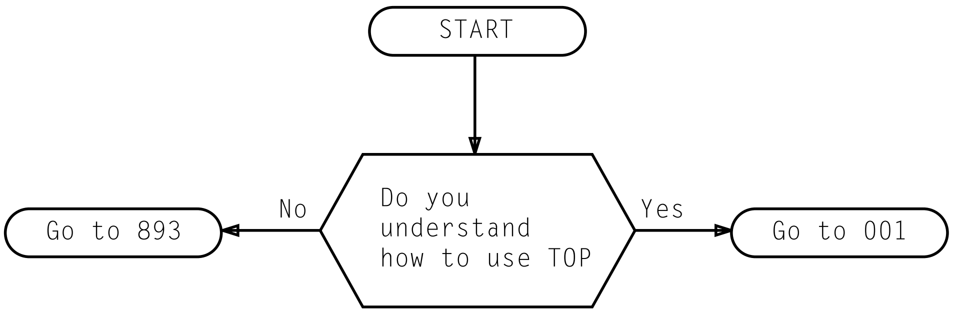
Lucent Technologies
Bell Labs Innovations

Task Oriented Practice (TOP)

4ESS™ Switch
Common Network Interface



TOP Comments Hot Line:

Monday through Friday

8:00 a.m. - 4:00 p.m. (Eastern)

Call: 1-800-334-0404

Or FAX to: 1-910-727-3043

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TITLE PAGE	000

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P.O. Box 19901
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Developed by:

Lucent Technologies Network Systems TSVS Information Development

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

FIND YOUR JOB IN THE LIST BELOW . . . . THEN GO TO

FIND YOUR JOB IN THE LIST BELOW . . . . THEN GO TO

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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,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 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 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

ADD DIGITAL SIGNALING LINK TO SERVICE

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	–

REMOVE ANALOG OR DIGITAL SIGNALING LINK FROM SERVICE

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

PERFORM DIGITAL SERVICE UNIT (DSU) END-TO-END TESTING

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	–

ADD ANALOG SIGNALING LINK TO SERVICE

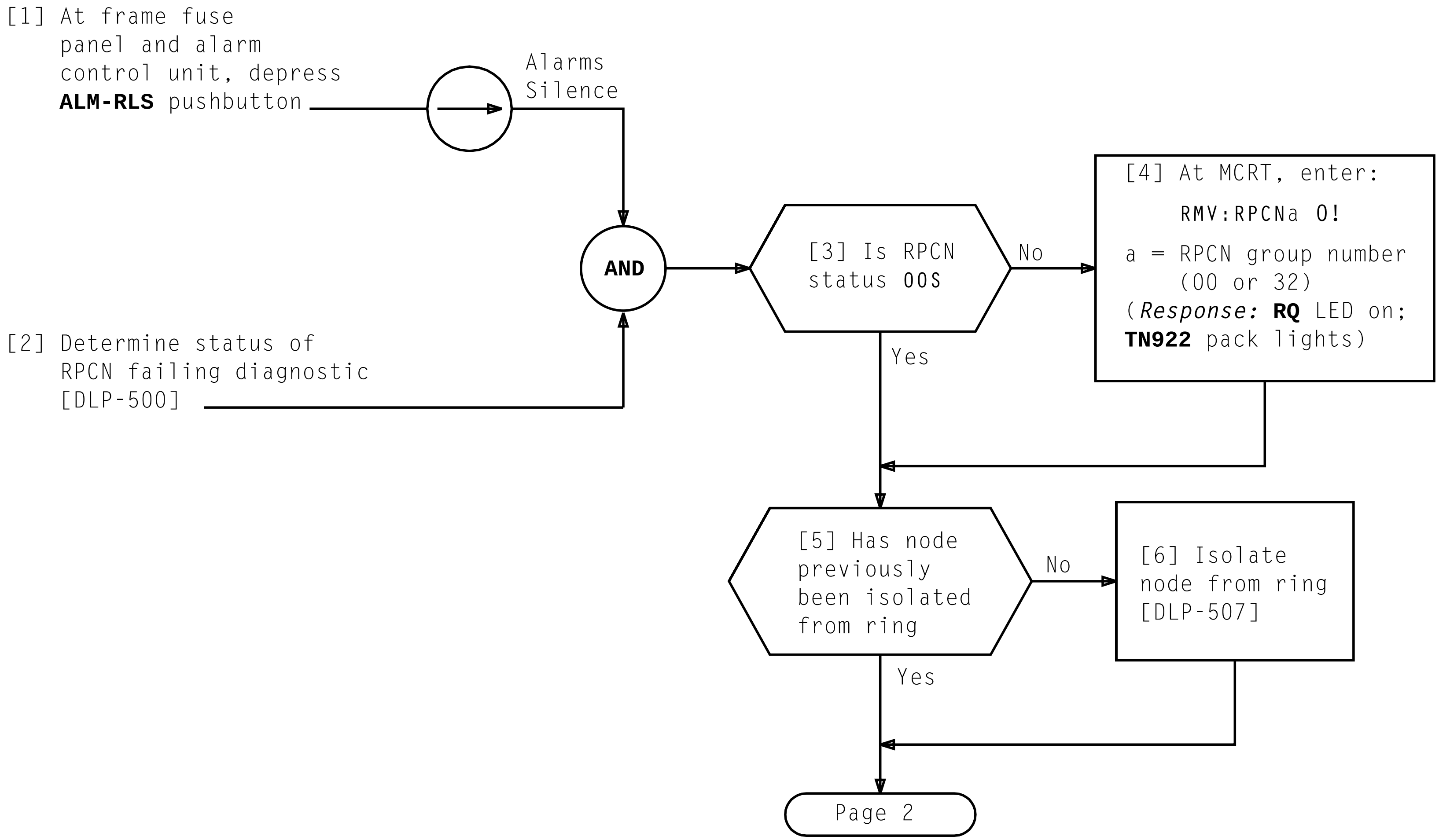
DO THE ITEMS BELOW IN THE ORDER LISTED		FOR DETAILS, GO TO
16	Change Signaling Link State To UNAVAILABLE-TEST (**CHG:SLK(**a,b**);TEST!** a = Ring Node Group Number (00-63); b = Node Member Number (1-15))	DLP-525
17	Verify Signaling Link Is In SYNC and PROVED-IN	DLP-526
18	At MCRT, Enter **MON:SLK(**a,b**);OFF!** 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:LN**a 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	—

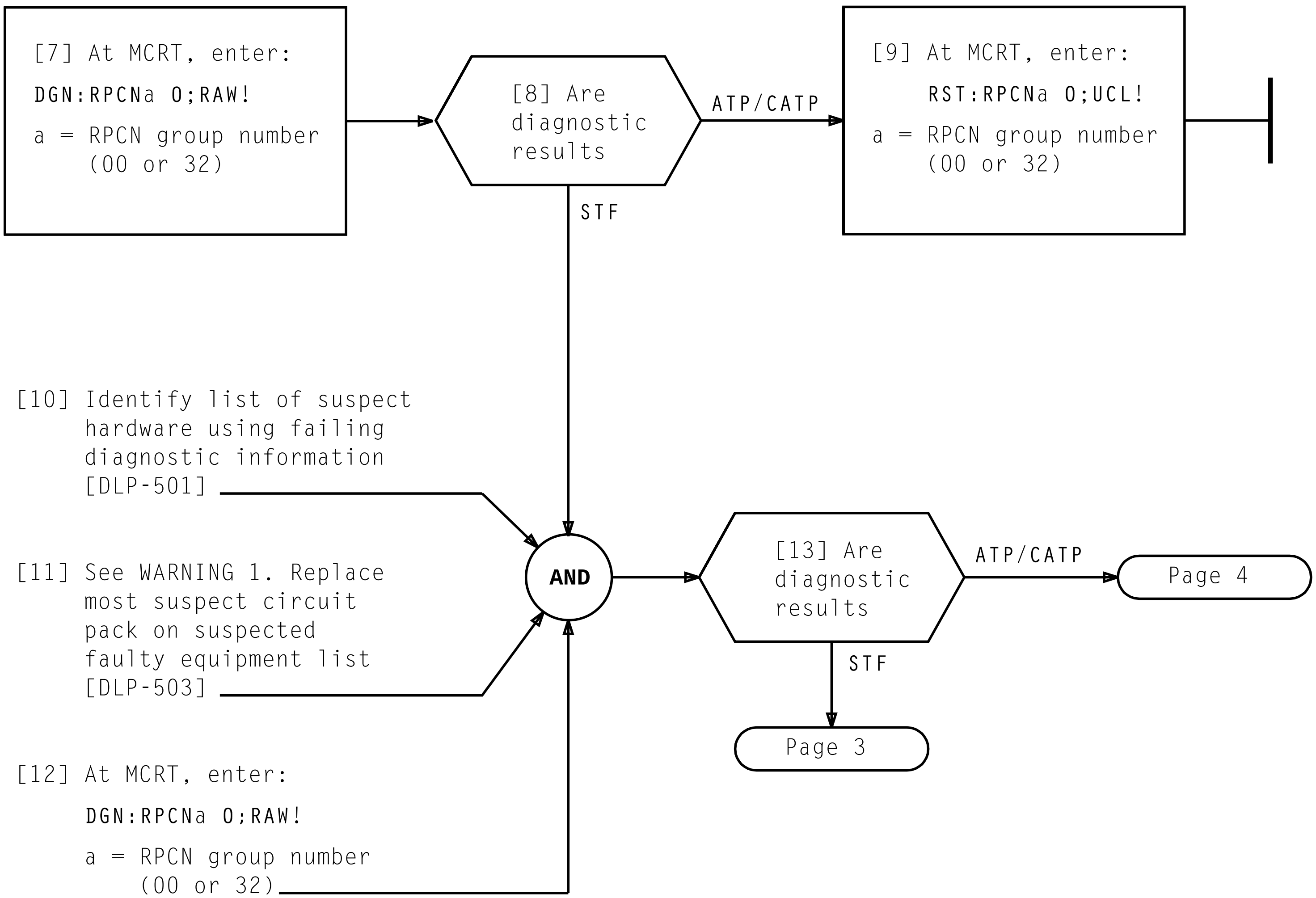
CHANGE SIGNALING LINK CONFIGURATION DATA

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	—

PERFORM ANALOG SIGNALING LINK CROSS-OFFICE, END-TO-END, AND LOOPBACK TESTS

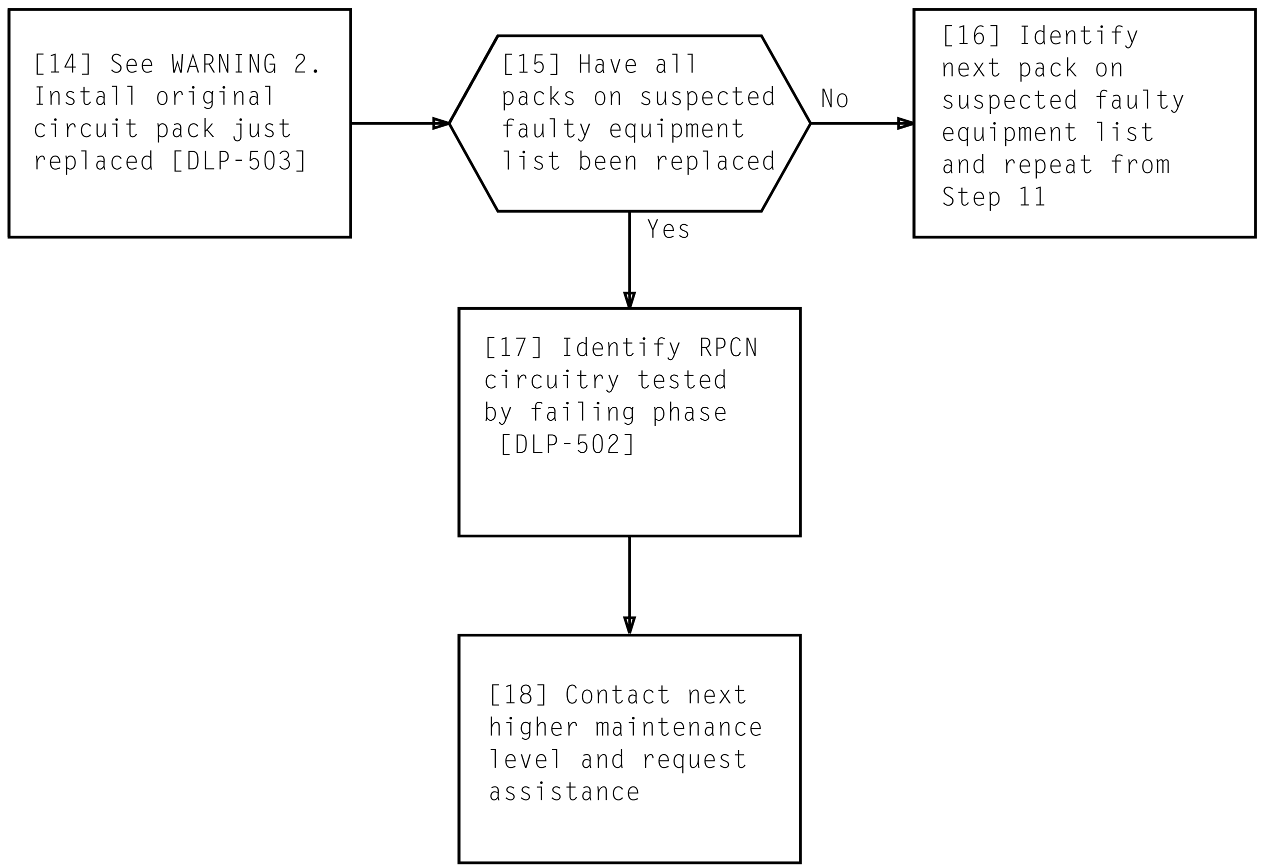


CLEAR DIAGNOSTIC FAILURE BY ANALYZING RAW DATA AND REPLACING SUSPECT PACKS — RING PERIPHERAL CONTROLLER NODE (RPCN)



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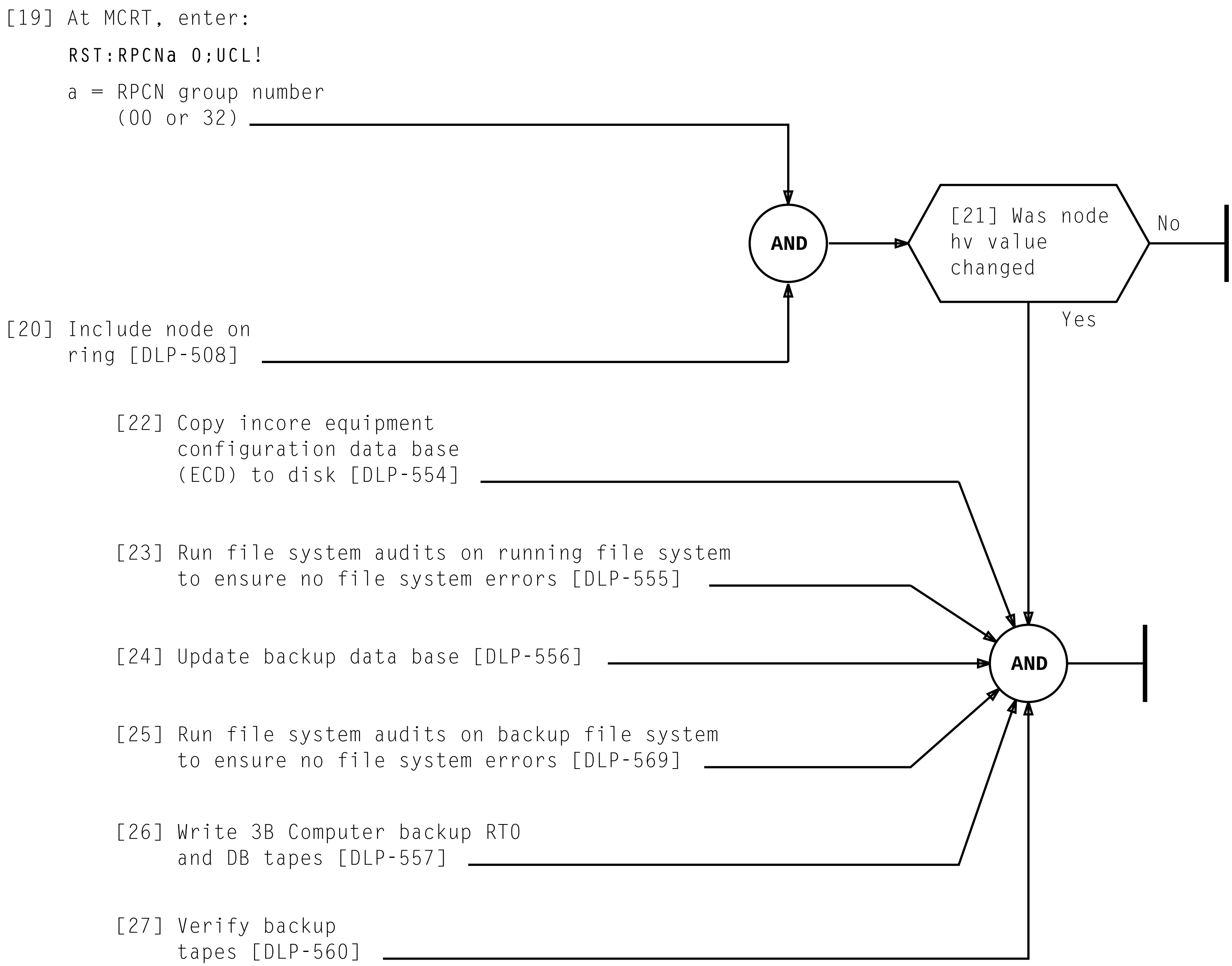
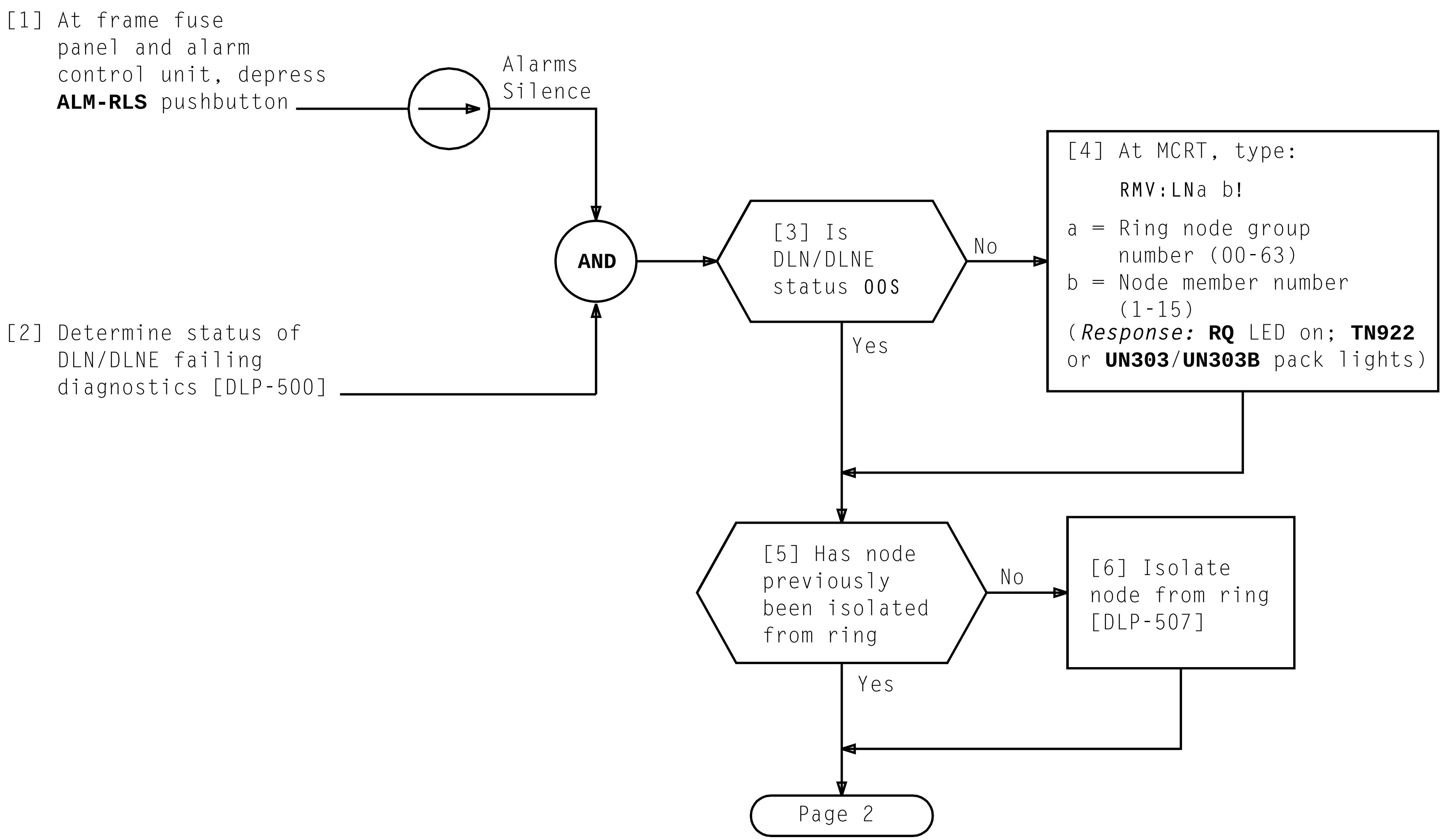
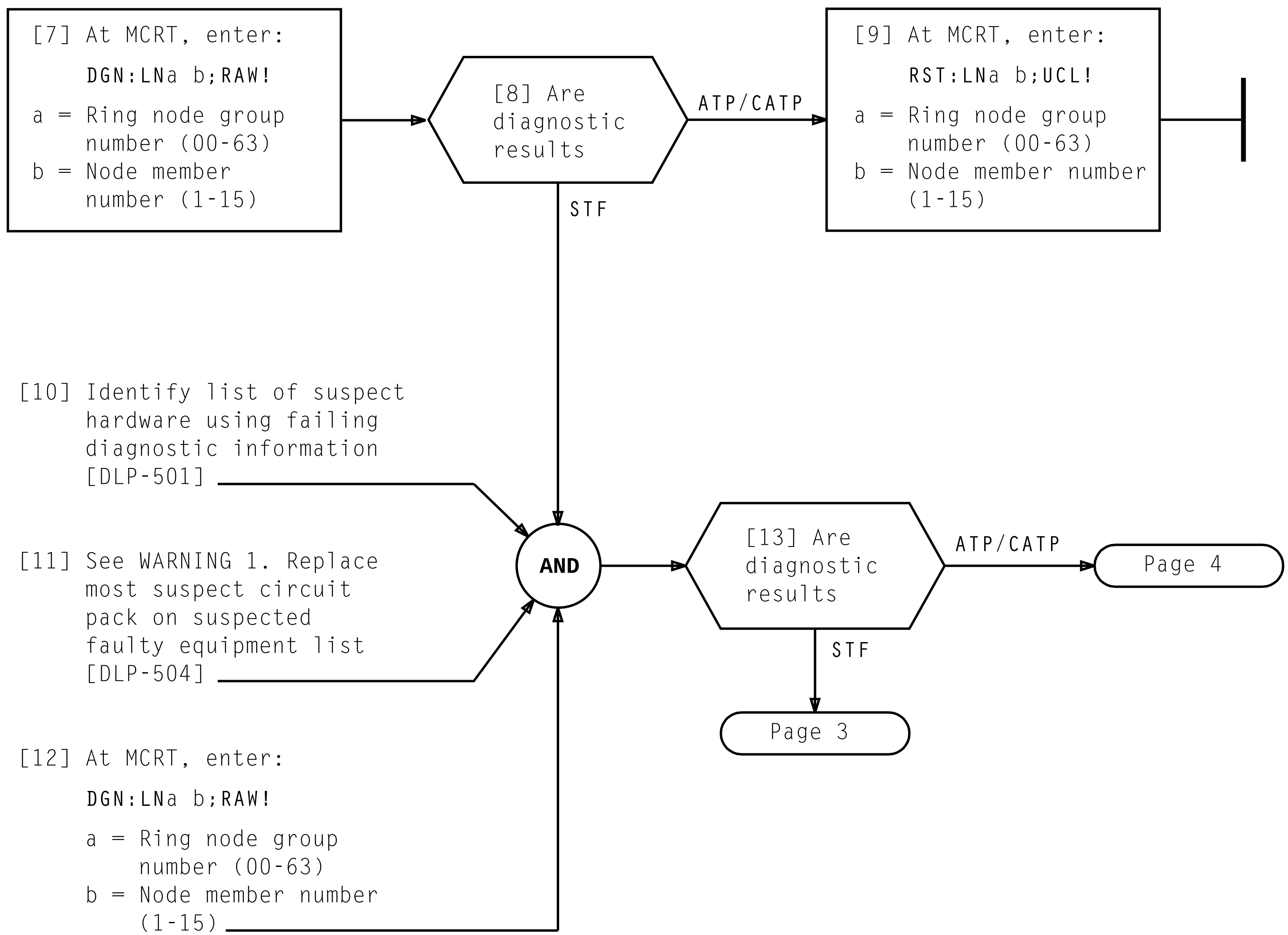
CLEAR DIAGNOSTIC FAILURE BY ANALYZING RAW DATA AND REPLACING SUSPECT PACKS — RING PERIPHERAL CONTROLLER NODE (RPCN)



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



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



WARNING 1
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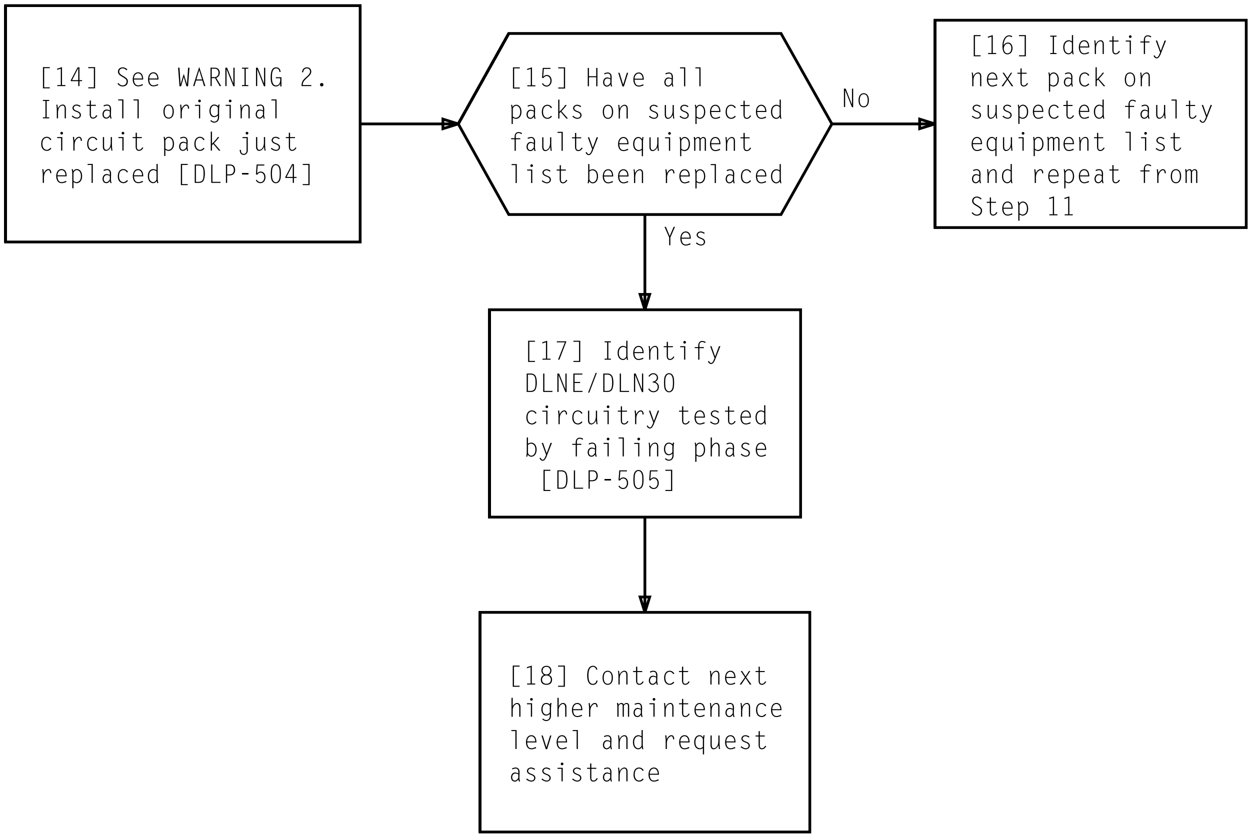
CLEAR DIAGNOSTIC FAILURE BY ANALYZING RAW DATA AND REPLACING SUSPECT PACKS — DLNE/DLN30



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)

AND

[21] Was node
hv value
changed

No

Yes

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

[22] Copy incore equipment configuration data
data base (ECD) to disk [DLP-554]

[23] Run file system audits on running file system to
ensure no file system errors [DLP-555]

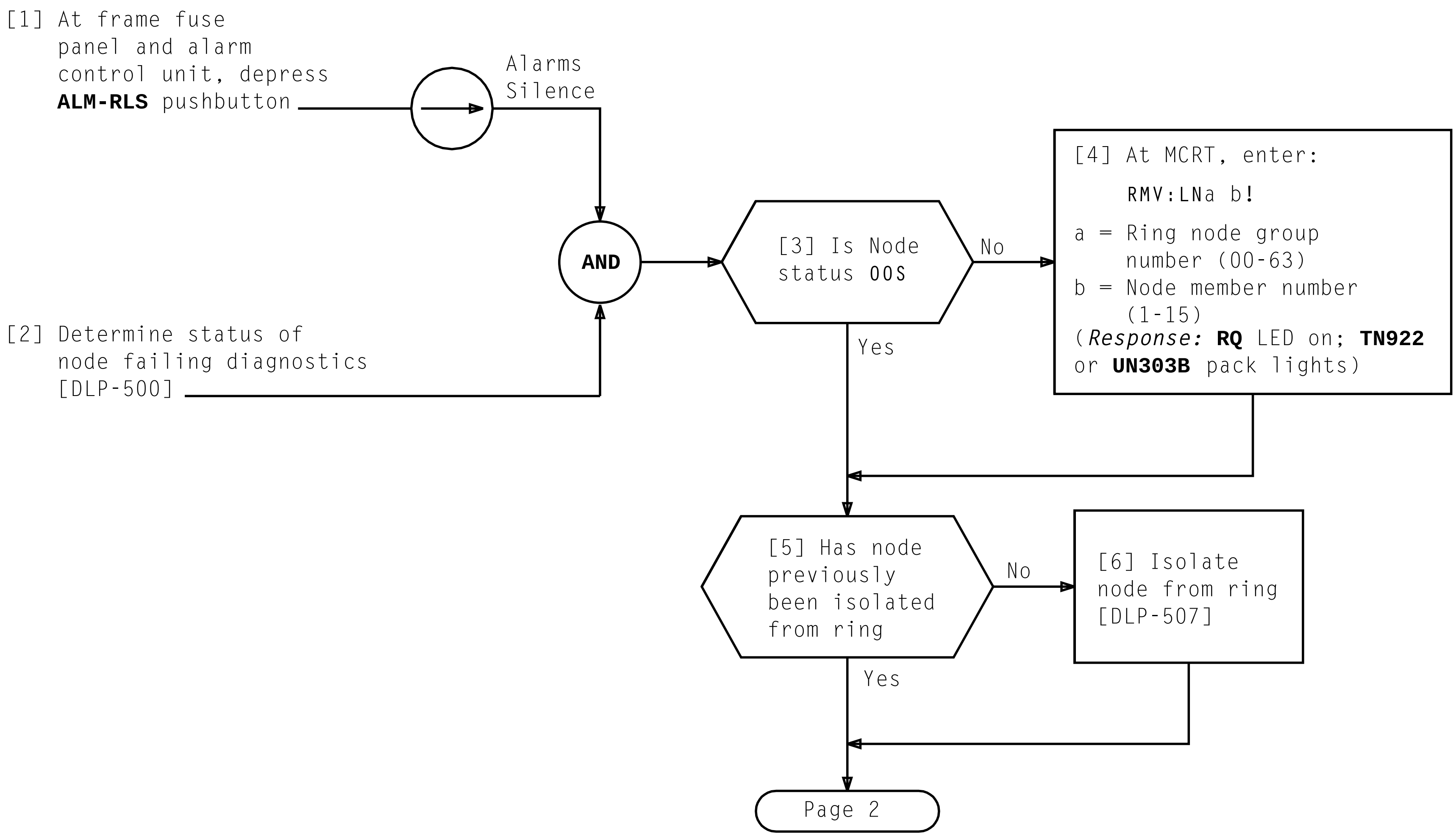
[24] Update backup data base [DLP-556]

AND

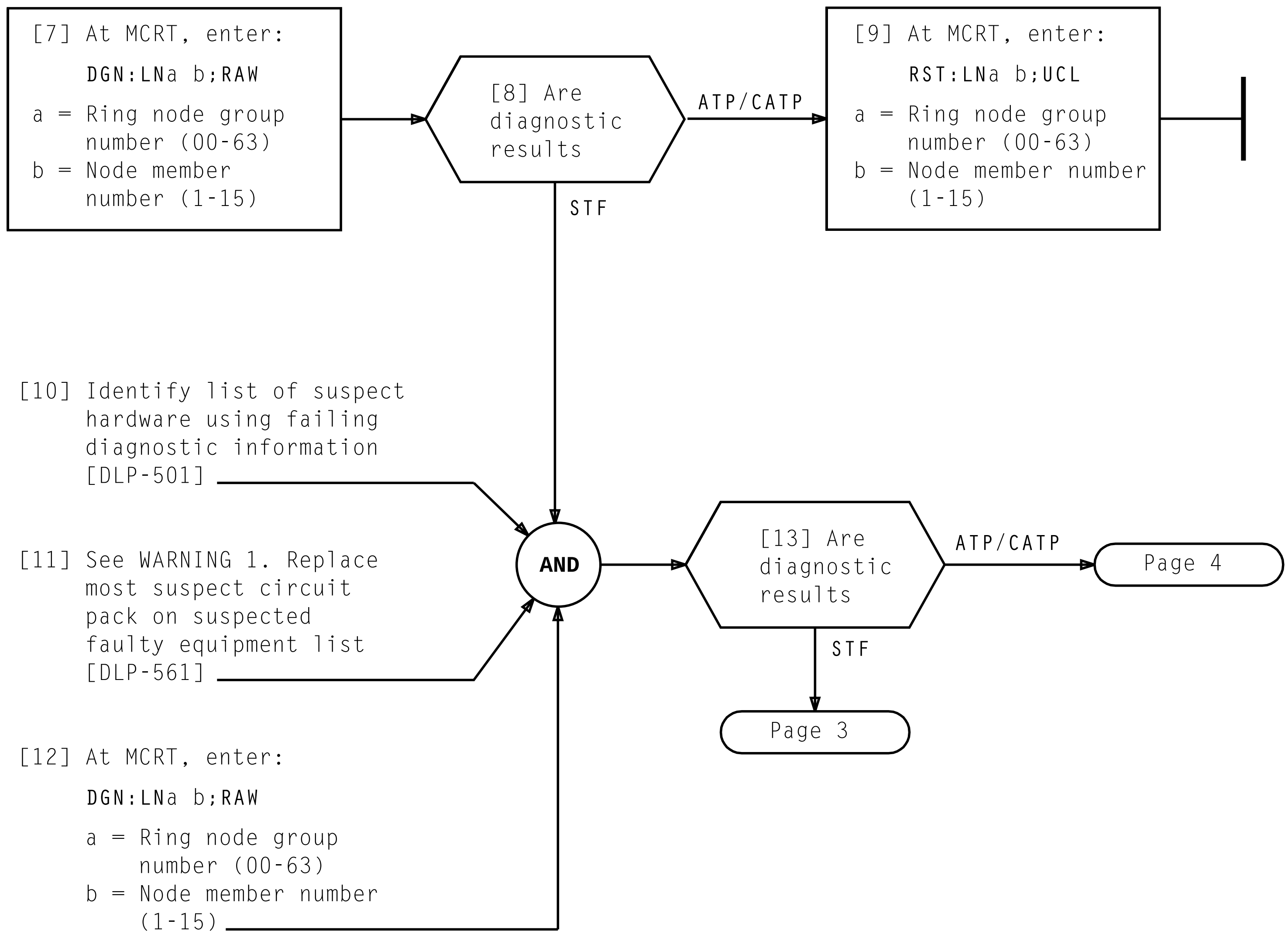
[25] Run file system audits on backup file system
to ensure no file system errors [DLP-569]

[26] Write 3B Computer backup RTO
and DB tapes [DLP-557]

[27] Verify backup tapes [DLP-560]

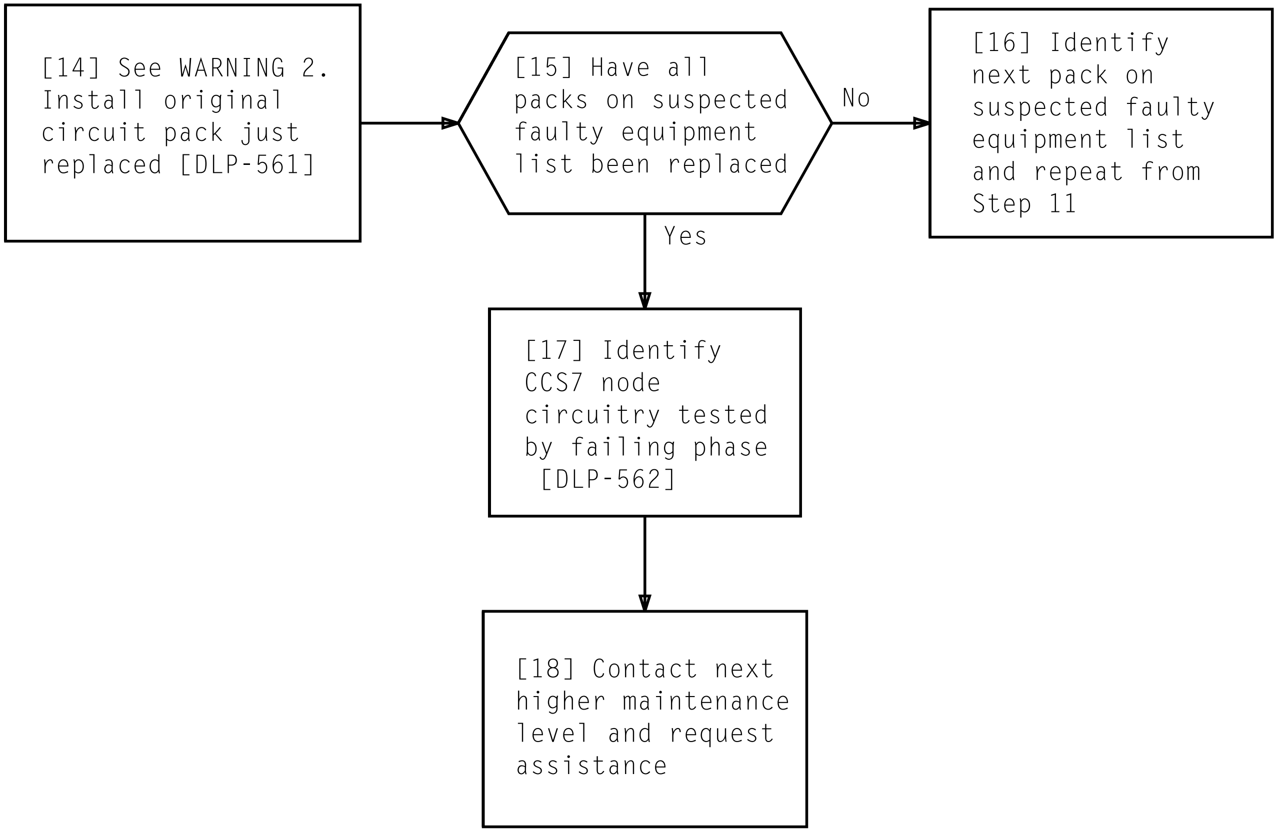


CLEAR DIAGNOSTIC FAILURE BY ANALYZING RAW DATA AND REPLACING SUSPECT PACKS — COMMON CHANNEL SIGNALING 7 (CCS7) NODE



CLEAR DIAGNOSTIC FAILURE BY ANALYZING RAW DATA AND REPLACING SUSPECT PACKS — COMMON CHANNEL SIGNALING 7 (CCS7) 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



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 — COMMON CHANNEL SIGNALING 7 (CCS7) NODE

[19] At MCRT, enter:

RST:LNa b;**UCL!**

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

AND

[21] Was node hv value changed

No

Yes

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

[22] Copy incore equipment configuration data base (ECD) to disk [DLP-554]

[23] Run file system audits on running file system to ensure no file system errors [DLP-555]

[24] Update backup data base [DLP-556]

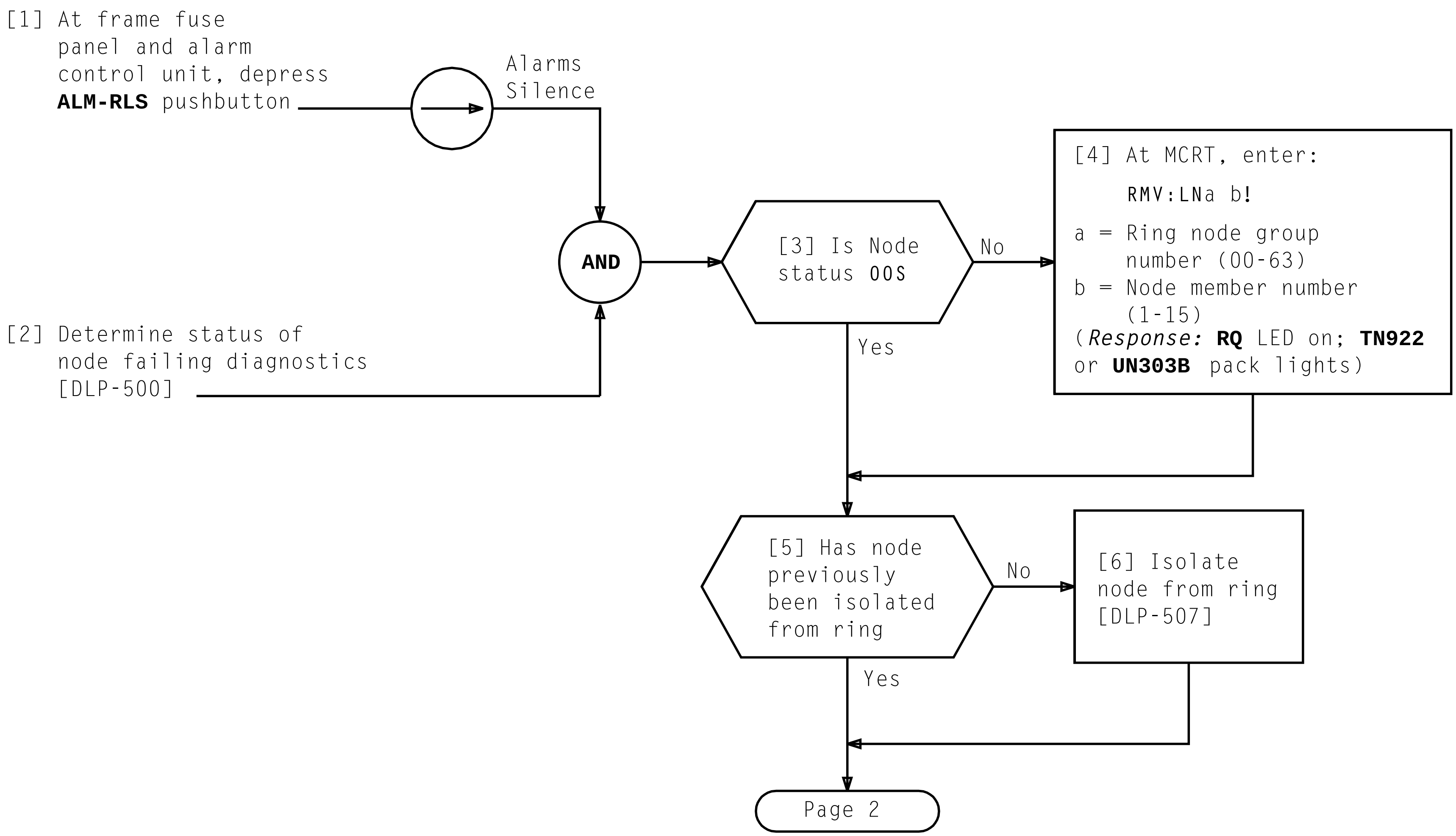
AND

[25] Run file system audits on backup file system to ensure no file system errors [DLP-569]

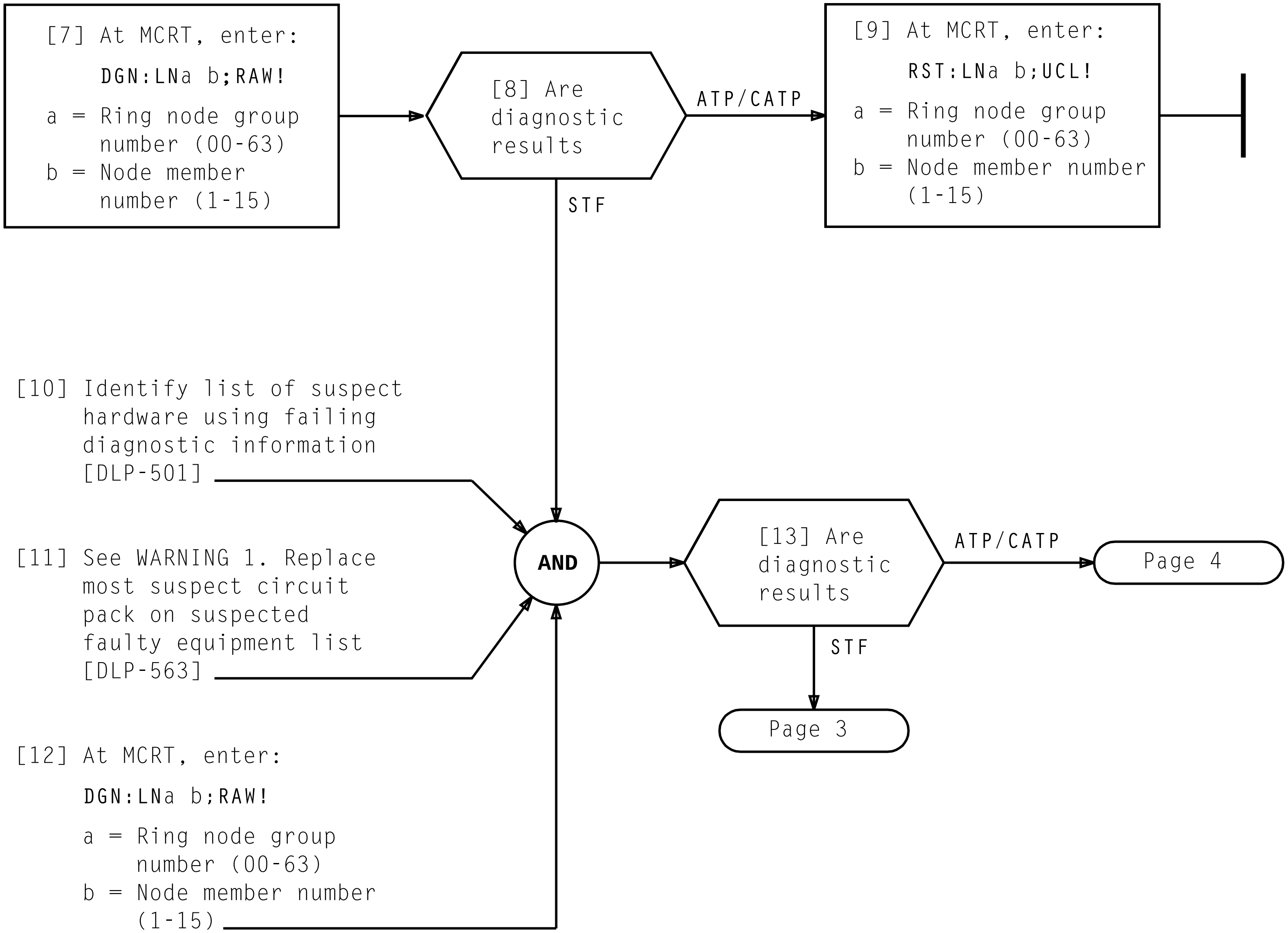
[26] Write 3B Computer backup RTO and DB tapes [DLP-557]

[27] Verify backup tapes [DLP-560]

CLEAR DIAGNOSTIC FAILURE BY ANALYZING RAW DATA AND REPLACING SUSPECT PACKS — COMMON CHANNEL SIGNALING 7 (CCS7) NODE

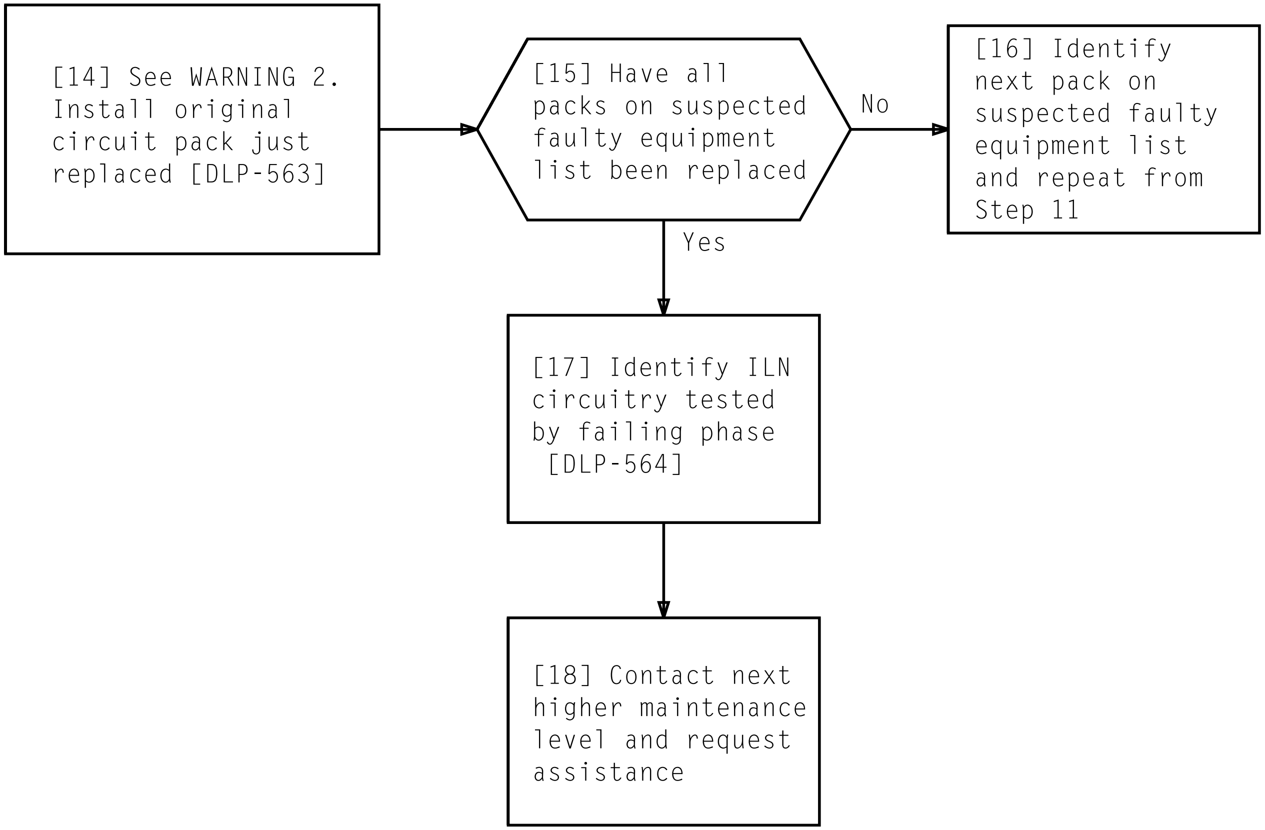


CLEAR DIAGNOSTIC FAILURE BY ANALYZING RAW DATA AND REPLACING SUSPECT PACKS — INTERNATIONAL LINK NODE (ILN)



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 — INTERNATIONAL LINK NODE (ILN)



WARNING 2
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CLEAR DIAGNOSTIC FAILURE BY ANALYZING RAW DATA AND REPLACING SUSPECT PACKS —INTERNATIONAL LINK NODE (ILN)

[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]

AND

[21] Was node hv value changed

No

Yes

[22] Copy incore equipment configuration data base (ECD) to disk [DLP-554]

[23] Run file system audits on running file system to ensure no file system errors [DLP-555]

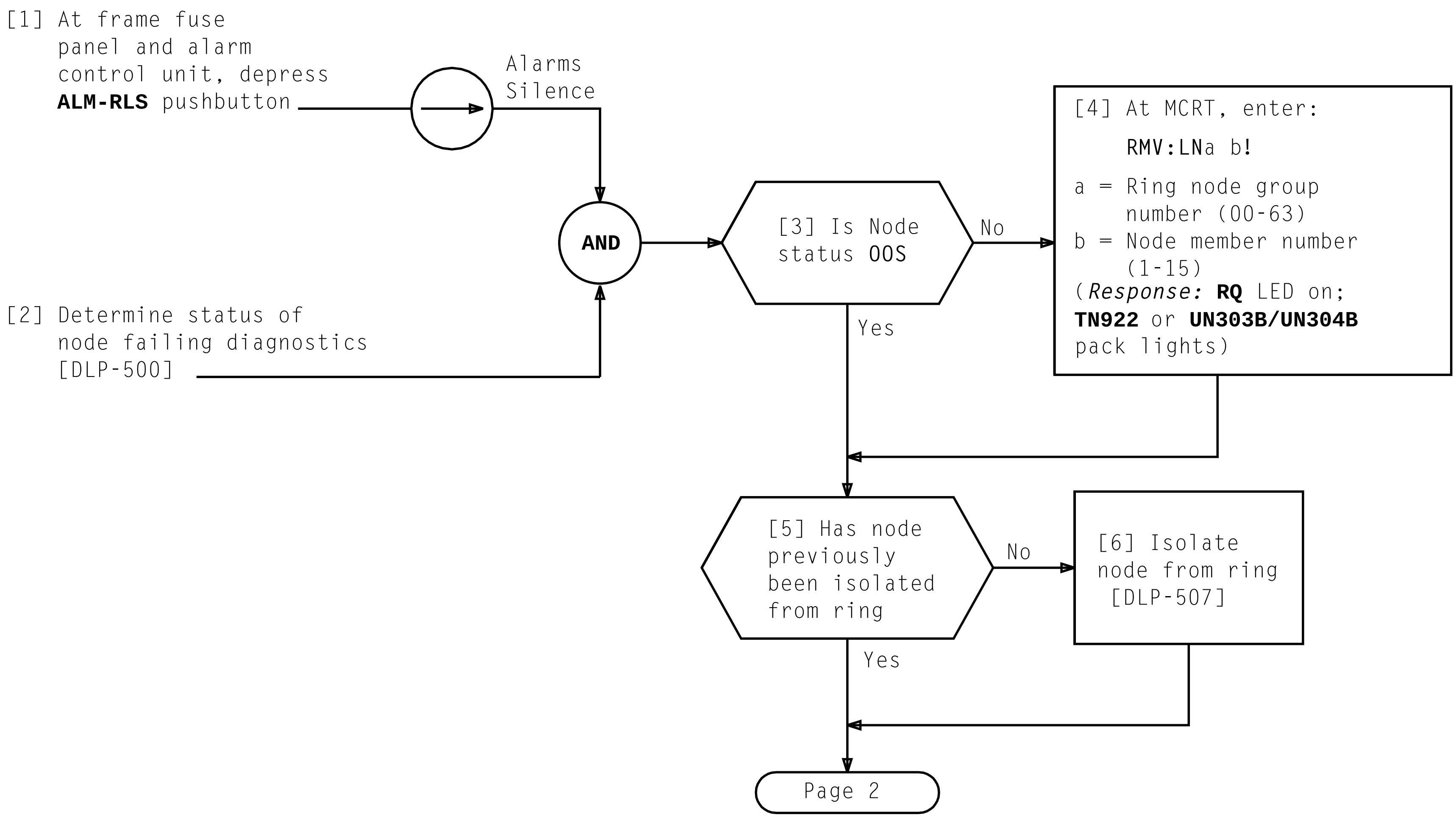
[24] Update backup data base [DLP-556]

[25] Run file system audits on backup file system to ensure no file system errors [DLP-569]

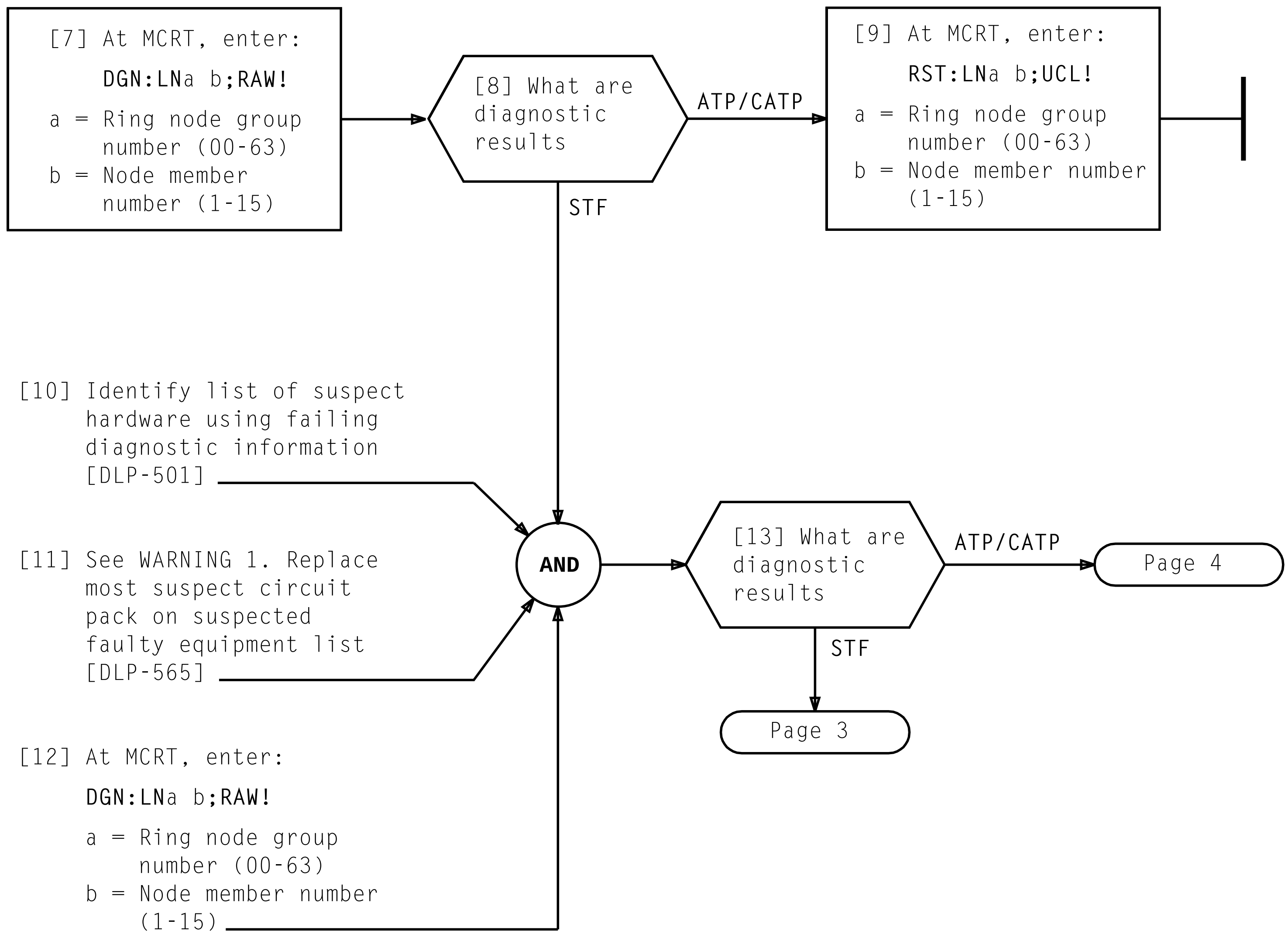
[26] Write 3B Computer backup RTO and DB tapes [DLP-557]

[27] Verify backup tapes [DLP-560]

AND

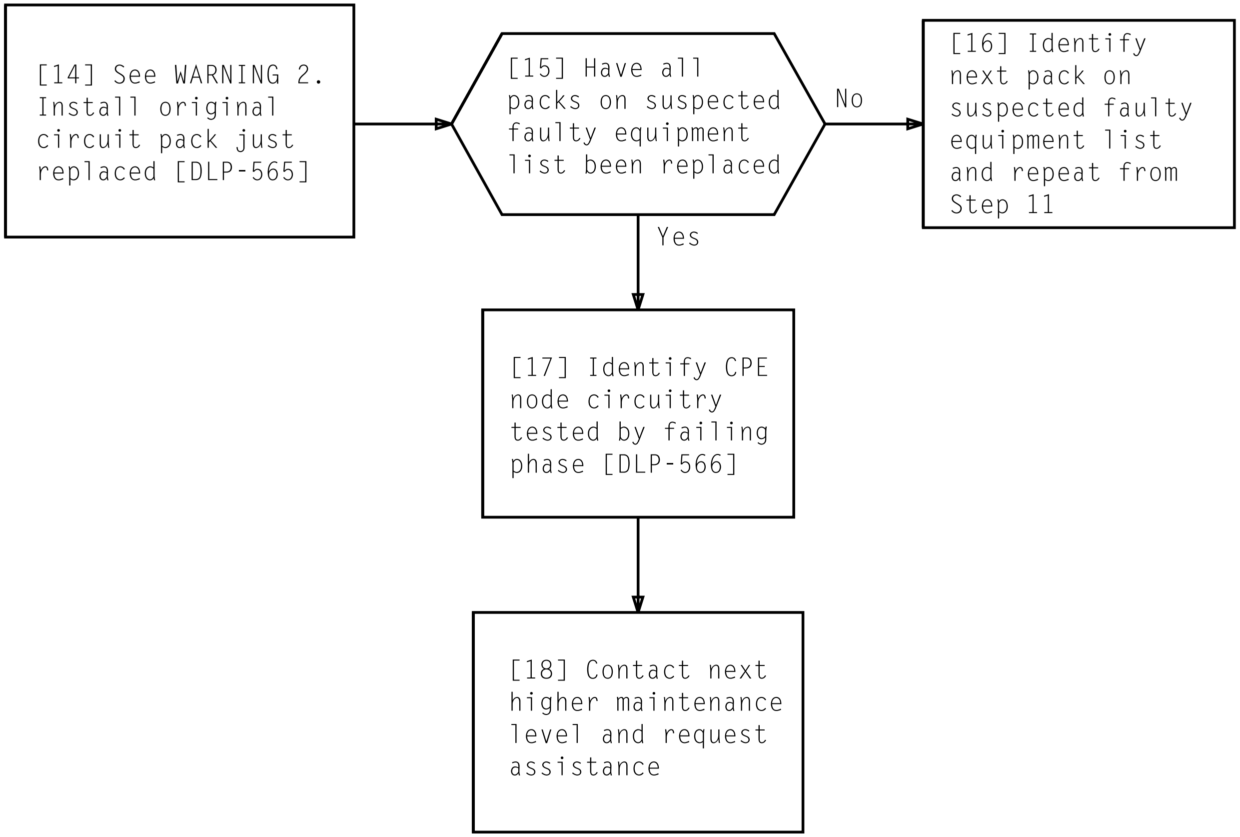


CLEAR DIAGNOSTIC FAILURE BY ANALYZING RAW DATA AND REPLACING SUSPECT PACKS — CUSTOMER PREMISE EQUIPMENT (CPE) NODE



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)

AND

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

[21] Was node hv value changed

No

Yes

[22] Copy incore equipment configuration data base (ECD) to disk [DLP-554]

[23] Run file system audits on running file system to ensure no file system errors [DLP-555]

[24] Update backup data base [DLP-556]

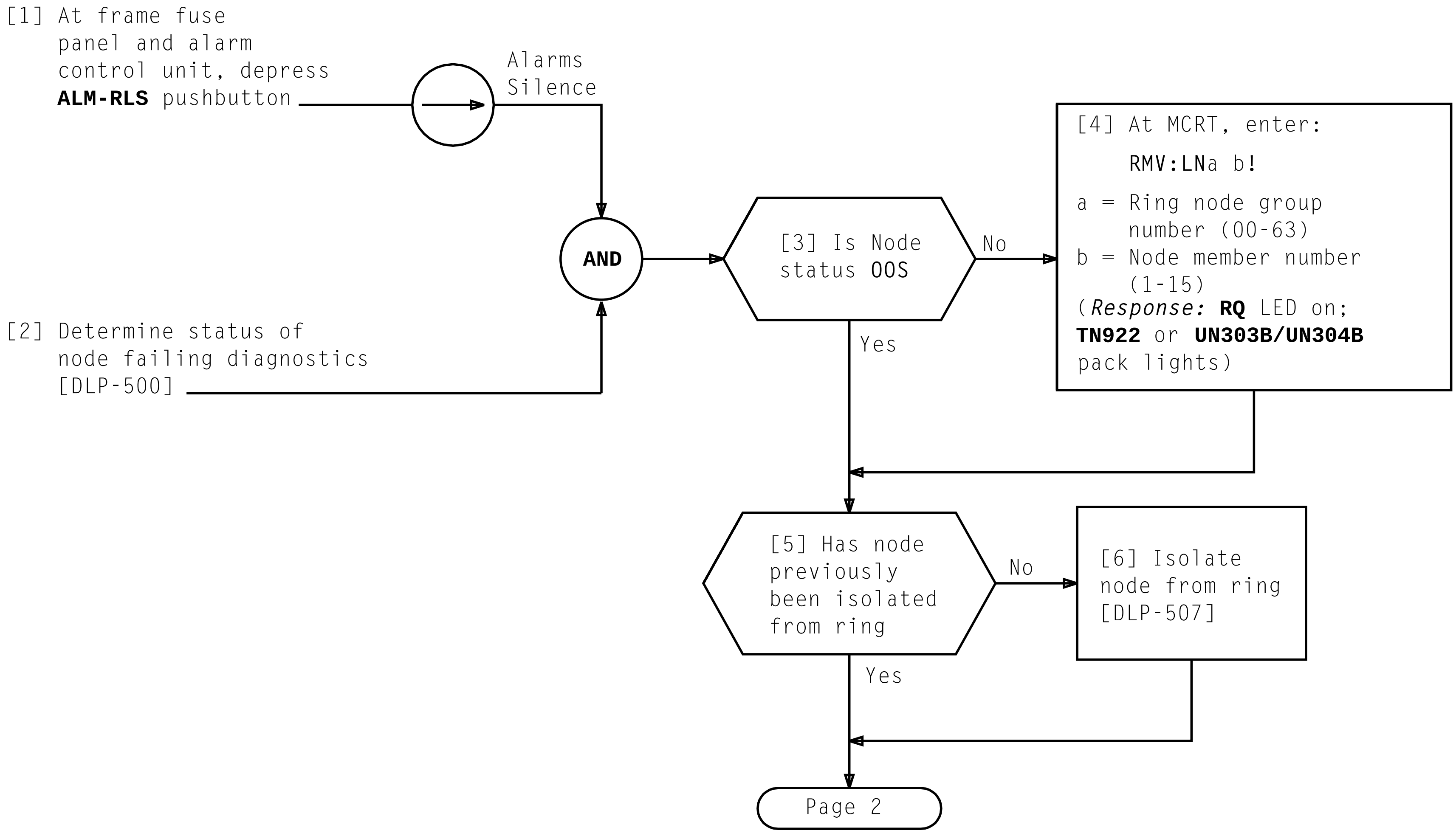
AND

[25] Run file system audits on backup file system to ensure no file system errors [DLP-569]

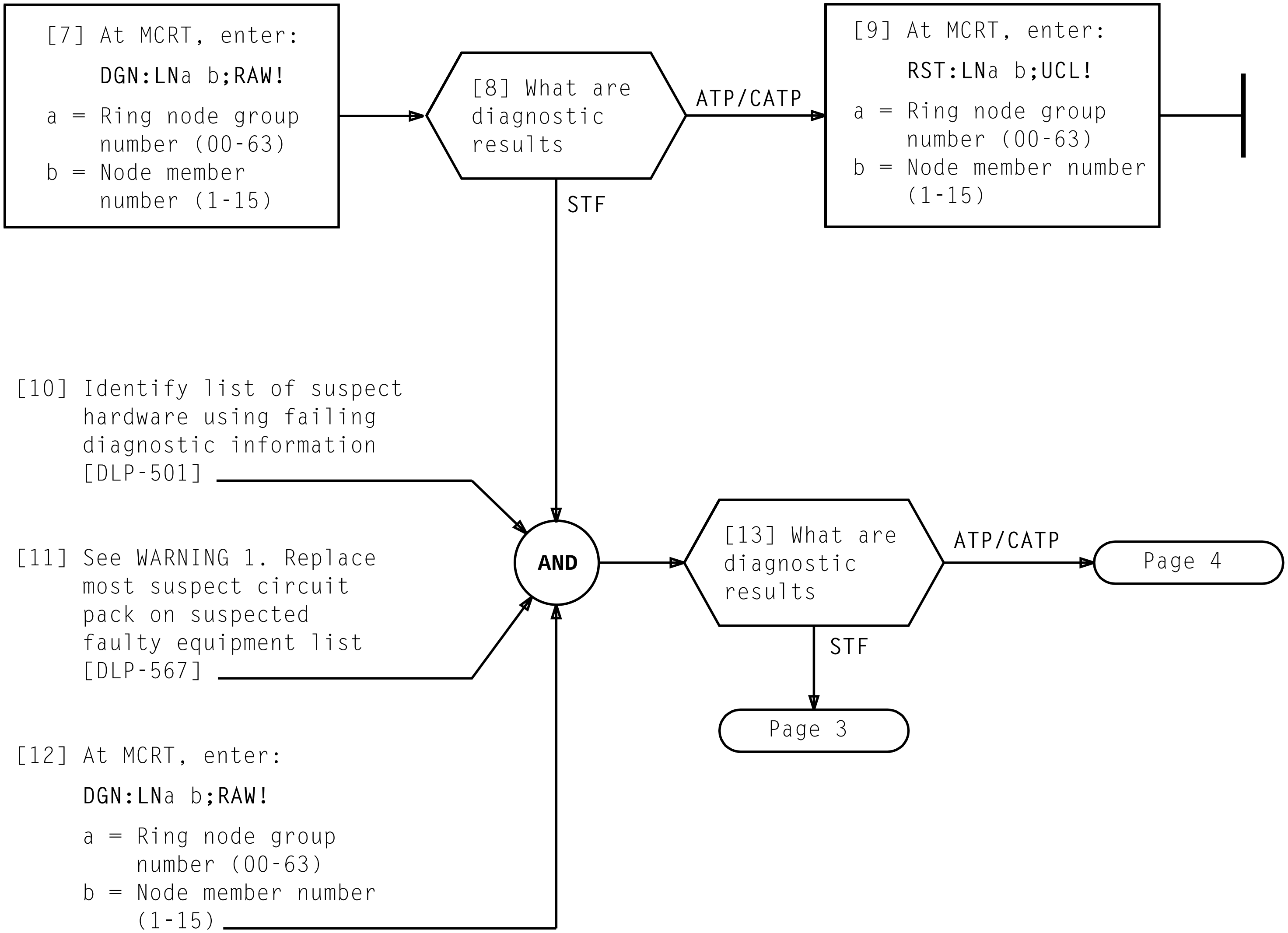
[26] Write 3B Computer backup RTO and DB tapes [DLP-557]

[27] Verify backup tapes [DLP-560]

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

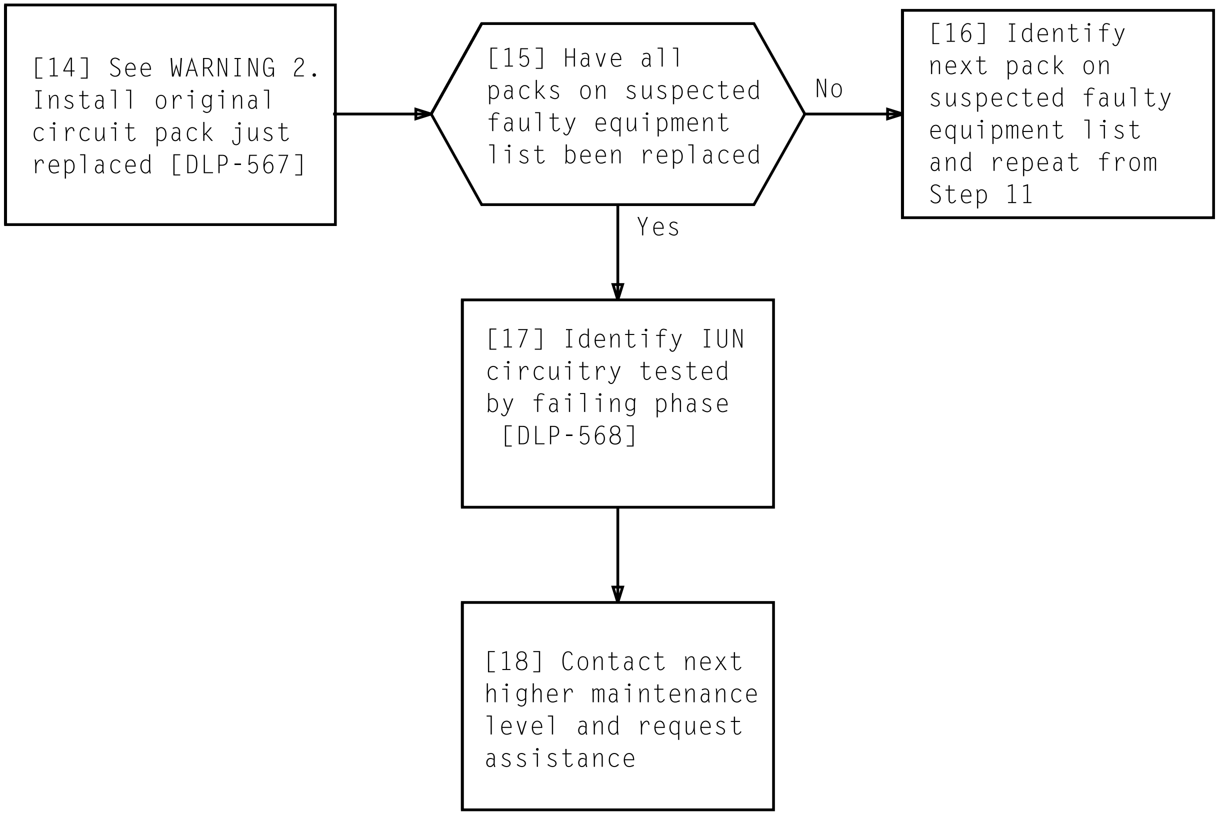


CLEAR DIAGNOSTIC FAILURE BY ANALYZING RAW DATA AND REPLACING SUSPECT PACKS — IMS USER NODE (IUN)



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 — IMS USER NODE (IUN)



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 — IMS USER NODE (IUN)

[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]

AND

[21] Was node hv value changed

No

Yes

[22] Copy incore equipment configuration data base (ECD) to disk [DLP-554]

[23] Run file system audits on running file system to ensure no file system errors [DLP-555]

[24] Update backup data base [DLP-556]

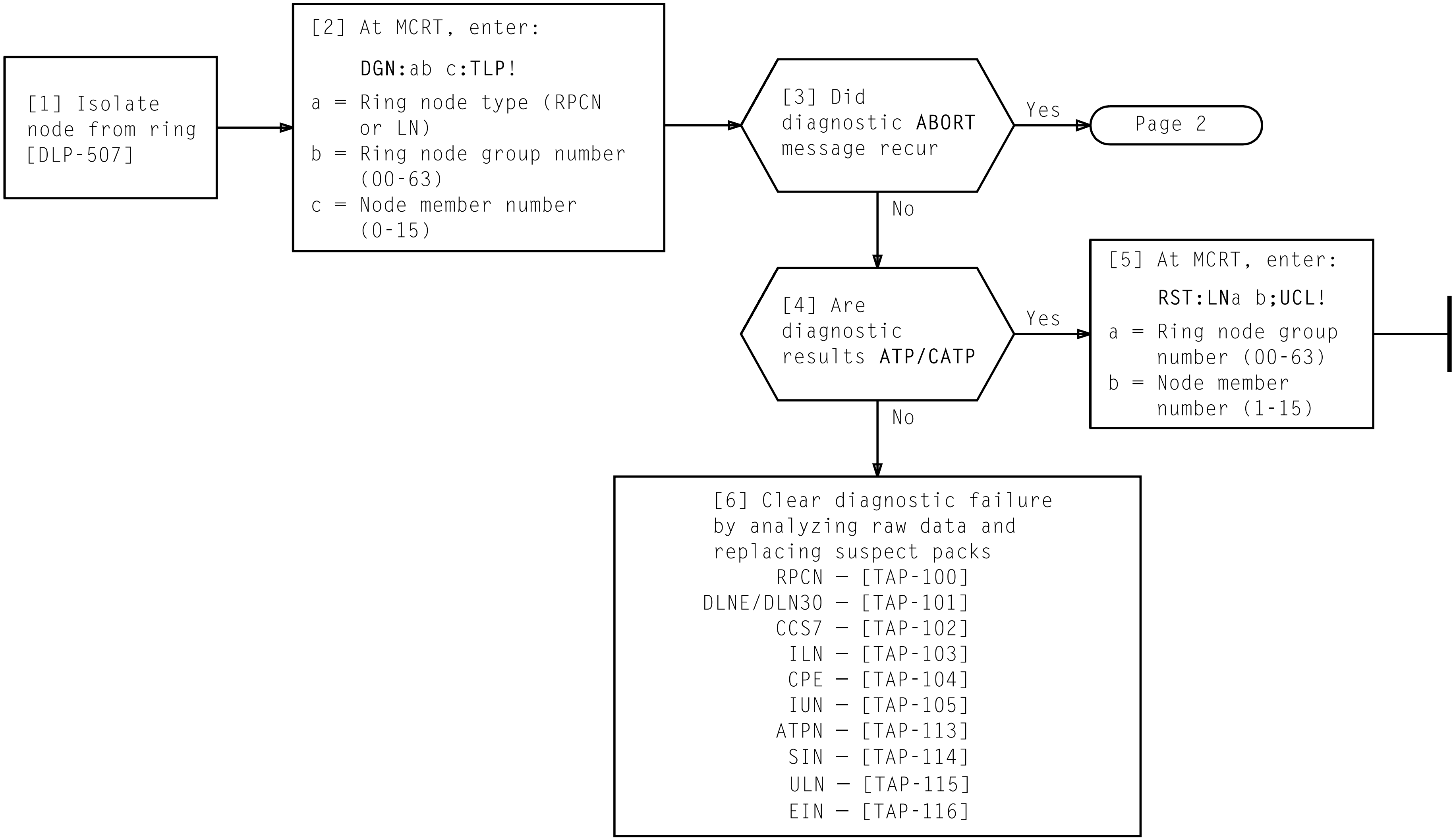
[25] Run file system audits on backup file system to ensure no file system errors [DLP-569]

[26] Write 3B Computer backup RTO and DB tapes [DLP-557]

[27] Verify backup tapes [DLP-560]

AND

CLEAR DIAGNOSTIC FAILURE BY ANALYZING RAW DATA AND REPLACING SUSPECT PACKS — IMS USER NODE (IUN)



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

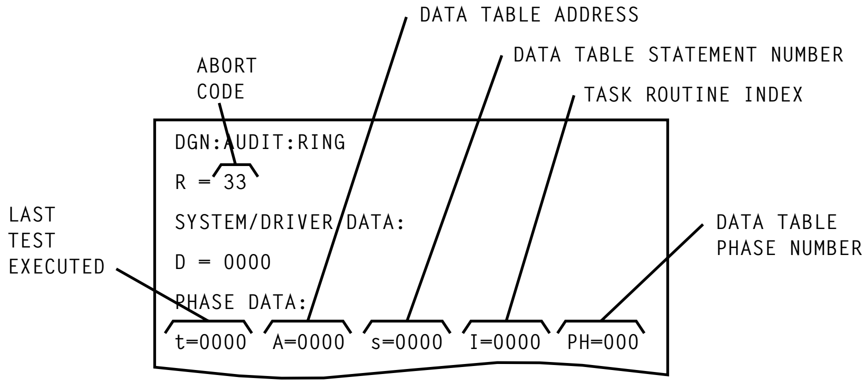


Figure 1 — Example Printout of Diagnostic Abort Message

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

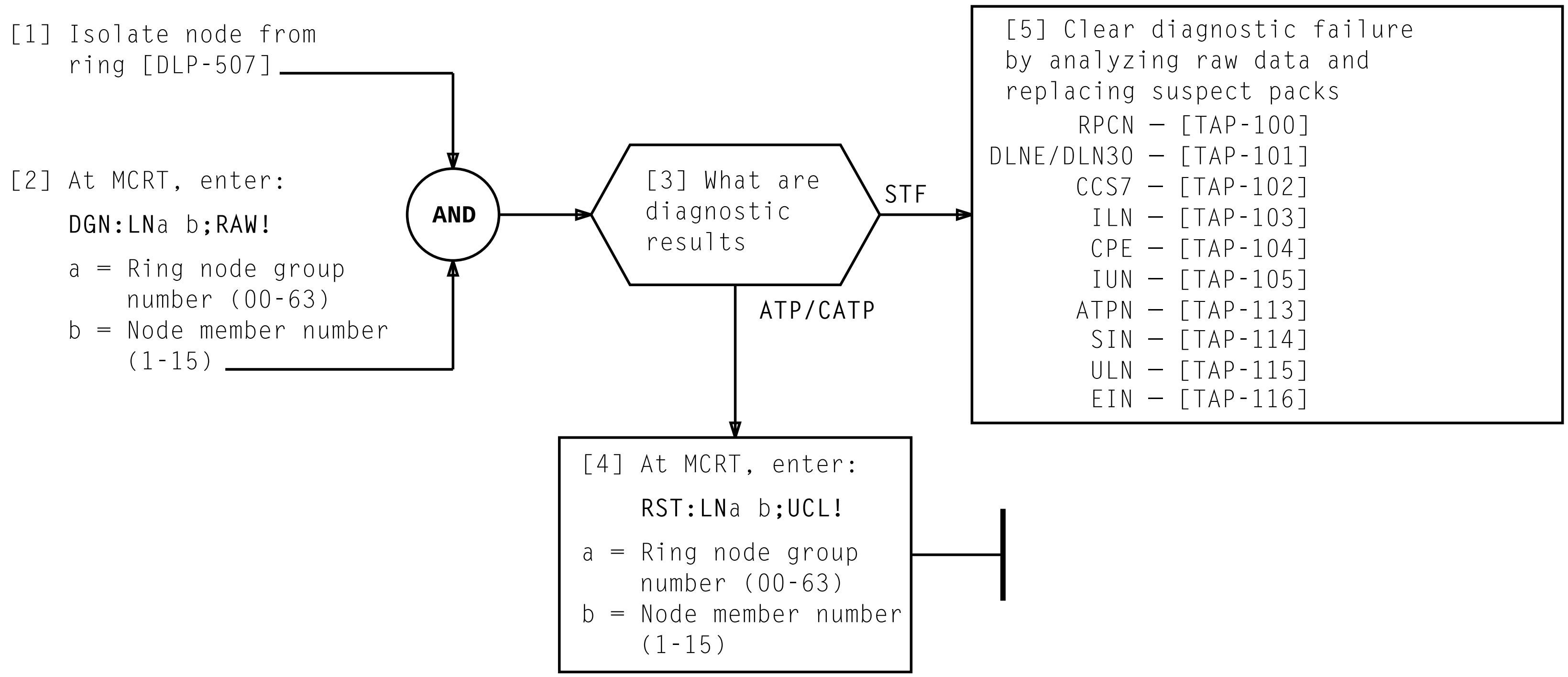
CODE	CODE DEFINITION
47-50	Not used
51	Message type not recognized
52	Cannot find process in process tables
53	Library file does not exist
54	All process slots in use (pstart fail)
55	Insufficient memory for kernel
56	All sides are allocated or there is no swap space left
57	Unable to read a pfile or 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

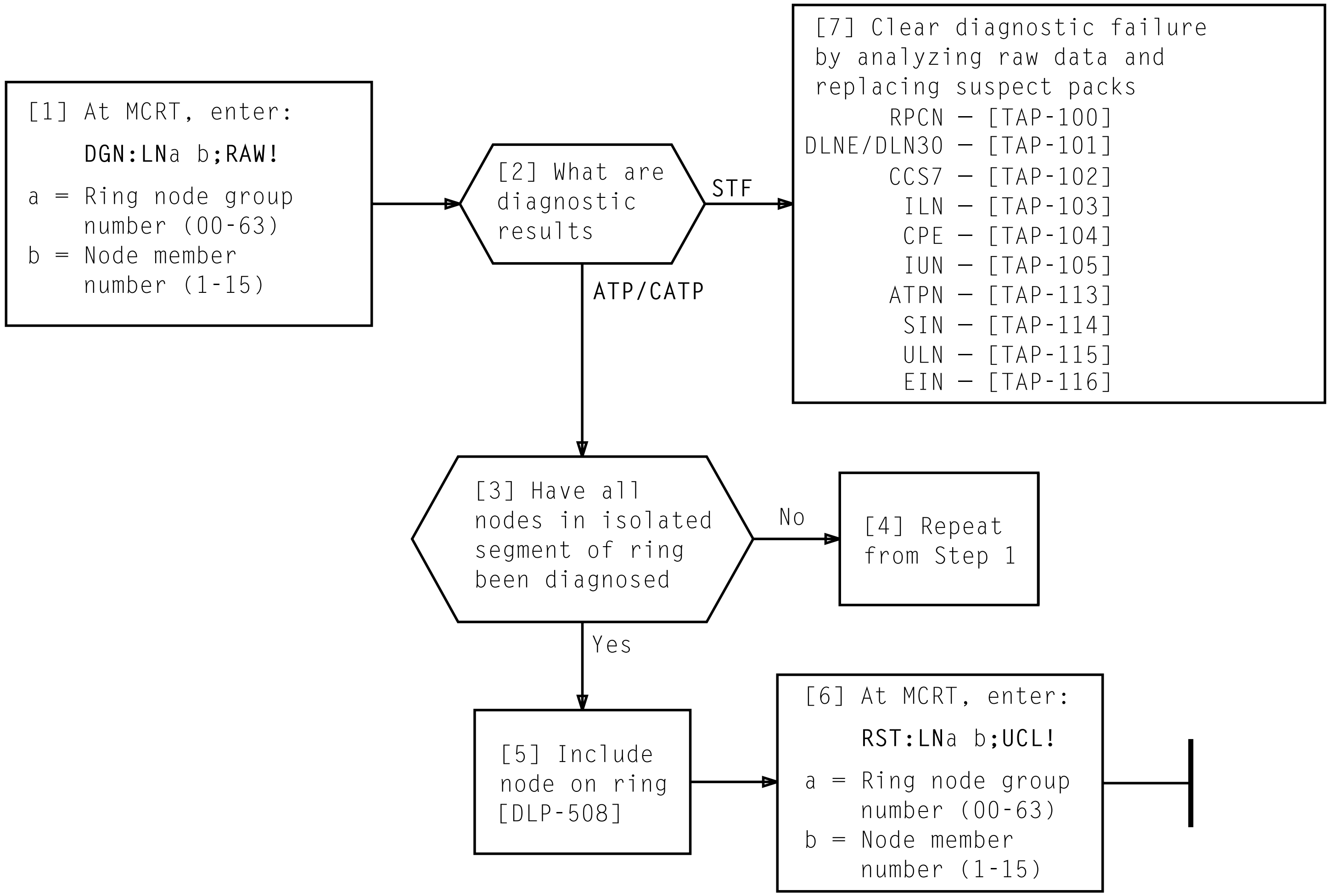
TABLE B (Contd) SYSTEM ERROR CODES			
CODE	**CODE DEFINITION**	**CODE**	**CODE DEFINITION**
82*	FLTRCV: CONFIG fail return PMGR: The fork request failed pcreate - super	96	Unequipped Unit Control Block specified or accessed
		97	Not a top Unit Control Block
83*	FLTRCV: Processor not duplexed PMGR: Can't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

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

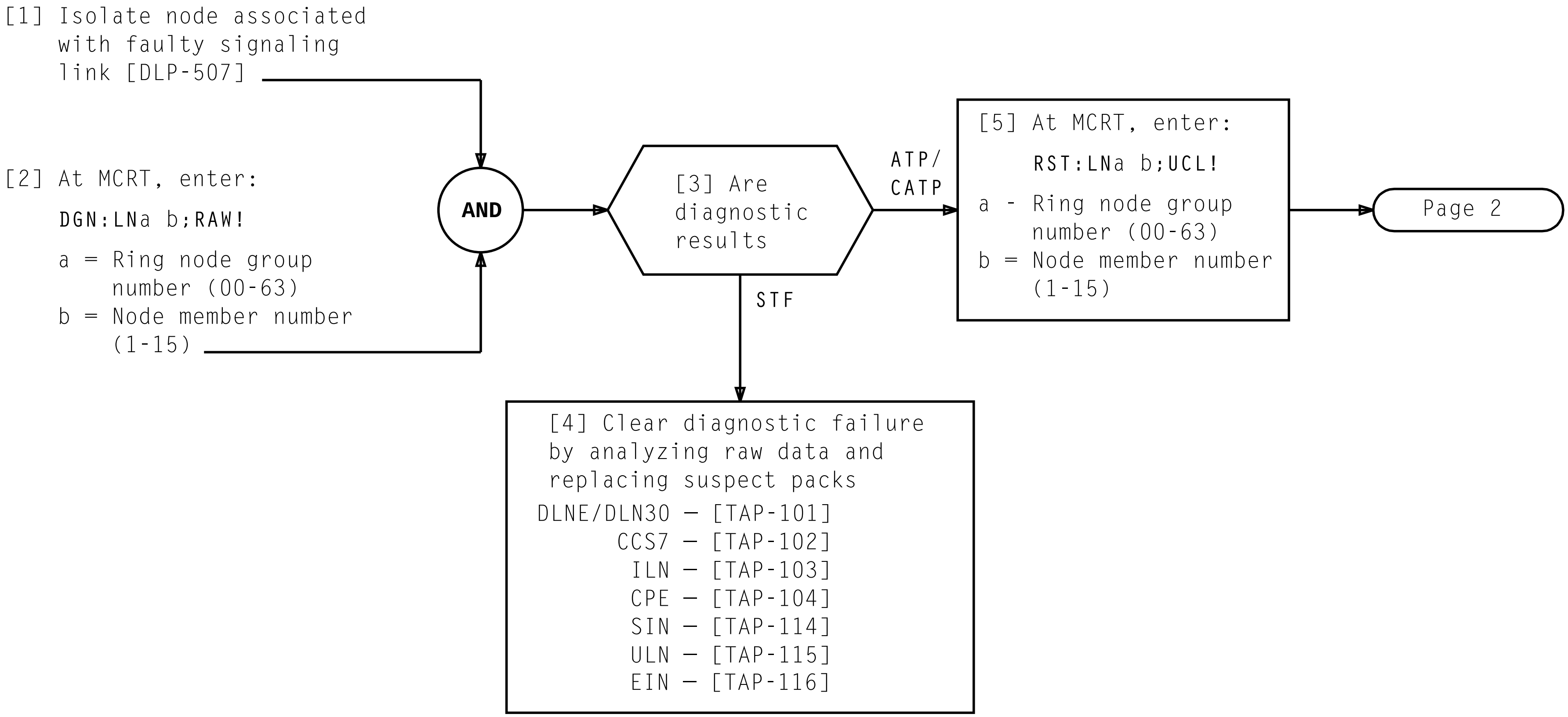
TABLE C IMSDRV DIAGNOSTIC ERROR CODES	
CODE	**CODE DEFINITION**
1	Failed to attach interrupt
2	Failed to detach interrupt
3	Failed to get dma address (getdma failed)
4	Wrong sequence
5	Wrong opercode
6	Wrong node address
7	Driver not open for diagnostics
8	Failed to open since init is in progress
9	Failed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



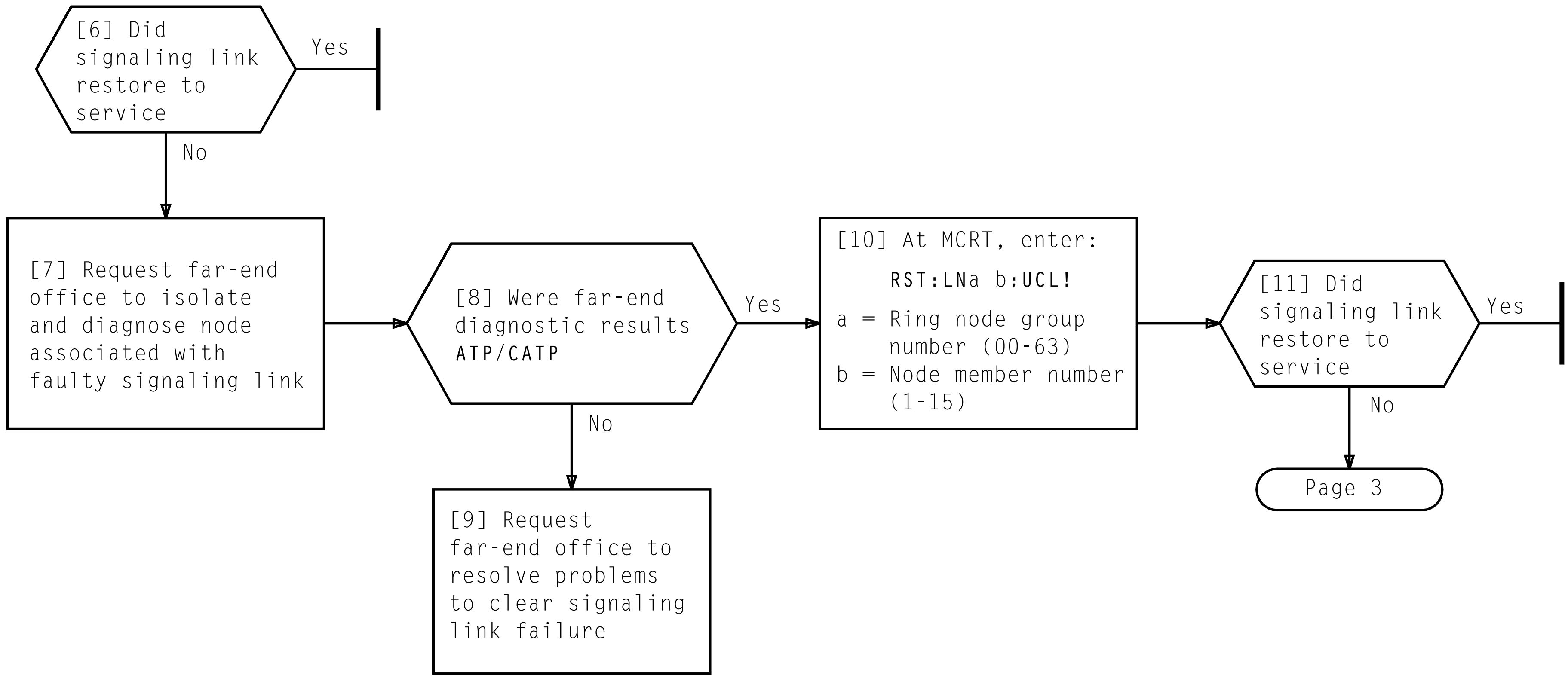
CLEAR NODE (LN, DLNE/DLN30, OR RPCN) HARDWARE FAULT



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]

AND

Page 4

TABLE A

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

CLEAR SIGNALING LINK FAILURE

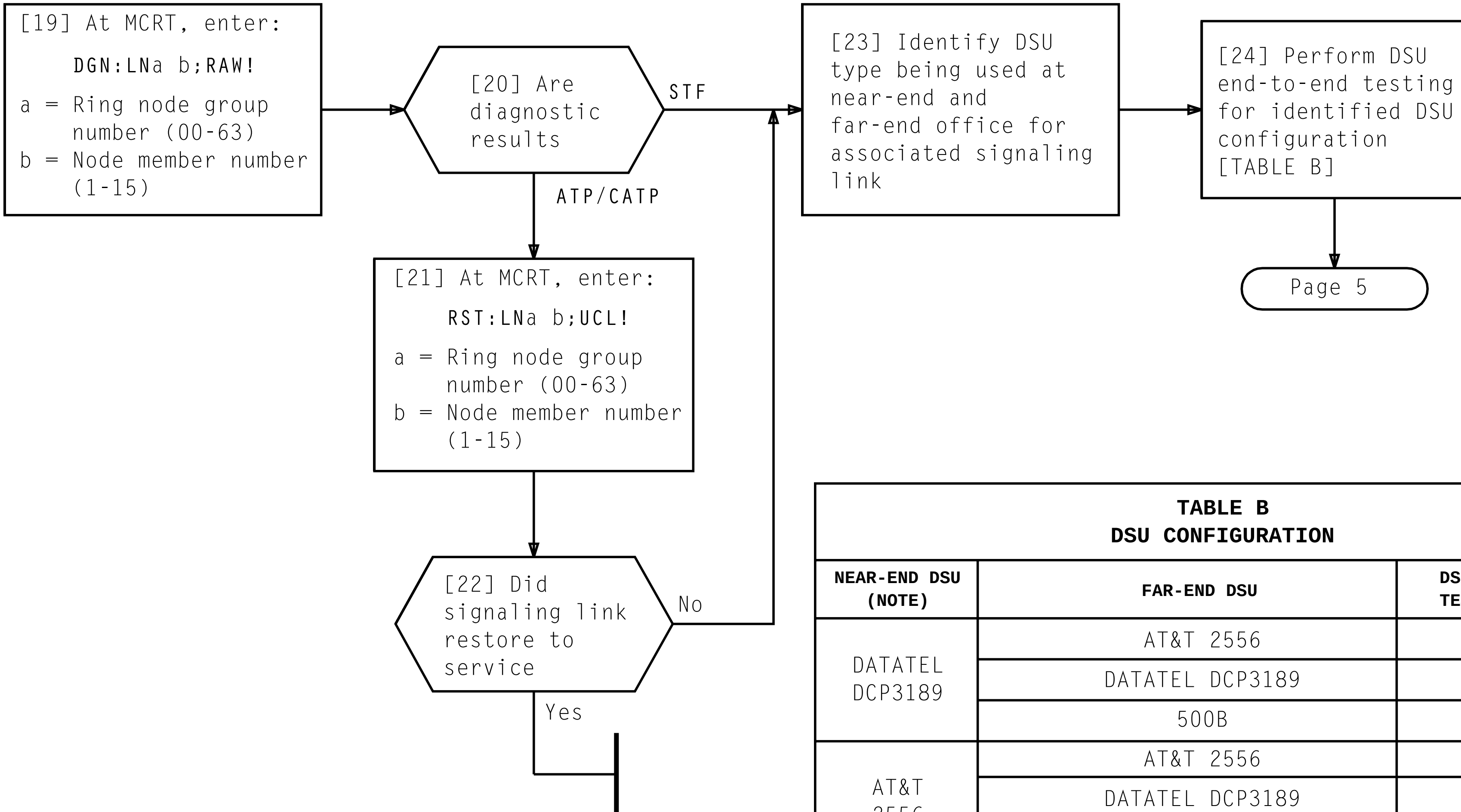
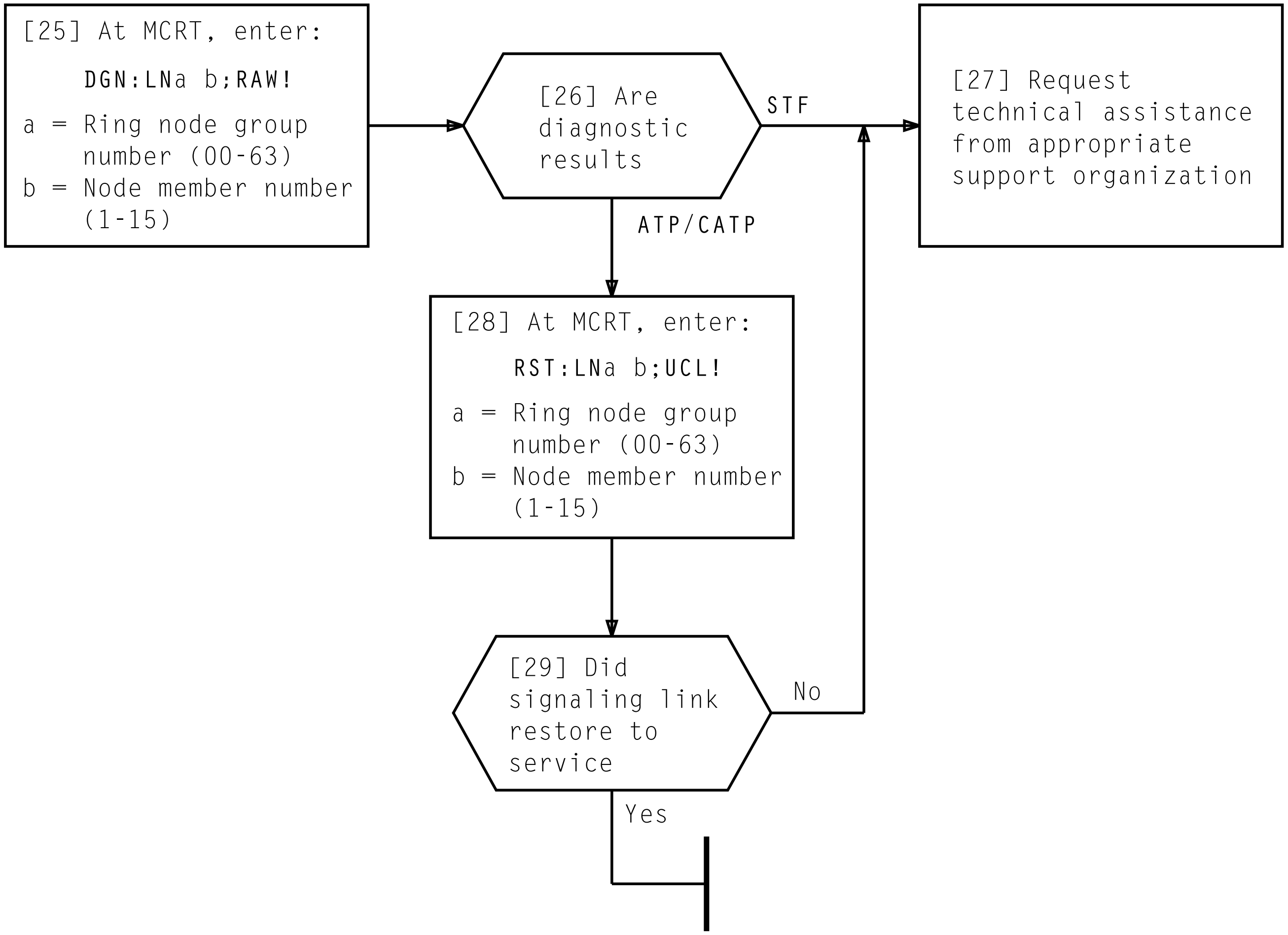


TABLE B
DSU CONFIGURATION

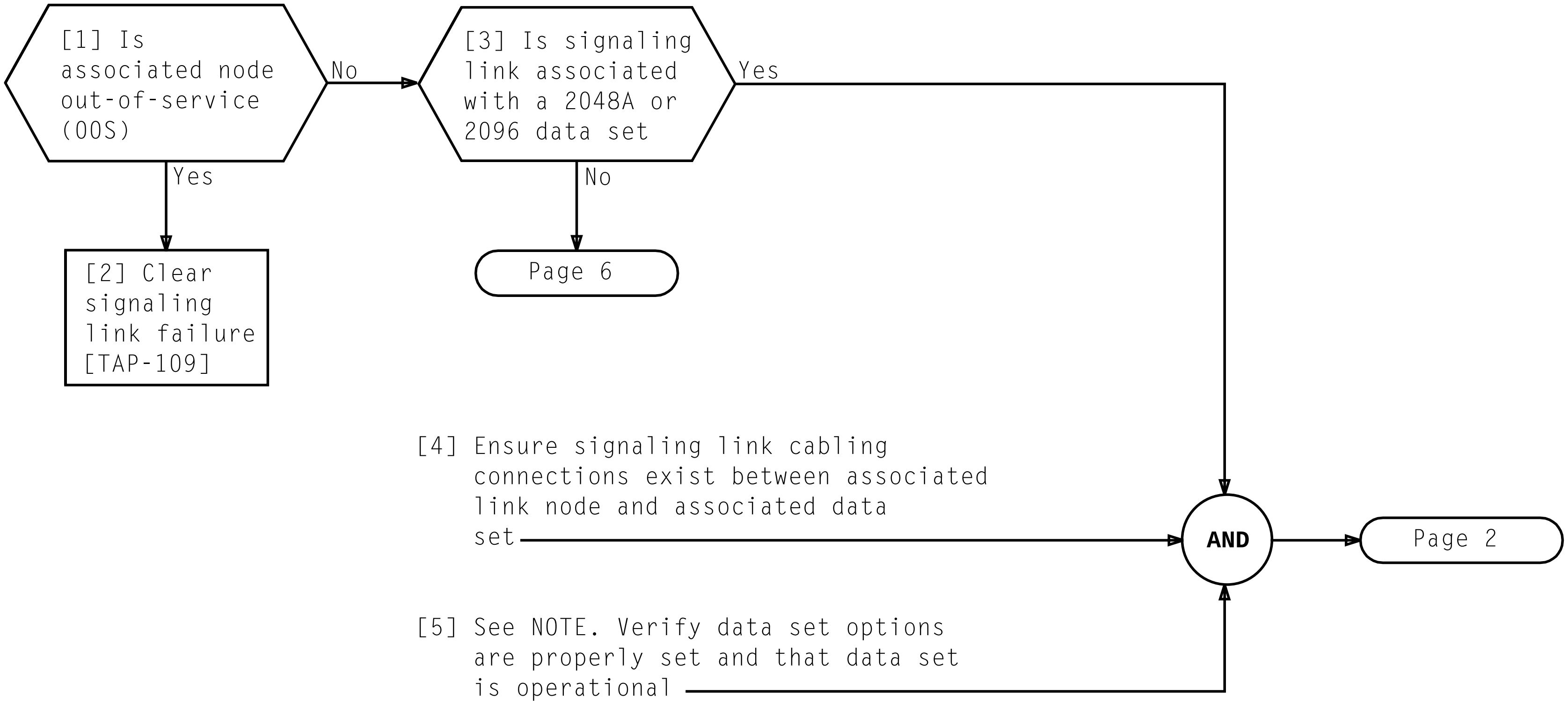
NEAR-END DSU (NOTE)	FAR-END DSU	DSU END-TO-END TEST PROCEDURE
DATATEL DCP3189	AT&T 2556	[DLP-531]
	DATATEL DCP3189	[DLP-532]
	500B	[DLP-533]
AT&T 2556	AT&T 2556	[DLP-534]
	DATATEL DCP3189	[DLP-535]
	500B	[DLP-536]

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

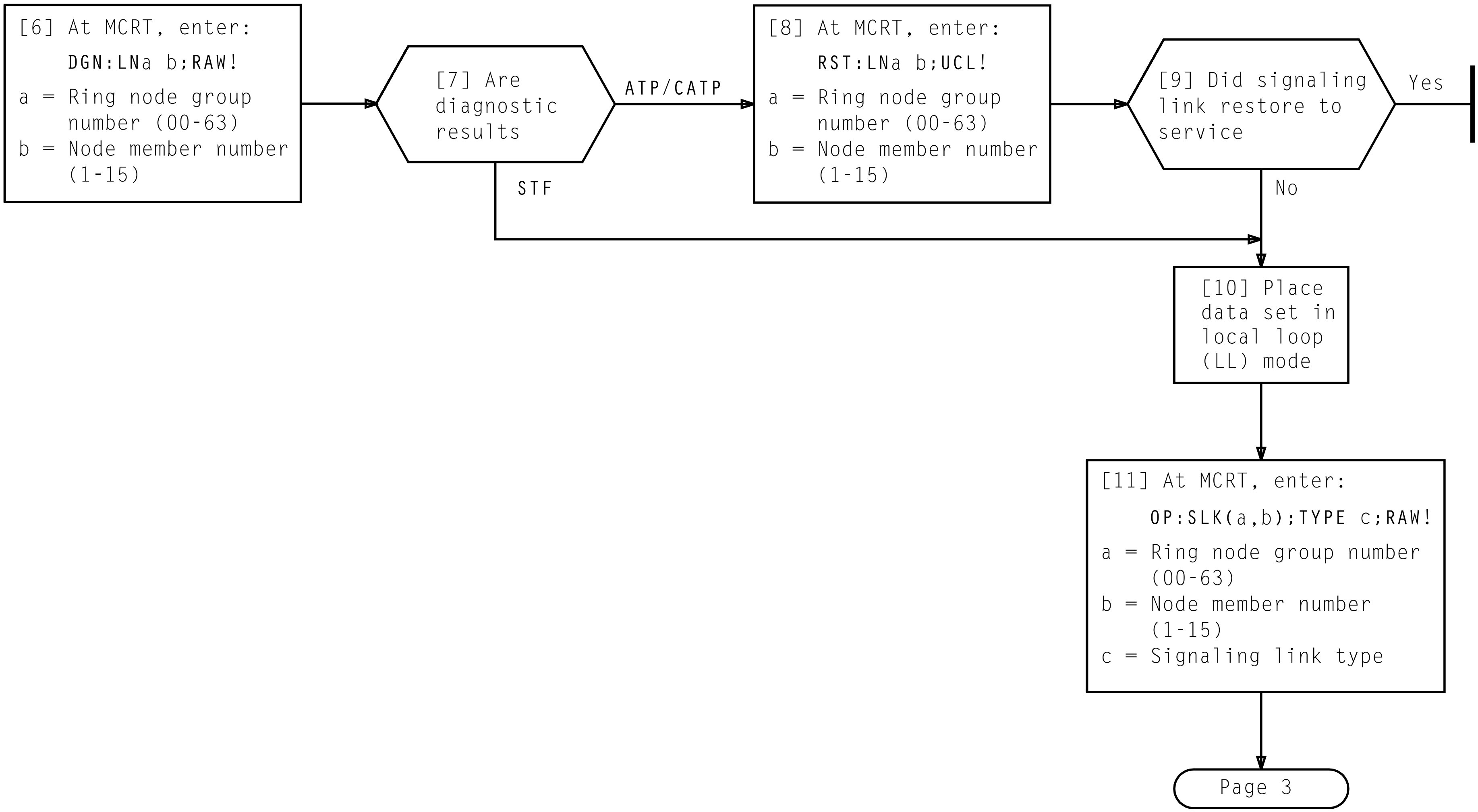


CLEAR SIGNALING LINK FAILURE

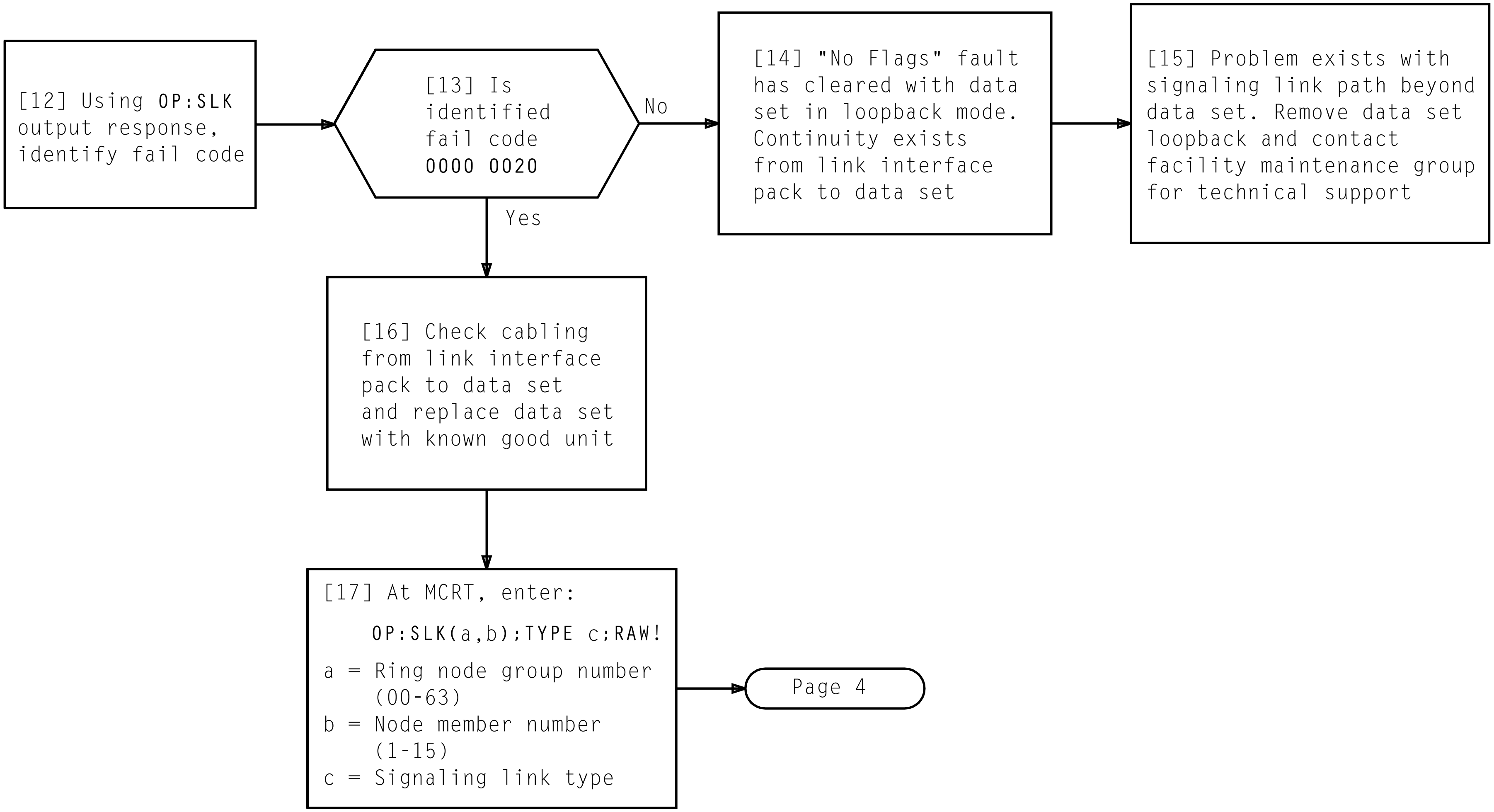


NOTE
AT&T practices 592-040-120 and 592-040-520 provides information for checking data set operations and verifying applicable option settings

CLEAR SIGNALING LINK "NO FLAGS" FAULT



CLEAR SIGNALING LINK "NO FLAGS" FAULT



CLEAR SIGNALING LINK "NO FLAGS" FAULT

[18] Using **OP:SLK** output response, identify fail code

[19] Is identified fail code **0000 0020**

Yes → [21]

No → [20]

[20] "No Flags" fault has cleared

[21] Identify link interface pack associated with faulty signaling link

[22] See WARNING 1.
Replace link interface pack associated with faulty signaling link

- CCS7 node — [DLP-561]
- ILN — [DLP-563]
- CPE node — [DLP-565]
- ULN — [DLP-575]

[23] At MCRT, enter:

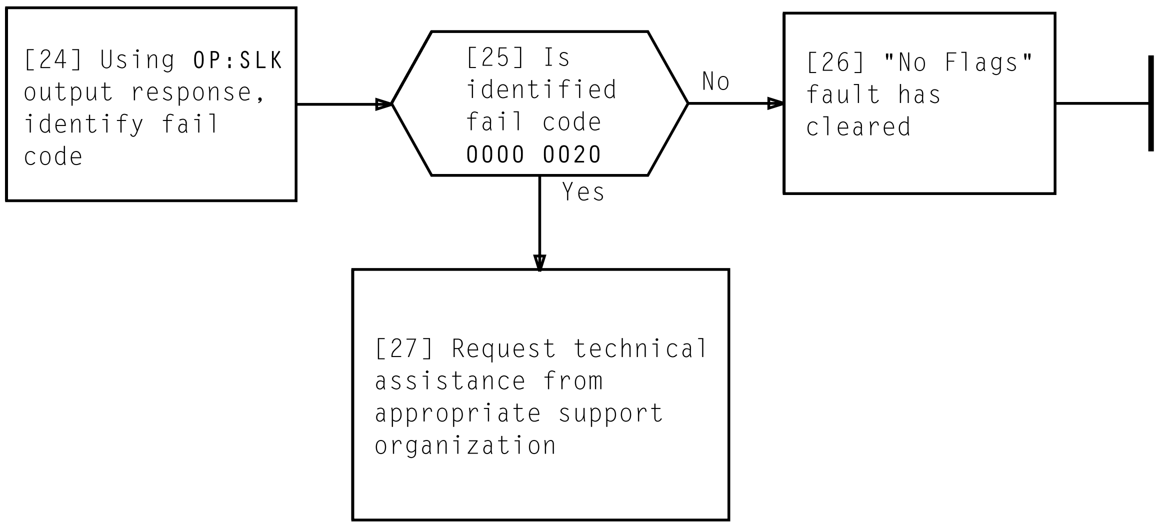
OP:SLK(a,b**);TYPE** c**;RAW!**

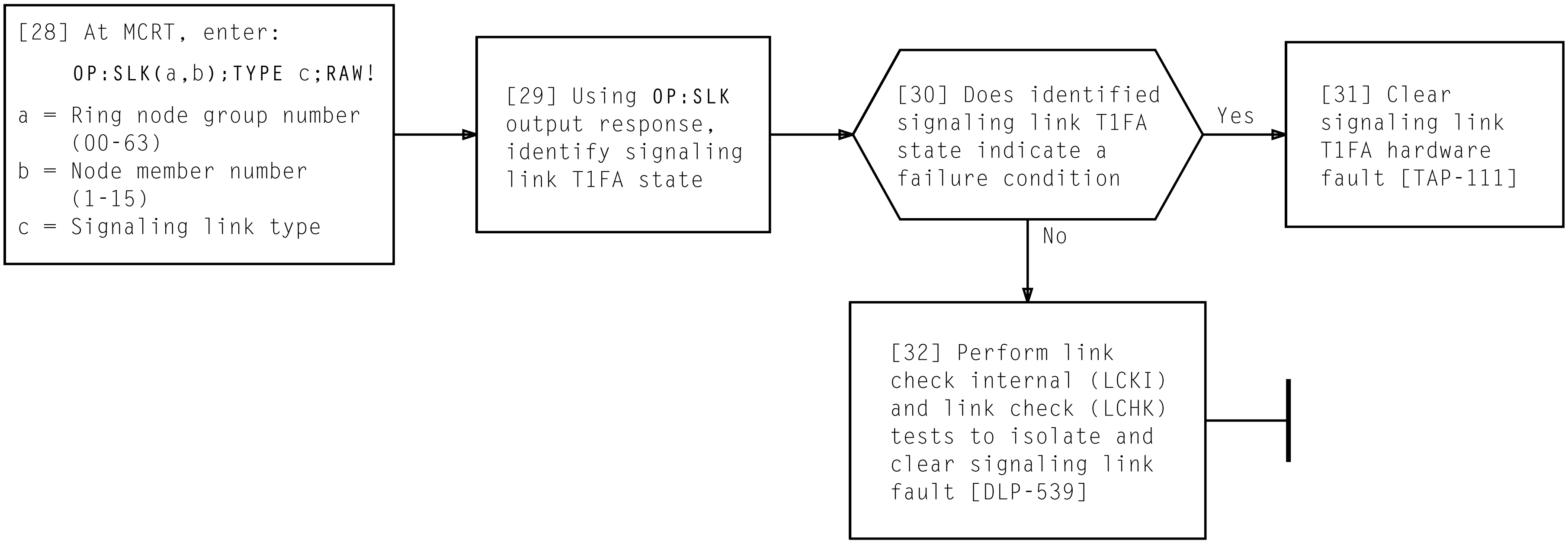
a = Ring node group number (00-63)
b = Node member number (1-15)
c = Signaling link type

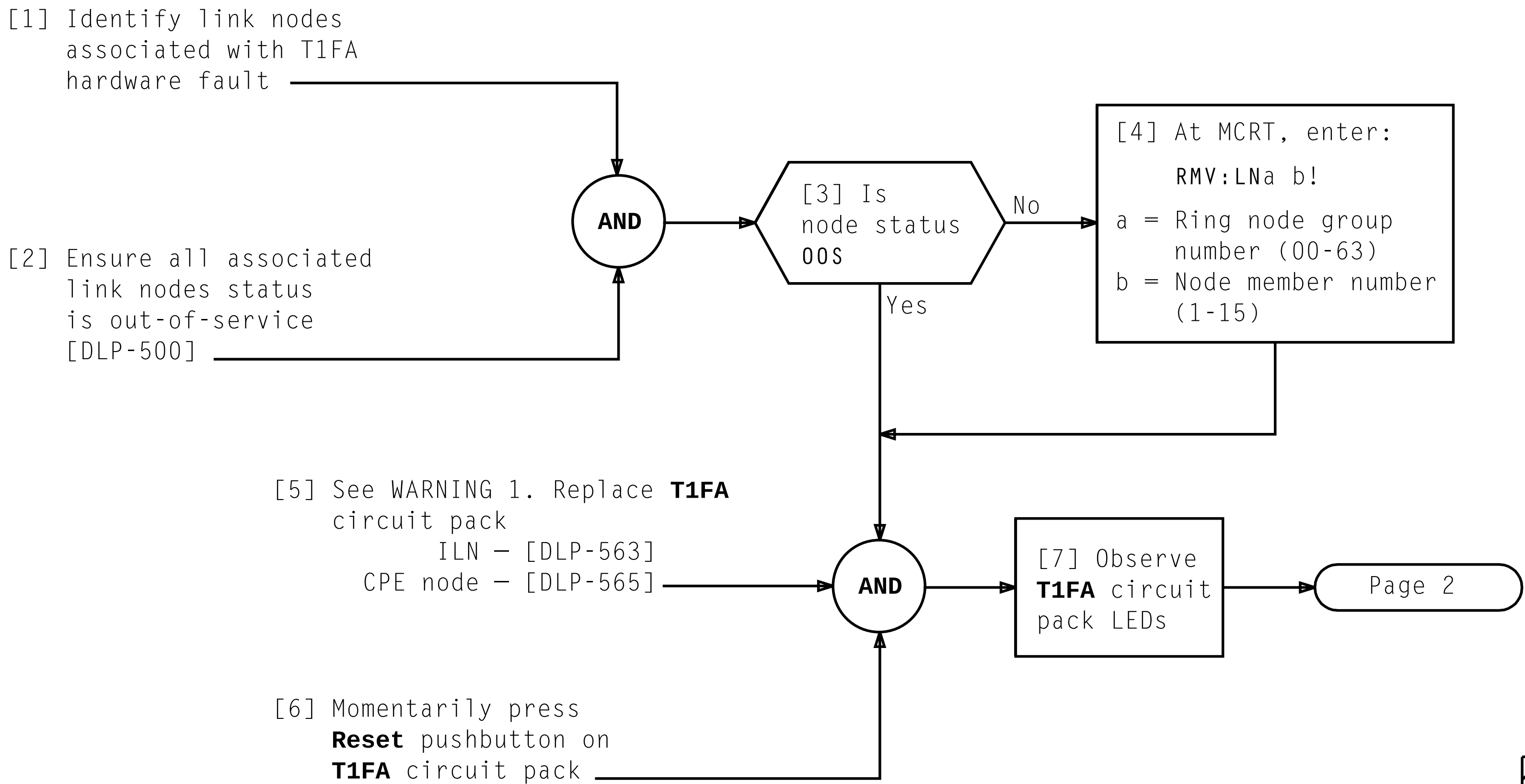
Page 5

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

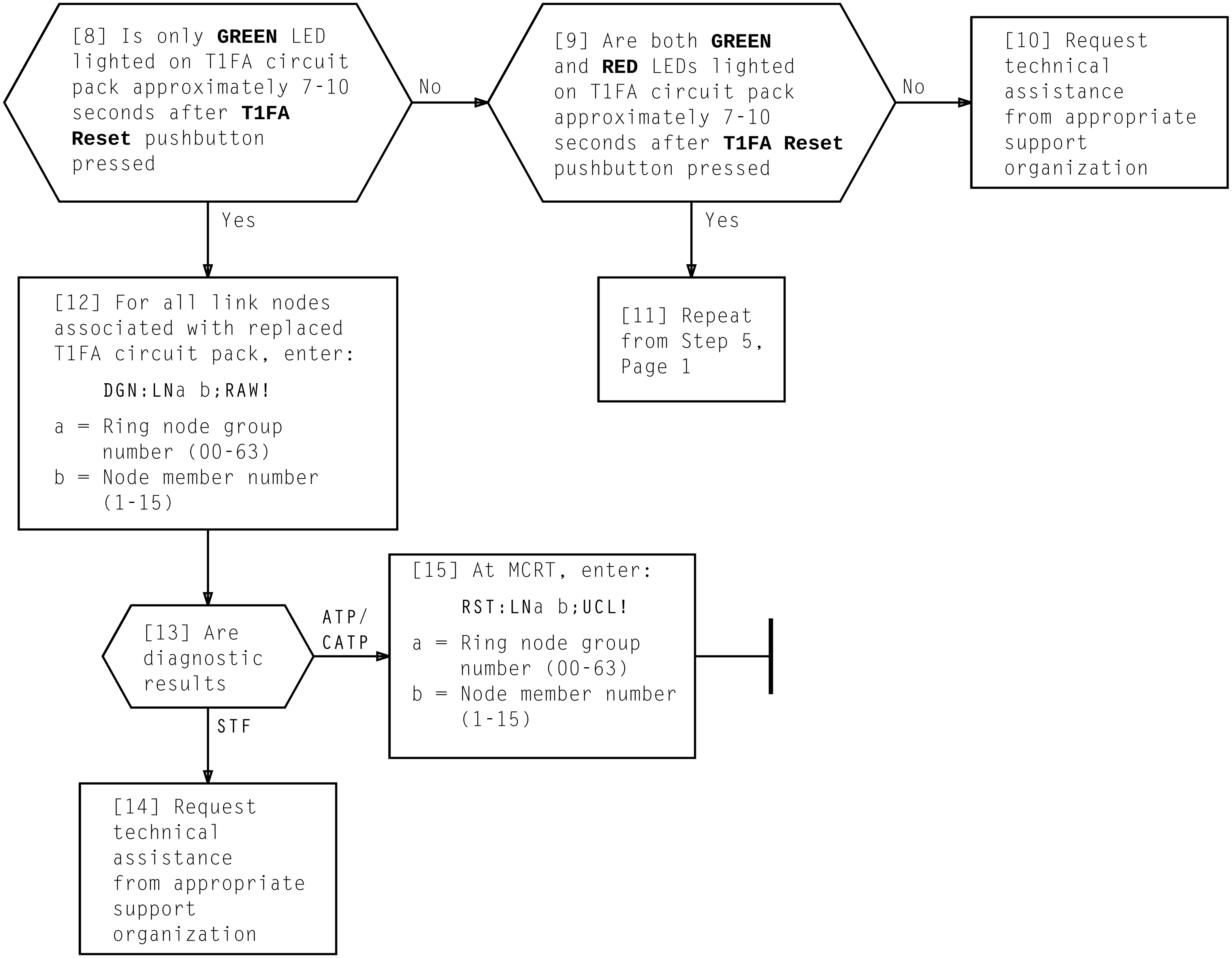

[24] Using OP:SLK output response, identify fail code
[25] Is identified fail code 0000 0020
No
Yes
[26] "No Flags" fault has cleared
[27] Request technical assistance from appropriate support organization


[28] At MCRT, enter:
OP:SLK(a,b);TYPE c;RAW!
a = Ring node group number (00-63)
b = Node member number (1-15)
c = Signaling link type
[29] Using OP:SLK output response, identify signaling link T1FA state
[30] Does identified signaling link T1FA state indicate a failure condition
Yes
[31] Clear signaling link T1FA hardware fault [TAP-111]
No
[32] Perform link check internal (LCKI) and link check (LCHK) tests to isolate and clear signaling link fault [DLP-539]

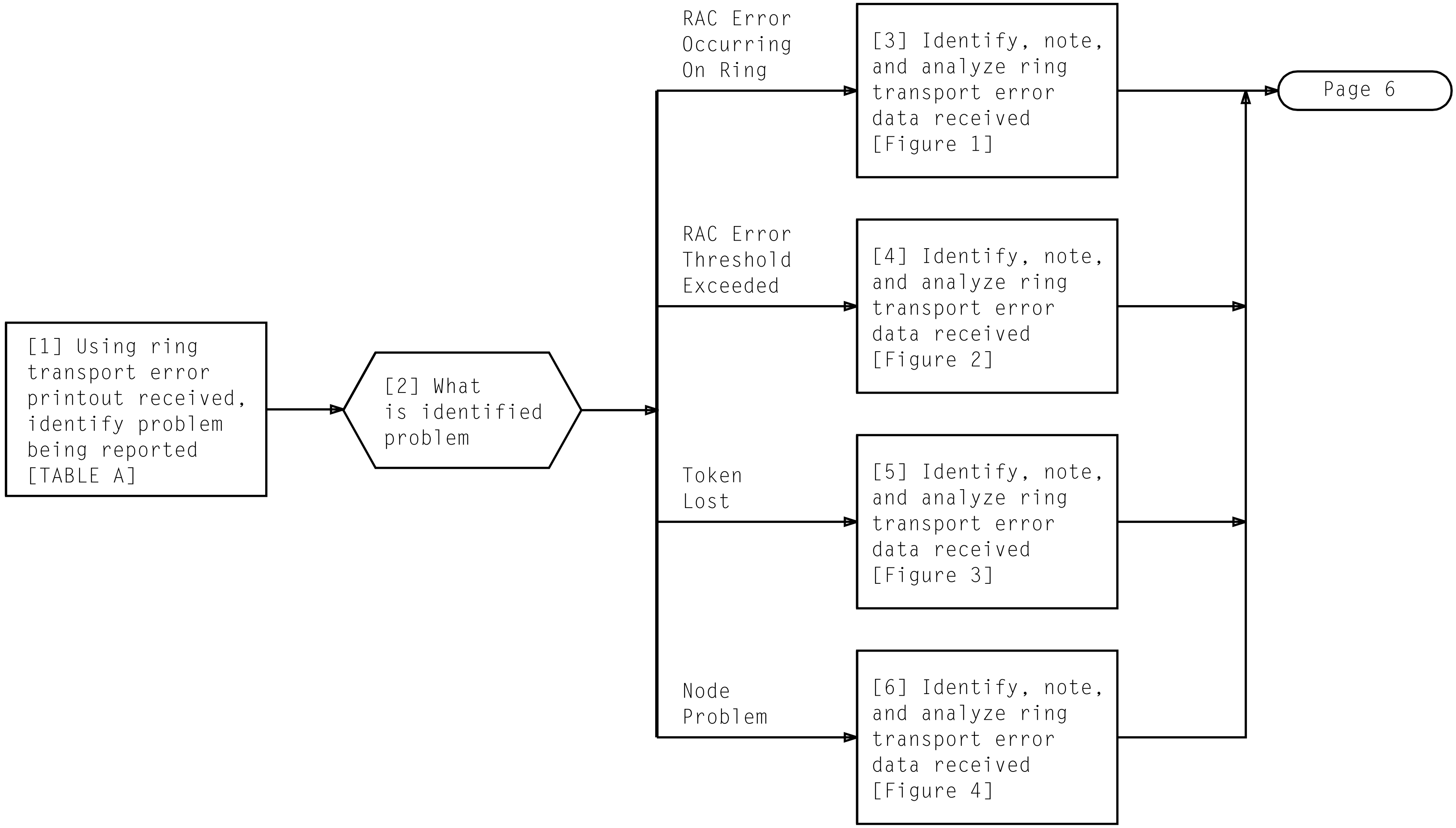


WARNING 1
Replacement of T1FA pack causes service interruption to all signaling links associated with T1FA. Determine best time to introduce service outage in order to minimize service disruption

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

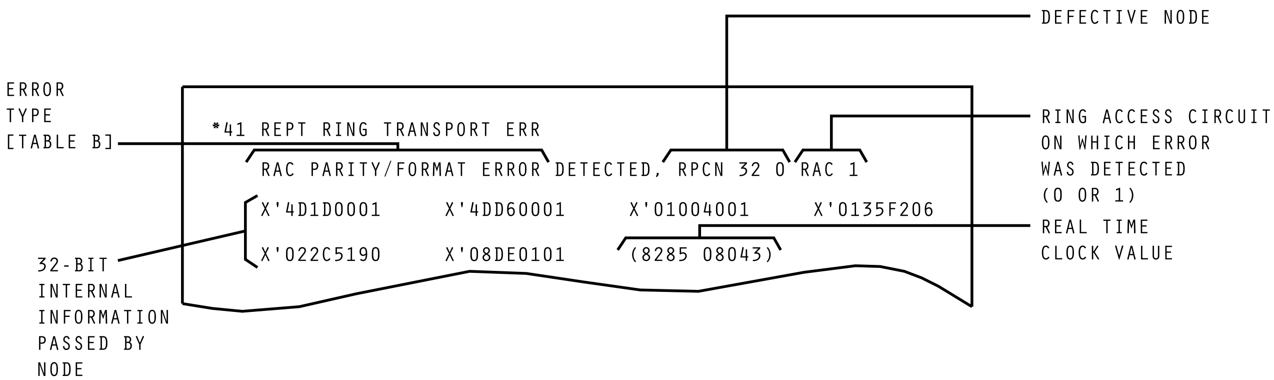


Figure 1 — Sample Printout of Ring Transport Error (Format 1)

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

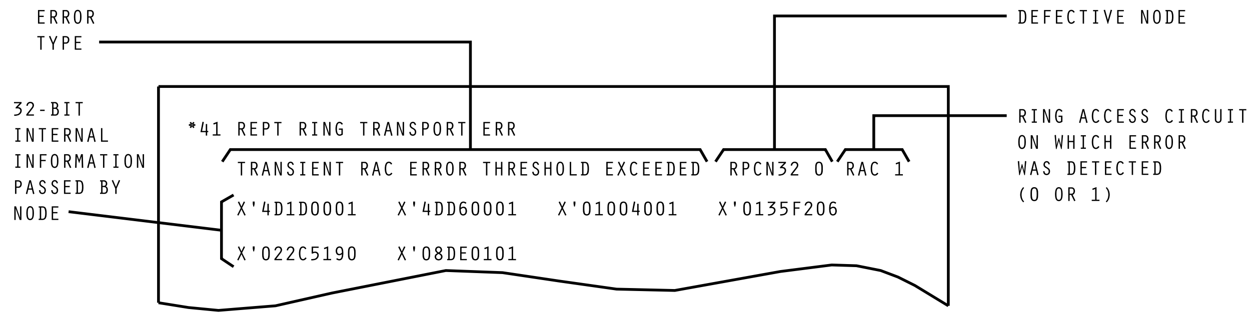


Figure 2 — Sample Printout of Ring Transport Error (Format 2)

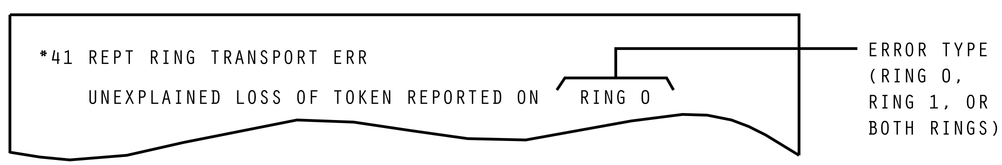


Figure 3 — Sample Printout of Ring Transport Error (Format 3)

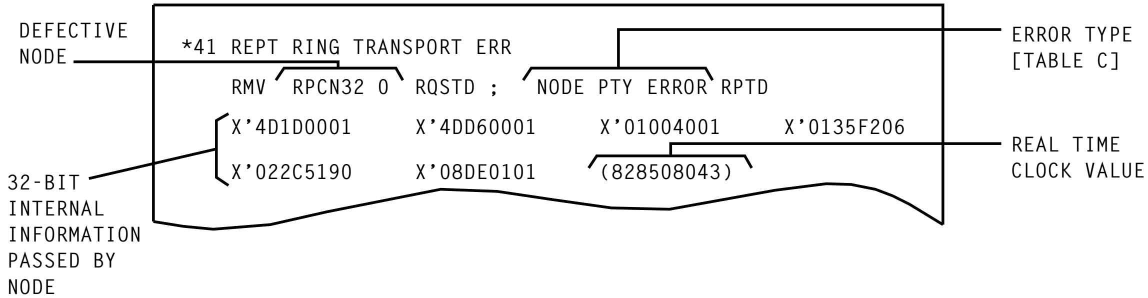
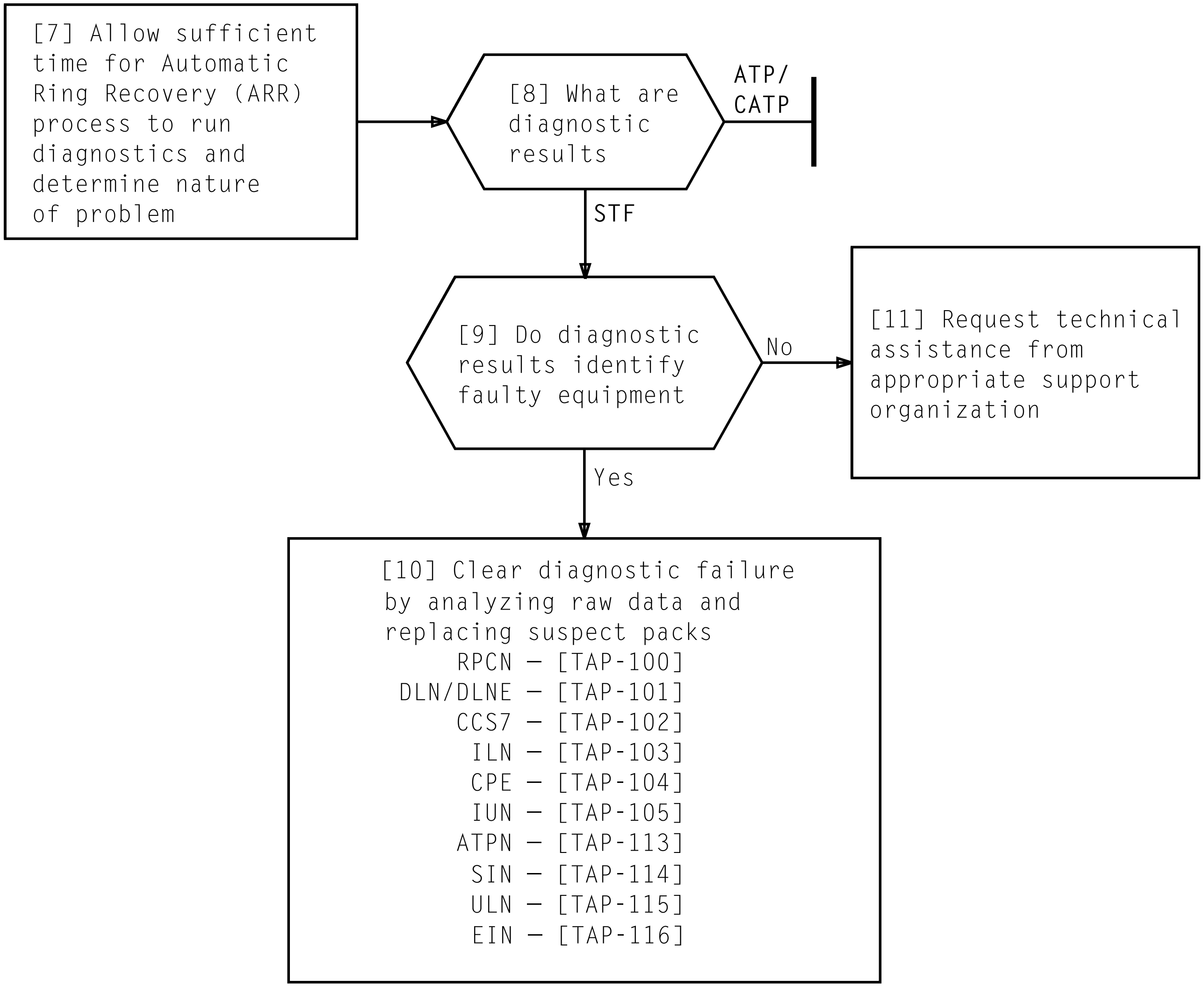
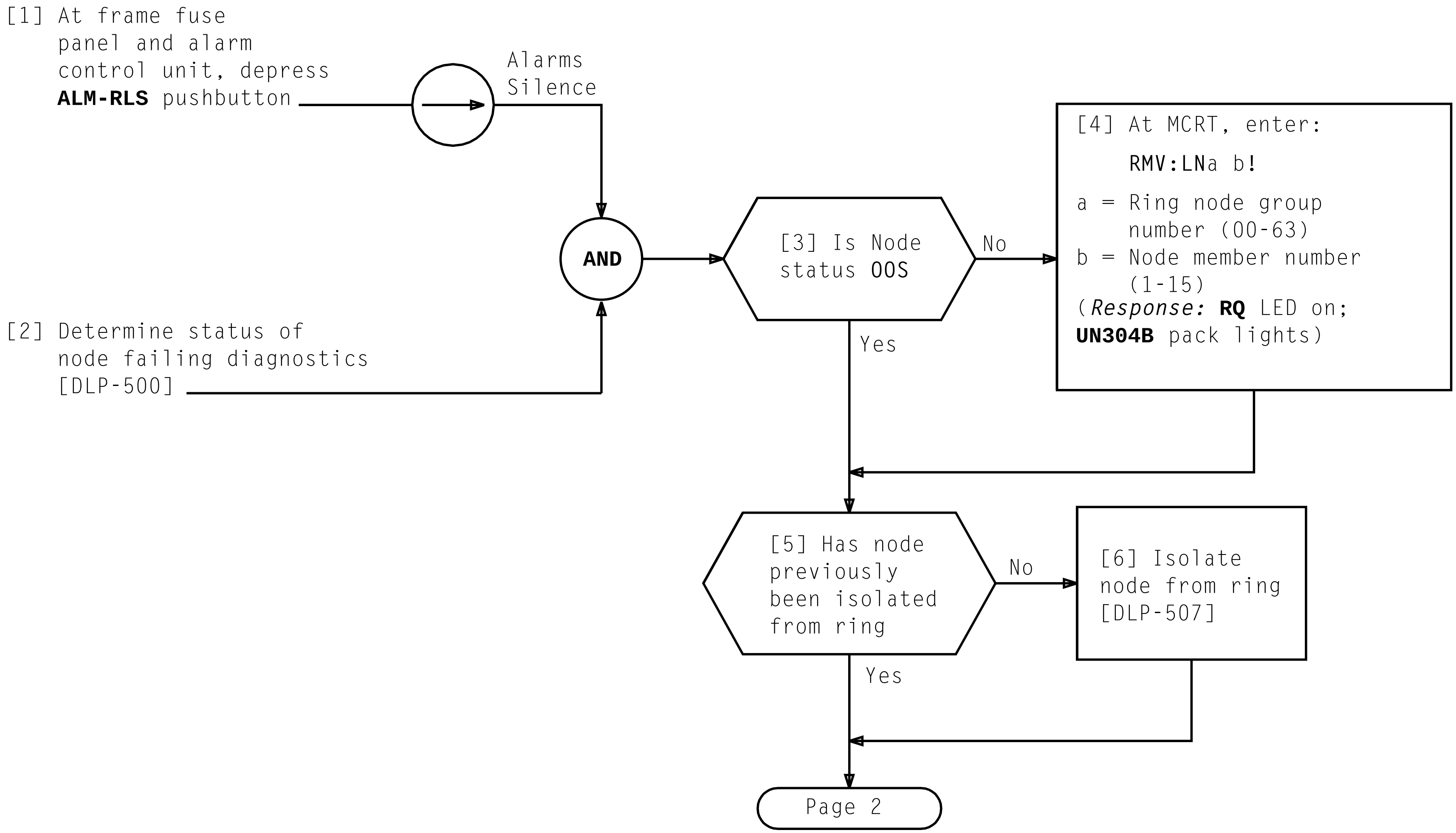


Figure 4 — Sample Printout of Ring Transport Error (Format 4)

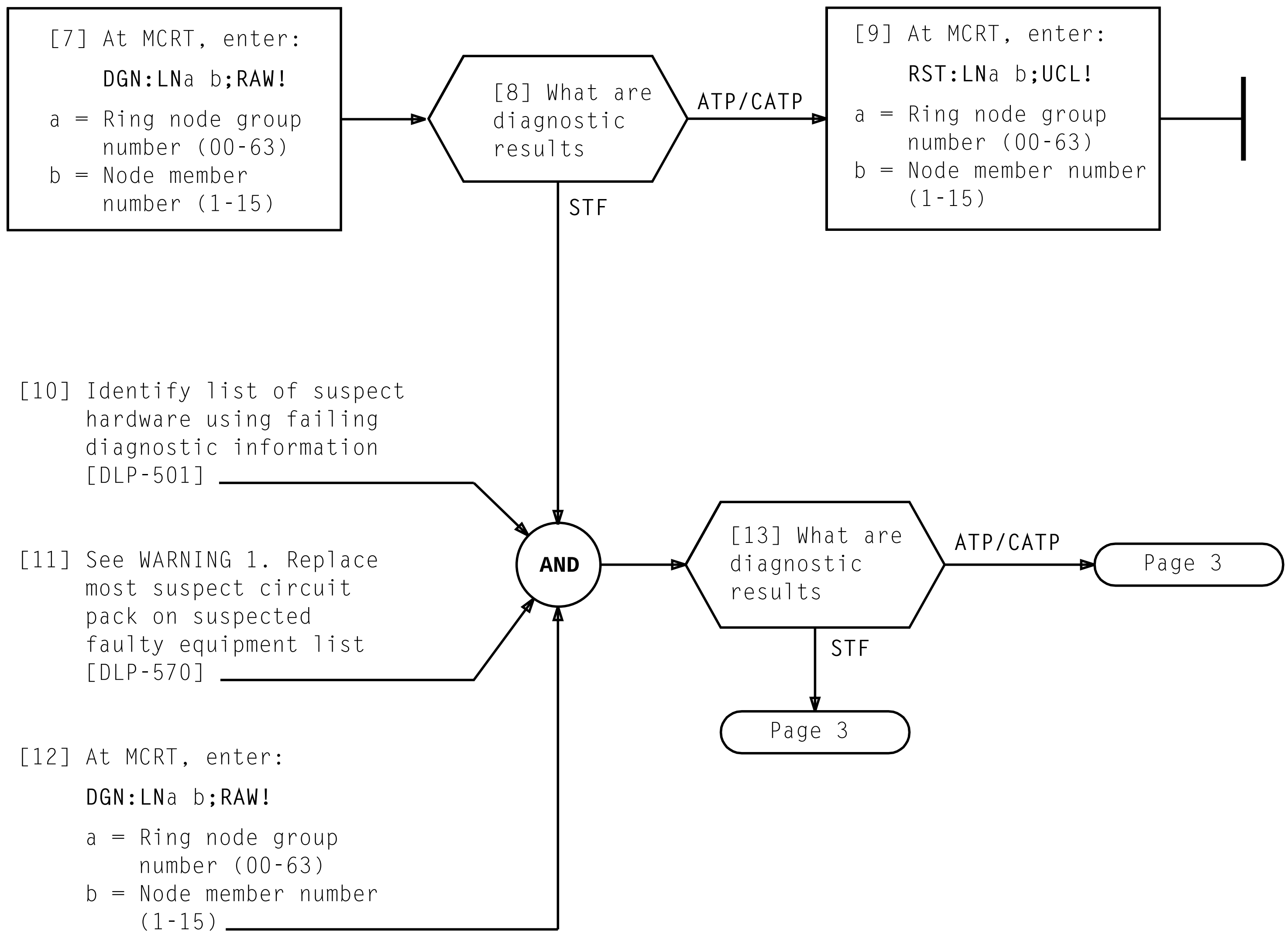
TABLE C RING TRANSPORT ERROR TYPES (FORMAT 4)
SRC MATCH
NAUD FAILURE
NODE PTY ERROR
NODE CKSUM ERROR
RING WRITE FAILURE
RING READ FAILURE
RPC PANIC
UNXPCTD SET QUAR
RAC CONTROL FAILURE
MSG RELAY FAILURE
RING INTERFACE FAILURE
PIO FAILURE
RPC STATE CHANGE FAILURE
RPC ISOLATION
UNXPCTD STATE CHNG MSG



ANALYZE RING TRANSPORT ERROR



CLEAR DIAGNOSTIC FAILURE BY ANALYZING RAW DATA AND REPLACING SUSPECT PACKS — ATP NODE (ATPN)



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 — ATP NODE (ATPN)

[14] See WARNING 2. Install original circuit pack just replaced [DLP-570]

[15] Identify ATP node (ATPN) circuitry tested by failing phase [DLP-571]

[16] Contact next higher maintenance level and request assistance

[17] At MCRT, enter:

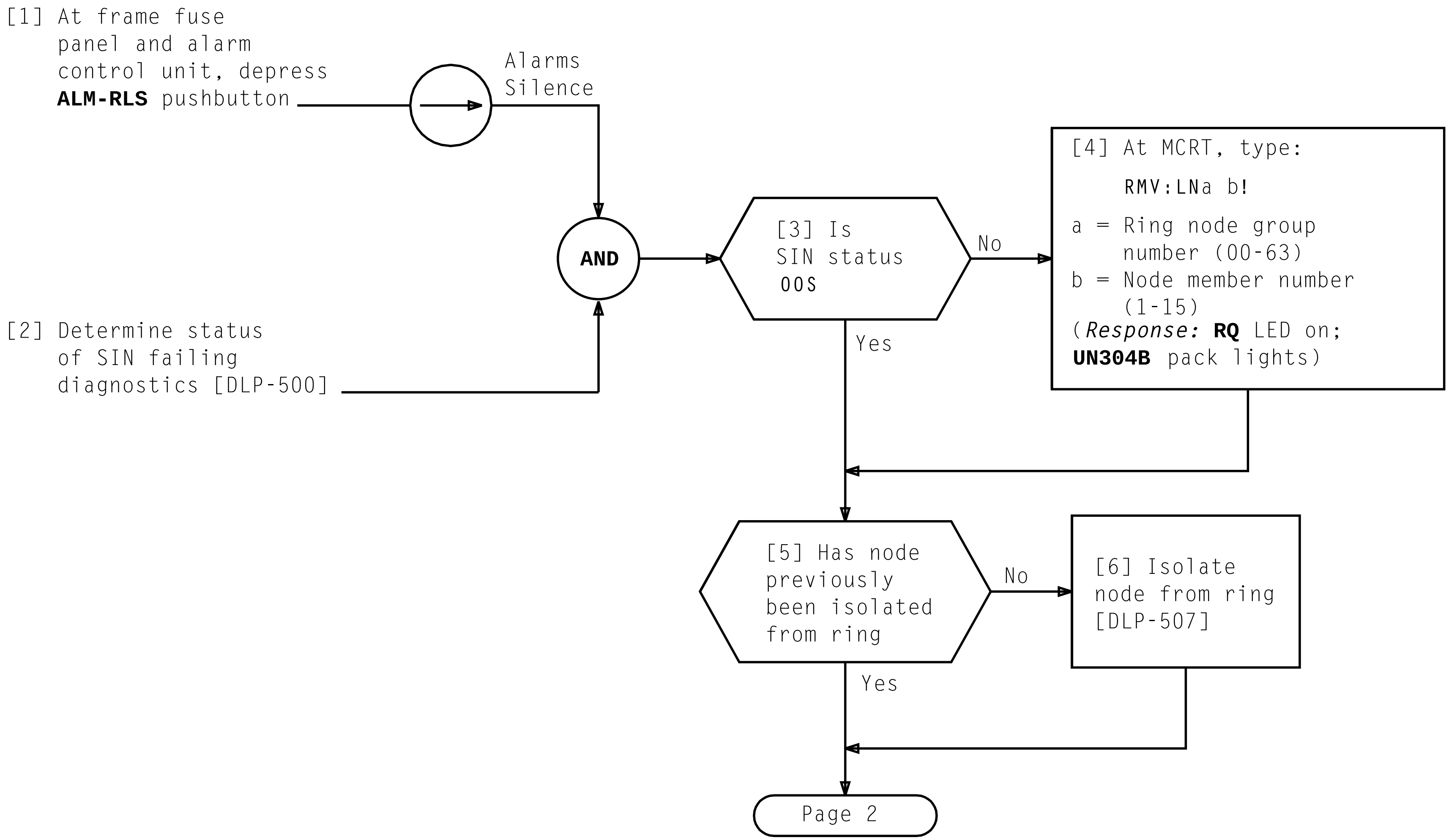
RST:LNa b;UCL!

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

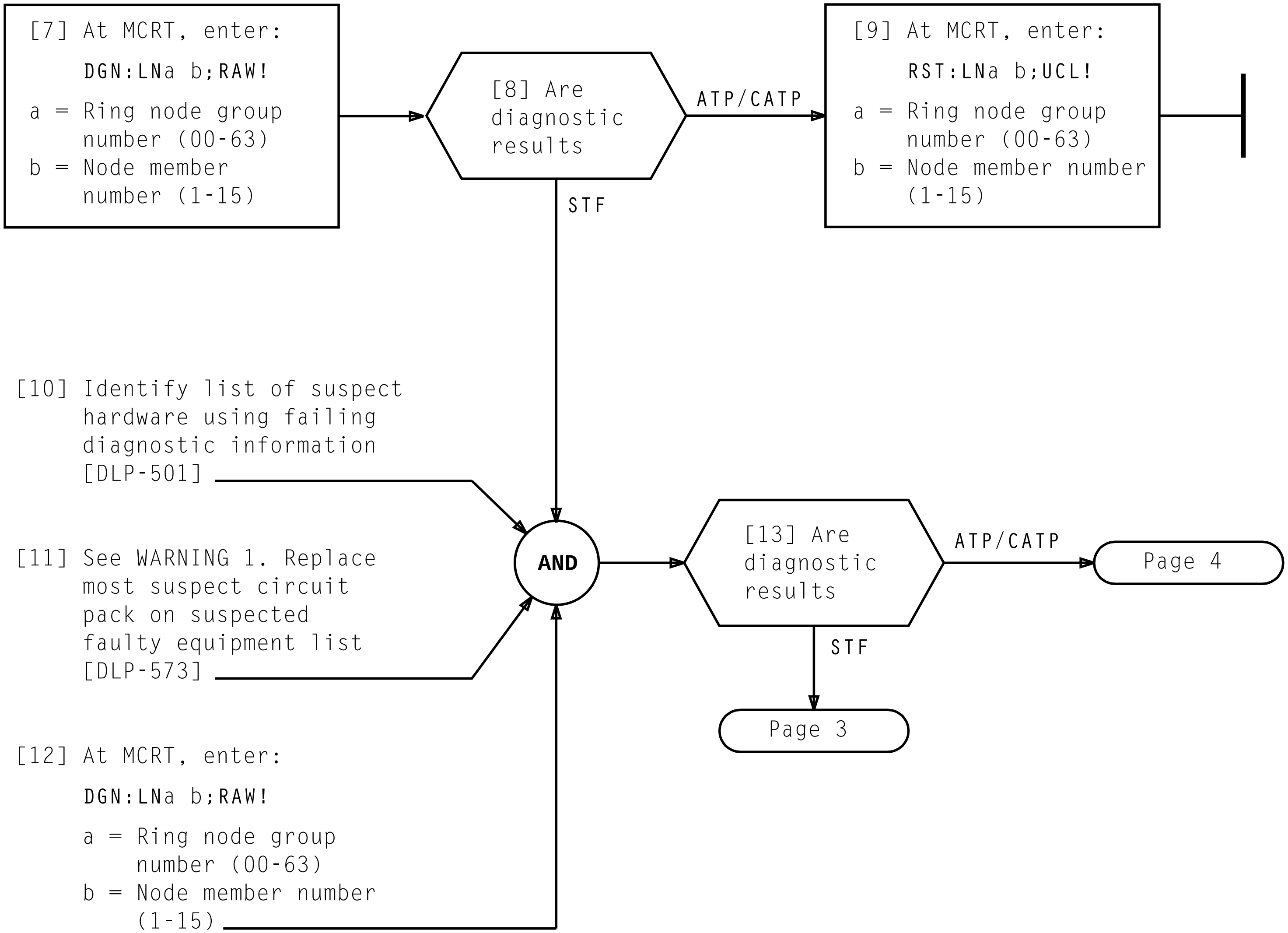
AND

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

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



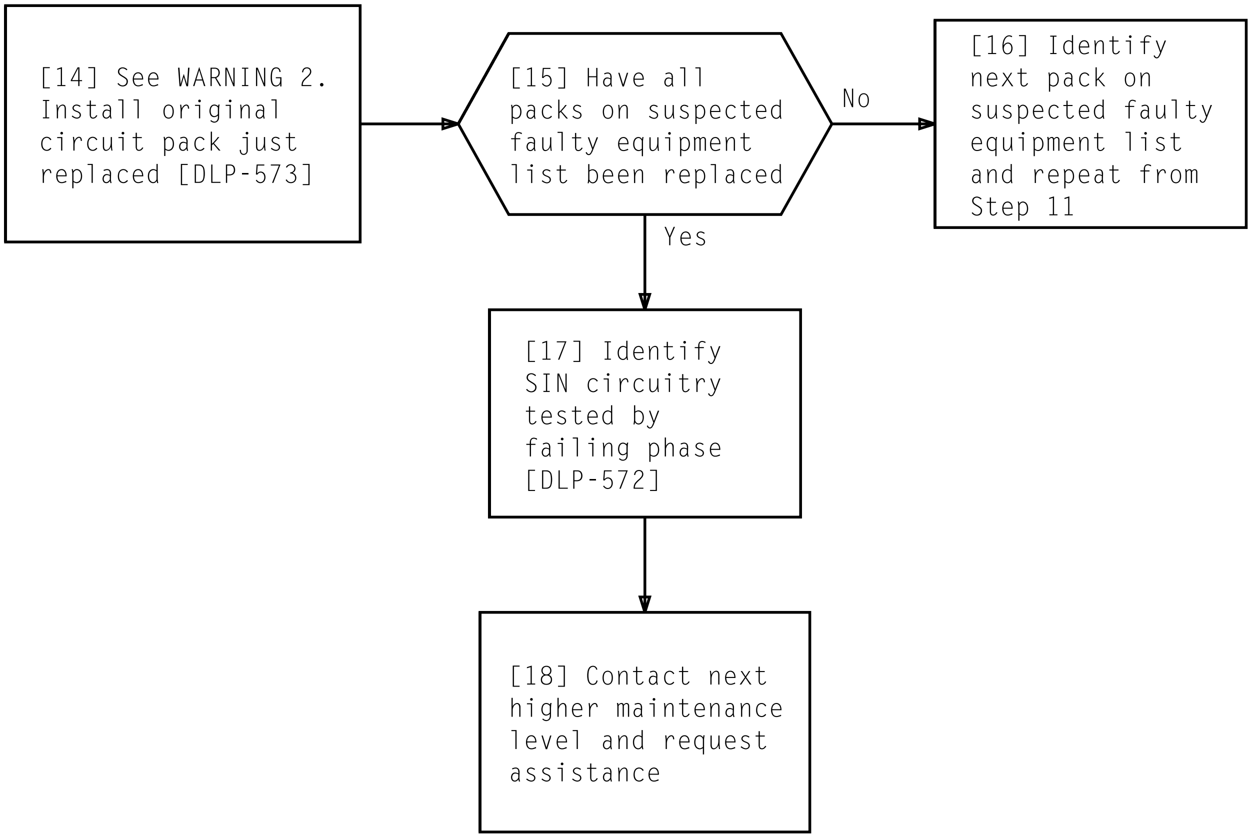
CLEAR DIAGNOSTIC FAILURE BY ANALYZING RAW DATA AND REPLACING SUSPECT PACKS — SMALL COMPUTER SYSTEMS INTERFACE NODE (SIN)



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 — SMALL COMPUTER SYSTEMS INTERFACE NODE (SIN)



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 — SMALL COMPUTER SYSTEMS INTERFACE NODE (SIN)

[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]

AND

[21] Was node
hv value
changed

No

Yes

[22] Copy incore equipment configuration data
data base (ECD) to disk [DLP-554]

[23] Run file system audits on running file system to
ensure no file system errors [DLP-555]

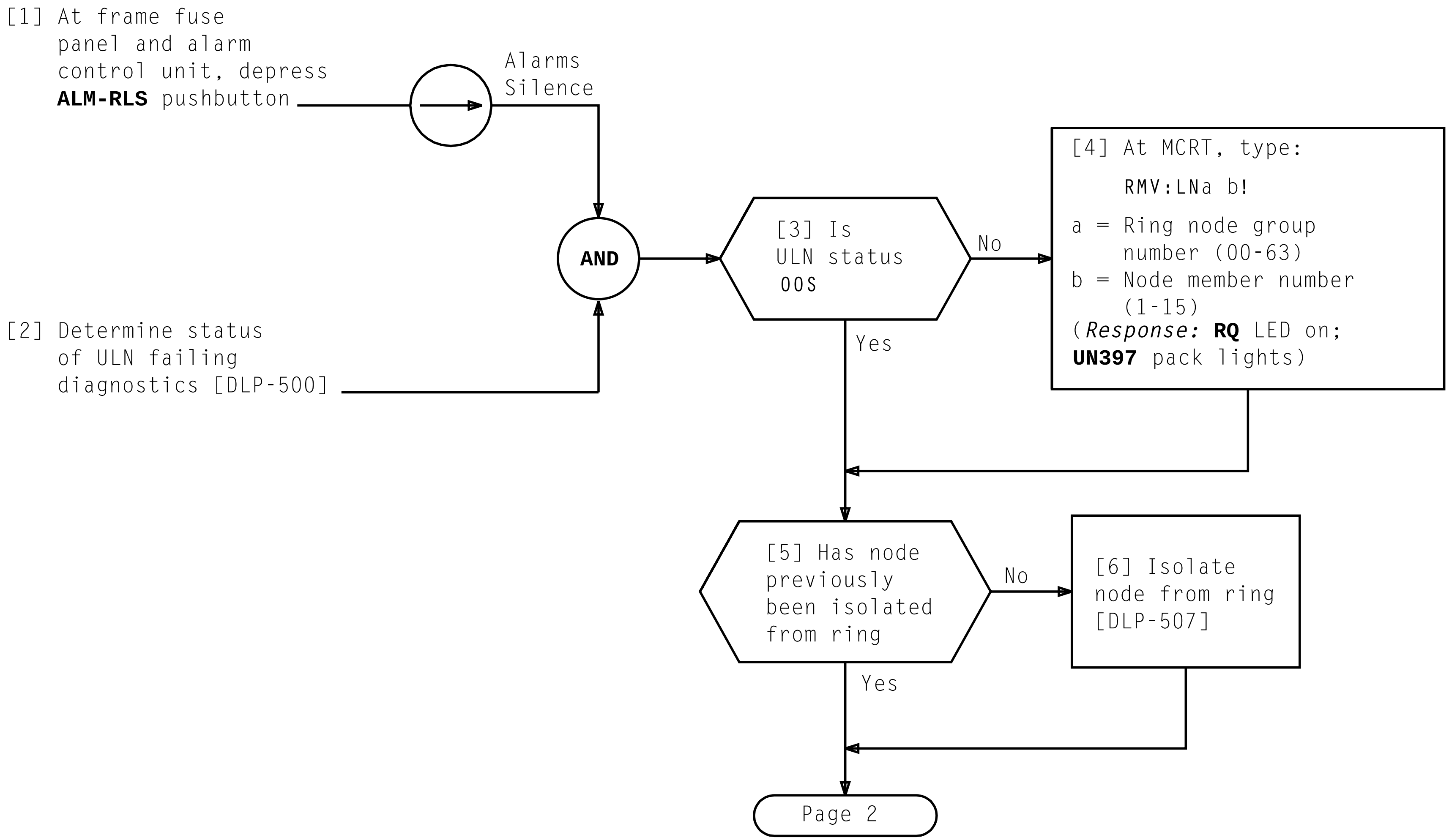
[24] Update backup data base [DLP-556]

[25] Run file system audits on backup file system
to ensure no file system errors [DLP-569]

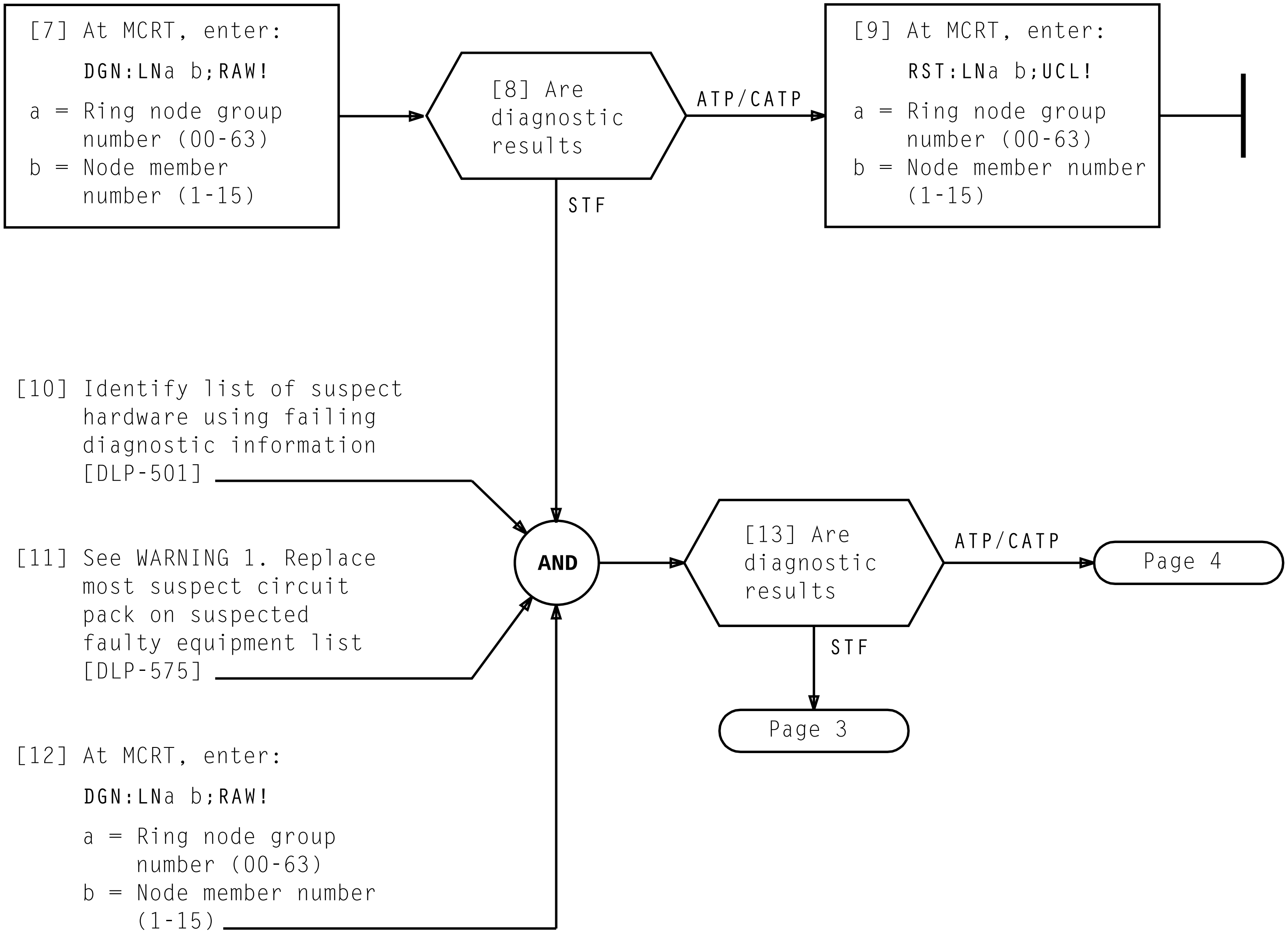
[26] Write 3B Computer backup RTO
and DB tapes [DLP-557]

[27] Verify backup tapes [DLP-560]

AND

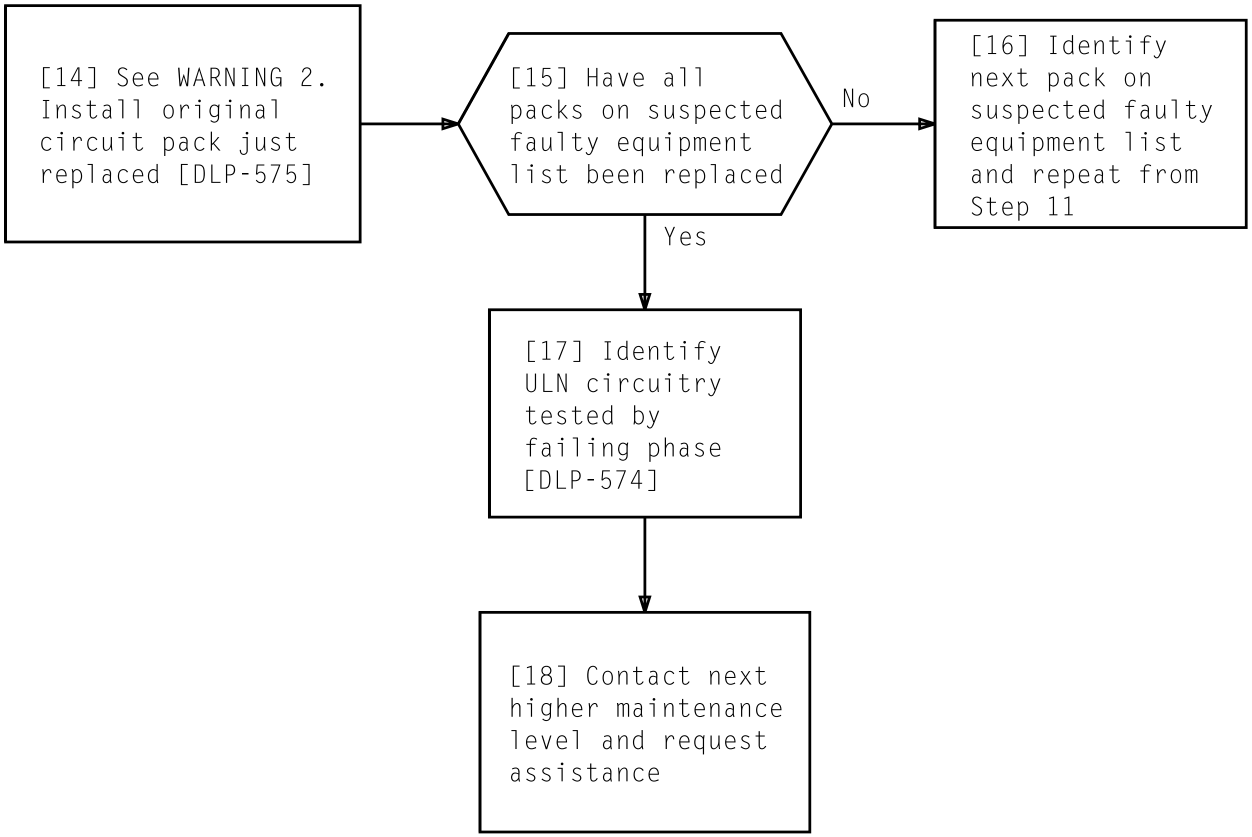


CLEAR DIAGNOSTIC FAILURE BY ANALYZING RAW DATA AND REPLACING SUSPECT PACKS — UNIVERSAL LINK NODE (ULN)



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 — UNIVERSAL LINK NODE (ULN)



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 — UNIVERSAL LINK NODE (ULN)

[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]

AND

[21] Was node hv value changed

No

Yes

[22] Copy incore equipment configuration data data base (ECD) to disk [DLP-554]

[23] Run file system audits on running file system to ensure no file system errors [DLP-555]

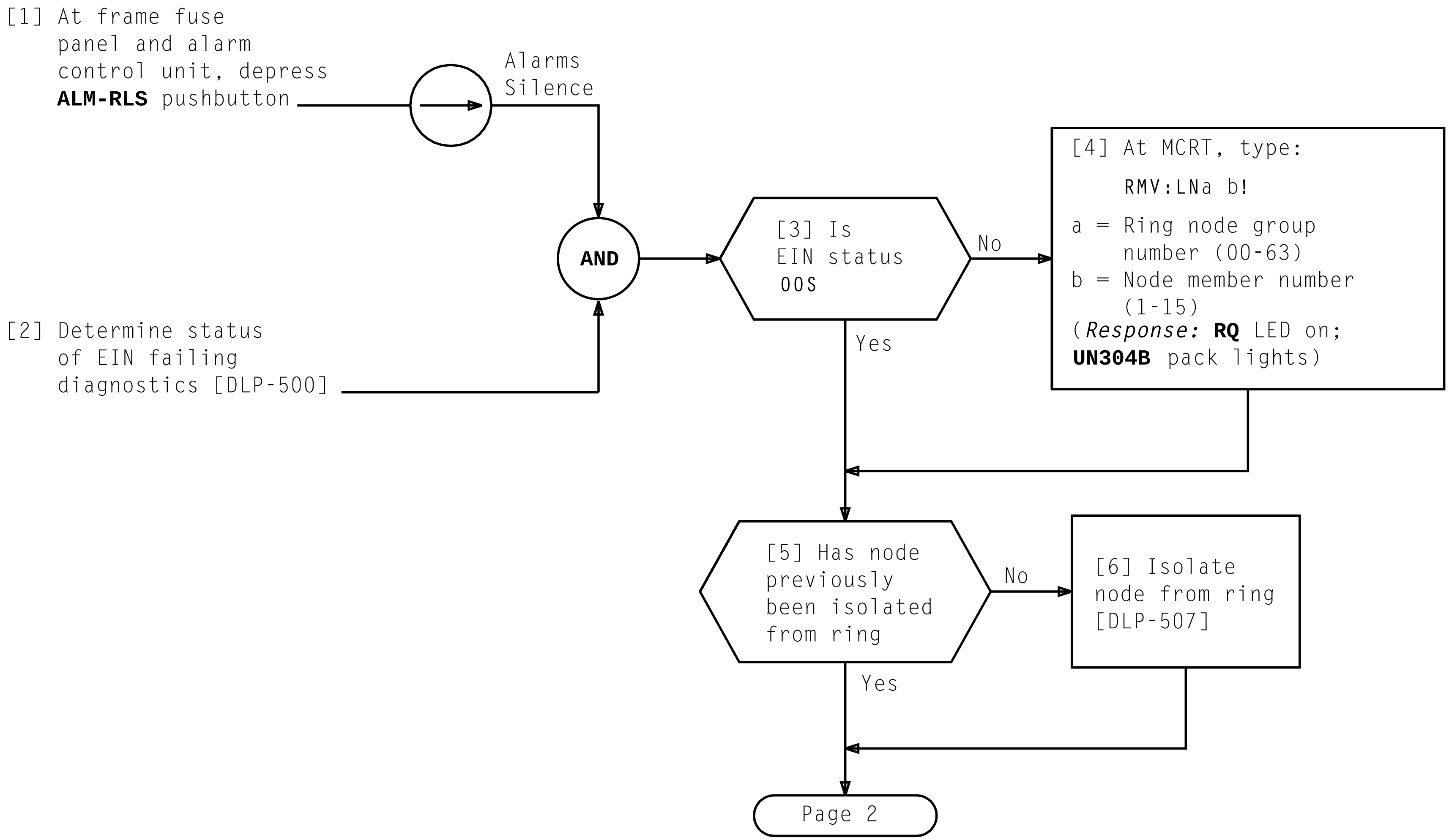
[24] Update backup data base [DLP-556]

AND

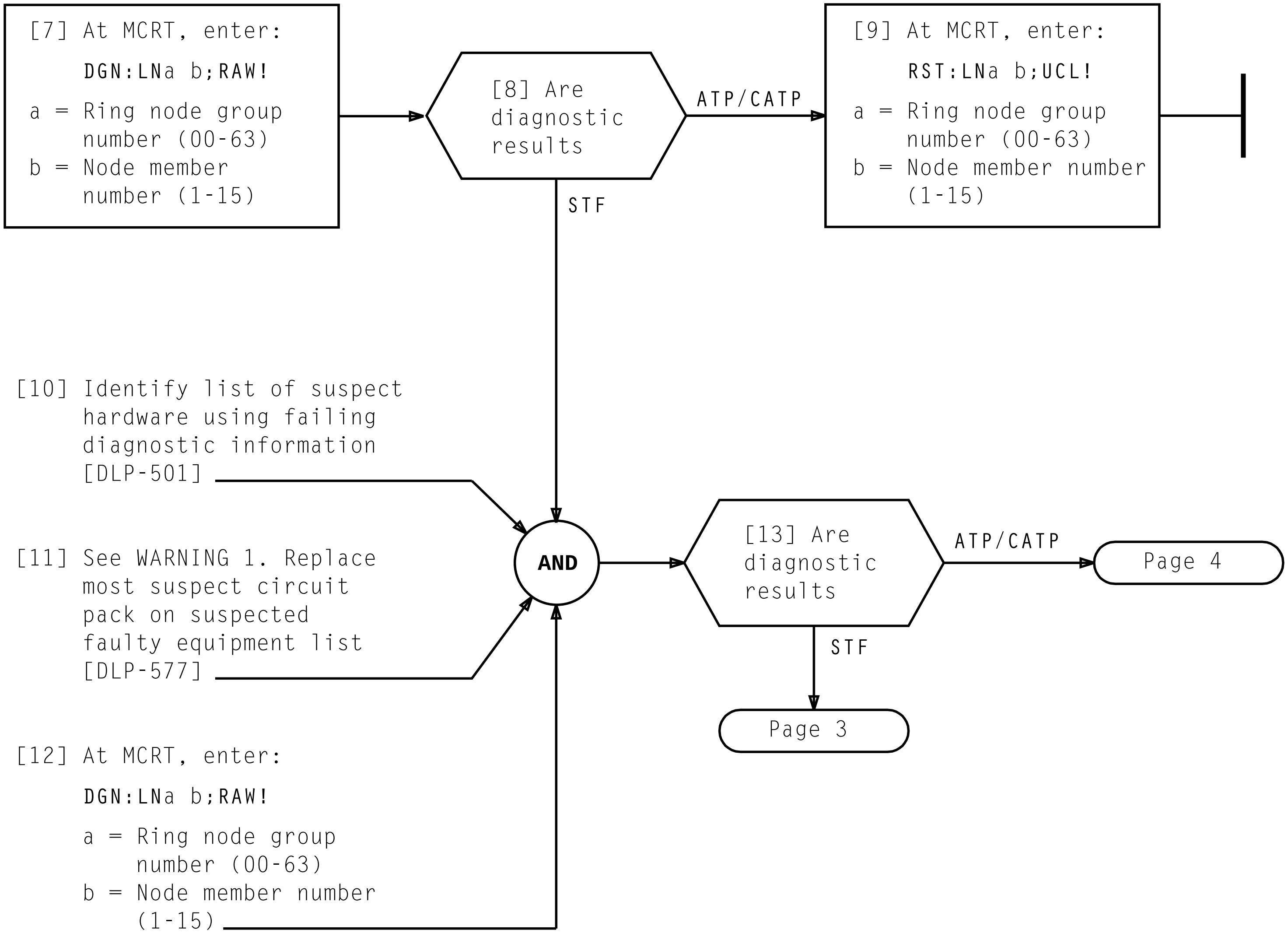
[25] Run file system audits on backup file system to ensure no file system errors [DLP-569]

[26] Write 3B Computer backup RTO and DB tapes [DLP-557]

[27] Verify backup tapes [DLP-560]



CLEAR DIAGNOSTIC FAILURE BY ANALYZING RAW DATA AND REPLACING SUSPECT PACKS — ETHERNET INTERFACE NODE (EIN)



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 — ETHERNET INTERFACE NODE (EIN)

[14] See WARNING 2. Install original circuit pack just replaced [DLP-577]

[15] Have all packs on suspected faulty equipment list been replaced

No

[16] Identify next pack on suspected faulty equipment list and repeat from Step 11

Yes

[17] Identify EIN circuitry tested by failing phase [DLP-576]

[18] Contact next higher maintenance level and request assistance

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 — ETHERNET INTERFACE NODE (EIN)

[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]

AND

[21] Was node hv value changed

No

Yes

[22] Copy incore equipment configuration data data base (ECD) to disk [DLP-554]

[23] Run file system audits on running file system to ensure no file system errors [DLP-555]

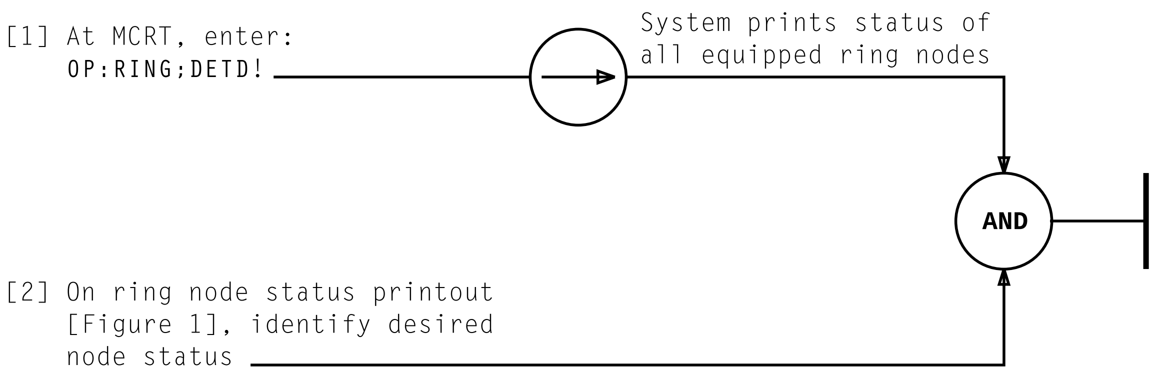
[24] Update backup data base [DLP-556]

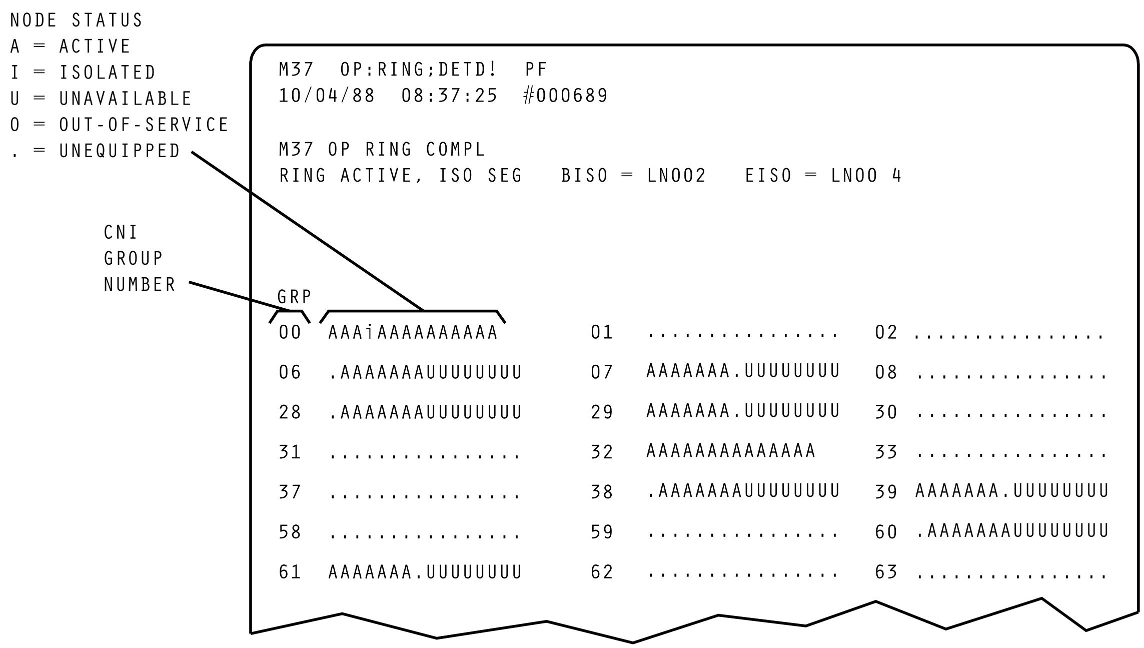
[25] Run file system audits on backup file system to ensure no file system errors [DLP-569]

[26] Write 3B Computer backup RTO and DB tapes [DLP-557]

[27] Verify backup tapes [DLP-560]

AND

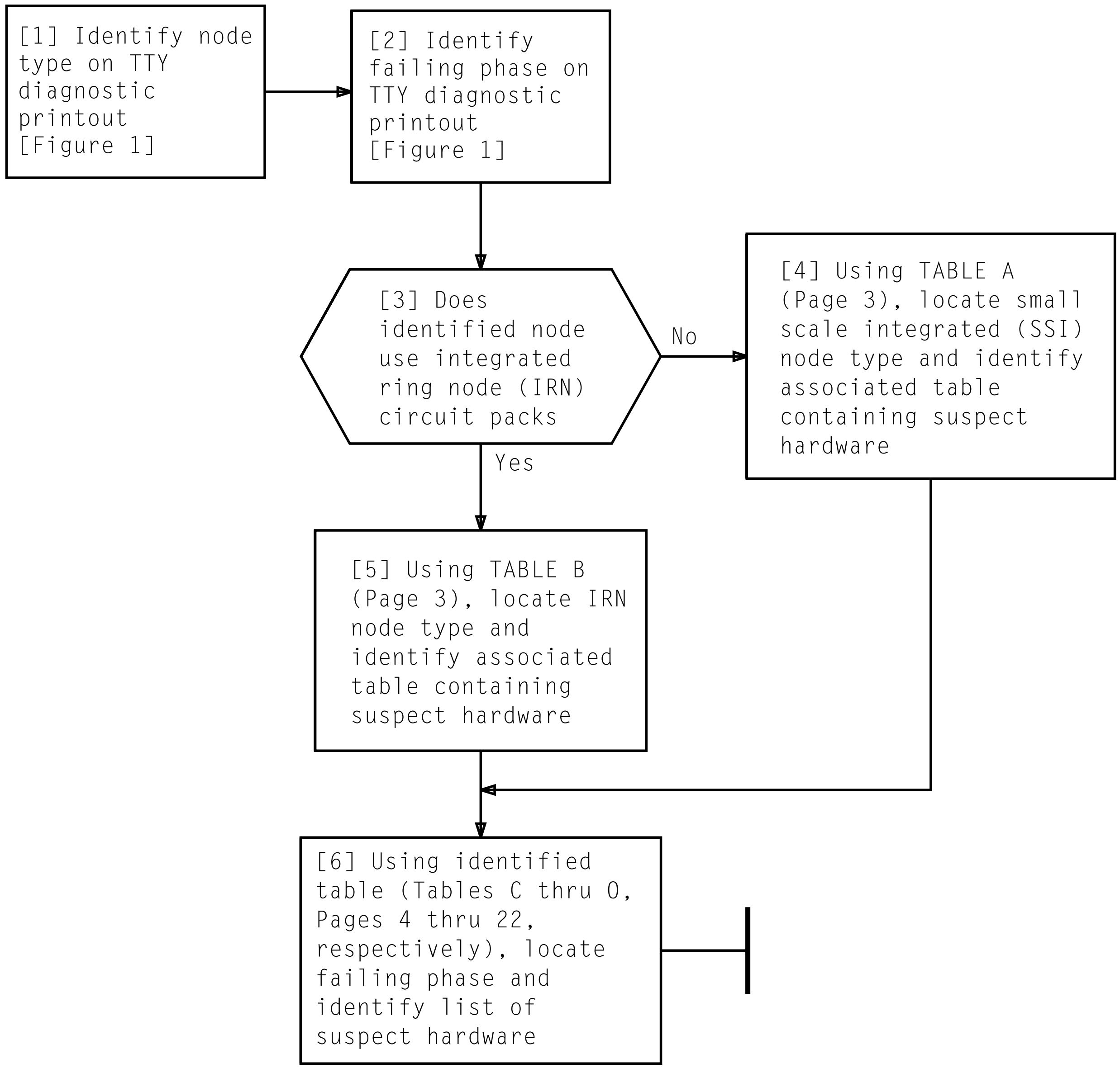





```
M37  OP:RING;DETD!  PF
10/04/88  08:37:25  #000689

M37 OP RING COMPL
RING ACTIVE, ISO SEG   BISO = LN002   EISO = LN00 4



GRP
00  AAAiAAAAAAAAAAA      01  ................   02 ................
06  .AAAAAAAUUUUUUUU     07  AAAAAAA.UUUUUUUU   08 ................
28  .AAAAAAAUUUUUUUU     29  AAAAAAA.UUUUUUUU   30 ................
31  ................     32  AAAAAAAAAAAAAA     33 ................
37  ................     38  .AAAAAAAUUUUUUUU   39 AAAAAAA.UUUUUUUU
58  ................     59  ................   60 .AAAAAAAUUUUUUUU
61  AAAAAAA.UUUUUUUU     62  ................   63 ................
```

Figure 1 — Sample Printout of Ring Node Status

DETERMINE NODE STATUS



IDENTIFY SUSPECT HARDWARE USING DIAGNOSTIC INFORMATION

NODE TYPE 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 1P

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

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 CCS7	TABLE D (Pages 6-7)
SSI CPE	TABLE E (Pages 8-9)
SSI IUN	TABLE F (Page 10)

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 ILN	TABLE G (Page 11)
IRN/IRN2 IUN	TABLE H (Page 12)
IRN CCS7	TABLE I (Page 13)
IRN/IRN2 CPE	TABLE J (Page 14)
IRN DLNE/DLN30	TABLE K (Page 16)
IRN2 ATPN	TABLE L (Page 18)
IRN2 SIN	TABLE M (Page 19)
ULN	TABLE N (Page 20)
IRN2 EIN	TABLE O (Page 21)

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.

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 CCS7 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 CCS7 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
SSI IUN 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	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 G IRN ILN SUSPECT HARDWARE							
FAILING PHASE	SUSPECT HARDWARE						
	FIRST	SECOND	THIRD	FOURTH	FIFTH	SIXTH	SEVENTH
01	UN303B	TN915,TN918, TN1506,TN1508 TN1509,TN1803	RING BUS CABLE	—	—	—	—
02	UN303B	TN915,TN918, TN1506,TN1508 TN1509,TN1803	RING BUS CABLE	—	—	—	—
10	UN303B	—	—	—	—	—	—
12	UN303B	TN915,TN918, TN1506,TN1508 TN1509,TN1803	—	—	—	—	—
13	UN303B	TN915,TN918, TN1506,TN1508 TN1509,TN1803	—	—	—	—	—
20	UN303B	—	—	—	—	—	—
21	UN303B	—	—	—	—	—	—
29	UN291	—	—	—	—	—	—
39	UN303B	—	—	—	—		—
50	UN303B	TN1315	—	—	—	—	—
51	UN303B	TN1315	—	—	—	—	—
52	TN1315	—	—	—	—	—	—
53	TN1315	—	—	—	—	—	—
54	TN1315	—	—	—	—	—	—
55	TN1315	—	—	—	—	—	—

TABLE H
IRN/IRN2 IUN SUSPECT HARDWARE

FAILING PHASE	SUSPECT HARDWARE						
	FIRST	SECOND	THIRD	FOURTH	FIFTH	SIXTH	SEVENTH
01	UN303B UN304B	TN915,TN918, TN1506,TN1508, TN1509,TN1803	RING BUS CABLE	—	—	—	—
02	UN303B UN304B	TN915,TN918, TN1506,TN1508, TN1509,TN1803	RING BUS CABLE	—	—	—	—
10	UN303B UN304B	—	—	—	—	—	—
12	UN303B UN304B	TN915,TN918, TN1506,TN1508, TN1509,TN1803	—	—	—	—	—
13	UN303B UN304B	TN915,TN918, TN1506,TN1508, TN1509,TN1803	—	—	—	—	—
20	UN303B UN304B	—	—	—	—	—	—
21	UN303B UN304B	—	—	—	—	—	—
39	UN303B UN304B	—	—	—	—	—	—

TABLE I IRN CCS7 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 J IRN/IRN2 CPE SUSPECT HARDWARE							
FAILING PHASE	SUSPECT HARDWARE						
	FIRST	SECOND	THIRD	FOURTH	FIFTH	SIXTH	SEVENTH
01	UN303B,UN304B	TN915,TN918, TN1506,TN1508, TN1509,TN1803	RING BUS CABLE	—	—	—	—
02	UN303B,UN304B	TN915,TN918, TN1506,TN1508, TN1509,TN1803	RING BUS CABLE	—	—	—	—
10	UN303B,UN304B	—	—	—	—	—	—
12	UN303B,UN304B	TN915,TN918, TN1506,TN1508, TN1509,TN1803	—	—	—	—	—
13	UN303B,UN304B	TN915,TN918, TN1506,TN1508, TN1509,TN1803	—	—	—	—	—
20	UN303B,UN304B	—	—	—	—	—	—
21	UN303B,UN304B	—	—	—	—	—	—
29	TN69B	UN9,UN9B	—	—	—	—	—
39	TN914	TN69B	—	—	—	—	—
50	UN303B,UN304B	UN1315 UN1316	—	—	—	—	—
51	UN303B,UN304B	UN1315 UN1316	—	—	—	—	—
52	TN1315,TN1316	—	—	—	—	—	—
53	TN1315,TN1316	—	—	—	—	—	—
54	TN1315,TN1316	—	—	—	—	—	—
55	TN1315,TN1316	—	—	—	—	—	—

TABLE J (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,UN304B	TN1315,TN1316	—	—	—	—	—
61	UN303B,UN304B	TN1315,TN1316	—	—	—	—	—
62	TN1315,TN1316	—	—	—	—	—	—
63	TN1315,TN1316	—	—	—	—	—	—
64	TN1315,TN1316	—	—	—	—	—	—
65	TN1315,TN1316	—	—	—	—	—	—
66	TN1316	DATA SET	APPLIQUE 12A	—	—	—	—

TABLE K IRN DLNE/DLN30 SUSPECT HARDWARE							
FAILING PHASE	SUSPECT HARDWARE						
	FIRST	SECOND	THIRD	FOURTH	FIFTH	SIXTH	SEVENTH
01	UN303B/ UN304B	TN915,TN918, TN1508, TN1803	RING BUS CABLE	–	–	–	–
02	UN303B/ UN304B	TN915,TN918, TN1508, TN1803	RING BUS CABLE	–	–	–	–
10	UN303B/UN304B	–	–	–	–	–	–
12	UN303B/ UN304B	TN915*,TN918, TN1508,TN1803	–	–	–	–	–
13	UN303B/ UN304B	TN915*,TN918, TN1508,TN1803	–	–	–	–	–
20	UN303B/UN304B	–	–	–	–	–	–
21*	UN303B	–	–	–	–	–	–
30	TN69B	UN9,UN9B	–	–	–	–	–
31	TN914	TN69B	–	–	–	–	–
32	TN914	UN303B/UN304B	–	–	–	–	
33	TN914	UN303B/UN304B	–	–	–	–	–
34	TN69B	UN9,UN9B	–	–	–	–	–
35	TN914	UN303B/UN304B	–	–	–	–	–
40	TN1630B	–	–	–	–	–	–
41	TN1630*/TN1630B**	–	–	–	–	–	–
42	TN1630*/TN1630B**	–	–	–	–	–	–
43	TN1630B	–	–	–	–	–	–

* Applicable for DLNE only
** Applicable for DLN30 only

TABLE K (Contd) IRN DLNE/DLN30 SUSPECT HARDWARE							
FAILING PHASE	SUSPECT HARDWARE						
	FIRST	SECOND	THIRD	FOURTH	FIFTH	SIXTH	SEVENTH
41	TN1630	—	—	—	—	—	—
42	UN303B/ UN304B	TN1630	—	—	—	—	—

TABLE L IRN2 ATPN SUSPECT HARDWARE							
FAILING PHASE	SUSPECT HARDWARE						
	FIRST	SECOND	THIRD	FOURTH	FIFTH	SIXTH	SEVENTH
01	UN304B	RING BUS CABLE		—	—	—	—
02	UN304B	RING BUS CABLE		—	—	—	—
10	UN304B	—	—	—	—	—	—
12	UN304B	—	—	—	—	—	—
13	UN304B	—	—	—	—	—	—
20	UN304B	—	—	—	—	—	—
21	UN304B	—	—	—	—	—	—
39	UN304B	—	—	—	—	—	—

TABLE M
IRN2 SIN SUSPECT HARDWARE

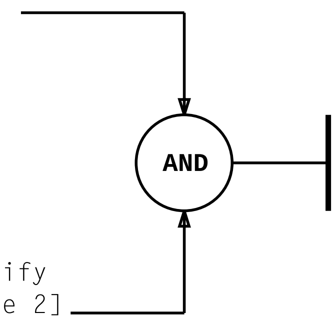
FAILING PHASE	SUSPECT HARDWARE						
	FIRST	SECOND	THIRD	FOURTH	FIFTH	SIXTH	SEVENTH
01	UN304B	TN918, TN1508, TN1803	RING BUS CABLE	—	—	—	—
02	UN304B	TN918, TN1508, TN1803	RING BUS CABLE	—	—	—	—
10	UN304B	—	—	—	—	—	—
12	UN304B	TN918, TN1508, TN1803	—	—	—	—	—
13	UN304B	TN918, TN1508, TN1803	—	—	—	—	—
20	UN304B	—	—	—	—	—	—
30	TN69B	UN9,UN9B	—	—	—	—	—
31	TN914	TN69B	—	—	—	—	—
32	TN914	UN304B	—	—	—	—	
33	TN914	UN304B	—	—	—	—	—
34	TN69B	UN9,UN9B	—	—	—	—	—
35	TN914	UN304B	—	—	—	—	—
40	TN1804	—	—	—	—	—	—

TABLE N
ULN SUSPECT HARDWARE

FAILING PHASE	SUSPECT HARDWARE						
	FIRST	SECOND	THIRD	FOURTH	FIFTH	SIXTH	SEVENTH
01	UN397	TN1803, TN1508, TN918		RING BUS CABLE	—	—	—
02	UN397	TN1803, TN1508, TN918		RING BUS CABLE	—	—	—
10	UN397	—	—	—	—	—	—
12	UN397	TN1803, TN1508, TN918		—	—	—	—
13	UN397	TN1803, TN1508, TN918		—	—	—	—
20	UN397	—	—	—	—	—	—
40	TN2520	UN397	—	—	—	—	—
41	TN2520	UN397	—	—	—	—	—
43	TN2520	UN397	—	—	—	—	—
50	TN2520	LINK CABLING	TRANSMISSION FACILITIES	UN397	—	—	—

TABLE O IRN2 EIN SUSPECT HARDWARE							
FAILING PHASE	SUSPECT HARDWARE						
	FIRST	SECOND	THIRD	FOURTH	FIFTH	SIXTH	SEVENTH
01	UN304B	TN918, TN1508, TN1803	RING BUS CABLE	—	—	—	—
02	UN304B	TN918, TN1508, TN1803	RING BUS CABLE	—	—	—	—
10	UN304B	—	—	—	—	—	—
12	UN304B	TN918, TN1508, TN1803	—	—	—	—	—
13	UN304B	TN918, TN1508, TN1803	—	—	—	—	—
20	UN304B	—	—	—	—	—	—
30	TN69B	UN9,UN9B	—	—	—	—	—
31	TN914	TN69B	—	—	—	—	—
32	TN914	UN304B	—	—	—	—	
33	TN914	UN304B	—	—	—	—	—
34	TN69B	UN9,UN9B	—	—	—	—	—
35	TN914	UN304B	—	—	—	—	—
40	TN4016	—	—	—	—	—	—

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



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

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 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 in the isolated segement 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 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	Tests the ability of the NP to go "insane" and set the interrupt request flag when the 3BI has an error.
13	Downloads the portion of code that is used to test the interface between the 3BI and the NP. Also, verifies 3BI status words.
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)

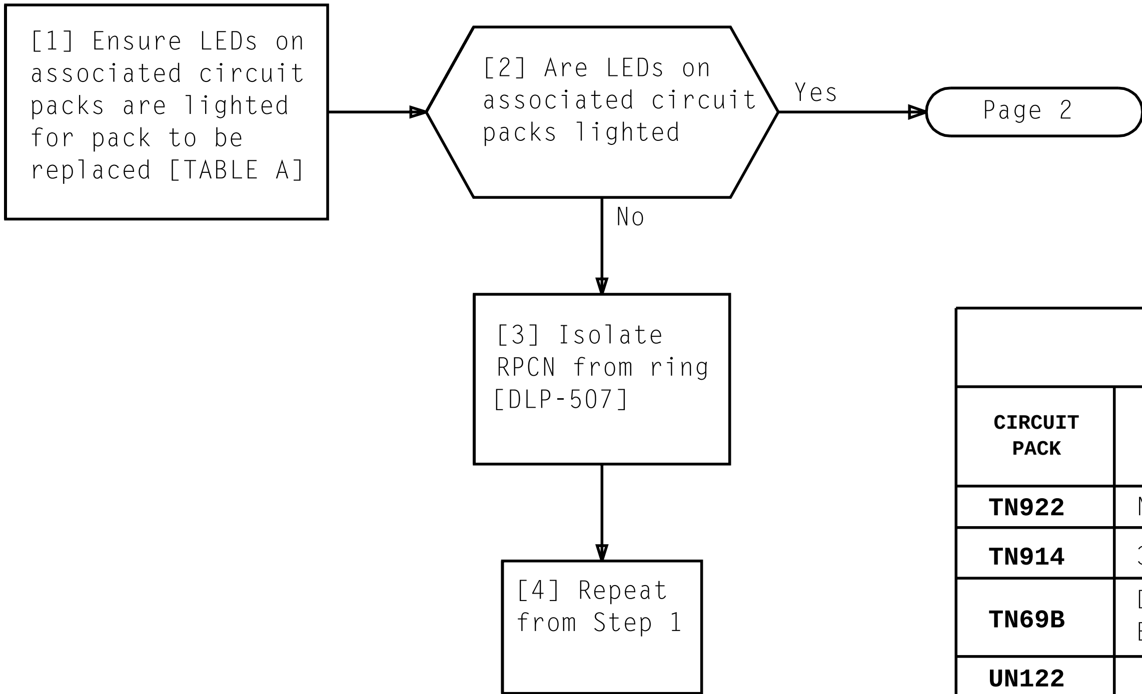


TABLE A
CIRCUIT PACKS

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 0/ (RI0/)	**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)

[5] See WARNING 1. Remove circuit pack to be replaced

[6] See WARNING 1. Insert and properly seat replacement pack

AND

[7] Was **UN122**, **UN122B**, **UN122C**, **UN123**, **UN123B**, **TN69B**, **TN914**, **TN915**, **TN918**, **TN922**, **TN91506**, **TN1508**, **TN1509**, or **TN1803** pack replaced

No

Yes

[8] Was same version of pack used for replacement

Yes

No

[9] See NOTE 1. Perform recent change to change node hv value to proper value [DLP-538]

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

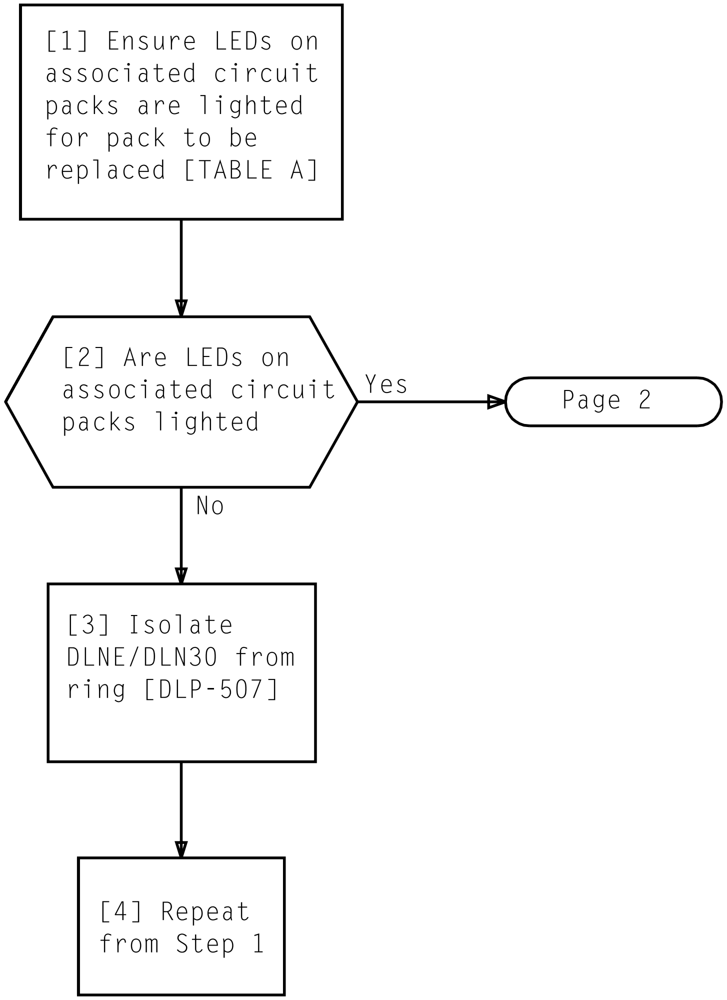


TABLE A
CIRCUIT PACKS

CIRCUIT PACK	FUNCTION	LED STATUS ON ASSOCIATED CIRCUIT PACKS
TN922	Node Processor (NP)	**NT** LED on; **UN123** or **UN123B** lighted
UN303B/ UN304B	Integrated Ring Node (IRN)	—
UN122	Ring Interface 0/ (RI0/)	**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

[5] See WARNING 1. Remove circuit pack to be replaced

[6] See WARNING 1. Insert and properly seat replacement pack

AND

[7] Was **TN922**, **UN122**, **UN122B**, **UN122C**, **UN123**, **UN123B**, **UN303B**, **TN915**, **TN918**, **TN1506**, **TN1508**, **TN1509**, or **TN1803** pack **replaced**

No

Yes

[8] Was same version of pack used for replacement

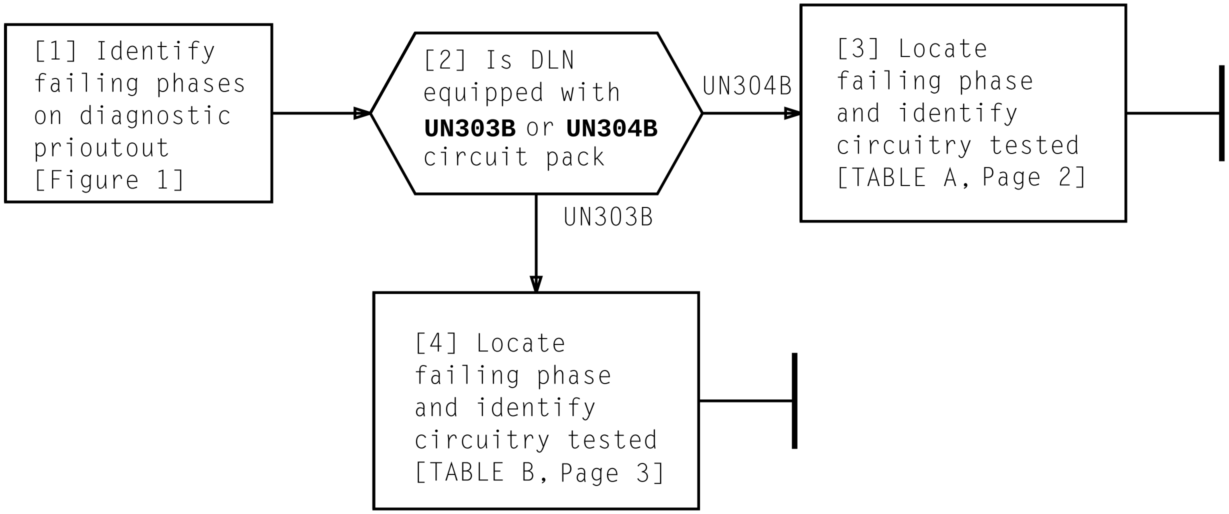
Yes

No

[9] See NOTE 1. Perform recent change to change node hv value to proper value [DLP-538]

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



FAILING PHASE

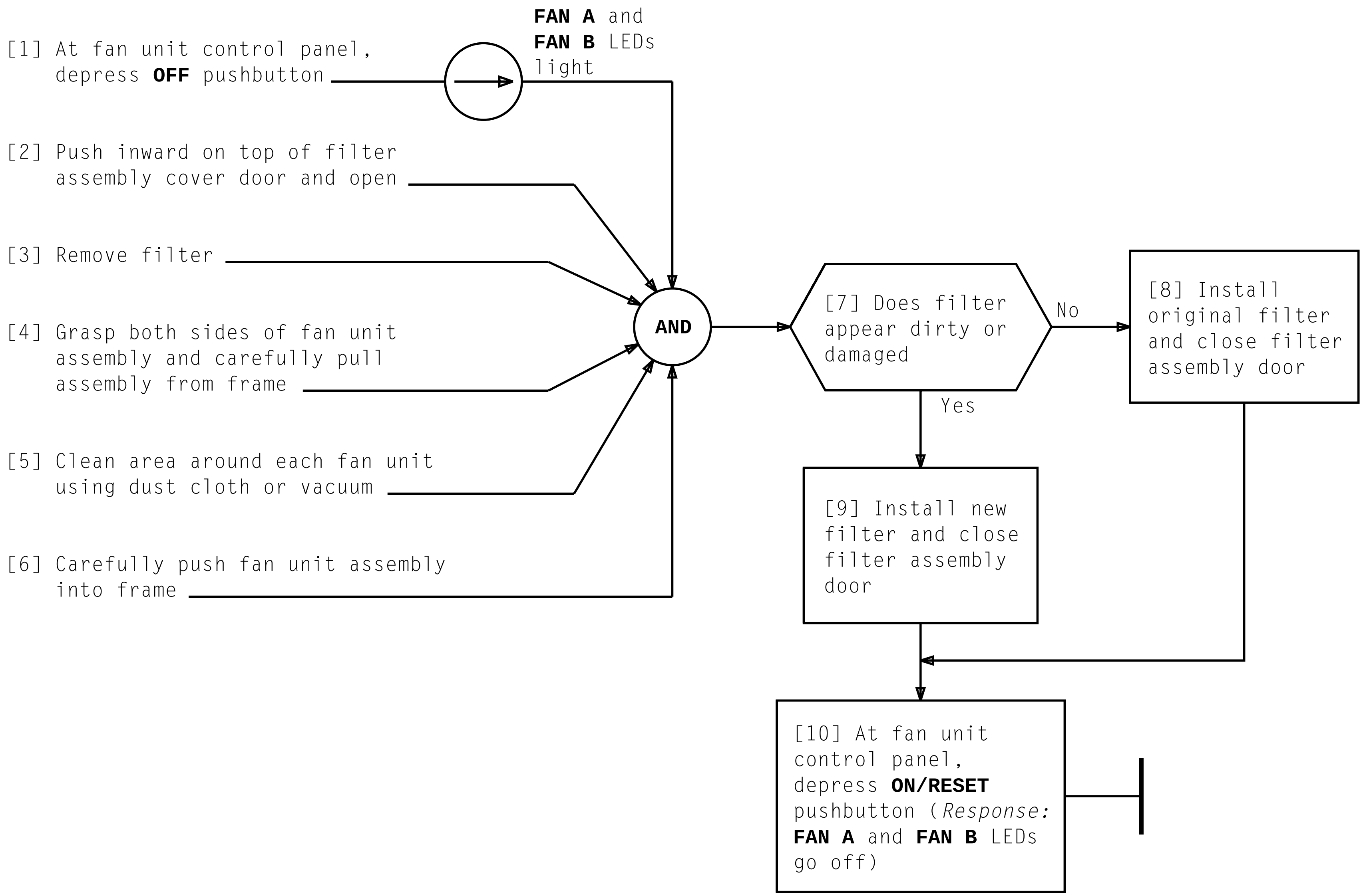
```
30 DGN: RPCN32 0:PH 10-31. PF

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

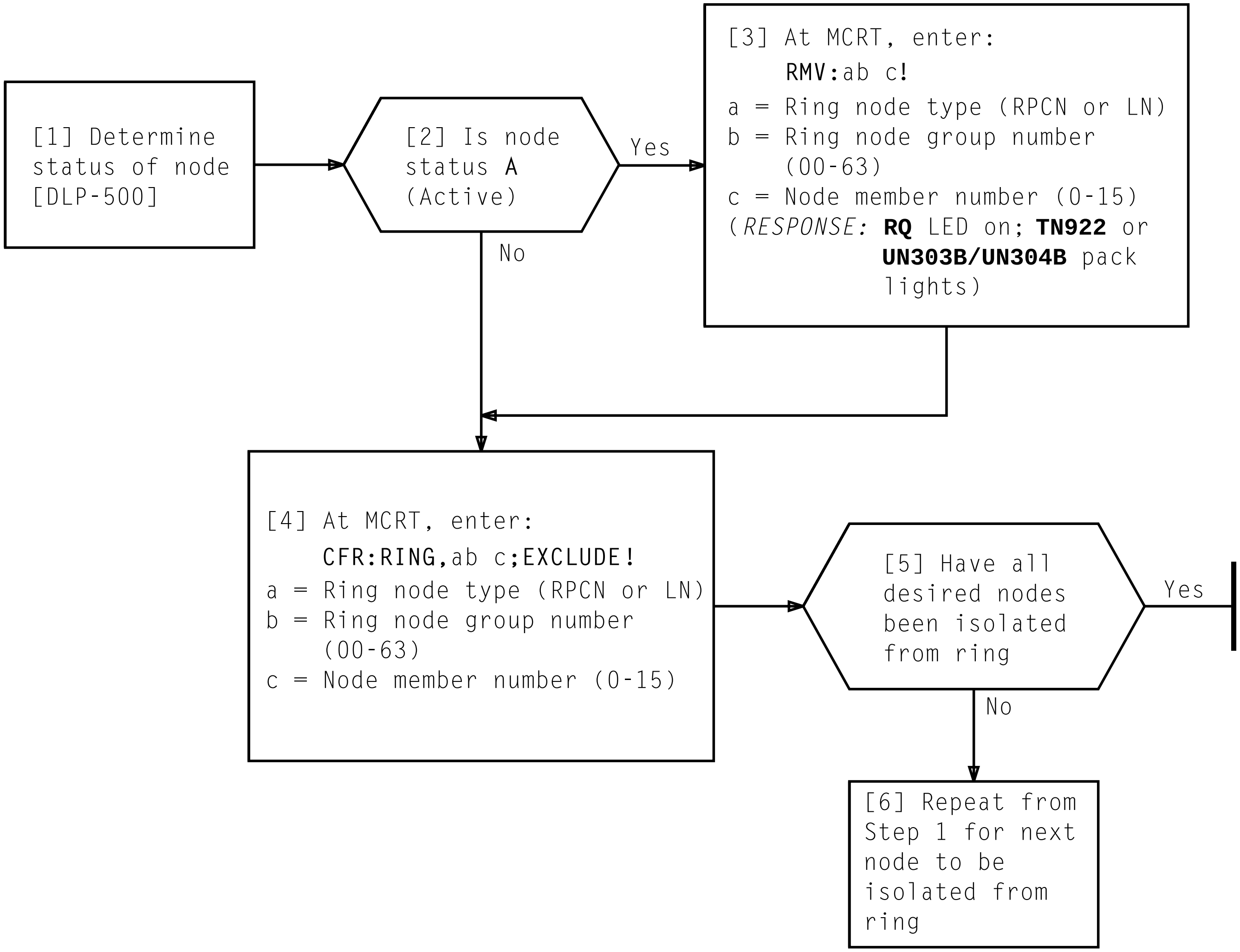
IDENTIFY DIRECT LINK NODE DLNE/DLN30 CIRCUITRY TESTED BY FAILING PHASE

TABLE A UN304B 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

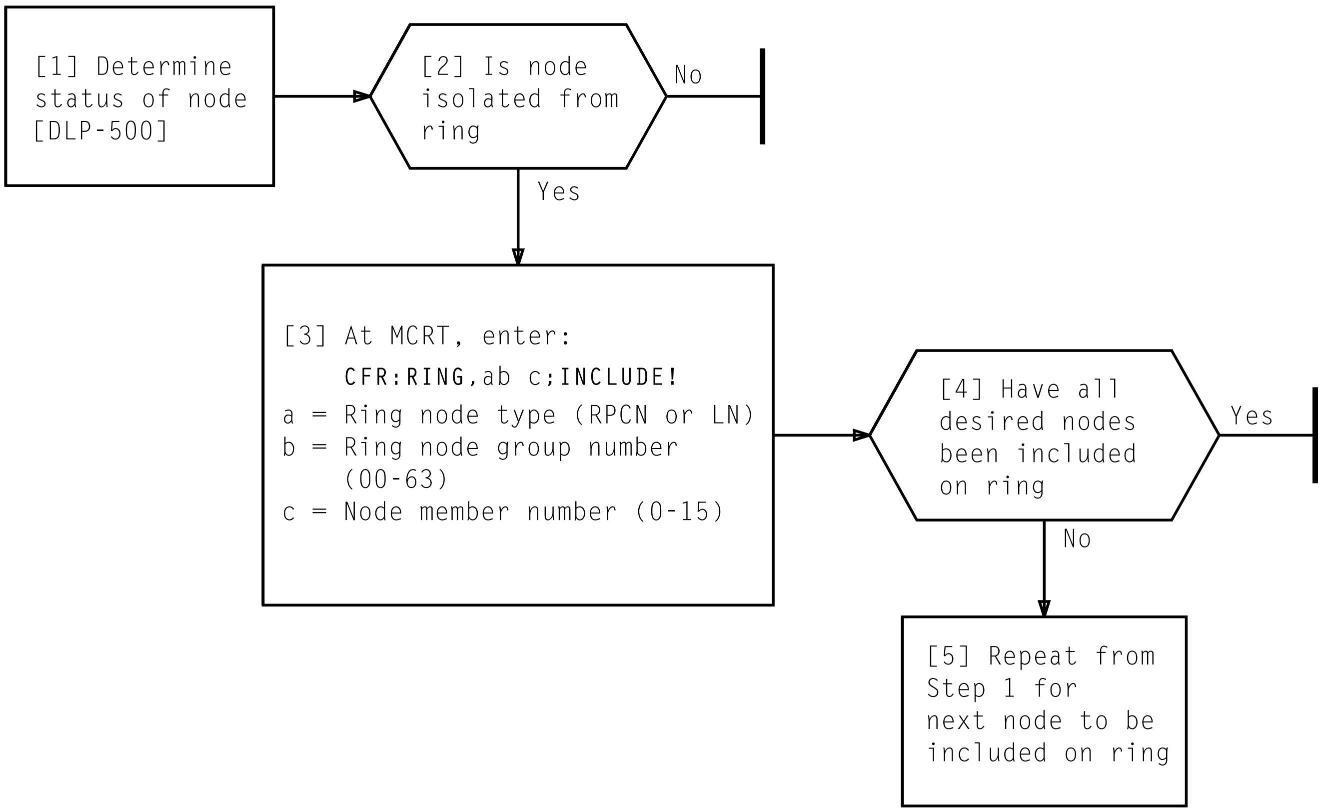
TABLE B UN303B DIAGNOSTIC PHASES	
FAILING PHASE	**DESCRIPTION OF CIRCUITRY TESTED**
01	Tests that each node in isolated segment is able to set and clear its data selector via hardware commands at RAC0/. Phase 1 also tests that a message can be relayed from BISO node to EISO node via isolated segment 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 EISO node to BISO 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



ISOLATE NODE FROM RING



INCLUDE NODE ON RING

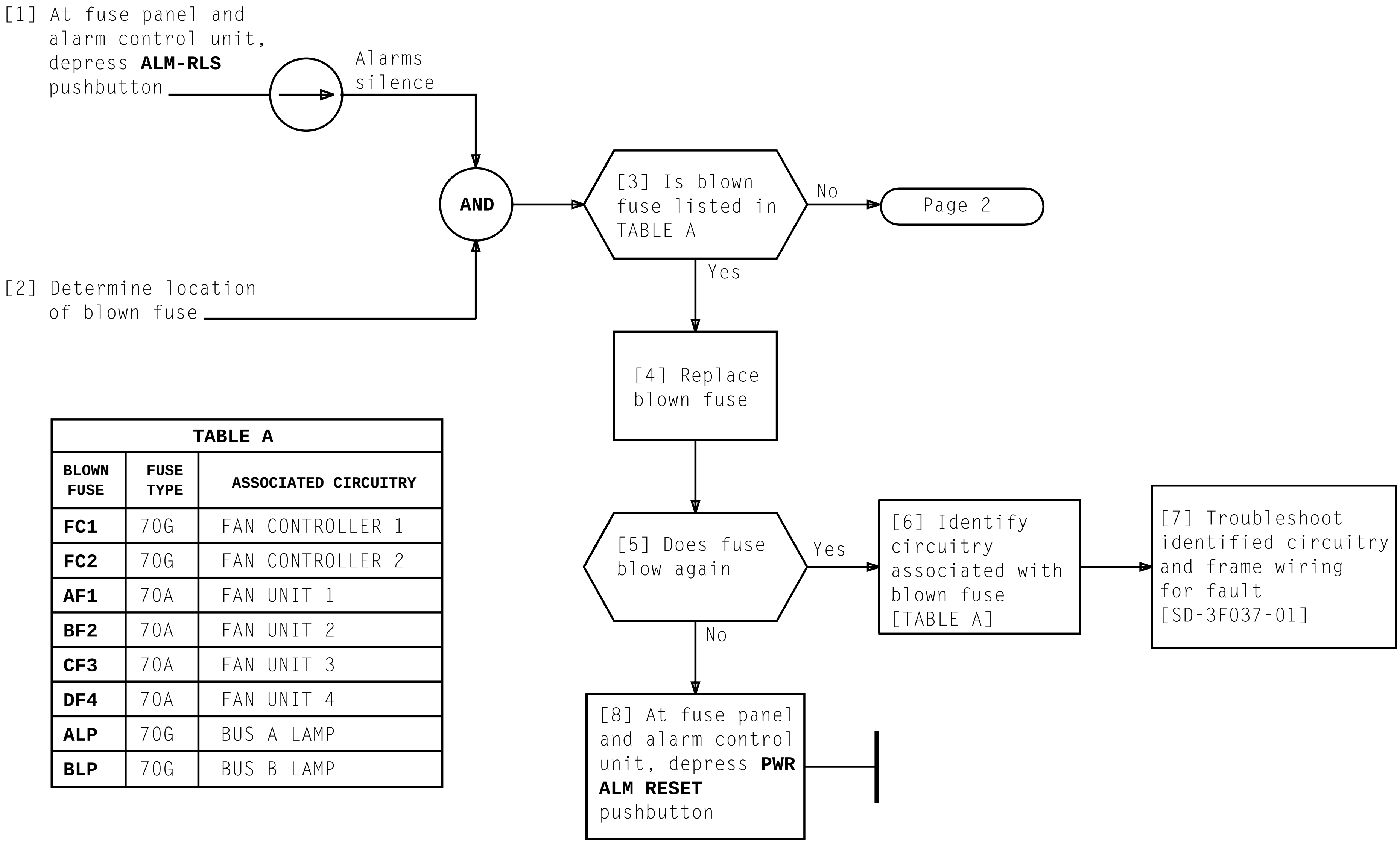


TABLE A

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)

AND

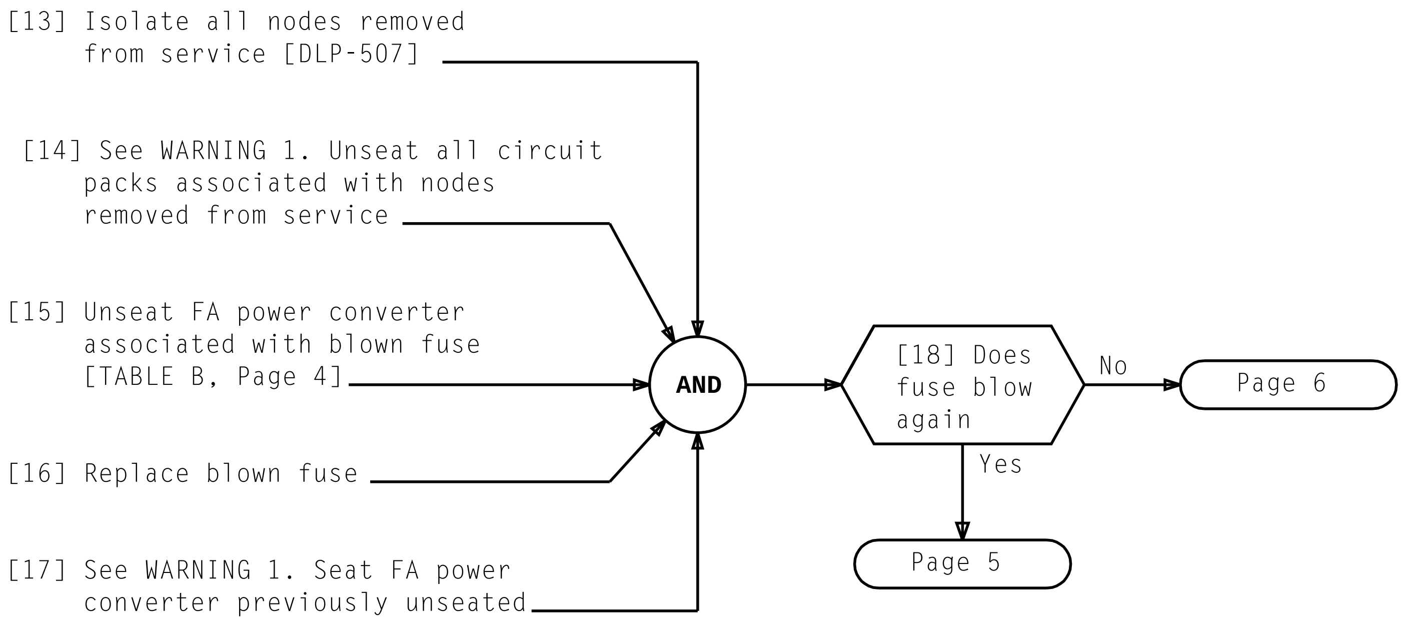
[11] Have all nodes associated with converter fuse been removed from service

Yes → Page 3

No → [12] Repeat from Step 10 for next node associated with converter fuse

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

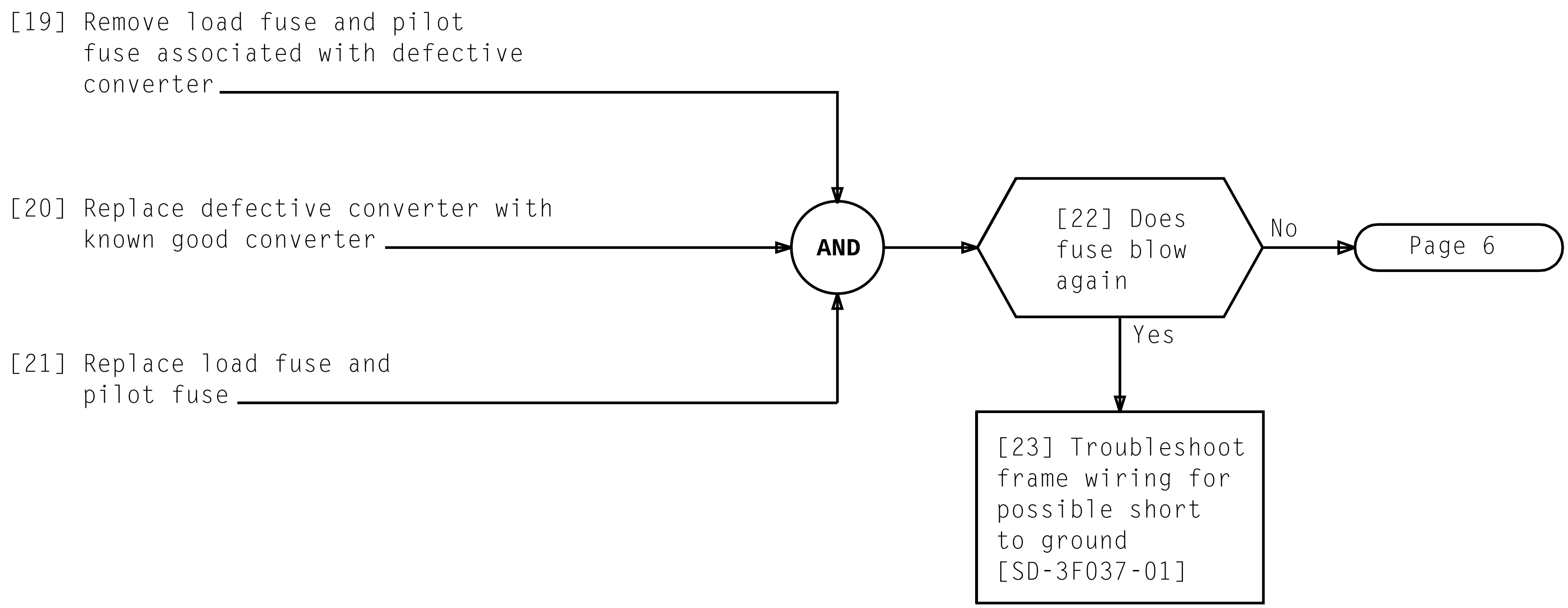


WARNING 1

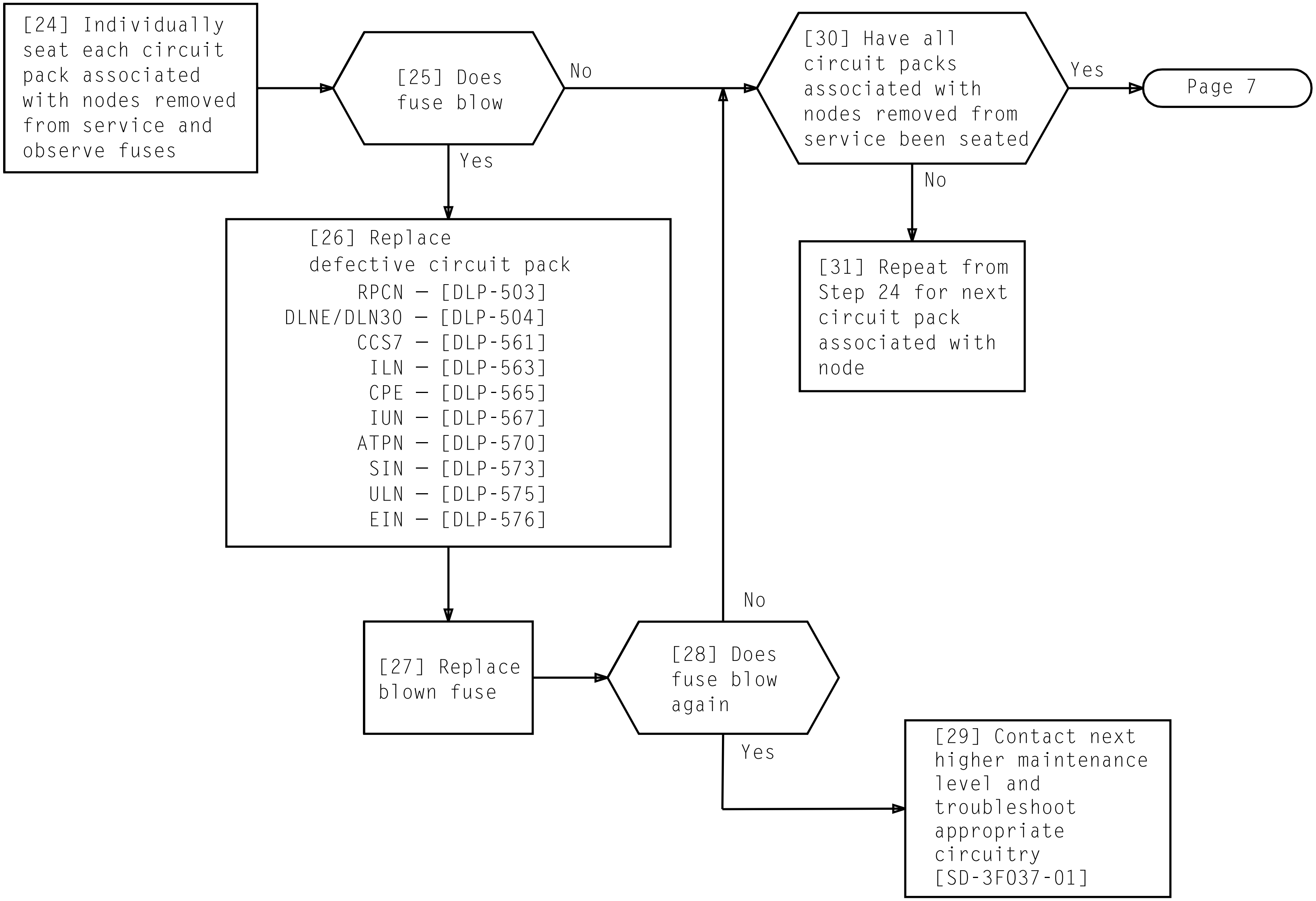
It should be assumed that all circuit packs containing solid-state electronic components can be damaged by electrostatic discharge. When handling circuit packs and working in the backplane area, a grounded antistatic wrist strap (R-4987 or equivalent) must be worn. The strap should be connected to ground 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 **0**

LNxx y

xx = Ring node group number (00-63)

y = Node member number (1-15)

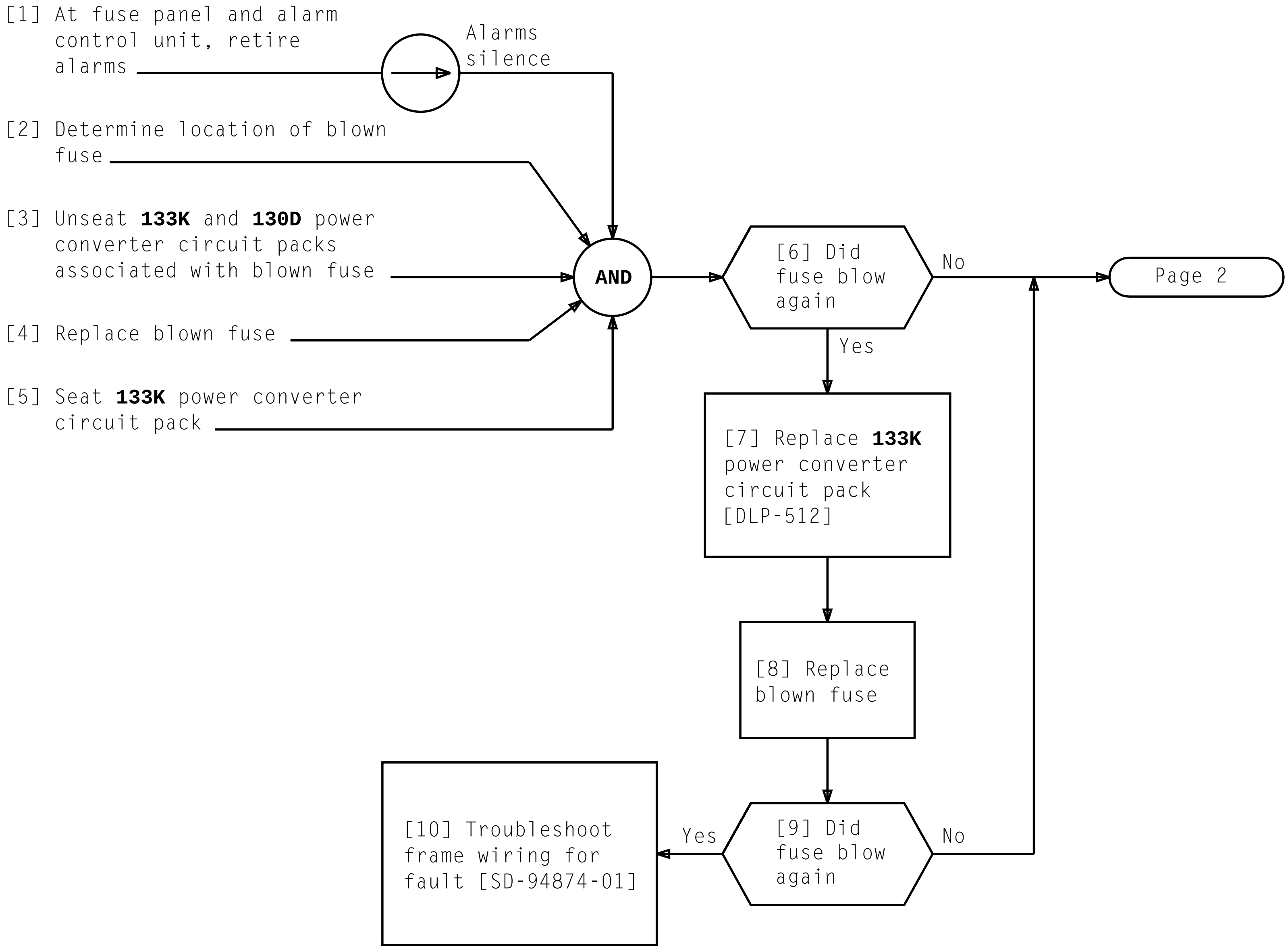
AND

[35] Have all nodes previously removed from service been restored

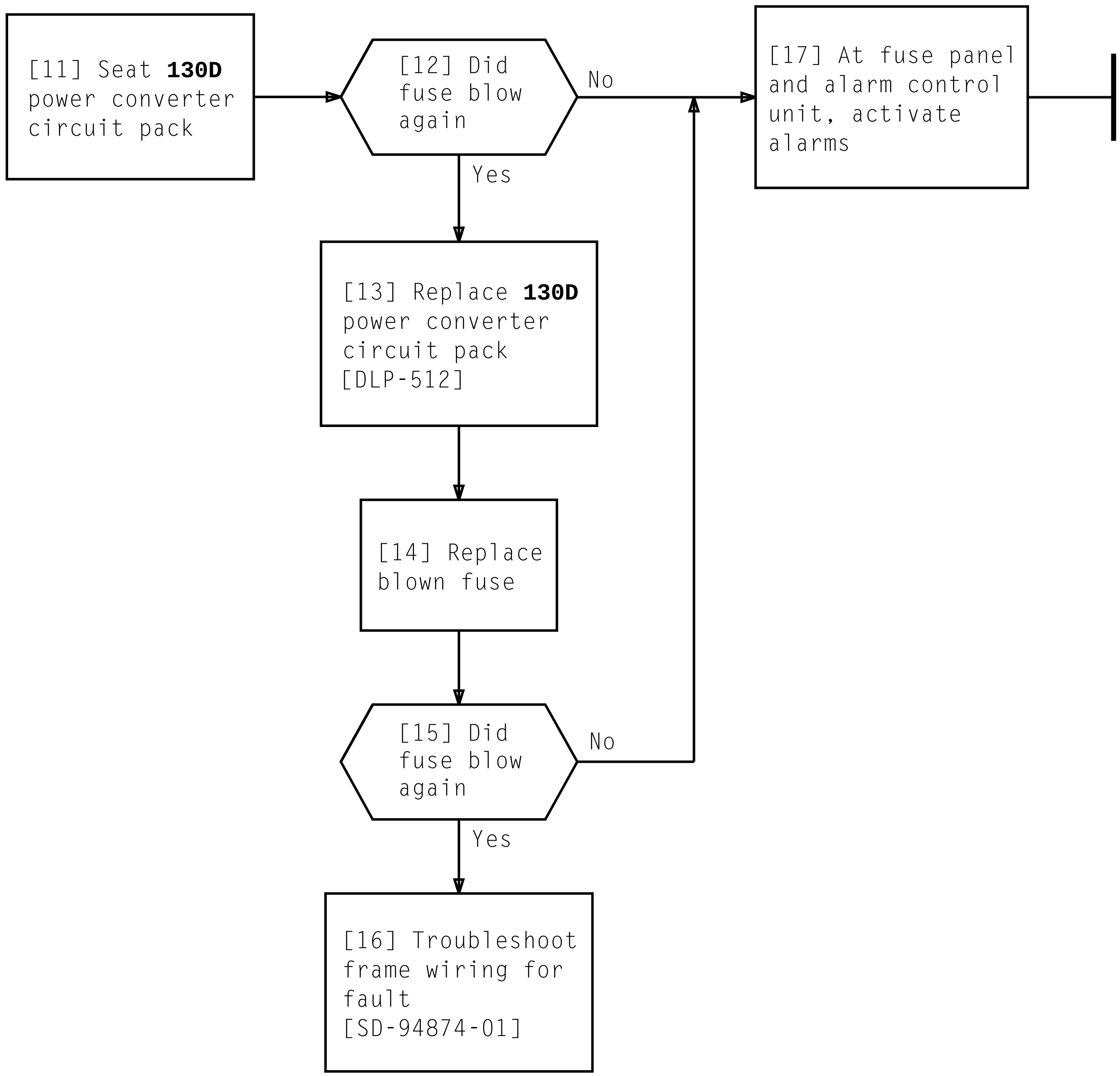
Yes

No

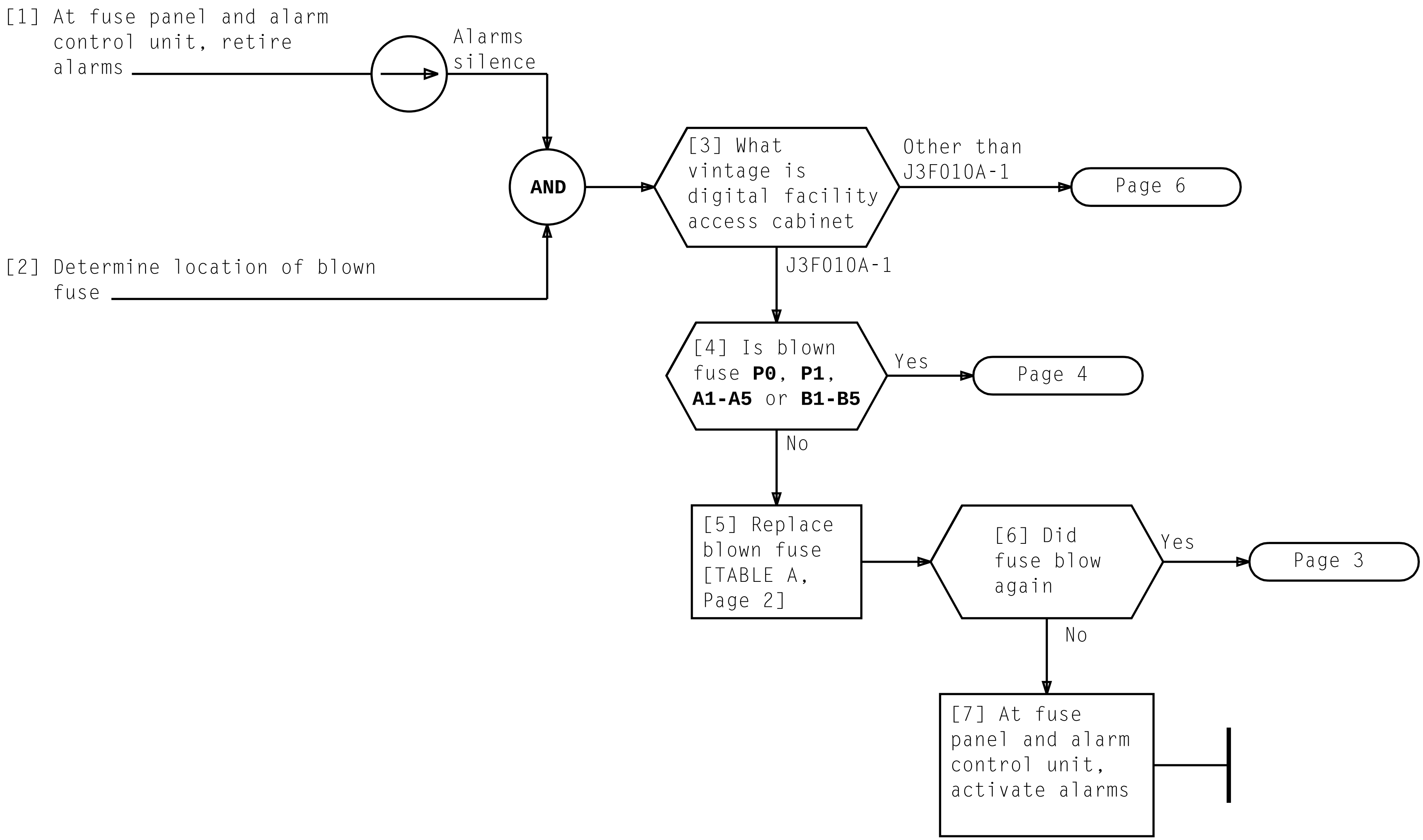
[36] Repeat from Step 34



REPLACE BLOWN FUSE — ANALOG FACILITY ACCESS (AFA) CABINET

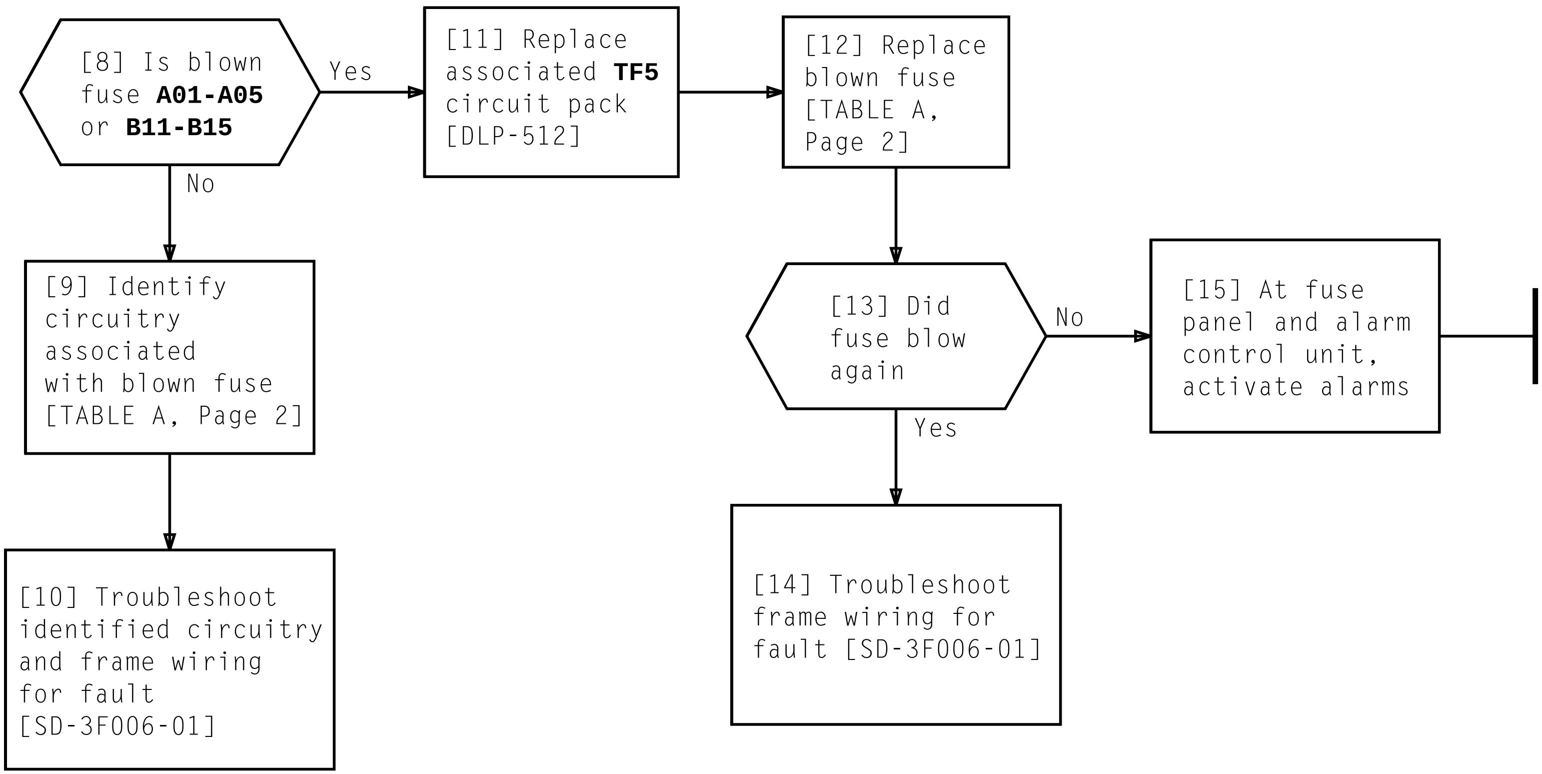


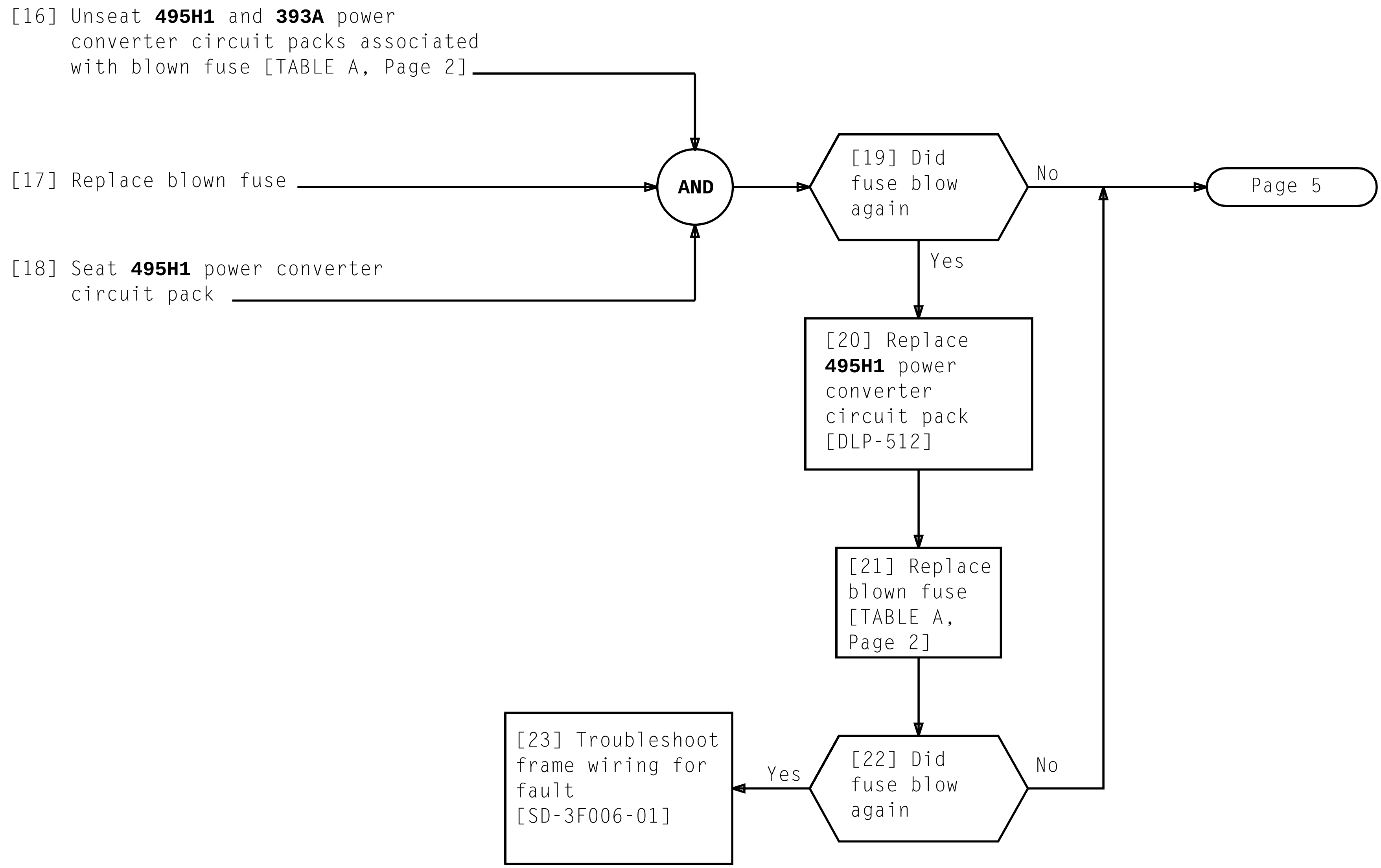
REPLACE BLOWN FUSE — ANALOG FACILITY ACCESS (AFA) CABINET



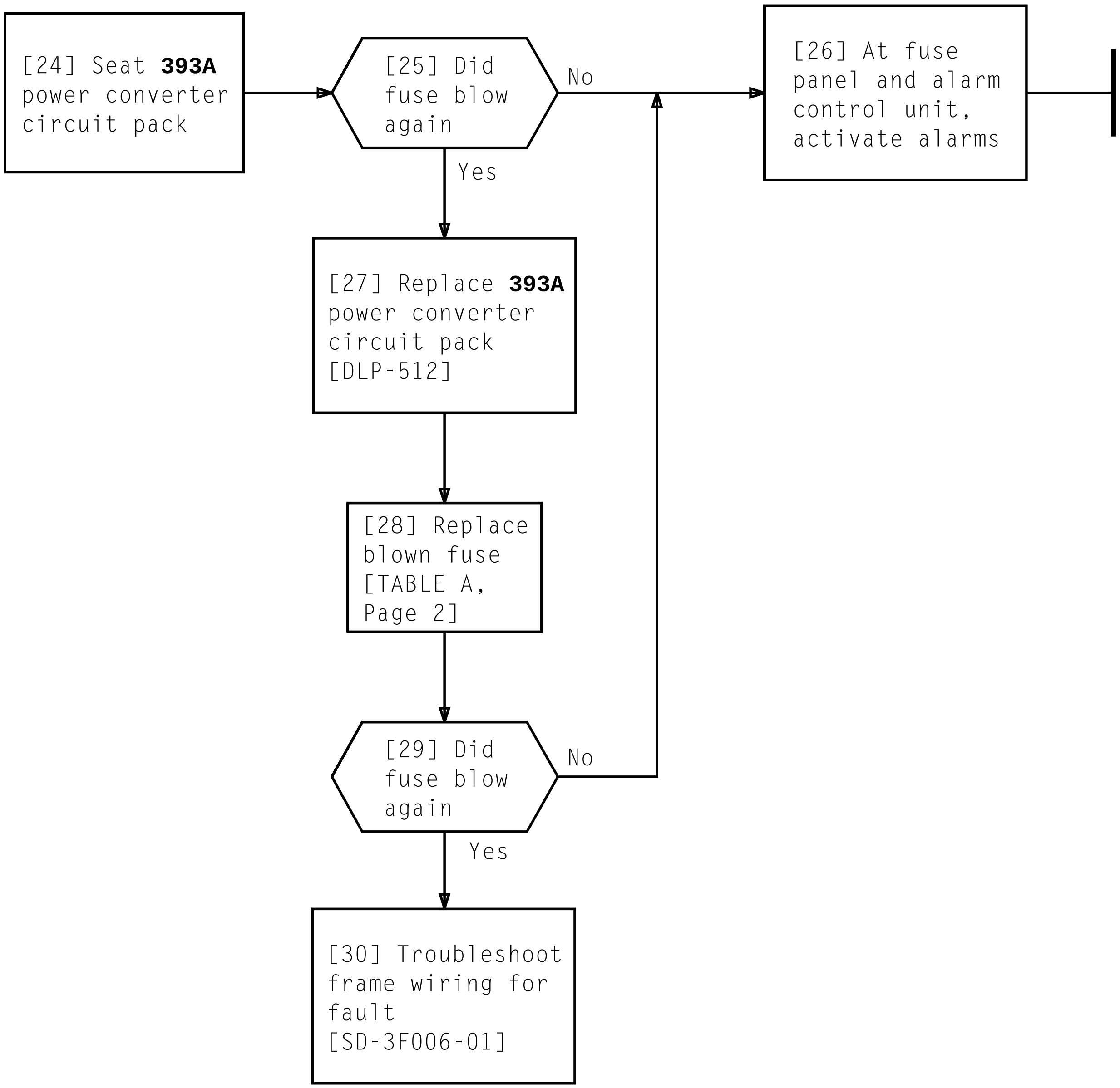
REPLACE BLOWN FUSE — DIGITAL FACILITY ACCESS (DFA) CABINET

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

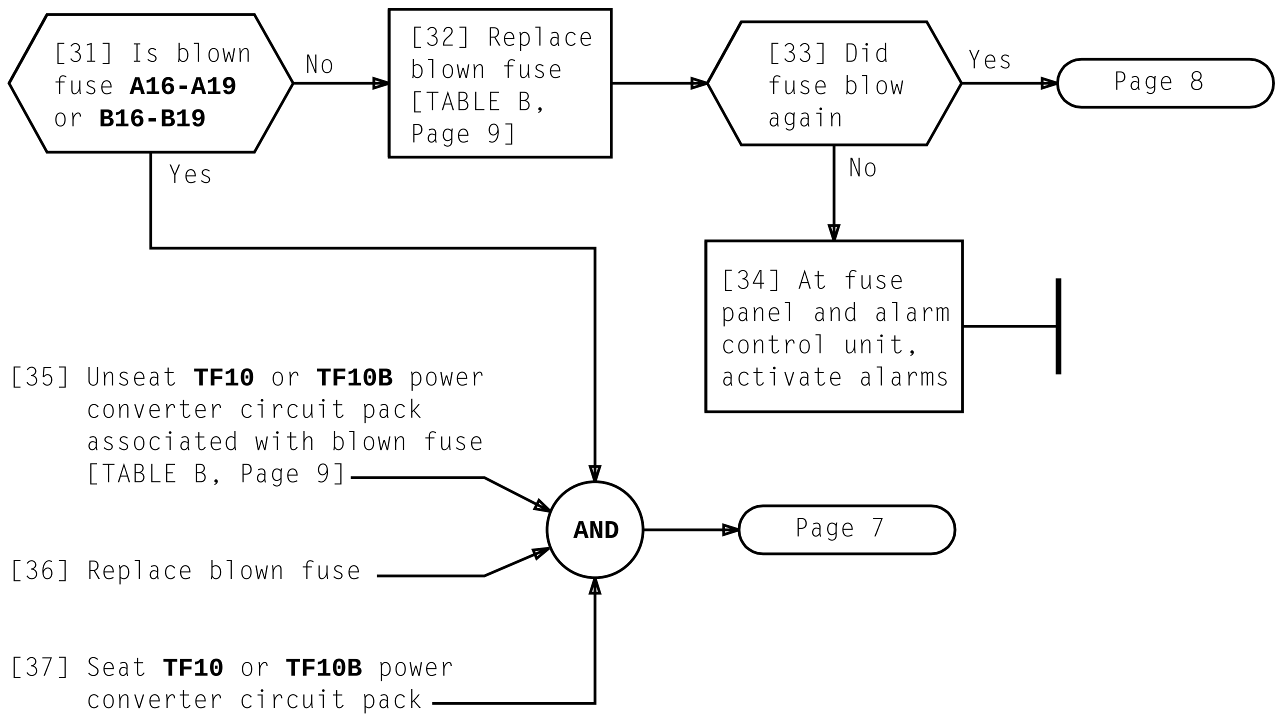

[8] Is blown fuse **A01-A05** or **B11-B15**
Yes
No
[9] Identify circuitry associated with blown fuse [TABLE A, Page 2]
[10] Troubleshoot identified circuitry and frame wiring for fault [SD-3F006-01]
[11] Replace associated **TF5** circuit pack [DLP-512]
[12] Replace blown fuse [TABLE A, Page 2]
[13] Did fuse blow again
No
Yes
[14] Troubleshoot frame wiring for fault [SD-3F006-01]
[15] At fuse panel and alarm control unit, activate alarms

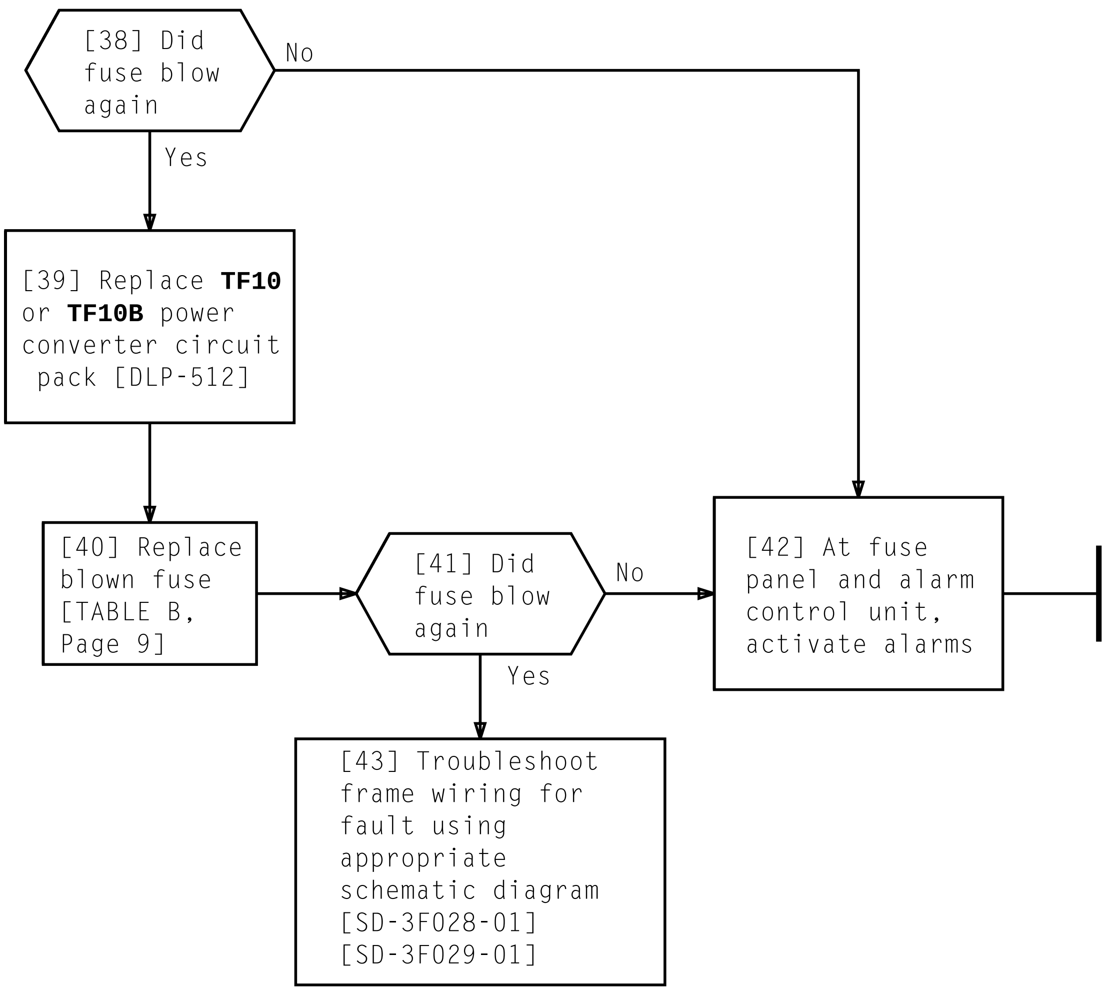


REPLACE BLOWN FUSE — DIGITAL FACILITY ACCESS (DFA) CABINET

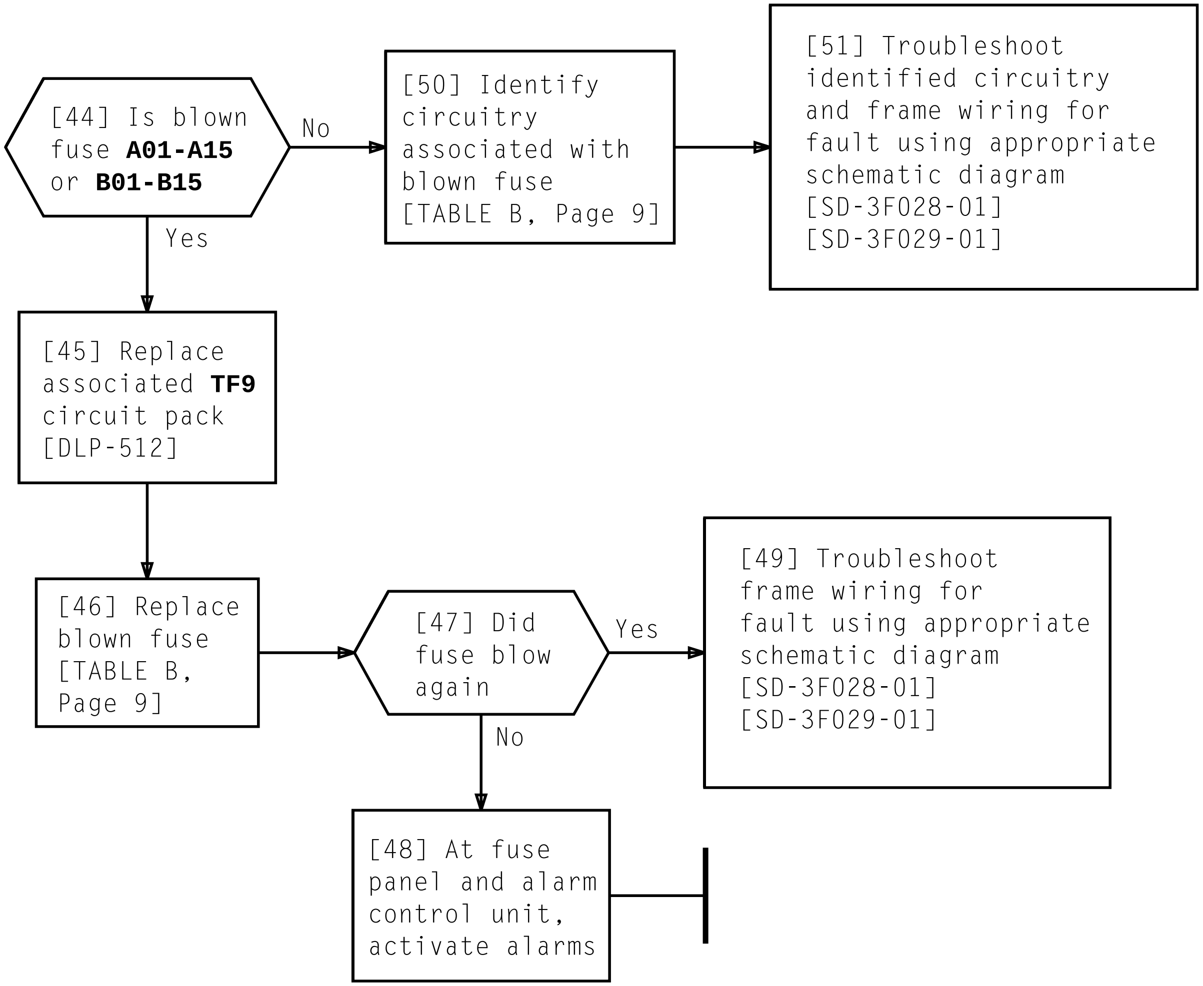


REPLACE BLOWN FUSE — DIGITAL FACILITY ACCESS (DFA) CABINET


[31] Is blown fuse **A16-A19** or **B16-B19**
No
Yes
[32] Replace blown fuse [TABLE B, Page 9]
[33] Did fuse blow again
Yes
No
Page 8
[34] At fuse panel and alarm control unit, activate alarms
[35] Unseat **TF10** or **TF10B** power converter circuit pack associated with blown fuse [TABLE B, Page 9]
[36] Replace blown fuse
[37] Seat **TF10** or **TF10B** power converter circuit pack
AND
Page 7



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

[1] See WARNING 1. Remove circuit pack to be replaced

[2] Clean and lubricate circuit pack connector per approved procedure

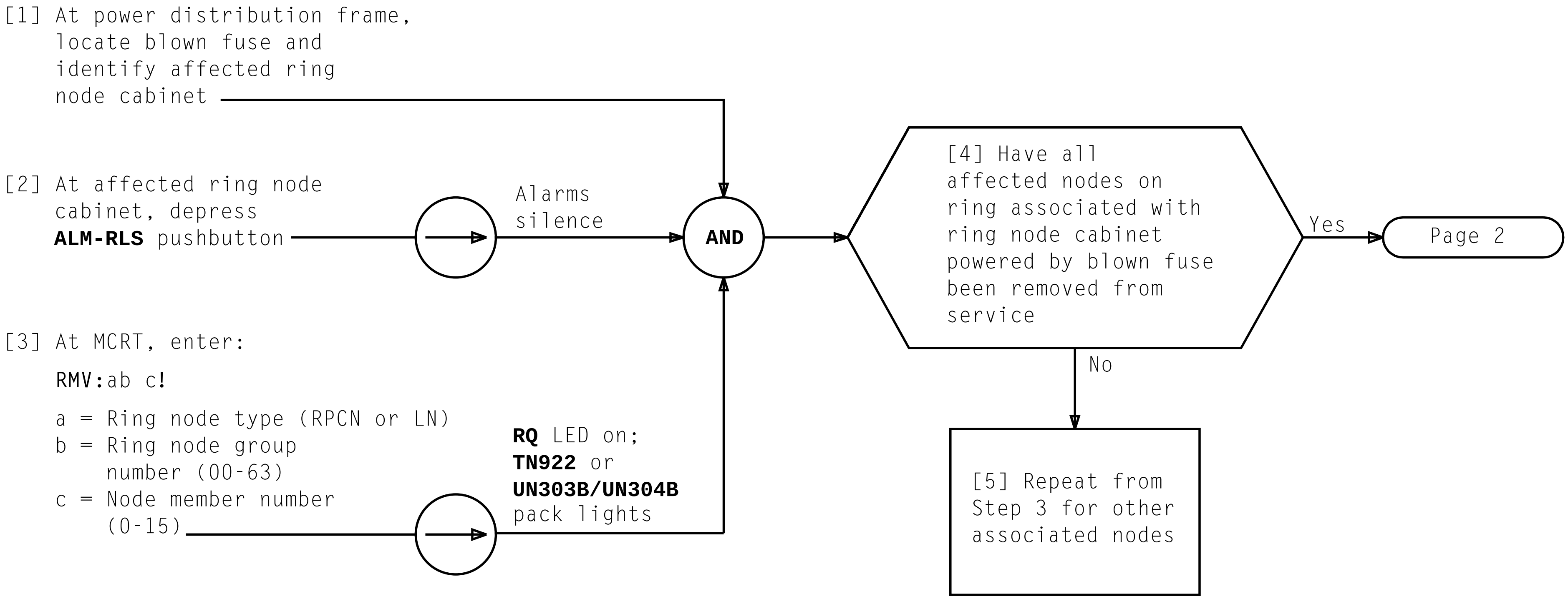
[3] See WARNING 1. Insert and properly seat replacement pack

AND

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)

[6] Isolate all affected nodes from ring [DLP-507] if not already isolated

[7] At affected ring node cabinet, unseat power converters and node circuit packs

[8] Remove fan assembly fuses

At Power Distribution Frame:

[9] Remove blown 20-amp main fuse and indicator fuse

[10] Insert charging tool into indicator fuse slot

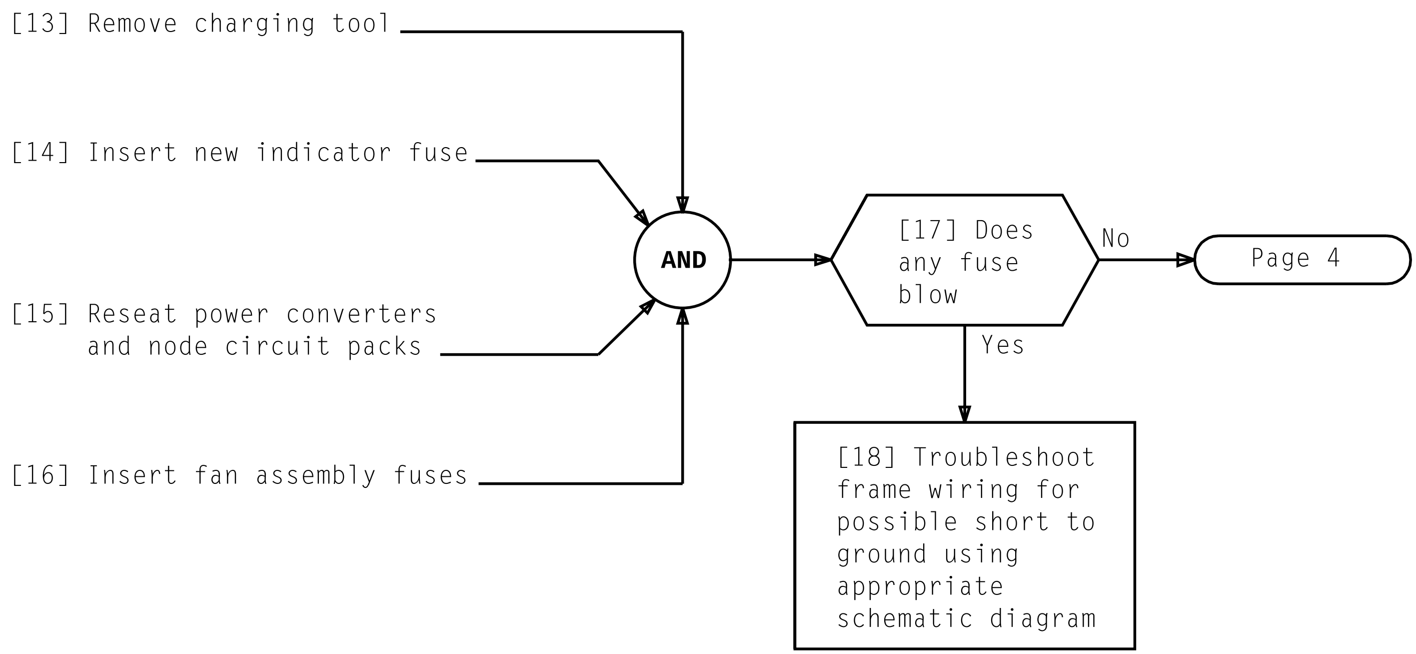
[11] Depress **CHARGE** pushbutton on control panel and allow capacitors to fully charge

Charge LED lights and slowly decays

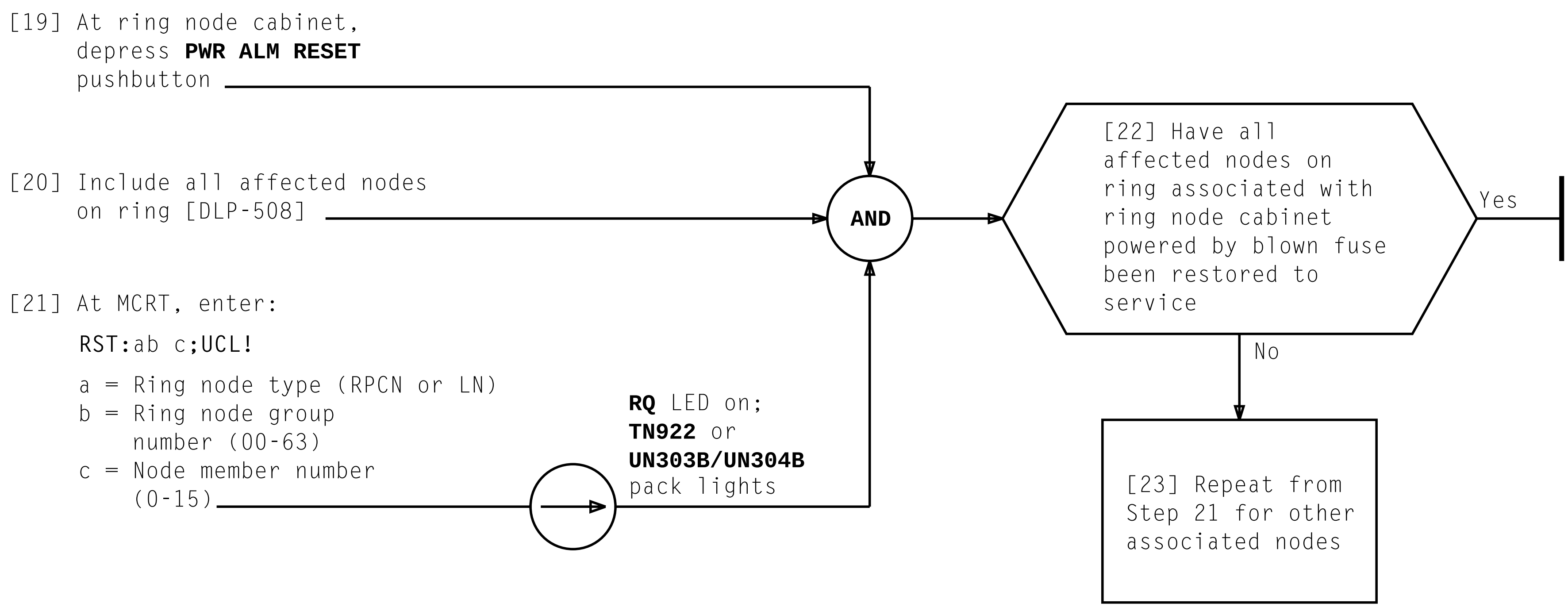
[12] Insert new 20-amp main fuse

AND

Page 3



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



[19] At ring node cabinet, depress **PWR ALM RESET** pushbutton
[20] Include all affected nodes on ring [DLP-508]
[21] At MCRT, enter:
RST:ab c;UCL!
a = Ring node type (RPCN or LN)
b = Ring node group number (00-63)
c = Node member number (0-15)
RQ LED on; **TN922** or **UN303B/UN304B** pack lights
AND
[22] Have all affected nodes on ring associated with ring node cabinet powered by blown fuse been restored to service
Yes
No
[23] Repeat from Step 21 for other associated nodes

[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

[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)

AND

[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

REPLACE FA POWER CONVERTER

[6] Isolate all nodes removed from service [DLP-507]

[7] See WARNING 1. Unseat all circuit packs associated with nodes removed from service

[8] Remove pilot fuse and load fuse associated with power converter to be replaced [TABLE A, Page 3]

[9] See WARNING 1. Remove power converter to be replaced

[10] Clean and lubricate converter connector per approved procedure

[11] See WARNING 1. Insert and properly seat replacement converter

AND

Page 4

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

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)

AND

[15] Have all nodes removed from service been restored

Yes

[17] Include all restored nodes on ring [DLP-508]

No

[16] Repeat from Step 14 for next node to be restored

WARNING 1

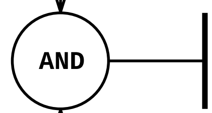
It should be assumed that all circuit packs containing solid-state electronic components can be damaged by electrostatic discharge. When handling circuit packs and working in the backplane area, a grounded antistatic wrist strap (R-4987 or equivalent) must be worn. The strap should be connected to ground 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)



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

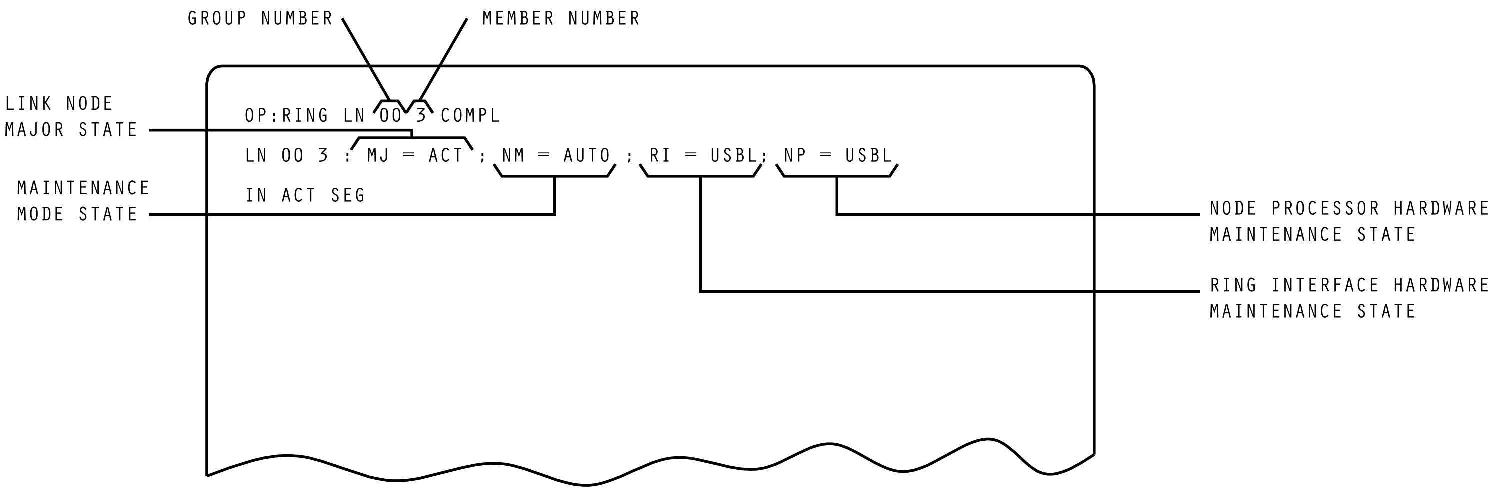


Figure 1 — Sample Printout of Link Node (LN) State

VERIFY LINK NODE (LN) STATE

VERIFY SIGNALING LINK (SLK) 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

AND

[3] Is signaling link state correct

Yes

No

[4] Change signaling link state [DLP-525]

```
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

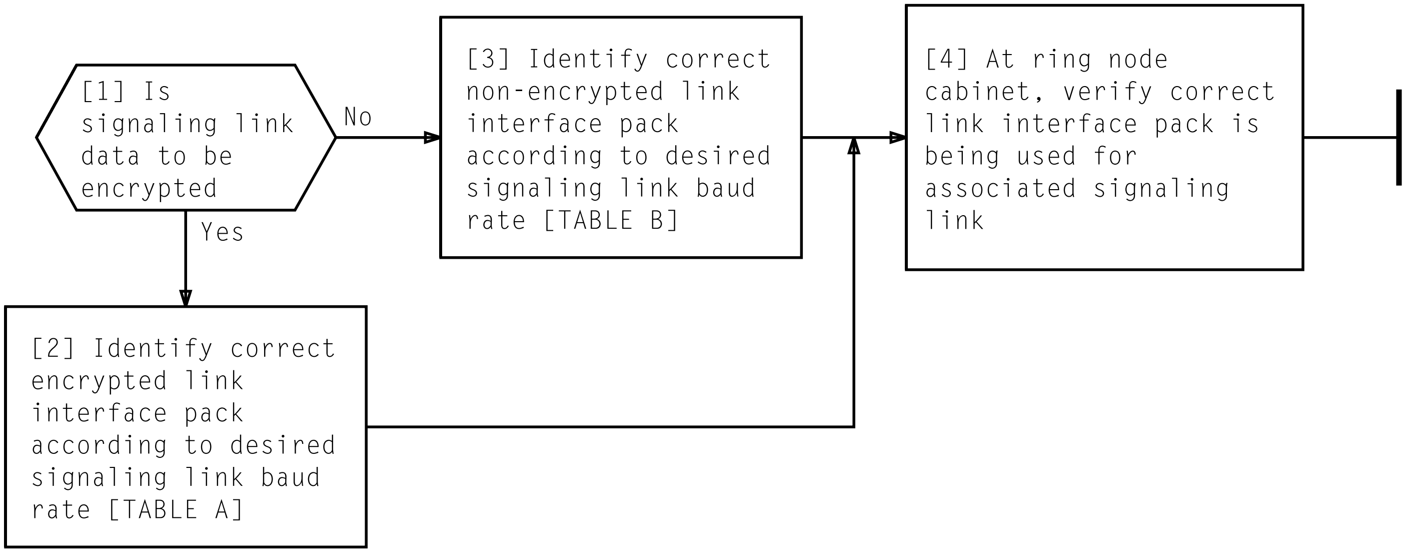


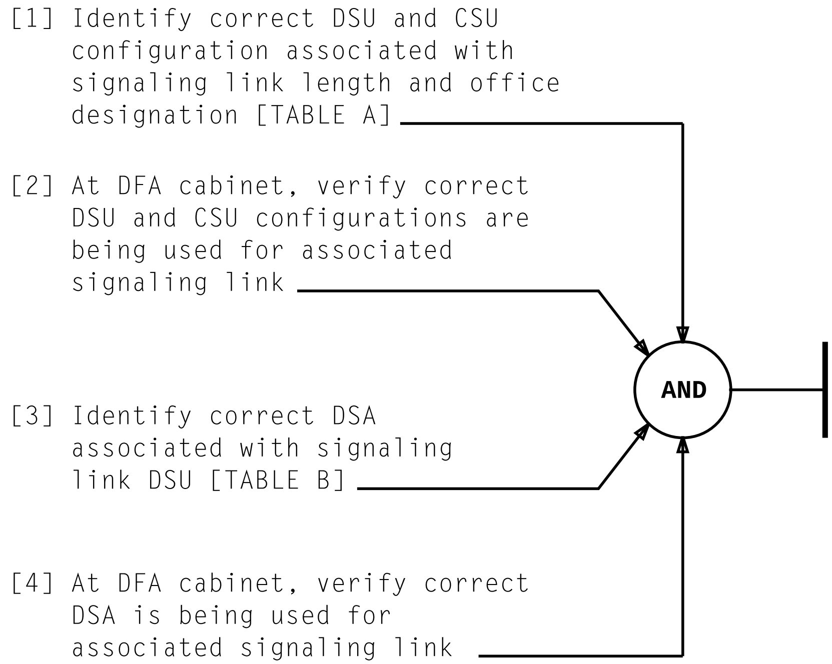
TABLE A
ENCRYPTED LINK INTERFACE PACKS

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)



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]

AND

Page 3

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

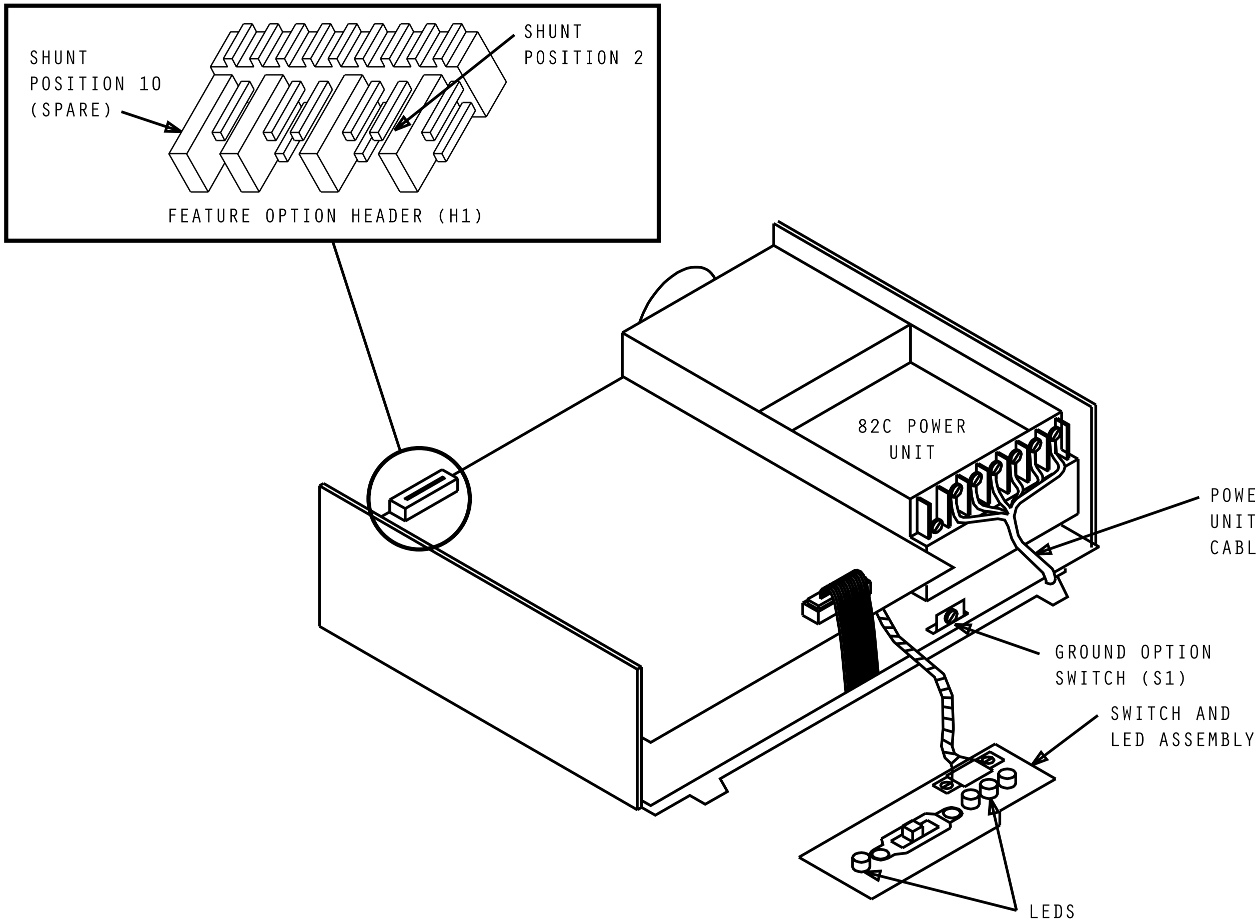
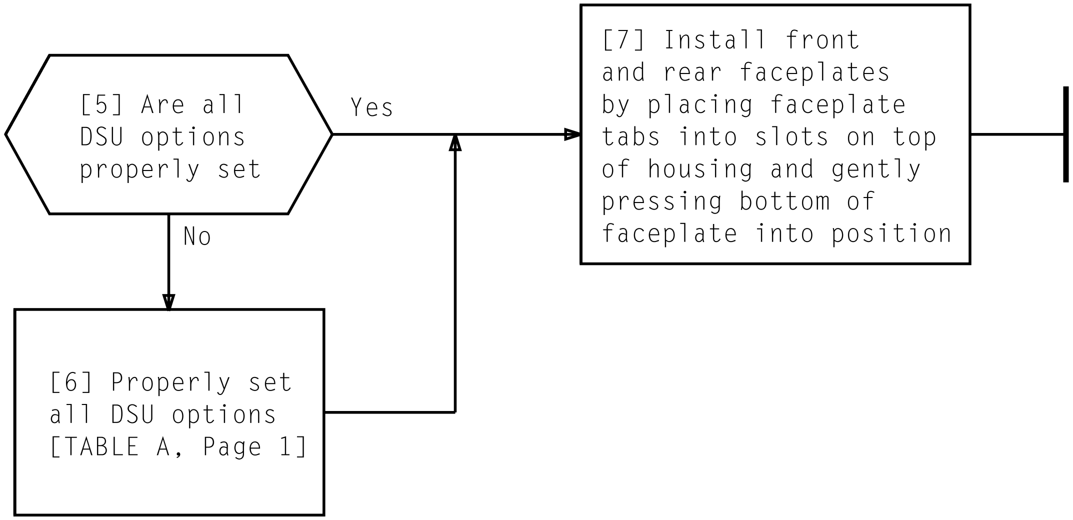
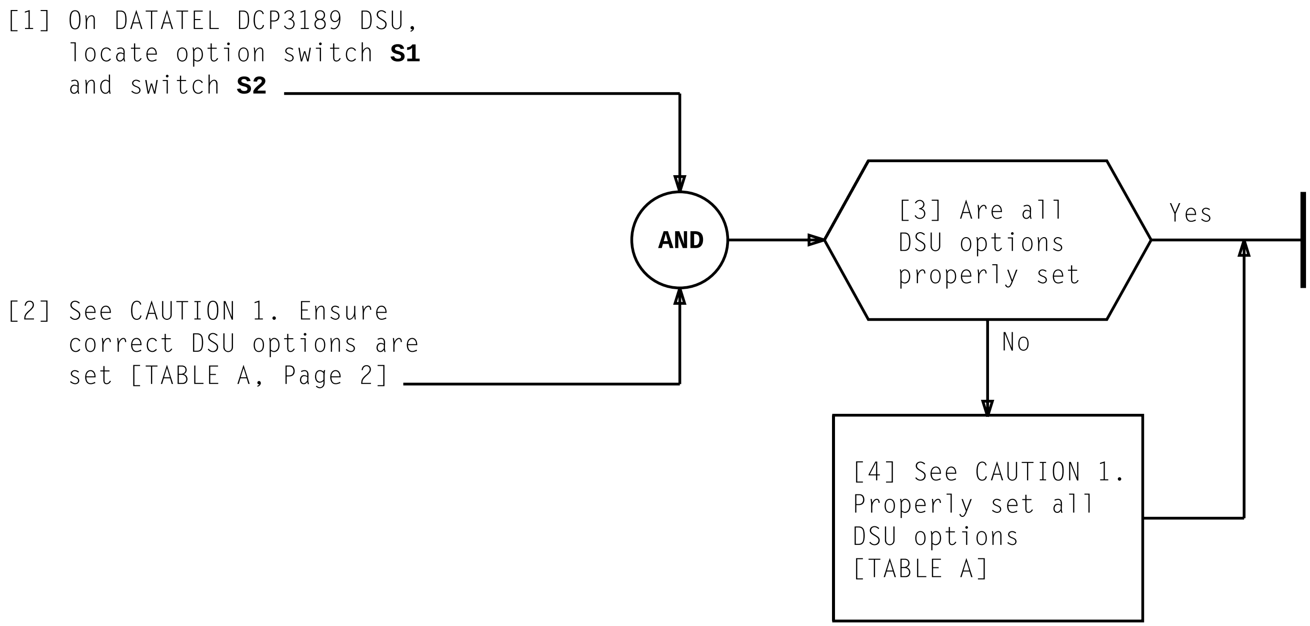


Figure 1 — 500B/502B TYPE DATA UNIT SELECTOR (INTERNAL VIEW)



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



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

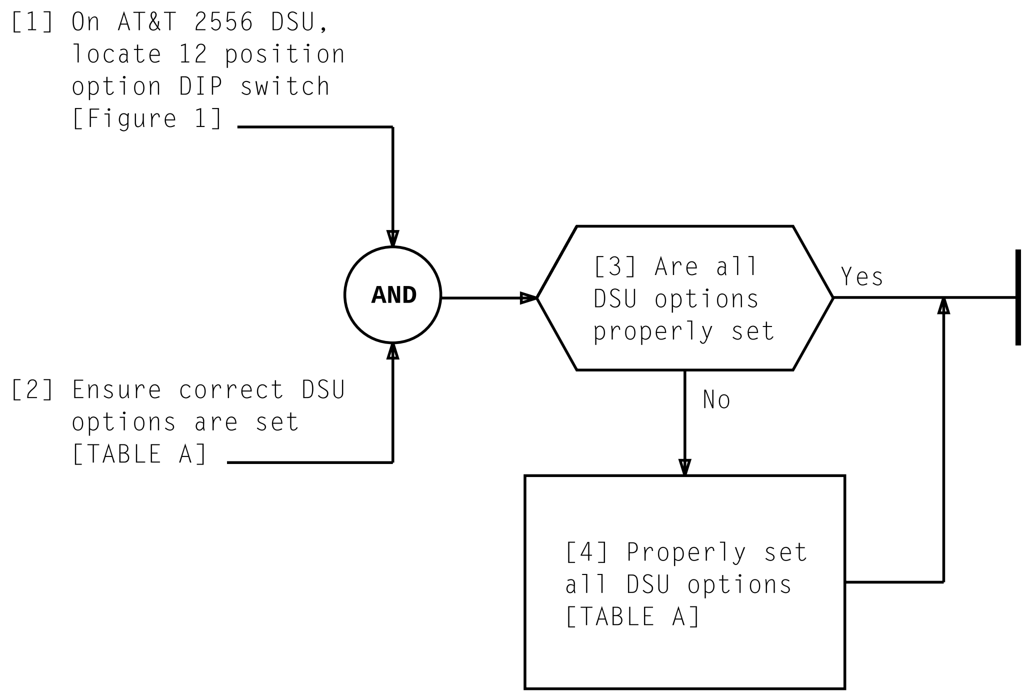


TABLE A
AT&T 2556 DSU OPTIONS

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

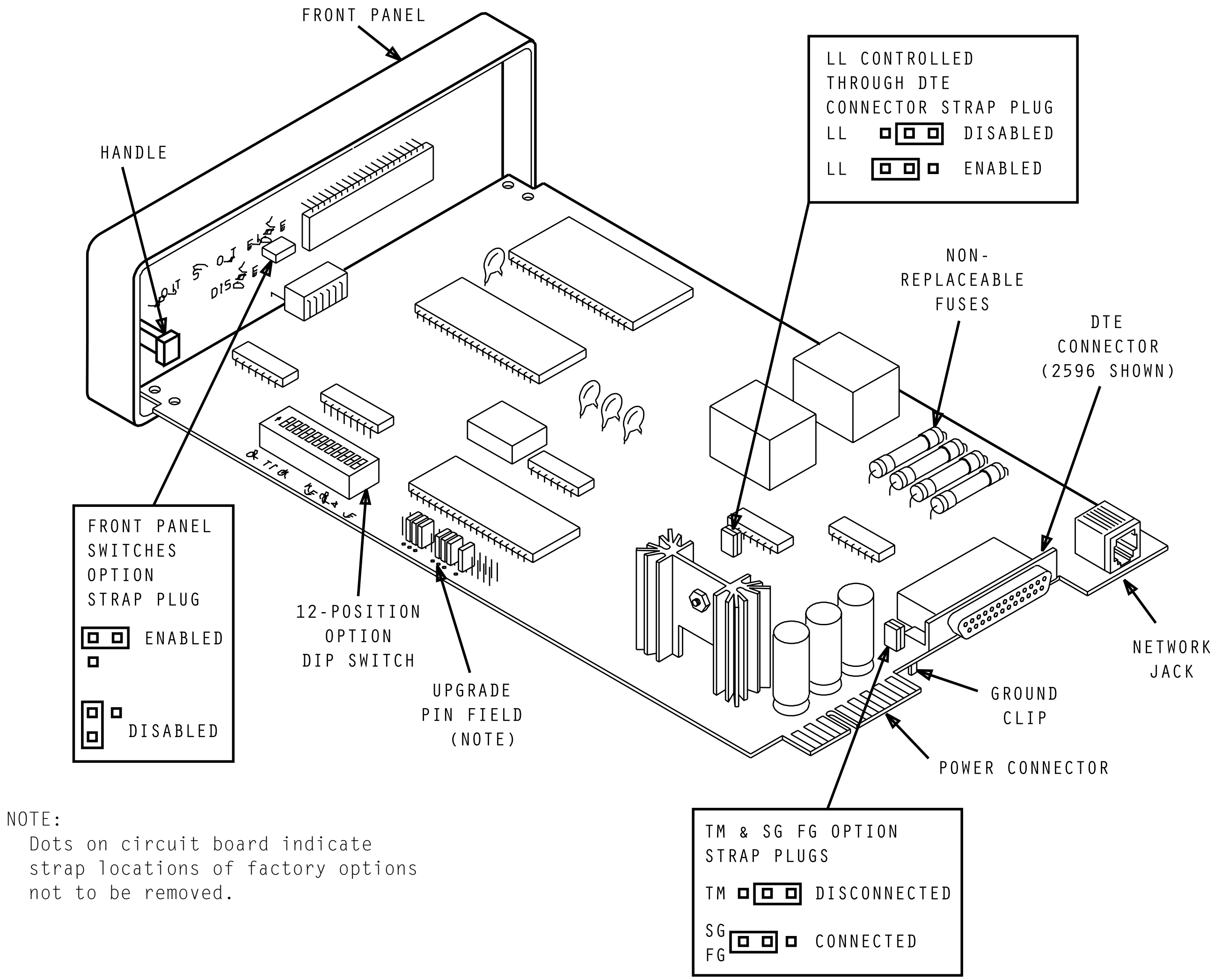


Figure 1 — AT&T 2556 TYPE DATA UNIT SELECTOR (INTERNAL VIEW)

VERIFY AT&T 2556 DATA SERVICE UNIT (DSU) 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

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

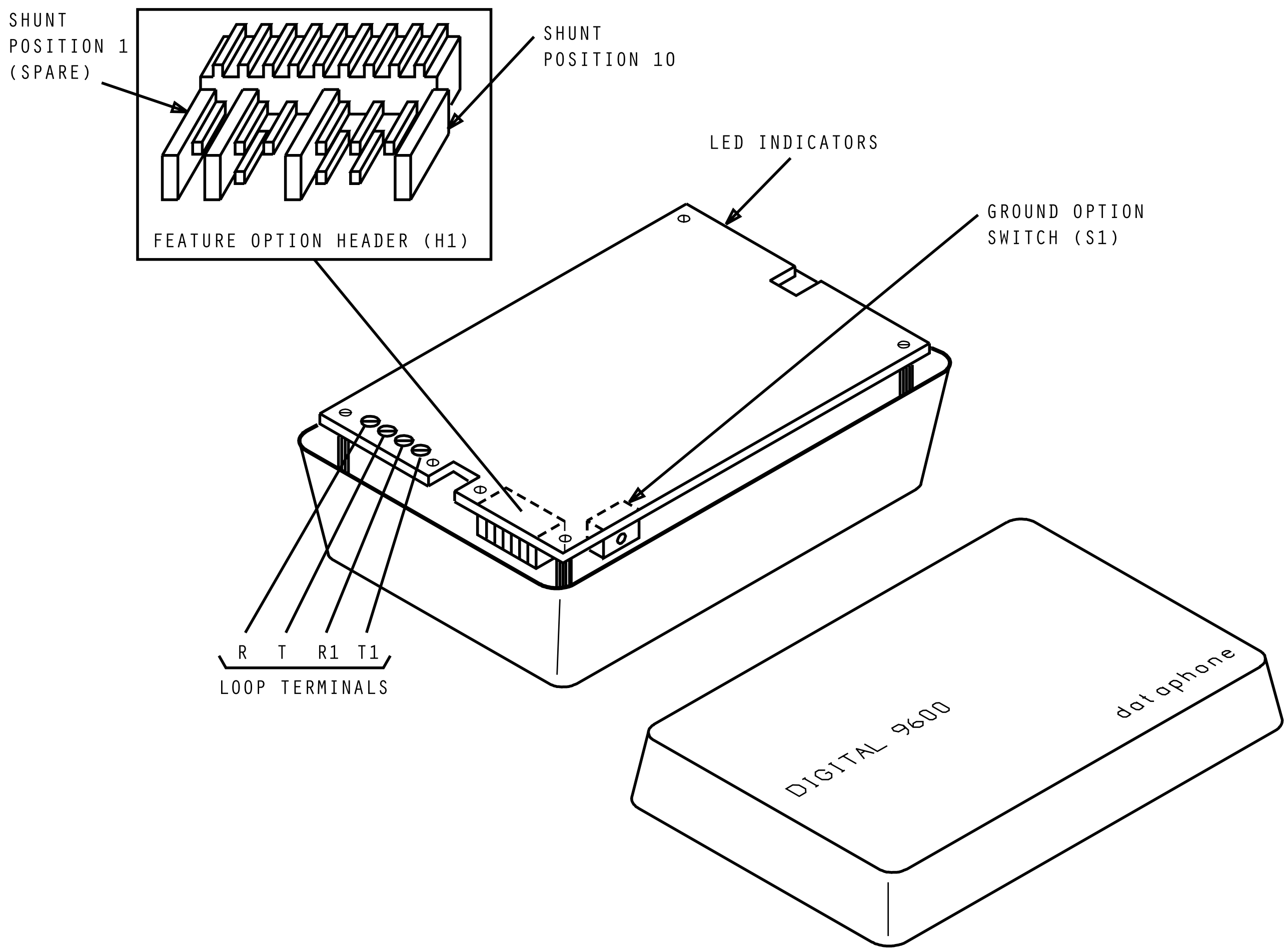
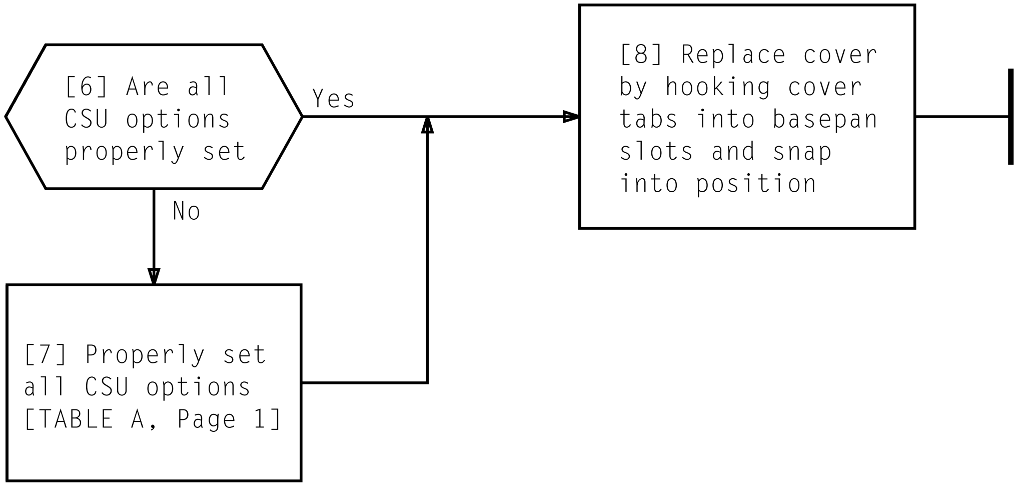


Figure 1 — 550A TYPE CHANNEL SELECTOR UNIT — COVER REMOVED

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


[6] Are all CSU options properly set
Yes
No
[7] Properly set all CSU options [TABLE A, Page 1]
[8] Replace cover by hooking cover tabs into basepan slots and snap into position

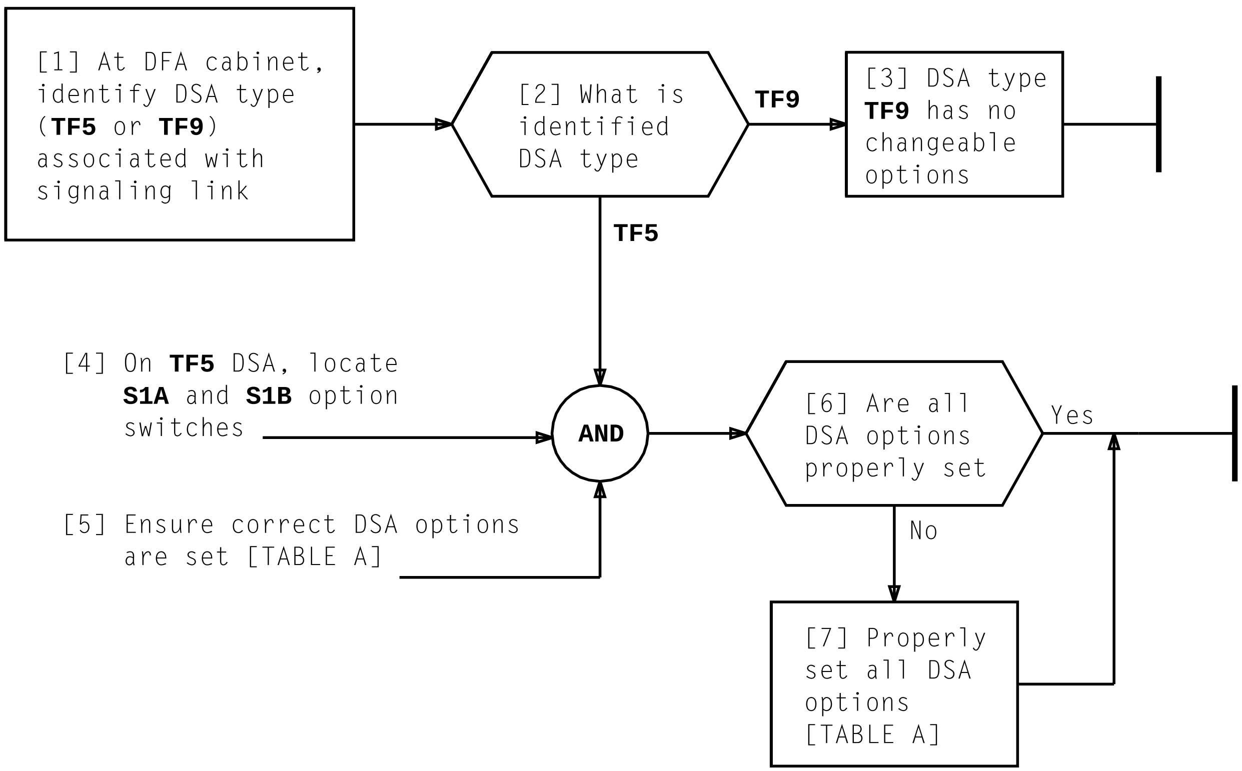
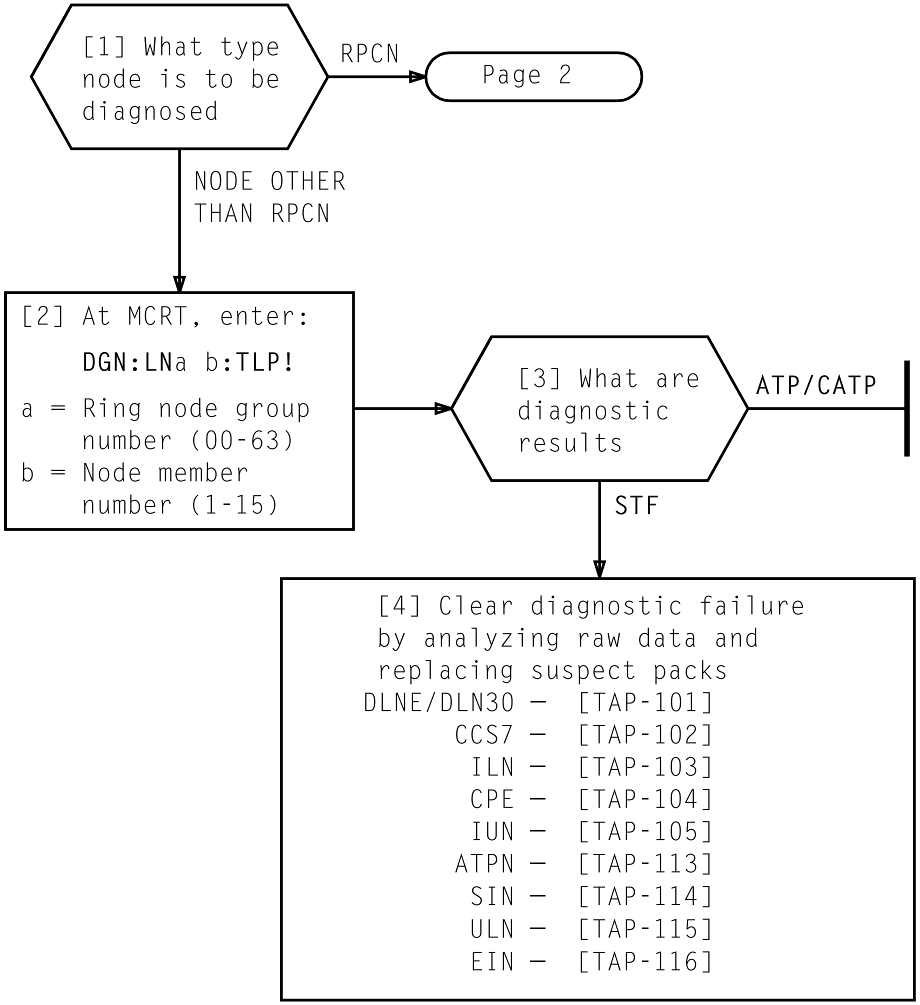


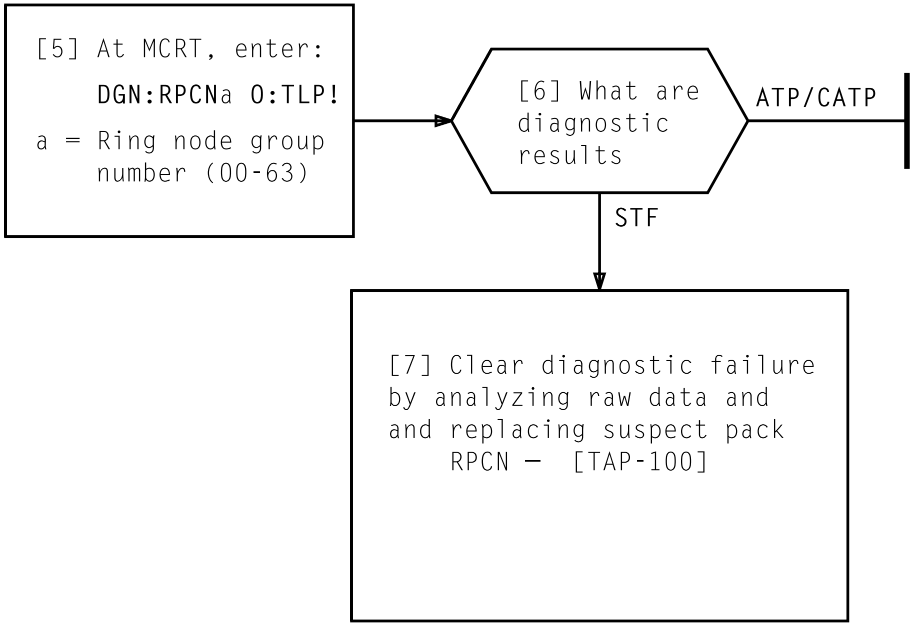
TABLE A
TF5 DSA OPTIONS

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

AND

[3] Is signaling link state correct

Yes

No

[4] Repeat from Step 1

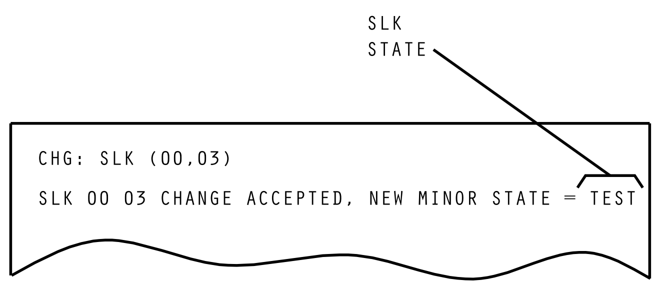


Figure 1 — Sample Printout of Output Response To Signaling Link State Change

CHANGE SIGNALING LINK STATE

[1] Has system responded with output message indicating **PROVE-IN COMPLETE** [Figure 1]

Yes → End

No ↓

[2] At MCRT, enter:

MON:SLK(a,b);STATUS!

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

[3] Does system response indicate signaling link monitor is **ON**

Yes → [4]

No ↓

[4] Wait for signaling link **PROVE-IN COMPLETE** output response [FIG. 1]

→ End

[5] Enter:

MON:SLK(a,b);ON!

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

→ [4]

```
REPT MON SLK
SLK 00 03 DNVRCOMA03T UNA TEST PROVE-IN COMPLETE 43
```

Figure 1 — Sample Printout of PROVE-IN COMPLETED Response

VERIFY SIGNALING LINK IS IN SYNC AND PROVED-IN

[1] See CAUTION 1.
Obtain replacement DSU

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

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

[4] Release retaining mechanism and
remove DSU from cabinet

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

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

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

AND

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

REPLACE DIGITAL SERVICE UNIT (DSU)

[1] See CAUTION 1.
Obtain replacement CSU

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

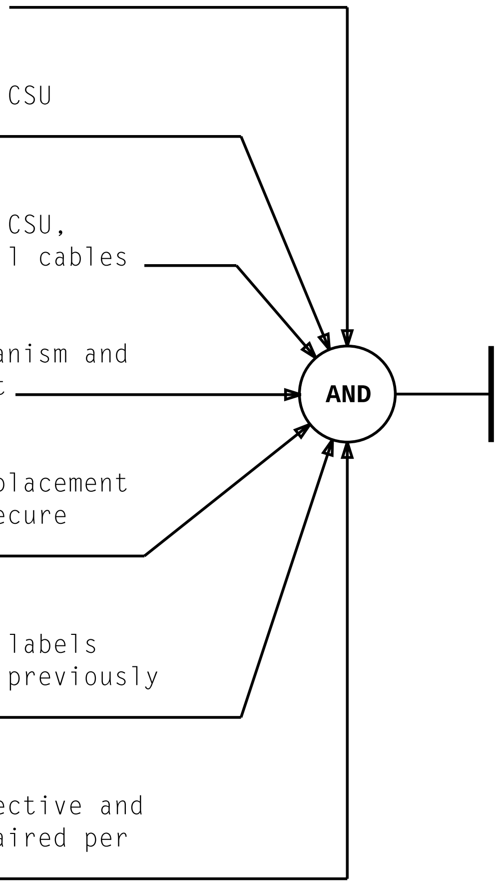
[3] See NOTE 1. On back of CSU,
disconnect and label all cables

[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



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

REPLACE CHANNEL SERVICE UNIT (CSU)

[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

AND

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

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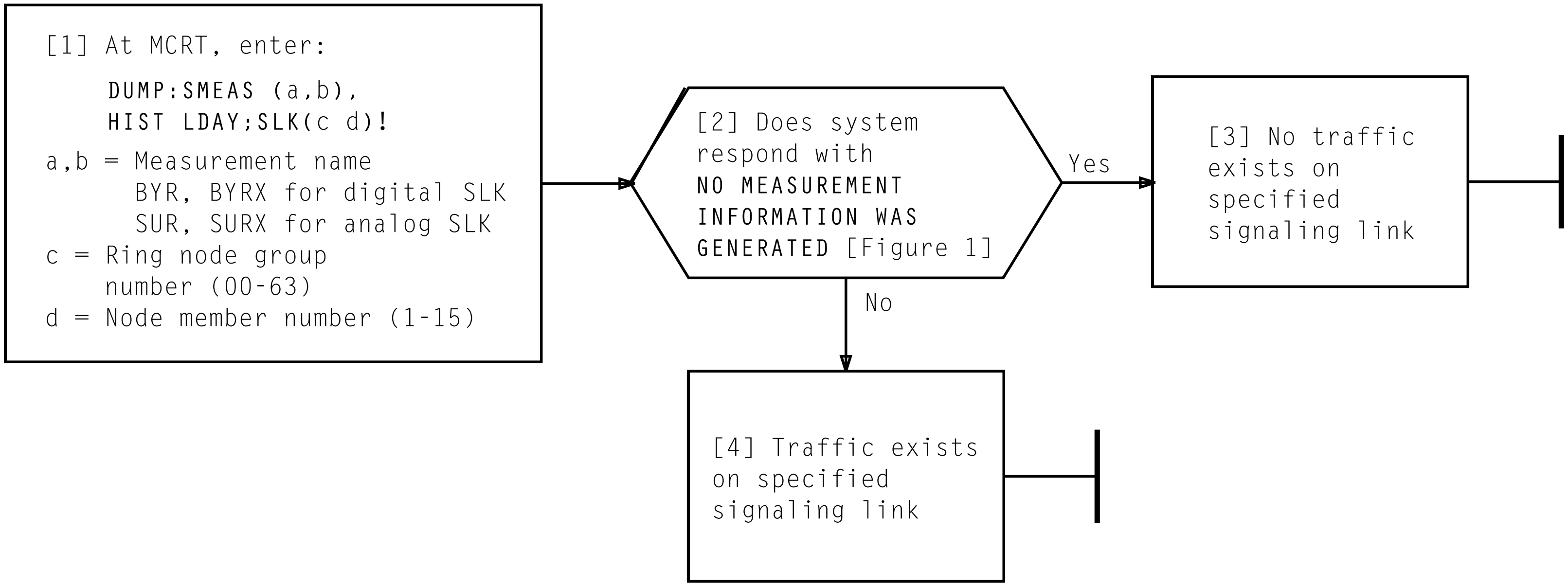
REPLACE DIGITAL SERVICE ADAPTER (DSA)

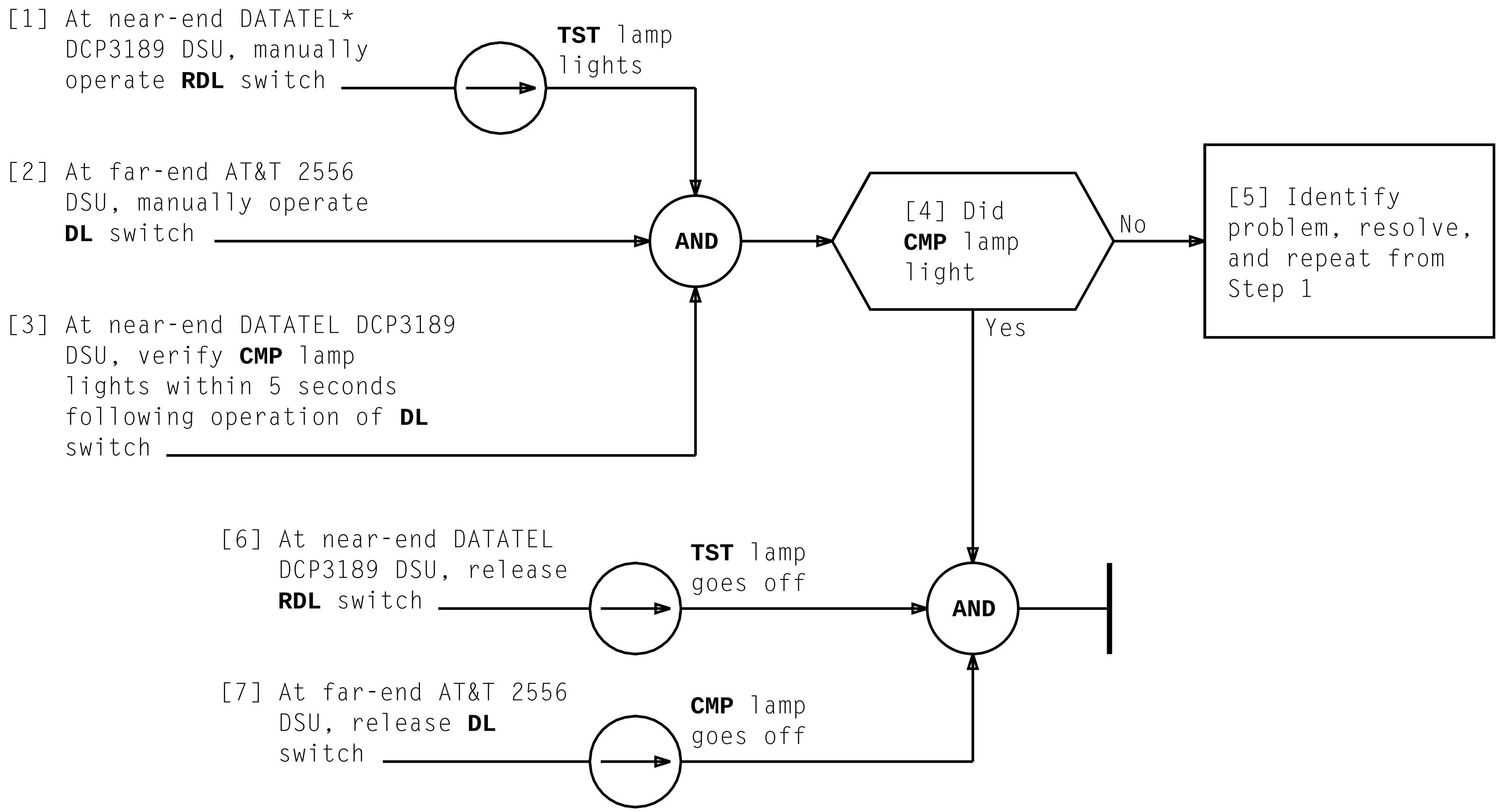



```
DUMP SMEAS COMPL

NO MEASUREMENT INFORMATION WAS GENERATED
```

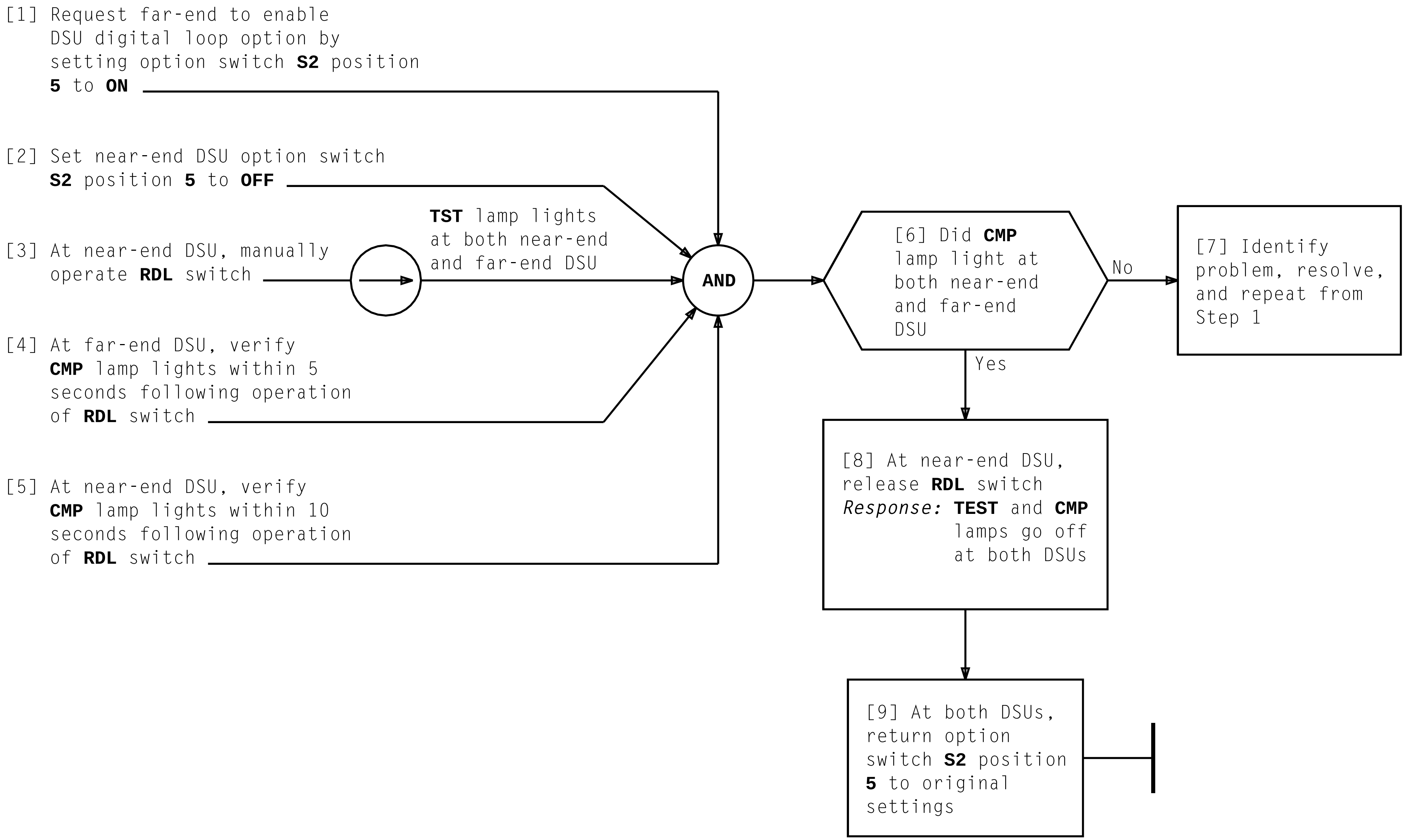
Figure 1 — Sample Printout Indicating No Signaling Link Measurement Data

VERIFY SIGNALING LINK TRAFFIC

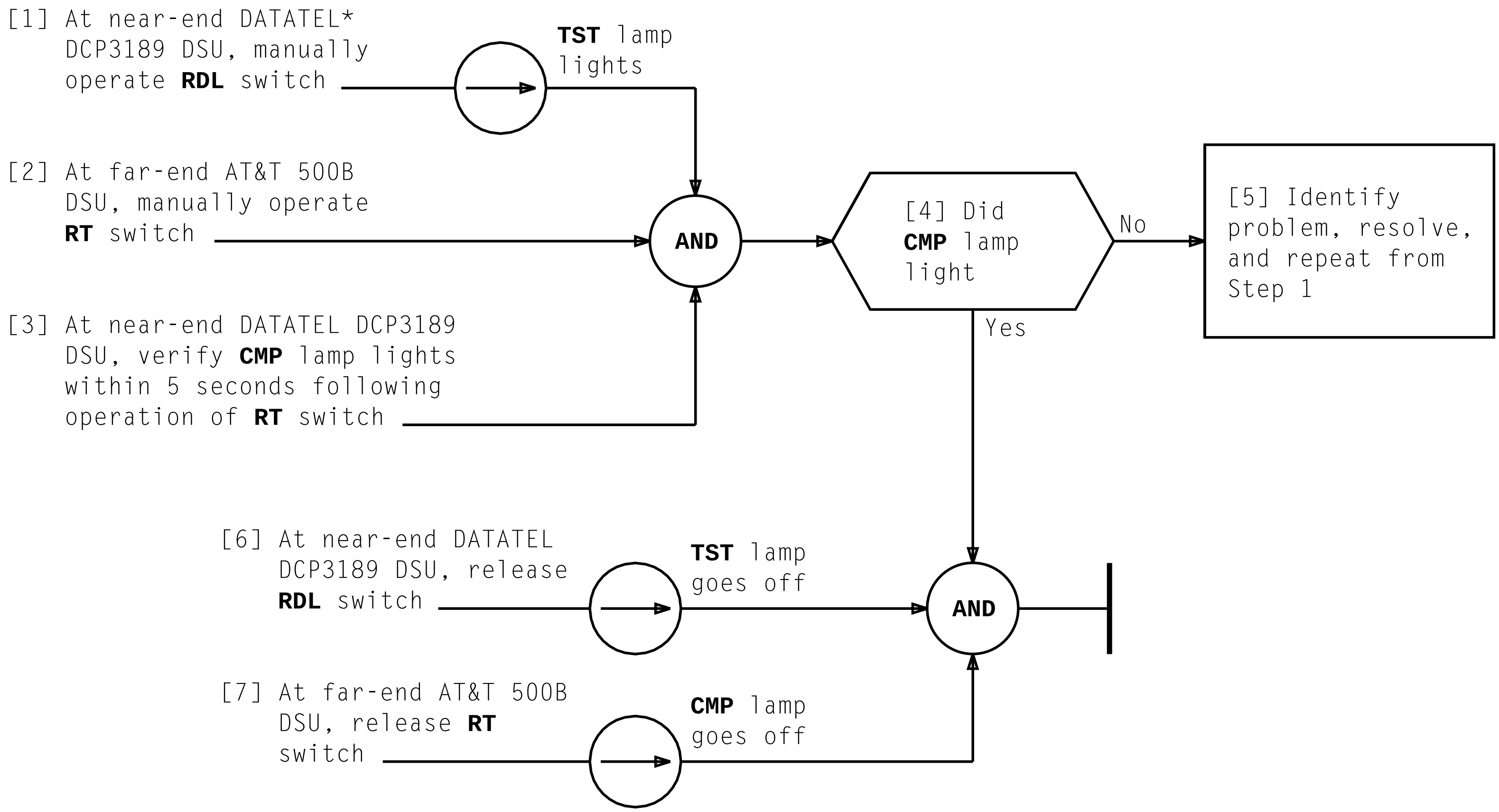


* DATATEL is a registered Trademark of DATATEL, Inc.

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

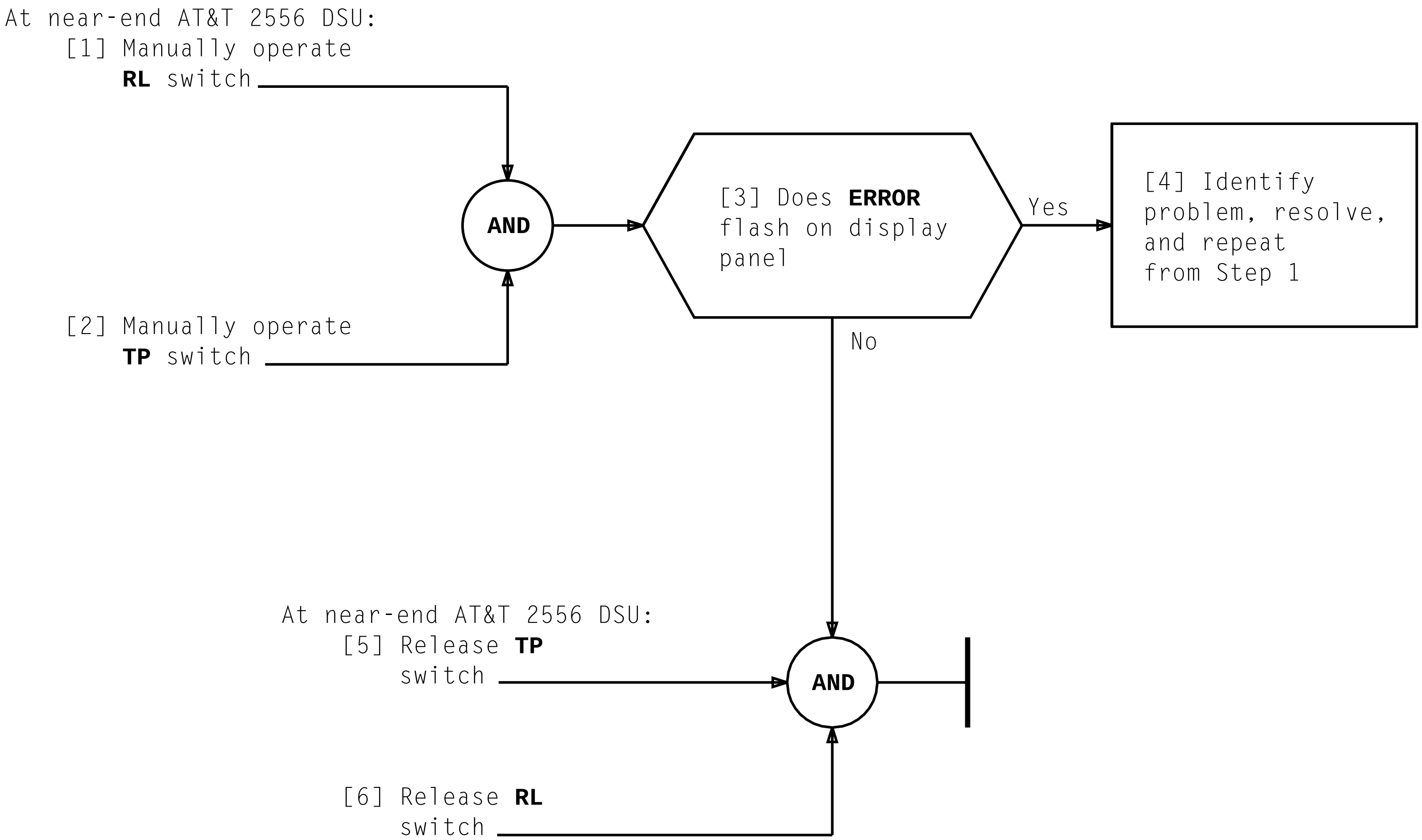


PERFORM DIGITAL SERVICE UNIT (DSU) END-TO-END TEST (DATATEL DCP3189 DSU TO DATATEL DCP3189 DSU)

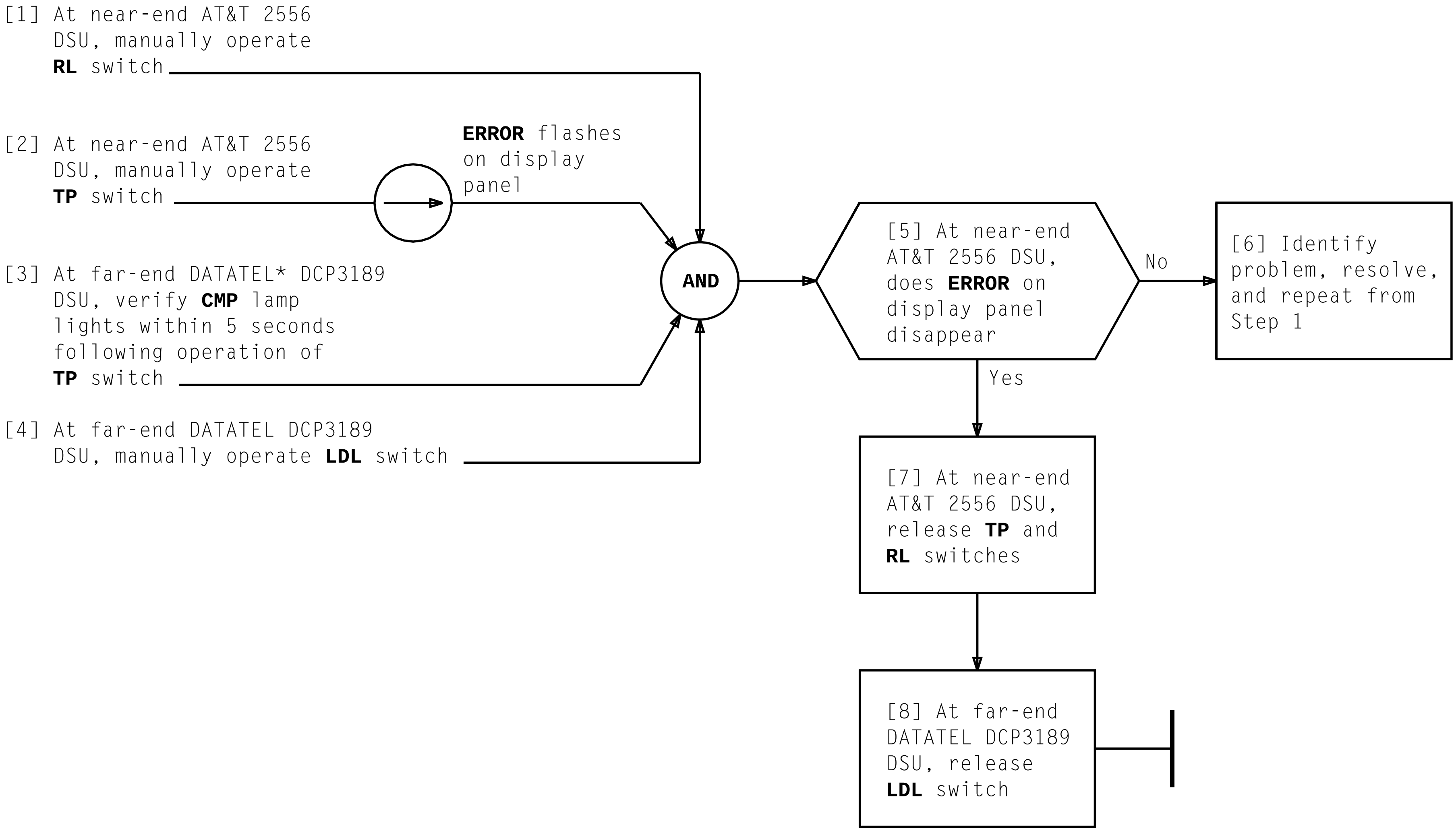


* DATATEL is a registered trademark of DATATEL, Inc.

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

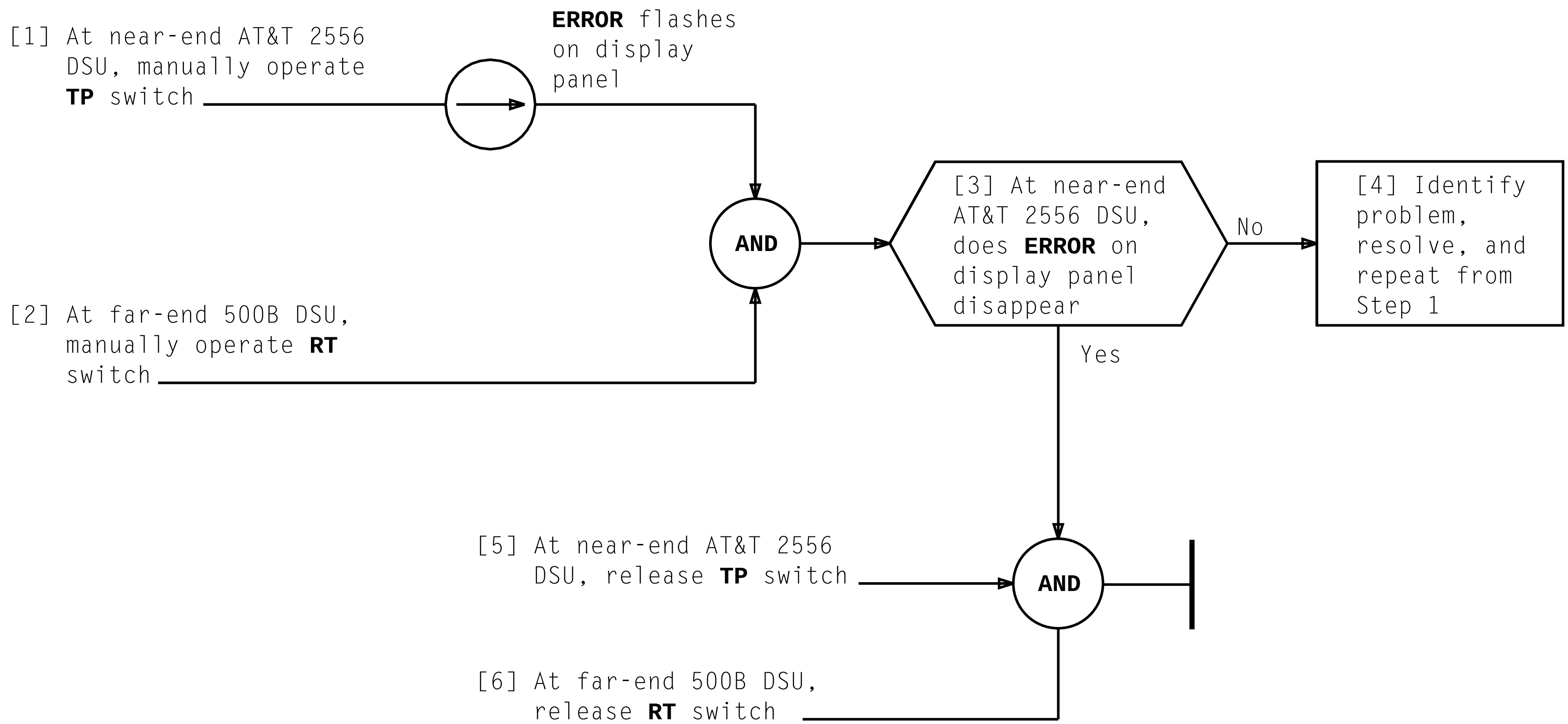


PERFORM DIGITAL SERVICE UNIT (DSU) END-TO-END TEST (AT&T 2556 DSU TO AT&T 2556 DSU)



* 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

[1] At frame control panel, depress **ALARM CUTOFF** pushbutton

Alarms silence

[2] At fan unit control panel, depress **OFF** pushbutton

FAN A and **FAN B** LEDs light

[3] At frame fuse panel, remove fuses associated with faulty unit [TABLE A]

[4] At fan unit assembly, grasp both sides of drawer and carefully pull assembly from frame

[5] On faulty fan unit, disconnect −48V power cabling from unit

[6] Loosen screws securing fan unit to drawer assembly

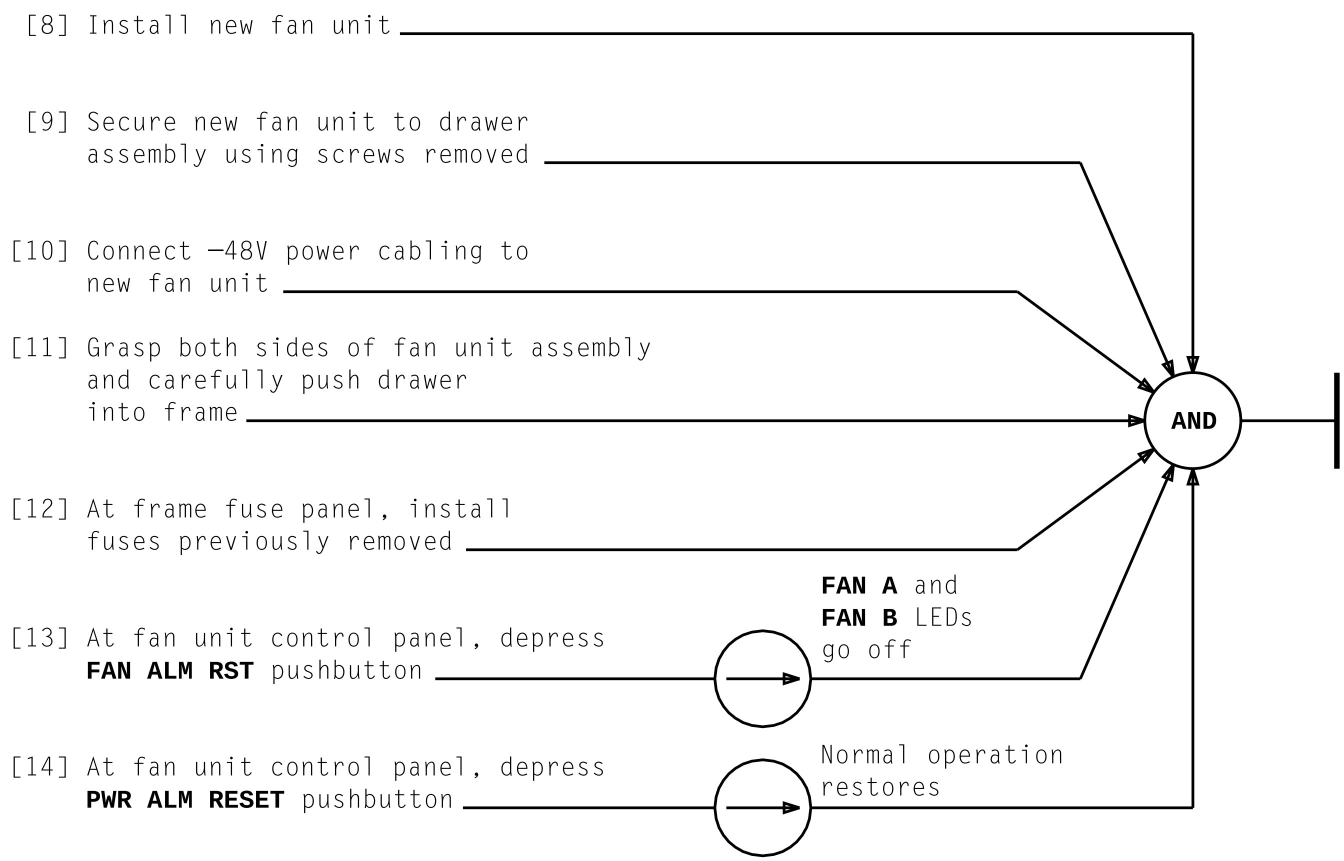
[7] Remove faulty fan unit

AND

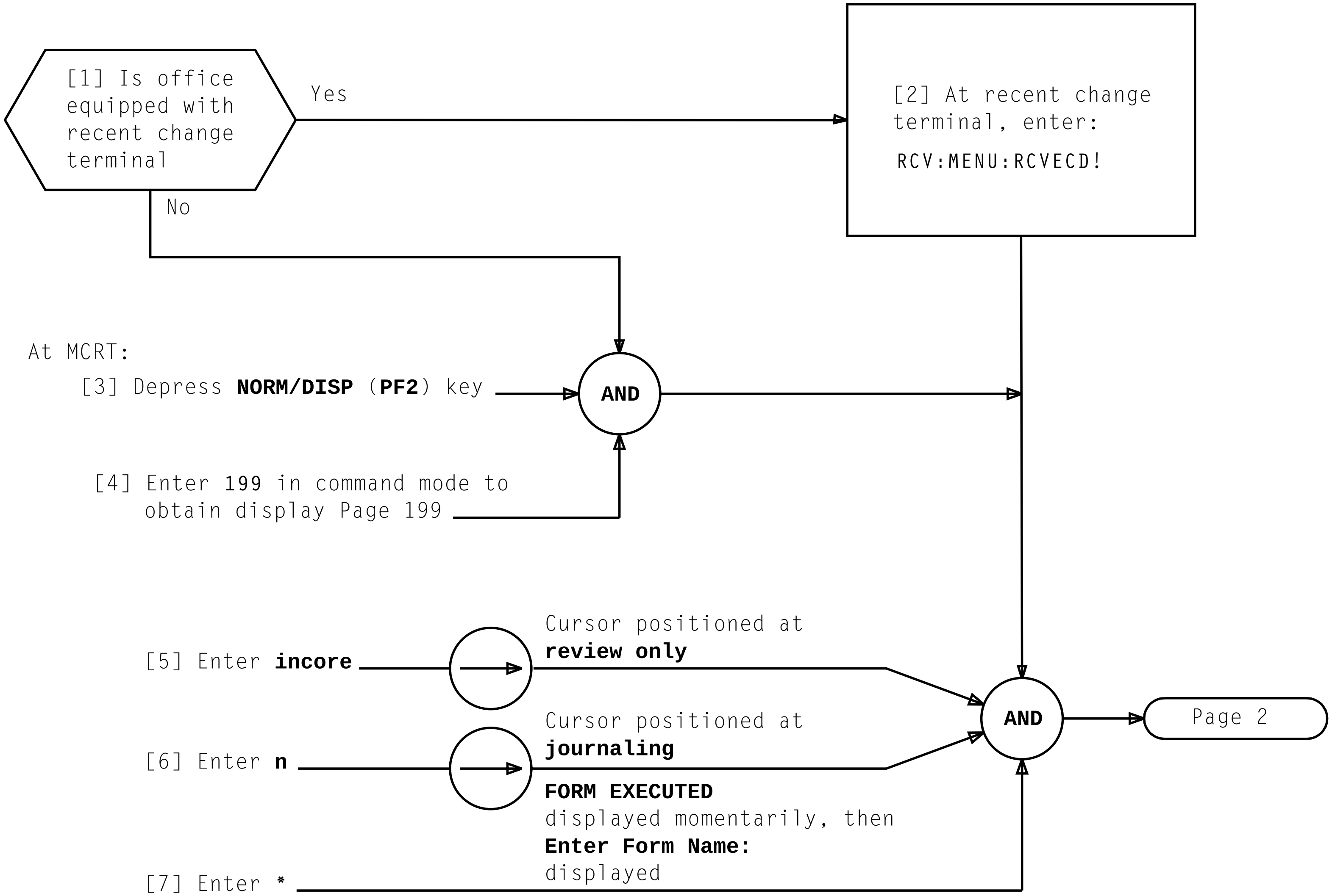
Page 2

TABLE A
FAN UNIT FUSES

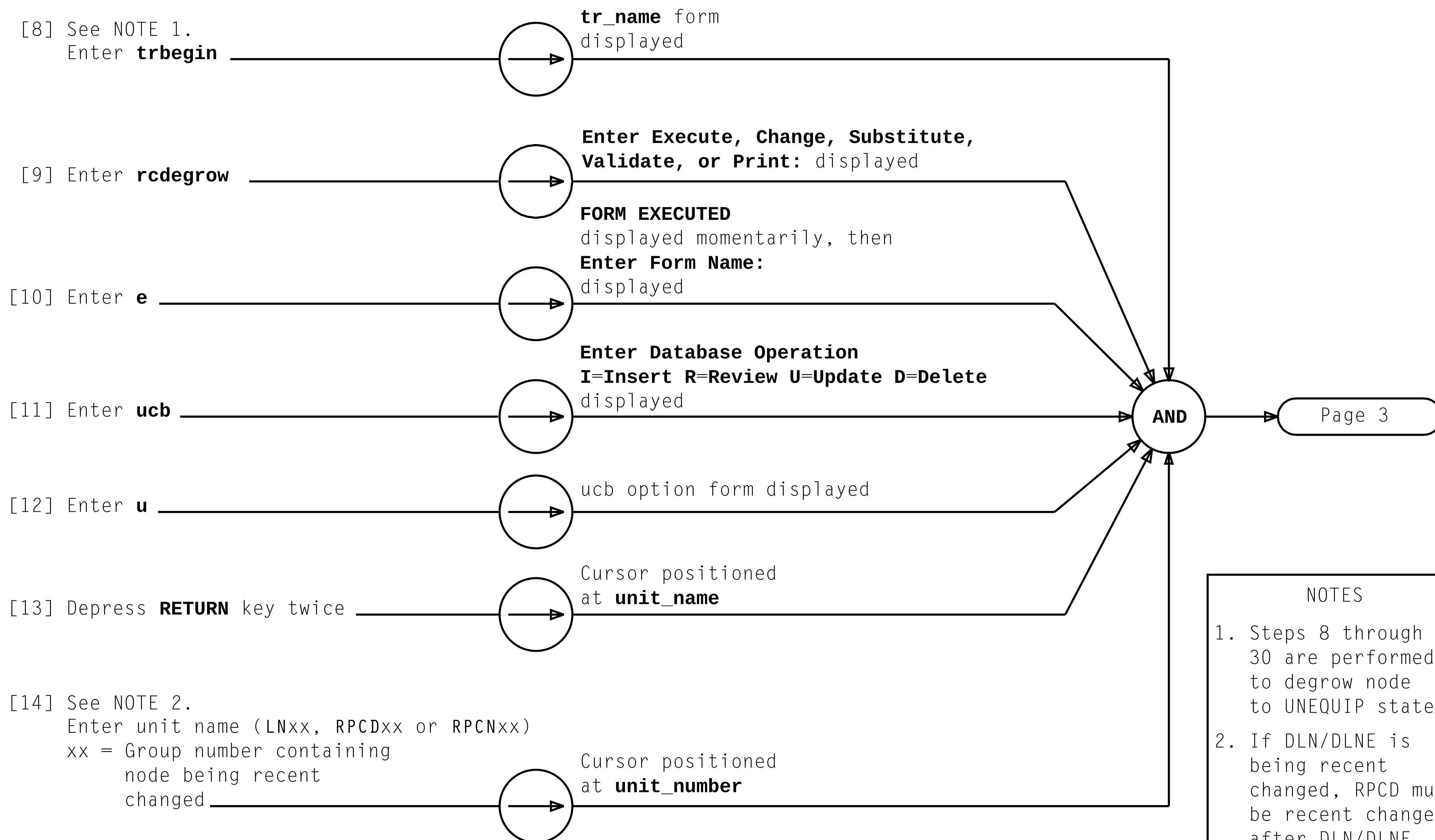
BLOWN FUSE	FUSE TYPE	ASSOCIATED CIRCUITRY
FC1	70G	FAN CONTROLLER 1
FC2	70G	FAN CONTROLLER 2
AF1	70A	FAN UNIT 1
BF2	70A	FAN UNIT 2
CF3	70A	FAN UNIT 3
DF4	70A	FAN UNIT 4
ALP	70G	BUS A LAMP
BLP	70G	BUS B LAMP



REPLACE CABINET FAN UNIT ASSEMBLY



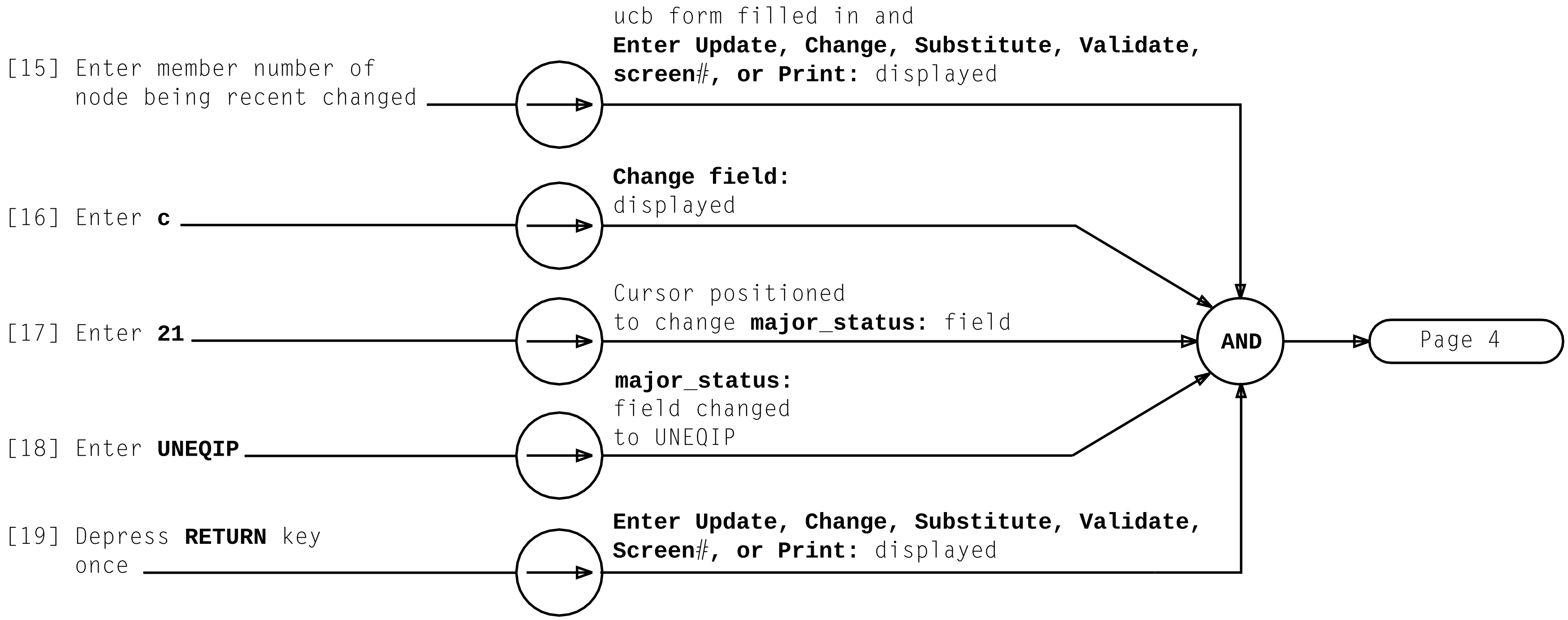
PERFORM RECENT CHANGE TO CHANGE NODE HV VALUE



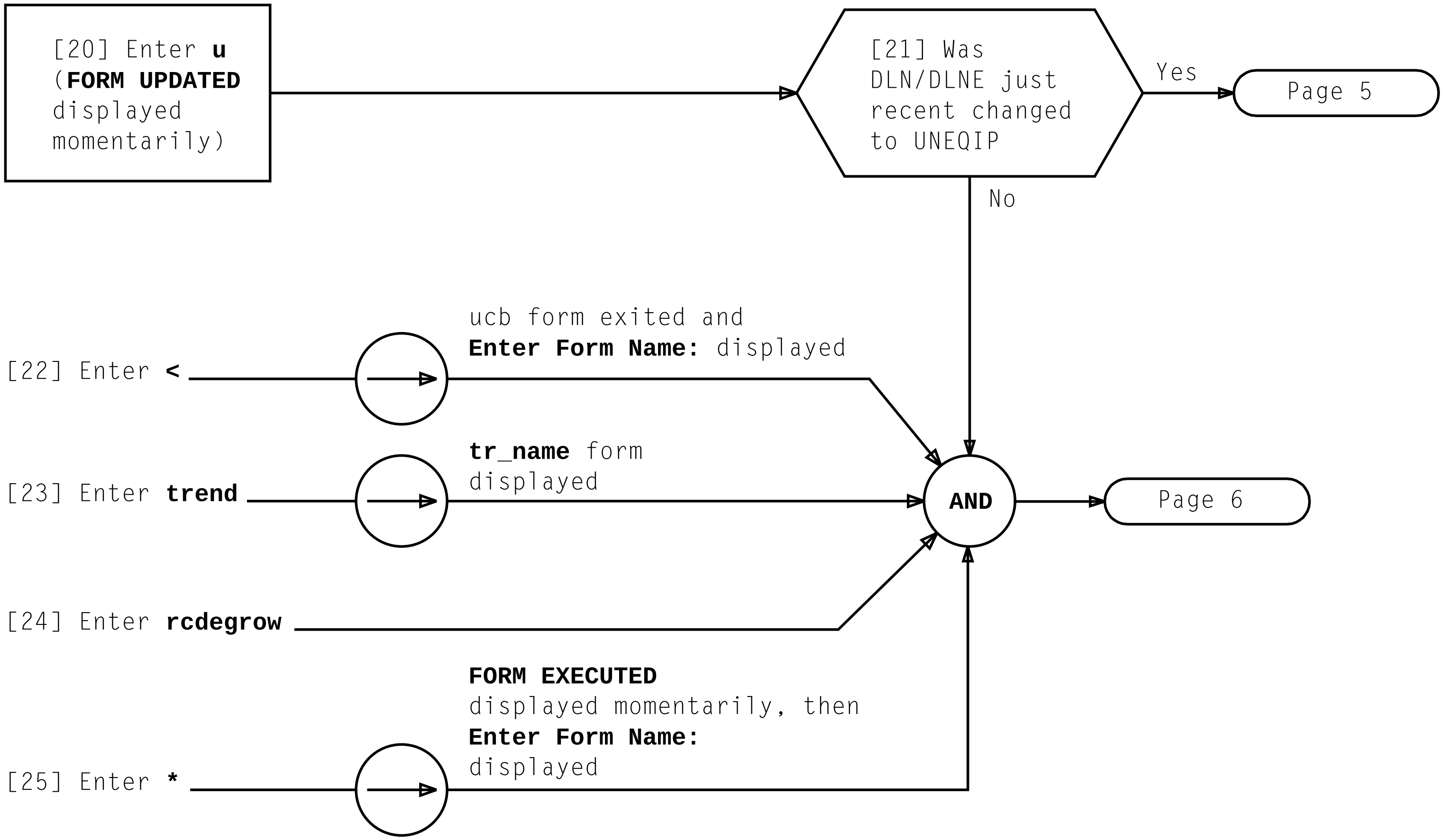
NOTES

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

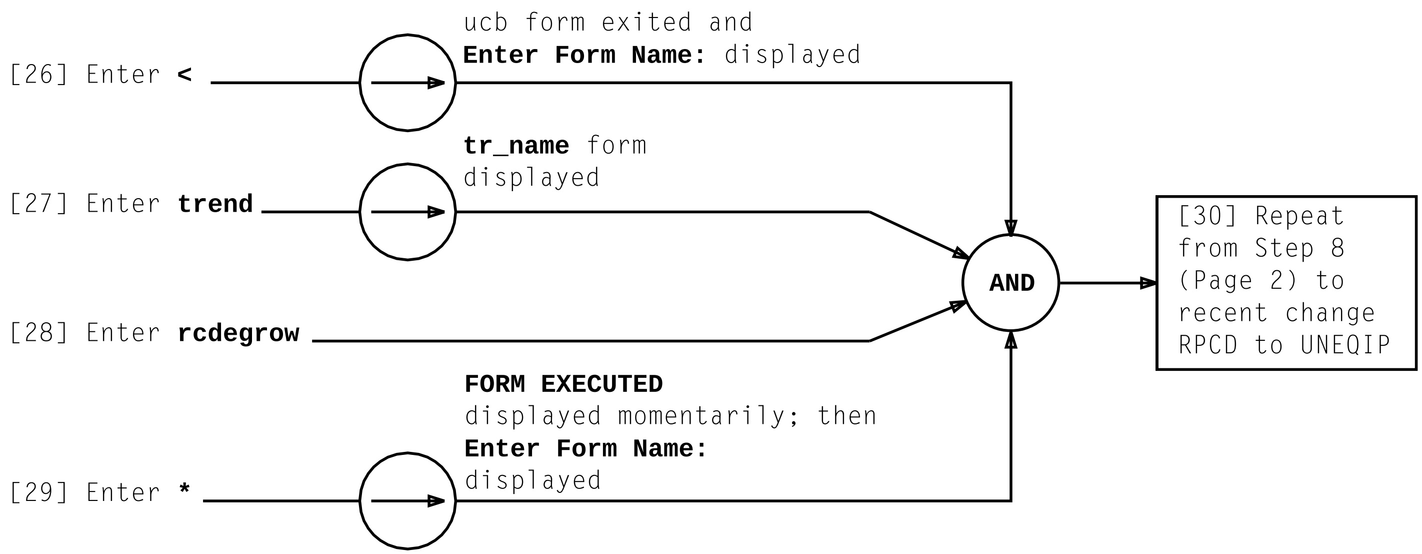
PERFORM RECENT CHANGE TO CHANGE NODE HV VALUE



PERFORM RECENT CHANGE TO CHANGE NODE HV VALUE



PERFORM RECENT CHANGE TO CHANGE NODE HV VALUE



PERFORM RECENT CHANGE TO CHANGE NODE HV VALUE

[31] See NOTE 3.
Is node being recent changed in RN cabinet 00 or 32

No → Page 8

Yes ↓

At node:

[32] See NOTE 4. Identify equipped ring interface (RI) packs (**UN122**, **UN122B**, or **UN122C** and **UN123** or **UN123B** or **UN397**) and record

[33] See NOTE 5. Determine if interframe buffer (IFB) pack is equipped and identify IFB type (**TN915**, **TN918**, **TN1506**, **TN1508, TN1509**, or **TN1803**) if equipped

[34] See NOTE 6. If IFB pack is equipped, determine IFB position on ring

[35] Identify and record hv value for identified RI0, RI1 and IFB pack combination previously identified [TABLE A, Page 7]

AND → Page 9

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
	Lowest						
	Highest						
UN397	*	0x4000	*	*	*	*	*

* Not Applicable

At node:

[36] Identify equipped integrated ring node (IRN) pack (UN303B,UN304B) 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]

AND

Page 9

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
UN304B	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

[40] Enter **trbegin**

tr_name form displayed

[41] Enter **rchv**

Enter Execute, Change, Substitute, Validate, or Print: displayed

[42] Enter **e**

FORM EXECUTE displayed momentarily; then **Enter Form Name:** displayed

[43] Enter **ucb**

Enter Database Operation I=Insert R=Review U=Update D=Delete displayed

[44] Enter **u**

ucb option form displayed

[45] Depress **RETURN** key twice

Cursor positioned at **unit_name**

[46] See NOTE 9. Enter unit name (RPCDxx, LNxx or RPCNxx)
xx = Group number containing node being recent changed

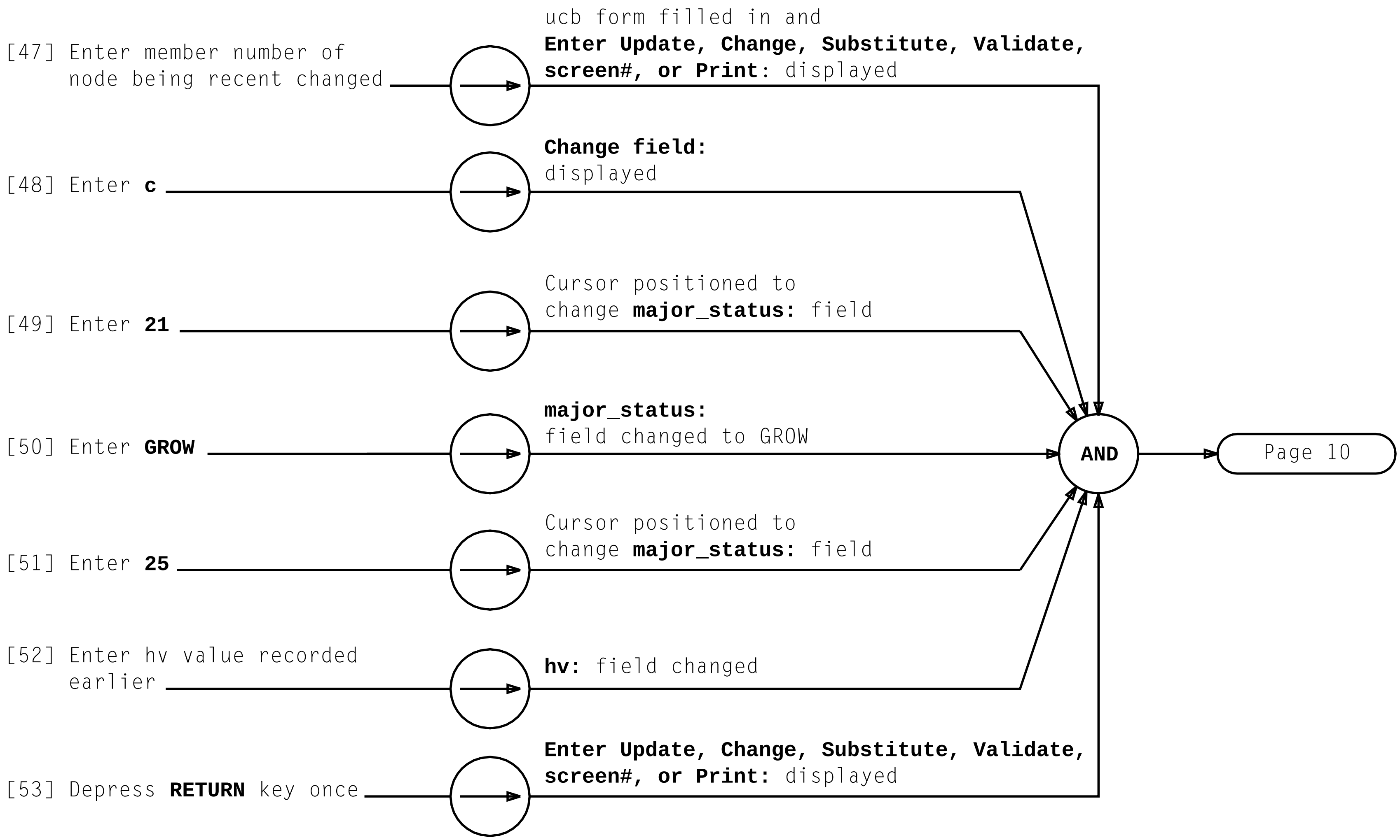
Cursor positioned at **unit_number**

AND

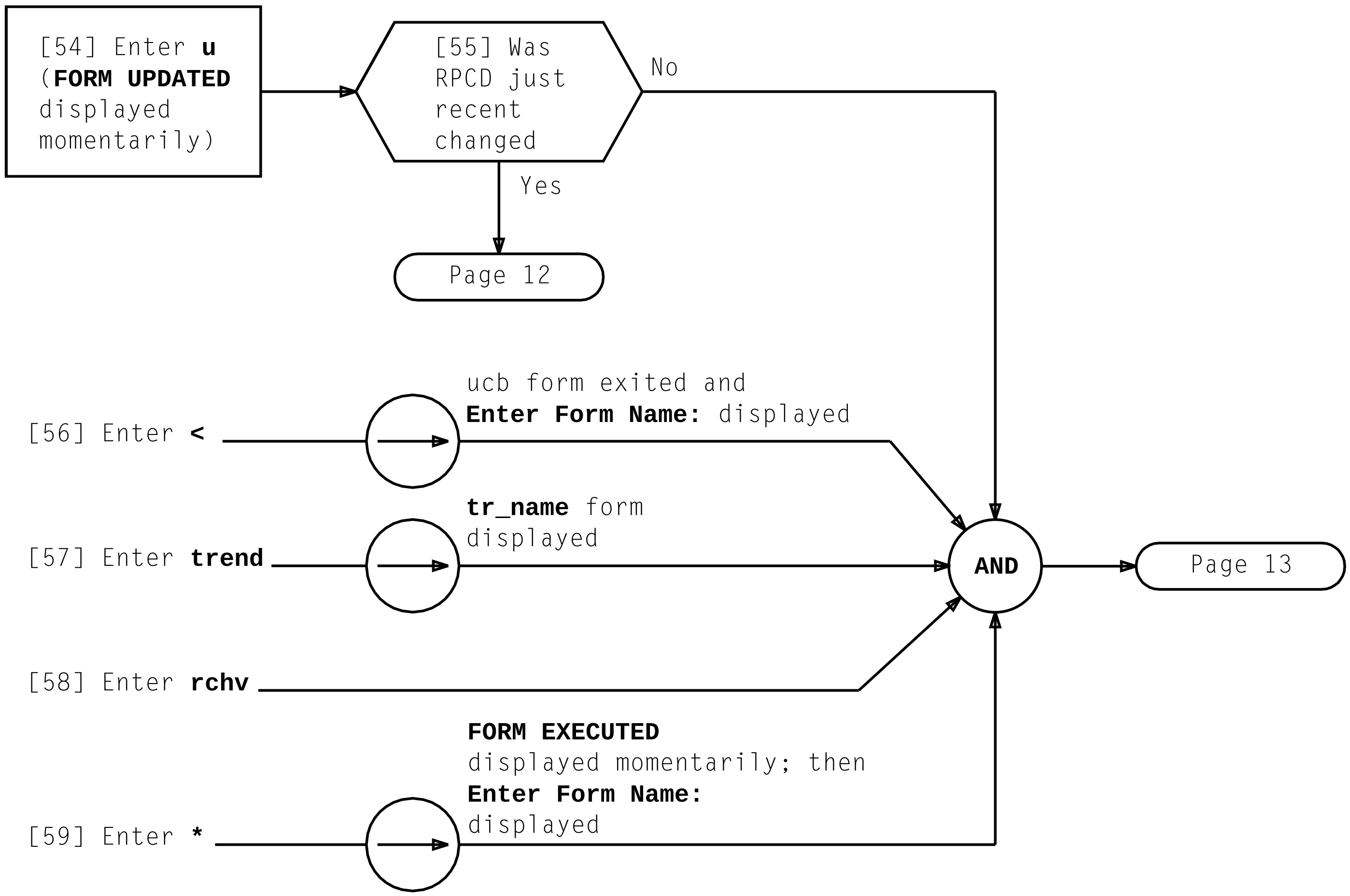
Page 10

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

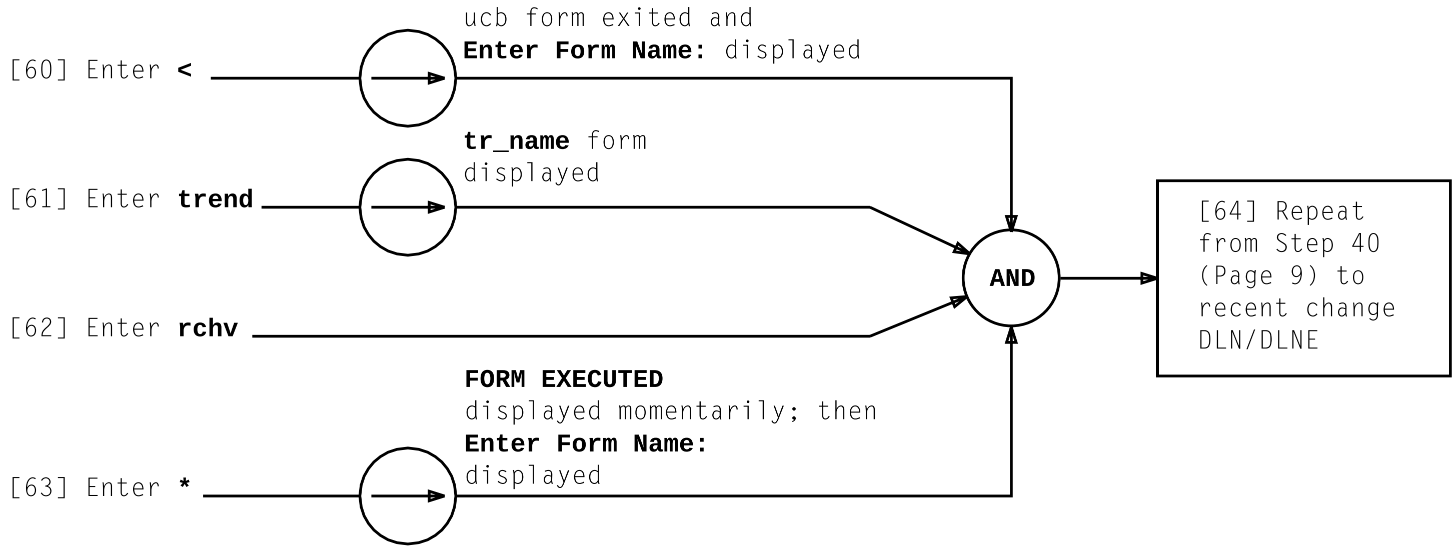
PERFORM RECENT CHANGE TO CHANGE NODE HV VALUE

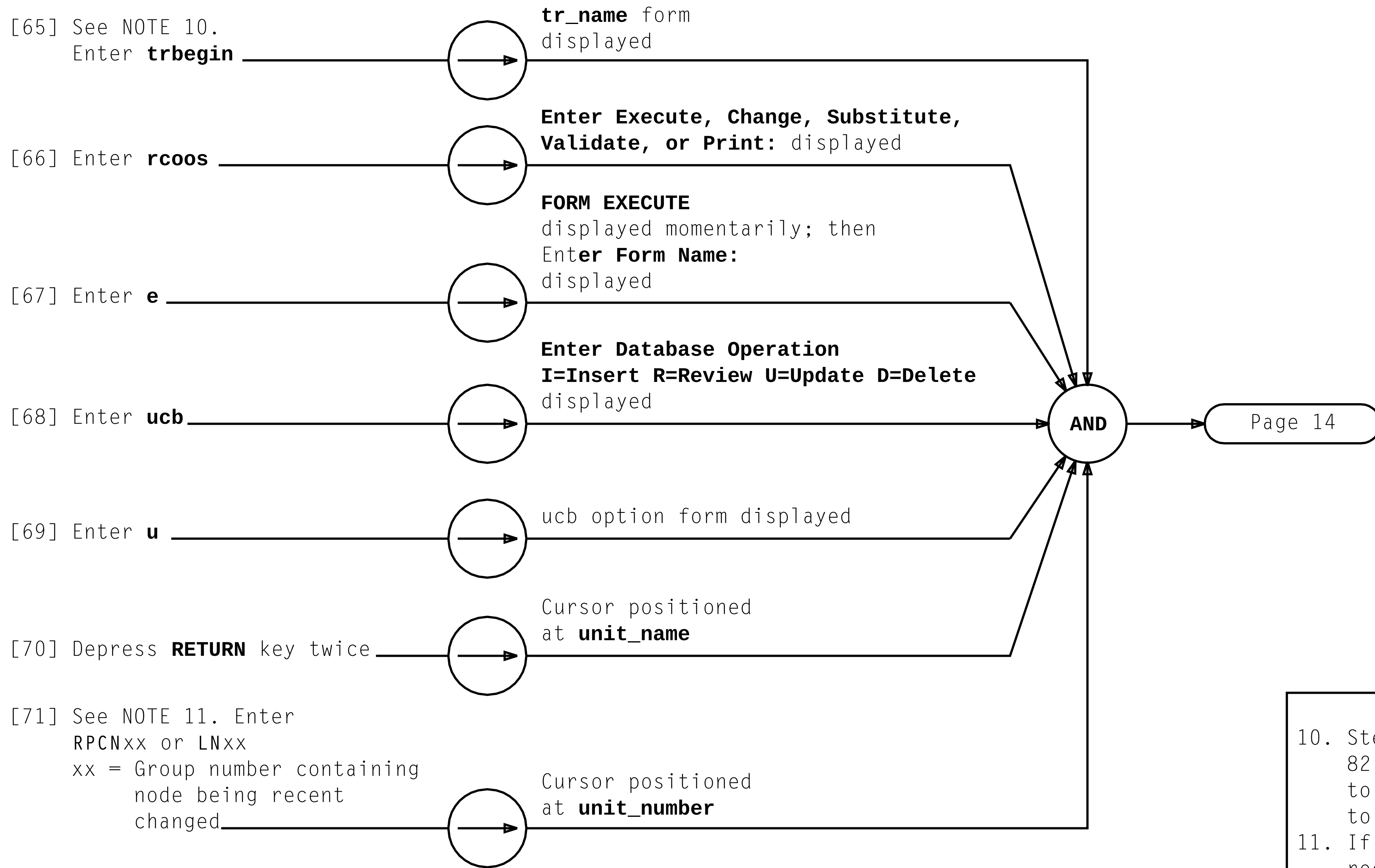


PERFORM RECENT CHANGE TO CHANGE NODE HV VALUE



PERFORM RECENT CHANGE TO CHANGE NODE HV VALUE

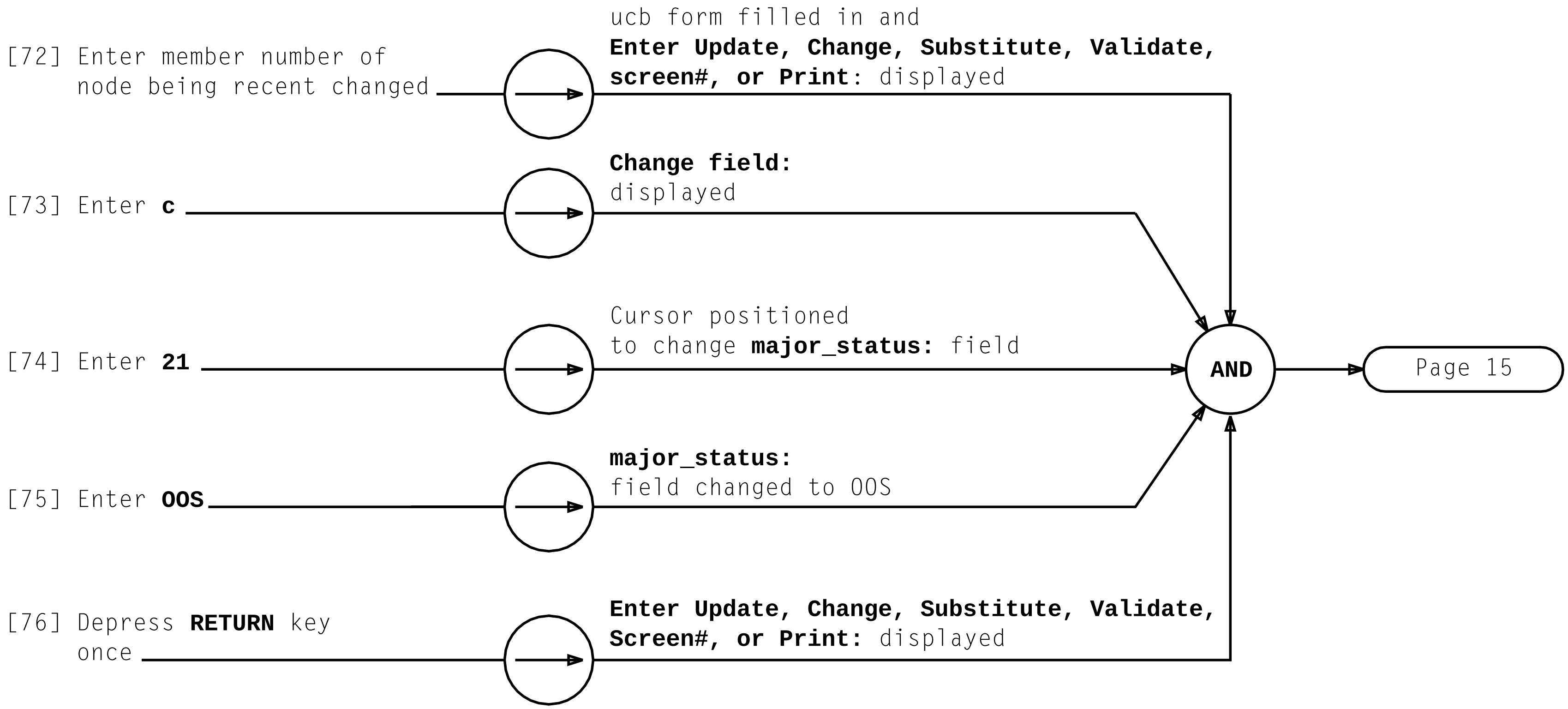

[60] Enter **<**
ucb form exited and
Enter Form Name: displayed
[61] Enter **trend**
tr_name form
displayed
[62] Enter **rchv**
[63] Enter *****
FORM EXECUTED
displayed momentarily; then
Enter Form Name:
displayed
AND
[64] Repeat
from Step 40
(Page 9) to
recent change
DLN/DLNE



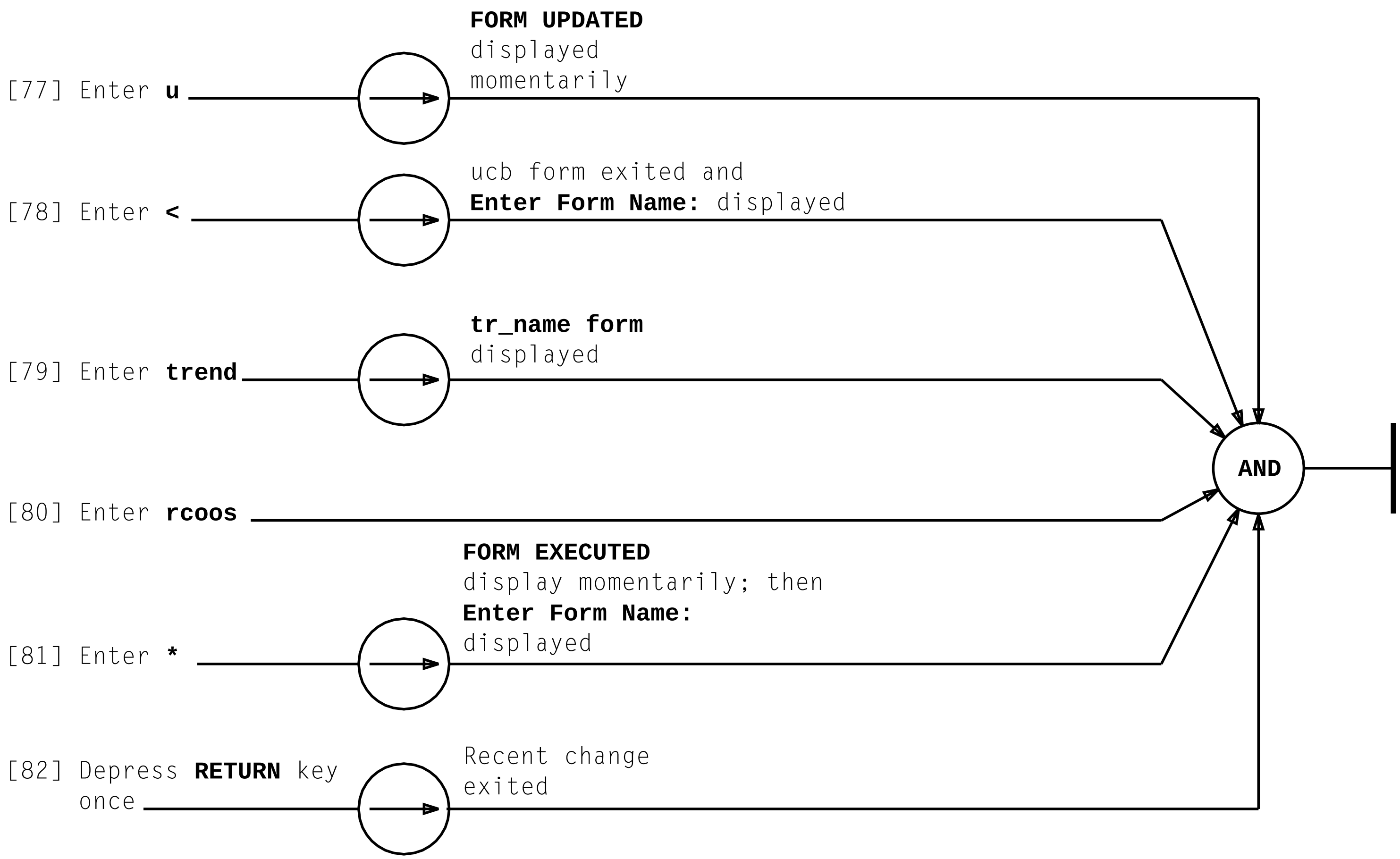
NOTES

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)

AND

[3] Does system respond with
REPT LKC SLK COMPL
SLK a b c d LINK
CHECK INTERNAL PASSED

Yes → Page 3

No ↓

[4] Identify link interface pack associated with faulty signaling link

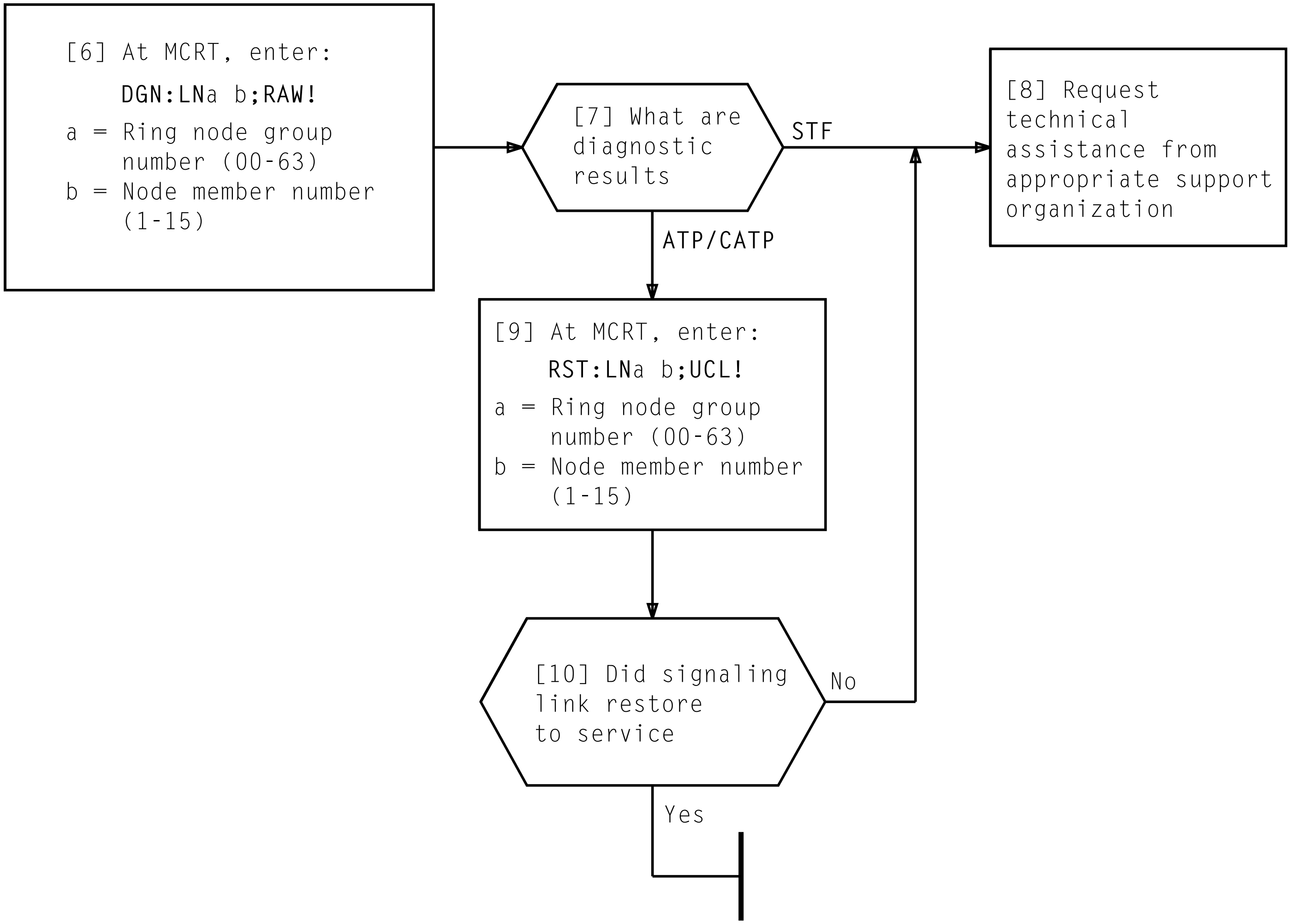
[5] See WARNING 1. Replace link interface pack associated with faulty signaling link

CCS7 node	[DLP-561]
ILN	[DLP-563]
CPE node	[DLP-565]
ULN	[DLP-575]

AND → Page 2

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

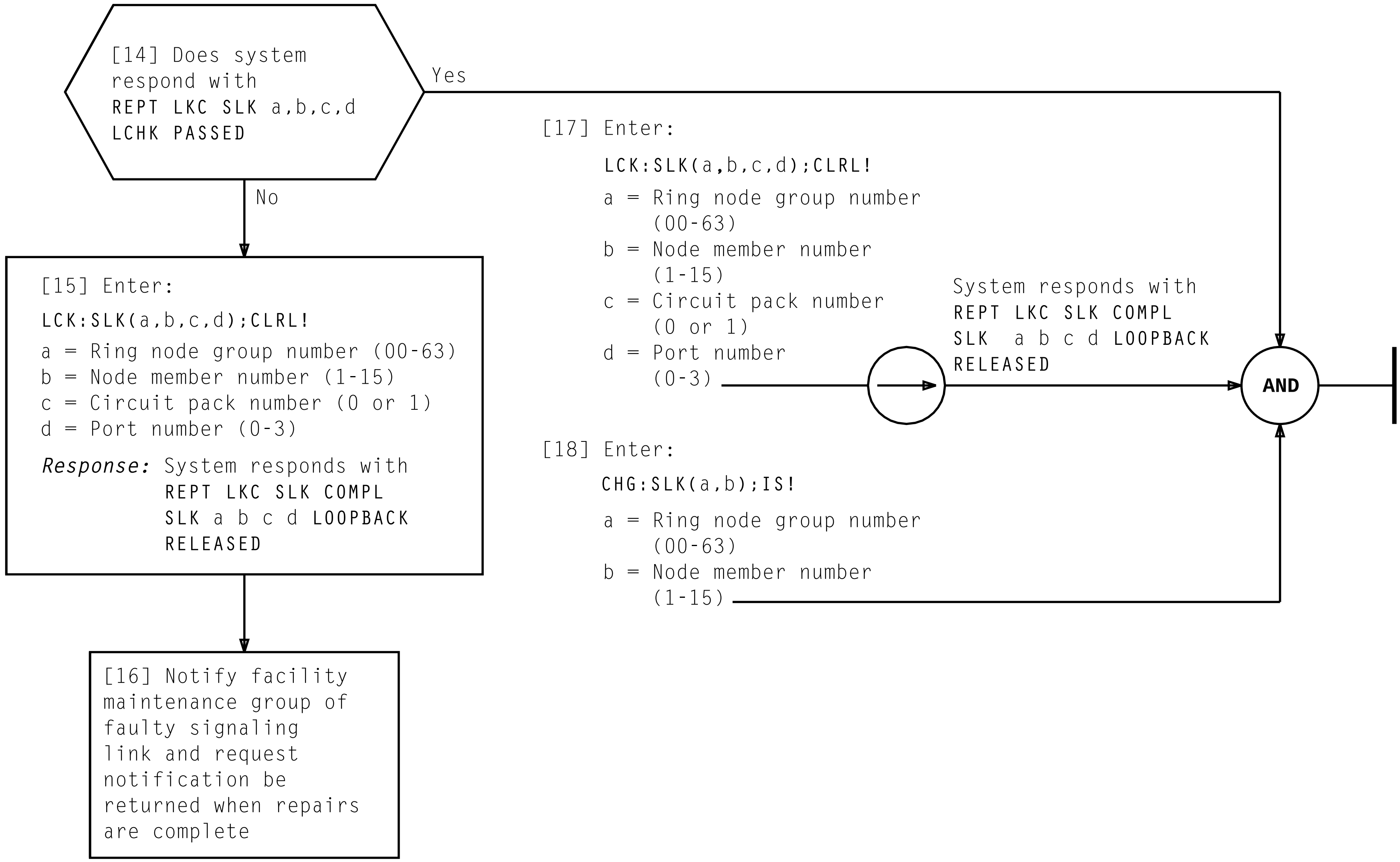
Page 4

[13] Enter:

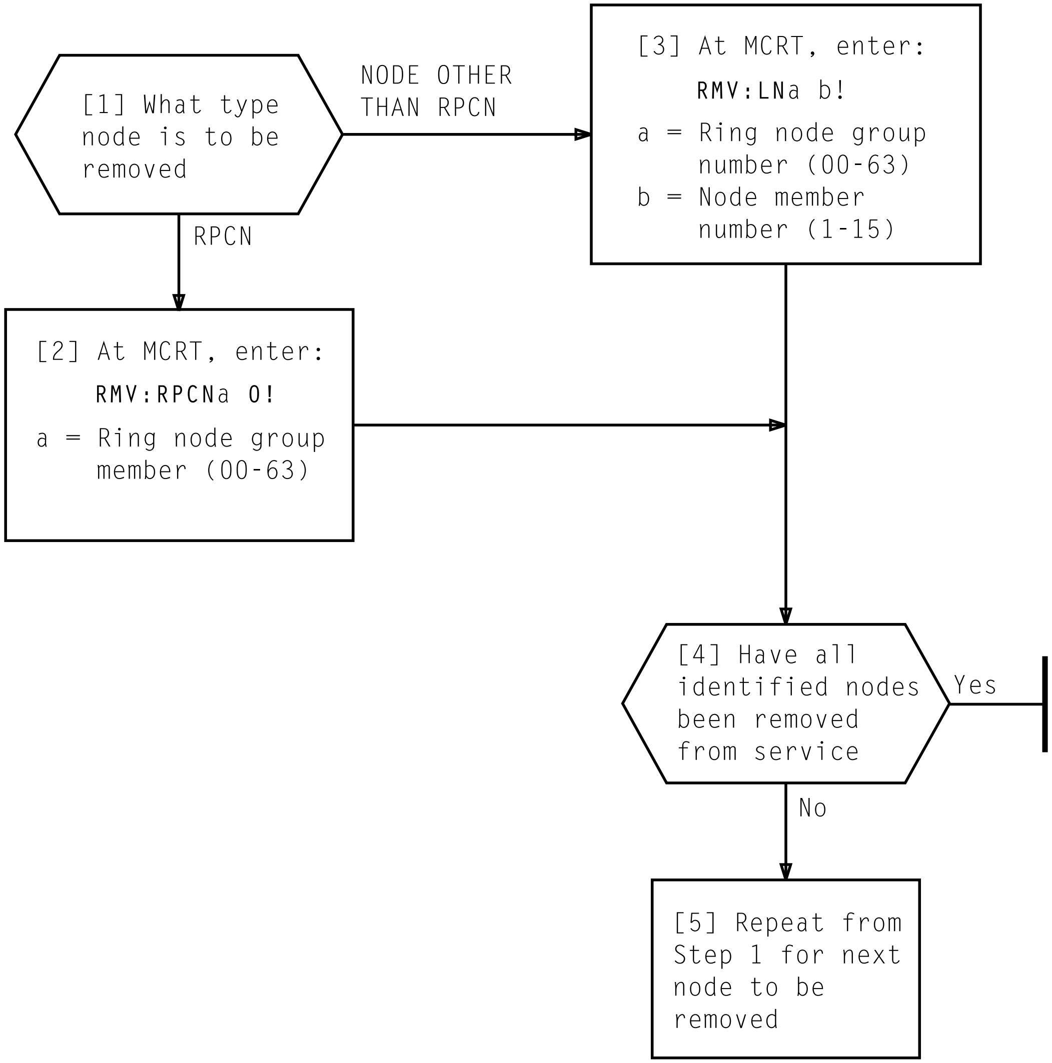
LKC:SLK(a,b,c,d);LCHK!

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

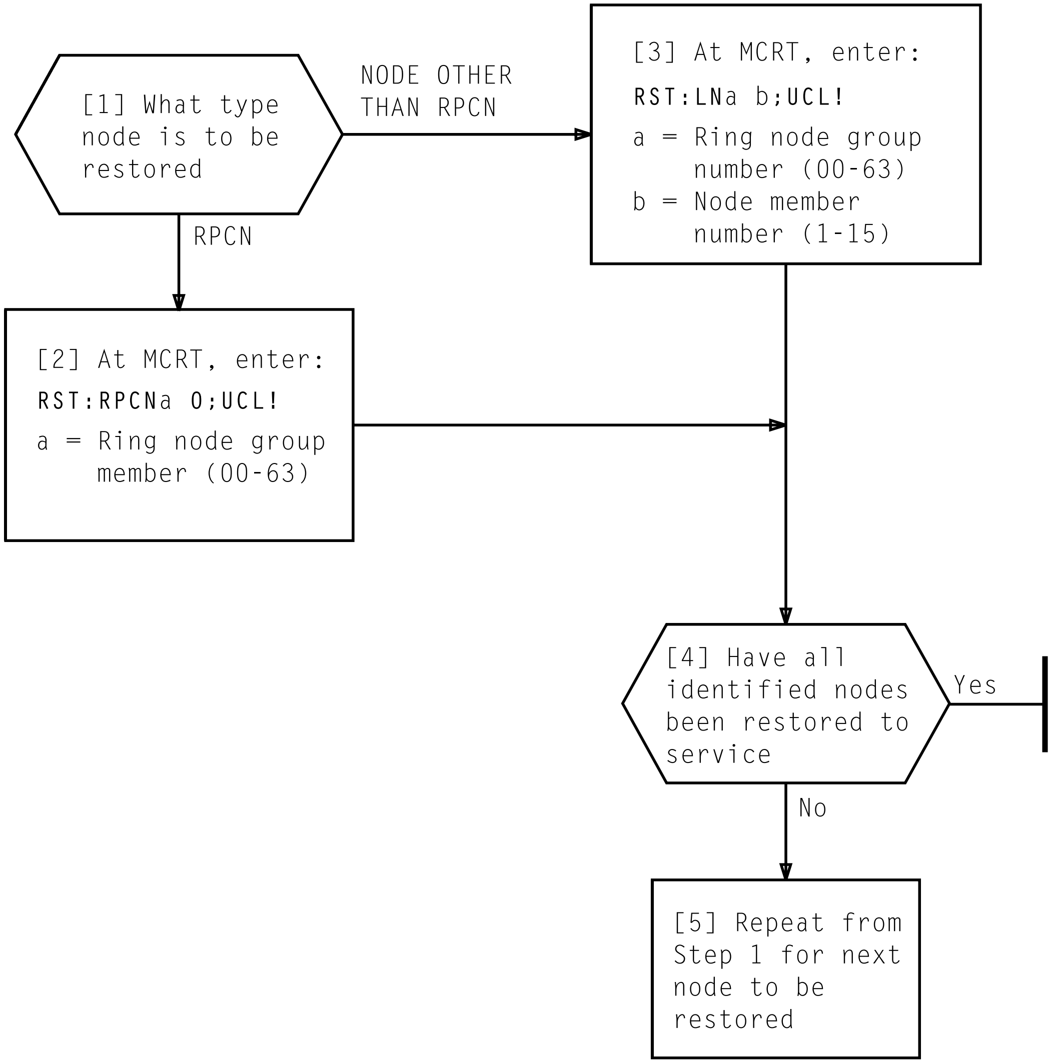
PERFORM LINK CHECK INTERNAL (LCKI) AND LINK CHECK (LCHK) TESTS TO ISOLATE AND CLEAR SIGNALING LINK FAULT



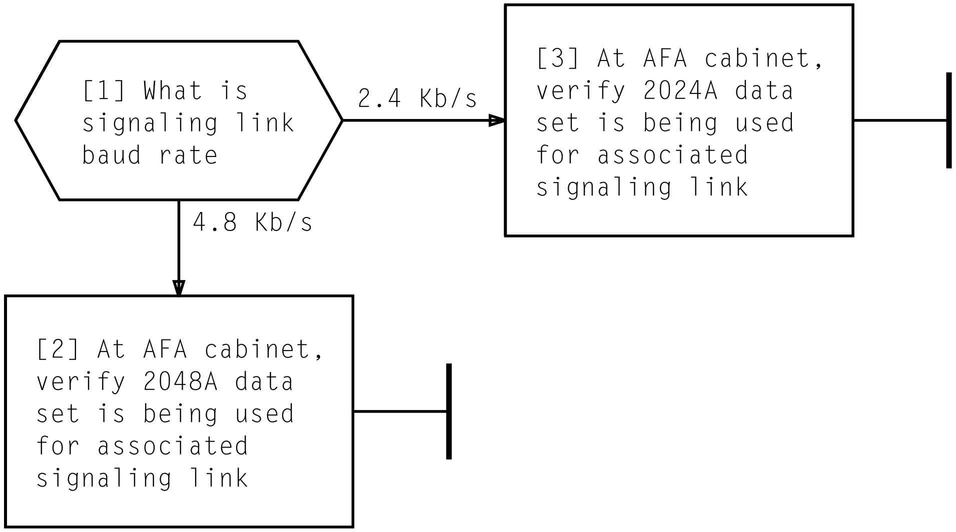
PERFORM LINK CHECK INTERNAL (LCKI) AND LINK CHECK (LCHK) TESTS TO ISOLATE AND CLEAR SIGNALING LINK FAULT



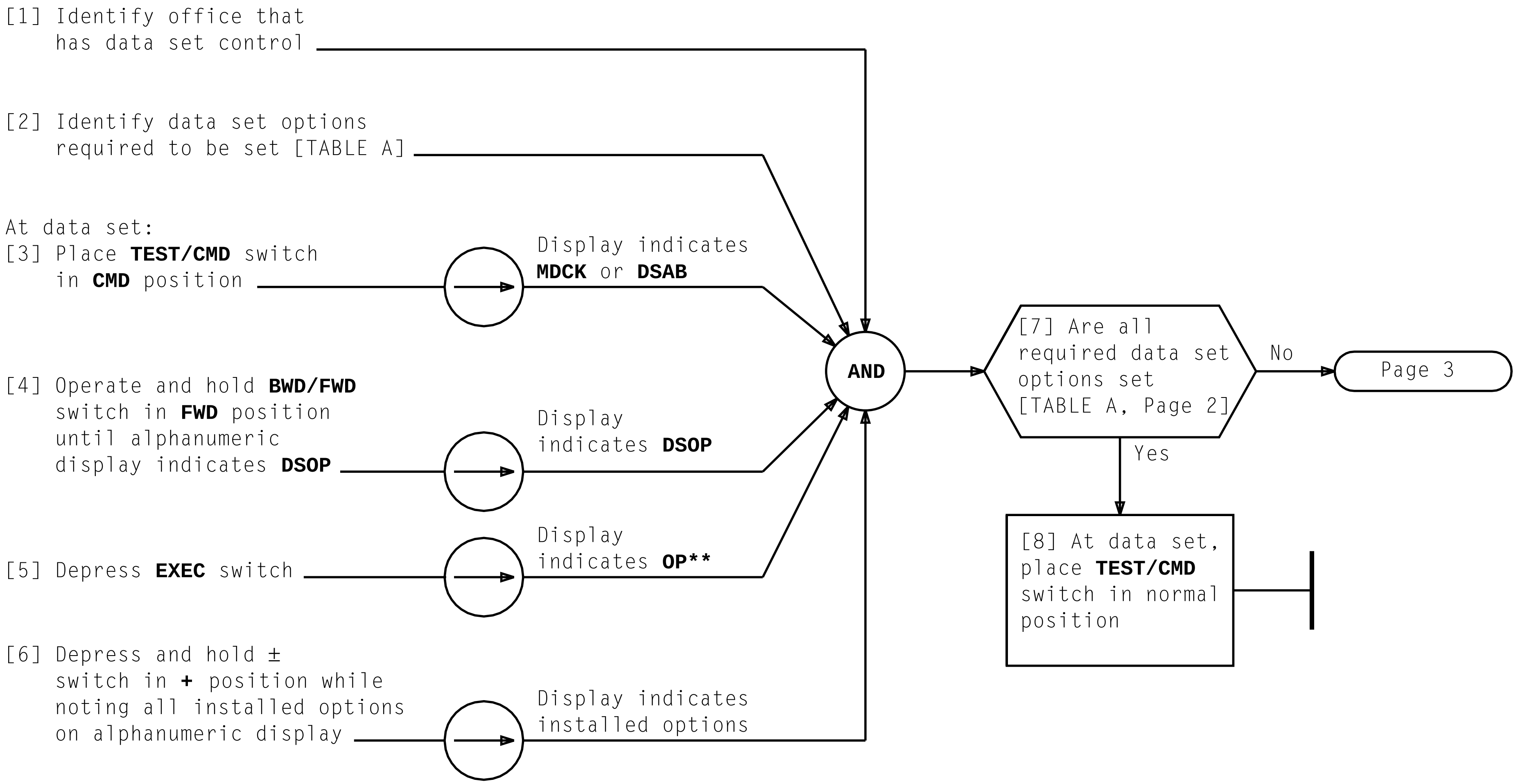
REMOVE NODE FROM SERVICE



RESTORE NODE TO SERVICE



VERIFY ANALOG SIGNALING LINK DATA SET

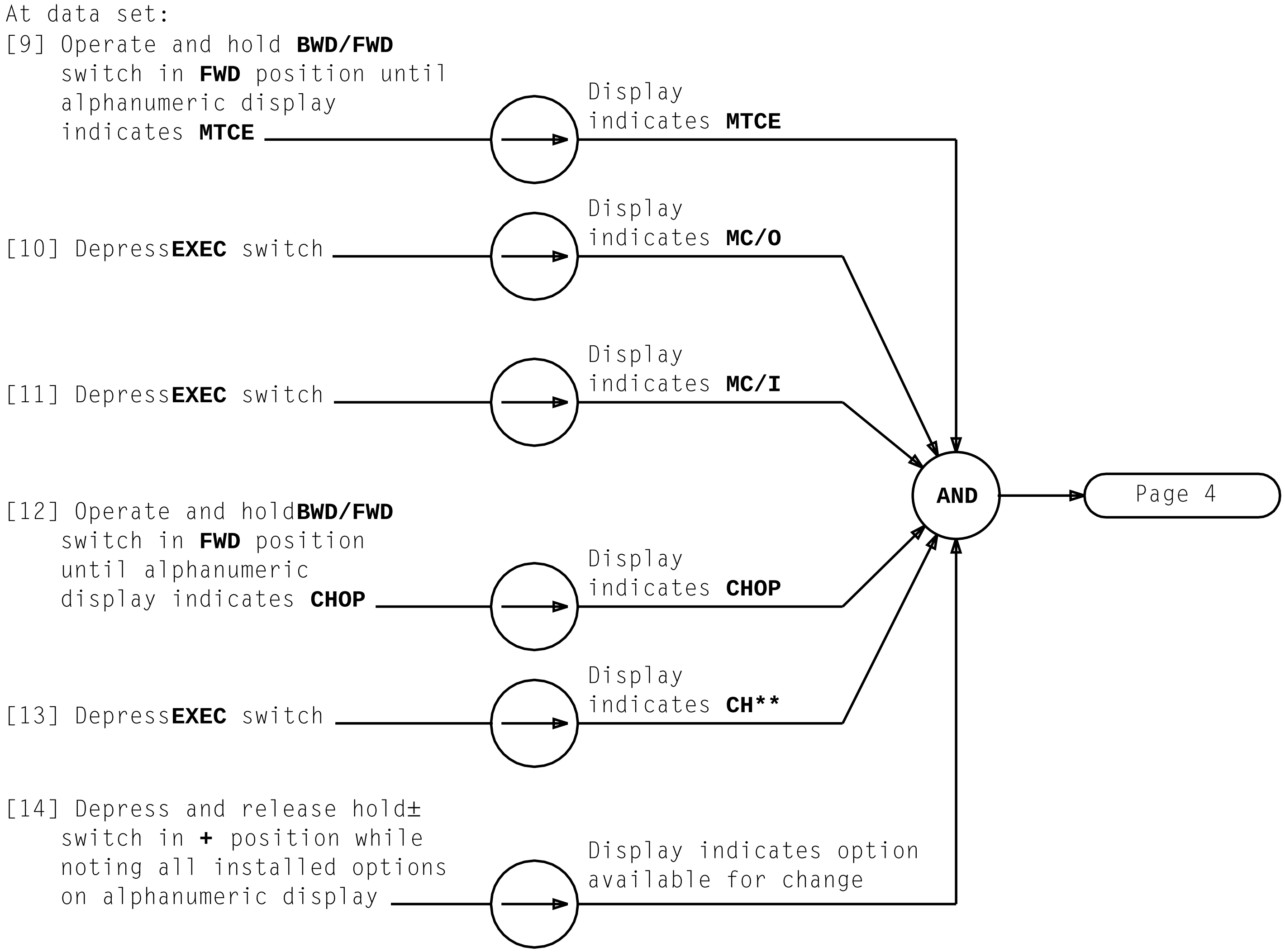


VERIFY 2024A/2048A DATA SET OPTIONS ARE PROPERLY SET

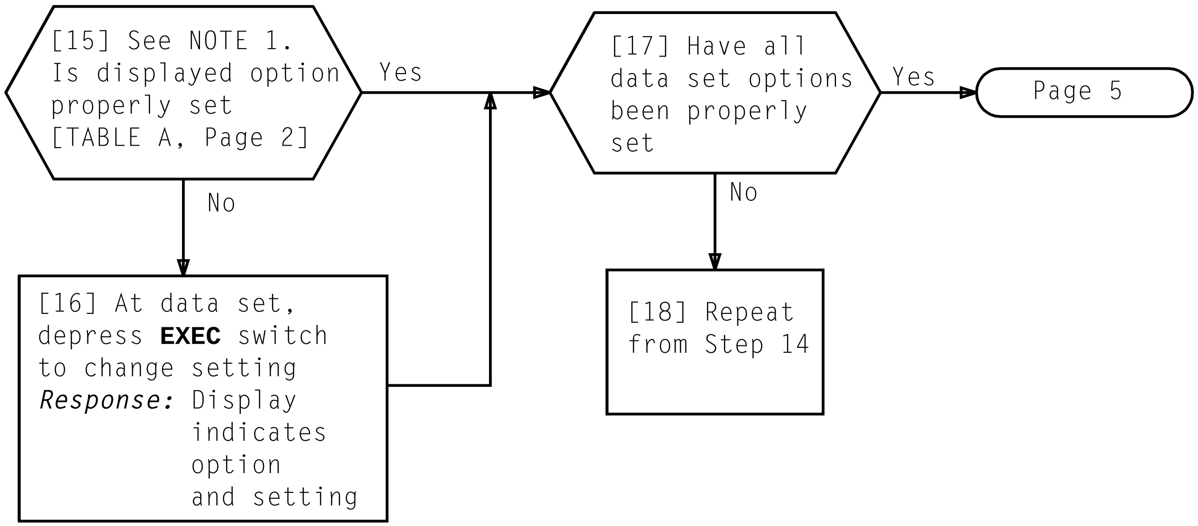
TABLE A 2024A/2048A DATA SET OPTION SETTINGS			
OPTION DESIGNATION	OPTION NAME	OPTION SETTINGS (NOTE 1)	
		OFFICE WITH DATA SET CONTROL	OFFICE WITHOUT DATA SET CONTROL
A1	Point-to-point control	ON	OFF
A2	Point-to-point tributary	OFF	ON
B1	Internal timing	ON	ON
C5	Continuous carrier, continuous request-to-send	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.

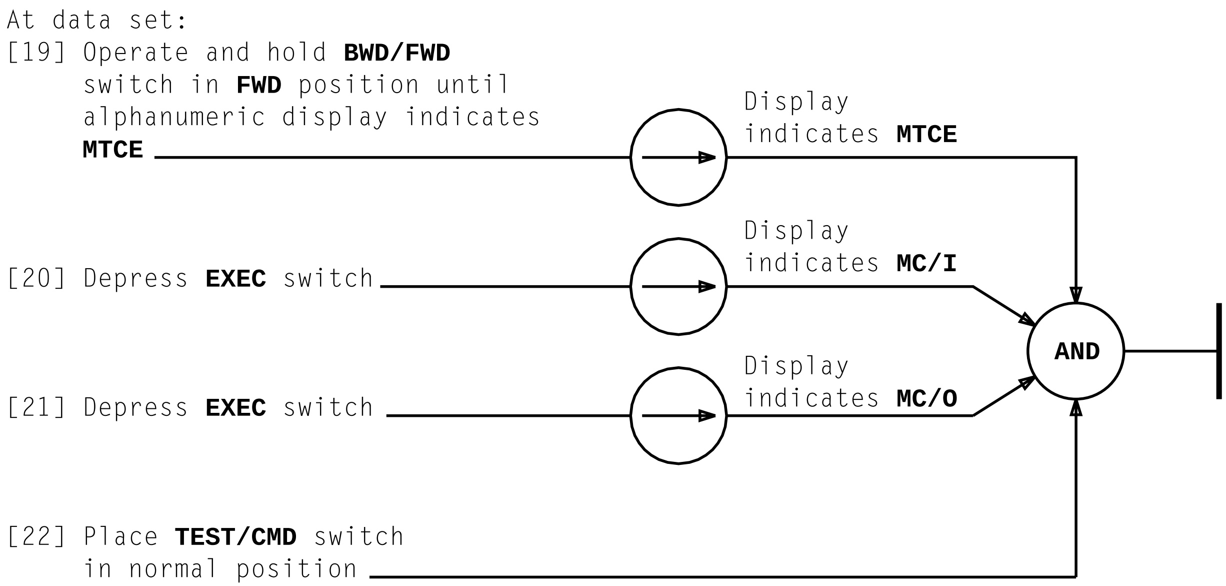


VERIFY 2024A/2048A DATA SET OPTIONS ARE PROPERLY SET



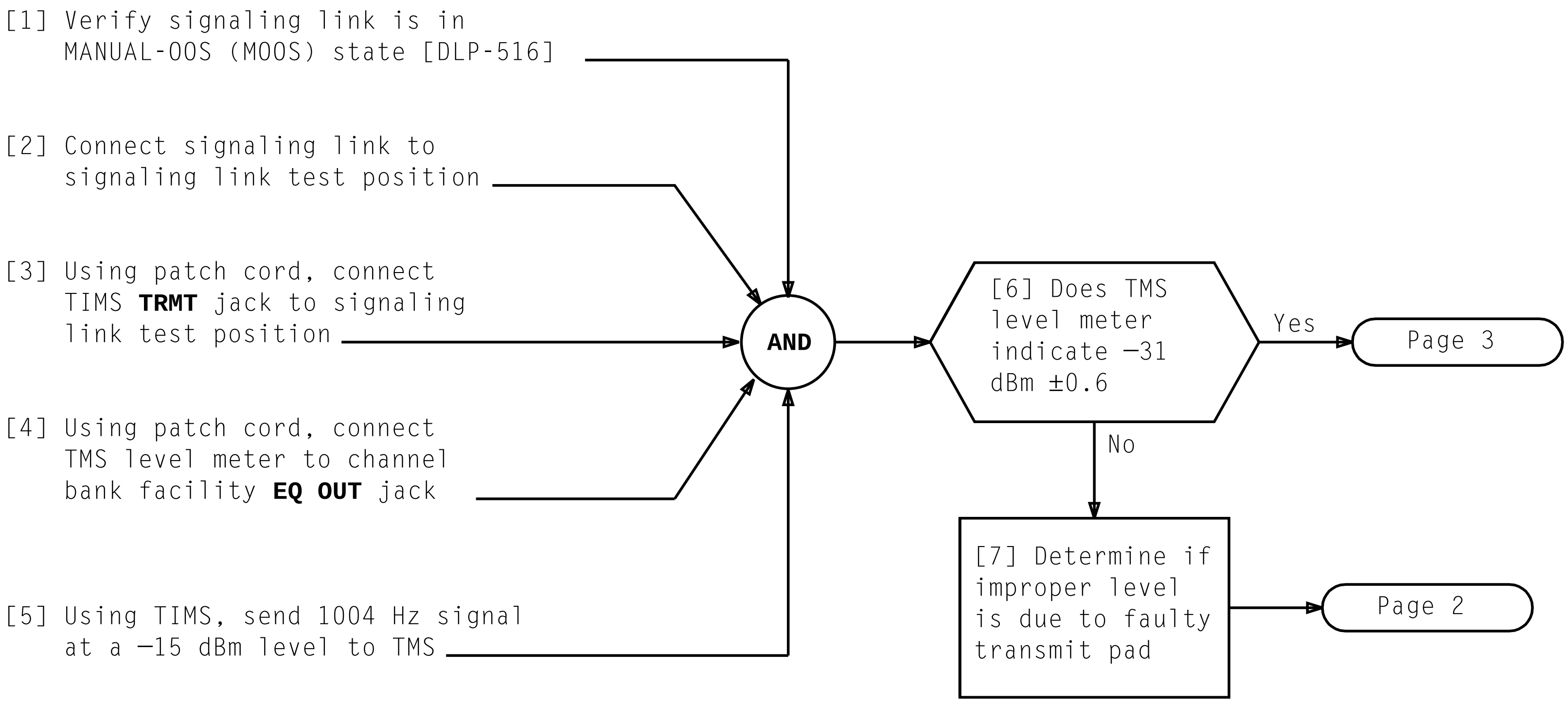
NOTE 1
Options activity set will appear in alphanumeric display with a checkmark as the first character (√bA1)

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

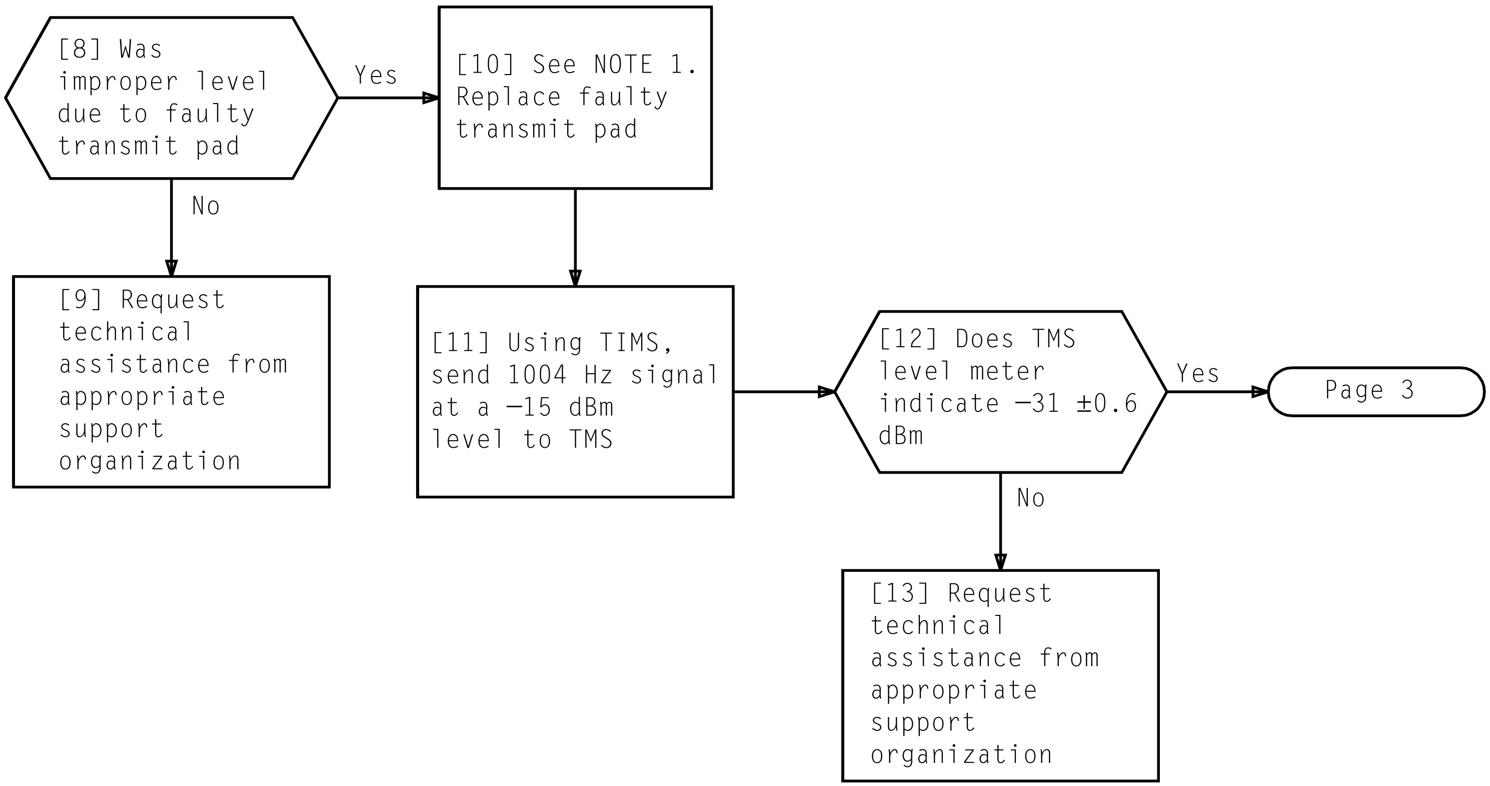

At data set:
[19] Operate and hold **BWD/FWD** switch in **FWD** position until alphanumeric display indicates **MTCE**
Display indicates **MTCE**
[20] Depress **EXEC** switch
Display indicates **MC/I**
[21] Depress **EXEC** switch
Display indicates **MC/O**
[22] Place **TEST/CMD** switch in normal position
AND

SUMMARY

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

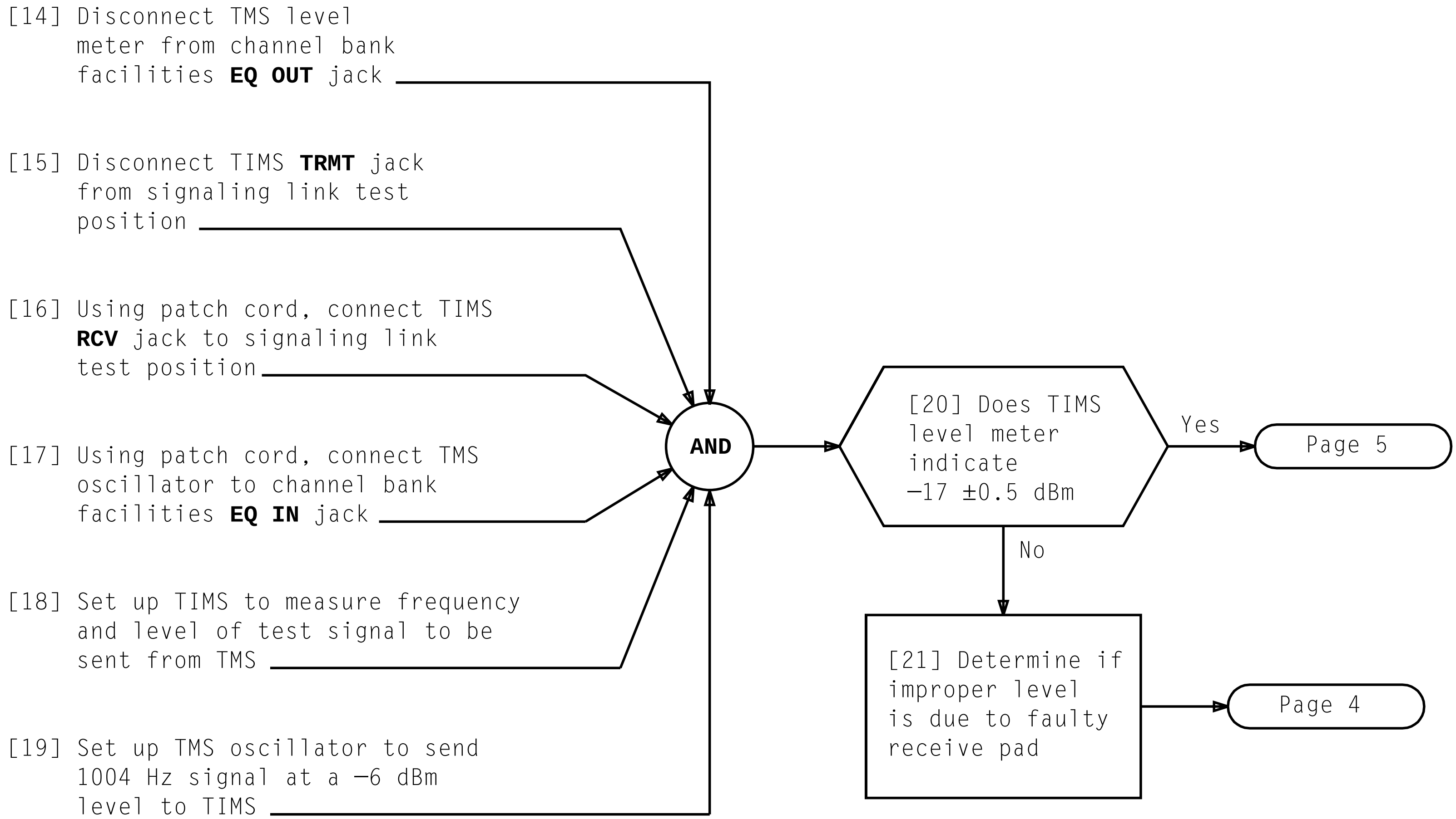


PERFORM ANALOG SIGNALING LINK CROSS-OFFICE TEST

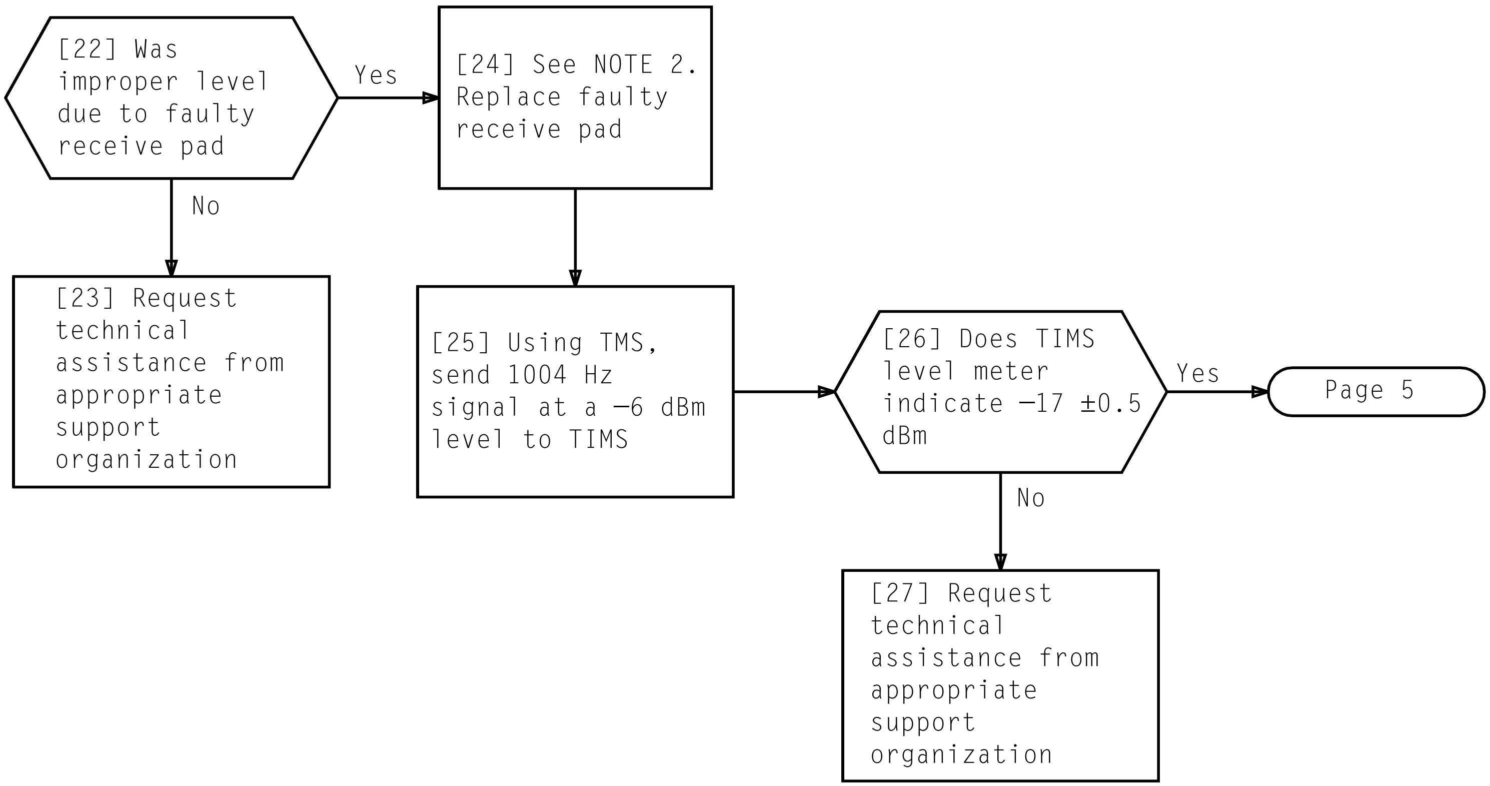


NOTE 1
Transmit pads with values less than 12 dB and greater than 14 dB cannot be used. If correct meter level cannot be obtained within this tolerance, other problems exist

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

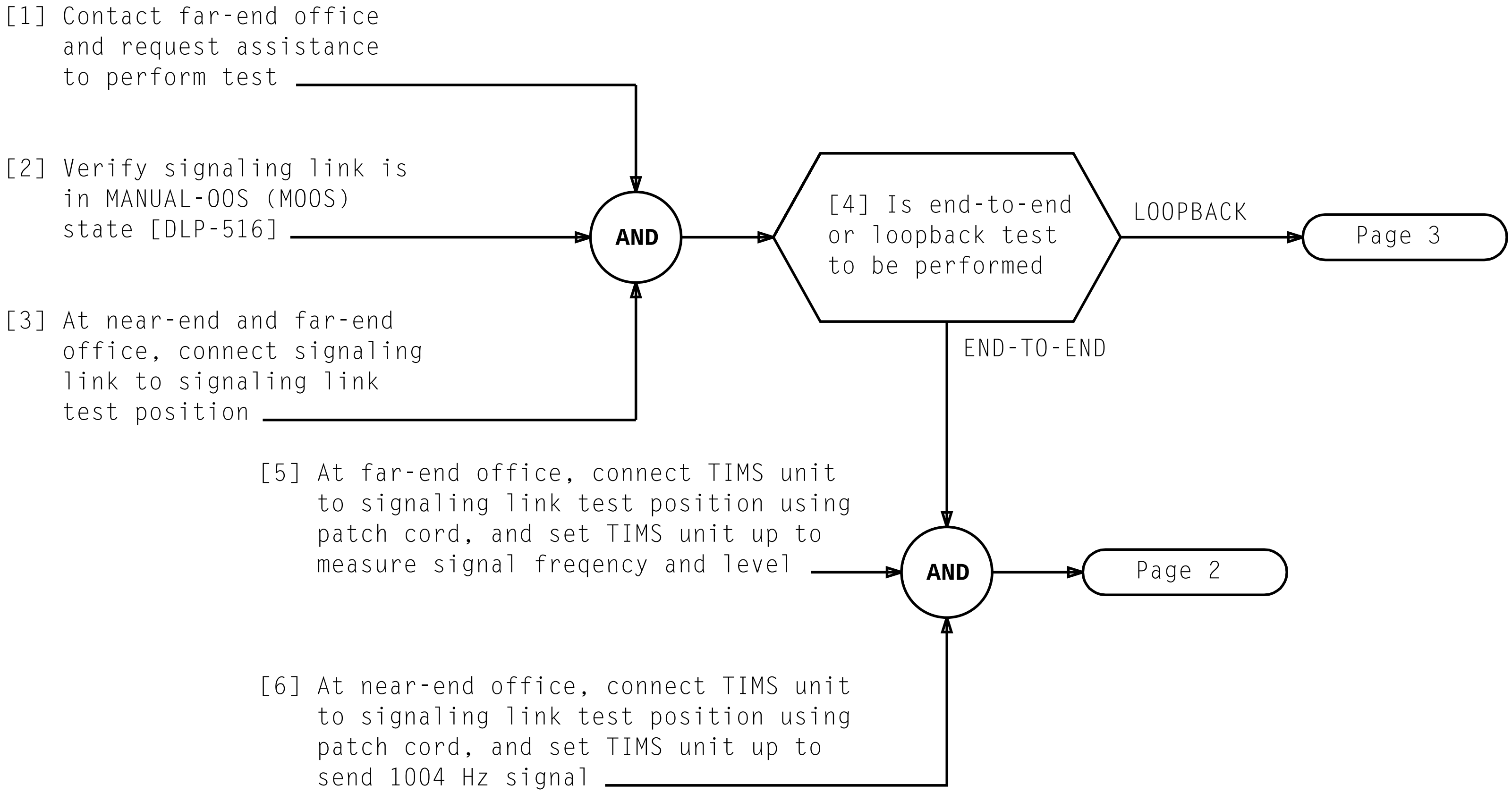
[31] Change signaling link state to AVAILABLE — IS [DLP-525]

AND

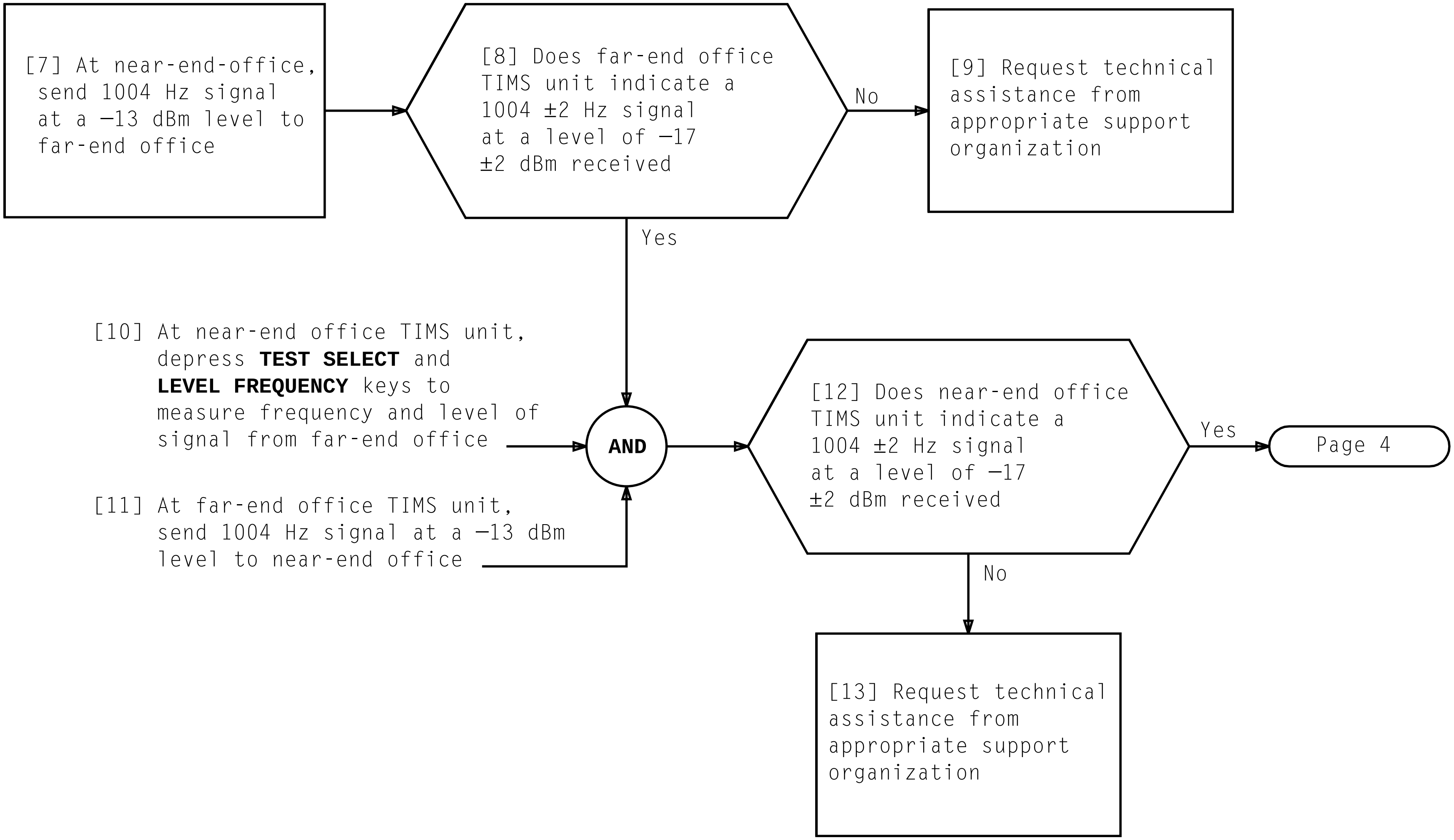
PERFORM ANALOG SIGNALING LINK CROSS-OFFICE TEST

SUMMARY

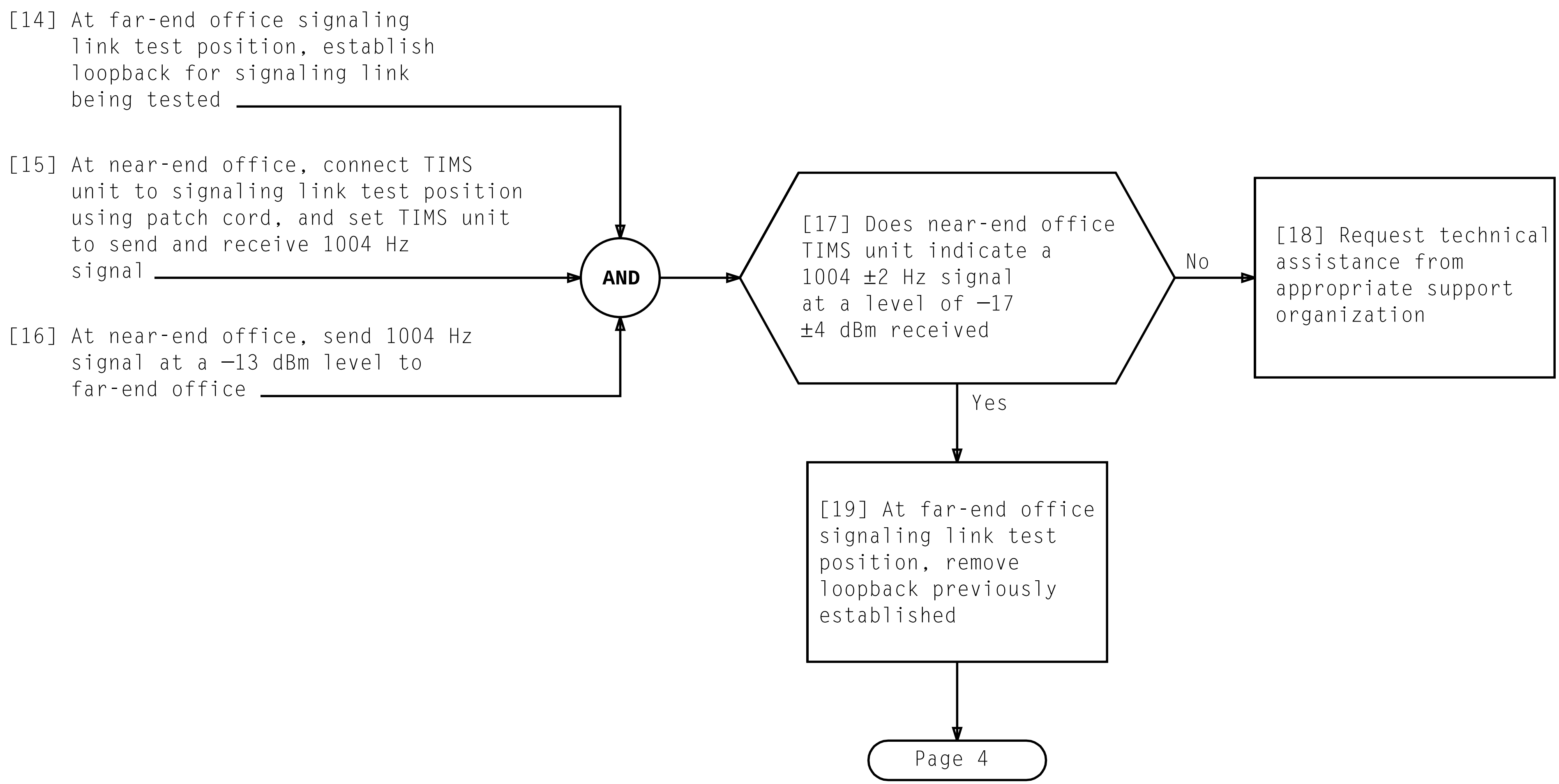
The 1004 Hz net loss test verifies that end-to-end or loopback net loss on a signaling link does not exceed the Expected Measured Loss (EML)



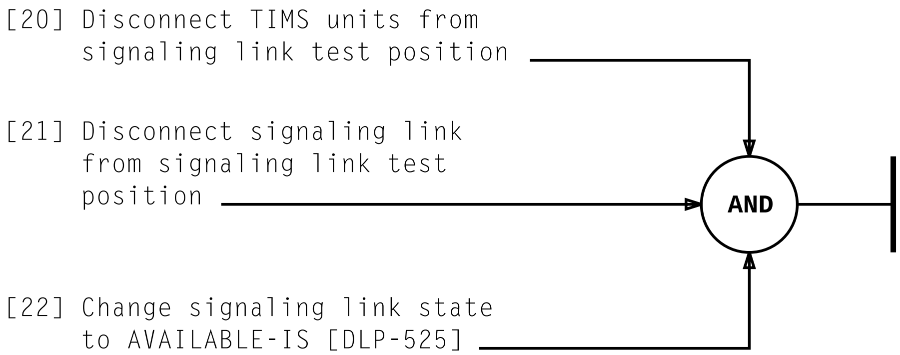
PERFORM ANALOG SIGNALING LINK 1004 Hz NET LOSS TEST



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

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

[1] Contact far-end office and request assistance to perform test

[2] Verify signaling link is in the MANUAL-OOS (MOOS) state [DLP-516]

[3] At near-end and far-end office, connect signaling link to signaling link test position

[4] At far-end office, connect TIMS unit to signaling link test position using patch cord

At far-end office TIMS unit:

[5] Set **MEASUREMENT** switch to **NOISE WITH TONE** position

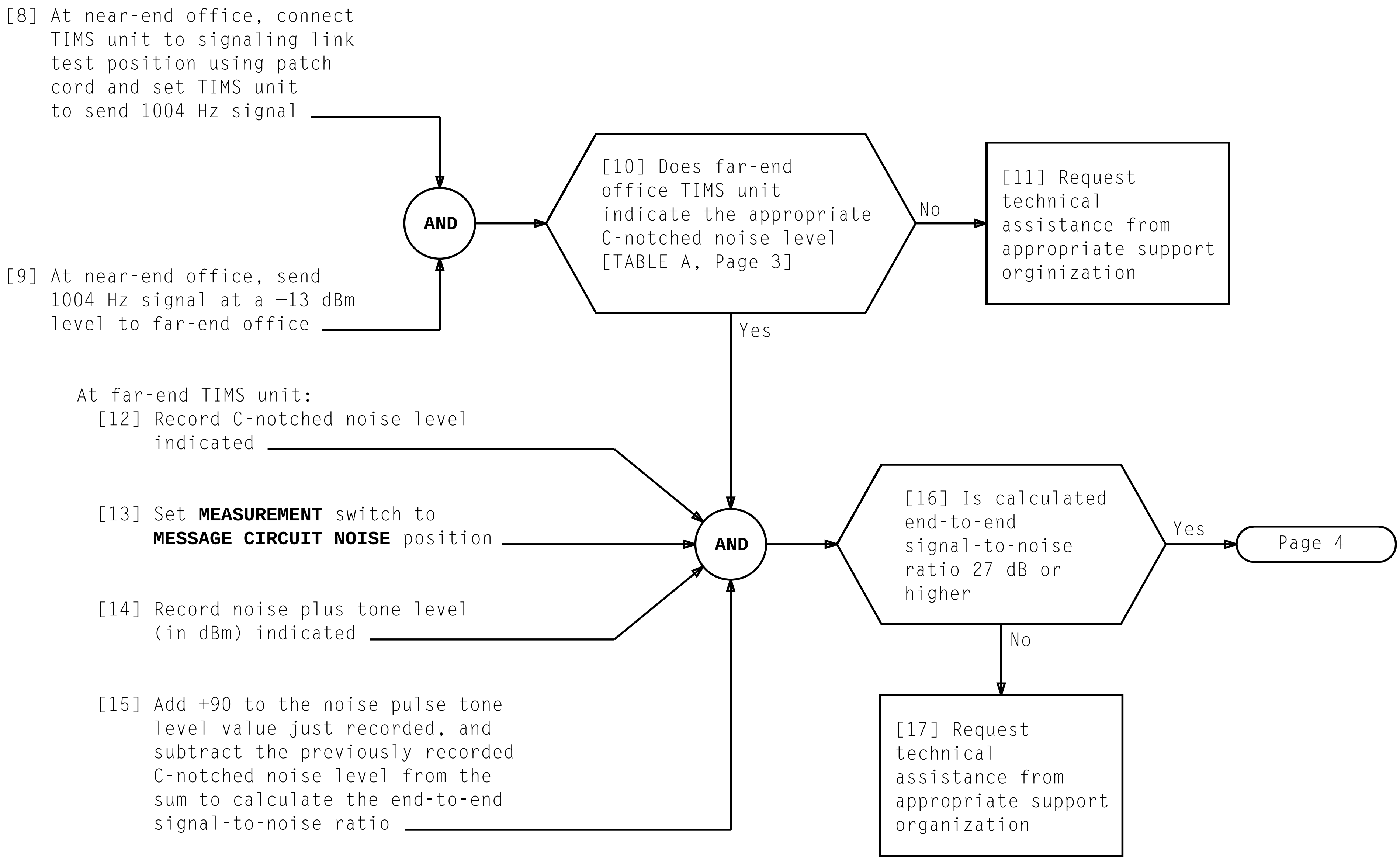
[6] Set **DISPLAY CONNECTED TO** switch to **RCV** position

[7] Depress **C-MSG NOISE FILTER** pushbutton

AND

Page 2

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

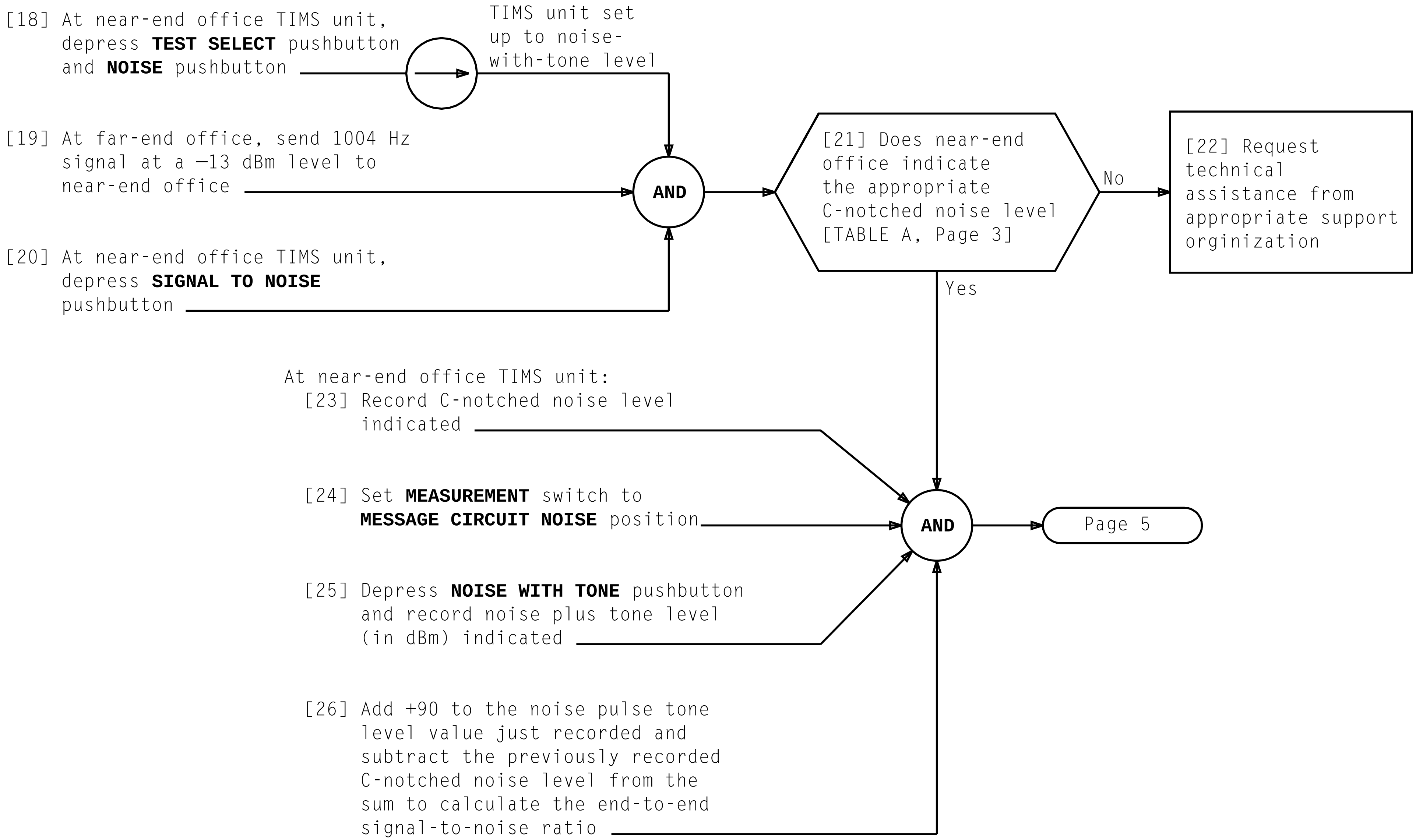


PERFORM ANALOG SIGNALING LINK C-NOTCHED NOISE AND SIGNAL-TO-NOISE TEST

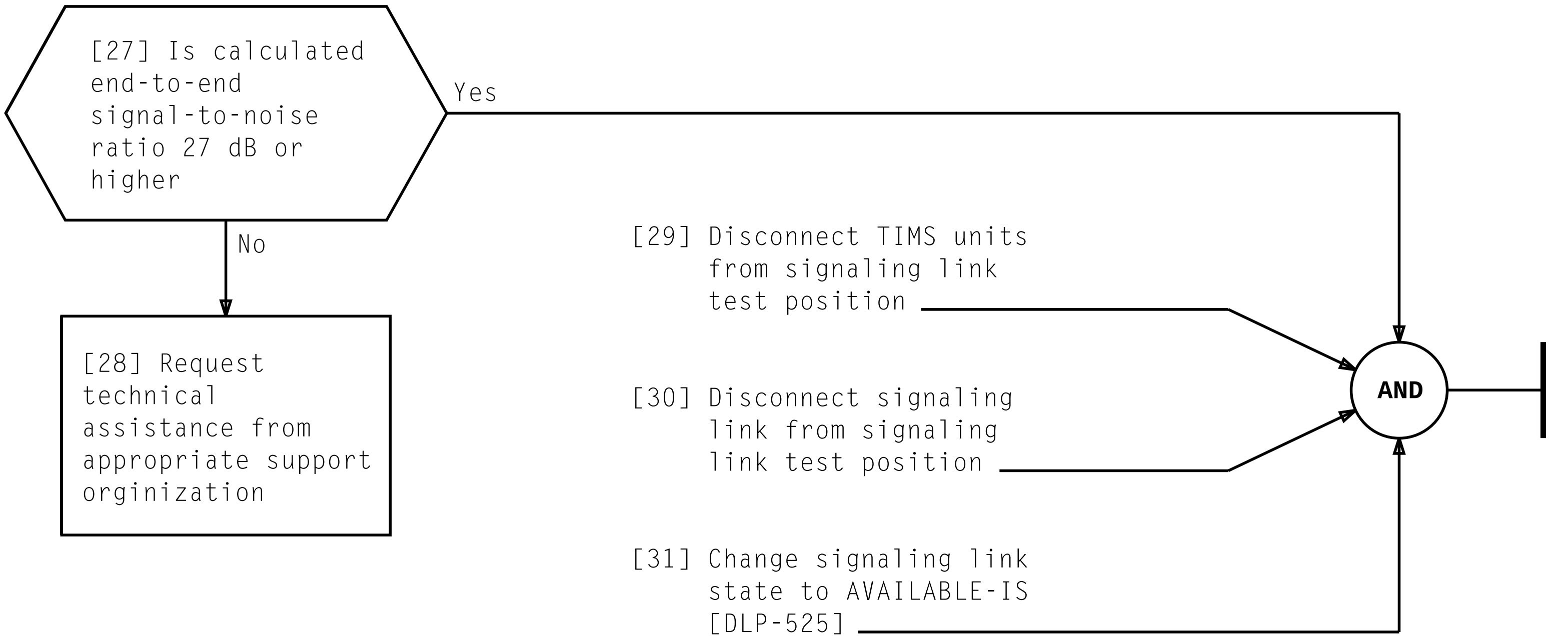
TABLE A C-NOTCHED NOISE REQUIREMENTS				
END-TO-END CIRCUIT LENGTH IN MILES (NOTE 1)	FACILITY TYPE (NOTE 2)			
	NONCOMPANDORED FACILITY	ANALOG AND N- CARRIER FACILITY (N1, N2, N3, ON)	ANALOG AND T- CARRIER FACILITY (D1A, D1B)	ANALOG AND T- CARRIER FACILITY (D1D, D2, D3, D4)
0 to 50	28	38	47	40
51 to 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


[27] Is calculated end-to-end signal-to-noise ratio 27 dB or higher
Yes
No
[28] Request technical assistance from appropriate support orginization
[29] Disconnect TIMS units from signaling link test position
[30] Disconnect signaling link from signaling link test position
[31] Change signaling link state to AVAILABLE-IS [DLP-525]
AND

SUMMARY

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

[1] Contact far-end office and request assistance to perform test

[2] Verify signaling link is in MANUAL-OOS (MOOS) state [DLP-516]

[3] At near-end and far-end office, connect signaling link to signaling link test position

[4] At near-end office, connect TIMS unit to signaling link test position using patch cord

[5] At near-end office TIMS unit, depress **TEST SELECT** and **NOISE** pushbuttons

AND

Page 2

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

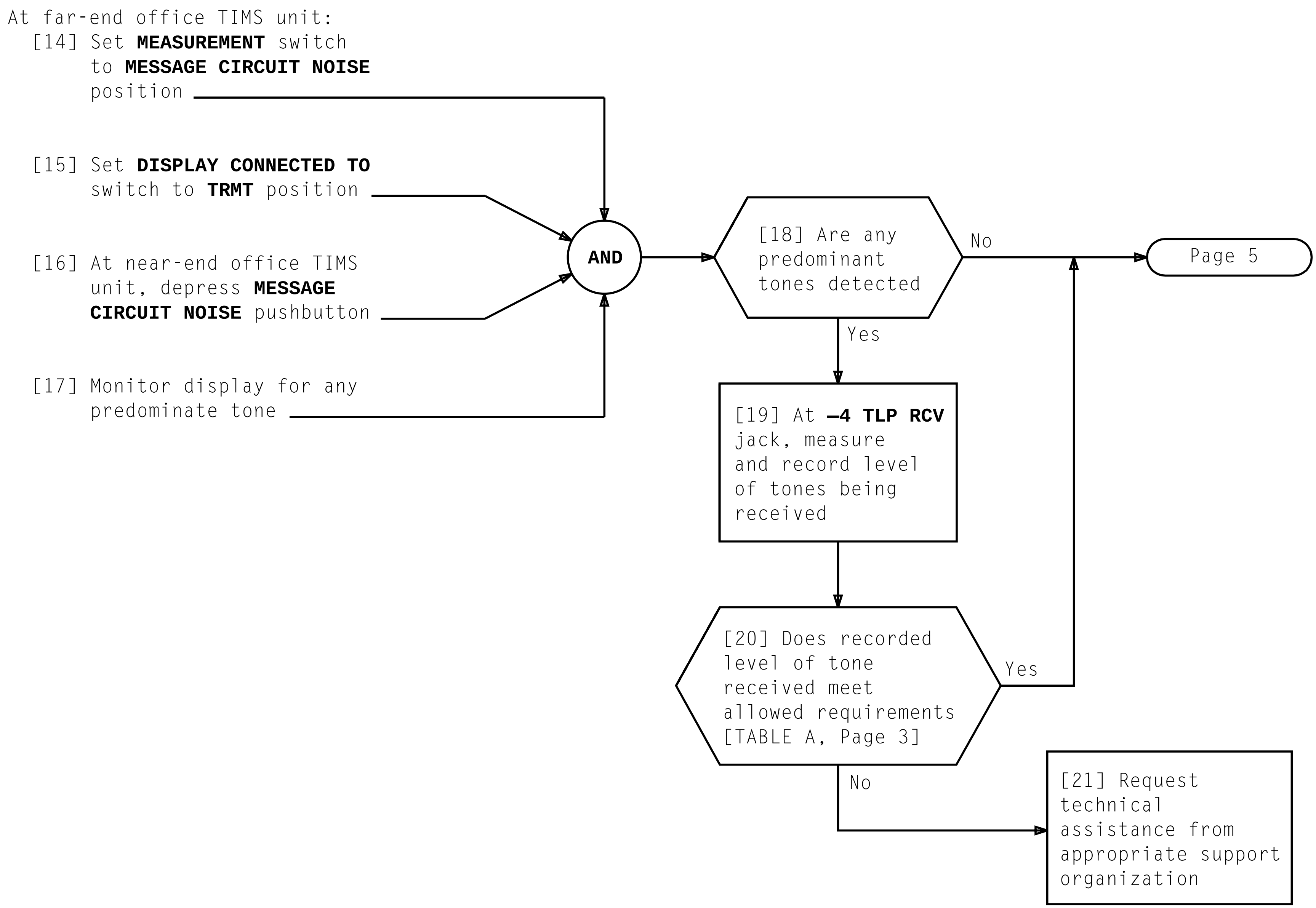
[12] Does recorded level of tone received meet allowed requirements [TABLE A, Page 3]

Yes → Page 4

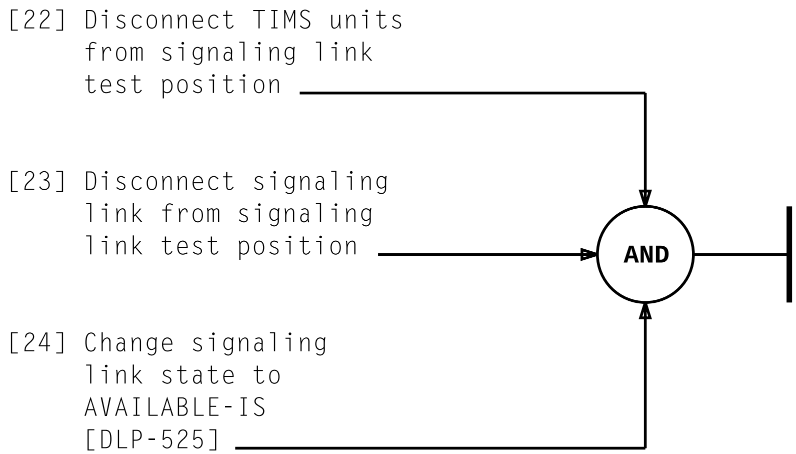
No

[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



PERFORM ANALOG SIGNALING LINK SINGLE FREQUENCY INTERFERENCE TEST


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

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

[1] Contact far-end office and request assistance to perform test

[2] Verify signaling link is in MANUAL-OOS (MOOS) state [DLP-516]

[3] At near-end and far-end office, connect signaling link to signaling link test position

AND

[4] Is end-to-end or loopback test to be performed

LOOPBACK → Page 5

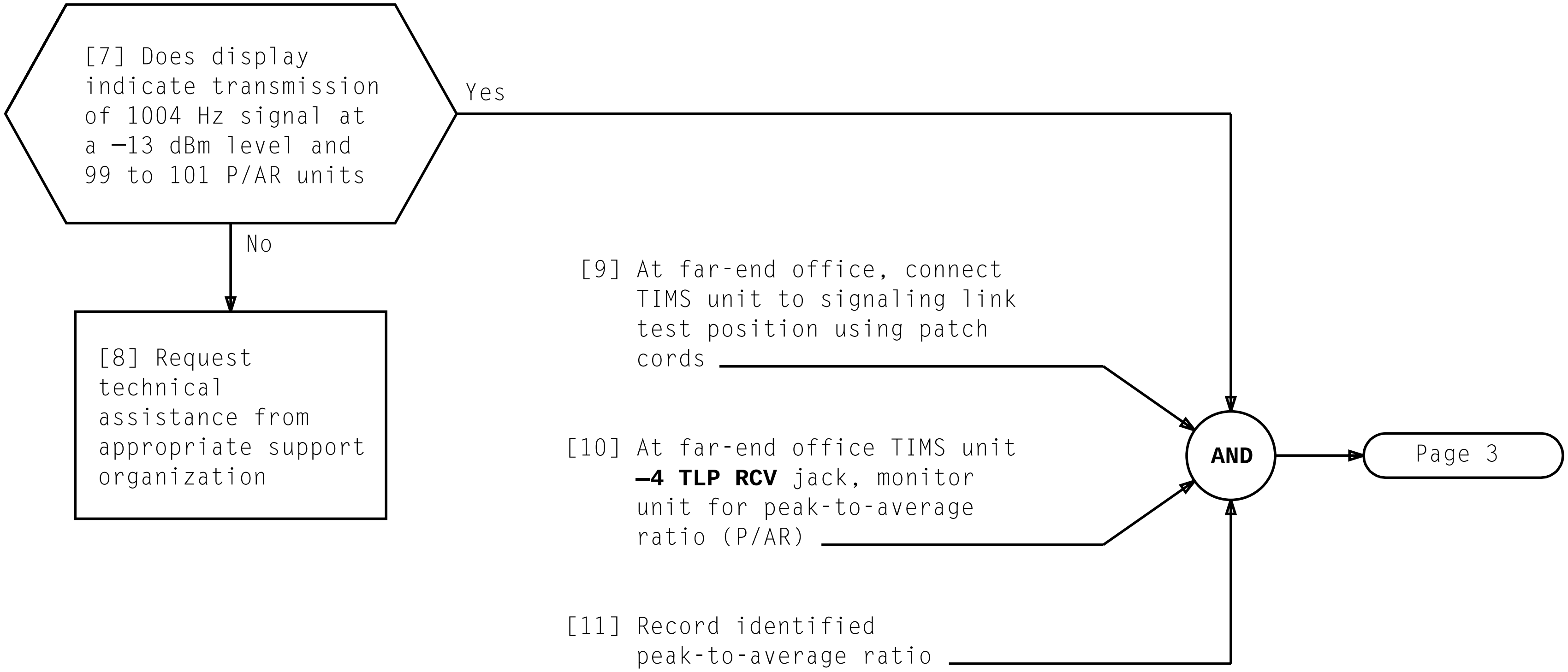
END-TO-END

[5] At near-end office, connect TIMS unit to signaling link test position using patch cords

[6] At near-end office TIMS unit, depress **TEST SELECT** and **P/AR** pushbuttons

AND → Page 2

PERFORM ANALOG SIGNALING LINK PEAK-TO-AVERAGE RATIO TEST



PERFORM ANALOG SIGNALING LINK PEAK-TO-AVERAGE RATIO TEST

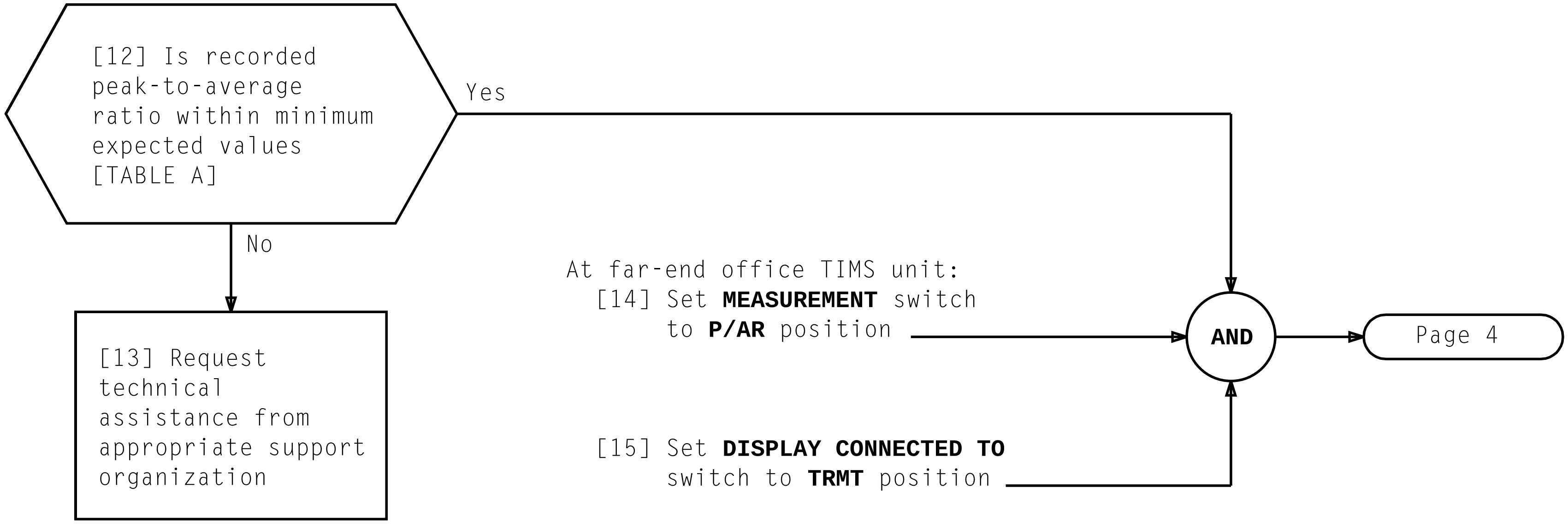
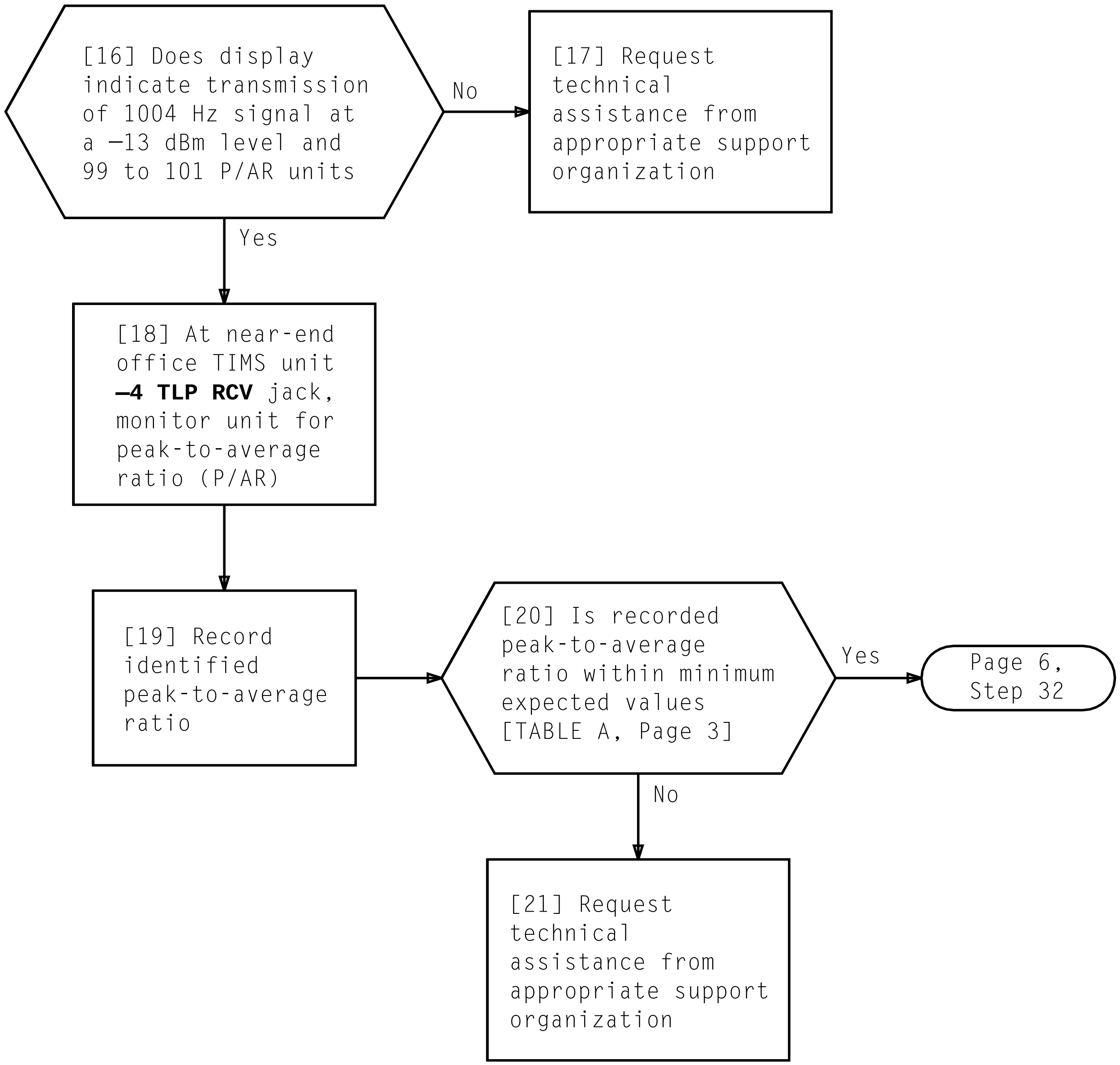


TABLE A
MINIMUM PEAK-TO-AVERAGE RATIO VALUES

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

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

[23] At near-end office, connect TIMS unit to signaling link test position using patch cords

[24] At near-end office TIMS unit, depress **TEST SELECT** and **P/AR** pushbuttons

AND

[25] Does display indicate transmission of 1004 Hz signal at a −13 dBm level and 99 to 101 P/AR units

No

[26] Request technical assistance from appropriate support organization

Yes

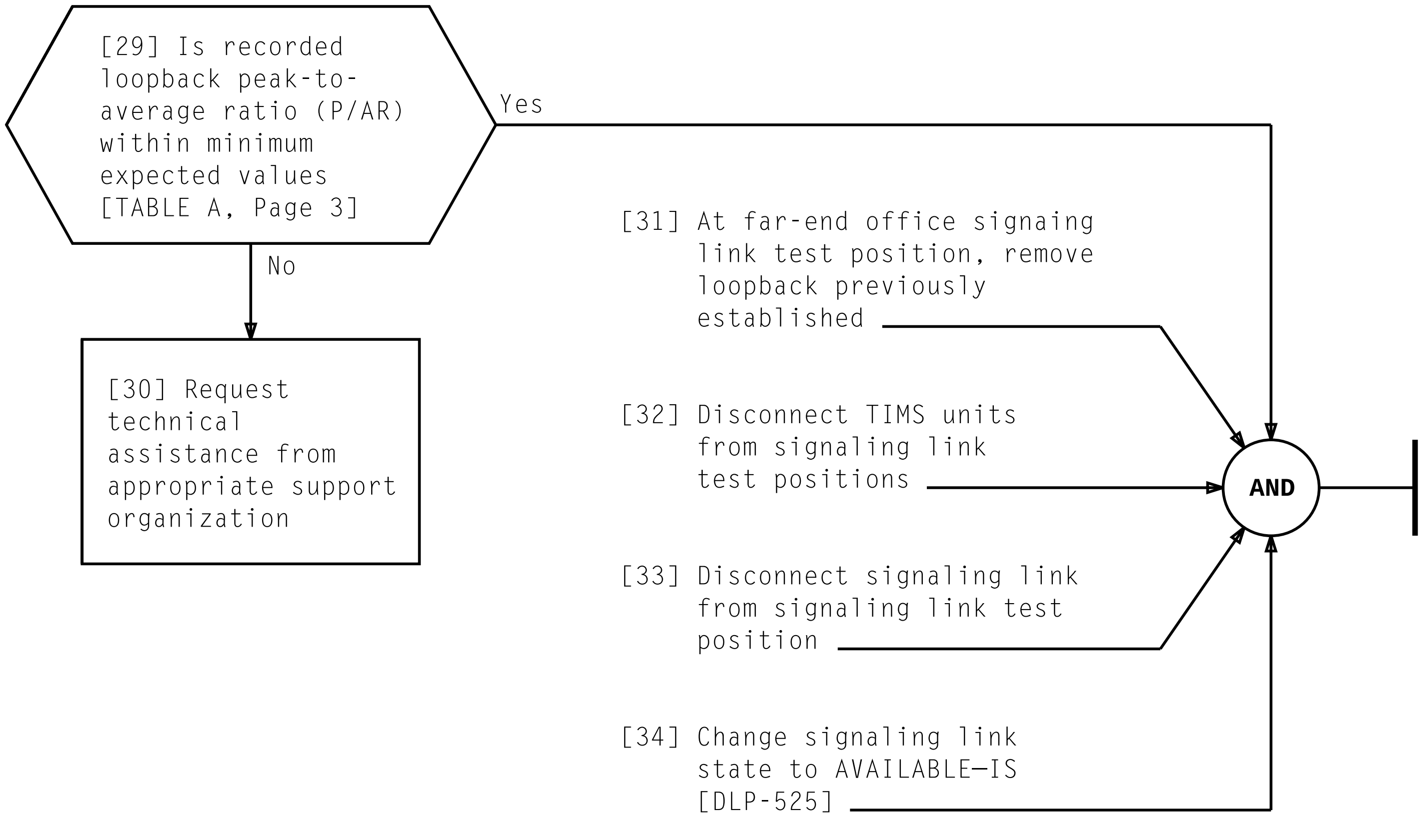
[27] At near-end office TIMS unit **−4 TLP RCV** jack, monitor unit for loopback peak-to-average ratio (P/AR)

[28] Record identified loopback peak-to-average ratio (P/AR)

AND

Page 6

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.

[1] Contact far-end office and request assistance to perform test

[2] Verify signaling link is in MANUAL-OOS (MOOS) state [DLP-516]

[3] At near-end and far-end office, connect signaling link to signaling link test position

AND

[4] Is end-to-end or loopback test to be performed

LOOPBACK: Page 6

END-TO-END:

[5] At far-end office, connect TIMS unit to signaling link test position using patch cords

At far-end office TIMS unit:

[6] See NOTE 1. Set **MEASUREMENT** switch to **3-LEVEL IMPULSE NOISE HITS & DROPOUTS** position

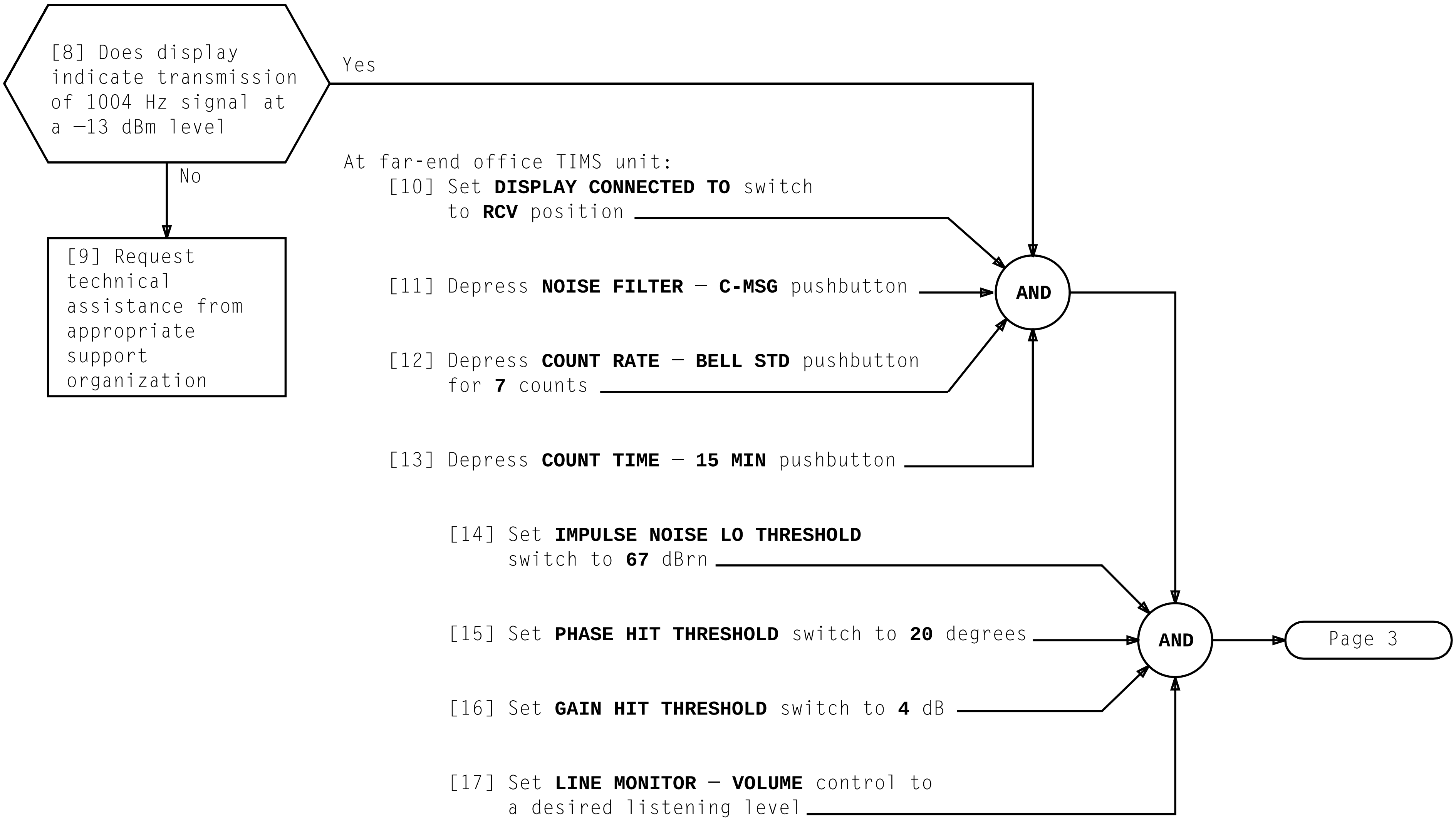
[7] Set **DISPLAY CONNECTED TO** switch to **TRMT** position

AND

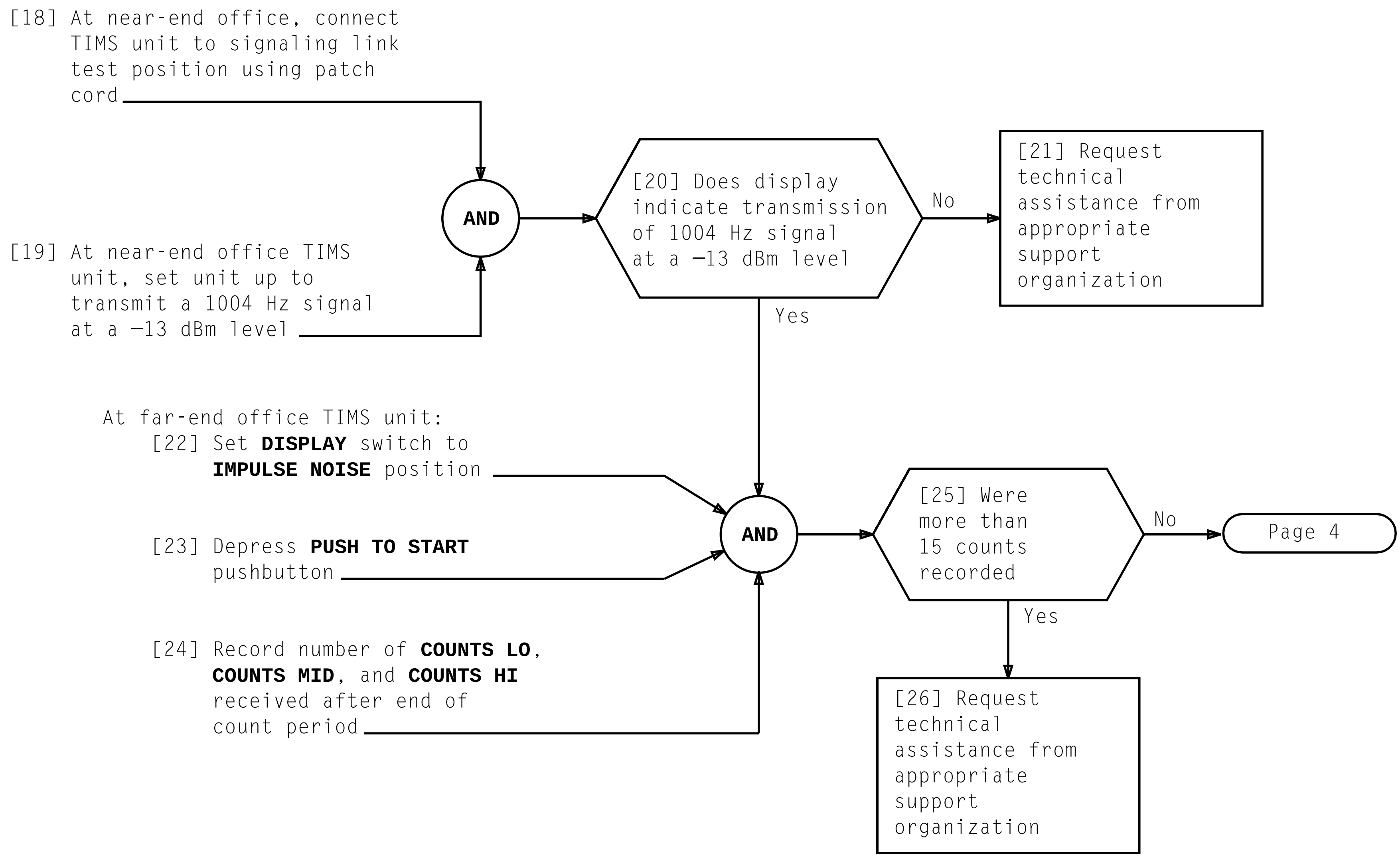
Page 2

NOTE 1
Due to time required to perform this test, it should be performed simultaneously at both offices

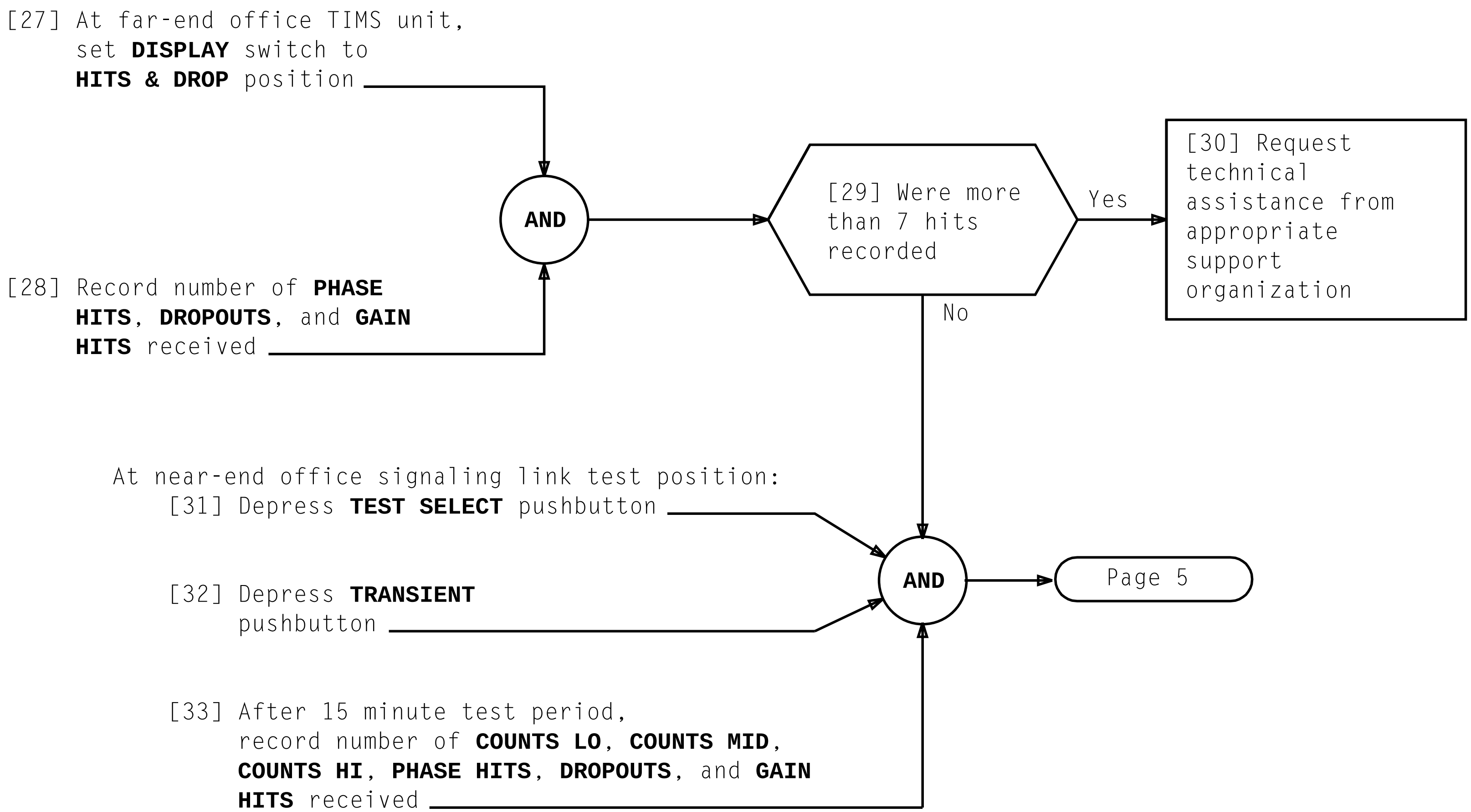
PERFORM ANALOG SIGNALING LINK IMPULSE NOISE, PHASE HITS, AND GAIN HITS TEST



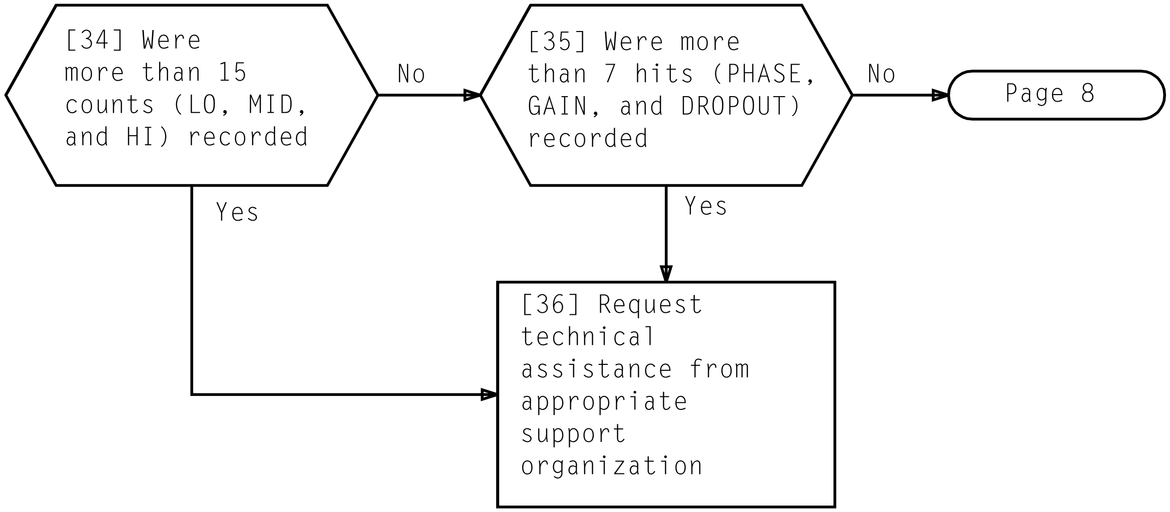
PERFORM ANALOG SIGNALING LINK IMPULSE NOISE, PHASE HITS, AND GAIN HITS TEST

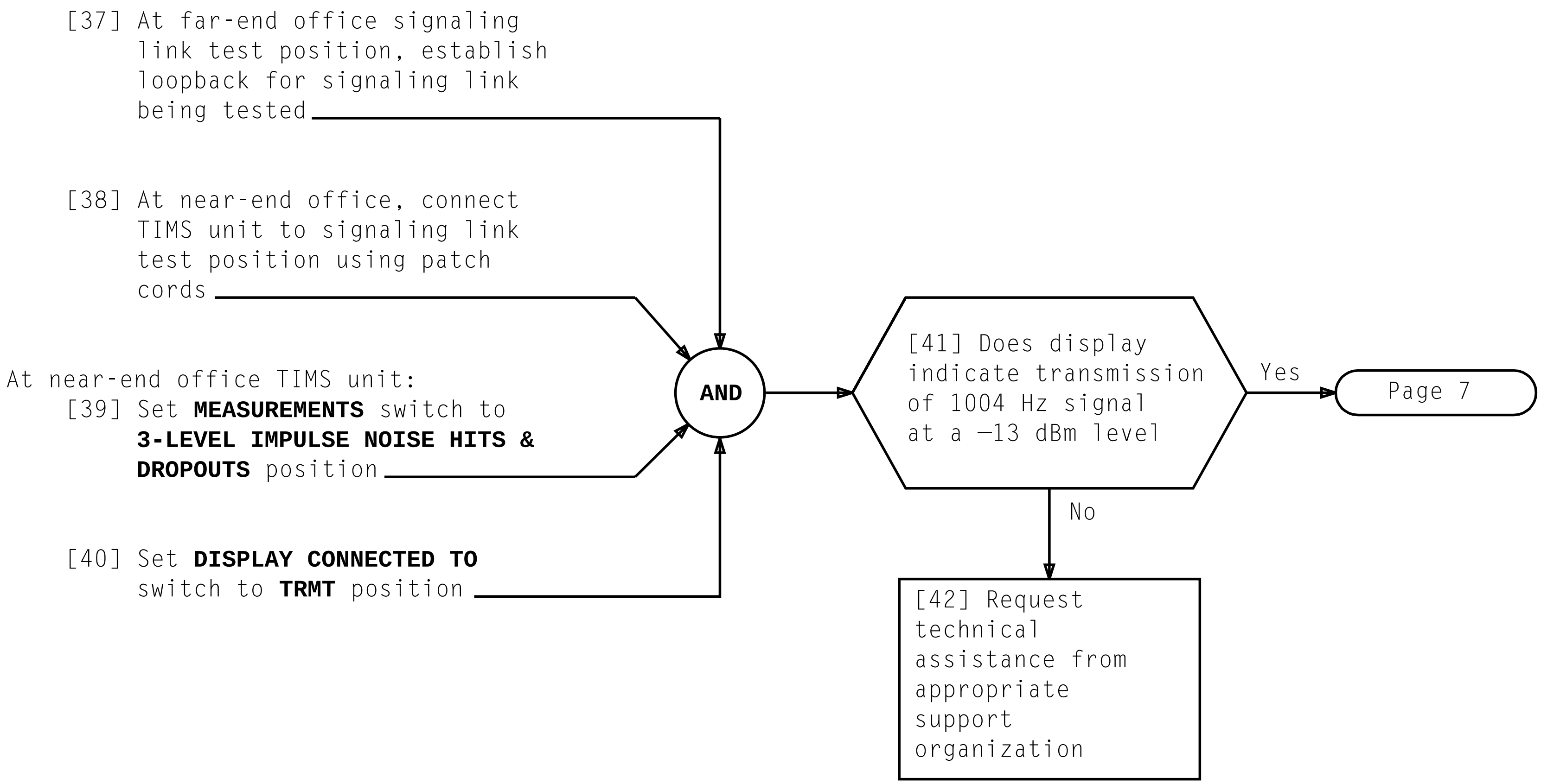


PERFORM ANALOG SIGNALING LINK IMPULSE NOISE, PHASE HITS, AND GAIN HITS TEST

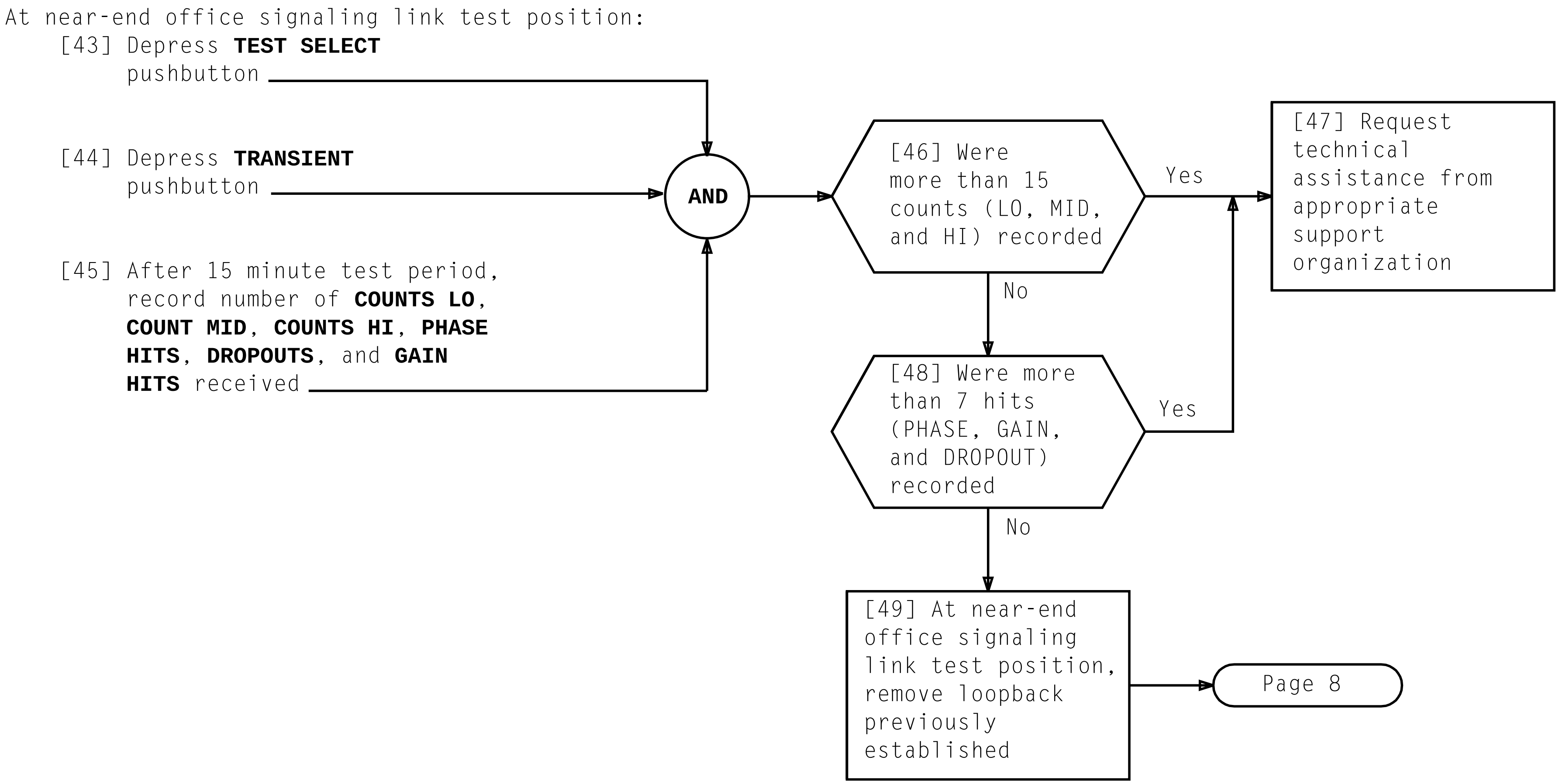


PERFORM ANALOG SIGNALING LINK IMPULSE NOISE, PHASE HITS, AND GAIN HITS TEST

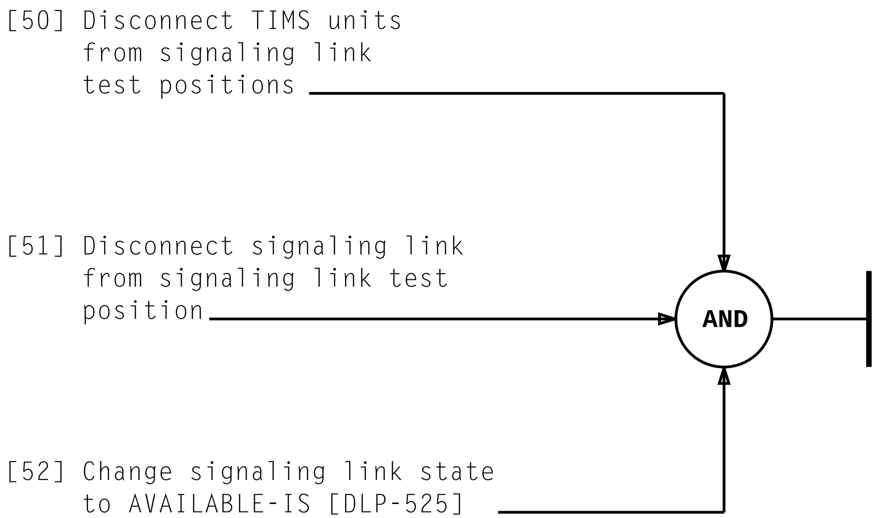

[34] Were more than 15 counts (LO, MID, and HI) recorded
No
[35] Were more than 7 hits (PHASE, GAIN, and DROPOUT) recorded
No
Page 8
Yes
Yes
[36] Request technical assistance from appropriate support organization



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

[1] Contact far-end office and request assistance to perform test

[2] Verify signaling link is in MANUAL-OOS (MOOS) state [DLP-516]

[3] At near-end and far-end office, connect signaling link to signaling link test position

AND

[4] Is end-to-end or loopback test to be performed

LOOPBACK

Page 7

END-TO-END

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

At near-end office TIMS unit:

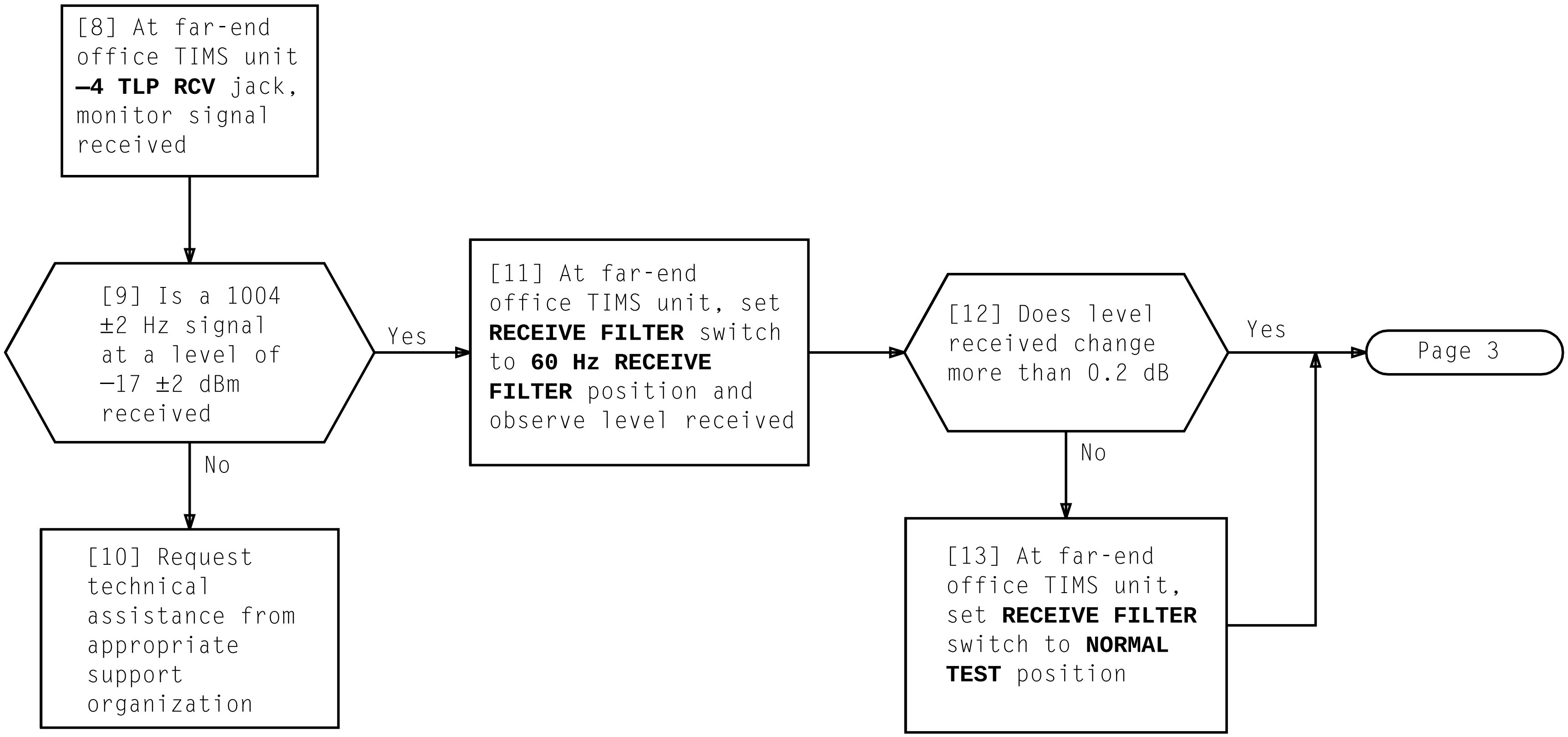
[6] Set up unit to send 1004 Hz signal from 0 TLP at a −13 dBm level

[7] Depress **TEST SELECT** and **LEVEL FREQUENCY** pushbutton

AND

Page 2

PERFORM ANALOG SIGNALING LINK FREQUENCY RESPONSE TEST



[8] At far-end office TIMS unit **–4 TLP RCV** jack, monitor signal received
[9] Is a 1004 ±2 Hz signal at a level of −17 ±2 dBm received
Yes
No
[10] Request technical assistance from appropriate support organization
[11] At far-end office TIMS unit, set **RECEIVE FILTER** switch to **60 Hz RECEIVE FILTER** position and observe level received
[12] Does level received change more than 0.2 dB
Yes
No
[13] At far-end office TIMS unit, set **RECEIVE FILTER** switch to **NORMAL TEST** position
Page 3

[14] See NOTE 1. At far-end office TIMS unit, depress **LEVEL ZERO** pushbutton

[15] At near-end office TIMS unit, set up unit to transmit test signal from 0 TLP at a −13 dBm level [TABLE A, Page 4]

AND

[16] At far-end office TIMS unit, is test signal received and attenuation tolerances acceptable [TABLE A, Page 4]

No → [17] Request technical assistance from appropriate support organization

Yes ↓

[18] Have all test signals been tested [TABLE A, Page 4]

No → [19] Repeat from Step 15 for next signal listed

Yes ↓

[20] At far-end office TIMS unit, set up unit to send 1004 Hz signal from 0 TLP at a −13 dBm level

[21] At near-end office TIMS unit **−4 TLP RCV** jack, monitor signal received

AND

Page 5

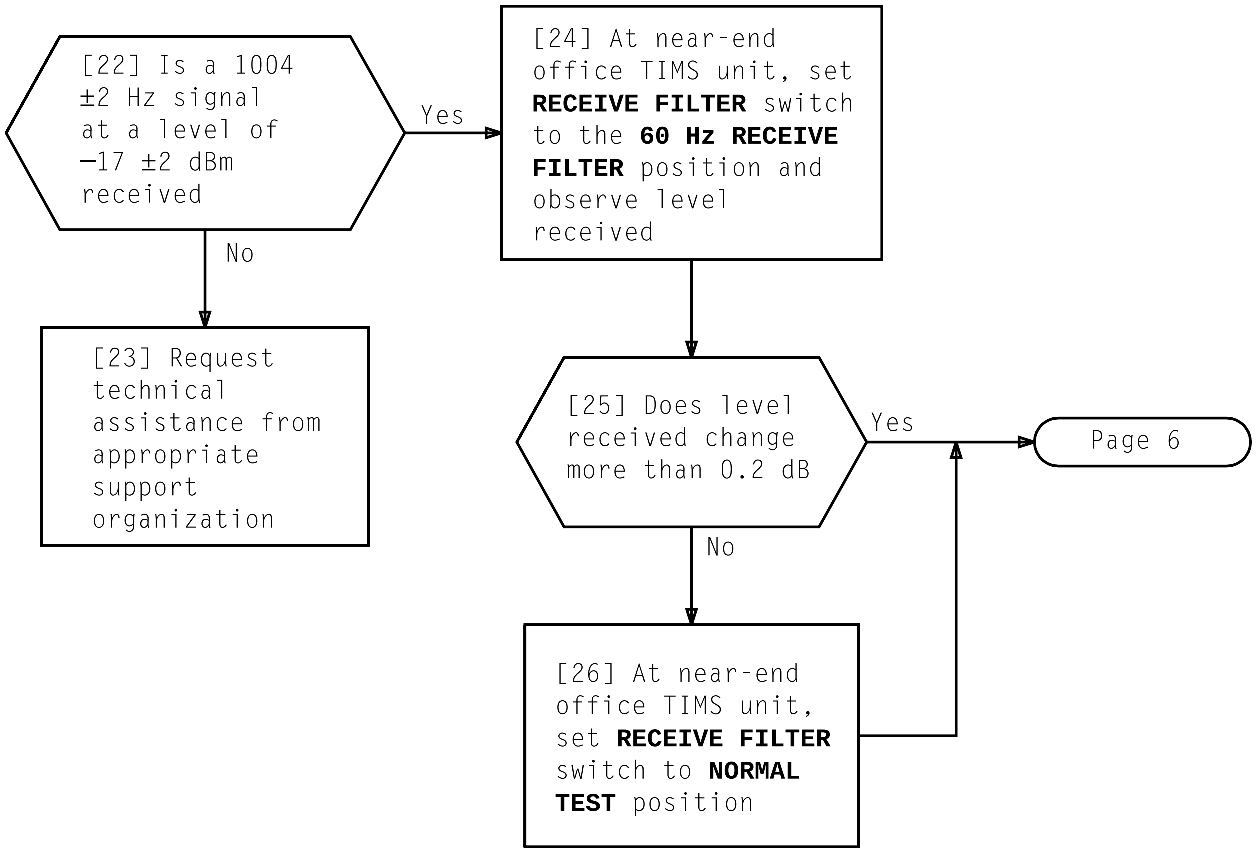
NOTE 1
The **LEVEL ZERO** pushbutton establishes a 0 dB relative loss value for the received reference frequency. All subsequent level measurements are made in dB relative to the reference frequency dBm

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

[27] See NOTE 2. At near-end office TIMS unit, depress **LEVEL ZERO** pushbutton

[28] At far-end office TIMS unit, set up unit to transmit test signal from 0 TLP at a −13 dBm level [TABLE A, Page 4]

AND

[29] At near-end office TIMS unit, is test signal received and attenuation tolerances acceptable [TABLE A, Page 4]

No → [30] Request technical assistance from appropriate support organization

Yes ↓

[31] Have all test signals been tested [TABLE A, Page 4]

No → [32] Repeat from Step 28 for next signal listed

Yes ↓

Page 10

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

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

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

At near-end TIMS unit:

[35] Set up unit to send 1004 Hz signal from 0 TLP at a −13 dBm level

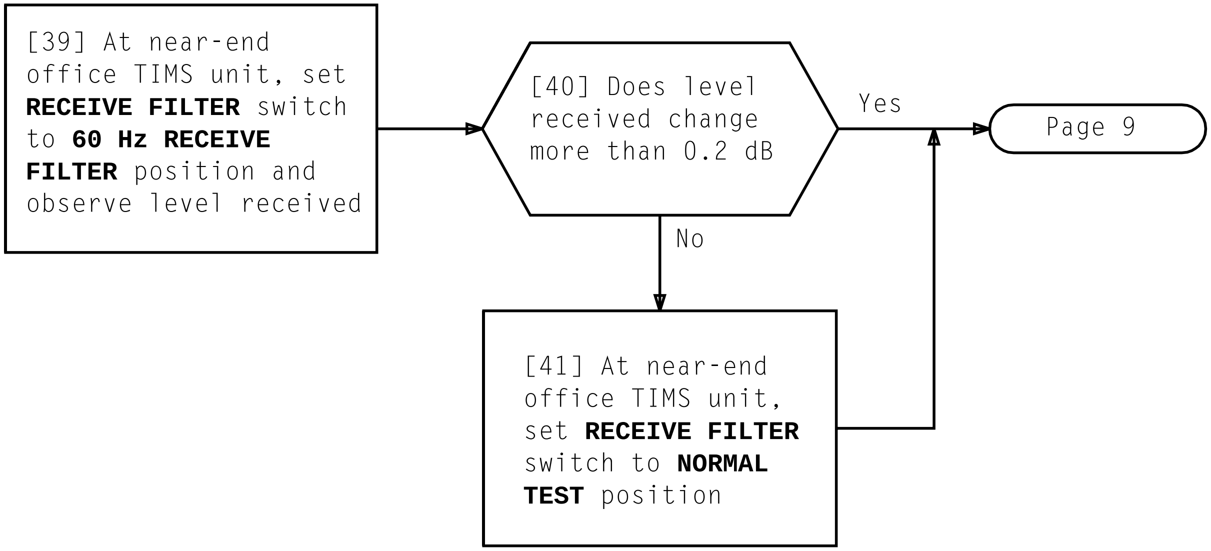
[36] At TIMS unit **−4 TLP RCV** jack, monitor signal received

AND

[37] Is a 1004 ±2 Hz signal at a level of −17 ±2 dBm received

Yes → Page 8

No → [38] Request technical assistance from appropriate support organization


[39] At near-end office TIMS unit, set **RECEIVE FILTER** switch to **60 Hz RECEIVE FILTER** position and observe level received
[40] Does level received change more than 0.2 dB
Yes
Page 9
No
[41] At near-end office TIMS unit, set **RECEIVE FILTER** switch to **NORMAL TEST** position

[42] See NOTE 3. At near-end office TIMS unit, depress **LEVEL ZERO** pushbutton

[43] At near-end office TIMS unit, set up unit to transmit test signal from 0 TLP at a −13 dBm level [TABLE A, Page 4]

AND

[44] At near-end office TIMS unit, is test signal received and attenuation tolerances acceptable [TABLE A, Page 4]

No

[45] Request technical assistance from appropriate support organization

Yes

[46] Have all test signals been tested [TABLE A, Page 4]

No

[47] Repeat from Step 43 for next signal listed

Yes

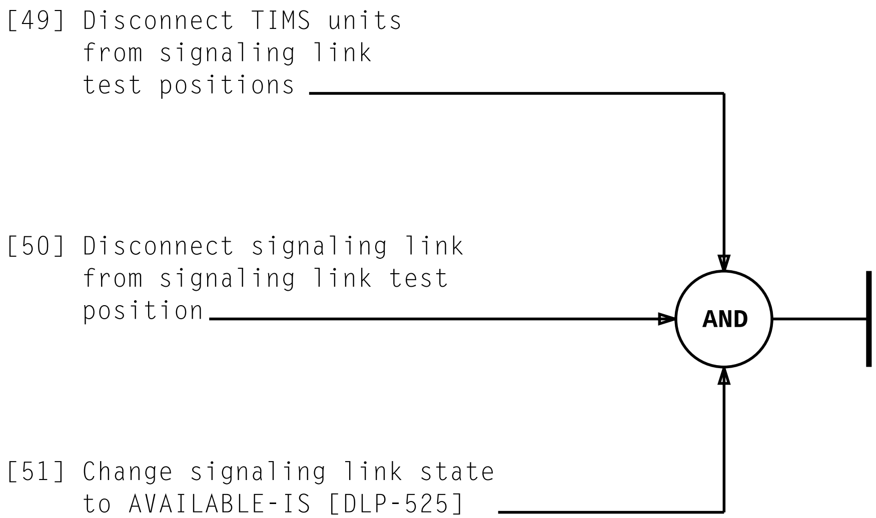
[48] At near-end office signaling link test position, remove loopback previously established

Page 10

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.

[1] Contact far-end office and request assistance to perform test

[2] Verify signaling link is in MANUAL-OOS (MOOS) state [DLP-516]

[3] At near-end and far-end office, connect signaling link to signaling link test position

AND

[4] Is end-to-end or loopback test to be performed

LOOPBACK → Page 9

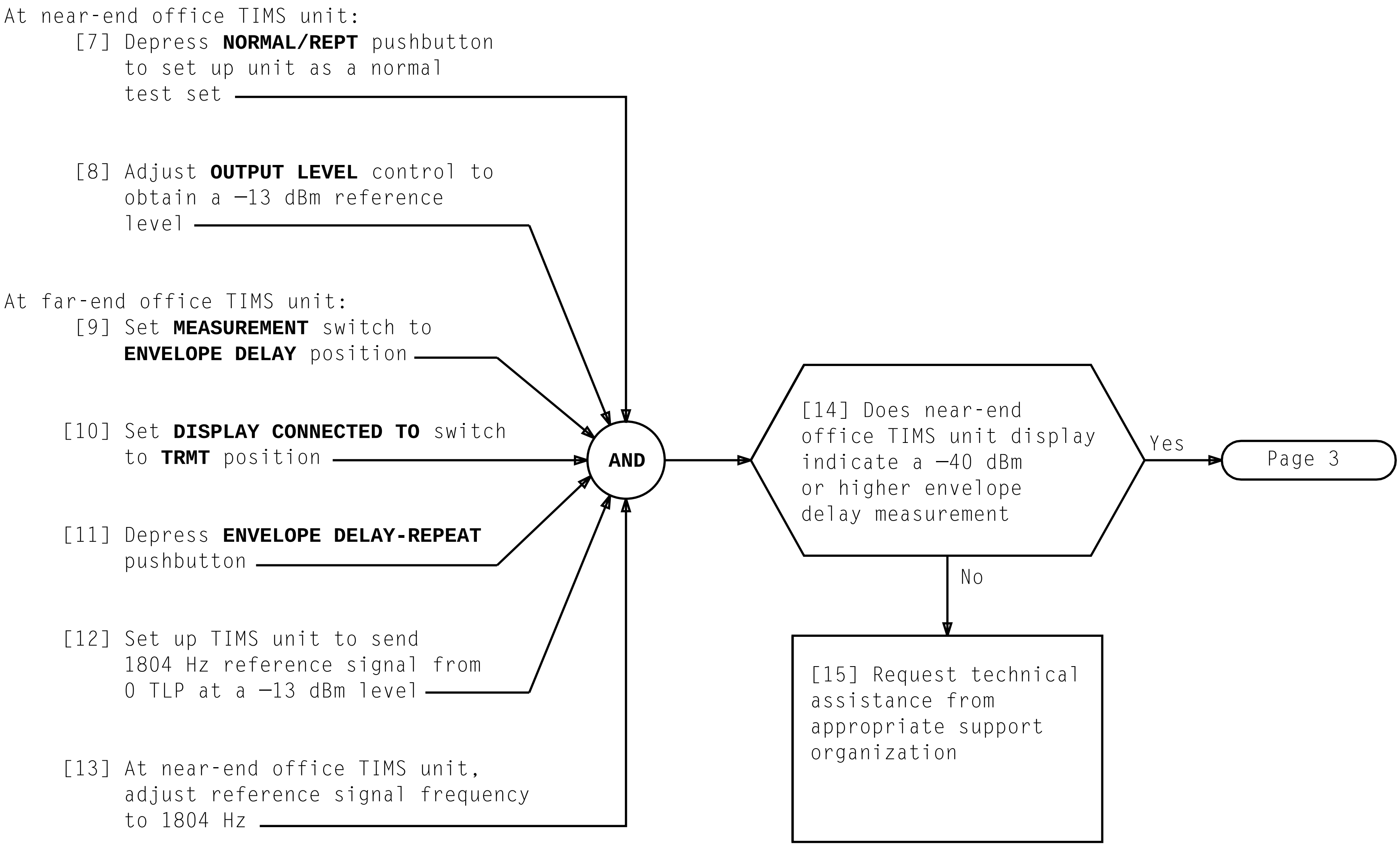
END-TO-END

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

[6] At near-end signaling link test position, depress **TEST SELECT** and **ENVELOPE DELAY** pushbutton

AND → Page 2

PERFORM ANALOG SIGNALING LINK ENVELOPE DELAY DISTORTION TEST


At near-end office TIMS unit:
[7] Depress **NORMAL/REPT** pushbutton to set up unit as a normal test set
[8] Adjust **OUTPUT LEVEL** control to obtain a −13 dBm reference level
At far-end office TIMS unit:
[9] Set **MEASUREMENT** switch to **ENVELOPE DELAY** position
[10] Set **DISPLAY CONNECTED TO** switch to **TRMT** position
[11] Depress **ENVELOPE DELAY-REPEAT** pushbutton
[12] Set up TIMS unit to send 1804 Hz reference signal from 0 TLP at a −13 dBm level
[13] At near-end office TIMS unit, adjust reference signal frequency to 1804 Hz
AND
[14] Does near-end office TIMS unit display indicate a −40 dBm or higher envelope delay measurement
Yes
Page 3
No
[15] Request technical assistance from appropriate support organization

[16] Allow few seconds for display to stabilize and depress **DELAY ZERO** pushbutton to establish a zero reference at the reference frequency

[17] See NOTE 1. Are reading variations on display evenly distributed above and below zero (20 microseconds typically)

No

[18] Request technical assistance from appropriate support organization

Yes

[19] At near-end office TIMS unit, adjust **FREQUENCY** control to obtain desired test signal frequency at a −13 dBm level [TABLE A, Page 4]

[20] Is test signal end-to-end envelope delay within limits [TABLE A, Page 4]

Yes

[22] Have all test signal frequencies been tested [TABLE A, Page 4]

Yes

Page 5

No

[21] Request technical assistance from appropriate support organization

No

[23] Repeat from Step 19 for next signal frequency listed

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

AND

Page 6

PERFORM ANALOG SIGNALING LINK ENVELOPE DELAY DISTORTION TEST

At far-end office TIMS unit:

[30] Set **DISPLAY CONNECTED TO** switch to **RVC** position

[31] Adjust reference signal frequency to 1804 Hz

AND

[32] Does far-end office TIMS unit display indicate a −40 dBm or higher envelope delay measurement

Yes

Page 7

No

[33] Request technical assistance from appropriate support organization

[34] Allow few seconds for displayed frequency to stabilize and depress **DELAY ZERO** pushbutton to establish a zero reference at the reference frequency

[35] See NOTE 2.
Are reading variations on display evenly distributed above and below zero (20 microseconds typically)

No

[36] Request technical assistance from appropriate support organization

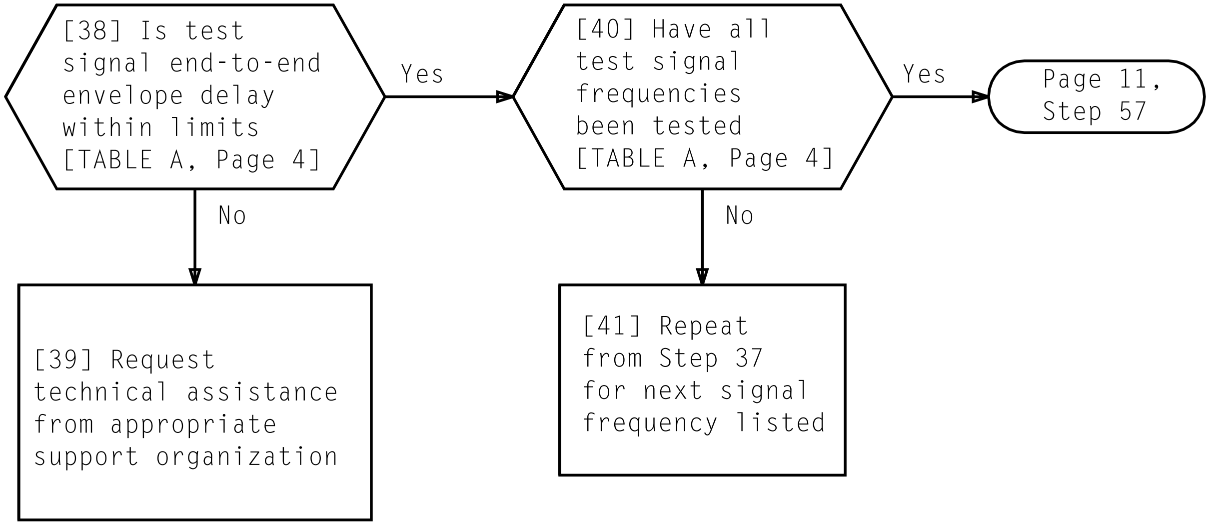
Yes

[37] At far-end office TIMS unit, adjust **FREQUENCY** control to obtain desired test signal frequency at a −13 dBm level [TABLE A, Page 4]

Page 8

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


[38] Is test signal end-to-end envelope delay within limits [TABLE A, Page 4]
Yes
No
[39] Request technical assistance from appropriate support organization
[40] Have all test signal frequencies been tested [TABLE A, Page 4]
Yes
No
[41] Repeat from Step 37 for next signal frequency listed
Page 11, Step 57

[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

AND

Page 10

[48] Allow few seconds for displayed frequency to stabilize and depress **DELAY ZERO** pushbutton to establish a zero reference at the reference frequency

[49] See NOTE 3. Are reading variations on display evenly distributed above and below zero (20 microseconds typically)

No

[50] Request technical assistance from appropriate support organization

Yes

[51] At near-end office TIMS unit, adjust **FREQUENCY** control to obtain desired test signal frequency at a −13 dBm level [TABLE A, Page 4]

[52] Is test signal loop back envelope delay within limits [TABLE A, Page 4]

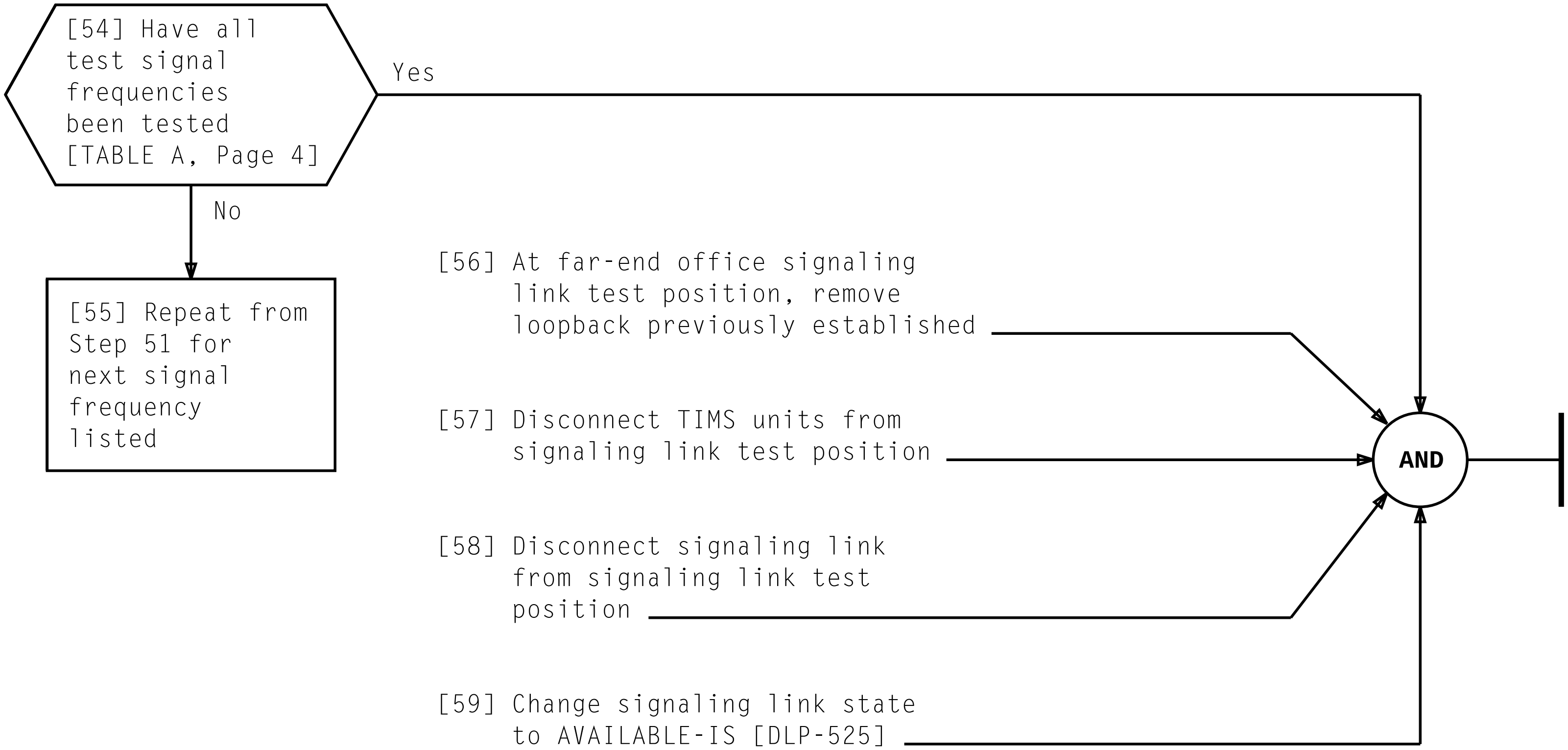
Yes

Page 11

No

[53] Request technical assistance from appropriate support organization

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



[54] Have all test signal frequencies been tested [TABLE A, Page 4]
Yes
No
[55] Repeat from Step 51 for next signal frequency listed
[56] At far-end office signaling link test position, remove loopback previously established
[57] Disconnect TIMS units from signaling link test position
[58] Disconnect signaling link from signaling link test position
[59] Change signaling link state to AVAILABLE-IS [DLP-525]
AND

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

[1] Contact far-end office and request assistance to perform test

[2] Verify signaling link is in MANUAL-OOS (MOOS) state [DLP-516]

[3] At near-end and far-end office, connect signaling link to signaling link test position

AND

[4] Is end-to-end or loopback test to be performed

LOOPBACK → Page 7

END-TO-END

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

[6] At near-end signaling link test position, depress **TEST SELECT** pushbutton

AND → Page 2

PERFORM ANALOG SIGNALING LINK NONLINEAR DISTORTION TEST

[7] At near-end office TIMS unit, set up unit to send 1004 Hz signal from 0 TLP at a −13 dBm level

At far-end office TIMS unit:

[8] Set **MEASUREMENT** switch to **NONLINEAR DISTORTION** position

[9] Set **DISPLAY CONNECTED TO** switch to **RCV** position

[10] Depress **SIGNAL LEVEL** pushbutton

AND

[11] Does far-end office TIMS unit display indicate a −35 dBm or higher signal level

No

[12] Request technical assistance from appropriate support organization

Yes

At far-end office TIMS unit:

[13] Allow few seconds for display to stabilize and depress **LEVEL ZERO** pushbutton to establish a zero reference

[14] Depress **2ND ORDER** pushbutton

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

AND

Page 3

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

AND

[20] Is second order nonlinear distortion greater than 27 dB

Yes

Page 5

No

[21] Request technical assistance from appropriate support organization

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.

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

AND

[28] Is third order nonlinear distortion greater than 32 dB

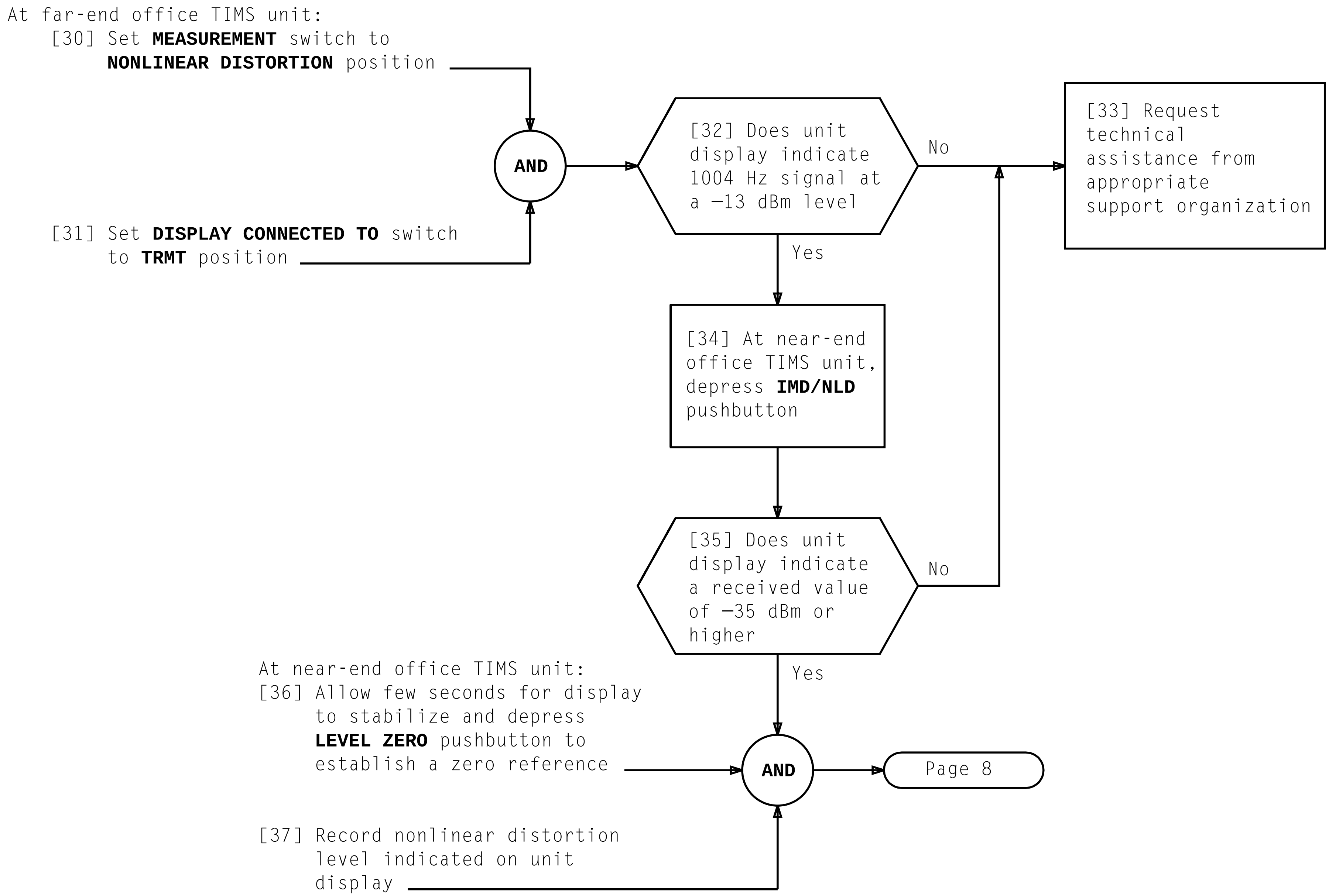
Yes

Page 6

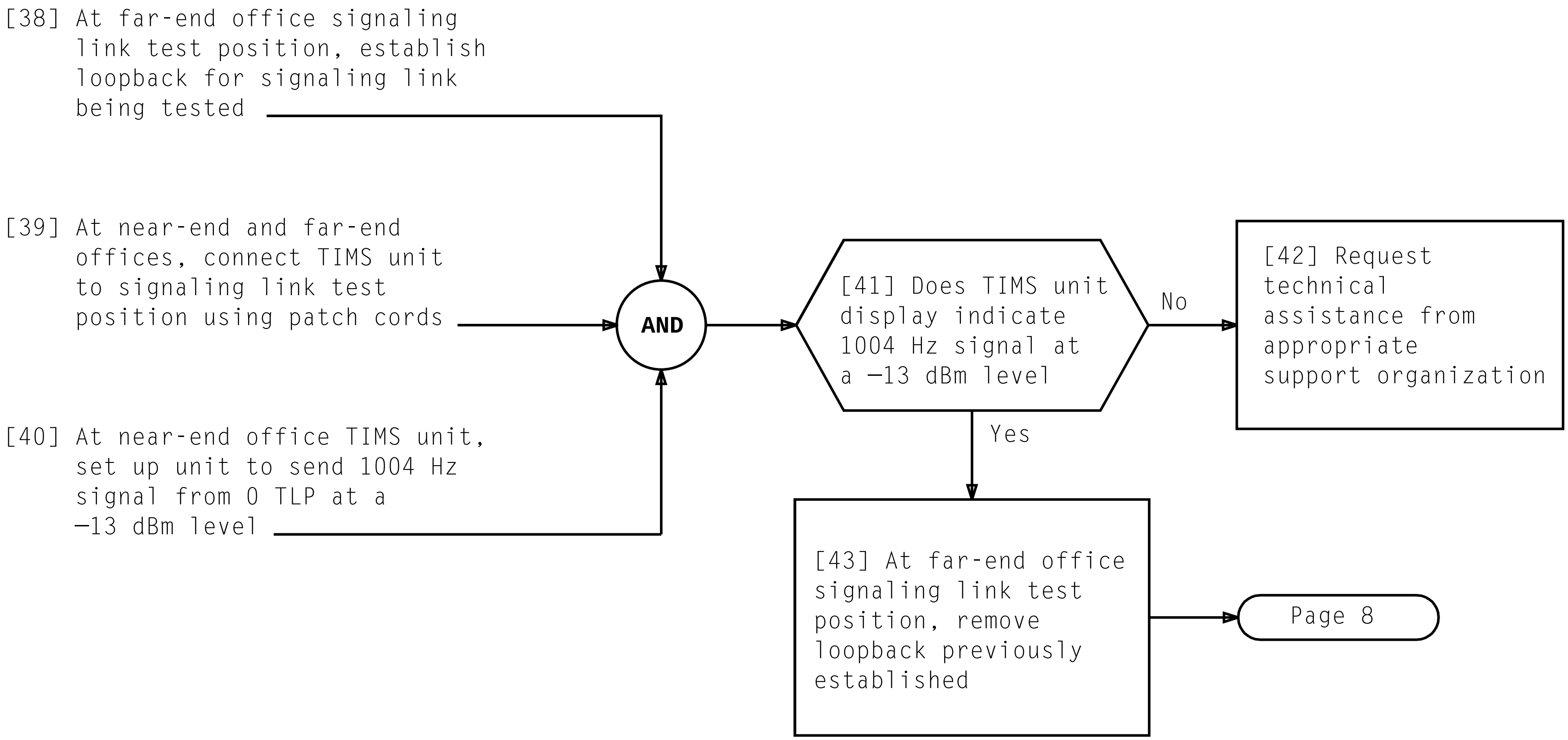
No

[29] Request technical assistance from appropriate support organization

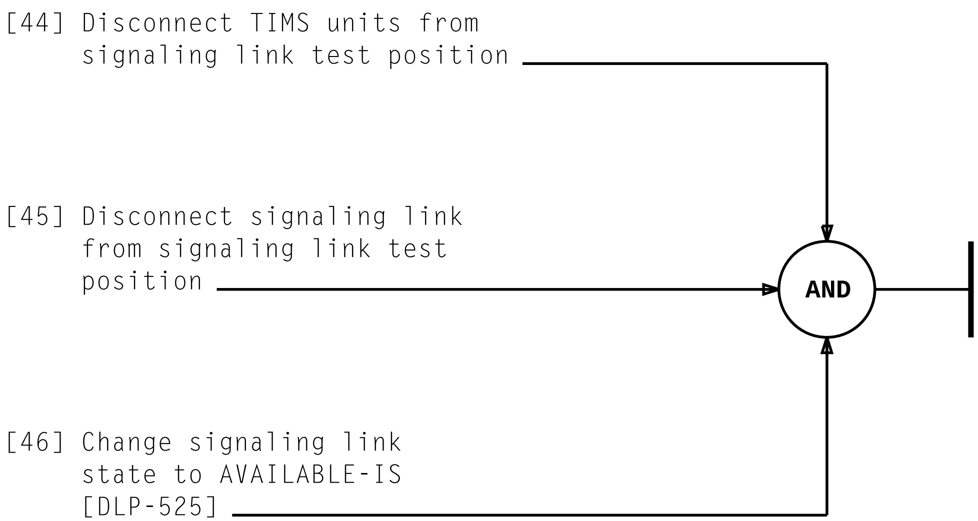
PERFORM ANALOG SIGNALING LINK NONLINEAR DISTORTION TEST



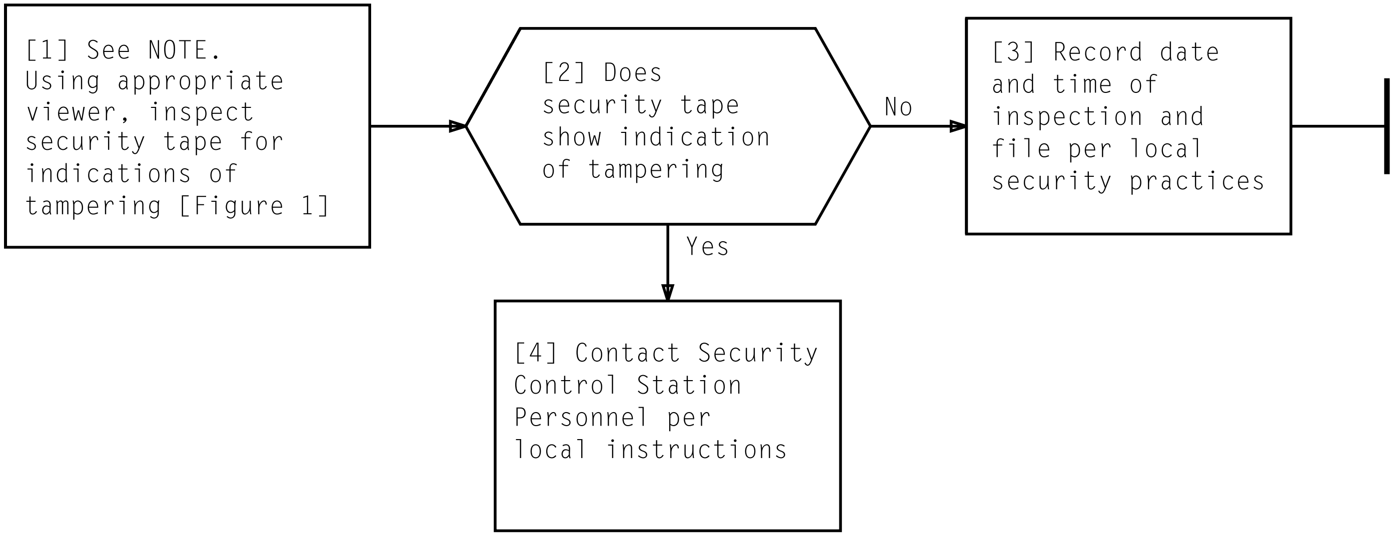
PERFORM ANALOG SIGNALING LINK NONLINEAR DISTORTION TEST



PERFORM ANALOG SIGNALING LINK NONLINEAR DISTORTION TEST



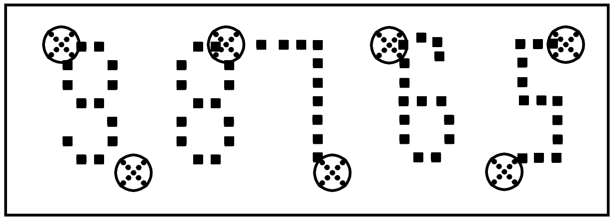
PERFORM ANALOG SIGNALING LINK NONLINEAR DISTORTION TEST



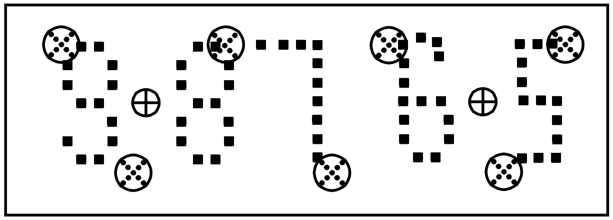
NOTE

Patterns on security tape are made to change if tampering occurs. Inspectors should be familiar with actual patterns as they appear on unaltered and altered tapes.

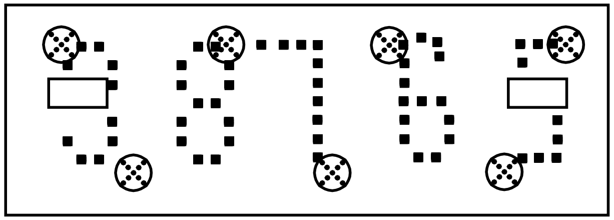
INSPECT SECURITY TAPE ON ENCRYPTED CIRCUIT PACKS FOR ALTERATIONS



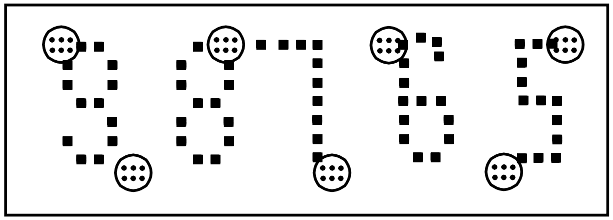
Tape Unaltered
(Some Tapes Have Perforated Numbers;
Some do Not)



Tape Altered
(Screws Removed and Reinstalled)

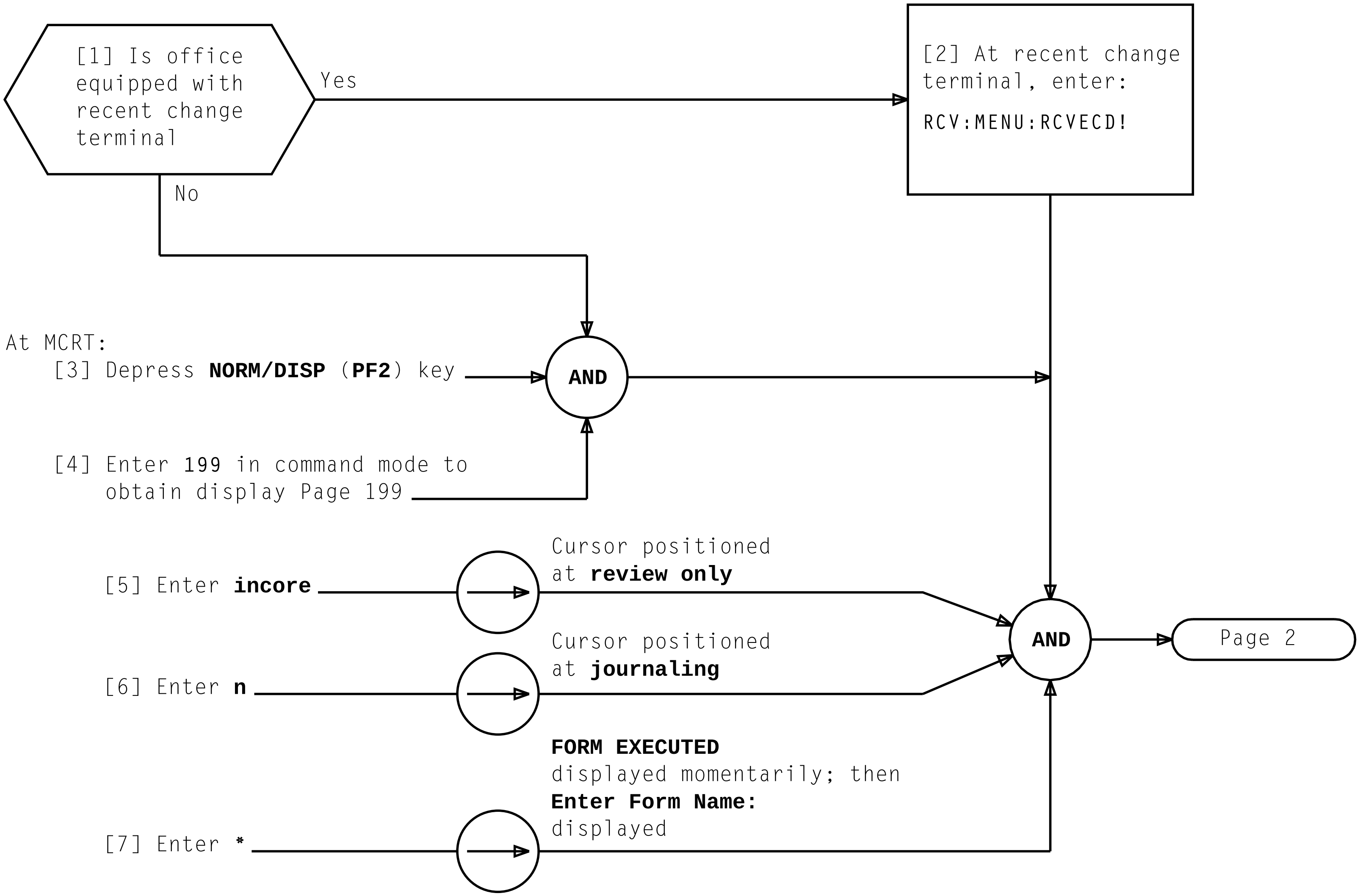


Tape Altered
(Replaced Tape on Screwheads)

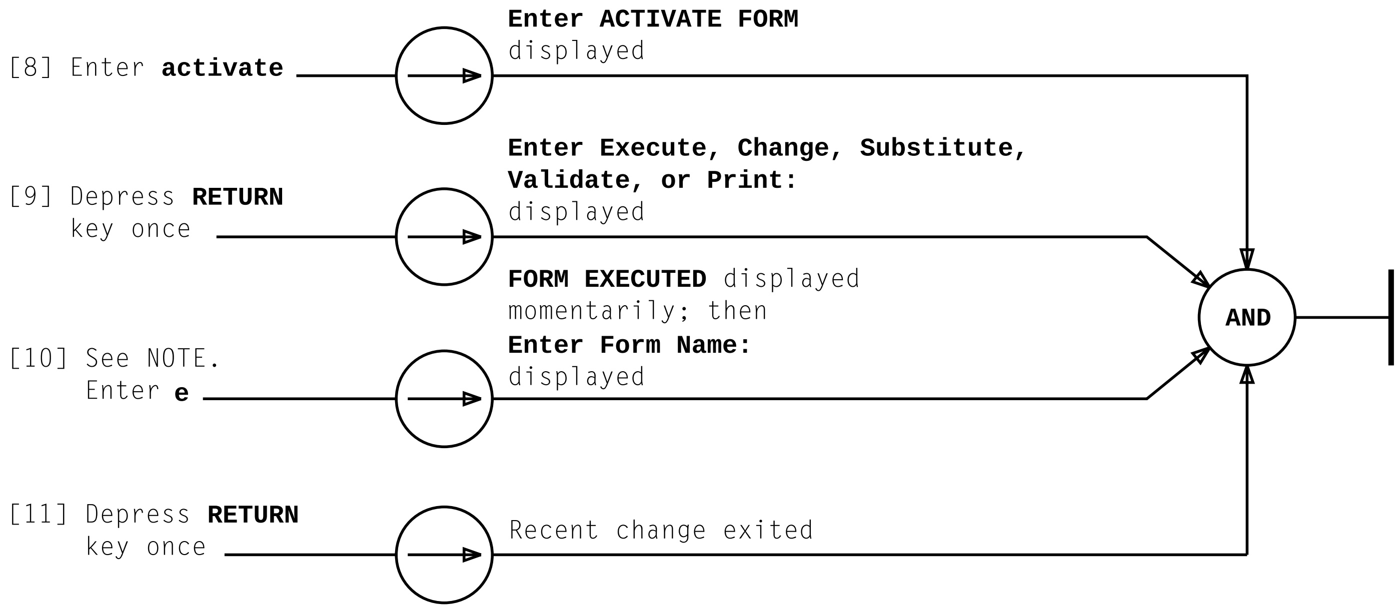


Tape Removed and Replaced
(Different Pattern)

Fig. 1 - Examples of Unaltered and Altered Security Tapes



COPY INCORE EQUIPMENT CONFIGURATION DATA BASE (ECD) TO DISK



NOTE

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

COPY INCORE EQUIPMENT CONFIGURATION DATA BASE (ECD) TO DISK

[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

AND

[4] On printout received, is number of errors found and number of errors corrected the same

No: [5] Request technical assistance from appropriate support organization

Yes: [6] Has audit been run for all three files associated with running file system [TABLE A]

No: [7] Repeat from Step 3 for next file [TABLE A]

Yes: Page 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

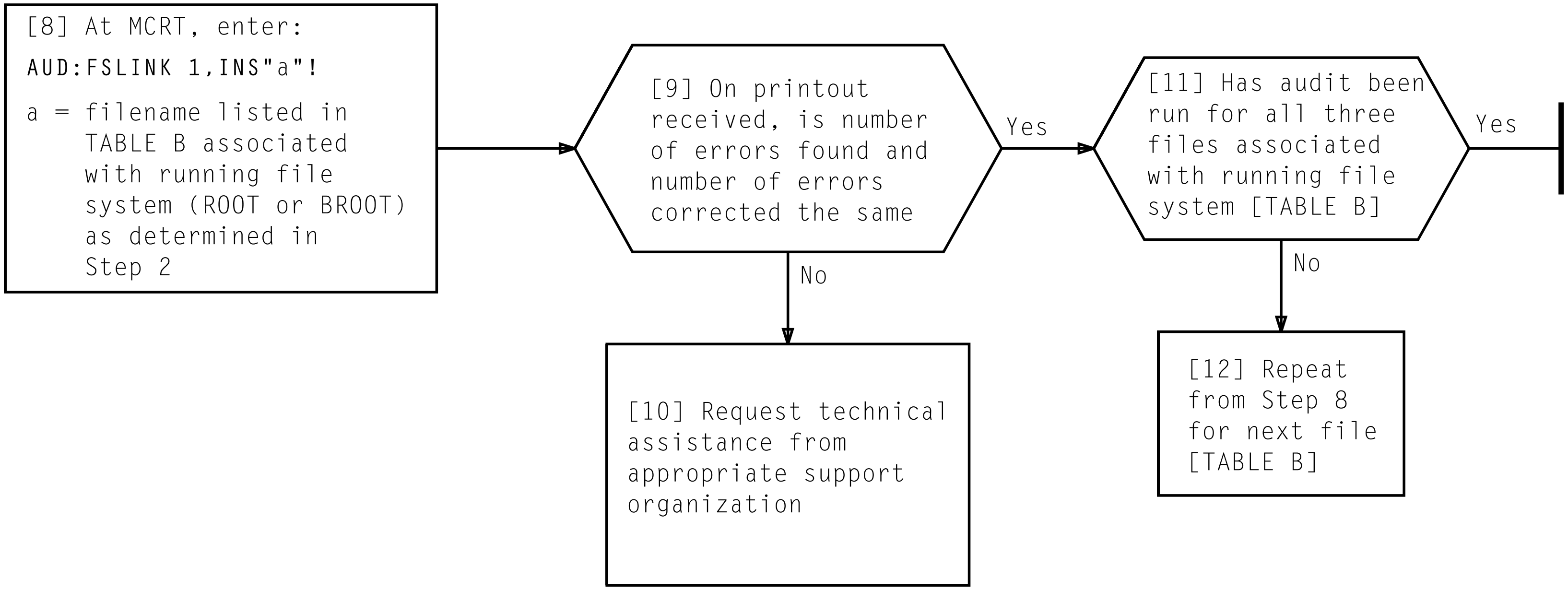
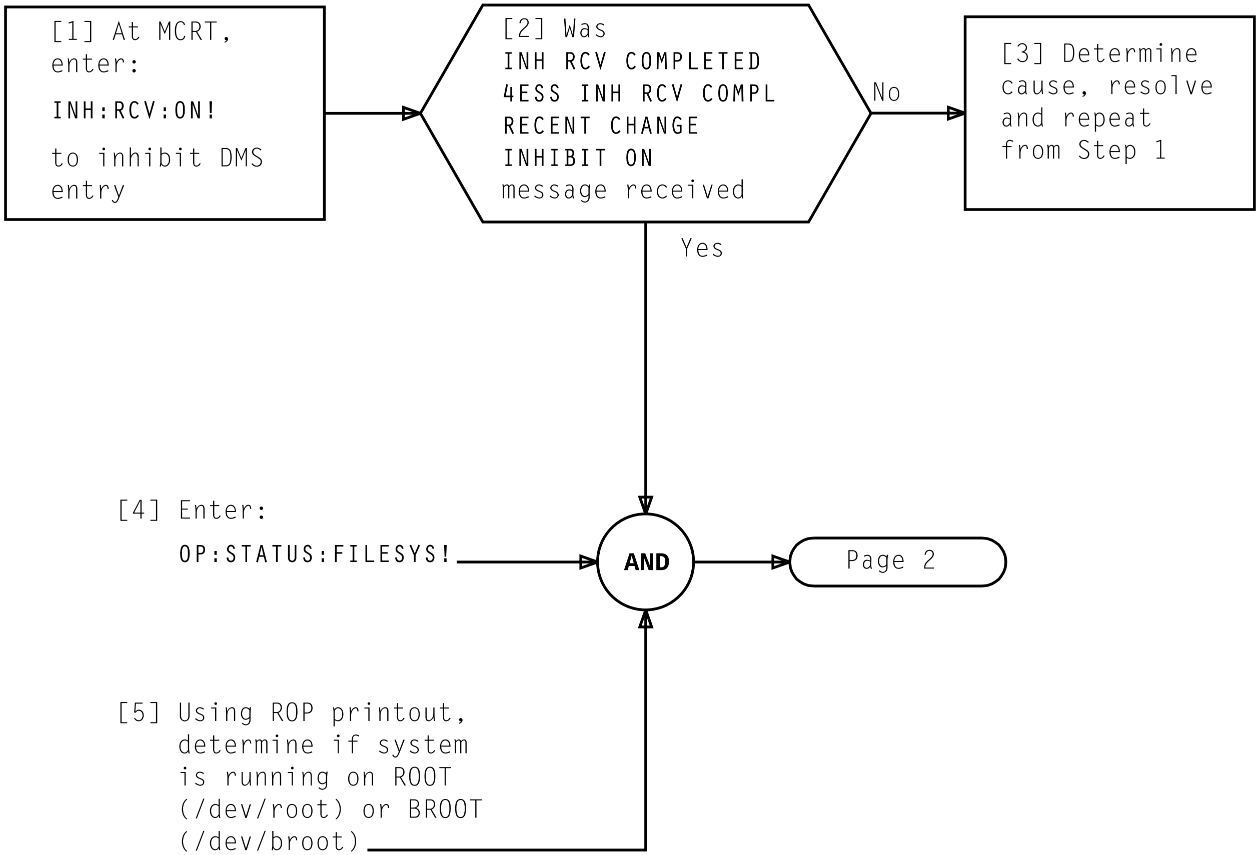
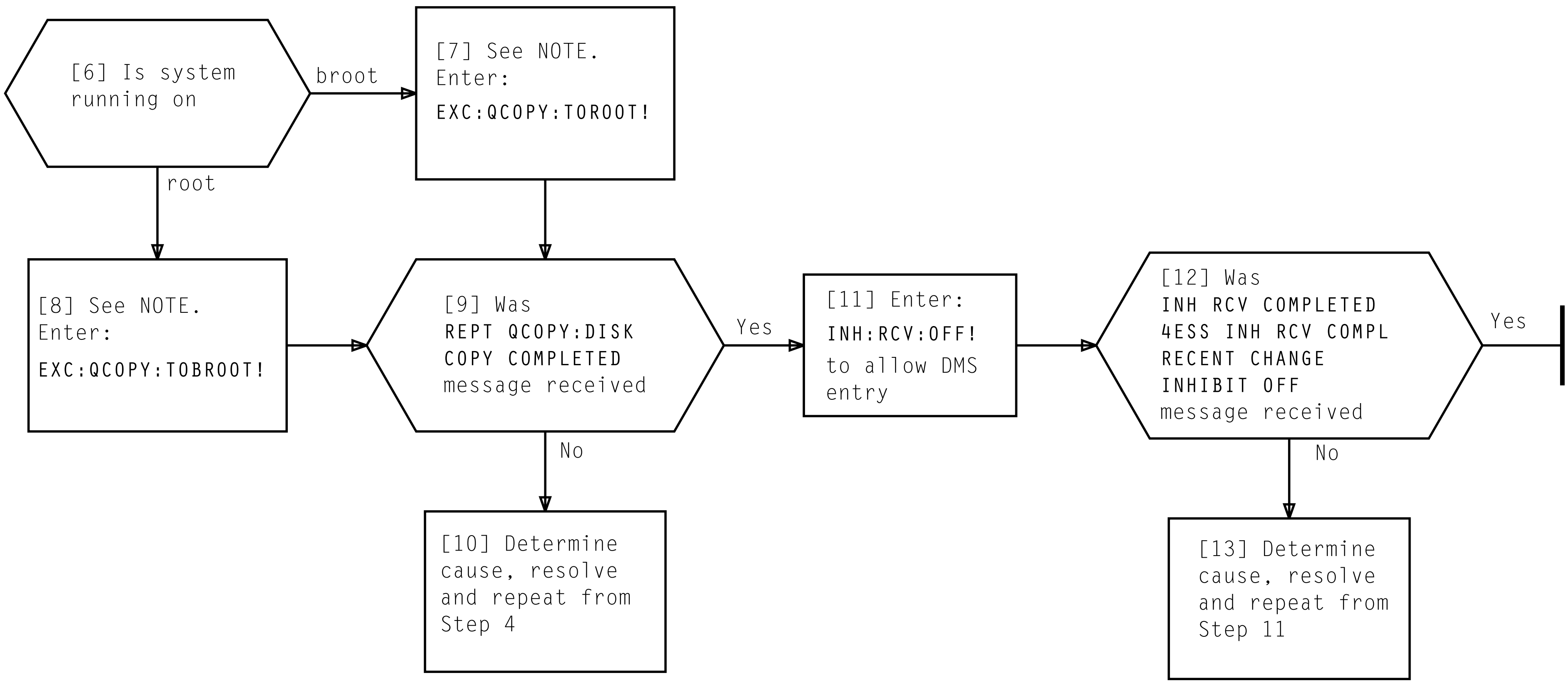


TABLE B	
SYSTEM RUNNING ON	
ROOT	**BROOT**
/dev/root	/dev/broot
/dev/db	/dev/bdb
/dev/etc	/dev/betc



UPDATE BACKUP DATA BASE



NOTE
This command requires several minutes to complete

UPDATE BACKUP DATA BASE

WRITE 3B COMPUTER BACKUP RT0 AND DB TAPES

[1] Select available 3B Computer tape unit

[2] Install write enable ring on 2400-foot 1600 BPI tape

[3] Mount 1600 BPI tape on selected tape unit [DLP-558]

[4] At MCRT, enter:

EXC:ENVIR:UPROC,FN"/tools/bootaud"!

[5] Wait for **EXC ENV UPROC/tools/bootaud COMPLETED** message and ensure no errors are received

AND

[6] Are errors received

Yes

[7] Determine cause, resolve, and repeat from Step 4

No

[8] At MCRT, enter:

DUMP:FILE:ALL,FN"/etc/pdtspec"!

DUMP FILE ALL COMPLETED message received

[9] Enter:

COPY:BKDISK;START:SRC"/dev/vtoc",TD"/dev/mta8",TPSIZE 2400!

a = Tape unit member number

[10] Wait for **COPY BKDISK DISMOUNT GENERIC TAPE, LABEL AND MOUNT NEXT TAPE** response

[11] Demount first tape containing disk data [DLP-559], label (4AP<x> RTO 1), and remove write enable ring

AND

Page 2

[12] Mount second 2400-foot tape with write enable ring installed on same tape unit [DLP-558]

[13] At MCRT, enter: **COPY:BKDISK;ACK:TPSIZE 2400!**

[14] Wait for **COPY BKDISK DISMOUNT GENERIC TAPE, LABEL AND MOUNT NEXT TAPE** response

[15] Demount second tape containing disk data [DLP-559], label (4AP<x> RT0 2) and remove write enable ring

AND

[16] Mount third 2400-foot tape with write enable ring installed on same tape unit [DLP-558]

[17] At MCRT, enter: **COPY:BKDISK;ACK:TPSIZE 2400!**

[18] Wait for **COPY BKDISK DISMOUNT GENERIC TAPE, LABEL AND MOUNT NEXT TAPE** response

[19] Demount third tape containing disk data [DLP-560], label (4AP<x> RT0 3) and remove write enable ring

AND

Page 3

WRITE 3B COMPUTER BACKUP RT0 AND DB TAPES

[20] See NOTE.
Have all generic
tapes been written

No

Yes

Page 4

[21] Mount another 2400-foot tape
with write enable ring installed
on same tape unit [DLP-558]

[22] At MCRT, enter:
COPY:BKDISK;ACK:TPSIZE 2400!

[23] Wait for
COPY BKDISK DISMOUNT GENERIC TAPE,
LABEL AND MOUNT NEXT TAPE
response

[24] Demount tape containing disk data
[DLP-559], label (4AP<x> RT0 y)
and remove write enable ring

AND

[25] Repeat
from
Step 20

NOTE
The number of
generic backup tapes
vary from generic
to generic

WRITE 3B COMPUTER BACKUP RT0 AND DB TAPES

[26] Mount 2400-foot tape
with write enable ring installed
on same tape unit [DLP-558]

[27] At MCRT, enter:

COPY:BKDISK;ACK:TPSIZE 2400!

[28] Wait for
**COPY BKDISK COMPLETED DISMOUNT
DATABASE TAPE AND LABEL**
response

[29] Demount tape containing data base data
[DLP-559], label (4AP<x> DB)
and remove write enable ring

AND

[1] Is 3B Computer a model 1, 2, or 3 vintage

Model 2/3 → Page 3

Model 1 → AND

[2] Open tape unit dust cover

[3] Lift supply (upper) reel hub tab and place tape reel onto supply reel hub [Figure 1]

[4] While holding tape reel, secure reel by returning supply hub tab to normal locked (down) position

[5] Thread tape through tape path indicated on tape unit [Figure 1]

[6] Start tape on take-up (lower) reel making sure tape is not twisted and manually wind reel clockwise three or four turns

AND → Page 2

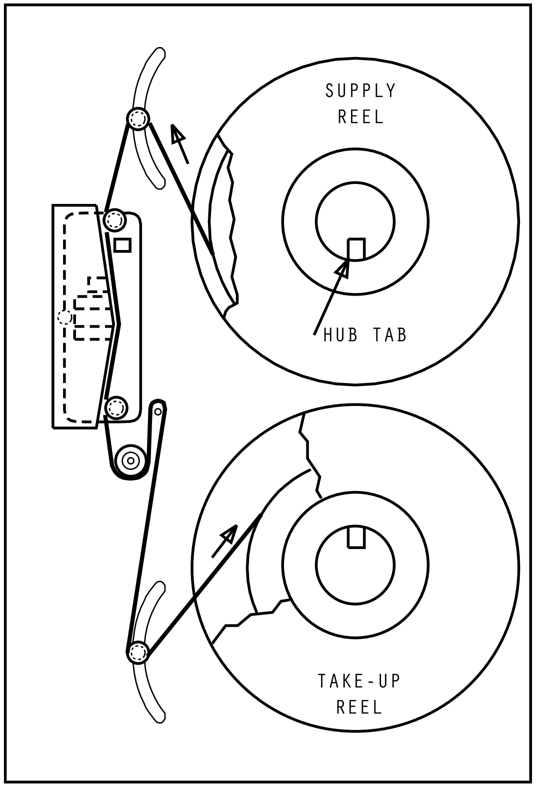
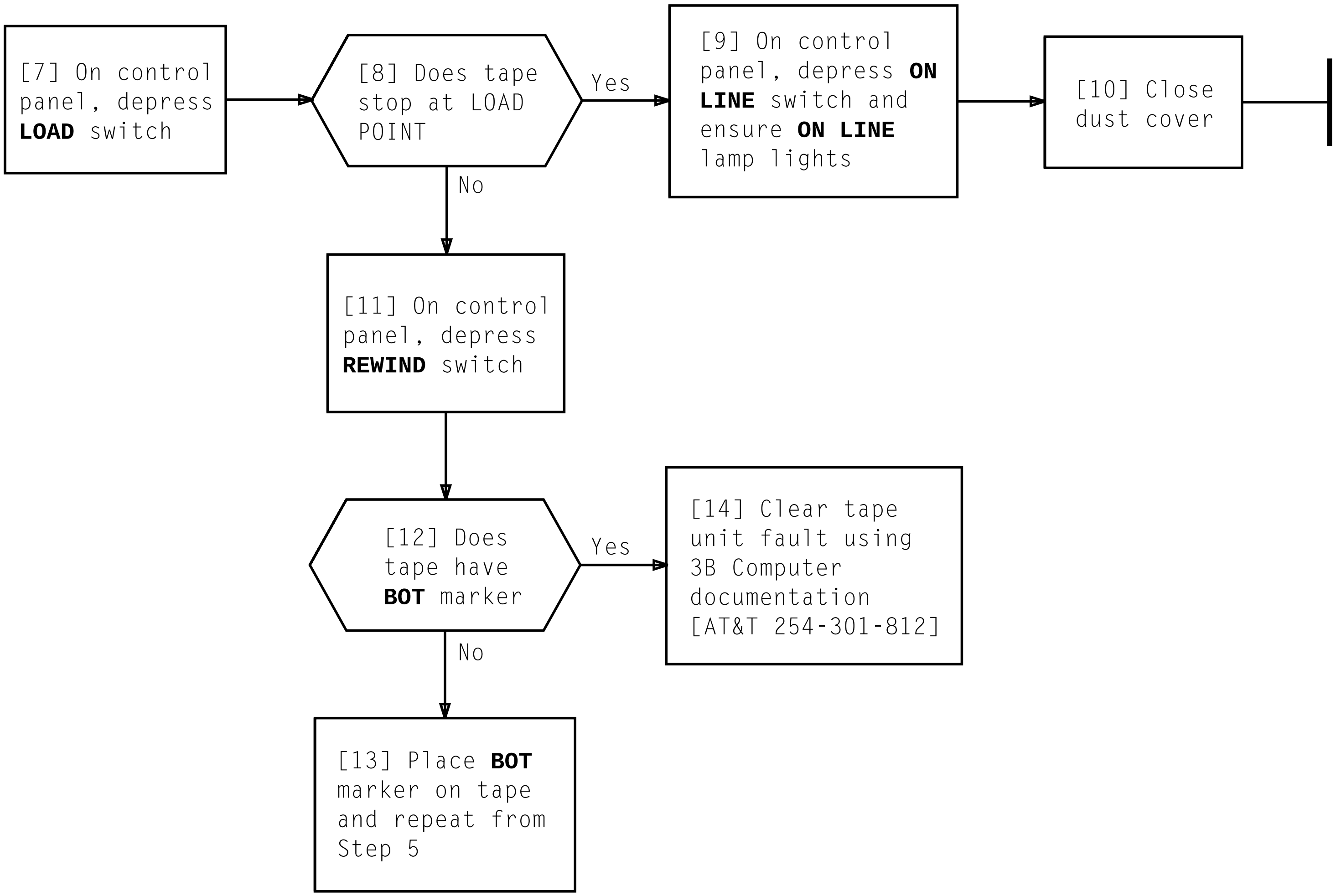


Figure 1 — 3B Computer Tape Unit

MOUNT 1600 BPI TAPE ON 3B COMPUTER TAPE UNIT



MOUNT 1600 BPI TAPE ON 3B COMPUTER TAPE UNIT

[15] On control panel, is **LOGIC OFF** LED lighted

Yes → [16] Depress **LOGIC ON** switch

No

[17] Open dust cover

[18] Place supply (upper) reel on hub and depress hub latch [Figure 2]

[19] Thread tape through tape path indicated on tape drive [Figure 2]

[20] Start tape on take-up (lower) reel making sure tape is not twisted and manually wind reel clockwise three or four turns

[21] Close dust cover

[22] On control panel, depress **LOAD/REWIND** switch

AND

[23] Does tape load and **BOT** LED light

Yes → [24] Depress **ON LINE** switch and ensure **ON LINE** lamp lights

No → [25] Depress **RESET** switch, place BOT marker on tape and repeat from Step 19

No → [26] Request technical assistance from appropriate support organization

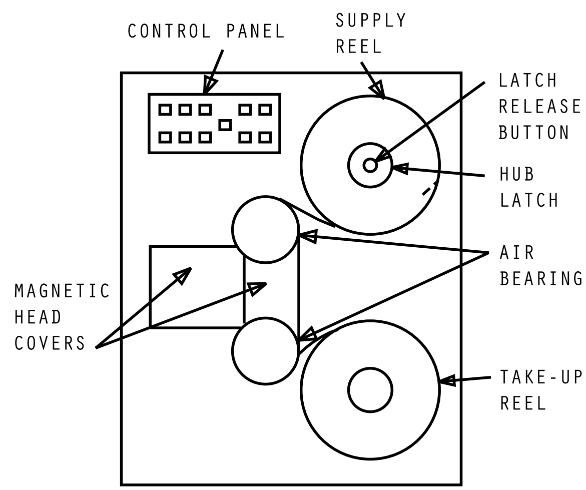
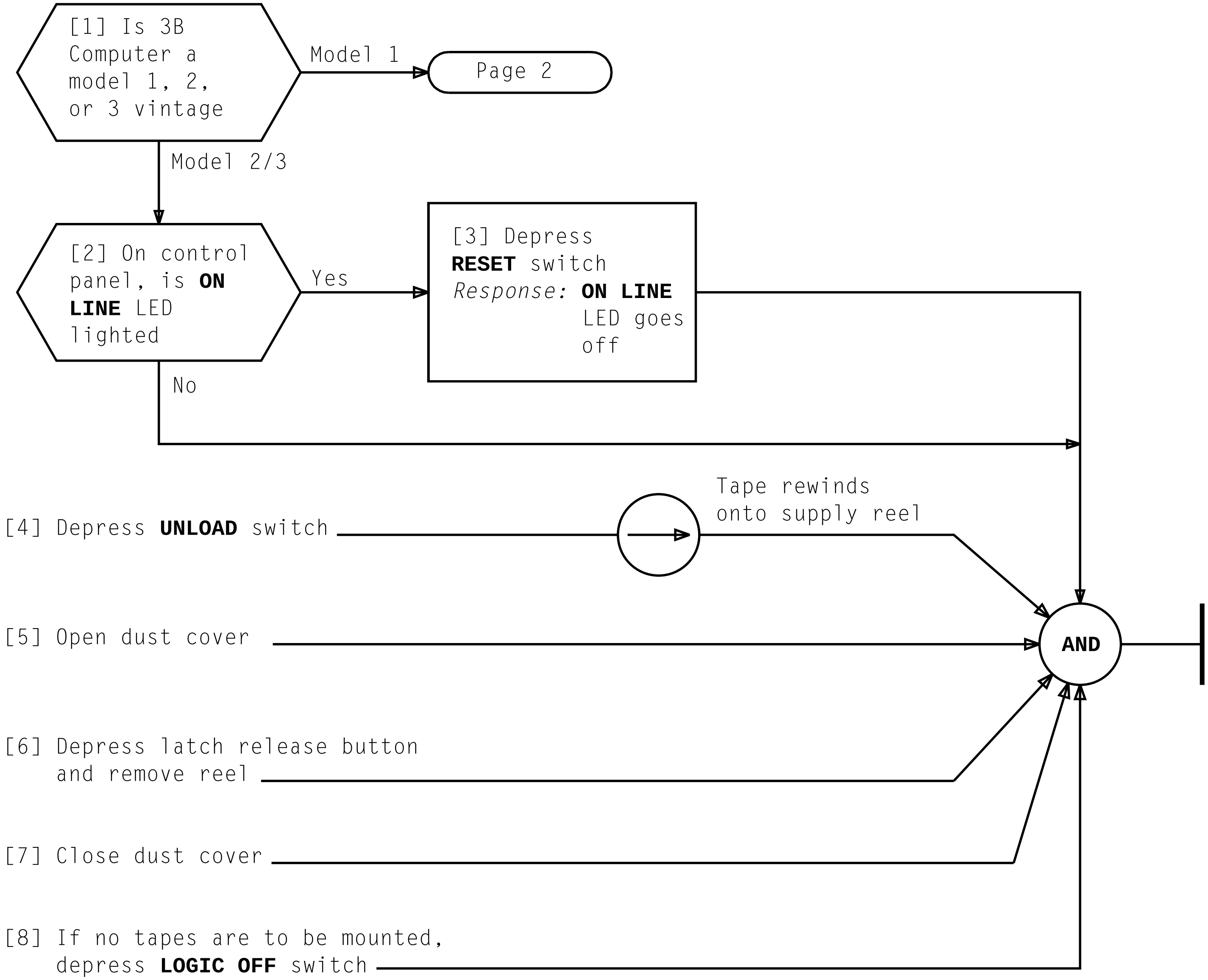
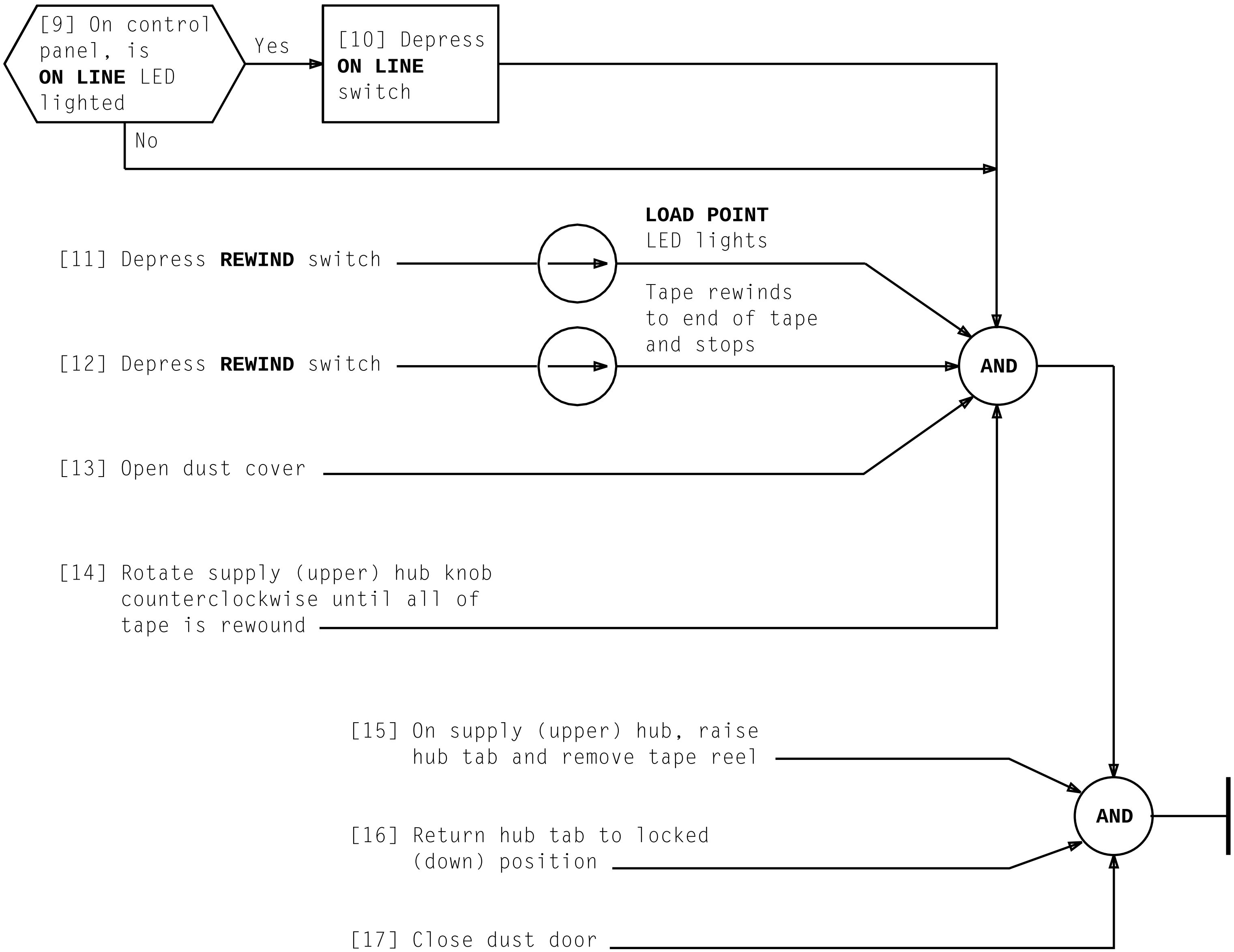


Figure 2 — 3B Computer Tape Unit

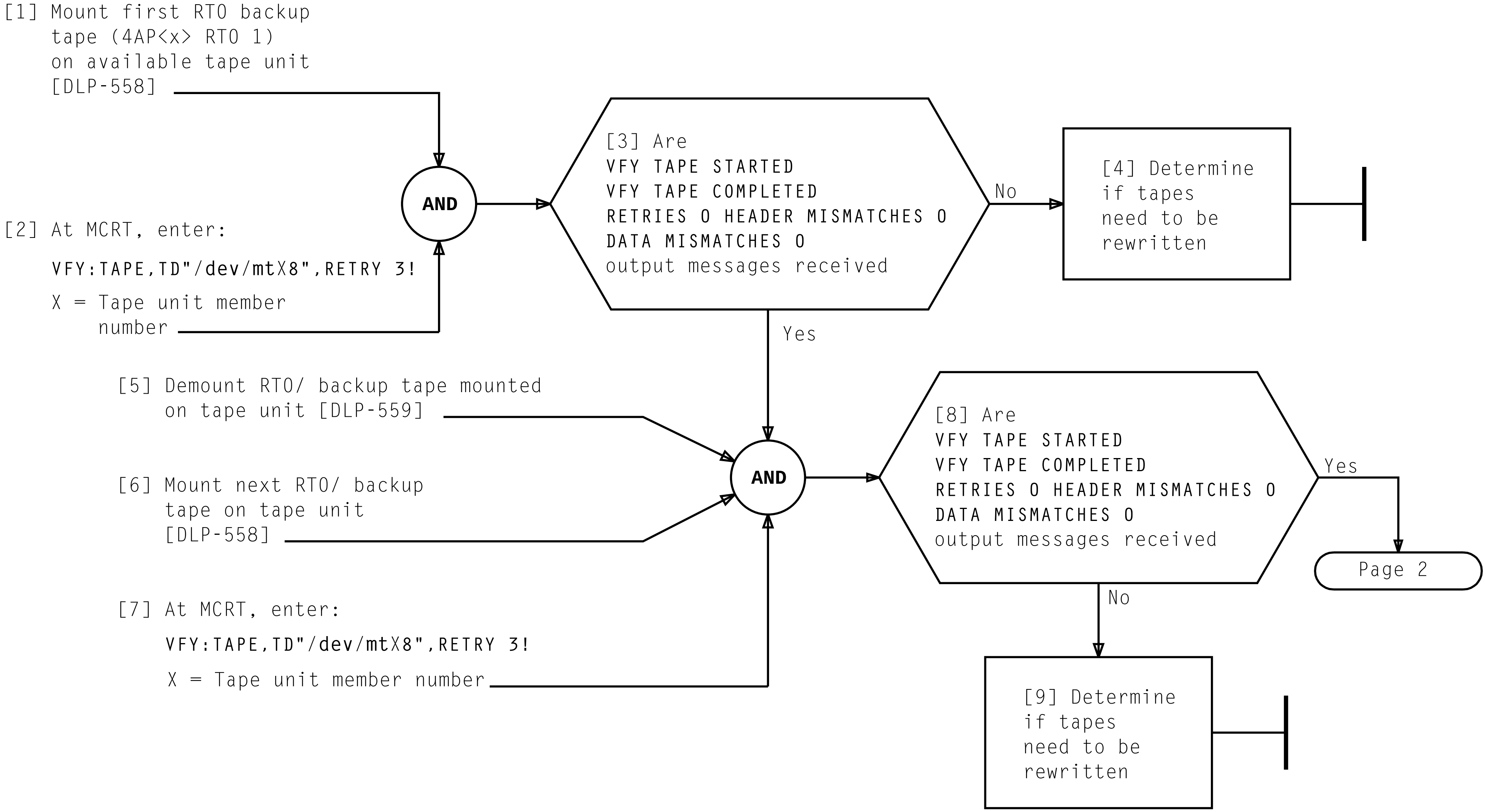
MOUNT 1600 BPI TAPE ON 3B COMPUTER TAPE UNIT



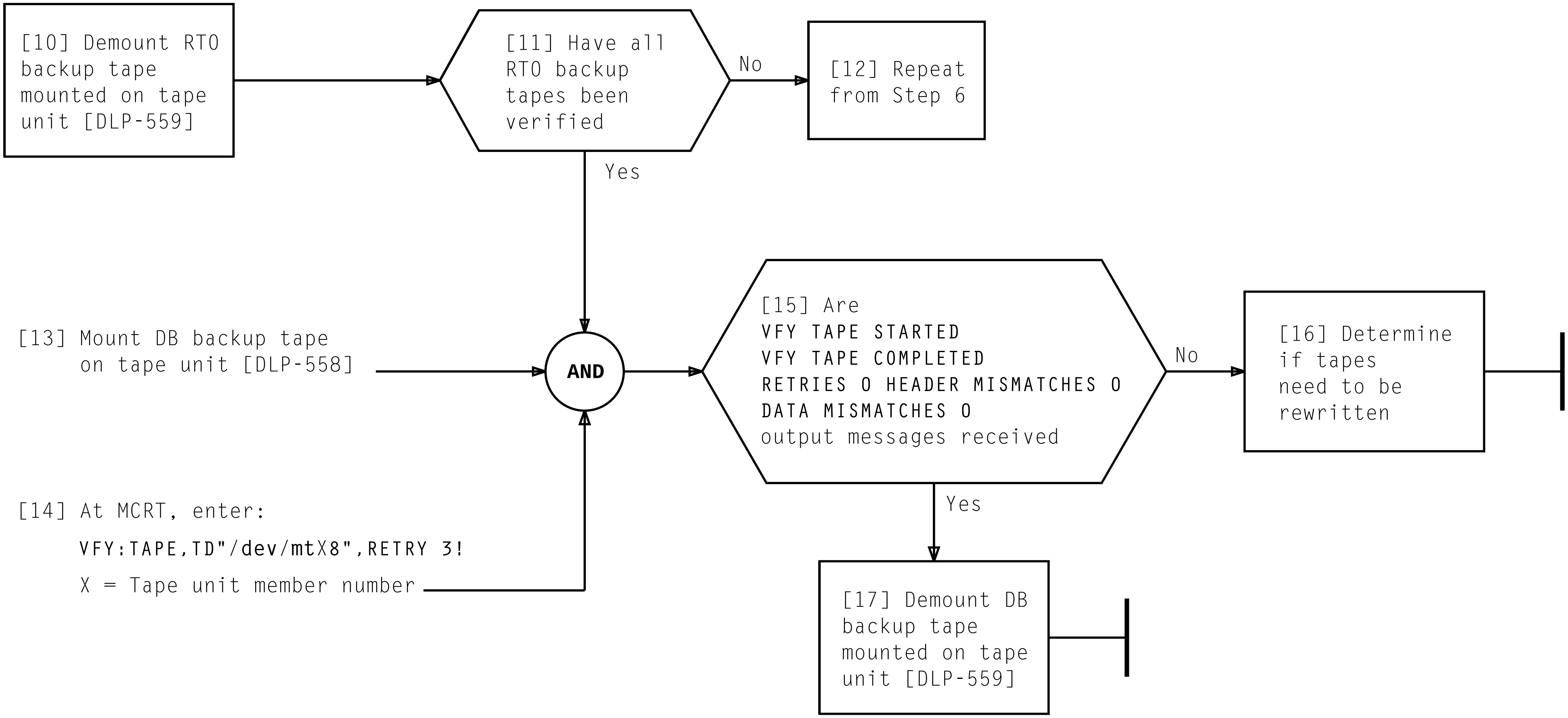
DEMOUNT 1600 BPI TAPE ON 3B COMPUTER TAPE UNIT



DEMOUNT 1600 BPI TAPE ON 3B COMPUTER TAPE UNIT



VERIFY 3B COMPUTER BACKUP TAPES



VERIFY 3B COMPUTER BACKUP TAPES

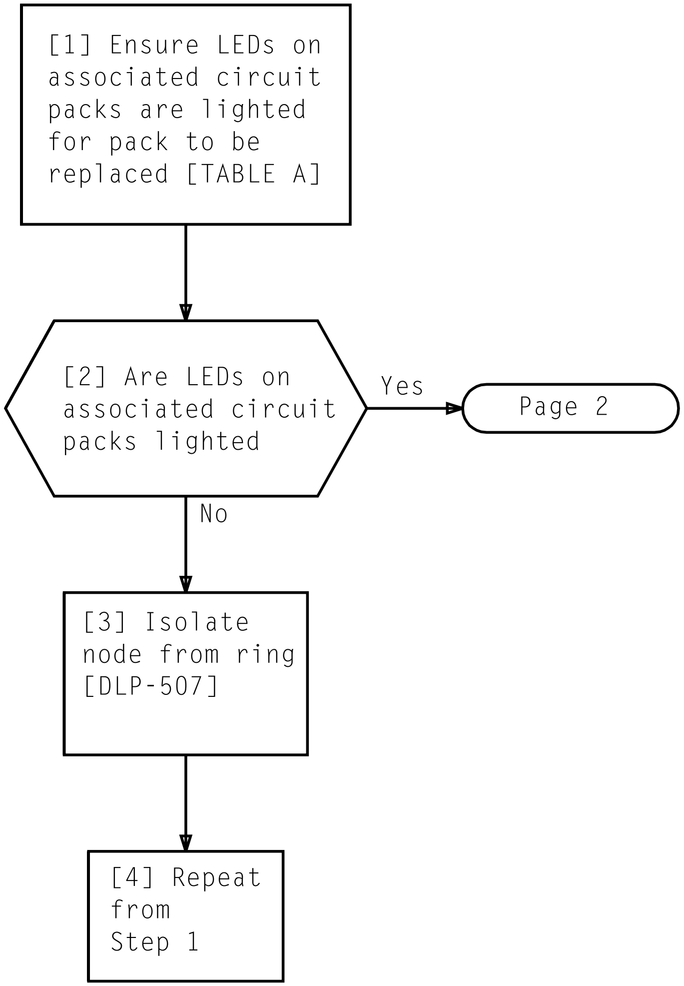
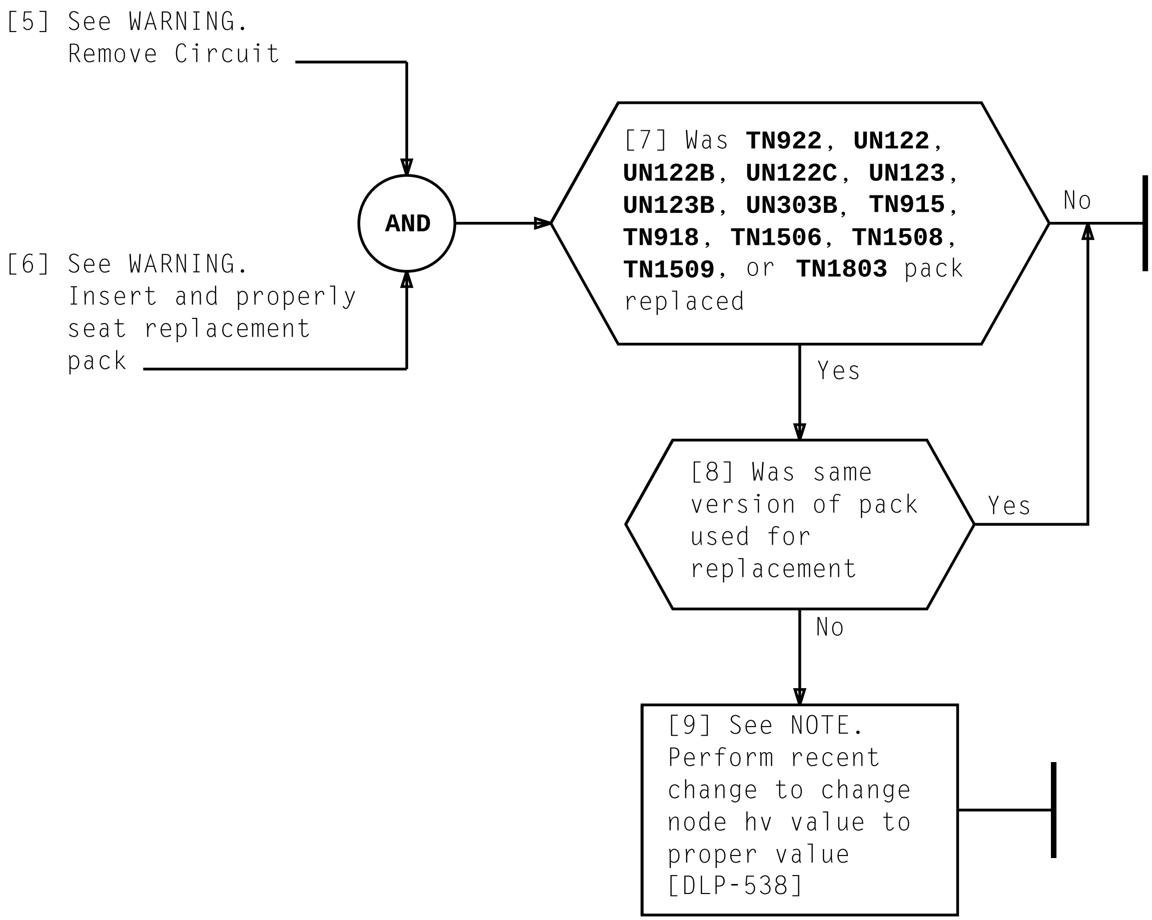


TABLE A
CCS7 Circuit Packs

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, COMMON CHANNEL SIGNALING 7 (CCS7) NODE



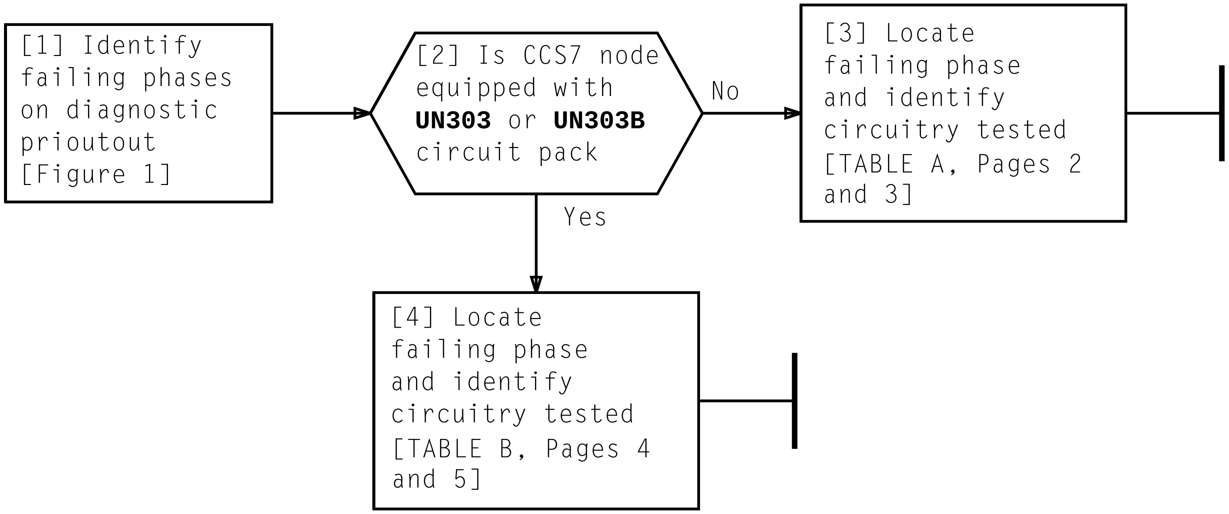
NOTE

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, COMMON CHANNEL SIGNALING 7 (CCS7) 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 CCS7 NODE CIRCUITRY TESTED BY FAILING PHASE

TABLE A
SSI CCS7 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 BISO node to EISO 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 EISO node to BISO 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 CCS7 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. CCS7 will ATP by default.
48	Ensures that firmware and hardware in LI board functions as a whole.

TABLE B IRN CCS7 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 BISO node to EISO 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 EISO node to BISO 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 CCS7 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. CCS7 is ATP by default.
48	Ensures that firmware and hardware on LI board functions as a whole.

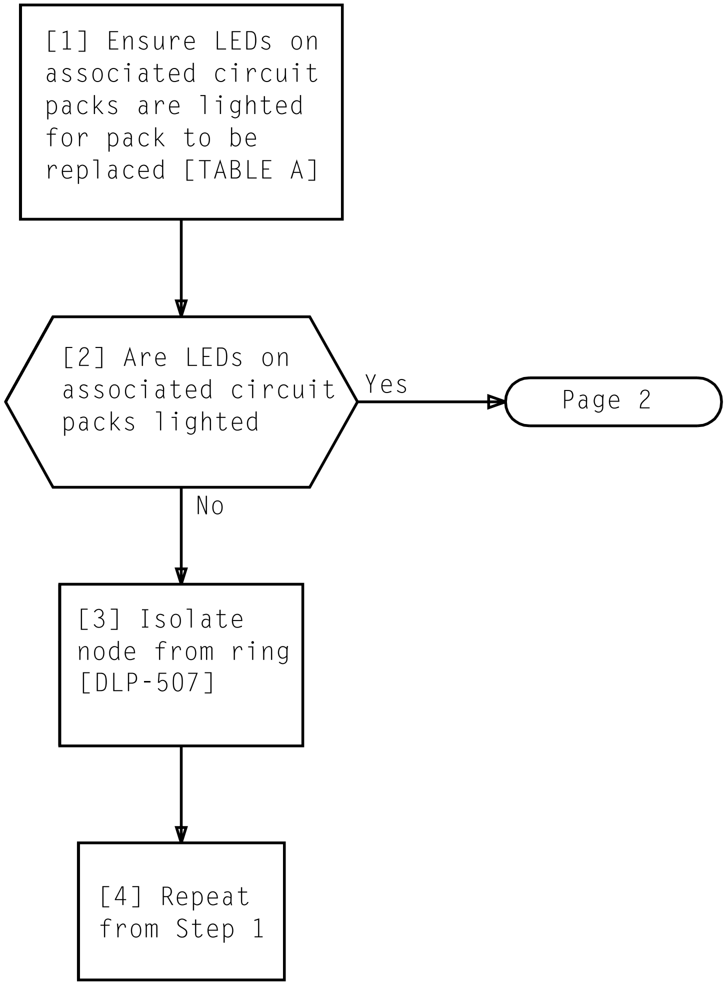
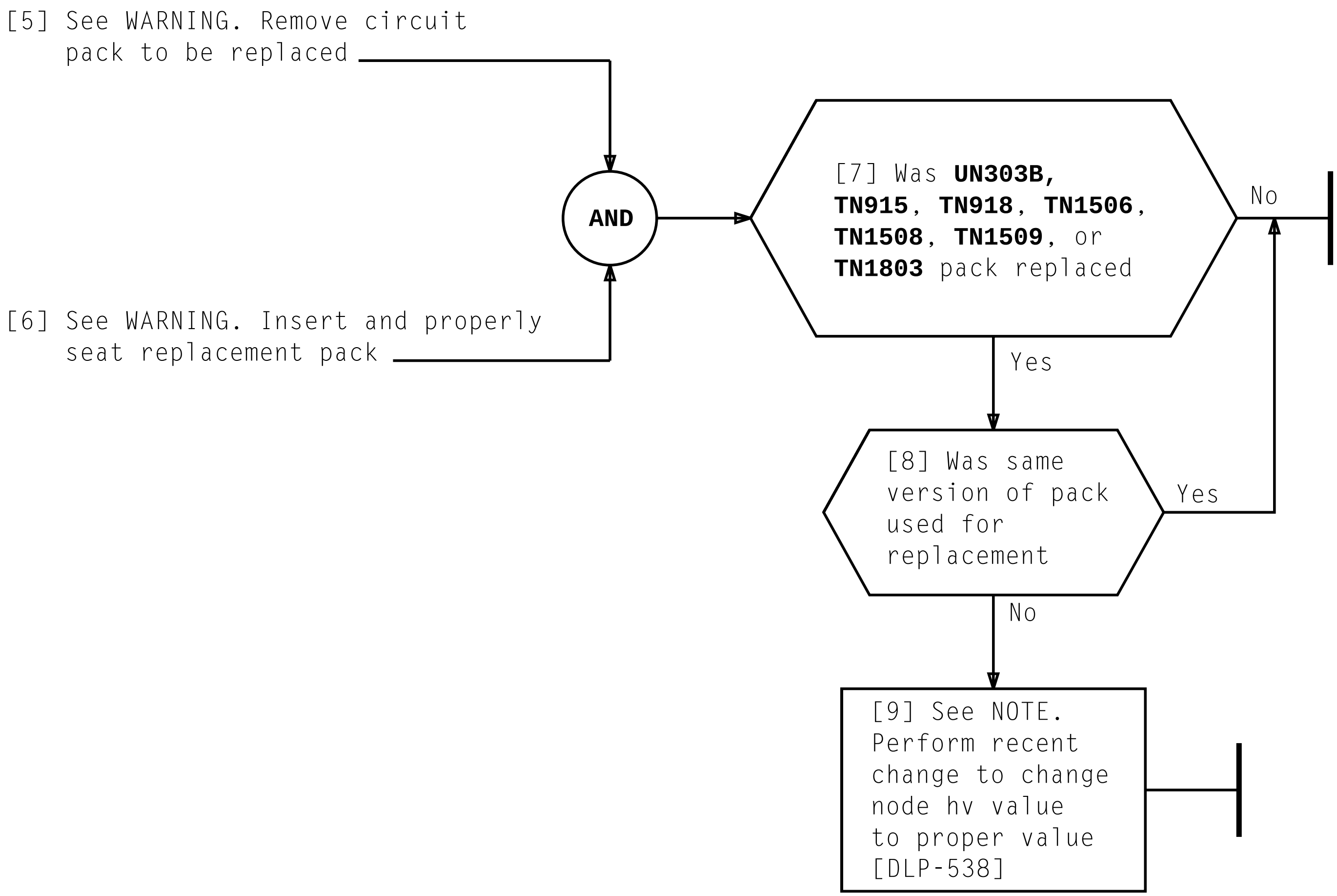


TABLE A

CIRCUIT PACK	FUNCTION	LED STATUS ON ASSOCIATED CIRCUIT PACKS
UN303B	Integrated Ring Node (IRN)	**RQ** LED and **NT** LED on; **UN303B** and **RQ** LED on; **TN1315** lighted
TN1315	Link Interface (LI)	**RQ** LED on; **TN1315**, **RQ** LED and **NT** LED on; **UN303B** lighted
TN915 **TN918** **TN1506** **TN1508** **TN1509** **TN1803**	Interframe Buffer (IFB)	**NT** LED on; associated **UN123**, **UN123B** or **NT** LED on; **UN123** **UN123B** of neighbor node in adjacent frame lighted
T1FA	T1 Facility Access	—

REPLACE CIRCUIT PACK, INTERNATIONAL LINK NODE (ILN)



NOTE

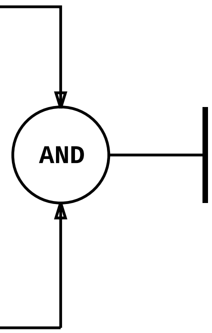
If IFB pack is being replaced, the two IFB packs that make up a pair must be of the same version

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 always 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, INTERNATIONAL LINK NODE (ILN)

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



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

FAILING PHASE

```
30 DGN: LN28 3:PH 10-31. PF

M 30 DGN: LN28 3 SLOT 1  MSG STARTED
M 30 REPT IMSRMVRST ERROR 3 3
M 31 DGN: LN28 3 PH 10 STF  ( 2 00000000 00000000 )   MSG IP
     TEST                MISMATCH
        3                00000009
        4                00000009
M 31: LN28 3 TERMINATED AT PH 10 STMNT 434 AFTER TEST 438

M 31 ANALY TLPFILE: LN28 3 SUMMARY DATA  MSG STARTED
     TLP: LN28 3 PH=10 K1=0X00000002 K2=0X00000000 FFK=1
     TLPFILE COMPLETED
M 31 DGN: LN28 3 COMPLETED  STF  ( 2 00000000 00000000 )  MSG IP

M 31 DGN: LN28 3 STF ( 2 00000000 00000000 ) MSG COMPL
```

Figure 1 — Sample Printout of Failing Diagnostic Phase

IDENTIFY INTERNATIONAL LINK NODE (ILN) CIRCUITRY TESTED BY FAILING PHASE

TABLE A IRN ILN 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 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 procesor circuitry of the integrated ring node (IRN) circuit pack.

TABLE A (Contd) IRN ILN 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.
39	Verifies ability of node to read, write, and propagate a maximum length message (demand only phase for transition load).
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).

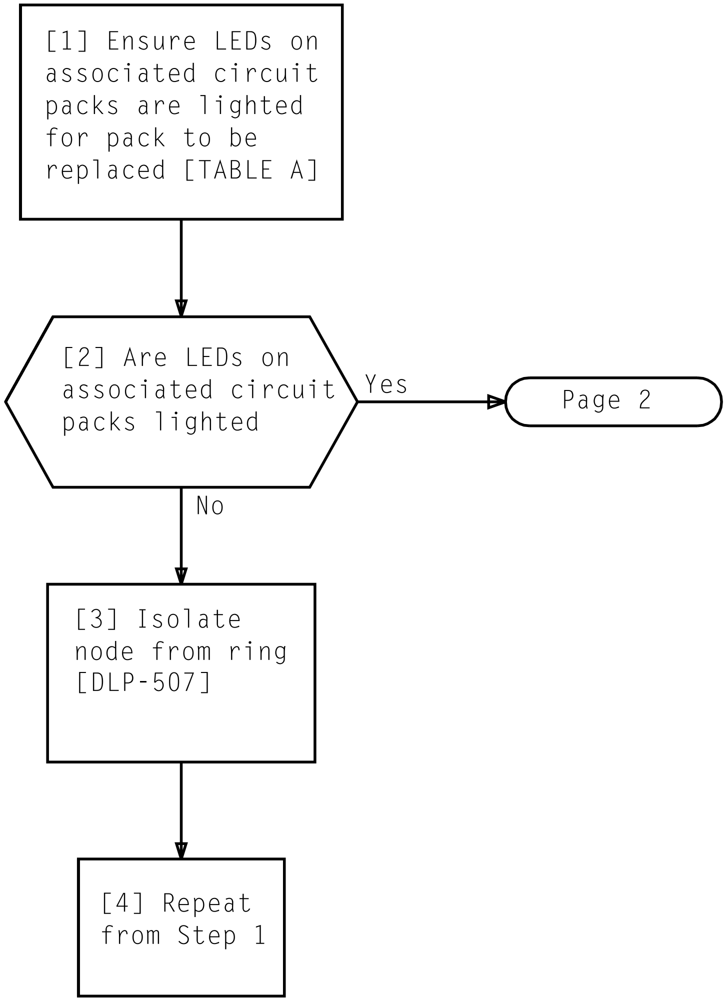


TABLE A Replacement Circuit Packs		
CIRCUIT PACK	**FUNCTION**	**LED STATUS ON ASSOCIATED CIRCUIT PACKS**
TN922	Node Processor (NP)	**NT** LED on; **UN123** or **UN123B** lighted
TN1315 **TN1316**	Link Interface (LI)	**RQ** LED on; **TN916**, **TN917**, or **TN917B** and **NT** LED on; **UN123** or **UN123B** 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)	—
UN304B	Integrated Ring Node 2 (IRN2)	—
T1FA	T1 Facility Access	—

REPLACE CIRCUIT PACK, CUSTOMER PREMISE EQUIPMENT (CPE) NODE

[5] See WARNING. Remove circuit pack to be replaced

[6] See WARNING. Insert and properly seat replacement pack

AND

[7] Was **TN922**, **UN122**, **UN122B**, **UN122C**, **UN123**, **UN123B**, **UN303B**, **UN304B**, **TN915**, **TN918**, **TN1506**, **TN1508**, **TN1509**, or **TN1803** pack replaced

No

Yes

[8] Was same version of pack used for replacement

Yes

No

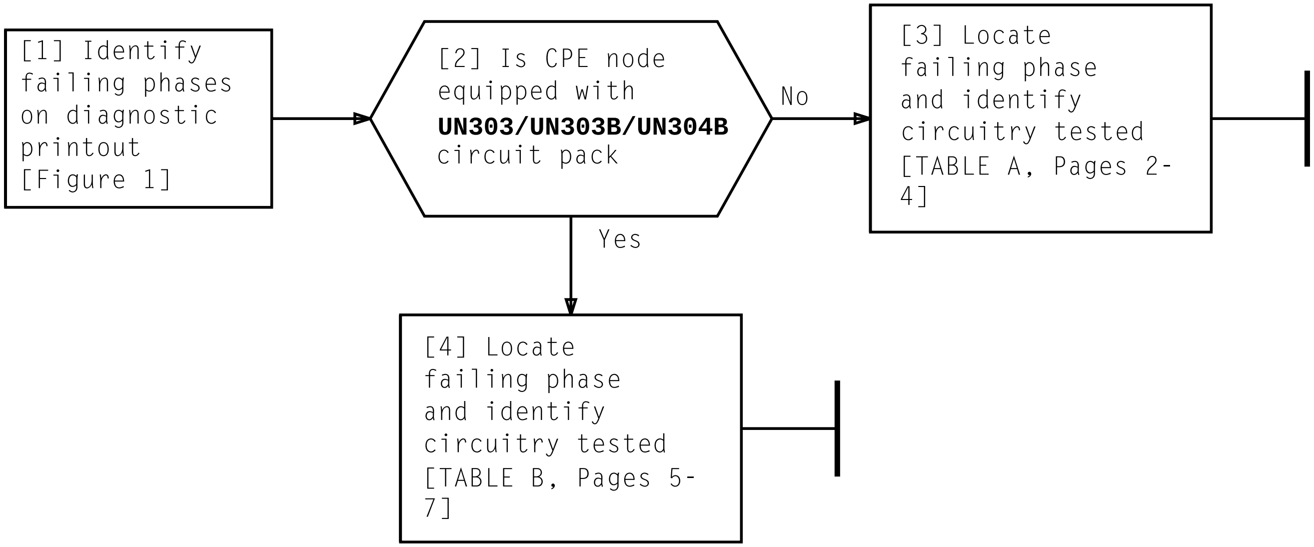
[9] See NOTE. Perform recent change to change node hv value to proper value [DLP-538]

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 always 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



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 BISO node to EISO 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 EISO node to BISO 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.
39	Verifies ability of node to read, write, and propagate a maximum length message (demand only phase for transition load).
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.
39	Verifies ability of node to read, write, and propagate a maximum length message (demand only phase for transition load).
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.

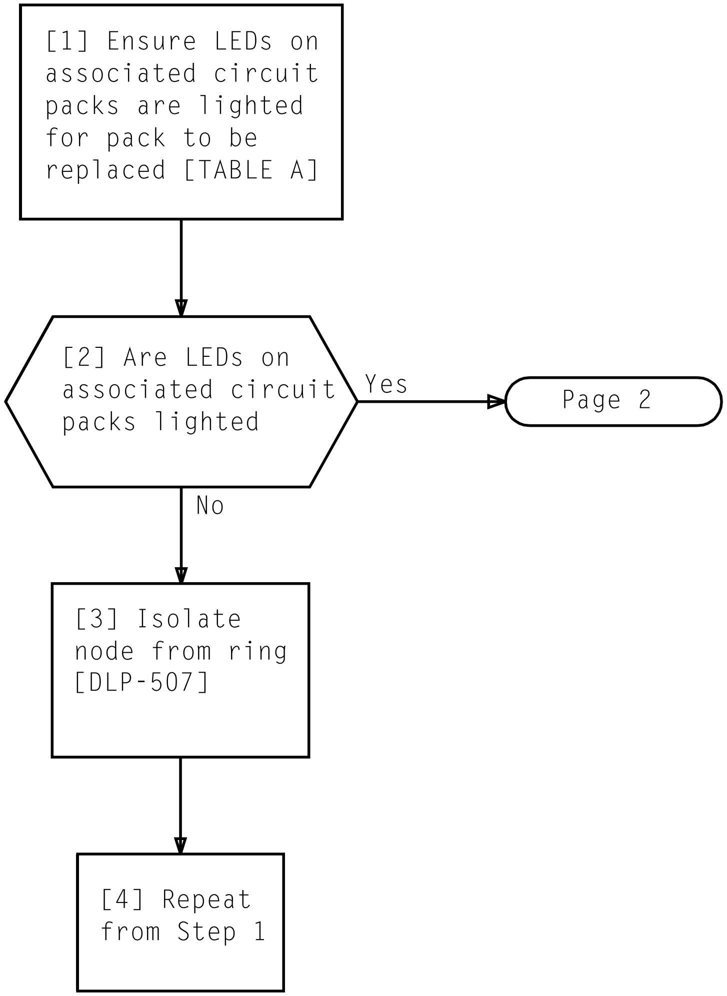


TABLE A
Replacement Circuit Pack

CIRCUIT PACK	FUNCTION	LED STATUS ON ASSOCIATED CIRCUIT PACKS
TN922	Node Processor (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 **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)	—
UN304B	Integrated Ring Node 2 (IRN2)	—

REPLACE CIRCUIT PACK, IMS USER NODE (IUN)

[5] See WARNING. Remove circuit pack to be replaced

[6] See WARNING. Insert and properly seat replacement pack

AND

[7] Was **TN922**, **UN122**, **UN122B**, **UN122C**, **UN123**, **UN123B**, **UN303B**, **UN304B**, **TN915**, **TN918**, **TN1506**, **TN1508**, **TN1509**, or **TN1803** pack replaced

No

Yes

[8] Was same version of pack used for replacement

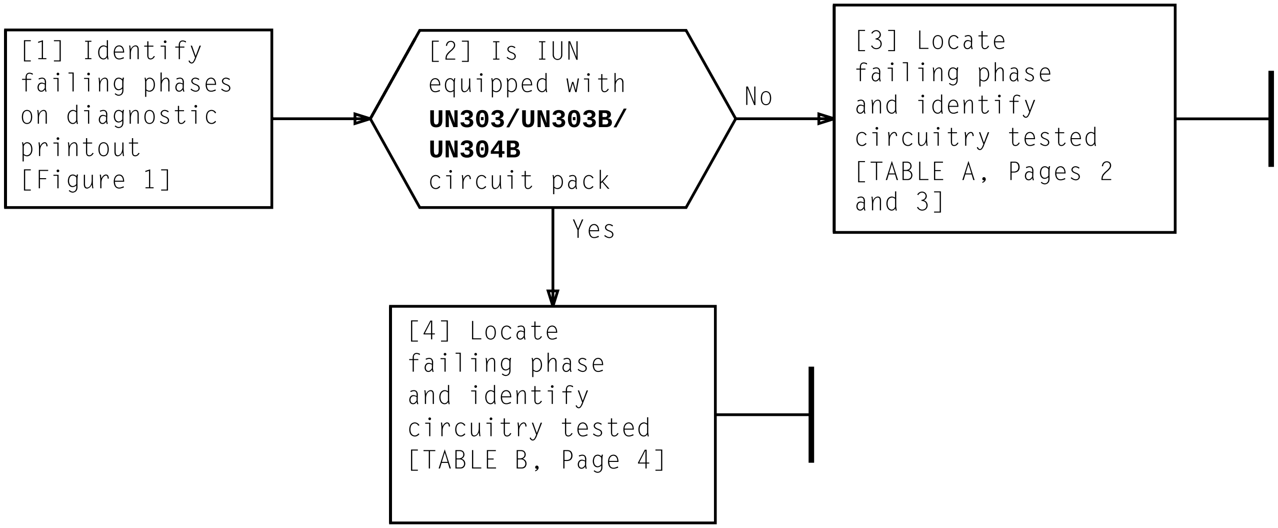
Yes

No

[9] See NOTE. Perform recent change to change node hv value to proper value [DLP-538]

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




```
                                          FAILING PHASE
30 DGN: LN32 11:PH 10-31. PF

M 30 DGN: LN32 11 SLOT 1  MSG STARTED
M 30 REPT IMSRMVRST ERROR 3 3
M 31 DGN: LN32 11 PH 10 STF  ( 2 00000000 00000000 )   MSG IP
     TEST               MISMATCH
        3               00000009
        4               00000009
M 31: LN32 11 TERMINATED AT PH 10 STMNT 434 AFTER TEST 438

M 31 ANALY TLPFILE: LN32 11 SUMMARY DATA  MSG STARTED
     TLP: LN32 11 PH=10 K1=0X00000002 K2=0X00000000 FFK=1
     TLPFILE COMPLETED
M 31 DGN: LN32 11 COMPLETED  STF  ( 2 00000000 00000000 )  MSG IP

M 31 DGN: LN32 11 STF ( 2 00000000 00000000 ) MSG COMPL
```

Figure 1 — Sample Printout of Failing Diagnostic Phase

TABLE A SSI IUN 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 IUN 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).

TABLE B IRN/IRN2 IUN 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 BISO node to EISO 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 EISO node to BISO 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.
39	Verifies ability of node to read, write, and propagate a maximum length message (demand only phase for transition load).

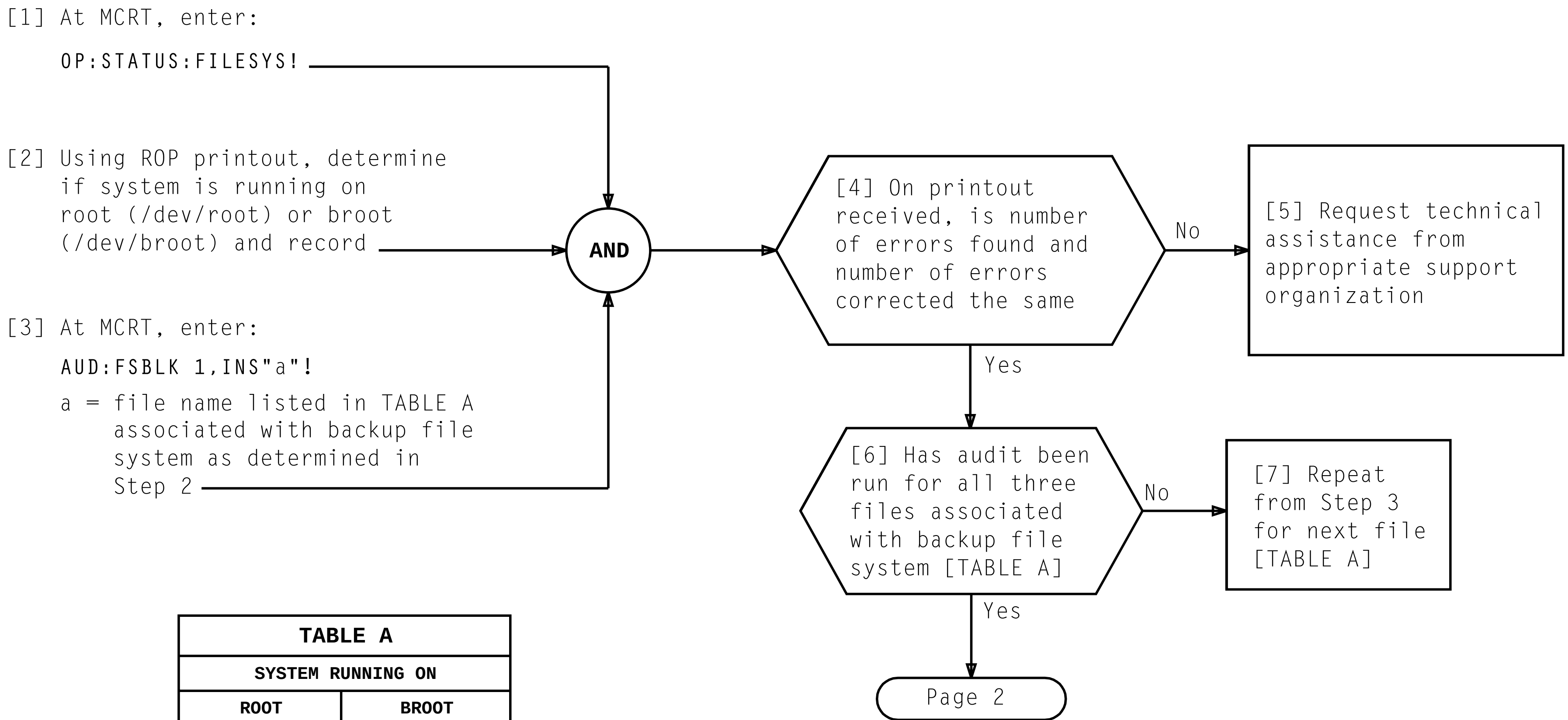


TABLE A	
SYSTEM RUNNING ON	
ROOT	**BROOT**
/dev/root	/dev/broot
/dev/db	/dev/bdb
/dev/etc	/dev/betc

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

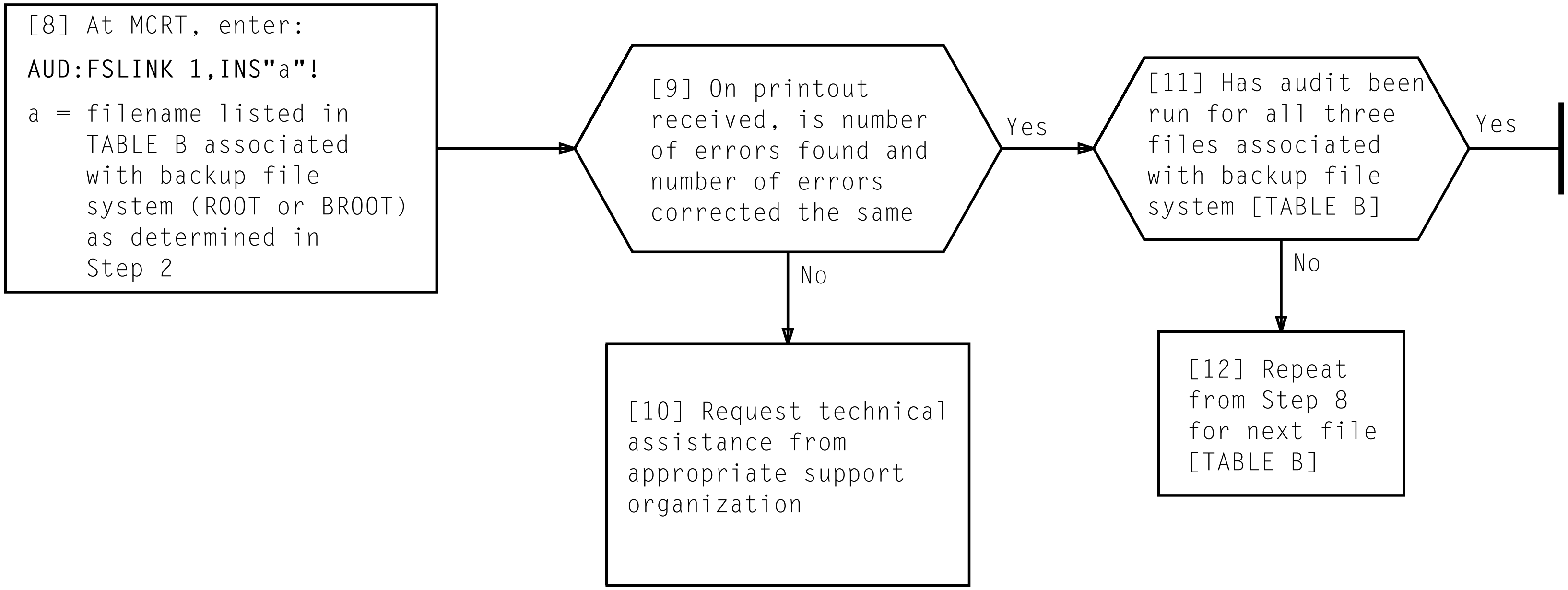


TABLE B	
SYSTEM RUNNING ON	
ROOT	BROOT
/dev/root	/dev/broot
/dev/db	/dev/bdb
/dev/etc	/dev/betc

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

[1] Isolate node from ring [DLP-507]

[2] See WARNING. Remove **UN304B** circuit pack to be replaced

[3] See WARNING. Insert and properly seat replacement pack

AND

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, ATP NODE (ATPN)

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

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

FAILING PHASE

```
30 DGN: LN38 8:PH 10-31. PF

M 30 DGN: LN38 8 SLOT 1  MSG STARTED
M 30 REPT IMSRMVRST ERROR 3 3
M 31 DGN: LN38 8 PH 10 STF  ( 2 00000000 00000000 )   MSG IP
     TEST               MISMATCH
        3               00000009
        4               00000009
M 31: LN38 8 TERMINATED AT PH 10 STMNT 434 AFTER TEST 438

M 31 ANALY TLPFILE: LN38 8 SUMMARY DATA  MSG STARTED
     TLP: LN38 8 PH=10 K1=0X00000002 K2=0X00000000 FFK=1
     TLPFILE COMPLETED
M 31 DGN: LN38 8 COMPLETED  STF  ( 2 00000000 00000000 )  MSG IP

M 31 DGN: LN38 8 STF ( 2 00000000 00000000 ) MSG COMPL
```

Figure 1 — Sample Printout of Failing Diagnostic Phase

IDENTIFY ATP NODE (ATPN) CIRCUITRY TESTED BY FAILING PHASE

TABLE A IRN2 ATPN 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 BISO node to EISO 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 EISO node to BISO 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.
39	Verifies ability of node to read, write, and propagate a maximum length message (demand only phase for transition load).

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

→

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

FAILING PHASE

```
30 DGN: LN41 3:PH 10-31. PF

M 30 DGN: LN41 3 SLOT 1  MSG STARTED
M 30 REPT IMSRMVRST ERROR 3 3
M 31 DGN: LN41 3 PH 10 STF  ( 2 00000000 00000000 )   MSG IP
     TEST              MISMATCH
        3              00000009
        4              00000009
M 31: LN41 3 TERMINATED AT PH 10 STMNT 434 AFTER TEST 438

M 31 ANALY TLPFILE: LN41 3 SUMMARY DATA  MSG STARTED
     TLP: LN41 3 PH=10 K1=0X00000002 K2=0X00000000 FFK=1
     TLPFILE COMPLETED
M 31 DGN: LN41 3 COMPLETED  STF  ( 2 00000000 00000000 )  MSG IP

M 31 DGN: LN41 3 STF ( 2 00000000 00000000 ) MSG COMPL
```

Figure 1 — Sample Printout of Failing Diagnostic Phase

IDENTIFY SMALL COMPUTER SYSTEMS INTERFACE NODE (SIN) CIRCUITRY CIRCUITRY TESTED BY FAILING PHASE

TABLE A SIN 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 RACs, the RAC to the NP interface, and the interface between both RACs and the ring bus. Checks the capacity of the 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, NP parity checker and generator 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 SCSI interface hardware.

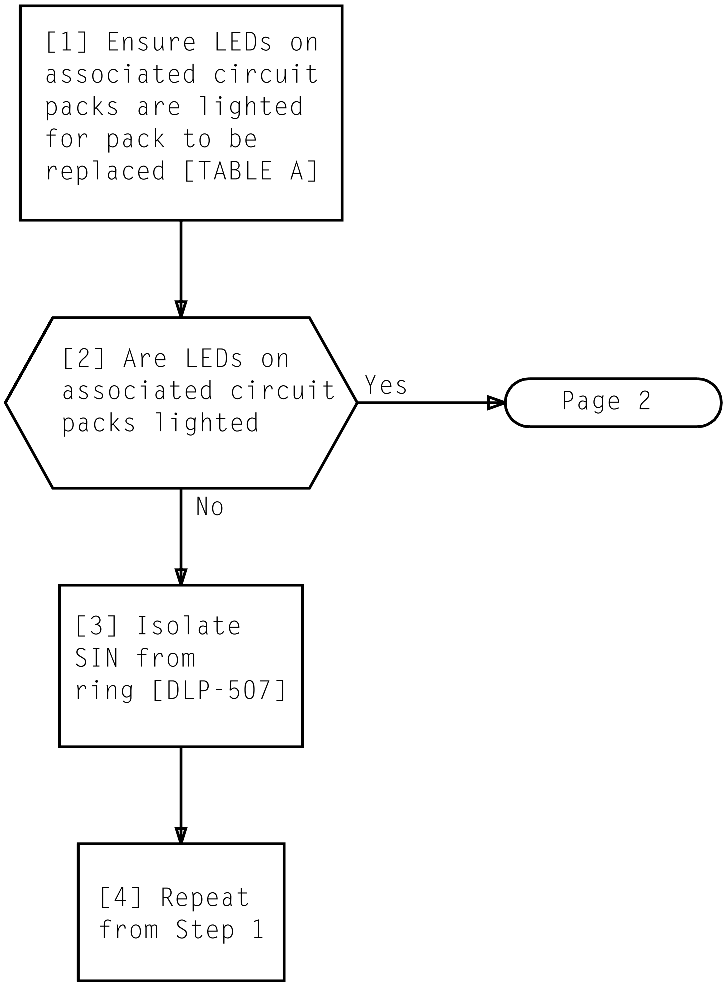
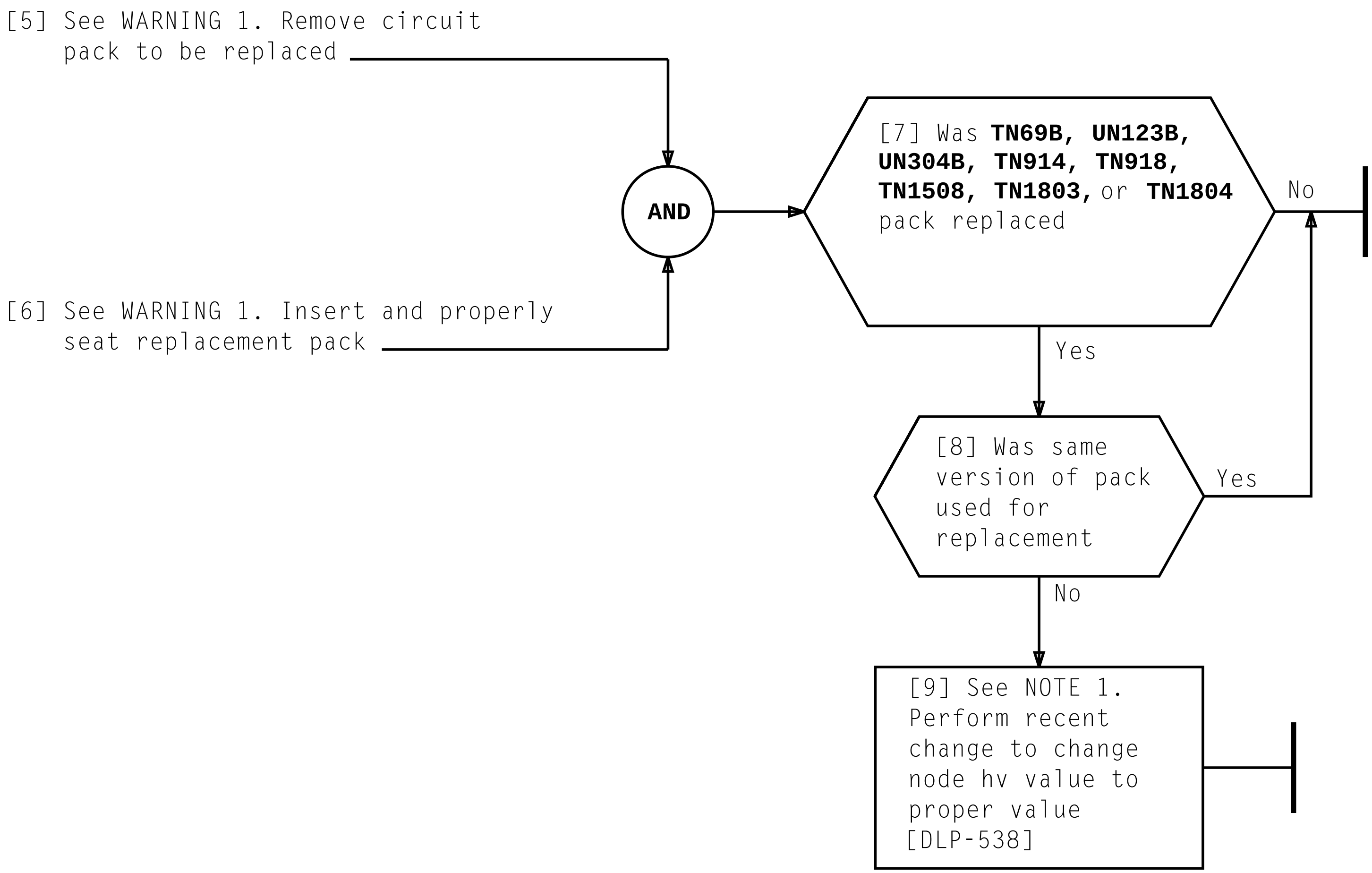


TABLE A
CIRCUIT PACKS

CIRCUIT PACK	FUNCTION	LED STATUS ON ASSOCIATED CIRCUIT PACKS
UN304B	Integrated Ring Node (IRN)	-
TN918 **TN1508** **TN1803**	Interface Buffer (IFB)	**NT** LED on; associated **UN123**, **UN123B** or **NT** LED on; **UN123** or **UN123B** of neighbor node in adjacent frame lighted
TN1804	Small Computer Systems Interface (SCSI)	-
TN914	3B Interface (3BI)	-
TN69B	Duplex Dual Serial Bus Selector (DDSBS)	-

REPLACE CIRCUIT PACK, SMALL COMPUTER SYSTEMS INTERFACE NODE (SIN)



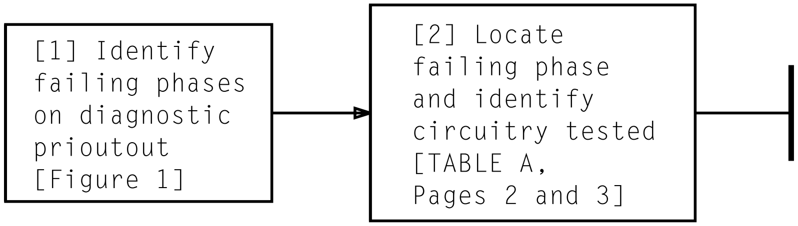
NOTE 1

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, SMALL COMPUTER SYSTEMS INTERFACE NODE (SIN)



FAILING PHASE

```
30 DGN: LN32 0:PH 10-31. PF

M 30 DGN: LN32 0 SLOT 1  MSG STARTED
M 30 REPT IMSRMVRST ERROR 3 3
M 31 DGN: LN32 0 PH 10 STF  ( 2 00000000 00000000 )   MSG IP
     TEST              MISMATCH
        3              00000009
        4              00000009
M 31: LN32 0 TERMINATED AT PH 10 STMNT 434 AFTER TEST 438

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

M 31 DGN: LN32 0 STF ( 2 00000000 00000000 ) MSG COMPL
```

Figure 1 — Sample Printout of Failing Diagnostic Phase

IDENTIFY UNIVERSAL LINK NODE (ULN) CIRCUITRY TESTED BY FAILING PHASE

TABLE A SSI ULN DIAGNOSTIC PHASES	
FAILING PHASE	**DESCRIPTION OF CIRCUITRY TESTED**
01	Runs the isolated segment diagnostics from the BISO end. It verifies that the data selector can be set and cleared at each isolated node and that all interframe buffers within the isolated segment are sized to agree with the ECD. This is accomplished by first setting the data selector at the isolated node closest to the BISO, verifying that the ring storage capacity from the BISO to the node having its data selector set agrees with the calculated capacity for that particular ring segment and then clearing the data selector that was just set. This process is then repeated at the next adjacent isolated node, etc., until the entire isolated segment is tested by adding one additional node to the test segment for each iteration. It also verifies that a message can be relayed from the 3B, via the BISO node, thru the isolated segment, and relayed back to the 3B via the EISO node.
02	Runs the isolated segment diagnostics from the EISO end. It verifies that the data selector can be set and cleared at each isolated node and that all interframe buffers within the isolated segment are sized to agree with the ECD. This is accomplished by first setting the data selector at the isolated node closest to the EISO, verifying that the ring storage capacity from the EISO to the node having its data selector set agrees with the calculated capacity for that particular ring segment and then clearing the data selector that was just set. This process is then repeated at the next adjacent isolated node, etc., until the entire isolated segment is tested by adding one additional node to the test segment for each iteration. It also verifies that a message can be relayed from the 3B, via the EISO node, thru the isolated segment, and relayed back to the 3B via the BISO node.
10	Requests download of the ulnph10.lv diagnostic code to run diagnostics on the ring interface. If Phases 01 and 02 are not run before this phase, other nodes in the isolated segment may affect the results.

TABLE A (Contd) SSI ULN DIAGNOSTIC PHASES	
FAILING PHASE	**DESCRIPTION OF CIRCUITRY TESTED**
12	Requests the relay module to write a message with bad parity from a BISO node into the isolated segment. The write is expected to block when the RAC at the node being diagnosed detects bad parity. The actual sequence is to first write the message with good parity, then with bad parity, then with good parity again.
13	Requests the relay module to write a message with bad parity from a EISO node into the isolated segment. The write is expected to block when the RAC at the node being diagnosed detects bad parity. The actual sequence is to first write the message with good parity, then with bad parity, then with good parity again.
20	Tests the ULN (RAM memory) on an RIB with code that is ROM resident.
40	Tests the ULN RIB-LIB inter-communications capability.
41	Tests the ULN (RAM memory) at an IUN with code that is ROM resident.
43	Tests the ULN T1 link option module
50	Tests the ULN T1 link connection. (Demand only phase.)

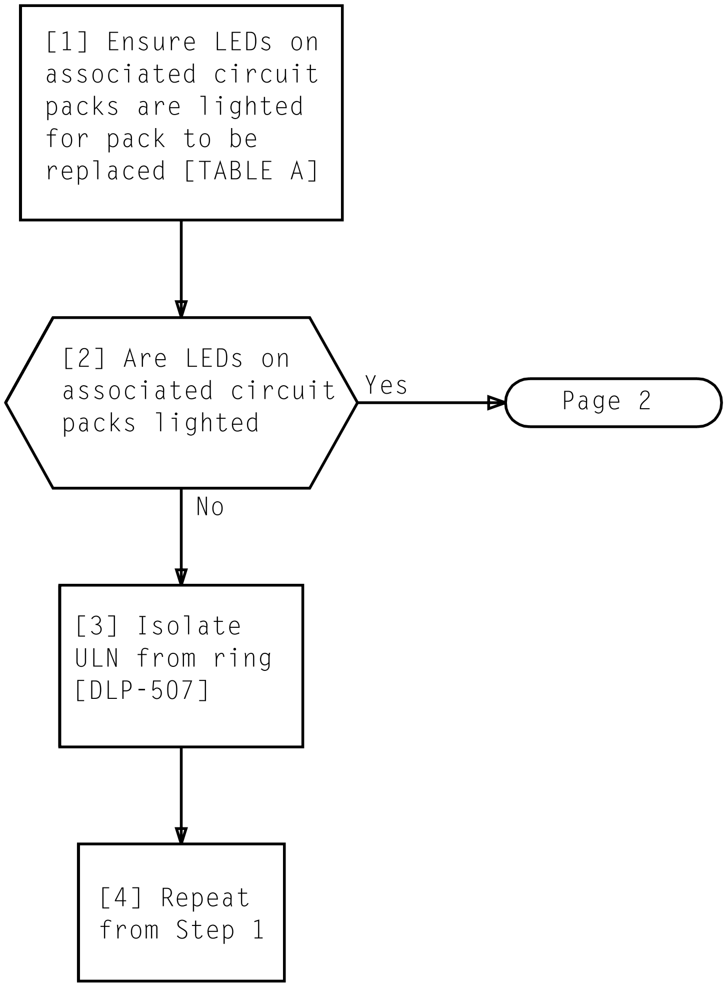


TABLE A CIRCUIT PACKS		
CIRCUIT PACK	**FUNCTION**	**LED STATUS ON ASSOCIATED CIRCUIT PACKS**
UN397	Ring Interface Board	**NT** LED on; **UN397** lighted
TN915 **TN918** **TN1506** **TN1508** **TN1509** **TN1803**	Interface Buffer (IFB)	**NT** LED on; associated **UN397**, or **NT** LED on; **UN397** of neighbor node in adjacent frame lighted
TN2520	Link Interface Board	**RQ** LED on; **TN2520** lighted and **NT** LED on

REPLACE CIRCUIT PACK, UNIVERSAL LINK NODE (ULN)

[5] See WARNING 1. Remove circuit pack to be replaced

[6] See WARNING 1. Insert and properly seat replacement pack

AND

[7] Was **UN397**, **TN915**, **TN918**, **TN1506**, **TN1508**, **TN1509**, **TN1803**, or **TN2520**, pack replaced

No

Yes

[8] Was same version of pack used for replacement

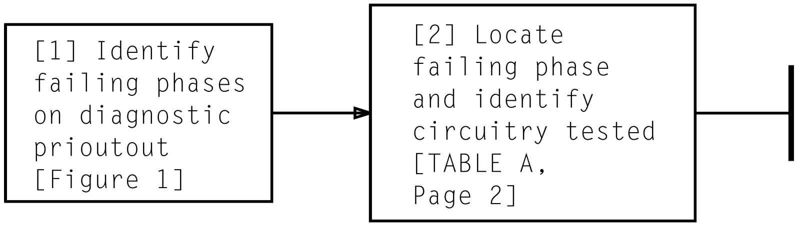
Yes

No

[9] See NOTE 1. Perform recent change to change node hv value to proper value [DLP-538]

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



FAILING PHASE

```
30 DGN: LN41 3:PH 10-31. PF

M 30 DGN: LN41 3 SLOT 1  MSG STARTED
M 30 REPT IMSRMVRST ERROR 3 3
M 31 DGN: LN41 3 PH 10 STF  ( 2 00000000 00000000 )   MSG IP
     TEST               MISMATCH
        3               00000009
        4               00000009
M 31: LN41 3 TERMINATED AT PH 10 STMNT 434 AFTER TEST 438

M 31 ANALY TLPFILE: LN41 3 SUMMARY DATA  MSG STARTED
     TLP: LN41 3 PH=10 K1=0X00000002 K2=0X00000000 FFK=1
     TLPFILE COMPLETED
M 31 DGN: LN41 3 COMPLETED  STF  ( 2 00000000 00000000 )  MSG IP

M 31 DGN: LN41 3 STF ( 2 00000000 00000000 ) MSG COMPL
```

Figure 1 — Sample Printout of Failing Diagnostic Phase

IDENTIFY ETHERNET INTERFACE NODE (EIN) CIRCUITRY TESTED BY FAILING PHASE

TABLE A EIN 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 RACs, the RAC to the IRN2 interface, and the interface between both RACs and the ring bus.
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 IRN2 RAM memory, IRN2 parity checker and generator 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	Requests download of diagnostic dirver code to the IRN2 and initiates its execution to diagnose the Ethernet interface hardware. Testing ends at the loopback relay on the ELI circuit pack.

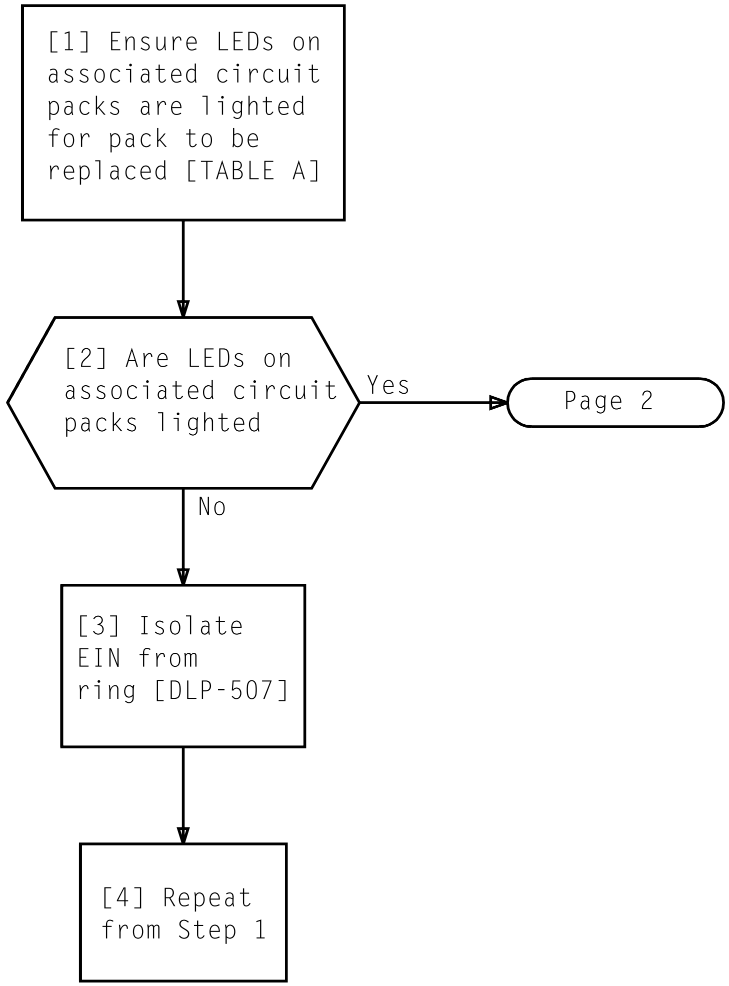
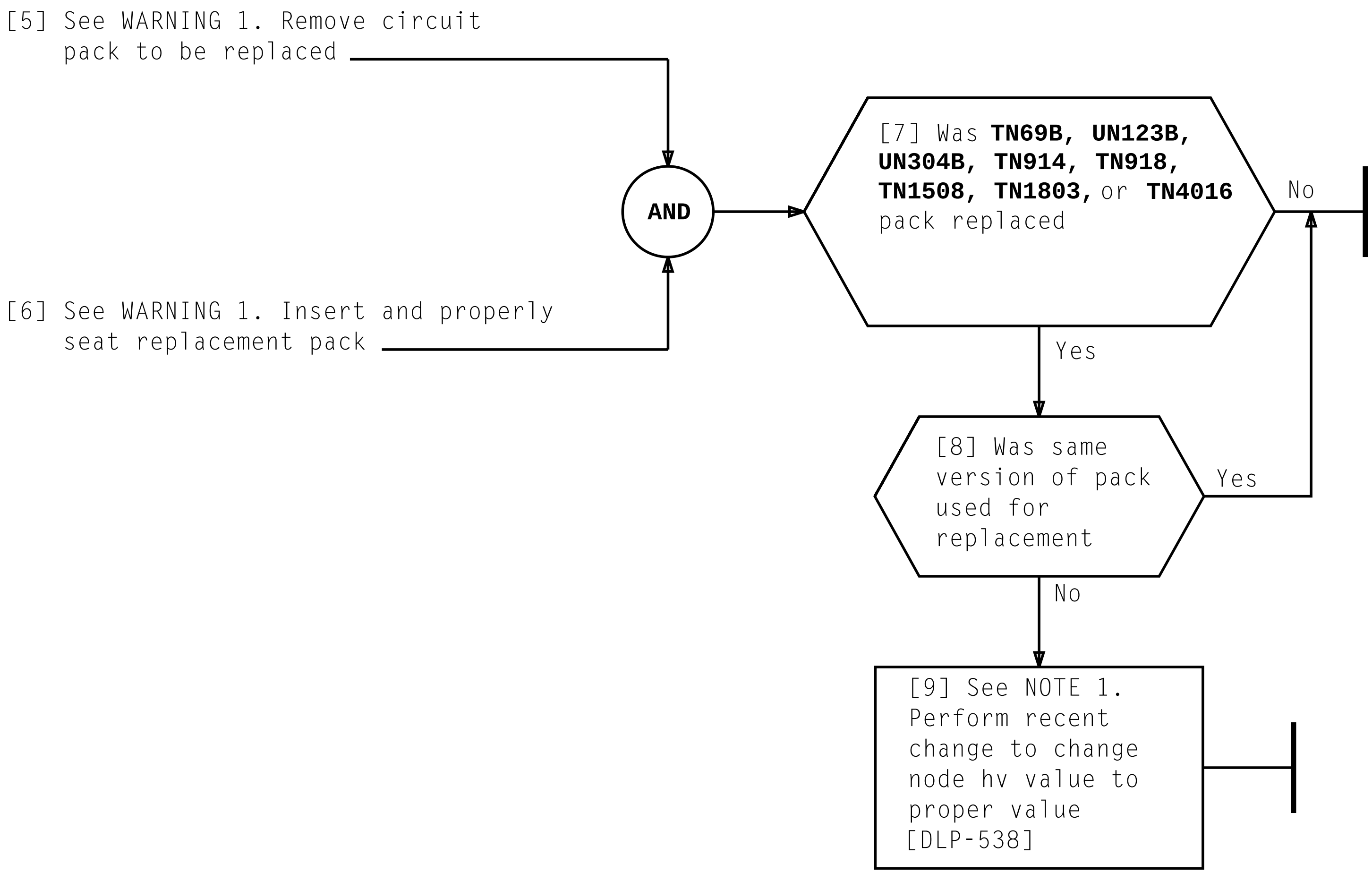


TABLE A CIRCUIT PACKS		
CIRCUIT PACK	**FUNCTION**	**LED STATUS ON ASSOCIATED CIRCUIT PACKS**
UN304B	Integrated Ring Node (IRN)	-
TN918 **TN1508** **TN1803**	Interface Buffer (IFB)	**NT** LED on; associated **UN123**, **UN123B** or **NT** LED on; **UN123** or **UN123B** of neighbor node in adjacent frame lighted
TN4016	Ethernet Link Interface (ELI)	-
TN914	3B Interface (3BI)	-
TN69B	Duplex Dual Serial Bus Selector (DDSBS)	-

REPLACE CIRCUIT PACK, ETHERNET INTERFACE NODE (EIN)



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, ETHERNET INTERFACE NODE (EIN)

ITEM	ISSUE	ITEM	ISSUE	ITEM	ISSUE	ITEM	ISSUE	ITEM	ISSUE	ITEM	ISSUE
○ TPG-000		DLP-508		DLP-543		● CKL-891					
● IXL-001		● DLP-509		DLP-544		TNG-893					
NTP-002		DLP-510		DLP-545							
NTP-003		DLP-511		DLP-546							
NTP-004		DLP-512		DLP-547							
NTP-005		DLP-513		DLP-548							
NTP-006		DLP-514		DLP-549							
NTP-007		DLP-515		DLP-550							
NTP-008		DLP-516		DLP-551							
NTP-009		DLP-517		DLP-552							
TAP-100		DLP-518		DLP-553							
○ TAP-101		DLP-519		DLP-554							
○ TAP-102		DLP-520		DLP-555							
TAP-103		DLP-521		DLP-556							
TAP-104		DLP-522		DLP-557							
TAP-105		DLP-523		DLP-558							
● TAP-106		● DLP-524		DLP-559							
● TAP-107		DLP-525		DLP-560							
● TAP-108		DLP-526		DLP-561							
● TAP-109		DLP-527		DLP-562							
TAP-110		DLP-528		DLP-563							
TAP-111		DLP-529		DLP-564							
● TAP-112		DLP-530		DLP-565							
TAP-113		DLP-531		DLP-566							
TAP-114		DLP-532		DLP-567							
TAP-115		DLP-533		DLP-568							
TAP-116		DLP-534		DLP-569							
DLP-500		DLP-535		DLP-570							
● DLP-501		DLP-536		DLP-571							
DLP-502		DLP-537		DLP-572							
DLP-503		DLP-538		DLP-573							
○ DLP-504		DLP-539		DLP-574							
○ DLP-505		DLP-540		DLP-575							
DLP-506		DLP-541		DLP-576							
DLP-507		DLP-542		DLP-577							

● **REVISED OR ADDED ITEM** □ **CANCELED ITEM**

CHECKLIST