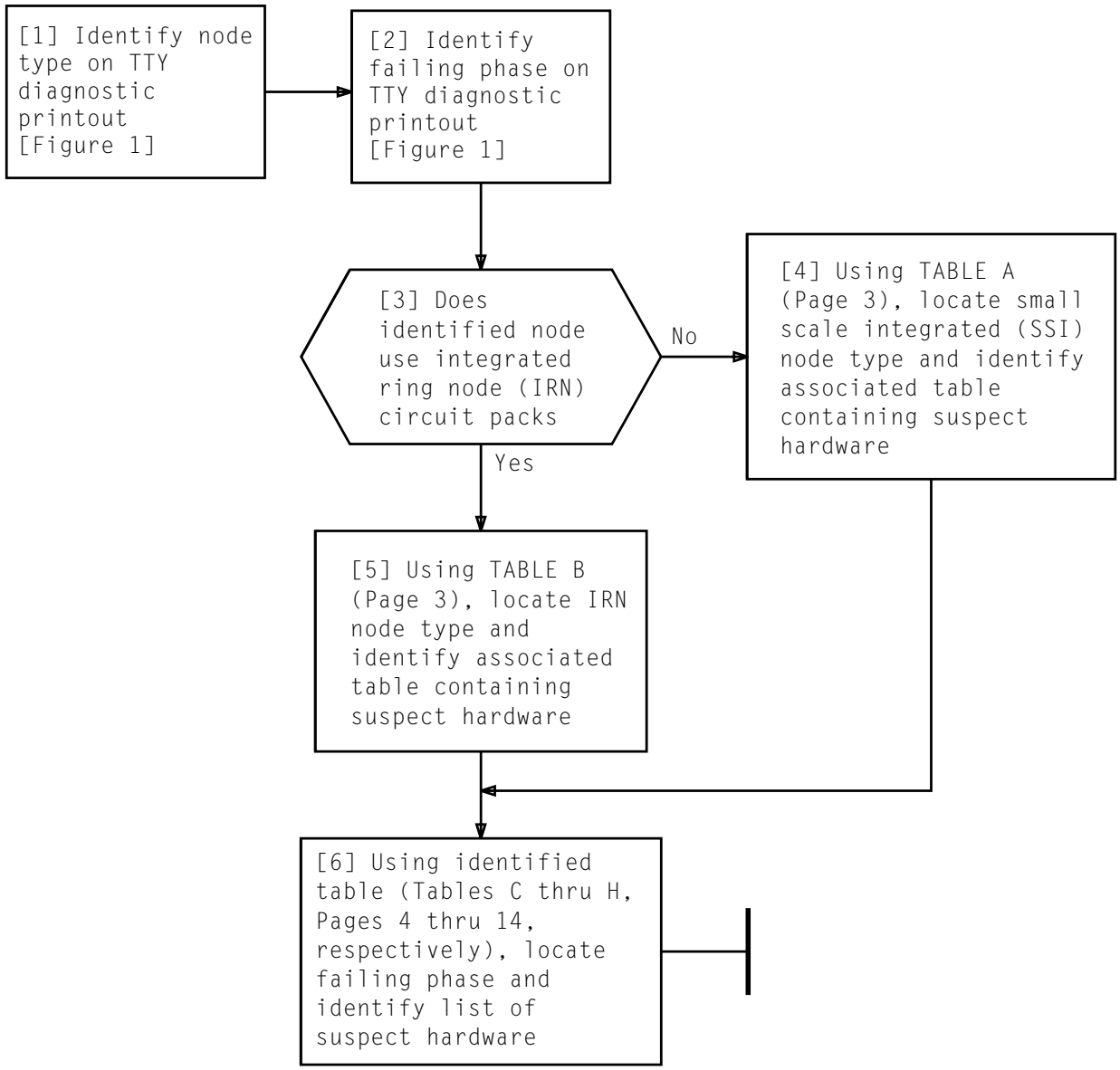


Figure 1 – Sample Printout of Ring Node Status

DETERMINE NODE STATUS



IDENTIFY SUSPECT HARDWARE USING DIAGNOSTIC INFORMATION

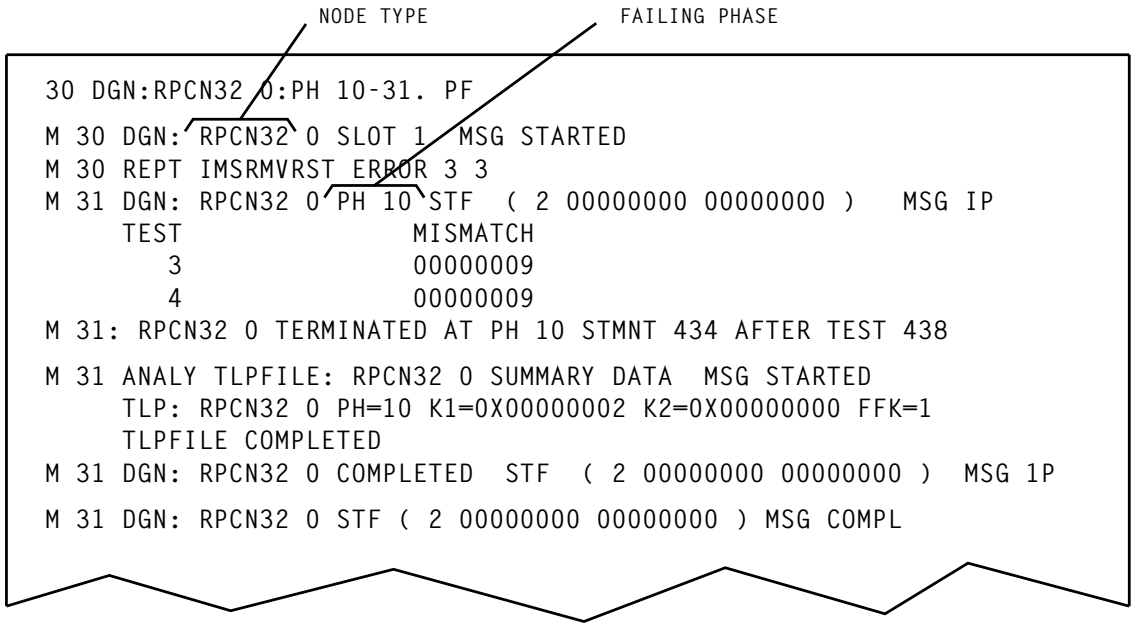


Figure 1 – Sample Printout of Failing Diagnostic Phase

TABLE A	
NODE TYPE (NOTE)	**ASSOCIATED TABLE CONTAINING SUSPECT HARDWARE**
SSI RPCN	TABLE C (Pages 4-5)
SSI SS7	TABLE D (Pages 6-7)
SSI CPE	TABLE E (Pages 8-9)

NOTE: Node types using small scale integrated (SSI) circuitry use individual circuit packs for the node processor, ring interface 0, and ring interface 1 circuitry.

TABLE B	
NODE TYPE (NOTE)	**ASSOCIATED TABLE CONTAINING SUSPECT HARDWARE**
IRN SS7	TABLE F (Page 10)
IRN/IRN2 CPE	TABLE G (Page 11)
IRN DLNE/DLN30	TABLE H (Page 13)

NOTE: Node types using integrated ring node (IRN) circuitry combines the node processor, ring interface 0, and ring interface 1 circuitry onto one circuit pack.

IDENTIFY SUSPECT HARDWARE USING DIAGNOSTIC INFORMATION

TABLE C
SSI RPCN SUSPECT HARDWARE

FAILING PHASE	SUSPECT HARDWARE						
	FIRST	SECOND	THIRD	FOURTH	FIFTH	SIXTH	SEVENTH
01	UN122 UN122B UN122C	UN123 UN123B	TN915, TN918 TN1506, TN1508, TN1509, TN1803	RING BUS CABLE	—	—	—
02	UN122 UN122B UN122C	UN123 UN123B	TN915, TN918 TN1506, TN1508 TN1509, TN1803	RING BUS CABLE	—	—	—
10	TN69B	UN9, UN9B	—	—	—	—	—
11	TN914	TN69B	—	—	—	—	—
12	TN914	TN922	—	—	—	—	—
13	TN914	TN922	—	—	—	—	—
14	TN69B	UN9, UN9B	—	—	—	—	—
20	TN922	—	—	—	—	—	—
23	TN922	—	—	—	—	—	—
24	TN922	—	—	—	—	—	—
26	TN922	—	—	—	—	—	—
27	TN922	—	—	—	—	—	—
30	UN122 UN122B UN122C	UN123 UN123B	TN922	—	—	—	—
31	UN122 UN122B UN122C	UN123 UN123B	TN922	—	—	—	—

TABLE C (Contd)
SSI RPCN SUSPECT HARDWARE

FAILING PHASE	SUSPECT HARDWARE						
	FIRST	SECOND	THIRD	FOURTH	FIFTH	SIXTH	SEVENTH
32	UN122 UN122B UN122C	UN123 UN123B	TN915, TN918 TN1506, TN1508, TN1509, TN1803	—	—	—	—
33	UN123 UN123B	UN122 UN122B UN122C	TN915, TN918, TN1506, TN1508, TN1509, TN1803	—	—	—	—
39	UN122 UN122B UN122C	UN123 UN123B	—	—	—	—	—

TABLE D SSI SS7 SUSPECT HARDWARE							
FAILING PHASE	SUSPECT HARDWARE						
	FIRST	SECOND	THIRD	FOURTH	FIFTH	SIXTH	SEVENTH
01	UN122 UN122B UN122C	UN123 UN123B	TN915, TN918, TN1506, TN1508, TN1509, TN1803	RING BUS CABLING	–	–	–
02	UN122 UN122B UN122C	UN123 UN123B	TN915, TN918 TN1506, TN1508, TN1509, TN1803	RING BUS CABLING	–	–	–
10	UN122 UN122B UN122C	UN123 UN123B	TN922	–	–	–	–
11	UN122 UN122B UN122C	UN123 UN123B	TN922	–	–	–	–
12	UN122 UN122B UN122C	UN123 UN123B	TN915, TN918, TN1506, TN1508, TN1509, TN1803	–	–	–	–
13	UN123 UN123B	UN122 UN122B UN122C	TN915, TN918, TN1506, TN1508, TN1509, TN1803	–	–	–	–
20	TN922	–	–	–	–	–	–
23	TN922	–	–	–	–	–	–
24	TN922	–	–	–	–	–	–
26	TN922	–	–	–	–	–	–
27	TN922	–	–	–	–	–	–
39	UN122 UN122B UN122C	UN123 UN123B	–	–	–	–	–

TABLE D (Contd) SSI SS7 SUSPECT HARDWARE							
FAILING PHASE	SUSPECT HARDWARE						
	FIRST	SECOND	THIRD	FOURTH	FIFTH	SIXTH	SEVENTH
40	TN916	TN917, TN917B	TN922	–	–	–	–
41	TN916	TN917, TN917B	TN922	–	–	–	–
47	TN916	TN917, TN917B	TN919	DATA SET	TN922	LINK CABLING	–
48	TF9	DATA SET	TN916	TN917, TN917B	TN922	LINK CABLING	–

TABLE E SSI CPE SUSPECT HARDWARE							
FAILING PHASE	SUSPECT HARDWARE						
	FIRST	SECOND	THIRD	FOURTH	FIFTH	SIXTH	SEVENTH
01	UN122 UN122B UN122C	UN123 UN123B	TN915, TN918, TN1506, TN1508, TN1059, TN1803	RING BUS CABLE	–	–	–
02	UN122 UN122B UN122C	UN123 UN123B	TN915, TN918, TN1506, TN1508, TN1509, TN1803	RING BUS CABLE	–	–	–
10	UN122 UN122B UN122C	UN123 UN123B	TN922	–	–	–	–
11	UN122 UN122B UN122C	UN123 UN123B	TN922	–	–	–	–
12	UN122 UN122B UN122C	UN123 UN123B	TN915, TN918, TN1506, TN1508, TN1509, TN1803	–	–	–	–
13	UN122 UN122B UN122C	UN122 UN122B UN122C	TN915, TN918, TN1506, TN1508, TN1509, TN1803	–	–	–	–
20	TN922	–	–	–	–	–	–
23	TN922	–	–	–	–	–	–
24	TN922	–	–	–	–	–	–
26	TN922	–	–	–	–	–	–
27	TN922	–	–	–	–	–	–
29	UN291	–	–	–	–	–	–
39	UN122 UN122B UN122C	UN123 UN123B	–	–	–	–	–

TABLE E (Contd)
SSI CPE SUSPECT HARDWARE

FAILING PHASE	SUSPECT HARDWARE						
	FIRST	SECOND	THIRD	FOURTH	FIFTH	SIXTH	SEVENTH
50	TN922	TN1315, TN1316	—	—	—	—	—
51	TN922	TN1315, TN1316	—	—	—	—	—
52 *	TN1315, TN1316	—	—	—	—	—	—
53 *	TN1315, TN1316	—	—	—	—	—	—
54 *	TN1315, TN1316	—	—	—	—	—	—
55 *	TN1315, TN1316	—	—	—	—	—	—
56	TN1316	DATA SET	APPLIQUE 12A	—	—	—	—
60	TN922	TN1315, TN1316	—	—	—	—	—
61	TN922	TN1315, TN1316	—	—	—	—	—
62 †	TN1315, TN1316	—	—	—	—	—	—
63 †	TN1315, TN1316	—	—	—	—	—	—
64 †	TN1315, TN1316	—	—	—	—	—	—
65 †	TN1315, TN1316	—	—	—	—	—	—
66	TN1316	DATA SET	APPLIQUE 12A	—	—	—	—

* Phases 52 through 55 test link interface 0
† Phases 62 through 65 test link interface 1

TABLE F IRN SS7 SUSPECT HARDWARE							
FAILING PHASE	SUSPECT HARDWARE						
	FIRST	SECOND	THIRD	FOURTH	FIFTH	SIXTH	SEVENTH
01	UN303 UN303B	TN915,TN918, TN1506,TN1508, TN1509,TN1803	RING BUS CABLE	–	–	–	–
02	UN303 UN303B	TN915,TN918, TN1506,TN1508, TN1509,TN1803	RING BUS CABLE	–	–	–	–
10	UN303,UN303B	–	–	–	–	–	–
12	UN303 UN303B	TN915,TN918, TN1506,TN1508, TN1509,TN1803	–	–	–	–	–
13	UN303 UN303B	TN915,TN918, TN1506,TN1508, TN1509,TN1803	–	–	–	–	–
20	UN303,UN303B	–	–	–	–	–	–
21	UN303,UN303B	–	–	–	–	–	–
39	UN303,UN303B	–	–	–	–	–	–
40	TN916,TN917, TN917B	UN303 UN303B	–	–	–	–	–
41	TN916,TN917, TN917B	UN303 UN303B	–	–	–	–	–
47	TN916,TN917, TN917B	TN719	DATA SET	TN922	LINK CABLING	–	–
48	TF9	DATA SET	TN916,TN917, TN917B	TN922	LINK CABLING	–	–

TABLE G
IRN/IRN2 CPE SUSPECT HARDWARE

FAILING PHASE	SUSPECT HARDWARE						
	FIRST	SECOND	THIRD	FOURTH	FIFTH	SIXTH	SEVENTH
01	UN303B,UN304	TN915,TN918, TN1506,TN1508, TN1509,TN1803	RING BUS CABLE	–	–	–	–
02	UN303B,UN304	TN915,TN918, TN1506,TN1508, TN1509,TN1803	RING BUS CABLE	–	–	–	–
10	UN303B,UN304	–	–	–	–	–	–
12	UN303B,UN304	TN915,TN918, TN1506,TN1508, TN1509,TN1803	–	–	–	–	–
13	UN303B,UN304	TN915,TN918, TN1506,TN1508, TN1509,TN1803	–	–	–	–	–
20	UN303B,UN304	–	–	–	–	–	–
21	UN303B,UN304	–	–	–	–	–	–
29	TN69B	UN9,UN9B	–	–	–	–	–
39	TN914	TN69B	–	–	–	–	–
50	UN303B,UN304	UN1315 UN1316	–	–	–	–	–
51	UN303B,UN304	UN1315 UN1316	–	–	–	–	–
52	TN1315,TN1316	–	–	–	–	–	–
53	TN1315,TN1316	–	–	–	–	–	–
54	TN1315,TN1316	–	–	–	–	–	–
55	TN1315,TN1316	–	–	–	–	–	–

TABLE G (Contd)
IRN/IRN2 CPE SUSPECT HARDWARE

FAILING PHASE	SUSPECT HARDWARE						
	FIRST	SECOND	THIRD	FOURTH	FIFTH	SIXTH	SEVENTH
56	TN1316	DATA SET	APPLIQUE 12A	—	—	—	—
60	UN303B,UN304	TN1315,TN1316	—	—	—	—	—
61	UN303B,UN304	TN1315,TN1316	—	—	—	—	—
62	TN1315,TN1316	—	—	—	—	—	—
63	TN1315,TN1316	—	—	—	—	—	—
64	TN1315,TN1316	—	—	—	—	—	—
65	TN1315,TN1316	—	—	—	—	—	—
66	TN1316	DATA SET	APPLIQUE 12A	—	—	—	—

TABLE H
IRN DLNE/DLN30 SUSPECT HARDWARE

FAILING PHASE	SUSPECT HARDWARE						
	FIRST	SECOND	THIRD	FOURTH	FIFTH	SIXTH	SEVENTH
01	UN303B/ UN304	TN915,TN918, TN1508, TN1803	RING BUS CABLE	–	–	–	–
02	UN303B/ UN304	TN915,TN918, TN1508, TN1803	RING BUS CABLE	–	–	–	–
10	UN303B/UN304	–	–	–	–	–	–
12	UN303B/ UN304	TN915*,TN918, TN1508,TN1803	–	–	–	–	–
13	UN303B/ UN304	TN915*,TN918, TN1508,TN1803	–	–	–	–	–
20	UN303B/UN304	–	–	–	–	–	–
21*	UN303B	–	–	–	–	–	–
30	TN69B	UN9,UN9B	–	–	–	–	–
31	TN914	TN69B	–	–	–	–	–
32	TN914	UN303B/UN304	–	–	–	–	
33	TN914	UN303B/UN304	–	–	–	–	–
34	TN69B	UN9,UN9B	–	–	–	–	–
35	TN914	UN303B/UN304	–	–	–	–	–
40	TN1630B	–	–	–	–	–	–
41	TN1630*/TN1630B**	–	–	–	–	–	–
42	TN1630*/TN1630B**	–	–	–	–	–	–
43	TN1630B	–	–	–	–	–	–

* Applicable for DLNE only
** Applicable for DLN30 only

TABLE H (Contd) IRN DLNE/DLN30 SUSPECT HARDWARE							
FAILING PHASE	SUSPECT HARDWARE						
	FIRST	SECOND	THIRD	FOURTH	FIFTH	SIXTH	SEVENTH
41	TN1630	—	—	—	—	—	—
42	UN303B/ UN304	TN1630	—	—	—	—	—

[1] Identify failing phases on diagnostic printout [Figure 1]

AND

[2] Locate failing phase and identify circuitry tested [TABLE A, Page 2]

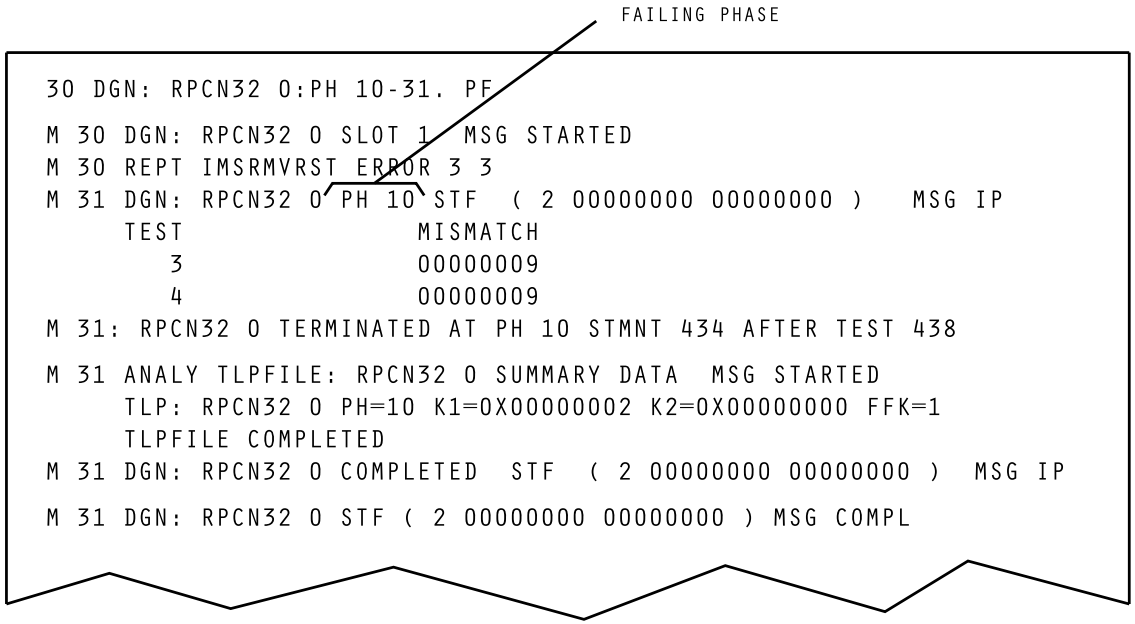


Figure 1 – Sample Printout of Failing Diagnostic Phase

IDENTIFY RPCN CIRCUITRY TESTED BY FAILING PHASE

TABLE A RPCN DIAGNOSTIC PHASES	
FAILING PHASE	**DESCRIPTION OF CIRCUITRY TESTED**
01	Tests that a message can be relayed from the BISO node to the EISO node via the isolated segement over ring 0/. Phase 1 also tests that any interframe buffers and all SSI boards (or IRN boards) in the isolated segment are equipped in accordance with ECD data, and that any interframe buffers in the isolated segment exhibit the proper data storage capacity.
02	Tests that a message can be relayed from the EISO node to the BISO node via the isolated segment over ring 1. Phase 2 also tests that any interframe buffers and all SSI boards (or IRN boards) in the isolated segment are equipped in accordance with ECD data, and that any interframe buffers in the isolated segment exhibit the proper data storage capacity.
10	Tests interface between DSCH and DDSBS
11	Tests interface between DDSBS and 3BI
12	Verifies that RAC 0 can detect bad polarity in ring message.
13	Verifies that RAC 1 can detect bad polarity in ring message.
14	Performs off-line CU to DDSBS tests (demand phase only)
20	Tests NP RAM memory, NP parity checker and generator circuitry
21	Performs diagnostics on RP of IRN circuit packs
23	Tests NP parity checker and generator circuitry
24	Tests NP programmable master and slave interrupt controllers and associated circuitry
26	Tests NP programmable Direct Memory Access Controller and associated circuitry
27	Tests NP programmable interval timer circuitry

TABLE A (Contd) RPCN DIAGNOSTIC PHASES	
FAILING PHASE	**DESCRIPTION OF CIRCUITRY TESTED**
30	Tests part of both RAC circuits, and RAC to NP interface. Partially tests interface between both RACs and ring bus.
31	Makes additional tests of interface between both RACs and ring bus
32	Verifies that RAC0/ can detect bad parity in a ring message
33	Verifies that RAC1 can detect bad parity in a ring message
39*	Verifies ability of node to read, write, and propagate a maximum length message (demand only phase for transition load)
* SSI cabinet only	

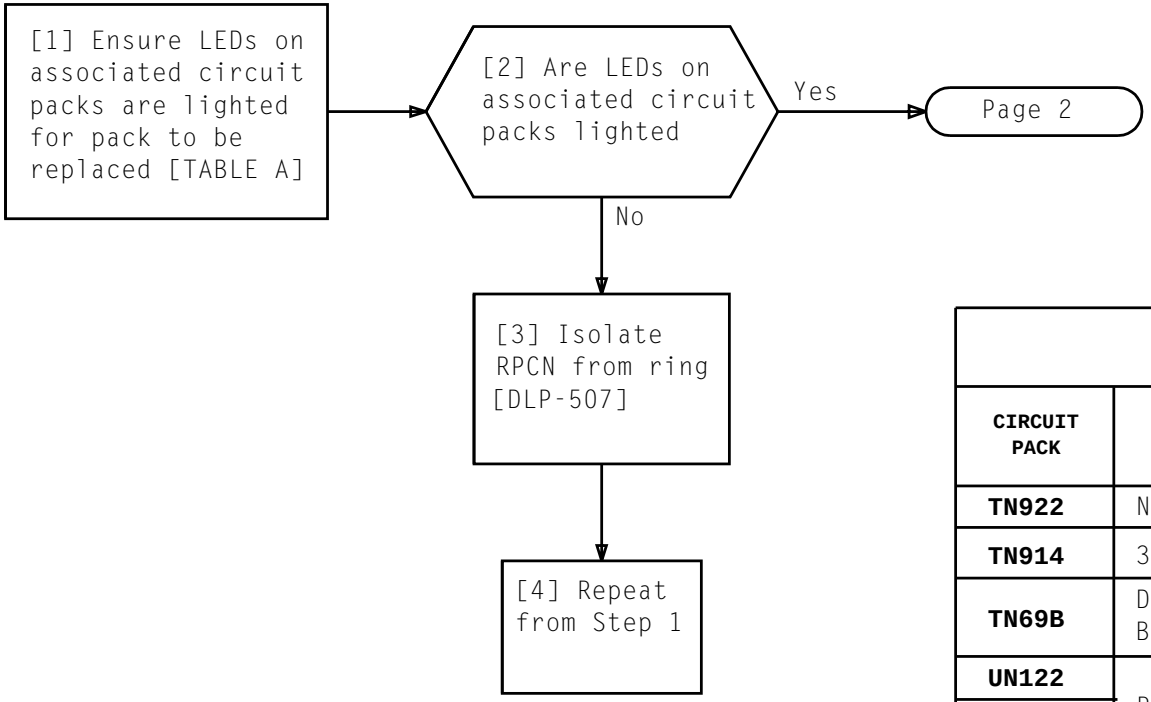
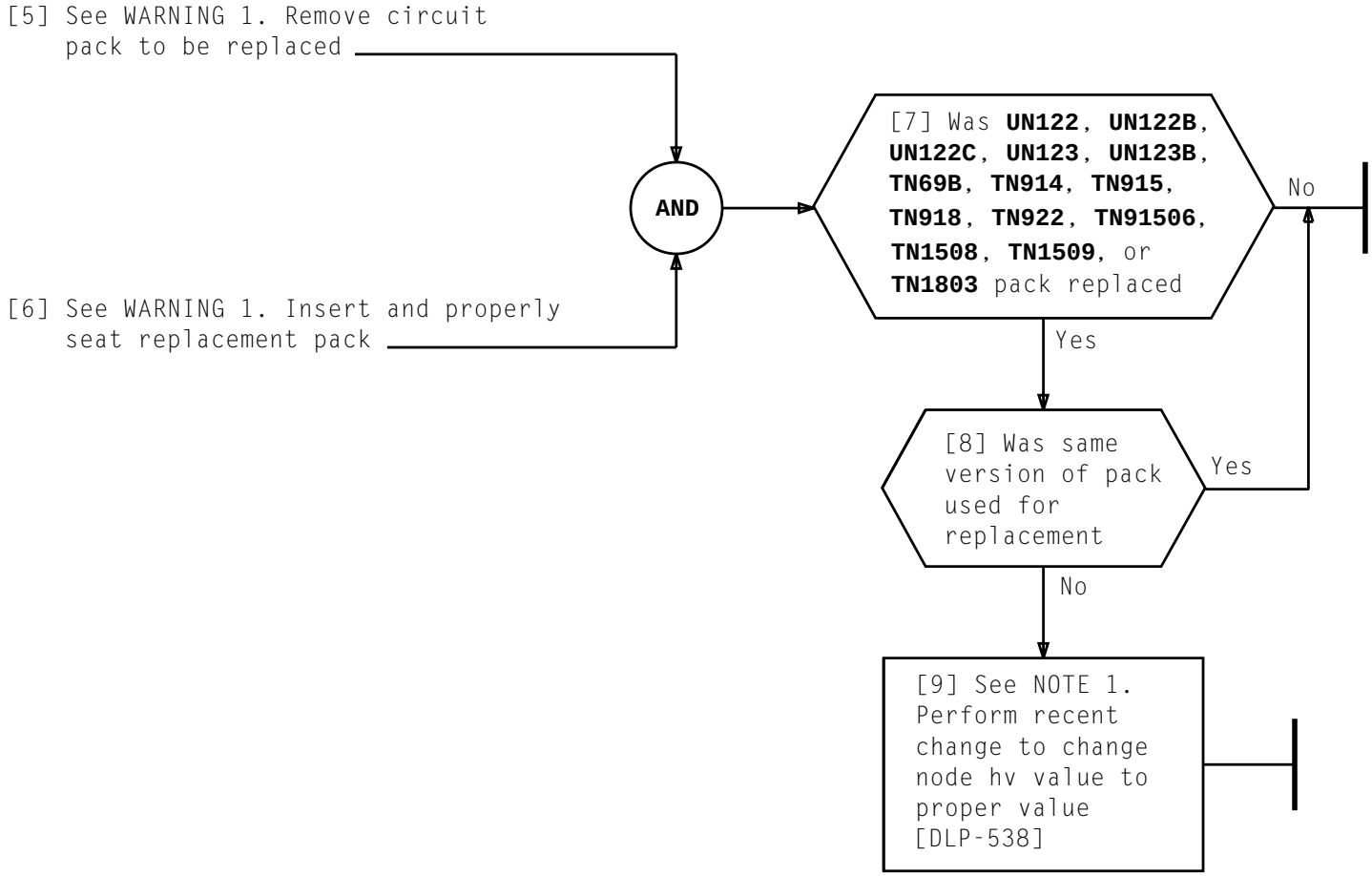


TABLE A
CIRCUIT PACKS

CIRCUIT PACK	FUNCTION	LED STATUS ON ASSOCIATED CIRCUIT PACKS
TN922	Node Processor (NP)	**RQ** LED on; **TN922** or **NT** LED on; **UN123** or **UN123B** lighted
TN914	3B Interface (3BI)	
TN69B	Duplex Dual Serial Bus Selector (DDSBS)	
UN122	Ring Interface O/ (RIO/)	**NT** LED on; **UN123** or **UN123B** lighted
UN122B		
UN122C		
UN123	Ring Interface 1 (RI1)	
UN123B		
TN915 **TN918** **TN1506** **TN1508** **TN1509** **TN1803**	Interface Buffer (IFB)	**NT** LED on; associated **UN123. UN123B** or **NT** LED on; **UN123** or **UN123B** of neighbor node in adjacent frame lighted

REPLACE CIRCUIT PACK, RING PERIPHERAL CONTROLLER NODE (RPCN)



NOTE 1
If IFB pack is being replaced, the two IFB packs that make up a pair must be of the same version

WARNING 1
It should be assumed that all circuit packs containing solid-state electronic components can be damaged by electrostatic discharge. When handling circuit packs and working in the backplane area, a grounded antistatic wrist strap (R-4987 or equivalent) must be worn. The strap should be connected to ground common to circuit pack ground. When appropriate wrist strap is not available, grounded (exposed) metal should be touched before handling circuit pack. An unprotected circuit pack should never be passed to an ungrounded person nor touch components, leads, nor connector pins

REPLACE CIRCUIT PACK, RING PERIPHERAL CONTROLLER NODE (RPCN)

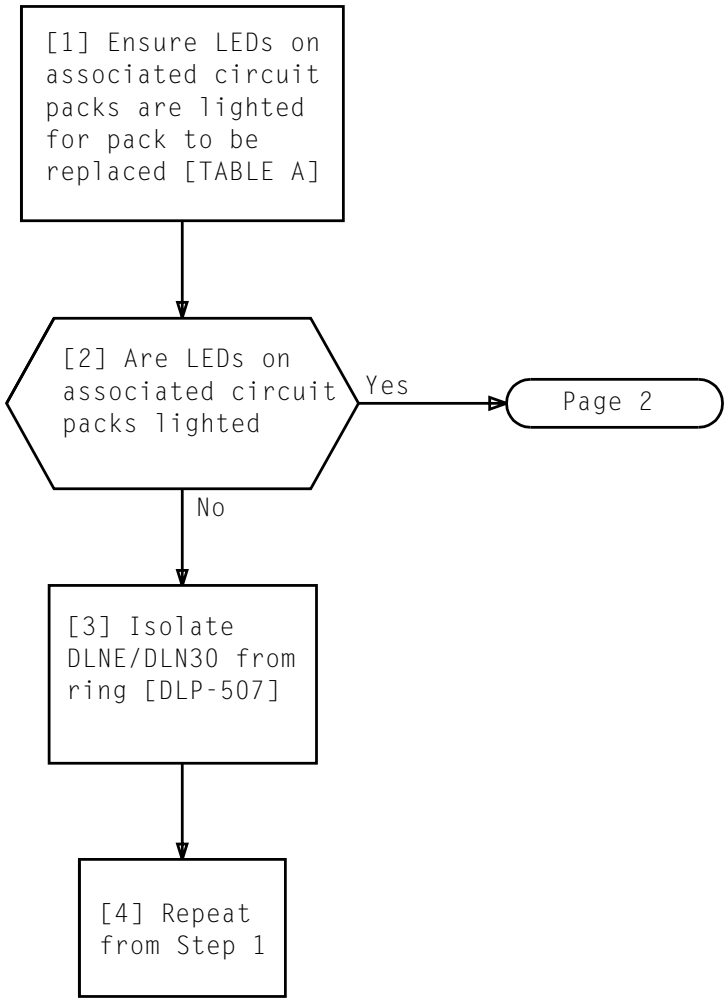
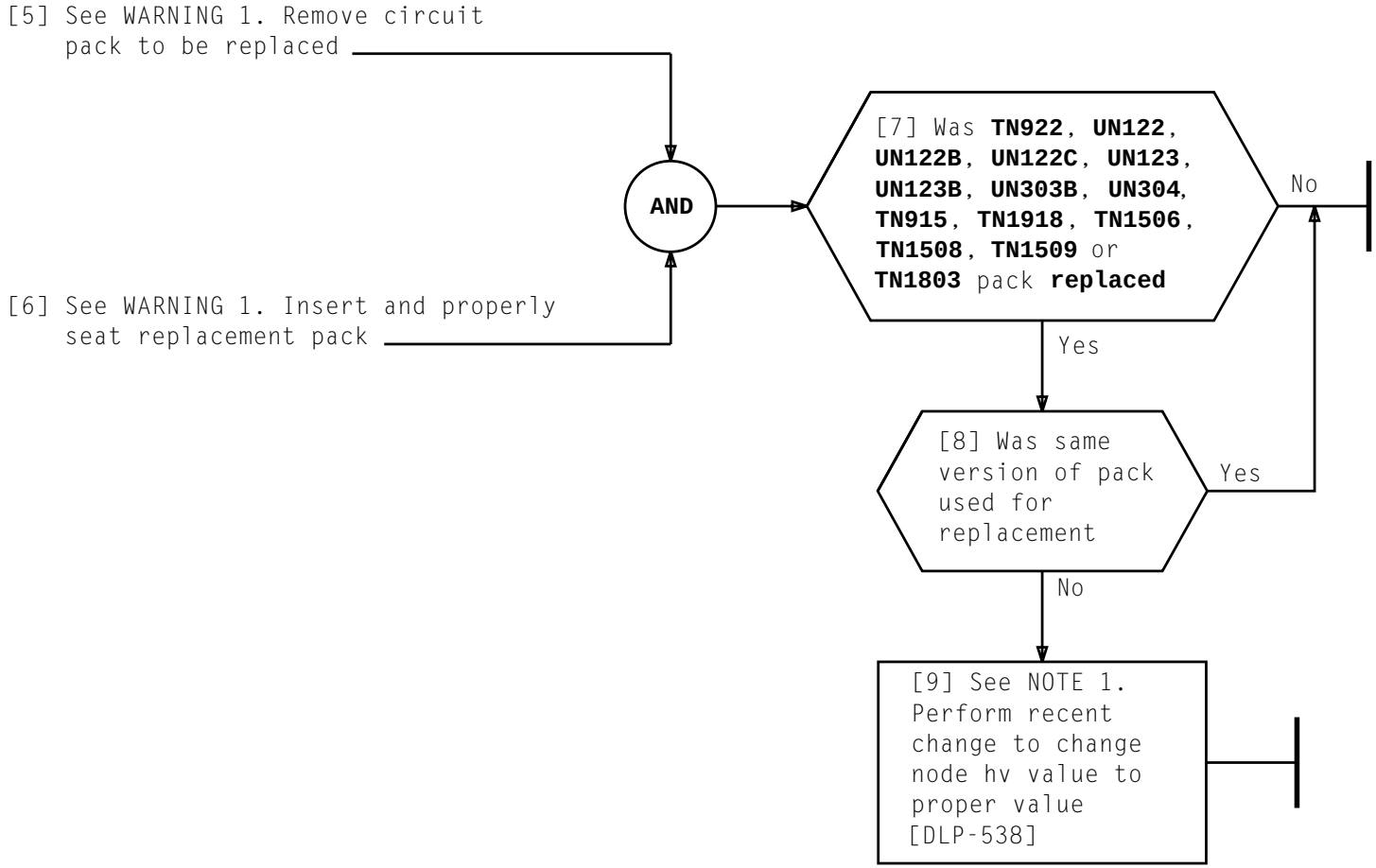


TABLE A
CIRCUIT PACKS

CIRCUIT PACK	FUNCTION	LED STATUS ON ASSOCIATED CIRCUIT PACKS
TN922	Node Processor (NP)	**NT** LED on; **UN123** or **UN123B** lighted
UN303B/ UN304	Integrated Ring Node (IRN)	–
UN122	Ring Interface 0/ (RIO/)	**NT** LED on; **UN123** or **UN123B** lighted
UN122B		
UN122C		
UN123	Ring Interface 1 (RI1)	
UN123B		
TN915 TN918 TN1506 TN1508 TN1509 TN1803	Interface Buffer (IFB)	**NT** LED on; associated **UN123**, **UN123B** or **NT** LED on; **UN123** or **UN123B** of neighbor node in adjacent frame lighted

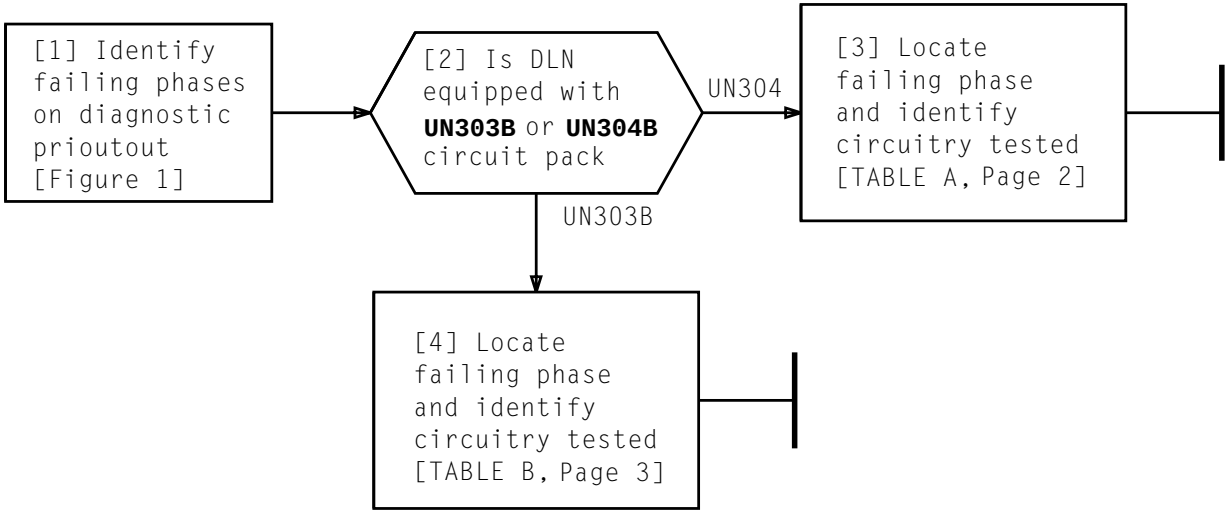
REPLACE CIRCUIT PACK, DLNE/DLN30



NOTE 1
If IFB pack is being replaced, the two IFB packs that make up a pair must be of the same version

WARNING 1
It should be assumed that all circuit packs containing solid-state electronic components can be damaged by electrostatic discharge. When handling circuit packs and working in the backplane area, a grounded antistatic wrist strap (R-4987 or equivalent) MUST be worn. The strap should be connected to ground common to circuit pack ground. When appropriate wrist strap is not available, grounded (exposed) metal should be touched before handling circuit pack. An unprotected circuit pack should never be passed to an ungrounded person nor touch components, leads, nor connector pins

REPLACE CIRCUIT PACK, DLNE/DLN30



FAILING PHASE

```
30 DGN: RPCN32 0:PH 10-31. PF

M 30 DGN: RPCN32 0 SLOT 1  MSG STARTED
M 30 REPT IMSRMVRST ERROR 3 3
M 31 DGN: RPCN32 0 PH 10 STF  ( 2 00000000 00000000 )   MSG IP
     TEST               MISMATCH
        3               00000009
        4               00000009
M 31: RPCN32 0 TERMINATED AT PH 10 STMNT 434 AFTER TEST 438

M 31 ANALY TLPFILE: RPCN32 0 SUMMARY DATA  MSG STARTED
     TLP: RPCN32 0 PH=10 K1=0X00000002 K2=0X00000000 FFK=1
     TLPFILE COMPLETED
M 31 DGN: RPCN32 0 COMPLETED  STF  ( 2 00000000 00000000 )  MSG IP

M 31 DGN: RPCN32 0 STF ( 2 00000000 00000000 ) MSG COMPL
```

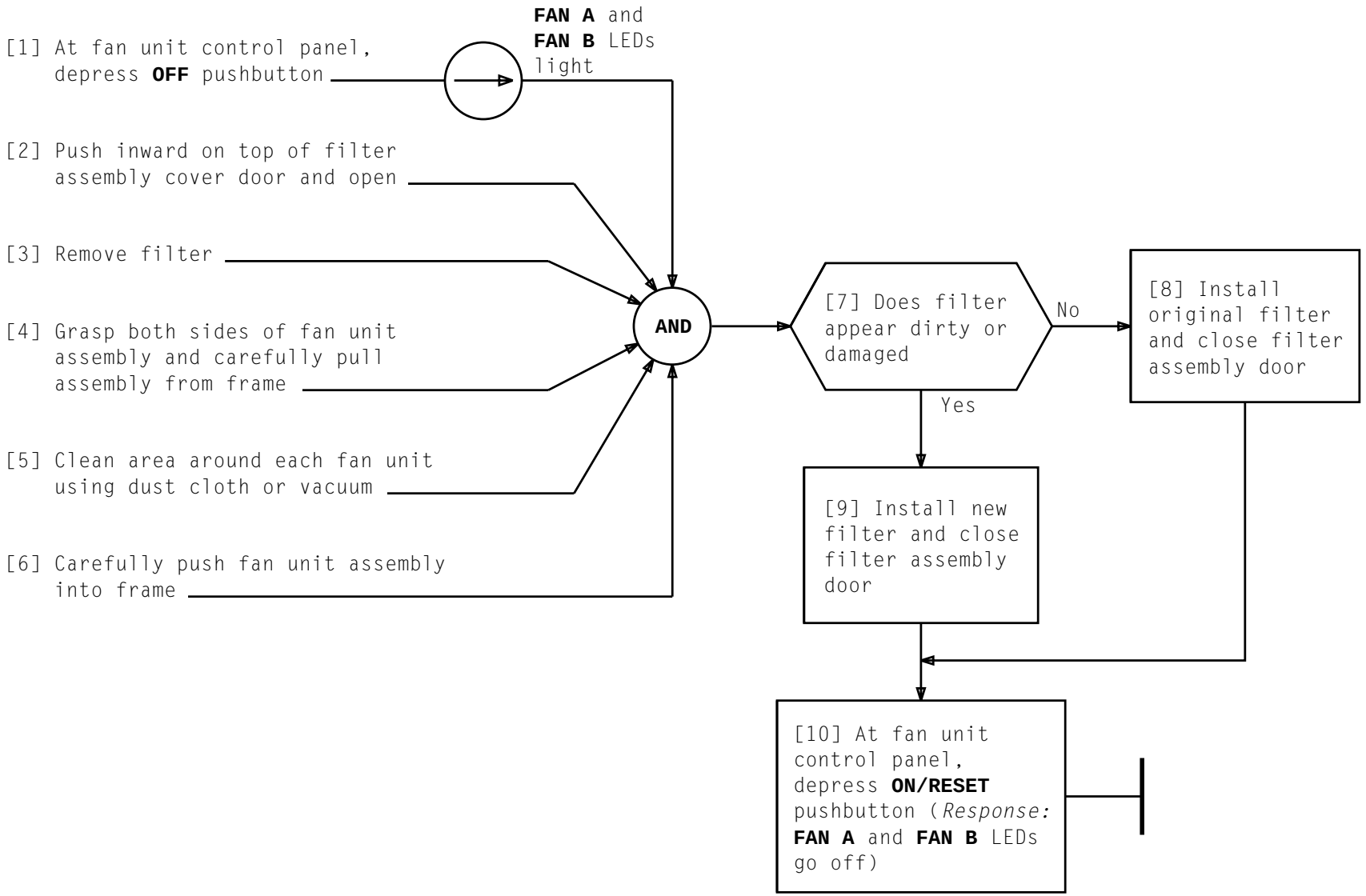
Figure 1 – Sample Printout of Failing Diagnostic Phase

IDENTIFY DIRECT LINK NODE DLNE/DLN30 CIRCUITRY TESTED BY FAILING PHASE

TABLE A
UN304 DIAGNOSTIC PHASES

FAILING PHASE	DESCRIPTION OF CIRCUITRY TESTED
01	Tests that each node in isolated segment is able to set and clear its data selector via hardware commands at RAC0/. Phase 1 also tests that a message can be relayed from BIS0 node to EIS0 node via isolated segment over ring 0/, and that any interframe buffers in isolated segment are equipped in accordance with ECD data and exhibits proper data storage capacity.
02	Tests that each node in isolated segment is able to set and clear its data selector via hardware commands at RAC1. Phase 2 also tests that a message can be relayed from EIS0 node to BIS0 node via isolated segment over ring 1, and that any interframe buffers in isolated segment are equipped in accordance with ECD data and exhibits proper data storage capacity.
10	Tests the ring interface (RI) circuitry of the integrated ring node (IRN2) circuit pack.
12	Verifies that RAC0/ can detect bad parity in a ring message.
13	Verifies that RAC1 can detect bad parity in a ring message.
20	Tests NP RAM memory.
30	Tests interface between DSCH and DDSBS.
31	Tests interface between DDSBS and 3B1.
32	Tests ability of NP to go "insane" and set "Interrupt Request Flag" when 3BI has an error.
33	Tests interface between 3B1 and NP.
34	Performs off-line CU to DDSBS tests (demand phase only).
35	Coorperates with 3B20D driver to test DMA capability via 3B1.
40	Tests the share static memory in the AP30 from the IRN2.
41	Tests the shared static memory form the AP30 side.
42	Tests interface between DMA and 3B1.
43	Tests the four D-Channel data links on the AP30

TABLE B UN303B DIAGNOSTIC PHASES	
FAILING PHASE	**DESCRIPTION OF CIRCUITRY TESTED**
01	Tests that each node in isolated segment is able to set and clear its data selector via hardware commands at RAC0/. Phase 1 also tests that a message can be relayed from BIS0 node to EIS0 node via isolated segment over ring 0/, and that any interframe buffers in isolated segment are equipped in accordance with ECD data and exhibits proper data storage capacity.
02	Tests that each node in isolated segment is able to set and clear its data selector via hardware commands at RAC1. Phase 2 also tests that a message can be relayed from EIS0 node to BIS0 node via isolated segment over ring 1, and that any interframe buffers in isolated segment are equipped in accordance with ECD data and exhibits proper data storage capacity.
10	Tests the ring interface (RI) circuitry of the integrated ring node (IRN2) circuit pack.
12	Verifies that RAC0/ can detect bad parity in a ring message.
13	Verifies that RAC1 can detect bad parity in a ring message.
20	Tests NP RAM memory.
21	Tests the NP programmable master and slave interrupt controllers and associated circuitry. Also tests the NP programmable interval timer circuitry.
30	Tests interface between DSCH and DDSBS.
31	Tests interface between DDSBS and 3BI.
32	Tests ability of NP to go "insane" and set "Interrupt Request Flag" when 3BI has an error.
33	Tests interface between 3BI and NP.
34	Performs off-line CU to DDSBS tests (demand phase only).
35	Coorperates with 3B20D driver to test DMA capability via 3BI.
40	Tests the share static memory in the AP30 form the IRN2.
41	Tests the sanity of microprocessor and ROM.
42	Tests interface between DMA and 3BI.
43	Tests the four D-Channel data links on the AP30



INSPECT AND CLEAN FAN FILTER ASSEMBLY

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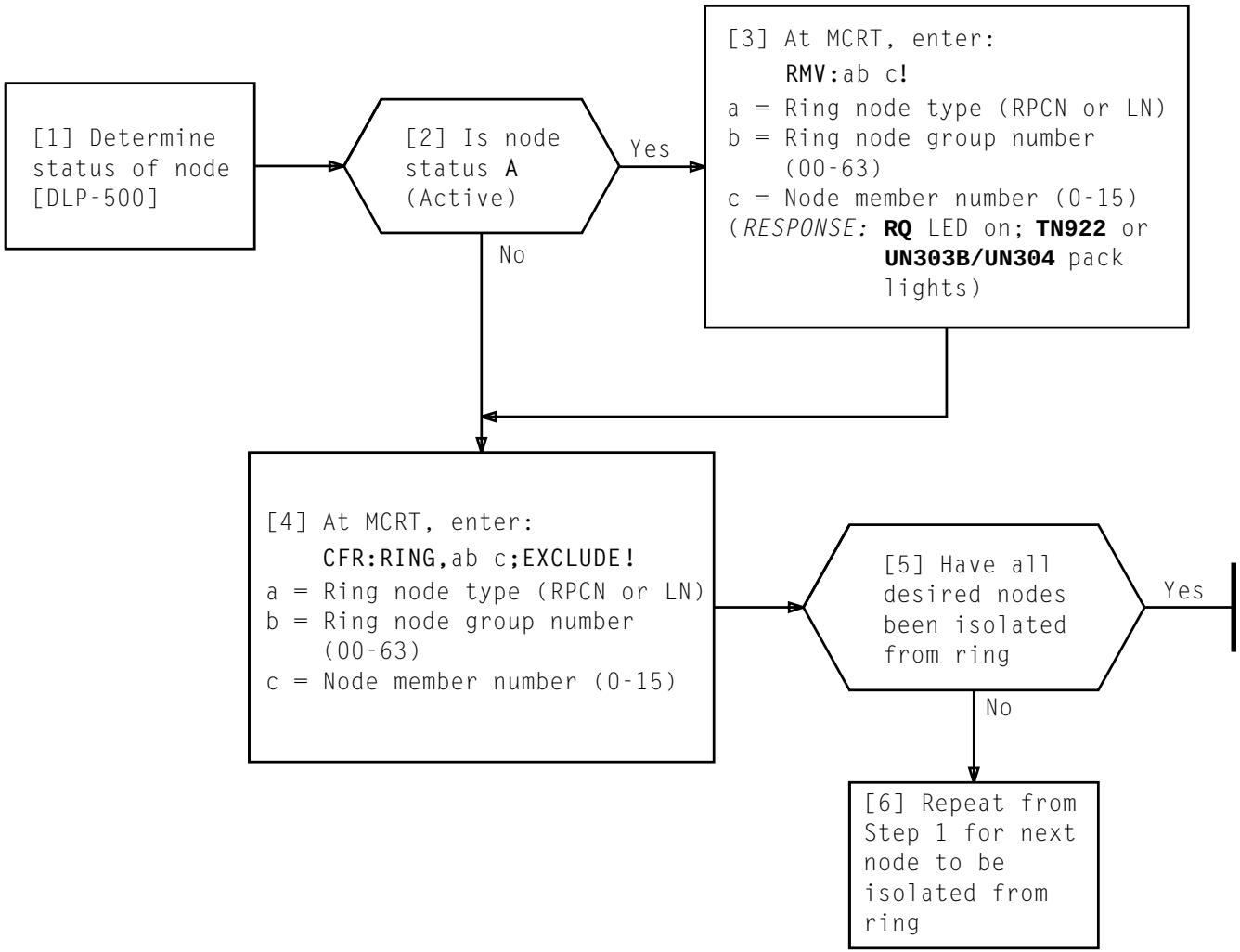
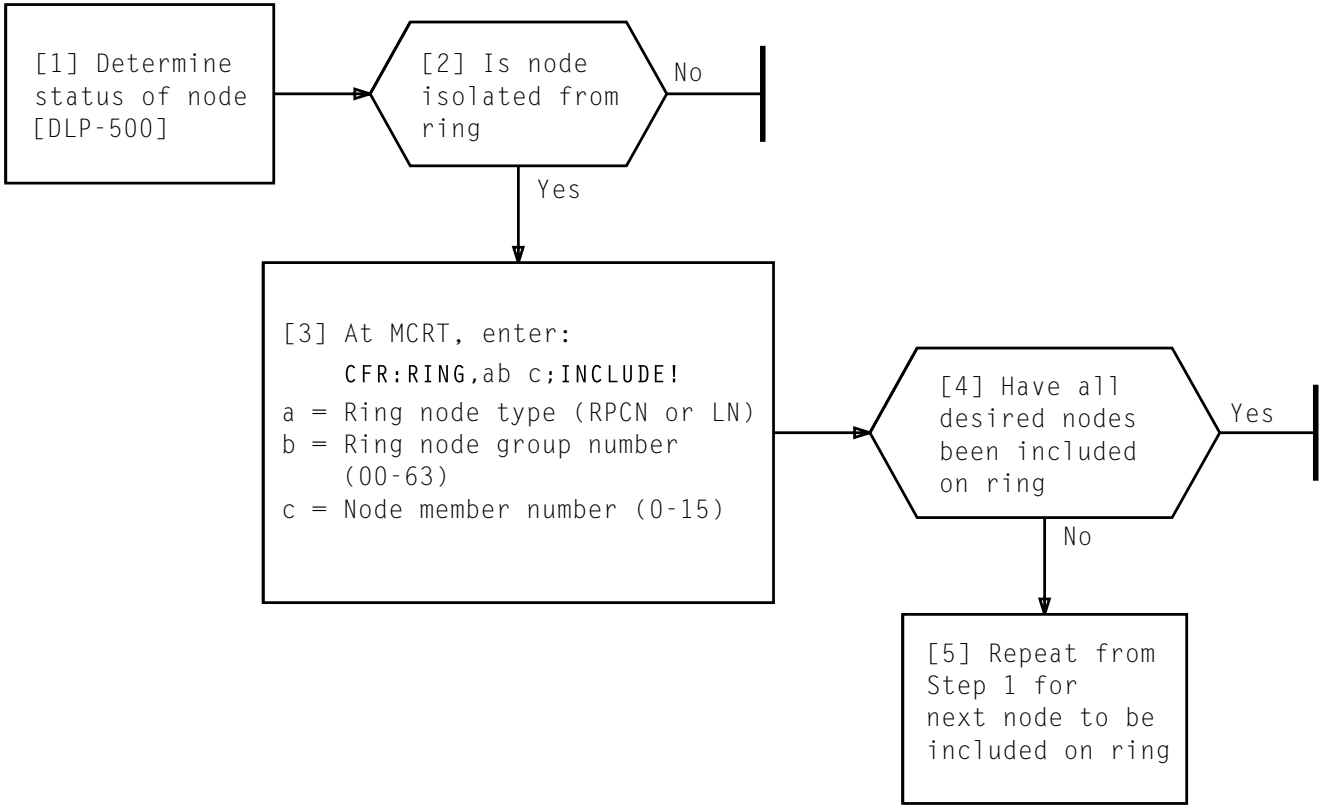


ISOLATE NODE FROM RING



INCLUDE NODE ON RING

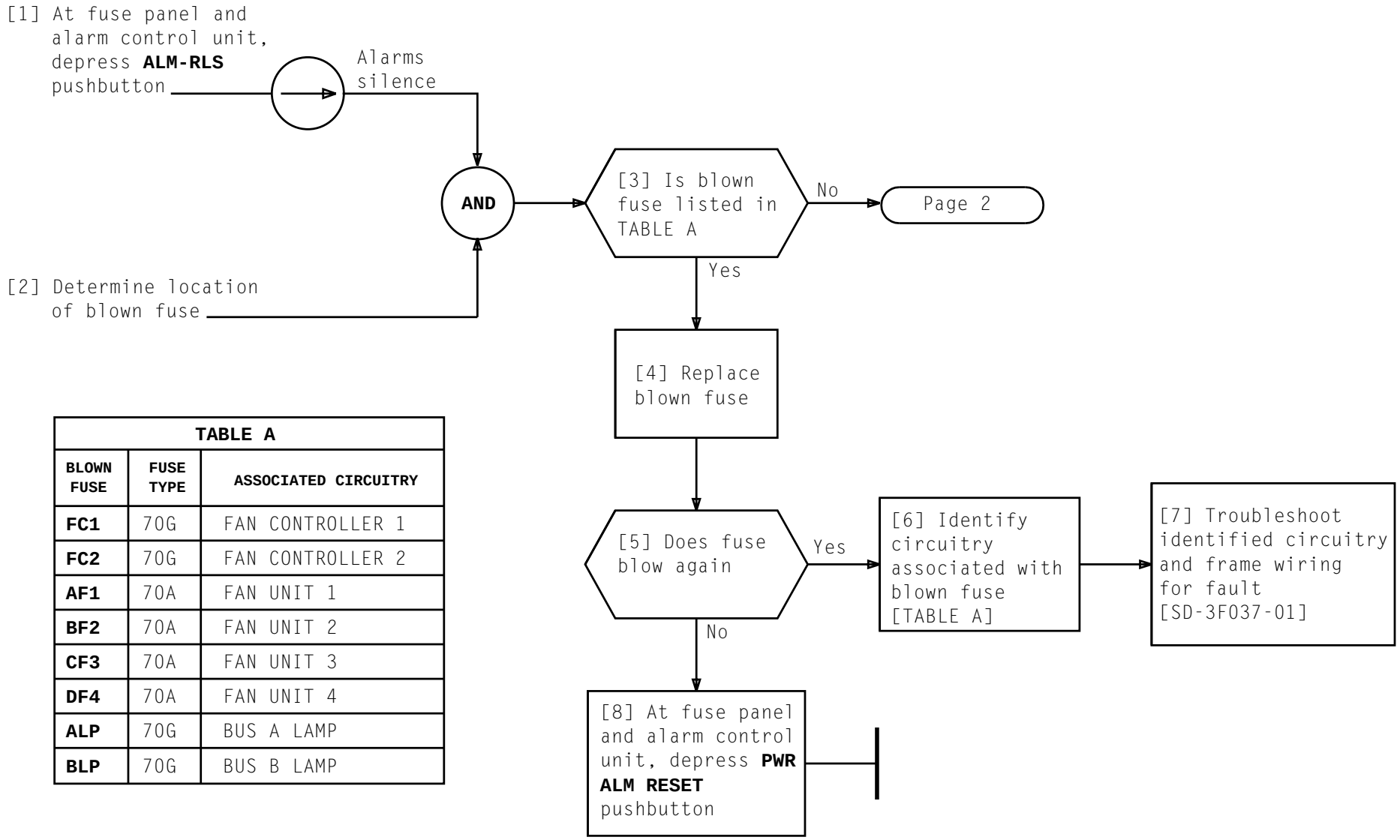


TABLE A		
BLOWN FUSE	**FUSE TYPE**	**ASSOCIATED CIRCUITRY**
FC1	70G	FAN CONTROLLER 1
FC2	70G	FAN CONTROLLER 2
AF1	70A	FAN UNIT 1
BF2	70A	FAN UNIT 2
CF3	70A	FAN UNIT 3
DF4	70A	FAN UNIT 4
ALP	70G	BUS A LAMP
BLP	70G	BUS B LAMP

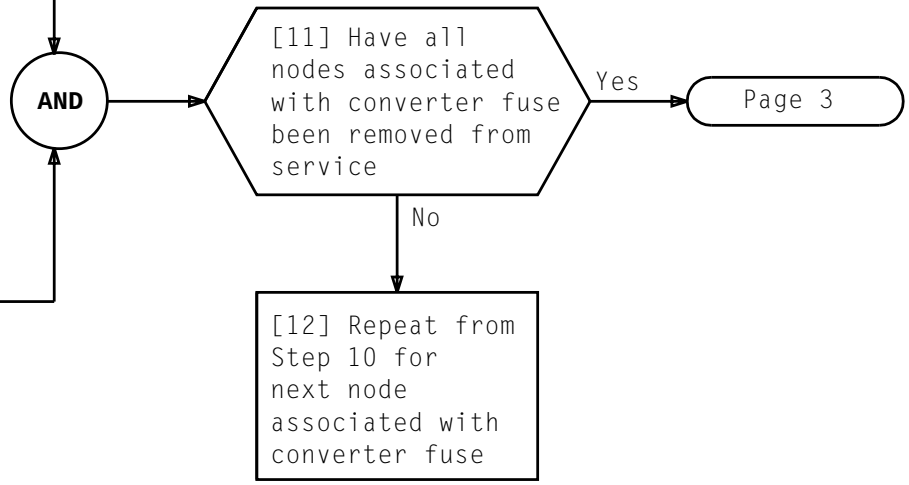
REPLACE BLOWN FUSE — RING NODE CABINET

[9] See NOTE 1. Identify nodes associated with FA power converter fuse

[10] For nodes associated with FA power converter fuse— at MCRT, enter:

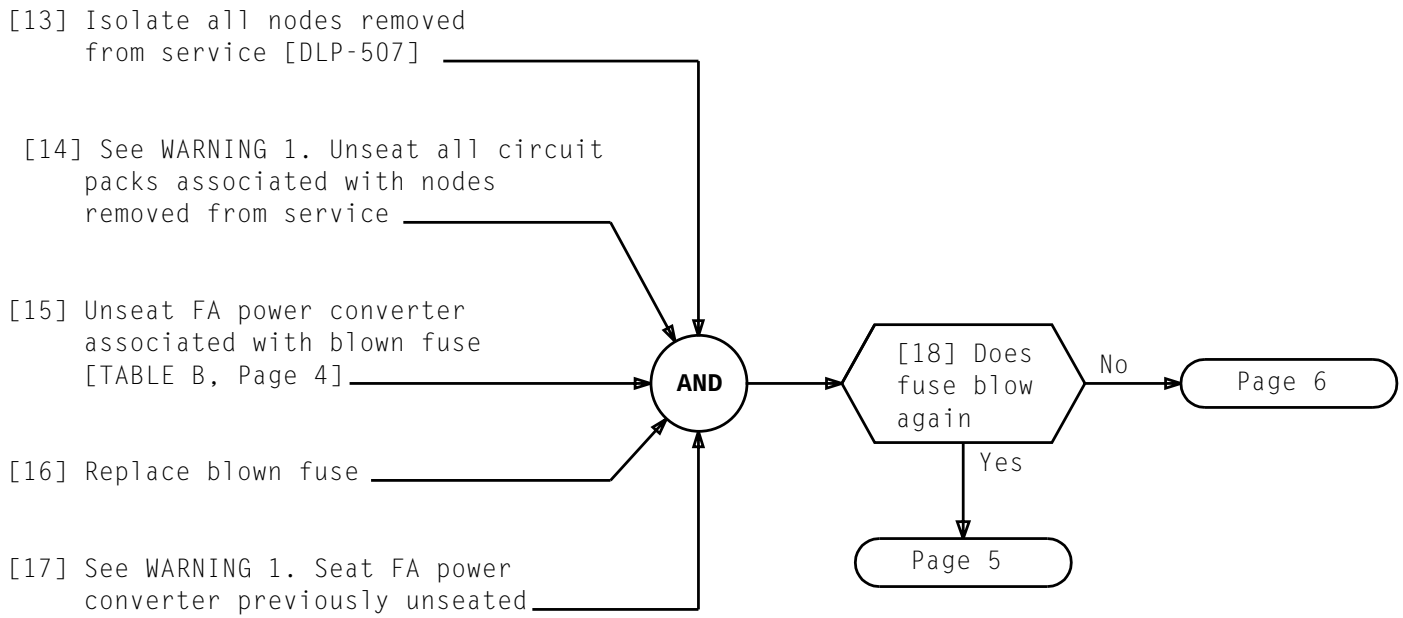
RMV:ab c!

a = Ring node type (RPCN or LN)
b = Ring node group number (00-63)
c = Node member number (0-15)



NOTE 1
Two FA power converters supply power to each LN shelf unit. One converter supplies power for one-half the shelf unit and the other converter supplies power to other half. With this arrangement, it is possible that some LNs are powered by both converters

REPLACE BLOWN FUSE — RING NODE CABINET

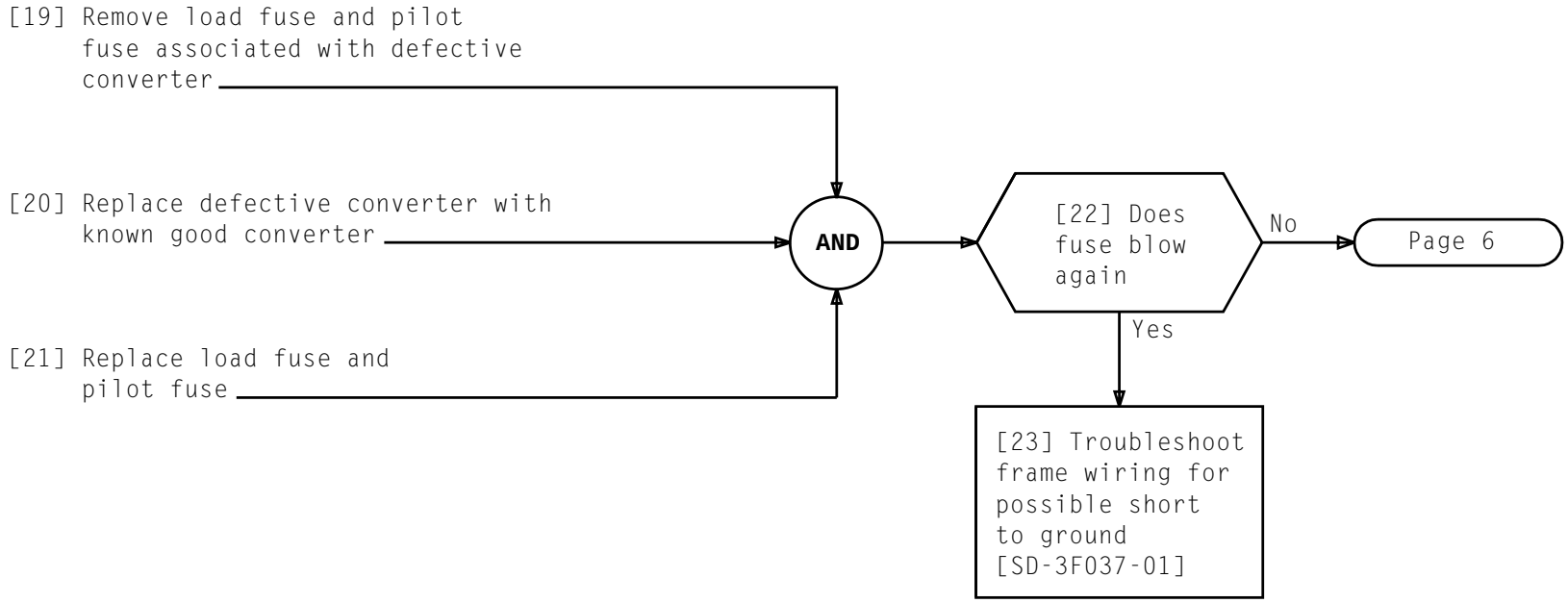


WARNING 1

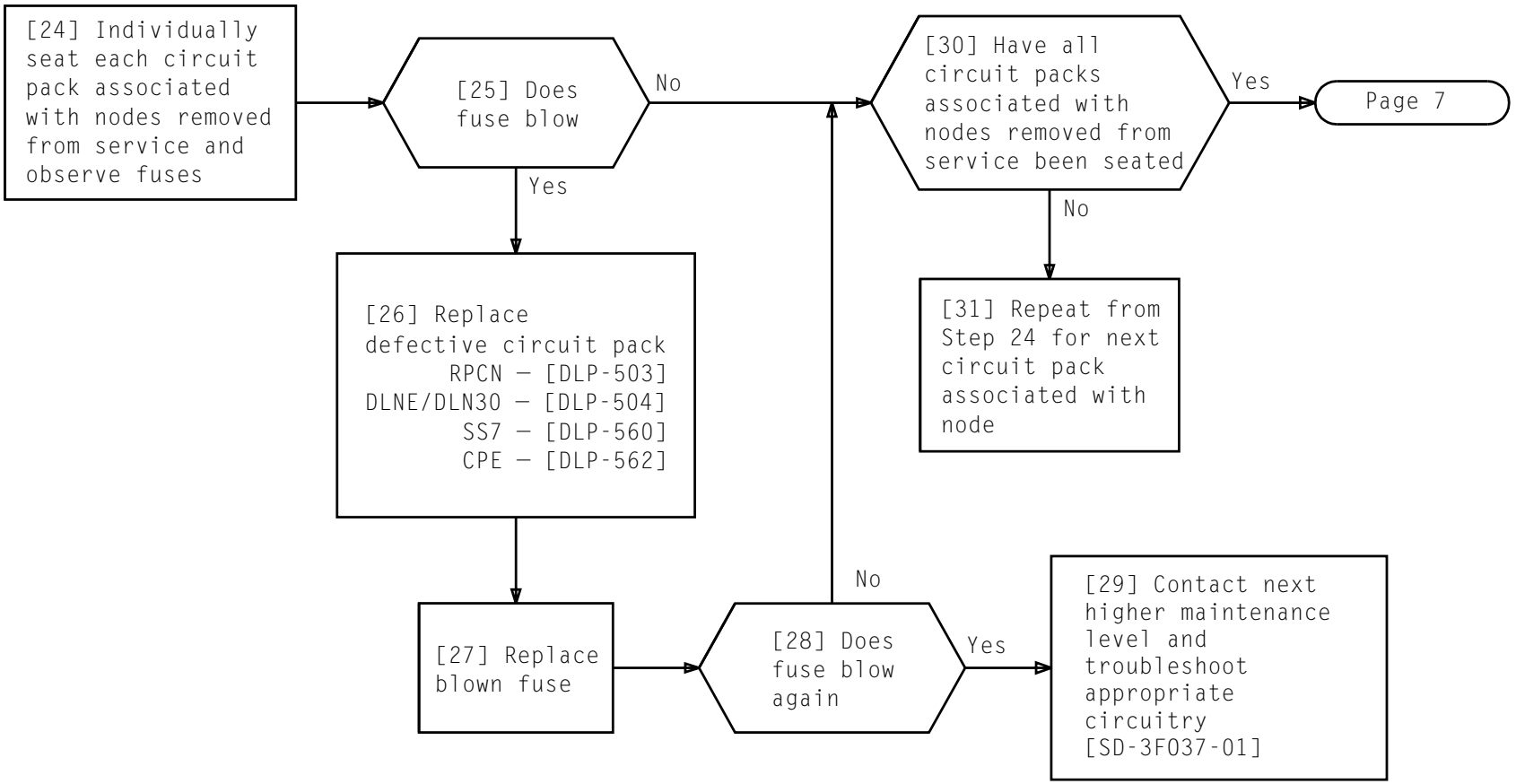
It should be assumed that all circuit packs containing solid-state electronic components can be damaged by electrostatic discharge. When handling circuit packs and working in the backplane area, a grounded antistatic wrist strap (R-4987 or equivalent) must be worn. The strap should be connected to ground common to circuit pack ground. When appropriate wrist strap is not available, grounded (exposed) metal should be touched before handling circuit pack. An unprotected circuit pack should never be passed to an ungrounded person nor touch components, leads, nor connector pins

REPLACE BLOWN FUSE — RING NODE CABINET

TABLE B FA POWER CONVERTER FUSE LOCATIONS					
BLOWN FUSE	FUSE TYPE	LINK NODE SHELF	RN CABINET 00 OR 32 CONVERTER HORIZONTAL LOCATION	ILN OR HDB CABINET CONVERTER HORIZONTAL LOCATION	FUSE FUNCTION
M00	70G	0	010	015	PILOT
M01	70G	0	170	032	
A00	74D	0	010	015	LOAD
A01	74D	0	170	032	
M10	70G	1	010	015	PILOT
M11	70G	1	170	032	
B10	74D	1	010	015	LOAD
B11	74D	1	170	032	
M20	70G	2	010	015	PILOT
M21	70G	2	170	032	
C20	74D	2	010	015	LOAD
C21	74D	2	170	032	
M30	70G	3	010	015	PILOT
M31	70G	3	170	032	
D30	74D	3	010	015	LOAD
D31	74D	3	170	032	
M40	70G	4	010	015	PILOT
M41	70G	4	170	032	
E40	74D	4	010	015	LOAD
E41	74D	4	170	032	
M50	70G	5	010	015	PILOT
M51	70G	5	170	032	
F50	74D	5	010	015	LOAD
F51	74D	5	170	032	



REPLACE BLOWN FUSE — RING NODE CABINET



REPLACE BLOWN FUSE – RING NODE CABINET

[32] At fuse panel and alarm control unit, depress **PWR ALM RESET** pushbutton

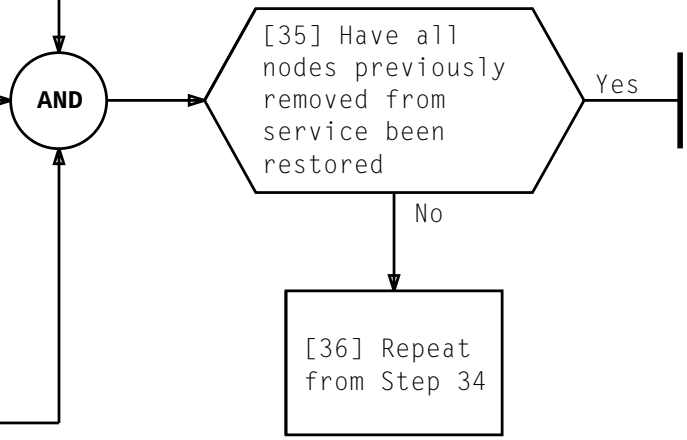
[33] Include previously isolated nodes on ring [DLP-508]

[34] At MCRT, enter:

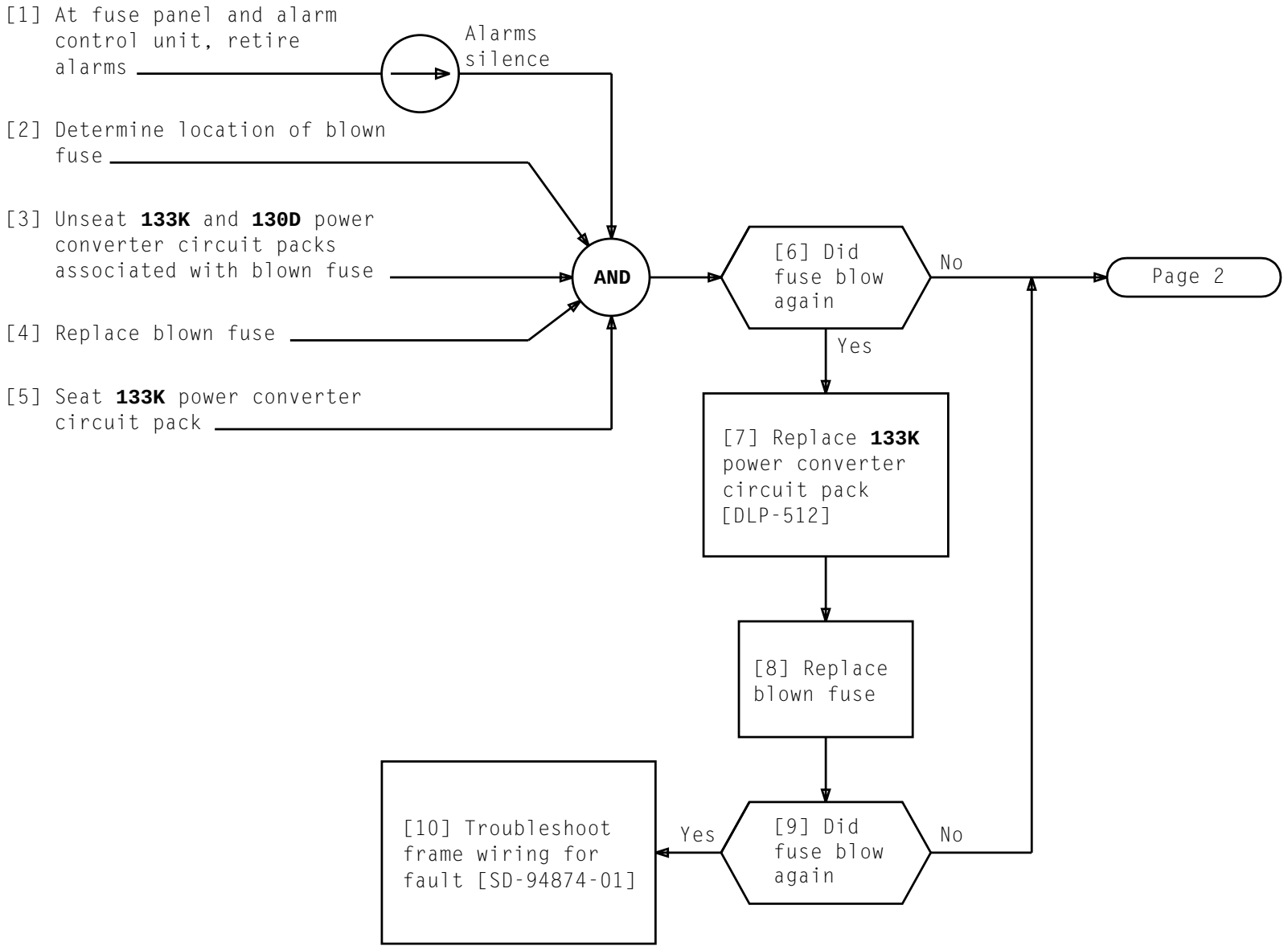
RST:a;UCL!

for nodes previously removed from service

a = **RPCN**xx **O**
LNxx y
xx = Ring node group number (00-63)
y = Node member number (1-15)



REPLACE BLOWN FUSE — RING NODE CABINET



REPLACE BLOWN FUSE — ANALOG FACILITY ACCESS (AFA) CABINET

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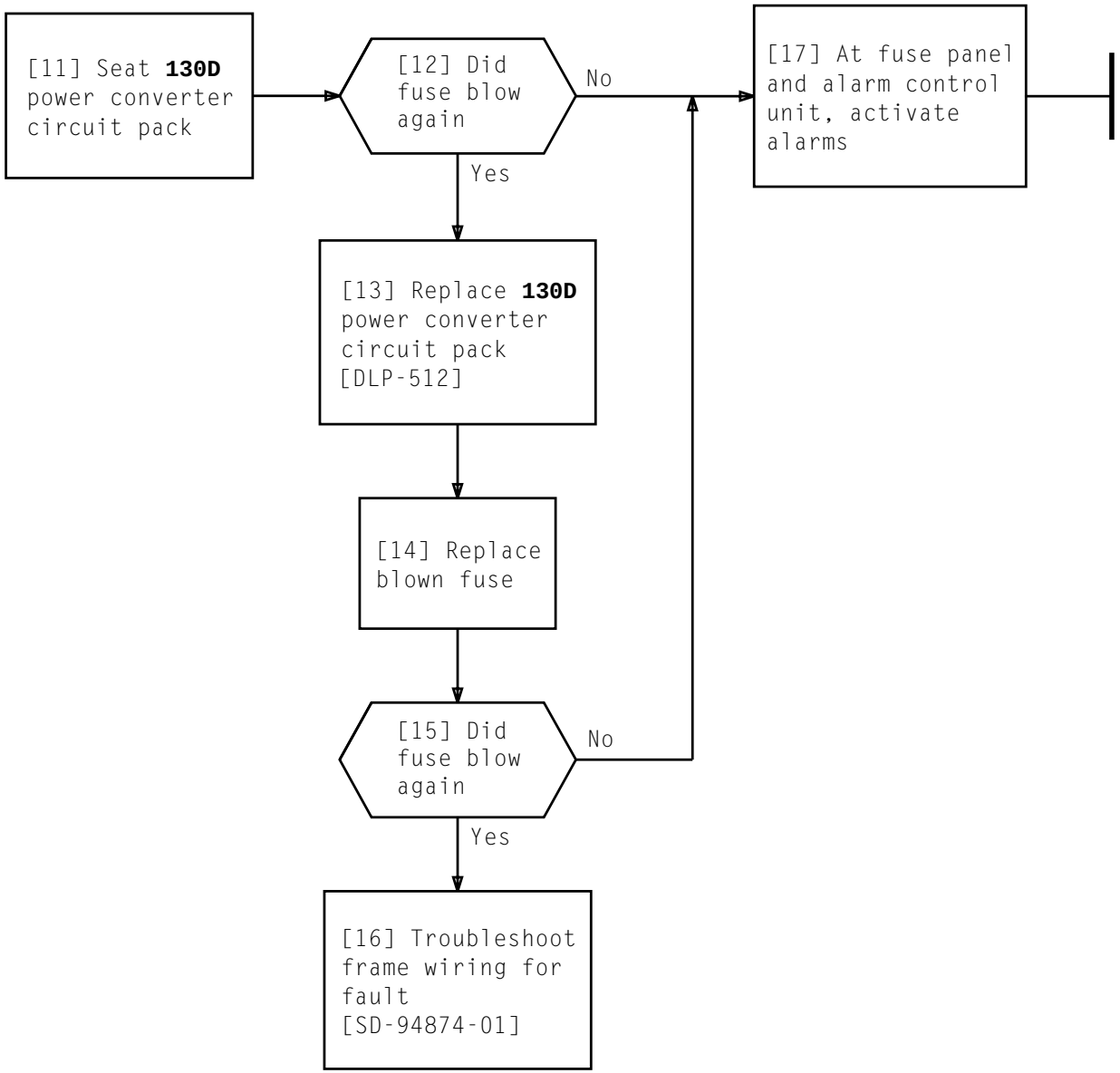
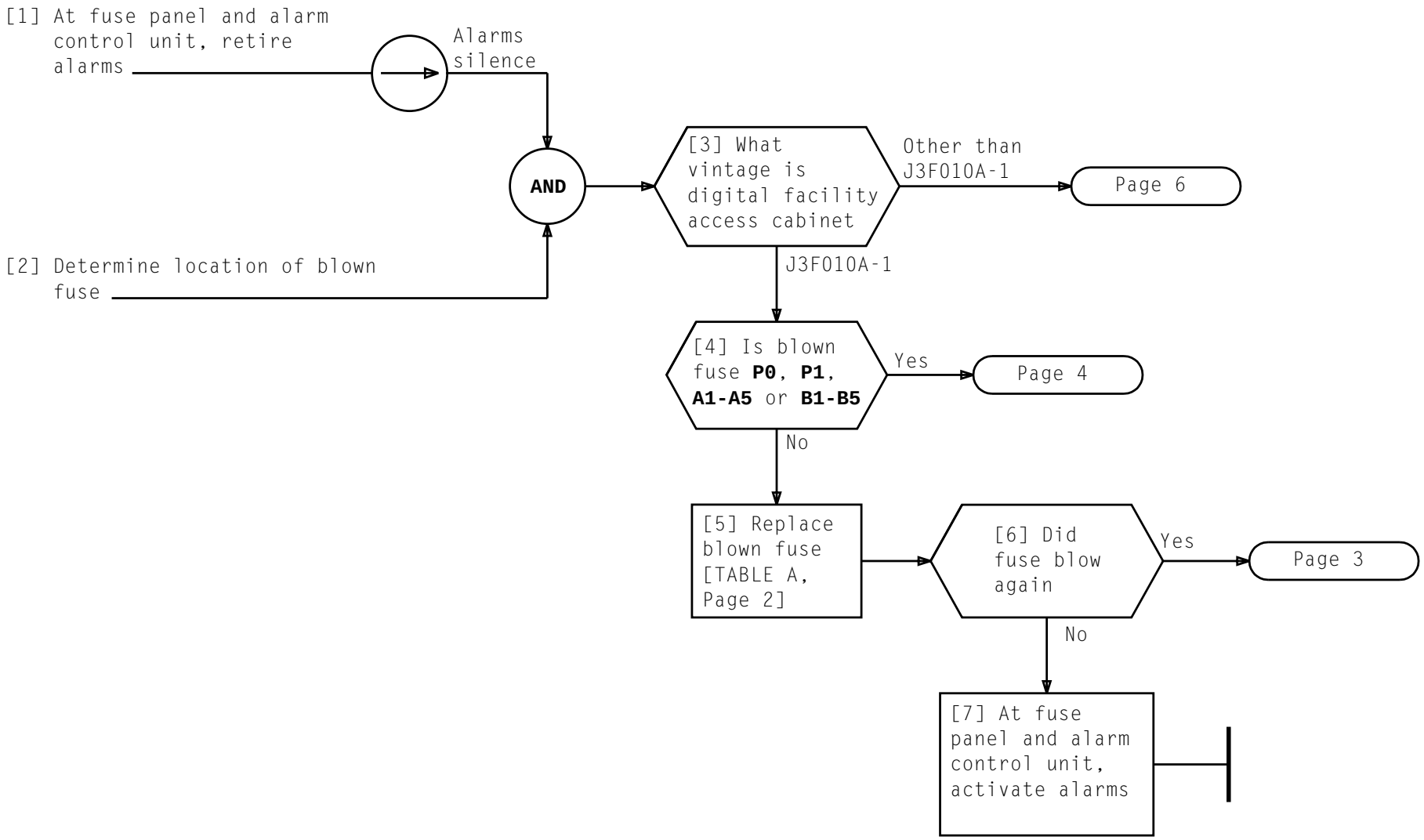


REPLACE BLOWN FUSE — ANALOG FACILITY ACCESS (AFA) CABINET



REPLACE BLOWN FUSE — DIGITAL FACILITY ACCESS (DFA) CABINET

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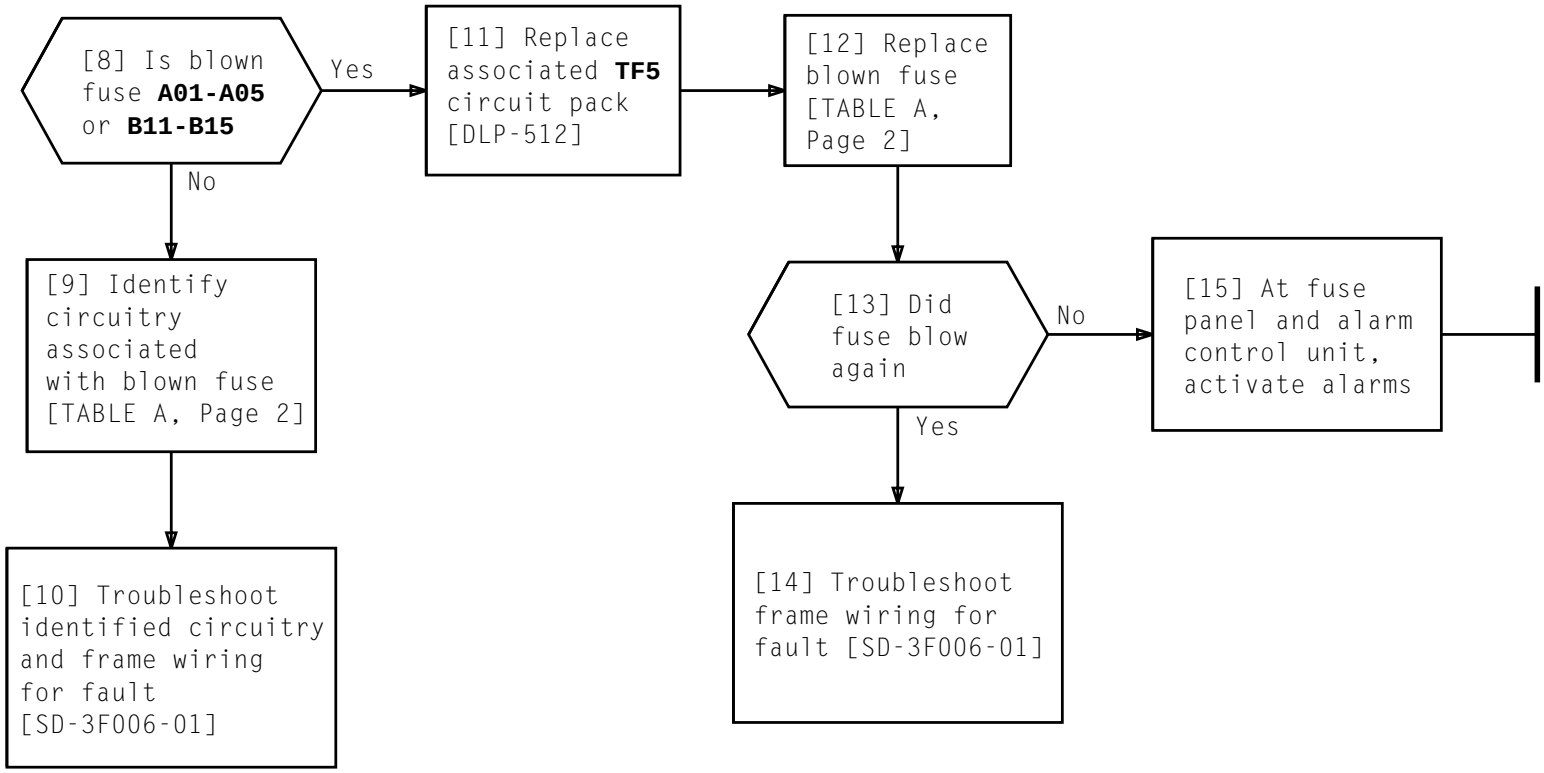
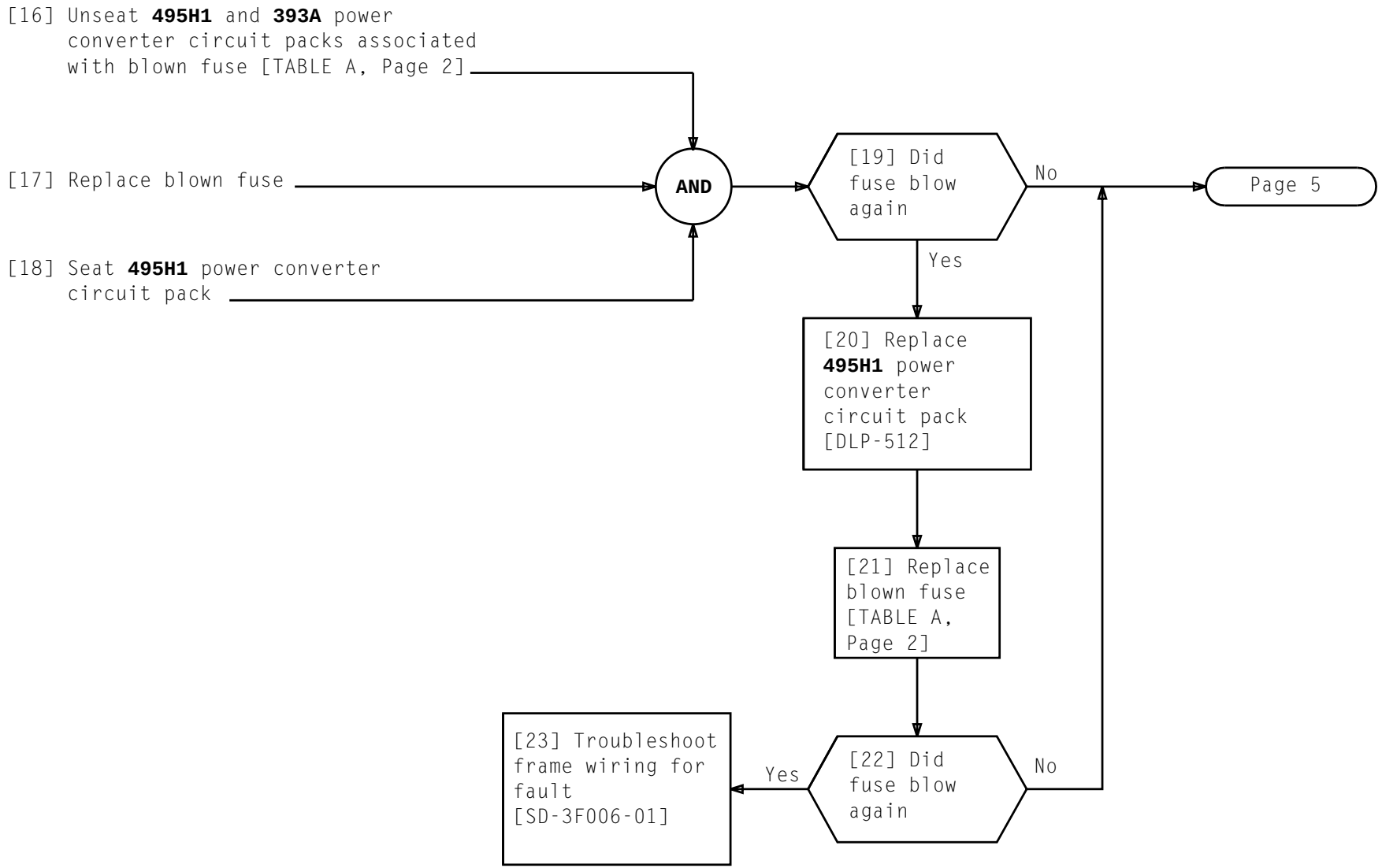
TABLE A					
BLOWN FUSE	**AMPERAGE**	**ASSOCIATED CIRCUITRY**	**BLOWN FUSE**	**AMPERAGE**	**ASSOCIATED CIRCUITRY**
A01	**1/2**	DSA01 –48 V (**TF5** Pack)	**BL**	**1/2**	Circuit 1 ALM Circuitry
A02	**1/2**	DSA02 –48 V (**TF5** Pack)	**M1**	**1/2**	Circuit 1 PWR Converter Pilot Fuse
A03	**1/2**	DSA03 –48 V (**TF5** Pack)	**P1**	**10**	Circuit 1 PWR Converter Load Fuse
A04	**1/2**	DSA04 –48 V (**TF5** Pack)	**A1**	**1/2**	Data Link 01 120 V AC
A05	**1/2**	DSA05 –48 V (**TF5** Pack)	**A2**	**1/2**	Data Link 02 120 V AC
AL	**1/2**	Circuit 0 ALM Circuitry	**A3**	**1/2**	Data Link 03 120 V AC
MO	**1/2**	Circuit 0 PWR Converter Pilot Fuse	**A4**	**1/2**	Data Link 04 120 V AC
PO	**10**	Circuit 0 PWR Converter Load Fuse	**A5**	**1/2**	Data Link 05 120 V AC
B11	**1/2**	DSA11 –48 V (**TF5** Pack)	**B1**	**1/2**	Data Link 11 120 V AC
B12	**1/2**	DSA12 –48 V (**TF5** Pack)	**B2**	**1/2**	Data Link 12 120 V AC
B13	**1/2**	DSA13 –48 V (**TF5** Pack)	**B3**	**1/2**	Data Link 13 120 V AC
B14	**1/2**	DSA14 –48 V (**TF5** Pack)	**B4**	**1/2**	Data Link 14 120 V AC
B15	**1/2**	DSA15 –48 V (**TF5** Pack)	**B5**	**1/2**	Data Link 15 120 V AC

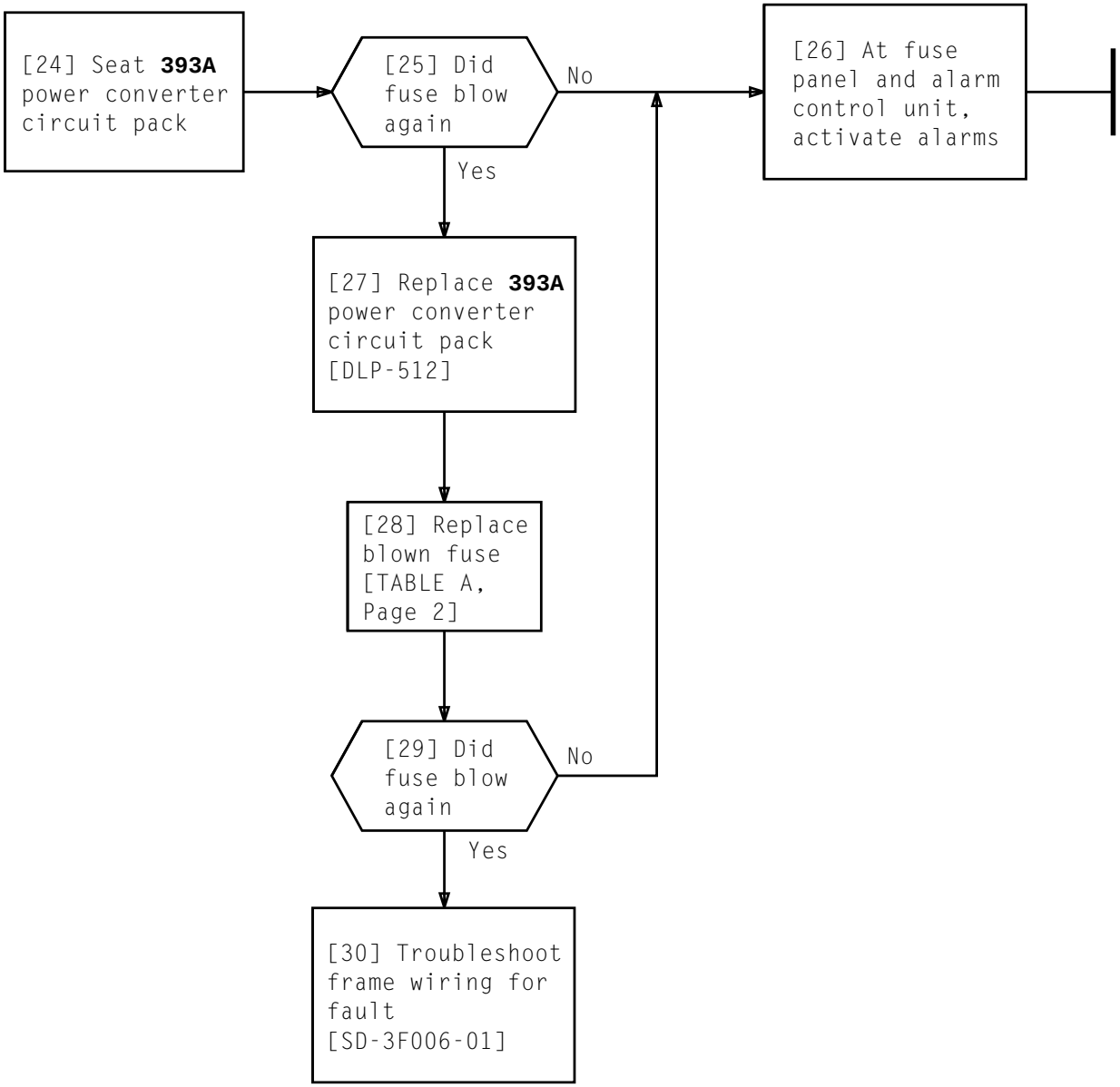
REPLACE BLOWN FUSE – DIGITAL FACILITY ACCESS (DFA) CABINET



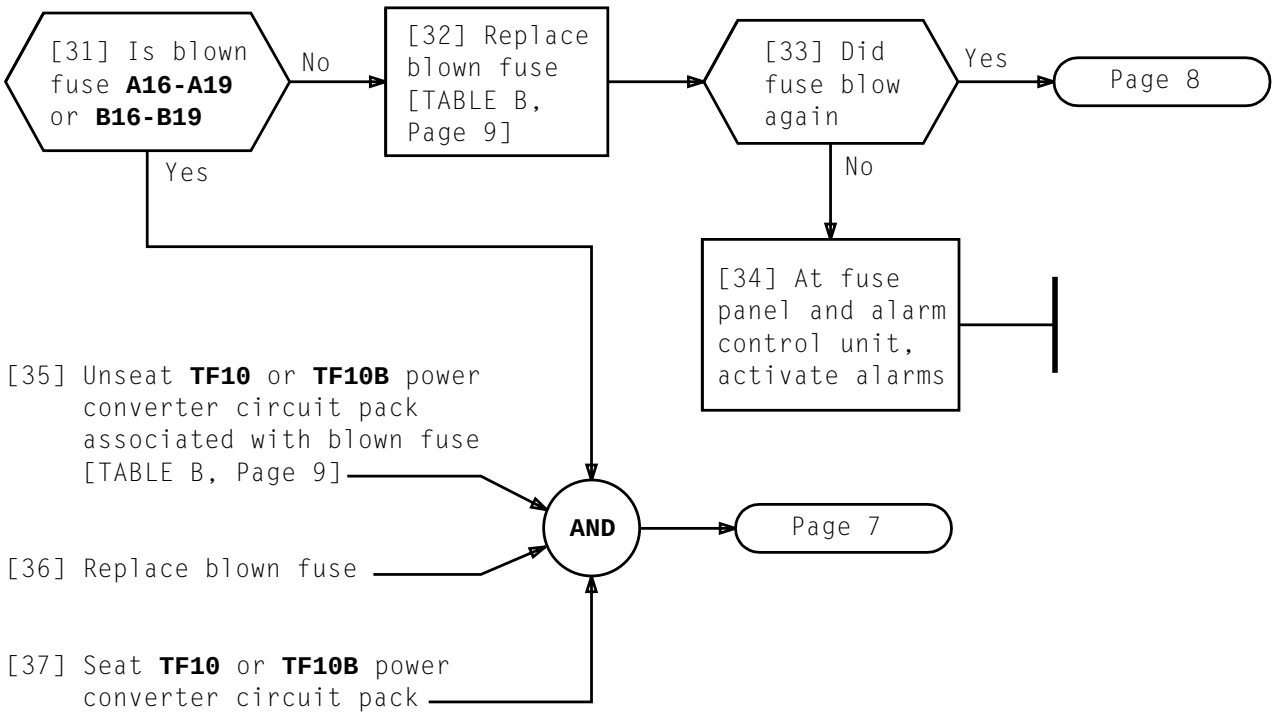
REPLACE BLOWN FUSE — DIGITAL FACILITY ACCESS (DFA) CABINET



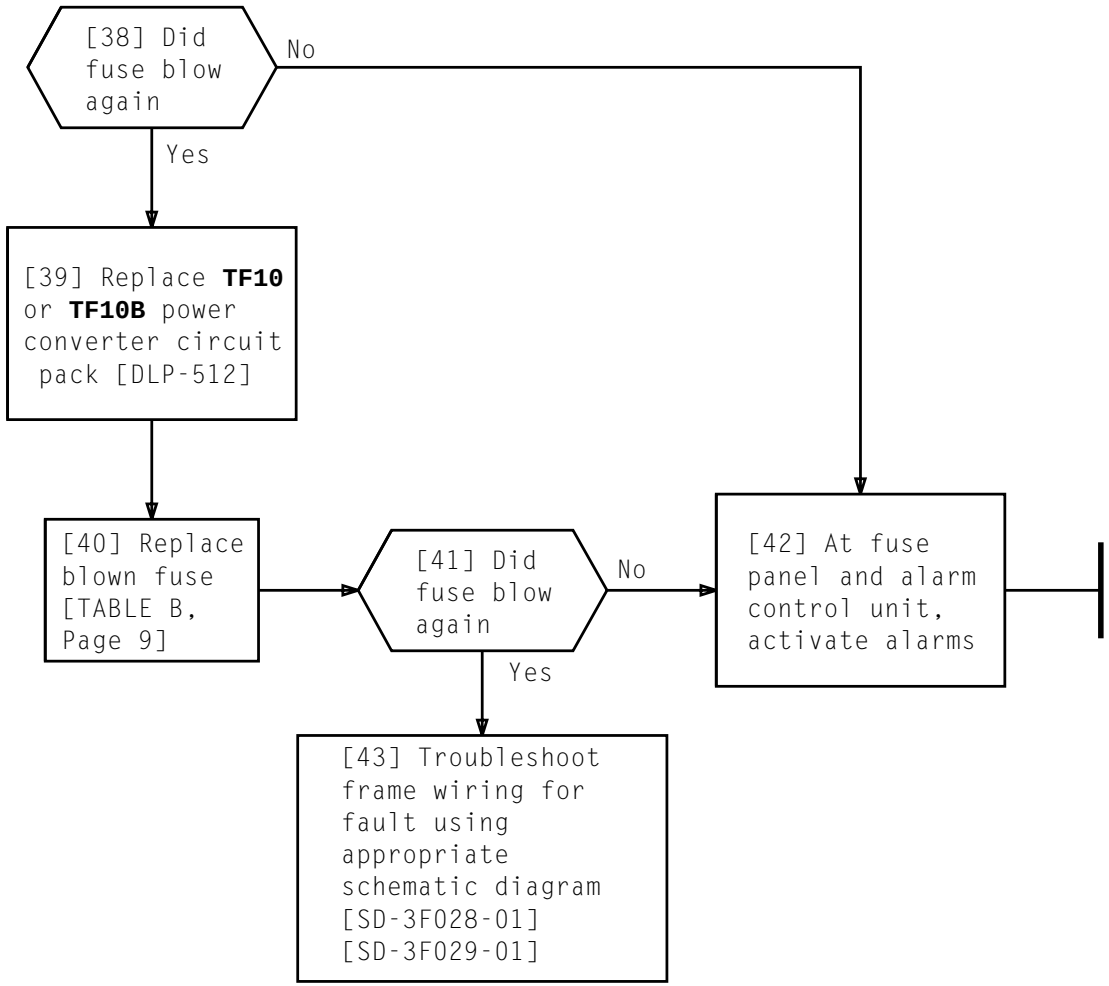
REPLACE BLOWN FUSE — DIGITAL FACILITY ACCESS (DFA) CABINET



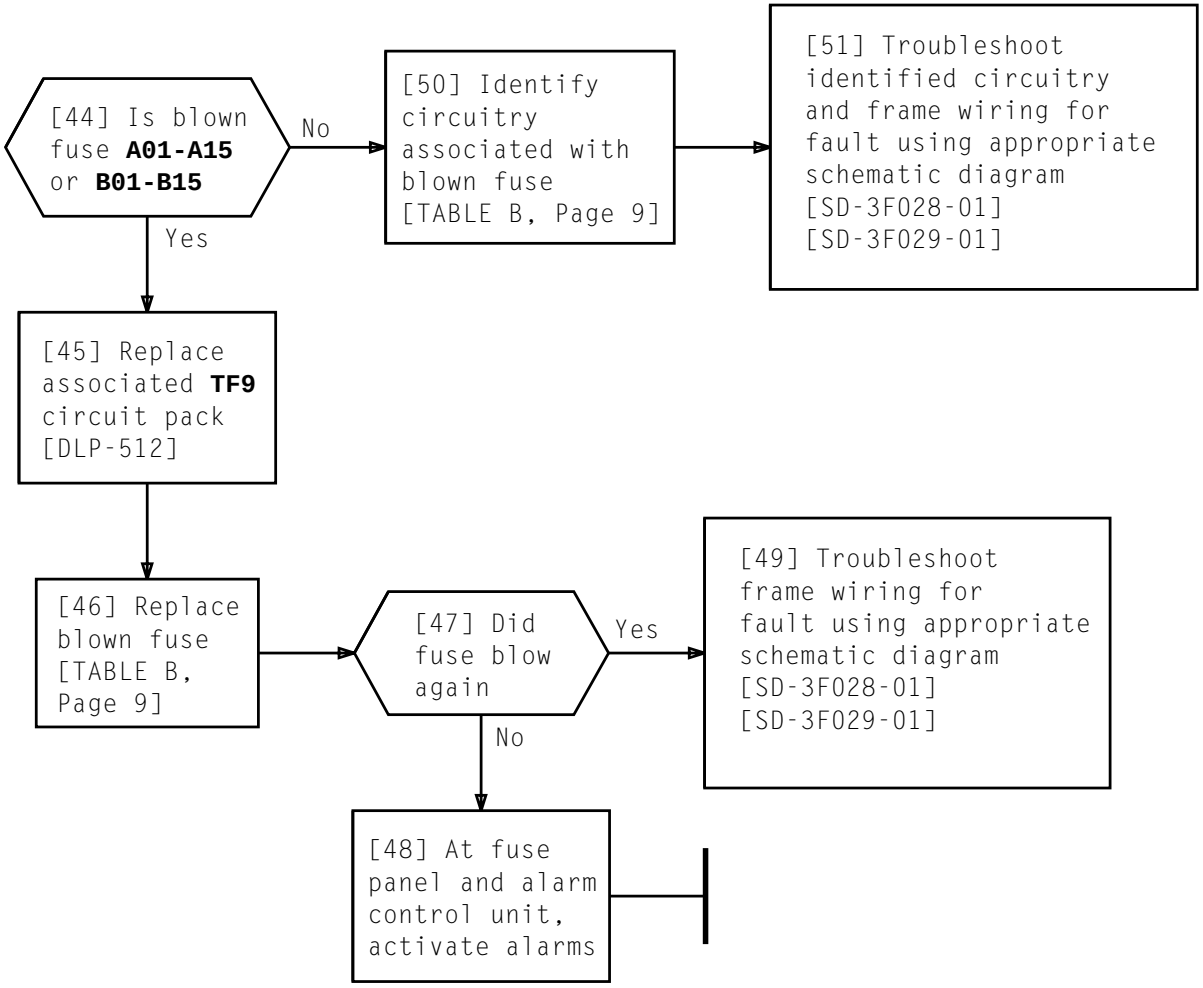
REPLACE BLOWN FUSE — DIGITAL FACILITY ACCESS (DFA) CABINET



REPLACE BLOWN FUSE — DIGITAL FACILITY ACCESS (DFA) CABINET



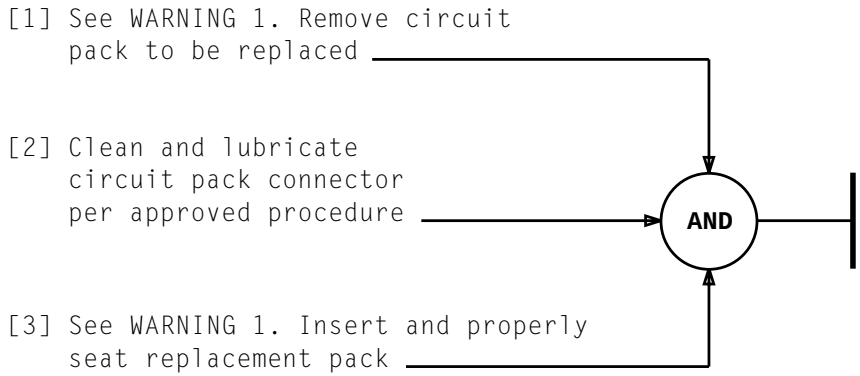
REPLACE BLOWN FUSE — DIGITAL FACILITY ACCESS (DFA) CABINET



REPLACE BLOWN FUSE — DIGITAL FACILITY ACCESS (DFA) CABINET

TABLE B					
BLOWN FUSE	**AMPERAGE**	**ASSOCIATED CIRCUITRY (CIRCUIT A)**	**BLOWN FUSE**	**AMPERAGE**	**ASSOCIATED CIRCUITRY (CIRCUIT B)**
A01	**1/2**	DSA01 –48V (**TF9** Pack)	**B01**	**1/2**	DSA01 –48V (**TF9** Pack)
A02	**1/2**	DSA02 –48V (**TF9** Pack)	**B02**	**1/2**	DSA02 –48V (**TF9** Pack)
A03	**1/2**	DSA03 –48V (**TF9** Pack)	**B03**	**1/2**	DSA03 –48V (**TF9** Pack)
A04	**1/2**	DSA04 –48V (**TF9** Pack)	**B04**	**1/2**	DSA04 –48V (**TF9** Pack)
A05	**1/2**	DSA05 –48V (**TF9** Pack)	**B05**	**1/2**	DSA05 –48V (**TF9** Pack)
A06	**1/2**	DSA06 –48V (**TF9** Pack)	**B06**	**1/2**	DSA06 –48V (**TF9** Pack)
A07	**1/2**	DSA07 –48V (**TF9** Pack)	**B07**	**1/2**	DSA07 –48V (**TF9** Pack)
A08	**1/2**	DSA08 –48V (**TF9** Pack)	**B08**	**1/2**	DSA08 –48V (**TF9** Pack)
A09	**1/2**	DSA09 –48V (**TF9** Pack)	**B09**	**1/2**	DSA09 –48V (**TF9** Pack)
A10	**1/2**	DSA10 –48V (**TF9** Pack)	**B10**	**1/2**	DSA10 –48V (**TF9** Pack)
A11	**1/2**	DSA11 –48V (**TF9** Pack)	**B11**	**1/2**	DSA11 –48V (**TF9** Pack)
A12	**1/2**	DSA12 –48V (**TF9** Pack)	**B12**	**1/2**	DSA12 –48V (**TF9** Pack)
A13	**1/2**	DSA13 –48V (**TF9** Pack)	**B13**	**1/2**	DSA13 –48V (**TF9** Pack)
A14	**1/2**	DSA14 –48V (**TF9** Pack)	**B14**	**1/2**	DSA14 –48V (**TF9** Pack)
A15	**1/2**	DSA15 –48V (**TF9** Pack)	**B15**	**1/2**	DSA15 –48V (**TF9** Pack)
A16	**1/2**	Power Converter –48V (**TF10** or **TF10B** Pack)	**B16**	**1/2**	Power Converter –48V (**TF10** or **TF10B** Pack)
A17	**1/2**	Power Converter –48V (**TF10** or **TF10B** Pack)	**B17**	**1/2**	Power Converter –48V (**TF10** or **TF10B** Pack)
A18	**1/2**	Power Converter –48V (**TF10** or **TF10B** Pack)	**B18**	**1/2**	Power Converter –48V (**TF10** or **TF10B** Pack)
A19	**1/2**	Power Converter –48V (**TF10** or **TF10B** Pack)	**B19**	**1/2**	Power Converter –48V (**TF10** or **TF10B** Pack)
AL	**1/2**	CIRCUIT A ALM CIRCUITRY	**BL**	**1/2**	CIRCUIT B ALM CIRCUITRY

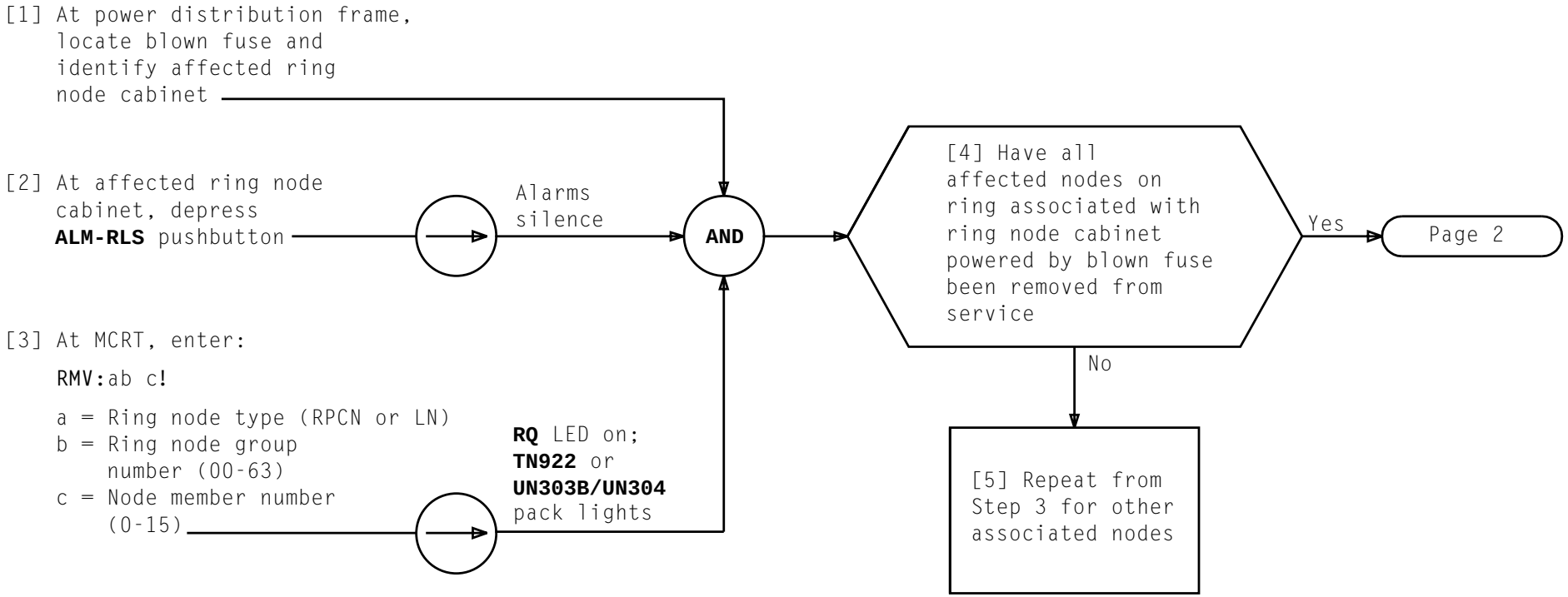
REPLACE BLOWN FUSE – DIGITAL FACILITY ACCESS (DFA) CABINET



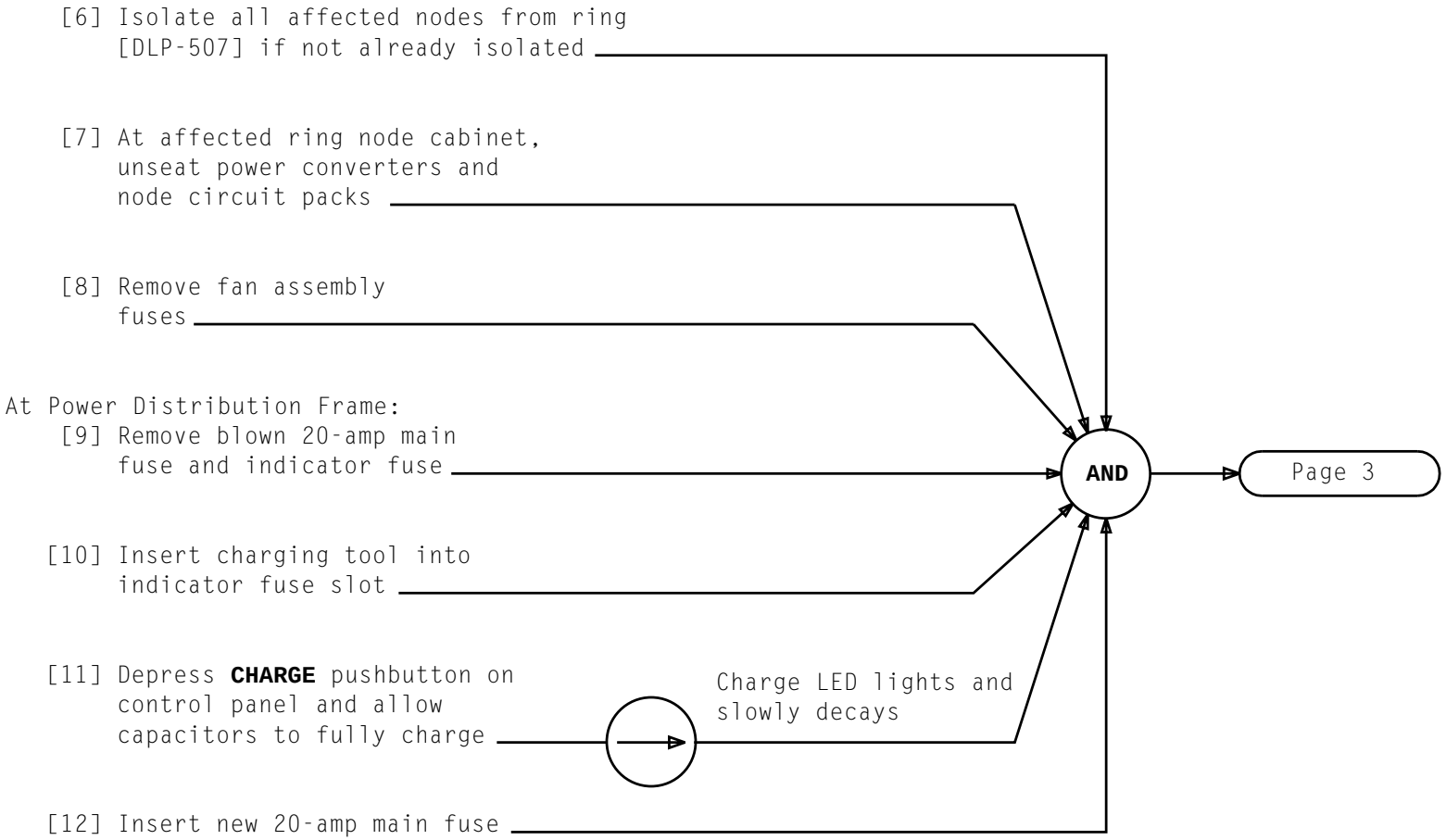
WARNING 1

It should be assumed that all circuit packs containing solid-state electronic components can be damaged by electrostatic discharge. When handling circuit packs and working in the backplane area, a grounded antistatic wrist strap (R-4987 or equivalent) must be worn. The strap should be connected to ground common to circuit pack ground. When appropriate wrist strap is not available, grounded (exposed) metal should be touched before handling circuit pack. An unprotected circuit pack should never be passed to an ungrounded person nor touch components, leads, nor connector pins

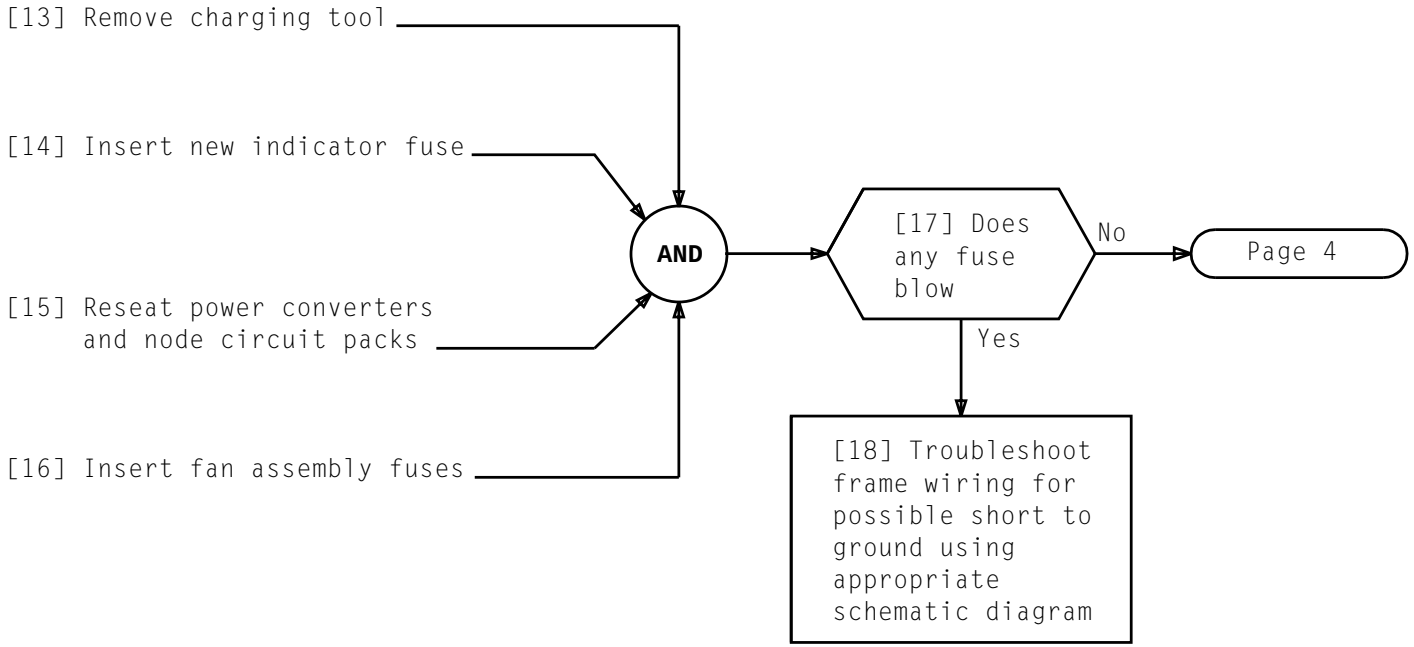
REPLACE CIRCUIT PACK — ANALOG FACILITY ACCESS (AFA) OR DIGITAL FACILITY ACCESS (DFA) CABINET



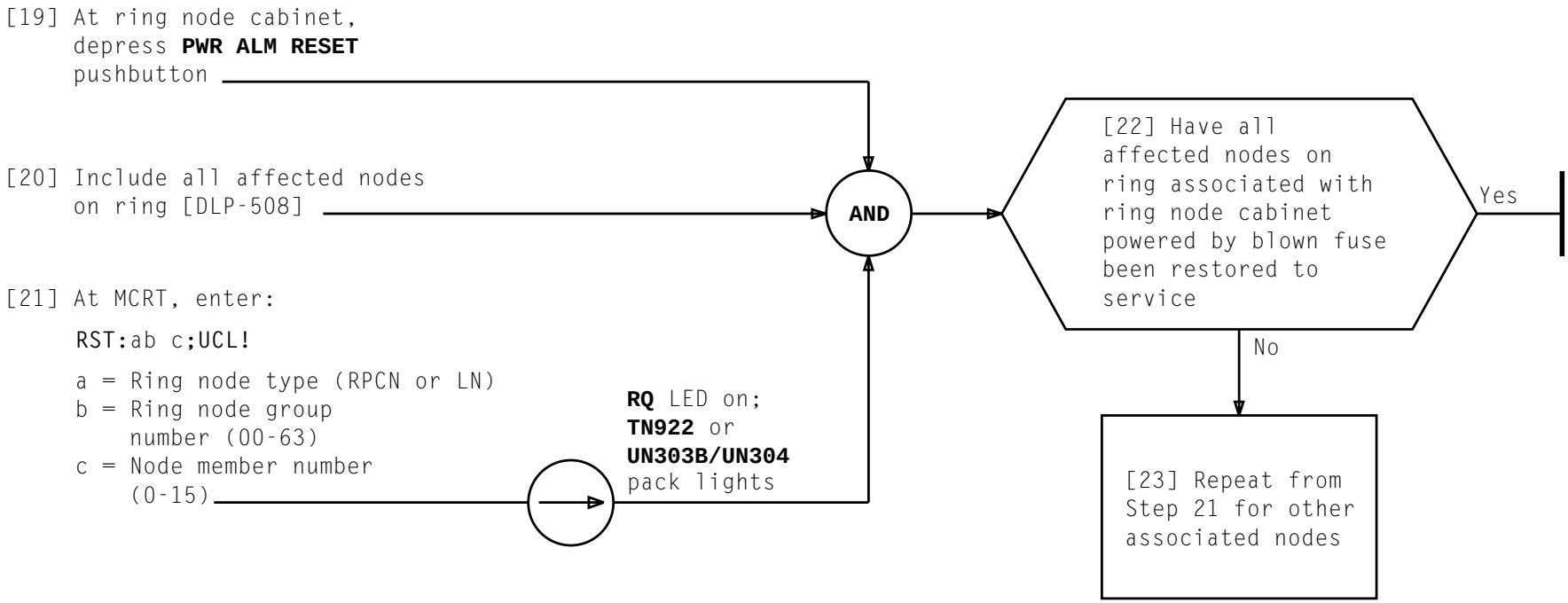
REPLACE BLOWN FUSE — POWER DISTRIBUTION FRAME (J86334-B/C)



REPLACE BLOWN FUSE — POWER DISTRIBUTION FRAME (J86334-B/C)



REPLACE BLOWN FUSE — POWER DISTRIBUTION FRAME (J86334-B/C)



REPLACE BLOWN FUSE — POWER DISTRIBUTION FRAME (J86334-B/C)

REPLACE FA POWER CONVERTER

[1] At fuse panel and alarm control unit, depress **ALM-RLS** pushbutton

Alarms Silence

[2] See NOTE 1. Identify nodes associated with FA power converter to be replaced

AND

[3] At MCRT, enter:

RMV:ab c!

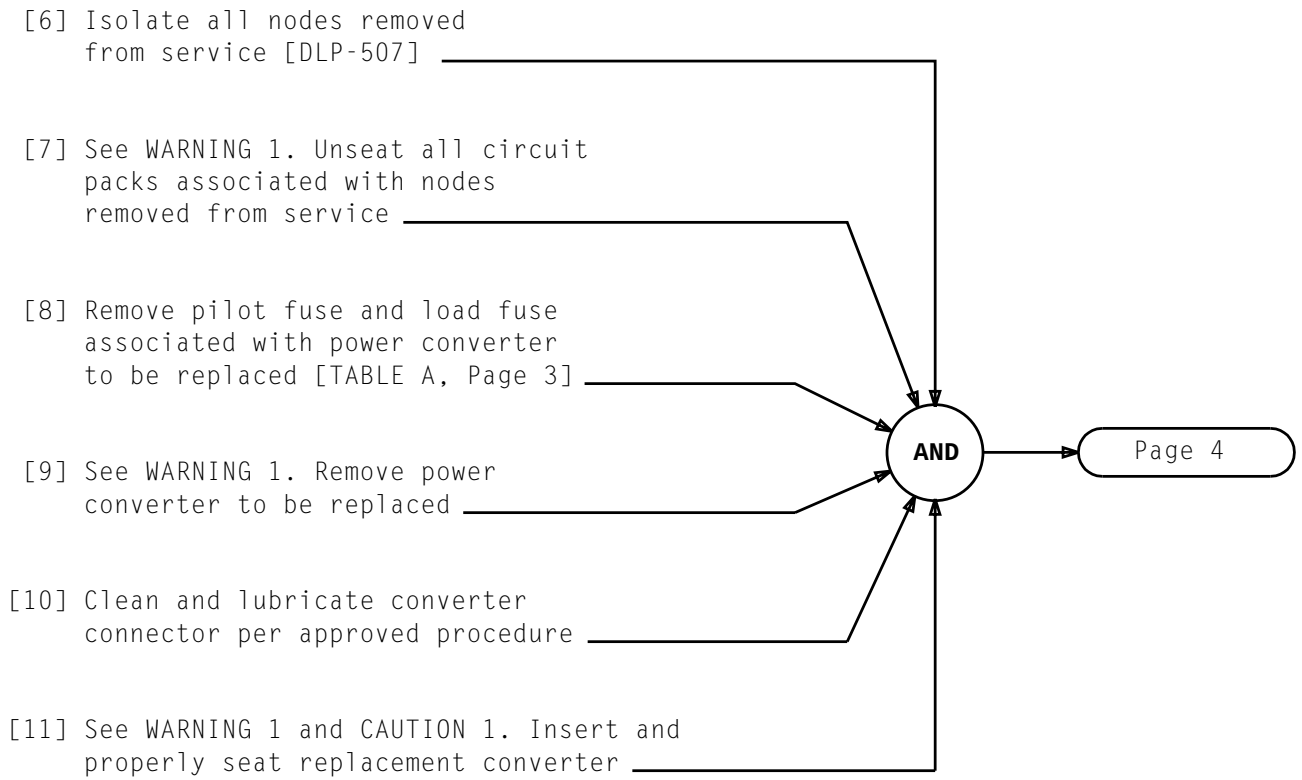
for nodes associated with FA power converter
a = Ring node type (RPCN or LN)
b = Ring node group number (00-63)
c = Node member number (0-15)

[4] Have all nodes associated with converter to be replaced been removed from service

Yes → Page 2

No → [5] Repeat from Step 3 for next node associated with converter

NOTE 1
Two FA power converters supply power to each LN shelf unit. One converter supplies power for one-half the shelf unit and the other converter supplies power to other half. With this arrangement, it is possible that some LNs are powered by both converters



WARNING 1

It should be assumed that all circuit packs containing solid-state electronic components can be damaged by electrostatic discharge. When handling circuit packs and working in the backplane area, a grounded antistatic wrist strap (R-4987 or equivalent) MUST be worn. The strap should be connected to ground common to circuit pack ground. When appropriate wrist strap is not available, grounded (exposed) metal should be touched before handling circuit pack. An unprotected circuit pack should never be passed to an ungrounded person nor touch components, leads, nor connector pins

CAUTION 1

When replacing the 495 FA power unit, series numbers 1:10, 1:11. 1:12 or 1:13, should NOT be used.

REPLACE FA POWER CONVERTER

TABLE A FA POWER CONVERTER FUSES				
LINK NODE SHELF UNIT	FA POWER CONVERTER HORIZONTAL LOCATION		ASSOCIATED FUSES	
	RN CABINET	ILN OR HDB CABINET	PILOT	LOAD
0	10	15	**M00**	**A00**
	170	32	**M01**	**A01**
1	10	15	**M10**	**B10**
	170	32	**M11**	**B11**
2	10	15	**M20**	**C20**
	170	32	**M21**	**C21**
3	10	15	**M30**	**D30**
	170	32	**M31**	**D31**
4	10	15	**M40**	**E40**
	170	32	**M41**	**E41**
5	10	15	**M50**	**F50**
	170	32	**M51**	**F51**

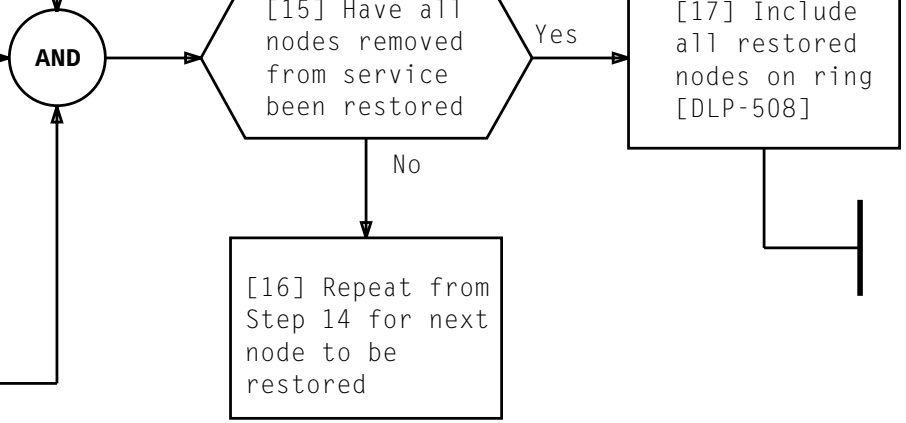
[12] Replace load fuse and pilot fuse previously removed

[13] See WARNING 1. Seat all circuit packs associated with nodes removed from service

[14] At MCRT, enter:

RST:ab c;UCL!

for nodes removed from service
a = Ring node type (RPCN or LN)
b = Ring node group number (00-63)
c = Node member number (0-15)



WARNING 1

It should be assumed that all circuit packs containing solid-state electronic components can be damaged by electrostatic discharge. When handling circuit packs and working in the backplane area, a grounded antistatic wrist strap (R-4987 or equivalent) must be worn. The strap should be connected to ground common to circuit pack ground. When appropriate wrist strap is not available, grounded (exposed) metal should be touched before handling circuit pack. An unprotected circuit pack should never be passed to an ungrounded person nor touch components, leads, nor connector pins

REPLACE FA POWER CONVERTER

[1] At MCRT, enter:

OP:RING,LNa b!

a = Ring node group number (00-63)
b = Node member number (1-15)

AND

[2] Using system response [Figure 1], identify LN major state

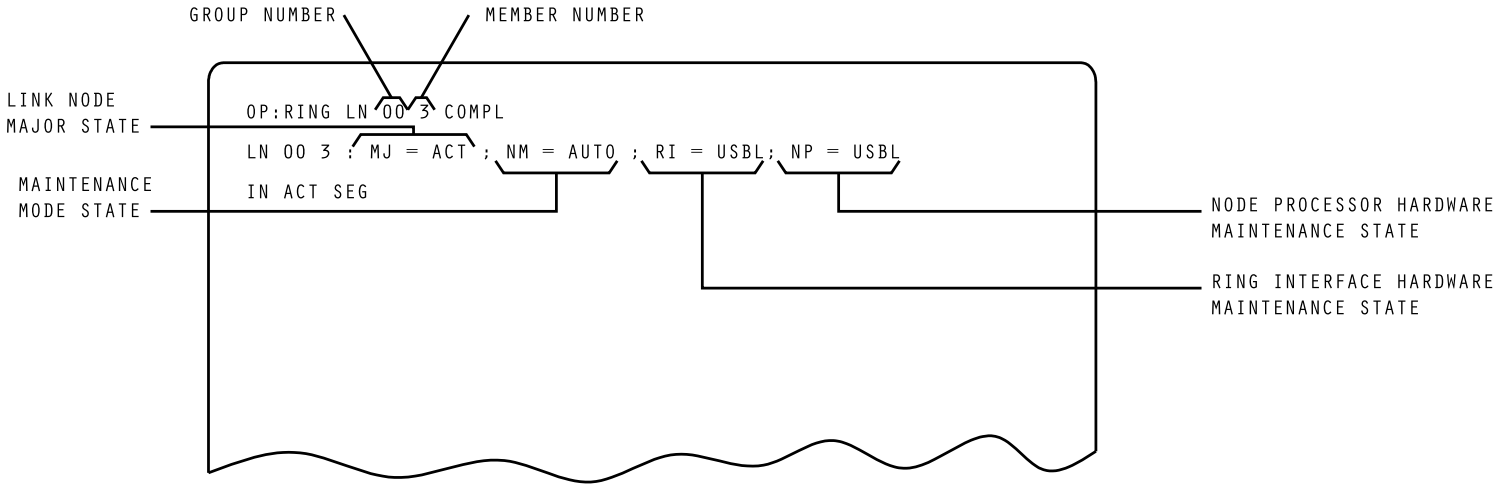


Figure 1 – Sample Printout of Link Node (LN) State

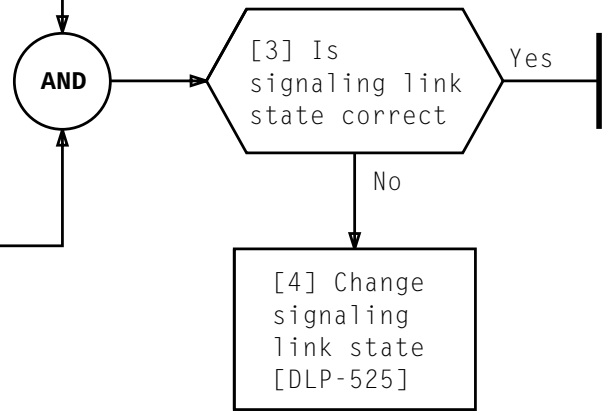
VERIFY LINK NODE (LN) STATE

[1] At MCRT, enter:

OP:SLK(a,b)!

a = Ring node group number (00-63)
b = Node member number (1-15)

[2] Using system response [Figure 1], identify signaling link state




```
OP:SLK 00 03 IN PROG
SLK    00    3    DCHN    0    1          UNA GROW
SLK    01    2    DCHN    0    2          UNE
```

SIGNALING LINK MAJOR AND MINOR STATE

Figure 1 – Sample Printout of Signaling Link (SLK) State

VERIFY SIGNALING LINK (SLK) STATE

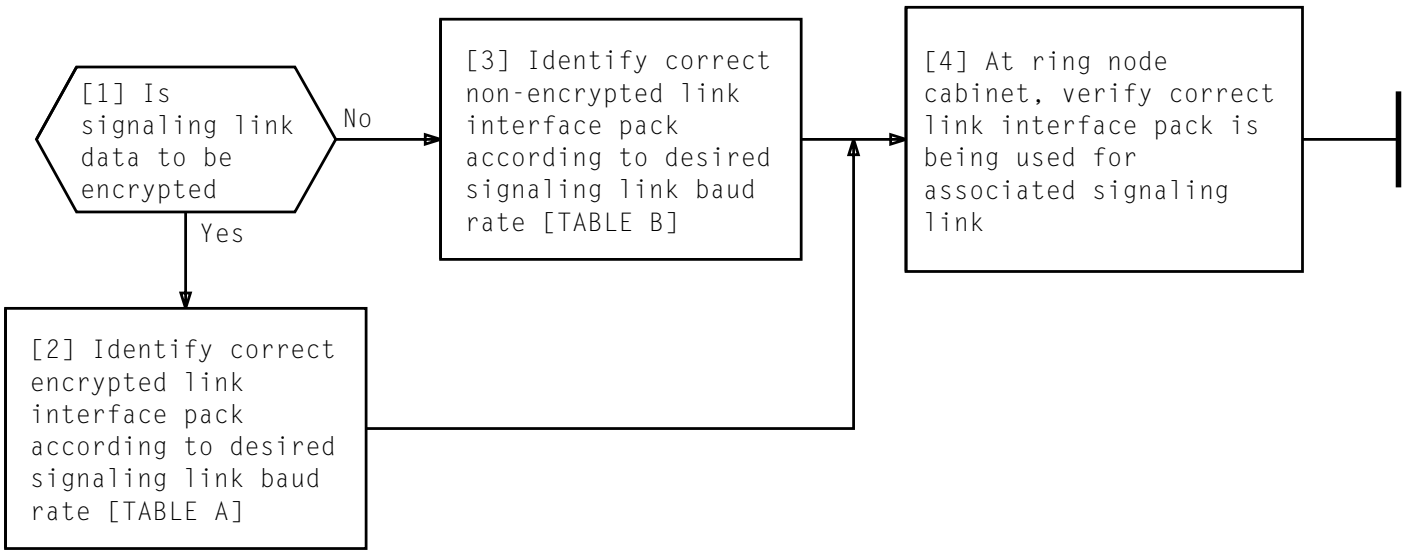


TABLE A
ENCRYPTED LINK INTERFACE PACKS

BAUD RATE	PACK IDENTIFICATION
2.4K	**TN917** (MC3F004A1)
4.8K	
56K	**TN917B** (MC3F022A1)

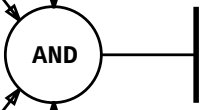
TABLE B
NON-ENCRYPTED LINK INTERFACE PACKS

BAUD RATE	PACK IDENTIFICATION
2.4K	**TN916** (MC3F001A1)
4.8K	
56K	**TN916** (MC3F003A1)
1.544M	**TN2520**

VERIFY SIGNALING LINK's LINK INTERFACE (LI)

[1] Identify correct DSU and CSU configuration associated with signaling link length and office designation [TABLE A]

[2] At DFA cabinet, verify correct DSU and CSU configurations are being used for associated signaling link



[3] Identify correct DSA associated with signaling link DSU [TABLE B]

[4] At DFA cabinet, verify correct DSA is being used for associated signaling link

VERIFY SIGNALING LINK DIGITAL SERVICE UNIT (DSU), CHANNEL SERVICE UNIT (CSU), AND DIGITAL SERVICE ADAPTER (DSA)

TABLE A
DIGITAL SERVICE UNIT AND CHANNEL SEVICE UNIT CONFIGURATION

SIGNALING LINK LENGTH	DSU AND CSU CONFIGRUATION		CONDITIONS
	NEAR-END OFFICE	FAR-END OFFICE	
1000 FEET OR LESS	500B/502B DSU with No CSU	500B/502B DSU with No CSU	With this configuration, neither a CSU or transmission facility is used. The designated control office must use the 502B DSU
GREATER THAN 1000 FEET BUT LESS THAN OR EQUAL TO 9 MILES	502B DSU and 550A CSU	502B DSU and 550A CSU	With this configuration, a CSU is used but no transmission facility is required. The near-end office must use the 502B DSU to provide internal timing. Repeaters are required every three miles.
	AT&T 2556/DATATEL DSU-CSU combination	AT&T 2556/DATATEL DSU-CSU combination	With this configuration, no transmission facility is required. One office must modify its DSU/CSU to provide internal timing by enabling position 5 of option switch 1 on the DATATEL DSU/CSU or by enabling position 6 and disabling position 7 of option switch 1 on the AT&T 2556 DSU/CSU. Repeaters are required every three miles.
GREATER THAN 9 MILES	500B DSU and 550A CSU	500B DSU and 550A CSU	With this configuration, both a CSU and transmission facility is required. A 500B DSU is used at both the near-end and far-end offices
	AT&T 2556/DATATEL DSU-CSU combination	AT&T 2556/DATATEL DSU-CSU combination	A transmission facility is required with this configuration.

TABLE B DIGITAL SERVICE ADAPTERS	
SIGNALING LINK DSU TYPE	**ASSOCIATED DSA TYPE**
500B DSU or Unmodified AT&T 2556 DSU-CSU Combination	**TF5**
502B DSU; DATATEL DSU-CSU Combination, or Modified AT&T 2556 (2556 L-1A/2) DSU-CSU Combination	**TF9**

[1] On 500B/502B DSU, remove front and rear faceplates by depressing two tabs on bottom edge and simultaneously pulling outward

[2] At front of DSU, locate ground option switch (**S1**) [Figure 1]

[3] At rear of DSU, locate ten position option header (**H1**) and associated shunts [Figure 1]

[4] See NOTE 1. Ensure correct DSU options are set [TABLE A]

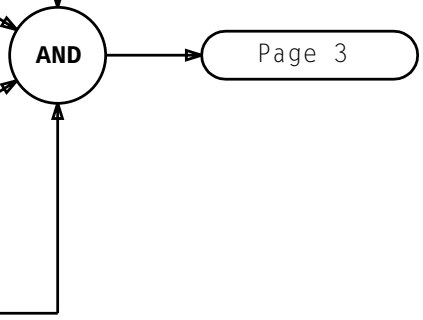


TABLE A
500B/502B DSU OPTIONS

OPTION	SETTING
Switch and LED assembly installed in front	—
LL spring clip installed	—
Ground option switch (**S1**) connected to frame ground (Switch IN) or disconnected from frame ground (Switch OUT)	**S1** switch either IN or OUT depending on what provides the best SLK performance
"Continuous request to send" feature enabled	**H1** header position 2 shunted
"Circuit assurance removed" feature enabled	**H1** header position 5 shunted
"System status removed" feature enabled	**H1** header position 8 shunted

NOTE 1
H1 header options are set by slipping shunts over the two pins that make up a position. Four shunts are provided. One is a spare and should be stored on position 10

VERIFY 500B/502B DATA SERVICE UNIT (DSU) OPTIONS ARE PROPERLY SET

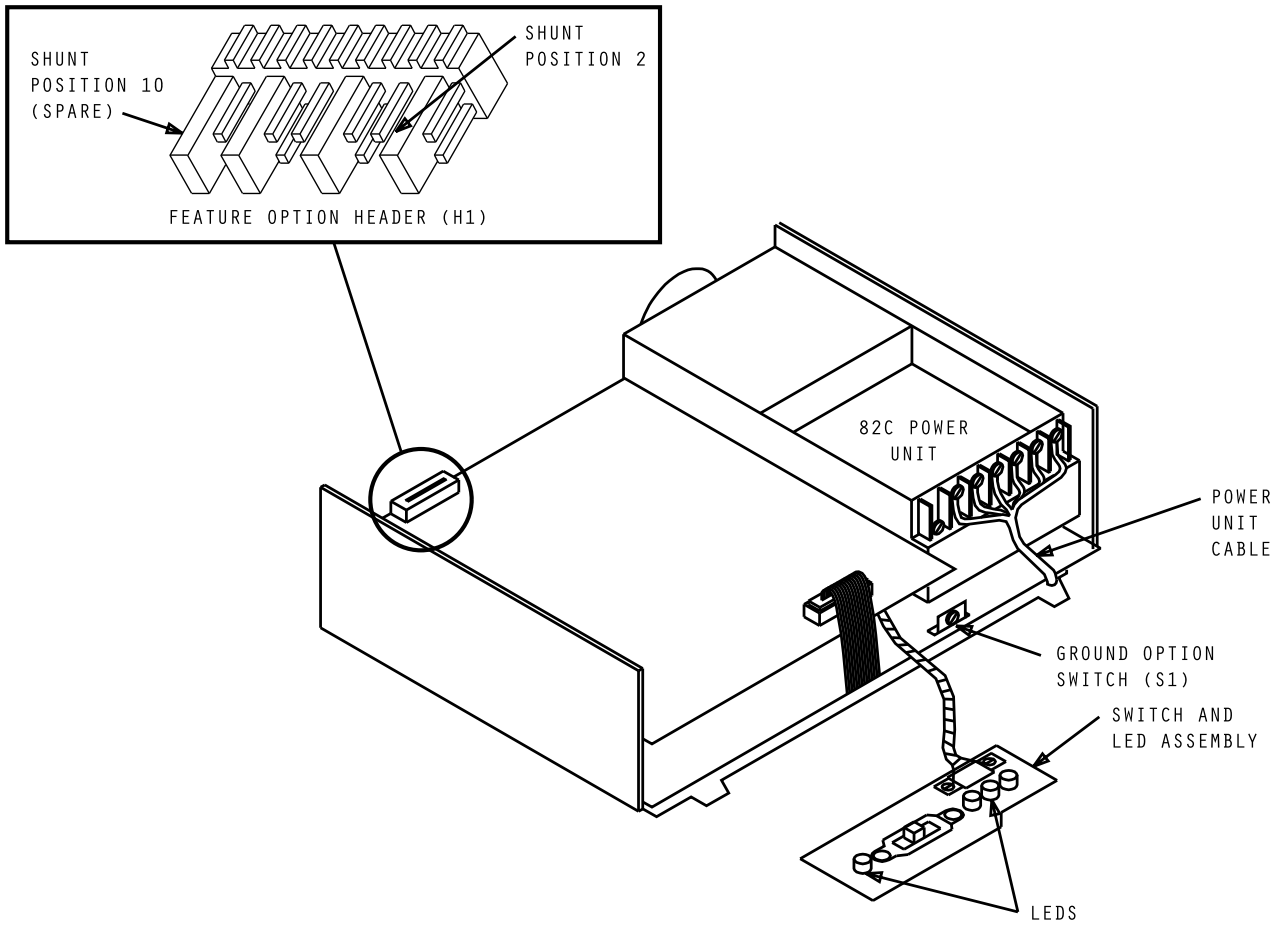
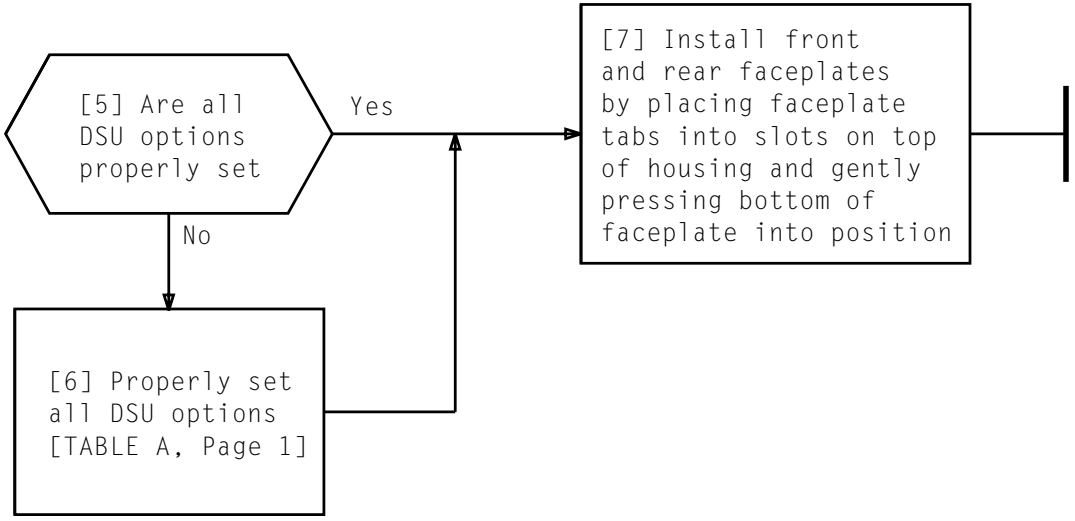
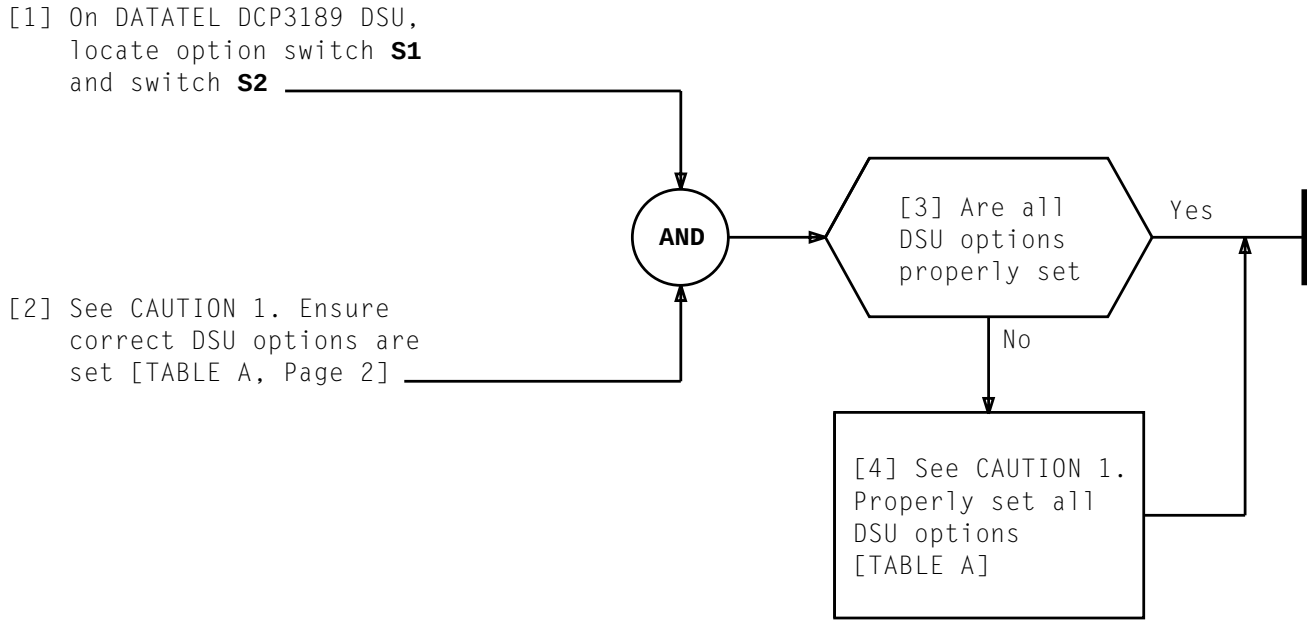


Figure 1 – 500B/502B TYPE DATA UNIT SELECTOR (INTERNAL VIEW)

VERIFY 500B/502B DATA SERVICE UNIT (DSU) OPTIONS ARE PROPERLY SET



VERIFY 500B/502B DATA SERVICE UNIT (DSU) OPTIONS ARE PROPERLY SET



CAUTION 1
*Option switch (**S1** or **S2**) position settings should not be changed while DSU power is ON*

VERIFY DATATEL DCP3189 DATA SERVICE UNIT (DSU) OPTIONS ARE PROPERLY SET

TABLE A DATATEL DCP3189 DSU OPTIONS		
OPTION SWITCH		
DESIGNATION	POSITION	SETTING
S1	1	OFF
	2	OFF
	3	ON
	4	ON
	5	SEE NOTE
	6	OFF
	7	ON
	8	ON
S2	1	OFF
	2	ON
	3	OFF
	4	ON
	5	ON
	6	ON
	7	ON
	8	ON

NOTE: Set switch to OFF for applications where internal timing is not required or to ON for applications where internal timing is required

VERIFY DATATEL DCP3189 DATA SERVICE UNIT (DSU) OPTIONS ARE PROPERLY SET

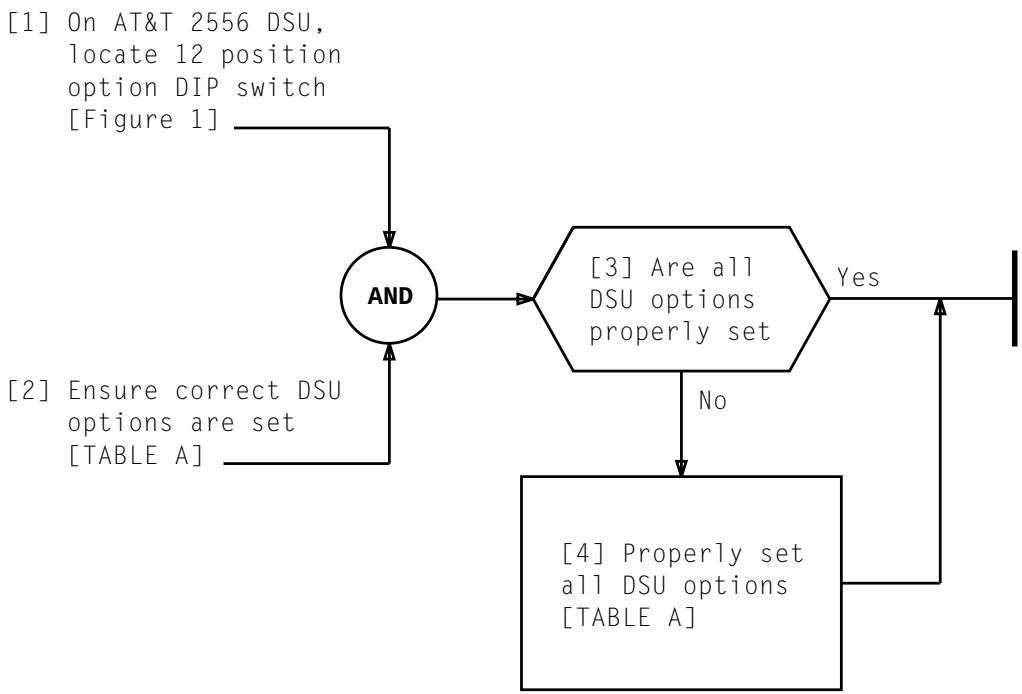
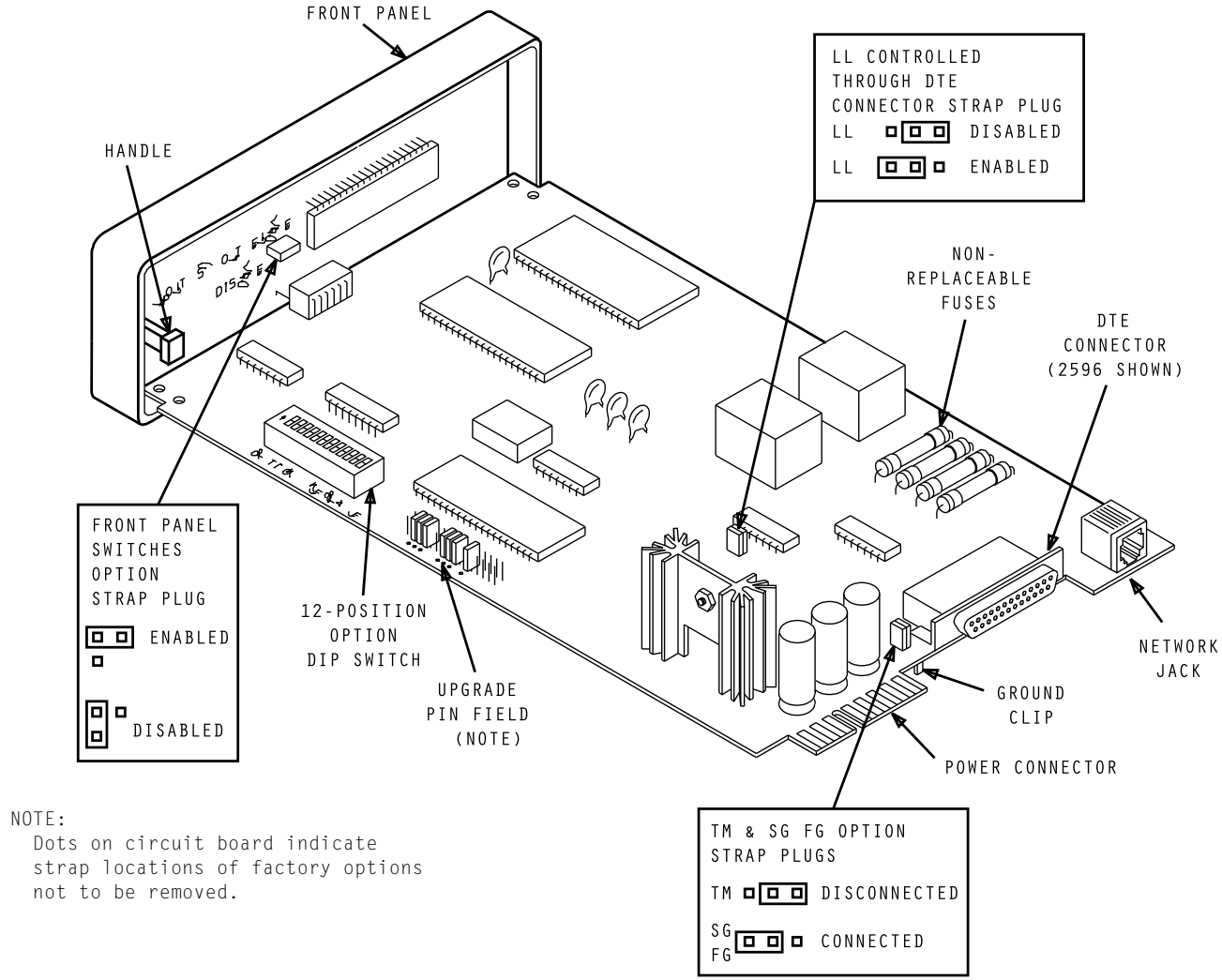


TABLE A
AT&T 2556 DSU OPTIONS

OPTION SWITCH	
POSITION	**SETTING**
1	ENABLE
2	DISABLE
3	ENABLE
4	DISABLE
5	DISABLE
6	DISABLE (SEE NOTE)
7	DISABLE
8	DISABLE
9	ENABLE
10	ENABLE
11	ENABLE
12	ENABLE

NOTE: This switch position should be enabled when the DSU is modified to be a 502B (metallic facility).

VERIFY AT&T 2556 DATA SERVICE UNIT (DSU) OPTIONS ARE PROPERLY SET



NOTE:
Dots on circuit board indicate strap locations of factory options not to be removed.

Figure 1 – AT&T 2556 TYPE DATA UNIT SELECTOR (INTERNAL VIEW)

VERIFY AT&T 2556 DATA SERVICE UNIT (DSU) OPTIONS ARE PROPERLY SET

VERIFY 550A CHANNEL SERVICE UNIT (CSU) OPTIONS ARE PROPERLY SET

[1] At DFA cabinet, identify 550A CSU associated with signaling link

[2] On 550A CSU, place tip of small screwdriver under cover and gently lift to flex basepan and release holding tabs

[3] At rear of CSU, locate ground option switch (**S1**) [Figure 1]

[4] At rear of CSU, locate ten position option header (**H1**) and associated shunts [Figure 1]

[5] See NOTE 1. Ensure correct CSU options are set [TABLE A]

AND

Page 3

TABLE A
550A CSU OPTIONS

OPTION	SETTING
Ground option switch (**S1**) connected to frame ground (Switch IN) or disconnected from frame ground (Switch OUT)	**S1** switch either IN or OUT depending on what provides the best SLK performance
"Fixed line build-out network installed" feature enabled	**H1** header positions 3, 5, and 9 shunted

NOTE 1
H1 header options are set by slipping shunts over the two pins that make up a position. Four shunts are provided. One is a spare and should be stored on position 10

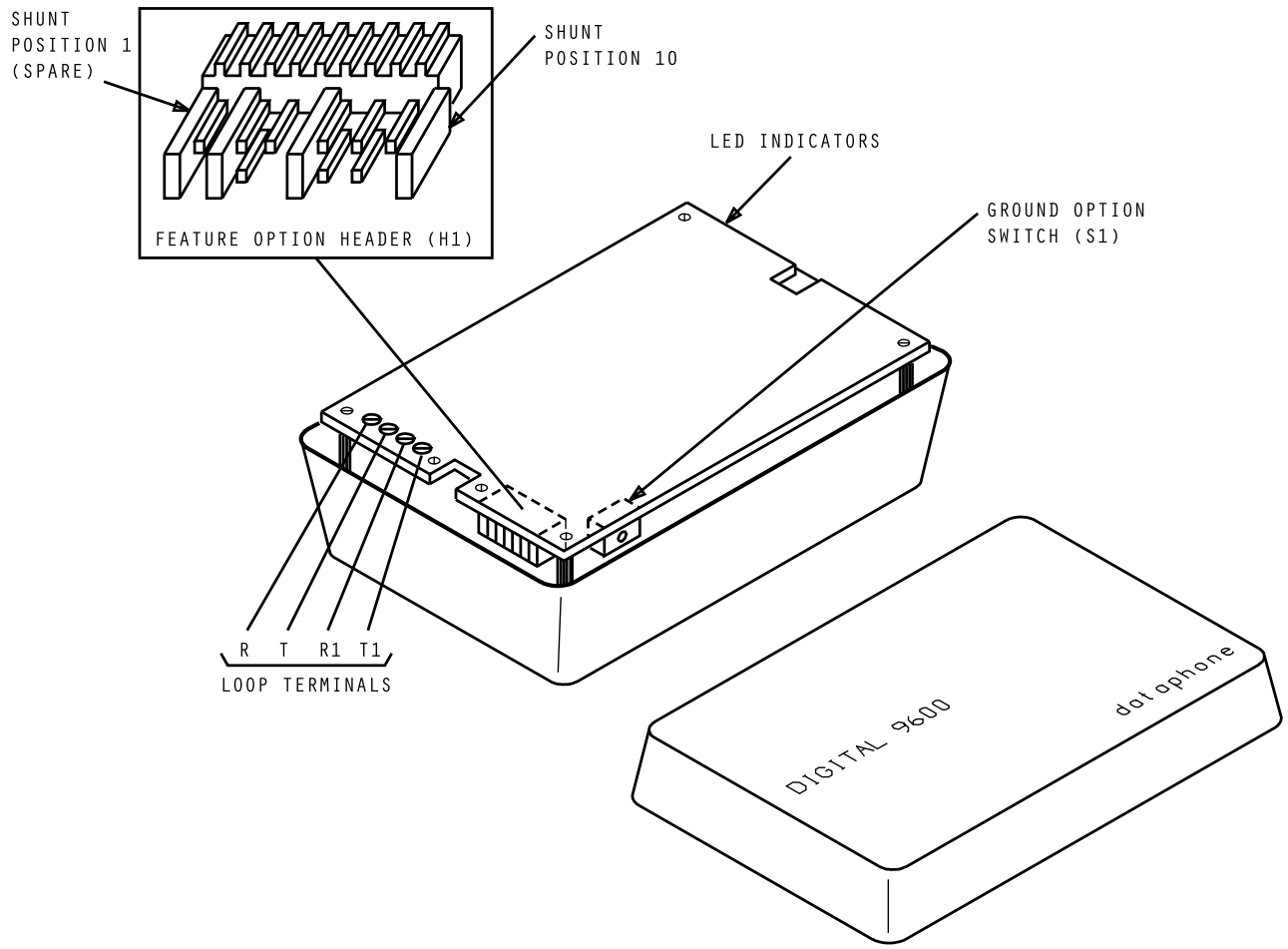
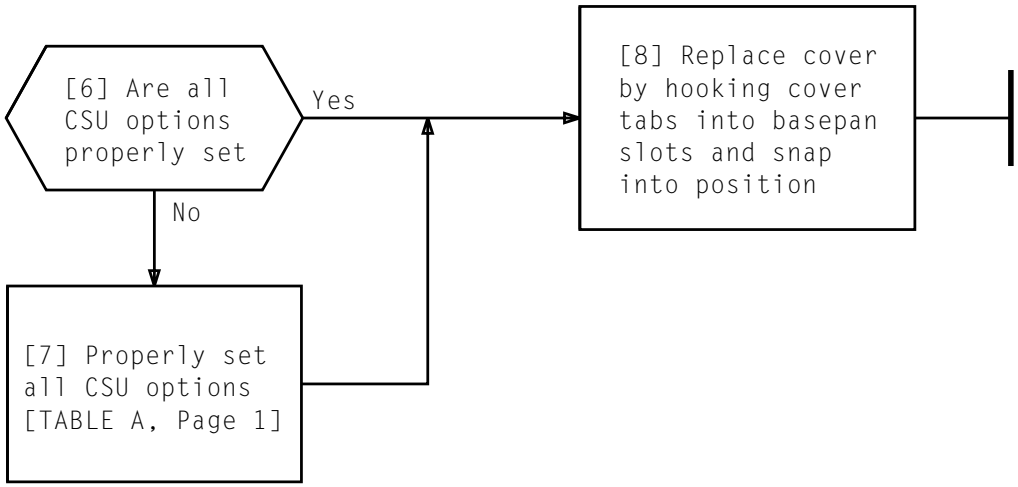


Figure 1 – 550A TYPE CHANNEL SELECTOR UNIT – COVER REMOVED

VERIFY 550A CHANNEL SERVICE UNIT (CSU) OPTIONS ARE PROPERLY SET



VERIFY 550A CHANNEL SERVICE UNIT (CSU) OPTIONS ARE PROPERLY SET

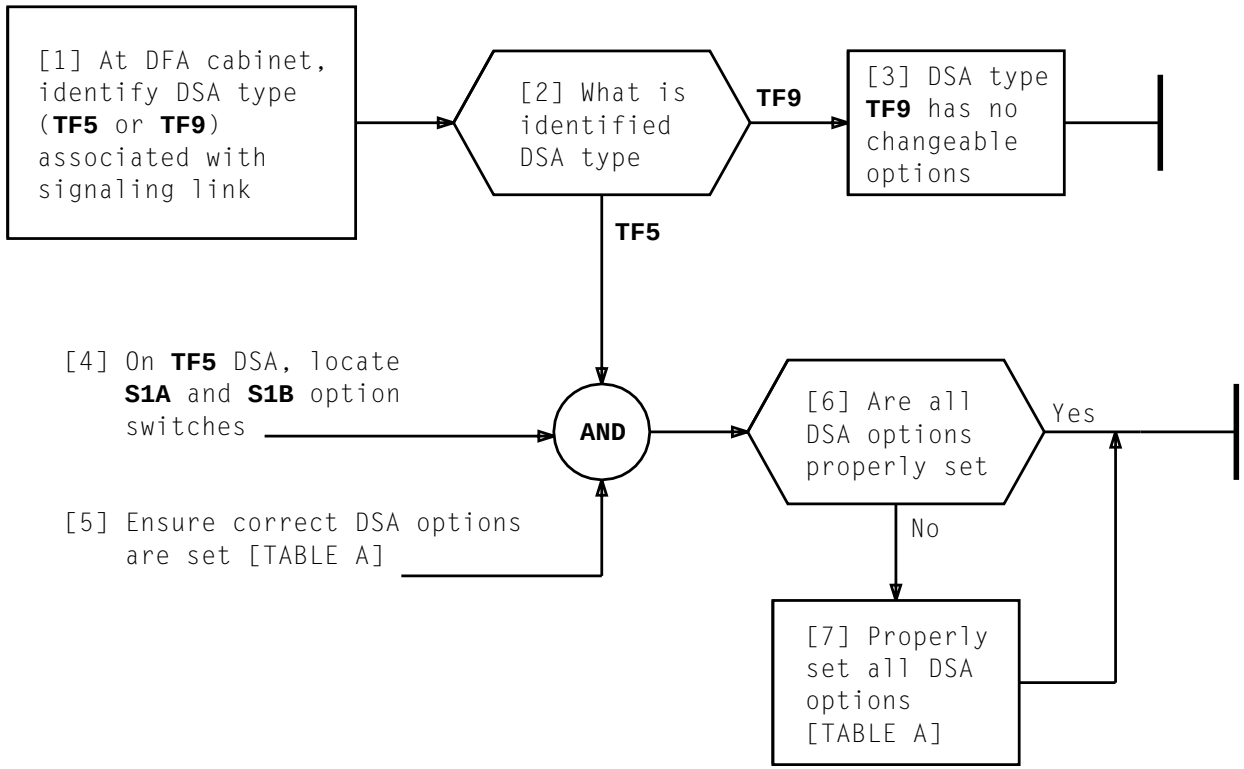
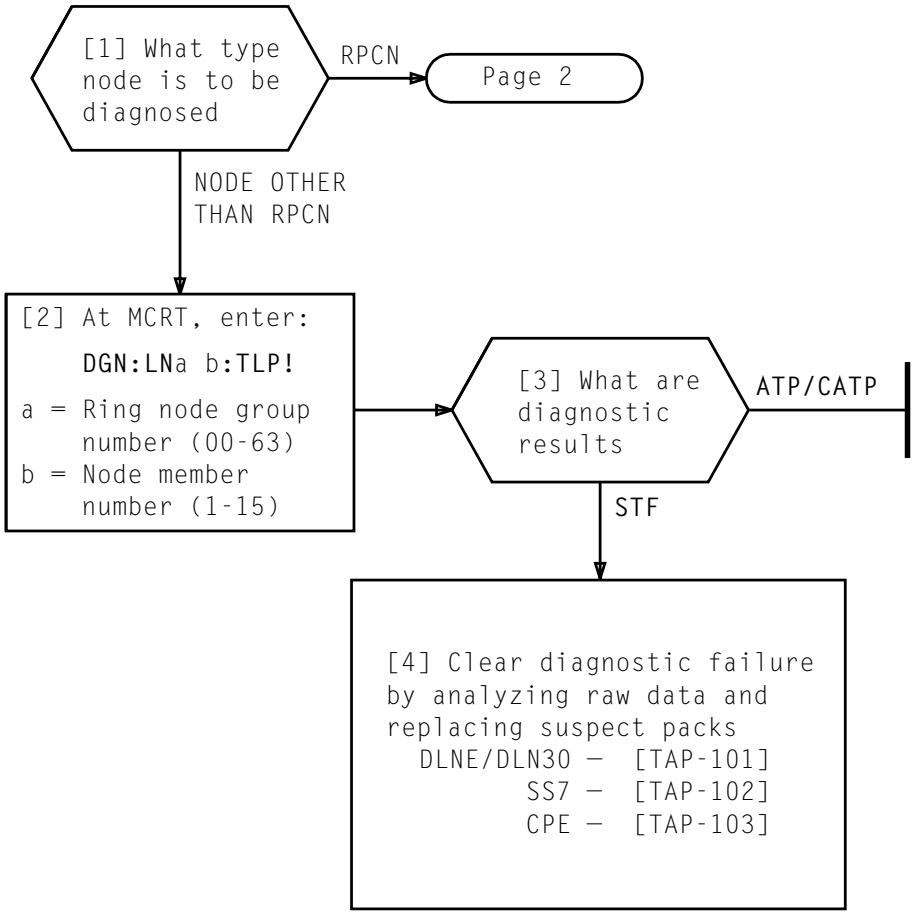


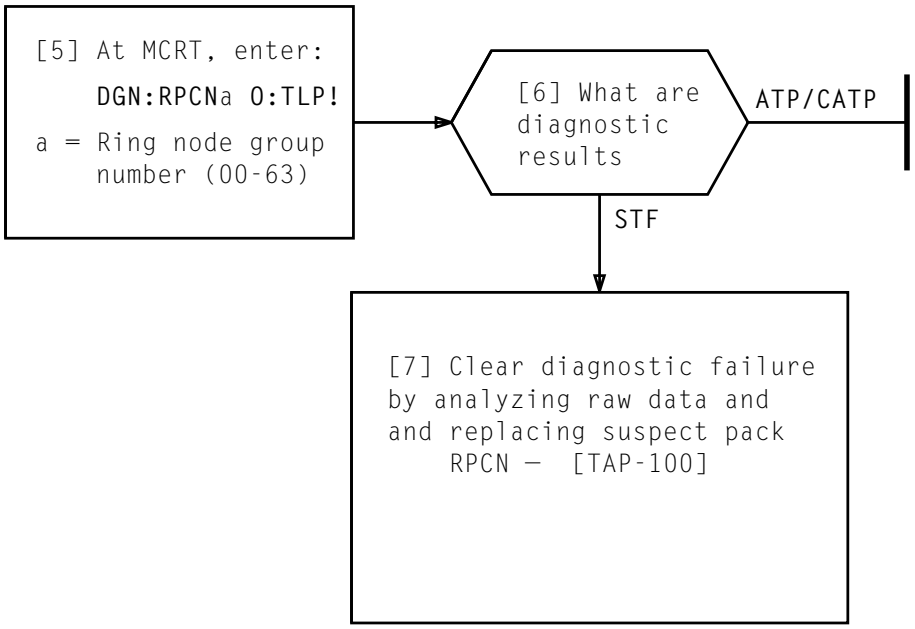
TABLE A
TF5 DSA OPTIONS

OPTION SWITCH	SETTING
S1A	ON
S1B	OFF

VERIFY DIGITAL SERVICE ADAPTER (DSA) OPTIONS ARE PROPERLY SET



PERFORM NODE DIAGNOSTICS



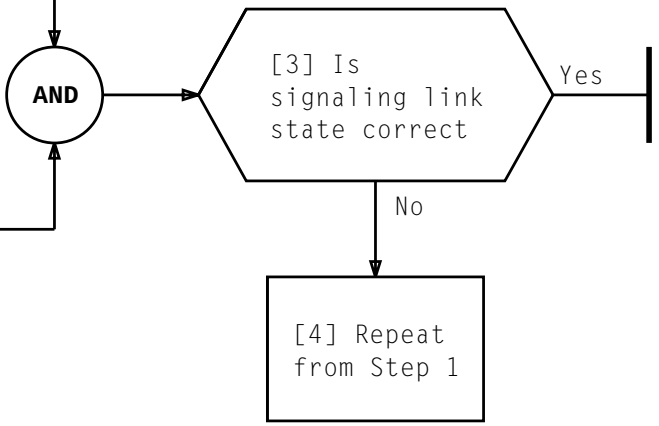
PERFORM NODE DIAGNOSTICS

[1] At MCRT, enter:

CHG:SLK(a,b);c!

a = Ring node group number (00-63)
b = Node member number (1-15)
c = Signaling link state

[2] Using system response [Figure 1], identify signaling link state



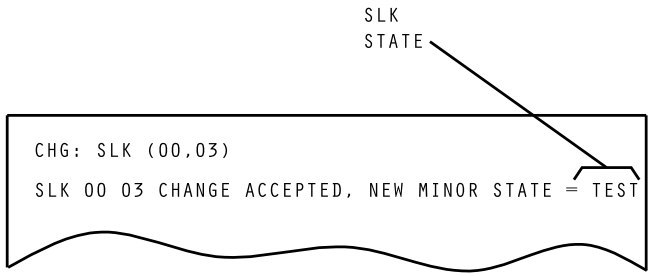
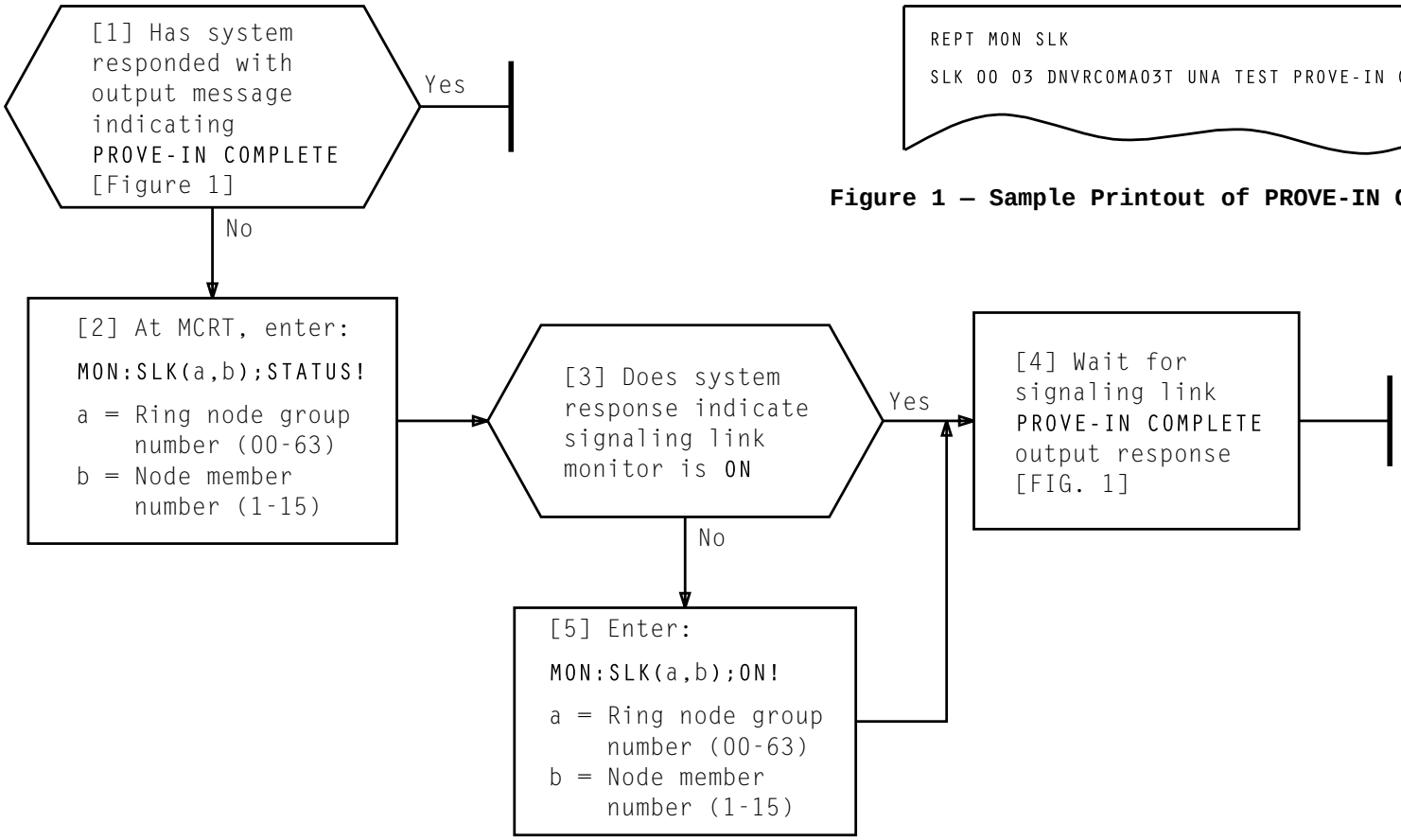


Figure 1 – Sample Printout of Output Response To Signaling Link State Change

CHANGE SIGNALING LINK STATE

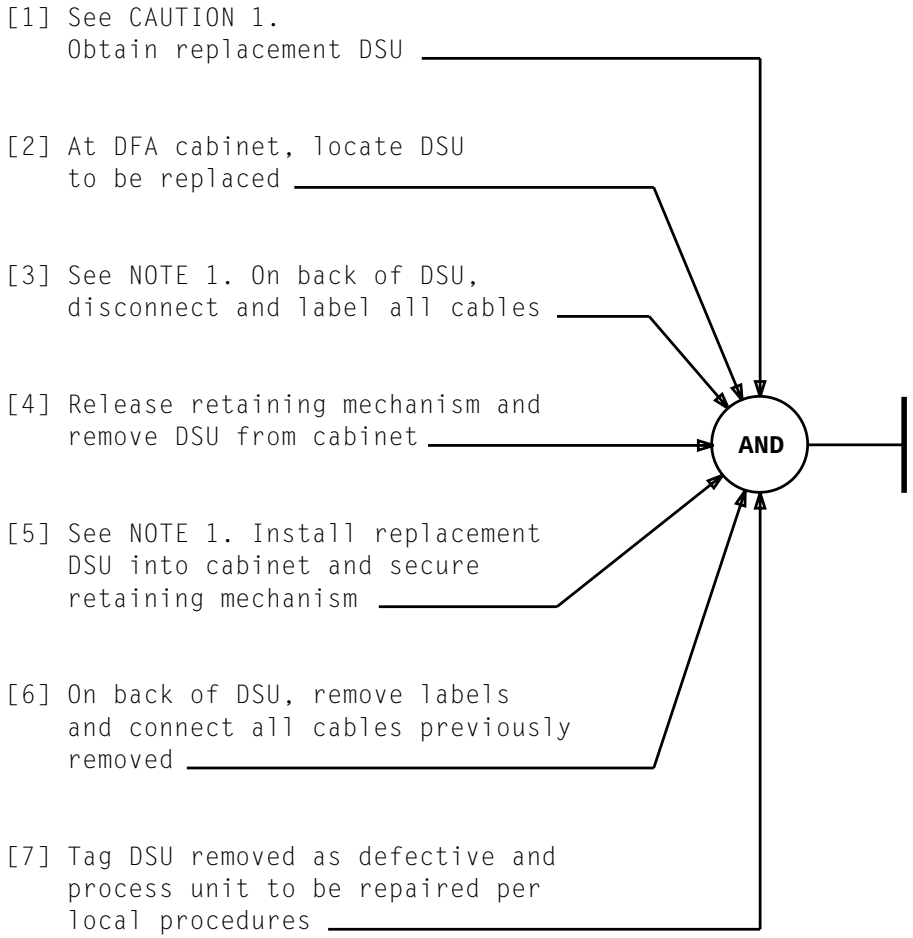



```
REPT MON SLK

SLK 00 03 DNVRC0MA03T UNA TEST PROVE-IN COMPLETE 43
```

Figure 1 — Sample Printout of PROVE-IN COMPLETED Response

VERIFY SIGNALING LINK IS IN SYNC AND PROVED-IN



REPLACE DIGITAL SERVICE UNIT (DSU)

NOTE 1

When handling any equipment or working in the backplane area, a grounded antistatic wrist strap (R-4987 or equivalent) must be worn. The strap should be connected to common ground. When appropriate wrist strap is not available, grounded (exposed) metal should always be touched before handling equipment. Unprotected equipment should never be passed to an ungrounded person nor touch components, leads nor connector pins

CAUTION 1

Keep DSU in protective package until it is ready to be installed in cabinet

[1] See CAUTION 1.
Obtain replacement CSU

[2] At DFA cabinet, locate CSU
to be replaced

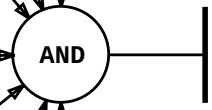
[3] See NOTE 1. On back of CSU,
disconnect and label all cables

[4] Release retaining mechanism and
remove CSU from cabinet

[5] See NOTE 1. Install replacement
CSU into cabinet and secure
retaining mechanism

[6] On back of CSU, remove labels
and connect all cables previously
removed

[7] Tag CSU removed as defective and
process unit to be repaired per
local procedures



REPLACE CHANNEL SERVICE UNIT (CSU)

NOTE 1
When handling any equipment or working in the backplane area, a grounded antistatic wrist strap (R-4987 or equivalent) must be worn. The strap should be connected to common ground. When appropriate wrist strap is not available, grounded (exposed) metal should always be touched before handling equipment. Unprotected equipment should never be passed to an ungrounded person nor touch components, leads nor connector pins

CAUTION 1
Keep CSU in protective package until it is ready to be installed in cabinet

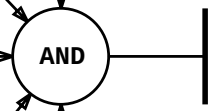
[1] See CAUTION 1.
Obtain replacement DSA

[2] At DFA cabinet, locate DSA to be replaced

[3] Release retaining mechanism and remove DSA from cabinet

[4] See NOTE 1. Install replacement DSA into cabinet and secure retaining mechanism

[5] Tag DSA removed as defective and process unit to be repaired per local procedures



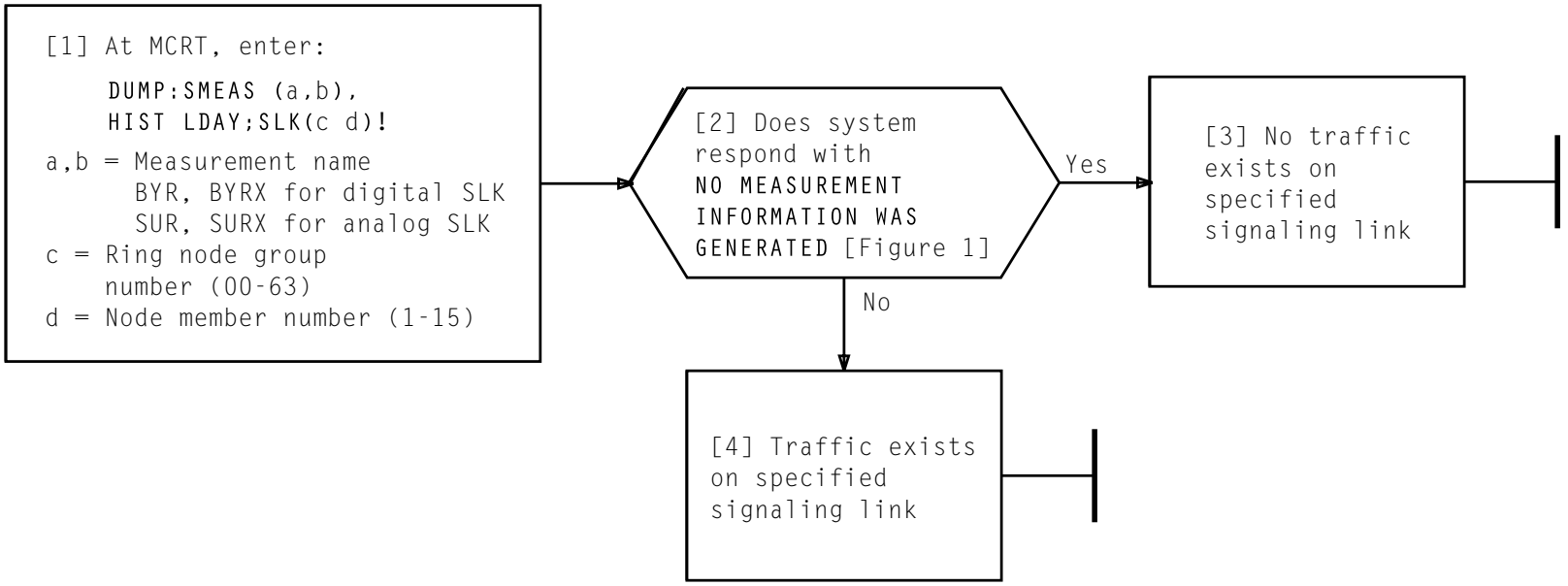
NOTE 1

When handling any equipment or working in the backplane area, a grounded antistatic wrist strap (R-4987 or equivalent) must be worn. The strap should be connected to common ground. When appropriate wrist strap is not available, grounded (exposed) metal should always be touched before handling equipment. Unprotected equipment should never be passed to an ungrounded person nor touch components, leads nor connector pins

CAUTION 1

Keep DSA in protective package until it is ready to be installed in cabinet

REPLACE DIGITAL SERVICE ADAPTER (DSA)

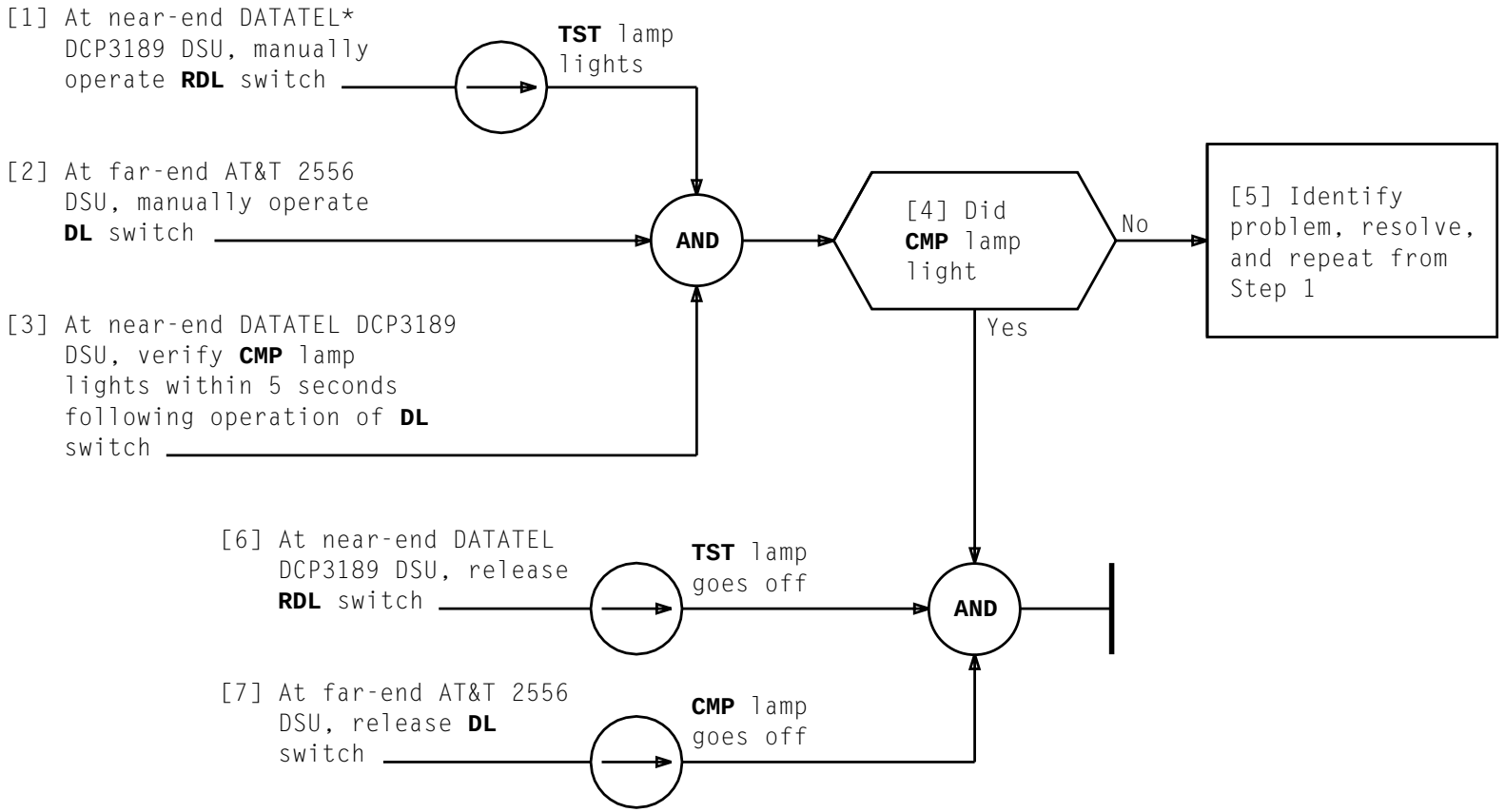



```
DUMP SMEAS COMPL

NO MEASUREMENT INFORMATION WAS GENERATED
```

Figure 1 — Sample Printout Indicating No Signaling Link Measurement Data

VERIFY SIGNALING LINK TRAFFIC



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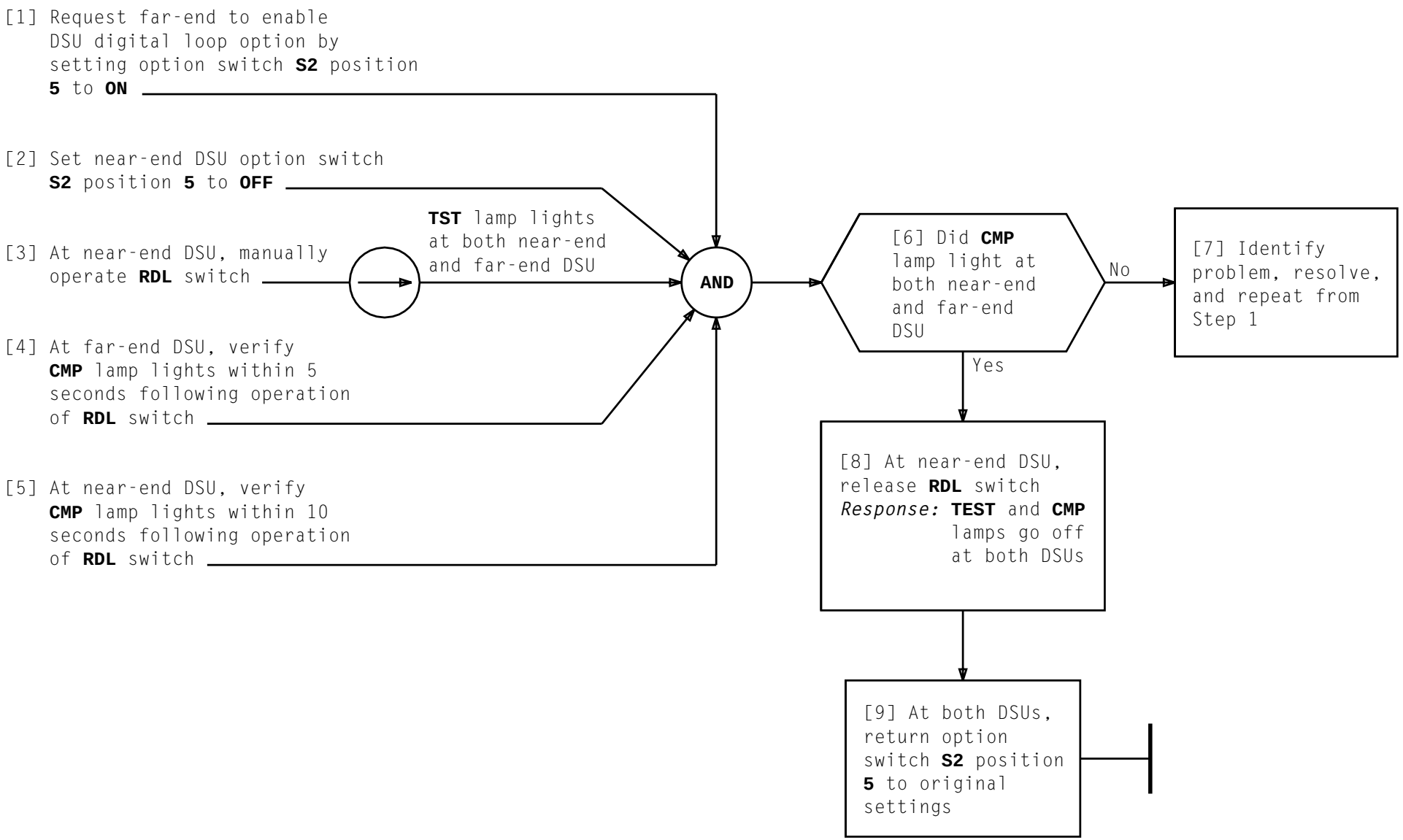
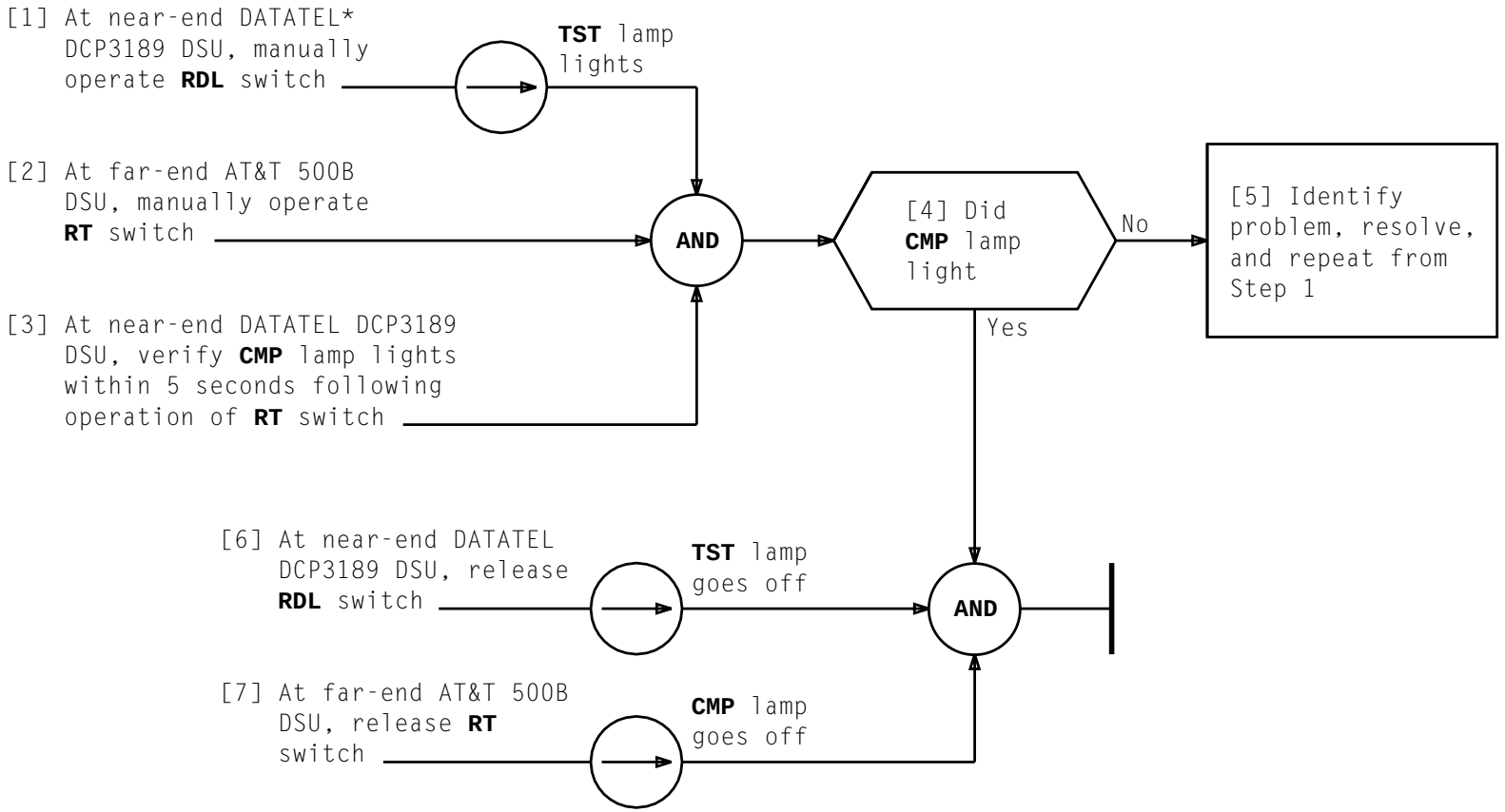
PERFORM DIGITAL SERVICE UNIT (DSU) END-TO-END TEST (DATATEL DCP3189 DSU TO AT&T 2556 DSU)

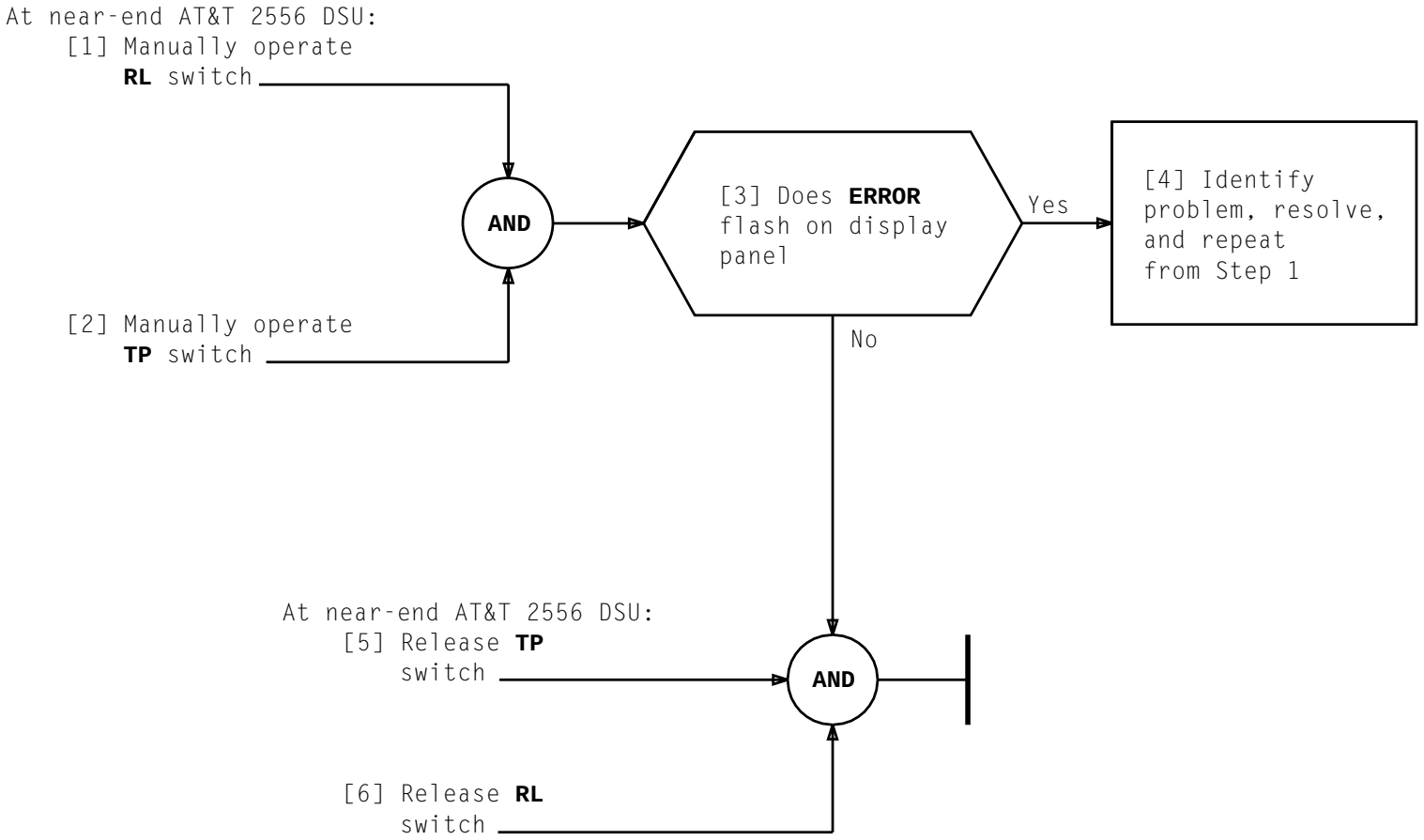


PERFORM DIGITAL SERVICE UNIT (DSU) END-TO-END TEST (DATATEL DCP3189 DSU TO DATATEL DCP3189 DSU)

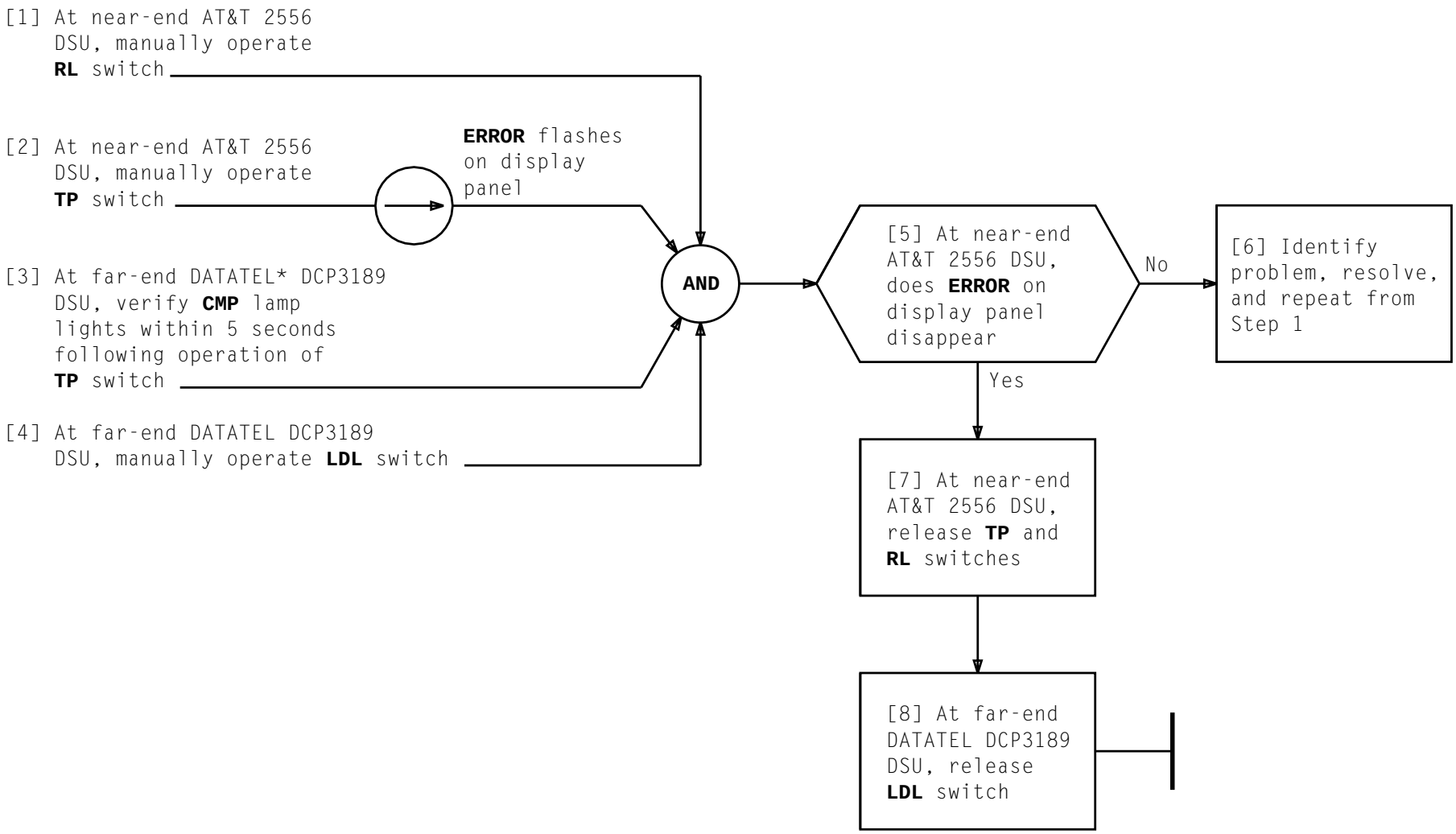


* DATATEL is a registered trademark of DATATEL, Inc.

PERFORM DIGITAL SERVICE UNIT (DSU) END-TO-END TEST (DATATEL DCP3189 DSU TO 500B DSU)

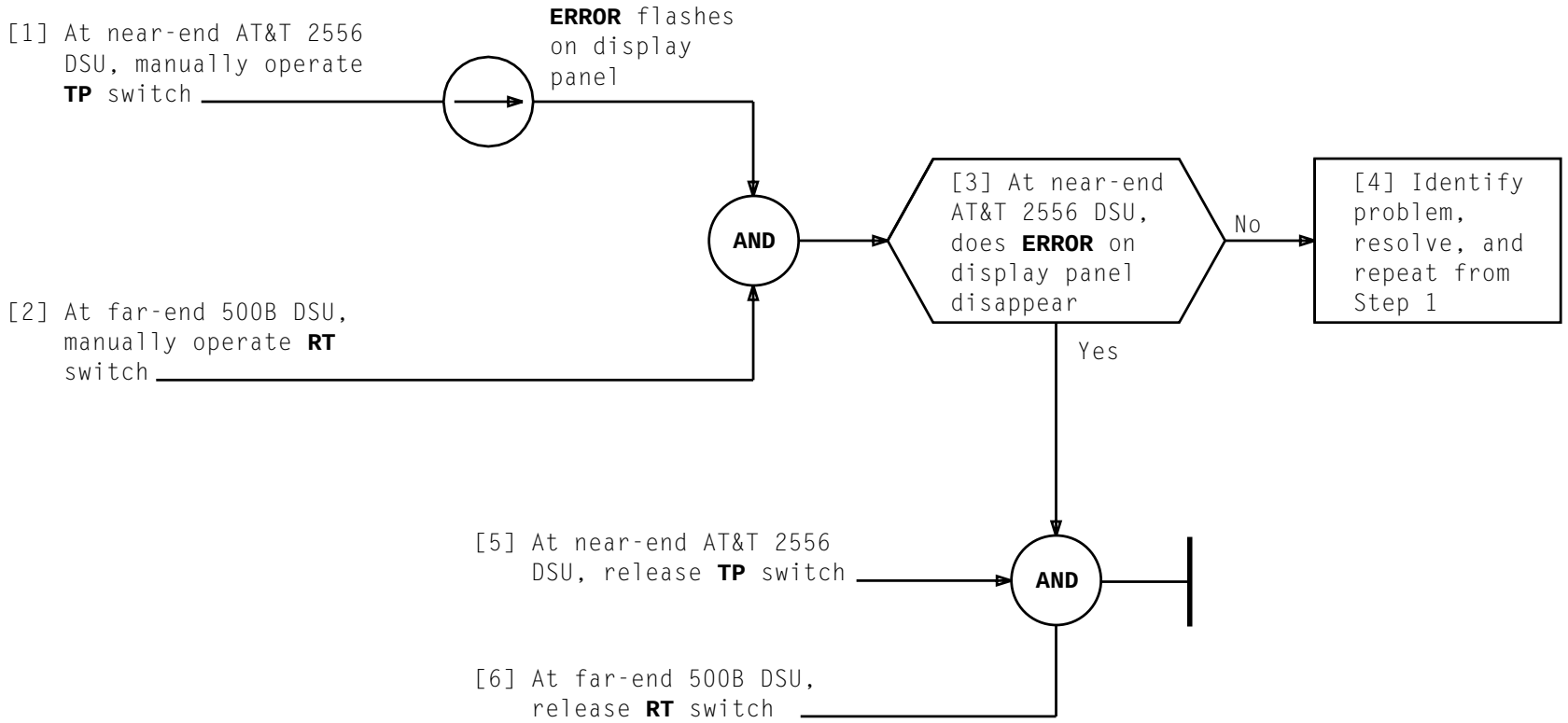


PERFORM DIGITAL SERVICE UNIT (DSU) END-TO-END TEST (AT&T 2556 DSU TO AT&T 2556 DSU)



* DATATEL is a registered trademark of DATATEL, Inc.

PERFORM DIGITAL SERVICE UNIT (DSU) END-TO-END TEST (AT&T 2556 DSU TO DATATEL DCP3189 DSU)



PERFORM DIGITAL SERVICE UNIT (DSU) END-TO-END TEST (AT&T 2556 DSU TO 500B DSU)

REPLACE CABINET FAN UNIT ASSEMBLY

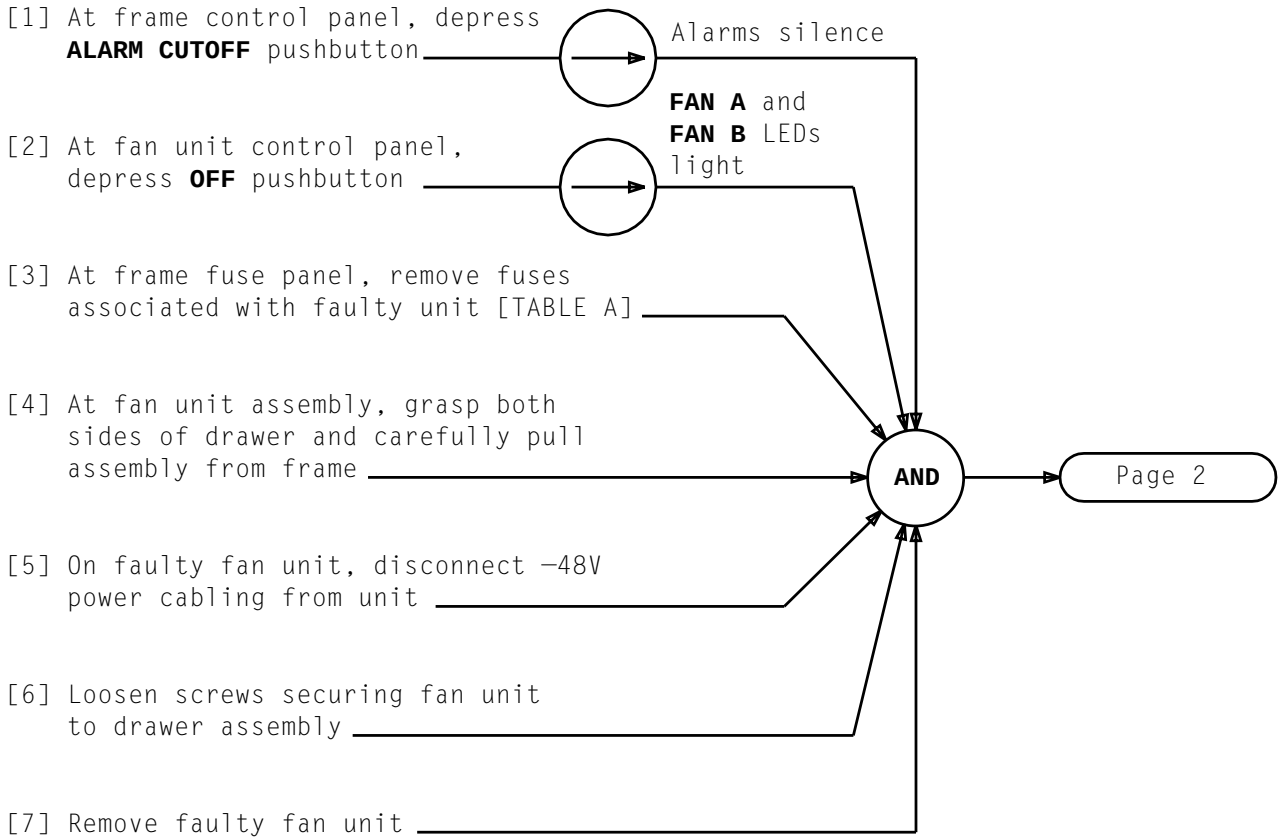
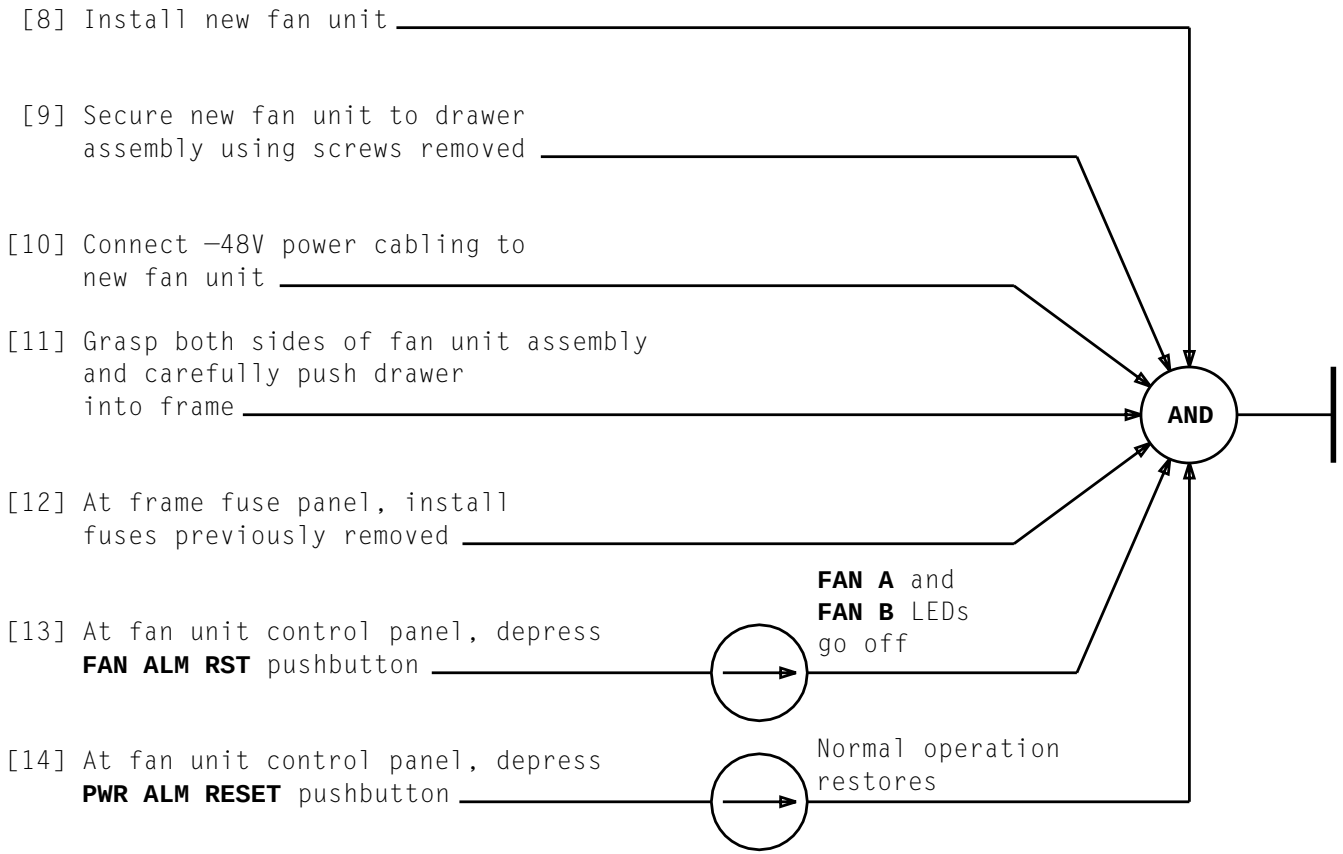
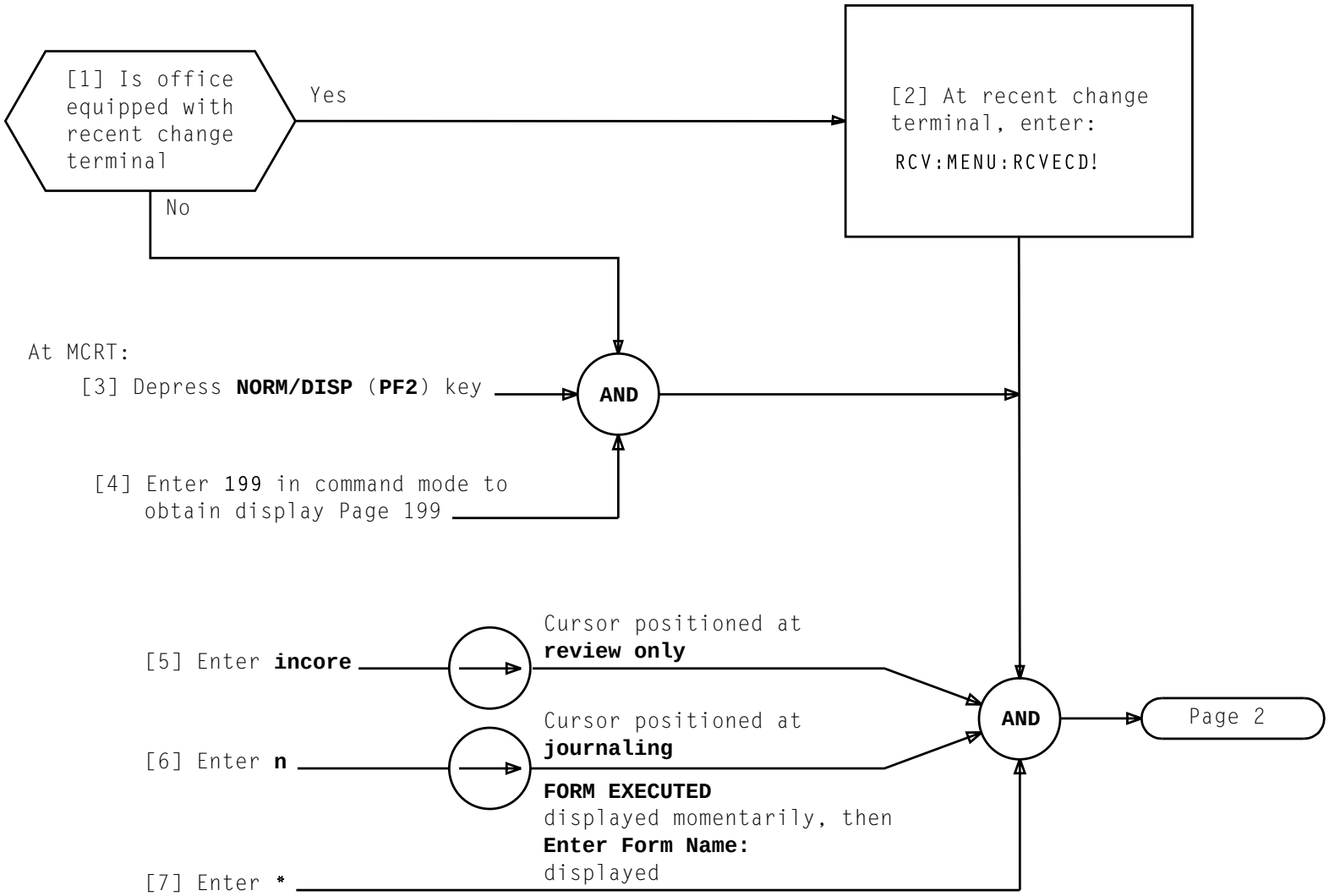


TABLE A
FAN UNIT FUSES

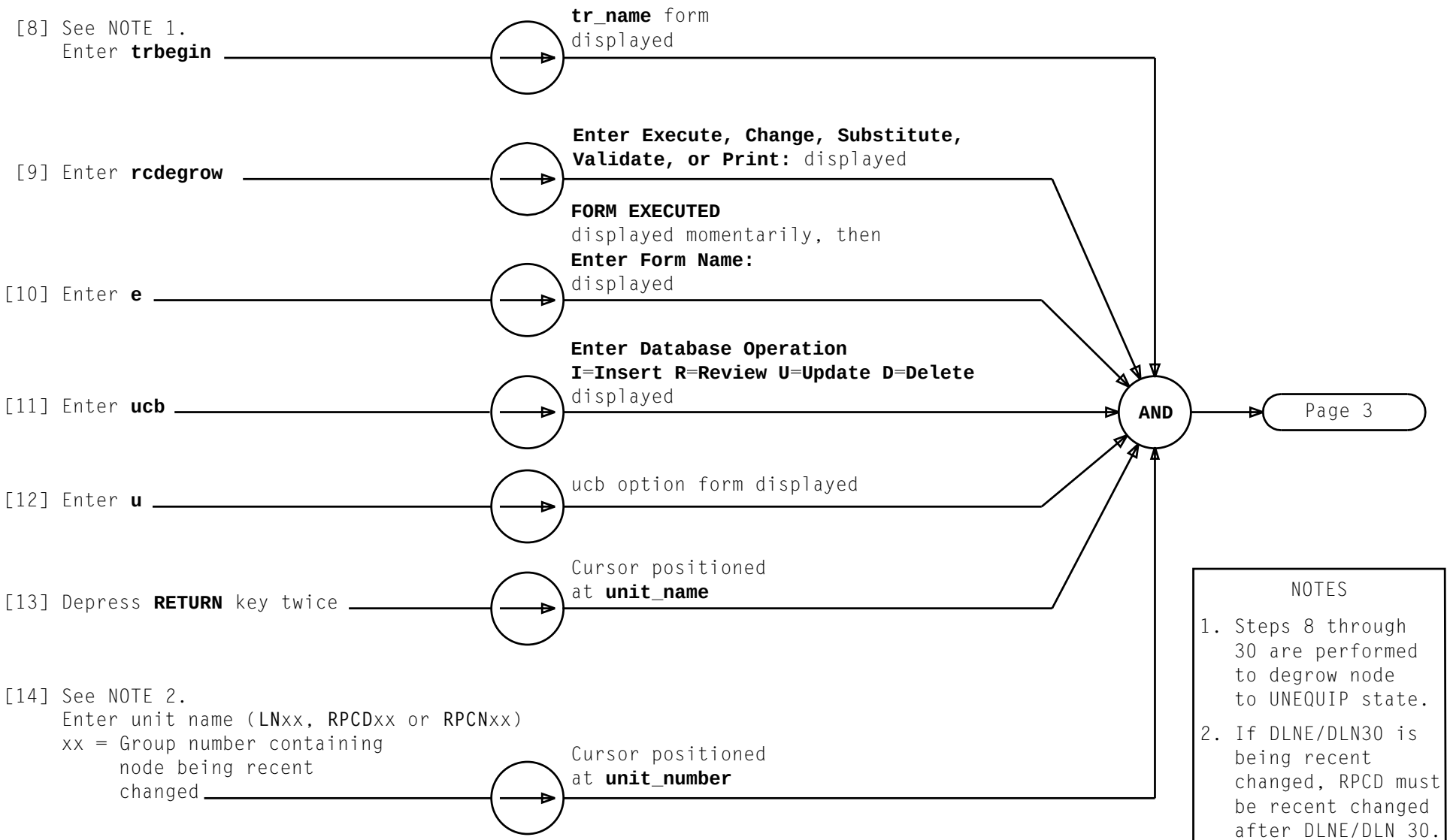
BLOWN FUSE	FUSE TYPE	ASSOCIATED CIRCUITRY
FC1	70G	FAN CONTROLLER 1
FC2	70G	FAN CONTROLLER 2
AF1	70A	FAN UNIT 1
BF2	70A	FAN UNIT 2
CF3	70A	FAN UNIT 3
DF4	70A	FAN UNIT 4
ALP	70G	BUS A LAMP
BLP	70G	BUS B LAMP



REPLACE CABINET FAN UNIT ASSEMBLY



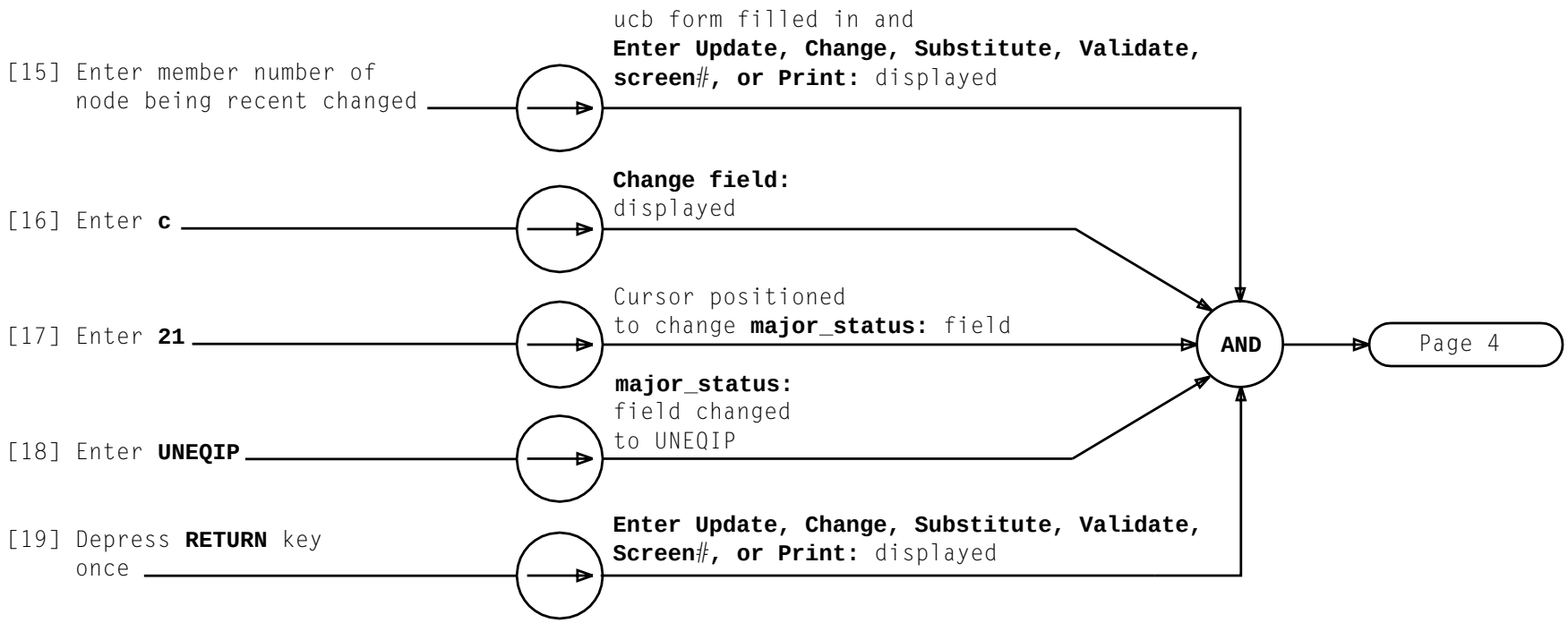
PERFORM RECENT CHANGE TO CHANGE NODE HV VALUE



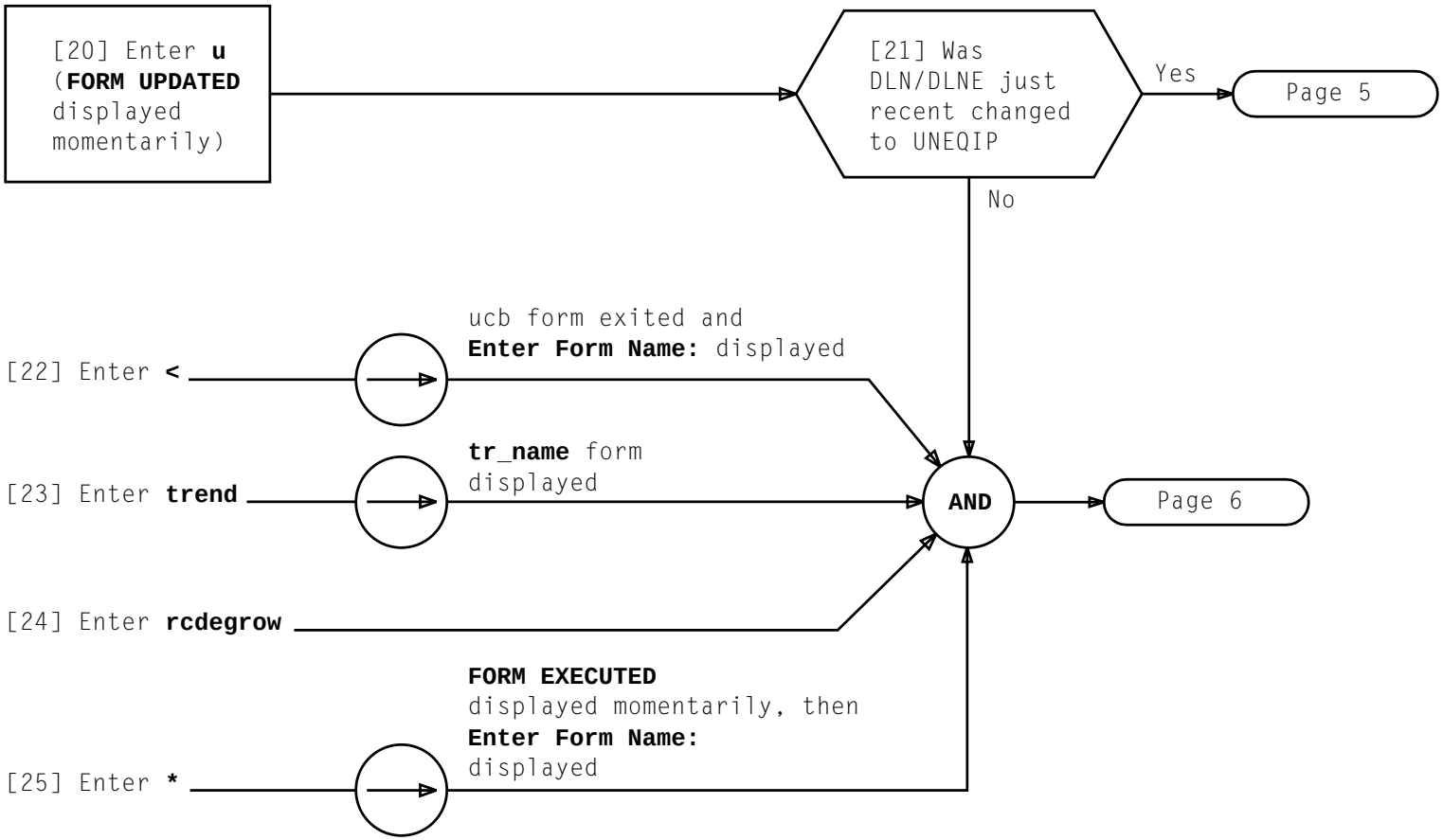
NOTES

1. Steps 8 through 30 are performed to degrow node to UNEQUIP state.
2. If DLNE/DLN30 is being recent changed, RPCD must be recent changed after DLNE/DLN 30. A **trend** is required between recent changes

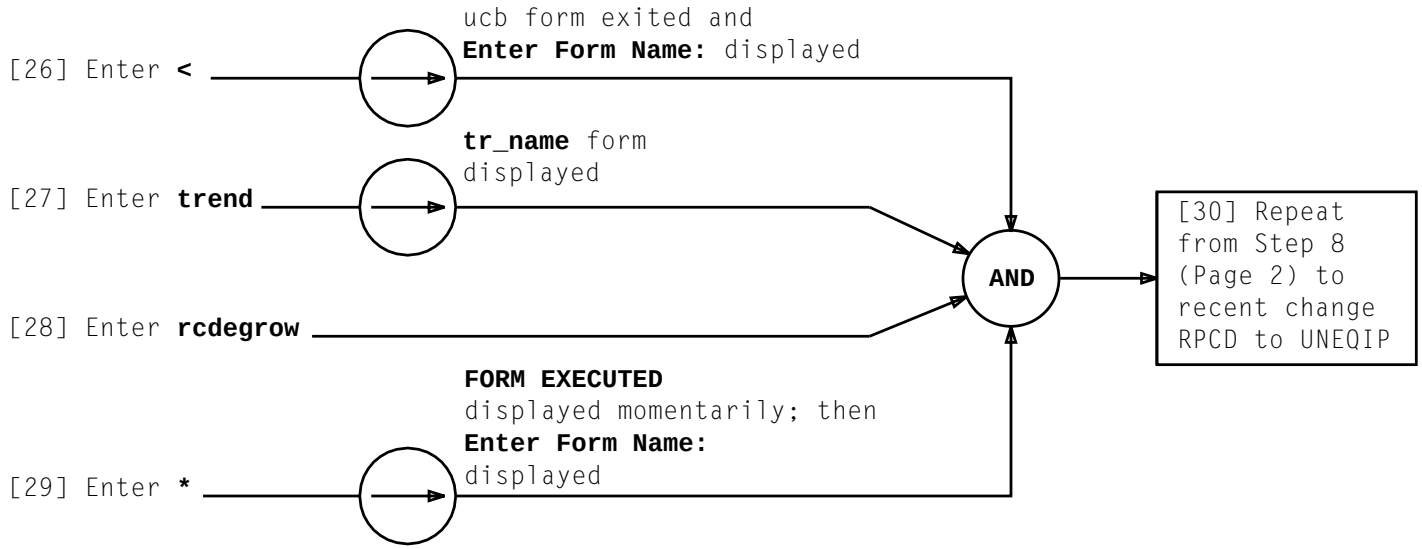
PERFORM RECENT CHANGE TO CHANGE NODE HV VALUE



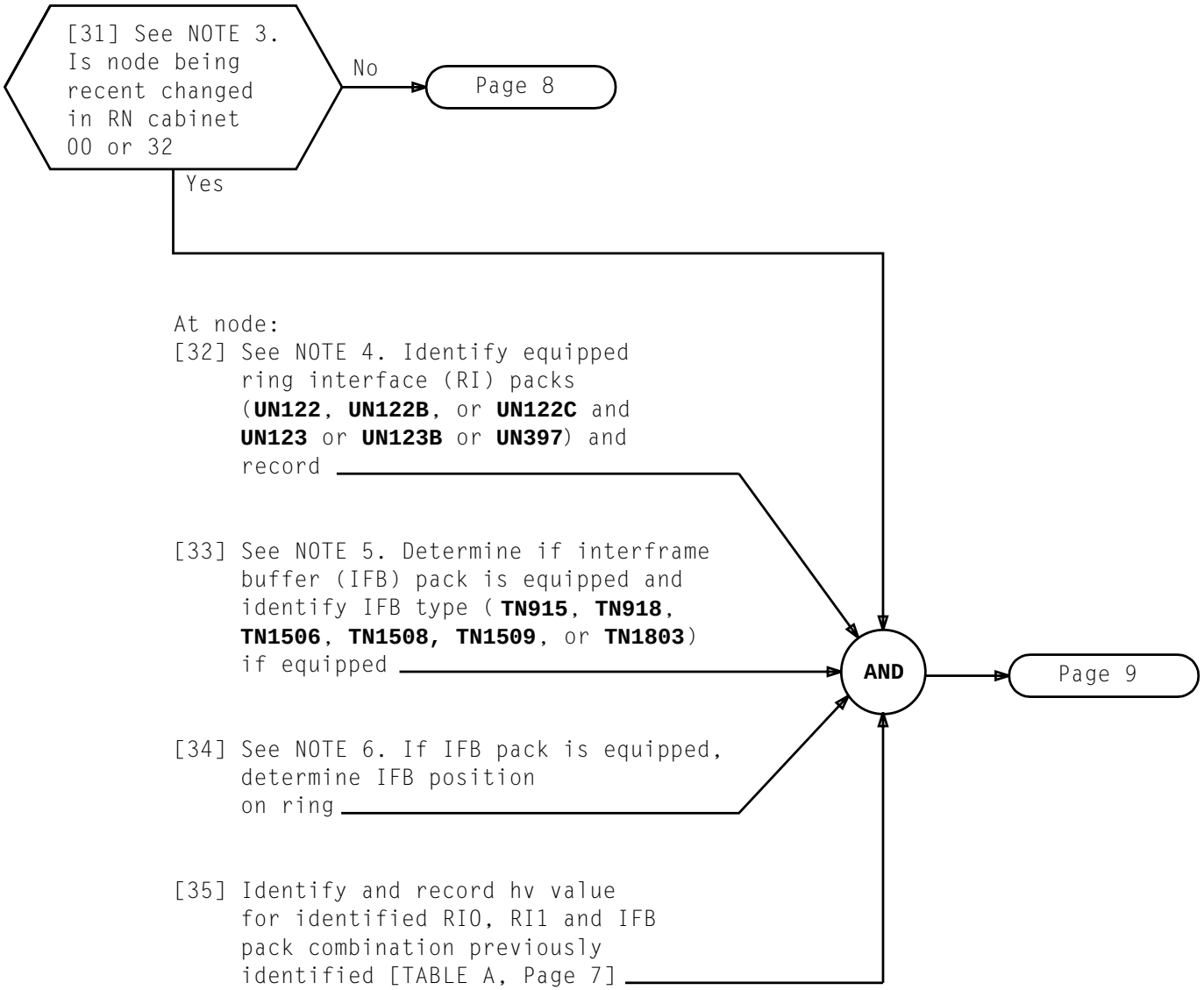
PERFORM RECENT CHANGE TO CHANGE NODE HV VALUE



PERFORM RECENT CHANGE TO CHANGE NODE HV VALUE



PERFORM RECENT CHANGE TO CHANGE NODE HV VALUE



NOTES

3. Steps 31 through 64 are performed to change node hv value.
4. If RPCD is being recent changed, hv value is same value as hv value for DLN
5. If IFB pack is being replaced, the two IFB packs that make up a pair must be of the same version.
6. IFB is considered lower if IFB is located in lowest node position in cabinet. IFB is considered higher if IFB is located in highest node position in cabinet.

PERFORM RECENT CHANGE TO CHANGE NODE HV VALUE

TABLE A SSI NODE hv VALUES							
RI0 & RI1 TYPE	IFB POSITION IN RNC	hv VALUES FOR IFB TYPE					
		NO IFB	TN918	TN915	TN1506	TN1508	TN1509/ TN1803
UN122 UN123	Lowest	0x0100	0x0101	0x0102	0x0104	0x0105	0x0106
	Highest	0x0100	0x0110	0x0120	0x0140	0x0150	0x0160
UN122B UN123B	Lowest	0x0900	0x0901	0x0902	0x0904	0x0905	0x0906
	Highest	0x0900	0x0910	0x0920	0x0940	0x0950	0x0960
UN122C UN123B	Lowest	0x1900	0x1901	0x1902	0x1904	0x1905	0x1906
	Highest	0x1900	0x1910	0x1920	0x1940	0x1950	0x1960
UN397	Lowest	0x4000	0x4001	*	*	0x4005	0x4006
	Highest	0x4000	0x4010	*	*	0x4050	0x4060

* Not Applicable

At node:

[36] Identify equipped integrated ring node (IRN) pack UN303B, UN304) and record

[37] See NOTE 7. Determine if interframe buffer (IFB) pack is equipped, and identify IFB type (**TN915**, **TN918**, **TN1506**, **TN1508, TN1509**, or **TN1803**) if equipped

[38] See NOTE 8. If IFB pack is equipped, determine IFB position on ring (lower or higher)

[39] Identify and record hv value for identified IRN and IFB pack combination previously identified [TABLE B]

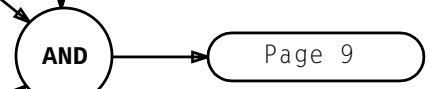


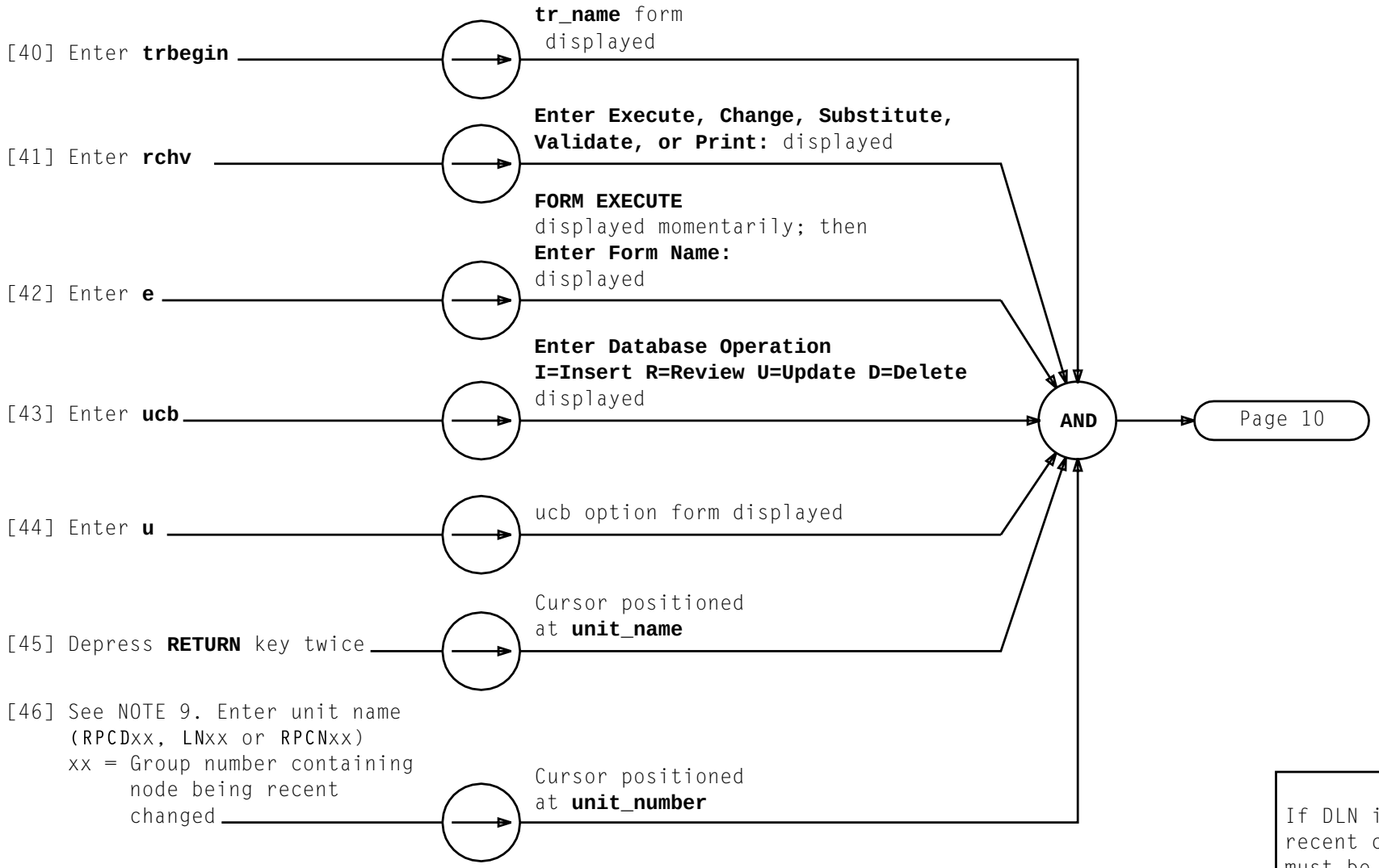
TABLE B
HDB NODE hv VALUES

IRN TYPE	IFB POSITION IN RNC	hv VALUES FOR IFB TYPE					
		NO IFB	TN918	TN915	TN1506	TN1508	TN1509/ TN1803
UN303B	Lowest	0x9000	0x9001	0x9002	0x9004	0x9005	0x9006
	Highest	0x9000	0x9010	0x9020	0x9040	0x9050	0x9060
UN304	Lowest	0xc000	0xc001	0xc002	0xc004	0xc005	0xc006
	Highest	0xc000	0xc010	0xc020	0xc040	0xc050	0xc060

NOTES

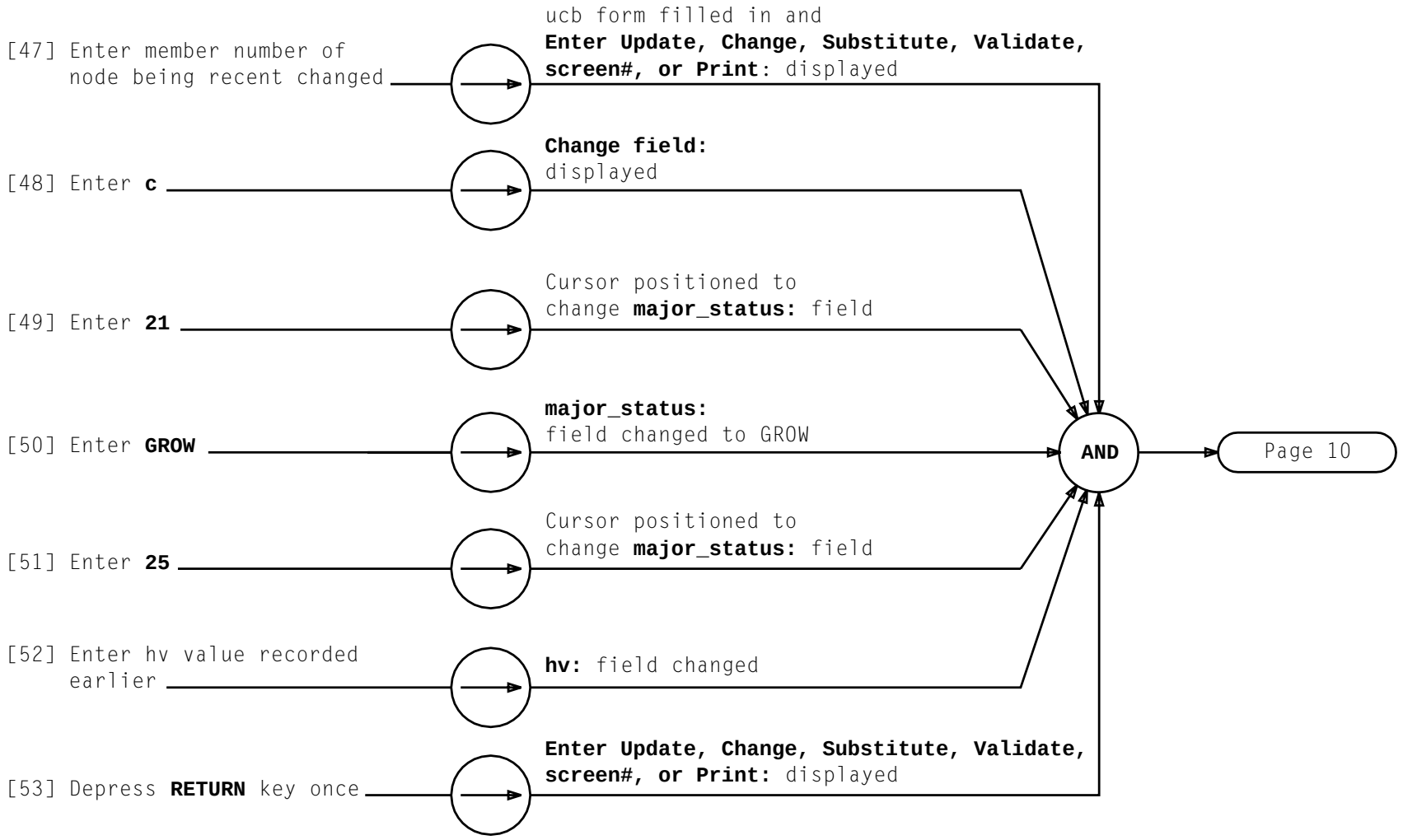
7. If IFB pack is being replaced, the two IFB packs that make up a pair must be of the same version.
8. IFB is considered lower if IFB is located in lowest node position in cabinet. IFB is considered higher if IFB is located in highest node position in cabinet.

PERFORM RECENT CHANGE TO CHANGE NODE HV VALUE

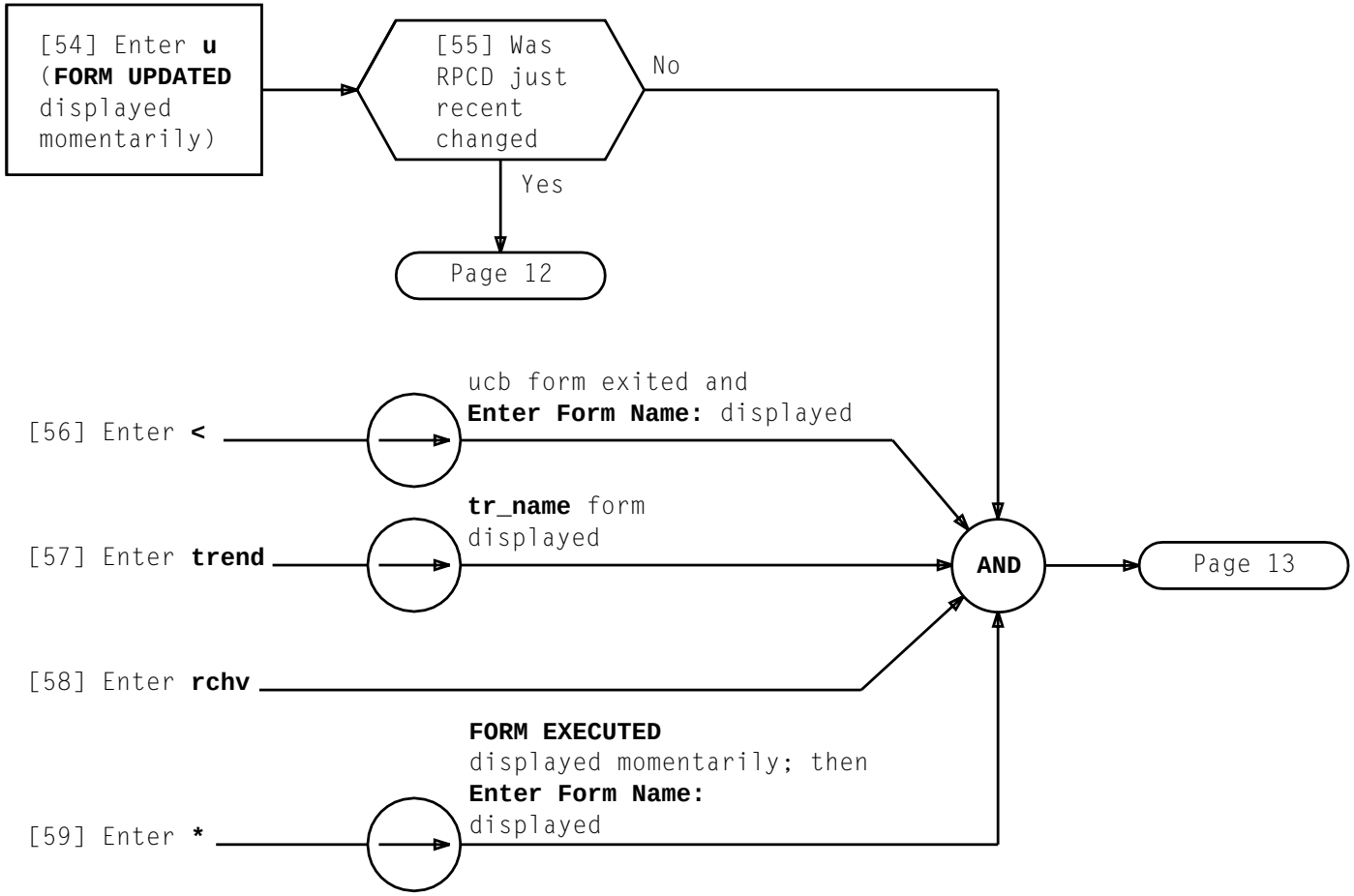


NOTE 9
If DLN is being recent changed, RPCD must be recent changed before DLN. A **trend** is required between recent changes

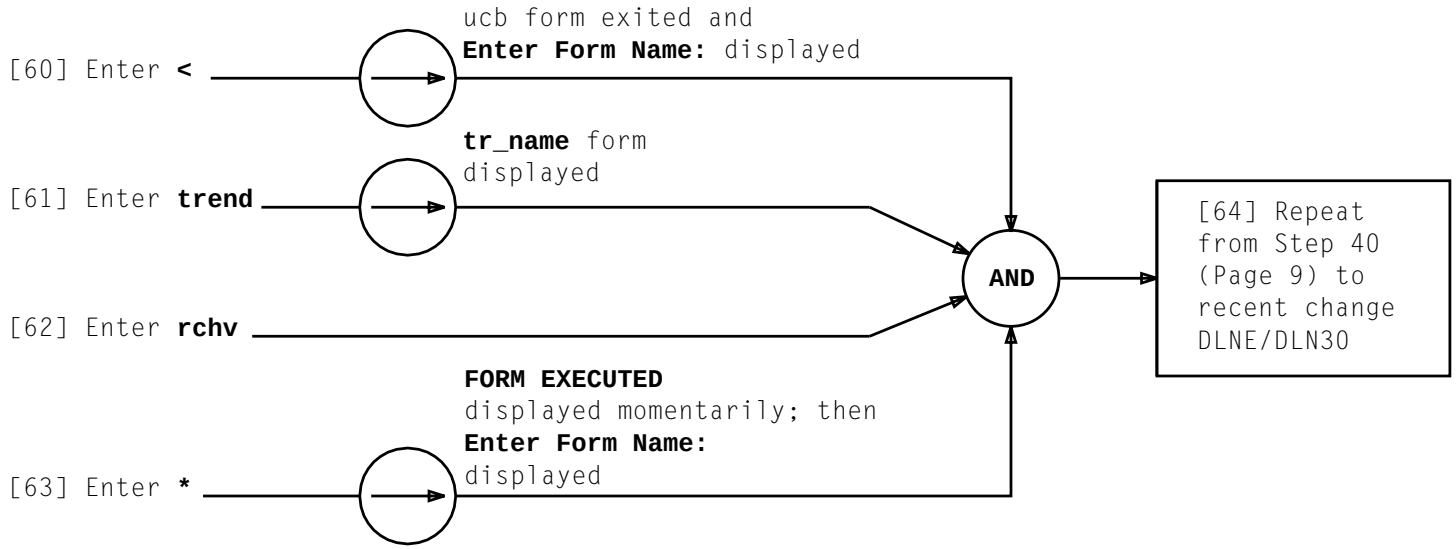
PERFORM RECENT CHANGE TO CHANGE NODE HV VALUE



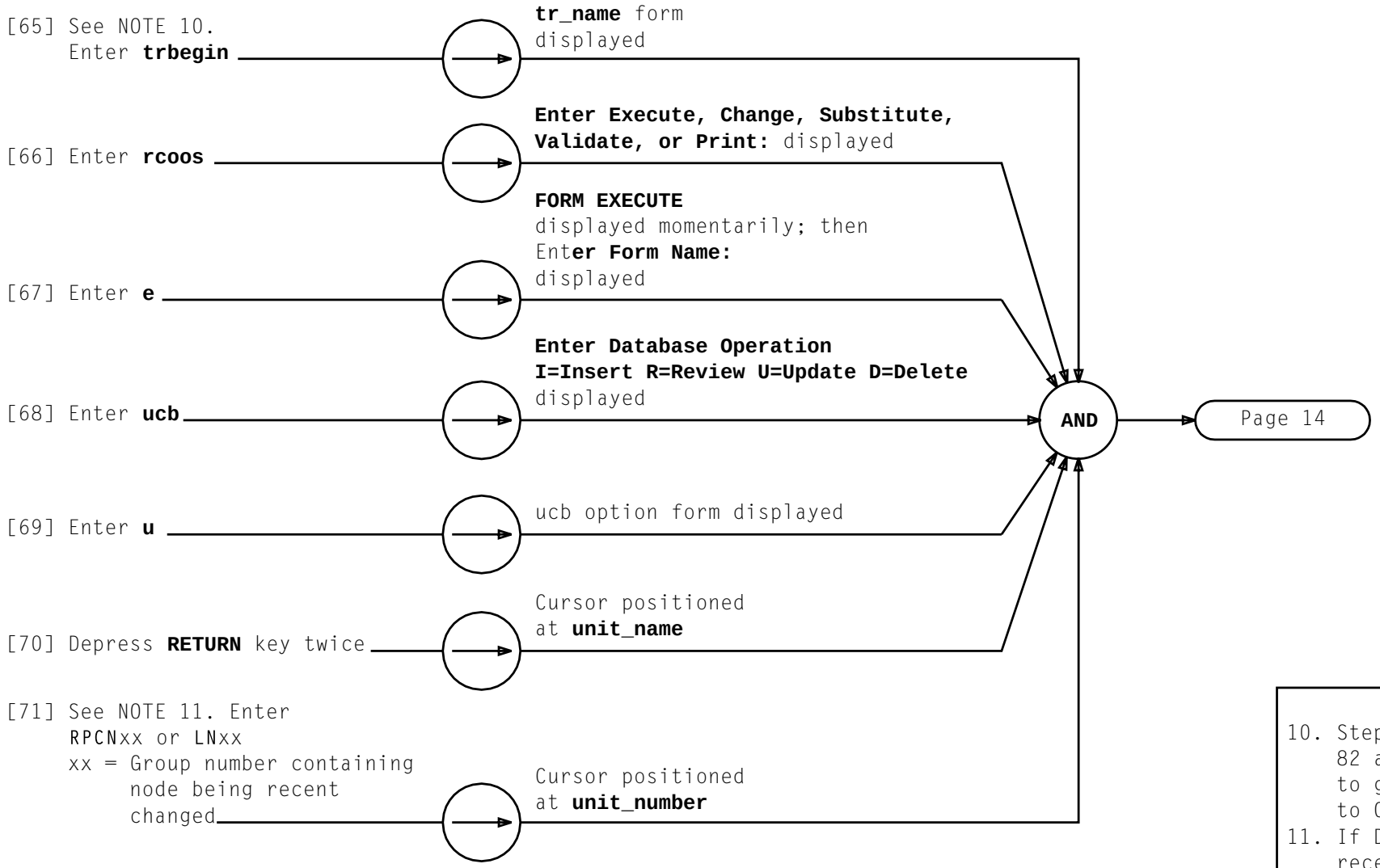
PERFORM RECENT CHANGE TO CHANGE NODE HV VALUE



PERFORM RECENT CHANGE TO CHANGE NODE HV VALUE



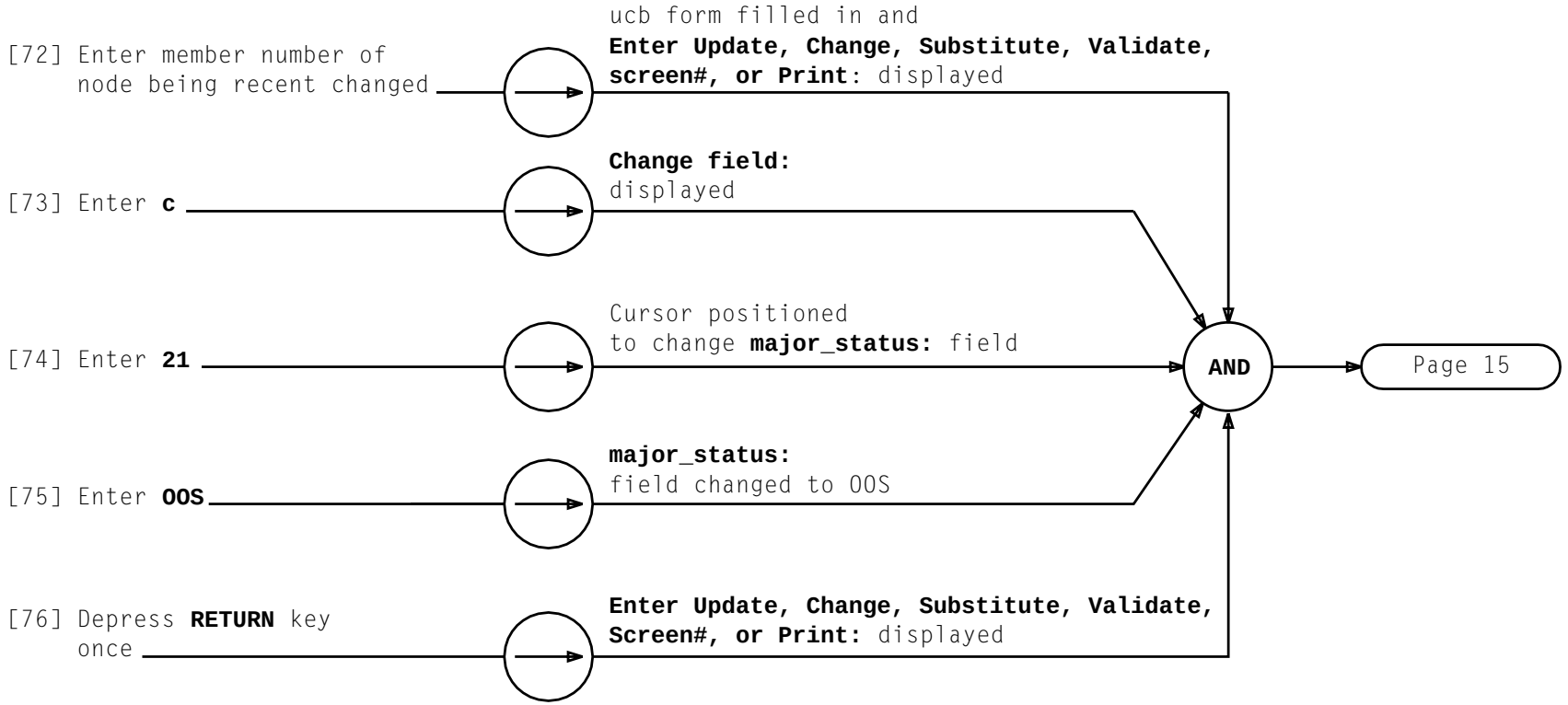
PERFORM RECENT CHANGE TO CHANGE NODE HV VALUE



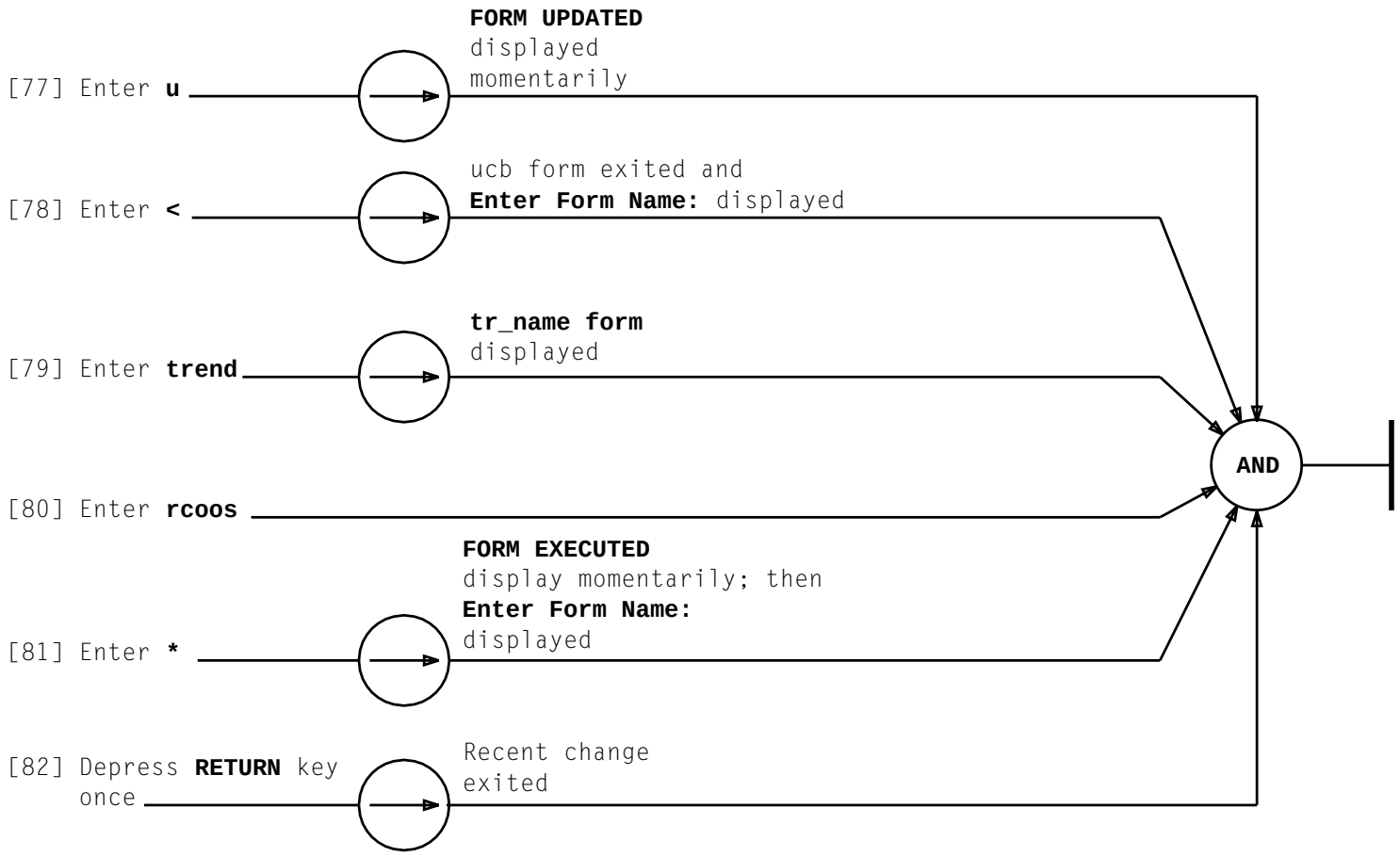
NOTES

10. Steps 65 through 82 are performed to grow node to OOS state.
11. If DLN is being recent changed, RPCD is not required to be recent changed to OOS

PERFORM RECENT CHANGE TO CHANGE NODE HV VALUE



PERFORM RECENT CHANGE TO CHANGE NODE HV VALUE



PERFORM RECENT CHANGE TO CHANGE NODE HV VALUE

[1] At MCRT, enter:

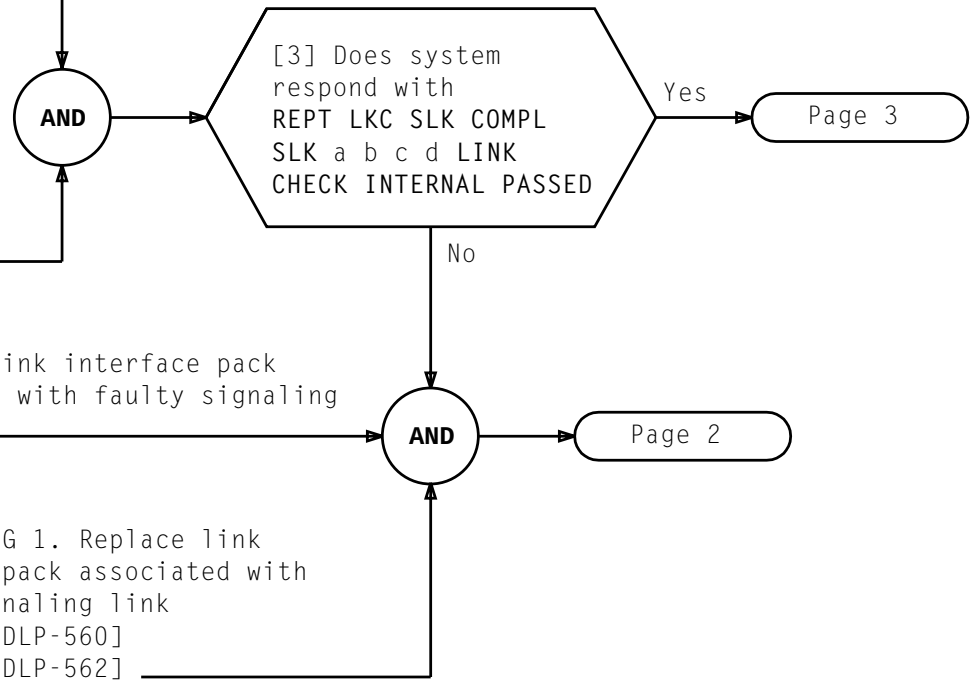
CHG:SLK(a,b,c,d);MOOS!

a = Ring node group number (00-63)
b = Node member number (1-15)
c = Circuit pack number (0 or 1)
d = Port number (0-3)

[2] Enter:

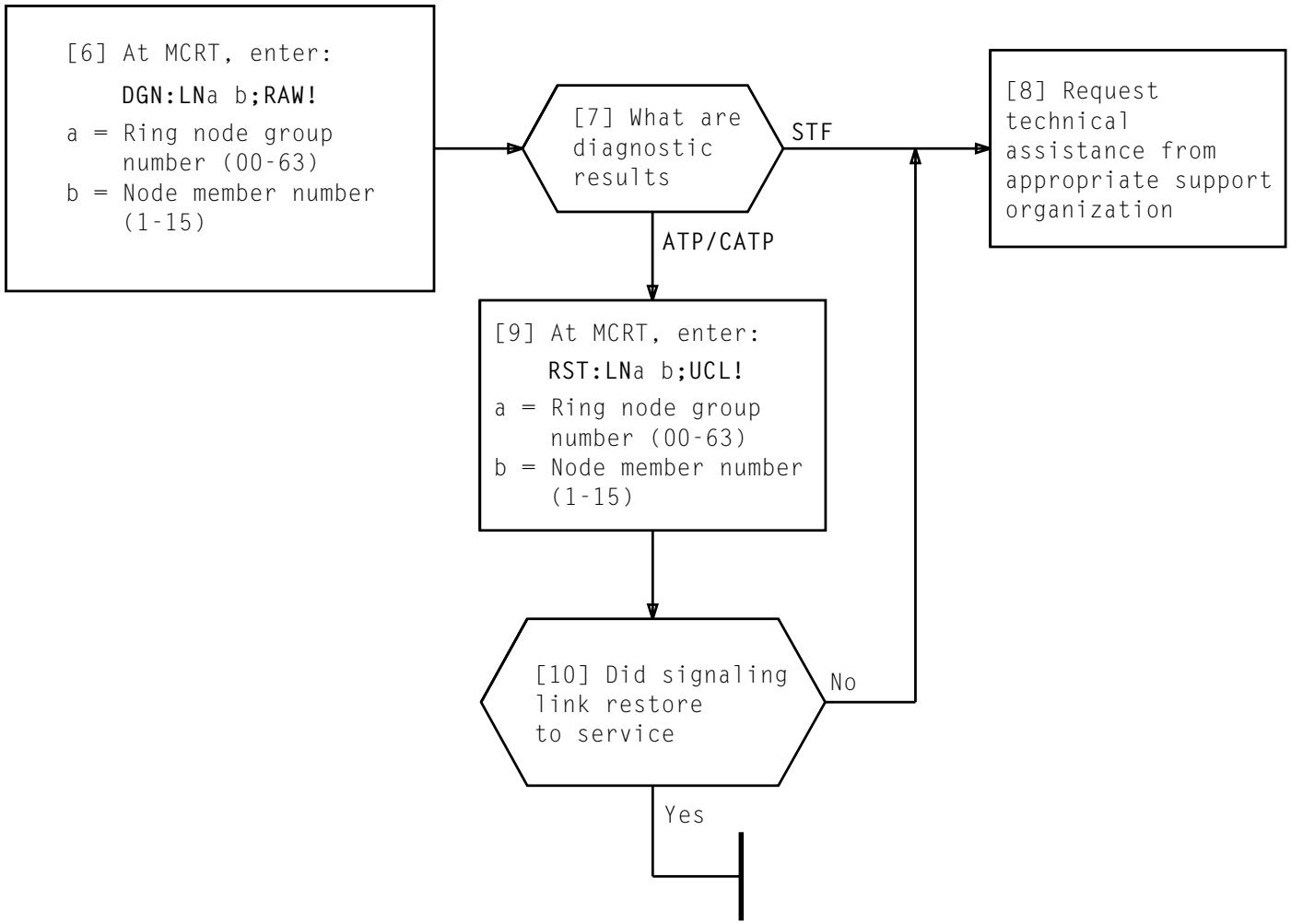
LKC:SLK(a,b,c,d);LCKI!

a = Ring node group number (00-63)
b = Node member number (1-15)
c = Circuit pack number (0 or 1)
d = Port number (0-3)



WARNING 1
Replacement of link interface pack causes service interruption to all signaling links associated with link interface. Determine best time to introduce service outage in order to minimize service disruption

PERFORM LINK CHECK INTERNAL (LCKI) AND LINK CHECK (LCHK) TESTS TO ISOLATE AND CLEAR SIGNALING LINK FAULT



PERFORM LINK CHECK INTERNAL (LCKI) AND LINK CHECK (LCHK) TESTS TO ISOLATE AND CLEAR SIGNALING LINK FAULT

[11] Notify far-end of intent
to perform link check test

[12] At MCRT, enter:

LKC:SLK(a,b,c,d);SETL!

a = Ring node group number (00-63)
b = Node member number (1-15)
c = Circuit pack number (0-1)
d = Port number (0-3)

System responds with
REPT LKC SLK COMPL
SLK a b c d LOOPBACK
ESTABLISHED

AND

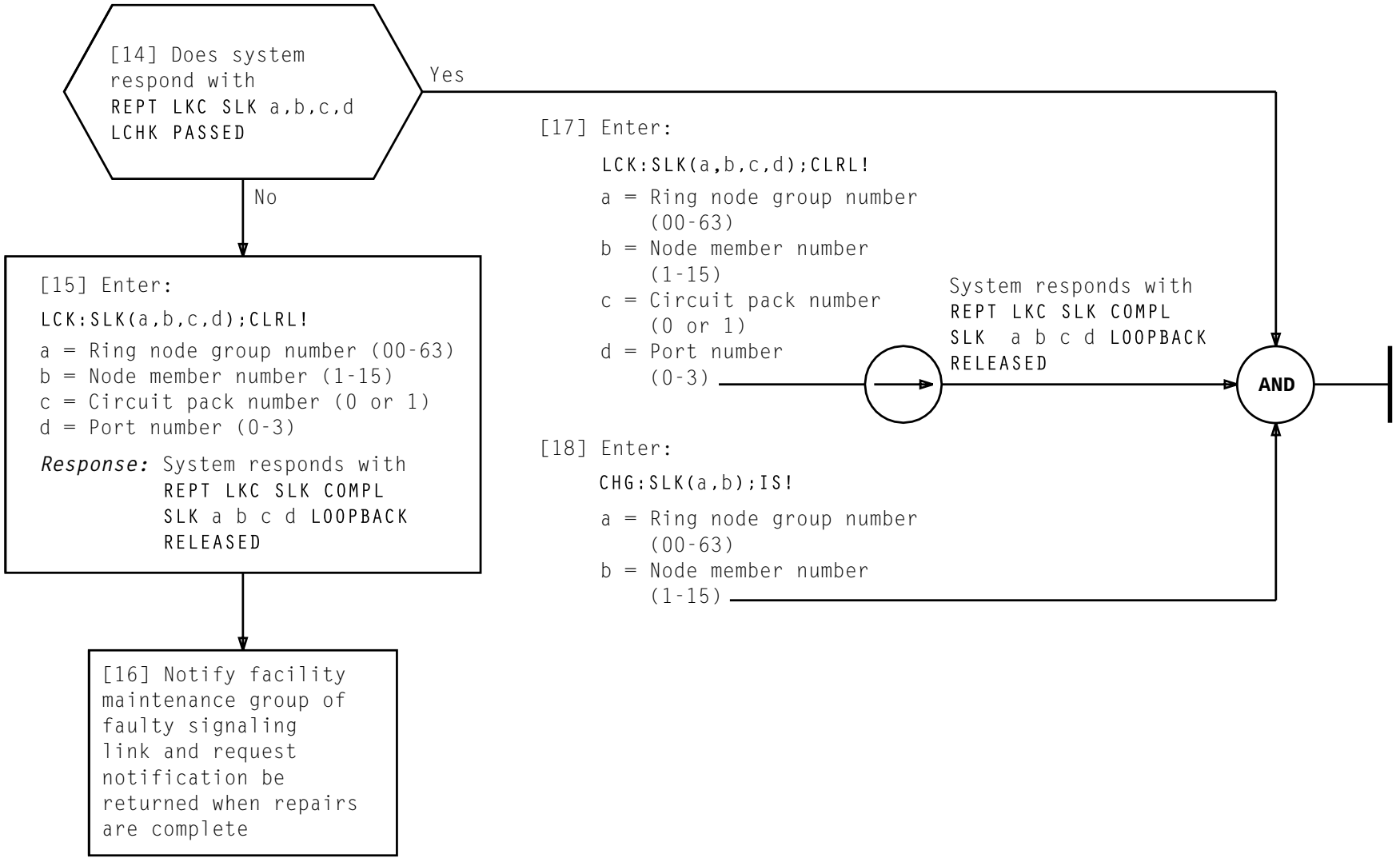
Page 4

[13] Enter:

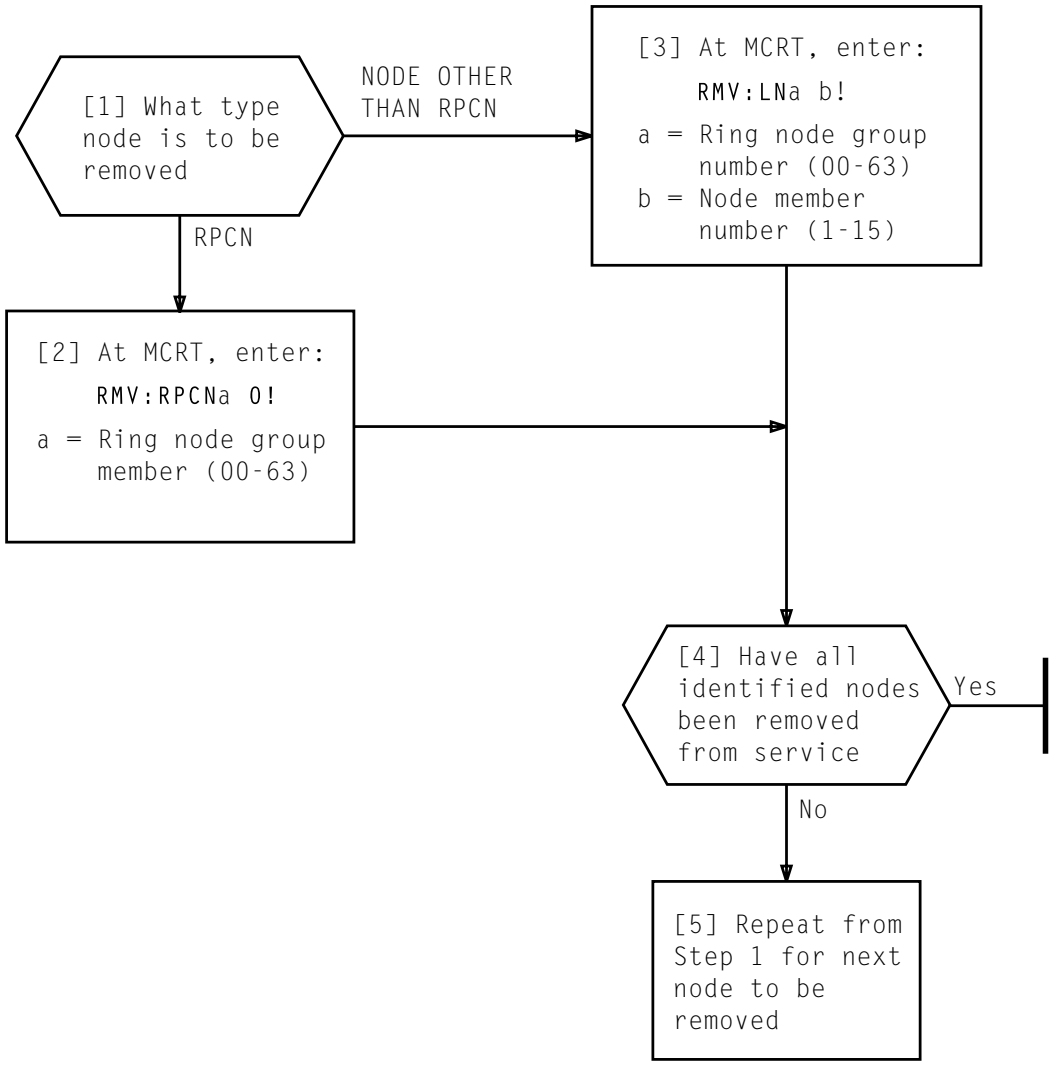
LKC:SLK(a,b,c,d);LCHK!

a = Ring node group number (00-63)
b = Node member number (1-15)
c = Circuit pack number (0-1)
d = Port number (0-3)

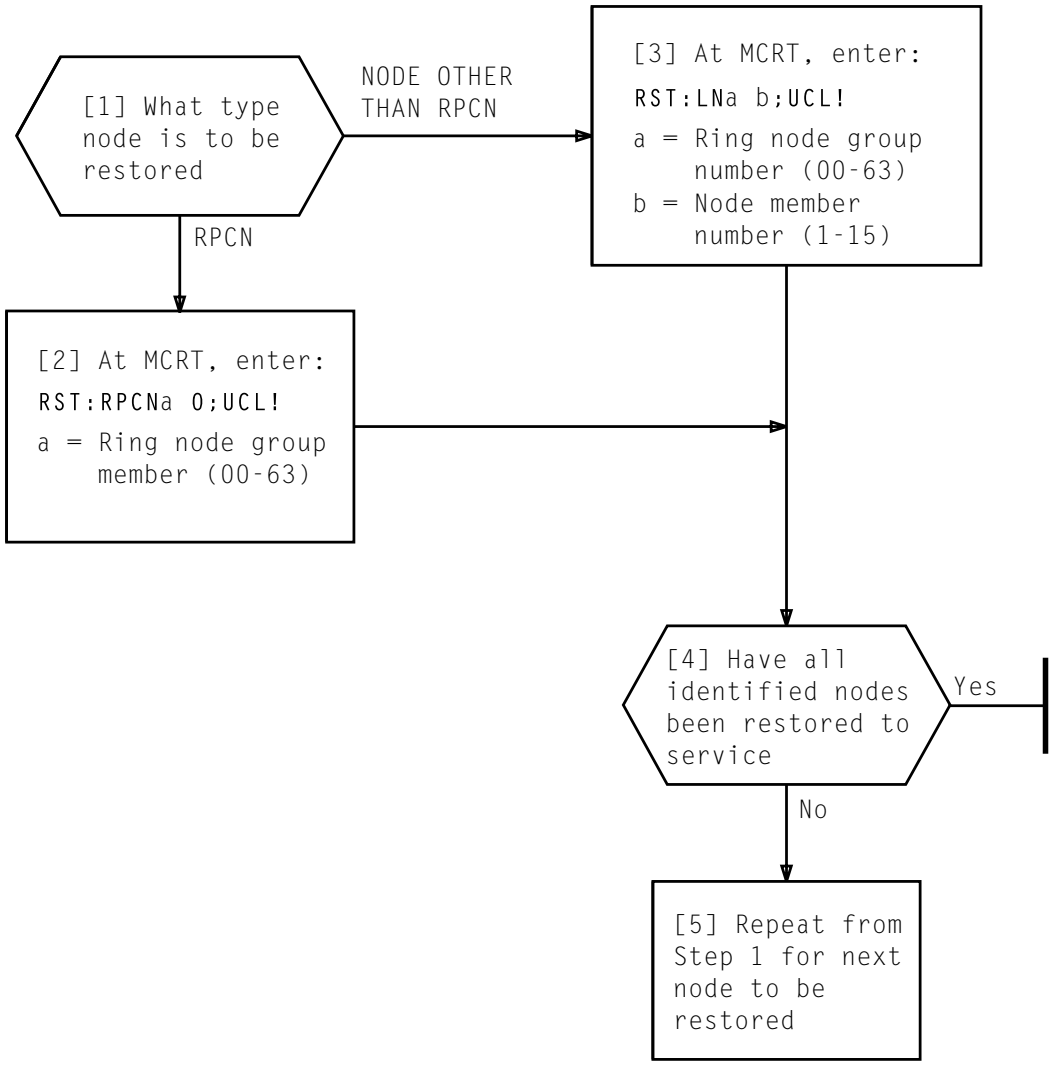
PERFORM LINK CHECK INTERNAL (LCKI) AND LINK CHECK (LCHK) TESTS TO ISOLATE AND CLEAR SIGNALING LINK FAULT



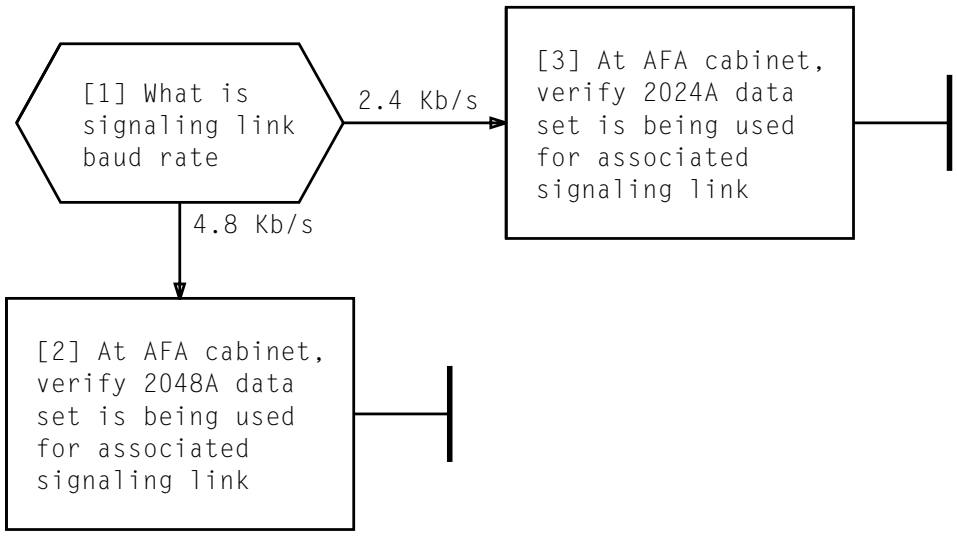
PERFORM LINK CHECK INTERNAL (LCKI) AND LINK CHECK (LCHK) TESTS TO ISOLATE AND CLEAR SIGNALING LINK FAULT



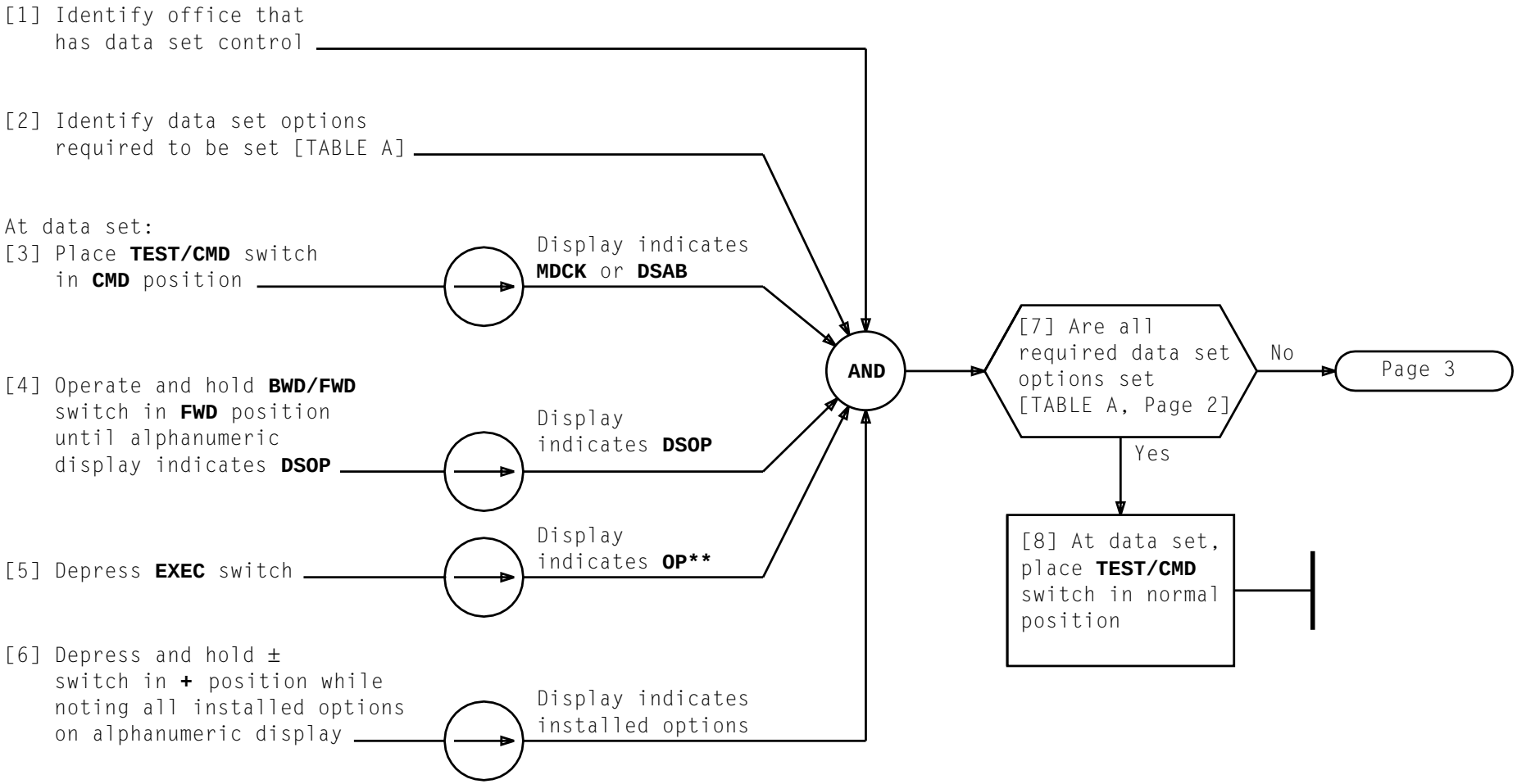
REMOVE NODE FROM SERVICE



RESTORE NODE TO SERVICE



VERIFY ANALOG SIGNALING LINK DATA SET



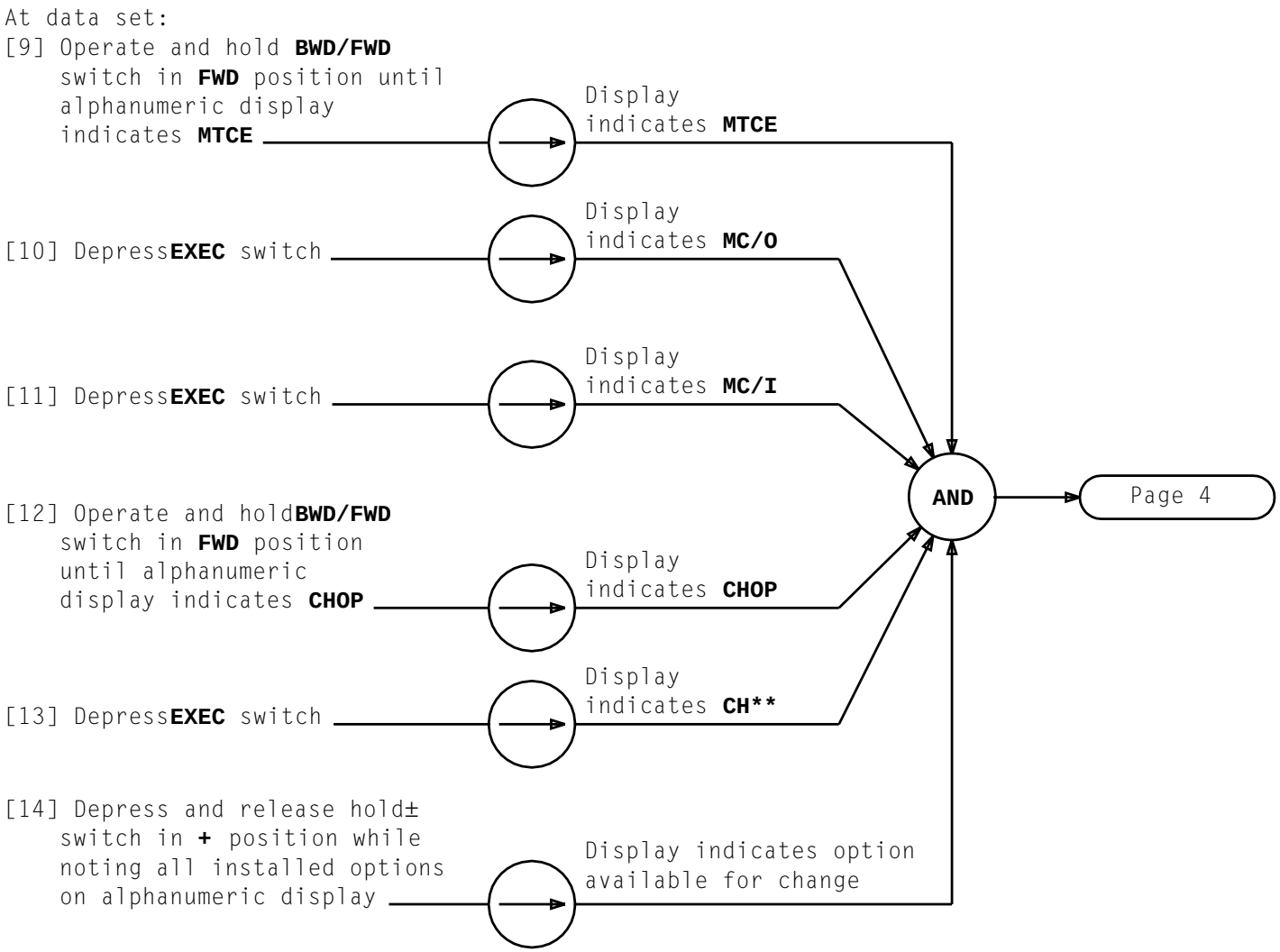
VERIFY 2024A/2048A DATA SET OPTIONS ARE PROPERLY SET

TABLE A
2024A/2048A DATA SET OPTION SETTINGS

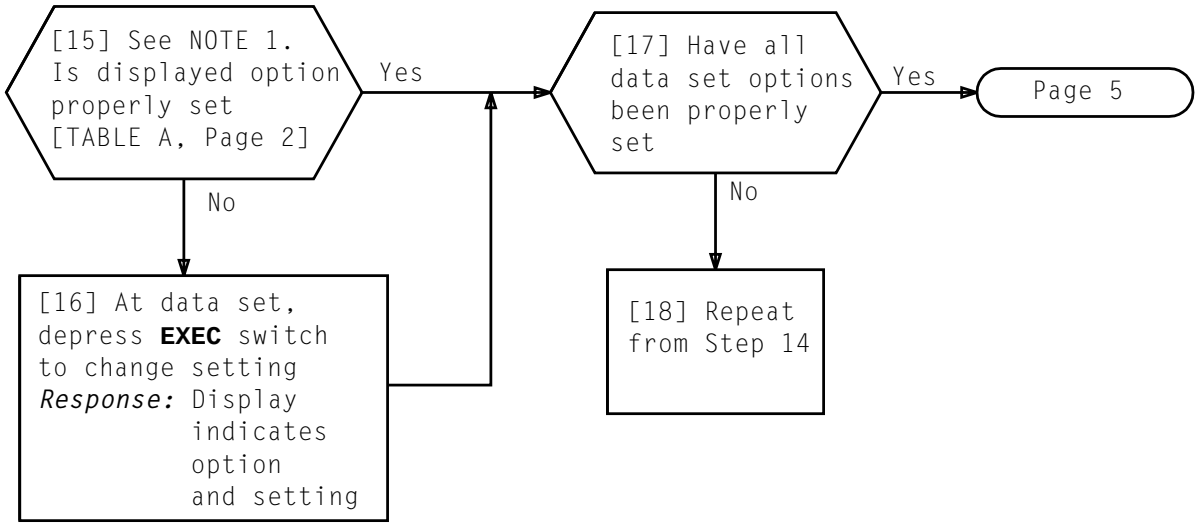
OPTION DESIGNATION	OPTION NAME	OPTION SETTINGS (NOTE 1)	
		OFFICE WITH DATA SET CONTROL	OFFICE WITHOUT DATA SET CONTROL
A1	Point-to-point control	ON	OFF
A2	Point-to-point tributary	OFF	ON
B1	Internal timing	ON	ON
C5	Continuous carrier, continuous request-to-send	ON	ON
D7	Data auxiliary set or line status indicator (TEK) leads not used	ON	ON
E5	Maximum address — 16	ON	ON
E7 (NOTE 2)	Disable secondary channel	ON	ON
NA01	Network address 01	OFF	ON
NA30	Network address 30	ON	OFF
PL01	Poll list contains network address 01	ON	OFF

NOTES:
1. Office designated as having data set control is not necessarily the same as designated control office.
2. Applicable to 2024A data set only.

VERIFY 2024A/2048A DATA SET OPTIONS ARE PROPERLY SET



VERIFY 2024A/2048A DATA SET OPTIONS ARE PROPERLY SET



NOTE 1
Options activity set will appear in alphanumeric display with a checkmark as the first character (✓bA1)

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234-351-120	**DLP**
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VERIFY 2024A/2048A DATA SET OPTIONS ARE PROPERLY SET

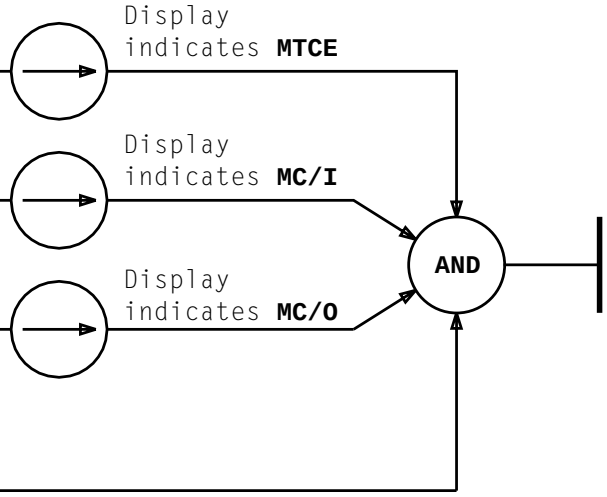
At data set:

[19] Operate and hold **BWD/FWD** switch in **FWD** position until alphanumeric display indicates **MTCE**

[20] Depress **EXEC** switch

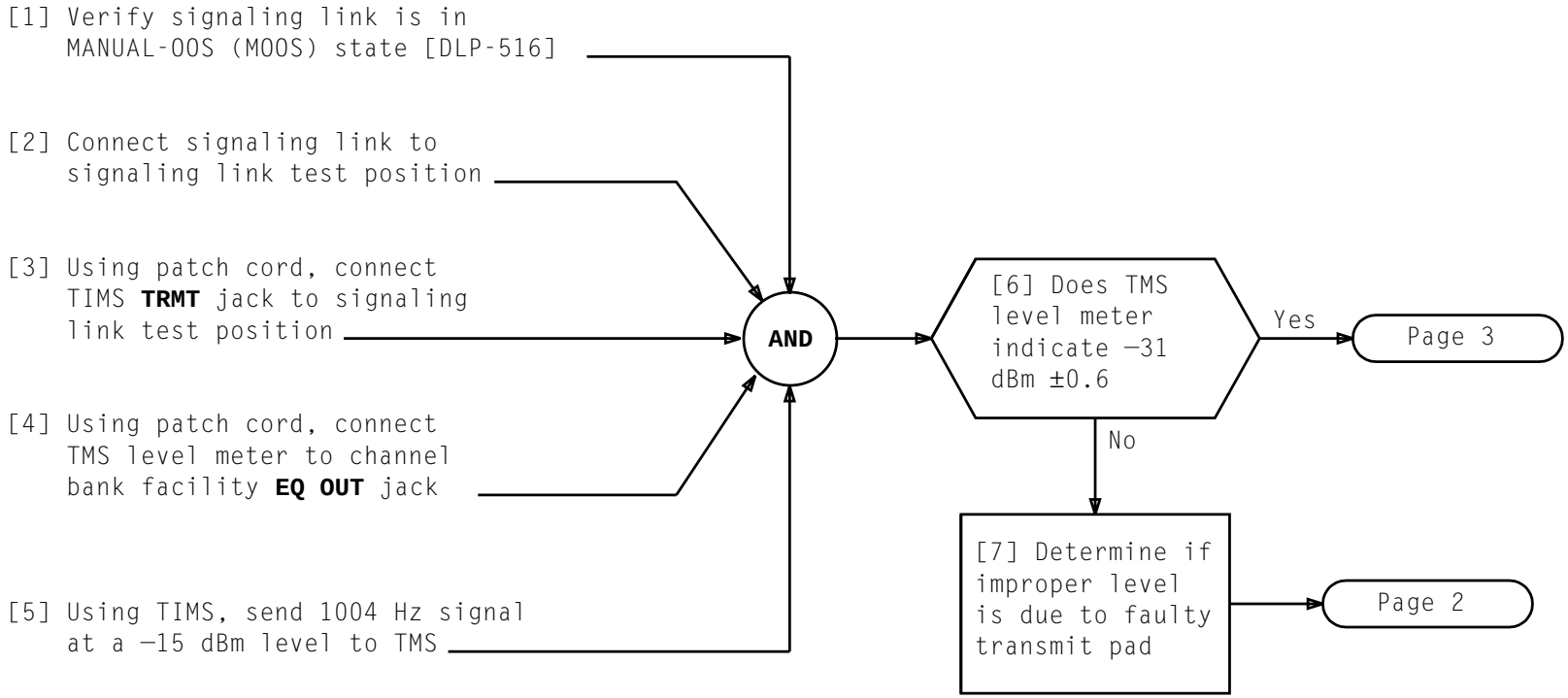
[21] Depress **EXEC** switch

[22] Place **TEST/CMD** switch in normal position

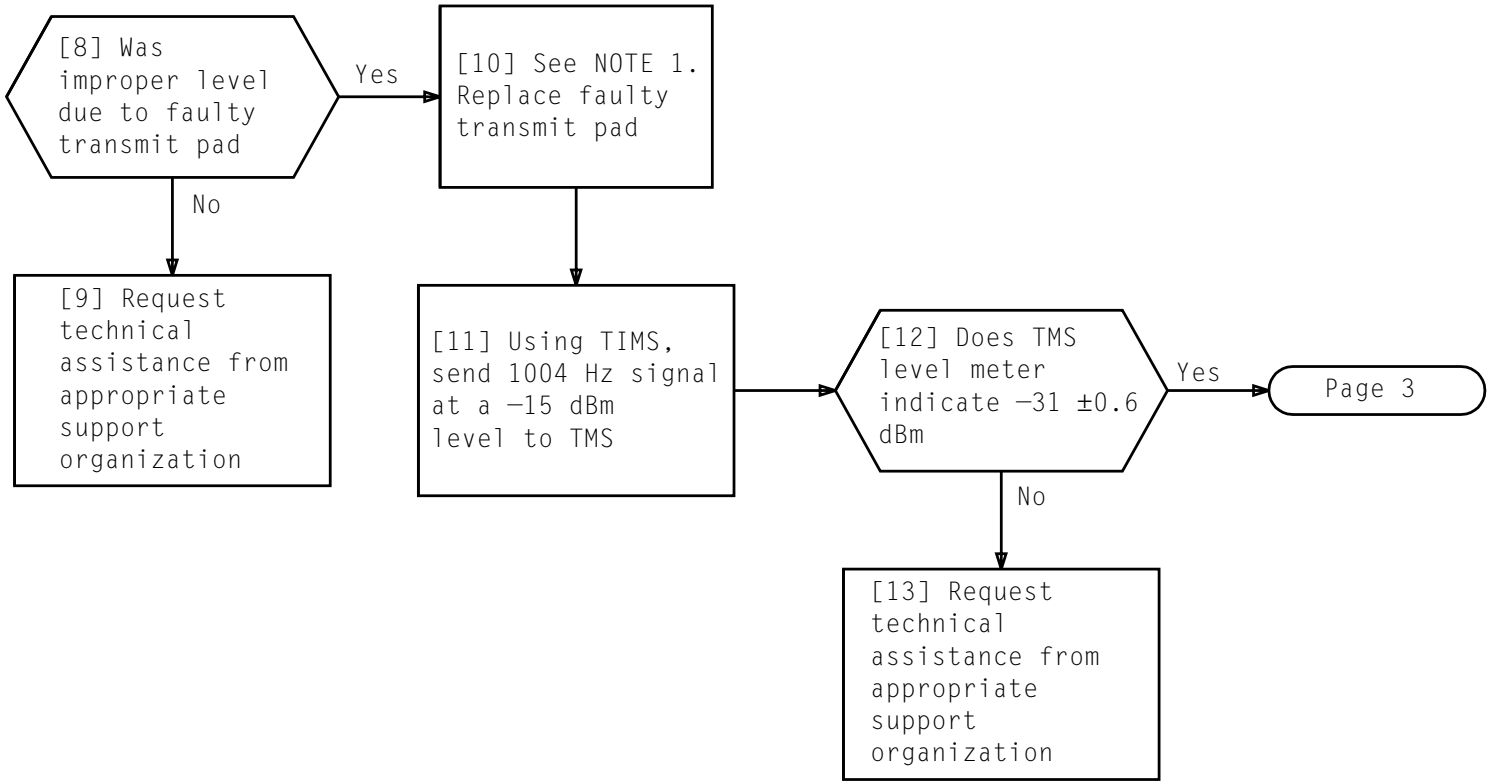


VERIFY 2024A/2048A DATA SET OPTIONS ARE PROPERLY SET

SUMMARY
The cross-office test verifies that the proper −31 dBm transmit pad level and −17 dBm receive pad level exist.

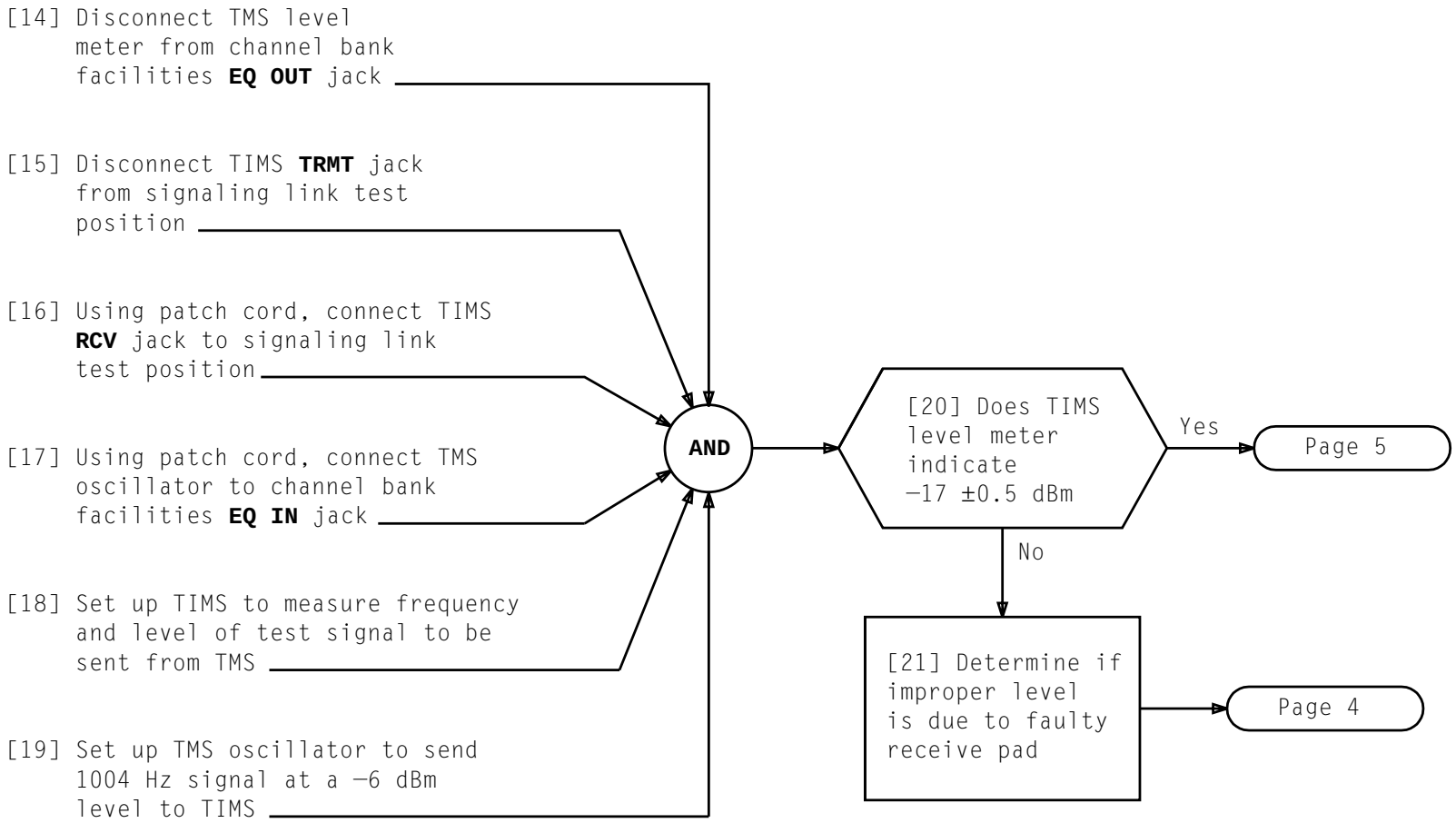


PERFORM ANALOG SIGNALING LINK CROSS-OFFICE TEST

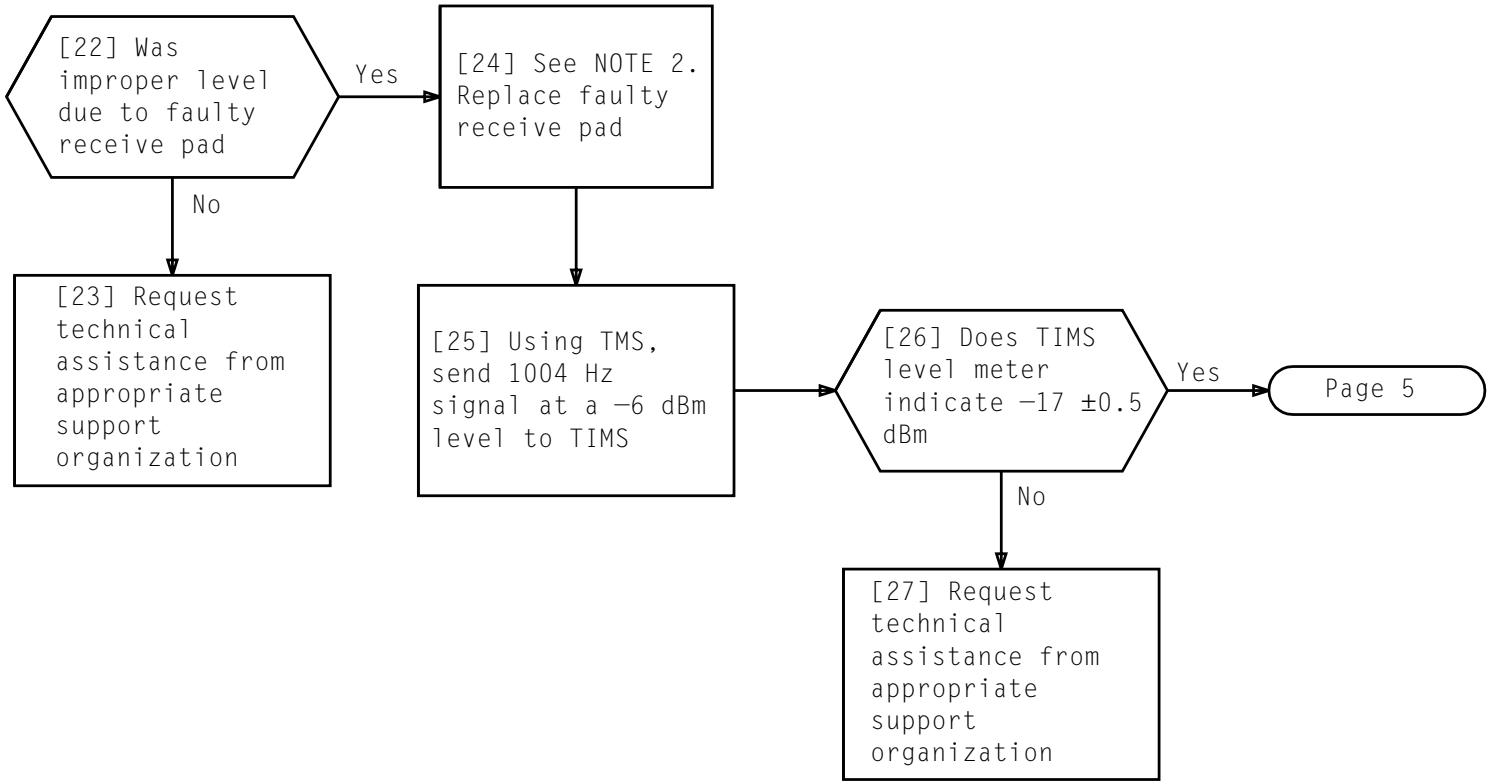


NOTE 1
Transmit pads with values less than 12 dB and greater than 14 dB cannot be used. If correct meter level cannot be obtained within this tolerance, other problems exist

PERFORM ANALOG SIGNALING LINK CROSS-OFFICE TEST



PERFORM ANALOG SIGNALING LINK CROSS-OFFICE TEST



NOTE 2
Receive pads with values less than 5 dB and greater than 7 dB cannot be used. If correct meter level cannot be obtained within this tolerance, other problems exist

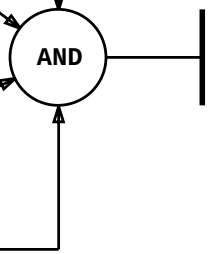
PERFORM ANALOG SIGNALING LINK CROSS-OFFICE TEST

[28] Disconnect TIMS **RCV** jack from signaling link test position

[29] Disconnect TMS oscillator from channel bank facility **EQ IN** jack

[30] Disconnect signaling link from signaling link test position

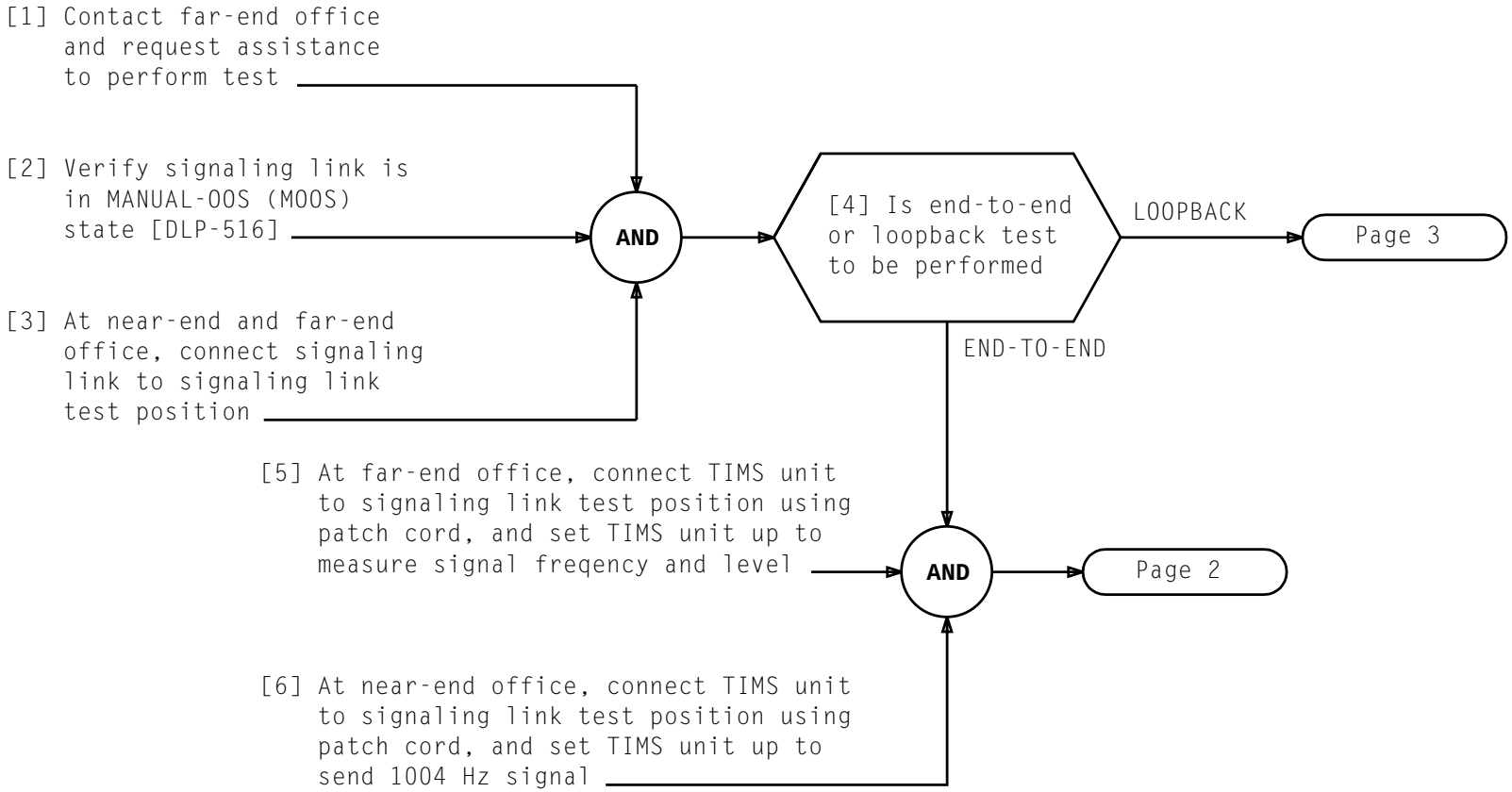
[31] Change signaling link state to AVAILABLE — IS [DLP-525]



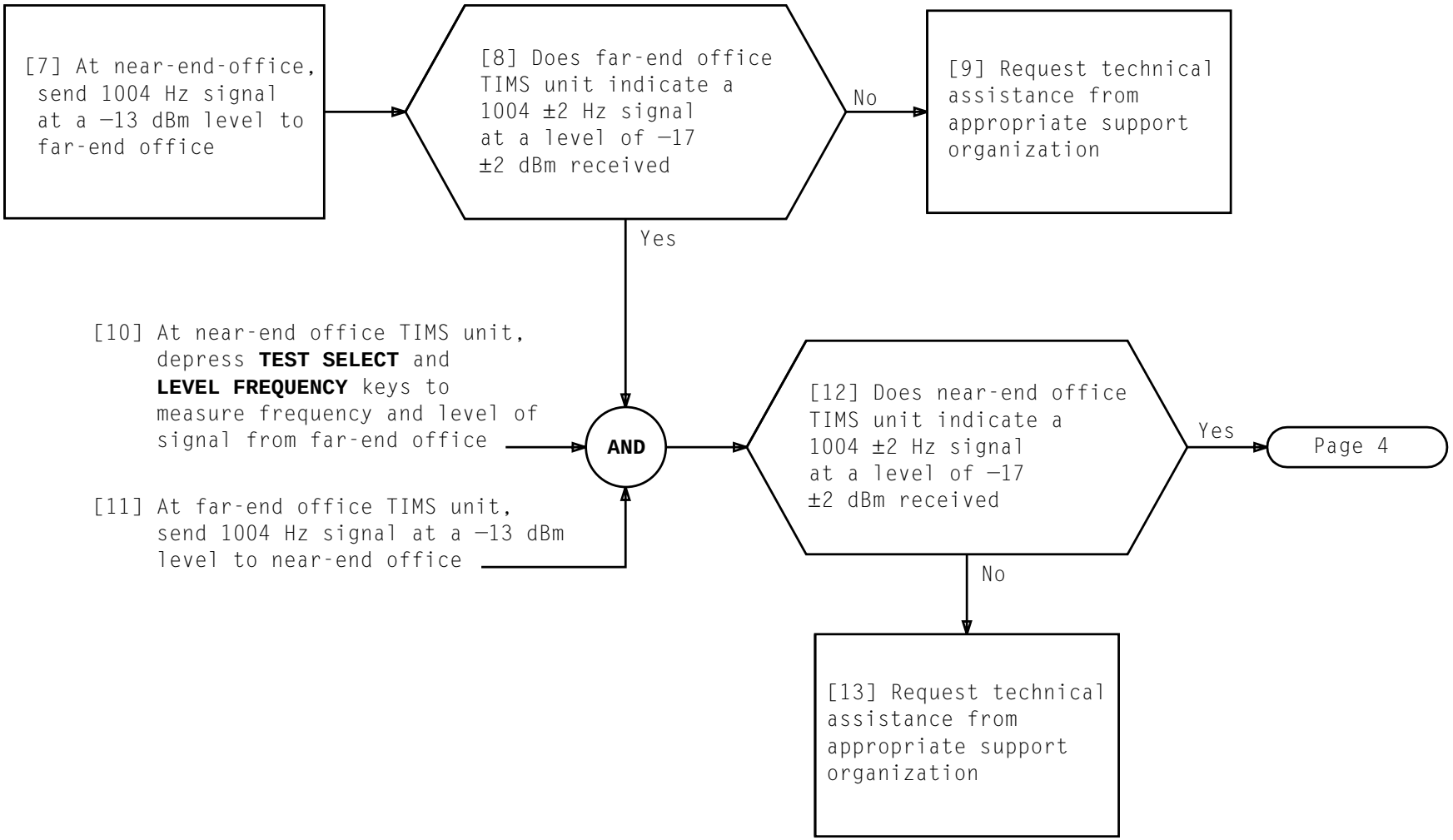
PERFORM ANALOG SIGNALING LINK CROSS-OFFICE TEST

SUMMARY

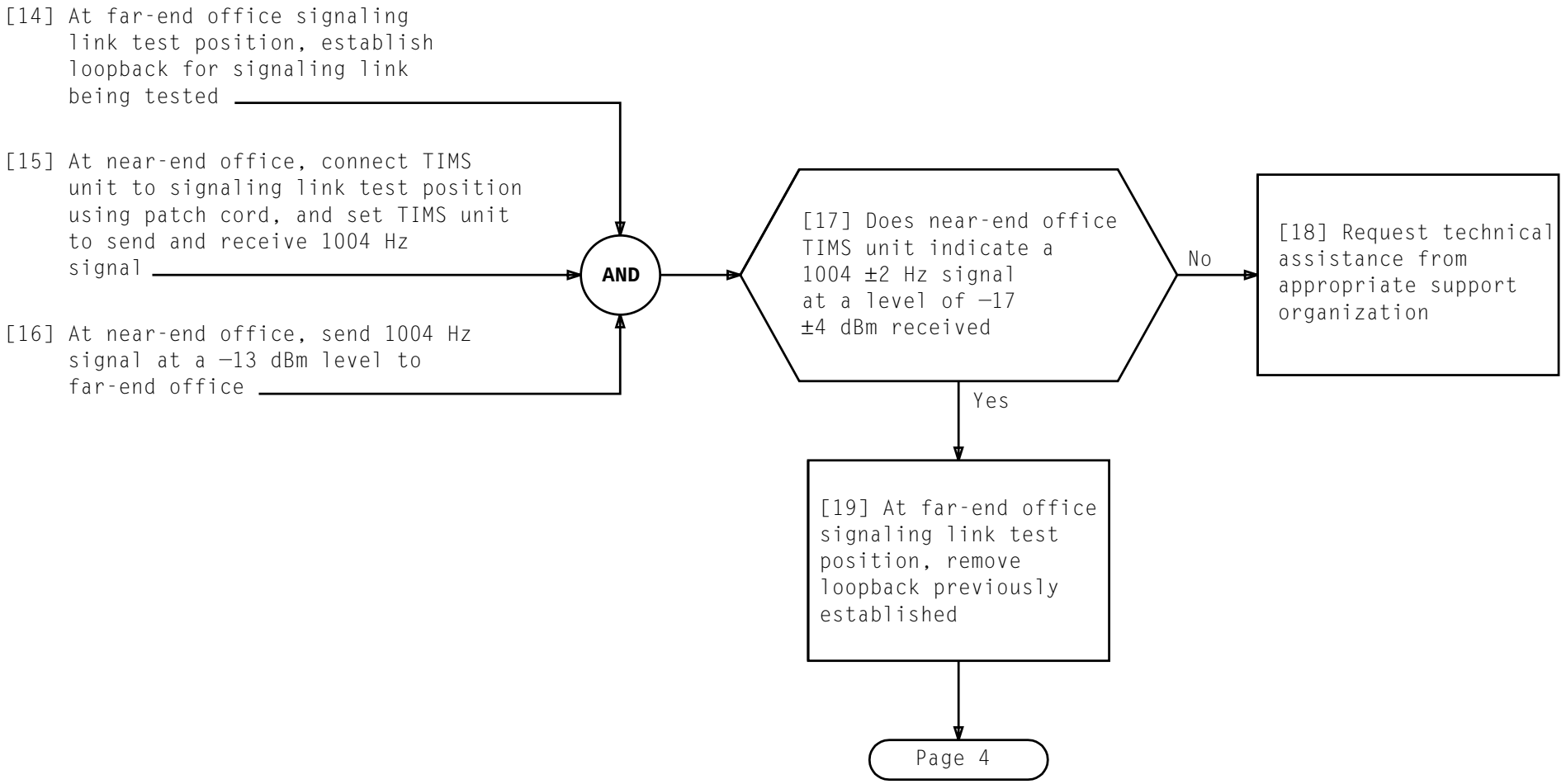
The 1004 Hz net loss test verifies that end-to-end or loopback net loss on a signaling link does not exceed the Expected Measured Loss (EML)



PERFORM ANALOG SIGNALING LINK 1004 Hz NET LOSS TEST



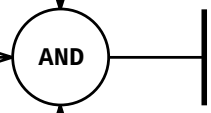
PERFORM ANALOG SIGNALING LINK 1004 Hz NET LOSS TEST



PERFORM ANALOG SIGNALING LINK 1004 Hz NET LOSS TEST

[20] Disconnect TIMS units from signaling link test position

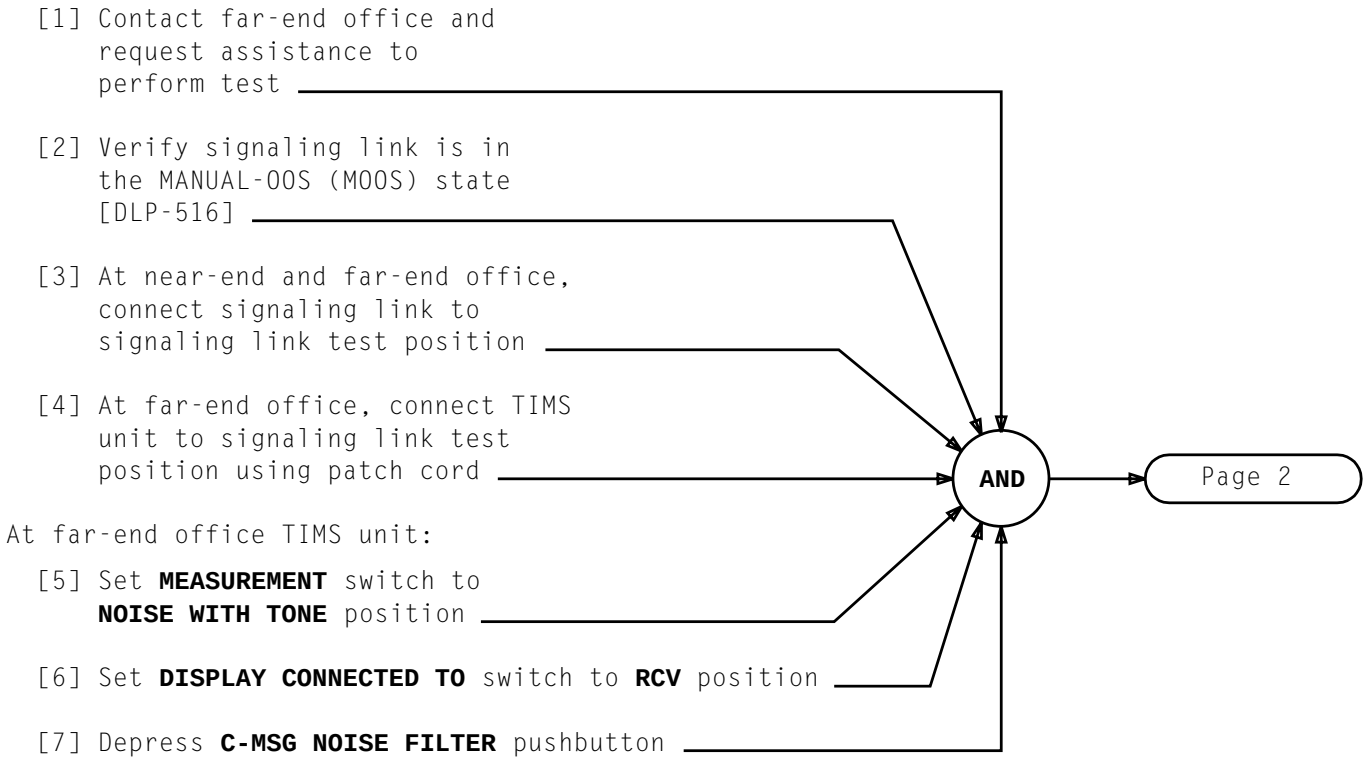
[21] Disconnect signaling link from signaling link test position



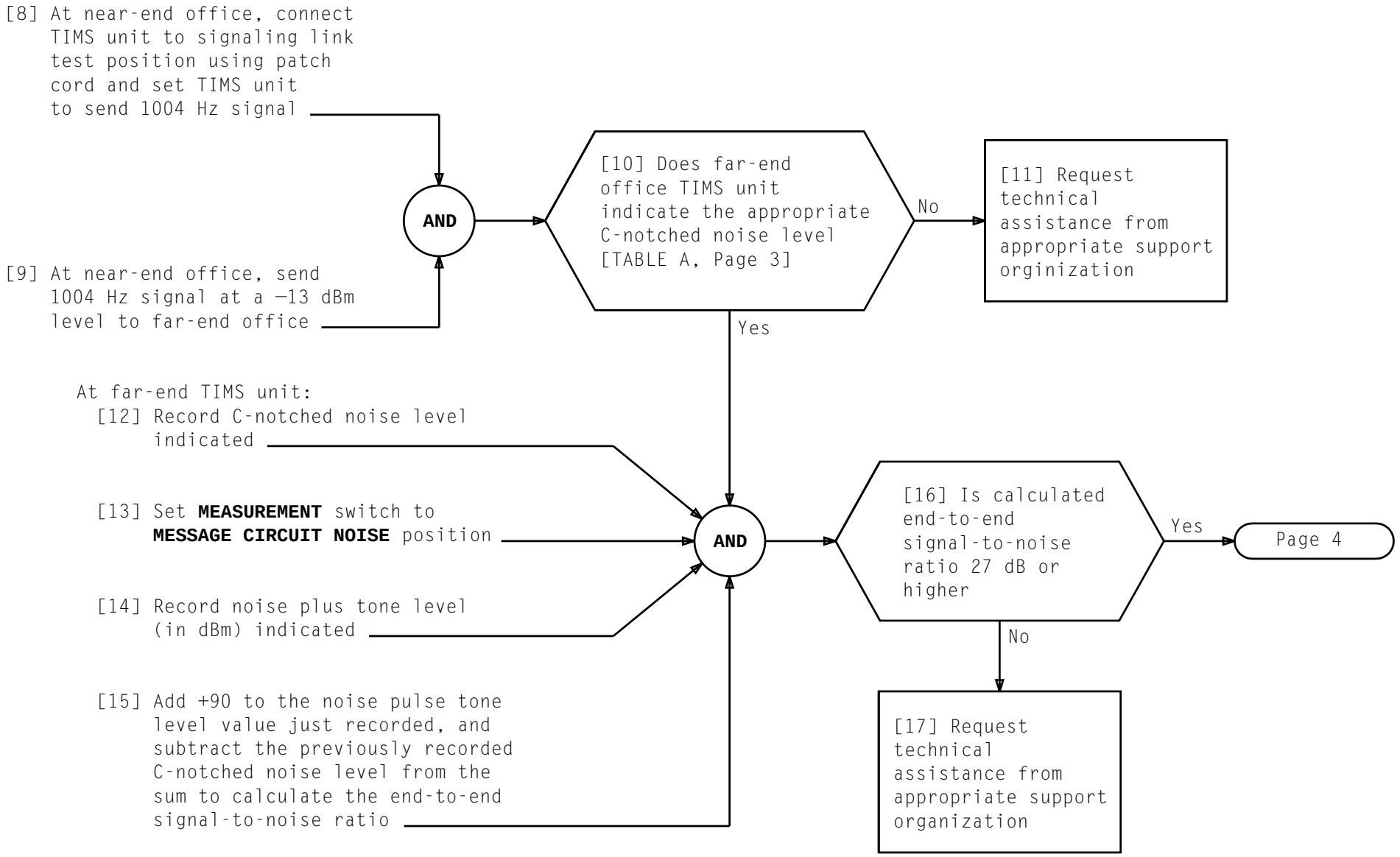
[22] Change signaling link state to AVAILABLE-IS [DLP-525]

PERFORM ANALOG SIGNALING LINK 1004 Hz NET LOSS TEST

SUMMARY
The C-notched noise and signal-to-noise test measures the noise level on a signaling link



PERFORM ANALOG SIGNALING LINK C-NOTCHED NOISE AND SIGNAL-TO-NOISE TEST

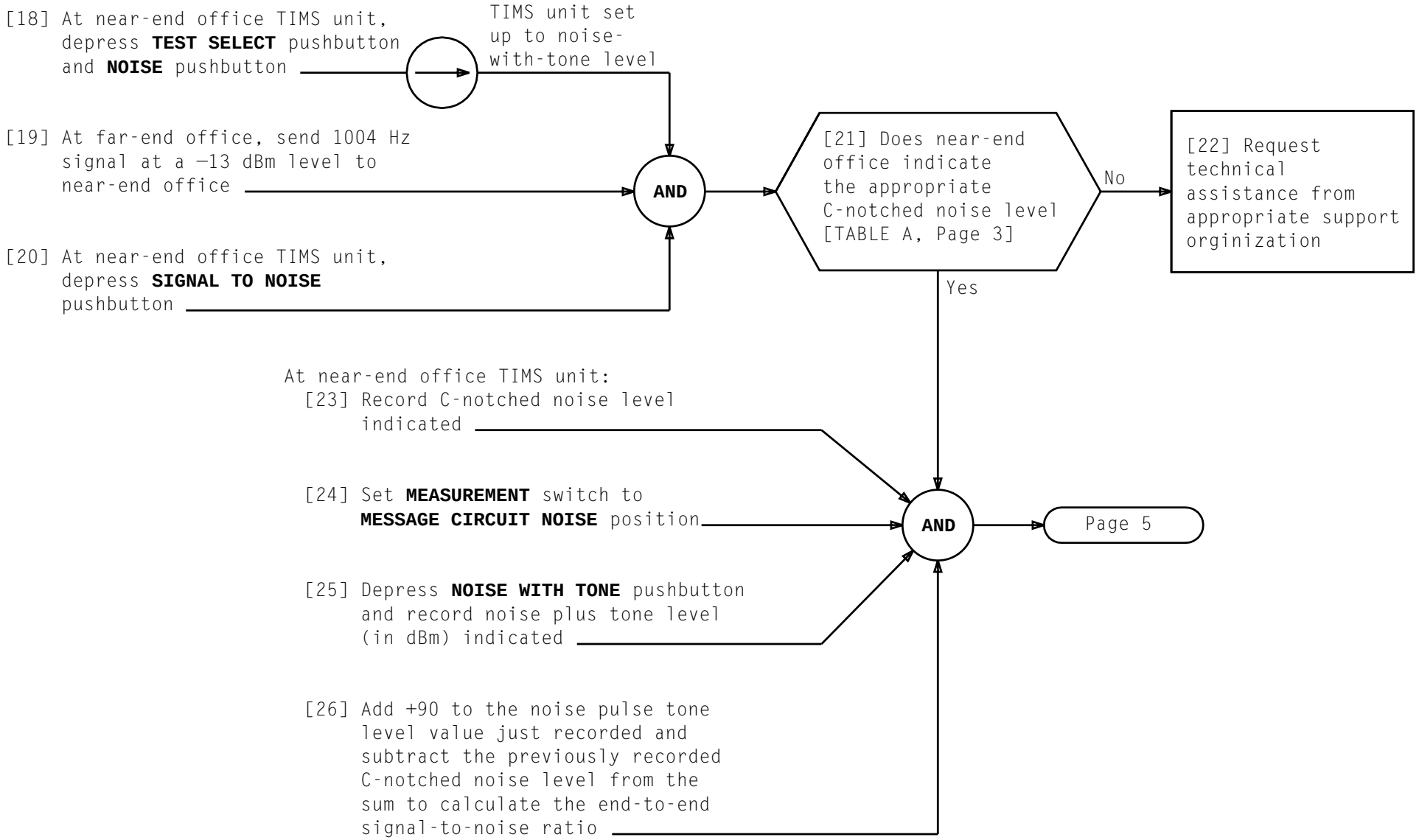


PERFORM ANALOG SIGNALING LINK C-NOTCHED NOISE AND SIGNAL-TO-NOISE TEST

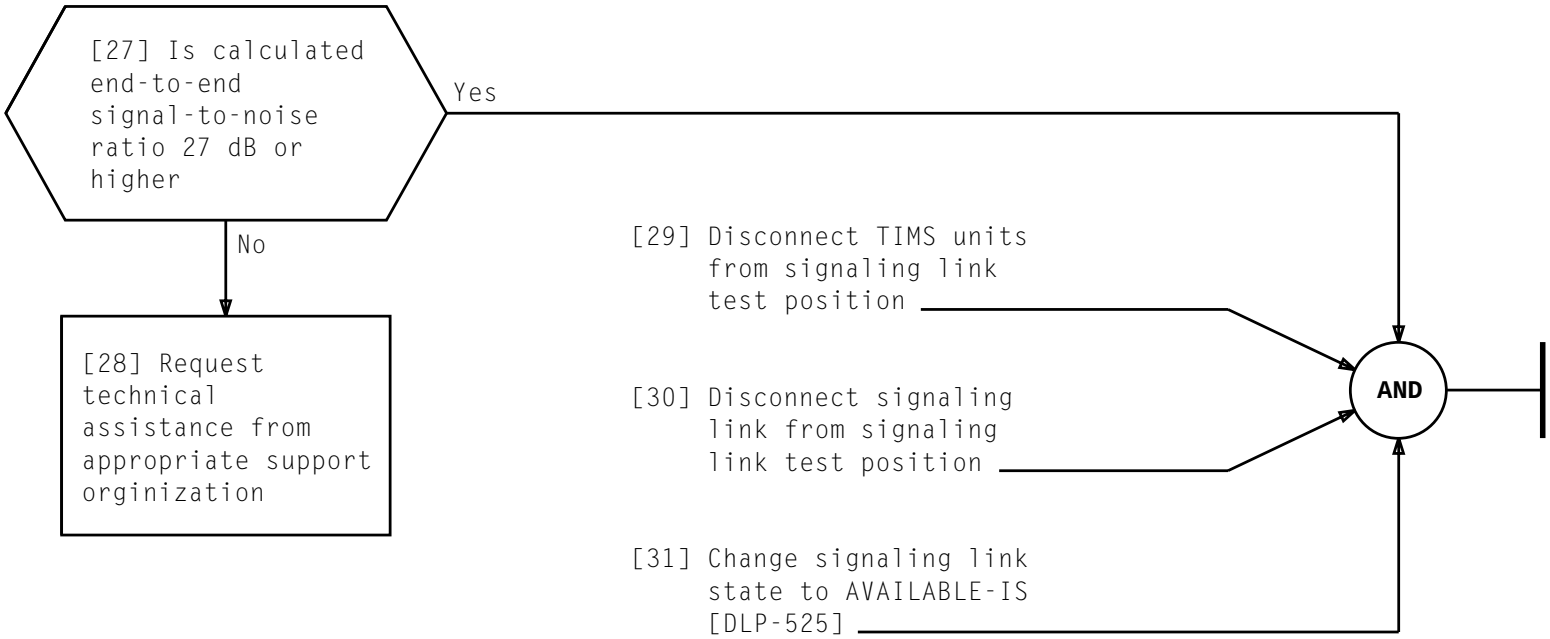
TABLE A
C-NOTCHED NOISE REQUIREMENTS

END-TO-END CIRCUIT LENGTH IN MILES (NOTE 1)	FACILITY TYPE (NOTE 2)			
	NONCOMPANDORED FACILITY	ANALOG AND N- CARRIER FACILITY (N1, N2, N3, ON)	ANALOG AND T- CARRIER FACILITY (D1A, D1B)	ANALOG AND T- CARRIER FACILITY (D1D, D2, D3, D4)
0 to 50	28	38	47	40
51 to 100	30	40	47	41
101 to 400	33	43	47	41
401 to 1000	37	42	48	42
1001 to 1500	39	43	48	43
1501 to 2500	41	43	48	44
2501 to 4000	43	45	49	45

NOTES:
1. For mixed compandored/noncompandored signaling links greater than 200 miles, the compandored section is assumed to be 51 to 100 miles in length.
2. Values listed are in dBrnc at −4 TLP for end-to-end noise measurement. For loopback testing, the values given must be increased by 3 dB.



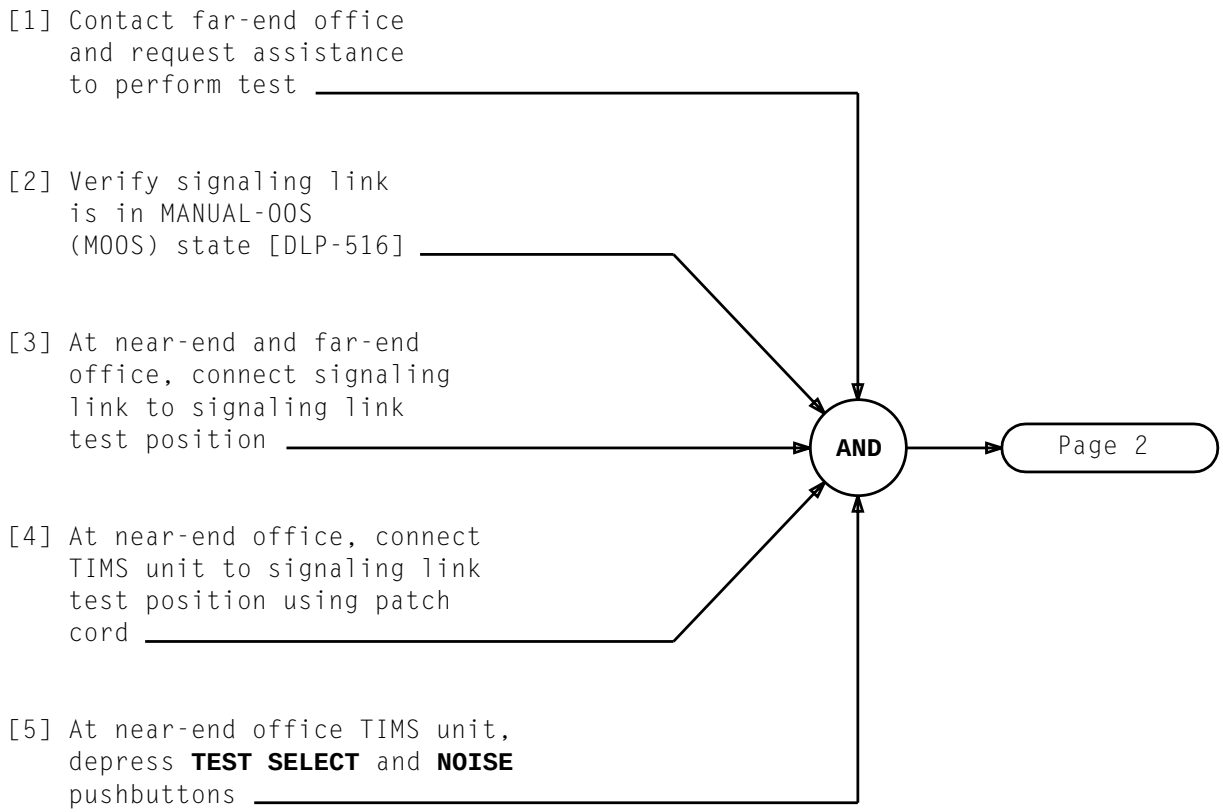
PERFORM ANALOG SIGNALING LINK C-NOTCHED NOISE AND SIGNAL-TO-NOISE TEST



PERFORM ANALOG SIGNALING LINK C-NOTCHED NOISE AND SIGNAL-TO-NOISE TEST

SUMMARY

The single frequency interference test checks a signaling link for spurious tones that can interfere with data signals



PERFORM ANALOG SIGNALING LINK SINGLE FREQUENCY INTERFERENCE TEST

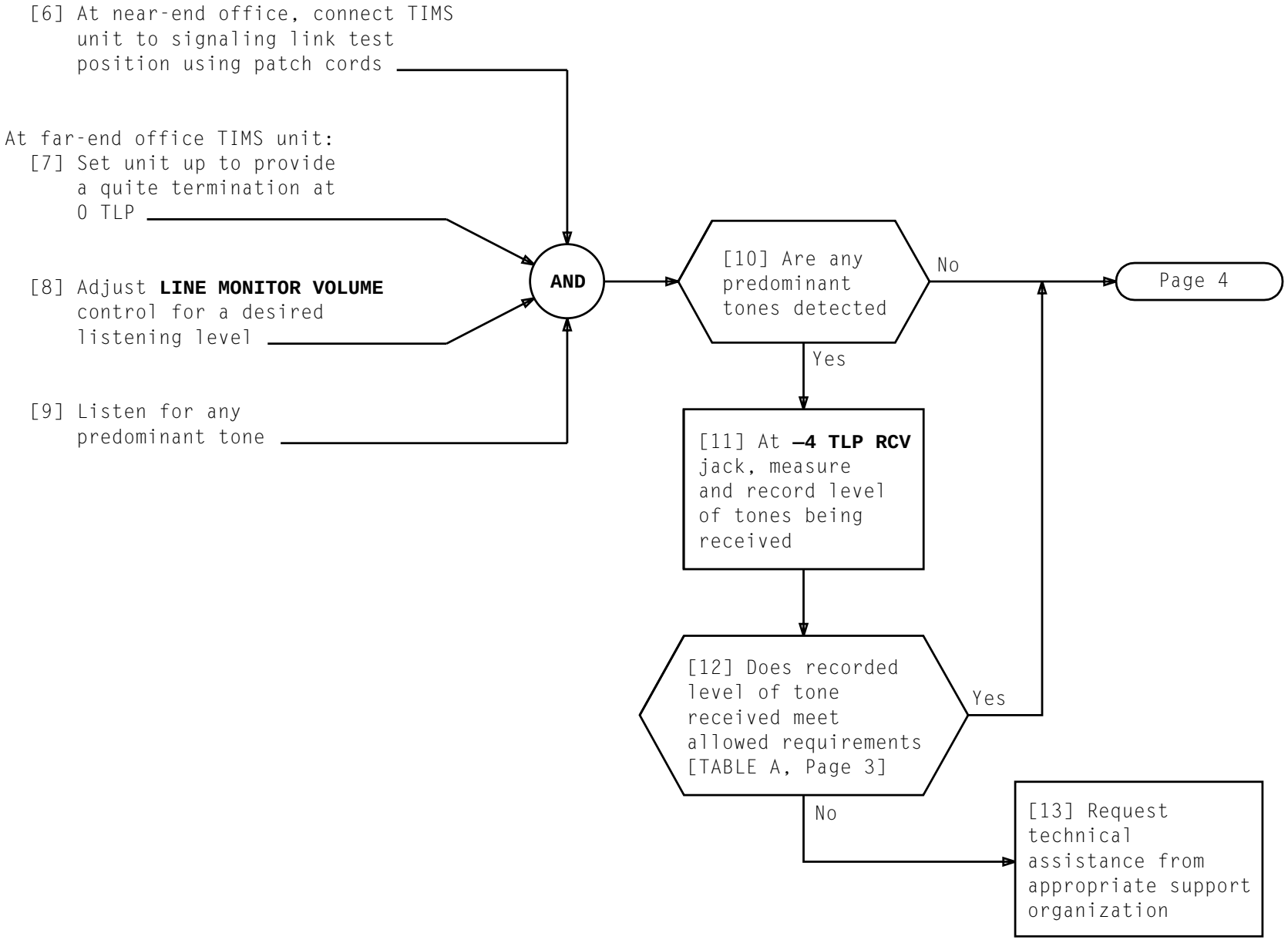
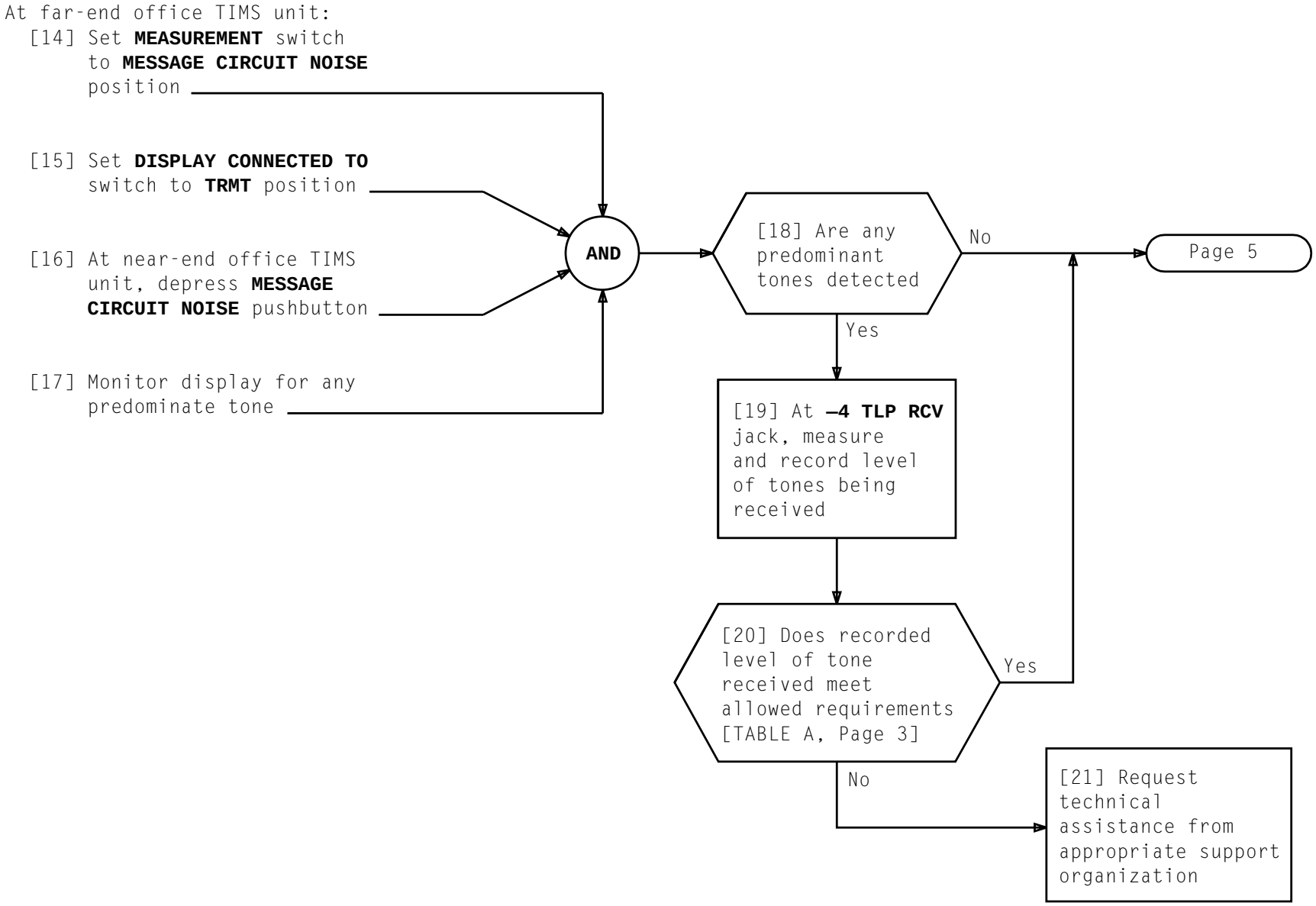
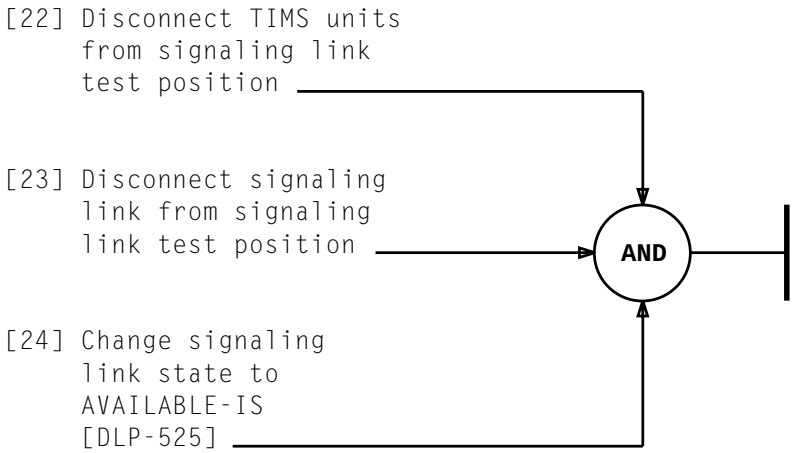

[6] At near-end office, connect TIMS unit to signaling link test position using patch cords
At far-end office TIMS unit:
[7] Set unit up to provide a quite termination at 0 TLP
[8] Adjust LINE MONITOR VOLUME control for a desired listening level
[9] Listen for any predominant tone
AND
[10] Are any predominant tones detected
No
Page 4
Yes
[11] At –4 TLP RCV jack, measure and record level of tones being received
[12] Does recorded level of tone received meet allowed requirements [TABLE A, Page 3]
Yes
No
[13] Request technical assistance from appropriate support organization

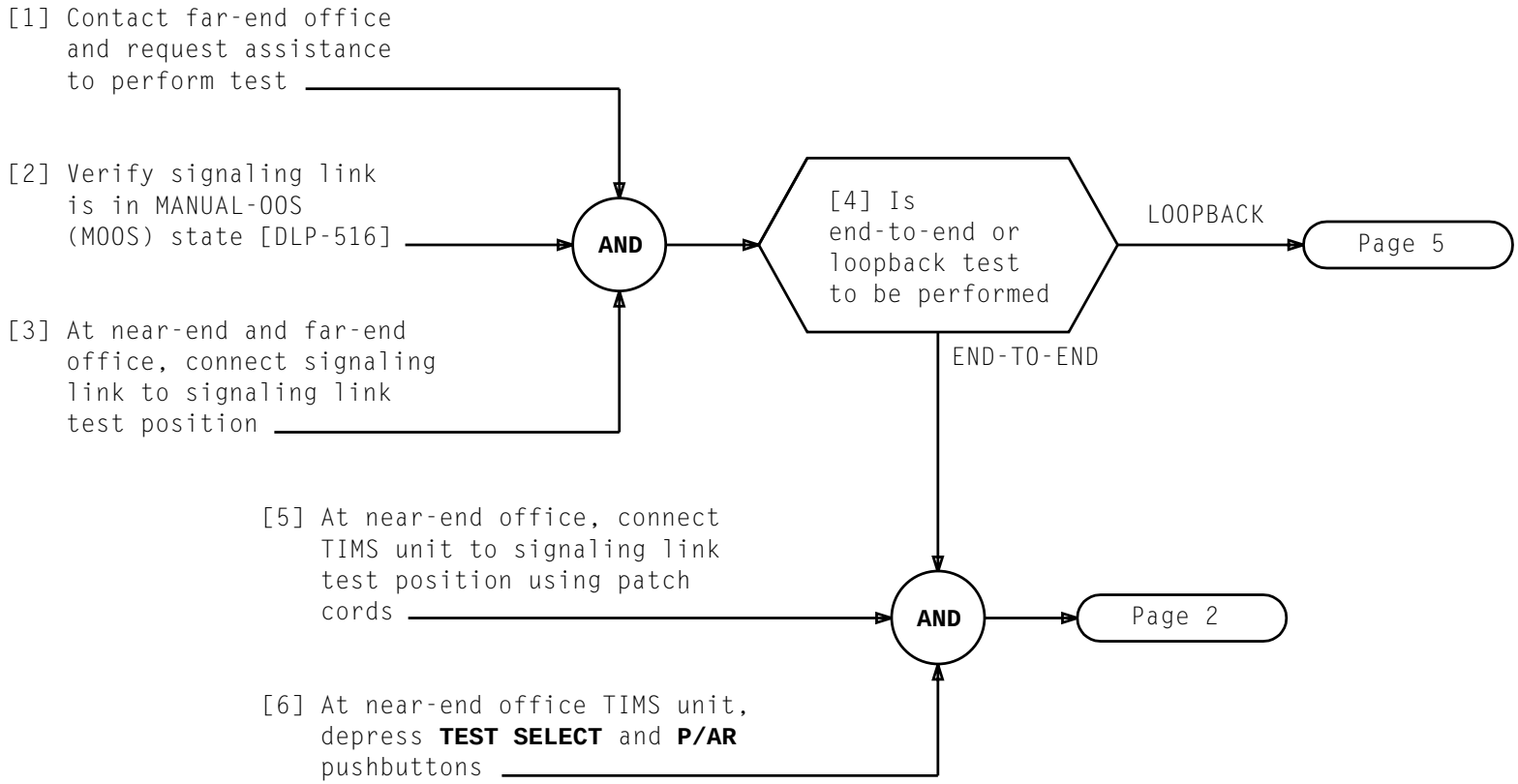
TABLE A SINGLE FREQUENCY INTERFERENCE TEST REQUIREMENTS	
CIRCUIT LENGTH IN MILES	**ACCEPTABLE TONE LEVEL AT –4 TLP**
0 to 50	24 dBrnc
51 to 100	27 dBrnc
101 to 400	30 dBrnc
401 to 1000	34 dBrnc
1001 to 1500	36 dBrnc
1501 to 2500	38 dBrnc
2501 to 4000	40 dBrnc
4001 to 8000	43 dBrnc
8001 to 16000	46 dBrnc
Satellite channel	37 dBrnc


At far-end office TIMS unit:
[14] Set **MEASUREMENT** switch to **MESSAGE CIRCUIT NOISE** position
[15] Set **DISPLAY CONNECTED TO** switch to **TRMT** position
[16] At near-end office TIMS unit, depress **MESSAGE CIRCUIT NOISE** pushbutton
[17] Monitor display for any predominate tone
AND
[18] Are any predominant tones detected
No
Page 5
Yes
[19] At **–4 TLP RCV** jack, measure and record level of tones being received
[20] Does recorded level of tone received meet allowed requirements [TABLE A, Page 3]
Yes
No
[21] Request technical assistance from appropriate support organization


[22] Disconnect TIMS units from signaling link test position
[23] Disconnect signaling link from signaling link test position
AND
[24] Change signaling link state to AVAILABLE-IS [DLP-525]

SUMMARY

The peak-to-average test checks the ratio of peak and full-wave rectified average values of a low duty cycle test pulse relative to the undistorted test signal on a signaling link



PERFORM ANALOG SIGNALING LINK PEAK-TO-AVERAGE RATIO TEST

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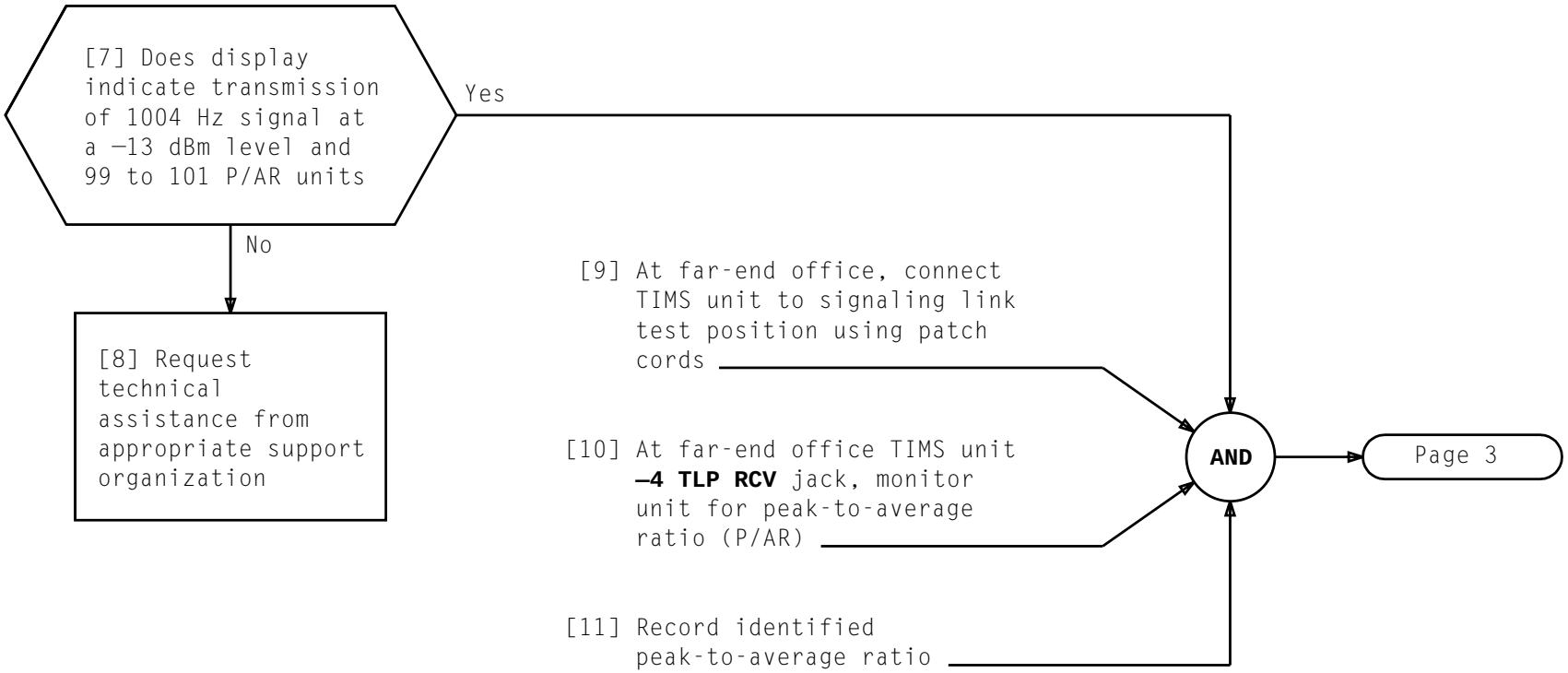


PERFORM ANALOG SIGNALING LINK PEAK-TO-AVERAGE RATIO TEST

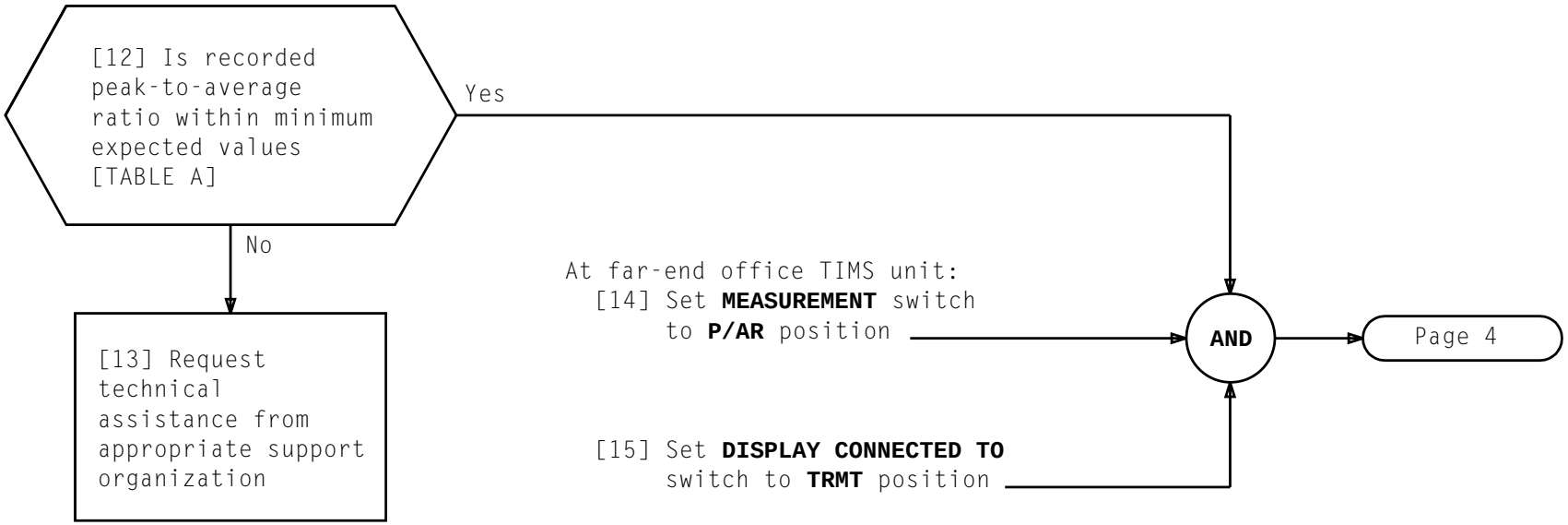
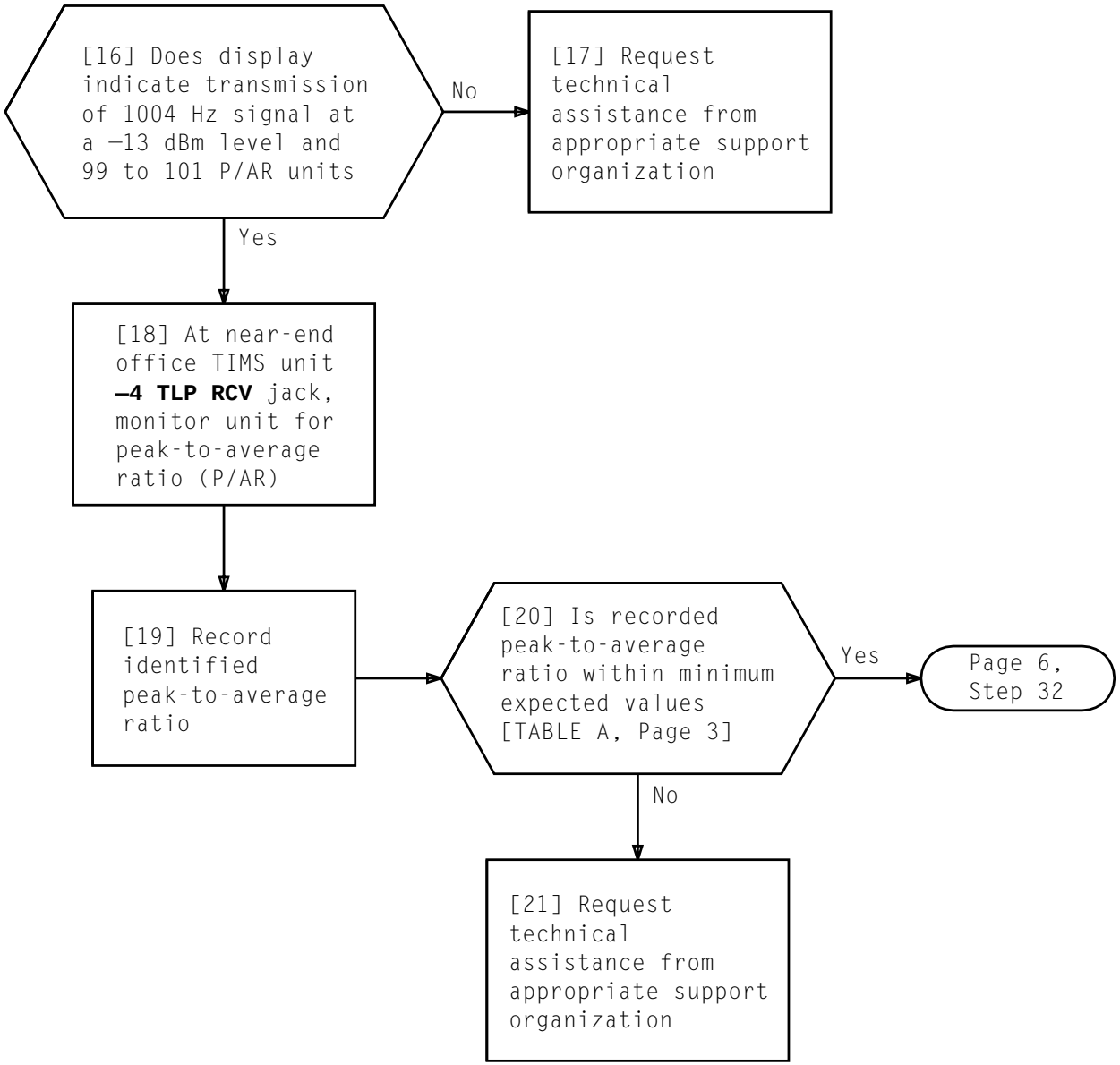


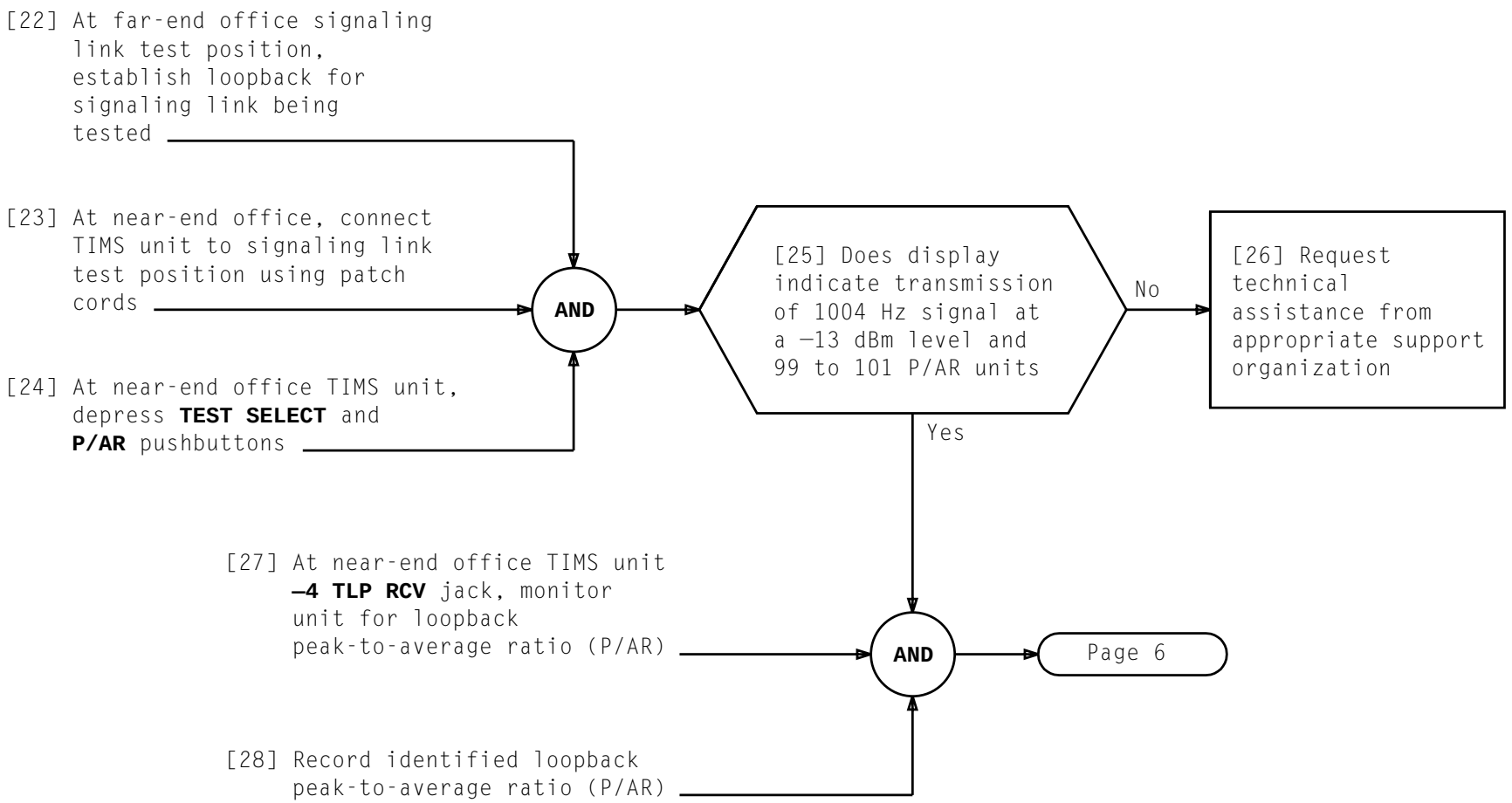
TABLE A
MINIMUM PEAK-TO-AVERAGE RATIO VALUES

FACILITY TYPE	MINIMUM PEAK-TO-AVERAGE RATIO
T	92
N1, N3, ON	86
N2	90
L or Radio	85

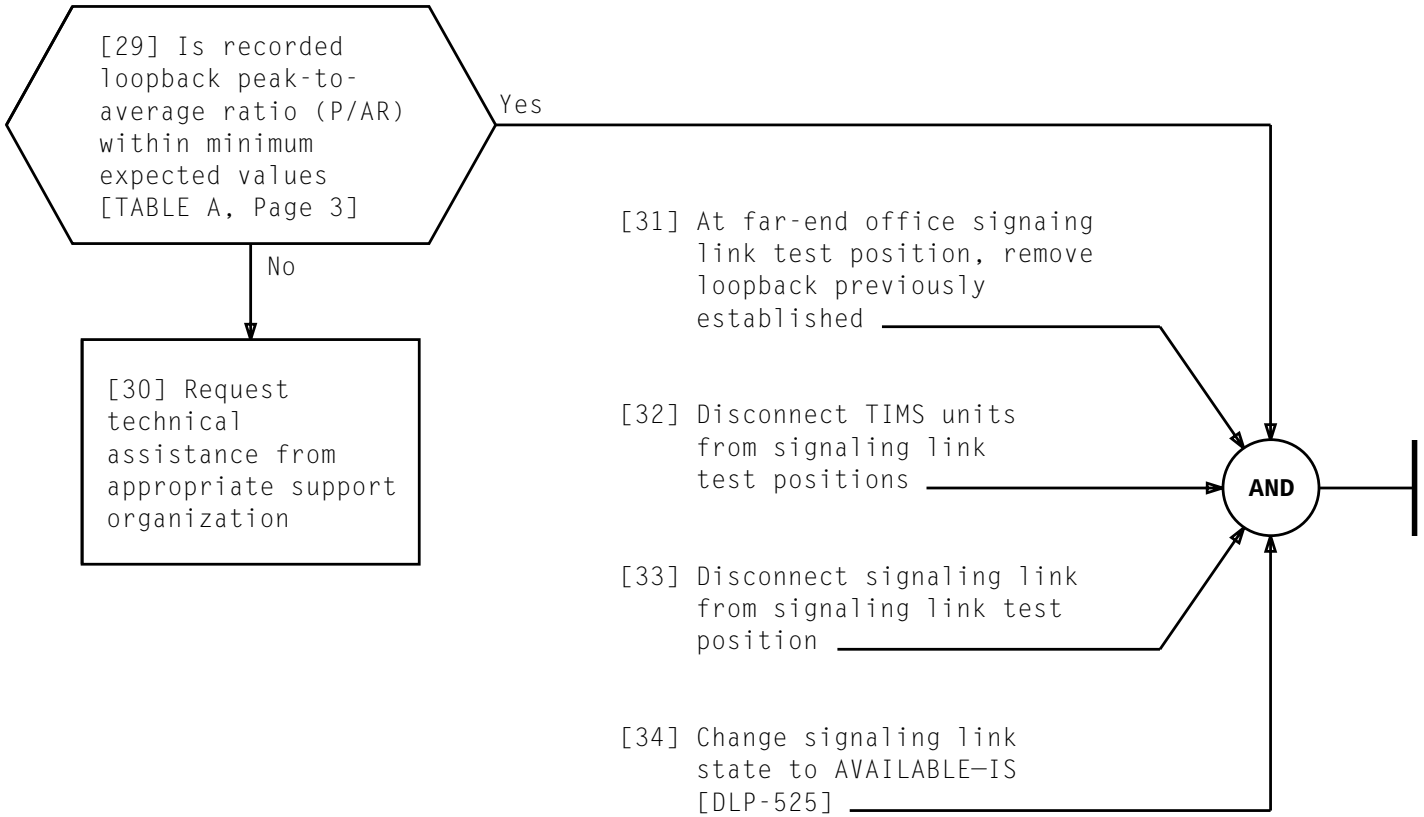
PERFORM ANALOG SIGNALING LINK PEAK-TO-AVERAGE RATIO TEST



PERFORM ANALOG SIGNALING LINK PEAK-TO-AVERAGE RATIO TEST



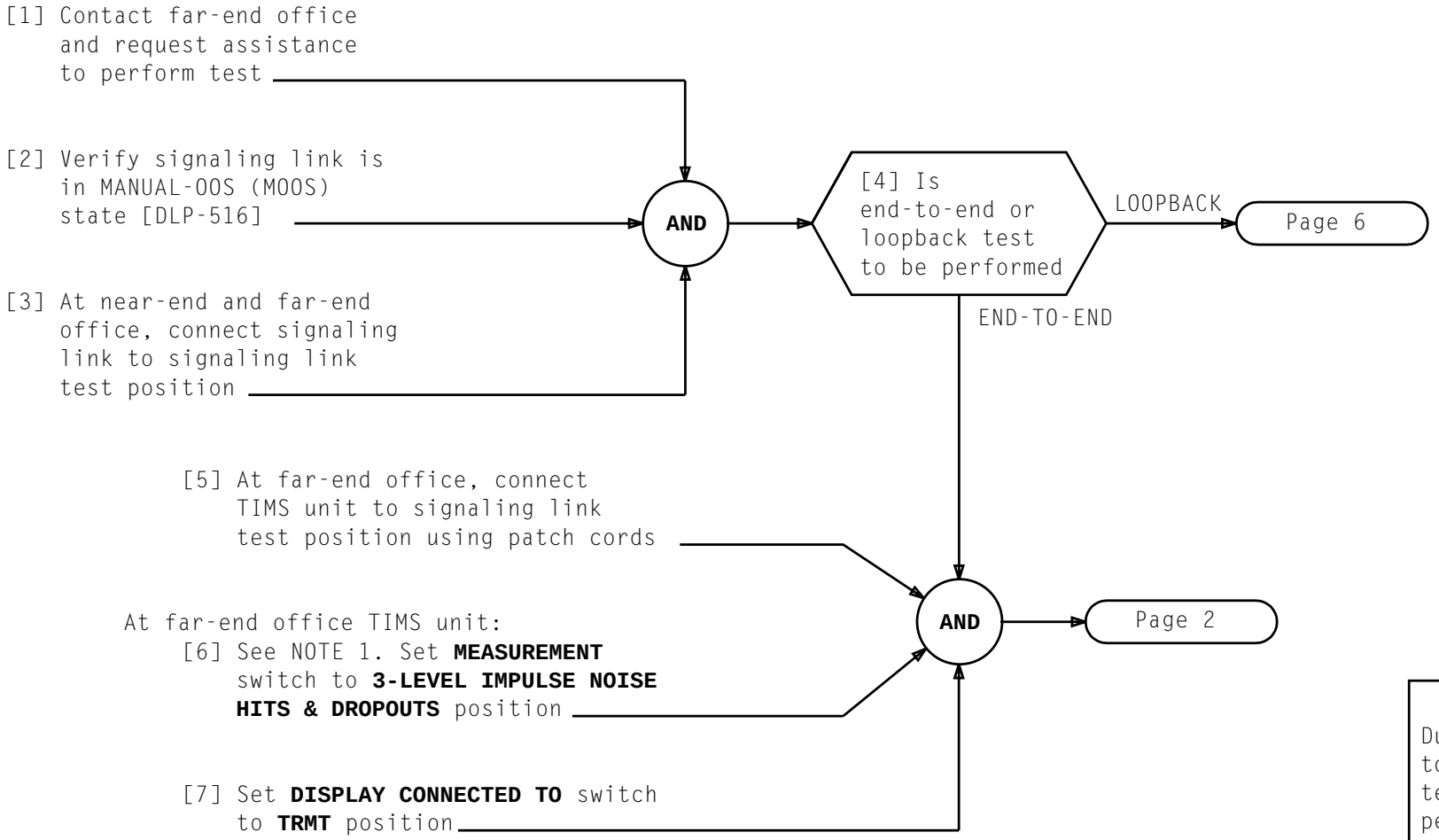
PERFORM ANALOG SIGNALING LINK PEAK-TO-AVERAGE RATIO TEST



PERFORM ANALOG SIGNALING LINK PEAK-TO-AVERAGE RATIO TEST

SUMMARY

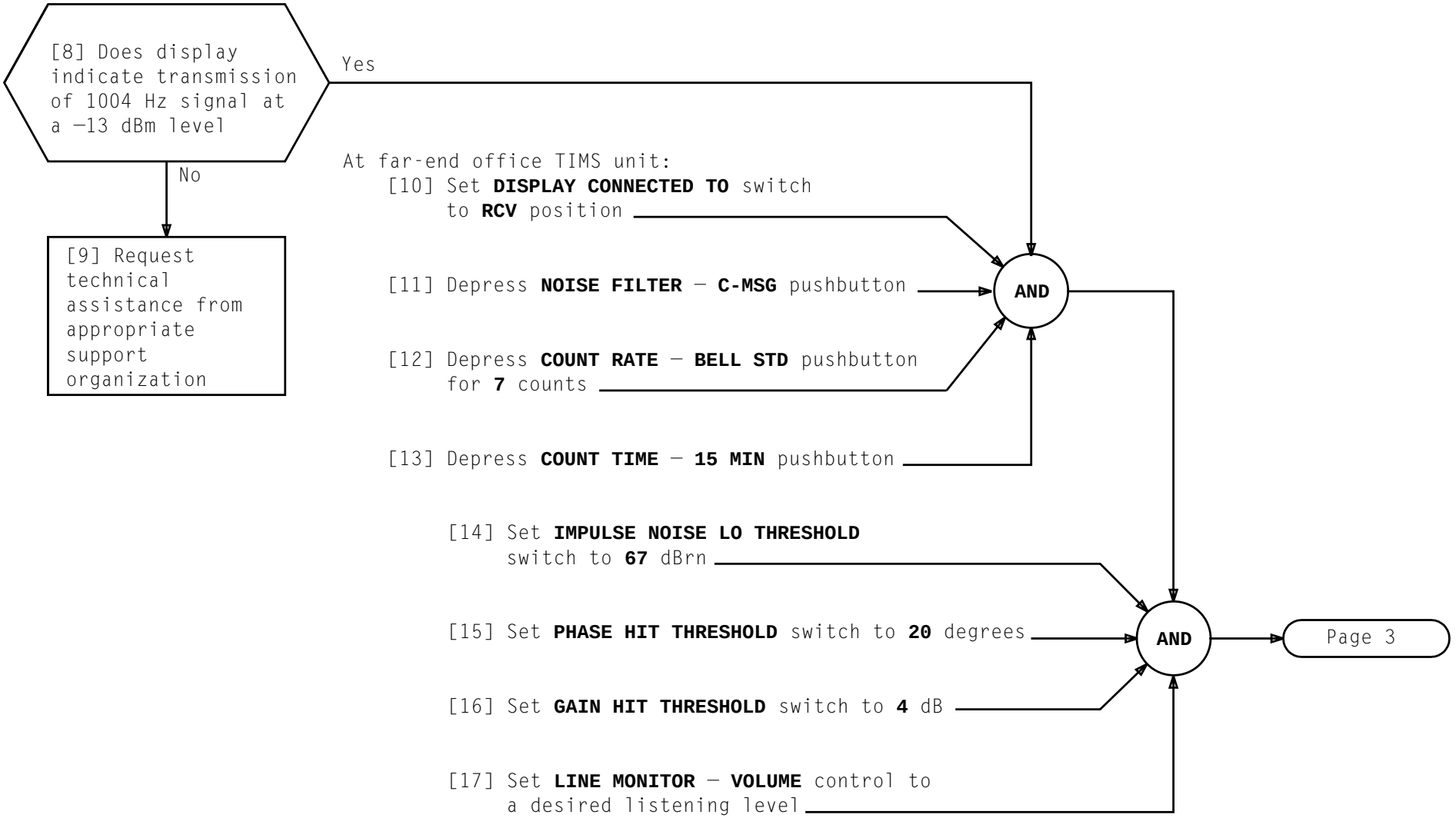
The impulse noise, phase hits, and gain hits test checks for these conditions on a signaling link.



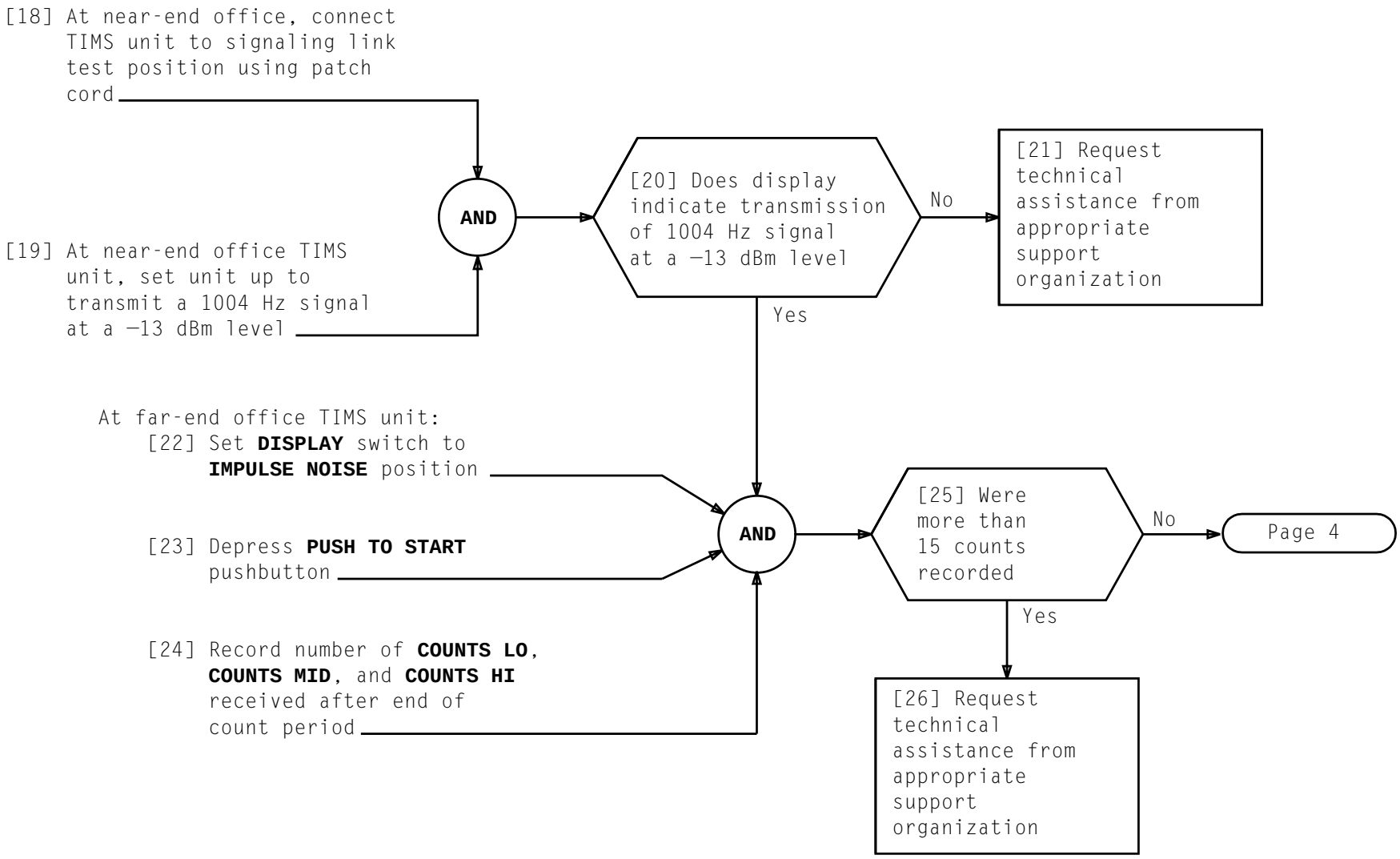
NOTE 1

Due to time required to perform this test, it should be performed simultaneously at both offices

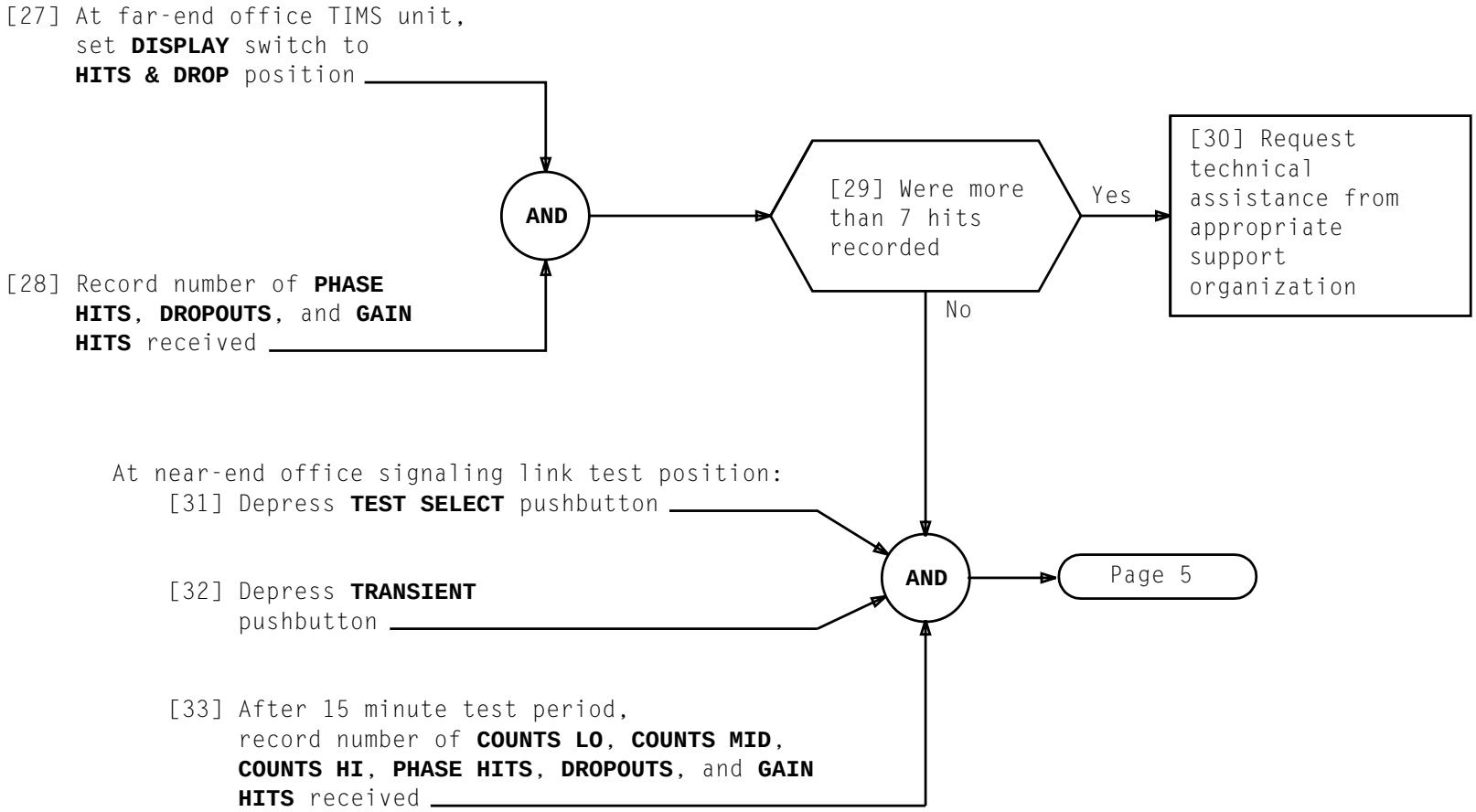
PERFORM ANALOG SIGNALING LINK IMPULSE NOISE, PHASE HITS, AND GAIN HITS TEST



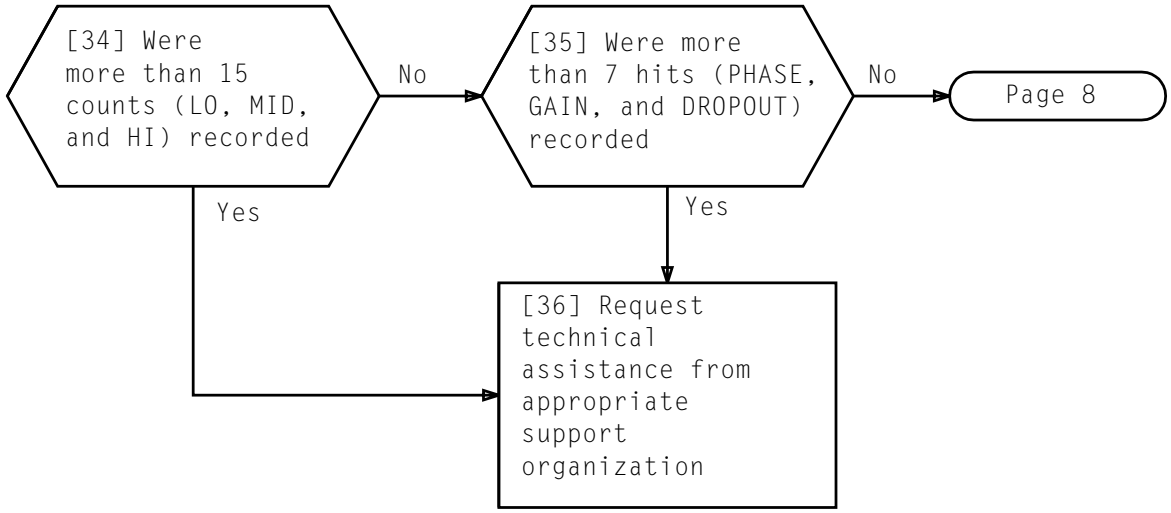
PERFORM ANALOG SIGNALING LINK IMPULSE NOISE, PHASE HITS, AND GAIN HITS TEST



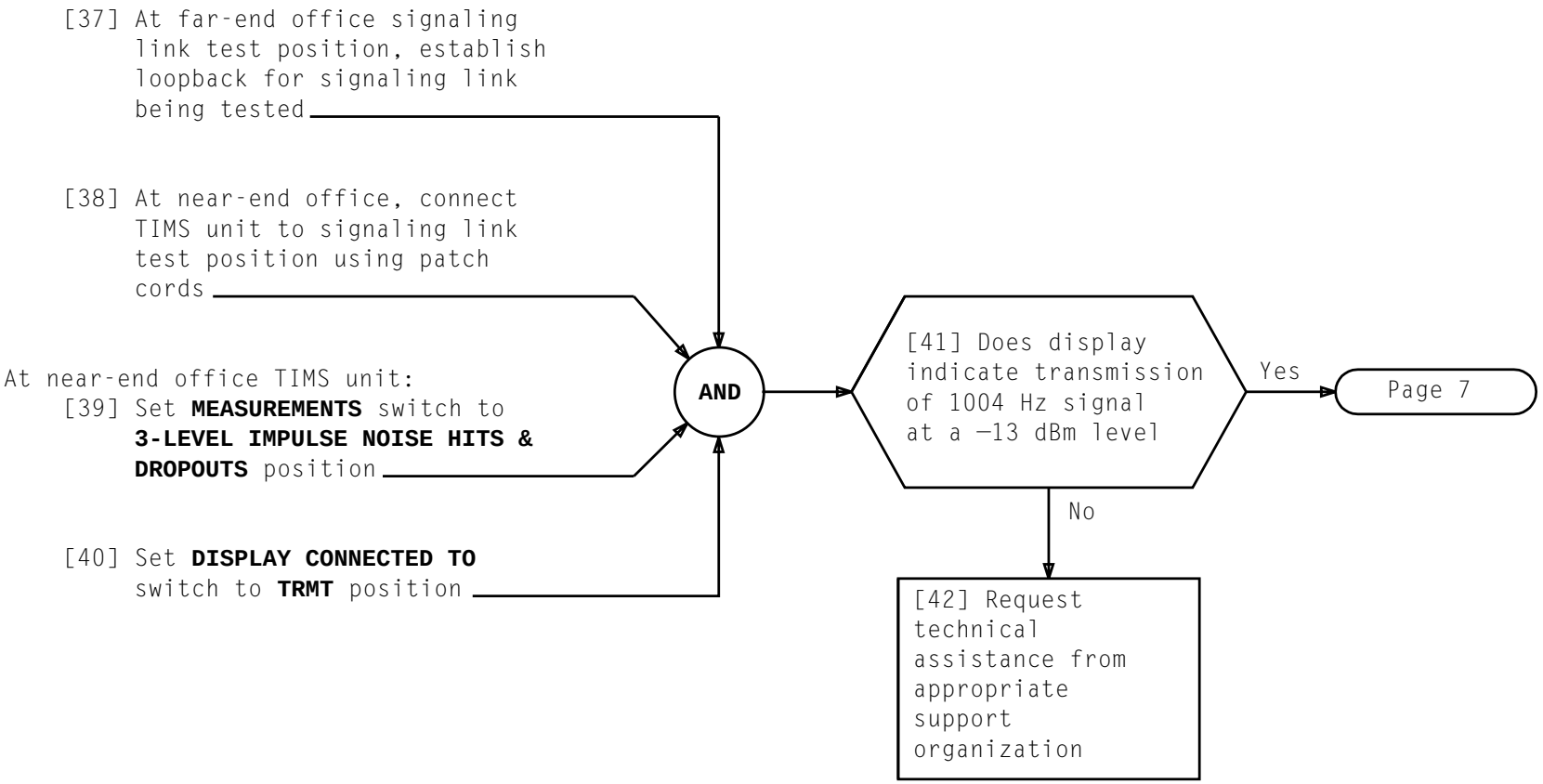
PERFORM ANALOG SIGNALING LINK IMPULSE NOISE, PHASE HITS, AND GAIN HITS TEST



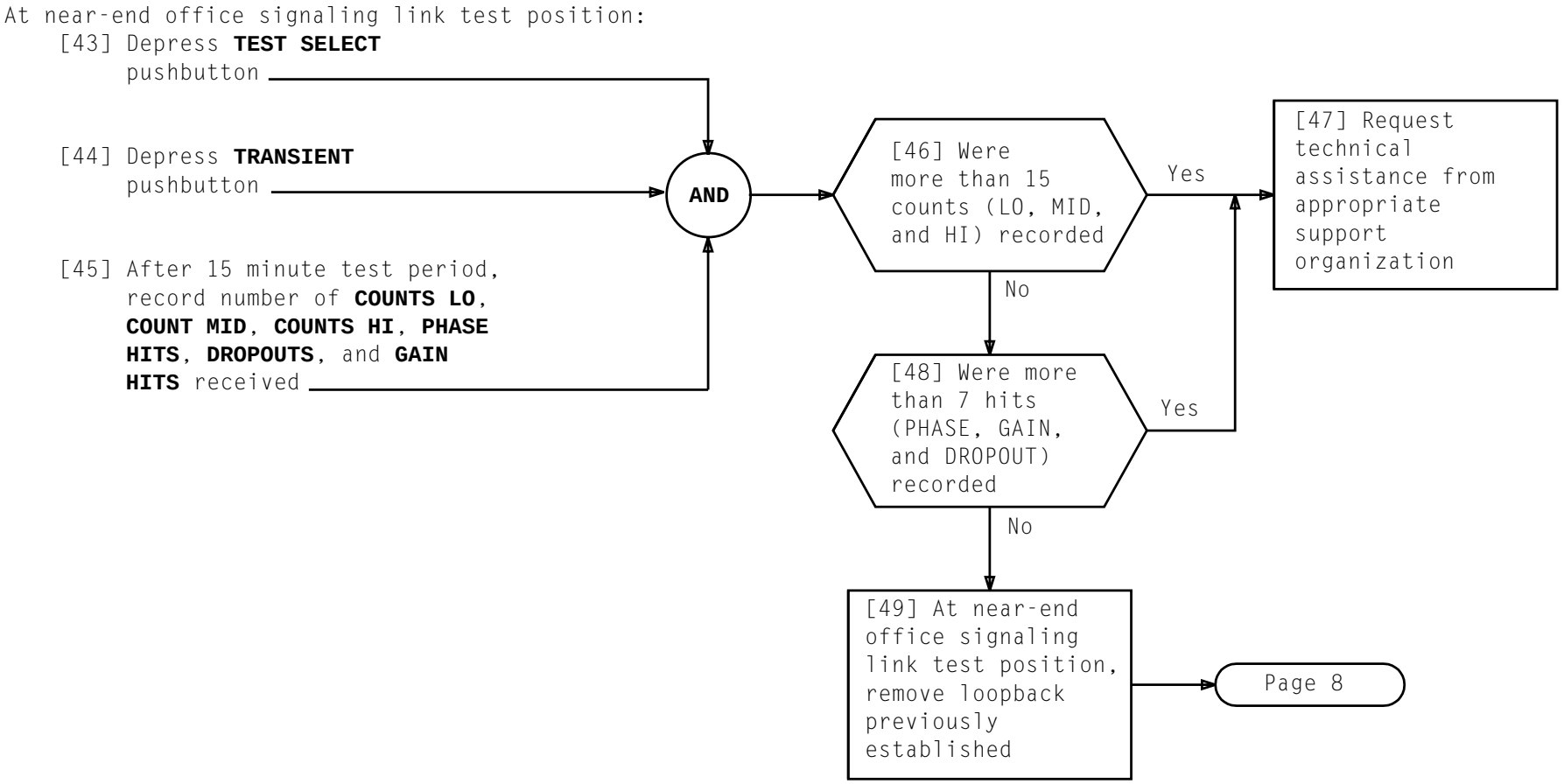
PERFORM ANALOG SIGNALING LINK IMPULSE NOISE, PHASE HITS, AND GAIN HITS TEST



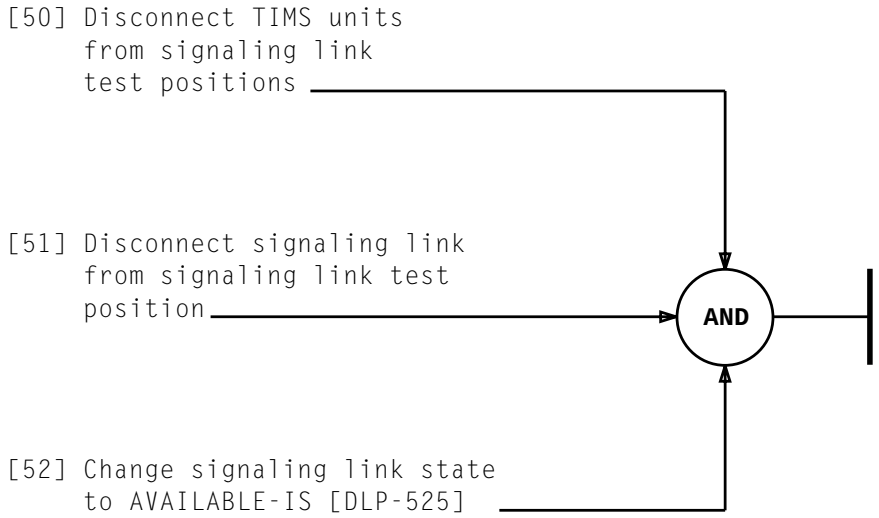
PERFORM ANALOG SIGNALING LINK IMPULSE NOISE, PHASE HITS, AND GAIN HITS TEST



PERFORM ANALOG SIGNALING LINK IMPULSE NOISE, PHASE HITS, AND GAIN HITS TEST



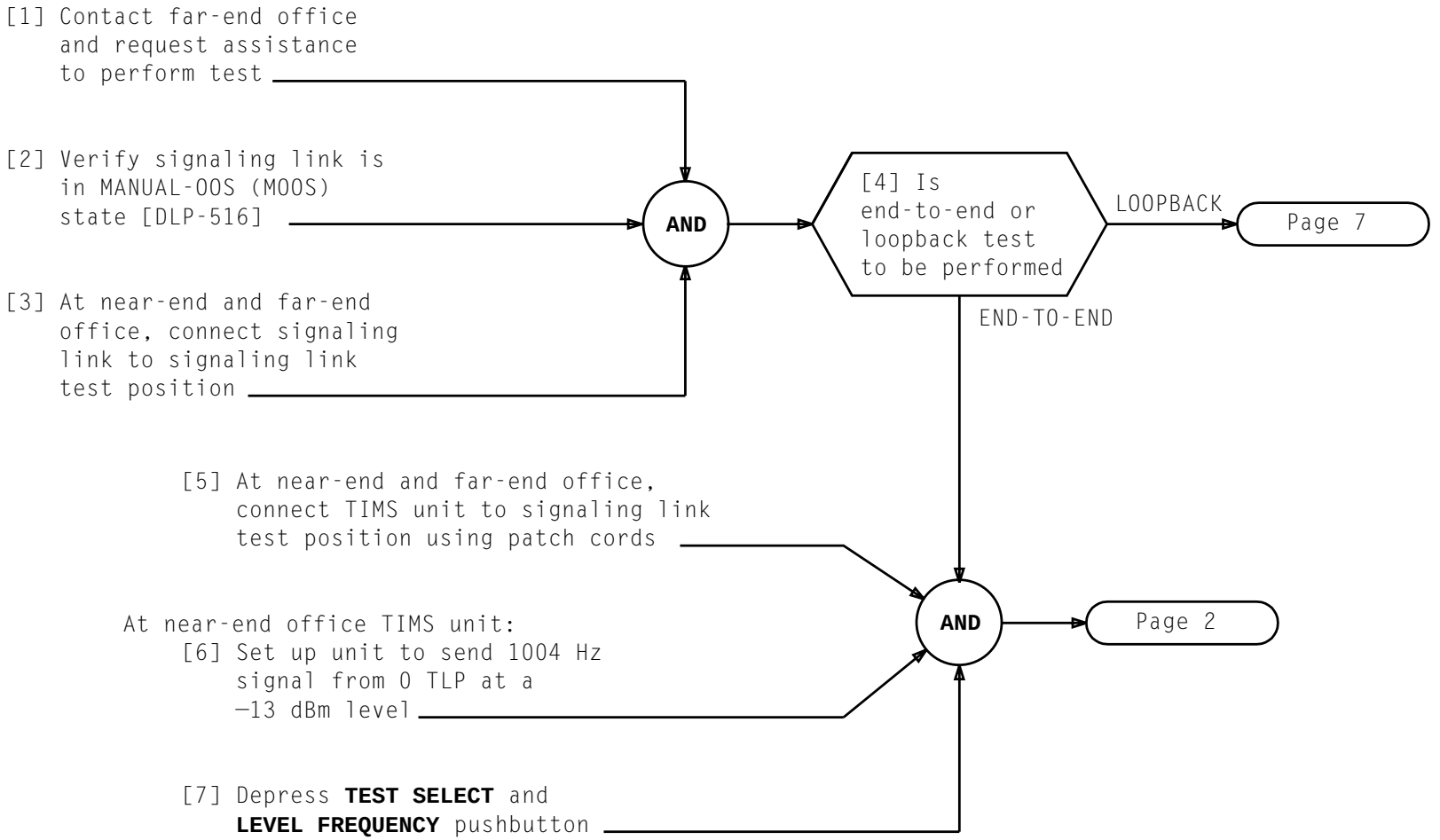
PERFORM ANALOG SIGNALING LINK IMPULSE NOISE, PHASE HITS, AND GAIN HITS TEST



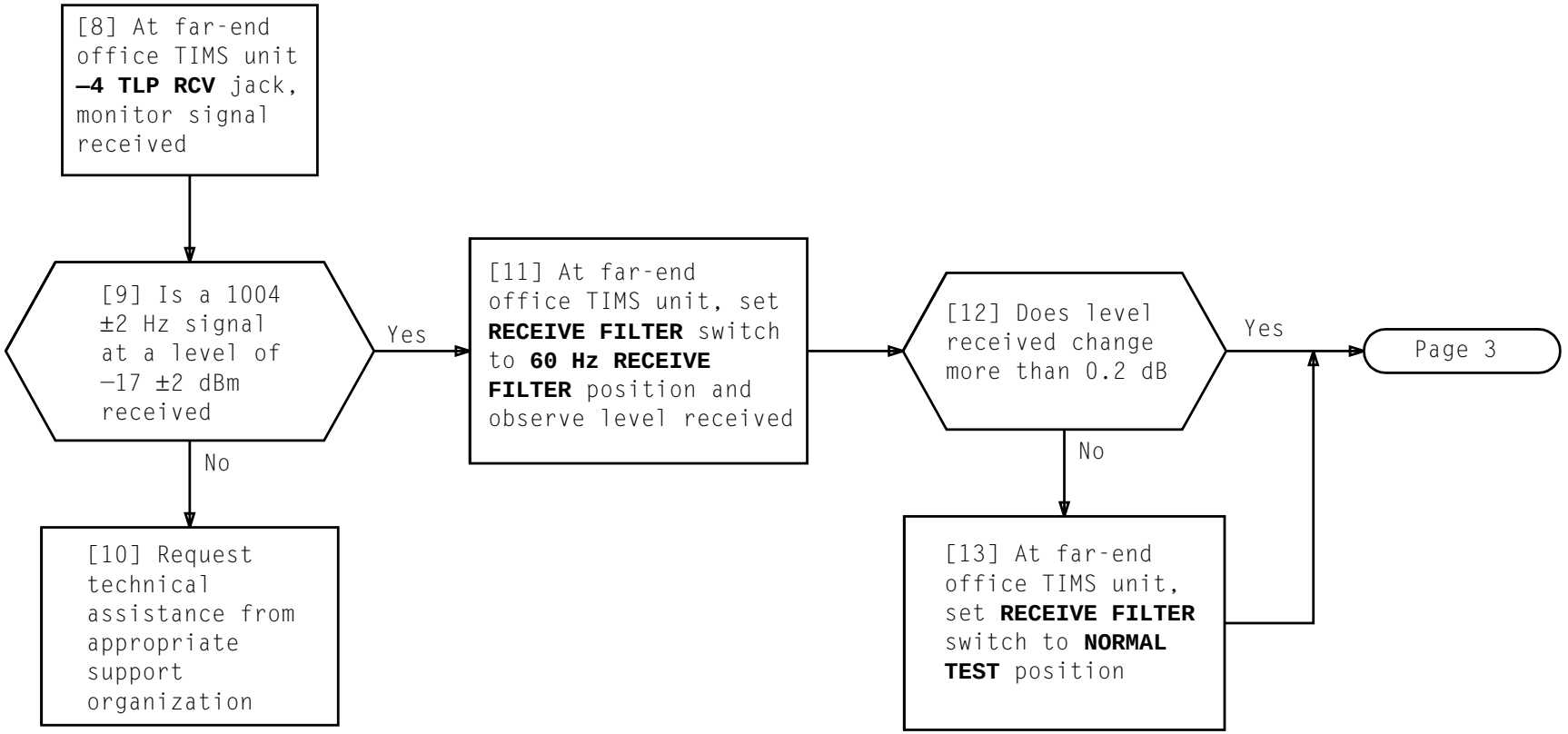
PERFORM ANALOG SIGNALING LINK IMPULSE NOISE, PHASE HITS, AND GAIN HITS TEST

SUMMARY

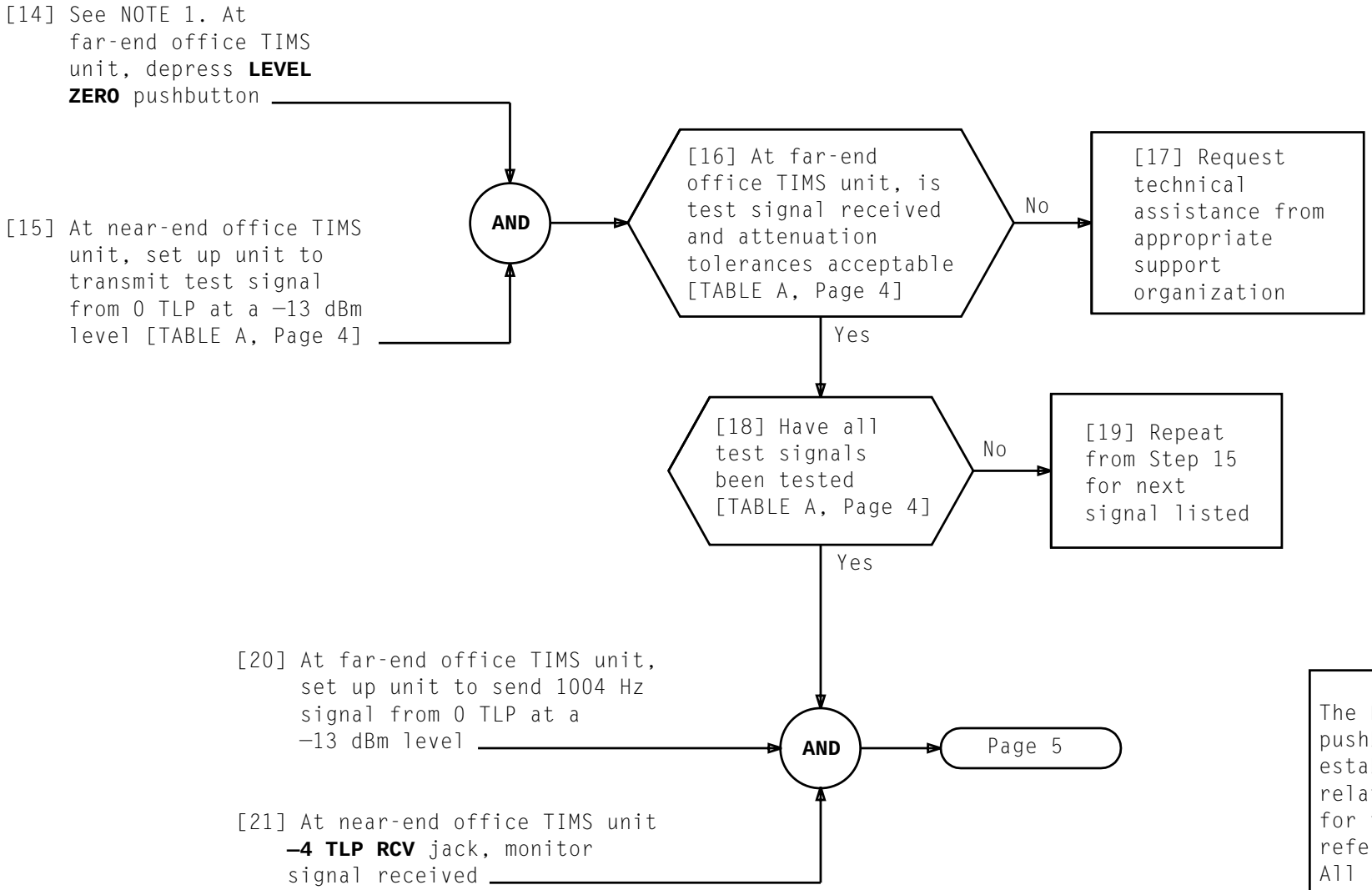
The frequency response test checks the amplitude versus frequency characteristics of the signaling link and transmission media



PERFORM ANALOG SIGNALING LINK FREQUENCY RESPONSE TEST



PERFORM ANALOG SIGNALING LINK FREQUENCY RESPONSE TEST



NOTE 1

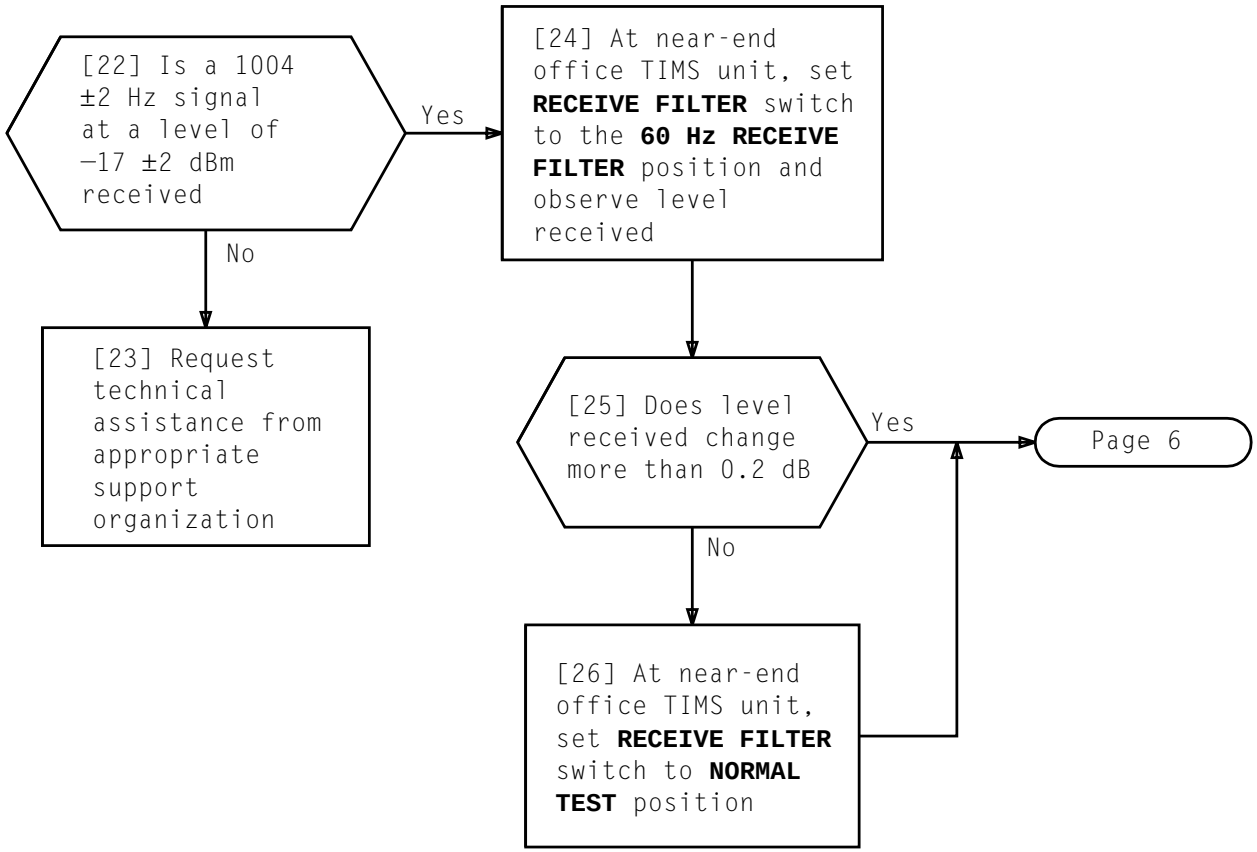
The **LEVEL ZERO** pushbutton establishes a 0 dB relative loss value for the received reference frequency. All subsequent level measurements are made in dB relative to the reference frequency dBm

PERFORM ANALOG SIGNALING LINK FREQUENCY RESPONSE TEST

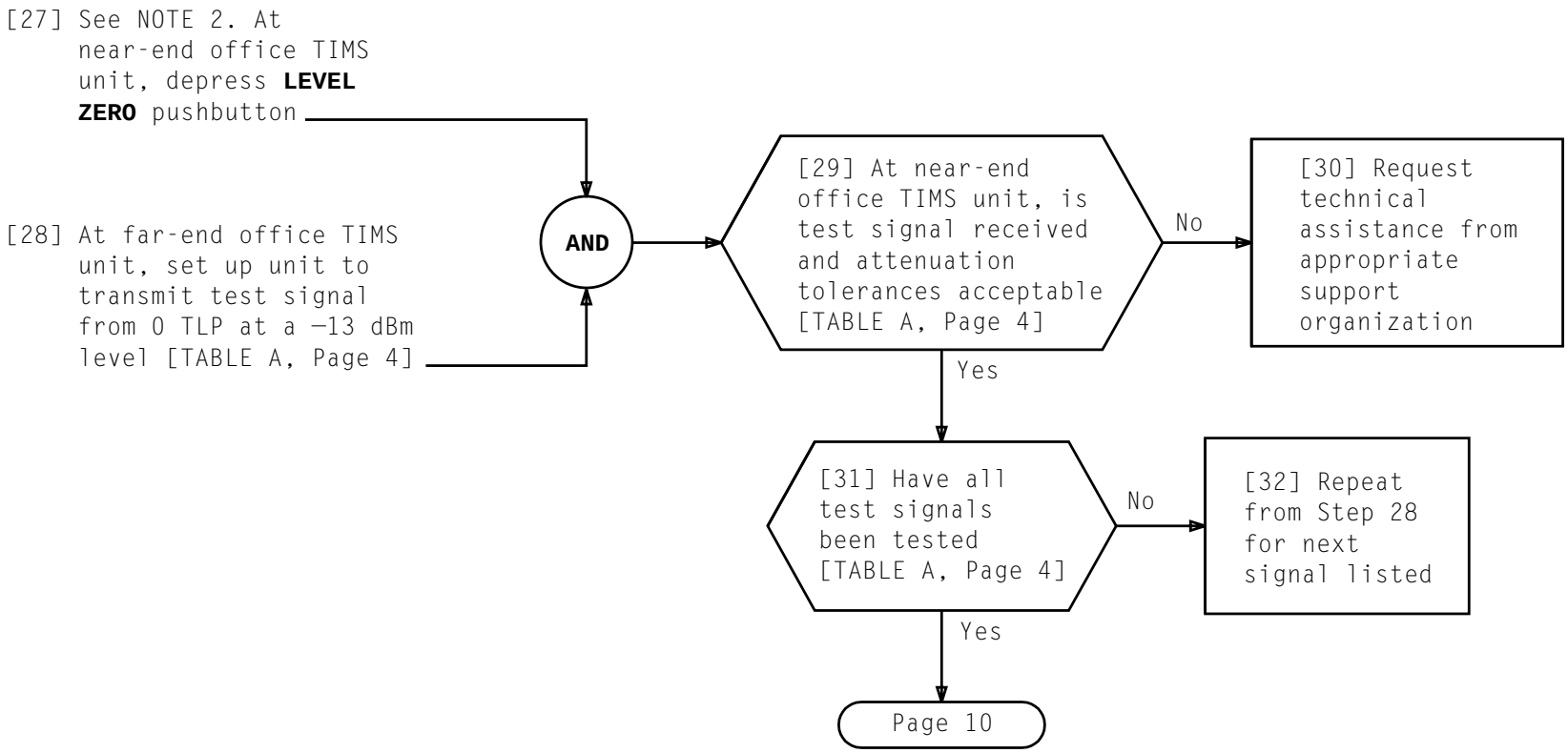
TABLE A
FREQUENCY RESPONSE REQUIREMENTS

SIGNAL FREQUENCY AND LEVEL AT 0 TLP	SIGNAL FREQUENCY RECEIVED AT –4 TLP	ATTENUATION TOLERANCE (NOTE)
304 Hz at –13 dBm	304 Hz ±2 Hz	–3 to +12 dB
404 Hz at –13 dBm	404 Hz ±2 Hz	–2 to +6 dB
504 Hz at –13 dBm	504 Hz ±2 Hz	–1 to +3 dB
604 Hz at –13 dBm	604 Hz ±2 Hz	–1 to +3 dB
804 Hz at –13 dBm	804 Hz ±2 Hz	–1 to +3 dB
1004 Hz at –13 dBm	1004 Hz ±2 Hz	0 dB
1404 Hz at –13 dBm	1404 Hz ±2 Hz	–1 to +3 dB
1804 Hz at –13 dBm	1804 Hz ±2 Hz	–1 to +3 dB
2204 Hz at –13 dBm	2204 Hz ±2 Hz	–1 to +3 dB
2504 Hz at –13 dBm	2504 Hz ±2 Hz	–1 to +3 dB
2604 Hz at –13 dBm	2604 Hz ±2 Hz	–2 to +6 dB
2804 Hz at –13 dBm	2804 Hz ±2 Hz	–2 to +6 dB
3004 Hz at –13 dBm	3004 Hz ±2 Hz	–3 to +12 dB

NOTE – Variance is relative to reference levels (dB)



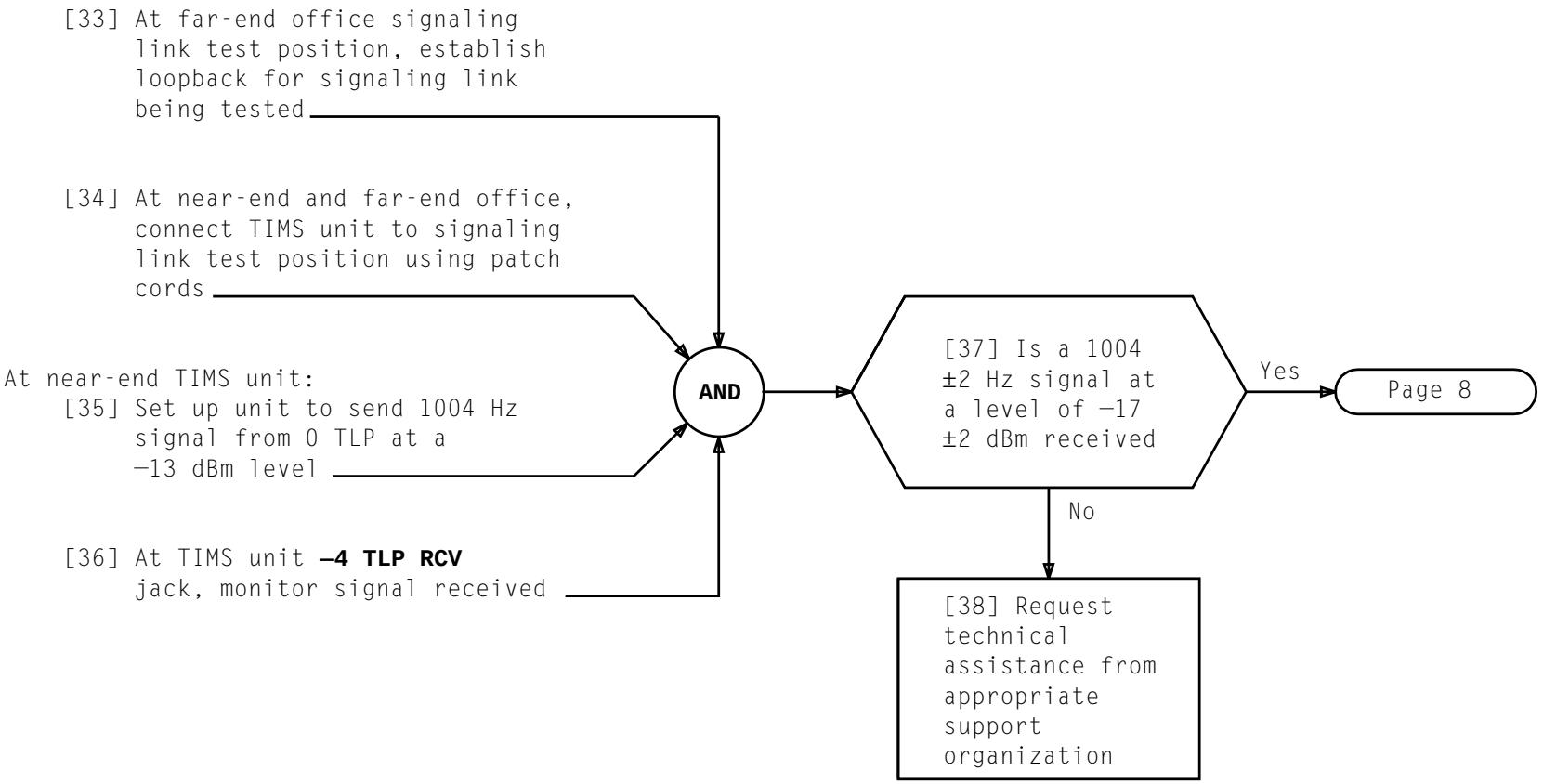
PERFORM ANALOG SIGNALING LINK FREQUENCY RESPONSE TEST



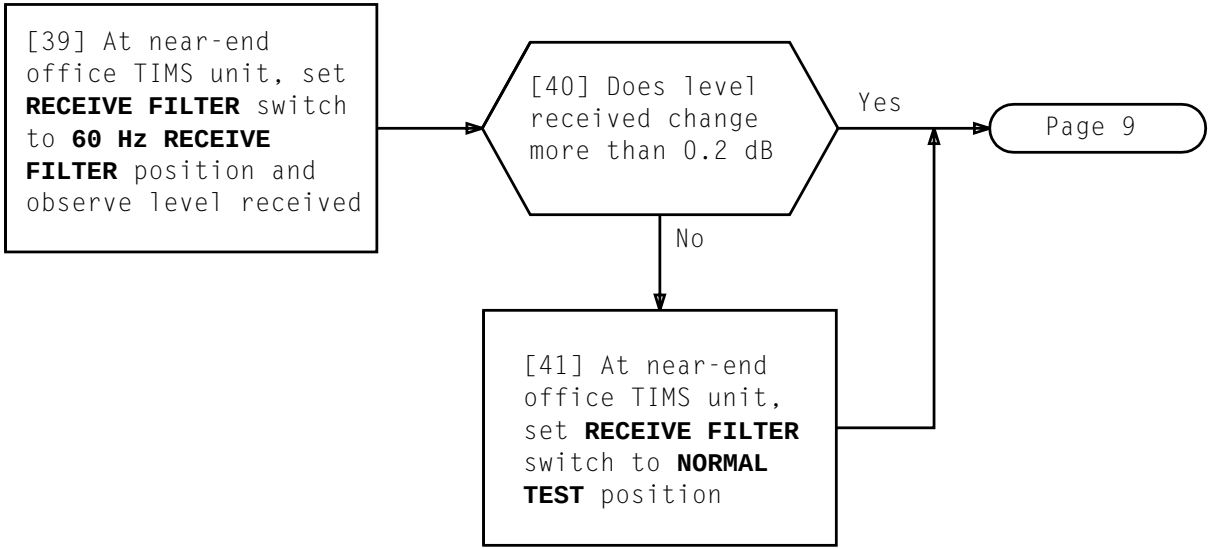
NOTE 2

The **LEVEL ZERO** pushbutton establishes a 0 dB relative loss value for the reference frequency. All subsequent level measurements are made in dB relative to the reference frequency dBm

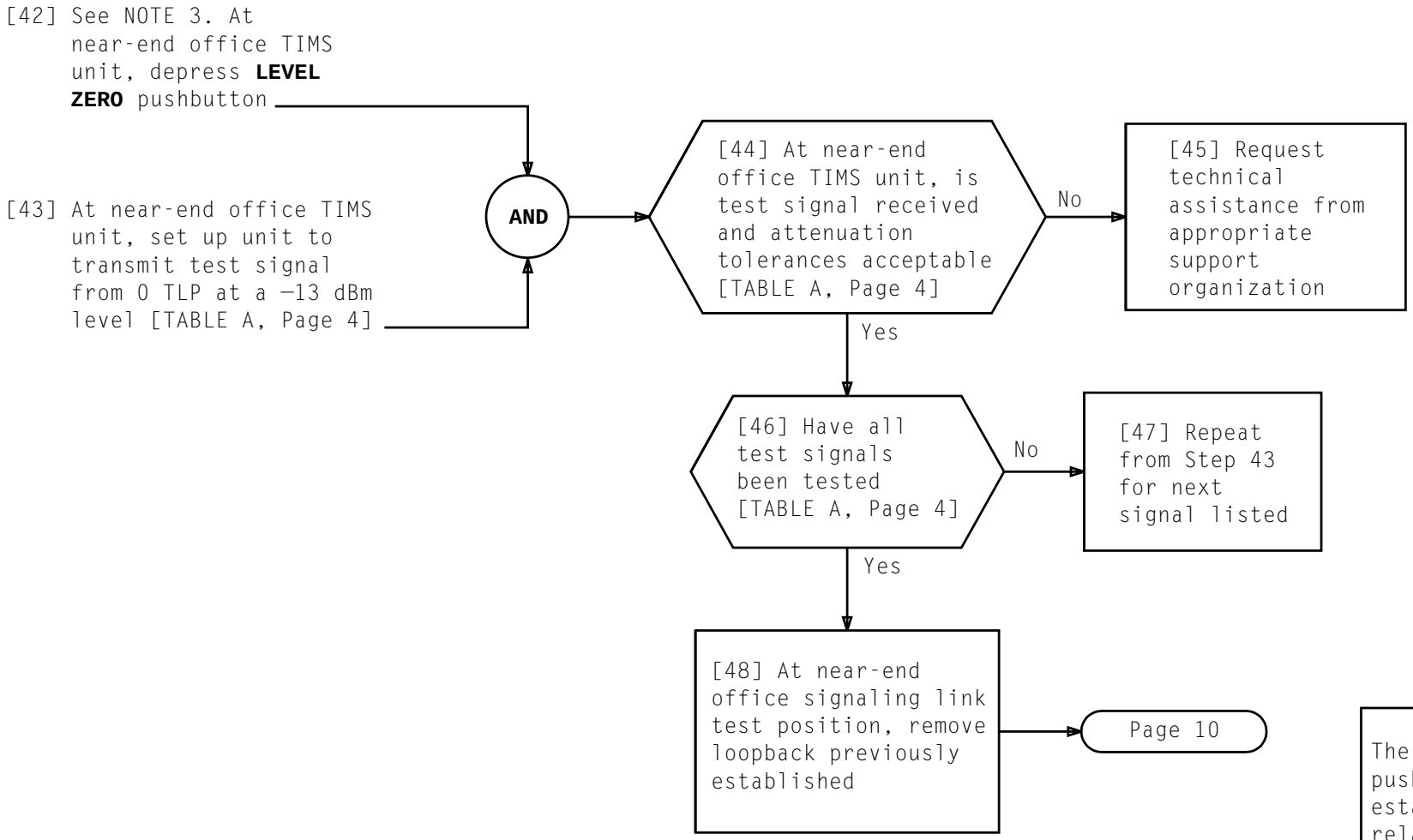
PERFORM ANALOG SIGNALING LINK FREQUENCY RESPONSE TEST



PERFORM ANALOG SIGNALING LINK FREQUENCY RESPONSE TEST

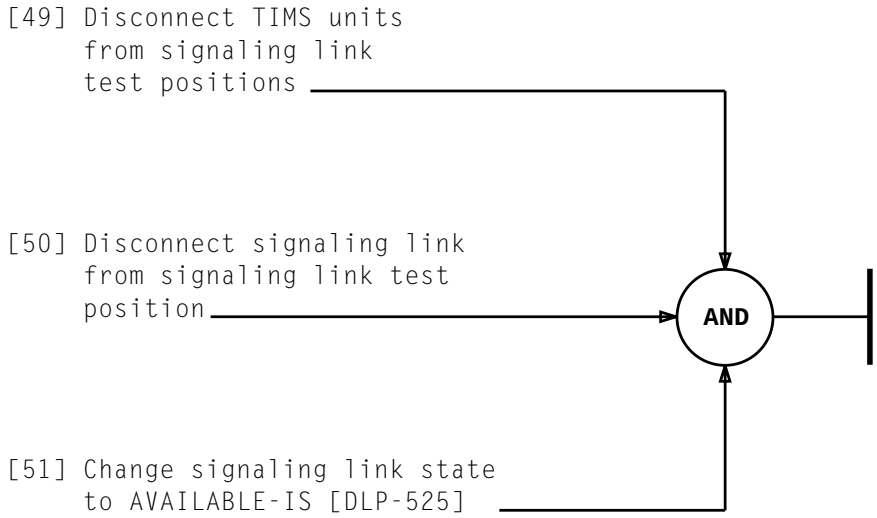


PERFORM ANALOG SIGNALING LINK FREQUENCY RESPONSE TEST



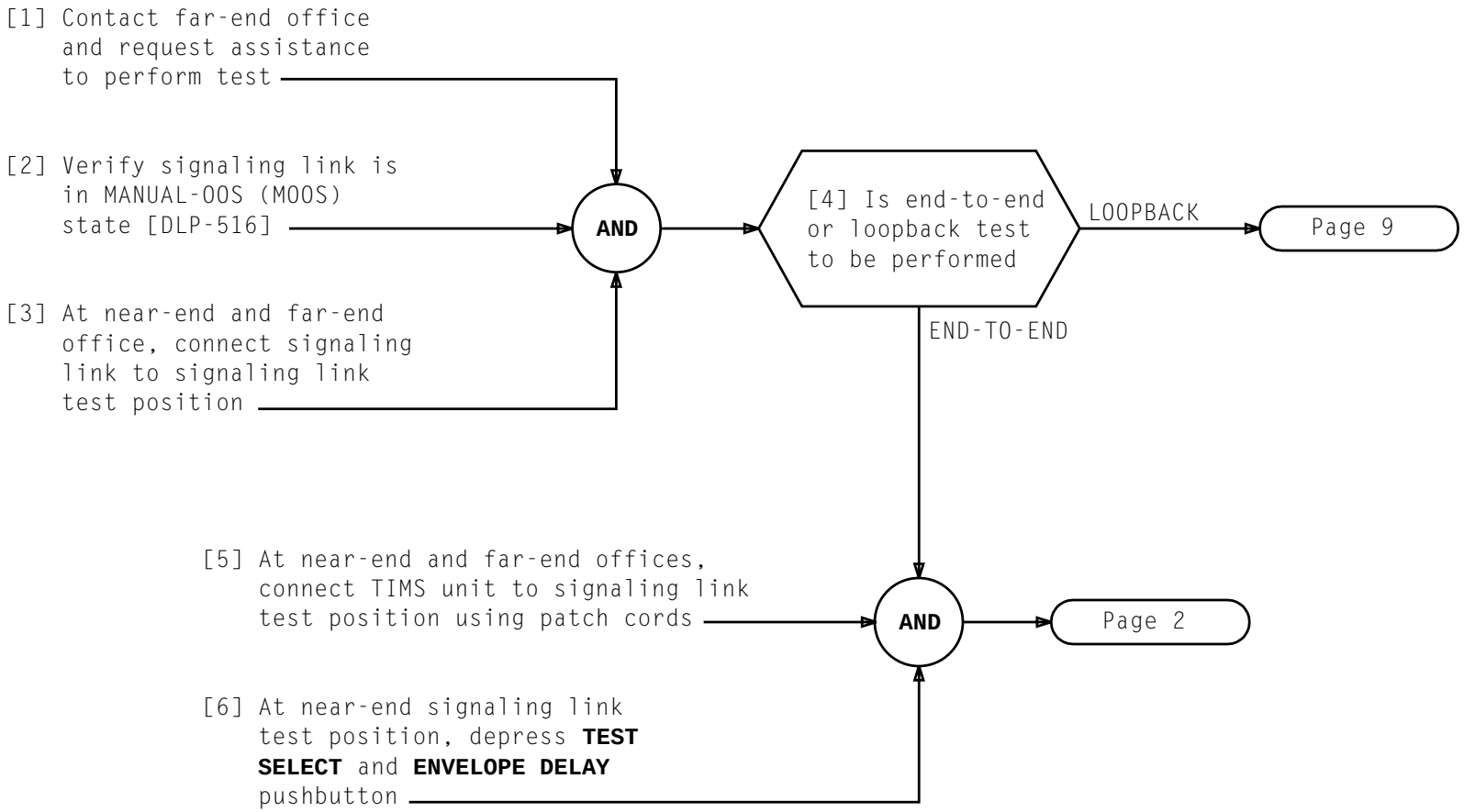
NOTE 3
The **LEVEL ZERO** pushbutton establishes a 0 dB relative loss value for the reference frequency. All subsequent level measurements are made in dB relative to the reference frequency dBm

PERFORM ANALOG SIGNALING LINK FREQUENCY RESPONSE TEST

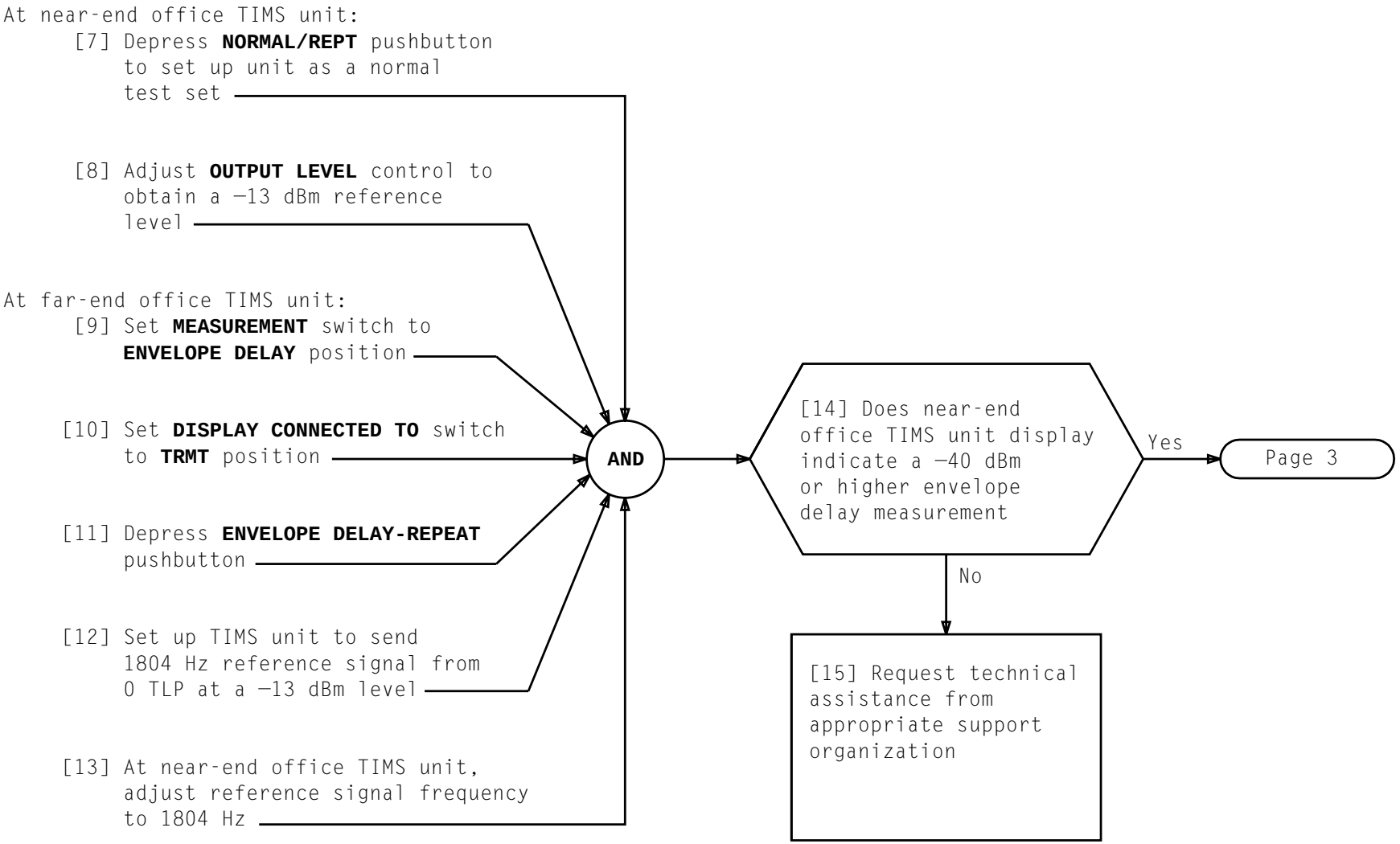


PERFORM ANALOG SIGNALING LINK FREQUENCY RESPONSE TEST

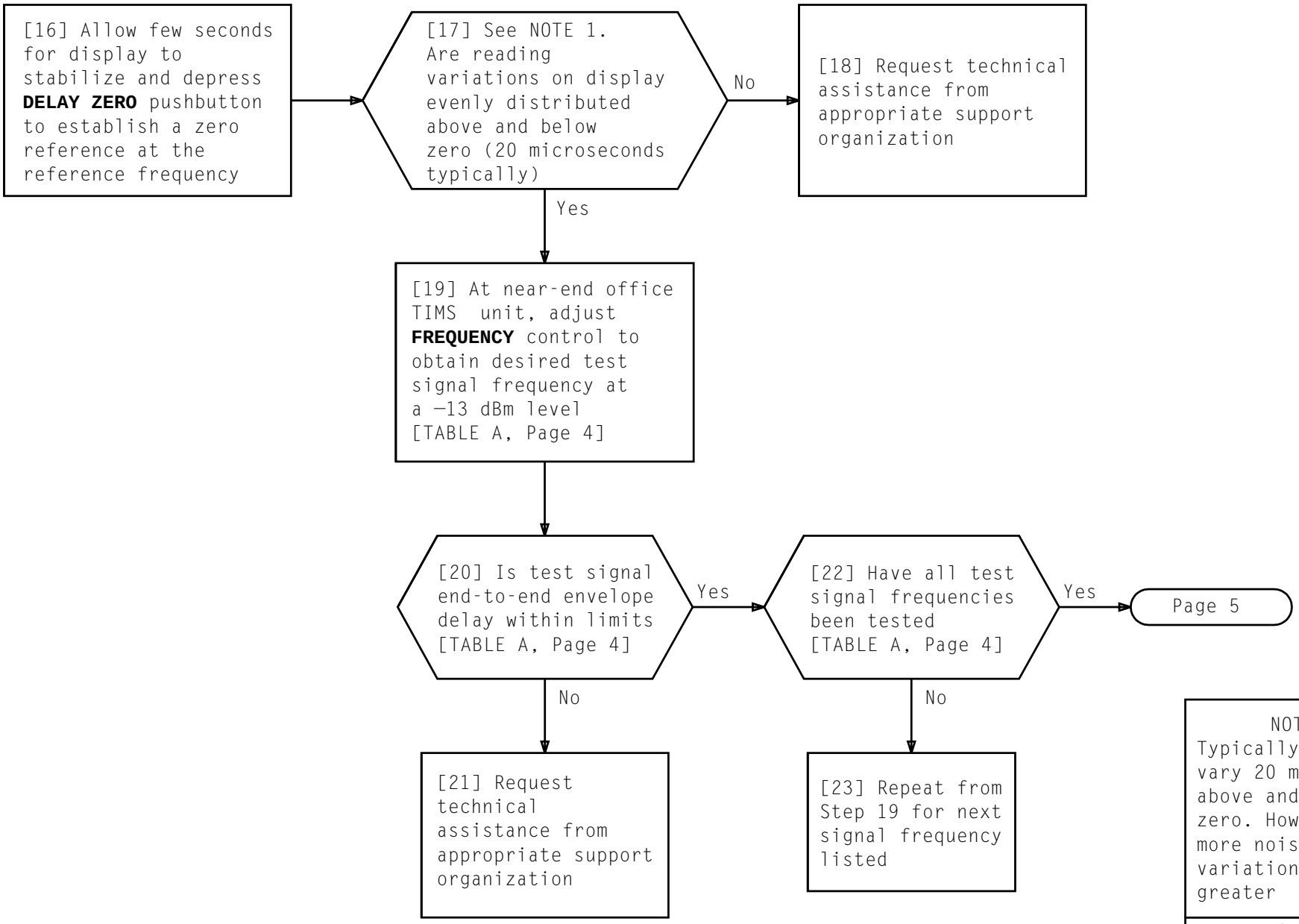
SUMMARY
The envelope delay distortion test checks the envelope delay distortion of a signaling link by transmitting specific test frequencies and measuring the delay.



PERFORM ANALOG SIGNALING LINK ENVELOPE DELAY DISTORTION TEST



PERFORM ANALOG SIGNALING LINK ENVELOPE DELAY DISTORTION TEST



NOTE 1
Typically, readings vary 20 microseconds above and below zero. However, on more noisy circuits, variations may be greater

PERFORM ANALOG SIGNALING LINK ENVELOPE DELAY DISTORTION TEST

TABLE A ENVELOPE DELAY DISTORTION REQUIREMENTS		
SIGNAL FREQUENCY AND LEVEL AT 0 TLP	MAXIMUM END-TO-END ENVELOPE DELAY (MICROSECONDS)	MAXIMUM LOOPED BACK ENVELOPE DELAY (MICROSECONDS)
804 Hz at −13 dBm	1750	3500
1004 Hz at −13 dBm	1750	3500
1404 Hz at −13 dBm	1750	3500
1804 Hz at −13 dBm	1750	3500
2204 Hz at −13 dBm	1750	3500
2504 Hz at −13 dBm	1750	3500
2604 Hz at −13 dBm	1750	3500

At far-end office TIMS unit:

[24] Set **MEASUREMENT** switch to **ENVELOPE DELAY** position

[25] Set **DISPLAY CONNECTED TO** switch to **TRMT** position

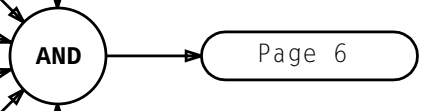
[26] Depress **ENVELOPE DELAY — NORM** pushbutton

[27] Adjust **OUTPUT LEVEL** control to obtain a −13 dBm reference level

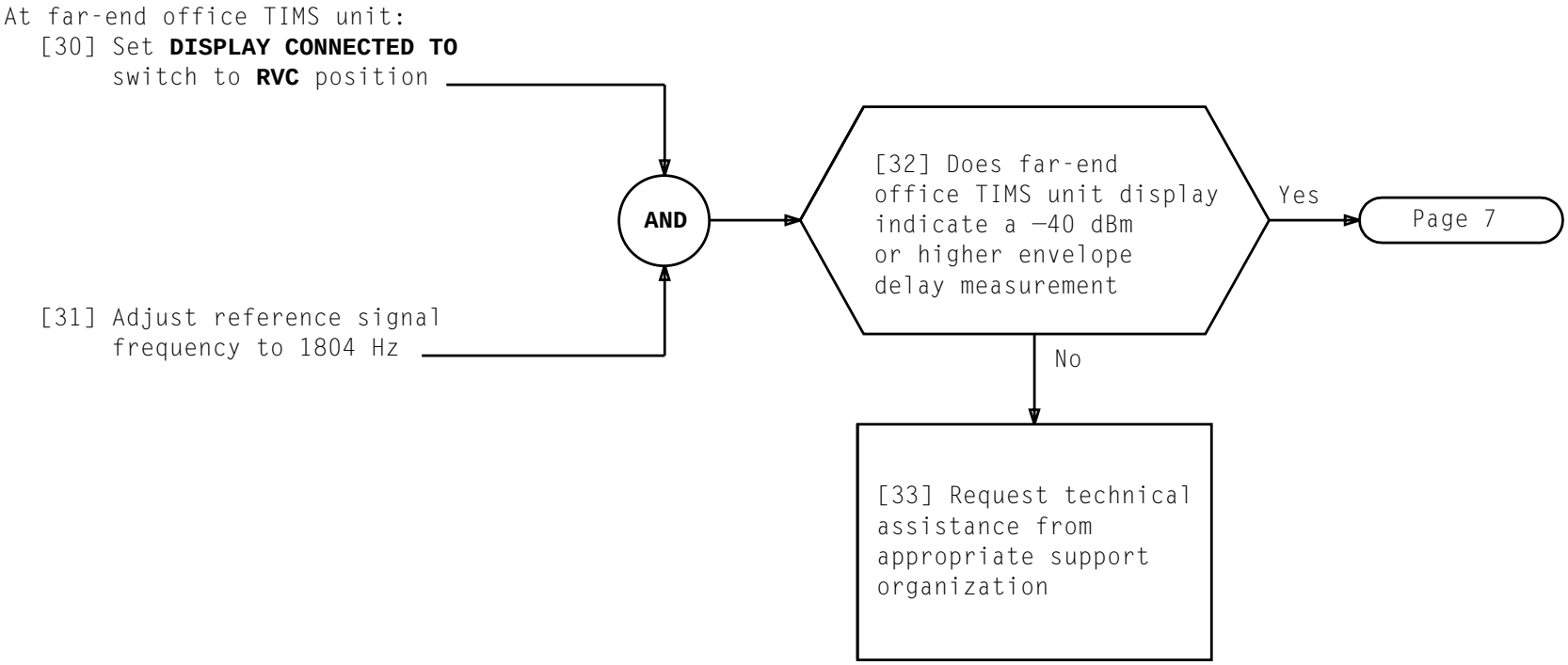
At near-end office TIMS unit:

[28] Depress **NORMAL/REPT** pushbutton to set up unit as a repeat test set

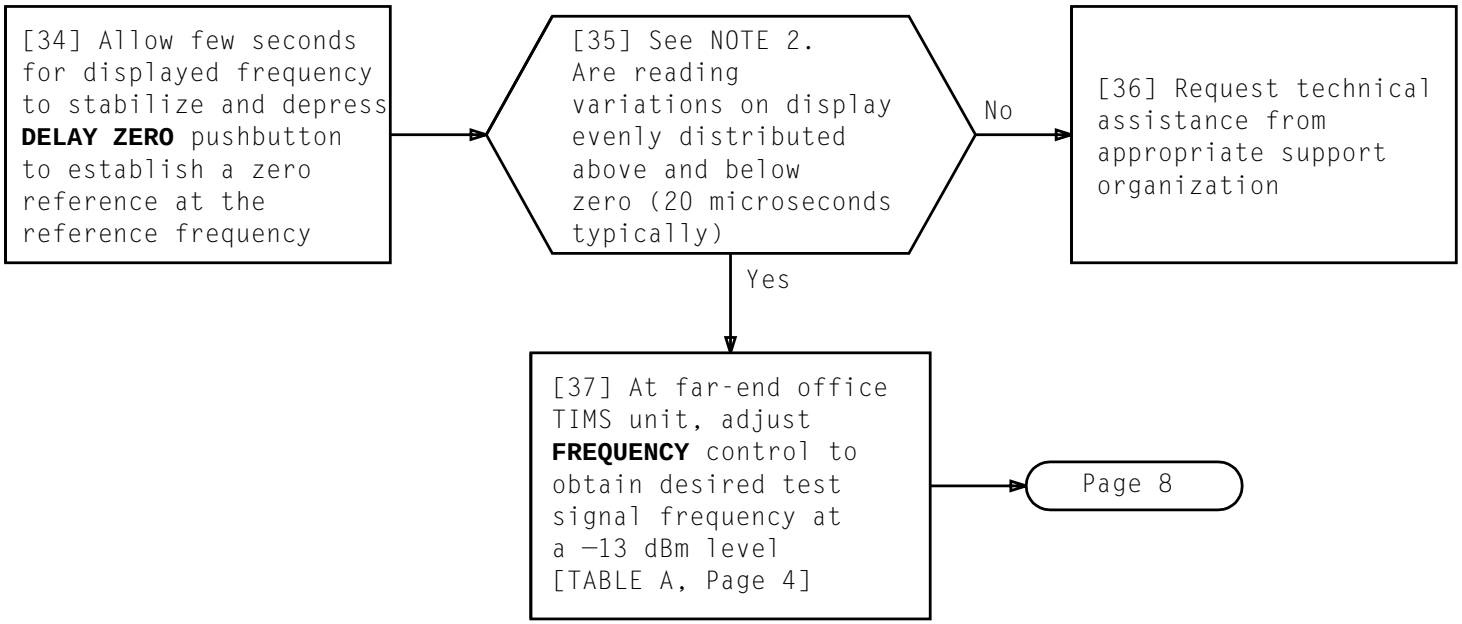
[29] Set up TIMS unit to send 1804 Hz reference signal from 0 TLP at a −13 dBm level



PERFORM ANALOG SIGNALING LINK ENVELOPE DELAY DISTORTION TEST

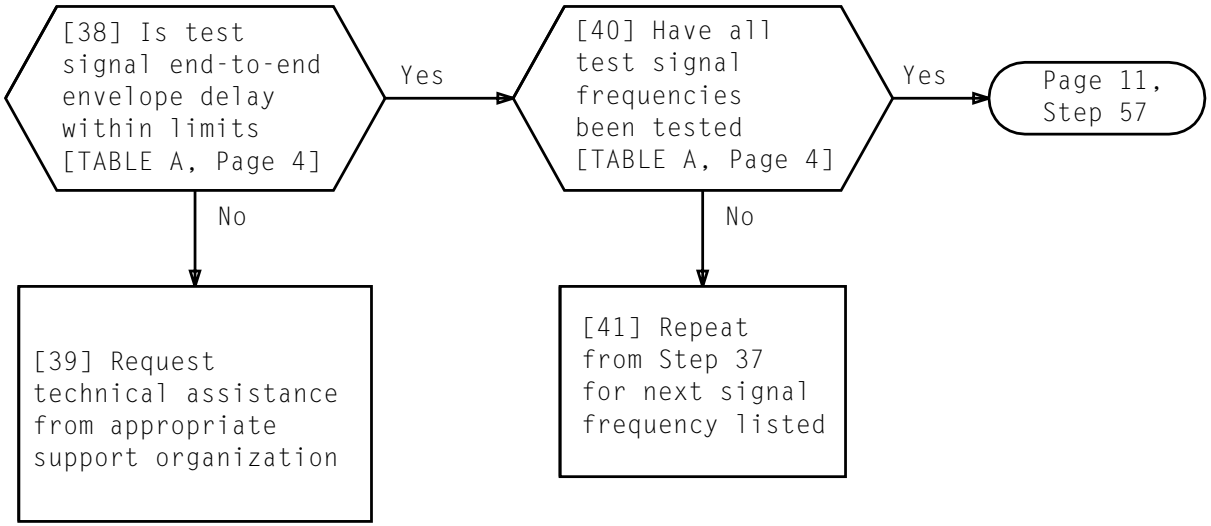


PERFORM ANALOG SIGNALING LINK ENVELOPE DELAY DISTORTION TEST



NOTE 2
Typically, readings vary 20 microseconds above and below zero. However, on more noisy circuits, variations may be greater

PERFORM ANALOG SIGNALING LINK ENVELOPE DELAY DISTORTION TEST



PERFORM ANALOG SIGNALING LINK ENVELOPE DELAY DISTORTION TEST

[42] At far-end office signaling link test position, establish loopback for signaling link being tested

[43] At near-end and far-end offices, connect TIMS unit to signaling link test position using patch cords

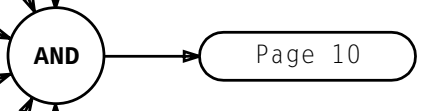
At near-end office TIMS unit:

[44] Depress **NORMAL/REPT** pushbutton to set up unit as a normal test set

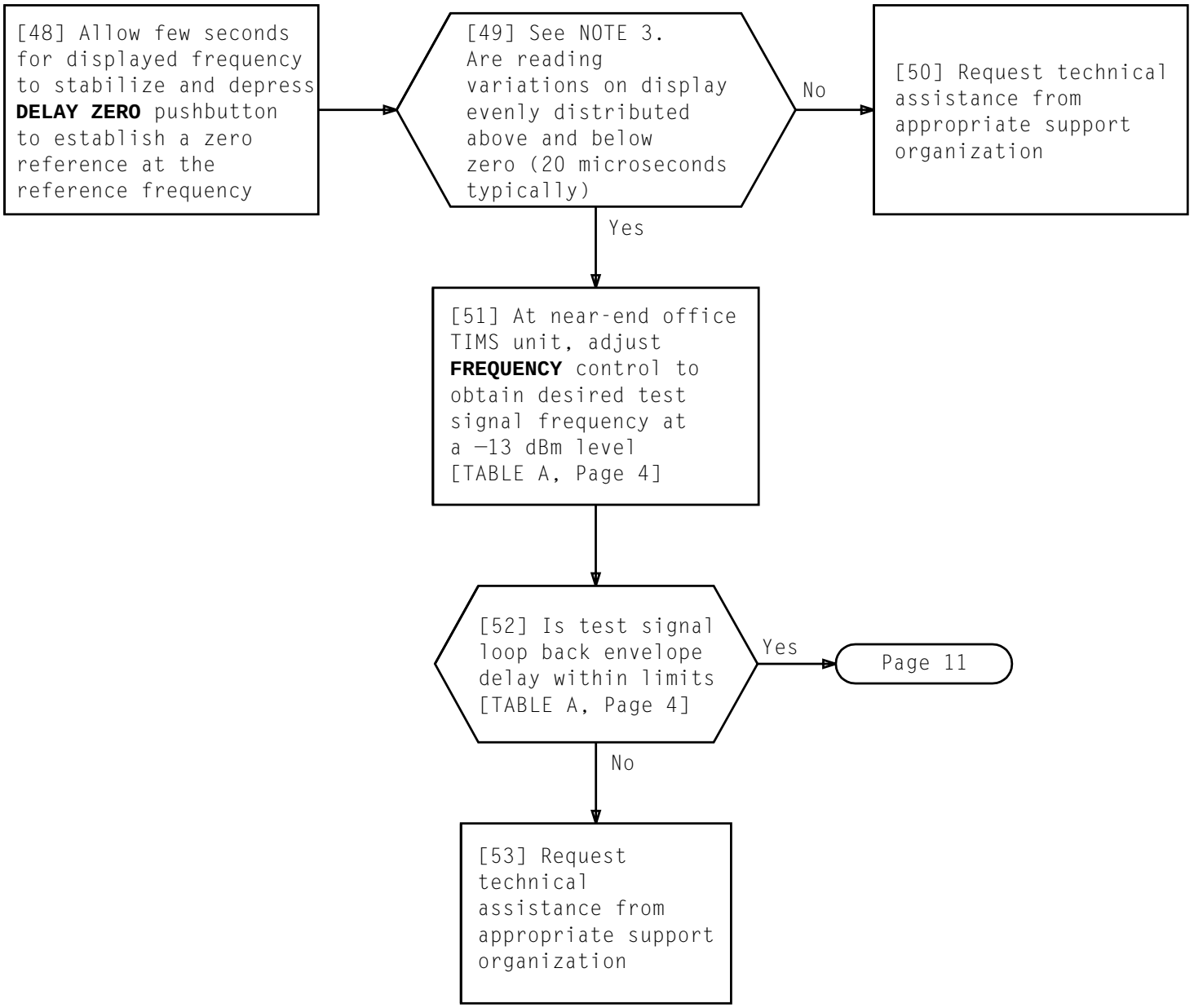
[45] Adjust **OUTPUT LEVEL** control to obtain a −13 dBm reference level

[46] Set up TIMS unit to send 1804 Hz reference signal from 0 TLP at a −13 dBm level

[47] Adjust **FREQUENCY** control to obtain 1804 Hz reference frequency

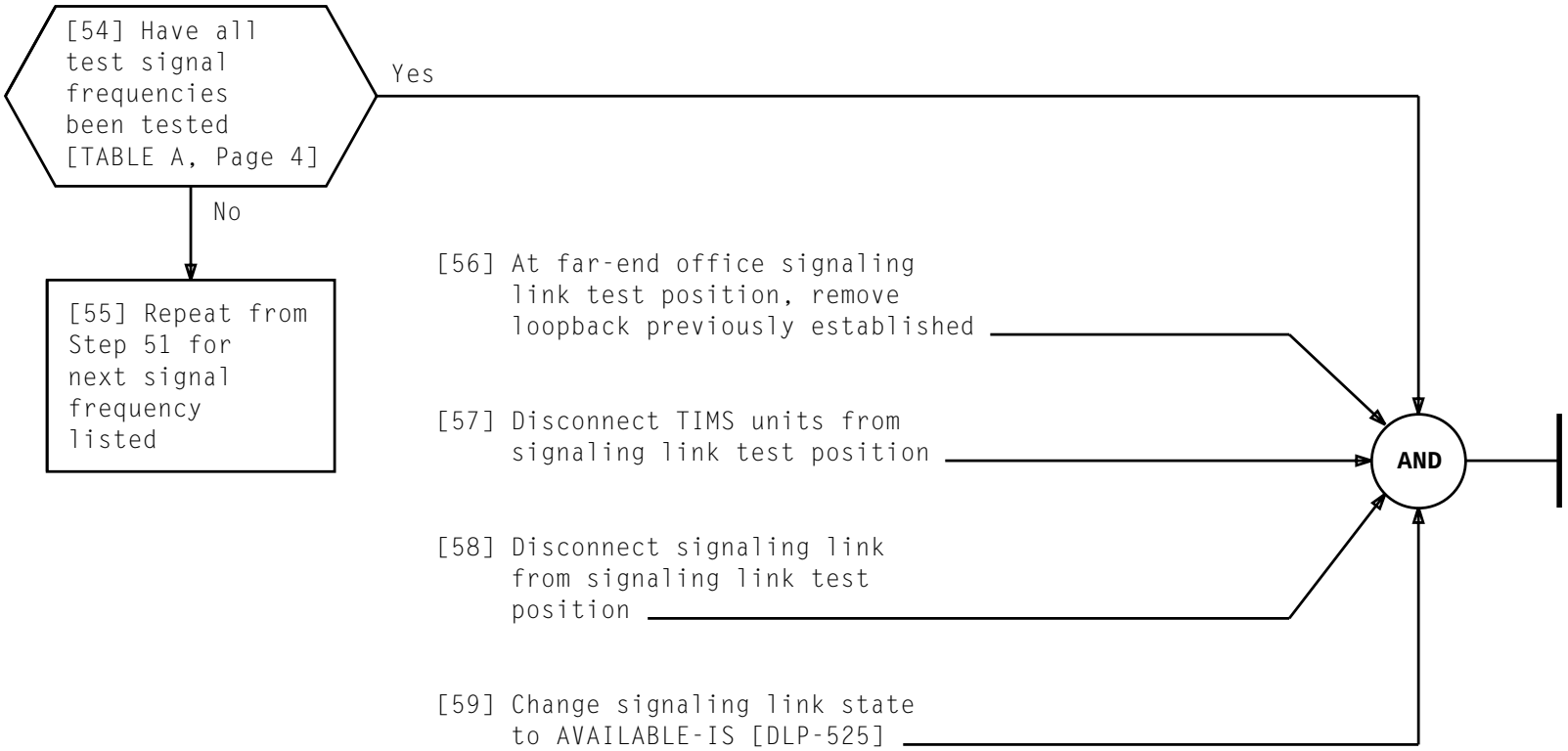


PERFORM ANALOG SIGNALING LINK ENVELOPE DELAY DISTORTION TEST



NOTE 3
Typically, readings vary 20 microseconds above and below zero. However, on more noisy circuits, variations may be greater

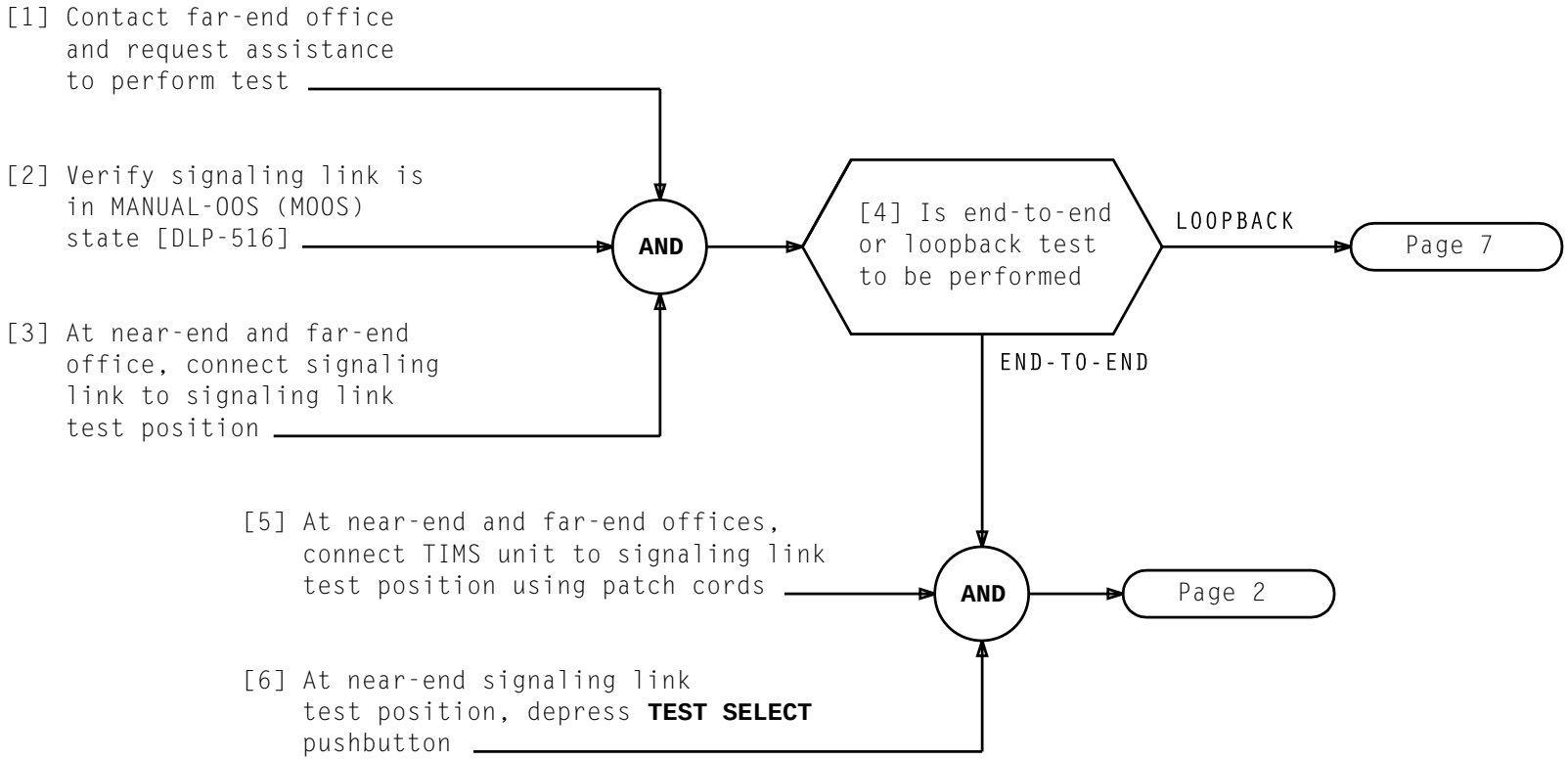
PERFORM ANALOG SIGNALING LINK ENVELOPE DELAY DISTORTION TEST



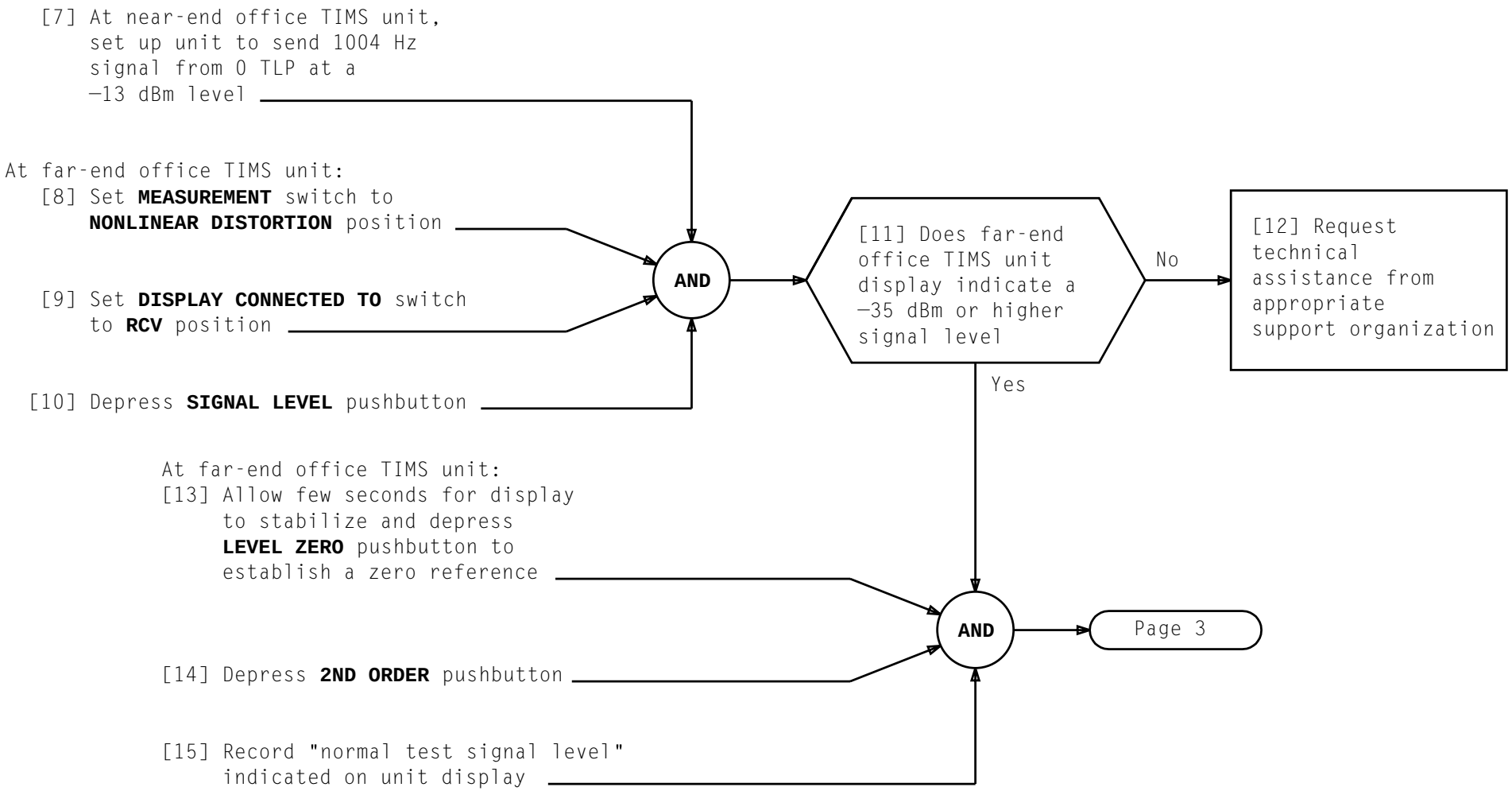
PERFORM ANALOG SIGNALING LINK ENVELOPE DELAY DISTORTION TEST

SUMMARY

The non-linear distortion test checks the second and third order distortions such as compression and clipping.



PERFORM ANALOG SIGNALING LINK NONLINEAR DISTORTION TEST



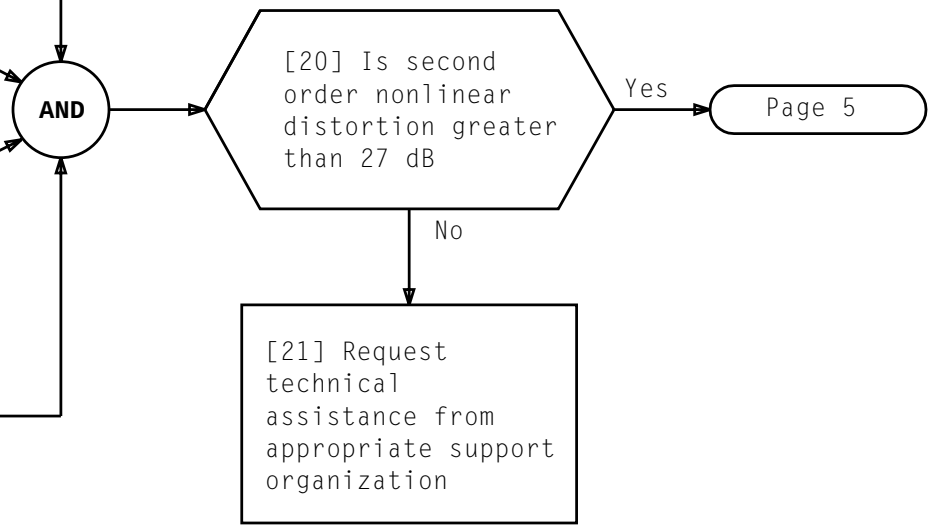
PERFORM ANALOG SIGNALING LINK NONLINEAR DISTORTION TEST

[16] At near-end signaling link test position, depress **CHECK SIGNAL** pushbutton and request far-end to record "check signal level" indicated on unit display

[17] Subtract recorded "check signal level" from recorded "normal signal level" and record difference value

[18] Identify "correction factor" associated with recorded difference value [TABLE A, Page 4]

[19] Calculate second order nonlinear distortion using the following formula:
(Correction Factor) + (Normal Test Signal Level) = Nonlinear Distortion



PERFORM ANALOG SIGNALING LINK NONLINEAR DISTORTION TEST

TABLE A

NONLINEAR DISTORTION NOISE CORRECTION FACTORS

DIFFERENCE VALUE	CORRECTION FACTOR
0	NOTE
1	7
2	4
3	3
4-5	2
6-8	1
Over 8	0

NOTE: Zero difference indicates the distortion level is buried in noise. This can mean extremely low distortion or extremely high noise.

PERFORM ANALOG SIGNALING LINK NONLINEAR DISTORTION TEST

At far-end office TIMS unit:

[22] Depress **3RD ORDER** pushbutton

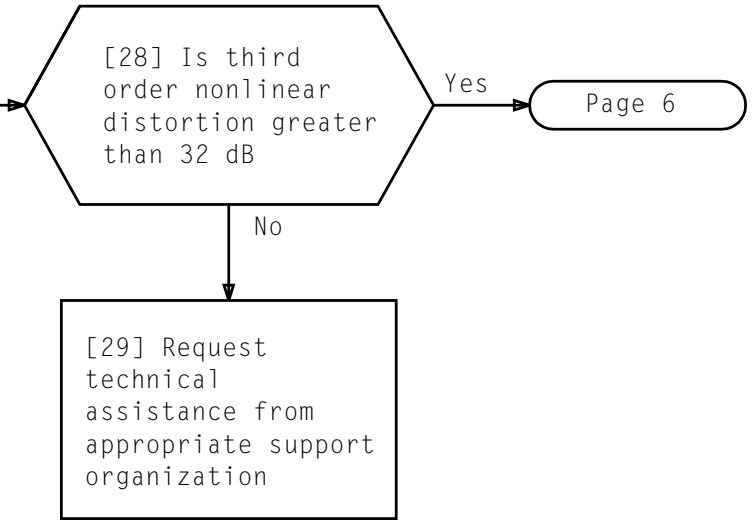
[23] Record "normal test signal level" indicated on unit display

[24] At near-end signaling link test position, depress **CHECK SIGNAL** pushbutton and request far-end to record "check signal level" indicated on unit display

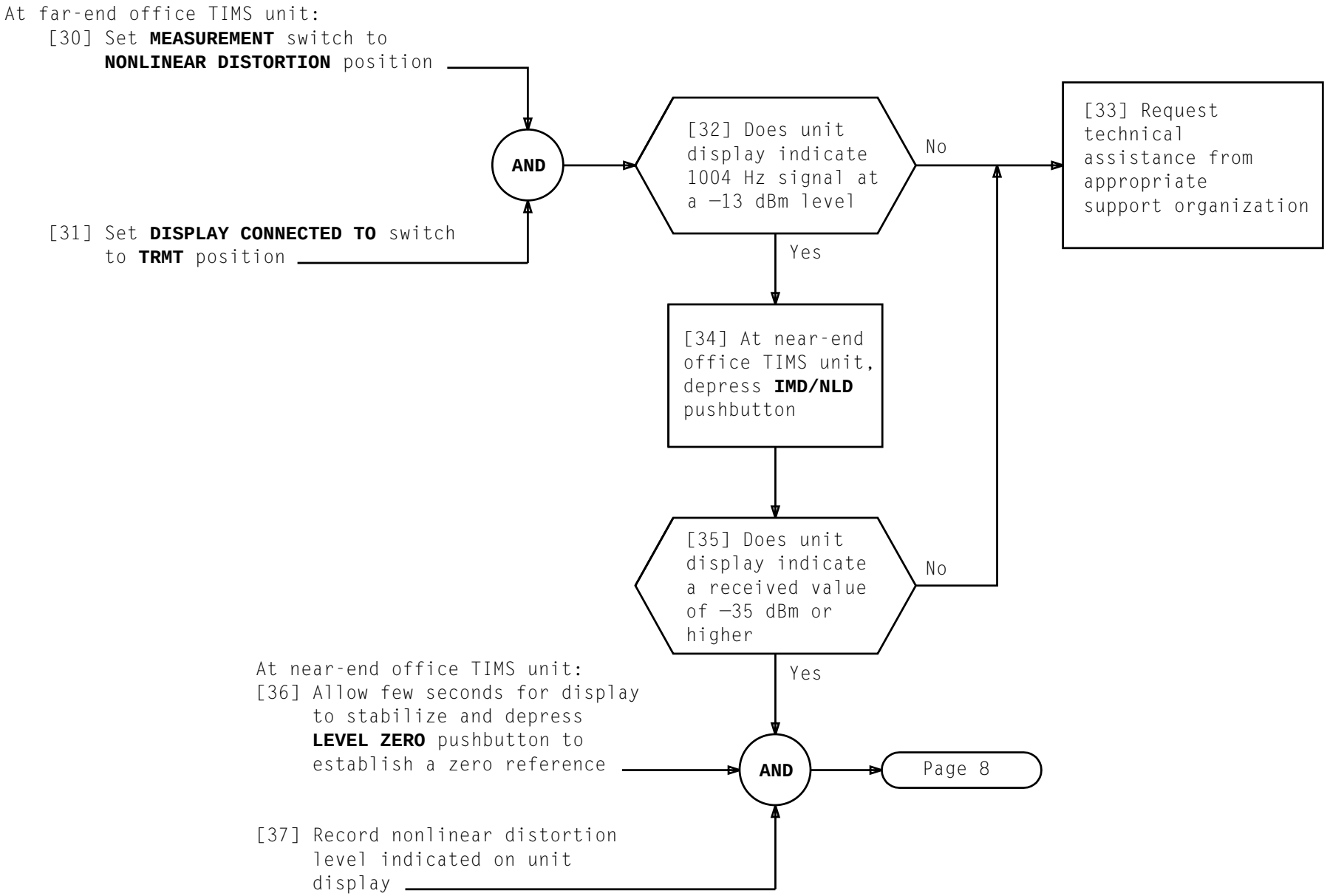
[25] Subtract recorded "check signal level" from recorded "normal signal level" and record difference value

[26] Identify "correction factor" associated with recorded difference value [TABLE A, Page 4]

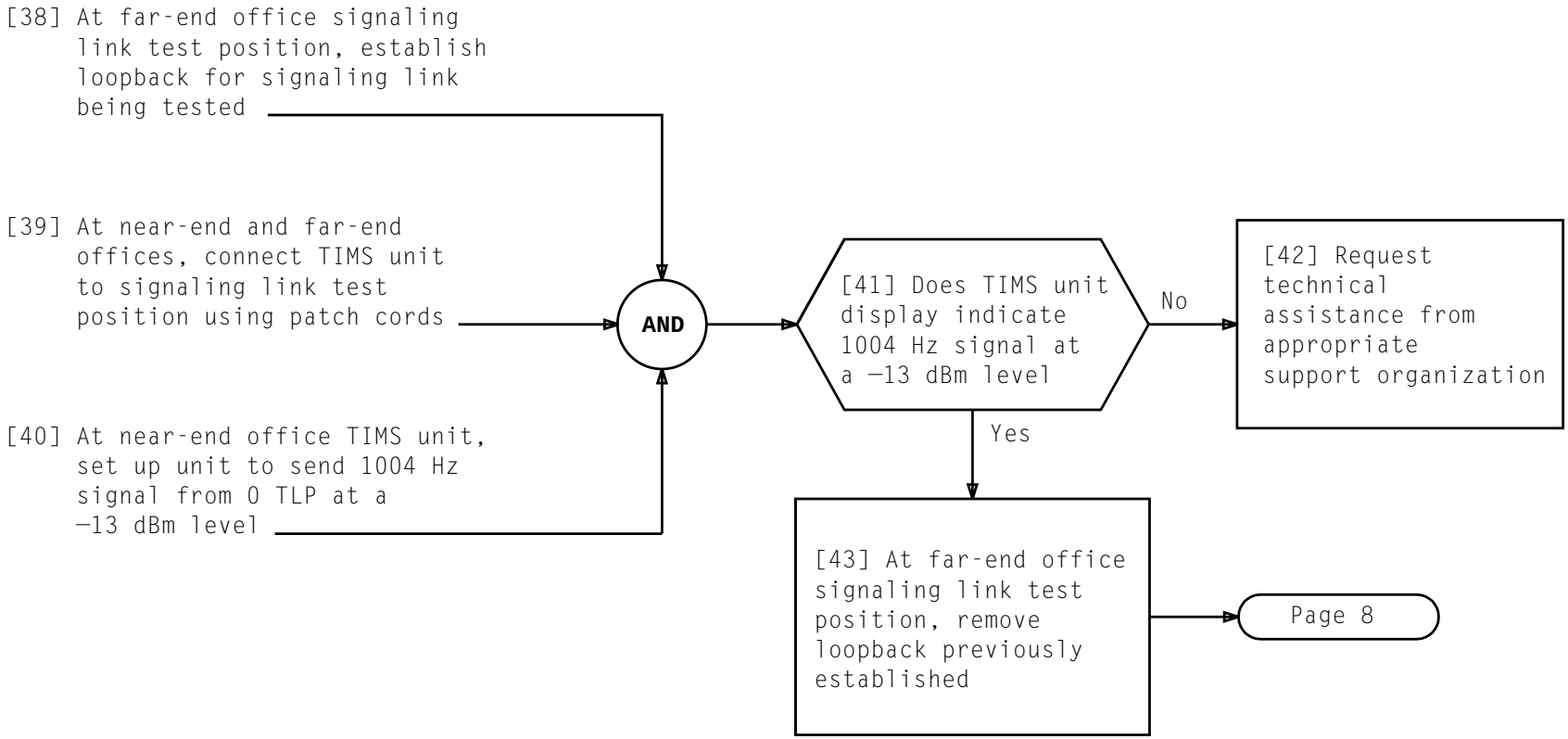
[27] Calculate third order nonlinear distortion using the following formula:
(Correction Factor) + (Normal Test Signal Level) = Nonlinear Distortion



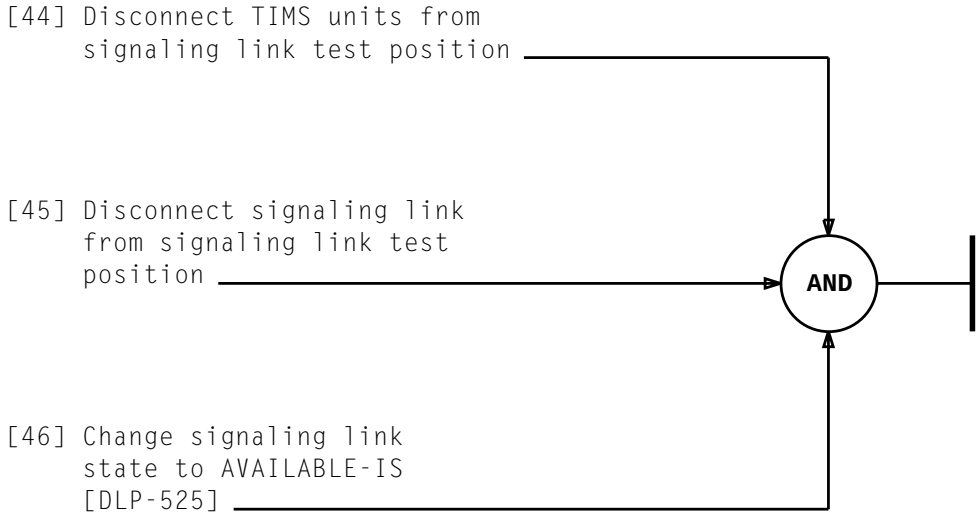
PERFORM ANALOG SIGNALING LINK NONLINEAR DISTORTION TEST



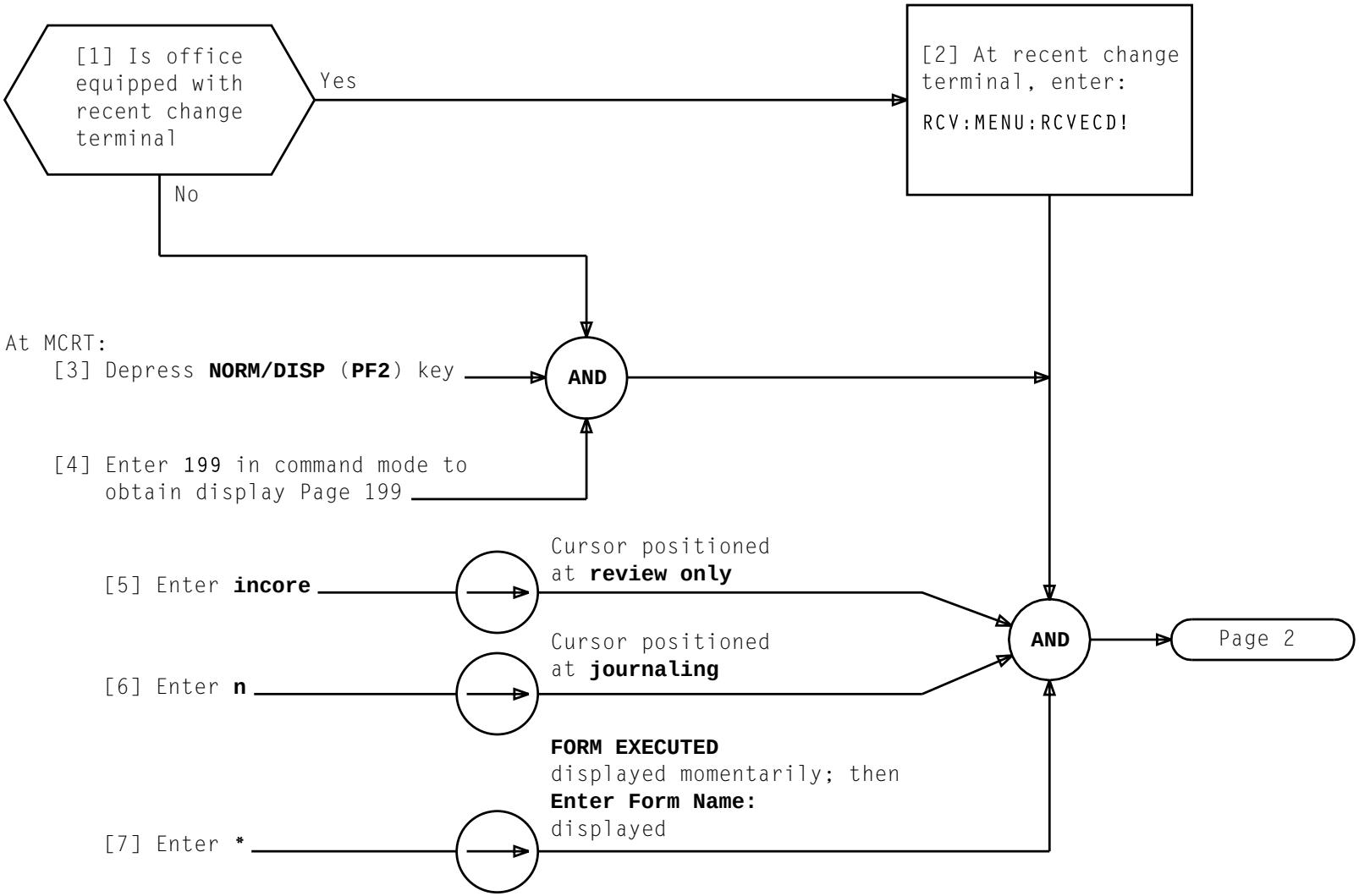
PERFORM ANALOG SIGNALING LINK NONLINEAR DISTORTION TEST



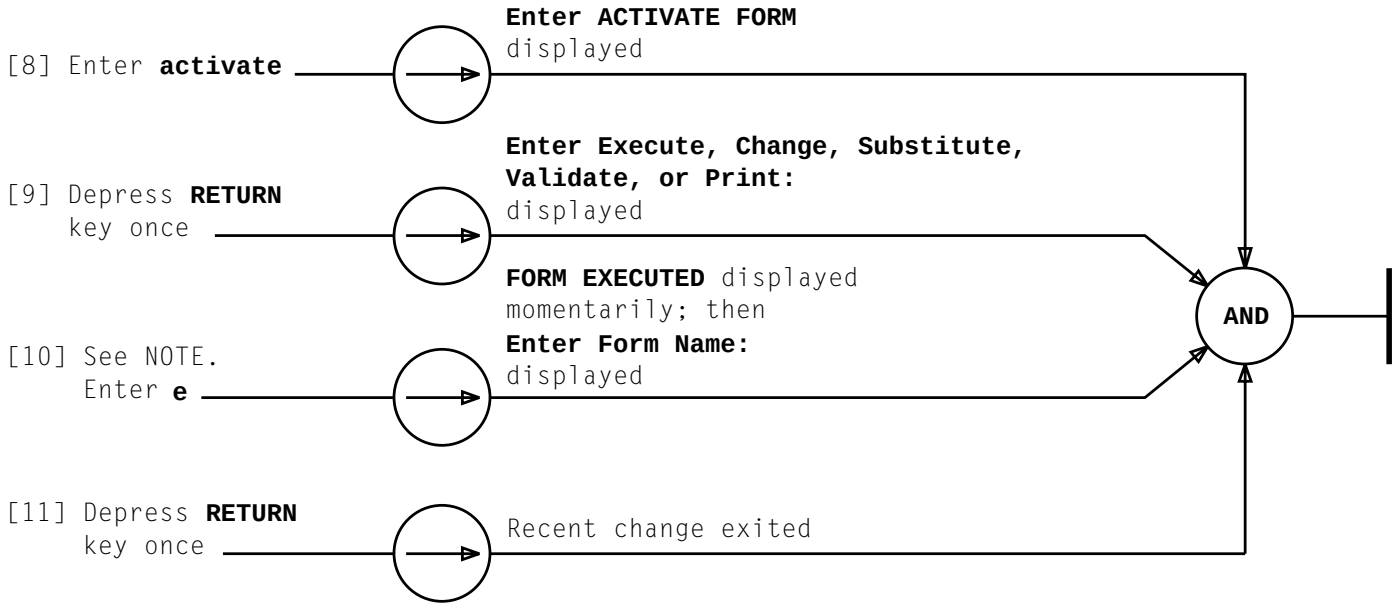
PERFORM ANALOG SIGNALING LINK NONLINEAR DISTORTION TEST



PERFORM ANALOG SIGNALING LINK NONLINEAR DISTORTION TEST



COPY INCORE EQUIPMENT CONFIGURATION DATA BASE (ECD) TO DISK



COPY INCORE EQUIPMENT CONFIGURATION DATA BASE (ECD) TO DISK

NOTE
It may take several minutes before **FORM EXECUTED** response is displayed

[1] At MCRT, enter:

`OP:STATUS:FILESYS!`

[2] Using ROP printout, determine if system is running on root (/dev/root) or broot (/dev/broot) and record

[3] At MCRT, enter:

`AUD:FSBLK 1,INS"a"!`

a = file name listed in TABLE A associated with running file system as determined in Step 2

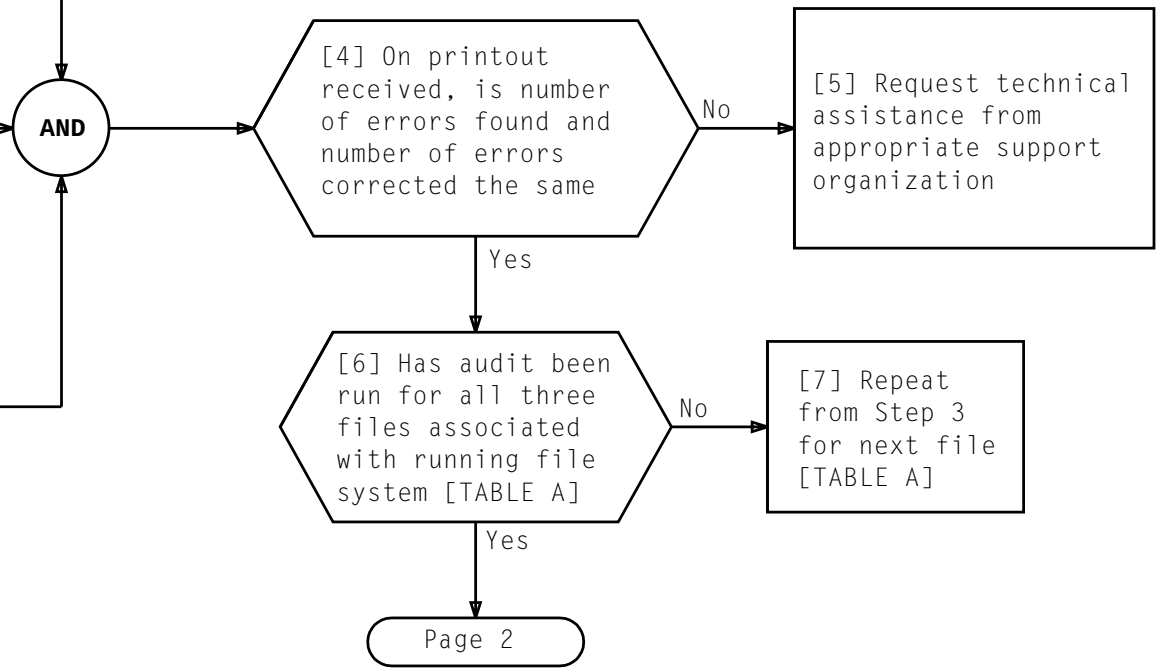


TABLE A

SYSTEM RUNNING ON	
ROOT	**BROOT**
/dev/root	/dev/broot
/dev/db	/dev/bdb
/dev/etc	/dev/betc

RUN FILE SYSTEM AUDITS ON RUNNING FILE SYSTEM TO ENSURE NO FILE SYSTEM ERRORS

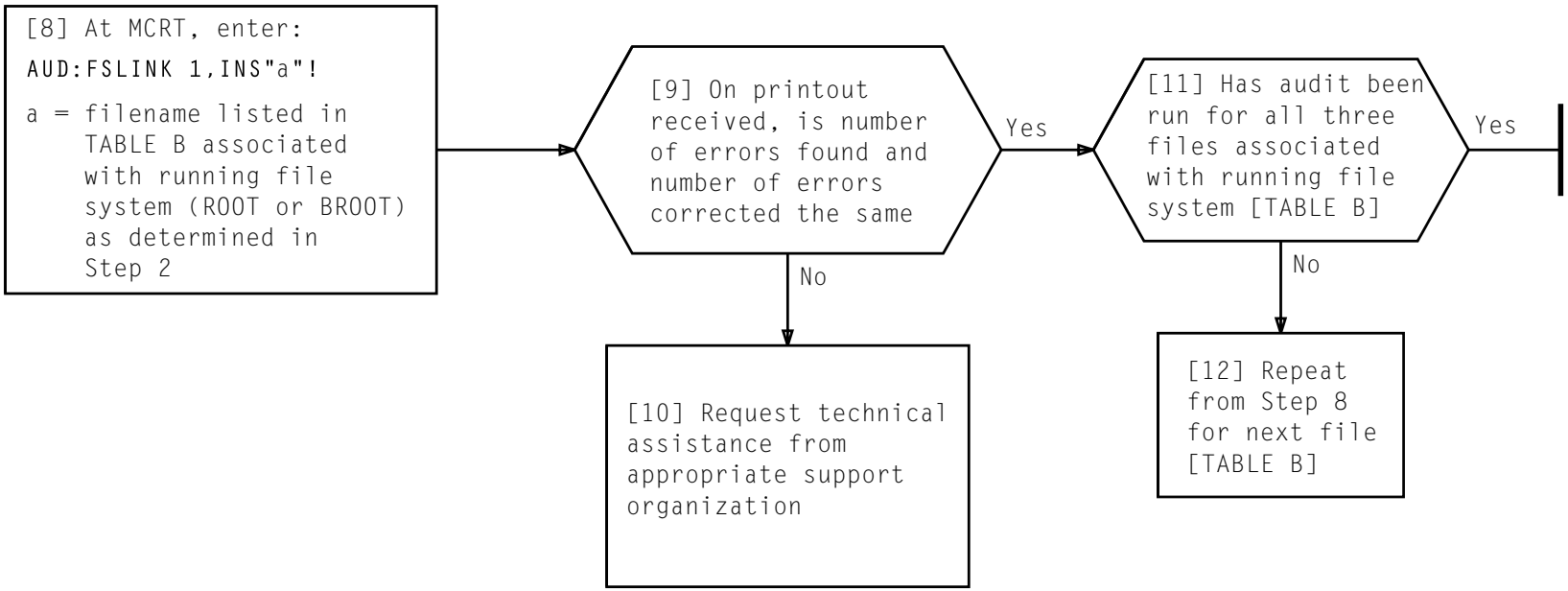
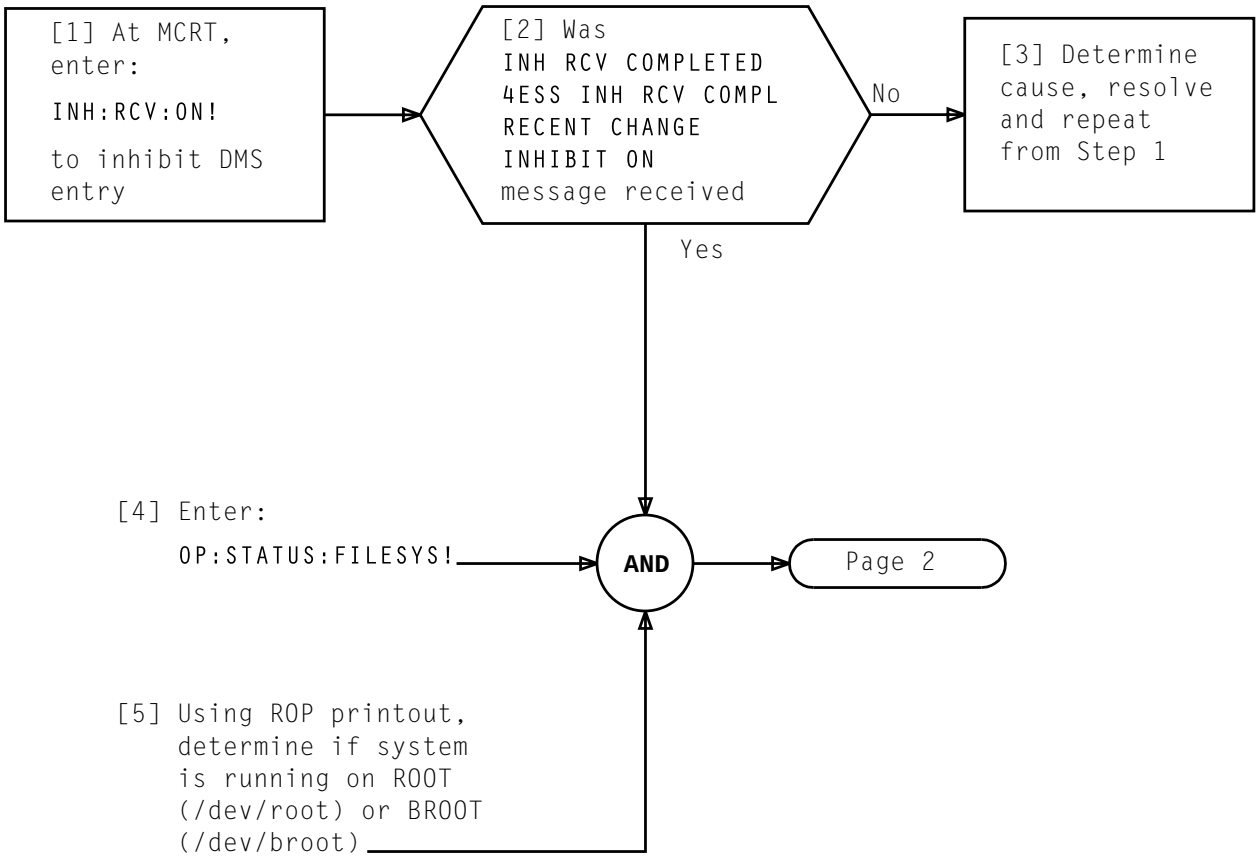
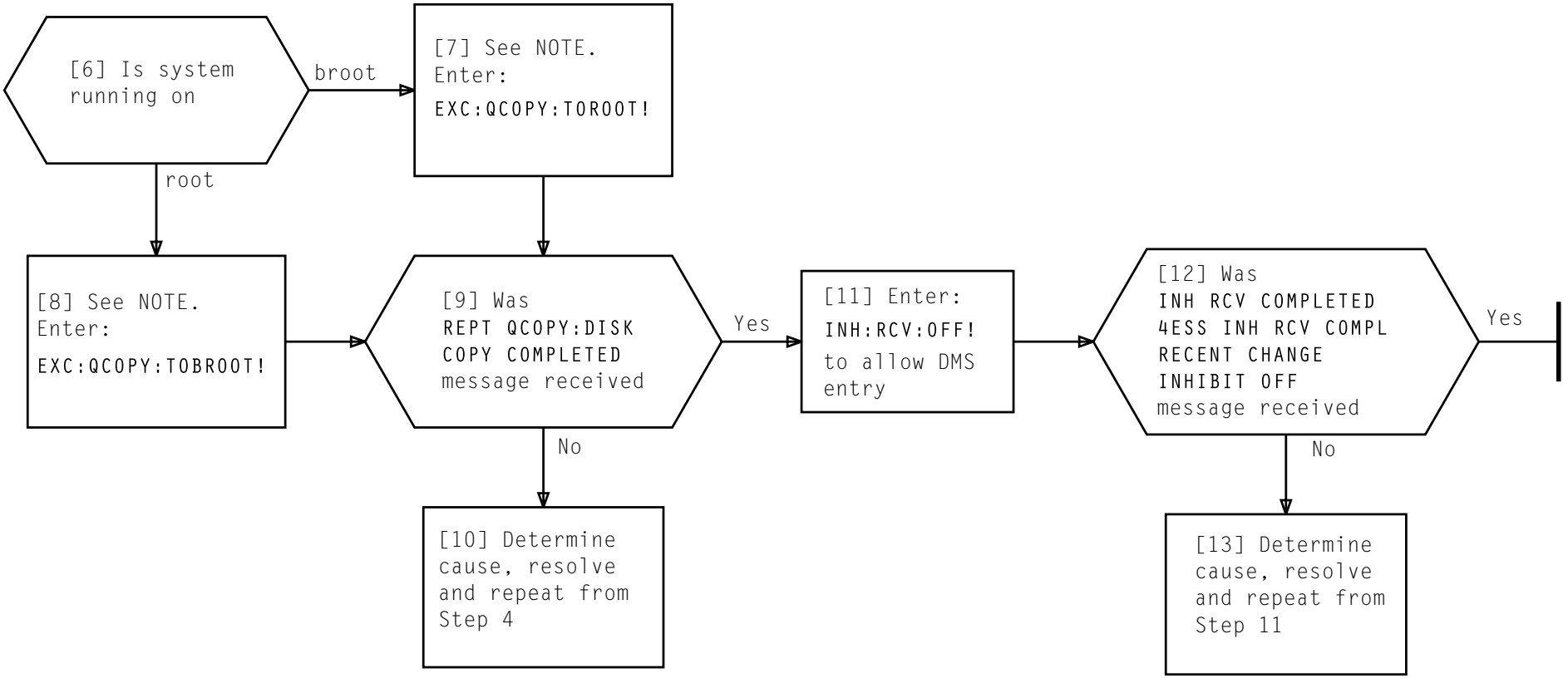


TABLE B	
SYSTEM RUNNING ON	
ROOT	BROOT
/dev/root	/dev/broot
/dev/db	/dev/bdb
/dev/etc	/dev/betc

RUN FILE SYSTEM AUDITS ON RUNNING FILE SYSTEM TO ENSURE NO FILE SYSTEM ERRORS



UPDATE BACKUP DATA BASE



NOTE
This command requires several minutes to complete

UPDATE BACKUP DATA BASE

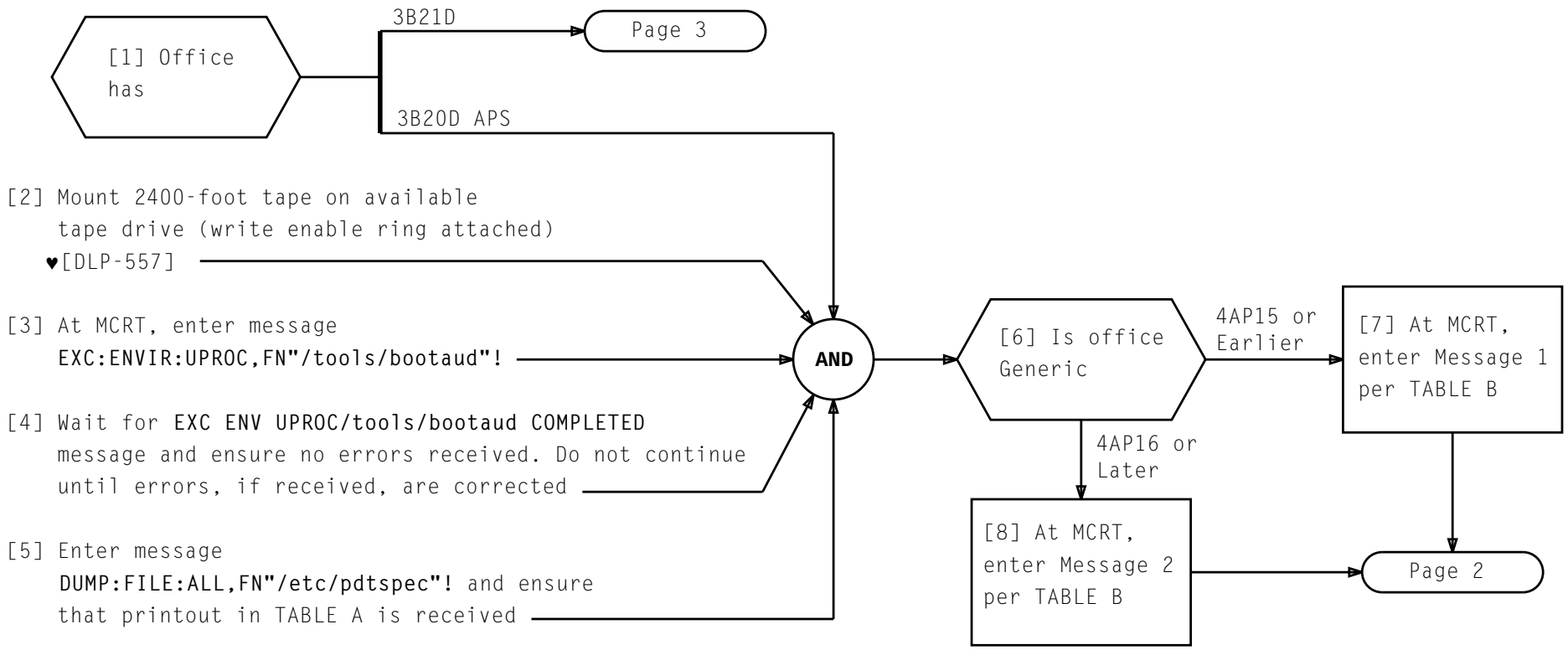


TABLE A

MESSAGE NUMBER	OUTPUT MESSAGE
1	DUMP FILE ALL COMPLETED /dev/lboot /dev/vtoc /dev/boot /dev/bboot /dev/root /dev/etc /dev/db /dev/amafiles /dev/amabfiles

TABLE B

MESSAGE NUMBER	INPUT MESSAGES
1	COPY:BKDISK;START:SRC"/dev/vtoc",TD"/dev/mtX8",TPSIZE 2200!
2	COPY:BKDISK;START:SRC"/devv/toc',TD"/dev/mtX8",TPSIZE 2200,COM!
X = tape drive number used in Step 2	

WRITE BACKUP TAPES

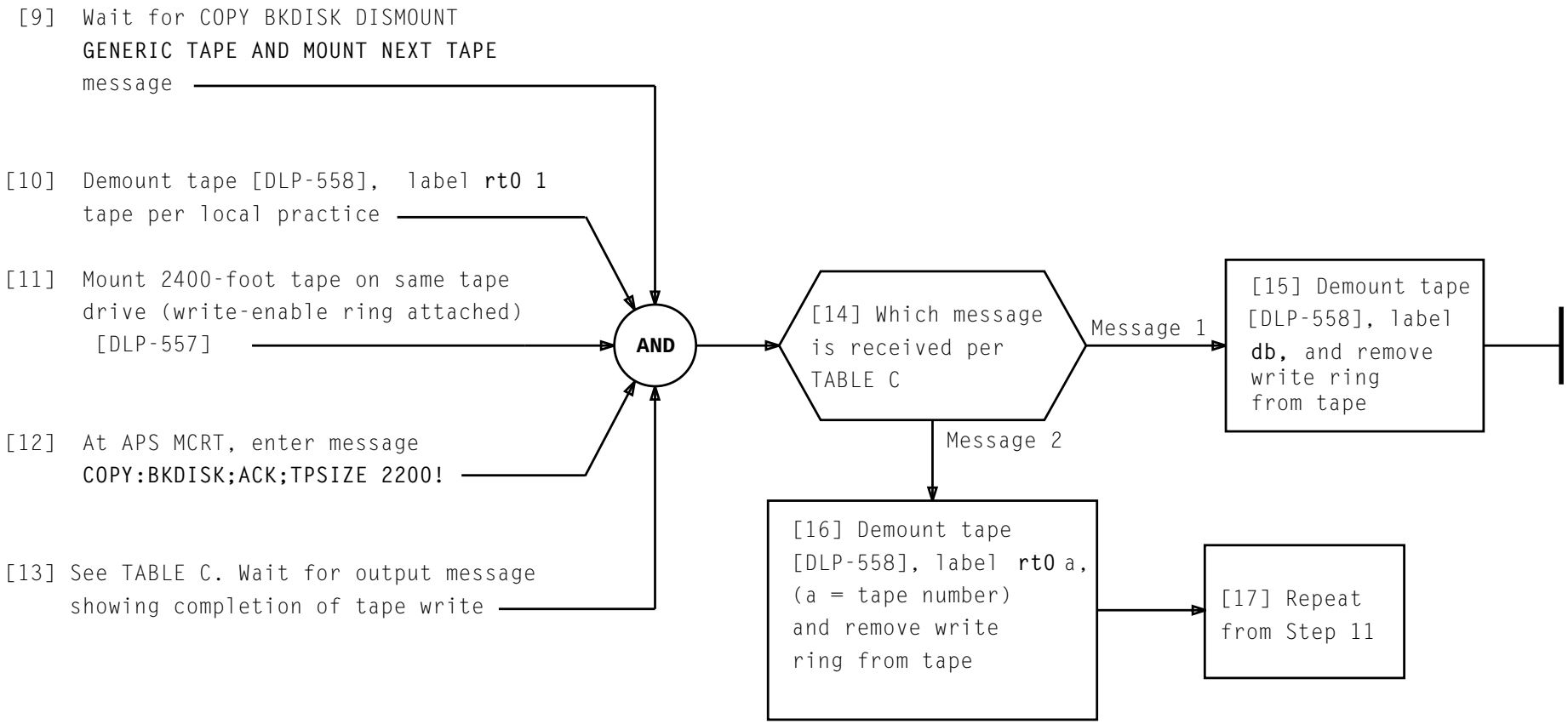


TABLE C

MESSAGE NUMBER	OUTPUT MESSAGE
1	COPY BKDISK COMPLETED DISMOUNT DATABASE TAPE AND LABEL
2	COPY DISMOUNT GENERIC TAPE LABEL AND MOUNT NEXT TAPE

WRITE BACKUP TAPES

[18] Insert blank or erasable 4-mm tape with write-protect tab is up (unlocked) position into available 3B21 APS DAT unit [DLP-557]

[19] At 3B21 APS MCRT, enter message **DUMP:FILE:ALL, FN"/etc/pdtspec"!** to dump the /etc/pdtspec file

[20] Wait for **DUMP FILE ALL COMPLETED** message and ensure that printout in TABLE D is received

[21] At 3B21 APS MCRT, enter message
COPY:DKDISK;START;START;SRC"/dev/vtoc",TD"/dev/mtX0",TPSIZE 90,COM!
[Where X = DAT unit number with backup tape inserted (0 or 1)]

[22] Wait for
COPY DKDISK DISMOUNT GENERIC TAPE LABEL AND MOUNT NEXT TAPE
message

[23] Remove tape from DAT unit [DLP-558], label the tape **rt0 1**, and put write-protect tab in down (locked) position

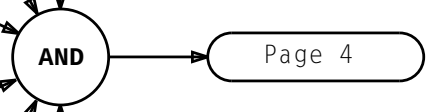


TABLE D

MESSAGE NUMBER	OUTPUT MESSAGE
1	DUMP FILE ALL COMPLETED /dev/lboot /dev/lboot21 /dev/vtoc /dev/boot /dev/bboot /dev/root /dev/etc /dev/db /dev/amafiles /dev/amabfiles

WRITE BACKUP TAPES

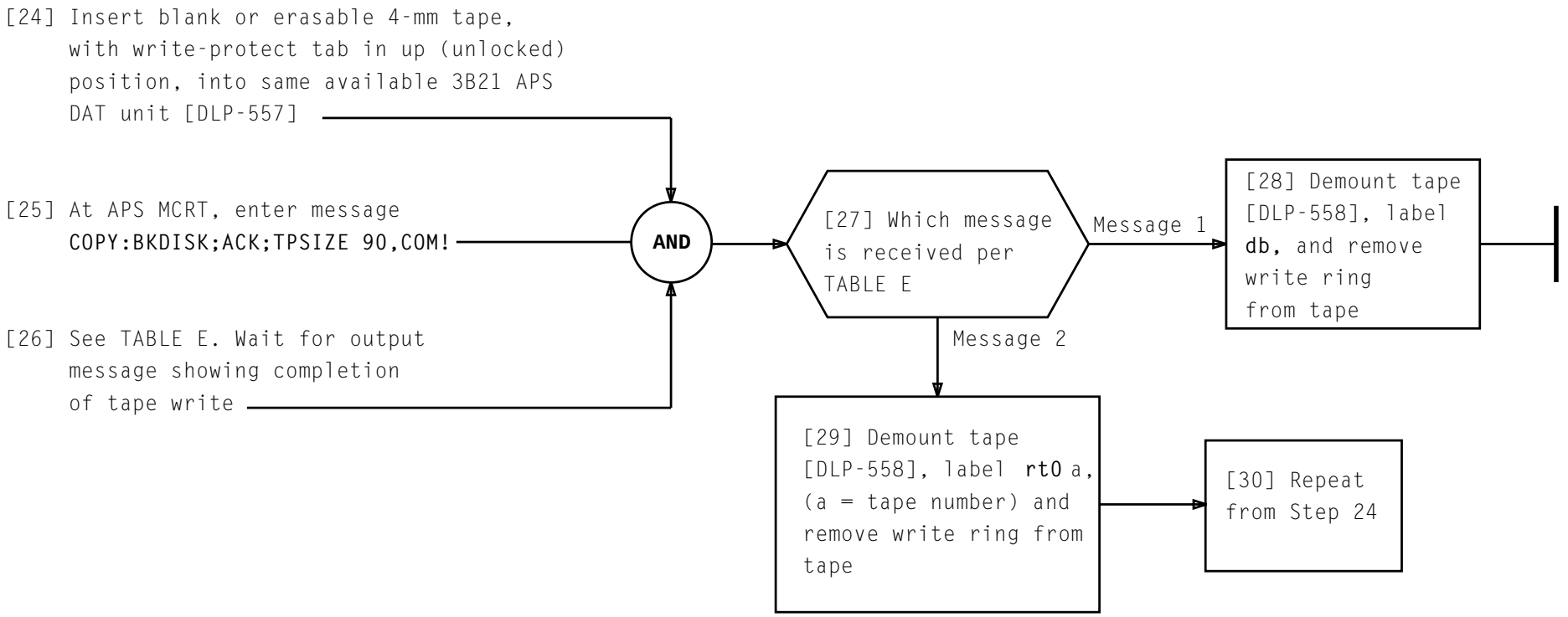
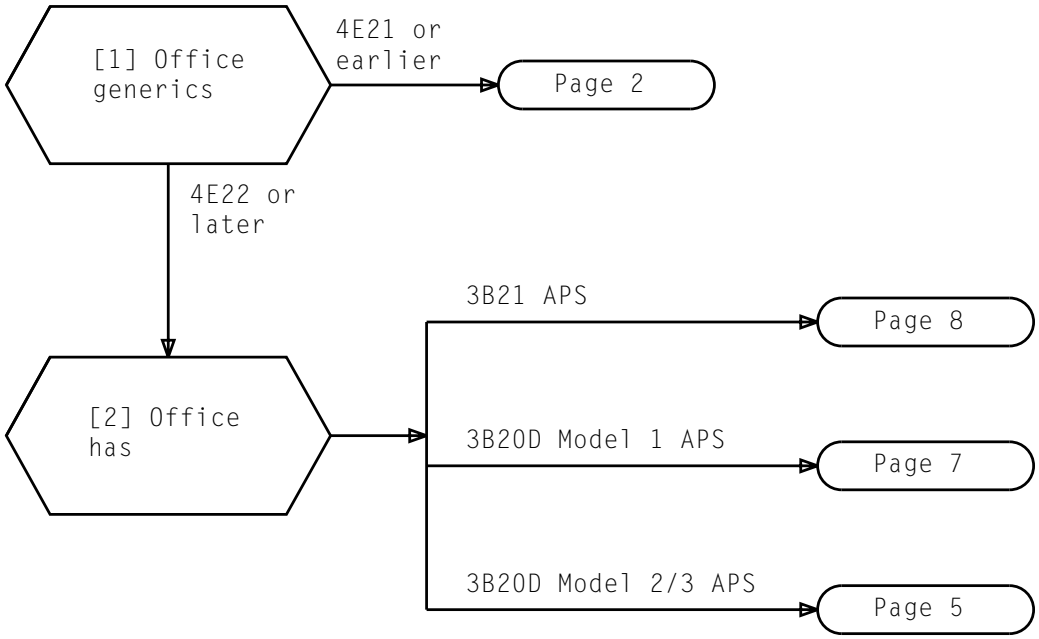


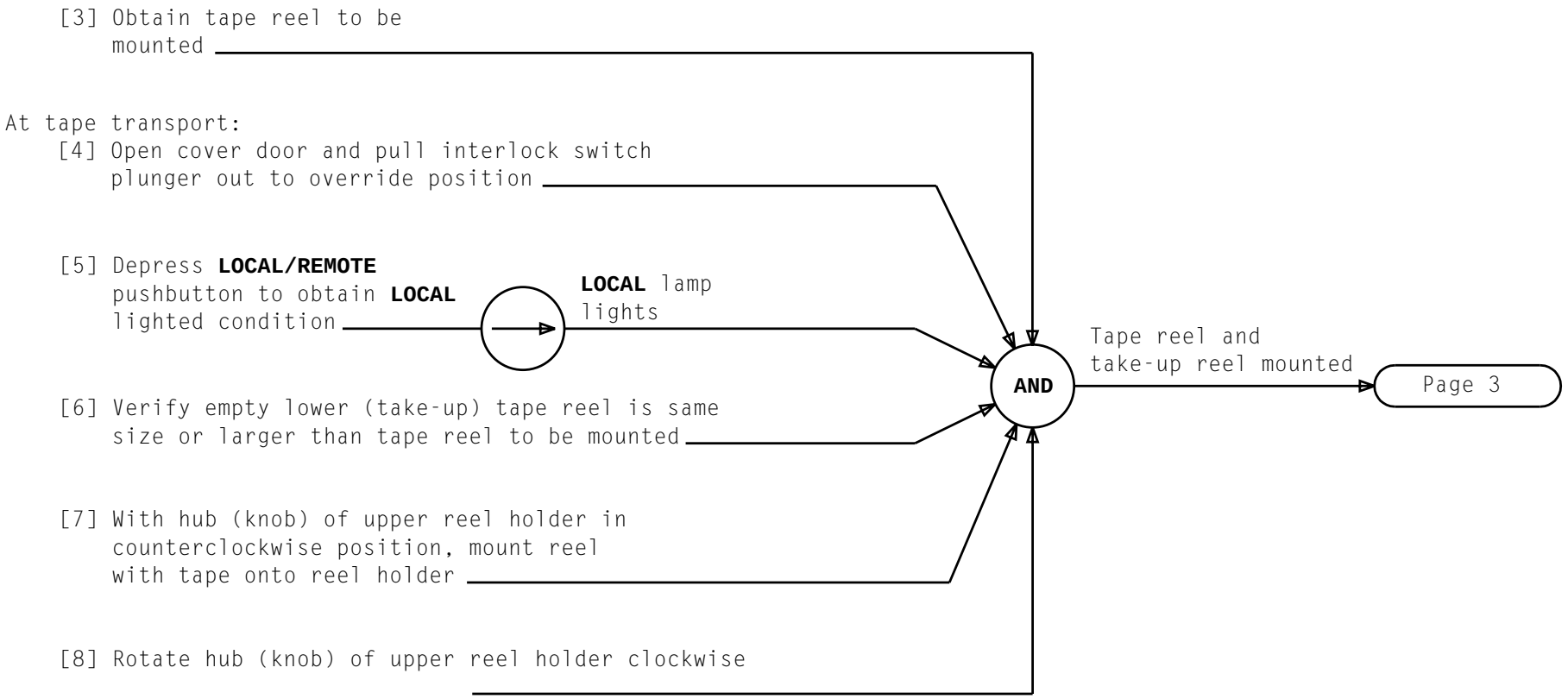
TABLE E

MESSAGE NUMBER	OUTPUT MESSAGE
1	COPY BKDISK COMPLETED DISMOUNT DATABASE TAPE AND LABEL
2	COPY DISMOUNT GENERIC TAPE LABEL AND MOUNT NEXT TAPE

WRITE BACKUP TAPES



MOUNT TAPE ON 3B TAPE UNIT OR DIGITAL AUDIO TAPE (DAT) UNIT



MOUNT TAPE ON 3B TAPE UNIT OR DIGITAL AUDIO TAPE (DAT) UNIT

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

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

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

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

AND

Page 4

[13] Depress **ARMS NORMAL** pushbutton

ARMS NORMAL lamp lights until arms apply tension to tape

[14] Depress **FORWARD** pushbutton

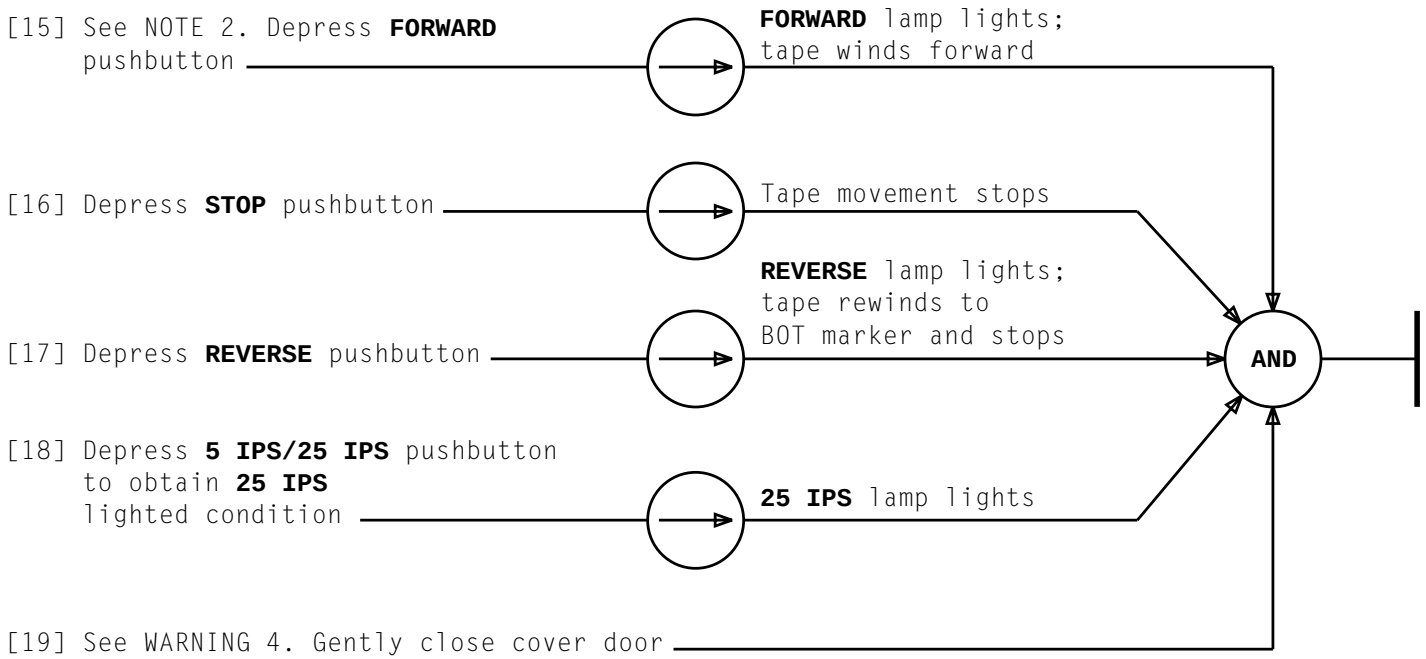
FORWARD lamp lights; tape winds forward to BOT marker and stops

NOTE 1
To start tape on take-up reel, tape end should be moistened (moistened fingers) and tape should be stuck to reel axle

WARNINGS

1. *Contamination of tape by contact with floor damages tape heads*
2. *Tape head surfaces should not be touched; body oil contaminates tape*
3. *If tape is not properly aligned along rollers and guides or is too loose, tape may be damaged*

MOUNT TAPE ON 3B TAPE UNIT OR DIGITAL AUDIO TAPE (DAT) UNIT



NOTE 2
Steps 13, 14, and 15 cause BOT marker to be approached from recorded area of tape

WARNING 4
Closing tape transport cover door in harsh manner may upset alignment

MOUNT TAPE ON 3B TAPE UNIT OR DIGITAL AUDIO TAPE (DAT) UNIT

[20] Open tape unit dust cover

[21] Lift supply (upper) reel hub tab. Place tape reel onto supply (upper) reel hub. See Figure 1

[22] While holding tape reel, secure tape reel by returning supply hub tab to normal locked-down position

[23] Thread tape along tape path as shown in Figure 1

[24] Hold end of tape against take-up reel and wrap several turns clockwise by rotating reel

AND

Page 6

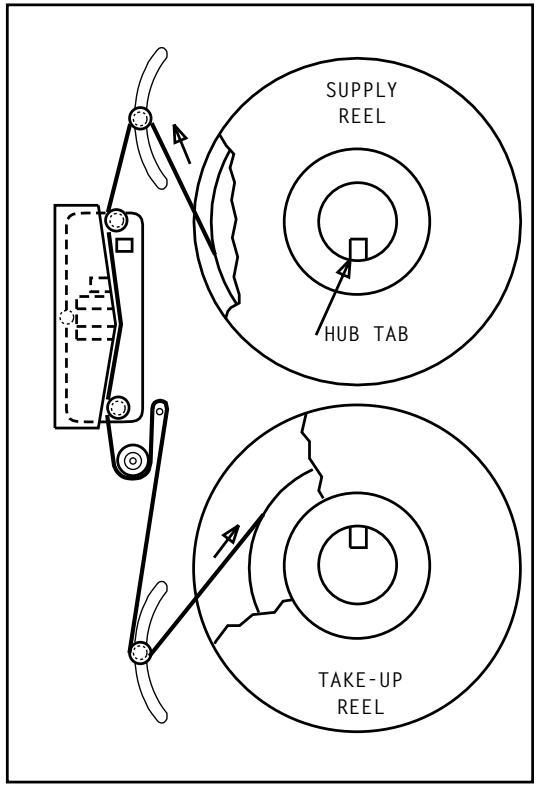
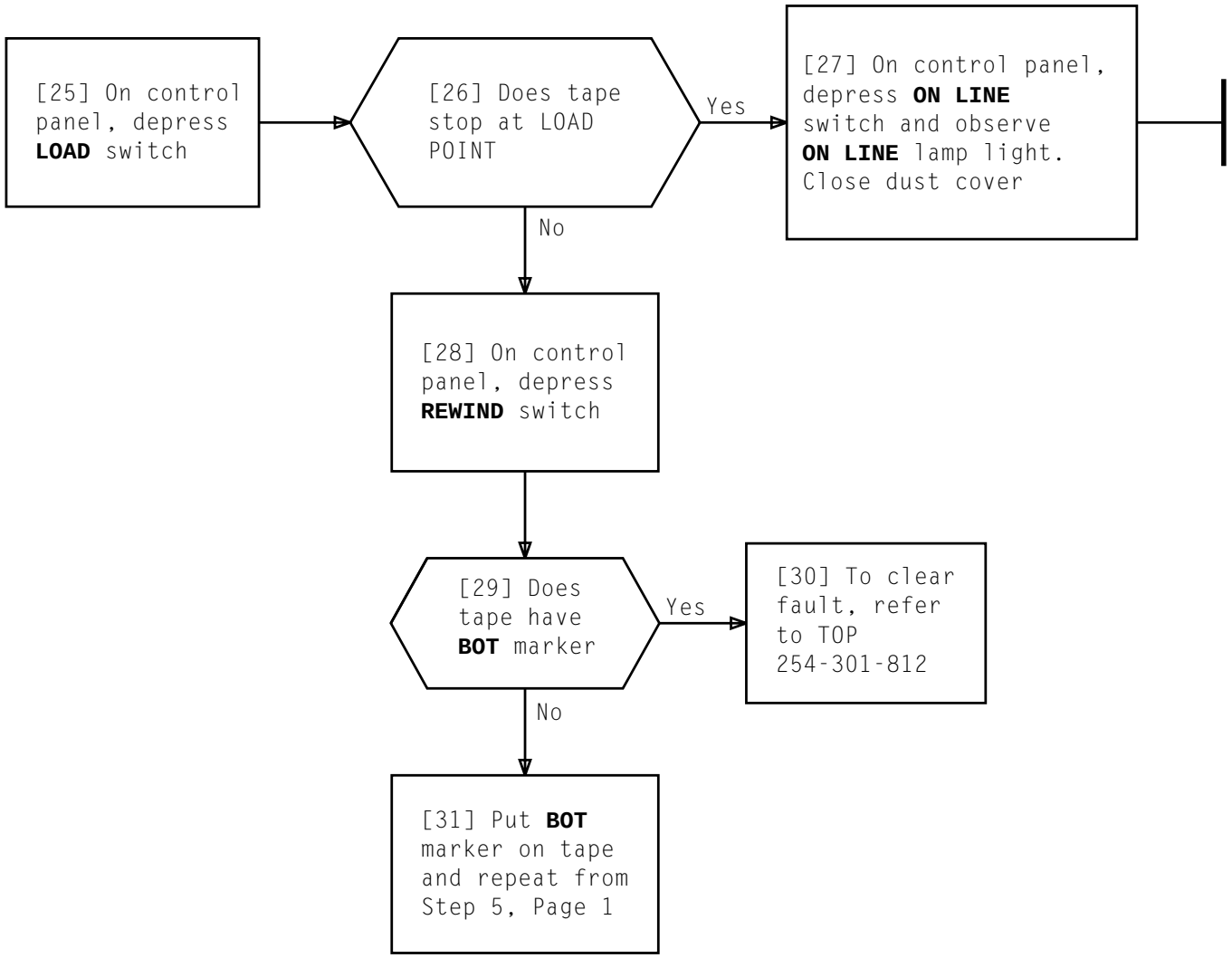


Figure 1

MOUNT TAPE ON 3B TAPE UNIT OR DIGITAL AUDIO TAPE (DAT) UNIT



MOUNT TAPE ON 3B TAPE UNIT OR DIGITAL AUDIO TAPE (DAT) UNIT

[32] If tape is to be written, attach write-enable ring on supply reel

[33] If **LOGIC OFF** LED lighted, touch **LOGIC ON** switch

[34] Open dust cover and verify circuit breaker at side 1

[35] See Figure 2. Place supply reel on hub and depress hub latch

[36] Thread tape from bottom of supply reel along path as shown in Figure 2

[37] Hold end of tape against take-up reel and wrap several turns clockwise by rotating reel; then close dust cover

[38] At control panel, touch **LOAD/REWIND** switch

AND

[39] Does tape move and stop, and is **BOT** LED lighted

Yes

[40] Touch **ON LINE** switch

No

[41] Touch **RESET** switch, attach beginning of tape (BOT) marker, and repeat from Step 18

No

[42] To clear fault, refer to TOP 254-301-812

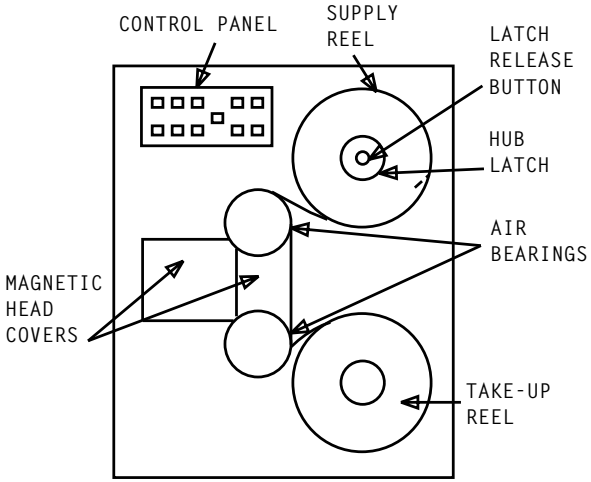


Figure 2

MOUNT TAPE ON 3B TAPE UNIT OR DIGITAL AUDIO TAPE (DAT) UNIT

[43] Is tape to be written

No

Yes

[44] Put write-protect tab on 4-mm tape in the up (unlocked) position [Figure 3]

[45] See NOTE 3 and CAUTION 1. At available in-service digital audio tape (DAT) unit (EQL 11-124 or 62-124), carefully insert 4-mm tape [Figure 4]

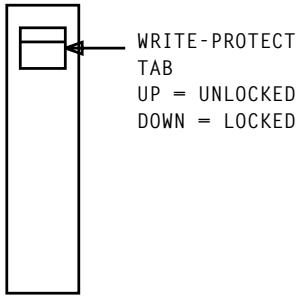


Figure 3 — 4-mm Tape

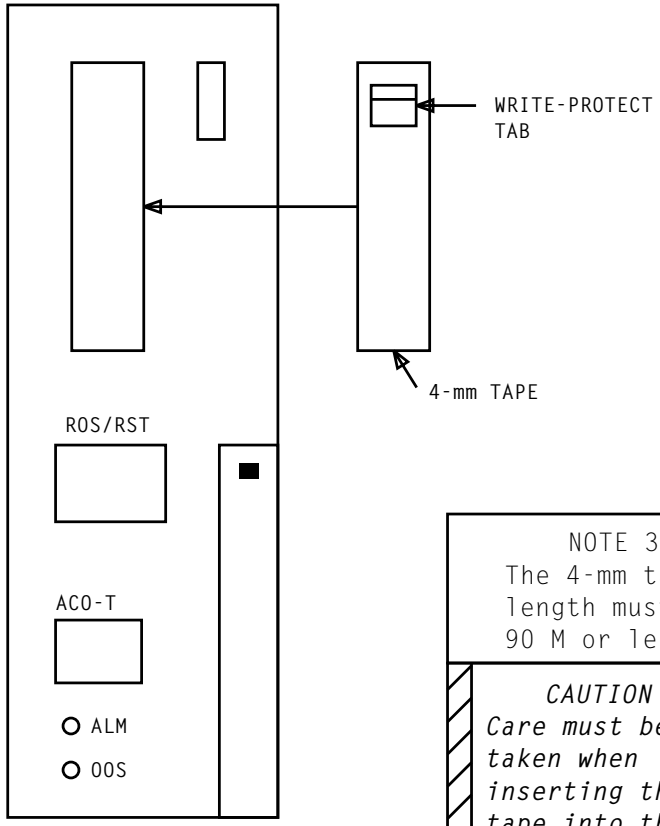
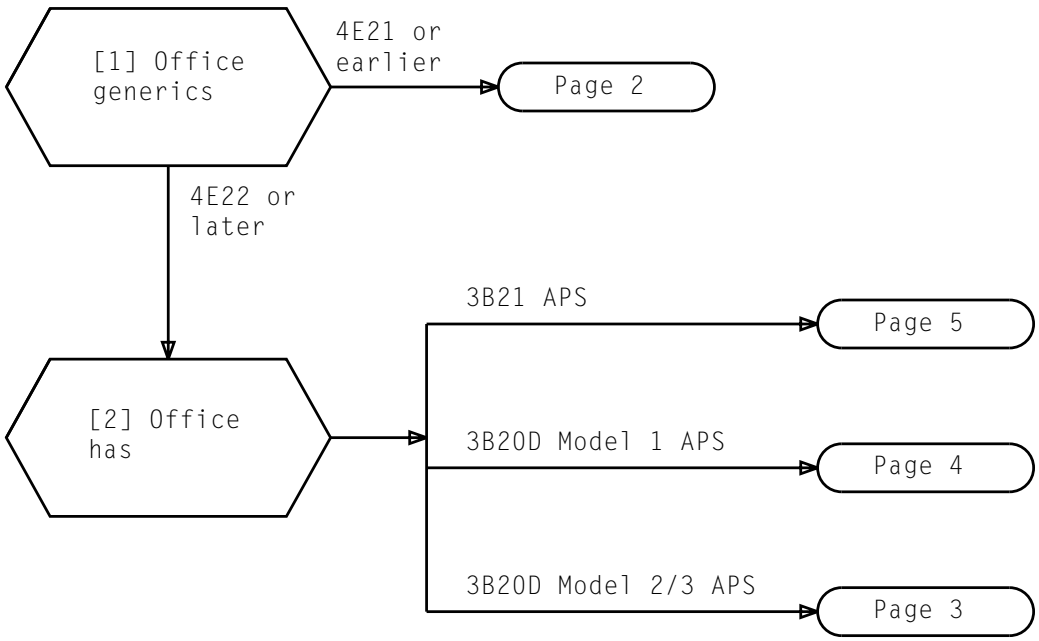


Figure 4 — DAT Unit

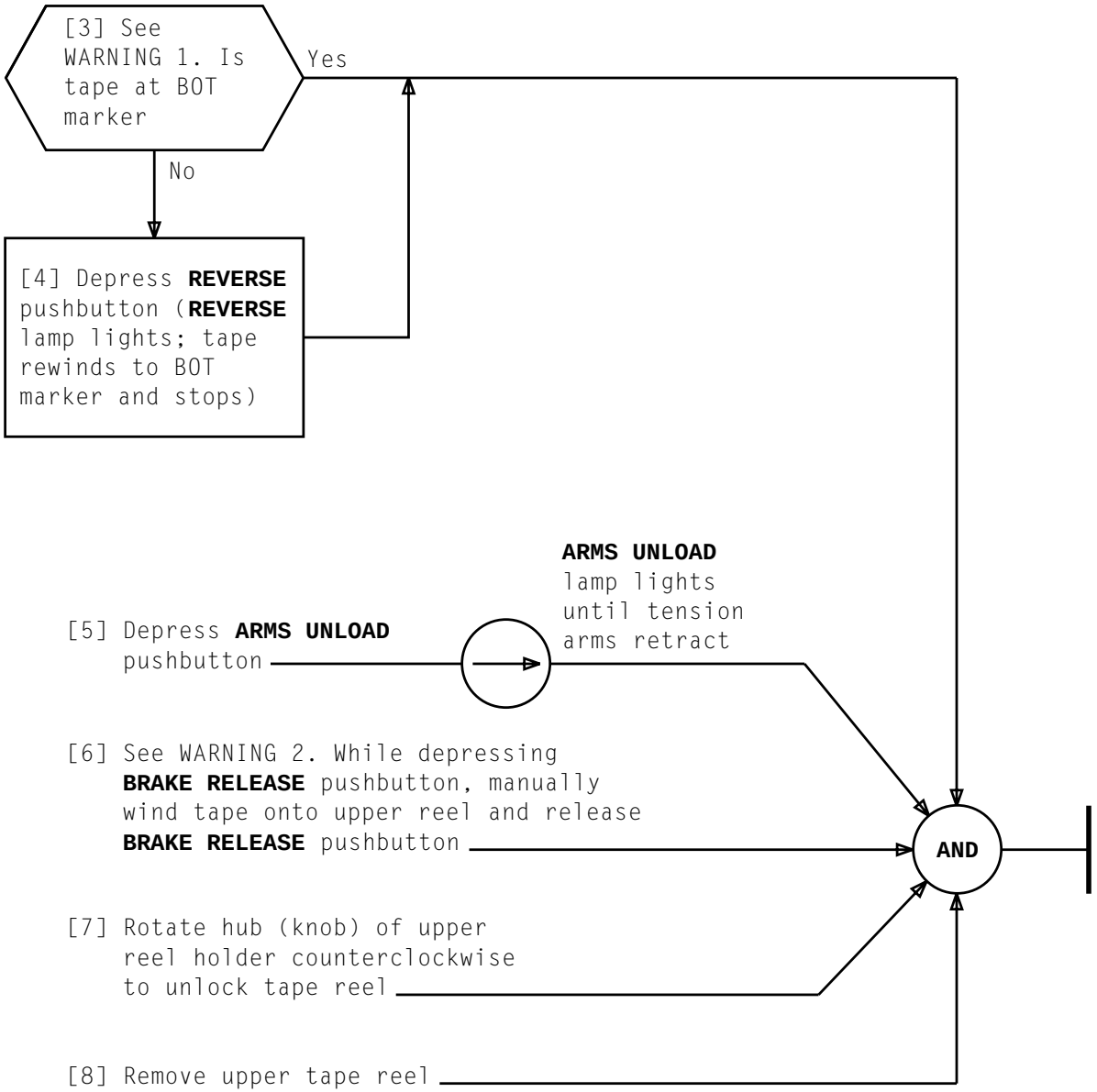
NOTE 3
The 4-mm tape length must be 90 M or less

CAUTION 1
Care must be taken when inserting the tape into the DAT unit. Tape must not be forced

MOUNT TAPE ON 3B TAPE UNIT OR DIGITAL AUDIO TAPE (DAT) UNIT



REMOVE TAPE ON 3B TAPE UNIT OR DIGITAL AUDIO TAPE (DAT) UNIT



WARNINGS

1. *If tape is being demounted due to an obvious faulty tape unit, the proper tape unit maintenance documentation should be referenced*
2. *Pulling or dragging last 5 feet of tape across heads may contaminate heads*

REMOVE TAPE ON 3B TAPE UNIT OR DIGITAL AUDIO TAPE (DAT) UNIT

At control panel:

[9] If **ON LINE** LED is on, touch **RESET** switch

ON LINE LED off

Tape rewinds onto supply reel

[10] Touch **UNLOAD** switch

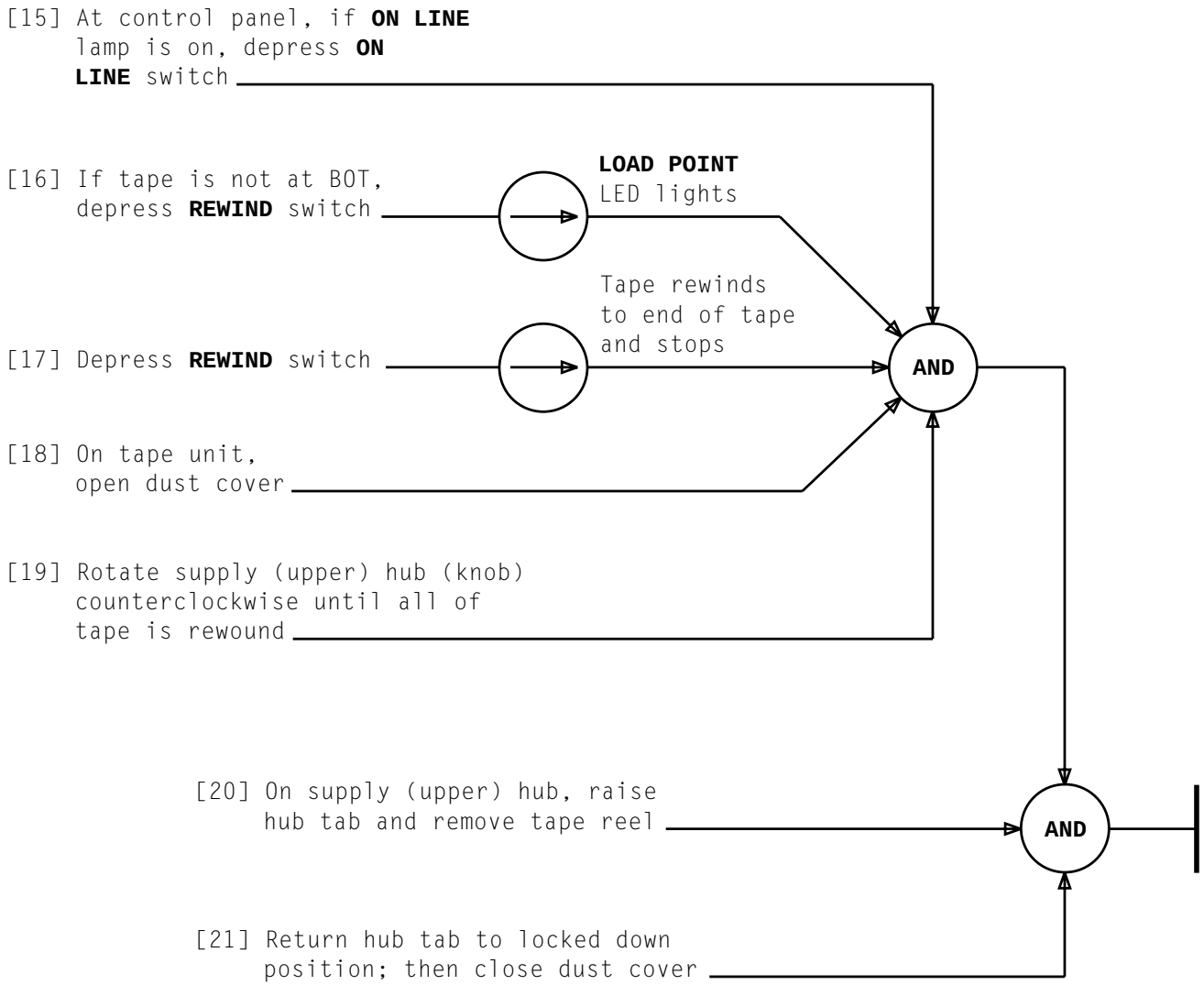
[11] Open dust cover

[12] Depress latch release button and remove reel

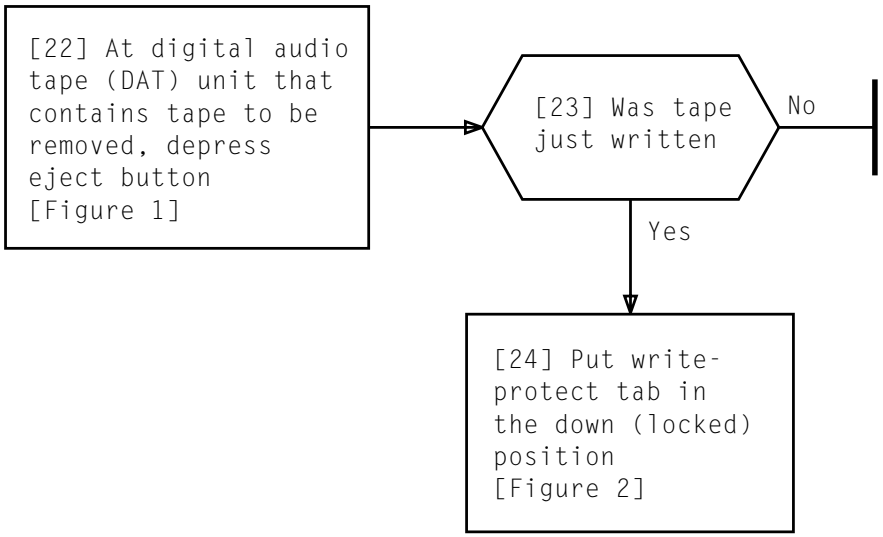
[13] Close dust cover

[14] If no more tapes are to be mounted, touch **LOGIC OFF** switch

REMOVE TAPE FROM 3B TAPE UNIT OR DIGITAL AUDIO TAPE (DAT) UNIT



REMOVE TAPE FROM 3B TAPE UNIT OR DIGITAL AUDIO TAPE (DAT) UNIT



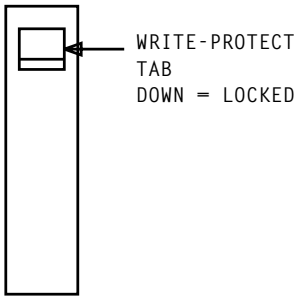


Figure 2 — 4-mm Tape

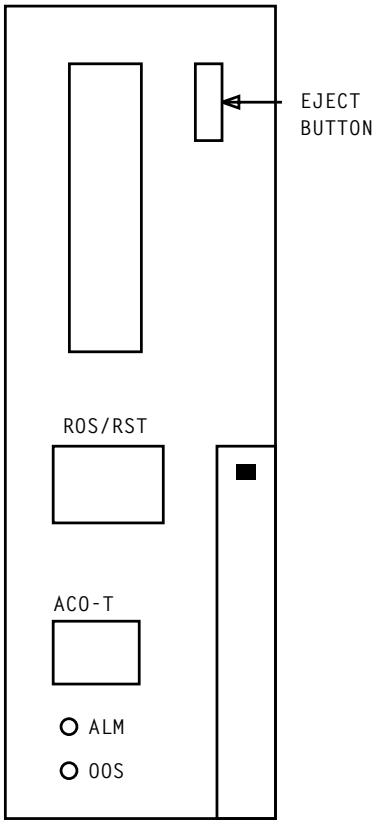
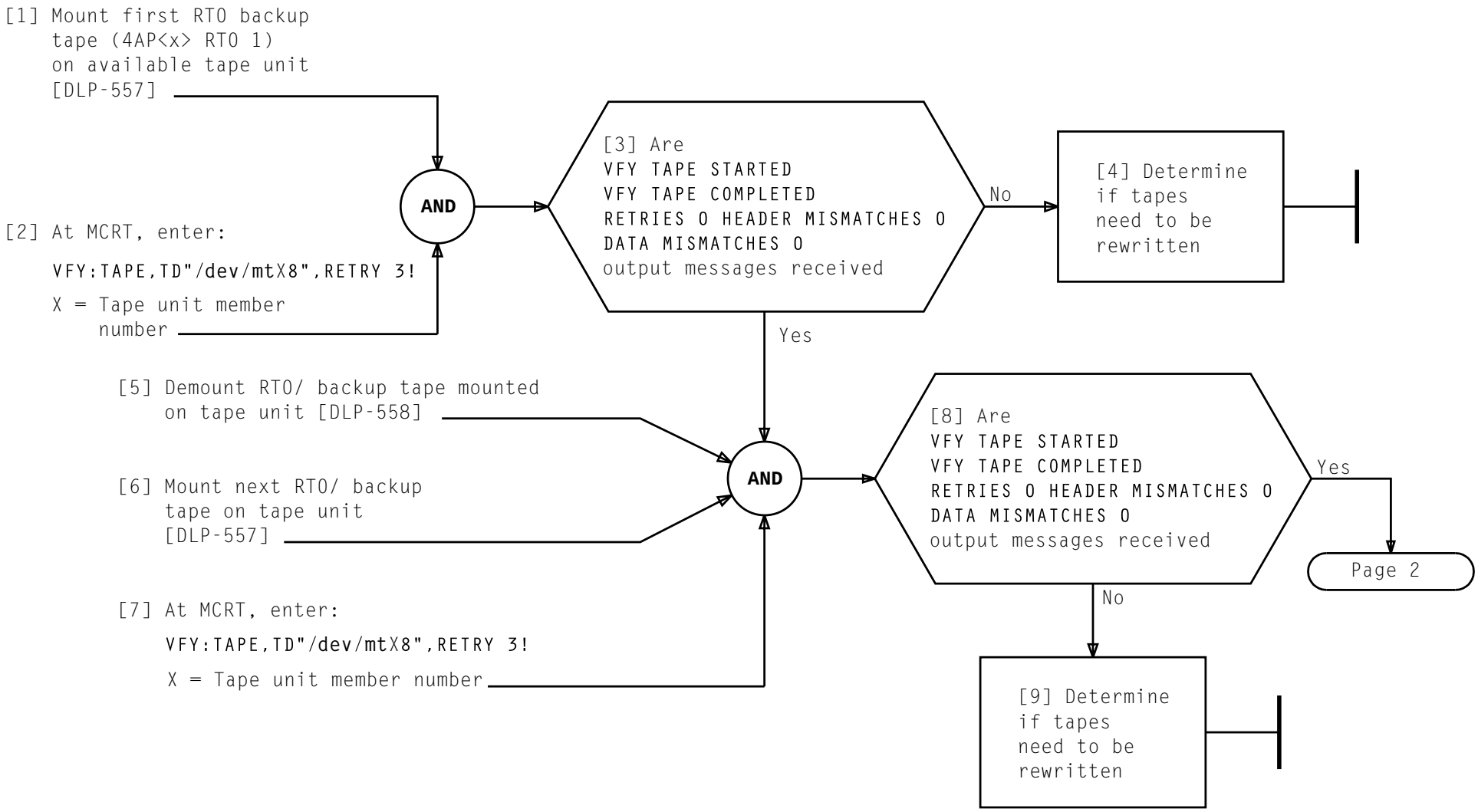
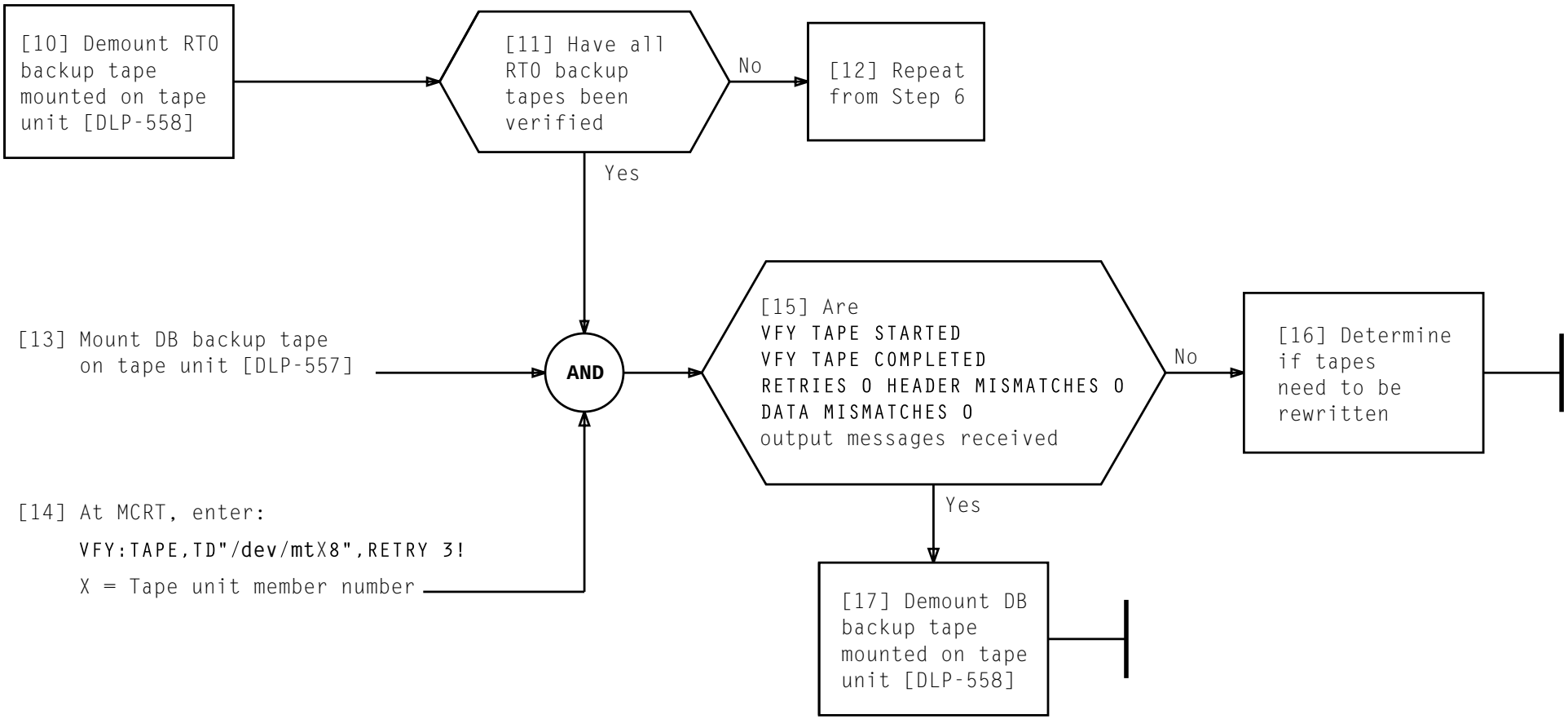


Figure 1 — DAT Unit

REMOVE TAPE FROM 3B TAPE UNIT OR DIGITAL AUDIO TAPE (DAT) UNIT

VERIFY 3B COMPUTER BACKUP TAPES





VERIFY 3B COMPUTER BACKUP TAPES

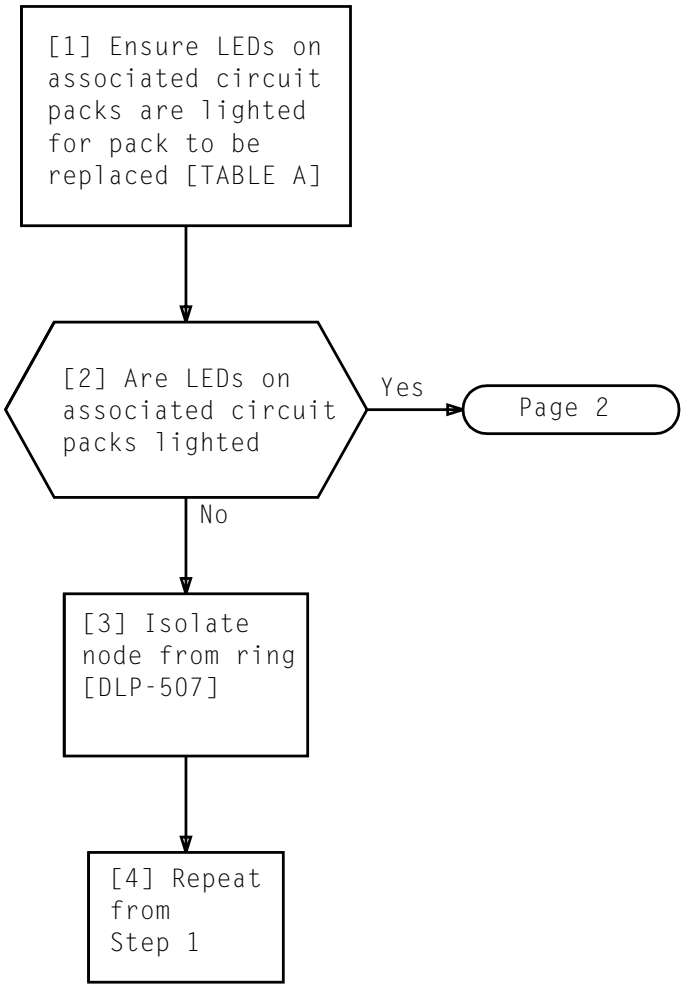
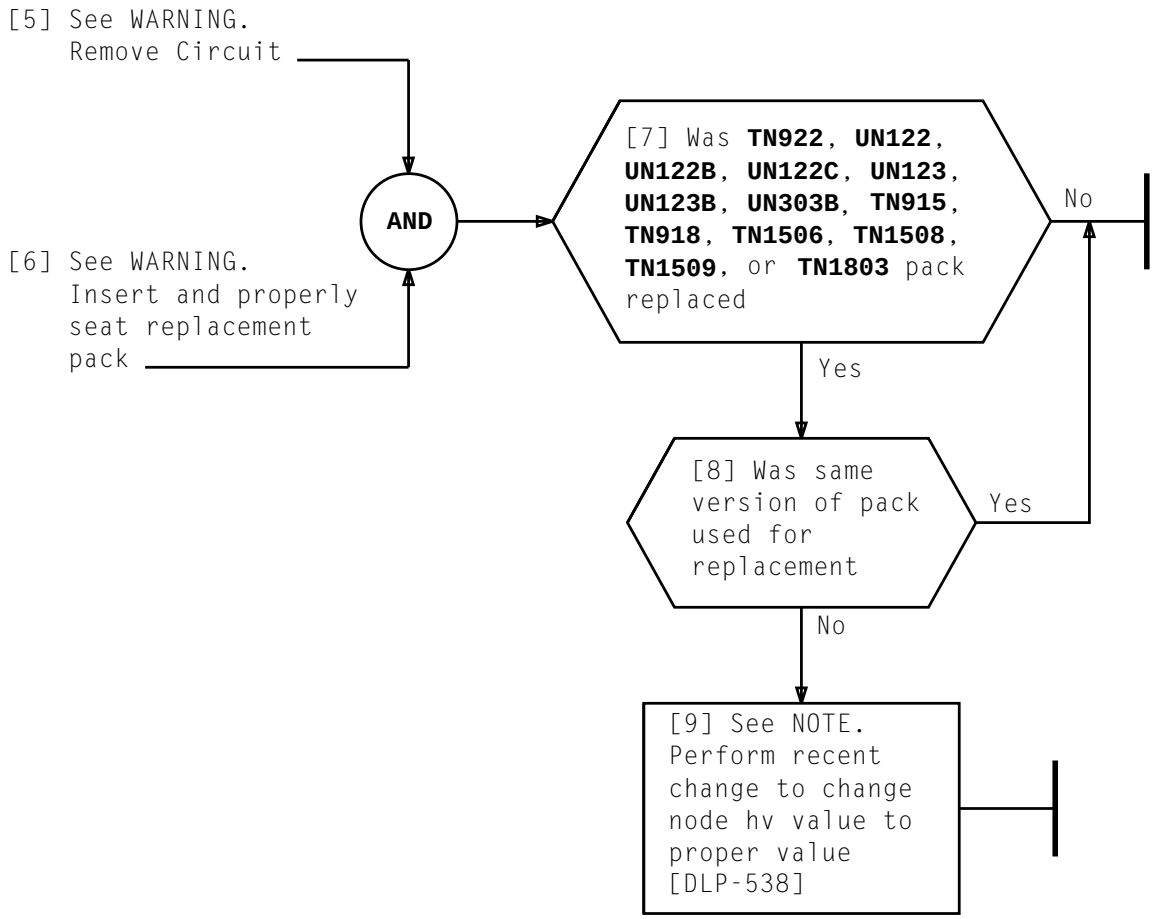


TABLE A
CCS7 Circuit Packs

CIRCUIT PACK	FUNCTION	LED STATUS ON ASSOCIATED CIRCUIT PACKS
TN922	Node Proccessor (NP)	**NT** LED on; **UN123** or **UN123B** lighted
TN916 **TN917** **TN917B**	Link Interface (LI)	**RQ** LED on; **TN916**, **TN917**, or **TN917B** and **NT** LED on; **UN123** or **UN123B** lighted
UN122	Ring Interface 0 (RI0)	**RQ** LED on; **TN916**, **TN917**, or **TN917B** and **NT** LED on; **UN123** or **UN123B** lighted
UN122B		
UN122C		
UN123	Ring Interface 1 (RI1)	
UN123B		
TN915 **TN918** **TN1506** **TN1508** **TN1509** **TN1803**	Interframe Buffer (IFB)	**NT** LED on; associated **UN123**, **UN123B** or **NT** LED on; **UN123** or **UN123B** of neighbor node in adjacent frame lighted
UN303B	Integrated Ring Node (IRN)	—

REPLACE CIRCUIT PACK, SIGNAL SYSTEM 7 (SS7) NODE



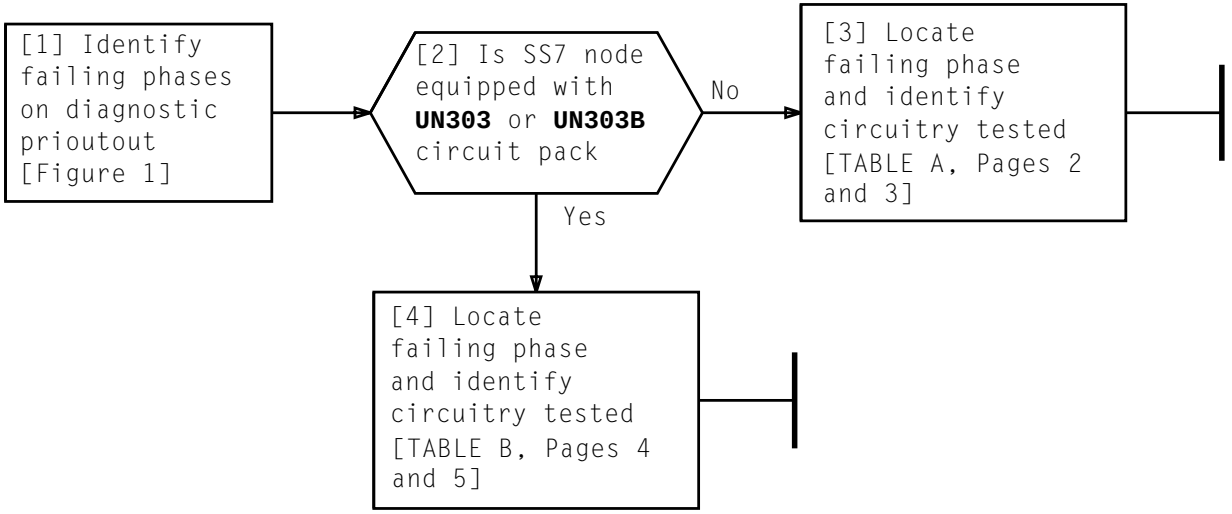
NOTE

If IFB pack is being replaced, the two IFB packs that make up a pair must be of the same version

WARNING

It should be assumed that all circuit packs containing solid-state electronic components can be damaged by electrostatic discharge. When handling circuit packs and working in the backplane area, a grounded antistatic wrist strap (R-4987 or equivalent) must be worn. The strap should be connected to ground common to circuit pack ground. When appropriate wrist strap is not available, grounded (exposed) metal should be touched before handling circuit pack. An unprotected circuit pack should never be passed to an ungrounded person nor touch components, leads nor connector pins

REPLACE CIRCUIT PACK, SIGNAL SYSTEM 7 (SS7) NODE



FAILING PHASE

```
30 DGN: LN32 6:PH 10-31. PF

M 30 DGN: LN32 6 SLOT 1  MSG STARTED
M 30 REPT IMSRMVRST ERROR 3 3
M 31 DGN: LN32 6 PH 10 STF  ( 2 00000000 00000000 )   MSG IP
     TEST               MISMATCH
        3               00000009
        4               00000009
M 31: LN32 6 TERMINATED AT PH 10 STMNT 434 AFTER TEST 438

M 31 ANALY TLPFILE: LN32 6 SUMMARY DATA  MSG STARTED
     TLP: LN32 6 PH=10 K1=0X00000002 K2=0X00000000 FFK=1
     TLPFILE COMPLETED
M 31 DGN: LN32 6 COMPLETED  STF  ( 2 00000000 00000000 )  MSG IP

M 31 DGN: LN32 6 STF ( 2 00000000 00000000 ) MSG COMPL
```

Figure 1 – Sample Printout of Failing Diagnostic Phase

IDENTIFY SS7 NODE CIRCUITRY TESTED BY FAILING PHASE

TABLE A SSI SS7 NODE DIAGNOSTIC PHASES	
FAILING PHASE	**DESCRIPTION OF CIRCUITRY TESTED**
01	Tests that each node in isolated segment is able to set and clear its data selector via hardware commands at RAC0. Phase 1 also tests that a message can be relayed from BIS0 node to EIS0 node via isolated segment over ring 0, and that any interframe buffers in isolated segment are equipped in accordance with ECD data and exhibits proper data storage capacity.
02	Tests that each node in isolated segment is able to set and clear its data selector via hardware commands at RAC1. Phase 2 also tests that a message can be relayed from EIS0 node to BIS0 node via isolated segment over ring 1, and that any interframe buffers in isolated segment are equipped in accordance with ECD data and exhibits proper data storage capacity.
10	Tests part of both RAC circuit packs, and RAC to NP interface. It also partially tests interface between both RACs and ring bus.
11	Makes additional tests of interface between both RACs and ring bus. Checks capacity of interframe buffers associated with node under test.
12	Verifies that RAC0 can detect bad parity in a ring message.
13	Verifies that RAC1 can detect bad parity in a ring message.
20	Tests NP RAM memory.

TABLE A (contd) SSI SS7 NODE DIAGNOSTIC PHASES	
FAILING PHASE	**DESCRIPTION OF CIRCUITRY TESTED**
23	Tests NP parity checker and generator circuitry.
24	Tests NP programmable master and slave interrupt controllers and associated circuitry.
26	Tests NP programmable direct memory access controllers and associated circuitry.
27	Tests NP programmable interval timer circuitry.
39	Verifies ability of node to read, write, and propagate a maximum length message (demand only phase for transition load).
40	Tests hardware in LI board or LI to NP interface.
41	Tests sanity of microprocessor and read-only memory (ROM) on LI board.
47	Tests 2.4-, 4.8-, and 56-kb/s data service units, along with their respective VFLA or DSA units. SS7 will ATP by default.
48	Ensures that firmware and hardware in LI board functions as a whole.

TABLE B IRN SS7 NODE DIAGNOSTIC PHASES	
FAILING PHASE	**DESCRIPTION OF CIRCUITRY TESTED**
01	Tests that each node in isolated segment is able to set and clear its data selector via hardware commands at RAC0. Phase 1 also tests that a message can be relayed from BIS0 node to EIS0 node via isolated segment over ring 0, and that any interframe buffers in isolated segment are equipped in accordance with ECD data and exhibits proper data storage capacity.
02	Tests that each node in isolated segment is able to set and clear its data selector via hardware commands at RAC1. Phase 2 also tests that a message can be relayed from EIS0 node to BIS0 node via isolated segment over ring 1, and that any interframe buffers in isolated segment are equipped in accordance with ECD data and exhibits proper data storage capacity.
10	Tests ring interface (RI) circuitry of the integrated ring node (IRN) circuit pack.
12	Verifies that RAC0 can detect bad parity in a ring message.
13	Verifies that RAC1 can detect bad parity in a ring message.
20	Tests RAM memory of the integrated ring node (IRN) circuit pack.
21	Tests the ring processor circuitry of the integrated ring node (IRN) circuit pack.

TABLE B (contd) IRN SS7 NODE DIAGNOSTIC PHASES	
FAILING PHASE	**DESCRIPTION OF CIRCUITRY TESTED**
39	Verifies ability of node to read, write, and propagate a maximum length long message (demand only phase for transition load).
40	Tests hardware in LI board or LI to NP interface.
41	Tests sanity of microprocessor and read-only memory (ROM)
47	Tests 2.4-, 4.8-, and 56-kb/s data service units, along with ther respective VFLA or DSA units. SS7 is ATP by default.
48	Ensures that firmware and hardware on LI board functions as a whole.

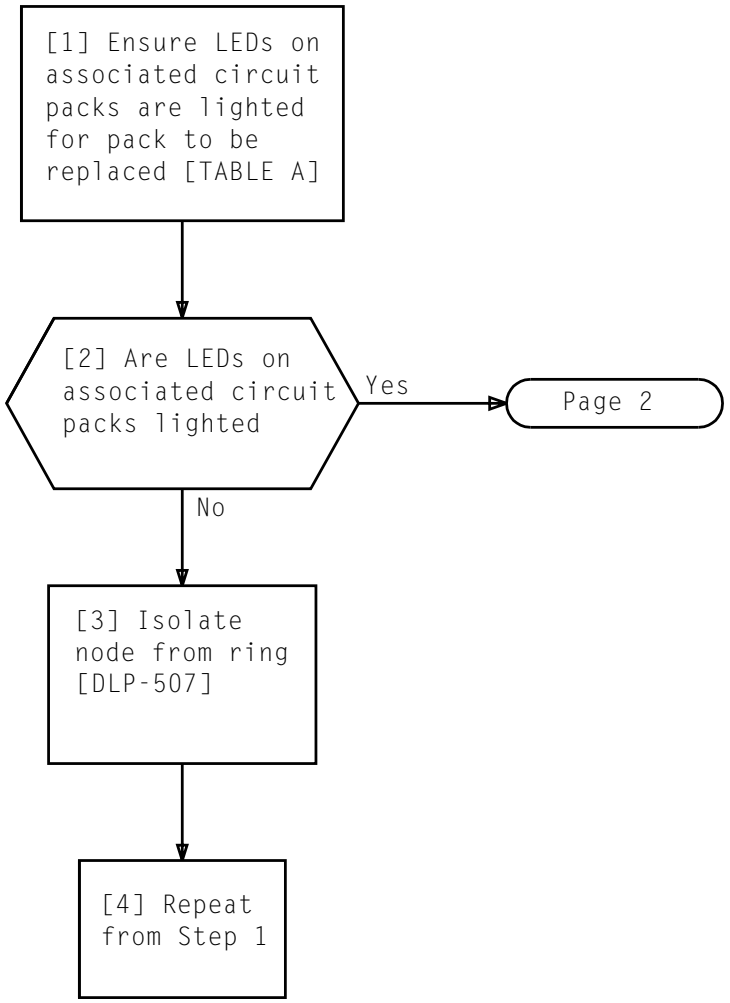
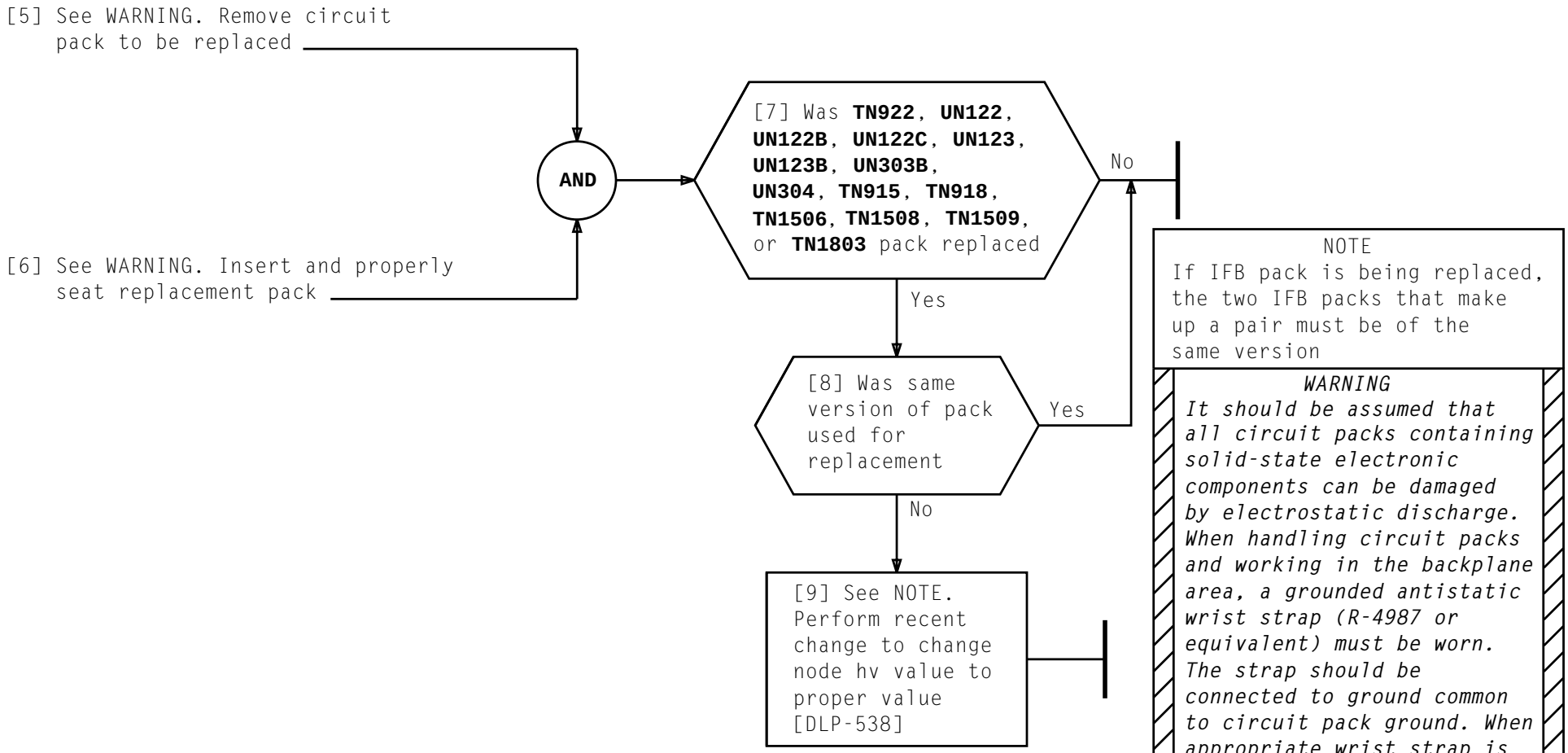


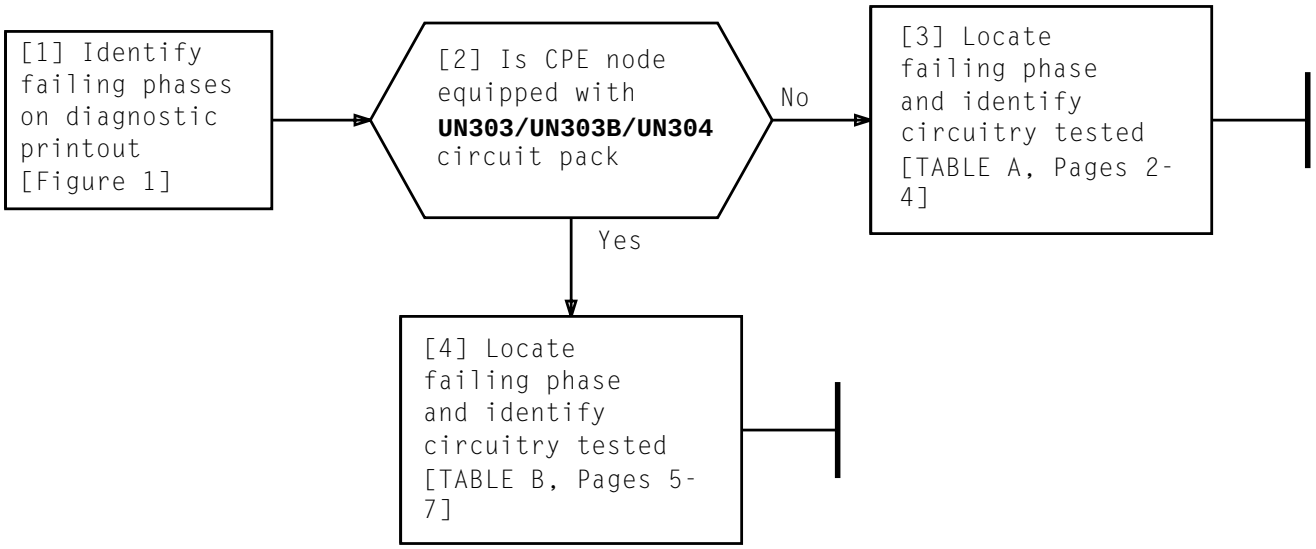
TABLE A
Replacement Circuit Packs

CIRCUIT PACK	FUNCTION	LED STATUS ON ASSOCIATED CIRCUIT PACKS
TN922	Node Processor (NP)	**NT** LED on; **UN123** or **UN123B** lighted
TN1315 **TN1316**	Link Interface (LI)	**RQ** LED on; **TN916**, **TN917**, or **TN917B** and **NT** LED on; **UN123** or **UN123B** lighted
UN122 **UN122B** **UN122C**	Ring Interface 0 (RI0)	**RQ** LED on; **TN916**, **TN917** or **TN917B** and **NT** LED on; **UN123** or **UN123B** lighted
UN123 **UN123B**	Ring Interface 1 (RI1)	
TN915 **TN918** **TN1506** **TN1508** **TN1509** **TN1803**	Interframe Buffer (IFB)	**NT** LED on; associated **UN123**, **UN123B** or **NT** LED on; **UN123** or **UN123B** of neighbor node in adjacent frame lighted
UN303B	Integrated Ring Node (IRN)	–
UN304	Integrated Ring Node 2 (IRN2)	–
T1FA	T1 Facility Access	–

REPLACE CIRCUIT PACK, CUSTOMER PREMISE EQUIPMENT (CPE) NODE



REPLACE CIRCUIT PACK, CUSTOMER PREMISE EQUIPMENT (CPE) NODE



FAILING PHASE

```
30 DGN: LN32 4:PH 10-31. PF

M 30 DGN: LN32 4 SLOT 1  MSG STARTED
M 30 REPT IMSRMVRST ERROR 3 3
M 31 DGN: LN32 4 PH 10 STF  ( 2 00000000 00000000 )   MSG IP
     TEST               MISMATCH
        3               00000009
        4               00000009
M 31: LN32 4 TERMINATED AT PH 10 STMNT 434 AFTER TEST 438

M 31 ANALY TLPFILE: LN32 4 SUMMARY DATA  MSG STARTED
     TLP: LN32 4 PH=10 K1=0X00000002 K2=0X00000000 FFK=1
     TLPFILE COMPLETED
M 31 DGN: LN32 4 COMPLETED  STF  ( 2 00000000 00000000 )  MSG IP

M 31 DGN: LN32 4 STF ( 2 00000000 00000000 ) MSG COMPL
```

Figure 1 – Sample Printout of Failing Diagnostic Phase

IDENTIFY CUSTOMER PREMISE EQUIPMENT (CPE) NODE CIRCUITRY TESTED BY FAILING PHASE

TABLE A
SSI CPE NODE DIAGNOSTIC PHASES

FAILING PHASE	DESCRIPTION OF CIRCUITRY TESTED
01	Tests that each node in isolated segment is able to set and clear its data selector via hardware commands at RAC0. Phase 1 also tests that a message can be relayed from BIS0 node to EIS0 node via isolated segment over ring 0, and that any interframe buffers in isolated segment are equipped in accordance with ECD data and exhibits proper data storage capacity.
02	Tests that each node in isolated segment is able to set and clear its data selector via hardware commands at RAC1. Phase 2 also tests that a message can be relayed from EIS0 node to BIS0 node via isolated segment over ring 1, and that any interframe buffers in isolated segment are equipped in accordance with ECD data and exhibits proper data storage capacity.
10	Tests part of both RAC circuit packs, and RAC to NP interface. It also partially tests interface between both RACs and ring bus.
11	Makes additional tests of interface between both RACs and ring bus. Checks capacity of interframe buffers associated with node under test.
12	Verifies that RAC0 can detect bad parity in a ring message.
13	Verifies that RAC1 can detect bad parity in a ring message.
20	Tests NP RAM memory.

TABLE A (Contd) SSI CPE NODE DIAGNOSTIC PHASES	
FAILING PHASE	**DESCRIPTION OF CIRCUITRY TESTED**
23	Tests NP parity checker and generator circuitry.
24	Tests NP programmable master and slave interrupt controllers and associated circuitry.
26	Tests NP programmable Direct Memory Access Controllers and associated circuitry.
27	Tests NP programmable interval timer circuitry.
29	Tests T1FA 8032 processor and its internal RAM, T1FA/NP Dual Port RAM, T1FA maintenance buffer, T1FA — T1 Chip Set (Framer, Transmitter/Formatter, Receiver/Synchronizer), and verifies EPROM based code by running "check-sum" test. It also verifies remaining DPRAM and ensures T1FA is not insane.
50	Tests LI4 0 local RAM and Dual Port RAM from Node Processor. The LI4 is held reset.
51	Tests NP-LI4 0 interface and DPRAM from NP view, while microprocessor on Link Interface board is running. This phase is downloaded to LI4 0 via NP.
52	Tests 8086 microprocessor on LI4 0 board. A subset of 8086 instruction set is exercised to verify that microprocessor operates properly. This phase is downloaded to LI4 0 via NP.
53	Tests DPRAM and parity check circuit. This phase is downloaded to LI4 0 RAM via NP.
54	Tests Programmable Interrupt Controllers and Programmable Interval Timers. This phase is downloaded to LI4 0 RAM via NP.

TABLE A (Contd) SSI CPE NODE DIAGNOSTIC PHASES	
FAILING PHASE	**DESCRIPTION OF CIRCUITRY TESTED**
55	Tests DMA, Serial Communications Chip (SCC) part of Programmable Interrupt Controller, timers, and formatting chips of LI4 0 when LI4D is tested (TN1315).
56	Tests 12A Applique and 2048 data set. This phase is downloaded to LI4 0 via NP. This only applies to LI-4S.
60	Tests LI4 1 local RAM and Dual Port RAM from Node Processor.
61	Tests NP-LI4 1 interface and DPRAM from NP view, while microprocessor on Link Interface board is running. This phase is downloaded to LI4 1 via NP1.
62	Tests 8086 microprocessor on LI4 1 board. A subset of 8086 instruction set is exercised to verify that microprocessor operates properly. This phase is downloaded to LI4 1 via NP.
63	Tests DPRAM and parity check circuit. This phase is downloaded to LI4 1 RAM via NP.
64	Tests Programmable Interrupt Controllers and Programmable Interval Timers. This phase is downloaded to LI4 1 RAM via NP.
65	Tests DMA, Serial Communications Chip (SCC), part of Programmable Interrupt Controller, timers, and formatting chips of LI4 1 when LI4D is tested (TN1315).
66	Tests 12A Applique and 2048 data set. This phase is downloaded to LI4 1 RAM via NP. This only applies to LI-4S.

TABLE B IRN/IRN2 CPE NODE DIAGNOSTIC PHASES	
FAILING PHASE	**DESCRIPTION OF CIRCUITRY TESTED**
01	Tests that each node in isolated segment is able to set and clear its data selector via hardware commands at RAC0. Phase 1 also tests that a message can be relayed from BIS0 node to EIS0 node via isolated segment over ring 0, and that any interframe buffers in isolated segment are equipped in accordance with ECD data and exhibits proper data storage capacity.
02	Tests that each node in isolated segment is able to set and clear its data selector via hardware commands at RAC1. Phase 2 also tests that a message can be relayed from EIS0 node to BIS0 node via isolated segment over ring 1, and that any interframe buffers in isolated segment are equipped in accordance with ECD data and exhibits proper data storage capacity.
10	Tests the ring interface (RI) circuitry of the integrated ring node (IRN) circuit pack.
12	Verifies that RAC0 can detect bad parity in a ring message.
13	Verifies that RAC1 can detect bad parity in a ring message.
20	Test RAM memory of the integrated ring node (IRN) circuit pack.
21	Tests the ring processor circuitry of the integrated ring node (IRN) circuit pack.

TABLE B (Contd) IRN/IRN2 CPE NODE DIAGNOSTIC PHASES	
FAILING PHASE	**DESCRIPTION OF CIRCUITRY TESTED**
29	Tests T1FA 8032 processor and its internal RAM, T1FA/NP Dual Port RAM, T1FA maintenance buffer, T1FA — T1 Chip Set (Framer, Transmitter/Formatter, Receiver/Synchronizer), and verifies EPROM based code by running "check-sum" test. It also verifies remaining DPRAM and ensures T1FA is not insane.
50	Tests LI4 0 local RAM and Dual Port RAM from Node Processor. The LI4 is held reset.
51	Tests NP-LI4 0 interface and DPRAM from NP view, while microprocessor on Link Interface board is running. This phase is downloaded to LI4 0 via NP.
52	Tests 8086 microprocessor on LI4 0 board. A subset of 8086 instruction set is exercised to verify that microprocessor operates properly. This phase is downloaded to LI4 0 via NP.
53	Tests DPRAM and parity check circuit. This phase is downloaded to LI4 0 RAM via NP.
54	Tests Programmable Interrupt Controllers and Programmable Interval Timers. This phase is downloaded to LI4 0 RAM via NP.
55	Tests DMA, Serial Communications Chip (SCC), part of Programmable Interrupt Controller, timers, and formatting chips of LI4 0 when LI4D is tested (TN1315).
56	Tests 12A Applique and 2048 data set. This phase is downloaded to LI4 0 via NP. This only applies to LI-4S.
60	Tests LI4 1 local RAM and Dual Port RAM from Node Processor.

TABLE B (Contd) IRN/IRN2 CPE NODE DIAGNOSTIC PHASES	
FAILING PHASE	**DESCRIPTION OF CIRCUITRY TESTED**
61	Tests NP-LI4 1 interface and DPRAM from NP view, while microprocessor on Link Interface board is running. This phase is downloaded to LI4 1 via NP1.
62	Tests 8086 microprocessor on LI4 1 board. A subset of 8086 instruction set is exercised to verify that microprocessor operates properly. This phase is downloaded to LI4 1 via NP.
63	Tests DPRAM and parity check circuit. This phase is downloaded to LI4 1 RAM via NP.
64	Tests Programmable Interrupt Controllers and Programmable Interval Timers. This phase is downloaded to LI4 1 RAM via NP.
65	Tests DMA, Serial Communications Chip (SCC), part of Programmable Interrupt Controller, timers, and formatting chips of LI4 1 when LI4D is tested (TN1315).
66	Tests 12A Applique and 2048 data set. This phase is downloaded to LI4 1 RAM via NP. This only applies to LI-4S.

[1] At MCRT, enter:

`OP:STATUS:FILESYS!`

[2] Using ROP printout, determine if system is running on root (/dev/root) or broot (/dev/broot) and record

[3] At MCRT, enter:

`AUD:FSBLK 1,INS"a"!`

a = file name listed in TABLE A associated with backup file system as determined in Step 2

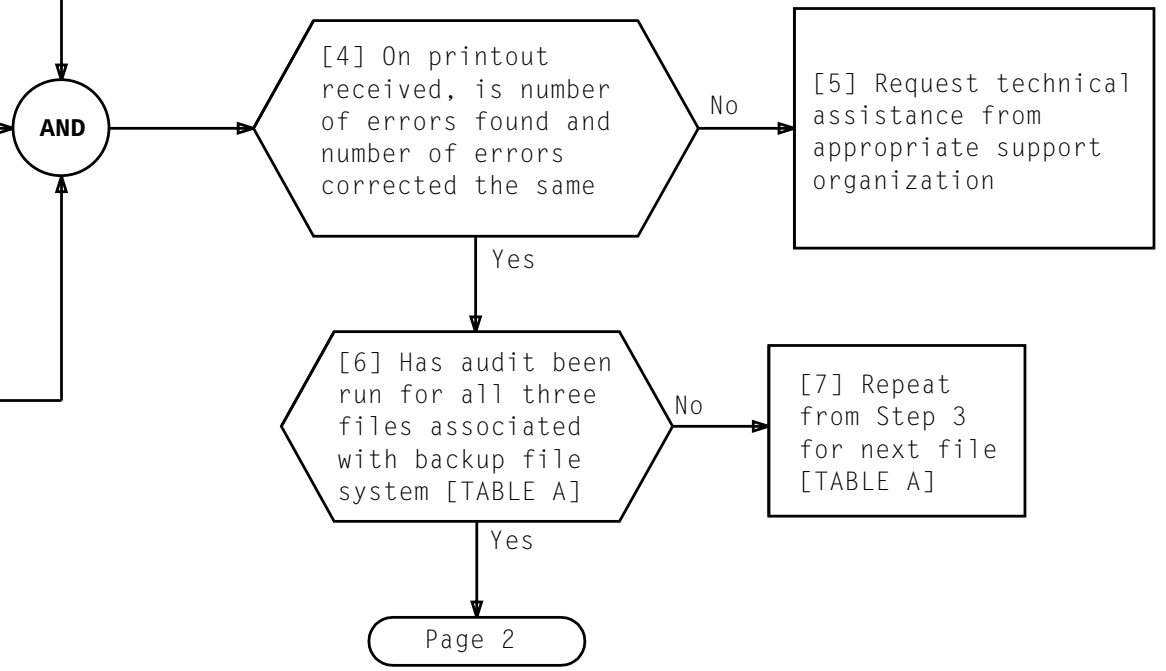


TABLE A	
SYSTEM RUNNING ON	
ROOT	BROOT
/dev/root	/dev/broot
/dev/db	/dev/bdb
/dev/etc	/dev/betc

RUN FILE SYSTEM AUDITS ON BACKUP FILE SYSTEM TO ENSURE NO FILE SYSTEM ERRORS

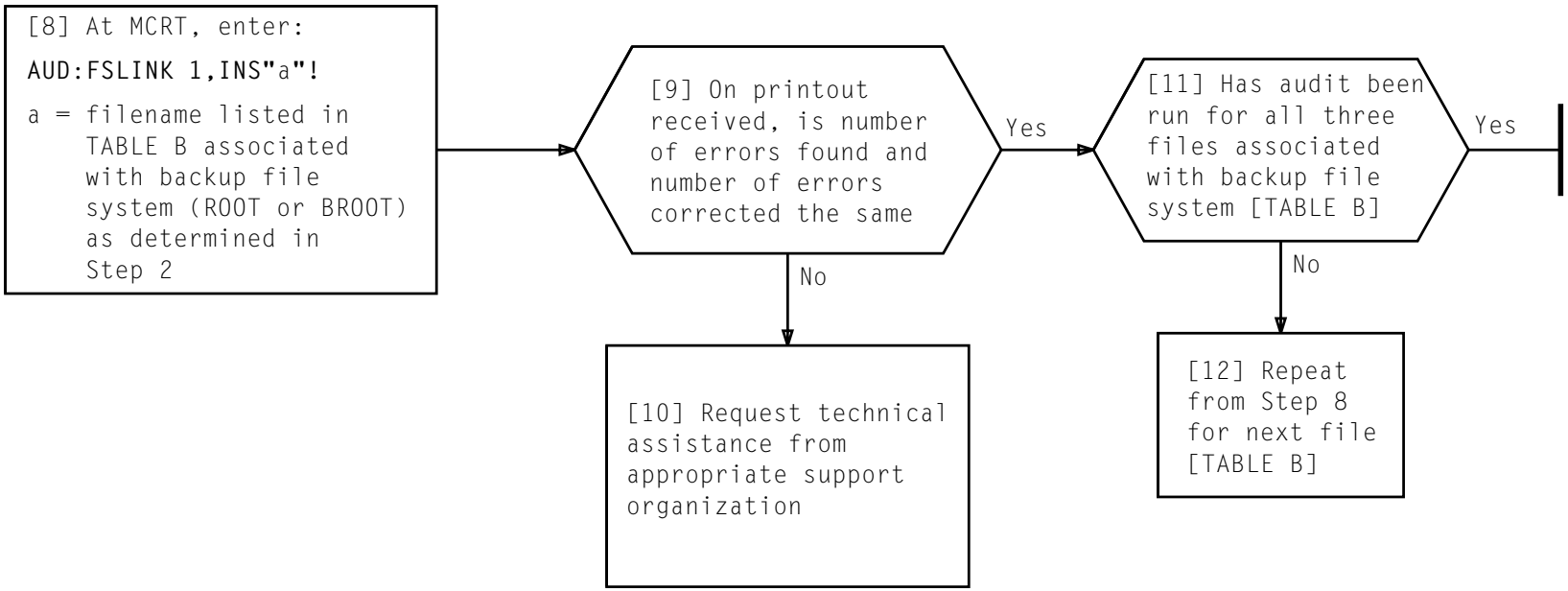


TABLE B	
SYSTEM RUNNING ON	
ROOT	BROOT
/dev/root	/dev/broot
/dev/db	/dev/bdb
/dev/etc	/dev/betc

RUN FILE SYSTEM AUDITS ON BACKUP FILE SYSTEM TO ENSURE NO FILE SYSTEM ERRORS

[1] Determine location of interface buffer (IFB) packs within frames 00 and 32

[2] Determine status (higher or lower) of IFB packs within CNI ring (following local procedure)

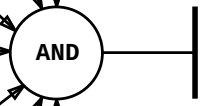
[3] Using the information from Steps 1 and 2, determine **hv** value of each node to be equipped. If node is non DLN, use TABLE A (Page 2 of 3); if node is DLN, use TABLE B (Page 2 of 3) and record on DLP-579

[4] Determine **mv** value of each node to be equipped from TABLE C (Page 3 of 3) and record on DLP-579

[5] Determine **pack code** value of each node to be equipped from TABLE D (Page 3 of 3) and record on DLP-579

[6] Determine **pathname** value of each node to be equipped from TABLE E (Page 3 of 3) and record on DLP-579

[7] Determine **issue** value of each node to be equipped from TABLE F (Page 3 of 3) and record on DLP-579



DETERMINE NODE DATA FOR ALL GROWTH NODES

TABLE A

Ring Interface Pack(s)	IFB Type	IFB Position	HV Value	Ring Interface Pack(s)	IFB Type	IFB Position	HV Value
UN122/UN123	None	N/A	0x0100	UN303	None	N/A	0x8000
UN122/UN123	TN918	Higher	0x0110	UN303	TN918	Higher	0x8010
UN122/UN123	TN1508	Higher	0x0150	UN303	TN1508	Higher	0x8050
UN122/UN123	TN1803	Higher	0x0160	UN303	TN1803	Higher	0x8060
UN122/UN123	TN918	Lower	0x0101	UN303	TN918	Lower	0x8001
UN122/UN123	TN1508	Lower	0x0105	UN303	TN1508	Lower	0x8005
UN122/UN123	TN1803	Lower	0x0106	UN303	TN1803	Lower	0x8006
UN122B/UN123B	None	N/A	0x0900	UN303B	None	N/A	0x9000
UN122B/UN123B	TN918	Higher	0x0910	UN303B	TN918	Higher	0x9010
UN122B/UN123B	TN1508	Higher	0x0950	UN303B	TN1508	Higher	0x9050
UN122B/UN123B	TN1803	Higher	0x0960	UN303B	TN1803	Higher	0x9060
UN122B/UN123B	TN918	Lower	0x0901	UN303B	TN918	Lower	0x9001
UN122B/UN123B	TN1508	Lower	0x0905	UN303B	TN1508	Lower	0x9005
UN122B/UN123B	TN1803	Lower	0x0906	UN303B	TN1803	Lower	0x9006
UN122C/UN123B	None	N/A	0x1900	UN304	None	N/A	0xc000
UN122C/UN123B	TN918	Higher	0x1910	UN304	TN918	Higher	0xc010
UN122C/UN123B	TN1508	Higher	0x1950	UN304	TN1508	Higher	0xc050
UN122C/UN123B	TN1803	Higher	0x1960	UN304	TN1803	Higher	0xc060
UN122C/UN123B	TN918	Lower	0x1901	UN304	TN918	Lower	0xc001
UN122C/UN123B	TN1508	Lower	0x1905	UN304	TN1508	Lower	0xc005
UN122C/UN123B	TN1803	Lower	0x1906	UN304	TN1803	Lower	0xc006
				UN397	None	N/A	0x4000
				UN397	TN918	Higher	0x4010
				UN397	TN1508	Higher	0x4050
				UN397	TN1803	Higher	0x4060
				UN397	TN918	Lower	0x4001
				UN397	TN1508	Lower	0x4005
				UN397	TN1803	Lower	0x4006

TABLE B

Ring Interface Pack(s)	IFB Type	IFB Position	HV* Value
UN303B	None	N/A	0x200 9000
UN303B	TN918	Higher	0x200 9010
UN303B	TN1508	Higher	0x200 9050
UN303B	TN1803	Higher	0x200 9060
UN303B	TN918	Lower	0x200 9001
UN303B	TN1508	Lower	0x200 9005
UN303B	TN1803	Lower	0x200 9006
UN304	None	N/A	0xc200 c000
UN304	TN918	Higher	0xc200 c010
UN304	TN1508	Higher	0xc200 c050
UN304	TN1803	Higher	0xc200 c060
UN304	TN918	Lower	0xc200 c001
UN304	TN1508	Lower	0xc200 c005
UN304	TN1803	Lower	0xc200 c006

* HV value for DLNs is used on both LN and RPCD UCB forms

DETERMINE NODE DATA FOR ALL GROWTH NODES

TABLE C

Node Type	MV Value LI Equipage			
	LI 0 Only	LI 1 Only	Both LIs	No LIs
CCITT7 (without TIFA)	0x3a			
CCITT7 (with TIFA)	0x40			
SS7 (without IRNs)	Blank*			
SS7 (with IRNs)	0x43			
DLN 30 16 mbytes				0x23
DLNE (RPCD)				0x23
RPCN				Blank*

* Blank field is obtained by entering an apostrophe.
† HDRNC can only be equipped with LI 0.

TABLE D

Node Type	Pack Code (Note)
CCITT7 (without TIFA)	IIDP
CCITT7 (with TIFA)	IITP
SS7 (without IRNs)	CNI7
SS7 (with IRNs)	C7I
DLN30 16 mbytes	DLNE
DLNE (RPCD)	Blank *
RPCN	RPC

Note: Pack codes must be entered in capital letters.
* Blank field is obtained by entering an apostrophe.

TABLE E

Node Type	Path Name
DLN 30 16 mbytes	pu/iun
DLNE (RPCD)	pu/DLNI_NA
RPCN	pu/rpc
All Other Nodes (without IRN2)	pu/iun
All Other Nodes (with IRN2)	pu/irn2

TABLE F

Node Type	Issue
SS7 (TN13126)	1
DLN30 16 mbytes	1
DLNE (RPCD)	1
RPCN	Blank*
IUN (UN303, UN303B, UN304)	1
All Other Nodes	Blank*

* Blank field is obtained by entering an apostrophe.

DETERMINE NODE DATA FOR ALL GROWTH NODES

Node-Specific Variable Record—Frames 00 & 32											
Node	**HV**	**MV**	**Pack Code**	**Issue**	**Pathname**	**Node**	**HV**	**MV**	**Pack Code**	**Issue**	**Pathname**
RPCN00 0		Blank *	RPC	N/A	pu/rpc	RPCN32 0		Blank *	RPC	N/A	pu/rpc
LN00 1						LN32 1					
LN00 2						LN32 2					
LN00 3						LN32 3					
LN00 4						LN32 4					
RPCD00 5	0x2009000	0x23	N/A	1	pu/DLNI_NA	RPCD32 5	0x2009000	0x23	N/A	1	pu/DLNI_NA
LN00 5	0x2009000	0x23	DLNE	1	pu/iun	LN32 5	0x2009000	0x23	DLNE	1	pu/iun
LN00 6						LN32 6					
LN00 7						LN32 7					
LN00 8						LN32 8					
LN00 9						LN32 9					
RPCD00 10	0x2009000	0x23	N/A	1	pu/DLNI_NA	RPCD32 10	0x2009000	0x23	N/A	1	pu/DLNI_NA
LN00 10	0x2009000	0x23	DLNE	1	pu/iun	LN32 10	0x2009000	0x23	DLNE	1	pu/iun
LN00 11						LN32 11					
LN00 12						LN32 12					
LN00 13						LN32 13					
LN00 14						LN32 14					
* Blank field is obtained by entering an apostrophe											

RECORD NODE DATA RESULTS

Node-Specific Variable Record—Frames 06											
Node	HV	MV	Pack Code	Issue	Pathname	Node	HV	MV	Pack Code	Issue	Pathname
LN06 2						LN09 1					
LN06 3						LN09 2					
LN06 4						LN09 3					
LN06 5						LN09 4					
LN06 6						LN09 5					
LN06 7											
LN06 8											
LN07 1											
LN07 2						LN10 1					
LN07 3						LN10 2					
						LN10 3					
LN07 5						LN10 4					
LN07 6						LN10 5					
LN07 7						LN10 6					
LN07 8						LN10 7					
LN08 1						LN10 8					
LN08 2						LN11 1					
LN08 3						LN11 2					
LN08 4						LN11 3					
LN08 5						LN11 4					
LN08 6						LN11 5					
LN08 7						LN11 6					
LN08 8						LN11 7					
* Blank field is obtained by entering an apostrophe											

RECORD NODE DATA RESULTS

Node-Specific Variable Record—Frames 38											
Node	HV	MV	Pack Code	Issue	Pathname	Node	HV	MV	Pack Code	Issue	Pathname
						LN41 1					
LN38 2						LN41 2					
LN38 3						LN41 3					
LN38 4						LN41 4					
LN38 5						LN41 5					
LN38 6											
LN38 7											
LN38 8											
LN39 1						LN42 1					
LN39 2						LN42 2					
LN39 3						LN42 3					
						LN42 4					
LN39 5						LN42 5					
LN39 6						LN42 6					
LN39 7						LN42 7					
LN39 8						LN42 8					
LN40 1						LN43 1					
LN40 2						LN43 2					
LN40 3						LN43 3					
LN40 4						LN43 4					
LN40 5						LN43 5					
LN40 6						LN43 6					
LN40 7						LN43 7					
LN40 8											
* Blank field is obtained by entering an apostrophe											

Node-Specific Variable Record—Frames 28 & 60											
Node	HV	MV	Pack Code	Issue	Pathname	Node	HV	MV	Pack Code	Issue	Pathname
LN28 2						LN60 2					
LN28 3						LN60 3					
LN28 4						LN60 4					
LN28 5						LN60 5					
LN28 6						LN60 6					
LN28 7						LN60 7					
LN28 8						LN60 8					
LN28 9						LN60 9					
LN28 60						LN60 10					
LN28 11						LN60 11					
LN28 12						LN60 12					
LN28 13						LN60 13					
LN28 14						LN60 14					
* Blank field is obtained by entering an apostrophe											

ITEM	ISSUE	ITEM	ISSUE	ITEM	ISSUE	ITEM	ISSUE	ITEM	ISSUE	ITEM	ISSUE
• TPG-000		• DLP-514		DLP-549							
• IXL-001		DLP-515		DLP-550							
NTP-002		DLP-516		DLP-551							
NTP-003		DLP-517		DLP-552							
NTP-004		DLP-518		DLP-553							
NTP-005		DLP-519		DLP-554							
NTP-006		DLP-520		DLP-555							
NTP-007		DLP-521		• DLP-556							
NTP-008		DLP-522		• DLP-557							
NTP-009		DLP-523		• DLP-558							
TAP-100		DLP-524		DLP-559							
• TAP-101		DLP-525		DLP-560							
TAP-102		DLP-526		DLP-561							
• TAP-103		DLP-527		• DLP-562							
TAP-104		DLP-528		• DLP-563							
• TAP-105		DLP-529		DLP-564							
TAP-106		DLP-530		• DLP-578							
TAP-107		DLP-531		• DLP-579							
TAP-108		DLP-532		• CKL-891							
TAP-109		DLP-533		TNG-893							
• TAP-110		DLP-534									
DLP-500		DLP-535									
• DLP-501		DLP-536									
• DLP-502		DLP-537									
DLP-503		• DLP-538									
• DLP-504		DLP-539									
• DLP-505		DLP-540									
DLP-506		DLP-541									
• DLP-507		DLP-542									
DLP-508		DLP-543									
DLP-509		DLP-544									
DLP-510		DLP-545									
DLP-511		DLP-546									
DLP-512		DLP-547									
• DLP-513		DLP-548									

This book is called a Task Oriented Practice or "TOP." It is a programmed document that gives step-by-step instructions to enable you to do a job (or task). If used correctly, TOP can be a very useful aid when completing everyday tasks.

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

Remember, a TOP contains all the instructions needed to do a task. If you are doing the job for the first time, you are given step-by-step instructions with all detail that enables you to complete the job. Remember, TOP can provide you the information you need regardless of your experience in doing a job.

The work that you do can be classified into two broad job categories — *Trouble Clearing* and *Non-Trouble Clearing*. The following are the TOP definitions for these two job categories:

Trouble Clearing

Trouble clearing may be done in answering a customer complaint or in responding to an office alarm, a trouble report, or an abnormal TTY printout, etc.

Non-Trouble Clearing

Non-trouble clearing is not connected with trouble clearing. These are procedures performed to accept a system after a system has been installed, turn up a system for service, maintain a system according to a controlled maintenance plan, etc.

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

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

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

HOW TO USE TOP

FIND YOUR JOB IN THE LIST BELOW . . . . . THEN GO TO	
Alert; External — Horn, Ringer, Etc. — Remove	NTP-028
Amplifiers; Channel — Recorded Announcement Frame — Test	NTP-009
ARO3 PWR ALM RA bb — bb = 16-30	TAP-105
BRDG LED — Does Not Light — Correct	TAP-117
Bridging Controller; Trunk — J1CO15MB — Replace	DLP-572
Channel Amplifiers — Recorded Announcment Frame — Test	NTP-009
Drum Wiper — Common Systems Recorded Announcement Frame — Inspect	NTP-010
Extended Station Capability — Nonkey Set Only — Reported Failure	TAP-123
External Alert — Horn, Ringer, Etc. — Remove	NTP-028
Interchange Two Working Station Numbers	NTP-081
LED; **BRDG** — Does Not Light — Correct	TAP-117
Loudspeaker Paging — Add	NTP-059
Loudspeaker; — Remove	NTP-006
Station Capability; Extended — Nonkey Set Only — Reported Failure	TAP-123
System Test — Perform	NTP-016
Trunk Bridging Controller — J1CO15MB — Replace	DLP-572
TTY Printout — ARO3 PWR ALM RA bb — bb = 16-30	TAP-105
Wiper; Drum — Common Systems Recorded Announcment Frame — Inspect	NTP-010

TASK INDEX LIST (Contd)	Issue 1	DEC 1980
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	PAGE 2 of 2	001

Figure 1

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

Remember that this procedure gives all the items that must be done and the order in which they must be done to complete the job. If you know how to do a task, you should proceed without going to the referenced details in the "FOR DETAILS, GO TO" column. If, on the other hand, you need additional details on how to do the task, turn to the procedure listed in the "FOR DETAILS, GO TO" column. In either case, after completing a task continue with the next task.

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

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

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PERFORM SYSTEM TEST

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

Summary Statement

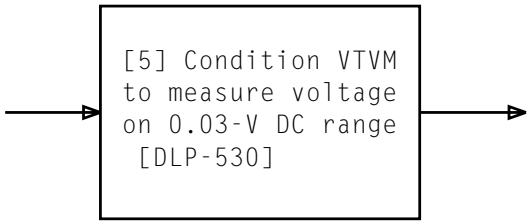
A summary statement is used with a procedure to tell you briefly how to do the procedure and what type measurement or result can be observed. If you can do the procedure after reading the summary, perform the procedure without reading any further. Simple procedures may not have summaries.

Result Statement

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

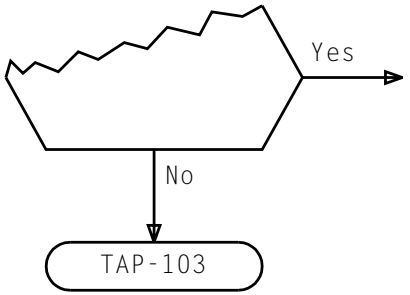
Support Procedures

The following reference in TOP refers to a support procedure:
The support procedure [DLP-530] (Detailed Level Procedure) provides the information on how to operate the VTVM. Here again, if you already know how to operate the VTVM, perform the procedure without looking up any further information.



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

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



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

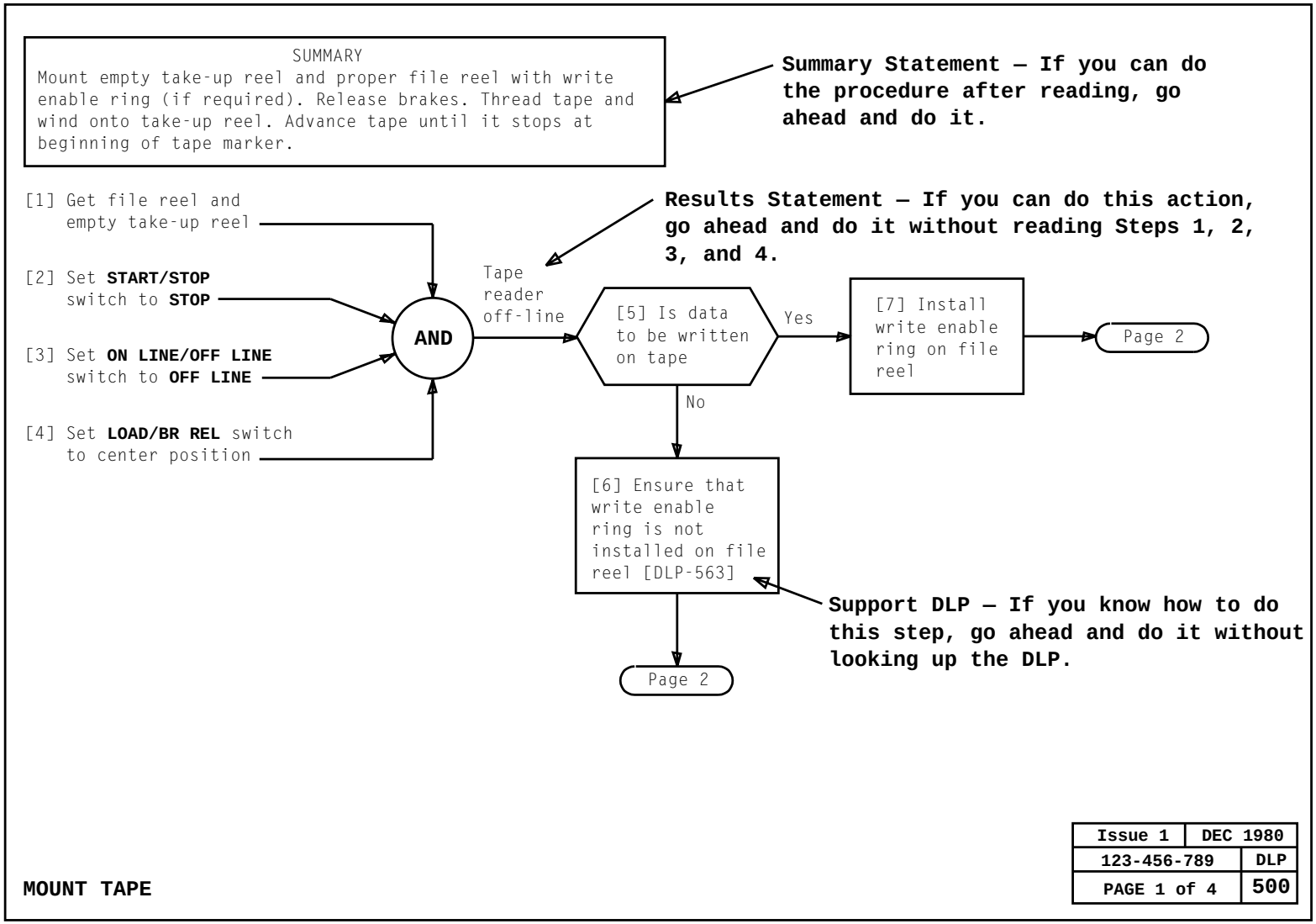
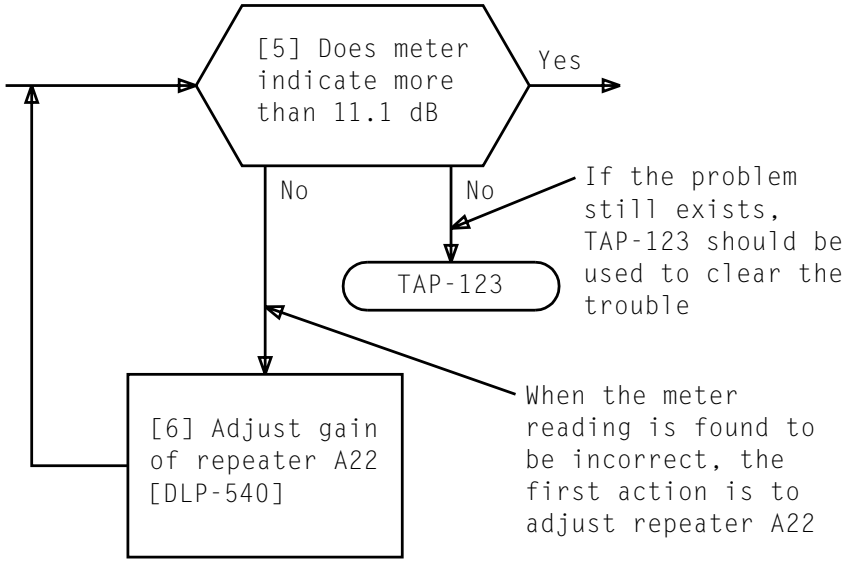

SUMMARY
Mount empty take-up reel and proper file reel with write enable ring (if required). Release brakes. Thread tape and wind onto take-up reel. Advance tape until it stops at beginning of tape marker.
Summary Statement – If you can do the procedure after reading, go ahead and do it.
[1] Get file reel and empty take-up reel
[2] Set START/STOP switch to STOP
[3] Set ON LINE/OFF LINE switch to OFF LINE
[4] Set LOAD/BR REL switch to center position
AND
Results Statement – If you can do this action, go ahead and do it without reading Steps 1, 2, 3, and 4.
Tape reader off-line
[5] Is data to be written on tape
Yes
[7] Install write enable ring on file reel
Page 2
No
[6] Ensure that write enable ring is not installed on file reel [DLP-563]
Support DLP – If you know how to do this step, go ahead and do it without looking up the DLP.
Page 2
MOUNT TAPE
Issue 1 DEC 1980
123-456-789 DLP
PAGE 1 of 4 500

Figure 2

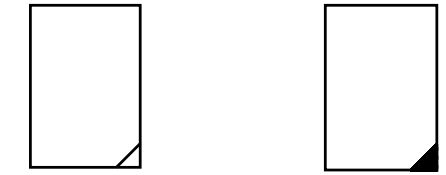
This idea can be carried further. In some cases, a decision block may have more than one abnormal output. This means that you should try more than one solution to the problem. See the following example.



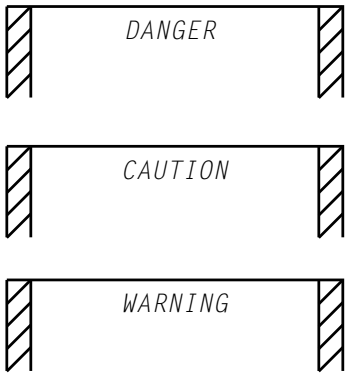
Trouble-clearing information in TOP is used basically the same way as non-trouble-clearing information. When an alarm or trouble report requires you to troubleshoot a system covered by a TOP, the TASK INDEX LIST (IXL-001) is the place to start. After locating your task on IXL-001, you are referenced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

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

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



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



— *means there is a possibility of personal injury*

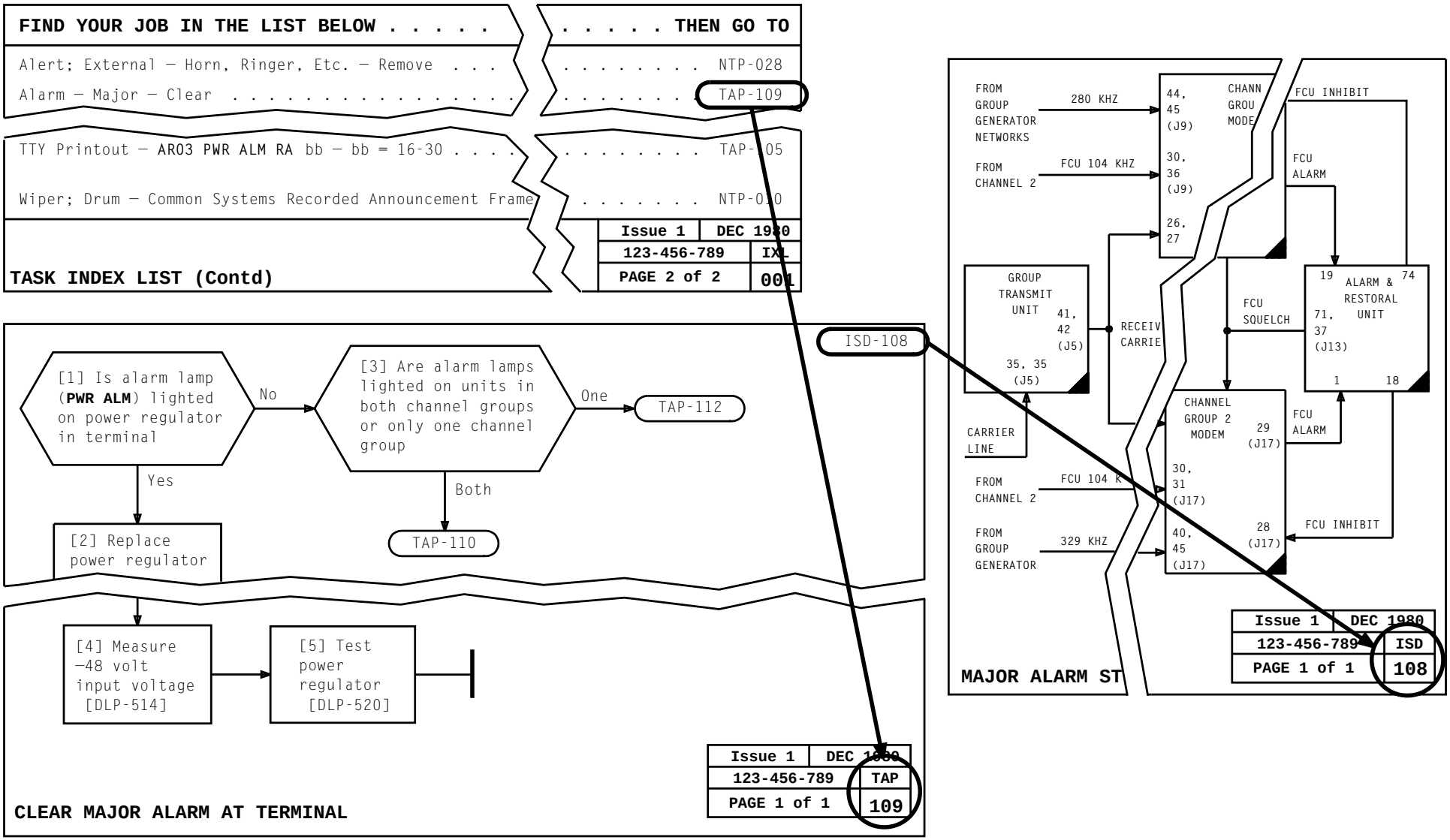
— *means there is a possibility of service interruptions*

— *means there is a possibility of equipment damage*

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

While using TOP, if you find errors, or if a procedure is inadequate or missing, call the TOP HOTLINE number shown on the front cover and title page. Your comments are greatly needed to help prepare better documentation. Comments may also be forwarded using the form provided in the front of this TOP.

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


FIND YOUR JOB IN THE LIST BELOW . . . . .
. . . . . THEN GO TO
Alert; External — Horn, Ringer, Etc. — Remove NTP-028
Alarm — Major — Clear TAP-109
TTY Printout — AR03 PWR ALM RA bb — bb = 16-30 . . . . . TAP-105
Wiper; Drum — Common Systems Recorded Announcement Frame NTP-010
Issue 1 DEC 1980
123-456-789 IXL
PAGE 2 of 2 001
TASK INDEX LIST (Contd)
ISD-108
[1] Is alarm lamp (PWR ALM) lighted on power regulator in terminal
No
[3] Are alarm lamps lighted on units in both channel groups or only one channel group
One
TAP-112
Yes
Both
[2] Replace power regulator
TAP-110
[4] Measure −48 volt input voltage [DLP-514]
[5] Test power regulator [DLP-520]
Issue 1 DEC 1980
123-456-789 TAP
PAGE 1 of 1 109
CLEAR MAJOR ALARM AT TERMINAL
FROM GROUP GENERATOR NETWORKS
280 KHZ
FROM CHANNEL 2
FCU 104 KHZ
44, 45 (J9)
30, 36 (J9)
26, 27
CHANN GROU MODE
FCU INHIBIT
FCU ALARM
GROUP TRANSMIT UNIT
41, 42 (J5)
35, 35 (J5)
RECEIV CARRIE
FCU SQUELCH
19
ALARM & RESTORAL UNIT
74
71, 37 (J13)
1
18
CHANNEL GROUP 2 MODEM
29 (J17)
CARRIER LINE
30, 31 (J17)
FROM CHANNEL 2
FCU 104 K
FCU ALARM
FROM GROUP GENERATOR
329 KHZ
40, 45 (J17)
28 (J17)
FCU INHIBIT
Issue 1 DEC 1980
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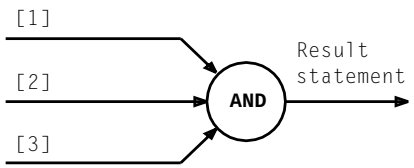
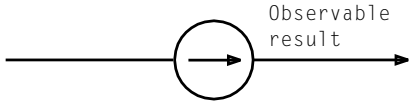
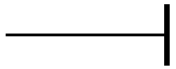
PAGE 1 of 1 108
MAJOR ALARM ST

Figure 3

TABLE A
IMPORTANT TOP SYMBOLS AND DEFINITIONS

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