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DMS-100 Family

RSC-SONET B

International Maintenance Manual

XPM11 and up Standard 09.01 October 1999

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About this document

When to use this document

This Remote Switching Center-SONET (RSC-S) for international applications maintenance reference manual provides: overview and hardware information for understanding the RSC-S product and operation; recovery procedure for returning to service an RSC-S from a completely out-of-service condition; alarm clearing procedures for clearing an RSC alarm condition at the MAP; card replacement procedures for removing and replacing hardware modules in the RSC-S as part of maintenance, verification, or acceptance procedures; trouble locating and clearing information for locating and clearing problems beyond the scope of other maintenance procedures.

How to check the version and issue of this document

The version and issue of the document are indicated by numbers, for example, 01.01.

The first two digits indicate the version. The version number increases each time the document is updated to support a new software release. For example, the first release of a document is 01.01. In the *next* software release cycle, the first release of the same document is 02.01.

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References in this document

The following documents are referred to in this document:

- *Product Documentation Directory*, 297-8991-001
- *Operational Measurements Reference Manual*
- *PMDEBUG User Guide*, TAM-1001-004
- *XPM Logs Reports Reference Manual*, 297-8331-840
- *XPM Translations Reference Manual*, 297-8331-815

What precautionary messages mean

The types of precautionary messages used in Nortel Networks documents include attention boxes and danger, warning, and caution messages.

An attention box identifies information that is necessary for the proper performance of a procedure or task or the correct interpretation of information or data. Danger, warning, and caution messages indicate possible risks.

Examples of the precautionary messages follow.

ATTENTION Information needed to perform a task

ATTENTION

If the unused DS-3 ports are not deprovisioned before a DS-1/VT Mapper is installed, the DS-1 traffic will not be carried through the DS-1/VT Mapper, even though the DS-1/VT Mapper is properly provisioned.

DANGER Possibility of personal injury



DANGER

Risk of electrocution

Do not open the front panel of the inverter unless fuses F1, F2, and F3 have been removed. The inverter contains high-voltage lines. Until the fuses are removed, the high-voltage lines are active, and you risk being electrocuted.

WARNING Possibility of equipment damage

**WARNING****Damage to the backplane connector pins**

Align the card before seating it, to avoid bending the backplane connector pins. Use light thumb pressure to align the card with the connectors. Next, use the levers on the card to seat the card into the connectors.

CAUTION Possibility of service interruption or degradation

**CAUTION****Possible loss of service**

Before continuing, confirm that you are removing the card from the inactive unit of the peripheral module. Subscriber service will be lost if you remove a card from the active unit.

How commands, parameters, and responses are represented

Commands, parameters, and responses in this document conform to the following conventions.

Input prompt (>)

An input prompt (>) indicates that the information that follows is a command:

>BSY

Commands and fixed parameters

Commands and fixed parameters that are entered at a MAP terminal are shown in uppercase letters:

>BSY CTRL

Variables

Variables are shown in lowercase letters:

>BSY CTRL ctrl_no

The letters or numbers that the variable represents must be entered. Each variable is explained in a list that follows the command string.

Responses

Responses correspond to the MAP display and are shown in a different type:

```
FP 3 Busy CTRL 0: Command request has been submitted.  
FP 3 Busy CTRL 0: Command passed.
```

The following excerpt from a procedure shows the command syntax used in this document:

- 1 Manually busy the CTRL on the inactive plane by typing

>BSY CTRL ctrl_no

and pressing the Enter key.

where

ctrl_no is the number of the CTRL (0 or 1)

Example of a MAP response:

```
FP 3 Busy CTRL 0: Command request has been submitted.  
FP 3 Busy CTRL 0: Command passed.
```

Maintenance overview

This chapter has the following sections:

- functional description
- fault conditions
- automatic maintenance
- increase to manual maintenance

The functional description contains a summary of the components of the Remote Switching Center-Synchronous Optical Network (SONET) or the RSC-S configurations. This section discusses the modular supervisory panel (MSP) and remote center offshore 2 (RCO2) components. The section explains voice and message flows and how software processes affect RCO2 components.

Fault conditions are problems that occur in the following areas:

- components, like card or power supply
- links that connect these components
- software that controls voice and message flow

The design of the RSC-S, Remote Switching Center (RSC) and Digital Multiplex System (DMS) switch makes sure the system responds correctly to fault conditions. When fault conditions occur, system actions, like audits, try to pinpoint and correct the fault automatically. Manual action is not always necessary if these system actions occur. If manual action is necessary, the system explains the trouble indicators.

Automatic maintenance includes the output of the trouble indicators of the RSC-S. The Automatic maintenance section contains this information.

Functional description

This section describes components and features of the RSC-S. The description includes the MSP and the RCO2.

Remote Switching Center–SONET (RSC-S)

The RSC-S uses common peripheral module (CPM) design instead of XMS-based peripheral module (XPM) design.

When RSC-S uses a CPM design, the following differences occur:

- a change to the channel supervision message (CSM) connections in the CPM
- a direct connection of channels to the enhanced D-channel handler (EDCH) circuit card or the D-channel handler (DCH) card
- an improvement of the matrix card NTMX75
- the creation of the pulse code modulation (PCM) circuit card (NTMX82) to concentrate all signaling functions in one circuit card
- a small change in the management of pulse code modulation 30 (PCM-30) signaling bits A, B, C and D
- the addition of firmware that can be downloaded to the following:
 - Unified Processor (UP) card (NTMX77)
 - Cellular Access Processor (CAP) card (NTAX74)
 - PCM Signaling Processor (SIGP) card (NTMX73)

Note: When an RCO2 has the optional NTAX74 CAP card, the system does not support Peripheral/Remote Loader-16 (NT7X05).

- the AB scanner of the SIGP card in the RCO2 unit scans with a 3ms interrupt.

The primary components of the RSC-S in the CPM design that can be assembled are the RCO2 or dual RCO2 (DRCO2). The installation of the RCO2 can occur with or without the integrated services digital network (ISDN) or emergency stand-alone (ESA) services. The following sections describe these components according to functional areas. These sections describe the functions of specified cards and present other RSC-S components for each functional area.

Note: The dual RSC-S configuration is not available with this release.

In-service firmware downloading

In-service firmware downloading permits XPM firmware loading in an XPM unit while the unit is in service (InSv). This feature reduces the

amount of time one unit of the XPM is out-of-service (OOS). In-service firmware downloading supports NTMX77 and NTAX74 processors.

Note: In-service firmware downloading refers to the loading of the firmware while the unit is InSv. The upgrade of the firmware occurs with the XPM unit out of service (OOS).

This feature introduces the LOADFW command. The LOADFW command distinguishes the firmware load application from the firmware upgrade application. The command syntax for the LOADFW command is:

```
LOADFW: Load Firmware onto a PM or unit.
        All parameter will execute LOADFW on
        all PMs in the post set of the same
        PM type displayed on the MAP.
        LOADFW UPGRADE must be used to
        activate the new firmware.
Parms: <DEVICE> {UNIT <UNIT_NO> {0 TO 1},
                PM,
                INACTIVE,
                ACTIVE}
        [<FILENAME> STRING]
        [UPGRADE]
        [NOWAIT]
        [ALL]
```

To download firmware to the XPM, execute one of the following commands. The following are examples of the LOADFW command.

>LOADFW PM

or

>LOADFW UNIT unit_no

or

>LOADFW INACTIVE

Note 1: If the firmware_file is not specified with the LOADFW command, the command applies the firmware_file datafilled in the appropriate inventory table.

Note 2: By using the LOADFW command without the UPGRADE option, the firmware downloads to the DMS system.

XPM Firmware Loader Robustness CM Component disables the firmware option of the LOADPM command. A message is output to the user if the

firmware option of the LOADPM command is used. This message states this option is not supported and to use the LOADFW command.

Loadfile verification

Integrity checks are performed on the firmware for loadfile accuracy. A loadfile record length check ensures the file is a firmware file before submission to the XPM. If the record length is not 54, a message is output to the user and the LOADFW command fails.

Another accuracy check is a 32-bit cyclic redundancy check (CRC) along with a 16-bit checksum. The CM sends a validation message to the XPM to verify the accuracy of the firmware load. The XPM extracts the CRC and checksum that is in the firmware load. The XPM computes the CRC value and the checksum. The XPM compares the computed and extracted values to see if the values are the same. The XPM sends the result of the comparison to the CM.

To verify the firmware load enter the following command at the MAP display terminal:

>QUERYPM CNTRS

Firmware upgrade

After loadfile verification, the XPM can be upgraded to the new firmware. To upgrade the firmware use one of the following command string sets:

>BSY PM
>LOADFW PM UPGRADE
>RTS PM

or

>BSY UNIT unit_no
>LOADFW UNIT unit_no UPGRADE
>RTS UNIT unit_no

or

>BSY INACTIVE
>LOADFW INACTIVE UPGRADE
>RTS INACTIVE

Note: By using the LOADFW command with the UPGRADE option, the firmware is upgraded to the new firmware load.

When this procedure is performed on a by-unit basis, perform a switch of activity (SwAct) followed by the RTS command. Execute the LOADFW command with the UPGRADE option on the now inactive unit.

The next table lists parameters used with the LOADFW command.

LOADFW parameters

Parameter	Value	Definition
UNIT	n/a	Peripheral module unit
PM	n/a	Peripheral module
INACTIVE	n/a	State of peripheral module
ACTIVE	n/a	State of peripheral module
unit_no	0 or 1	PM unit number
filename	n/a	Name of firmware file. If the firmware file is not specified, the firmware load found in the appropriate inventory table is used.
UPGRADE	n/a	Upgrades the PM to the new firmware load. UPGRADE is an optional parameter.
ALL	n/a	Permits the use of the LOADFW command on a posted set of PMs. ALL is an optional parameter.
NOWAIT	n/a	Returns the prompt before the command is finished, on-screen status is not visible. NOWAIT is an optional parameter.
Note: In this table N/A is an abbreviation for not applicable.		

Modular supervisory panel (MSP)

The following sections describe MSP components.

Talk battery module NTRX44AA

The NTRX44AA talk battery module provides a filtered power feed a maximum of 20A for cabinets in a central office (CO) environment. This

card also provides inrush current protection (a soft-start) to protect against power distribution center (PDC) breaker trips. The talk battery module has an MSP and accepts -48V or -60V battery input.

The NTRX44AA card provides the following functions:

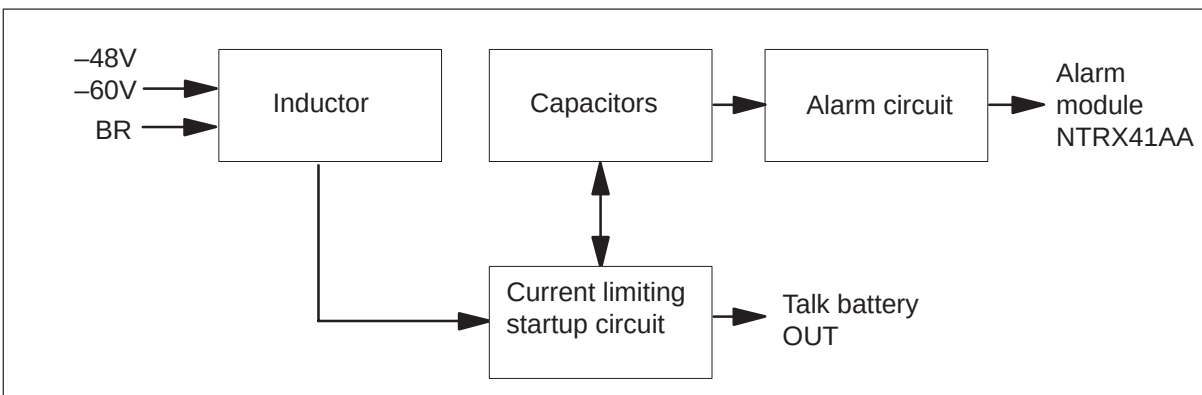
- termination point for PDC feeds
- filtered battery feed through connector interfaces
- soft-start that a current-limiting startup circuit provides to protect against PDC breaker trips
- two fail alarms

The NTRX44AA has the following functional blocks:

- inductor
- capacitors
- current limiting startup circuit
- alarm circuit

The following figure shows the relationship in NTRX44AA functional blocks.

NTRX44AA functional blocks



The NTRX44AA card uses a 20-A QHP77C bracket-mounted power inductor and six 80-V capacitors that provide 6800 μF of capacitance.

Current limiting startup circuit This circuit does not allow the PDC feed breaker to trip by a limit of the inrush current on startup. A thermistor charges the capacitors at the start. When the capacitors are completely charged, a relay powers on and the contacts connect the capacitors to the output. This soft-start occurs approximately 5 s from the time of application of input power.

Alarm circuit This block reports filter failure in the NTRX44AA card to the alarm module (NTRX41AA) through connector P3. The alarm module generates a FRAMEFAIL alarm. This block reports total power loss to the maintenance trunk monitor (MTM) through connector P4.

Pin-outs The following four tables show NTRX44AA pin-outs.

The following table shows pin-outs for PDC power input connector P1.

PDC power input connector P1

Pin	Signal
A	-48V or -60V
B	-48V or -60V
C	BAT RTN
D	BAT RTN

The following table shows pin-outs for the talk battery output connector P2.

Talk battery output connector P2

Pin	Signal
A	TALKBAT
B	TALKBAT
C	BAT RTN
D	BAT RTN

The following table shows pin-outs for FAIL alarm connector P3.

FAIL alarm connector P3

Pin	Signal
1	TALKALM
2	TALKALM
Note: Pin 1 must connect to alarm module NTRX41AA.	

The following table shows pin-outs for FAIL alarm connector P4.

FAIL alarm connector P4

Pin	Signal
1	LOSS1
2	LOSS2

Power requirements The small input voltage is -48V or -60V. The NTRX44AA card tolerates a range of -42V to -75V. The maximum steady-state input current is 20A. The maximum inrush current is 50A.

Output The following table that shows NTRX44AA output specifications.

NTRX44AA output specifications

Parameter	Value
Voltage	-48V or -60V
High-voltage shutdown	-75V
Low-voltage shutdown	-42V
Maximum current	20A
Attenuation	40 dB at 1kHz
Output impedance	50ohms at 300 to 3500Hz

Alarm module NTRX41AA

The NTRX41AA alarm card monitor and reports alarms for cabinets in a CO environment. The alarm card operates with an input battery voltage of -48V or -60V. This module includes the MSP.

The NTRX41AA alarm card detects and monitors the following fault conditions:

- converter faults
- thermal breaker failures
- fan failure on one or two cooling units
- failures in the talk battery modules
- inverter failure in the cabinet

If any of the first five conditions occur, the NTRX41AA card raises alarms and sends signals to the office alarm unit. The NTRX41AA provides maintenance facilities in the form of telephone, data and alarm battery supply (ABS) jacks.

The NTRX41AA alarm card has the following functional blocks:

- alarm circuit
- maintenance block

Alarm circuit The alarm circuit consists of transistor logic that the following alarm inputs activate:

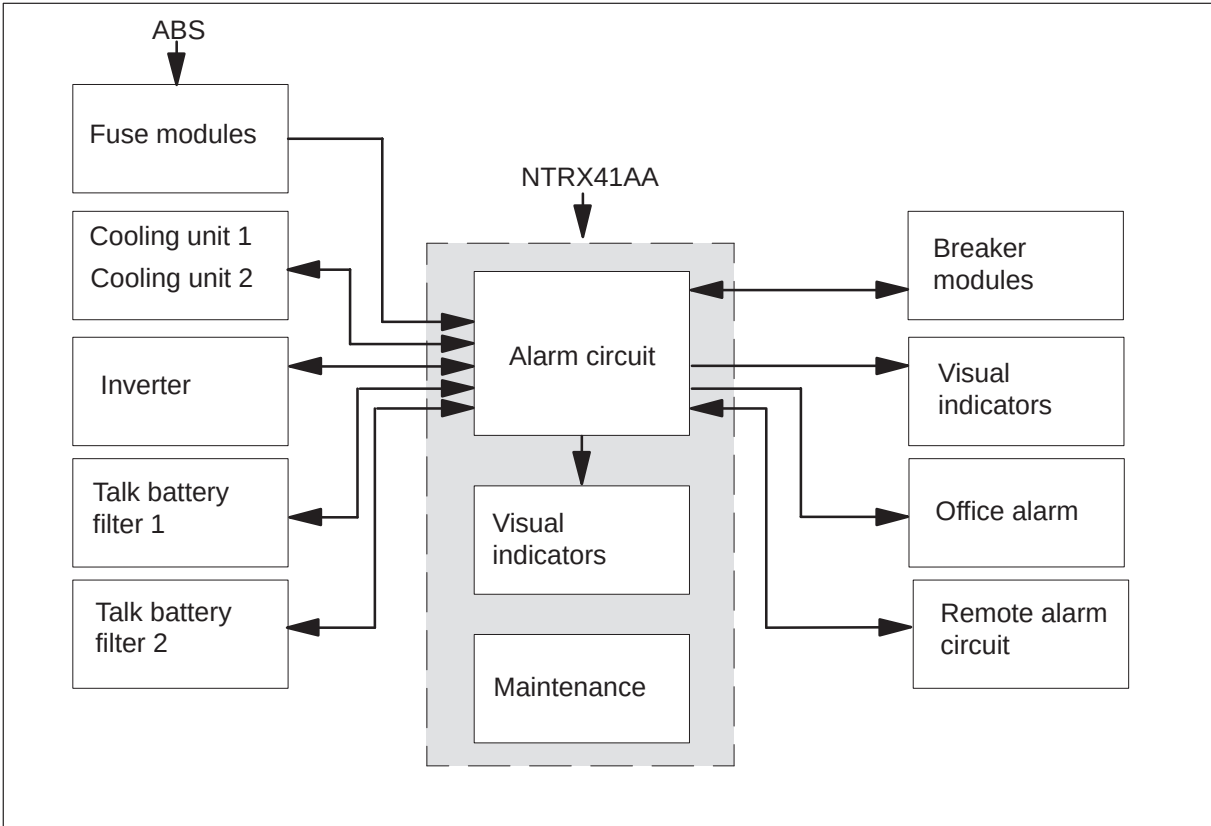
- battery-input voltage. This voltage triggers a FRAMEFAIL signal for an inverter alarm, talk battery module alarm or fuse module alarm.
- battery-return voltage. This voltage triggers a FRAMEFAIL signal for a converter fail alarm and line concentrating equipment (LCE) alarm.
- 90 Vrms. This input triggers a FRAMEFAIL signal for a ringing generator (RG) on an LCE cabinet.
- battery-input voltage. This voltage triggers a FANFAIL signal for a cooling unit alarm.

The alarm circuit provides two light-emitting diodes (LED) as visual indicators of the FRAMEFAIL and FANFAIL signals. The alarm circuit can drive two additional external LEDs with a connector interface.

Maintenance block The NTRX41AA card provides maintenance features like jacks for telephone, data and ABS. These features allow interoffice communication and data transmission.

The following figure shows the relationship among NTRX41AA functional blocks.

NTRX41AA functional blocks



Pin-outs The following table shows NTRX41AA pin-outs.

NTRX41AA output connector J1

Pin	D	C	B	A
1	RINGALM2	—	—	RINGALM1
2	—	—	—	—
3	—	—	—	—
4	BAT2	K2	BAT1	K1
5	BAT4	K4	BAT3	K3
6	BAT6	K6	BAT5	K5
—continued—				

NTRX41AA output connector J1 (continued)

Pin	D	C	B	A
7	BAT8	K8	BAT7	K7
8	BAT10	K10	BAT9	K9
9	BAT12	K12	BAT11	K11
10	BAT14	K14	BAT13	K13
11	BAT16	K16	BAT15	K15
12	BAT18	K18	BAT17	K17
13	BAT20	K20	BAT19	K19
14	—	FRAMEFAIL	—	FRMFLTST
15	INVALM	FUSEALM	FAN48	FAN48
16	D1B	D1A	TTB	TTA
17	–48V2	–48V2	–48V1	–48V1
18	–48V4	–48V4	–48V3	–48V3
19	FAIL4	FAIL3	FAIL2	FAIL1
20	FAIL8	FAIL7	FAIL6	FAIL5
21	FAIL12	FAIL11	FAIL10	FAIL9
22	FAIL16	FAIL15	FAIL14	FAIL13
23	FAIL20	FAIL19	FAIL18	FAIL17
24	—	FANALM2	—	FANALM1
25	—	—	—	—
26	FANLMPTST	ACO	AISALM2	AISALM1
27	D2B	D2A	TRB	TRA
28	BR	BR	BR	BR
29	—	TEMPSW2	—	TEMPSW1
30	+15FG	+15FG	+5FG	+5FG
—end—				

Power requirements The small input voltage is -48V or -60V. The NTRX41AA card tolerates a range from -42V to -75V. Maximum input current is 0.75A.

Fuse module NTRX43AA

The NTRX43AA fuse module provides a maximum of eight current-limited feed outputs and one alarm output. The fuse module provides these features for cabinets in a CO unit. This card has an MSP. The card can operate with an input battery voltage of -48V or -60V.

Note: This module does not include QFF fuses. The cabinet level contains the QFF fuses.

The functions of the NTRX43AA card are as follows:

- acts as a termination point for PDC feeds
- supplies eight current-limited outputs for circuits
- reports fuse and breaker failures to the NTRX41AA alarm module

Connector P1 provides the power feed for fuses F01 through F04. Connector P2 provides the power feed for fuses F05 through F08. These fuses are on the faceplate of the NTRX43AA card. Connector J1 provides the fused outputs with currents that range from 0.18A through 5.0A. Connector P3 provides alarm outputs that report fuse failure to the NTRX41AA alarm module.

Pins The following three tables show NTRX43AA pin-outs.

The following table shows pin-outs for power input connectors P1 and P2.

Power input connectors P1 and P2

Connector/pin	Signal
P1 1–9	-48V or -60V
P1 10–18	BAT RTN
P2 1–9	-48V or -60V
P2 10–18	BAT RTN

The following table shows pin-outs for NTRX43AA output connector J1.

NTRX43AA output connector J1

Pin	Signal	Pin	Signal
1	-48VOUT 1	10	-48VOUT 5
2	-48VOUT 2	11	BAT RTN 5
3	-48VOUT 4	12	BAT RTN 6
4	-48VOUT 6	13	BAT RTN 3
5	-48VOUT 7	14	BAT RTN 4
6	-48VOUT 8	15	NC
7	BAT RTN 1	16	NC
8	BAT RTN 2	17	BAT RTN 7
9	-48VOUT 3	18	BAT RTN 8

The following table shows pin-outs for fail alarm connector P3.

Fail alarm connector P3

Pin	Signal
1	FUSEALM
2	FUSEALM

Power requirements The small input voltage is -48V or -60V. A range from -42V through -75V is acceptable. Maximum input current is 30A.

Output The following table shows NTRX43AA output specifications.

NTRX43AA output specifications

Parameter	Value
Maximum voltage	-72V
Maximum current	5.0A
Minimum voltage	-42V
Minimum current	0.18A

Breaker module NTRX42AA

The NTRX42AA card is a breaker module provided with an MSP. This module contains two circuit breakers of -48V or -60V that provide two 10A power feeds.

The NTRX42AA receives two input feeds from the PDC. The two front-mounted breakers of the cards limit the input current. Automatic recovery from low battery (ARLB) and the standard DMS switch converter interface allow the breakers to monitor converters.

The functions of the NTRX42AA card are as follows:

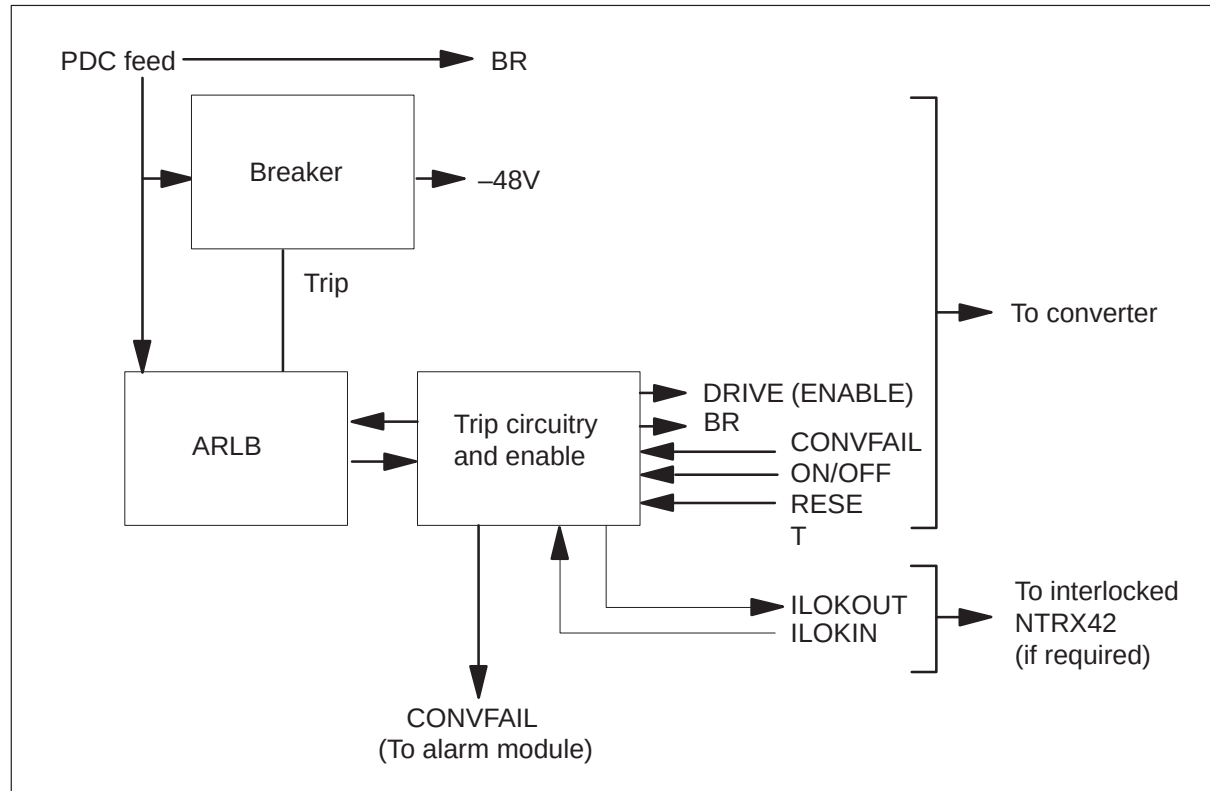
- monitors and detects converter failures
- trips breakers when overcurrent conditions occur
- trips breakers on converter failure
- provides termination points for PDC feeds
- provides battery feed samples for an alarm module
- responds to ARLB conditions

The NTRX42AA has the following functional blocks:

- ARLB
- trip circuitry and enable
- breakers

The following figure shows the relationship among NTRX42AA functional blocks.

NTRX42AA functional blocks



Automatic recovery from low battery The breaker module sends the NT6L62AA ARLB hybrid a sample of each of the two input battery feeds. The ARLB provides two outputs to the NTRX42AA card. One output controls the two relays on each breaker module. When the sampled voltage falls below $-44.5V \pm 0.5V$, the relays power down to prevent a breaker trip. The relays remove the DRIVE or ENABLE signal that cause the converters to shut down. The battery voltage must rise above $-44.5V \pm 0.5V$ before restart of the RESET relay.

Trip and enable circuitry A transistor circuit can trip the associated circuit breaker. This event occurs in response to alarm relay release in the associated power converter or RG. This circuit provides the DRIVE or ENABLE signal for the converters that require the signal.

Breakers Two 10-A magnetic breakers are one on top of the other in this breaker module. The breakers operate over the $-48V$ to $-60V$ range.

Pin-outs The following table shows NTRX42AA pins.

NTRX42AA output connector J1

Pin	Signal	Pin	Signal
1	-48VSW1	13	CONVFAIL2
2	Not used	14	ILOKIN
3	ON/OFF1	15	DRIVE2
4	OEM-ALM1	16	Not used
5	OEM-ALM2	17	BAT RTN1
6	ON/OFF2	18	BR1
7	Not used	19	RESET1
8	-48VSW2	20	CONVFAIL1
9	Not used	21	CONVFAIL 2
10	DRIVE1	22	RESET2
11	ILOKOUT	23	BR2
12	CONVFAIL1	24	BAT RTN2

Power requirements Normal input voltage is -48V or -60V. A range from -42V through -72V is acceptable. Maximum input current is 20A.

Output The following table shows NTRX42AA output specifications.

NTRX42AA output specifications

Parameter	Value
Voltage	-48V or -60V
High-voltage shutdown	-72V
Low-voltage shutdown	-42V
Maximum current	2 x 10A
Minimum current	0A

Breaker module NTRX42CA

The NTRX42CA is a breaker module that has an MSP. This module contains two circuit breakers of -48V or -60V that provide two 20-A power feeds.

The NTRX42CA card receives two input feeds from the PDC. Two breakers on the front of the card limit the input current. The ARLB and the standard DMS switch converter interface allow the breakers to monitor converters.

The functions of the NTRX42CA card are as follows:

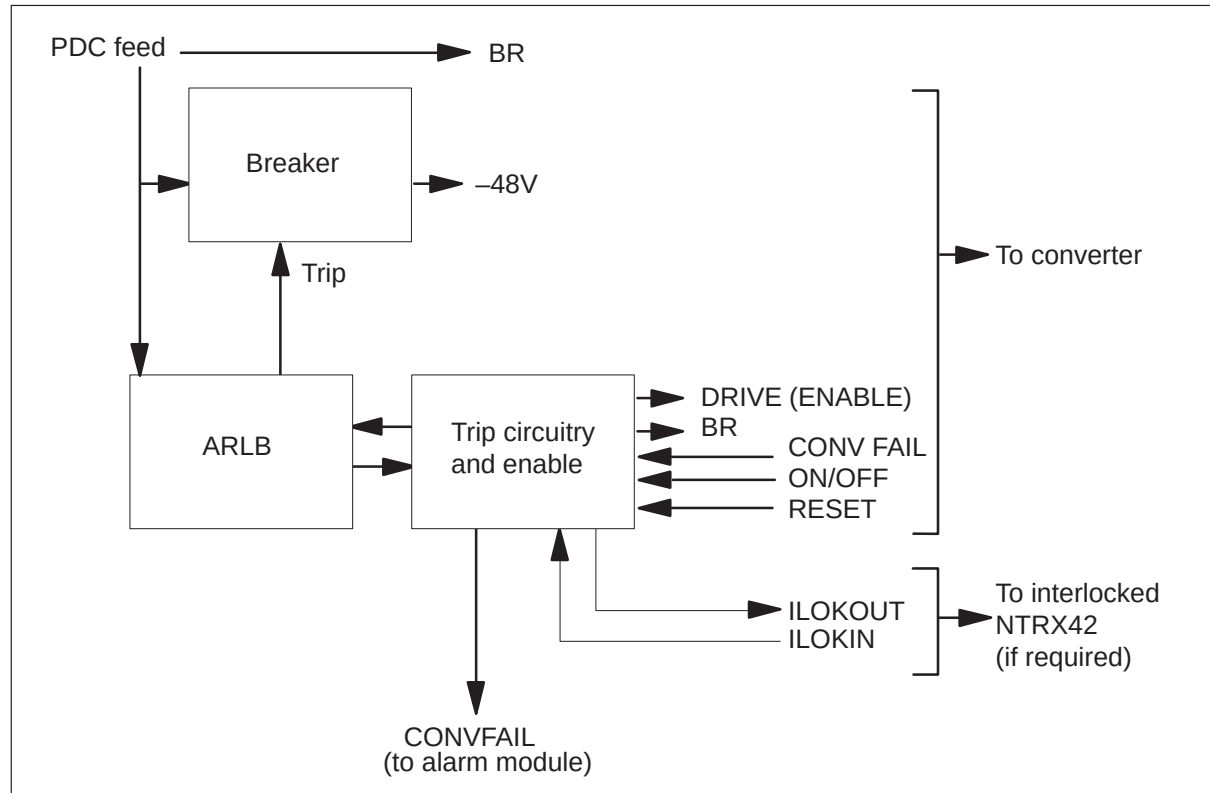
- monitors and detects converter failures
- trips breakers when overcurrent conditions are present
- trips breakers on converter failure
- provides termination points for PDC feeds
- provides battery feed samples for the alarm module
- responds to ARLB conditions

The NTRX42CA module has the following functional blocks:

- ARLB
- trip circuitry and enable
- breakers

The following figure shows the relationship among NTRX42CA functional blocks.

NTRX42CA functional blocks



Automatic recovery from low battery The breaker module sends the NT6L62AA ARLB hybrid a sample of each of the two input battery feeds. The ARLB provides two outputs to the NTRX42CA module. One output controls the two relays on each breaker module. When the sampled voltage falls below $-41.5V \pm 0.5V$, the relays power down to prevent a breaker trip. The relays remove the DRIVE or ENABLE signal that causes the converters to shut down. The battery voltage must rise above $-44.5V \pm 0.5V$ before the restart of the RESET relay.

Trip and enable circuitry An alarm relay release can trip the associated circuit breaker. This event occurs in response to alarm relay release in the associated power converter or RG. This circuit also provides the DRIVE or ENABLE signal for the converters that require the signal.

Breakers The two 20-A magnetic breakers are one over the other in this breaker module. The breakers operate in the -48V through -60V range.

Pins The following table shows card NTRX42CA pin-outs.

NTRX42CA output connector J1

Pin	Signal	Pin	Signal
1	-48VSW1	13	CONVFAIL2
2	Not used	14	ILOKIN
3	ON/OFF 1	15	DRIVE2
4	OEM ALM 1	16	Not used
5	OEM ALM 2	17	BAT RTN1
6	ON/OFF 2	18	BR1
7	Not used	19	RESET1
8	-48VSW2	20	CONVFAIL1
9	Not used	21	CONVFAIL2
10	DRIVE 1	22	RESET2
11	ILOKOUT	23	BR2
12	CONVFAIL 1	24	BAT RTN2

Power requirements Small input voltage is -48V or -60V. A range from -42V to -72V is acceptable. The maximum input current is 40A.

Output The following table shows NTRX42CA output specifications.

NTRX42CA output specifications

Parameter	Value
Voltage	-48V or -60V
High-voltage shutdown	-72V
Low-voltage shutdown	-42V
Maximum current	2 x 20A
Minimum current	0A

Fan power control module NTRX54BA

The fan power control (FPC) receives A- and B-feed inputs from the (cabinetized) power distribution center (C)PDC. The FPC provides a combined C-feed for the 48 Vdc fans and an alarm output. The card can operate at -48 Vdc and -60 Vdc input in a CO environment.

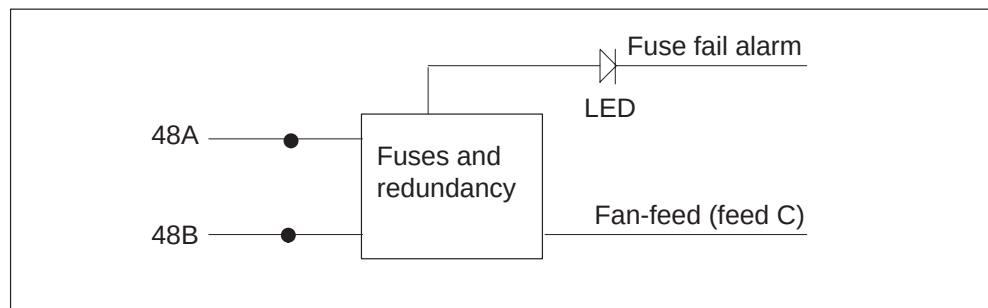
The card includes two fuse holders mounted on the faceplate that has 5-A fuses and an LED device. A captive screw, attached to the faceplate, provides positive retention and conductive coupling to the shelf.

Location The FPC card occupies the last two card positions in an MSP. The card is completely connectorized and provides A- and B-feed input and power/alarm output. The card provides the input through two 6.35 mm (0.25 in.) quick-connect plugs (A0381899). The card supplies power/alarm output through an 18-pin Positronics power-lock connector (A0380977).

The main function of the FPC card is to provide a small regulated 48V for fan operation. Features include the following:

- fuse failure alarm
- redundant feed operation

The following figure shows the relationship between NTRX54BA functional blocks.

NTRX54BA functional blocks

Combining feeds The unit of feeds A and B provides redundancy. If one of the feeds is not present, the other feed supplies the power.

Fuse failure alarm If a fuse failure occurs, an alarm indication appears.

Signaling The three connectors on the rear of the NTRX54BA module are as follows:

- the P1 input connector

- the P2 input connector
- the J1 output connector

The following three tables show the pin-outs of each connector.

The following table shows pin-outs of the P1 input (battery A) connector.

Power input (P1) connector

Connector number	Signal	Function	Description
P1/A, B	L – (A)	Input	-48 Vdc
P1/C, D	L + (A)	Input	BAT RTN

The following table shows pin-outs of the P2 input (battery B) connector.

Power input (P2) connector

Connector number	Signal	Function	Description
P2 /A, B	L – (B)	Input	-48 Vdc
P2 /C, D	L + (B)	Input	BAT RTN

The following table shows pin-outs of the J1 output (18-pin) connector.

18-pin output (J1) connector

Pin number	Signal	Function	Description
1–9	L – (FAN1)	Output	-48VDC
18	FAIL	Output	O/C – > BR through 3.0k and LED on output failure causes Frame Fail to alarm module
10–17	L + (FAN)	Output	BAT RTN from fans

Power requirements The following table lists input power requirements limits for the FPC card.

Power input requirement limits (A and B)

Alarm			
Signal	Norm	Minimum	Maximum
Voltage	-48Vdc	-39Vdc	-56Vdc
Current	1.5A		2.5A

The following table lists FPC card power output requirements limits.

Power output requirement limits (A and B)

Alarm			
Signal	Norm	Minimum	Maximum
Voltage	-48Vdc		-56Vdc
Current	1.5A	0.0A	3.0A

Environmental conditions The following table shows that the FPC card performs under limited environmental restrictions.

Ambient conditions

Condition	Operating range	Short-term range
Temperature	0°C to 50°C (32°F to 122°F)	N/A
Humidity	5% to 95%	N/A

Equipment dimensions The FPC card dimensions are 101.6 mm (4 in.) in height, 60.9 mm (2.4 in.) in width, and 254 mm (10 in.) in depth. The approximate weight is 0.68 kg (1.5 lb).

Remote center offshore #2

The RCO2 is the primary operations device for the RSC-S. The functional areas of the RCO2 include the following:

- cards
- speech and message paths in the RCO2

- routine exercise (REX) test
- switch of activity (SWACT)
- enhanced dynamic data sync (EDDS)
- the entrance and exit from emergency stand alone (ESA) mode
- an update static data (non-ESA)
- RTS of the RCO2

Note: The figure Functional block diagram of the RCO2 relates to the following description of the RCO2. The figure appears later in this section.

Cards

The following sections use the RCO2 cards:

- host communication
- processor
- speech bus
- peripheral communication

Host communication cards

These cards translate between the 16 host PCM-30 ports and the parallel speech bus. The RCO2 host communication cards include the Quad Frame Carrier (NTMX87) and the Enhanced Matrix (NTMX75).

The Quad Frame Carrier provides the following items:

- an interface between RSC-S peripherals, like remote line concentrating modules (RLCM)
- outside plant modules (OPM)
- collocated transmission equipment like channel banks

The Quad Frame Carrier can have a maximum of four packets that can be a dual PCM-30 (NTMX82AA) or a filler plate (NTMX83AA). The dual PCM-30 packets support the maintenance functions, features and performance counters that the NT6X50AB supplies.

The Enhanced Matrix NTMX75 card combines functions for RSC applications. Card NTMX75 combines the functions of the formatter card (NT6X72) with the time switch (NT6X44) used on the remote cluster controller (RCO2). The NTMX75 card does not block and does all the switching functions the RCO2 shelf and the extension shelf require. The card is a single-stage time switch with 2528 channels, both input and output. Any channel can switch to a free channel.

Input and output are two groups:

- one group contains 640 control side (C-side) channels, of which 128 channels are for service circuits
- one group contains 1888 peripheral side (P-side) channels

Processor cards

The RCO2 can have the Unified Processor (UP) card or the optional Cellular Access Processor (CAP) card. The CP card is a NTAX74 with 16 Mb memory. The UP card is a NTMX77 with 68020 CPU.

Note: When an RCO2 has the optional NTAX74 CAP card, the system does not support Peripheral/Remote Loader-16 (NT7X05) use.

NTMX77 Unified Processor The UP card controls RCO2 activities. The system consolidates memory associated with the UP to the card and provides 8Mbytes of memory. The memory can expand to 16Mb. The UP card provides electrically erasable programmable read-only memory (EEPROM). The UP card has also two FLASH EEPROMs, each a 256Kbyte programmable chip. To load firmware separately of RAM load on a manually-busied (ManB) RCO2 or a ManB RCO2 unit, use the following commands:

>LOADFW PM

or

>LOADFW UNIT unit_no

or

>LOADFW INACTIVE

The NTMX77 UP card increases real time and replaces several cards in each unit of the RCO2. This action reduces power use.

Note: The system requires NTMX77 to support NT7X05 functionality.

NTAX74AA (Cellular Access Processor card) The optional Cellular Access Processor (CAP) card is in slots 3 and 25 of the RCO2 shelf. The CAP card contains the NTAX74 motherboard and an NTNX4814 microcontroller subsystem (MCS) daughterboard. The MCS daughterboard has a 68040 processor and 16 Mbytes of memory to support downloadable firmware ability. The CAP card has direct read/write access to the following cards:

- the matrix card
- the SIGP card

- the EISP card
- the CMR card
- the UTR card
- the MSG card
- the CSM card

The NTAX74 card provides the following call processing functions:

- digit collection (pulse)
- channel assignment
- message processing

Real-time call processing functions include the following:

- delivery and receiving messages
- controlling the improved time switch
- supervising channels
- switching activity and reset control

Note: When an RCO2 includes the optional NTAX74 CAP card, the system does not support Peripheral/Remote Loader-16 (NT7X05).

The NTAX74 firmware can download independent of a RAM load on a ManB RCO2 or RCO2 unit. The following commands initiate this action:

>LOADFW PM

or

>LOADFW UNIT unit_no

or

>LOADFW INACTIVE

Speech bus cards

The speech bus is two speech buses. One speech bus sends XPCM to the C-side. The other speech bus receives RCPM at the P-side. The speech bus cards include the following:

- NT6X69
- NT6X92
- NTMX75
- NTMX73

- NTMX76
- NT6X78
- NT7X05

Note: The system only supports card NT7X05 when the RCO2 has the NTMX77 UP card. The system does not support NT7X05 when the RCO2 includes the optional NTAX74 CAP card.

The NT6X69 message and tone card provides an interface between the RCO2 and the central control (CC). The NT6X69 message and tone processes signaling and control message between the RCO2 and the CC. The NT6X69 card is packfilled during use of DMS-X protocol.

The NT6X92 card is available in both universal and global tone receiver versions.

ATTENTION

Do not install the Universal Tone Receiver (UTR) and Global Tone Receiver (GTR) on the same RCO2 unit. A method to which receiver interprets tones is not present at this time. Some call processing tones can degrade if designed for use with a GTR.

Universal tone receiver The UTR (NT6X92BB, BC, CA) identifies and processes the following tones in 32 channels on the parallel speech bus:

- DTMF
- MF
- MF-socotel
- CMF-forward and backward

Global tone receiver The GTR (NT6X92EA) identifies and processes the following tones in 64 channels on the parallel speech bus.

- DTMF
- MF
- MF-socotel
- CMF-forward and backward

The GTR card meets standards with the LATA switching systems general requirements (LSSGR) and the International Telegraph and Telephone Consultative Committee (CCITT). The GTR device is available as a replacement for all country and international versions of the UTR device.

The formatter card NT6X72 and time switch NT6X44 from the RCC are combined into one card. The two cards become the Enhanced Matrix NTMX75 on the RCO2.

The NTMX73 circuit card performs the following functions:

- supports all low-level signaling tasks
- provides the system clock
- replaces card types NT6X86, NT6X80 and NT6X28

Software that maintains synchronization with the network is also on the NTMX73 card. The NTMX73 circuit card provides the PCM-30 maintenance and the maintenance interface for the NTMX82 circuit card. The NTMX73 circuit card uses the straps at the backplane of the RCO2 shelf to distinguish between domestic and international environments. The NTMX73 card read-only memory (ROM) is identical in local and international applications.

The NTMX76 message and tone card is the interface between the UP card and a maximum of 32 data links. The card allows HDLC protocol with full duplex messaging, windowing, equal treatment and performance features, or DMS-X half duplex messaging. Message and tone card functions include the following:

- transmission and reception of DS30 control messages between nodes
- generation of ROM and RAM tones and transmission of the tones on a speech bus
- setup, maintenance and termination of calls
- confirmation of parity and PCM path accuracy

The NTMX76 card has direct communication with the following items:

- the UP card
- parallel buses
- the direct message link
- intermodule communication (IMC) links

Pack diagnostics allow the UP card to conduct several different levels of tests on the NTMX76 card. These tests are both destructive and not destructive.

Destructive tests are done from PMDEBUG device and include the following:

- Tone diagnostics

- Message tests
- Receive ASIC test
- Transmit ASIC test

Tests that are not destructive are HDLC tests. These tests include the following:

- Card presence
- Memory tests
- HDLC messaging system test
- IMC test

The NT6X78 custom local area signaling services (CLASS) modem resource (CMR) card supports calling number delivery.

The NT7X05 Peripheral/Remote Loader (PRL) cards provides local storage. The NT7X05 card stores XPM loads and images in a memory card that is not volatile and not mechanically-based.

Note: The system supports NT7X05 when the RCO2 has the NTMX77 UP card. The system does not support NT7X05 card when the RCO2 includes the optional NTAX74 CAP.

Peripheral/Remote Loader (PRL) allows the transfer of XPM software loads to the XPM. The system stores the XPM software loads in a close XPM unit while the unit is in-service (InSv). This action reduces XPM simplex time. This condition allows the replacement of a current loadfile with a newer loadfile. During the replacement, the last image remains available for recovery actions. The local storage mechanism is the NT7X05 circuit card. The improved LOADPM command instructs an XPM unit to load from the NT7X05 card to transfer software. The XPM unit must be ManB and uses the following parameters:

**>LOADPM [PM] LOCAL LOADFILE
[INACTIVE]
[UNIT]**

Peripheral loading improves with the use of imaging technology. Imaging changes that occur to restart survivable objects can be monitored in the XPM unit. This condition provides imaging control at a high level in the CM. Restart survivable objects are static data and codes that appear in the form of patches. In an InSv, active or inactive XPM unit, the PRL makes a copy of the NTMX77 RAM card. The PRL copies the image to the NT7X05 card. When the XPM must be reloaded, the image returns to the UP RAM card from the NT7X05 card.

When the XPM unit is InSv, the improved PM MAP level command LOADPM creates loadfiles on the NT7X05 card. The command creates loadfiles with the following parameters:

```
>XPMSTOR [PM] CC [load_file_name]
          [ACTIVE]
          [INACTIVE]
```

When installation of the NT7X05 card occurs, the loadfile is invalid. Operating company personnel must load the loadfile with the XPMSTOR parameter. The improved QUERYPM command with the new FILES option allows operating company personnel to view the state of files on the NT7X05 card.

Note: The load_file_name must be the name of the file entered in field LOAD in the RCCINV inventory table.

To view the state of files on the NT7X05 card, type

```
>QUERYPM FILES
and press the Enter key.
```

Example of a MAP response:

```
Unit 0:
  NT7X05 load File: ** Mismatch **
  NT7X05 Image File:
  CMR LOAD CMR03A
Unit 1:
  NT7X05 load File: ** Mismatch **
  NT7X05 Image File:
  CMR LOAD CMR03A
```

When loading is necessary, the CM determines if the NT7X05 card has data entries. If card NT7X05 is present, the following items transfer from the CM to the UP card:

- a software load called the recovery software loader (RSL)
- the name of the desired loadfile
- an indication if the operating company personnel must load the image or loadfile

The RSL software checks for the loadfile name on the NT7X05 card. If the load name test passes, the RSL software restores the image or load as instructed, to the UP card. The image/loadfile integrity check occurs as part of the restore/loading process to prevent delays that are not necessary. Delays occur when the file that is in the reload process is good. Operating company personnel can use the improved QUERYPM command to view the state of NT7X05 files

To view the state of the NT7X05 files, type

>QUERYPM FILES

and press the Enter key.

Example of a MAP response:

```
Unit 0:
  NT7X05 load File: KRI05AU
  NT7X05 Image File:
  CMR LOAD CMR05A
Unit 1:
  NT7X05 load File: KRI05AU
  NT7X05 Image File:
  CMR LOAD CMR05A
```

Note: Refer to the *Translations Guide* for NT7X05 entry requirements.

Peripheral communication cards

The following cards translate between the 54 P-side ports and the parallel speech bus:

- NTMX75
- NTMX87
- NTMX82
- NTMX74

For the NTMX75 card, the description under the host communication section also applies to the P-side.

The Quad Frame Carrier (NTMX87) card provides an interface between RSC-S peripherals and collocated transmission equipment like channel banks. The octal PCM-30 circuit card includes four dual PCM-30 packets (NTMX82). The dual PCM-30 packets provide and support all NT6X50 features and maintenance functions and all performance counters that NT6X50 supports.

The DS30A (NTMX74) card provides 32 DS30A links that terminate RSC-S line concentrating modules (LCM) and remote maintenance modules (RMM). The following figure shows a functional block diagram of the RCO2 unit.

Power converter NTMX72AA

The NTMX72AA power converters in slots 1 and 2 (unit 0) and 26 and 27 (unit 1) of the RCO2 main shelf receive -48V from office battery. The output voltages of the power converters are +5V, +12V and -12V.

The NTMX72 card provides:

- test jacks to check output voltages
- protects against overvoltage, undervoltage, overcurrent and over temperature
- detection of the condition of the D-channel handler power fuse
- a +5V monitoring circuit to check that the mate converter is in operation

Power converter NTMX72AB

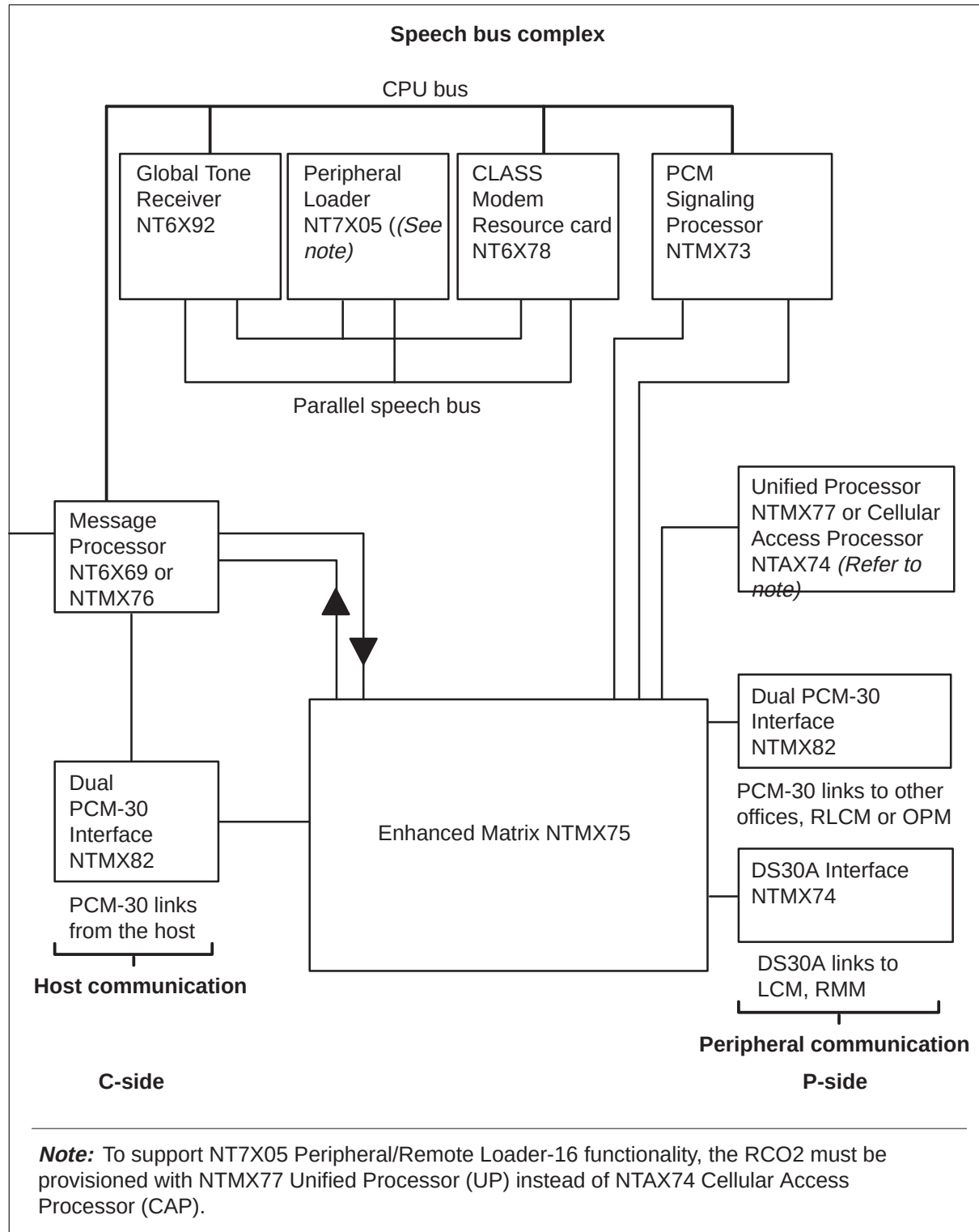
The NTMX72AB power converters in slots 1 and 2 (unit 0) and 26 and 27 (unit 1) of the RCO2 main shelf receive -48V from office battery. The power converters have output voltages of +5V, +12V and -12V.

The NTMX72AB card provides:

- active and fail indicators
- an automatic recovery from low battery (ARLB) circuit. Refer to the following note.
- protection against overvoltage, undervoltage and overcurrent
- detection of the condition of the D-channel handler power fuse
- a +5V monitor circuit to check that the mate converter is in operation
- support for -48V and -60V input voltages

Note: The ARLB circuit senses the input voltage. When the input voltage falls below the minimum specified operating level, the ARLB circuit signals the auxiliary power supply. The auxiliary power supply shuts down the converter. When the input voltage rises above the minimum startup level, the ARLB circuit enables the auxiliary supply, as follows

Functional block diagram of the RCO2



Each interface (I/F) chip on the NTMX74 card serves 4 DS30A links. A minimum of four must separate the message (MS) links during data entry for table LCMINV. This separation prevents a single chip failure that causes a T1 outage. The following chart shows the link-to-chip relationship.

DS30A link relationship

Chip number	DS30A link numbers
1	22, 23, 24, 25
2	26, 27, 28, 29
3	30, 31, 32, 33
4	34, 35, 36, 37
5	38, 39, 40, 41
6	42, 43, 44, 45
7	46, 47, 48, 49
8	50, 51, 52, 53

Speech and message paths in the RCO2

The parallel speech bus consists of a transmit bus and a receive bus. The voice and message paths connect the two RCO2 units in dual configuration from the RCO2 to the host.

Communication is necessary between the RCO2 units for the units to work. For example, the inactive unit can perform call processing actions if necessary. The RCO2 units communicate through the intermodule communication links (IMC).

Emergency stand-alone operation

Emergency stand-alone (ESA) operation provides maintenance operations and a minimum set of call processing activities on the RCO2. The ESA field in table RCCINV for the RCO2 must be set to Y to allow ESA operation ability.

The RCO2 communicates with the host through message links 0 and 2. If both message links fail, the RCO2 cannot communicate with the host and ESA operation begins. A loss of messaging to the CC or to the host can activate the ESA state in a RCO2 unit. When this condition occurs, an RCO2 can maintain synchronization with the network. This condition can activate ESA operation when a warm restart occurs and the CC does not respond to the message audit. The RCO2 normally enters ESA state because a complete loss of current links occurs.

Limits on call processing in ESA state are as follows:

- the system drops calls on secondary telephones of ISDN and MBS
- the system does not support warm ESA entries and exits of trunk calls
- the system does not support remote-off-remote
- billing operations during warm ESA entry or exit is not supported

During ESA operation, the system handles most intraswitched calls normally. Intraswitched calls include POTS and primary ISDN calls. The system drops netswitched calls that require CC interruption.

This activity applies to the incremental use required in the XPM03 Delivery Release Unit (DRU). The activity supports the same level of use on the RCO2 remote platform and supports NI-1 when the RCO2 unit is in ESA mode. The DRU provides the same level of NI-1 use during ESA state as on the North American RCS-S platform. This DRU support does not occur during an ESA Warm Entry/Exit. This condition is not currently supported on the RCO2 unit. The DRU also does not support a dual RCO2 configuration.

Entry into ESA state can be cold or warm. For a cold entry, the system drops all calls and loses all dial tones. For a warm entry, the system maintains established calls and drops all calls in a transient state. Feature AF5698 provides the RCO2 unit with ESA ability for warm entry and exit. Cold entry into ESA occurs only when a warm entry attempt fails.

When the RCO2 restarts C-side communications, an ESA exit occurs. An ESA exit can be cold or warm. The ESA exit has the same call processing limits as the ESA entry. Before the ESA, the RCO2 exit eliminates all calls that do not survive the ESA exit. The system holds all calls that originate during the ESA exit until the CC resumes call processing activities.

A warm exit attempts to perform an instant return to service (IRTS) on the active module. An IRTS is a modified version of RTS. A query also occurs on all subtending modules attached to the RCO2 unit. If the modules indicate operational status, the warm exit performs an IRTS. The IRTS process allows the RCO2 unit to exit ESA operation faster. The exit does not affect the active intraswitched calls. The warm ESA exit performs a normal RTS on the inactive module.

The CC controls the ESA exit process and determines the type of exit to perform. A warm ESA exit attempt on the active RCO2 unit can fail a cold exit. When this event occurs, a full RTS executes on the module. This condition occurs for all the subtending modules attached to the RCO2 unit.

A manual ESA exit can be performed in addition to the system-initiated ESA exit. Preservation of active calls has the highest priority in an ESA system exit. If a warm ESA exit attempt cannot complete, the module returns to ESA mode until the next system audit begins another attempt. The manual exit attempts to preserve call processing and gives the highest priority to the RTS of the module. If a warm exit is not possible, the system initiates a cold exit, with full RTS occurs. A loss of calls in progress occurs.

Switch of activity (SWACT)

In SWACT process, the two units of an RCO2 switch activity. The active unit becomes the inactive unit and the inactive unit becomes the active unit that performs call processing.

Controlled and uncontrolled SWACT The two types of SWACT are controlled and uncontrolled. The following actions implement controlled SWACTs:

- manual action, like the input of the SWACT command
- planned system requests, like the REX schedule
- a busy of the active unit while the inactive unit is in-service (InSv)

Controlled SWACTs can occur when both units are InSv or if the RCO2 unit is in-service trouble (ISTb). These conditions occur because of a previous REX failure.

The system implements uncontrolled SWACTs when a hardware fault or a trap in the active unit occurs. Examples of events that initiate uncontrolled SWACTs are as follows:

- power failure
- clock failure
- extension shelf failure
- power converter failure

Pre- and post-SWACT audits

Feature AN0538, a RCO2 Pre-SWACT/Post-SWACT Audit, improves the warm SWACT operation. Feature AN0538 denies the SWACT if the inactive unit cannot maintain activity or communicate with the CC unit. When these conditions occur, feature AN0538 gives the originally active unit the ability for a SWACT. The software that drives this feature is the SWACT controller in the CC and an autonomous ability added to RCO2 software.

SWACT controller

The system routes all manual requests and selected system requests for warm SWACTs to the SWACT controller in the CC unit. The SWACT controller searches PM diagnostic history data in the CC unit and in the RCO2 state data. The SWACT controller uses the data to deny the request for a warm SWACT or to allow a warm SWACT to proceed. During the SWACT, the newly inactive unit remains InSv and initiates a process to improve data structures that are not in stable states.

Pre-SWACT audit

Before the SWACT occurs, the active RCO2 unit performs the following actions:

- queries the mate RCO2 unit through intermodule communication (IMC) links
- messages the SWACT controller in the CC

Feature AN0538 improves the audit of the inactive unit from before the SWACT in the following actions:

- adjusts the SWACT audit to include the state of the unit during diagnostics
- assigns a weighted value to the results of the diagnostics

The result of the query before the SWACT audit is a boolean pass or fail.

The SWACT controller uses the MAP terminal to display the denial of a manual request for a warm SWACT. The MAP terminal displays a detailed reason for the denial. The MAP display informs the technician if the technician can use the SWACT FORCE command string to override the SWACT controller. An override of the SWACT controller produces a warm SWACT attempt without a search through diagnostic history or state data.

Post-SWACT audit

After a SWACT procedure, the system busies the inactive and performs RTS under the following conditions:

- two-way communication is available with the CC unit
- the new active unit can maintain activity

The previously active unit remains InSv until the newly active unit can perform the following actions:

- verify two-way communication with the CC
- verify the ability of the newly active unit to maintain activity

If communication fails or the newly active unit cannot maintain activity, the RCO2 performs a SWACT-back. The SWACT returns activity to the originally active unit.

SWACT-back

The originally active RCO2 unit can initiate the SWACT-back. This event occurs if the RCO2 does not receive an activity gain acknowledgement from the CC unit. During a SWACT-back procedure, the originally active unit attempts to gain activity again. The SWACT-back sets the inactive unit to SysB and performs an RTS. The active unit remains InSv. The system preserves stable calls from the originally active unit over the SWACT-back. The system drops all new calls that occur after the SWACT and before the SWACT-back procedures. If a SWACT-back procedure fails, the system sets both units of the RCO2 to SysB. The system performs an RTS on both units.

Note 1: The system does not initialize operational measurements and peg counts again after a SWACT-back.

Note 2: This feature is not supported during an RCO2 or a CC overload.

The following SWACT commands that the operating company personnel enters provide the SWACT-back ability:

- SWACT
- SWACT TST
- SWACT NOW
- SWACT ALL
- SWACT FORCE
- TST REX NOW
- BSY UNIT unit_no

where

unit_no is the number of the active unit

- BSY ACTIVE

Note: An REX test that the REX scheduler initiates includes the SWACT-back ability. For additional information on the link of this feature to REX tests, refer to Routine exercise test.

Updating static data (non-ESA)

The RCO2 must know the cards, ports, execs and terminals that are present. The RCO2 requires this static data to perform call processing and maintenance on the RCO2 and the subtending nodes. The static data is in tables. The data is called static data because the RCO2 does not change this data alone. The RCO2 uses dynamic data, like call processing connections, that activate when a call is set up.

If the system sets RCO2 peripheral module (PM) to SysB and performs an RTS, a download of static data to the RCO2 occurs.

Enhanced Dynamic Data Synchronization (EDDS)

Dynamic data describes the link and node states in the XPM necessary to support call processing. Node and link RTS or state alterations that external stimuli trigger normally set these states in the active unit of an XPM. These states move to the inactive XPM unit through the bulk and separate messages of the XPM data synchronization mechanism.

The EDDS device is a necessary component of a warm SWACT. A warm SWACT preserves call processing of ISDN and POTS calls. Warm SWACTs occur when the XPM active unit drops activity that an XPM trap, a REX test or other conditions cause. When the XPM drops activity, the XPM preserves call and unit states to continue calls without interruption. The inactive unit must be InSV for the completion of a warm SWACT procedure to occur.

Returning the RCO2 to service

An RCO2 is RTS when the following conditions occur:

- operating company personnel perform manual maintenance
- a system audit detects a defective component

When operating company personnel perform maintenance, a fault occurs. If this fault causes the RCO2 unit or PM to go SysB, the busy and test of the unit is normally necessary. When the operating company personnel find and repair or replace the defective component, an RTS is performed on the unit or PM.

If a system audit detects a defective component, the audit attempts to RTS the component.

The inactive unit can be out of service (OOS), manually busy (ManB), C-side busy (CBsy) or system busy (SysB). If this condition occurs, the following events occur during an RTS:

- the initialization of the inactive unit
- the OOS tests are run on the inactive unit
- the CM sends new static data and marks the inactive unit in-service trouble (ISTb). This action occurs when the inactive unit static data check calculation is not correct
- the active unit sends dynamic data to the inactive unit (bulk synchronization)
- the CM marks the inactive unit InSv.

Feature AF6436 provides EDDS and warm SWACT abilities for ISDN basic rate interface (BRI) calls on the RCO2 unit.

Performing an RTS without running diagnostics

The use of the FORCE parameter with the RTS command prevents performance of ROM diagnostics.

**Caution**

Use the FORCE parameter only if directed.

Do not use the FORCE parameter unless directed. Diagnostics that are normally part of the RTS command can find an additional fault.

For example, to return unit 0 of a PM to service, type:

>RTS UNIT 0 FORCE

and press the Enter key.

The MAP terminal displays following sequence:

```
ROM/RAM query
/Clear data
Initializing
/Static Data
Loading:Execs
Initializing
ESA Data Load
```

A dynamic data synchronization occurs, once the synchronization is complete, the unit is RTS.

Fault conditions

The next section in this chapter discusses fault conditions. Automatic maintenance detects fault conditions. This section describes fault conditions for the RSC-S by configuration.

RCO2

Fault conditions for the RCO2 include errors that occur on the processor cards. Fault conditions for the RC02 include errors that do not occur on the processor cards.

The following errors can occur in the RCO2 processor cards:

- parity faults
- traps
- software errors (SWERR)

Parity faults

In most instances, if the system detects a parity fault, the fault can be corrected without loss of service. This section provides information on the types of parity faults. This section provides a summary of the actions the CM takes to handle parity faults. This section also provides the actions operating company personnel should take.

A parity fault indicates a memory integrity fault. If the code that executes, encounters a fault, the CPM is insane. The CPM must drop activity and go out-of-service. The start of an interrupt instead of a bus error, causes the parity audit to identify memory faults. This condition occurs before code execution hits them. The CC handles parity faults so that the system can perform an RTS quickly.

There are three types of parity faults:

- Intermittent faults occur when the system detects a fault but cannot find an error when the RCO2 reads the location again.
- Soft faults occur when the system detects a parity error. The system finds an error when the RCO2 reads the location again. The system does not find an error when the RCO2 writes to the location. The error can occur in the program store or the memory store.
- Hard faults occur when the RCO2 detects a fault and cannot read again or write to the memory location.

When a parity fault occurs, the CM determines the action to perform on the RCO2 unit. The action of the CM depends on the status of the unit that reports the fault. The unit that reports the fault is active or inactive. The same CM handles all three types of faults.

The CM detects a parity fault in the active unit of the RCO2. The CM sets the unit ISTb with a reason of parity. The CM will recover the unit during a maintenance window. The maintenance window to recover a parity fault on the active unit is the XPM REX test window. The time for the XPM REX test window must be the same as the current time of the switch. An audit checks that the active unit of the XPM has an ISTb of parity. If an ISTb exists, the CM will SWACT and reload the RCO2 if no dependencies exist. This action will clear the ISTb parity fault and the short term failure (STF) parity fault peg and resolve the parity fault in the RCO2.

The active unit reports the parity fault. The system generates a PM181 log to notify operating company personnel of the problem. The CM can start a SWACT of the XPM to recover from the fault. The CM can load the new inactive unit to recover from the fault. The CM loads the unit with the XPM software load defined in the corresponding inventory table. The CM considers this load action an autoload. A manual or CM or mate reload of the XPM software to the affected unit clears the ISTb.

The CM does not permit REX tests on:

- a P-side or C-side node of the RCO2 that is in the process of recovery from a parity fault
- the RCO2 if a P-side or C-side node is in the process of recovery from a parity fault

The CM does not allow two XPMs in the same configuration to perform a parity load again. A P-side node cannot perform a parity load again at the same time as the C-side node of the XPM. A C-side parity load again cannot occur at the same time as P-side node of the XPM. This limit makes sure that only one XPM in a configuration is in simplex at a time.

The CM informs operating company personnel of a parity fault through PM181 log reports. This log is the primary trouble indicator. Operating company personnel can check for associated logs, like the PM128. These logs can help operating company personnel to understand the actions the CM takes. This section provides examples of the messages associated with the PM181 and PM128 logs.

The RCO2 unit can be ISTB with more than one reason at the same time. A QUERYPM FLT at the MAP level can display reasons for all present, not cleared, ISTbs.

Hard parity fault The active unit of the RCO2 can report a hard parity fault to the CM. When this event occurs the system generates a PM181 log. This log provides operating company personnel with the following information:

- when a parity fault occurs on the active unit, and the system sets the unit to ISTb
- when the unit the CM loads again, during the next XPM REX test window

Perform a manual SWACT and reload to clear the ISTb and the parity fault.

An example of log report PM181 follows:

```
PM181 JUL23 23:29:16 7700 INFO RCO2 0 Unit 0
Node: Istb, Unit0 Inact: ISTb, Unit1 Act: ISTb
Parity audit has detected a hard parity fault.
The system will autoloading the unit during the next
XPM REX test window.
Monitor the system for maintenance and recovery.
Site Flr RPos Bay_id Shf Description Slot EqPEC
RAL1 00 C05 CRSC 00 18 RCO2 : 000 3 AX74
```

When a unit changes state to ISTb of UP RAM parity fault, the system generates log report PM128. This log notifies operating company personnel that the unit changed status.

An example of log report PM128 follows:

```
*PM128 MAY09 09:49:56 9000 TBL ISTB RCO2 1
Node: ISTb (Unit ISTb)
Unit0 Inact: InSv
Unit1 Act: ISTb (UP RAM Parity)
```


Use the command string QUERYPM FLT to display the faults on a posted RCO2. The MAP response in the following example shows that unit 1 of the posted RCO2 has a hard parity fault.

```
>querypm flt
Node is ISTb
    One or both Units inservice trouble
Unit 0
    no fault exists
Unit 1
    The following inservice troubles exists:
    Parity audit has detected a hard parity fault.
    A reload is required to clear this fault.
    The system will autoloading this unit during the next
    XPM REX test window.
```

Action by the CM: The CM SWACTs and reloads the RCO2 during the next XPM REX test window. After the RCO2 reloads, the ISTb fault clears.

User action: There is no action required by operating company personnel. Operating company personnel can initiate a manual SWACT and reload to clear the parity fault.

Parity fault handler improvements

The Parity Improvements feature gives the CPM the ability to collect and report additional information on parity trap faults. This feature allows the parity audit to provide more information. This new information includes the address of the fault, and indicates if the fault is in code. This feature updates interfaces to the log (PM189) and trap (PM185) reports to include this new information. The Parity Improvements feature depends on features AF5682 XPM Code Protection, and AF5680 XPM Exception Traceback improvements.

Feature AN0741 provides the following improvements to handle parity faults:

- unify the parity audit and parity trap handlers
- improve the data the new handler captures and saves to
 - use the information stored in the card status register (SR)
 - localize the parity fault to an exact byte address
 - perform hard/soft/intermittent fault categorization
 - query to determine if the fault is in code
- update interfaces to the PM189 and PM185 log report systems, to include the new information

Parity interrupt handler

The function of the interrupt handler is to generate data on a memory fault. The interrupt handler stores data for reports and action. The following are the requirements for this function:

- Define a single entry point that can be bound as an interrupt handler.
- Be continuously available. Correctly handle interrupts that start from the time the function is bound.
- Be able to distinguish between two conditions. The system can raise an interrupt if entry occurs from parity audit or does not occur from parity audit.
- Localize the fault to an exact byte address.
- Perform low-level catalog functions of the fault (hard/soft/intermittent) that do not depend on the interrupt source.
- Determine if the fault address is in code space or is not in code space.
- Leave the fault indication in place if the fault is not corrected.
- Save the fault data according to where the interrupt originates.
- Exit the handler according to where the interrupt originates.

XPM Code Protection (AF5682)

The parity audit process examines both protected and not protected memory areas. Feature AF5682 allows maintenance personnel to write to a write-protected memory area. Feature AF5682 allows for pattern tests on a parity fault byte in protected space. The AF5682 allows a query if a specified physical address lies in loaded code. The parity exception handler can initiate the most immediate recovery process. To perform this action the parity exception handler must determine if the parity fault occurs in execution space.

The parity audit process examines both protected and not protected memory areas. Feature AF5682 allows the user to write to a write-protected memory area. This feature allows for pattern tests on a parity fault location byte. AF5682 allows a check to determine if a given physical address lies in loaded code. The parity exception handler determines if the parity fault occurred in execution space. This action allows the parity exception handler to initiate the most immediate recovery process.

Memory allocation (AF5391)

Feature AF5391 provides more flexibility in memory utilization to address memory management issues. This flexibility protects code and critical data from damage by software that is not controlled, and reduces the risk of outages.

This feature allocates protected memory for patches that can have protection when memory is not available. If the protected memory allocation fails, not protected memory can store the patch. When possible, local patches must be in memory that is not DMA. The unified processor (UP) receives an allocation of more memory that is not DMA.

System component interactions

System components can interact with the exception processing system to recover from error exceptions. System components can interact with the exception processing system to report and display information about error exceptions. The following is a list of these components:

- CC
- PMDEBUG
- local maintenance (XPM maintenance)

If the system detects a fatal error the system initiates local maintenance action. The local maintenance action drops activity for the active unit only and resets or starts the unit again. If the XPM unit is InSv, the XPM unit reports exception errors to the CC in the form of unsolicited messages. The XPM generates a report for each not reported exception in the trap buffer. The CC receives the report and acknowledges the message. The CC logs into PMDEBUG to extract the exception information to generate a PM185 log report. The PMDEBUG provides the ability to view and delete exceptions data from the trap buffer at the task level.

Exception recovery action

Exception recovery consists of three different operations:

- severity (fatal or can recover)
- process fatal trap
- recover task (not fatal trap)

When the recovery process is complete, the system notifies the exception report system that new trap data is available. Exception handling is complete. The recovery process sets the trapped task for recovery. The recovery process allows the task to resume. The recovery process can initiate a maintenance action to start the unit again or reset the unit.

If the trap is not fatal, the system restores the selected task to a point of execution. This point of execution allows the task to restore to a known state. The process of recovery does not restart the task. The process of recovery forces the task to perform a many level exit back to the task mainline. The task recovery model specifies that a task provide a mainline. A mainline is a do-forever loop that only calls the main body of the steady state code. The mainline follows the steady state code with an optional call to a recovery procedure. When the task resumes after a trap that can recover, the system forces the task to return to the next instruction. The system forces the task to return to the next instruction that follows the call to the main body of code. The next instruction must be a call to a recovery procedure. The recovery procedure indicates to the task that the task has a fault. The task uses the recovery procedure to take recovery action or a branch back to the start of the loop.

An enhancement to exception recovery involves the Direct Memory Access Memory Management Unit (NTMX77 DMA MMU). Attempts to recover from an NTMX77 DMA MMU error require special action. Before this feature, the exception processing system convicted the interrupted task when a DMA MMU error occurred. The system selects the task. This event occurs if the software on NTMX77 did not cause the error. An MMU error is not always fatal. The type of task that the system selects determines if the error is fatal. The results of the fatal evaluation depend on the trapped task.

The processor that causes the fault does not register that the problem occurs. If the access is for a read from the NTMX77 memory, the external processor receives invalid data. If the access is to write to NTMX77 memory, the system does not write to memory. The trap is fatal. The system initiates maintenance action to restart or reset the unit.

System component interactions

System components can interact with the exception processing system to recover from error exceptions. System components can interact with the processing system to report and display information. These components interact with the following error exceptions:

- CC
- PMDEBUG
- local maintenance (XPM maintenance)

If the system detects a fatal error, the system initiates local maintenance action. The maintenance action drops activity for the active unit only and resets or starts the unit again. When the XPM unit is InSv, the XPM reports exception errors to the CC. The error messages are in the form of unsolicited messages. The XPM generates a report for each exception that is not reported in the trap buffer. The CC receives the report and acknowledges the message. The CC logs into PMDEBUG to extract the exception information to generate a PM185 log report. The PMDEBUG provides the ability to view and delete exceptions data from the trap buffer at the task level.

Exception Traceback Enhancements (AF5680)

An exception is a special condition at either the ROM or TASK level that preempts normal processing. Internal and external conditions can cause exceptions. Task-level exception processing reports critical information on hardware and software states. Task-level exception processing reports when a hardware or software fault prevents normal operation of the CPM unit. The process restores the task to a known point of execution and allows the task to perform recovery actions. If recovery is not possible, task-level exception processing initiates local maintenance. Local maintenance starts the CPM unit again or resets the CPM unit.

Traps (XPM exception handling)

Feature AF5680, XPM Processing System Enhancements, provides improvements in exception handling and in exception services. Exception handling includes the following activities:

- trap detection
- trap data capture
- recovery action

Exception services includes the following activities:

- trap administration
- trap reporting
- trap data access and display

Exceptions

An exception is a special condition at the ROM or TASK level that preempts normal processing. Both internal and external conditions can cause exceptions.

The following internal conditions can cause an exception:

- not permitted instructions
- address errors
- tracing
- breakpoints
- coprocessor protocol violations

The following external conditions can cause an exception:

- interrupts from external devices
- bus errors
- coprocessor-detected errors
- resets

ROM-level exception processing

On initialization, the firmware maps all vectors to local exception handlers to provide the following:

- minimal error records and reports
- establishment of a bootstrap environment
- debugging of utilities
- hardware abstraction

Task-level exception processing

Task-level exception processing reports critical information on hardware and software states. Task-level exception processing generates when a hardware or software fault prevents normal operation of the XPM unit. The process restores the task to a known point of execution and allows the task to perform recovery actions. If recovery is not possible, the task-level exception processing initiates local maintenance. Local maintenance starts the XPM unit again or resets the XPM unit.

Exception data structure improvements

The processing system data structure supports the following:

- a task to eliminate loss of trap data when multiple traps are present in a 10-second period
- accurate capture of trap-specific data
- guaranteed preservation of trap data over restarts and reloads
- capture of both supervisor and user stacks at exception time
- circular buffer management at exception time
- enhanced trap administration functions
- expanded trap-specific error information to accommodate parity fault requirements
- exception processing system that reports parity faults to the parity audit instead of the central control (CC)
- a save of the trap system version for each trap

XPM exception usage

In the XPM, exceptions indicate error conditions for faults that must receive service. In the XPM, exceptions also indicate normal interrupts that do not have errors that indicate types of work that the CPU must perform.

The following examples are normal event XPM exceptions:

- 10-ms clock tick
- message frame pulse
- UART transmit and receive
- trap instructions (software interrupt)
- activity gain
- reset

The following table describes XPM exceptions. These XPM exceptions are error conditions and require service.

XPM error type and description

Type	Fatal	Description
1	No	Value range error
2	No	Segment not present
3	No	Exit erom not called procedure
4	No	Stack overflow
5	No	Floating point
6	No	Division by zero
7	No	Nil pointer reference
8	No	<Not Used>
9	No	<Not Used>
10	No	I/O Error - Result of system procedure IOCHECK
11	No	String
12	No	String indexing
13	No	Set error
14	No	Bad CSP (not implemented standard procedure)
15	Yes	Bad P-code instruction
16	No	Task error
17	Yes	Request for Reset – Trap 7
—continued—		

XPM error type and description (continued)

Type	Fatal	Description
18	No	<Not Used>
19	Yes	Parity error
20	No	Addressing error
21	No	Not permitted instruction
22	Yes	Not correct interrupt
23	No	Bus error
24	No	MMU – error
25	No	<Not Used>
26	No	Privilege violation
27	Yes	Sanity time-out
—end—		

System component interactions

The following system components interact with the XPM exception processing system. The components interact with the XPM to recover from error exceptions and to report and display information about error exceptions:

- CC
- PMDEBUG
- local maintenance (XPM maintenance)

If the system detects a fatal error, the system initiates local maintenance action to drop activity. Local maintenance action drops activity for the active unit only, and resets or starts the unit again. When the XPM unit is InSv, the XPM reports exception errors to the CC. The exception errors are in the form of unsolicited messages. The XPM generates a report for each exception not reported in the trap buffer. The CC receives the report and acknowledges the message. The CC logs into PMDEBUG to extract the exception information, and generates a PM185 log report. The PMDEBUG provides the ability to view and delete exceptions data from the trap buffer at the task level. Changes are made in the display routines to reflect data capture differences for required improvements. The following figure shows an example of the PMDEBUG debug TRAPINFO level display. At the ROM level, exception data applies as a hex dump only.

Example exception display with required improvements

```
Ram Load name = NLT02WY
MP rom name= XPMRKA03, SP rom name = XPMRKA03
trap in MP : Div by 0
Trap was Recoverable. Unit was Active/Busy
Task: BASEMON 0009 0009 Trap Sequence #: 1 Current load
PP Time : 00:00:22:04.70
Occurred at : 001951DF DEBUG 21 DOZER0DI 115 Offset: #21
Called from : 000D8A80 BASEMON 18 TDRIVB0D 30 Offset: #228
000D8B8C BASEMON 18 TERMDRIV 11 Offset: #18
PC:000010AA SR=2100 US=0001FEB2 SS=001ABFF6 TCB=0001F00C
D0 =0000FFFF D1 =00090000 D2 =FFFF0101 D3 =0000FF00
D4 =000100FF D5 =FFFF0009 D6 =00000B0D D7 =001A0000
A0 =0001F924 A1 =0001F92C A2 =0001FEB2 A3 =001951DF
A4 =000A6F6E A5 =0001FEC2 A6 =000F9BC2 A7 =001ABFF6
System Stack
0017ABFF6: 0004 0000 0006 0001 F00c 000A 000A 0998
0017AC006: 0004 0000 0006 0001 F00c 000A 000A 0998
User Stack:
0001FEB2: 0004 0000 0006 0001 F00c 000A 000A 0998
0001FEC2: 0004 0000 0006 0001 F00c 000A 000A 0998
0001FED2: 0004 0000 0006 0001 F00c 000A 000A 0998
```

Errors not only for processor cards

The following error types are not only for processor cards of the RCO2:

- static data mismatch faults
- intermodule communication faults

Static data is data that defines the RSC-S configuration and does not change as the system connects and disconnects. When the static data in the host and the RCO2 does not match, data corruption can result. One possible result of mismatch can cause the host to consider a line is present. The RCO2 does not recognize the line as present. This mismatch causes a loss of calls.

Two RCO2 units cannot always communicate with each other because of intermodule communication faults. If this event occurs warm SWACT cannot occur. A warm SWACT cannot occur because one unit does not sense the data the other unit processes.

Dual RCO2

The DRCO2 is available in a future release. The main fault that can occur in DRCO2 involves damage of the interlinks. When this fault occurs over the messaging interlinks (0 and 8), the peripherals cannot communicate and interswitched calls cannot occur.

RCO2 with ISDN

The RCO2 with ISDN can have the same faults as the RCO2 without ISDN. The RCO2 cannot always send and receive data packets and call control messages. Most RCO2 problems deal with how the (E)DCH card functions.

Automatic maintenance

This section describes how audits and system actions identify the fault conditions. The system can prepare to adjust the fault, or the system can produce a log that identifies the problem.

This section describes the REX and SWACT process. This section describes the audits and system actions that identify fault conditions in terms of RSC-S components.

Routine exercise test (REX)

A REX test includes a series of tests performed on an XPM unit. The system schedules initiates REX tests. Operating company personnel can also initiate REX tests. The REX test combines the diagnostic and functional routines available on XPMs. The four classes of REX test follows:

- not performed
- passed
- failed
- aborted by manual action

Note: The system can abort the tests if the start of a maintenance action occurs with the FORCE parameter or the ABTK command. The system can abort the test if the start of maintenance action occurs from another MAP terminal with the XPM posted.

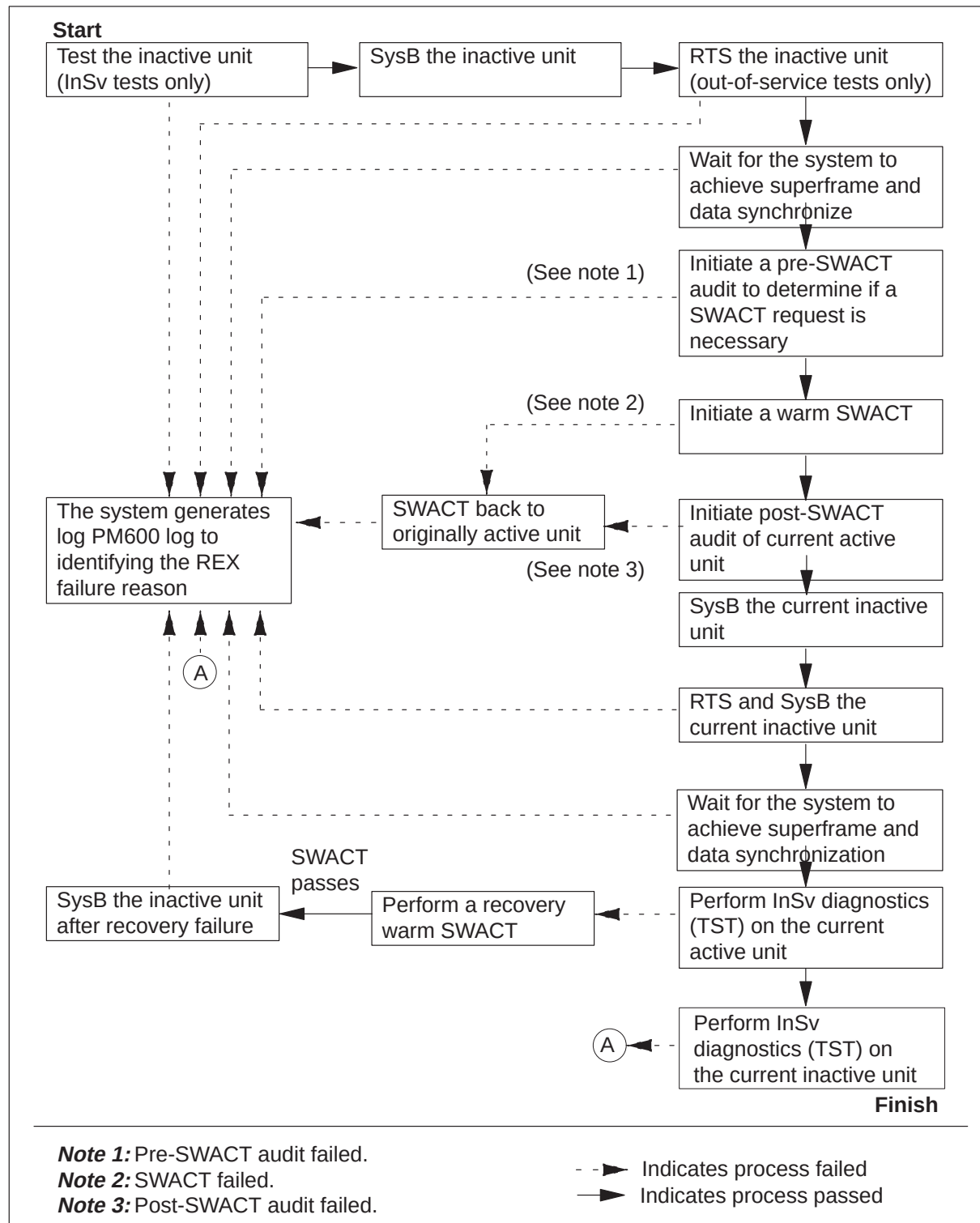
All four classes generate a log or display a message at the MAP terminal. Only passed and failed REX tests are stored in the maintenance record. Failure reasons are available only for failed REX tests.

The REX state machine (or controller) performs the following events.

- 1 Tests the inactive unit (includes InSv tests only).
- 2 System busies the inactive unit.
- 3 Returns the inactive unit to service (for out-of-service [OOS] tests only).
- 4 Waits for the system to achieve superframe and data sync.
- 5 Performs a pre-SWACT audit.
- 6 Performs a warm SWACT.
- 7 Maintains call processing capability on the unit that was active.
- 8 Performs a post-SWACT audit.
- 9 If necessary, SWACTs back to the previously active unit.
- 10 System busies the unit that is now inactive.
- 11 Returns the inactive unit to service.
- 12 Waits for the system to achieve superframe and data sync.
- 13 Run InSv diagnostics (TST) on the current active unit.
- 14 Run InSv diagnostics (TST) on the inactive unit.

The following figure shows REX state machine (controller) actions.

REX state machine actions



REX

Both units must be InSv for the REX sequence to run. The REX test does not run under the following conditions:

- Warm SWACT is not turned on for the PM.
- One unit is SysB and the PM is ISTb.
- Both units are SysB and the PM is SysB.
- The PM is in overload.
- The PM is ISTb.

Note: If the PM is ISTb because of a REX test that occurred earlier, the REX test runs again.

The TST REX NOW command can cause the REX test to abort. If this test aborts, the system returns a message. This message notifies operating company personnel why the REX test ends. If this event does not occur the system generates a PM181 log. This log notifies operating company personnel why the REX test ends.

The system generates a PM600 log if a REX test fails. The PM600 log initiates a major alarm for the XPM that fails the REX test. The major alarm appears at the MAP terminal under the PM banner at the top of the display.

If an InSv or OOS diagnostic test fails, the REX failure reason includes a mnemonic (an easy-to-remember abbreviation). The mnemonic is for the diagnostic that fails and the unit that fails (0 or 1).

The PM600 log details the start time of the steps that the REX test executes. The PM600 details the unit the REX step affects and the failure reason. The REX initiates specified steps as a result of the failure. After the failed step these steps are recovery actions. The REX includes these steps in the log. The system includes the unit number if the REX action is unit-specific (BSY unit, RTS unit, TST unit, sync). The system does not include the unit number if the REX is an action affecting the node. Examples of actions that affect the node are SWACT and BSY both units. The additional log data consists of a card list and a mnemonic of the failed diagnostic.

The QUERYPM command and QUERYPM FLT and TST REXCOV QUERY command strings contain information about the last REX. Manually and system-initiated REXs store and display a new date/time and status (passed/failed) in the REX maintenance record. The passed status means the REX completes with no errors. The failed status means the REX does not complete because of an error. The QUERY PM and TST REX QUERY command strings to display the REX test status. If the REX fails, the user performs a manual RTS, a manual REX, or an automated REX. These actions return the XPM to service from ISTb.

A stored REX maintenance record for each XPM is available. The maintenance record contains the following information:

- the REX scheduler, if the XPM is in the system
- date and time and result (passed/failed) of the last REX
- failure reason, diagnostics failures, and a list of defective cards, if the last REX fails
- date and time of earlier REX that failed
- date and time of first REX that passes after an earlier REX fails

The REX tests have the following limits:

- The system REX controller runs REX on one XPM at a time if the office uses the NT-40 processor. SuperNode supports REX tests for a maximum of ten XPMs at the same time with the same REX test class.
- A maximum of four LCM_REX_TESTs can run together, if the system does not run a REX test on the HOST XPM.
- The SREX scheduler schedules separate LCM_REXCOV tests of the converter and ringing voltages in LCM.
- The REX can run if the node is InSv or ISTb because a REX fails. The REX can run if the node is ISTb because P-side PCM-30 links are OOS.
- If a warm SWACT is not possible, the REX stops.
- After a REX completes, the SWACT creates a new active unit.
- If a restart occurs while REX is in progress, the system does not generate the PM600 log. The system does not generate the PM600 log because the start again de-allocates the temporary data store. The temporary data store is necessary to build the PM600 log.
- SWACT controller override is not provided for manual REX.

REX test state machine interface to the pre- and post-SWACT audits

The REX state machine (or controller):

- calls the pre-SWACT audit and messages the other unit. The system performs a warm SWACT if the audit passes.
- accounts for SWACT denial and failure reasons
- stops a REX test if the system denies a SWACT
- stops a REX test if a SWACT-back occurs. The active XPM unit does not change from the time the REX test begins. The REX performs recovery. A BSY and an RTS of the inactive unit comprise the recovery.
- displays the reason for a SWACT denial or failure performed during a manual REX at the MAP terminal as REX failed. To obtain the detailed reason the REX fails for the posted XPM, type

>TST REX QUERY

or

>TST REXCOV QUERY

The system generates a PM600 log report to identify the REX failure reason.

System REX Controller:XPM Maintenance

Feature AF3771 is the System REX Controller for XPM Maintenance. This feature provides the SuperNode switch with an S/DMS System REX test (SREX) controller. The SREX controller coordinates all the system REX tests under a common REX scheduler. This feature allows RSC-S REX tests to run while other REX tests run. The SREX controller allows REX tests to test the whole switch in less time. The REX tests include all peripherals, like the RSC-S. Feature AF3771 helps to find and resolve REX test failures earlier. This action helps to reduce outages in the field.

The SREX controller also allows operating company personnel to perform the following actions:

- change the order in which the REX tests peripherals
- coordinate between manual and automatic REX tests
- receive alarms for the RSC-S not being REXed in a time limit set, with table REXSCHED

The SREX scheduler permits the user to enter the CI-level command REXTEST and the following parameters:

- SUSPEND, which suspends REX tests for one maintenance window. A maintenance window is the time between the REX START and STOP times entered in table OFCVAR under the NODEREXCONTROL parameter.
- RESUME, which resumes a REX test after SUSPEND suspends a REX test
- QUERY, which returns the status of the REX test (active or suspended)
- HELP, which returns a short description of the REX test

Note: The maximum number of XPM REX tests of each type that can be run at the same time is ten.

The REX test order for feature AF3771 is critical nodes first, like CM and MS. The number of days from the last system or manual REX test occurs second. The order of internal PM (RSC-S) number occurs third.

Table REXSCHED must contain data to establish the REX schedule for the RSC-S. This table contains the information the REX coordinator requires to schedule the tests according to operating company specifications. Data entered in table REXSCHED can disable the REX test. For more information on table REXSCHED, see the data schema section of the *Translations Guide*.

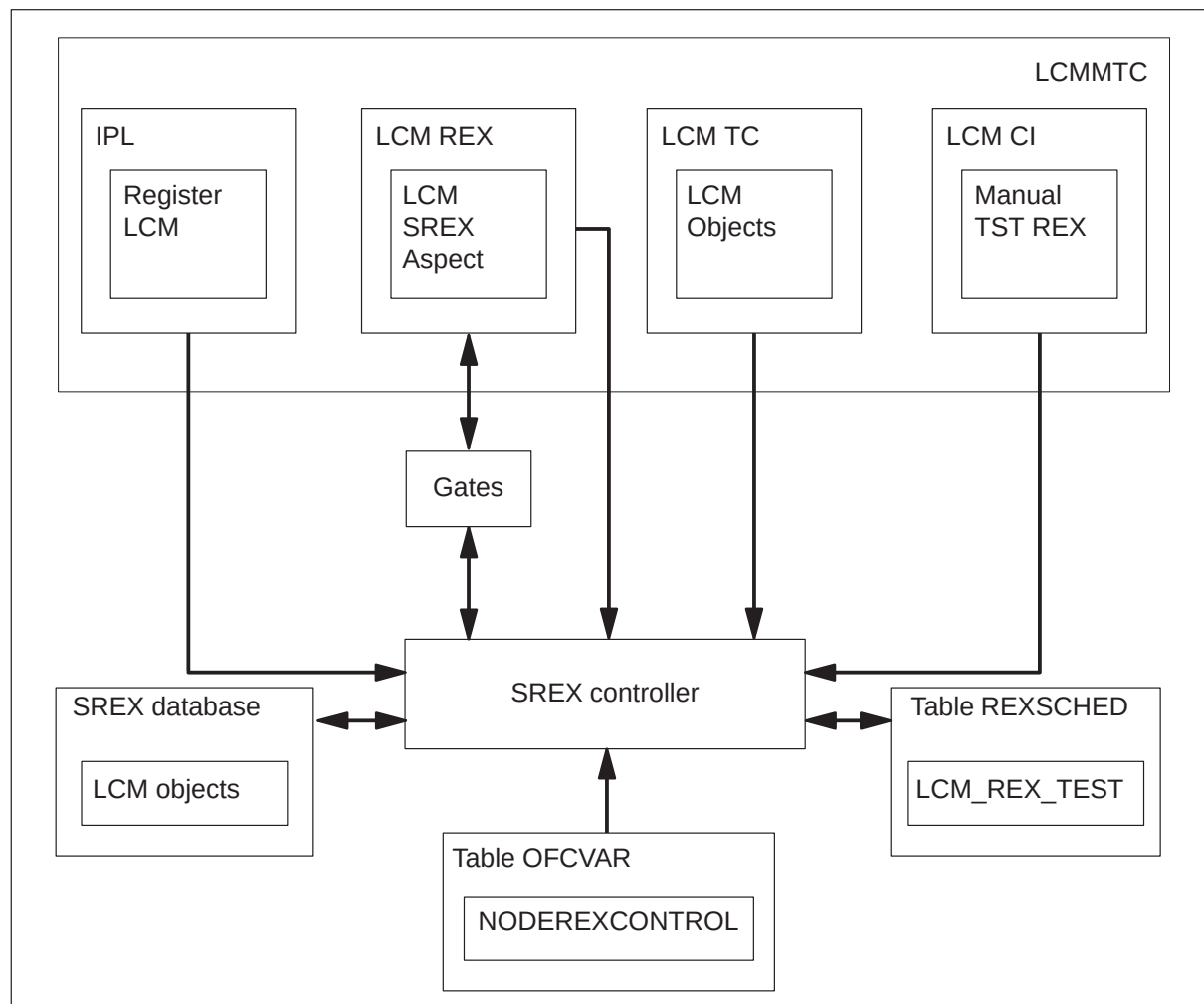
The system generates report IOAU112 for LCMs if one or more of the following occur:

- the REX test does not run on the LCM for more than seven days
- the REX test takes longer than specified
- the system is not able to start the REX test after a specified number of attempts

Extended line concentrating module (LCM) REX test results

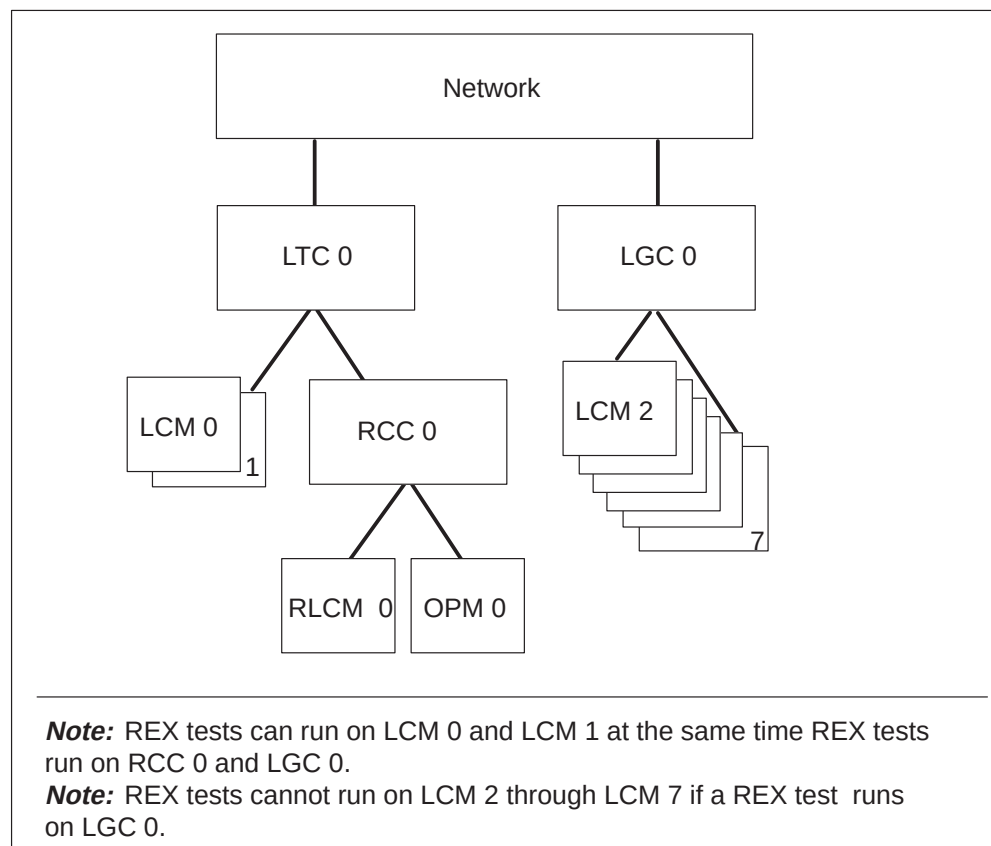
Table REXSCHED controls the scheduling of system REX (SREX) tests for LCMs. The LCM_REX_TEST task SREX can run together in multiples of four. The LCM_REX_TEST task SREX can run along side of REX tests of XPMs. The LGC, LTC, and the RCC XPMs can be hosts to LCMs. An XPM scheduled for a REX test that hosts an LCM scheduled for a REX test can cause a schedule conflict.

To avoid conflicts, the SREX controls schedules all REX tests of XPMs and LCMs that run at the same time. The LCM SREX subsystem registers the LCM_REX_TEST class and identifies requirements with other REX_TEST types during initial program load (IPL). As LCM nodes are added to the SREX database, the controller automatically enters data with defaults in table REXSCHED.

SREX system dependencies

The converter voltage and ring test parts of the LCM_REX_TEST require wait states and test resources. These states and resources cause delays that are not acceptable in SREX main task execution. The LCMCOV_REX_TEST, runs at a lower priority. The LCMCOV_REX_TEST runs these tests separately from the LCM_REX_TEST. The LCMCOV_REX_TEST requires logical test unit (LTU) connections in the maintenance line card. An LCM unit can access the single LTU when the other unit is out of service. This resource limit does not allow separate LCMCOV_REX_TESTS to run at the same time. The datafill in the PARALLEL execution field for LCMCOV_REX_TEST in table REXSCHED allows a maximum of one LCMCOV_REX_TEST.

SREX schedule



The site REX_TEST coverage finishes faster if the LCM_REX_TEST and the LCMCOV_REX_TEST do not run together. The LCM_REX_TESTS, without the limits of the converter voltage and ring test, can run at the same time. The LCM_REX_TESTS, without the limits of the converter voltage and ring tests, can run separately for the best execution periods.

Note: The LCMCOV_REX_TEST runs on LCMs, XLCMs, OPMs, and RLCMs.

Feature AF3234 provides the following REX test improvements for LCM peripherals and different LCMS, like LCME:

- ESA REX test
- LCM and ESA-independent REX test
- MAP command for manual REX test
- fault indicators
- REX test maintenance record
- MAP commands to access REX test failures

Emergency stand-alone REX test

The ESA REX tests the ability of RLCM units to enter and exit ESA. The ESA REX tests the ability of RLCM units to message the ESA processor when in ESA. The ESA REX tests begin after the LCM REX tests complete.

MAP commands for manual REX tests

The XLCM diagnostic allows manual LCM REX tests. The diagnostics allow manual LCM REX tests when the REX or REXCOV parameters are used with the TST command. This action occurs at the PM level of the MAP display. Examples of this command are as follows:

>MAPCI;MTC;PM;POST LCM <site><frame><unit>

Note: Post the LCM

>QUERYPM

Note: Displays information about the LCM node. Feature AF5898 adds information about the LCMCOV REX test.

After you post the LCM, set manual control of scheduled LCM or LCMCOV REX tests. To set manual control, type

>TST REX [ON] [OFF]

Note: This command enables or disables the REX test of the posted LCM.

or

>TST COVREX [ON] [OFF]

Note: This command enables or disables the COVREX test of the posted LCM.

To test the LCM REX tests for immediate execution, type

>TST REX NOW

Note: Performs LCM_REX_TEST on the posted LCM.

or

>TST COVREX NOW

Note: Performs LCMCOV_REX_TEST on the posted LCM.

The system displays the following message when you enter the TST COVREX NOW command.

```
LCM HOST 00 0 will be put into takeover mode during the
COV REX
Do you want to continue with the COV REX test
Please confirm ("YES", "Y", "NO", or "N")
```

Line concentrating module and ESA-independent REX test

The scheduler initiates REX tests on an LCM. When the tests complete, the scheduler starts the ESA REX test. A manual LCM REX test does not start an ESA REX test. A REX test that is not successful can occur. The system sets the LCM ISTb if InSv diagnostics fail or SysB if OOS diagnostics fail.

Fault indicators

A REX test that does not complete sets the LCM unit ISTb or SysB with a reason of REX failed. The system runs audits on LCMs one time every 10 min. Audits on LCMs run InSv tests. The ISTb flag remains and has the reason, REX failed. If the audit is not successful and detects more failure conditions, the audit contributes to the ISTb list. If the LCM is SysB and the system RTS completes, the unit returns to ISTb and not InSv. This event occurs with the REX failed reason. To remove the ISTb state the LCM must satisfy one of two conditions. The LCM must complete a successful manual RTS or a successful manual or scheduled REX test.

The system generates the node assessment graph log (NAG400) one time each hour. The system also generates the NAG40 in response to the NAG command. The NAG command can list all nodes not in-service (InSv). The REX_INFO field of log NAG400 displays the results of the last REX test. For LCMs, the system lists the LCM_REX_TEST result first, separated by a colon from the LCMCOV_REX_TEST result. For more information about NAG400 logs, refer to the *RSC-S Related Logs* section of this document.

REX maintenance records

The system generates a maintenance record from a REX test to display REX test results for each LCM entered. This information is available at the PM level of the MAP display for a posted LCM.

Note: After a reload restart, the system erases the maintenance record for each LCM.

SWACTs

SWACTs can be controlled or uncontrolled. Manual action, like entry of SWACT command, starts a controlled SWACT. A planned system request like the REX schedule, can start a controlled SWACT. If the active unit becomes busy while the inactive is INSV, the system can start a controlled SWACT.

A controlled SWACT can occur if both units become InSv. A controlled SWACT can occur if the RCO2 is ISTb because of an earlier REX failure.

The system starts an uncontrolled SWACT when the active unit has a trap or a hardware fault. The PM181 log messages inform operating company personnel why the active unit drops activity.

In a controlled SWACT the following message exchange occurs:

- The CC messages the active unit of the RCO2 to start an audit of the inactive unit.
- The active unit messages the inactive unit to start a pre-SWACT audit.
- The inactive unit messages back the pre-SWACT audit results to the active unit. The system initiates a warm SWACT based on the audit results.
- The unit that was first active stays InSv and clears data that is not stable.
- The unit that is now active sends five gain messages to the CC.
- The CC sends five gain-acknowledge messages to the RCO2.
- The RCO2 sends three gain-acknowledge received messages to the CC.
- The CC tells the unit that was first active to drop activity.
- The unit that was first active sends the CC a drop message, and the CC expects to receive this message.

If a controlled warm SWACT fails, the following message interchange occurs:

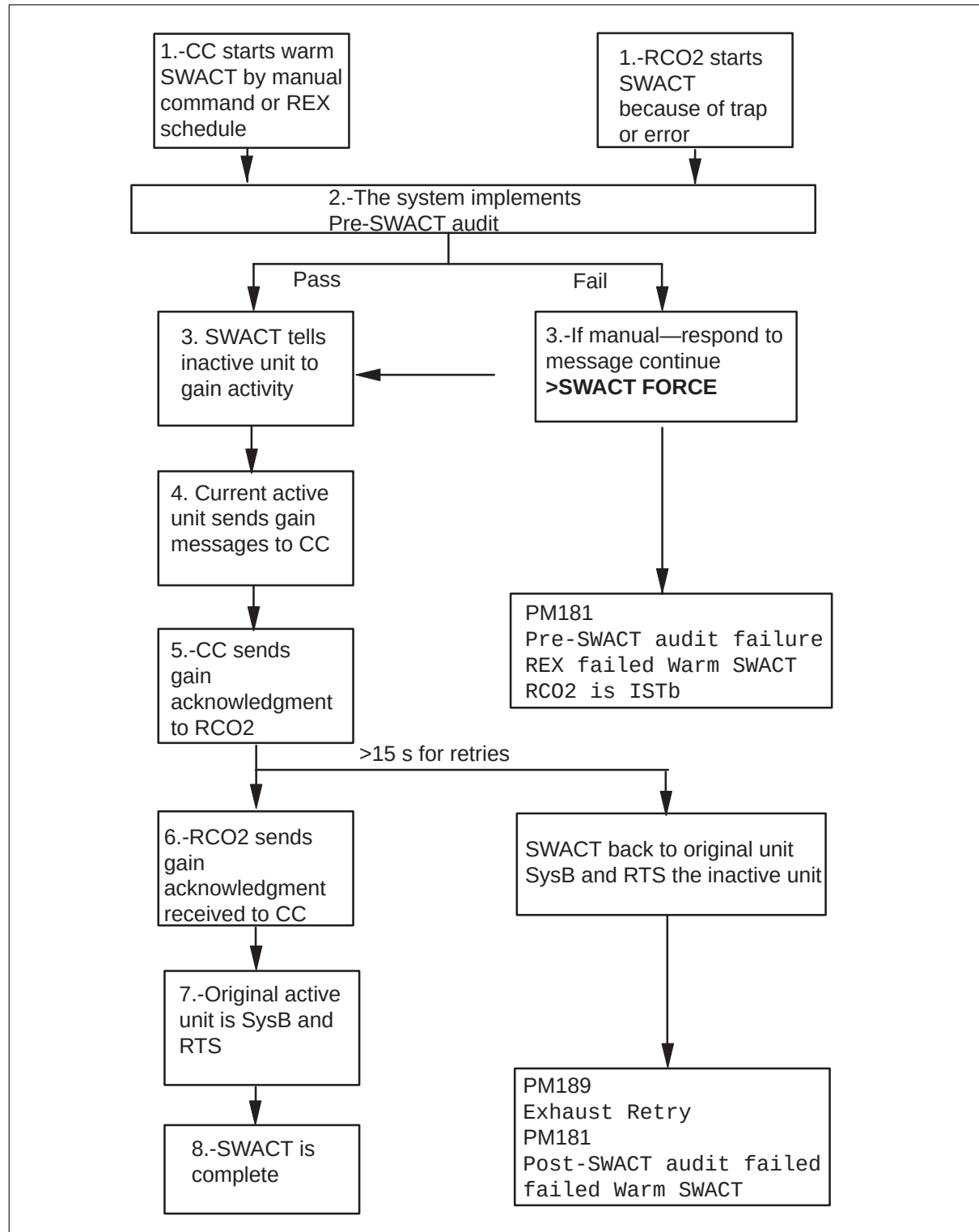
- The CC messages the active unit of the RCO2 to start an audit of the inactive unit.
- The system implements a pre-SWACT audit.
- Based on the audit results, the system initiates a warm SWACT.
- The unit that was first active stays InSv and clears data that is not normal.
- The current active unit does not send messages to the CC.
- The wait time of the original active unit is 5 s. When the wait time expires, a SWACT-back occurs.
- The original active unit sends a SWACT failed message to the CC.
- The CC system busies and returns to service the inactive RCO2 unit.
- If the CC does not receive messages the CC SysB and RTS both units of the RCO2.

In an uncontrolled SWACT the RCO2 initiates the pre-SWACT audit. The following message exchange occurs:

- The RCO2 active unit messages the inactive unit to start a pre-SWACT audit.
- The system implements a pre-SWACT audit.
- The system initiates a warm SWACT based on the audit results.
- The new active unit messages the CC that an not requested gain occurs.
- The original active unit stays InSv and clears data that is not stable.
- The current active unit sends five gain messages to the CC.
- The CC sends five gain-acknowledge messages to the RCO2.
- The RCO2 sends three gain-acknowledge received messages to the CC.
- The CC tells the original active unit to drop activity.
- If the CC does not receive messages the CC SysB and RTS both units of the RCO2.

The following figure describes a SWACT sequence.

SWACT sequence



The SWACT is complete, controlled or uncontrolled, when the CC receives and acknowledges the gain message from the new active unit.

When a SWACT occurs, the CC and the RCO2 exchange a series of drop and gain messages. These messages notify the CC and the RCO2 of present conditions. The following table describes common phrases in these messages.

Message phrases that describe CC and RCO2 SWACT communication

Message phrase	Explanation
Original active unit	Active unit before the SWACT (unit 0)
Original inactive unit	Inactive unit before the SWACT (unit 1)
Newly active unit	Active unit after the SWACT (unit 1)
Newly inactive unit	Inactive unit after the SWACT (unit 0)
Gain message	The message the current active unit (unit 1) sends to the CC, to indicate the CC the unit gains activity
Gain acknowledge message	The message the CC sends to the original active unit to confirm the current active unit sends messages
Gain acknowledge received	The Message the original active unit sends to the CC to confirm the current active unit passes the post-SWACT audit
Drop message	The Message the originally active unit (unit 0) sends to the CC to indicate the CC the unit drops activity
Note: The CC can solicit drop and gain messages. The drop and gain messages can be not requested, as in the occurrence of uncontrolled SWACTs.	

Manual SWACT The following message appears at the MAP display when you enter the SWACT command:

```
A warm SWACT will be performed
after data sync of active terminals are attempted.
The inactive unit may not be capable of gaining activity
(please check logs). Do you wish to continue regardless?
Please confirm ("YES" or "NO")
```

The default is to not proceed. The new inactive unit can take over call processing again.

Uncontrolled SWACT

The state of the units and the reason for the activity drop determine the sequence of events during an uncontrolled SWACT. An uncontrolled SWACT can occur when both units are InSv. An uncontrolled SWACT can occur if the active unit is InSv and the inactive unit is ISTb. An uncontrolled SWACT can occur if the active unit is InSv and the inactive unit is SysB. Each of these states causes a different SWACT sequence.

When a hardware fault occurs, the system produces a PM181 log. The PM181 log can contain messages that indicate the following conditions:

- The unit has an activity timeout.
- There are no CC links, the message links to the CC or host XPM so that messaging cannot occur.
- The system finds a duplicate fault. A critical hardware fault occurs when both units are out-of-service.
- The unit is jammed. The unit cannot change state from active not active.
- The unit is ready for ESA. This message also deals with the RCO2, in which occurrence the system loses all CC messaging. If the original inactive unit does not send a drop message during a specified period of time, the RCO2 enters ESA.
- The unit has static data damage.
- The original active unit sends a drop message to the CC.
- The current active unit must send a gain message.

The XPM continues to send the gain message for up to 15 s.

An uncontrolled SWACT can occur if the original active unit is InSv and the original inactive unit is ISTb. The condition that causes the inactive unit to be ISTb determines the action of the system. The cause of the ISTb may be because of data synchronization. If data synchronization causes the ISTb, the system response is the like when the active and inactive units are InSv. If loss of data synchronization causes the ISTb, the original active unit drops synchronization and the RCO2 initializes again.

If the original active unit is InSv less than 3 min, the unit returns to service (RTS) without OOS diagnostics. If the last SWACT occurred less than 3 min in the past, the active unit performed OOS diagnostics at the time. If the original unit is active more than 3 min, the active unit returns to service with OOS diagnostics.

The active unit attempts to return to service during RTS. If the active unit cannot RTS, both units become SysB. The complete XPM becomes SysB.

Components

This section describes diagnostics and REX results for the extended line concentrating module (XLCM). This section describes how to identify and resolve fault conditions for the three main RSC-S components. These components are the RCO2, the RCO2 with ISDN, and the DRCO2.

XLCM diagnostics

The XLCM diagnostics implement CC and XLCM software to test the tip/ring reversal relay on each bus interface card (BIC), of a specified LCM. The BIC card is NT6X54. The system performs the test on each logical drawer. You can run the test manually from the MAP display level. The system can schedule the test to run automatically. The XLCM diagnostic applies to the LCM and does not operate on the LCME.

The XLCM diagnostics perform the following steps:

- schedules the BIC test
- activation/deactivation of the test
 - BICRELAY command
- test operation
 - system test, run according to a schedule the user defines
 - manual test, initiated from the LCM MAP display level over a single drawer of an LCM
- test results
 - new LCM node ISTb reason
 - PM132 log report
 - PM181 log report

The BIC acts as an interface. This interface is between the 64 line cards in a drawer, and the digroup control card (DCC), NT6X52, in the LCM. A BIC has two identical halves that connect a maximum of 32 line cards (0–31). The two identical halves form a drawer pair. Each drawer of the pair is a logical drawer or digroup 0 or 1. Each LCM has ten BICs in ten physical drawers. An LCM contains 20 logical drawers.

Each half of the BIC has two relays for ringing distribution. The first relay selects between ringing voltages and ANI/coin voltages. The ringing voltages are ac ringing voltages to a telephone. The ANI/coin voltages are dc voltages to perform coin-activated functions. The second relay is the tip/ring reversal relay. This function of this relay is to switch ringing voltages from tip to ring and ring to tip. Multiparty ringing uses the tip/ring reversal relay.

This feature tests only the reversal relay. The XLCM diagnostic allows you to schedule the system BIC relay test (BRT) over a specified set of LCMs and associated drawers. This procedure is the scheduled BRT. You can run a manual BRT on each logical drawer.

Information from two new office parameters in table OFCVAR allow BTY scheduling. These parameters are:

- BICRELAY_XLCM_TEST_SCHEDULE
- BICRELAY_MUM_SIMUL_TESTS

The parameters allow you to schedule the BRT from one to seven days a week. The parameters allow you to define the window size, and define the number of tests (LCM-level) that can run together.

The XLCM diagnostics run tests at the office level, the LCM level, and the drawer level. The office-level test loops over each LCM in the schedule. The system runs a single BRT on each drawer of the LCM. The system generates a report. The reports displays the results of each drawer test.

The scheduled BRT runs the LCM-level test. The test selects an LCM on which drawers tests have not run during the BRT window defined by the office parameters. The test runs a BRT on each drawer of the LCM. This test is a single LCM drawer test run from the LCM-level test or from the LCM MAP display level. The office-level test loops over the LCMs in an office and performs the LCM-level test. The LCM-level test loops over each drawer of a specified LCM. The LCM-level test performs the drawer-level test that comprises a BRT.

The BICRELAY command enables, disables, resets, or queries the BRT for the office. The BICRELAY command has one parameter that can be ON, OFF, RESET or QUERY:

- ON allows the test to begin at the scheduled window.
- OFF disables any scheduled drawer-level tests, and does not allow the office-level test to start again.
- RESET restarts office-level tests if there are not tested LCMs.
- QUERY displays the current on or off status of an office-level test and the number of LCM-level tests in progress. QUERY displays the next LCM for the scheduled to BRT test. An example of the BICRELAY command follows:

>BICRELAY ON

The system BRT displays the results of each LCM-level test in log report PM132. This report displays a combined report of each drawer-level test in a specified LCM.

The limits that follow apply to the XLCM diagnostics:

- The system test performs a ManB on the logical drawer before the system runs the relay test. If any lines are in a call-processing busy state, the system skips the drawer for this test cycle.
- Before the system runs the manual BRT on a single drawer, maintenance personnel must make the drawer ManB.
- NT6X17 line cards, in each logical drawer, do not always contain the correct datafill. If this event occurs the system does not test the drawer.
- This test does not run on an LCM at the same time as the following tests:
 - automatic line test (ALT)
 - REX test
- The BRTST_START_TIME and BRTST_STOP_TIME fields of the BICRELAY_XLCM_TEST_SCHEDULE office parameter cannot contain the same value. There must be 10 min or more time between the start and stop times.

The XLCM diagnostics use the test access bus, the metallic test equipment (MTE) and a single NT6X17 card in each drawer to complete tests. If the ALT and the BRT run together, delays can occur on both tests. If a REX test begins on an LCM, the BRT does not run on that LCM. The LCM remains in the current state of the LCM. The system generates a PM181 log that indicates the BRT does not run because a REX test is in progress.

XLCM REX results

The REX tests can provide an early indication of faults that can affect service. These tests allow operating company personnel to correct the faults. An office parameter controls system-initiated REX tests for LCMs. The office parameter determines the time interval to perform a REX on the LCM. The REX tests the LCMs one at a time, in the order the LCMs are entered. The REX test includes OOS and InSv tests on both units of the LCM.

Note: Before this feature, only the system scheduler initiated REX tests on an LCM. Manual REX tests were not available.

The changes this feature applies to the system REX do not change the functionality of the present diagnostic subtests.

The following is a list of improvements to the REX process for LCM peripherals and different LCMs:

- ESA REX
- LCM/ESA-independent REX
- MAP command for manual REX
- fault indicators
- REX maintenance record
- MAP commands to access REX failures

Audits of the IML links An audit runs sanity tests on IML links. The tests make sure the system does not lose or corrupt data passed on the IML links. The audit tests the inactive and active units. If the audit detects a fault, only the active InSv unit reports the fault to the CC.

When the audit detects a fault on the IML link or links, the steps that follow occur:

- The link is closed.
- The RCO2 status changes to ISTb.
- The RCO2 units cannot communicate over the links. A warm SWACT cannot occur.
- The system generates a PM128 log.
- At the RCO2 level, the QUERYPM FLT command contains the following message:

NON-CRITICAL HARDWARE FAULT

RCO2

Operating company personnel can enter the TST command to test the RCO2. The state of the RCO2 and the parameters in the TST command determine the type of test on the RCO2.

The following conditions indicate faults in the RCO2.

- overload indicators (PM128, QUERYPM)
- REX
- audits of the IML links
- parity errors in the RCO2

DRCO2

The maintenance functions provided for PCM-30 interlinks are:

- detecting if the card is present.
- monitoring the PCM-30 circuits. Conditions reported include slips, frame loss, bipolar violation (BpV), remote carrier group alarms (RCGA), and local carrier group alarms (LCGA).
- reporting the state of the link.

Note: The DRCO2 configuration will be available with a future release.

RCO2 with ISDN

If an EDCH card goes OOS, the RCO2 can be configured with a spare EDCH. The spare EDCH gains control of the present D-channel processing and does not cause temporary loss of D-channel service. Use the SWITCH command to start this function manually.

When the RCO2 performs a warm SWACT, the SWACT does not affect data communication.

Emergency stand-alone REX The ESA REX runs on ESAs that are associated with RLCMs. The ESA REX tests the ability of RLCM units to enter and exit ESA. The ESA REX tests the ability of the RLCM to message to the ESA processor while in ESA. A system or manual request can initiate the ESA REX test. The XLCM diagnostics change the sequencing order of the system REX. The ESA REX runs after the system LCM REX completes. The ESA REX does not run as a subtest of the LCM REX.

LCM/ESA-independent REX With this feature, the scheduler initiates REX tests on an LCM. When the REX completes, the system starts the ESA REX test. A manual LCM REX test does not start an ESA REX test. If a REX does not complete, the system places the LCM ISTb or SysB. The system places the LCM ISTb if InSv diagnostics fail. The system places the LCM SysB if OOS diagnostics fail.

MAP command for manual REX The XLCM diagnostics allow a manual LCM REX test. Add the new parameter REX to the TST command to run a manual REX test. Add the REX parameter to the TST command at the PM level of the MAP display. An example of this command string follows:

>TST REX QUERY

Note: All subcommands are performed on one posted LCM.

Fault indicators REX tests that cannot complete places the LCM unit ISTb or SysB, with a reason of REX failed. Audits that run InSv, tests run every 10 min on LCMs. With this feature, an audit that completes remains ISTb with a reason of REX failed. If the audit does not complete and the audit detects additional faults, the audit adds to the ISTb list. If the LCM is SysB and a system RTS completes, the RTS returns the unit to ISTb. The unit becomes ISTb with a reason of REX failed. Operating company personnel now notice a failed REX. To remove the ISTb, the LCM must complete either a manual RTS or a manual or scheduled REX.

REX maintenance record The system generates a maintenance record from a REX. The system stores the maintenance record in an internal database to indicate the results of REX tests for each LCM entered. The system updates the maintenance record each time REX activity occurs. This information is available at the PM level of the MAP display for a posted LCM.

Note: The system erases the maintenance record for each LCM after a reload–restart.

MAP commands to access REX failures The QUERYPM FLT command indicates an LCM unit is ISTb or SysB. An LCM unit is ISTb or SysB state because the reason for a REX failure is REX failed.

The TST REX QUERY command string can display the test ID of the subtest. The TST REX QUERY command can display the card list that causes the REX to fail for each unit.

Overload resources

The traffic load on the LCM can exceed the amount that the LCM processor cards can handle. If this event occurs, the LCM accepts calls at a slower rate until the system the overload clears. Normally, the LCM queues the call requests and assigns the requests a priority in the CCM data store. As the data store reaches capacity, the LCM overload controls slow the rate of load acceptance. The LCM overload controls can halt the call process until more data store becomes available.

Overload control in the LCM occurs for C-side communication and line scans.

When C-side communication slows or stops, the LCM processor cards slow the rate at which the cards scan for messages on the C-side. By slowing when the incoming work load slows, the need for data store decreases. The MAP display queries of LCM status slow. The C-side responses to LCM-supported terminals slow.

During overload, the LCM processor cards do not scan the BIC until enough data store is available. During the time that the LCM does not scan the BIC, the system prevents incoming work from the P-side. To prevent incoming work from the P-side, the system queues the work in the output buffers of the BIC. When the buffers are full, the system does not accept more work. When the system does not accept work, the result is dials that are not complete or ignored keys on business sets.

Display of overload state

When the LCM becomes overloaded, the LCM status display changes to in-service trouble (ISTb) when both units show InSv. The system displays the phrase LCM Over loaded in response to the QUERYPM FLT command at the LCM level.

Overload indicators (PM128, QUERYPM) When the RCO2 enters overload, the system produces a PM128 log (RCO2 is ISTb). The PM128 log includes the following message:

PM Over loaded

The system displays the same message if you post the RCO2 and enter the QUERYPM FLT command. Perform these actions at the PM level of the MAP display.

When this message occurs, operating company personnel must collect the OM's that track the amount and types of traffic. Maintenance area faults, like network faults, can cause the RCO2 to enter overload. The capacity capability of the RCO2 configuration can cause the RCO2 to enter overload. Forward the OM reports to both maintenance and engineering personnel for analysis.

Log reports PM128 and PM181 identify the overload condition in the LCM. When call processing resumes, the system generates the PM128 log. The log displays the phrase LCM out of Over load.

Current XLCM overload controls

The XLCM has a specified number of small, medium, and large memory blocks. The memory blocks have a fixed size. Domestic LCMs and XLCMs receive external messages and send messages with small memory blocks (SMB). Small memory blocks (SMB) are used for utility purposes like timer control blocks. Medium memory blocks (MMB) are used for Call Data Blocks (CDB), that hold data associated with active lines.

In the current XLCM installation, the system reports overload when the XLCM cannot receive an external message. The DMSX or Inter-Unit Communication (IUC) are examples of external messages. The XLCM cannot receive external messages because of not enough small or large memory blocks. Service can degrade before the system enters overload.

The XLCM has four levels of throttling to prevent overload. The number of available SMBs determines three of these levels. The three levels conserve SMBs. The levels are weighted so that terminating calls have priority over originating calls.

There are four types of throttling:

- 1 The XPM throttles messages to the XLCM. The XPM throttles messages to not more than two messages in 50 ms. This action controls small peaks of very heavy traffic. Sustained messaging at this rate can drive the XLCM far into overload.
- 2 The XLCM appends the number of SMBs available for external messages to each POTS origination message. The XLCM also appends all messages that originate from P-phones. This number equals the total available SMBs without the number of the SMB reserve. When this number is less than 20, the XPM delays processing the origination until this number returns to 20 or greater.

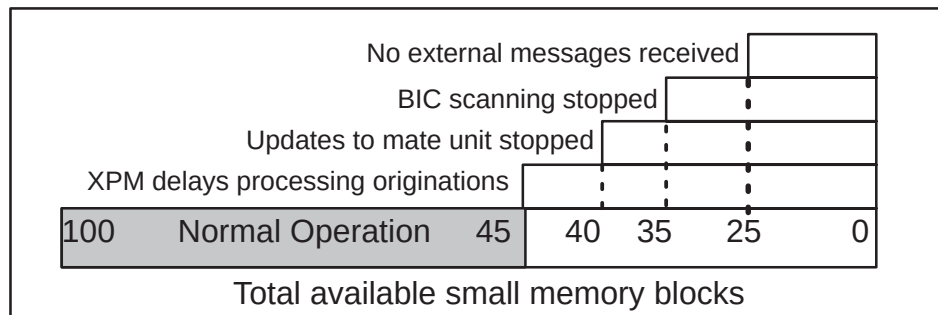
- 3 The total number of SMBs available for external messages can be less than 15. If this event occurs the XLCM does not send call processing updates to the mate. The number of SMBs available for external messages is the available SMBs without the number of SMB reserve less than 15.
- 4 The total number of SMBs available for external messages can be less than ten. If this event occurs, the XLCM does not scan the bus interface cards (BIC) for line scan changes. The number of SMBs available for external messages is the total available SMBs without the number of SMB reserve.

To protect the XLCM while in overload, the XLCM holds a small amount of memory blocks in reserve. The XLCM does not use the memory blocks to receive external messages. The amount of memory is enough If the XLCM enters heavy overload. Internal processes have enough small memory blocks to complete tasks. The total number of SMBs available can be less than or equal to the size of the SMB reserve. If this event occurs, the system rejects external messages that require SMBs, except for maintenance or monitor messages. At this point, the XLCM sends an overload report to the computing module (CM).

The overload protection system is static. The throttle levels are constant and do not react. This system is a distributed overload protection system. Overload is not monitored from only one place in the system. Protective measures are not started and controlled from one place in the system.

The following figure describes the XLCM Overload Protection System.

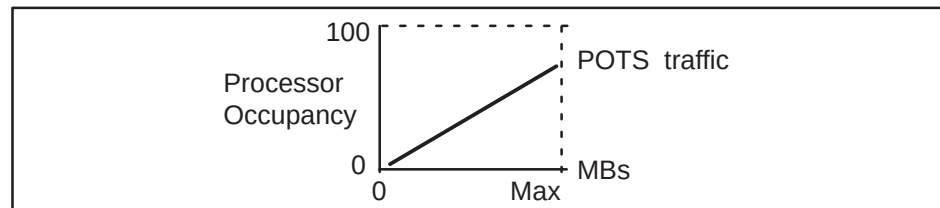
XLCM Overload Protection System



Early POTS models of the small-memory LCM (64k), display the capacity of the LCM to be memory block limited. The LCM ran out of small memory blocks before the LCM ran out of real-time use. The LCM design depends on this characteristic. Memory block limited is an LCM characteristic present in XLCMs.

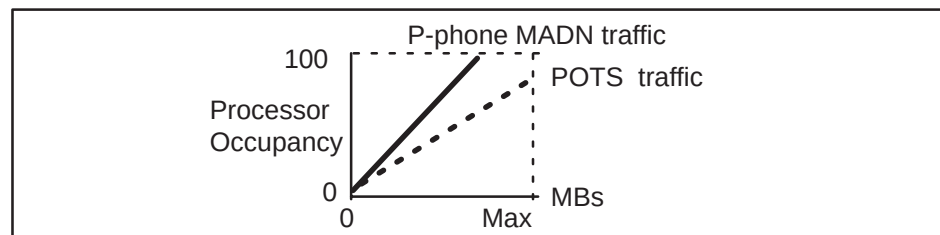
The XLCM overload system works with POTS traffic. The processor remains memory block limited with POTS traffic. The current number of SMBs, (100) and the size of the SMB reserve (25) affects the system. The current number of SMBS and the size of the SMB reserve cause the processor to remain memory block limited. The system depletes SMBs before the system depletes out of real-time usage. The following rough graph describes percentages of processor occupancy or real-time use compared to percentages of memory block use.

Memory-block use



The XLCMs have more memory blocks than small-memory LCMs. The XLCMs require additional messaging and have P-phones with features like displays and MADN. The XLCM can deplete real-time before the XLCM depletes out of memory blocks. This condition is a real-time overload condition. The following figure describes the overload condition.

MDC memory-block usage percentages xxx



The XLCM design is memory block limited. As a result, the XLCM can not handle real-time overload. The following conditions can cause outages in the XLCM:

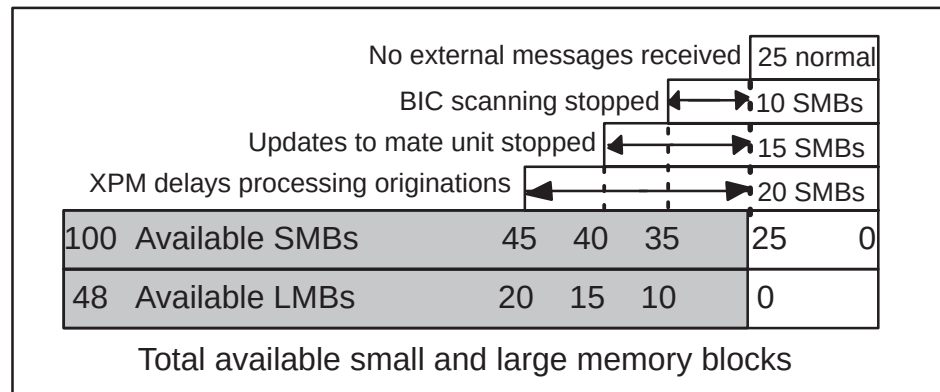
- 1 The XLCM does not detect real-time overload and does not send overload reports. The CM does not suspend functions that require a response from the XLCM because the system does not report overload. If the XLCM does not respond in the required time, the CM system busies the XLCM.
- 2 The XLCM cannot handle when lower priority tasks do not run. This event can cause traps or important software errors. Traps and errors like this cause the CM to system busy the XLCM.

Enhancements to the overload protection system

The improved XLCM overload protection system can detect when the XLCM is in real-time overload and reports overload to the CM. The improved XLCM can protect XLCM sanity. These protective measures are active for a short time period to retain the call processing capacity of the XLCM.

This enhancement adds three new components to the present overload protection system.

- 1 The system distributes the processor occupancy data collection component over key areas of the XLCM code. This component collects raw data used to detect real-time overload. This component leaves the raw data for the data analysis component. The priority of this component matches the priority of the segment of the system that contains the component.
- 2 The real-time data analysis component analyzes the data in the depository, and generates an easy-to-read processor occupancy status. The status is not a percentage. The status is a distress rating. Percentages are difficult to work when real-time availability is low. Percentages do not supply all of the information the control component requires. The control component requires the distress rating and reports the rating to the CM overload when the XLCM reports overload. The data analysis component provides indication of activity. This component runs at a high priority.
- 3 The real-time overload control component monitors the distress rating that the data analysis component operates. The rating can indicate real-time overload. If this event occurs the control component adjusts parameters in the overload protection system to recover some real-time. The component adjusts parameters to keep the memory block limits ahead of the real-time limits of the XLCM. The following figure that describes this component adjustment. If the data does not indicate trouble, the control component restores the overload protection system parameters to allow maximum call processing. This component runs at a very high priority.

XLCM Overload Protection System new variable thresholds**Changes to the real-time subsystem**

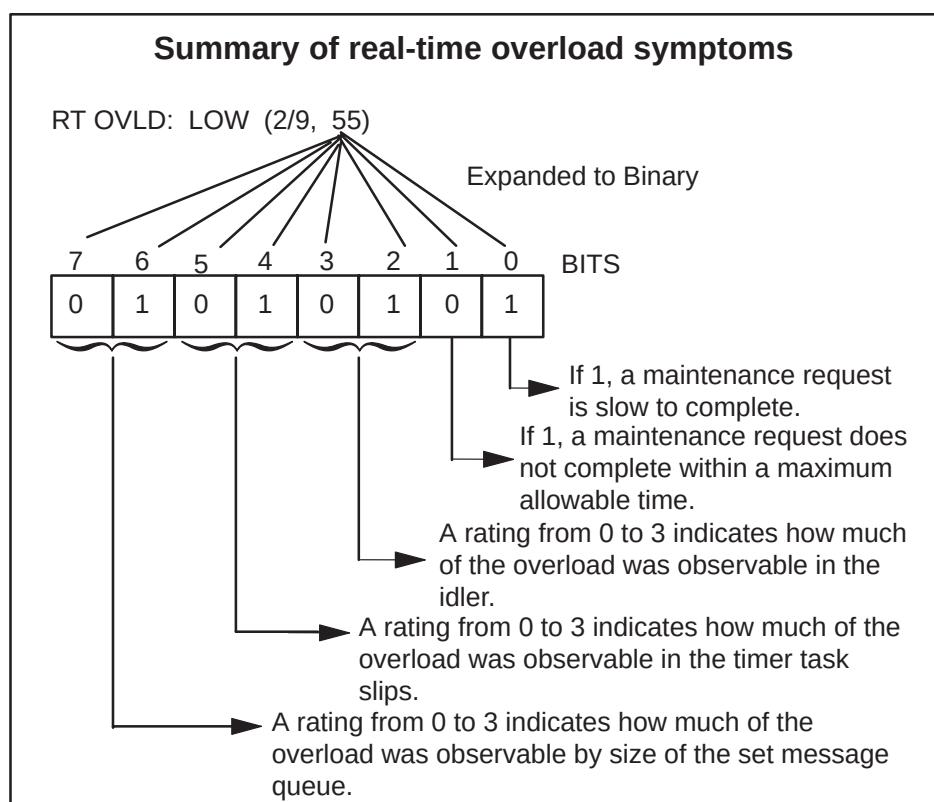
The real-time subsystem changes memory block system parameters to keep memory block limits ahead of real-time limits. The following section describes improvements to the real-time subsystem.

- 1 Reduction of memory blocks preserves real-time. Reduce the number of memory blocks available by increments for external messages to shed work. Reduce all associated throttles, until the system recovers some real-time use.
- 2 Define real-time overload as a processor occupancy rate of 75 percent or higher for a minimum amount of time. Define overload this way because in the XLCM, calculation of percentages is real-time use. This method is not flexible because the method can cause early reaction. Early reaction occurs if the XLCM is not in dangerous real-time trouble.
- 3 Monitor the amount of time to process key maintenance requests at high levels but not 100 percent occupancy. This monitoring makes sure that the XLCM responds to these requests before the CM times out or enter overload. Benchmark the average time to process the key requests. If the time takes longer than this average, assume real-time overload.
- 4 Monitor idle task activity and enter real-time overload if an idle task does not run for a specified period of time.
- 5 Characterize the timer task slip counter at a high occupancy, but not at 100 percent. If the timer task slips at more than the normal high occupancy rate, enter real-time overload.
- 6 Monitor the size of the set message queue. If the message queue becomes too high, the XLCM approaches real-time overload. A message queue of 40 or above is too high.
- 7 Include large memory blocks (LMB) in the reduction of memory blocks component to recover real-time.

XLCM log report appendages

The XLCM appends a new field to present overload messages that the XLCM sends to the CM. The appended field reflects the limit of real-time overload. If the CM is at CCM04 or later, this new information appears in the modified PM180 LCM Enters Overload log. This new information appears in the modified PM180 LCM Overloaded log. The new field contains a ratio of the maximum real-time distress reached before the system generates an overload report (values 0–9). The ratio compares the amount of current distress to the maximum possible level of real-time distress, (values 5–9). The following figure describes a real-time overload indications summary byte in hexadecimal form.

XLCM Overload Protection System thresholds



The XLCM maintains data about overload. The data provides a summary about the overload period. Figure XLCM Overload Protection System thresholds describes this summary. This summary is appended to the present overload exit message to the CM. If the CM is at CCM04 or later, a modified PM180 LCM out of Overload log reflects this information.

This feature is active in XLCMs and International XLCMs with extended memory and XPM04 loads. The new logs apply automatically. This event occurs on the installation of CCM04 in the CM.

This feature only detects real-time overload so that the CM can receive the overload status. This feature allows the system to preserve real-time. This real-time makes sure the XLCM functions according to XLCM operating model. The XLCM operating model is memory block limited.

The current memory block overload system contains the real-time overload detection and protection subsystem. When real-time trouble occurs, the system changes memory block overload system parameters to reduce memory blocks. This change in parameters reduces the amount of memory blocks available for new work. This aspect of the design makes the new overload system dynamic. The system adjusts to allow high processor occupancy under any traffic configuration.

Escalation to manual maintenance

RSC-S allows automatic maintenance to generate trouble indicators. For additional information, refer to the “Automatic maintenance” section of this maintenance guide.

RSC-S hardware

Hardware components

The development phases of the Remote Switching Center-Synchronous Optical Network (SONET), or RSC-S, produce many hardware and software deliverables. The hardware component deliverables appear in the following table.

Hardware component deliverables

Hardware	PEC
Cellular Access Processor with 16Mbyte Memory (<i>Refer to note 1</i>)	NTAX74AA
Power converter	NTMX72AA
Pulse code modulation (PCM) signaling	NTMX73AB
32-port DS30A	NTMX74AA
Enhanced matrix	NTMX75AA
HDLC/DMSX messaging interface card	NTMX76AB
Processor with 8 Mbyte digital recorded announcement machine (DRAM) (<i>Refer to note 2</i>)	NTMX77AA
DS60 extender and power supply	NTMX79AA
Dual pulse code modulation 30 (PCM-30) packlet	NTMX82AA
Filler packlet	NTMX83AA
Common peripheral module (CPM) shelf	Not available
Extension (EXT) shelf	Not available
Note 1: The NTAX74AA is an optional processor. The NTAX74AA does not support the functionality for NT7X05 Peripheral/Remote Loader-16. Note 2: The system requires NTMX77AA to support the functionality for NT7X05 Peripheral/Remote Loader-16.	
—continued—	

Hardware component deliverables (continued)

Hardware	PEC
Quad frame carrier	NTMX87AA
Cabinetized extension module (CEXT) cabinet	NTMX89FC
CRSC cabinet with enhanced line concentrating module (LCME)	NTMX89FB
CRSC cabinet with line concentrating module (LCM)	NTMX89FA
Modular supervisory panel (MSP) for cabinetized Remote Switching Center (CRSC) and cabinetized extension module (CEXT)	NTRX40AA
Note 1: The NTAX74AA is an optional processor. The NTAX74AA does not support the functionality for NT7X05 Peripheral/Remote Loader-16. Note 2: The system requires NTMX77AA to support the functionality for NT7X05 Peripheral/Remote Loader-16.	
—end—	

The hardware developed includes nine circuit cards and the main shelf. The cabinetized Remote Switching Center (CRSC) cabinet houses the circuit cards and the main shelf. The hardware also includes the cabinetized extension module (CEXT) cabinet. In addition to these cabinets, the modular supervisory panel (MSP) for the CRSC and the CEXT appears.

RSC-S packaging

The RSC-S hardware component package is different from the normal Remote Switching Center (RSC) package. The RSC-S is in cabinets and not equipment frames. These cabinets house many hardware units. The configuration of these cabinets and each component determines the services that the RSC-S can offer.

Nortel (Northern Telecom) offers RSC-S in single-cabinet and multicabinet configurations.

Model B RSC-S

The Model B Remote Switching Center project introduces the enhanced cabinet and MSP to the RSC-S for international applications. The model B RSC-S includes improvements in the cooling unit (CU) and system cabling. These improvements eliminate many earlier assignment restrictions on remote maintenance module (RMM) shelves in RSC-S applications. These improvements also ease the integration of remote cabinets with current frame-based equipment.

The project addresses cabinet, cooling, MSP and cabling issues. Circuit pack-level provisioning rules are not changed. The remote center offshore #2 (RCO2) and extension (EXT) shelves are equipped like the original RSC-S, and the numbers and types of supported interfaces are not changed. The Model B remote is vertically powered (powered through a top-mounted remote power filter unit) for applications except during the extension of a current Model A lineup. The Model A lineup uses horizontal (internal) power. A horizontal power kit can be supplied for this application.

Single-cabinet RSC-S configuration

The single-cabinet RSC-S configuration requires the CRSC cabinet, which provides facilities for the following components:

- a master controller, the RCO2, which controls associated line concentrating modules (LCM), RMMs, remotes, and digital trunks according to the host)
- 480 lines for each enhanced line concentrating module (LCME) which can support a group of services

Note: LCMEs can support services like ISDN, two binary one quaternary (2B1Q), POTS, and MDC.

- maintenance and service circuits that the RMM provides
- MSP
- ringing generators (RG)

Options for the single-cabinet configuration include central-side (C-side) links for communication with the host. Options also include peripheral-side (P-side) PCM-30 links for trunking off the RSC-S. P-side and C-side port requirements for the CRSC and CEXT that the Model B does not change.

Cabinetized Remote Switching Center

The CRSC is a single-cabinet RSC-S that supports service and maintenance circuits and PCM-30 links to the host. The CRSC supports these circuits and links at a maximum distance of 160.9 km (100 mi). A single-configuration RSC-S can have one CRSC cabinet with one of the following components:

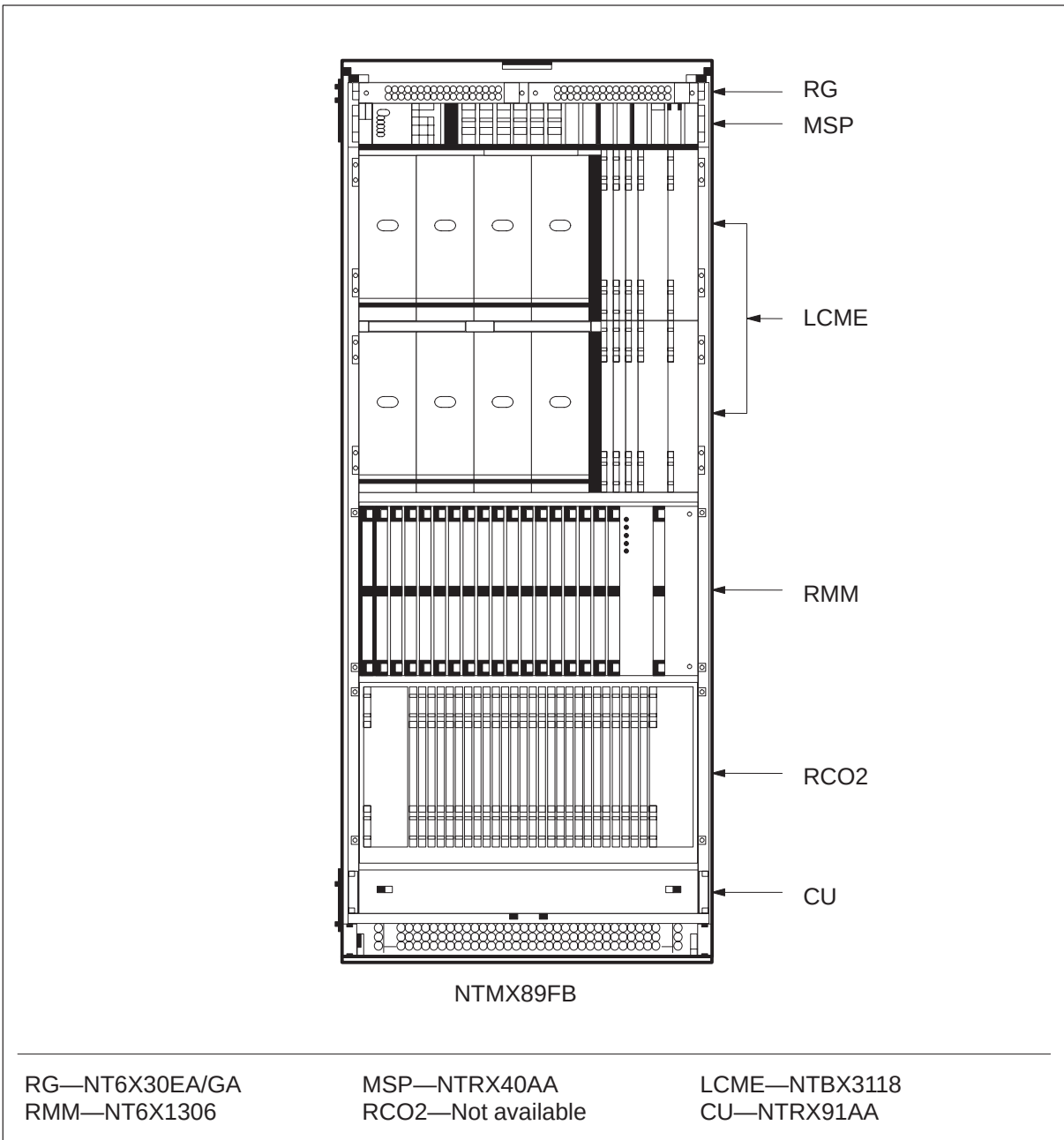
- RCO2 shelf (always provided)
- RMM that dedicated DS30A links serve
- LCME or LCM
- MSP
- RGs

2-4 RCS-S hardware

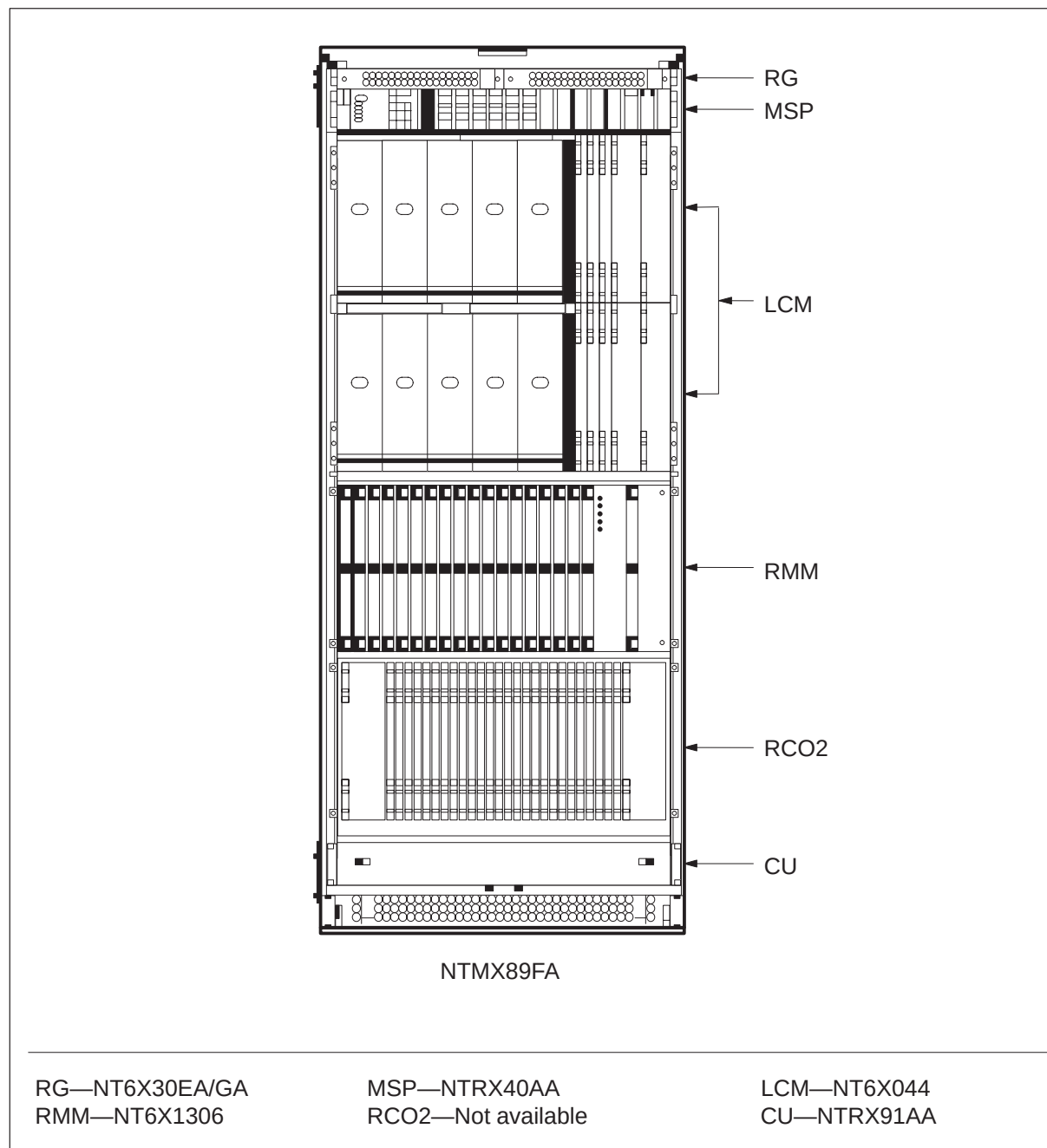
The single CRSC C-side connects PCM-30 links to a PCM-30 line group controller (PLGC)/line group controller offshore (LGCO) host peripheral.

The following figures illustrate the CRSC components. The following figures describe the CRSC components.

CRSC cabinet with LCME



CRSC cabinet with LCM



Remote center offshore #2 The RSC-S is based on the RCO2, which acts as the master controller for RSC-S peripherals. The RCO2 controls associated LCMs, RMMs, remotes, and digital trunks according to the host. The host PLGC/LGCO controls the RCO2.

The RCO2 is the remote office unit of the common peripheral module (CPM). The RCO2 is a single-shelf, 68020- or 68040-based module that contains units 0 and 1. The RCO2 units 0 and 1 run in an active and standby mode of operation for reliability. An RCO2 shelf contains the following components:

- duplicate RCO2 processor cards that contain a 68020- or 68040-based processor (NTMX77 or NTAX74, in the sequence given). The 68040-based NTAX74 CAP is an optional upgrade replacement for the 68020-based NTMX77 UP. The CAP increases XPM capacity, real-time availability, and memory. An RCO2 with the CAP requires the following components to support NTAX74 functionality:
 - NTB01BA or NTB01AC ISDN Signaling Preprocessor
 - NTB02BA Enhanced D-Channel Handler

Note 1: The NT7X05 Peripheral/Remote Loader-16 requires the NTMX77 to function.

Note 2: The RCO2 provisioned with an NTAX74 requires the NTB01BA or NTB01AC ISDN Signaling Preprocessor and the NTB02BA Enhanced D-Channel Handler.

- duplicate expanded time switch, a high capacity switch matrix
- duplicate messaging interface circuit cards contain the interface to the C-side and P-side message channels
- duplicate power converters to power the above circuit cards
- a pulse code modulation (PCM) signaling card that supports low-level PCM signaling tasks
- PCM-30 interface cards (eight PCM-30 links for each card) for host-directed, PCM-30 links for P-side link requirements
- a DS30A interface card provides 32 DS30A links to interface to LCMs, RMMs, and Subscriber Carrier Module-100S Remotes (SMS-R), at the RSC-S

- a selection of:
 - global tone receiver (GTR)
 - universal tone receiver (UTR)
 - custom local area signaling service (CLASS) modem resource (CMR)
 - D-channel handler (DCH)
 - enhanced ISDN signaling preprocessor (EISP) service circuit cards

The RCO2 houses RSC-S processor and memory cards for normal and emergency stand-alone (ESA) modes. The RCO2 also houses time switches, tone generators, and power converters. The RCO2 supports GTR/UTR for lines and trunks in normal and ESA modes. The RCO2 provides local switching for:

- host-directed calls connect LCMs
- line calls internal to the RSC-S supported under the intraswitching feature
- intraswitched calls during ESA supported if ESA is started

The RCO2 accomplishes local switching through 16 C-side ports and 54 P-side ports. These side ports support the features of the current RSC and RSC with ISDN with increased capacity. An RCO2 peripheral allows for C-side to P-side and P-side to C-side connections. An RCO2 also allows for P-side to P-side, and C-side to C-side connections. The C-side ports support host-to-remote capabilities.

An RCO2 performs the following termination functions:

- C-side links from the host PLGC/LGCO (for PCM-30 electrical links) with a maximum of 16 PCM-30 links, that provide a maximum of 480 channels
- P-side DS30A links from LCMs and RMMs
- P-side PCM-30 links for digital trunking to community dial offices (CDO) and private branch exchanges (PBX)

Remote maintenance module The RMM is like the DMS-100 switch maintenance trunk module (MTM). The system recommends a minimum of one RMM at each RSC-S site to perform diagnostic and line tests, and monitor alarm conditions. The system can provide a maximum of two RMMs for each RCO2. One DS30A P-side port is dedicated to each RMM.

The RMM can contain the following:

- one RMM control card

- one group coder-decoder (CODEC) card
- two power converters
- a maximum of 14 service circuit cards, like scan, signal distribution (SD), metallic test access (MTA), test trunk, and line test unit.

Enhanced line concentrating module The LCME is a part of the CRSC. An additional LCME can connect to the RSC-S. The CRSC uses the LCME shelf to extend the capabilities of the CRSC. The LCME is the subscriber interface of the RCS-S for a maximum of 480 lines. The LCME consists of two ISDN line concentrating array (LCAI) shelves. Each LCAI shelf contains the following equipment:

- eight line drawers containing line cards
- two power converters
- two digroup control cards
- one processor card

Additional LCMEs connect to the RCO2 P-side through 2 to 18 DS30A links. The operating company engineers the number of DS30A links for each LCME according to its traffic requirements. The RCO2 P-side links can define a maximum of two LCMEs.

Line concentrating module The LCM can be part of the CRSC. The LCM is the subscriber line interface of the RSC-S for a maximum of 640 lines. The LCM connects to the RCO2 P-side through two to six DS30A links. The LCM consists of two line concentrating array (LCA) shelves, that contain the following equipment:

- a maximum of five line drawers that contain 64 line cards in each drawer
- one digroup controller
- one LCM processor card
- one power converter

Modular supervisory panel The NTRX40AA MSP provides alarm monitor and control functions for C28 cabinets. Modules provide exact functions. The system can arrange for a maximum of 10 breaker modules, each breaker module with two breakers for –48 V dc distribution. The system can provide a maximum of eight fuse modules, each module with eight breakers, for protection of subcircuits. A total of 13 fuse and breaker modules are available.

Ringling generators The NT6X30EA/GA RG module that can be provisioned provides analog ringing voltage. The RG unit uses the NTRX40AA MSP.

Cooling unit The enhanced NTRX91AA CU is a 10 in. deep forced air unit that uses three Rotron-type (6 in. diameter) tube axial fans. These fans provide 200 cfm at 3 in. of back pressure. These fans dissipate approximately 1600 W.

The NTRX91AA uses the current A0346832 air filter. This air filter is an 80% dust stopping filter made of synthetic fiber material.

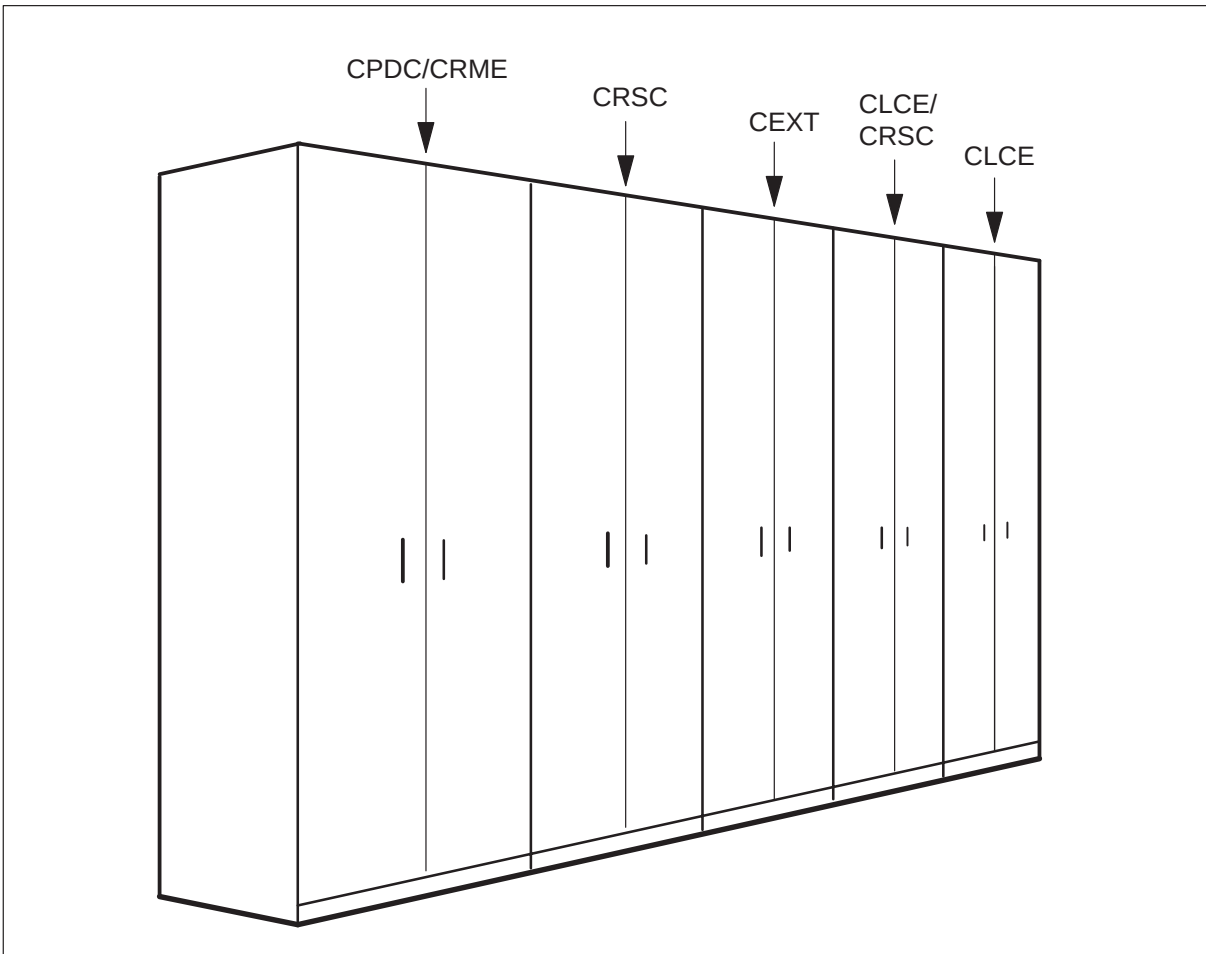
Multicabinet RSC-S configuration

The multicabinet configuration requires a cabinetized power distribution cabinet (CPDC), or cabinetized remote miscellaneous equipment (CRME) cabinet in addition to the CRSC. The system can provide a CEXT cabinet.

The system can provide a maximum of five cabinetized line concentrating equipment (CLCE) cabinets and an LCME on the CEXT. These CLCEs and the LCME increase the maximum for line size. An EXT provides additional RCO2 capacity. This RCO2 capacity can include a cabinetized miscellaneous equipment cabinet (CMIS) used to store client-specified equipment. The RCO2 capacity can also include cabinetized miscellaneous spares storage (CMSS) cabinet, for spare card storage.

The following figure illustrates a multicabinet configuration.

Multicabinet RSC-S configuration



The following provisioning options are also available for the multicabinet configuration:

- P-side PCM-30 links for trunking
- C-side links for communication with the host

The following sections describe the cabinets and associated components.

Cabinetized line concentrating equipment

A single configuration RSC-S can have a maximum of five CLCE cabinets. Each cabinet supports a maximum of two duplicate LCMs. Each cabinet provides 640-line card capacity.

The POTS applications uses the CLCE and connects to the RCO2 by two to six DS30A links. A maximum of ten LCMs can connect to the RCO2 in a single RCO2 configuration.

Each CLCE cabinet contains the following equipment:

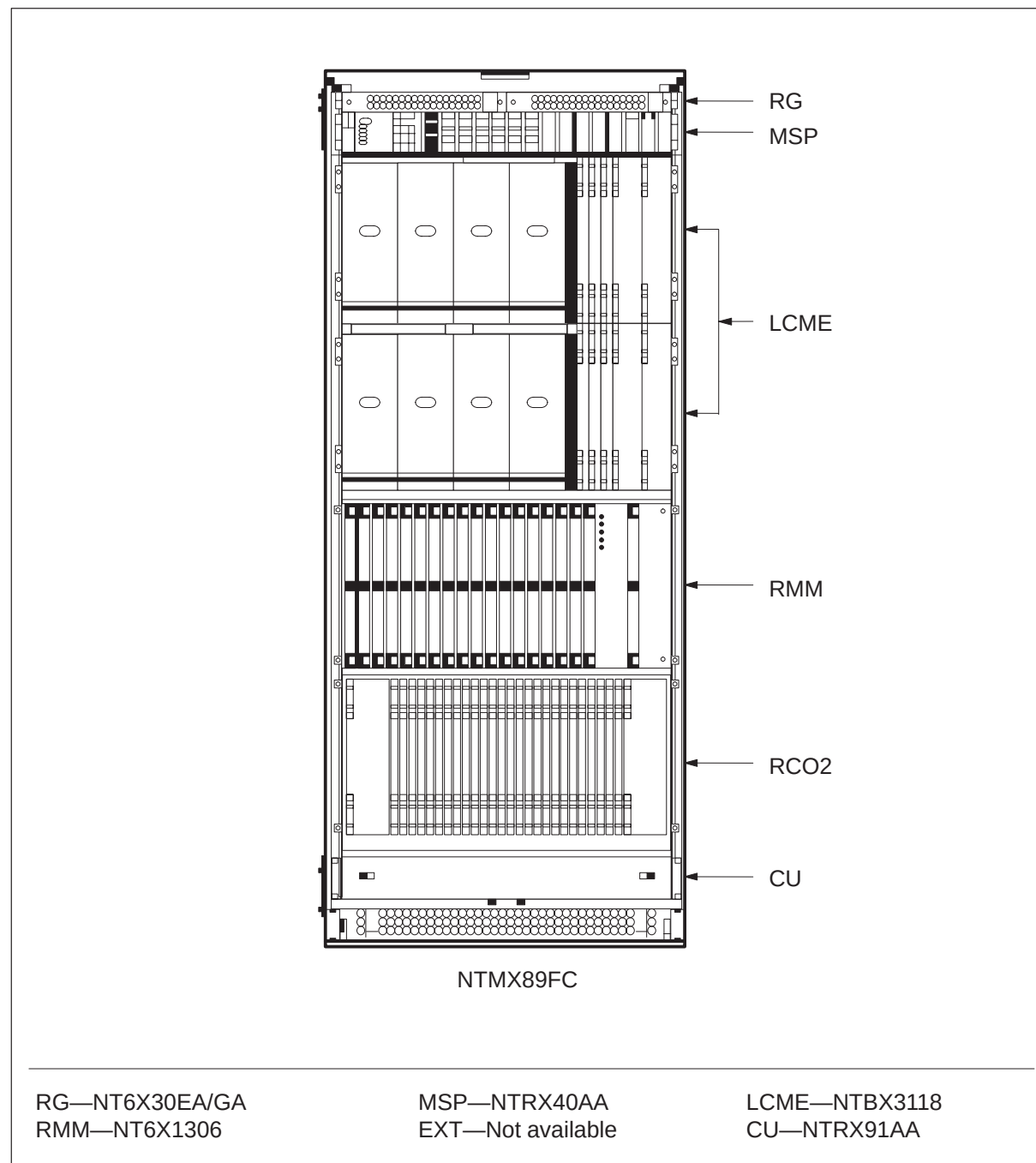
- a maximum of two duplicate LCMs to complete subscriber lines
- one MSP for power, control, two RGs, and alarm circuits

Cabinetized extension module cabinet (CEXT)

The CEXT contains an EXT, an MSP, an RMM shelf, and an LCME. The CEXT provides power, service, maintenance circuits, and an additional 480 lines. This cabinet houses additional ISDN DCHs or PCM-30 interfaces. The CEXT also provides an EXT shelf with one ISDN LCM.

The following figure illustrates and describes the CEXT components.

CEXT cabinet



The CEXT provides room for additional PCM-30 interfaces, and DCH cards. Each side of CEXT (unit 1 and unit 2) requires the DS60 card, that provides the DS60 links to the CRSC. The extension card contains 12 DS60 links that connect the card to the RCO2 shelf. The EXT shelf uses two extension cards.

Extension shelf The EXT shelf contains two extension half shelves. Each half of the EXT shelf supports one RCO2 shelf. One CEXT can support two CRSC cabinets. Each CRSC cabinet contains an RCO2.

The EXT shelf provides additional PCM-30 links or supports additional DCHs to accommodate ISDN line requirements. This shelf works with the RCO2 shelf. The shelf connects to the RCO2 shelf through a DS60 plus power card.

Mounted on the CEXT, the EXT shelf houses the following:

- 0–3 octal PCM-30 interface cards (up to 24 PCM-30 links)
- 0–10 DCH cards
- DS60 extension cards

Other CEXT components The MSP, RMM, and LCM for the CEXT perform the same functions as described for the CRSC. The unit redundancy of the CEXT provides increased RSC-S capabilities.

Cabinetized line module ISDN cabinet

A single-configuration RSC-S can have one cabinetized line module ISDN (CLMI) cabinet to house a maximum of two ISDN 2B1Q line modules.

Cabinetized miscellaneous equipment cabinet

A single-configuration RSC-S can have one CMIS cabinet to house customer-specified equipment.

Cabinetized miscellaneous spares storage

A single-configuration RSC-S can have one CMSS cabinet for spare card storage.

Additional components

The RSC-S with ISDN configuration like the RSC-S that does not have ISDN configuration. The following additional components are required for ISDN basic rate interface (BRI) services:

- RCO2 or with ISDN
 - DCH card
 - EISP card
- LCME
 - host
 - operation, administration, and maintenance (OAM) processor
- customer premises equipment (CPE)

RCO2 with ISDN

For the RSC-S configuration to support ISDN services, the following actions are required:

- Use P-side PCM-30 slots so that DCH circuit cards can be provisioned.
- Change the MSP to support DCH cards.
- Add the correct software loads.

DCH card

The DCH card functions in the same method as the DCH for a host ISDN office. The following list summarizes the card functions:

- provides service access point identifier (SAPI) discrimination function at layer 2 (Q.921 link access procedure on the D-channel [LAPD])
- completes SAPI signaling frames and routes the frames to the EISP card
- completes statistical multiplexes SAPI 16 (packet) frames and sends the frames to the packet handler (PH) with a statistical multiplex ratio of a maximum of 64:1
- reflects SAPI 17 user-to-user loop-around frames back toward the user

EISP card

The EISP card functions in the same way as the EISP for a host ISDN office. The following list summarizes the card functions:

- provides a communication channel between the signaling processor (SP), master processor (MP), and the DCH cards
- processes SAPI 0 call control messages from the DCH card

LCME

The LCME provides the subscriber with BRI, through the 2B1Q U-loop interface. The system can use 2B + D channels, and six maintenance channels (M) from throughout the 2B1Q superframe. When the system uses these components, Nortel provides the North American Standard 2B1Q U-loop interface.

Packet handler

Like the Data Packet Network-100 (DPN-100) Family of packet switches, the PH consists of the following main components:

- digital interworking unit (DIU)
- access module (AM)
- resource module (RM)

The DIU takes the B- and D-channel packets in PCM-30 format that came from the DMS-100 switch controller peripheral. These packets can be the RCO2, or other ISDN-compatible peripheral. The DIU converts the packets to the V.35 format for the AM. For data sent in the opposite direction, the DIU changes data from the V.35 format to the PCM-30 format.

The AM provides access to the RMs of the DPN from local subscriber packet lines and from the DIU.

The RM performs the following functions:

- packet switching operations on data packets sent from the AM, or from digital trunks, in the packet-switched network
- switched packets can return back to the AM for format conversion and distribution to the correct destination. Switched packets can also be sent to terminals in the packet-switched network through a digital trunk

OAM processor

The ISDN OAM processor achieves central OAM. The OAM processor allows transfers information to and from the PH from the MAP terminal at the exchange termination (ET).

Customer premises equipment

For BRI, the CPE consists of the following components:

- S/T bus
- ISDN terminals
- ISDN Universal Terminal Adapter (UTA)
- network termination one (NT1)
- U-loop

The S/T bus is the allocation of the ISDN BRI interface where ISDN terminals connect.

The ISDN terminals include the T2317, M5209T/TD, and M5317T/TD telephone sets that provide many voice and data features.

The ISDN UTA provides a connection to the S/T bus for a personal computer.

The NT1 converts the proprietary loop protocol on the network side to the CCITT standardized protocols on the user side. The NT1 is required equipment for BRI when an ISDN U-line card ends a line.

The U-loop is the allocation of the BRI interface that converts the NT1 to an ISDN U-line card in the exchange termination (ET) ISDN switch.

RSC-S signaling

Signaling for RSC-S

This section describes the signaling in use by the Remote Switching Center-SONET (RSC-S) and the Remote Switching Center Equipment (RSCE) subsystems. The following subsections describe RSC-S signaling format, signaling protocols, and features the format and protocols support.

Signaling and communications protocols

The RSC-S uses the DMS-X and high-level data link control (HDLC) protocol for communications with the host switch. The HDLC and DMS-X protocols can work in parallel on host XPMs.

The DMS-X is a half-duplex, byte-oriented protocol, which uses a full duplex message channel. These channels are PCM-30 or DS-30A links. The RSC-S processor handles the DMS-X message protocol on RSC-S message channels to the host, remote, or co-located equipment. The delay ability of a remote peripheral from the host is 2 ms during the use of DMS-X protocol.

The HDLC protocol is a full duplex message protocol based on the CCITT level 2 Signaling System 7 (Q.703). The system supports this protocol between the PCM-30 Line Group Controller (PLGC) and Remote Center Offshore 2 (RCO2) peripherals when the NTMX76 card is installed at the host and remote. Operating company personnel must enter the NTMX76 for HDLC on that link.

C-side links

The RSC-S and the host central controller (CC) use a multiframe format to exchange information over 2 to 16 PCM-30 C-side links. PCM-30 links operate at a rate of 2.048 Mbit/s with a sample frequency of 8000 frames each second.

The PCM-30 link consists of 32 channels. Each channel contains 8 bits of pulse code modulation (PCM) data. Thus, 256 bits of information are sent during each 32 channel sequence.

Thirty PCM-30 channels carry speech or data information. One channel transmits signaling information. Another channel is used for framing and maintenance.

As part of normal carrier maintenance operation, software checks for PCM-30 link instability. Local loss of frame alignment (LLFA) or local loss of multiframe alignment (LLMA) is detected after 3 seconds of loss of frame or multiframe alignment. Three seconds is the default value for entry as the time filter value in table CARRMTC. If the loss of alignment is detected, the CC sets the link to system busy (SysB). Carrier maintenance software monitors for remote frame alarms indication (RFAI) and remote multiframe alarm indication (RMAI) alarms, along with the other standard PCM-30 alarm and error count thresholds.

Besides providing trunking off PCM-30 digital trunk controllers (PDTC), PCM-30 links are used between host XPMs and remote XPMs such as the RCO2 and the international remote line concentrating modules (IRLCM) and PCM-30 remote line concentrating modules (PRLCM). The XPM's messaging system performs another check for link instability by measuring the number of rebounded messages caused by protocol errors. The CC sets the link to SysB if the link exceeds the threshold of nine rebounded messages within a ten second sliding window. If the message link is to the active unit, the system executes a warm switch of activity (Warm SWACT) so the inactive unit takes the activity.

Note: With DMS-X protocol, if a bit errored message is negatively acknowledged (NACK'ed) by the receiver, it is then retransmitted. If the same message is again bit errored and NACK'ed a second time, it is rebounded and is counted as a single rebound toward the nine rebounded messages in ten threshold.

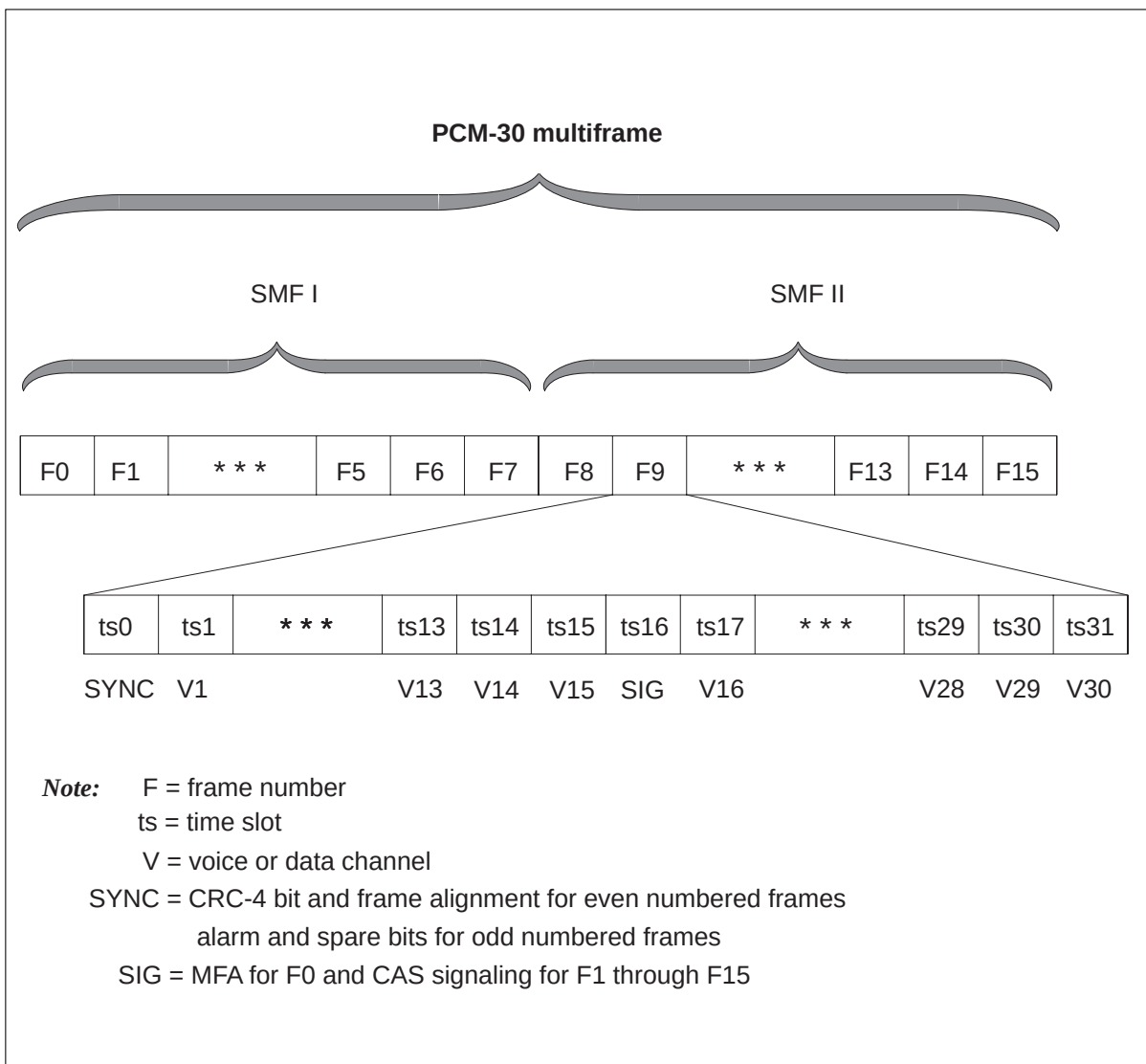
Multiframe format

The PCM-30 multiframe format has two sub-multiframes (SMF) of eight frames each. The PCM-30 multiframe uses both channel associated signaling (CAS) and cyclic redundancy checking (CRC-4). CAS is a form of circuit state signaling in which the circuit state is indicated by one or more bits of signaling status sent repetitively and associated with that specific circuit. CRC-4 verifies that data transmits error free. The bits for these functions are as follows:

- the first bit from time slot zero of the even frames from each SMF are used for a CRC-4 code word
- the remaining seven bits from time slot zero of the even frames from each SMF are used for a frame alignment signal
- eight bits from time slot 16 of frame zero contain a multiframe alignment word and a set of spare and alarm bits
- eight bits from time slot 16 of frames one through fifteen are used for CAS

The following figure is the format for a PCM-30 frame and a multiframe. A multiframe consists of 2 sub-multiframes or 16 frames.

PCM-30 frame format



Signaling additions

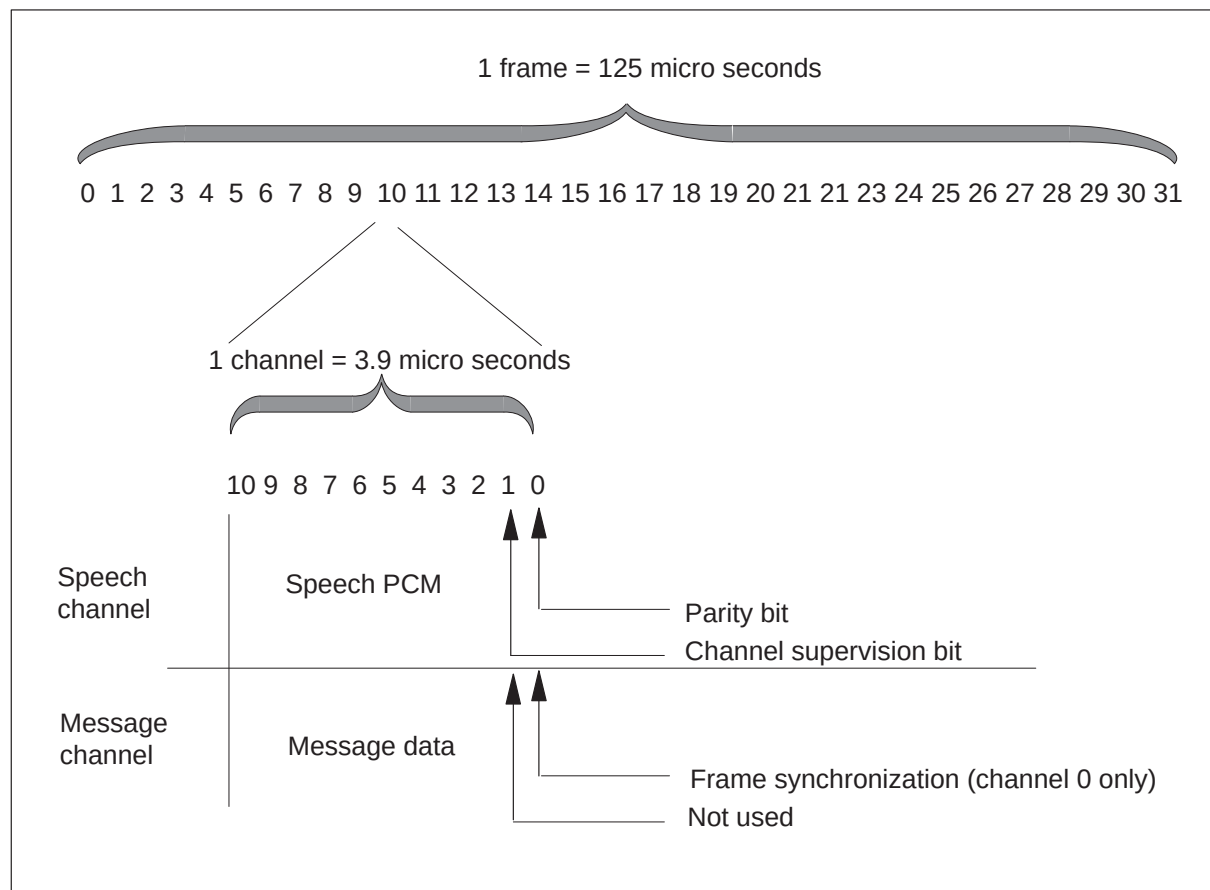
As a part of the international signaling, the MELCAS V5.2 protocol adds a facility data link.

P-side links

The RSC-S supports a maximum of 60 P-side links although only 54 are used for speech. The operating company can configure different mixes of DS-30As and D-channel handlers (DCH). A maximum of 32 DS-30As or ten DCHs may be provided in different configurations. Other P-side links are reserved for remote maintenance modules (RMM) and extension shelves (EXT). The P-side DS-30A links can connect to co-located equipment like line concentrating modules (LCM) or RMMs.

The DS-30A channel frames carry speech information or message information. The following figure is the format for a DS-30A frame. The DS-30A links operate at a rate of 2.56 Mbit/s with a sample frequency of 8000 frames each second. The DS-30A link frame has 32 channels. Each channel contains 10 bits of pulse code modulation (PCM) data.

DS-30A frame format



A frame synchronization bit is at channel 0 bit 0. The location of the bit allows the remote cluster controller (RCC) and the LCM or RMM to recognize the start of each frame sequence.

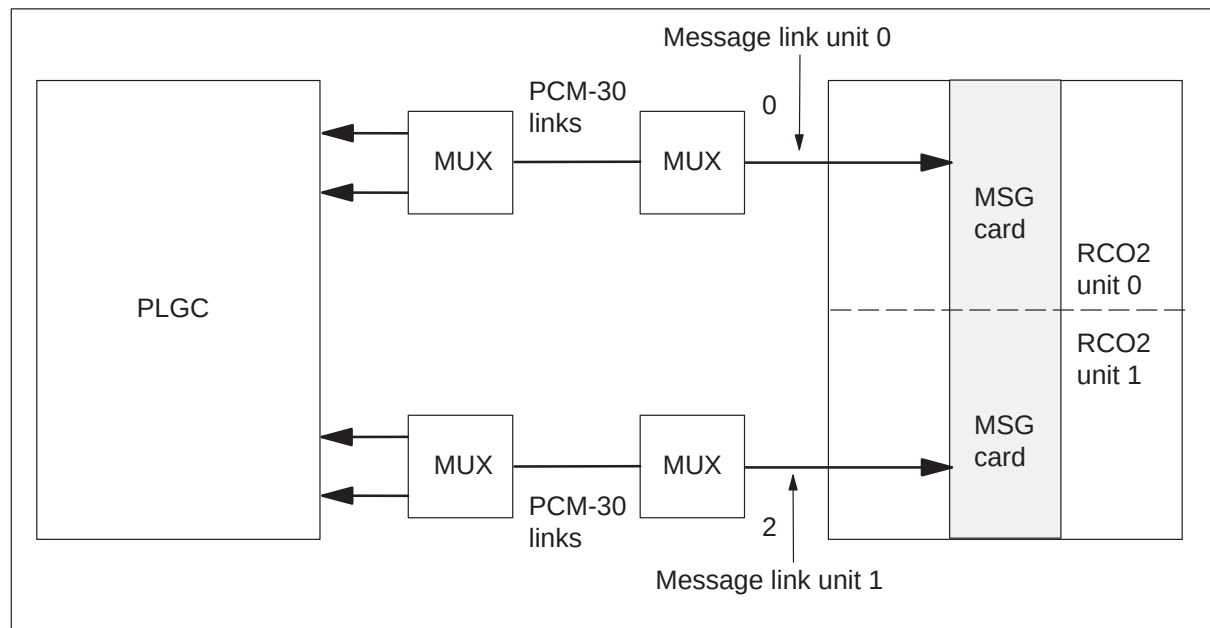
Message links

The RSC-S and host use dedicated message links to exchange system control information. The host uses system control messages to transfer call processing, initialization and maintenance information to the RSC-S. The RSC-S uses system control messages to tell the host of the RSC-S activities. System control messages contain time slot assignments to off-hook subscriber lines, test requests, and alarm status information.

One message channel time slot is for the active unit message link. The other message channel is for the inactive unit message link. The active unit message link is not limited and can transmit call processing and maintenance messages. The inactive unit message link is limited to maintenance messages.

The host monitors both links for maintenance messages. The host responds to call processing messages from the active unit only.

RCO2 message links



Message channels

Communication links between the RCO2 and the host peripherals on the C-side use the DMS-X protocol. The communication links between the RCO2 and peripherals on the P-side use the DMS-X protocol.

The CC sends messages to the host PCM-30 line group controller (PLGC) first and then to the RCO2. The host PLGC acknowledges that the message is for the host PLGC P-side node. The XPM messaging software system sends the message to its destination through a message channel between the two nodes.

The XPM messaging software system includes these layers:

- The link layer (level 1) provides the mechanism required to transfer the data bits from one node to another node. In this occurrence, the required mechanism is the PCM-30 link that connects the host XPM P-side interface card and the RCO2 C-side interface card.
- The data link layer (level 2) provides the mechanism required to transfer messages from one node to another node. These nodes connect to the mechanism. The transfer of messages uses the route selected by the network layer. The data link layer:
 - performs error detection and notification
 - maintains sequential order of messages
 - allows the activation and deactivation of message supporting links

The RCO2 converts two standard PCM-30 frames into one internal DS-60 frame. The system removes timeslot 1 of links 0 and 2 from the PCM-30 interface. The timeslots are wired to the first network message interface (NMIF) channel in the valid RCO2 message card. The speech bus interface (SBIF) routes messages along the speech bus until the messages reach the messaging card. Each timeslot on the speech bus can be a messaging channel to the C-side or P-side of the shelf. Use channel 1 on each link for DMS-X protocol.

- The network layer (level 3) provides the mechanism required to send a message from one node to another in the network. Application software uses this mechanism. The network layer selects a route and starts the required service from the message link layer. The route sends the message to the destination node.

DMS-X applications

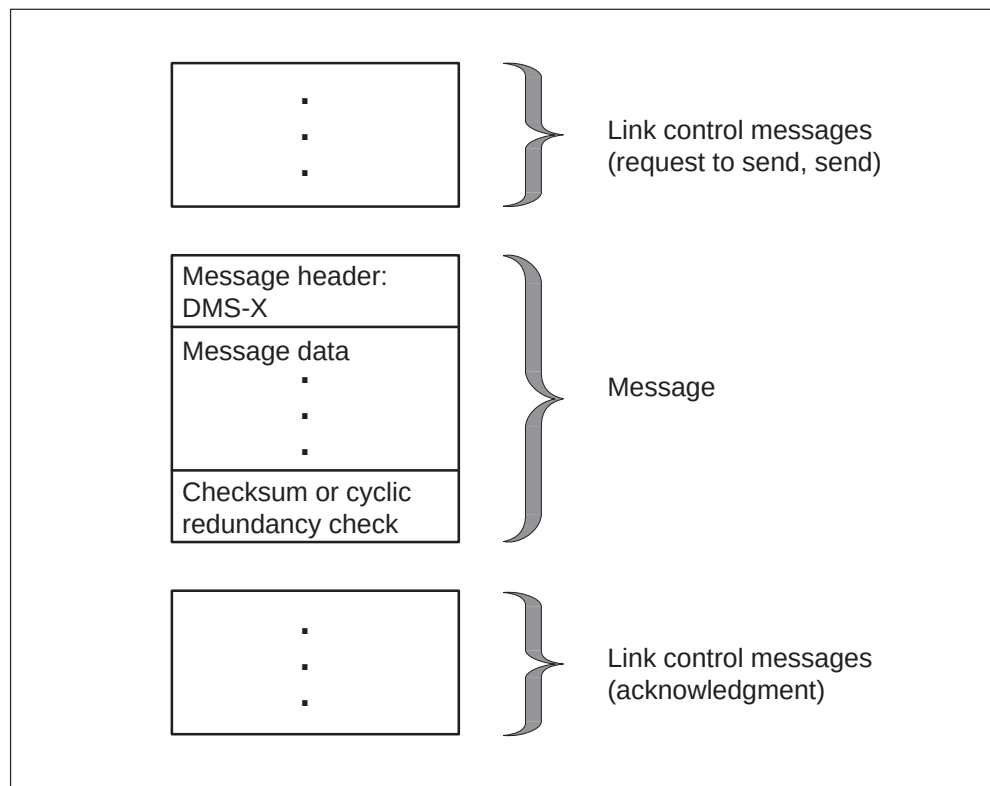
The DMS-X is the data link protocol between the PLGC and the RCO2. The C-side of the RCO2 or the P-side of the PLGC is a timeslot. To apply a data link protocol to the valid timeslot, assign the channel as a `data_link`. Assign this `data_link` to a specified `node_entity`.

DMS-X protocol

A full duplex message channel, like the PCM-30 links, starts the DMS-X half-duplex, byte-oriented protocol.

The DMS-X protocol is a state-driven code that requires handshake messaging between the RSC-S and host at each stage of data transfer. The handshake messaging allows the communicating terminals to delay the message transfer if one or both terminals are not ready.

DMS-X handshaking protocol



Message time-out, message checksum or CRC calculation perform message error detection. When protocol, checksum or CRC failure on an outgoing message occurs, the sending node performs the send sequence again.

On an incoming message failure, the sending node routes the message again over an alternate control side (C-side) link. Hardware redundancies provide a minimum of one other path to and from a node.

PCM-30 message format

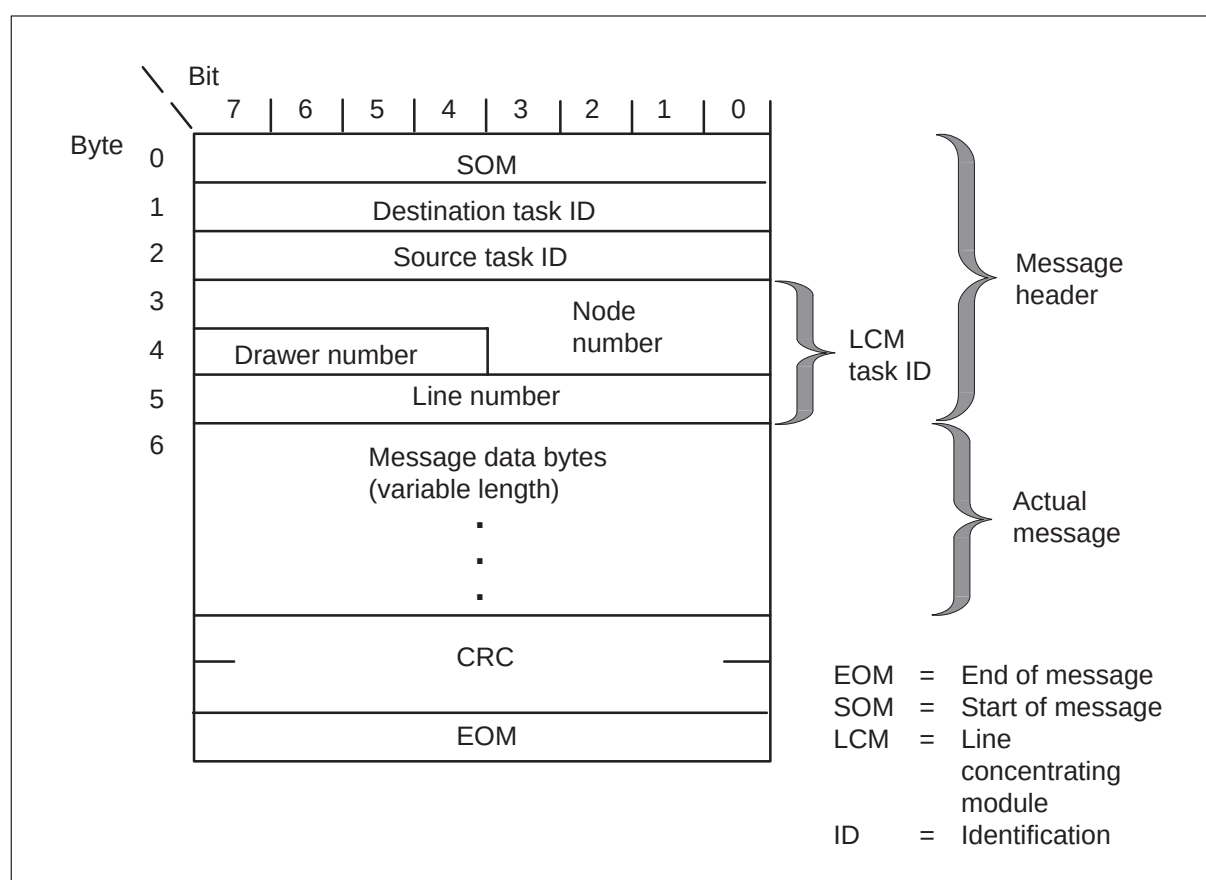
The DMS-X PCM-30 message header is the first six bytes as follows:

- The first byte is the start of message.

- The second byte is the destination task identification (ID) of the message. Use this ID in an outgoing message to identify the process to receive the message.
- The third byte is the source task ID. Use this ID in an incoming message to identify the process that sent the message.
- The last three bytes are the task ID number.

The number of bytes in the sent message or data varies. The CRC occupies two bytes and detects transmission errors. The end of message occupies one byte. The DMS-X message format appears in the following figure.

DMS-X message format



DS-30A message format

The DS30A message header is the first eight bytes as follows:

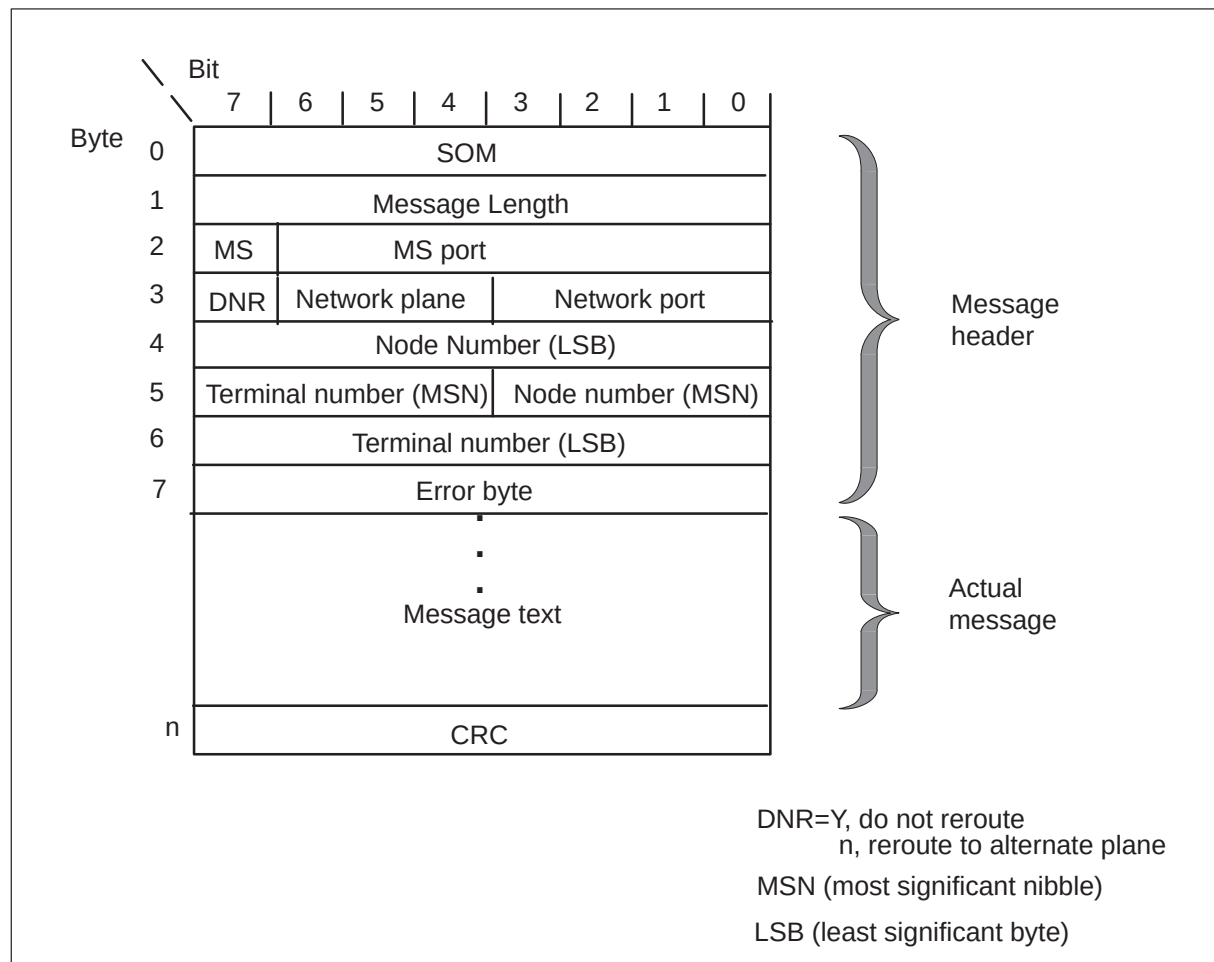
- The first byte is the start of message.
- The second byte is the message length.

3-10 RSC-S signaling

- The third byte is the route message switch (MS) and port identifier.
- The fourth byte contains message network routing information.
- The fifth, sixth, and seventh bytes contain message destination node and terminal information.
- The eighth byte contains the message error emulation byte.

The number of bytes in the sent message or data varies. The checksum occupies one byte and detects transmission errors.

DS-30A message format



MBS signaling

Meridian Business Set (MBS) signaling allows call processing software to communicate with the MBS terminal. An above-voice frequency, low-speed data channel transports the sent MBS messaging over the loop to the host.

The data channel is an 8-kHz signal. Communicate the data if this signal is present or not available. The following MBS features are supported for the RSC-S:

- Automatic Answer Back
- Automatic Dial
- Automatic Line
- Executive Busy Override
- Call Back Queuing
- Call Forward All Calls
- Call Park
- Call Pickup
- Call Waiting
- End-to-End signaling
- Group Intercom
- Individual Business Line
- Intercom
- Listen on Hold
- Make Set Busy
- Malicious Call Hold
- Multiple Appearance DN
- On-Hook Dialing
- Privacy Release
- Ring Again
- Speed Calling
- 3-Way Call/Call Transfer
- 6-Port Conference
- Feature Display
- Display Called Number
- Display Calling Number
- Query Time
- Business Set Inspect Key
- Automatic Inspect Mode
- Business Set Call Forward Universal Per Key

- Call-Request Enhancement
- Direct Station/Busy Lamp Field for MBS
- Station Camp-On for MBS
- Group Intercom All Call
- MADN Cut-Off on Disconnect (COD)
- MADN Bridging – Three-Way Call
- Multiple Executive Message Waiting Keys for each DN

Global and universal tone receiver (GTR/UTR) features

ATTENTION

Do not install the Universal Tone Receiver (UTR) and Global Tone Receiver (GTR) on the same RCO2 unit. Presently, there is no way of knowing which receiver interprets tones. Some call processing tones can degrade if designed for use with a GTR.

Note: For the following paragraphs related to UTR/GTR, the abbreviation CAS represents customer premises equipment (CPE) alerting signal.

Subscriber lines that terminate on an RSC-S can use the global tone receiver (GTR) or universal tone receiver (UTR) feature. This feature starts in the PM.

With the GTR/UTR feature, the RSC-S performs all digit collection functions at the location of the originating terminal. The functions included are:

- the allocation of a free receiver
- determining a path to the receiver
- the collection and processing of digits
- the deallocation of the receiver

With a GTR/UTR, the RSC-S goes through the following steps:

- 1 Request a GTR/UTR channel.
- 2 Instruct the GTR/UTR to monitor tones.

- 3 When monitoring starts, the RSC-S is informed of digits and sends the digits to the CM.
- 4 When the receiver is not required, the RSC-S frees the allocated GTR/UTR channel.

Note: A receiver request is required to start the sequence.

The RSC-S creates alerting tones to support the Deluxe Spontaneous Call Waiting Identification (DSCWID) feature. A line with the DSCWID option can establish a call and a second call can try to terminate to that line. In this occurrence, the RSC-S provides one of two types of alerting signals. The two types of signals are a subscriber alerting signal (SAS) and a SAS followed by a customer premises equipment (CPE) alerting signal (CAS). The tones alert the DSCWID subscriber of the pending call and the DSCWID CPE of pending caller data.

The subscriber identifies the SAS as the call waiting tone. The CAS alerts the CPE of incoming data. The CAS must follow the SAS to trigger an Analog Display Services Interface (ADSI) compatible CPE to display the DSCWID options. The CAS tone prepares the CPE to receive caller identification (CID) data.

The DSCWID CPE generates an acknowledge (ACK) tone to indicate the DSCWID CPE can receive DSCWID data. If the CPE is ADSI compatible, the CPE sends a DTMF A ACK signal in response to the CAS. If the CPE is a SCWID CPE, the CPE sends a DTMF D ACK signal in response to the CAS. The subscriber can use the CPE softkeys to control disposition to the incoming call when the alerting tone is sent. The CPE must be ADSI for the subscriber to change the ADSI. If the CPE is a SCWID or a 2500 set, the subscriber can use hard-coded keys.

T-tone timers set the maximum amount of time between a sent flash and the DTMF digit on an ADSI set. The RSC-S starts a T-tone timer. This event occurs after the RSC-S receives a flash signal from the ADSI compatible CPE of the customer. The value of T-tone is 600ms. The speech path is silent during the T-tone. The first option of a DSCWID call uses the T-tone timer. The CPE type does not change this action. Additional DSCWID options on an ADSI set also use the T-tone timer.

Additional DSCWID options on a SCWID or 2500 use a new timer (T-flash). These options use T-flash after a call is answered, with SCWID and 2500 sets. The use of T-flash provides the customer with time to select an option after a flash. The T-flash was introduced because subscribers were unable to flash and dial a DTMF digit in 600ms. The T-flash is an operating company controlled timer that the operating company sets from 1 to 8 seconds. The default value is 1.5 seconds. The RSC-S starts the T-flash

timer if the NON-ADSI field is set to Y. The RSC-S receives a flash signal from the SCWID or 2500 set of the customer. The RSC-S receives the signal during the held or conference call state. The RETURN option applies if the RSC-S cannot attach a GTR/UTR before 400ms.

Custom Local Area Subscriber Services

Custom Local Area Subscriber Services (CLASS) provide capabilities for call handling and the delivery and display of information. CLASS services can assign to the different intergrated business network (IBN) line types supported by the DMS-100 switch in the same way as Meridian Digital Centrex features.

Support for CLASS services depends on the ability to transmit digital information over an analog line. The NT6X78 (CLASS Modem Resource card) provides this ability for standard IBN lines. Note that the Meridian Business Set (P-Phone) line has dedicated out-of-band signaling capability and does not require the CMR card.

The RCO2 uses P-side to P-side connections for intraswitched calls. The Class Modem Resource card (CMR) requires a C-side channel to transmit the data but this channel is not available for intraswitched calls. CLASS calls that use the CMR cannot be intraswitched in the RCO2. The network switch handles these calls.

The North American version of the RCO2, the RCC2, uses DS-1 signaling protocol. Each RCC2 or RCO2 C-side link can carry 31 channels. However, DS-1 signaling protocol uses 24 channels. The seven spare channels per C-side link handle all the RCC2 intraswitched CLASS calls. For the RCO2, which uses PCM-30, there are no free C-side channels for C-side intraswitching.

Links between the CMR and the host switch remain active after the call has been set up. Plan and engineer PCM-30 equipment between the RCO2 and the host switch for this condition.

Extended Distance Capability

An RCO2 unit can be located an extended distance from the host. HDLC and the addition of the NTMX76 card allow EDC (extended distance capability).

RCO2s can operate beyond the present 2ms delay limit. The operating company must change the protocols used by the RCO2 and the host. These modifications increase the allowed one-way signal delay to 6.5ms. For RCO2s greater than 2ms delay from the host and for fiber-optic ring applications, the increased transmission delay does not depend on the actual distance.

The operating company can provide the increased delay when the operating company changes the DMS-X protocol to HDLC. The HDLC controller can then send messages over 32 P-side channels. The host and the remote peripheral equipment use four channels for messaging (per PM), two for HDLC, and two for DMS-X.

The maximum number of channels available for voice and static trunk is 476 for PCM-30 links. The operating company can use EDC over any transmission medium, provided no RCO2 specification (for example, jitter or bit error rate) is in error. The RCO2s with EDC require an XPM-PLUS equipped peripheral installed with the HDLC messaging packs. These packs are NTMX76AA-EDC only, or NTMX76AB-EDC with ADSI/SCWID feature. For the host PLGC to support RCO2-EDC capability, the host PLGC must support ISDN and use an ISDN PLGC software load. RCO2-EDC does not work with a non-ISDN PLGC.

The HDLC and DMS-X protocols can only work in parallel on host XPMs. The operating company can define the protocols for each remote. Each remote can have its own protocol. A subscriber defines the message card for extended distance ability. The subscriber selects DMS-X or HDLC protocol in table RCCINV at the remote. Refer to *Extended Peripheral Module International Translations Reference Manual*, 297-8331-815 for entry examples.

A- and B-bit signaling

The RSC-S basic call processing supports software for basic call processing, CLASS services, and ESA. To support these activities, the RSC-S and host must transfer system control messages over the PCM-30 message channel. Separate channel signaling messages use A-bits and B-bits from specified speech channels. The A- and B-bits are transported on timeslot 16 of frames one through fifteen.

The A-bits and B-bits are signaling bits that provide the following supervisory information:

- status of subscriber lines (on-hook or off-hook)
- ringing
- dial pulses

Use the A-bits and B-bits, each with a value 0 or 1, for signaling. The type of line card that receives or sends the bits determines how the bits are read. For dial pulses, a series of makes and breaks are sent on the subscriber loop. A=1 is a make and A=0 is a break.

Coin lines use A-bits and B-bits in specified speech channels for separate channel signaling. The coin lines use 8-bit patterns in appropriate speech

channels for supervision. Use the A-bits and B-bits and 8-bit coin signaling patterns to perform supervision. The coin line card handles ground start or loop start supervisory signaling.

The following eight areas are essential to call processing:

- origination and channel allocation
- tone generation with dial tone speed recording
- digit collection
- ringing
- automatic number identification
- loss padding
- messaging loss to host
- busy/return to service of lines

The RSC-S uses the following protocols for communications and subscriber services:

- HDLC

HDLC is a full duplex message protocol based on the CCITT level 2 Signaling System 7 (Q.703). Support this protocol between PLGC+ and RCO2 peripherals.

Protocol change from DMS-X to HDLC

Features AN1548 and AN0979, In-service upgrade DMS-X to HDLC, support the upgrade of PCM-30 links between the PLGC and the RCO2. Change the messaging protocol and the remote can be in-service. Download static data from the CC. A dynamic update occurs in the host and the remote peripherals.

When the HDLC protocol applies dynamically, the system scans for current calls on channels dedicated to HDLC messaging. If established calls are not present on these channels, the system displays a warning that active calls are dropped. The system prompts the user to reject or confirm that these calls be dropped. Free channels are channels that calls do not occupy. Reserve these channels for HDLC until the protocol is changed or until the user refuses the change.

The following is an example MAP display of this process:

```
Enter Y to confirm, N to reject or E to edit
>Y
2 existing calls will be dropped
```


Please confirm ("Yes", "Y", "NO", or "N")
>Y

In the example, two calls are active. The operating company allows the two calls to be dropped and to continue the DSM-X to HDLC protocol change. As a result, the following occur:

- static data is sent from the CC to the PLGC and the RCO2
- RCO2 nailed-up connections for the HDLC message channels are set
- creates and binds data and network links into the messaging system
- it sets the PM to ISTb until all HDLC links are synchronized

The NTMX76 firmware (layer) synchronizes HDLC. The link synchronizes when the sides of the link host and remote communicate with each other. The NTMX76 audit process verifies if the new HDLC links are synchronized.

When a minimum of one HDLC link synchronizes for each unit, the audit activates the HDLC link for messaging. A message that is not solicited is sent to the CC. The system generates a PM181 log when each HDLC link synchronizes. When all HDLC message links of an RCO2 unit synchronize again, the ISTb state caused by the synchronization problem clears.

When a link fails to synchronize or loses synchronization:

- each remote unit sends a message to the CC that is not solicited. To prevent problems in the one-night-process (ONP), each remote unit sends the message after the version registry check.
- the system generates a PM181 log and indicates that the valid link is not synchronized

If all HDLC links lose synchronization to the active RCO2 unit, the RCO2 attempts to SWACT. If the SWACT fails, the RCO2 enters ESA. All HDLC message links of an RCO2 unit must be synchronized after the dynamic upgrade. If the message links are not synchronized, the RCO2 unit works in the DMS-X mode.

RCO2 with ISDN

The RCO2 can be configured with ISDN services for RSC-S. The functional areas of the RCO2 with ISDN include the following:

- cards
- speech and message paths
- host ISDN peripherals
- enhanced LCM (LCME)

Note: The figure “Operating block diagram of the RCO2 with ISDN” relates to the following functional description of the RCO2 with ISDN.

Cards

The RCO2 with ISDN is based on the RCO2 with the addition of two cards: the enhanced ISDN signaling preprocessor (EISP) and the enhanced D-channel handler (EDCH).

The EDCH card provides the primary interface to D-channels, and performs Q.921 link access procedure on D-channel (LAPD) layer 2 processing. The EDCH permanently connects to an ISDN loop and receives or sends messages on the signaling/packet data channel.

The EISP card provides a communication channel between the UP and the EDCH cards.

The PCM-30 cards (the NTMX82) provide the 64-Kbps clear channels required to process D-channels.

Speech and message paths

The speech and message paths of the RCO2 with ISDN are like the RCO2 without ISDN. The addition of the EDCH, EISP, and PCM-30 (NTMX82) cards allows the RCO2 to process calls from ISDN terminals.

The EDCH cards provide the Q.921 function and the physical processing. The EDCH provides these functions for the D-channels from the ISDN loops that end on ISDN line cards.

Enhanced D-Channel Handler (EDCH)

Feature AJ3453 provides for integration of the Enhanced D-Channel Handler (EDCH) card, NTB02BA, in the RCO2. Feature AJ3453 improves the capability on the RCO2 for a host of ISDN features that relates to National ISDN (NI-1) compliance.

Requirements required for feature AJ3453 to integrate the EDCH card, NTB02BA, in an RCO2 follow:

- The RCO2 must have an NTMX77 Unified Processor card.
Note: When an RCO2 is provisioned the optional NTAX74 CAP (with WRI software load), Peripheral/Remote Loader-16 (NT7X05) functionality is not supported.
- The RCO2 must have an NTB01BA Enhanced ISDN Processor card.
Note: The NTB01BA is required to support NTAX74 CAP functionality.
- The NTX750AD software package is required to RTS an EDCH on a RCO2.

The following restrictions apply to an RCO2 with the EDCH cards:

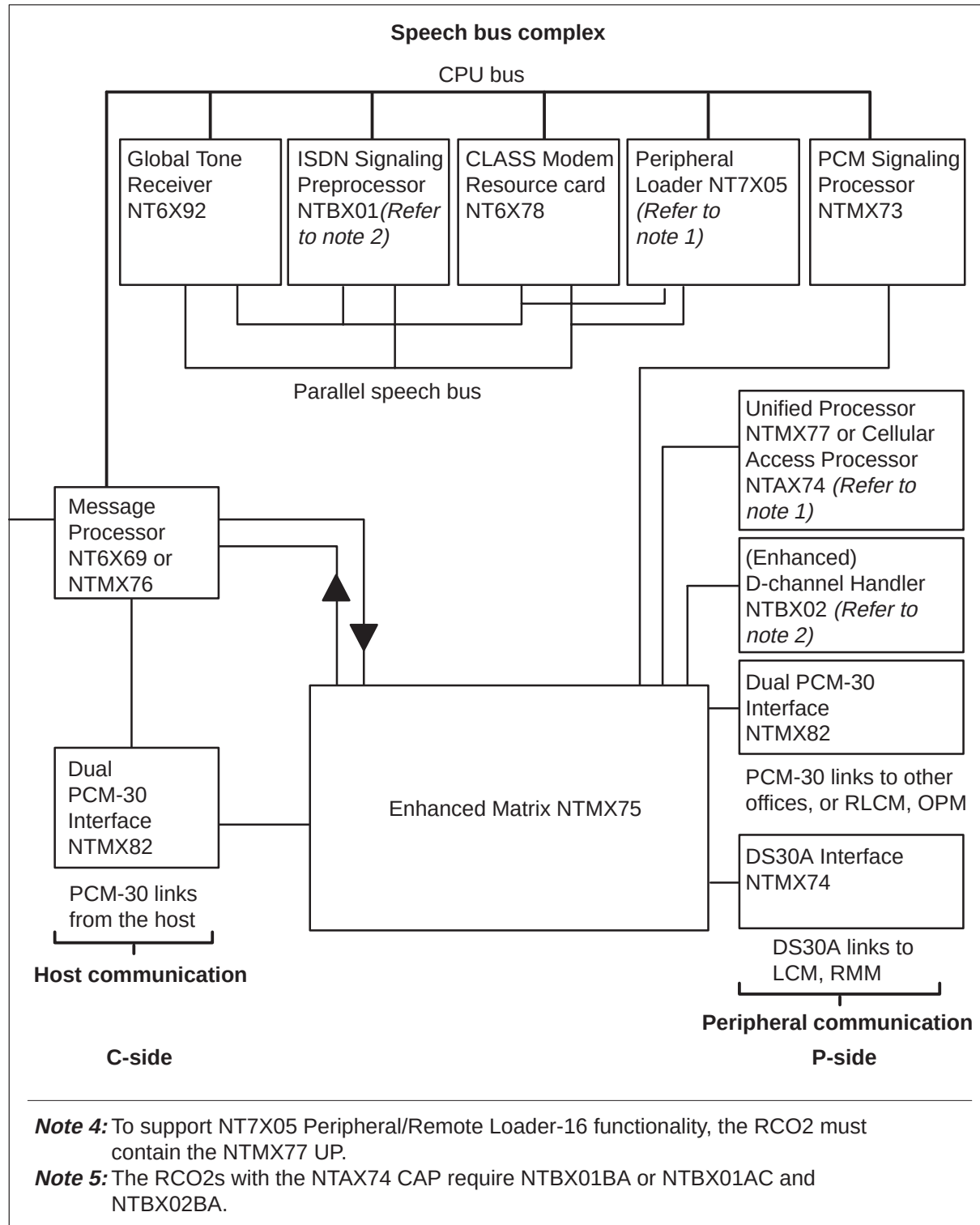
- In table DCHINV, the system does not allow an attempt to change the PEC for a DCH with an attached ISDN service group (ISG). The DCH must become a spare DCH before the tuple changes.
- Loading a DCH circuit pack with an EDCH load can pass, but the RTS fails.
- The system does not allow sparing from an EDCH circuit pack with an EDCH load to a DCH circuit pack.
- The system only allows sparing between EDCH cards during a takeover from a DCH load to an EDCH load. One of the EDCH cards must have a different load. Sparing from an EDCH to an EDCH with the same load is acceptable.

LCME

The LCME provides the subscriber with BRI, through the two binary one quaternary (2B1Q) U-loop interface. Nortel Networks provides this interface with 2B + D-channels and six maintenance channels throughout the 2B1Q superframe.

An operating block diagram of the RCO2 with ISDN appears in the following figure.

Operating block diagram of the RCO2 with ISDN

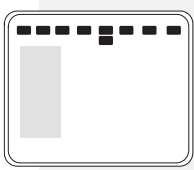


RSC-S recovery procedures

This chapter contains the recovery procedure for the DMS-100 group Remote Switching Center-SONET (RSC-S) for international applications. Maintenance personnel use this procedure to return the RSC-S to service from an out-of-service condition. This condition can be an emergency stand-alone (ESA) condition.

PM RCO2
critical

Alarm display

	CM	MS	IOD	Net	PM	CCS	Lns	Trks	Ext	Appl
	.	.	.	.	nRCO2	.	.	.	.	.
					C					

Application

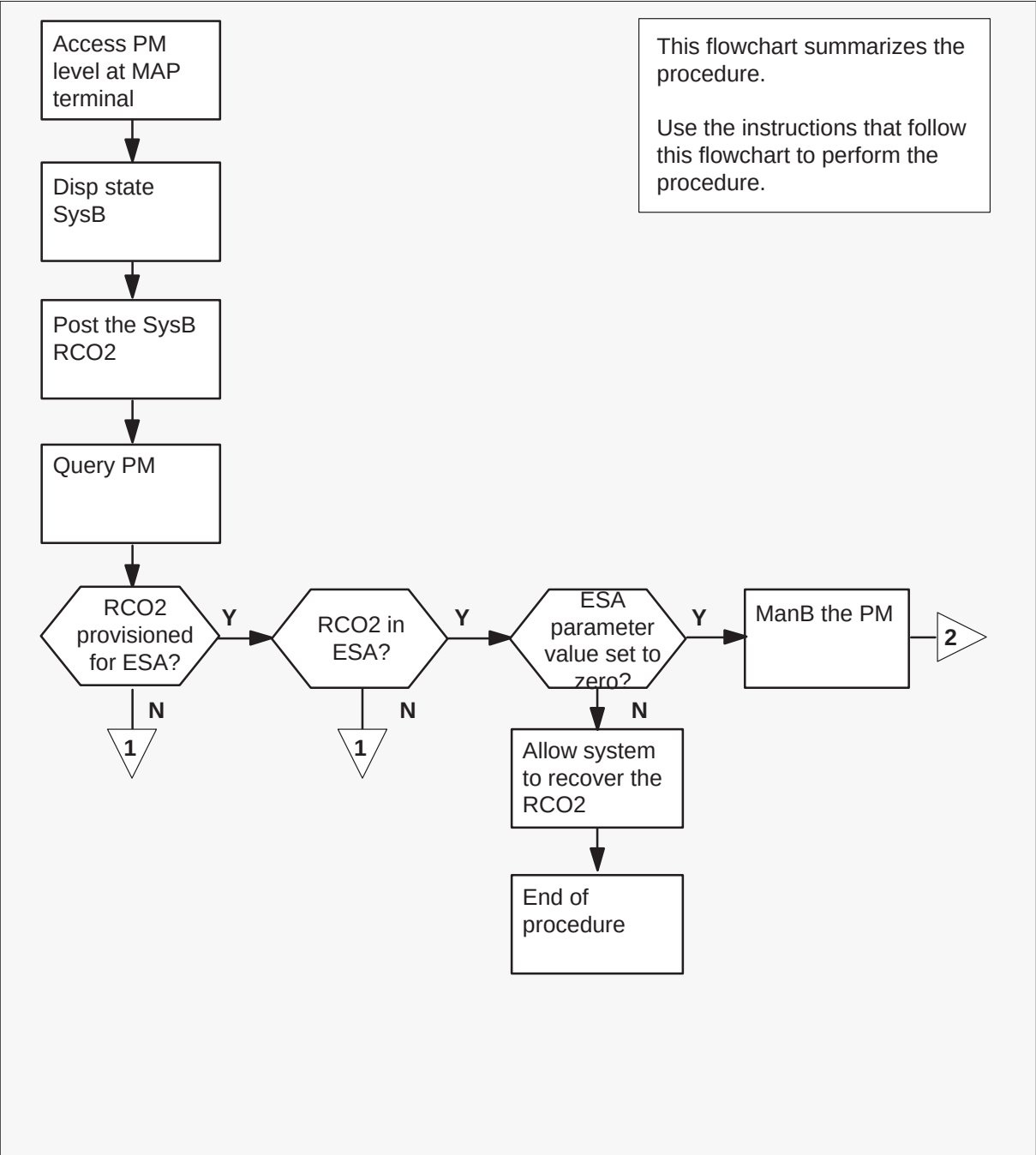
Use this procedure to restore call processing under cental control (CC) on an RCO2.

Action

This procedure contains a summary flowchart and a list of steps. Use the flowchart to review the procedure. Follow the steps to perform the procedure.

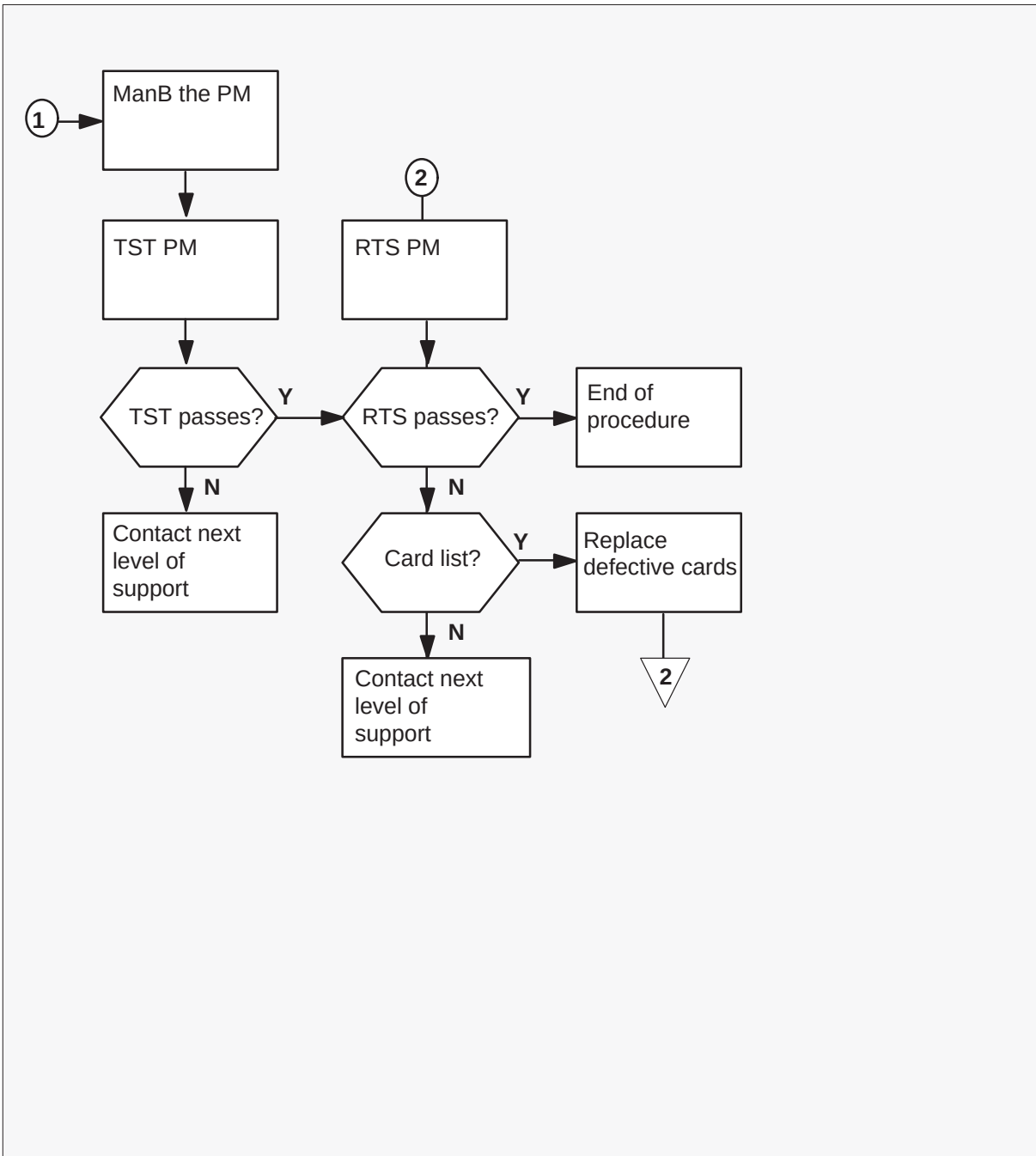
PM RCO2
critical (continued)

Summary of recovering an RCO2



PM RCO2 critical (continued)

Summary of recovering an RCO2 (continued)



PM RCO2
critical (continued)

To recover a PM RCO2***At the host office***

- 1 Proceed if:
 - an *Alarm Clearing Procedure* procedure directed you to this procedure
 - your maintenance support group directed you to this procedure

At the MAP terminal

- 1 To silence an audible alarm, type
>MAPCI;MTC;SIL
and press the Enter key.
- 2 To access the peripheral module (PM) level of the MAP display and identify the defective RCO2, type
>PM;DISP STATE SYSB RCO2
and press the Enter key.
- 3 To post the RCO2 with the alarm condition, type
>POST RCO2 SYSB
and press the Enter key.
- 4 To determine the fault condition, type
>QUERYPM FLT
and press the Enter key.

Example of a MAP response:

Unit 0

System busy reason: Link Audit

Unit 1

System busy reason: Link Audit

PM RCO2 critical (continued)

- 5 To determine if the RCO2 is equipped with emergency stand-alone (ESA), type

>QUERYPM

and press the Enter key.

Example of a MAP response for RCO2s configured with the NTMX77AA Unified Processor:

```
PM Type: RCO2  PM No.: 0  PM Int. No.: 1  Node_No.: 203
PMs Equipped: 309  Loadname: ESR07AT EEPROM Load: MX77NF02
ESA equipped: YES IntraSwitching is ON
WARM SWACT is supported and available.
RCO2 0 is included in the REX schedule.
Last REX date was FRI. 1995/03/10 at 12:25:07; PASSED.
Node Status: {OK, FALSE}
Unit 0  Act, Status: {SysB, TRUE}
Unit 1 Inact, Status: {SysB, TRUE}
  Site Flr RPos Bay_id Shf Description Slot EqPEC
  RCO20  01  A00  RCE 00   18  RCO2 : 000      6X12AA
```

Note: For RCO2s with the optional NTAX74AA Cellular Access Processor (CAP) the EEPROM load name reflects NTAX74AA. For RCO2s with the NTMX77AA Unified Processor (UP), the EEPROM load name reflects NTMX77AA. For an RCO2 provisioned with NTAX74AA, a sample EEPROM load name is AX74XE01. In the example, the EEPROM load name is MX77NH08.

If the RCO2	Do
is equipped with ESA	step 6
is not equipped with ESA	step 15

- 6 Determine if the ESA exit time is set for manual recovery from ESA. To access table OFCENG, type

>TABLE OFCENG

and press the Enter key.

PM RCO2 critical (continued)

- 7 To check the RCO2 ESA exit time, type

>POS RCO2_XPMESAEXIT

and press the Enter key.

Example of a MAP response:

PARMNAME	PARMVAL
RCO2_XPMESAEXIT	0

If the PARMVAL	Do
is set to zero	step 8
is more than zero	Allow the system to recover the RCO2. Go to step 36.

- 8 To quit table OFCENG and remain at the POST level of the MAP display, type

>QUIT

and press the Enter key.

- 9 To examine PM181 log reports that this RCO2 generates, type

>LOGUTIL;OPEN PM 181;BACK ALL

and press the Enter key.

Example of a PM181 log report:

```
PM181 MAR14 14:33:54 7534 INFO RCO20 RCO2 0 UNIT 0
Node:SysB, Unit 0 Act:SysB, Unit 1 Inact:SysB
PM in ESA, Communication restored, ready to be RTSed
```

Note: The system generates this log when the value for XPMESAEXIT in table OFCENG is equal to 0.

- 10 To quit Logutil and remain at the POST level of the MAP display, type

>QUIT

and press the Enter key.

- Host XPM P-side link number
- Link 0: PLGC 1 0;Cap MS;Status:OK P;MsgCond:CLS, Restrict
- Link 1: PLGC 1 2;Cap MS;Status:OK P;MsgCond:CLS, Unrestricted
- Link 2: PLGC 1 4;Cap S;Status:OK
- Link 3: PLGC 1 5;Cap S;Status:OK

- Host XPM P-side link number
- | N | CLASS | SITE | PLGC | CK | D | ALRM | SLIP | FRME | BER | ES | SES | STATE |
|---|--------|------|------|----|---|------|------|------|------|----|-----|-------|
| 0 | REMOTE | HOST | 1 | 0 | C | | 0 | 0 | <-7. | 0 | 0 | INSV |

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PM RCO2
critical (continued)

- 14** To access the PM level of the MAP terminal and post the RCO2, type

>PM;POST RCO2 RCO2_no

and press the Enter key.

where

RCO2_no is the number of the RCO2 identified in step 3

- 15** To manually busy (ManB) the PM, type

>BSY PM

and press the Enter key.

- 16** To test the RCO2, type

>TST PM

and press the Enter key.

If the system response	Do
is TEST PASSED	step 17
is TEST FAILED with reason, C-side links not available	step 23
is TEST FAILED and the system generates a card list	step 33

PM RCO2 critical (continued)

- 17 To return the PM to service, type

>RTS PM

and press the Enter key.

MAP response example of an RCO2:

```
RCO2 RCO2_no UNIT unit_no IN ESA MODE.  
THIS ACTION WILL CAUSE ESA EXIT with n ACTIVE CALLS  
A COLD EXIT WILL BE ATTEMPTED.  
ALL CALLS WILL BE ABORTED.  
PLEASE CONFIRM ("YES" OR "NO")  
or
```

```
RCO2 RCO2_no UNIT unit_no IN ESA MODE.  
THIS ACTION WILL CAUSE ESA EXIT with n ACTIVE CALLS  
A WARM EXIT WILL BE ATTEMPTED.  
SOME CALLS MAY BE ABORTED.  
PLEASE CONFIRM ("YES" OR "NO")
```

If the system response	Do
is RTS PASSED	step 36
is RTS FAILED and the RCO2 is configured with an NTMX77AA processor	step 18
is RTS FAILED and the RCO2 is configured with an NTAX74AA processor	step 20

Note: The system generates a PM171 log during ESA EXIT. This procedure details the call processing operational measurements (OM) during ESA.

PM RCO2 critical (continued)

- 18 The peripheral loader card (NT7X05) allows local loading of the RCO2 data. Local data loading reduces recovery time. To check if the NT7X05 card is provisioned, type

>QUERYPM FILES

and press the Enter key.

Example of a MAP display:

```

      CM   MS   IOD   Net   PM   CCS   LNS   Trks   Ext   APPL
      .    .    .    .    1RCO2  .    .    .    .    .
                *C*
RCO2                SysB   ManB   OffL   CBsy   ISTb   InSv
0 Quit          PM      2      0      2      0      2      25
2 Post         RCO2     1      0      0      0      0      1
3 ListSet
4
4          RCO2      0 ISTb Links_00S: CSide 0, PSide 0
5 TRNSL_       Unit 0: Inact SysB
6 TST_        Unit 1: Inact SysB
7 BSY_
8 RTS_        QUERYPM files
9 OffL        Unit 0:
10 LoadPM_     NT7X05 load File: KRI07AU
11 Disp_
12 Next_       Unit 1:
13 SwAct       NT7X05 load File: KRI07AU
14 QueryPM     NT7X05 Image File:
15
16 IRLINK
17 Perform
18

```

Note: If the NT7X05 card is not provisioned, the MAP response is:

Nt7X05 not datafilled, QueryPm files invalid

If the NT7X05 card	Do
is provisioned	step 19
is not provisioned	step 20

PM RCO2 critical (continued)

19



WARNING

Possible service interruption

The LOCAL LOADFILE option of the LOADPM command has a parameter of [<file> string]. The LOADPM command does not patch the loadfile when you use this parameter. Do not use this parameter unless you need to use the NOPATCH option of the loadfile.

To load the RCO2 from the local loadfile, type

>LOADPM PM LOCAL LOADFILE

and press the Enter key.

If the load	Do
passed	step 21
failed	step 20

20 To load the RCO2 from the CC, type

>LOADPM PM

and press the Enter key.

If the load	Do
passed	step 21
failed	step 35

21 To return the PM to service, type

>RTS PM

and press the Enter key.

If the system response	Do
is RTS PASSED	step 22
is RTS FAILED	step 35

PM RCO2
critical (continued)

- 22 Check for dial tone according to local operating company procedures.

If the dial tone	Do
is not restored	step 35
is restored	step 36

- 23 To identify central-side (C-side) links to the host PM that are system busy (SysB), type

>TRNSL C

and press the Enter key.

Example of a MAP response:

```
LINK    0:  PLGC 1 0;CAP MS;SysB;MSGCOND:CLS,Restricted
LINK    1:  PLGC 1 1;CAP S;STATUS:OK
LINK    2:  PLGC1 2;CAPMS;SysB;MSGCOND:CLS,Unrestricted
LINK    4:  PLGC1 4;CAP S;STATUS:OK
```

PM RCO2
critical (continued)

24 To post the host PM identified in step 23, type

>POST host_pm host_pm_no

and press the Enter key.

where

host_pm is an LGC or an LTC

host_pm_no is the number of the LGC or LTC

Example of a MAP display:

CM	MS	IOD	Net	PM	CCS	Lns	Trks	Ext	APPL
.	.	.	.	nRC02 *C*	.	.	.	.	.
LTC			SysB	ManB	OffL	CBsy	ISTb	InSv	
0 Quit	PM		3	0	1	0	4	12	
2 Post_	PLGC		0	0	2	0	2	9	
3 ListSet									
4	LTC	1	ISTb	Links_00S:	CSide	0,	PSide	2	
5 Trnsl_	Unit0:		Inact	InSv					
6 Tst_	Unit1:		Act	InSv					
7 Bsy_									
8 RTS_									
9 OffL									
10 LoadPM_									
11 Disp_									
12 Next									
13 SwAct									
14 QueryPM									
15									
16									
17 Perform									
18									

25 To identify the defective P-side links, type

>TRNSL P

and press the Enter key.

Example of a MAP response:

LINK 0:	RC02	1	0;CAP	MS;STATUS;	SysB;MSGCOND:CLS,Restricted
LINK 1:	RC02	1	1;CAP	S;STATUS:	OK
LINK 2:	RC02	1	2;CAP	MS;STATUS	SysB;MSGCOND:CLS,Unrestricted
LINK 4:	RC02	1	3;CAP	S;STATUS:	OK
LINK 5:	RC02	1	4;CAP	S;STATUS:	OK
LINK 6:	RC02	1	5;CAP	S;STATUS:	OK
LINK 7:	RC02	1	6;CAP	S;STATUS:	OK

PM RCO2
critical (continued)

- 26 To busy the defective link, type

>BSY LINK link_no

and press the Enter key.

where

link_no is the number of the defective P-side link identified in step 25

- 27 To test the defective link, type

>TST LINK link_no

and press the Enter key.

where

link_no is the number of the link manually busied in step 26

Note: Perform this step for each manual busy (ManB) link.

If the system response	Do
is TEST PASSED	step 28
is TEST FAILED	step 35

- 28 To return the link(s) to service, type

>RTS LINK link_no

and press the Enter key.

where

link_no is the number of the link tested in step 27

Note: Perform this step for each ManB link.

If the system response	Do
is RTS FAILED	step 35
is RTS PASSED	step 29

- 29 To post the RCO2, type

>POST RCO2 RCO2_no

and press the Enter key.

where

RCO2_no is the number of the ManB RCO2

PM RCO2 critical (continued)

- 30** To return the RCO2 to service, type

>RTS PM

and press the Enter key.

If the system response	Do
is RTS PASSED on both units	step 36
is RTS FAILED on both units	step 35
is RTS FAILED on one unit	step 31

- 31** To test the ManB RCO2 unit, type

>TST UNIT unit_no

and press the Enter key.

where

unit_no is the number of the ManB RCO2 unit (0 or 1) that did not RTS

If the system response	Do
is TST PASSED	step 32
is TST FAILED	step 35

- 32** To return the tested RCO2 unit to service, type

>RTS UNIT unit_no

and press the Enter key.

where

unit_no is the number of the RCO2 unit tested in step 31

If the system response	Do
is RTS PASSED	step 36
is RTS FAILED	step 35

PM RCO2 critical (end)

- 33** Check the card list shown in the MAP display, that results from step 16.

For RCO2s with the optional NTAX74AA Cellular Access Processor (CAP) the card list in the MAP response reflects AX74 in slot 03. For RCO2s with the NTMX77AA Unified Processor (UP), the card list in the MAP response reflects MX77 in slot 03. Both configurations appear in the following examples.

Example of a MAP response for RCO2s configured with the NTMX77AA Unified Processor:

SITE	FLR	RPOS	BAY_ID	SHF	DESCRIPTION	SLOT	EQPEC
RSCS0	01	A00	RCE	00 32	RCO2 : 000	:03	MX77
RSCS0	01	A00	RCE	00 32	RCO2 : 000	:08	6X69
RSCS0	01	A00	RCE	00 32	RCO2 : 000	:11	MX73
RSCS0	01	A00	RCE	00 32	RCO2 : 000	:15	MX74
RSCS0	01	A00	RCE	00 32	RCO2 : 000	:17	MX73

Example of a MAP response for RCO2s configured with the optional NTAX74AA Cellular Access Processor:

SITE	FLR	RPOS	BAY_ID	SHF	DESCRIPTION	SLOT	EQPEC
RSCS0	01	A00	RCE	00 32	RCO2 : 000	:03	AX74
RSCS0	01	A00	RCE	00 32	RCO2 : 000	:08	6X69
RSCS0	01	A00	RCE	00 32	RCO2 : 000	:11	MX73
RSCS0	01	A00	RCE	00 32	RCO2 : 000	:15	MX74
RSCS0	01	A00	RCE	00 32	RCO2 : 000	:17	MX73

If all of the cards on the list	Do
are replaced	step 35
are not replaced	step 34

- 34** If the system indicates other cards that have faults, go to the card replacement procedure in *Card Replacement Procedures* for the next card on the card list. Complete the card replacement procedures and go to step 16.
- 35** For additional help to clear this alarm, contact the next level of support.
- 36** This procedure is complete. If the system displays other alarms, refer to the appropriate alarm clearing procedures in the *Clearing an Alarm Procedures*.

RSC-S alarm clearing procedures

This chapter contains the alarm clearing procedures for the DMS-100 Remote Switching Center-SONET (RSC-S) for international applications. Maintenance personnel use these procedures to clear alarms as the alarms appear at the MAP terminal display.

Procedures in this chapter correspond to the alarms as the alarms appear at the MAP display. These procedures are in numeric order to allow maintenance personnel to locate the procedures easily.

PM LCME
critical

Alarm display

	CM	MS	IOD	Net	PM	CCS	Lns	Trks	Ext	EIO
	.	.	.	.	1LCME	.	.	.	.	.
					C					

Indication

The 1LCME *C* indicates a critical condition in the LCME. The LCME is under the PM subsystem header at the MTC level of the MAP terminal.

Meaning

The indicated number of LCME units are in the system-busy (SysB) state.

Result

Call processing ceases if the LCME units fail. No call processing support exists.

Common procedures

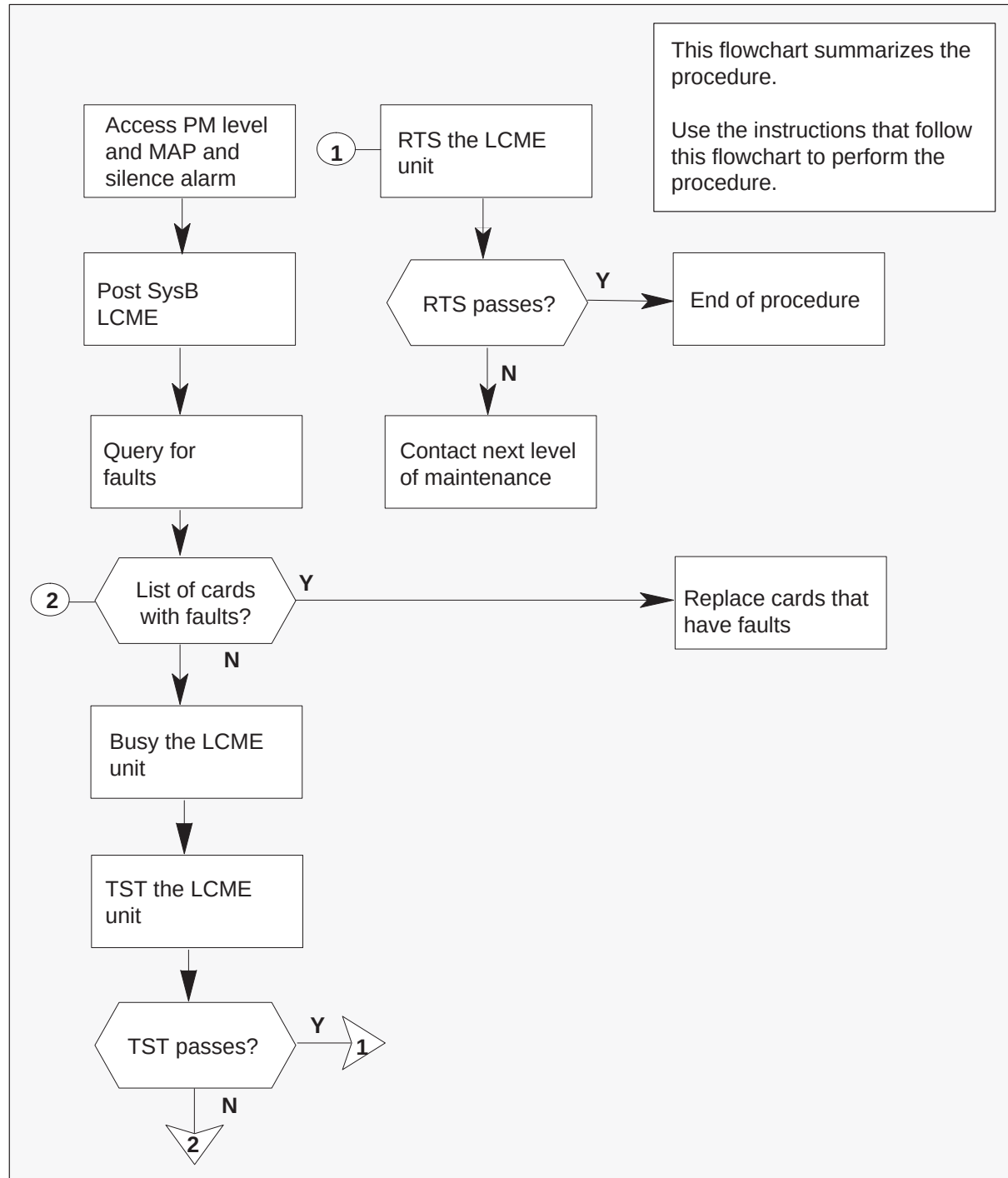
There are no common procedures.

Action

This procedure contains a summary flowchart and a list of steps. Use the flowchart to review the procedure. Use the steps to perform the procedure.

PM LCME critical (continued)

Summary of clearing a PM LCME critical alarm



PM LCME critical (continued)

Clearing a PM LCME critical alarm

At the MAP terminal

1

ATTENTION

Enter this procedure from a PM system-level alarm clearing procedure step that identifies an LCME-associated fault.

To silence the alarm, type

>MAPCI;MTC;PM;SIL

and press the Enter key.

2 To identify the LCME that has faults, type

>DISP STATE SYSB LCME

and press the Enter key.

Normal response on the MAP display:

SysB LCME : 2

PM LCME critical (continued)

- 3 To post the SysB LCME identified step 2, type

>POST LCME lcme_site_name lcme_frame_no lcme_no

and press the Enter key.

where

lcme_site_name is the site name for the LCME that has faults

lcme_frame_no is the number of the associated LCME equipment frame

lcme_no is the number of the LCME that has faults

Normal response on the MAP display:

CM	MS	IOD	Net	PM	CCS	Lns	Trks	Ext
.	.	.	.	1LCME	.	.	.	.
				C				
LCME			SysB	ManB	OffL	CBsy	ISTb	InSv
0 Quit	PM	1	0	2	0	2	12	
2 Post_	LCME	0	0	2	0	2	9	
3 ListSet								
4 SwRG	LCME	RSC-S 14	1 SysB	Links_00S:	CSide	2	PSide	0
5 Trnsl_	Unit0:	SysB		/RG: 1				
6 Tst_	Unit1:	SysB		/RG: 1				
7 Bsy_				11 11 11 11 11	RG:Pref	1	InSv	
8 RTS_	Drwr:	01 23 45 67 89	01 23 45 67 89	Stby	0	InSv		
9 OffL		.. .. .	.. .. .	.. .. .	.. .. .	.. .. .		
10 LoadPM_								
11 Disp_								
12 Next								
13								
14 QueryPM								
15								
16								
17								
18								

PM LCME
critical (continued)

4 To check for fault indicators, type

>QUERYPM FLT

and press the Enter key.

Normal response on the MAP display:

CM	MS	IOD	Net	PM	CCS	Lns	Trks	Ext
.	.	.	.	1LCME	.	.	.	.
				C				
LCME			SysB	ManB	OffL	CBsy	ISTb	InSv
0 Quit	PM	1	0	2	0	2	12	
2 Post_	LCME	0	0	2	0	2	9	
3 ListSet								
4 SwRG	LCME	RSC-S	14 1	SysB	Links_00S:	CSide	0	PSide 0
5 Trnsl_	Unit0:	SysB			/RG: 1			
6 Tst_	Unit1:	SysB			/RG: 1			
7 Bsy_					11 11 11 11	11 11	RG:Pref 1	InSv
8 RTS_	Drwr:	01 23 45 67 89	01 23 45 67 89				Stby 0	InSv
9 OffL		.. .. .	.. .. .					
10 LoadPM_	QUERYPM FLT							
11 Disp_	Node inservice troubles exist:							
12 Next	One or both Units inservice trouble							
13	LCME UNIT 0 Out of Service Troubles Exist:							
14 QueryPM	LCME UNIT 1 Out of Service Troubles Exist:							
15								
16	SITE FLR RPOS BAY_ID SHF					DESCRIPTION	SLOT	EQPEC
17	RSCS0 01 A00 LCME 00 32					LCME : 000	: 21	BX34
18	RSCS0 01 A00 LCME 00 32					LCME : 000	: 19	BX35
	RSCS0 01 A00 LCME 00 32					LCME : 000	: 20	BX35

If the system	Do
indicates a card that has faults	step 16
does not indicate a card that has faults	step 5

5 To manually busy (ManB) the LCME posted in step 3, type

>BSY PM

and press the Enter key.

PM LCME critical (continued)

- 6 To test the ManB LCME, type

>TST PM

and press the Enter key.

Normal response on the MAP display:

Test Passed

or

Test Failed

If TST	Do
passes	step 19
fails	step 16
cannot test central-side busy (CBsy)	step 7

- 7 To identify C-side links in SysB condition, type

>TRNSL C

and press the Enter key.

Normal response on the MAP display:

```
LINK 0    RC02 2 ;CAP MS;STATUS:  SYSB, ;MSGCOND:CLS
LINK 1    RC02 2  CAP S; STATUS:   OK
LINK 2    RC02 2  CAP S; STATUS:   OK
LINK 3    RC02 2  CAP S; STATUS:   OK
LINK 4    RC02 2 ;CAP MS;STATUS:  SysB, ;MSCOND:cls,
```

If links	Do
are SysB	step 8
are open	step 20

PM LCME
critical (continued)

8 To post the RCO2 unit associated with the LCME, type:

>POST RCO2 rco2_no

and press the Enter key.

where

rco2_no is the RCO2 unit identified in step 7

Normal response on the MAP display:

CM	MS	IOD	Net	PM	CCS	Lns	Trks	Ext
.	.	.	.	1LCME *C*	.	.	.	.
RCO2			SysB	ManB	OffL	CBsy	ISTb	InSv
0 Quit	PM	3	0	1	0	4	12	
2 Post_	RCO2	0	0	2	0	2	9	
3 ListSet								
4	RCO2	1	ISTb	Links_00S:	CSide	0, PSide	2	
5 Trnsl_	Unit0:	Act	InSv					
6 Tst_	Unit1:	Inact	InSv					
7 Bsy_								
8 RTS_								
9 OffL								
10 LoadPM_								
11 Disp_								
12 Next								
13 SwAct								
14 QueryPM								
15								
16								
17								
18								

9 To identify the P-side links that have faults and choose a link that has faults, type

>TRNSL P

and press the Enter key.

Normal response on the MAP display:

LINK 23:LCME	1	0;CAP	MS;STATUS:	SYSB;MSGCOND:CLS
LINK 24:LCME	1	1;CAP	S;STATUS:	OK
LINK 25:LCME	1	2;CAP	S;STATUS:	OK
LINK 26:LCME	1	3;CAP	S;STATUS:	OK
LINK 27:LCME	2	0;CAP	MS;STATUS:	SysB;MSGCOND:CLS
LINK 28:LCME	2	1;CAP	S;STATUS:	OK
LINK 29:LCME	2	2;CAP	S;STATUS:	OK

PM LCME
critical (continued)

- 10** To busy the link that has faults, type

>BSY LINK link_no

and press the Enter key.

where

link_no is the number of the P-side link that has faults from step 9

- 11** To test the ManB link, type

>TST LINK link_no

and press the Enter key.

where

link_no is the number of the link set to manually busy in step 10

If the system	Do
indicates a card that has faults	step 16
does not indicate a card that has faults	step 12

- 12** To return the ManB link to service, type

>RTS LINK link_no

and press the Enter key.

where

link_no is the number of the link tested in step 11

If RTS	Do
passes	step 13
fails	step 20

Note: If you identify other lines that have faults, repeat the procedures in steps 10 through 12 for each link. Execute the steps until all the links are busied, tested, and returned to service.

PM LCME critical (continued)

- 13 To post the LCME from step 2, type

>POST LCME lcme_site_name lcme_frame_no lcme_no
and press the Enter key.

where

lcme_site_name is the site name for the LCME that has faults

lcme_frame_no is the number of the associated LCME

lcme_no is the number of the LCME that has faults

- 14 To test the LCME, type

>TST PM
and press the Enter key.

If TST	Do
passes	step 19
fails	step 16

- 15 To return the ManB LCME to service, type

>RTS PM
and press the Enter key.

If RTS	Do
passes	step 21
fails	step 20

PM LCME critical (continued)

- 16** Check the card listing. An example of the card listing appears in the following MAP display.

Normal response on the MAP display:

SITE	FLR	RPOS	BAY_ID	SHF	DESCRIPTION	SLOT	EQPEC
RSCS0	01	A00	LCME 00	32	LCME :000	: 19	BX35
RSCS0	01	A00	LCME 00	32	LCME :000	: 20	BX35
RSCS0	01	A00	LCME 00	32	LCME :000	: 21	BX34

If you	Do
replaced all the cards on the list	step 17
did not replace all the cards on the list	step 19

- 17** The trouble can be the NTMX74 DS30A interface card in the RCO2. The RCO2 connects to the links that have faults identified in step 9.

If you	Do
replaced the NTMX74 card	step 20
did not replace the NTMX74 card	step 18

Note: If the NTMX74 card is indicated, check if one or several links have defects. Repeat clearing procedure.

PM LCME
critical (end)

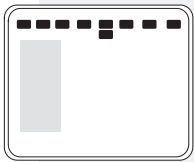
- 18** Each interface (I/F) chip on the NTMX74 card serves four DS30A links. The following chart describes the link-to-chip relationship.

Separate Message (MS) links with a minimum of four links when you enter data in table LCMINV.

Chip number	DS30A Links
1	22, 23, 24, 25
2	26, 27, 28, 29
3	30, 31, 32, 33
4	34, 35, 36, 37
5	38, 39, 40, 41
6	42, 43, 44, 45
7	46, 47, 48, 49
8	50, 51, 52, 53

Go to the card replacement procedure for the NTMX74 circuit card in *Card Replacement Procedures*. When you finish the card replacement procedures, go to step 11.

- 19** Go to the card replacement procedure in *Card Replacement Procedures* for the next card on the card list. When you finish with the card replacement procedures, go to step 14.
- 20** For additional help, contact the next level of maintenance.
- 21** The procedure is complete. If other alarms appear at the MAP display, reference the appropriate alarm clearing procedures for the indicated alarms.

**PM RCO2
critical****Alarm display**

CM	MS	IOD	Net	PM	Lns	Trks	Ext	APPL
.	.	.	.	nRCO2 *C*	.	.	.	.

Indication

The nRCO2 *C* under the PM subsystem header at the MTC level of the MAP indicates a RCO2 critical alarm.

Meaning

Both RCO2 units, are in the system-busy (SysB) or in the central-side (C-side) busy (CBsy) state.

Result

Call processing ceases. The RCO2 can be in emergency stand-alone (ESA).

Common procedures

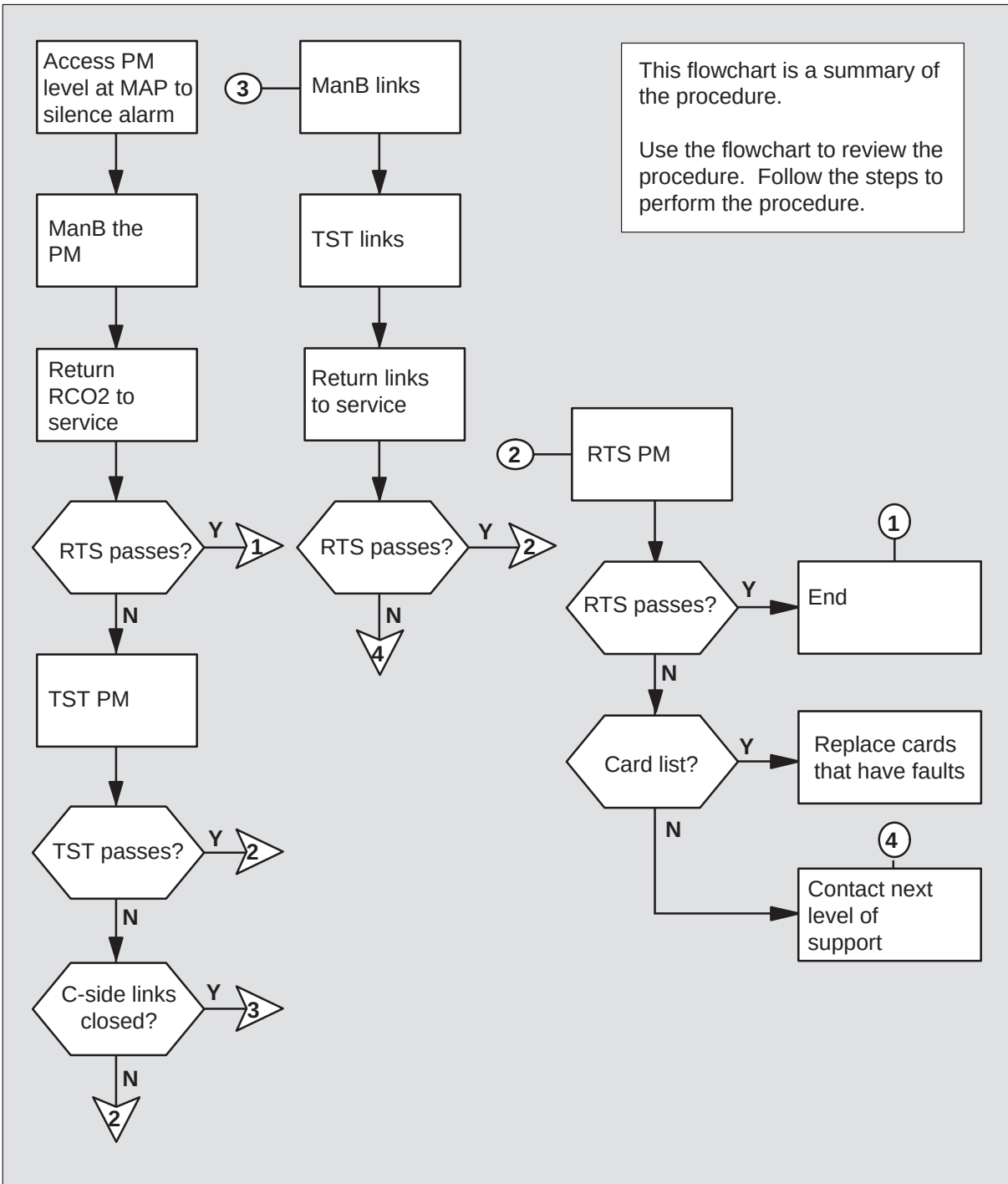
There are no common procedures.

Action

This procedure contains a summary flowchart and a list of steps. Use the flowchart to review the procedure. Follow the steps to perform the procedure.

PM RCO2 critical (continued)

Summary of a PM RCO2 critical alarm



PM RCO2 critical (continued)

Clearing a PM RCO2 critical alarm

At the MAP display

1

ATTENTION

Enter this procedure from the PM system-level alarm clearing procedure step that identified an RCO2-associated fault.

To silence the alarm, if required, type:

>MAPCI;MTC;SIL

and press the Enter key.

2 To identify the RCO2 that has faults, type:

>PM;DISP STATE CBSY RCO2

and press the Enter key.

Example of a MAP response:

CBSy RCO2: 2

or

None

If None appears on the MAP screen, display the SYSB RCO2. Type

>DISP STATE SYSB RCO2

and press the Enter key.

Example of a MAP response:

SysB RCO2: 2

3 To post the CBSy or SysB RCO2, type

>POST RCO2 rco2_no

and press the Enter key.

where

rco2_no is the number of the RCO2 displayed in step 2

Example of a MAP response:

RCO2	SysB	ManB	Offl	CBSy	ISTb	InSv
PM	3	0	1	1	4	12
RCO2	0	0	2	1	2	9

PM RCO2
critical (continued)

4 To check for fault indicators, type

>QUERYPM FLT
and press the Enter.

Example of a MAP display:

CM	MS	IOD	Net	PM	CCS	Lns	Trks	Ext	APPL
.	.	.	.	1RCC *C*	.	.	.	.	.
RCC			SysB	ManB	OffL	CBsy	ISTb	InSv	
0 Quit	PM	1	0	1	2	4	12		
2 Post_	RCO2	1	0	2	2	2	9		
3 ListSet									
4	RCO2	0 CBsy	Links_00S:	CSide	1,	PSide	0		
5 TRNSL_	Unit0:	Act	CBsy						
6 Tst_	Unit1:	Inact	CBsy						
7 Bsy_	QUERYPM FLT								
8 RTS_	Unit0	Static data not updated							
9 OffL	Unit1	Reset							
10 LoadPM_									
11 Disp_									
12 Next									
13									
14 QueryPM									
15									
16									
17									
18									

5



WARNING
The RCO2 can be in ESA
A CBsy indicator can change to a SysB indicator. This change indicates the RCO2 is in ESA mode. The system generates PM180 and PM181 logs during ESA. The system supports local calls.

Use the following information to determine where to proceed.

If the RCO2	Do
is SysB	step 6
is CBsy	step 15

PM RCO2
critical (continued)

- 6 Check for PM180 and PM181 logs. The logs indicate the RCO2 is in emergency stand-alone (ESA). Perform this check according to local operating company policy and according to the type of device that generates log reports.

If log reports	Do
are available	step 10
are not available	step 7

- 7 To activate the LOGUTIL database, type
>QUIT ALL;LOGUTIL PM
and press the Enter key.
- 8 To display PM180 and PM181 log reports, type
>WHILE (BACK)(SLEEP 2)
and press the Enter key.
- 9 The MAP display scrolls PM181 and PM180 log reports and other types of log reports. Use these reports to find reasons for the critical alarm in the RCO2. To return to the CI command level when the MAP display finishes the scroll and you have the necessary information, type:
>QUIT
and press the Enter key.
- 10 To post the RCO2 again, type
>MAPCI;MTC;PM;POST RCO2 rco2_no
and press the Enter key.
where
rco2_no is the number of the RCO2 displayed in step 2

If the PM logs	Do
indicate ESA	step 35
do not indicate ESA	step 11

PM RCO2
critical (continued)

11 To manually busy (ManB) the RCO2, type
>BSY PM
and press the Enter key.

12 To restore PM service, type
>RTS PM FORCE
and press the Enter key.

Example of a MAP response:

UNIT unit_no in ESA MODE.
THIS ACTION WILL CAUSE ESA EXIT AND ABORT n CALLS
PLEASE CONFIRM ("YES" OR "NO")

where

unit_no is the number of the RCO2 identified in step 2
n is the number of calls in progress

13 To confirm the command in step 12, type
>YES
and press the Enter key.

If RTS PM FORCE	Do
passes for both units	step 37
fails for both units	step 14
fails for one unit	Refer to the alarm clearing procedures for an RCO2 ISTb major alarm.

PM RCO2 critical (continued)

- 14 To perform an in-service (INSV) test on the ManB RCO2, type

>TST PM

and press the Enter key.

Example of a MAP response:

Test Passed

or

Test Failed

If TST	Do
passes	step 12
fails because C-side links are closed	step 15
fails and the system generates a card list	step 31

- 15 To identify CBsy links to the host PM, type

>TRNSL C

and press the Enter key.

Note: A host PM is a PCM-30 line group controller (PLGC).

Example of a MAP response:

```
LINK 0: PLGC    1 0;CAP MS;STATUS: OK,;MSGCOND: OPN,Restricted
LINK 1: PLGC    1 1;CAP S;STATUS: OK
LINK 2: PLGC    1 2;CAP MS;STATUS: OK,;MSGCOND:OPN,Unrestricted
LINK 4: PLGC    1 4;CAP S;STATUS: CBsy
LINK 5: PLGC    1 4;CAP S;STATUS: OK
LINK 6: PLGC    1 4;CAP S;STATUS: OK
LINK 7 :PLGC    1 4;CAP S;STATUS: OK
```

- 16 To post the host PM identified in step 15, type

>POST host_pm host_pm_no

and press the Enter key.

where

host_pm is the PLGC

host_pm_no is the number of the PLGC

PM RCO2

critical (continued)

Example of a MAP display:

CM	MS	IOD	Net	PM	CCS	Lns	Trks	Ext	APPL
.	.	.	.	1RC02 *C*	.	.	.	.	.
PLGC			SysB	ManB	OffL		CBsy	ISTb	InSv
0 Quit	PM		3	0	1		1	4	12
2 Post_	PLGC		0	0	2		1	2	9
3 ListSet									
4	PLGC	1	ISTb	Links_00S:	CSide	0,	PSide	1	
5 Trnsl_	Unit0:		Act	InSv					
6 Tst_	Unit1:		Inact	InSv					
7 Bsy_									
8 RTS_									
9 OffL									
10 LoadPM_									
11 Disp_									
12 Next									
13 SwAct									
14 QueryPM									
15									
16									
17 Perform									
18									

- 17** To identify the peripheral-side (P-side) links that have faults and choose a link that has faults, type

>TRNSL P

and press the Enter key.

Example of a MAP response:

```
LINK 0: RCO2      1 0;CAP MS;STATUS: OK,;MSGCOND: OPN,Restricted
LINK 1: RCO2      1 1;CAP S;STATUS: OK
LINK 2: RCO2      1 2;CAP MS;STATUS: OK,;MSGCOND:OPN,Unrestricted
LINK 4: RCO2      1 4;CAP S;STATUS: ISTb
LINK 5: RCO2      1 4;CAP S;STATUS: OK
LINK 6: RCO2      1 4;CAP S;STATUS: OK
LINK 7 :RCO2      1 4;CAP S;STATUS: OK
```

- 18** To busy the link that has faults, type

>BSY LINK link_no

and press the Enter key.

where

link_no is the number of the P-side link indicated in step 17

PM RCO2 critical (continued)

- 19 To test the link that has faults, type

>TST LINK link_no

and press the Enter key.

where

link_no is the number of the link manually busied in step 18

If TST	Do
passes and the alarm clears	step 25
fails	step 20

- 20 To display trunks that have faults, type

>TRKS;CARRIER;POST REMOTE

and press the Enter key.

Example of a MAP response:

```

CLASS ML OS ALARM SYSB MANB UNEQ OFFL CBSY PBSY INSV
TRUNKS 0 0 0 0 0 0 0 0 0 0 0
REMOTE 0 0 0 5 1 0 0 1 0 10

```

```

NO CLASS SITE RC02 CKT D ALARM SLIP FRAME BER SES STATE
0 TRUNKS BRSC 0 2 C 0 0 <-.7 0 INSV
1 REMOTE BRSC 0 12 C 0 0 <-.7 0 INSV
2 REMOTE BRSC 0 13 C 0 0 <-.7 0 MANB

```

MORE . . .

Note: The MORE . . . at the bottom of the display indicates the user can display more links. To display more links, type:

>NEXT

and press the Enter key.

PM RCO2 critical (continued)

- 21 Perform the repair or corrective procedure indicated in the MAP display in step 20.

Note: If the system indicates message links that have faults, ManB the links that have faults before returning them to service.

- 22 To test the ManB link, type

>TST link_no

and press the Enter key.

where

link_no is the number of the ManB link. This link number appears under the NO column in the MAP display in step 20. The number for the ManB link in the example is 2.

If TST	Do
passes and the alarm clears	step 23
fails	step 36
fails and the system generates a card list	step 31

- 23 To post the host PM, type

>PM;POST host_pm host_pm_no

and press the Enter key.

where

host_pm is the host PM PLGC posted in step 16

host_pm_no is the number of the host PM PLGC

- 24 To check the status of the P-side links, type

>TRNSL P

and press the Enter key.

Example of a MAP response:

```
LINK 0: RCO2      1 0;CAP MS;STATUS:  OK,;MSGCOND: OPN,Restricted
LINK 1: RCO2      1 1;CAP S;STATUS:   OK
LINK 2: RCO2      1 2;CAP MS;STATUS:  OK,;MSGCOND:OPN,Unrestricted
LINK 4: RCO2      1 4;CAP S;STATUS:   OK
LINK 5: RCO2      1 4;CAP S;STATUS:   OK
LINK 6: RCO2      1 4;CAP S;STATUS:   OK
LINK 7 :RCO2      1 4;CAP S;STATUS:   OK
```

PM RCO2
critical (continued)

- 25 To return the link to service, type

>RTS LINK link_no

and press the Enter key.

where

link_no is the number of the link identified in step 17

Note: Perform this step for each link that was busied.

- 26 To post the *inactive* RCO2, type

>POST RCO2 rco2_no

and press the Enter key.

where

rco2_no is the number of the RCO2 identified in step 2

Note: This RCO2 must be SysB.

- 27 To return the *inactive* PM unit to service, type

>RTS PM

and press the Enter key.

If RTS for both RCO2 units	Do
passes	step 37
fails	step 28

- 28 To ManB the *inactive* RCO2 unit, type

>BSY UNIT unit_no

and press the Enter key.

where

unit_no is the number of the *inactive* RCO2 unit from step 26

PM RCO2

critical (continued)

- 29 To perform an out-of-service (OOS) test on the *inactive* RCO2 unit, type

>TST UNIT unit_no

and press the Enter key.

where

unit_no is the number of the RCO2 unit manually busied in step 28

If TST	Do
passes	step 30
fails	step 31

- 30 To return the *inactive* RCO2 unit to service, type

>RTS UNIT unit_no

and press the Enter key.

where

unit_no is the number of the RCO2 tested in step 29

If RTS	Do
passes	step 37
fails	step 36

- 31 Check the card list that appears on the MAP display.

For RCO2s with the NTMX77AA Unified Processor (UP), the card list the MAP response displays reflects MX77 in slot 03. For RCO2s with the NTAX74AA Cellular Access Processor (CAP), the MAP response displays a list that reflects AX74 in slot 03.

Example of a MAP response for RCO2s with the NTMX77AA Unified Processor:

SITE	FLR	RPOS	BAY_ID	SHF	DESCRIPTION	SLOT	EQPEC
RSCS0	01	A00	RCE	00 32	RC02 : 000	:03	MX77
RSCS0	01	A00	RCE	00 32	RC02 : 000	:08	6X69
RSCS0	01	A00	RCE	00 32	RC02 : 000	:11	MX73
RSCS0	01	A00	RCE	00 32	RC02 : 000	:15	MX74
RSCS0	01	A00	RCE	00 32	RC02 : 000	:17	MX73

PM RCO2 critical (end)

Example of a MAP response for RCO2s configured with the optional NTAX74AA Cellular Access Processor:

SITE	FLR	RPOS	BAY_ID	SHF	DESCRIPTION	SLOT	EQPEC
RSCS0	01	A00	RCE	00	32	RC02 : 000	:03 AX74
RSCS0	01	A00	RCE	00	32	RC02 : 000	:08 6X69
RSCS0	01	A00	RCE	00	32	RC02 : 000	:11 MX73
RSCS0	01	A00	RCE	00	32	RC02 : 000	:15 MX74
RSCS0	01	A00	RCE	00	32	RC02 : 000	:17 MX73

If you	Do
replaced all the cards on the list	step 32
did not replace all the cards on the list	step 34

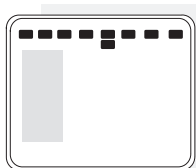
- 32** Determine if the NTMX81 circuit card is replaced.

If you	Do
replaced the NTMX81 card	step 36
did not replace the NTMX81 card	step 33

- 33** Go to the card replacement procedure for the NTMX81 circuit card in *Card Replacement Procedures*. When you complete the card replacement procedures, go to step 23 of this procedure.
- 34** Go to the card replacement procedure in *Card Replacement Procedures* for the next card on the card list. When you complete the card replacement procedures, go to step 29 of this procedure.
- 35** Go to *Recovery Procedures* for instructions on recovering the RCO2. When you complete the recovery procedure, return to step 4, and complete the how to clear an alarm procedure.
- 36** For additional help to clear this alarm, contact the next level of support.
- 37** This procedure is complete. If other alarms display, refer to the correct how to clear an alarm procedures for the indicated alarms.

Ext MSP CLCE cabinet major

Alarm display

	CM	MS	IOD	Net	PM	CCS	Lns	Trks	Ext 1FSP M	APPL
	.	.	.	.	.	.	.	.	.	.

Indication

An FSP that follows a number under the Ext header of the alarm banner indicates an Ext modular supervisory panel (MSP) alarm. An M under the FSP indicates that the alarm class is major. The alarm display is at the MTC level of the MAP display.

Note: Current software does not reflect the change from FSP to MSP in the MAP display.

Meaning

An MSP alarm occurs when one or more cabinets in the office have a power fault or a cooling unit fault. The number that precedes FSP is the number of cabinets with an MSP alarm. Refer to the previous note.

Result

The effect of this alarm on subscriber service depends on the type of fault. The effect also depends on the type of frame the fault is in.

Common procedures

This procedure refers to the common procedure “Replacing the cooling unit”. Common procedures are located in the routine maintenance section of this manual.

Action

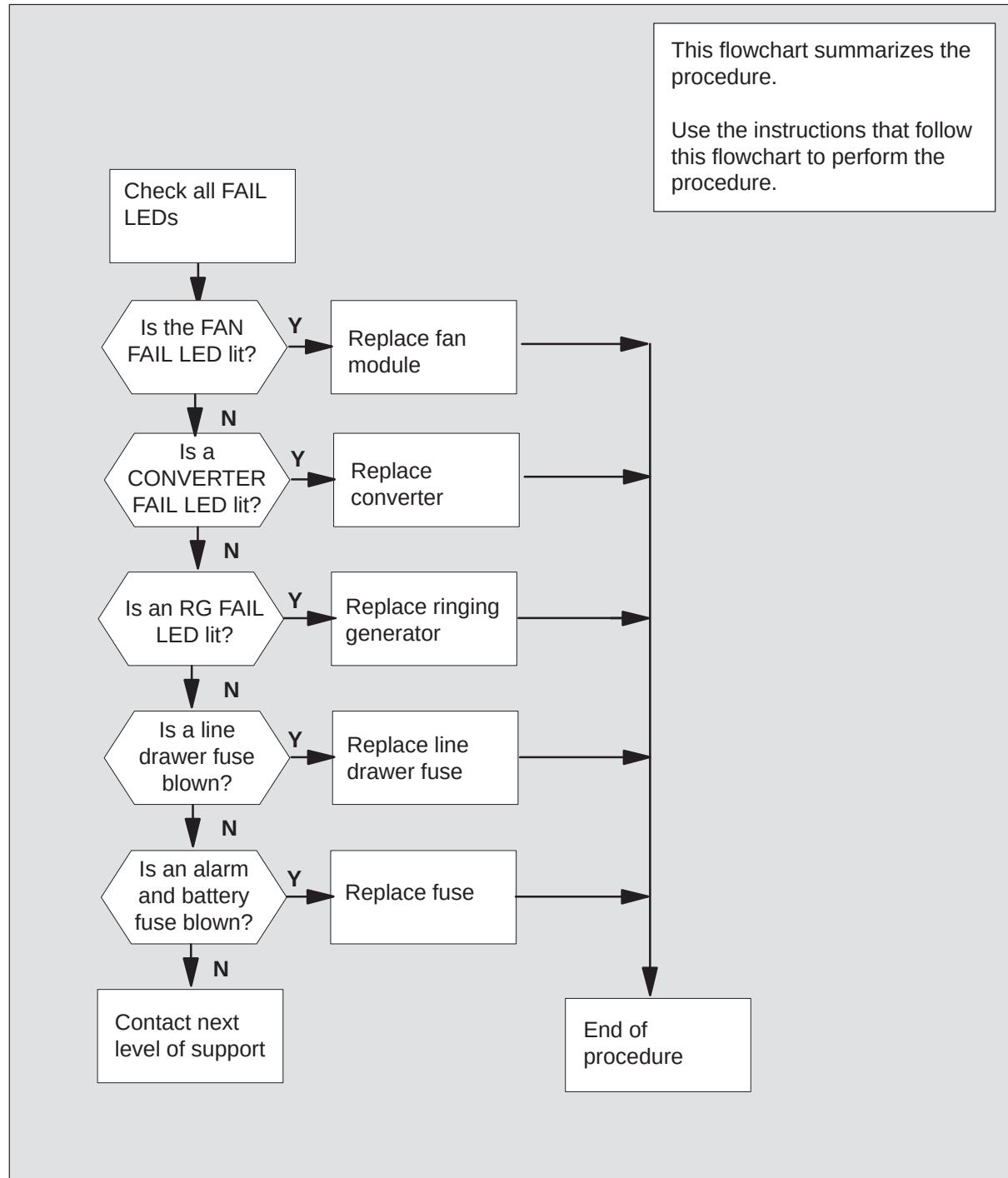
This procedure applies to the following cabinets:

- Cabinetized Remote Switching Center with Line Concentrating Module (CRSC with LCM), NTMX89FA
- Cabinetized Line Concentrating Equipment (CLCE), NTRX30CA

This procedure contains a flowchart and a list of steps. Use the flowchart to review the procedure. Follow the steps to perform the procedure

Ext MSP CLCE cabinet major (continued)

Summary of clearing an Ext MSP CLCE cabinet major alarm



Ext MSP CLCE cabinet major (continued)

Clearing an Ext MSP CLCE cabinet major alarm

At the CLCE cabinet

1

ATTENTION

Illustrations of the CLCE cabinet, LCME fuse panel, and MSP appear at the end of this procedure.

Check the FAN FAIL LEDs.

If	Do
any FAN FAIL LEDs are lit	step 90
FAN FAIL LEDs are not lit	step 2

2 Check the CONVERTER FAIL LED on each converter in the cabinet.

If	Do
any CONVERTER FAIL LEDs are lit	step 51
CONVERTER FAIL LEDs are not lit	step 3

3 Check the RG FAIL LED on both RGs. The RGs are at the top of the cabinet. The FAIL LED is behind the front panel of the RG.

If	Do
an RG has a lit FAIL LED	step 40
neither RG has a lit FAIL LED	step 4

Ext MSP

CLCE cabinet major (continued)

- 4 Check the line drawer fuses, located on the fuse panel to the left or right of each line concentrating array (LCA) (0 and 1) of the LCM.

If	Do
there is a blown fuse (protruding)	step 9
there are no blown fuses	step 5

- 5 Check the alarm battery supply (ABS) fuses F01, F02, F03, F04, and F08 that are located on the MSP.

If	Do
there is a blown fuse (protruding)	step 6
there are no blown fuses	step 87

- 6 Obtain a replacement fuse with the same voltage and amperage as the blown fuse.

- 7 Remove the blown fuse.

8



Danger

Risk of fire

To protect against risk of fire, replace the fuse only with a fuse of the same type, rating (color code), and manufacturer.

Insert the replacement fuse.

If	Do
the fuse blows (protrudes) again	step 87
the fuse does not blow	step 83

- 9 Determine which fuse is blown.

Ext MSP
CLCE cabinet major (continued)

Note: Fuses 01 to 05 each supply +5 V, fuses 06 to 10 each supply +15 V, and fuses 11 to 15 each supply –48 V.

If the blown fuse	Do
is 01 to 05	step 14
is 06 to 15	step 10
is RA or RB	step 14

- 10** Use the following table to determine that +15V fuse (06 through 10) is associated with which –48V fuse (11 through 15).

–48V fuse number	+15V fuse number
11	06
12	07
13	08
14	09
15	10

- 11** Remove the blown fuse and the associated fuse. For example, if the blown fuse is 06, remove fuse 11.
- 12** Obtain a replacement fuse with the same voltage and amperage as the blown fuse.
- 13** Insert the –48V fuse, then the +15V fuse.

If	Do
the fuse blows (protrudes) again	step 17
the fuse does not blow	step 83

- 14** Obtain a replacement fuse with the same voltage as the blown fuse.
- 15** Remove the blown fuse.

Ext MSP

CLCE cabinet major (continued)

16

**Danger****Risk of fire**

To protect against risk of fire, replace the fuse only with a fuse of the same type, rating (color code), and manufacturer.

Insert the replacement fuse.

If	Do
the fuse blows (protrudes) again	step 19
the fuse does not blow	step 83

- 17** Remove the blown fuse and the associated fuse. For example, if the blown fuse is 06, remove fuse 11.
- 18** Obtain a replacement fuse with the same voltage and amperage as the blown fuse.
- 19** Use the following table to identify the drawer associated with the blown fuse. The drawers are in the shelf below the fuse panel. The RA and RB fuses supply ringing voltage to all five drawers in the shelf.

Fuse number	shelves 5 and 33 drawer number	shelves 19 and 47 drawer number
01, 06, 11	0 (the top left)	5 (the top left)
02, 07, 12	1	6
03, 08, 13	2	7
04, 09, 14	3	8
05, 10, 15	4	9

- 20** Pull out the line drawer you identified in step 19. When you work with a blown RA or RB fuse, begin with the the top left drawer.

Ext MSP

CLCE cabinet major (continued)

21



Danger

Personal injury

Do not touch the line feed resistors on the line cards. The line feed resistors generate enough heat to burn you.



Caution

Loss of service

Perform this procedure during periods of low traffic.

Unseat all the line cards in the drawer. Do not remove the line cards from the drawer.

If	Do
the fuse is one of fuses 01 to 05	step 23
the fuse is one of fuses 06 to 15	step 22
the fuse is an RA or RB fuse	step 23

22 Insert the –48V fuse, then the +15V fuse.

If	Do
the fuse blows (protrudes) again	step 26
the fuse does not blow	step 28

23 Obtain a replacement fuse with the same voltage and amperage as the blown fuse.

24 Remove the blown fuse.

Ext MSP

CLCE cabinet major (continued)

25

**Danger****Risk of fire**

To protect against risk of fire, replace the fuse only with a fuse of the same type, rating (color code), and manufacturer.

Insert the replacement fuse.

If	Do
the fuse blows (protrudes) again	step 26
the fuse does not blow	step 28

26 Check the drawer for loose or short-circuited wires.

If	Do
there are loose or short-circuited wires	step 89
there are no loose or short-circuited wires, and the fuse is a ringing voltage fuse (RA or RB)	step 27
there are no loose or short-circuited wires, the fuse is a ringing voltage fuse (RA or RB), and you have done all five drawers in the shelf	step 89
there are no loose or short-circuited wires, and the fuse is one of the line drawer fuses (01 to 15)	step 89

27 Reseat all the line cards in the drawer and repeat steps 20 and 21 for the next drawer.

Ext MSP

CLCE cabinet major (continued)

- 28 Reseat the line cards one at a time, and check the fuse after you reseat each line card.

If	Do
after you reseat a line card, the fuse blows (protrudes) again	step 29
after you reseat all the line cards, the fuse does not blow	step 85

29



Danger

Personal injury

Do not touch the line feed resistors on the line cards. The line feed resistors generate enough heat to burn you.

Remove the line card from the drawer.

- 30 Obtain a replacement line card. Make sure that the replacement card has the same PEC as the original card. The PEC must include the suffix.
- 31 Insert the replacement line card into the drawer.

If	Do
the fuse is one of fuses 01 to 05	step 35
the fuse is one of fuses 06 to 15	step 32
the fuse is an RA or RB fuse	step 35

- 32 Obtain a replacement fuse with the same voltage as the blown fuse.
- 33 Remove the blown fuse and the associated fuse. For example, if the blown fuse is 06, remove fuse 11.

Ext MSP
CLCE cabinet major (continued)

- 34 Insert the –48V fuse, then the +15V fuse.

If	Do
the fuse blows (protrudes) again	step 89
the fuse does not blow	step 38

- 35 Obtain a replacement fuse with the same voltage and amperage as the blown fuse.

- 36 Remove the blown fuse.

37



Danger
Personal injury
Do not touch the line feed resistors on the line cards. The line feed resistors generate enough heat to burn you.



Danger
Risk of fire
To protect against risk of fire, replace the fuse only with a fuse of the same type, rating (color code), and manufacturer.

Insert the replacement fuse.

If the fuse	Do
blows (protrudes) again	step 89
does not blow	step 38

- 38 Reseat all the other line cards in the drawer.

- 39 Push the drawer back in and go to step 83.

Ext MSP
CLCE cabinet major (continued)

- 40 Use the following table to identify the circuit breaker that is associated with the RG that displays a lit FAIL LED. The circuit breaker is on the MSP.

RG number	Circuit breaker number
RG0 (the top left)	CB1
RG 1	CB3

- 41 Check the associated circuit breaker.

If the circuit breaker	Do
is ON	step 48
is OFF	step 42

- 42 Set the circuit breaker to ON.

If the circuit breaker	Do
goes OFF and the FAIL LED on the RG is lit	step 43
remains ON and the FAIL LED on the RG is not lit	step 83
remains ON and the FAIL LED on the RG is lit	step 48

At the CPDC

- 43 Locate the fuse associated with the cabinet and shelf number.

If the fuse	Do
is blown (protrudes)	step 44
is not blown	step 49

- 44 Remove the fuse holder with the blown fuse.

Ext MSP

CLCE cabinet major (continued)

45

**Danger****Risk of fire**

To protect against risk of fire, replace the fuse only with a fuse of the same type, rating (color code), and manufacturer.

Replace the cartridge fuse inside the fuse holder.

46 Install the fuse holder back on the CPDC.

At the CLCE cabinet

47 Set the circuit breaker to ON.

If the circuit breaker	Do
goes OFF and the RG FAIL LED is lit	step 49
remains ON and the RG FAIL LED is not lit	step 83
remains ON and the RG FAIL LED is lit	step 48

48 Set the circuit breaker to OFF.

49 Go to the correct procedure in *Card Replacement Procedures* to replace the RG. When you complete the procedure, return to this point.

50 Check the FAIL LED on the RG you replaced in step 49 .

If the FAIL LED on the RG	Do
is lit	step 82
is not lit	step 83

51 Note the number of the shelf that contains the converter with the lit CONVERTER FAIL LED.

Ext MSP

CLCE cabinet major (continued)

- 52 Use the following table to identify the circuit breaker that is associated with the shelf that shows the lit CONVERTER FAIL LED. This circuit breaker is on the MSP.

Shelf number	Circuit breaker number
65	CB1 (RG-0)
05, 33	CB2 (LCM0/LCA0) (LCM1/LCA0)
65	CB3 (RG-1)
19, 47	CB4 (LCM0/LCA1) (LCM1/LCA1)
33	CB5 (converter)
05	CB6 (converter)
47	CB7 (converter)
19	CB8 (converter)

- 53 Check the associated circuit breaker.

If the circuit breaker	Do
is ON	step 62
is OFF	step 54

- 54 Set the circuit breaker to ON.

If the circuit breaker	Do
goes OFF and the CONVERTER FAIL LED is lit	step 55
remains ON and the CONVERTER FAIL LED is lit	step 62
remains ON and the CONVERTER FAIL LED is not lit	step 83

- 55 Note the numbers of the cabinet and shelf that contain the converter with the lit CONVERTER FAIL LED.

Ext MSP

CLCE cabinet major (continued)

At the CPDC

- 56** Locate the fuse that powers the shelf in the CLCE cabinet.

If the fuse	Do
is blown (protrudes)	step 57
is not blown	step 62

- 57** Remove the fuse holder with the blown fuse.

- 58** Replace the cartridge fuse inside the fuse holder.

59

**Danger****Risk of fire**

To protect against risk of fire, replace the fuse only with a fuse of the same type, rating (color code), and manufacturer.

Replace the blown fuse.

- 60** Install the fuse holder back on the CPDC.

- 61** Set the circuit breaker to ON.

If the circuit breaker	Do
goes OFF and the CONVERTER FAIL LED is lit	step 63
remains ON and the CONVERTER FAIL LED is not lit	step 83
remains ON and the CONVERTER FAIL LED is lit	step 62

- 62** Set the circuit breaker to OFF.

- 63** Go to the correct procedure in *Card Replacement Procedures* to replace the converter. When you complete the procedure, return to this point.

Ext MSP

CLCE cabinet major (continued)

- 64** Check the converter that you replaced in step 63 and check the associated circuit breaker.

If the circuit breaker	Do
goes OFF and the CONVERTER FAIL LED is lit	step 66
remains ON and the CONVERTER FAIL LED is not lit	step 83
remains ON and the CONVERTER FAIL LED is lit	step 65

- 65** Set the circuit breaker to OFF.
- 66** Remove the NT6X51 and NT6X52 cards from the shelf with the lit CONVERTER FAIL LED.
- 67** Set the circuit breaker to ON.

If the CONVERTER FAIL LED	Do
is lit	step 80
is not lit	step 68

- 68** Set the circuit breaker to OFF.
- 69** Insert the NT6X51 card back into the shelf.
- 70** Set the circuit breaker to ON.

If the circuit breaker	Do
goes OFF and the CONVERTER FAIL LED is lit	step 72
remains ON and the CONVERTER FAIL LED is not lit	step 74
remains ON and the CONVERTER FAIL LED is lit	step 71

Ext MSP
CLCE cabinet major (continued)

- 71** Set the circuit breaker to OFF.
- 72** Go to the correct procedure in *Card Replacement Procedures* to replace the NT6X51 card. When you complete the procedure, return to this point.
- 73** Set the circuit breaker to ON.

If the circuit breaker	Do
goes OFF and the CONVERTER FAIL LED is lit	step 78
remains ON and the CONVERTER FAIL LED is not lit	step 74
remains ON and the CONVERTER FAIL LED is lit	step 77

- 74** Set the circuit breaker to OFF.
- 75** Insert the NT6X52 card back into the shelf.
- 76** Set the circuit breaker to ON.

If the circuit breaker	Do
goes OFF and the CONVERTER FAIL LED is lit	step 78
remains ON and the CONVERTER FAIL LED is not lit	step 83
remains ON and the CONVERTER FAIL LED is lit	step 77

- 77** Set the circuit breaker to OFF.
- 78** Go to the correct procedure in *Card Replacement Procedures* to replace the NT6X52 card. When you complete the procedure, return to this point.

Ext MSP
CLCE cabinet major (continued)

- 79 Set the circuit breaker to ON.

If the circuit breaker	Do
goes OFF and the CONVERTER FAIL LED is lit	step 80
remains ON and the CONVERTER FAIL LED is not lit	step 83
remains ON and the CONVERTER FAIL LED is lit	step 82

- 80 Check the backplane of the shelf for bent or short-circuited pins.

If	Do
the pins are bent or short-circuited	step 89
the pins are not bent or short-circuited	step 81

- 81 Insert the NT6X51 and the NT6X52 cards into the shelf.

- 82 Go to the correct procedure in *Card Replacement Procedures* to replace the alarm card. When you complete the procedure, return to this point.

At the CLCE cabinet

- 83 Check the frame FAIL lamp on the MSP.

If the frame FAIL lamp	Do
is lit and steps 2, 3, 4, and 5 in this procedure are not complete	step 84
is lit and steps 2, 3, 4, and 5 in this procedure are complete	step 89
is not lit	step 85

- 84 Go to the step that is not completed (step 2, 3, 4, or 5 in this procedure).

Ext MSP CLCE cabinet major (continued)

At the MAP terminal

- 85** To Access the Ext level of the MAP display to determine if an MSP alarm is present, type:

>MAPCI;MTC;EXT

Press the Enter key.

If an MSP alarm	Do
is present, and you did not access all the cabinets with an MSP alarm	step 86
is present, and you accessed all the cabinets with an MSP alarm	step 89
is not present	step 91

- 86** Go to the table of contents in this document to locate the procedure for the type of cabinet that contains an MSP alarm. Perform that procedure.

At the CLCE cabinet

87



Danger

Risk of injury from high energy levels

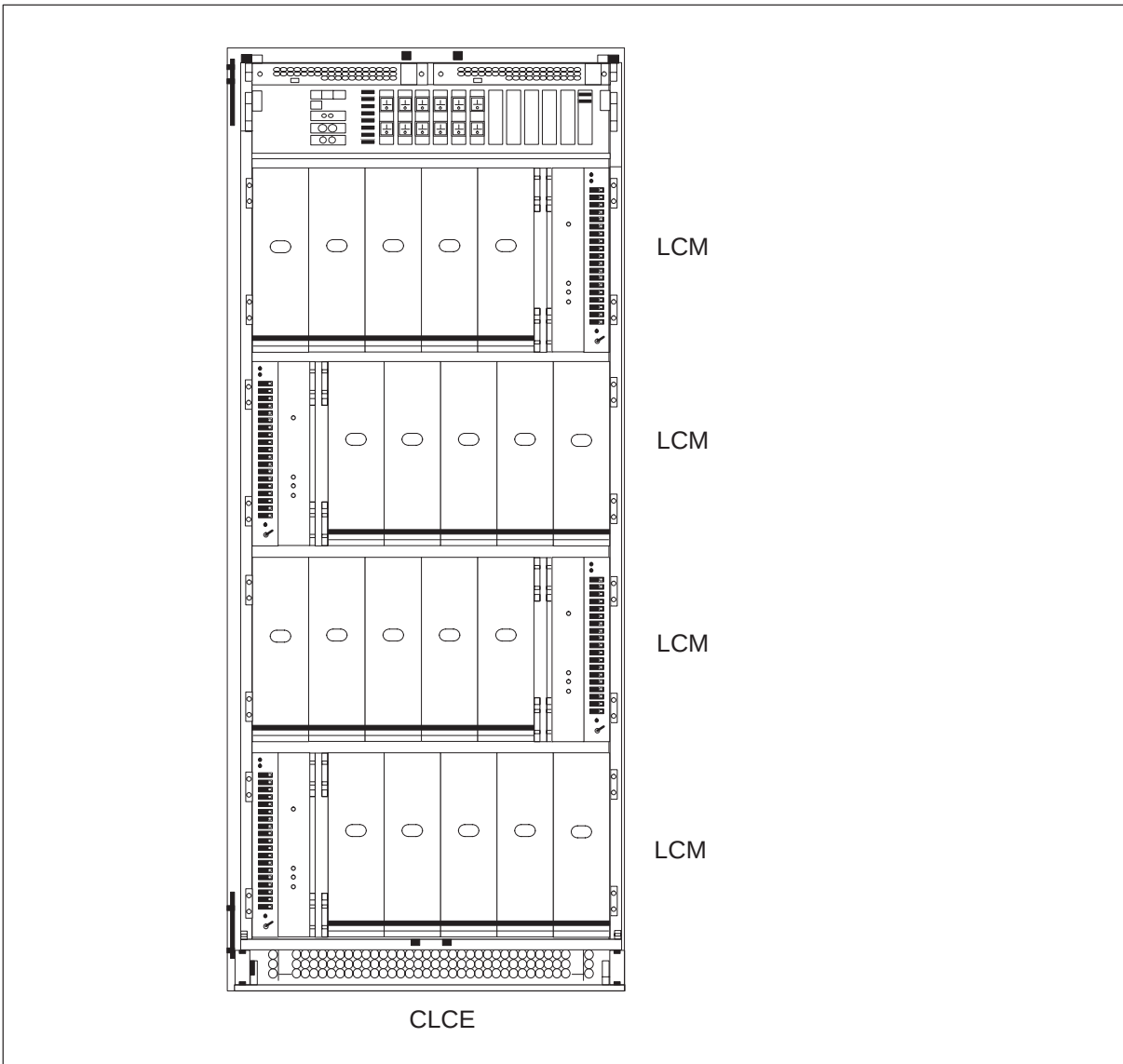
Some of the terminals inside the MSP have an electrical potential of –48 Vdc. Do not touch any terminals inside the MSP.

Loosen the slotted nut on the left-hand side of the MSP.

- 88** Open the MSP panel.
- 89** For additional help, contact the next level of support.
- 90** Go to the table of contents, in the routine maintenance section, to locate the procedure *Replacing the cooling unit*. Perform that procedure. If the MSP alarm continues to be present, return to this procedure at step 85.
- 91** This procedure is complete.

Ext MSP CLCE cabinet major (continued)

CLCE cabinet



Ext MSP
CLCE cabinet major (continued)

LCME fuse panel

● Low voltage

● L – Fail

1

+5V

2

+5V

3

+5V

4

+5V

5

+5V

6

+15V

7

+15V

8

+15V

9

+15V

10

+15V

11

L–

12

L–

13

L–

14

L–

15

RG

16

RG

17

RG

18

RG

19

RG

● Disable

ENABLE

Alarm

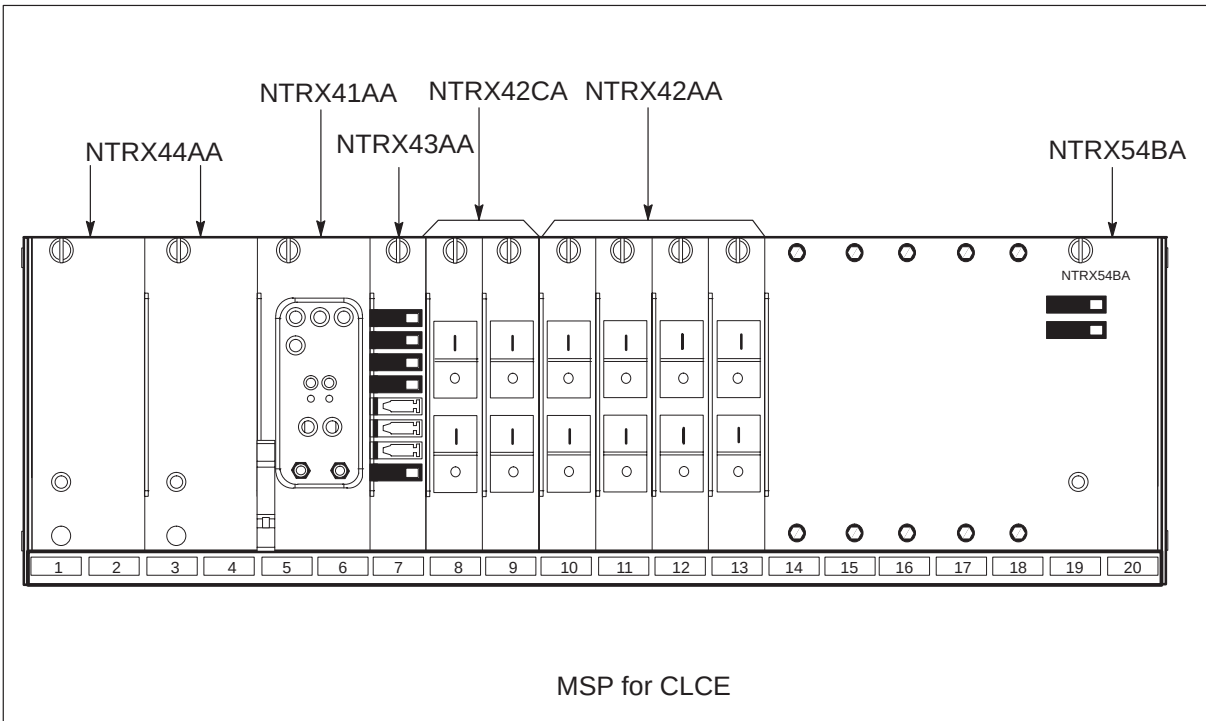
DISABLE

NT6X04FA

Fuse panel

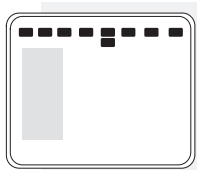
Ext MSP CLCE cabinet major (end)

CLCE modular supervisory panel (MSP)



Ext MSP
CPDC cabinet major

Alarm display

	CM	MS	IOD	Net	PM	CCS	Lns	Trks	Ext 1FSP M	APPL
	.	.	.	.	.	.	.	.		.

Indication

An FSP preceded by a number indicates an Ext MSP major alarm. The FSP and number appear under the alarm banner at the MTC level of the MAP display.

Note: The change from FSP to MSP in the MAP display is not updated in the software changes.

Meaning

An MSP alarm occurs when one or more cabinets in the office has a power fault or a cooling unit fault. The number that precedes FSP is the number of cabinets with an MSP alarm. Refer to the previous note.

Result

The type of fault and the type of cabinet that contains the fault determines the effect on subscriber service.

Common procedures

This procedure refers to common procedure “Replacing the cooling unit”. Common procedures are located in the routine maintenance section of this manual.

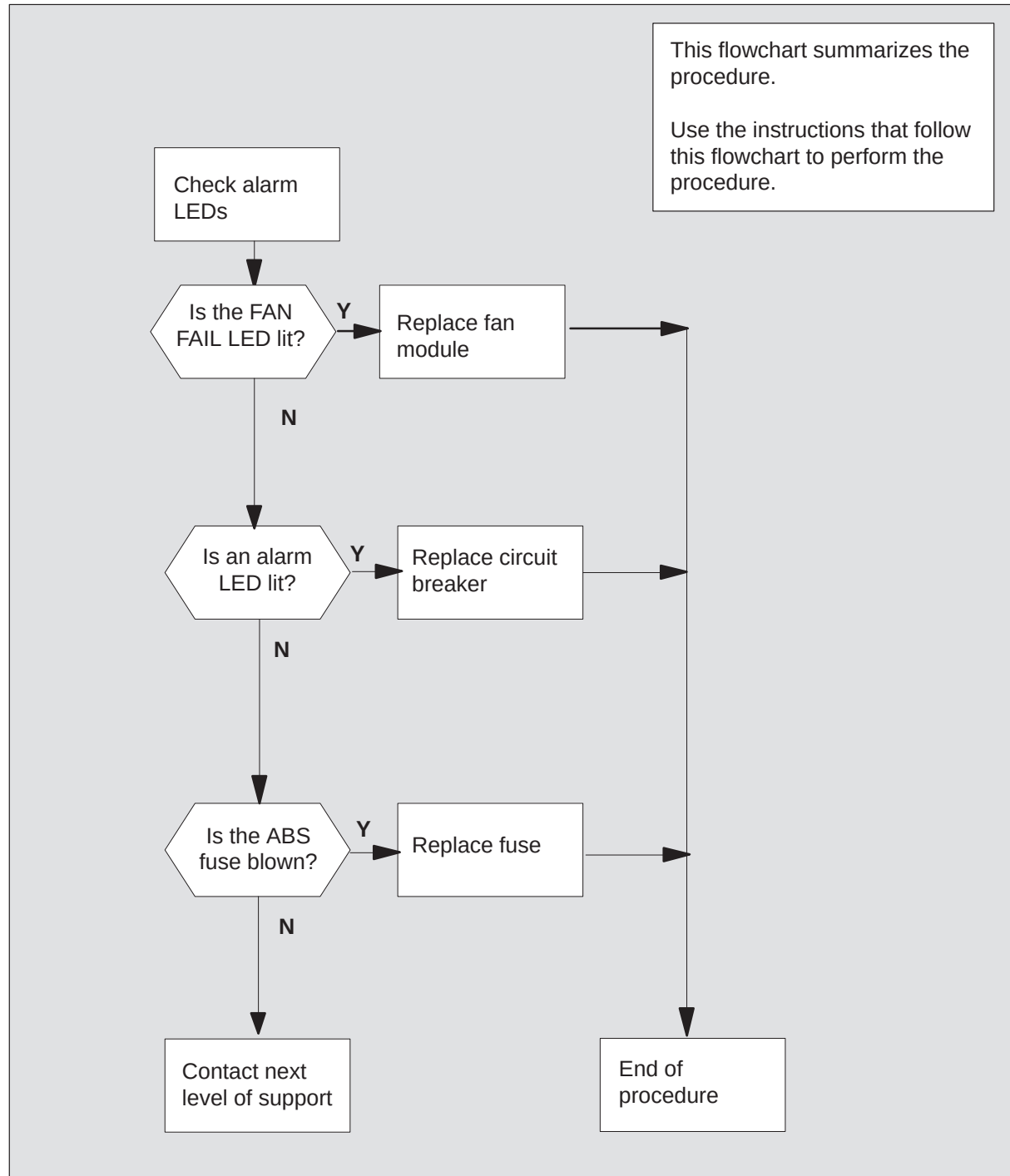
Action

This procedure applies to the Cabinetized Power Distribution Center (CPDC) NTRX31AA.

This procedure contains a summary flowchart and a list of steps. Use the flowchart to review the procedure. Follow the steps to perform the procedure.

Ext MSP CPDC cabinet major (continued)

Summary of clearing an Ext MSP CPDC cabinet major alarm



Ext MSP CPDC cabinet major (continued)

Clearing an Ext MSP CPDC cabinet major alarm

At the CPDC

- 1 Check the FAN FAIL LEDs.

If	Do
any FAN FAIL LEDs are lit	step 45
FAN FAIL LEDs are not lit	step 2

- 2 Check the alarm LED, which is located on the right side of the breaker panel.

If	Do
any alarm LEDs are lit	step 3
alarm LEDs are not lit	step 4

- 3 Check the circuit breakers on the breaker panel that has the lit alarm LED.

If	Do
any circuit breaker is in center-trip position	step 5
all circuit breakers are ON	step 4

- 4 Check the ABS fuse on the MSP.

If the ABS fuse	Do
is blown (protrudes)	step 22
is not blown	step 44

Ext MSP

CPDC cabinet major (continued)

- 5 Check the label under the circuit breaker in the center-trip position.

If the circuit breaker	Do
supplies the talk battery to a line concentrating equipment (LCE) cabinet	step 7
does not supply the talk battery to an LCE cabinet	step 6
supplies power to a filter capacitor on the CPDC breaker panel	step 25

- 6 Set the circuit breaker to ON, and proceed to step 21.
- 7 Record the numbers of the CLCE cabinet and the shelf associated with the circuit breaker.

At the CLCE cabinet:

- 8 Remove the ten talk battery fuses, five for each shelf. The fuses are located above the shelves.

Note: Talk battery A powers the first and third shelves from the bottom of the LCE. Talk battery B powers the second and fourth shelves from the bottom of the LCE.

- 9 Obtain a capacitor-forming tool.

Note: A capacitor-forming tool consists of a 100 W 120 V light bulb inserted in a socket with pigtail leads. The pigtail leads must have spring-type alligator clips on each end.

At the CPDC

10



Danger

Risk of injury from high energy levels

The fuse holder contacts on the filter panel faceplate have high voltages. Do not touch the probes of the capacitor-forming tool to the faceplate of the filter panel. Do not let the probes of the capacitor-forming tool touch each other.

Ext MSP
CPDC cabinet major (continued)

Connect the leads of the capacitor-forming tool across the circuit breaker to charge the capacitors.

If, after a few seconds, the lamp	Do
is lit	step 11
is not lit	step 17

At the CLCE cabinet

- 11** Label the leads of the capacitor's positive terminal as (+), indicating positive. Label the capacitor's negative terminal as (–) indicating negative.
- 12** Disconnect the leads from the short-circuited capacitor.
- 13** Remove the capacitor.
- 14** Install a replacement capacitor.
- 15** Connect the positive lead to the capacitor's positive terminal.
- 16** Connect the negative lead to the capacitor's negative terminal. Return to step 10 to charge the capacitors again.

At the back of the CPDC

- 17** Remove the capacitor-forming tool.

At the front of the CPDC

- 18** Set the circuit breaker to ON.

At the CLCE cabinet

- 19** Insert the ten talk battery fuses, removed in step 8. Insert the fuses one at a time, and pause between fuses.
- 20** Press the indicator on one of the talk battery fuses you replaced to determine if the talk battery works.

If the FRAME FAIL LED	Do
is lit	step 40
is not lit	step 21

Ext MSP
CPDC cabinet major (continued)

At the CPDC

- 21** Check the circuit breaker.

If the circuit breaker	Do
is OFF	step 44
is ON	step 40

- 22** Obtain a replacement fuse that has the same voltage and amperage as the blown ABS fuse.

- 23** Remove the blown ABS fuse.

- 24**
- 

Danger
Risk of fire
For protection against risk of fire, replace the fuse with a fuse of the same type, rating (color code), and manufacturer.

Insert the replacement ABS fuse.

If the fuse	Do
blows (protrudes) again	step 43
does not blow again	step 40

- 25** Make sure the circuit breaker for the capacitor is OFF.

If voltage	Do
is within 3V of -48V rail	step 38
is greater than 3V from -48V rail	step 26

At the back of the CPDC

- 26** Obtain a capacitor-forming tool and a voltmeter.

Ext MSP
CPDC cabinet major (continued)

Note: A capacitor-forming tool consists of a 100 W 120 V light bulb screwed in a socket with pigtail leads. The pigtail leads must have spring-type alligator clips on each end.

- 27 Label the leads of the capacitor's positive terminal as (+), indicating positive. Label the capacitor's negative terminal as (–), indicating negative.
- 28 Connect one lead of the capacitor-forming tool to a ground stud on the battery return ground plate (L+) of the breaker panel.
- 29 Connect the other lead of the capacitor-forming tool to the bottom post of the circuit breaker that powers the short-circuited capacitor.
- 30 Use the voltmeter, to make sure voltage across the terminals of the capacitor is not present.
- 31 Use the voltmeter, to make sure voltage between either terminal of the capacitor and the battery return is not present.

32

**Danger****Risk of injury from high energy levels**

The terminals at the back of the CPDC have an electrical potential of –48 Vdc to –60 Vdc. Do not attempt to replace the capacitor when the voltmeter detects voltage.

Disconnect the leads from the short-circuited capacitor with the capacitor-forming tool in place.

- 33 Remove the capacitor.
- 34 Install a replacement capacitor.
- 35 Connect the positive terminal of the capacitor to the positive lead. Connect the negative terminal of the capacitor to the negative lead.
- 36 Remove the capacitor-forming tool.
- 37 Wait 3 to 5 min to allow the capacitor to charge again.

At the front of the CDPC

- 38 Set the circuit breaker for the capacitor to ON.

Ext MSP CPDC cabinet major (continued)

- 39 Check the circuit breaker.

If the circuit breaker	Do
is OFF	step 44
is ON	step 40

- 40 Check the FRAME FAIL LED on the MSP.

If the FRAME FAIL LED	Do
is lit and you have not completed step 4 in this procedure	step 5
is lit and you have completed step 4 in this procedure	step 43
is not lit	step 41

At the MAP terminal

- 41 To access the Ext level of the MAP display to determine if an MSP alarm is present, type

>MAPCI;MTC;EXT

and press the Enter key.

If an MSP alarm	Do
is present, and you have not accessed all the cabinets with an MSP alarm	step 42
is present, and you accessed all the cabinets with an MSP alarm	step 44
is not present	step 44

- 42 Go to the table of contents in this document to find the procedure for the cabinet that has the MSP alarm. Perform that procedure.

Ext MSP
CPDC cabinet major (end)

At the back of the CPDC

43



Danger

Risk of injury from high energy levels

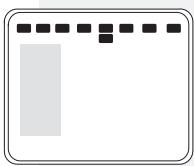
The terminals at the back of the CPDC have an electrical potential of –48 Vdc to –60 Vdc. Do not touch any terminals inside the MSP.

Note any short circuits of the ABS wiring inside the MSP. The personnel at the next level of support can request this information.

- 44 For additional help, contact the next level of support.
- 45 Refer to the table of contents, in the routine maintenance section, to find the common procedure “Replacing the cooling unit”. Perform that procedure. If the MSP alarm is present, return to this procedure at step 41.
- 46 The procedure is complete.

Ext MSP CRME cabinet major

Alarm display

	CM	MS	IOD	Net	PM	CCS	Lns	Trks	Ext	APPL
	.	.	.	.	.	.	.	.	1FSP	.
									M	

Indication

An FSP that follows a number under the Ext header of the alarm banner indicates an Ext modular supervisory panel(MSP) major alarm. An M under the FSP indicates that the alarm class is major. The alarm display is at the MTC level of the MAP display.

Note: Current software does not reflect the change from FSP to MSP in the MAP display.

Meaning

An MSP alarm occurs when one or more cabinets in the office has a power fault or a cooling unit fault. The number that precedes FSP is the number of cabinets with an MSP alarm. Refer to the previous note.

Result

The type of fault and the type of cabinet that contains the fault determines the effect on subscriber service.

Common procedures

This procedure refers to the common procedure “Replacing the cooling unit”. Common procedures are located in the routine maintenance section of this manual.

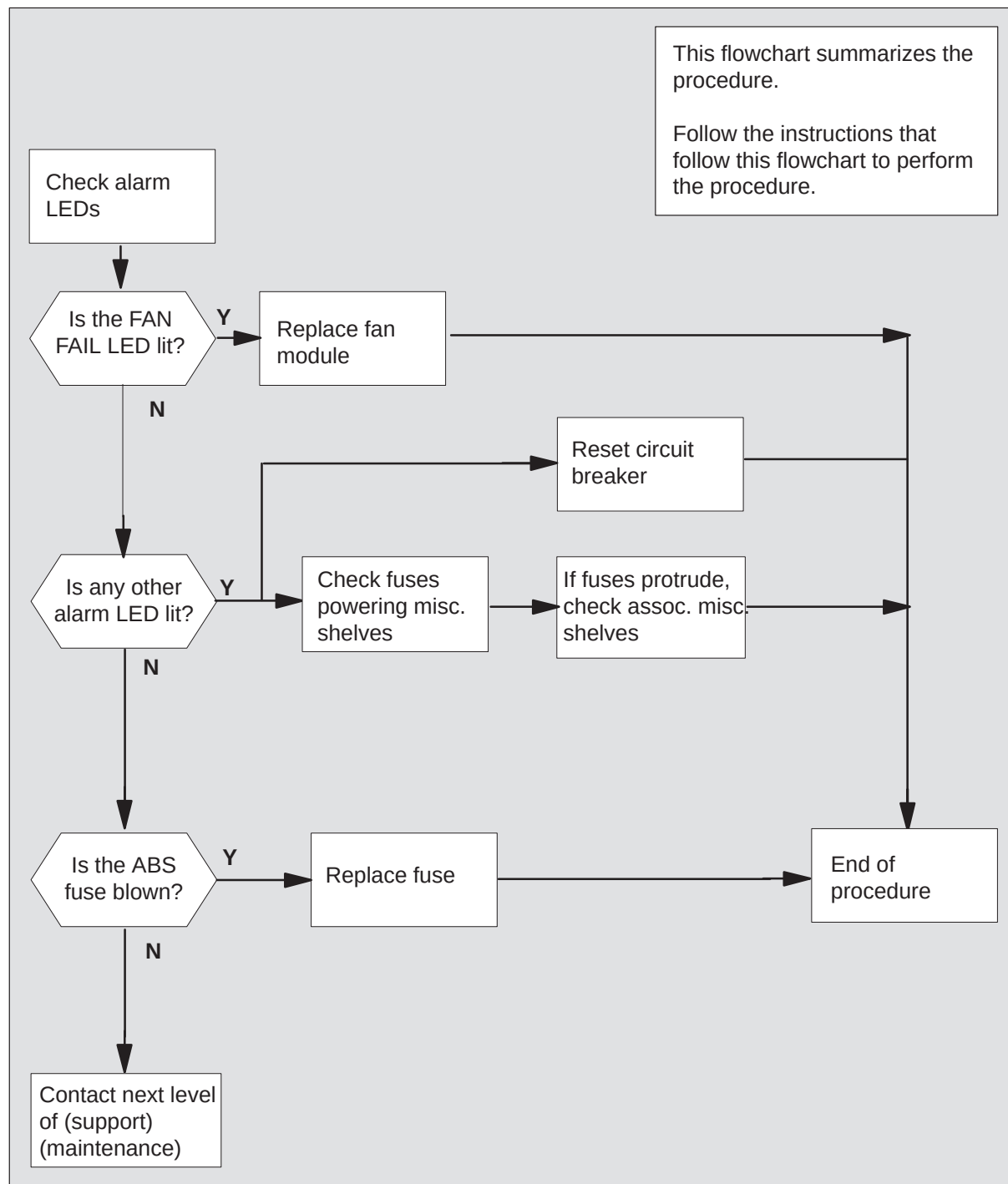
Action

This procedure applies to Cabinetized Remote Miscellaneous Equipment (CRME), NTRX31EA.

This procedure contains a summary flowchart and a list of steps. Use the flowchart to review the procedure. Use the steps to perform the procedure.

Ext MSP CRME cabinet major (continued)

Summary of clearing an Ext MSP CRME cabinet major alarm



Ext MSP CRME cabinet major (continued)

Clearing an Ext MSP CRME cabinet major alarm

At the CRME

1

ATTENTION

Illustrations of the CRME cabinet and MSP appear at the end of this procedure.

Check the FAN FAIL LEDs.

If	Do
any FAN FAIL LEDs are lit	step 49
FAN FAIL LEDs are not lit	step 2

2 Check the alarm LED, located on the right side of the breaker panel.

Note 1: The alarm extension panel does not hold shelf alarms or internal fuses.

Note 2: The alarm panel has a redundant power supply.

If	Do
any alarm LEDs are lit	step 3
alarm LEDs are not lit	step 4

3 Check the circuit breakers on the breaker panel with the lit alarm LED.

If	Do
any circuit breaker is in center-trip position	step 5
all circuit breakers are ON	step 4

Note: The system is in an overload condition when the handle is in the center position. If the circuit breaker is manually set to the OFF position, an alarm does not occur.

Ext MSP

CRME cabinet major (continued)

- 4 Check the ABS fuse on the MSP.

If the ABS fuse	Do
is blown (protrudes)	step 26
is not blown	step 48

- 5 Check the label under the circuit breaker in center-trip position.

If the circuit breaker	Do
supplies the talk battery to a line concentrating equipment (LCE) cabinet	step 11
does not supply the talk battery to an LCE cabinet	step 10
supplies power to a filter capacitor on the CRME breaker panel	step 29
supplies power to miscellaneous equipment at bottom of cabinet	step 6

Note: Circuit breakers in the CRME provide an alarm contact closure. An alarm occurs if an electrical overload trips a device.

- 6 Check fuses that power the miscellaneous shelves for alarm indication. If fuses are blown (protrude), check the associated miscellaneous shelf.
- 7 Check the Cook Digital Announcer component for alarm indication. Replace the fuse on the rear of the unit, if required.

Note: The Cook Digital Announcer does not have a redundant power supply.

- 8 Check the DS-6 modem for alarm indication. Replace the internal fuse on the power supply if required.

Note: The DS-6 modem does not have a redundant power supply.

- 9 Check the LaMarch inverter for alarm indication. Check for a short in power supplied to end aisle ac. Reset the circuit breaker on the front of the unit, if required.

- 10 Set the circuit breaker to ON, and go to step 25.

Ext MSP

CRME cabinet major (continued)

- 11 Record the numbers of the CLCE cabinet and shelf associated with the circuit breaker.

At the CLCE cabinet

- 12 Remove the ten talk battery fuses, five for each shelf. The fuses are located above the shelves.

Note: Talk battery A powers the first and third shelves from the bottom of the LCE. Talk battery B powers the second and fourth shelves.

- 13 Obtain a capacitor-forming tool.

Note: A capacitor-forming tool consists of a 100 W 120 V light bulb in a socket with pigtail leads. The pigtail leads must have spring-type alligator clips on each end.

At the CRME

14



DANGER

Risk of injury from high energy levels

The fuse holder contacts on the filter panel faceplate have high voltages. Do not touch the probes of the capacitor-forming tool to the faceplate of the filter panel. Do not let the probes of the capacitor-forming tool touch each other.

Connect the leads of the capacitor-forming tool across the circuit breaker to charge the capacitors.

If, after a few seconds, the lamp	Do
is lit	step 15
is not lit	step 21

At the CLCE cabinet

- 15 Label the leads of the capacitor's positive terminal as (+), to indicate positive. Label the capacitor's negative terminal as (–), indicating negative.
- 16 Disconnect the leads from the short-circuited capacitor.
- 17 Remove the capacitor.
- 18 Install a replacement capacitor.

Ext MSP
CRME cabinet major (continued)

- 19 Connect the + lead to the positive terminal of the capacitor.
- 20 Connect the – lead to the negative terminal of the capacitor. Return to step 10 to recharge the capacitors.

At the back of the CRME

- 21 Remove the capacitor-forming tool.

At the front of the CRME

- 22 Immediately set the circuit breaker to ON.

At the CLCE cabinet

- 23 Insert the ten talk battery fuses removed in step 12. Insert the fuses one at a time, and pause between each fuse.
- 24 Press the indicator on one of the talk battery fuses you replaced to determine if the talk battery is present.

If the frame FAIL LED	Do
is lit	step 44
is not lit	step 25

At the CRME

- 25 Check the circuit breaker.

If the circuit breaker	Do
is OFF	step 48
is ON	step 44

- 26 Obtain a replacement fuse with the same voltage and amperage as the blown ABS fuse.
- 27 Remove the blown ABS fuse.

Ext MSP
CRME cabinet major (continued)

28

**DANGER****Risk of fire**

For continued protection against risk of fire, replace the fuse with a fuse of the same type, rating (color code), and manufacturer.

Insert the replacement ABS fuse.

If the fuse	Do
blows (protrudes) again	step 47
does not blow again	step 44

- 29 Make sure the circuit breaker for the capacitor remains OFF. Obtain a voltmeter, and check voltage across capacitor leads.

If voltage	Do
is within 3V of –48V rail	step 42
is more than 3V from –48V rail	step 30

At the back of the CRME

- 30 Obtain a capacitor-forming tool and a voltmeter.

Note: A capacitor-forming tool consists of a 100 W 120 V light bulb in a socket with pigtail leads. The pigtail leads must have spring-type alligator clips on each end.

- 31 Label the leads of the capacitor's positive terminal as (+), to indicate positive. Label the capacitor's negative terminal as (–) to indicate negative.
- 32 Connect one lead of the capacitor-forming tool to a ground stud on the battery return ground plate (L+) of the breaker panel.
- 33 Connect the other lead of the capacitor-forming tool to the bottom post of the circuit breaker that powers the short-circuited capacitor.
- 34 Use the voltmeter to make sure that voltage is not present across the terminals of the capacitor.

Ext MSP
CRME cabinet major (continued)

- 35 Use the voltmeter to make sure that voltage is not present between the terminals of the capacitor and the battery return.

36

**DANGER****Risk of injury from high energy levels**

The terminals at the rear of the CRME have an electrical potential of -48 Vdc to -60 Vdc . Do not attempt to replace the capacitor when you use the voltmeter to detect voltage.

With the capacitor-forming tool in place, disconnect the leads from the short-circuited capacitor.

- 37 Remove the capacitor.
- 38 Install a replacement capacitor.
- 39 Connect the positive lead to the capacitor's positive terminal. Connect the negative lead to the capacitor's negative terminal.
- 40 Remove the capacitor-forming tool.
- 41 Wait approximately 3 to 5 min to allow the capacitor to recharge.

At the front of the CRME

- 42 Set the circuit breaker for the capacitor to ON.
- 43 Check the circuit breaker.

If the circuit breaker	Do
is OFF	step 48
is ON	step 44

Ext MSP CRME cabinet major (continued)

- 44 Check the frame FAIL LED on the MSP.

If the frame FAIL LED	Do
is lit and step 5 in this procedure is not complete	step 5
is lit and step 5 in this procedure is complete	step 47
is not lit	step 45

At the MAP terminal

- 45 To access the Ext level of the MAP display to determine if an MSP alarm is present, type:

>MAPCI;MTC;EXT

and press the Enter key.

If an MSP alarm	Do
is present, and you did not access each cabinet with an MSP alarm	step 46
is present, and you did access the cabinet with an MSP alarm	step 48
is not present	step 48

- 46 Go to the table of contents in this document to find the procedure for the cabinet with the MSP alarm. Perform the procedure.

At the back of the CRME

47



DANGER

Risk of injury from high energy levels

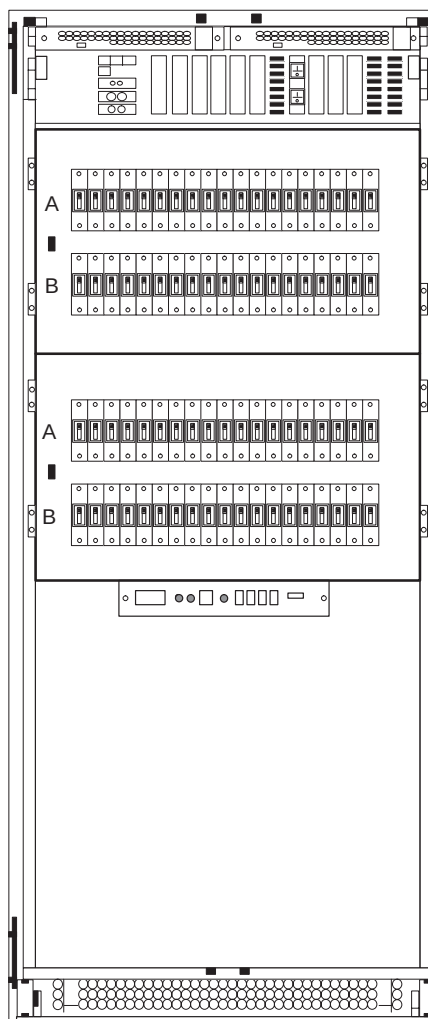
The terminals at the rear of the CRME have an electrical potential of –48 Vdc to –60 Vdc. Do not touch the terminals inside the MSP.

Note if the ABS wiring inside the MSP has short-circuits. The personnel at the next level of support can request this information.

- 48 For additional help, contact the next level of support.

Ext MSP
CRME cabinet major (continued)

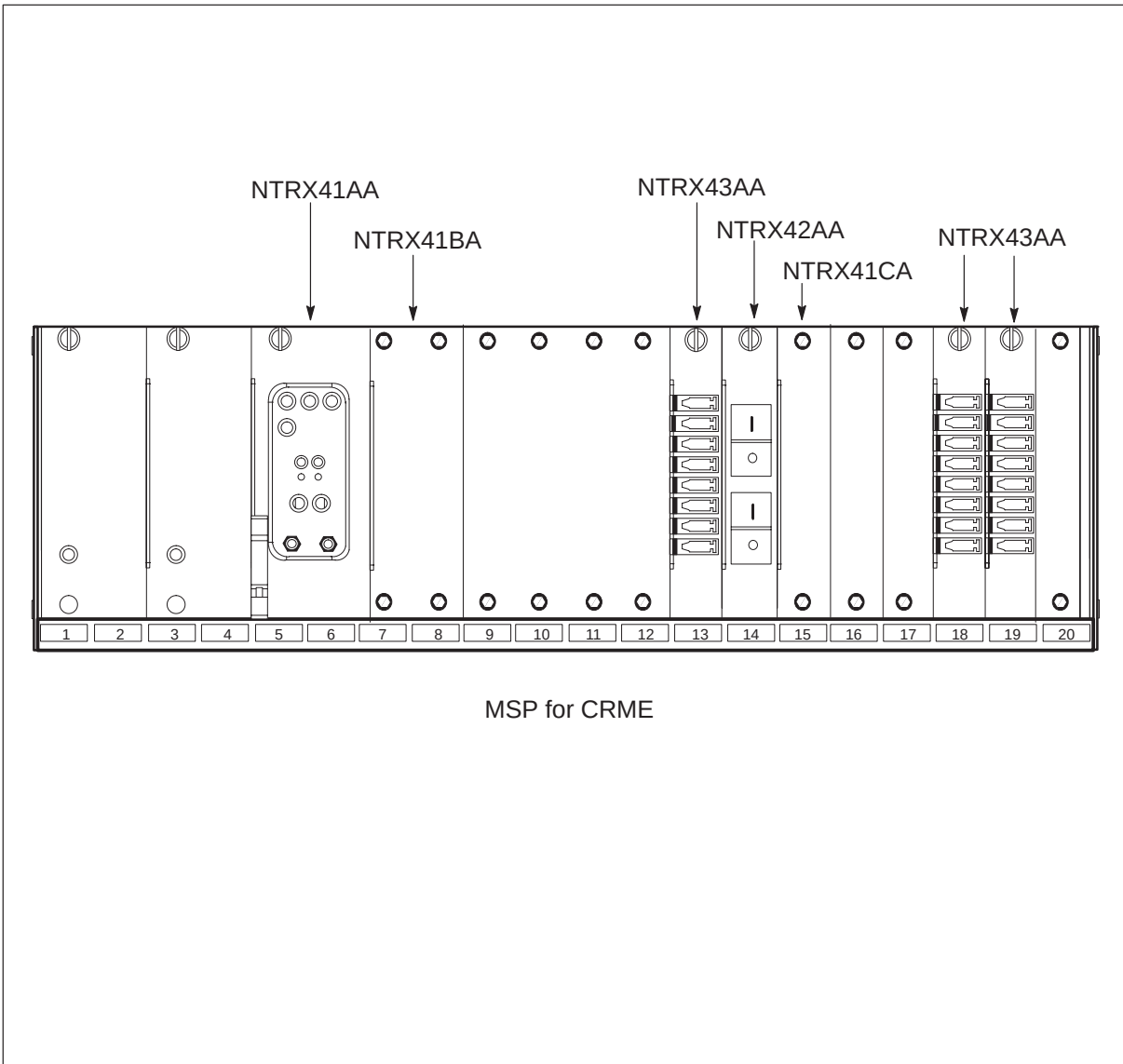
- 49 Go to the table of contents, to find the common procedure "Replacing the cooling unit". Common procedures are located in the routine maintenance section. Perform the procedure. If the MSP alarm is present, return to this procedure at step 45.
- 50 The procedure is complete.

CRME cabinet

CRME

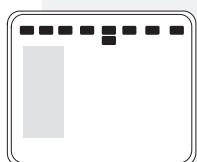
Ext MSP CRME cabinet major (end)

MSP for CRME



Ext MSP CRSC and CEXT cabinets major

Alarm display



CM	MS	IOD	Net	PM	CCS	Lns	Trks	Ext	APPL
.	.	.	.	.	.	.	.	1FSP M	.

Indication

An FSP that follows a number under the Ext header of the alarm banner indicates an Ext modular supervisory panel(MSP) major alarm. An M under the FSP indicates that the alarm class is major. The alarm display is at the MTC level of the MAP display.

Note: Current software does not reflect the change from FSP to MSP in the MAP display.

Meaning

An MSP alarm occurs when one or more cabinets in the office has a power fault or a cooling unit fault. The number that precedes FSP is the number of cabinets with an MSP alarm. Refer to the earlier note.

Result

The type of fault and the type of cabinet that contains the fault determines the effect on subscriber service.

Common procedures

This procedure refers to the common procedure "Replacing the cooling unit". Common procedures are located in the routine maintenance section of this manual.

Action

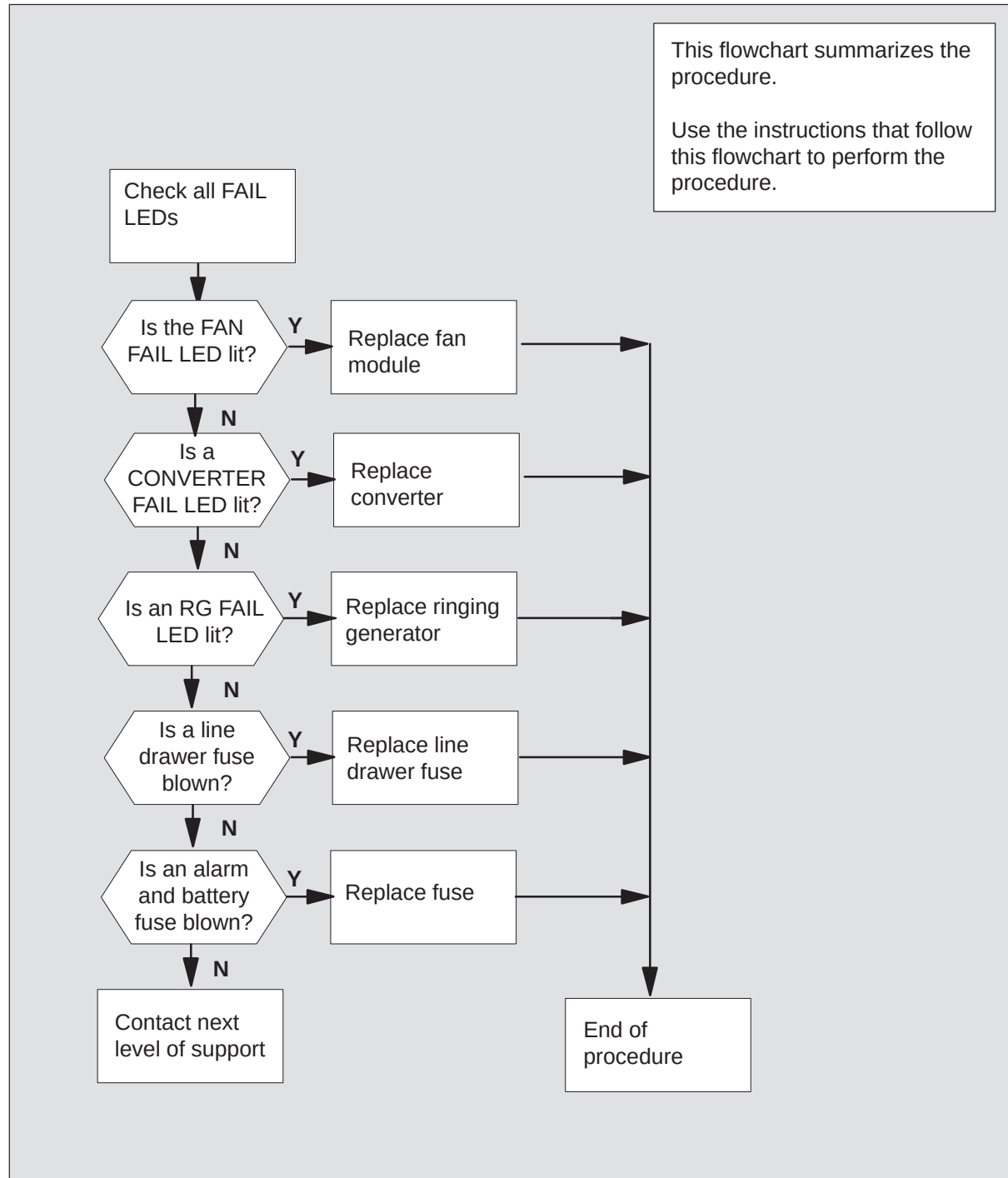
This procedure applies to the following cabinets:

- Cabinetized Remote Switching Center with Integrated Services Digital Network (CRSC with ISDN), NTMX89FB.
- Cabinetized Extension cabinet (CEXT), NTMX89FC.

The following flowchart contains a summary and a list of steps. Use the flowchart to review the procedure. Follow the steps to perform the procedure.

Ext MSP CRSC and CEXT cabinets major (continued)

Summary of clearing an Ext MSP CRSC and CEXT cabinets major alarm



Ext MSP

CRSC and CEXT cabinets major (continued)

Clearing an Ext MSP CRSC and CEXT cabinets major alarm

At the CRSC or CEXT cabinets

1

ATTENTION

Illustrations of the CRSC and CEXT cabinets, LCME fuse panel, and MSP appear at the end of this procedure.

Check the FAN FAIL LEDs.

If	Do
any FAN FAIL LEDs are lit	step 30
FAN FAIL LEDs are not lit	step 2

2 Check the CONVERTER FAIL LED on each converter in the cabinet.

If	Do
any CONVERTER FAIL LEDs are lit	step 11
CONVERTER FAIL LEDs are not lit	step 3

3 Check the RG FAIL LED on both RGs at the top of the cabinet. The FAIL LED is behind the front panel of the RG.

If	Do
an RG's FAIL LED is lit	step 31
the RGs' FAIL LEDs are not lit	step 4

Ext MSP CRSC and CEXT cabinets major (continued)

- 4 Check the line drawer fuses (F01 to F17) on shelves 33 and 47, slot number 18.

If a fuse	Do
is blown (protrudes)	step 10
is not blown	step 3

- 5 Check the ABS fuses 01 to 04 on the MSP.

If a fuse	Do
is blown (protrudes)	step 4
is not blown	step 5

- 6 Obtain a replacement fuse with the same voltage and amperage ratings as the blown fuse.
- 7 Check the D-channel handler (DCH) power fuses on the power converter circuit card (NTMX72AA) in shelf position 06 in the CRSC cabinet. Check the DCH power fuses on the DS60 extension pack (NTMX79AA) in position 06 in the CEXT cabinet.
- 8 Remove the blown fuse.

- 9
- 

Danger
Risk of fire
For continued protection against risk of fire, replace the fuse with a fuse of the same type, rating (color code), and manufacturer.

Insert the replacement fuse.

If the fuse	Do
blows (protrudes) again	step 8
does not blow again	step 59

Ext MSP**CRSC and CEXT cabinets major** (continued)

- 10 Determine which fuse is blown.
- 11 Obtain a replacement fuse with the same voltage as the blown fuse.
- 12 Remove the blown fuse.

13

**Danger****Risk of fire**

For continued protection against risk of fire, replace the fuse with a fuse of the same type, rating (color code), and manufacturer.

Insert the replacement fuse.

If the fuse	Do
blows (protrudes) again	step 14
does not blow again	step 59

Ext MSP
CRSC and CEXT cabinets major (continued)

- 14 Use the following information to identify the drawer associated with the blown fuse. The drawers are beside the fuse panel.

Fuse location

Fuse number	Drawer number
F1 –48 battery return	0 or 4
F2 –48 battery return	1 or 5
F3 –48 battery return	2 or 6
F4 –48 battery return	3 or 7
F5 –48V	0 or 4
F6 –48V	1 or 5
F7 –48V	2 or 6
F8 –48V	3 or 7
F9 + 15V	0 or 4
F10 + 15V	1 or 5
F11 + 15V	2 or 6
F12 + 15V	3 or 7
F13 –48V	0 or 4
F14 –48V	1 or 5
F15 –48V	2 or 6
F16 –48V	3 or 7
F17 RG	0 - 7

Ext MSP**CRSC and CEXT cabinets major (continued)**

- 15 Pull out the line drawer identified in step 14. When working with a blown RG fuse, begin with the top left drawer.

16

**Danger****Personal injury**

Do not touch the line feed resistors on the line cards. The line feed resistors generate enough heat to burn you.

**Caution****Loss of service**

Perform this procedure during periods of low traffic.

Unseat all the line cards in the drawer. Do not remove the line cards from the drawer.

- 17 Obtain a replacement fuse with the same voltage and amperage ratings as the blown fuse.
- 18 Remove the blown fuse.

19

**Danger****Risk of fire**

For continued protection against risk of fire, replace the fuse with a fuse of the same type, rating (color code), and manufacturer.

Insert the replacement fuse.

If the fuse	Do
blows (protrudes) again	step 20
does not blow again	step 22

Ext MSP
CRSC and CEXT cabinets major (continued)

- 20 Check the drawer for loose or short-circuited wires.

If loose or short-circuited wires	Do
are present	step 29
are not present and the fuse is a ringing voltage fuse	step 21
are not present, the fuse is a ringing voltage fuse, and you have done all four line drawers in the shelf	step 29
are not present, and the fuse is one of the line drawer fuses (1–17)	step 29

- 21 Reseat all the line cards in the drawer. Repeat steps 15 and 16 for the next drawer.
- 22 Reseat the line cards one at a time. Check the fuse after you reseat each line card.

If	Do
after reseating a line card, the fuse blows (protrudes) again	step 23
after reseating all line cards, the fuse does not blow again	step 30

Ext MSP**CRSC and CEXT cabinets major (continued)**

23

**Danger****Personal injury**

Do not touch the line feed resistors on the line cards. The line feed resistors generate enough heat to burn you.

Remove the line card from the drawer.

24 Obtain a replacement line card. Make sure the replacement card has the same PEC as the card you remove. The PEC must include the suffix.

25 Insert the replacement line card into the drawer.

26 Obtain a replacement fuse with the same voltage and amperage ratings as the blown fuse.

27 Remove the blown fuse.

28

**Danger****Personal injury**

Do not touch the line feed resistors on the line cards. The line feed resistors generate enough heat to burn you.

**Danger****Risk of fire**

For continued protection against risk of fire, replace the fuse with a fuse of the same type, rating (color code), and manufacturer.

Insert the replacement fuse.

If the fuse	Do
blows (protrudes) again	step 29
does not blow again	step 29

Ext MSP CRSC and CEXT cabinets major (continued)

- 29 Reseat all line cards in the drawer.
- 30 Push the drawer back in. Proceed to step 59.
- 31 Use the following table to identify the circuit breaker on the MSP. This circuit breaker is associated with the RG that has a lit FAIL LED.

RG number	Circuit breaker number
RG0	3
RG1	5

- 32 Check the associated circuit breaker.

If the circuit breaker	Do
is ON	step 40
is OFF	step 33

- 33 Set the circuit breaker to ON.

If the circuit breaker	Do
goes OFF and the FAIL LED on the RG is lit	step 34
remains ON and the FAIL LED on the RG is not lit	step 59
remains ON and the FAIL LED on the RG is lit	step 40

Ext MSP

CRSC and CEXT cabinets major (continued)

At the CPDC cabinet

- 34 Locate the fuse associated with the cabinet and shelf number.

If the fuse	Do
is blown (protrudes)	step 35
is not blown	step 41

- 35 Remove the fuse holder with the blown fuse.

- 36 Replace the cartridge fuse in the fuse holder.

37



Danger

Risk of fire

For continued protection against risk of fire, replace the fuse with a fuse of the same type, rating (color code), and manufacturer.

Replace the blown fuse.

- 38 Install the fuse holder back on the CPDC.

At the CRSC or CEXT cabinet

- 39 Set the circuit breaker to ON.

If the circuit breaker	Do
goes OFF (the RG FAIL LED is lit)	step 41
remains ON and the RG FAIL LED is not lit	step 59
remains ON and the RG FAIL LED is lit	step 40

Ext MSP

CRSC and CEXT cabinets major (continued)

- 40 Set the circuit breaker to OFF.
- 41 Go to *Card Replacement Procedures* to replace the RG. Replace the RG and return to this step.
- 42 Check the FAIL LED on the replaced RG.

If the FAIL LED on the RG	Do
is lit	step 43
is not lit	step 59

- 43 Go to the *Alarm Clearing Procedures* to clear the RG alarm. Clear the RG alarm and return to this step.
- 44 Note the number of the shelf that contains the converter with the lit CONVERTER FAIL LED.
- 45 Use the information that follows to identify circuit breakers on the MSP. These circuit breakers are associated with the shelf that you noted in step 44.

Shelf number	Circuit breaker number
06	7, 8, 9, 10
19	1
33	4, 11
47	6, 13
61	12, 14
65	3, 5

Ext MSP

CRSC and CEXT cabinets major (continued)

- 46 Check the associated circuit breaker.

If the circuit breaker	Do
is ON	step 22
is OFF	step 14

- 47 Set the circuit breaker you identify in step 45 to ON.

If the circuit breaker	Do
goes OFF (the CONVERTER FAIL LED is lit)	step 15
remains ON and the CONVERTER FAIL LED is lit	step 22
remains ON and the CONVERTER FAIL LED is not lit	step 59

- 48 Note the numbers of the cabinet and shelf that contain the converter with the lit CONVERTER FAIL LED.

At the CDPC

- 49 Locate the fuse that powers the shelf that you noted in step 48. The fuses are located in the CRSC or CEXT cabinet.

If the fuse	Do
is blown (protrudes)	step 17
is not blown	step 22

- 50 Remove the fuse holder with the blown fuse.

- 51 Replace the cartridge fuse in the fuse holder.

Ext MSP CRSC and CEXT cabinets major (continued)

52



Danger

Risk of fire

For continued protection against risk of fire, replace the fuse with a fuse of the same type, rating (color code), and manufacturer.

Replace the blown fuse.

53 Install the fuse holder back on the CPDC cabinet.

At the CRSC or CEXT cabinet

54 Set the circuit breaker to ON.

If the circuit breaker	Do
goes OFF (the CONVERTER FAIL LED is not lit)	step 23
remains ON and the CONVERTER FAIL LED is not lit	step 59
remains ON and the CONVERTER FAIL LED is lit	step 22

55 Set the circuit breaker to OFF.

56 Go to the *Card Replacement Procedures* to replace the converter. Replace the converter and return to this step.

57 Check the converter that you replaced in step 56. Check the associated circuit breaker.

If the circuit breaker	Do
goes OFF and the CONVERTER FAIL LED is lit	step 29
remains ON and the CONVERTER FAIL LED is not lit	step 59
remains ON and the CONVERTER FAIL LED is lit	step 25

Ext MSP

CRSC and CEXT cabinets major (continued)

58 Set the circuit breaker to OFF.

At the CLCE cabinet

59 Check the frame FAIL lamp on the MSP.

If the frame FAIL lamp	Do
is lit and steps 2, 3, 4, and 5 in this procedure are not complete	step 26
is lit and steps 2, 3, 4, and 5 in this procedure are complete	step 29
is not lit	step 27

60 Go to the step that is not complete (step 2, 3, 4, or 3) in this procedure.

At the MAP terminal

61 To access the Ext level of the MAP to determine if an MSP alarm is present, type

>MAPCI;MTC;EXT

and press the Enter key.

If an MSP alarm	Do
is present, and you did not access all the cabinets with an MSP alarm	step 28
is present, and you did access all the cabinets with an MSP alarm	step 29
is not present	step 31

62 Go to the table of contents in this document. Locate the procedure for the type of cabinet with an MSP alarm. Perform that procedure.

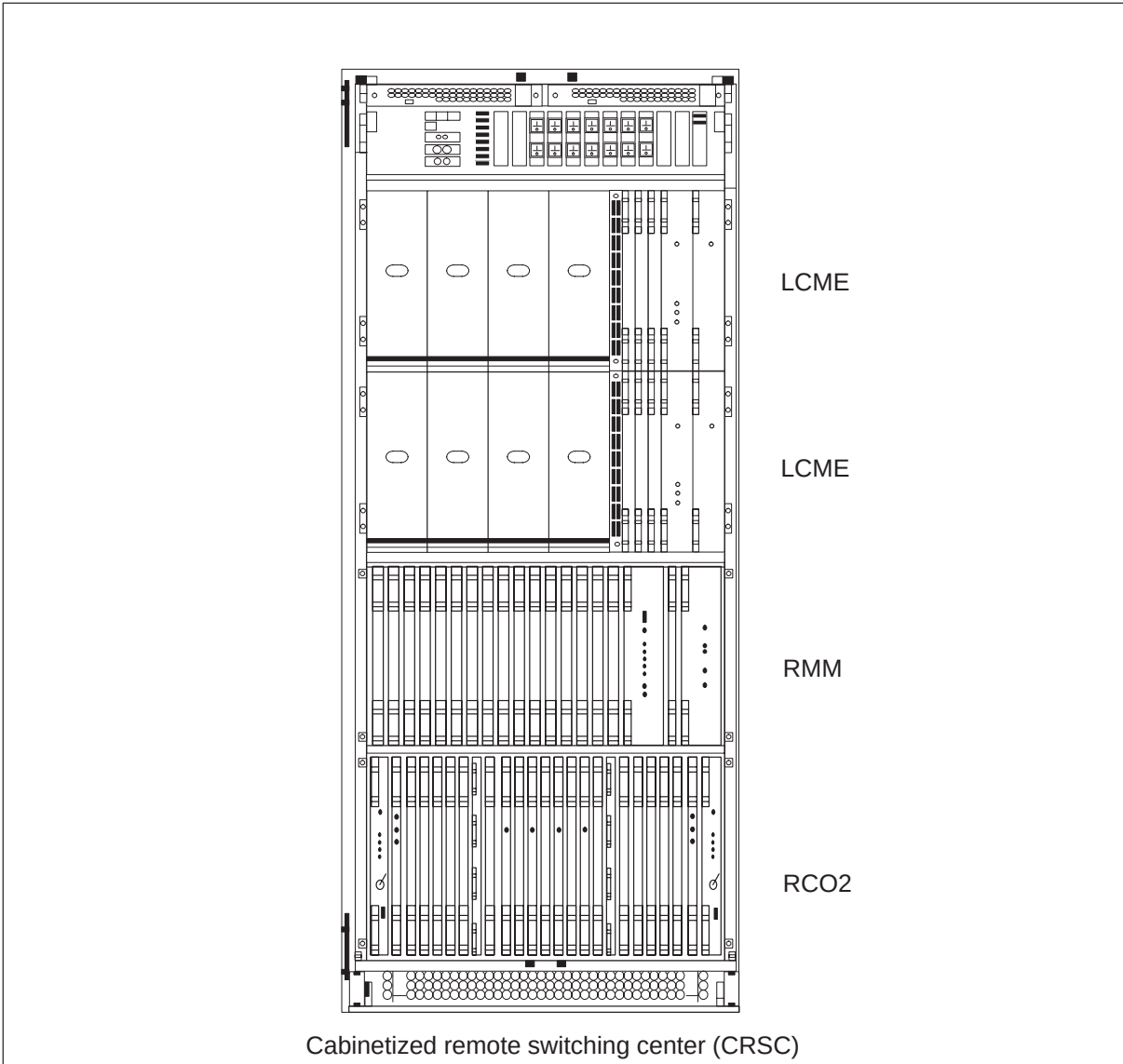
63 For additional help, contact the next level of support.

64 Go to the table of contents in the routine maintenance section. Locate the common procedure "Replacing the cooling unit". Perform that procedure. If the MSP alarm continues, return to this procedure at step 26.

65 This procedure is complete.

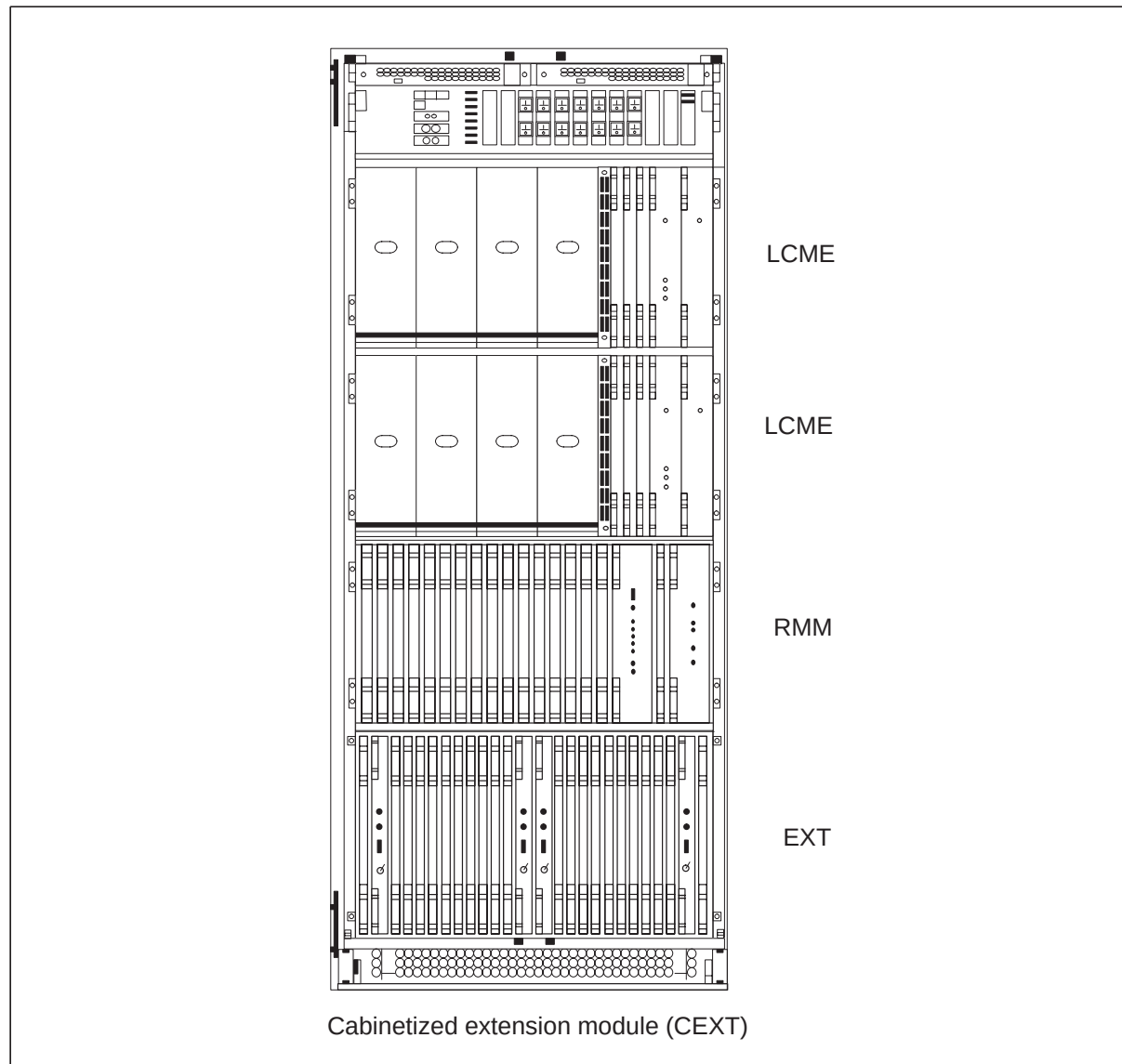
Ext MSP CRSC and CEXT cabinets major (continued)

CRSC cabinet



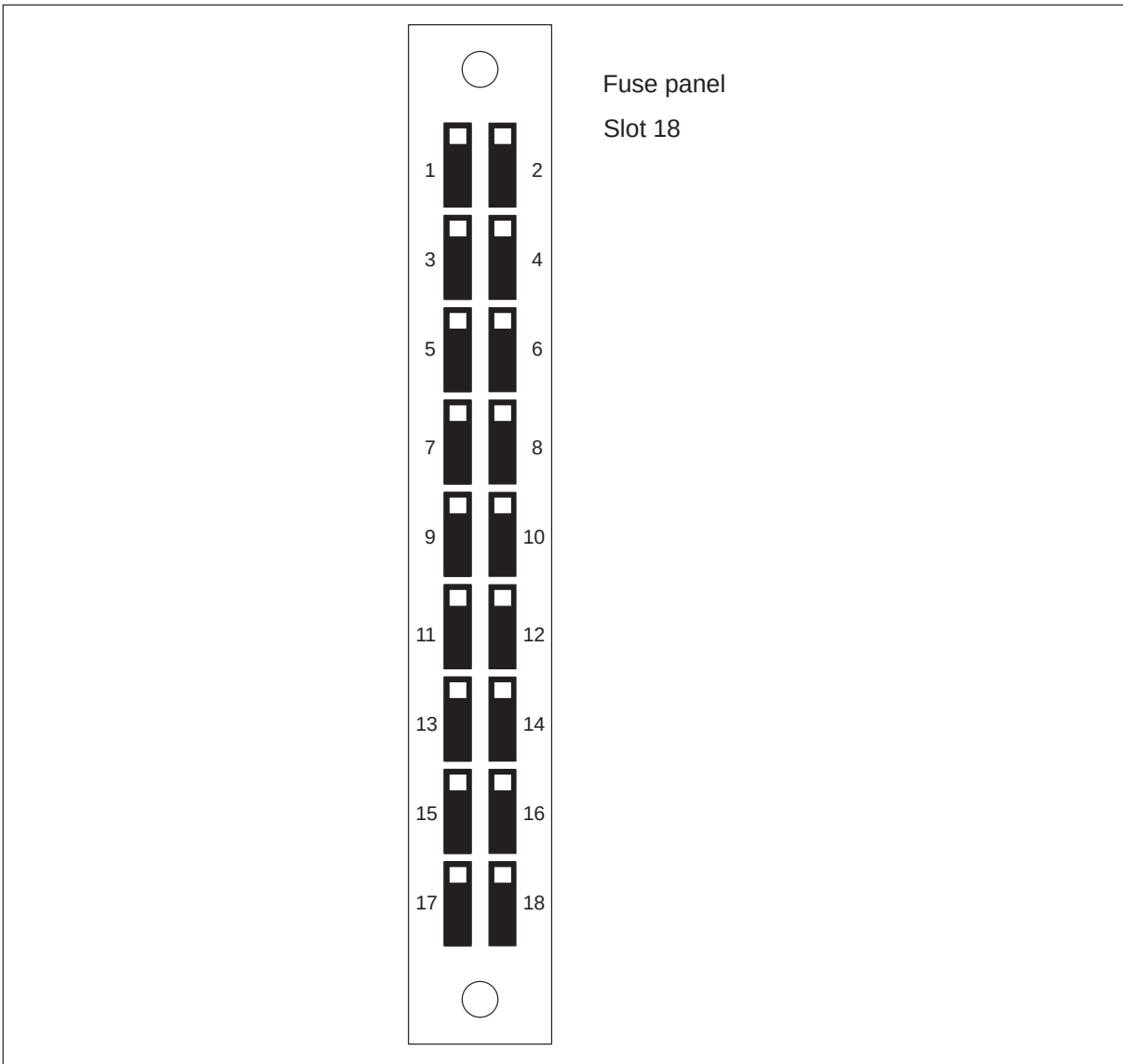
Ext MSP **CRSC and CEXT cabinets major** (continued)

CEXT cabinet



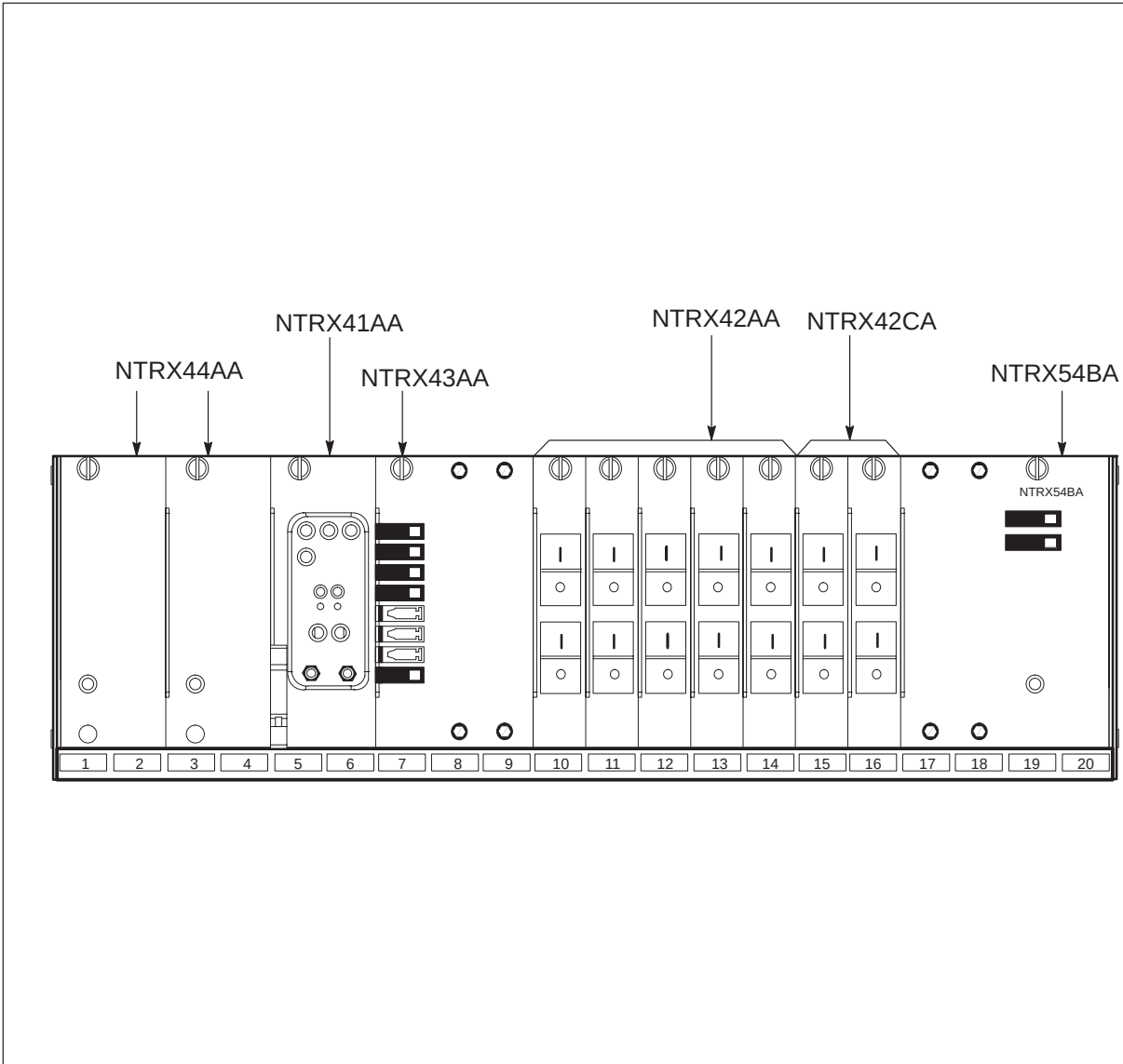
Ext MSP CRSC and CEXT cabinets major (continued)

LCME fuse panel



Ext MSP CRSC and CEXT cabinets major (end)

MSP shelf for CRSC and CEXT cabinets



PM LCME
major

Alarm display

	CM	MS	IOD	Net	PM	CCS	Lns	Trks	Ext	EIO
	.	.	.	.	1LCME	.	.	.	.	.
					M					

Indication

A 1LCME alarm code under the PM subsystem header at the MTC level of the MAP display indicates an alarm involving an LCME. The letter M under the alarm code indicates that the alarm class is major.

Meaning

The indicated number of LCME units are in the in-service (InSv) or system-busy (SysB) state.

Result

This alarm affects subscriber service. Local LCME backup is not available if the other LCME units fail.

Common procedures

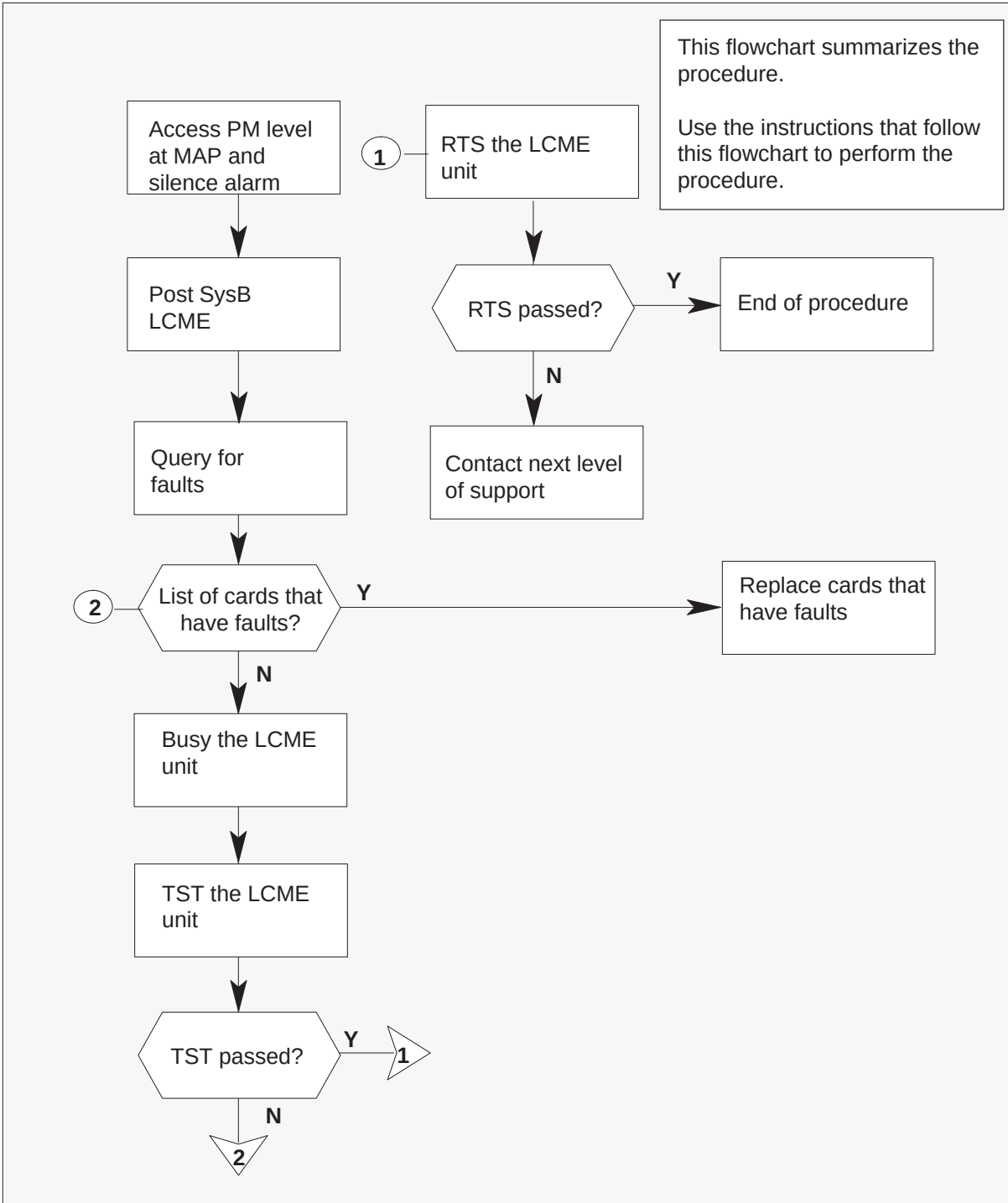
There are no common procedures.

Action

This procedure contains a flowchart and a list of steps. Use the flowchart to review the procedure. Follow the steps to perform the procedure.

PM LCME major (continued)

Summary of clearing a PM LCME major alarm



PM LCME major (continued)

Clearing a PM LCME major alarm

At the MAP terminal

1

ATTENTION

You must enter this procedure from a step in a PM system-level alarm clearing procedure that identified an LCME-associated fault.

To silence the alarm, type

>MAPCI;MTC;PM;SIL

and press the Enter key.

2 To identify the SysB LCME, type

>DISP STATE ISTB LCME

and press the Enter key.

Example response on the MAP display:

SysB LCME : 2

PM LCME major (continued)

- 3 To post the SysB LCME identified in step 2, type

>POST LCME lcme_site_name lcme_frame_no lcme_no

and press the Enter key.

where

lcme_site_name is the site name for the LCME that has faults

lcme_frame_no is the number of the associated LCME equipment frame

lcme_no is the number of the LCME that has faults

Example response on the MAP display:

CM	MS	IOD	Net	PM	CCS	Lns	Trks	Ext
.	.	.	.	1LCME	.	.	.	.
				M				
LCME			SysB	ManB	OffL	CBsy	ISTb	InSv
0 Quit	PM	1	0	2	0	2	12	
2 Post_	LCME	1	0	2	0	2	9	
3 ListSet								
4 SwRG	LCME	RSCS 14	1 ISTb	Links_00S:	CSide	0	PSide	0
5 Trnsl_	Unit0:	InSv	Takeover	/RG: 1				
6 Tst_	Unit1:	SysB		/RG: 1				
7 Bsy_				11 11 11	RG:Pref	1	InSv	
8 RTS_	Drwr:	01 23 45 67 89	01 23 45	Stby	0	InSv		
9 OffL		.. ..	.. ..	.. ..	.. ..	.. ..		
10 LoadPM_								
11 Disp_								
12 Next								
13								
14 QueryPM								
15								
16								
17								
18								

PM LCME
major (continued)

- 4 To check for fault indicators, type

>QUERYPM FLT

and press the Enter key.

Example response on the MAP display:

CM	MS	IOD	Net	PM	CCS	LnS	Trks	Ext
.	.	.	.	1LCME M	.	.	.	.
LCME								
0	Quit	PM	1	0	2	0	2	12
2	Post_	LCME	1	0	2	0	2	9
3	ListSet							
4	SwRG	LCME	RSCS 14	1 ISTb	Links_00S:	CSide	0	PSide 0
5	Trnsl_	Unit0:	InSv	Takeover	/RG: 1			
6	Tst_	Unit1:	SysB		/RG: 1			
7	Bsy_				11 11 11	RG:Pref	1	InSv
8	RTS_	Drwr:	01 23 45 67 89	01 23 45		Stby	0	InSv
9	OffL		.. ..	.. ..	.. ..	.. ..	.. ..	
10	LoadPM_	QUERYPM FLT						
11	Disp_	Node inservice troubles exist:						
12	Next	One or both Units inservice trouble						
13		LCME	UNIT 0	Inservice No Troubles Exist:				
14	QueryPM	LCME	UNIT 1	Out of service Troubles Exist:				
15								
16		SITE	FLR	RPOS	BAY_ID	SHF	DESCRIPTION	SLOT EQPEC
17		RSCS0	01	A00	LCME 00	32	LCME : 000	: 19 BX35
18		RSCS0	01	A00	LCME 00	32	LCME : 000	: 20 BX35

If the MAP display	Do
indicates a card that has faults	step 16
does not indicate a card that has faults	step 5

- 5 To manually busy the LCME posted in step 3, type

>BSY UNIT unit_no

and press the Enter key.

where

unit_no is the number of the SysB LCME

PM LCME major (continued)

- 6 To test the LCME, type

>TST UNIT unit_no

and press the Enter key.

where

unit_no is the number of the LCME unit manually busied in step 5

Example response on the MAP display:

Test Passed

or

Test Failed

If TST	Do
passes	step 15
fails	step 16
cannot test CBsy links	step 7

- 7 To identify C-side links that are in a SysB condition, type

>TRNSL C

and press the Enter key.

Example response on the MAP display:

```
LINK 0   RC02 2 ;CAP MS;STATUS:  SYSB, ;MSGCOND:CLS
LINK 1   RC02 2  CAP S; STATUS:   OK
LINK 2   RC02 2  CAP S; STATUS:   OK
LINK 3   RC02 2  CAP S; STATUS:   OK
LINK 4   RC02 2 ;CAP MS;STATUS:  OK, ;MSCOND:OPN,
```

If links	Do
are SysB	step 8
are open	step 20

PM LCME
major (continued)

- 8 To post the RCO2 unit associated with the LCME, type

>POST RCO2 rco2_no

and press the Enter key.

where

rco2_no is the RCO2 unit identified in step 7

Example response on the MAP display:

CM	MS	IOD	Net	PM	CCS	Lns	Trks	Ext
.	.	.	.	1LCME M	.	.	.	.
RCO2			SysB	ManB	OffL	CBsy	ISTb	InSv
0 Quit	PM	3	0	1	0	4	12	
2 Post_	RCO2	0	0	2	0	2	9	
3 ListSet								
4	RCO2	1	ISTb	Links_00S:	CSide	0, PSide	1	
5 Trnsl_	Unit0:	Act	InSv					
6 Tst_	Unit1:	Inact	InSv					
7 Bsy_								
8 RTS_								
9 OffL								
10 LoadPM_								
11 Disp_								
12 Next								
13 SwAct								
14 QueryPM								
15								
16								
17								
18								

- 9 To identify the P-side links that have faults and choose a link that has faults, type

>TRNSL P

and press the Enter key.

Example response on the MAP display:

LINK 23:LCME	1	0;CAP	MS;STATUS:	SYSB;MSGCOND:CLS
LINK 24:LCME	1	1;CAP	S;STATUS:	OK
LINK 25:LCME	1	2;CAP	S;STATUS:	OK
LINK 26:LCME	1	3;CAP	S;STATUS:	OK
LINK 27:LCME	2	0;CAP	MS;STATUS:	OK;MSGCOND:OPN
LINK 28:LCME	2	1;CAP	S;STATUS:	OK
LINK 29:LCME	2	2;CAP	S;STATUS:	OK

PM LCME
major (continued)

- 10** To busy the link that has faults, type

>BSY LINK link_no

and press the Enter key.

where

link_no is the number of the P-side link chose in step 9

- 11** To test the ManB link, type

>TST LINK link_no

and press the Enter key.

where

link_no is the number of the link manually busied in step 10

If the MAP display	Do
indicates a card that has faults	step 16
does not indicate a card that has faults	step 12

- 12** To return the ManB link to service, type

>RTS LINK link_no

and press the Enter key.

where

link_no is the number of the link that you tested in step 11

Note: If the MAP display identifies other links that have faults, perform the procedures in steps 10 through 12. Perform this procedure for each link until you busy, test, and return to service all links.

If RTS	Do
passes	step 13
fails	step 20

PM LCME major (continued)

- 13** To post the LCME identified in step 2, type
>POST LCME lcme_site_name lcme_frame_no lcme_no
and press the Enter key.
where
lcme_site_name is the site name for the LCME that has faults
lcme_frame_no is the number of the associated LCME
lcme_no is the number of the LCME that has faults
- 14** To test the LCME unit, type
>TST UNIT unit_no
and press the Enter key.
where
unit_no is the number of the LCME unit posted in step 13

If TST	Do
passes	step 15
fails	step 16

- 15** To return the LCME to service, type
>RTS UNIT unit_no
and press the Enter key.
where
unit_no is the number of the LCME tested in step 14

If RTS	Do
passes	step 21
fails	step 20

PM LCME major (continued)

- 16 Check the card listing that appears in the following MAP display.

Example response on the MAP display:

SITE	FLR	RPOS	BAY_ID	SHF	DESCRIPTION	SLOT	EQPEC
RSCS0	01	A00	LCME 00	32	LCME :000	: 21	BX34
RSCS0	01	A00	LCME 00	32	LCME :000	: 19	BX35
RSCS0	01	A00	LCME 00	32	LCME :000	: 20	BX35

Note: If the system does not generate a card list, check the logs. Go to step 20 to move to a higher level of maintenance support.

If you	Do
replaced all cards on the list	step 17
did not replace all cards on the list	step 19

- 17 The NTMX74 DS30A interface card in the RCO2 can cause the problem. The NTMX74 card connects to the links with faults that appear in step 9.

If you	Do
replaced the NTMX74	step 20
did not replace the NTMX74	step 18

Note: If the MAP display indicates the NTMX74 card, determine if one link or several links have faults. Repeat clearing procedure as necessary.

PM LCME major (end)

- 18** Each interface (I/F) chip on the NTMX74 card serves four DS30A links. The following chart illustrates the Link to chip relationship. You must separate Message (MS) links by a minimum of 4 when you enter data in table LCMINV.

Chip number	DS30A Links
1	22, 23, 24, 25
2	26, 27, 28, 29
3	30, 31, 32, 33
4	34, 35, 36, 37
5	38, 39, 40, 41
6	42, 43, 44, 45
7	46, 47, 48, 49
8	50, 51, 52, 53

Go to the card replacement procedure for the NTMX74 circuit card in *Card Replacement Procedures*. Complete the card replacement procedures and go to step 11 of this procedure.

- 19** Go to the card replacement procedure in *Card Replacement Procedures* for the next card on the card list. Complete the card replacement procedures and go to step 14 of this procedure.
- 20** For additional help, contact the next level of support.
- 21** This procedure is complete. If other alarms appear, refer to the correct alarm clearing procedures for the indicated alarms.

**PM LCME(RG)
major**

Alarm display

	CM	MS	IOD	Net	PM	CCS	Lns	Trks	Ext	EIO
	.	.	.	.	1LCME	.	.	.	.	.
					M					

Indication

The 1LCME M alarm code, under the PM subsystem header, indicates a major alarm that involves an LCME ringing generator. The header appears at the MTC level of the MAP display.

Meaning

One ringing generator unit is in the in-service trouble (ISTb) state. The other ringing generator is system-busy (SysB).

Result

This alarm affects subscriber service. The system does not provide ringing to the subscribers.

Common procedures

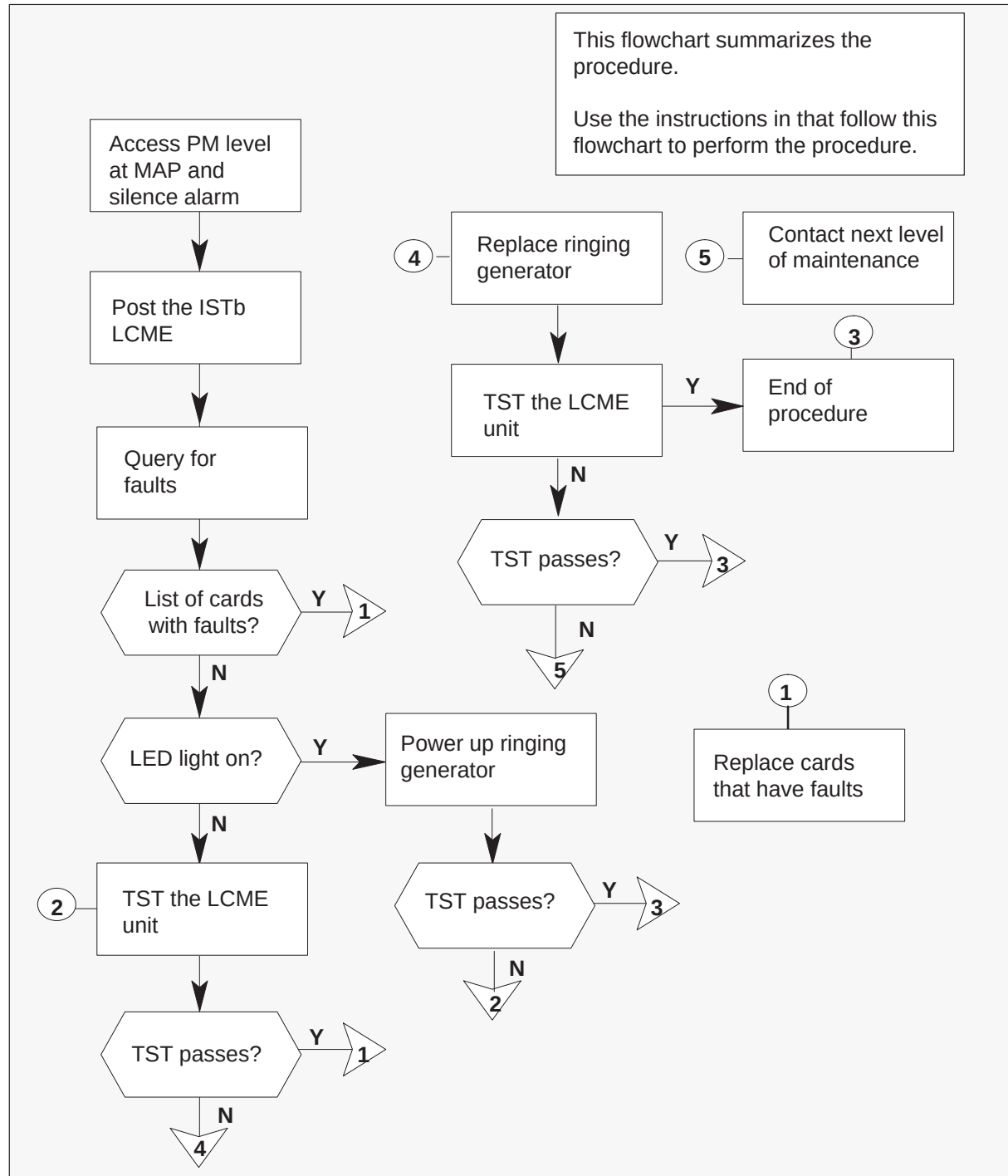
There are no common procedures.

Action

This procedure contains a summary flowchart and a list of steps. Follow the flowchart to review the procedure. Follow the steps to perform the procedure.

PM LCME(RG) major (continued)

Summary of clearing a PM LCME(RG) major alarm



PM LCME(RG)
major (continued)

Clearing a PM LCME(RG) major alarm***At the MAP terminal*****1****ATTENTION**

Enter this procedure from a PM system-level alarm clearing procedure step that identifies an LCME-associated fault.

To silence the alarm, type

>MAPCI;MTC;PM;SIL

and press the Enter key.

2 To identify the LCME that has faults, type

>DISP STATE ISTB LCME

and press the Enter key.

Sample response on the MAP display:

ISTB LCME : 1

PM LCME(RG)
major (continued)

- 3 To post the ISTb LCME from step 2, type
>POST LCME lcme_site_name lcme_frame_no lcme_no
and press the Enter key.

where

lcme_site_name is the site name for the LCME that has faults
lcme_frame_no is the number of the associated LCME equipment frame
lcme_no is the number of the LCME that has faults

Sample response on the MAP display:

CM	MS	IOD	Net	PM	CCS	Lns	Trks	Ext							
.	.	.	.	1LCME	.	.	.	.							
				C											
LCME															
0	Quit	PM	1	0	2	0	1	12							
2	Post_	LCME	1	0	2	0	1	9							
3	ListSet														
4	SwRG	LCME	RSCS 14	1 ISTb	Links_00S:	CSide	0	PSide 0							
5	Trnsl_	Unit0:	ISTb	/RG: 1											
6	Tst_	Unit1:	SysB	/RG: 1											
7	Bsy_					11 11 11 11 11	RG:Pref 1	ISTb							
8	RTS_	Drwr: 01	23 45 67 89	01 23 45 67 89	Stby 0 ISTb										
9	OffL	..	..	..	..	..	..	..							
10	LoadPM_														
11	Disp_														
12	Next														
13															
14	QueryPM														
15															
16															
17															
18															

PM LCME(RG)
major (continued)

4 To check for fault indicators, type

>QUERYPM FLT

and press the Enter key.

Sample response on the MAP display:

CM	MS	IOD	Net	PM	CCS	Lns	Trks	Ext
.	.	.	.	1LCME *C*	.	.	.	.
LCME			SysB	ManB	OffL	CBsy	ISTb	InSv
0 Quit	PM	1	0	2	0	1	12	
2 Post_	LCME	1	0	2	0	1	9	
3 ListSet								
4 SwRG	LCME	RSCS 14	1 ISTb	Links_00S:	CSide	0	PSide	0
5 Trnsl_	Unit0:	ISTb		/RG: 1				
6 Tst_	Unit1:	SysB		/RG: 1				
7 Bsy_				11 11 11 11	11	RG:Pref	1	ISTb
8 RTS_ Drwr:	01 23 45	67 89	01 23 45 67 89	Stby	0	ISTb		
9 OffL								
10 LoadPM_	QUERYPM FLT							
11 Disp_	Node inservice troubles exist:							
12 Next	One or both Units inservice trouble							
13	LCME UNIT 0 Inservice Troubles Exist:							
14 QueryPM	Ringing Generator Failure :Ring Generator in Excess load							
15	LCME UNIT 1 Inservice Troubles Exist:							
16	Ring Generator in Excess load							
17								
18								

If the system	Do
indicates a card that has faults	step 10
does not indicate a card that has faults	step 5

At the LCME

5 Inspect the ringing generator. Check if the LED is ON.

If the LED	Do
is ON	step 6
is OFF	step 7

PM LCME(RG)
major (continued)

- 6 To power up the ringing generator (RG), move the power switch to the ON position. The LED goes off. The switches are: RG 0 and RG 1.

If	Do
turning ON the RG restores power	step 15
turning ON the RG does not restore power	step 7

At the MAP terminal

- 7 To manually busy the LCME unit that is ISTb, type

>BSY UNIT unit_no

and press the Enter key.

where

unit_no is the number of the LCME unit that appears in step 3

- 8 To test the ManB LCME, type

>TST UNIT unit_no

and press the Enter key.

where

unit_no is the number of the LCME unit manually busied in step 7

Sample response on the MAP display:

```
LCME      RSCS0      14  1      Unit 1      OSVCE Test Initiated
LCME      RSCS0      14  1      Unit 1      Tst Failed: (Reason for
failure)
```

or

```
LCME      RSCS0      14  1      Unit 1      OSVCE Test Initiated
LCME      RSCS0      14  1      Unit 1      Tst passed
```

If TST	Do
passes	step 9
fails	step 10

PM LCME(RG) major (continued)

- 9 To return the ManB LCME to service, type

>RTS UNIT unit_no

and press the Enter key.

where

unit_no is the number of the LCME tested in step 8

If RTS	Do
passes	step 15
fails	step 14

- 10 Check the card list. This card list results from step 8.

Sample response on the MAP display:

SITE	FLR	RPOS	BAY_ID	SHF	DESCRIPTION	SLOT	EQPEC
RSCS0	01	A00	LCME 00	32	LCME :000	: 20	BX35
RSCS0	01	A00	LCME 00	32	LCME :000	: 21	BX34

If you	Do
replaced all the cards on the list	step 11
did not replace all the cards on the list	step 13

- 11 Determine if the NT6X30 circuit card is replaced.

If you	Do
replaced the NT6X30 circuit card	step 14
did not replace the NT6X30 circuit card	step 12

- 12 Go to the card replacement procedure for the NT6X30 circuit card in *Card Replacement Procedures*. Complete the card replacement procedures. Go to step 8.

PM LCME(RG)
major (end)

- 13 Go to the card replacement procedure in *Card Replacement Procedures* for the next card on the card list. Complete the card replacement procedures. Go to step 8.
- 14 For additional help, contact the next level of maintenance.
- 15 The procedure is complete. If other alarms appear at the MAP display, refer to the appropriate alarm clearing procedures.

**PM RCO2
Major**

Alarm display

	CM	MS	IOD	Net	PM	CCS	Lns	Trks	Ext	EIO
	.	.	.	.	1RCO2	.	.	.	.	.
					M					

Indication

The alarm code 1RCO2 M under the PM subsystem header at the MTC level of the MAP display indicates an RCO2 major alarm.

Meaning

The indicated number of RCO2 units are in the system-busy (SysB) or C-side busy (CBsy) state.

Result

This alarm does not affect subscriber service if both RCO2 units fail, subscriber service ends.

Common procedures

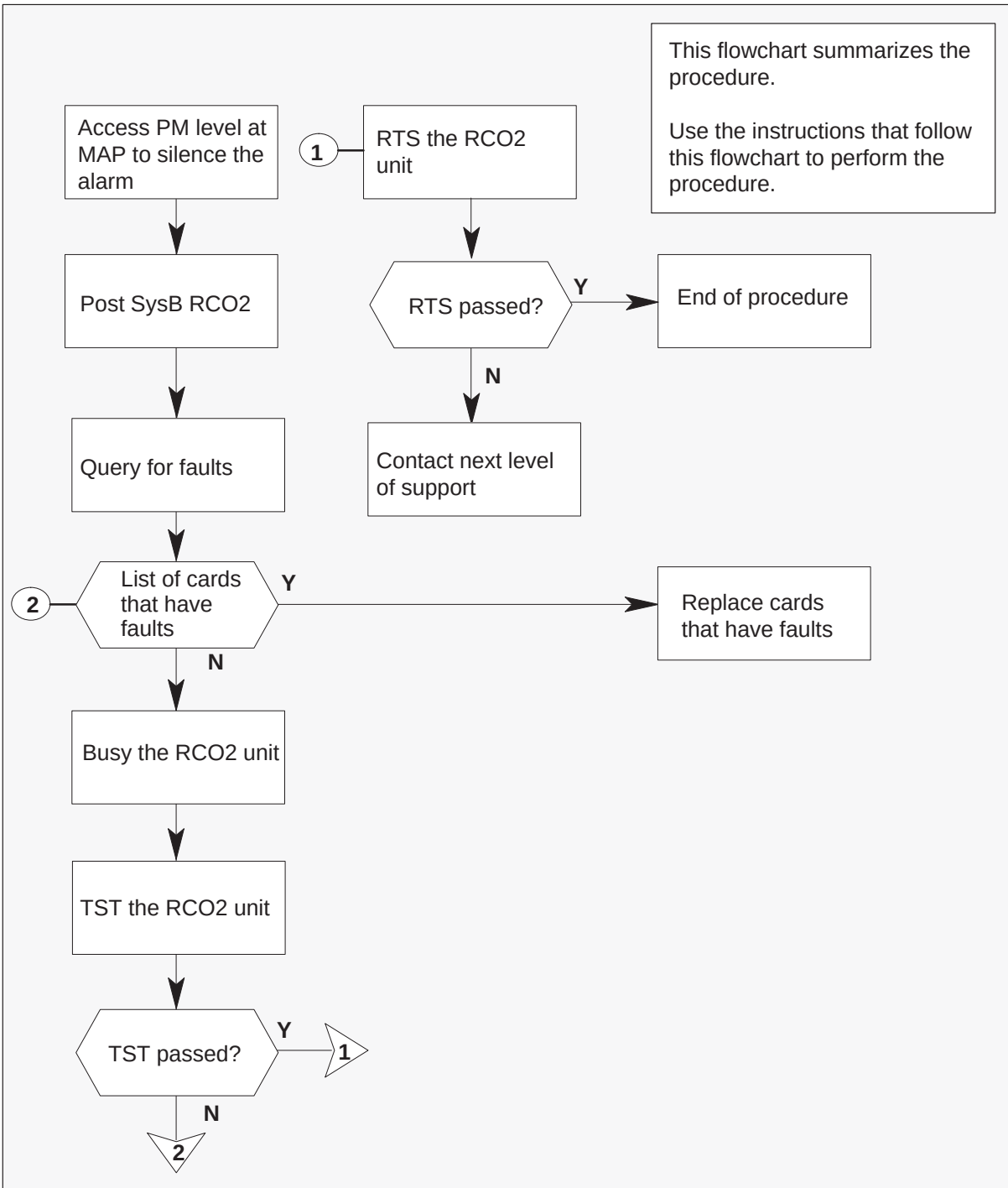
There are no common procedures.

Action

This section provides a summary flowchart of the procedure to clear an alarm. A detailed step-action procedure follows the flowchart.

PM RCO2 Major (continued)

Summary of clearing a PM RCO2 major alarm



PM RCO2 Major (continued)

Clearing a PM RCO2 major alarm

At the MAP display

1

ATTENTION

Enter this procedure from a PM system-level clearing alarm procedure step. that identifies an RCO2-associated fault.

To silence the alarm, if required, type

>MAPCI;MTC;PM;SIL

and press the Enter key.

2 To identify the RCO2 that has faults, type

>DISP STATE SYSB RCO2

and press the Enter key.

Sample response on the MAP display:

SysB RCO2 : 2

3 To post the SysB RCO2, type

>POST RCO2 rco2_no

and press the Enter key.

where

rco2_no is the number of the RCO2 displayed in step 2

Sample response on the MAP display:

RCO2	2	SysB	ManB	Offl	CBsy	ISTb	InSv
		PM	3	0	1	0	4
		RCO2	1	0	2	0	2
							12
							9

PM RCO2
Major (continued)

- 4 To check for fault indicators, type

>QUERYPM FLT

and press the Enter key.

Sample response on the MAP display:

CM	MS	IOD	Net	PM	CCS	Lns	Trks	Ext
.	.	.	.	1RCO2	.	.	.	.
				M				
RCO2		SysB	ManB	OffL	CBsy	ISTb	InSv	
0 Quit	PM	1	0	1	0	0	12	
2 Post_	RCO2	1	0	2	0	0	9	
3 ListSet								
4	RCO2 2	ISTb	Links_00S:	CSide	0, PSide	0		
5 TRNSL_	Unit0:	Act	InSv					
6 Tst_	Unit1:	Inact	SysB					
7 Bsy_	QUERYPM FLT							
8 RTS_	Unit0	InSv						
9 OffL	Unit1	No data sync						
10 LoadPM_								
11 Disp_								
12 Next								
13								
14 QueryPM								
15								
16								
17								
18								

If the system indicates	Do
a card that has faults	step 25
no cards have faults	step 5

- 5 To manual busy the SysB RCO2 unit, type

>BSY UNIT unit_no

and press the Enter key.

where

unit_no is the number of the SysB RCO2 indicated in step 4

PM RCO2

Major (continued)

- 6 To test the ManB RCO2, type

>TST UNIT unit_no

and press the Enter key.

where

unit_no is the number of the RCO2 unit manually busied in step 5

Sample response on the MAP display:

Test Passes

or

Test Fails

If TST	Do
passes	step 24
fails, and the system generates a card list	step 25
fails, and the system does not generate a card list	step 7

- 7 To identify C-side links to the host PM that are in a SysB condition, type

>TRNSL C

and press the Enter key.

Note: A host PM is a PCM-30 line group controller (PLGC).

Sample response on the MAP display:

```
LINK 0:  PLGC      1 0;CAP MS;STATUS:  OK, ;MSGCOND:OPN,Restricted
LINK 1:  PLGC      1 1;CAP S;STATUS:  OK
LINK 2:  PLGC      1 2;CAP MS;STATUS:  SysB, ;MSGCOND:CLS,Unrestricted
LINK 4:  PLGC      1 4;CAP S;STATUS:  ISTb
LINK 5:  PLGC      1 4;CAP S;STATUS:  OK
LINK 6:  PLGC      1 4;CAP S;STATUS:  OK
LINK 7:  PLGC      1 4;CAP S;STATUS:  OK
```

If link	Do
is not busy	step 29
is a message link or a speech link	step 8

PM RCO2
Major (continued)

- 8 To post the host PM, type
>POST host_pm host_pm_no
and press the Enter key.

where

host_pm is a PLGC
host_pm_no is the number of the PLGC

Sample response on the MAP display:

CM	MS	IOD	Net	PM	CCS	Lns	Trks	Ext
.	.	.	.	1RC02	.	.	.	.
M								
PLGC		SysB	ManB	OffL	CBsy	ISTb	InSv	
0 Quit	PM	1	0	1	0	1	12	
2 Post_	PLGC	0	0	2	0	1	9	
3 ListSet								
4	PLGC	1	ISTb	Links_00S:	CSide	0, PSide	1	
5 Trnsl_	Unit0:	Act	InSv					
6 Tst_	Unit1:	Inact	InSv					
7 Bsy_								
8 RTS_								
9 OffL								
10 LoadPM_								
11 Disp_								
12 Next								
13 SwAct								
14 QueryPM								
15								
16								
17 Perform								
18								

- 9 To identify the P-side links that have faults, type
>TRNSL P
and press the Enter key.

Sample response on the MAP display:

LINK 0: RCO2 2 0;CAP MS;STATUS:OK,;MSGCOND:OPN,Restricted
LINK 1: RCO2 2 1;CAP S;STATUS:OK
LINK 2: RCO2 2 2;CAP MS;STATUS:SysB,;MSGCOND:CLS,Unrestricted
LINK 4: RCO2 2 4;CAP S;STATUS:ISTb
LINK 5: RCO2 2 4;CAP S;STATUS:OK
LINK 6: RCO2 2 4;CAP S;STATUS:OK
LINK 7: RCO2 2 4;CAP S;STATUS:OK

PM RCO2 Major (continued)

- 10 To busy the link that has faults, type

>BSY LINK link_no

and press the Enter key.

where

link_no is the number of the P-side link that have faults chosen in step 9

- 11 To test the link that has faults, type

>TST LINK link_no

and press the Enter key.

where

link_no is the number of the link manually busied in step 10

If TST	Do
passes and alarm continues	step 29
passes and alarm clears	step 16
fails	step 12

- 12 To display any links that can have faults, type

>TRKS;CARRIER;POST MANB

and press the Enter key.

Sample response on the MAP display:

CLASS	ML	OS	ALARM	SYSB	MANB	UNEQ	OFFL	CBSY	PBSY	INSV
TRUNKS	0	0	0	0	0	0	0	0	0	0
REMOTE	0	0	0	5	1	0	0	0	0	10

NO	CLASS	SITE	RCC	CKT	D	ALARM	SLIP	FRAME	BER	SES	STATE
0	TRUNKS	BRSCS	0	0	C		0	0	<-.7	0	INSV
1	REMOTE	BRSCS	0	1	C		0	0	<-.7	0	INSV
2	REMOTE	BRSCS	0	2	C		0	0	<-.7	0	MANB

MORE . . .

Note: The MORE . . . at the bottom of the display indicates the user can see more links. To see these links, type

>NEXT

and press the Enter key.

PM RCO2

Major (continued)

- 13 To test the ManB link, type

>TST link_no

and press the Enter key.

where

link_no is the number of the ManB link. The MAP display in step 12 shows this link number listed under the NO column. The number for the ManB link in the example is 2.

If TST	Do
passes and alarms clears	step 15
fails	step 29

- 14 Perform the corrective procedure on the link indicated on the MAP display in step 12.

Note: The system can indicate message links that have faults. These links must be in the ManB state before the links can return to service (RTS).

- 15 To post the host PM, type

>PM;POST host_pm host_pm_no

and press the Enter key.

where

host_pm is the PLGC posted in step 8

host_pm_no is the number of the PLGC

- 16 To return the link to service, type

>RTS LINK link_no

and press the Enter key.

where

link_no is the number of the link identified in step 9

If RTS	Do
passes	step 19
fails	step 29

PM RCO2
Major (continued)

- 17 To post the RCO2, type

>POST RCO2 rco2_no

and press the Enter key.

where

rco2_no is the number of the RCO2 identified in step 2

Note: This RCO2 must be SysB.

- 18 To return the *inactive* unit to service, type

>RTS UNIT unit_no

and press the Enter key.

where

unit_no is the number of the RCO2 posted in step 19

If RTS	Do
passes	step 19
fails	step 29

- 19 To switch activity (SwAct) of the RCO2 units, which makes sure the unit you want to test is *inactive*, type

>SWACT

and press the Enter key.

Sample response on the MAP display:

RCO2 2 A Warm SwAct will occur
Please confirm ("YES" or "NO")

If the prompt indicates	Do
a warm SwAct occurs	step 21
a cold SwAct occurs	step 20

PM RCO2 Major (continued)

20



CAUTION

Loss of service

All calls that this PM handles end, including data calls. Perform this step during a period of low traffic only.

21 To confirm the SwAct initiated in step 19, type

>YES

and press the Enter key.

After both units are in-service, use the following information to determine where to go next in this procedure.

If SWACT	Do
passes	step 22
fails	step 29

22 To busy the inactive RCO2 unit, type

>BSY UNIT unit_no

and press the Enter key.

where

unit_no is the number of the *inactive* RCO2 unit

23 To perform an out-of-service (OOS) test on the *inactive* RCO2 unit, type

>TST UNIT unit_no

and press the Enter key.

where

unit_no is the number of the RCO2 unit busied in step 22

If TST	Do
passes	step 24
fails	step 25

PM RCO2 Major (continued)

- 24 To return the *inactive* RCO2 unit to service, type

>RTS UNIT unit_no

and press the Enter key.

where

unit_no is the number of the RCO2 unit tested in step 23

If RTS	Do
passes	step 30
fails	step 29

- 25 Observe the card listing

that appears in the following MAP display.

For the RCO2s provisioned with the optional NTAX74AA Cellular Access Processor (CAP) and not the NTMX77AA Unified Processor (UP), the card list appears in the MAP response. The card list in the MAP response reflects AX74 in slot 03 and not MX77, as the following examples show.

Example of a MAP response for RCO2s configured with the NTMX77AA Unified Processor:

SITE	FLR	RPOS	BAY_ID	SHF	DESCRIPTION	SLOT	EQPEC
RSCS0	01	A00	RCE	00 32	RCO2 : 000	:03	MX77
RSCS0	01	A00	RCE	00 32	RCO2 : 000	:08	6X69
RSCS0	01	A00	RCE	00 32	RCO2 : 000	:11	MX73
RSCS0	01	A00	RCE	00 32	RCO2 : 000	:15	MX74
RSCS0	01	A00	RCE	00 32	RCO2 : 000	:17	MX73

Example of a MAP response for RCO2s configured with the optional NTAX74AA Cellular Access Processor:

SITE	FLR	RPOS	BAY_ID	SHF	DESCRIPTION	SLOT	EQPEC
RSCS0	01	A00	RCE	00 32	RCO2 : 000	:03	AX74
RSCS0	01	A00	RCE	00 32	RCO2 : 000	:08	6X69
RSCS0	01	A00	RCE	00 32	RCO2 : 000	:11	MX73
RSCS0	01	A00	RCE	00 32	RCO2 : 000	:15	MX74
RSCS0	01	A00	RCE	00 32	RCO2 : 000	:17	MX73

If all cards on the list	Do
are replaced	step 26
are not replaced	step 28

PM RCO2
Major (end)

- 26 Determine if the user replaced the NTMX81 circuit card.

If the NTMX81 card	Do
is replaced	step 29
is not replaced	step 27

- 27 Refer to the card replacement procedure for the NTMX81 circuit card in *Card Replacement Procedures*. When you complete the card replacement procedures, go to step 13 of this procedure.
- 28 Go to the card replacement procedure in *Card Replacement Procedures* for the next card on the card list. When you complete the the card replacement procedures, go to step 23 of this procedure.
- 29 For further assistance, contact the next level of support.
- 30 This procedure is complete. If other alarms appear, refer to the correct clearing alarm procedures for the indicated alarms.

**PM RMM
Major**

Alarm display

	CM	MS	IOD	Net	PM 1SysB M	Lns	Trks	Ext	APPL
	.	.	.	.		.	.	.	.

Indication

The 1SysB M alarm code under the peripheral module (PM) subsystem header indicates a major alarm for a remote maintenance module (RMM). The alarm code appears at the MTC level of the MAP display.

Meaning

The indicated number of RMM units are in the system-busy (SysB) state.

Result

If the RMM unit fails, the system stops maintenance and line testing. This condition does not affect subscriber service.

Common procedures

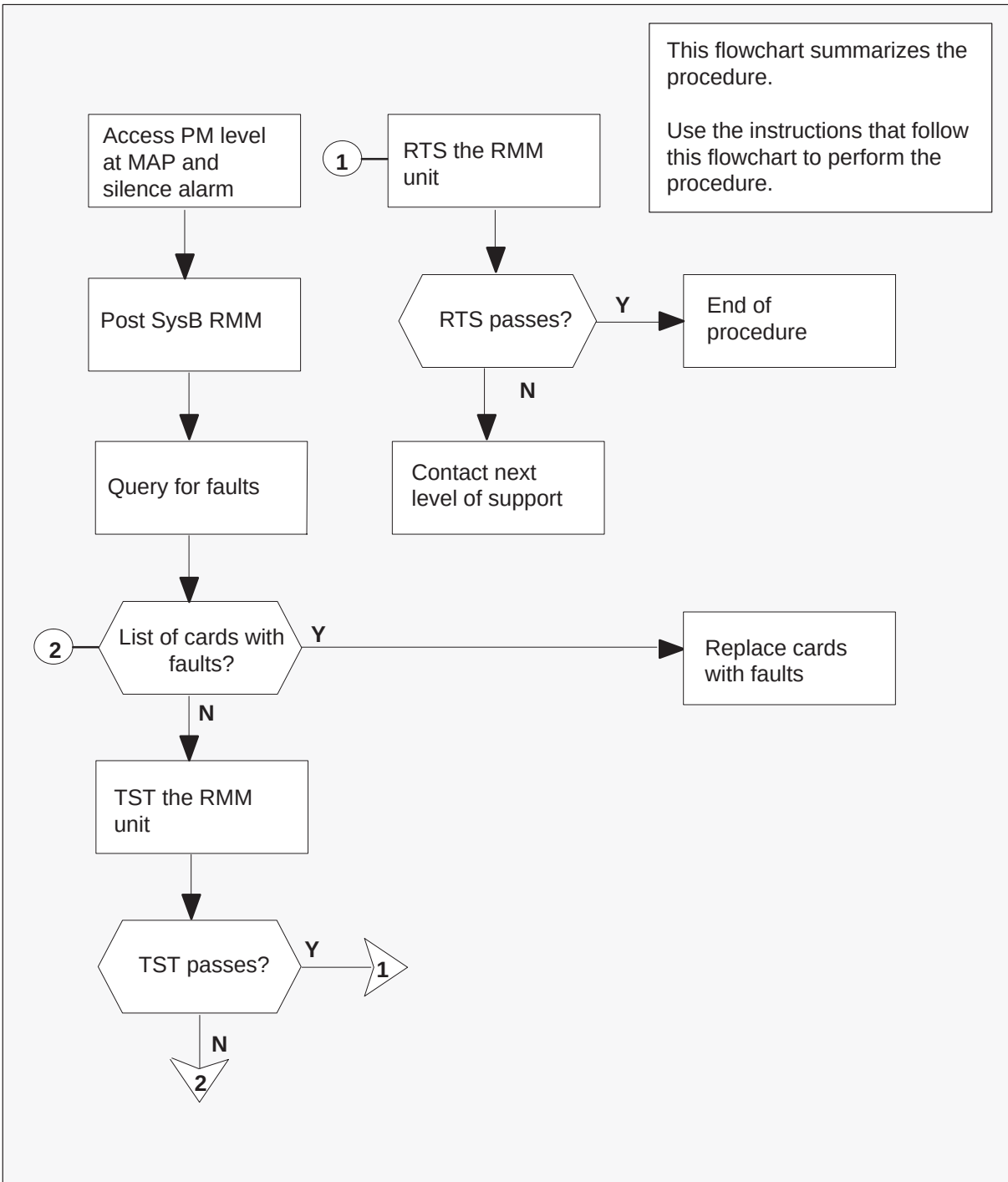
There are no common procedures.

Action

The procedure contains a summary flowchart and a list of steps. Use the flowchart to review the procedure. Follow the steps to perform the procedure.

PM RMM Major (continued)

Summary of clearing a PM RMM major alarm



PM RMM
Major (continued)

Clearing a PM RMM major alarm***At the MAP terminal*****1****ATTENTION**

Enter this procedure from a PM system-level alarm clearance procedure step that identified an RMM-associated fault.

To silence the alarm, type

>MAPCI;MTC;PM;SIL

and press the Enter key.

2 To identify the RMM that has faults, type

>DISP STATE SYSB RMM

and press the Enter key.

Example of a MAP response:

SysB RMM 2

PM RMM
Major (continued)

3 To post the SysB RMM you identify in step 2, type

>POST RMM rmm_no

and press the Enter key.

where

rmm_no is the number of the RMM that has faults

Example of a MAP display:

CM	MS	IOD	Net	PM	CCS	Lns	Trks	Ext	APPL
.	.	.	.	1SysB	.	.	.	.	.
RMM		SysB	ManB	OffL	CBsy	ISTb	InSv		
0 Quit	PM	3	0	1	1	4	12		
2 Post_	RMM	0	0	2	1	2	9		
3									
4	RMM	2	SysB						
5 TrnsL_									
6 Tst_									
7 Bsy_									
8 RTS_									
9 OffL									
10 LoadPM_									
11 Disp_									
12 Next_									
13									
14 QueryPM									
15									
16									
17									
18									

PM RMM
Major (continued)

- 4 To check for fault indicators or cards that have faults, type
>QUERYPM FLT
and press the Enter key.

Example of a MAP display:

CM	MS	IOD	Net	PM	CCS	Lns	Trks	Ext	APPL
.	.	.	.	1SysB	.	.	.	.	.
RMM		SysB	ManB	OffL	CBsy	ISTb	InSv		
0 Quit	PM	3	0	1	1	4	12		
2 Post_	RMM	0	0	2	1	2	9		
3									
4		RMM 2 SysB							
5 TrnsL_									
6 Tst_									
7 Bsy_		QUERYPM FLT							
8 RTS_									
9 OffL									
10 LoadPM_									
11 Disp_									
12 Next_									
13									
14 QueryPM									
15									
16									
17									
18									

If the display	Do
indicates a card that has faults	step 16
does not indicate a card that has faults	step 5

- 5 To manually busy the RMM posted in step 3, type
>BSY
and press the Enter key.

PM RMM

Major (continued)

- 6 To perform an in-service test on the RMM that has faults, type

>TST

and press the Enter key.

Example of a MAP response:

Test Passed

or

Test Failed

If TST	Do
passes	step 15
fails because of the central side (C-side) links	step 7
fails and the system generates a card list	step 16

- 7 To identify C-side links to the RCO2 that are in a busy condition, type

>TRNSL C

and press the Enter key.

Example of a MAP response:

```
LINK 22: RCO2 2    0;CAP S;STATUS:    OK, ;MSGCOND:    OPN,Restricted
LINK 23: RCO2 2    1;CAP S;STATUS:    SYSB
```


PM RMM

Major (continued)

- 8 To post the RCO2 unit for the RMM, type

>POST RCO2 rco2_no

and press the Enter key.

where

rco2_no is the number of the RCO2 unit identified in step 7

Example of a MAP display:

CM	MS	IOD	Net	PM	CCS	Lns	Trks	Ext	APPL
.	.	.	.	1SysB	.	.	.	.	.
RCO2			SysB	ManB	OffL	CBsy	ISTb	InSv	
0 Quit	PM	3	0	1	1	4	12		
2 Post_	RCO2	0	0	2	1	2	9		
3 ListSet									
4	RCO2	2	ISTb	Links_00S:	CSide	0, PSide	1		
5 TRNSL_	Unit0:	Act	ISTb						
6 TST_	Unit1:	Inact	InSv						
7 BSY_									
8 RTS_									
9 OffL									
10 LoadPM_									
11 Disp_									
12 Next									
13 SwAct									
14 QueryPM									
15									
16									
17									
18									

- 9 To identify the peripheral side (P-side) links that have faults, type

>TRNSL P

and press the Enter key.

Example of a MAP response:

```
LINK 22: RMM 2 0;CAP MS;STATUS: OK,;MSGCOND: OPN,Restricted
LINK 23: RMM 2 1;CAP S;STATUS: SYSB
```

- 10 To choose and busy a link that has faults, type

>BSY LINK link_no

and press the Enter key.

where

link_no is the number of the link (22 or 23) identified in step 9

PM RMM Major (continued)

- 11** To test the manually busied (ManB) link, type

>TST LINK link_no

and press the Enter key.

where

link_no is the number of the link (22 or 23) made ManB in step 10

If TST	Do
passes	step 12
fails	step 20

- 12** To return the link to service, type

>RTS LINK link_no

and press the Enter key.

where

link_no is the number of the link (22 or 23) tested in step 11

If RTS	Do
passes	step 13
fails	step 16

Note: The system can identify other links that have faults. Perform steps 11 through 13 for each link, until all links are busied, tested, and returned to service.

- 13** To post the ManB RMM, type

>POST RMM rmm_no

and press the Enter key.

where

rmm_no is the number of the RMM busied in step 5

PM RMM

Major (continued)

- 14** To test the RMM unit, type

>TST

and press the Enter key.

If TST	Do
passes	step 15
fails	step 16

- 15** To return the ManB RMM to service, type

>RTS

and press the Enter key.

If RTS	Do
passes	step 21
fails	step 20

- 16** Check the card listing, like the sample MAP display below.

Example of a MAP display:

SITE	FLR	RPOS	BAY_ID	SHF	DESCRIPTION	SLOT	EQPEC
RSC0	01	A00	RCE	00	32	RMM:000	: 00 6X23
RSC0	01	A00	RCE	00	32	RMM:000	: 04 6X51
RSC0	01	A00	RCE	00	32	RMM:000	: 05 6X52
RSC0	01	A00	RCE	00	32	RMM:000	: 16 6X23

If you	Do
replaced all the cards on the list	step 17
did not replace all the cards on the list	step 19

PM RMM
Major (end)

- 17 Determine if the NTMX74 circuit card was replaced.

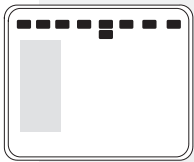
If you	Do
replaced the NTMX74 circuit card	step 20
did not replace the NTMX74 circuit card	step 18

Note: If the system indicates the NTMX74 card, verify if one link or several links have defects. Repeat the alarm clearance procedure as necessary.

- 18 Refer to the card replacement procedure for the NTMX74 circuit card in *Card Replacement Procedures*. Complete the card replacement procedures. Go to step 11 of this procedure.
- 19 Refer to the card replacement procedure in *Card Replacement Procedures* for the next card on the card list. Complete the card replacement procedures. Go to step 14 of this procedure.
- 20 For additional help, contact the next level of support.
- 21 This procedure is complete. If other alarms occur, refer to the appropriate alarm clearance procedures for the indicated alarms.

Ext MSP CLMI cabinet major

Alarm display

	CM	MS	IOD	Net	PM	CCS	Lns	Trks	Ext	APPL
	.	.	.	.	.	.	.	.	1FSP	.
									M	

Indication

The alarm code FSP appears after a number under the Ext header of the alarm banner at the MTC level of the MAP display. This code indicates an Ext modular supervisory panel (MSP) alarm.. The letter M under the code indicates that the alarm class is major.

Note: Current software does not indicate the change from FSP to MSP in the MAP display.

Meaning

An MSP alarm occurs when one or more cabinets in the office has a power fault or cooling unit fault. The number that precedes FSP indicates the number of cabinets with an MSP alarm. Refer to the above note.

Result

The type of fault and the type of cabinet that contains the fault determine the effect of this alarm on subscriber service.

Common procedures

This procedure refers to the common procedure “Replacing the cooling unit”. This procedure is found in the routine maintenance section of this manual.

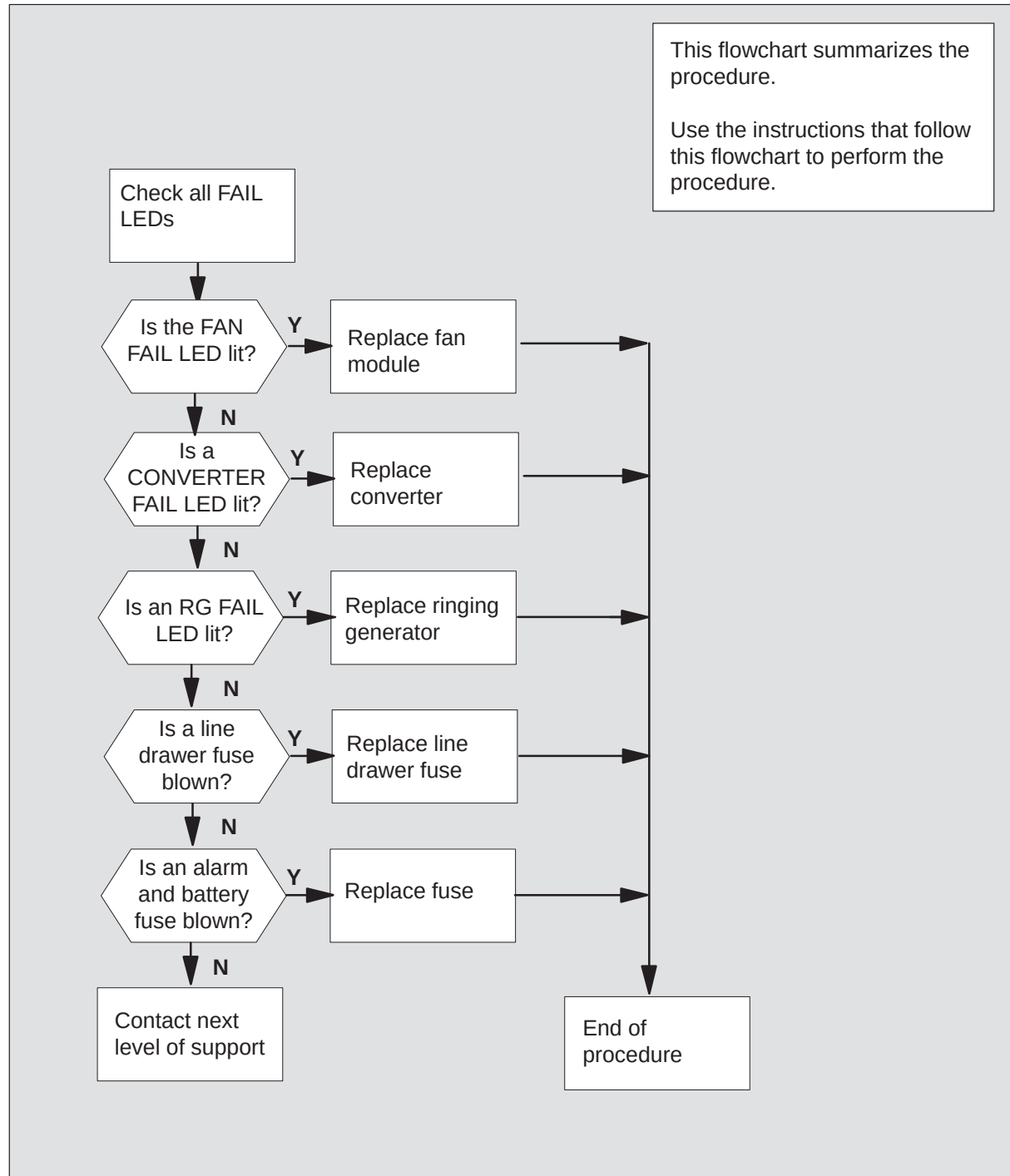
Action

This procedure applies to the Cabinetized Line Module ISDN (CLMI), NTRX30DA.

This procedure contains a summary flowchart and a list of steps. Use the flowchart to review the procedure. Follow the steps to perform the procedure.

Ext MSP CLMI cabinet major (continued)

Summary of clearing an Ext MSP CLMI cabinet major alarm



Ext MSP CLMI cabinet major (continued)

Clearing an Ext MSP CLMI cabinet major alarm

At the CLMI cabinets

1

ATTENTION

Illustrations of the CLMI cabinet, LCME fuse panel, and MSP appear at the end of this procedure.

Check the FAN FAIL LEDs.

If	Do
a FAN FAIL LED is lit	step 63
the FAN FAIL LEDs are not lit	step 2

2 Check the CONVERTER FAIL LED on each converter in the cabinet.

If	Do
a CONVERTER FAIL LED is lit	step 43
the CONVERTER FAIL LEDs are not lit	step 3

3 Check the RG FAIL LED on both RGs. The RGs are located at the top of the cabinet. The FAIL LED is behind the front panel of the RG.

If	Do
an RG has a lit FAIL LED	step 30
the RGs do not have a lit FAIL LED	step 4

Ext MSP

CLMI cabinet major (continued)

- 4 Check the line drawer fuses (F01 to F17). These fuses are located on shelves 33 and 47, slot number 18.

If	Do
a fuse is blown (protudes)	step 9
the fuses are not blown	step 5

- 5 Check the ABS fuses 01 to 04 located on the MSP.

If	Do
a fuse is blown (protrudes)	step 6
the fuses are not blown	step 62

- 6 Obtain a replacement fuse with the same voltage and amperage ratings as the blown fuse.

- 7 Remove the blown fuse.

- 8
- 

Danger
Risk of fire

To protect against risk of fire, replace the fuse with a fuse of the same type, rating or color code, and vendor.

Insert the replacement fuse.

If the fuse	Do
blows (protrudes) again	step 10
does not blow	step 58

- 9 Determine which fuse is blown.

- 10 Obtain a replacement fuse with the same voltage as the blown fuse.

- 11 Remove the blown fuse.

Ext MSP
CLMI cabinet major (continued)

12



Danger
Risk of fire
To protect against risk of fire, replace the fuse with a fuse of the same type, rating or color code, and vendor.

Insert the replacement fuse.

If the fuse	Do
blows (protrudes) again	step 13
does not blow	step 58

Ext MSP

CLMI cabinet major (continued)

- 13** Use the following information to identify the drawer associated with the blown fuse. The drawers are beside the fuse panel.

Fuse location

Fuse number	Drawer number
F1 –48 battery return	0 or 4
F2 –48 battery return	1 or 5
F3 –48 battery return	2 or 6
F4 –48 battery return	3 or 7
F5 –48V	0 or 4
F6 –48V	1 or 5
F7 –48V	2 or 6
F8 –48V	3 or 7
F9 +15V	0 or 4
F10 + 15V	1 or 5
F11 + 15V	2 or 6
F12 + 15V	3 or 7
F13 –48V	0 or 4
F14 –48V	1 or 5
F15 –48V	2 or 6
F16 –48V	3 or 7
F17 RG	0 –7

- 14** Pull out the line drawer identified. When working with a blown RG fuse, begin with the left drawer.

Ext MSP

CLMI cabinet major (continued)

15

**Danger****Personal injury**

Do not touch the line feed resistors on the line cards. The line feed resistors generate enough heat to burn you.

**Caution****Loss of service**

Perform this procedure during periods of low traffic.

Unseat all the line cards in the drawer. Do not remove the line cards from the drawer.

16 Obtain a replacement fuse with the same voltage and amperage ratings as the blown fuse.

17 Remove the blown fuse.

18

**Danger****Risk of fire**

To protect against risk of fire, replace the fuse with a fuse of the same type, rating or color code, and vendor.

Insert the replacement fuse.

If the fuse	Do
blows (protrudes) again	step 19
does not blow	step 21

Ext MSP
CLMI cabinet major (continued)

- 19 Check the drawer for loose or short-circuited wires.

If the wires	Do
are loose or short-circuited	step 62
are not loose or short-circuited wires, and the given fuse is a ringing voltage fuse	step 20
are not loose or short-circuited wires, the given fuse is a ringing voltage fuse, and you checked all four line drawers in the shelf	step 62
are not loose or short-circuited wires, and the given fuse is one of the line drawer fuses (1–17)	step 62

- 20 Reseat all the line cards in the drawer. Repeat steps 15 and 16 for the next drawer.
- 21 Reseat the line cards one at a time. Check the fuse after you reseat each line card.

If after	Do
reseating a line card, the fuse blows or protrudes again	step 22
reseating all line cards, the fuse does not blow	step 29

22

**Danger****Personal injury**

Do not touch the line feed resistors on the line cards. The line feed resistors generate enough heat to burn you.

Remove the line card from the drawer.

- 23 Obtain a replacement line card. Make sure the replacement card has the same PEC and suffix, as the card that you remove.

Ext MSP
CLMI cabinet major (continued)

- 24 Insert the replacement line card in the drawer.
- 25 Obtain a replacement fuse with the same voltage and amperage ratings as the blown fuse.
- 26 Remove the blown fuse.

27



Danger
Personal injury
Do not touch the line feed resistors on the line cards. The line feed resistors generate enough heat to burn you.



Danger
Risk of fire
To protect against risk of fire, replace the fuse with a fuse of the same type, rating (color code), and vendor.

Insert the replacement fuse.

If the fuse	Do
blows (protrudes) again	step 62
does not blow	step 28

- 28 Reseat all line cards in the drawer.
- 29 Push the drawer back in and go to step 59.
- 30 Use the following information to identify the circuit breaker associated with the RG that has a lit FAIL LED. This circuit breaker is on the MSP.

RG number	Circuit breaker number
RG0	13
RG1	15

Ext MSP CLMI cabinet major (continued)

- 31 Check the associated circuit breaker.

If the circuit breaker	Do
is ON	step 39
is OFF	step 32

- 32 Set the circuit breaker to ON.

If the circuit breaker	Do
goes OFF and the FAIL LED on the RG is lit	step 33
remains ON and the FAIL LED on the RG is not lit	step 58
remains ON and the FAIL LED on the RG is lit	step 39

At the CPDC cabinet

- 33 Locate the fuse associated with the cabinet and shelf number.

If the fuse	Do
is blown	step 34
is not blown	step 40

- 34 Remove the fuse holder with the blown fuse.

- 35 Replace the cartridge fuse inside the fuse holder.

- 36
- 

Danger
Risk of fire

To protect against risk of fire, replace the fuse with a fuse of the same type, rating or color code, and vendor.

Replace the blown fuse.

Ext MSP
CLMI cabinet major (continued)

- 37** Install the fuse holder back on the cabinetized power distribution center (CPDC).

At the CRSC or CEXT cabinet

- 38** Set the circuit breaker to ON.

If the circuit breaker	Do
goes OFF and the RG FAIL LED is lit	step 40
remains ON and the RG FAIL LED is not lit	step 58
remains ON and the RG FAIL LED is lit	step 39

- 39** Set the circuit breaker to OFF.

- 40** Refer to *Card Replacement Procedures* to replace the RG. After you replace the RG, return to this step.

- 41** Check the FAIL LED on the RG you replaced.

If the FAIL LED on the RG	Do
is lit	step 43
is not lit	step 58

- 42** Refer to *Alarm and Performance Monitoring Procedures* to clear the RG alarm. After you clear the RG alarm, return to this step.

- 43** Note the number of the shelf that contains the converter with the lit CONVERTER FAIL LED.

Ext MSP
CLMI cabinet major (continued)

- 44** Use the following information to identify the circuit breaker associated with the shelf that contains the lit CONVERTER FAIL LED. This circuit breaker is on the MSP.

Shelf number	Circuit breaker number
05	6, 10
19	8, 12
33	5, 9
47	7, 11

- 45** Check the associated circuit breaker.

If the circuit breaker	Do
is ON	step 54
is OFF	step 46

- 46** Set the circuit breaker identified to ON.

If the circuit breaker	Do
goes OFF and the CONVERTER FAIL LED is lit	step 47
remains ON and the CONVERTER FAIL LED is lit	step 54
remains ON and the CONVERTER FAIL LED is not lit	step 58

- 47** Note the numbers of the cabinet and shelf that contain the converter with the lit CONVERTER FAIL LED.

Ext MSP

CLMI cabinet major (continued)

At the CDPC

- 48 Locate the fuse that powers the shelf in the CLMI cabinet.

If the fuse	Do
is blown	step 49
is not blown	step 54

- 49 Remove the fuse holder with the blown fuse.

- 50 Replace the cartridge fuse inside the fuse holder.

51

**Danger****Risk of fire**

To protect against risk of fire, replace the fuse with a fuse of the same type, rating or color code, and vendor.

Replace the blown fuse.

- 52 Install the fuse holder back on the CPDC cabinet.

At the CRSC or CEXT cabinet

- 53 Set the circuit breaker to ON.

If the circuit breaker	Do
goes OFF and the CONVERTER FAIL LED is not lit	step 55
remains ON and the CONVERTER FAIL LED is not lit	step 58
remains ON and the CONVERTER FAIL LED is lit	step 54

- 54 Set the circuit breaker to OFF.

- 55 Refer to *Card Replacement Procedures* to replace the converter. After you replace the converter, return to this step.

Ext MSP

CLMI cabinet major (continued)

- 56 Check the converter you replaced and the associated circuit breaker.

If the circuit breaker	Do
goes OFF and the CONVERTER FAIL LED is lit	step 62
remains ON and the CONVERTER FAIL LED is not lit	step 58
remains ON and the CONVERTER FAIL LED is lit	step 57

- 57 Set the circuit breaker to OFF.

At the CLCE cabinet

- 58 Check the frame FAIL LED on the MSP.

If the frame FAIL lamp	Do
is lit and you did not complete steps 2, 3, 4, and 5 in this procedure	step 59
is lit and you completed steps 2, 3, 4, and 5 in this procedure	step 62
is not lit	step 60

- 59 Go to the step you did not complete. This step is step 2, 3, 4, or 5 in this procedure.

Ext MSP
CLMI cabinet major (continued)

At the MAP terminal

- 60** To access the Ext level of the MAP display to determine if an MSP alarm is present, type:

>MAPCI;MTC;EXT

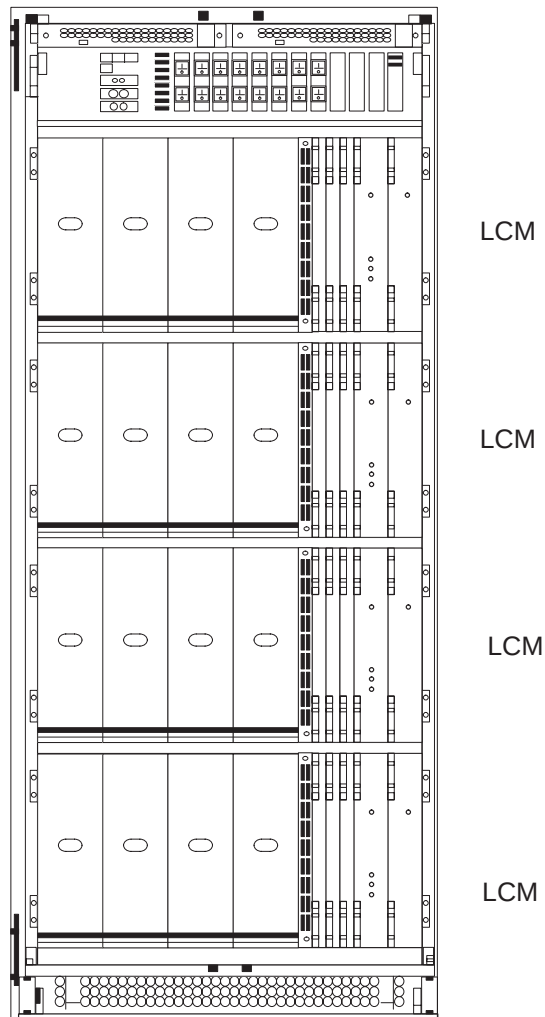
and press the Enter key.

If an MSP alarm	Do
is present and you did not access all the cabinets with an MSP alarm	step 61
is present and you accessed all the cabinets with an MSP alarm	step 62
not present	step 64

- 61** Refer to the table of contents in this document to find the procedure for the type of cabinet that has an MSP alarm. Perform the procedure.
- 62** For additional help, contact the next level of support.
- 63** Refer to the procedure "Replacing the cooling unit". This procedure appears in the table of contents of the routine maintenance section. Perform the procedure. If the system continues to indicate an MSP alarm, return to this procedure at step 60.
- 64** This procedure is complete.

Ext MSP CLMI cabinet major (continued)

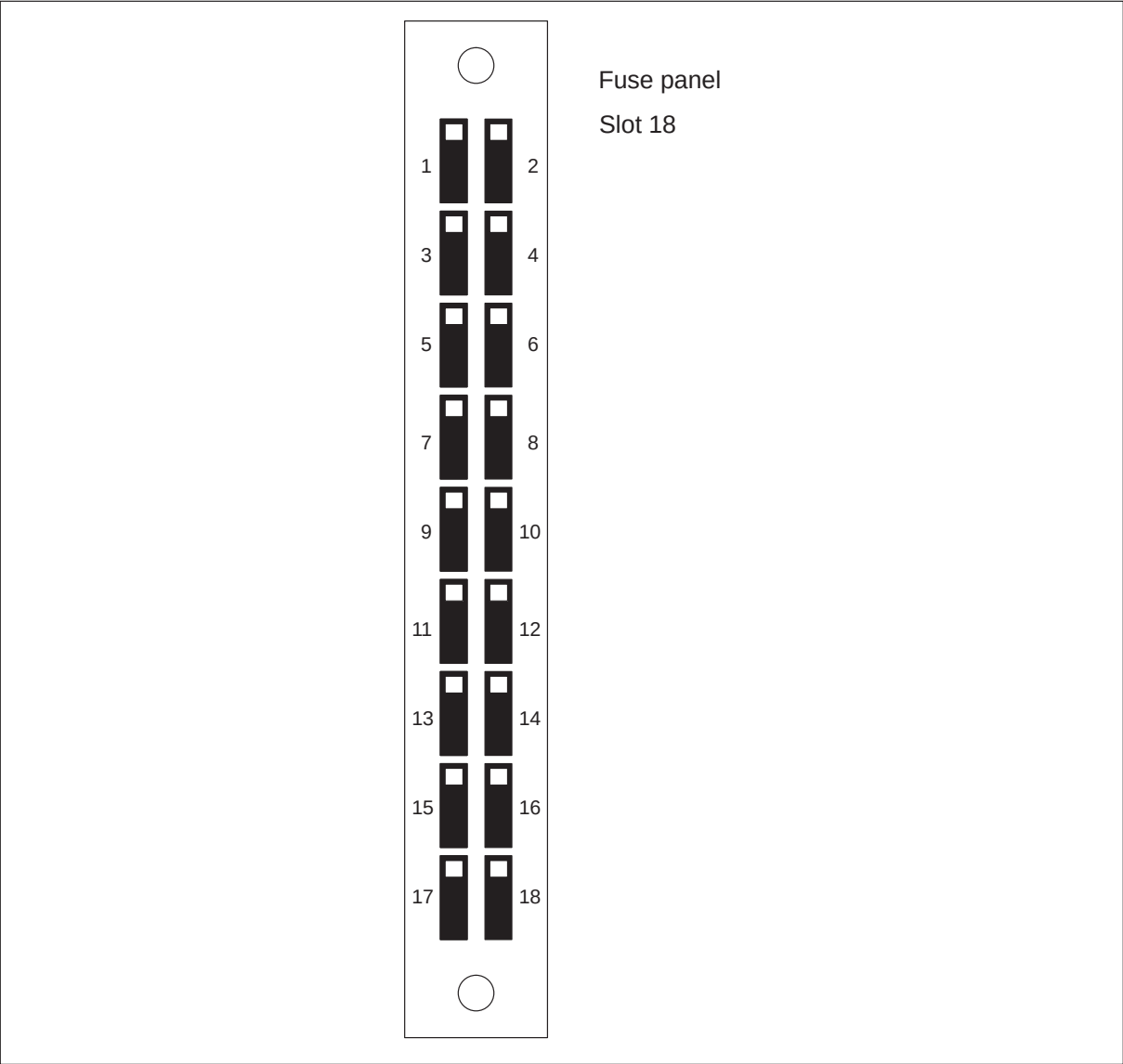
CLMI cabinet



Cabinetized Line Module ISDN (CLMI)

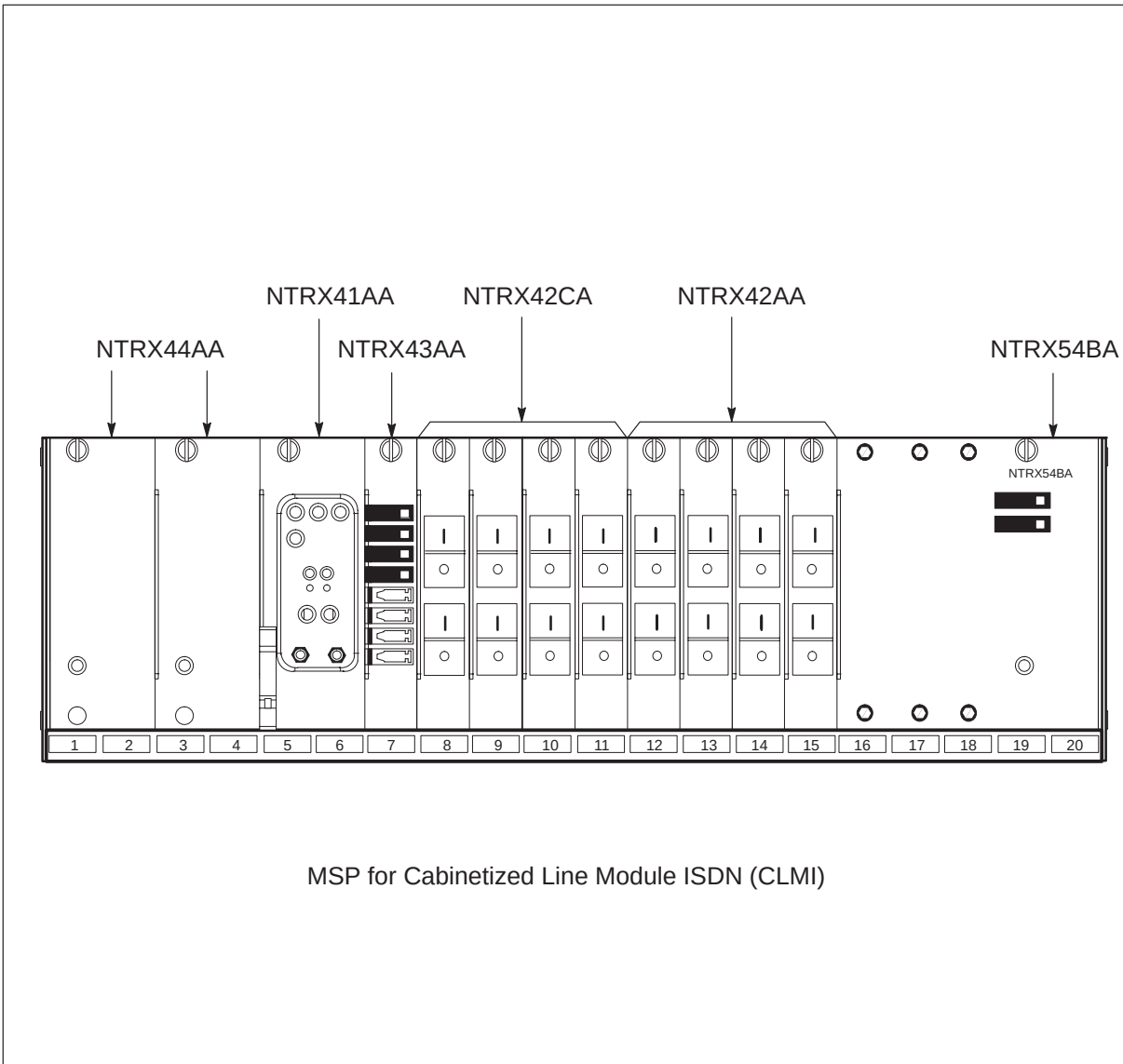
Ext MSP
CLMI cabinet major (continued)

LCME fuse panel



Ext MSP CLMI cabinet major (end)

MSP for CLMI cabinet



PM LCME
minor

Alarm display

	CM	MS	IOD	Net	PM	CCS	Lns	Trks	Ext	APPL
	.	.	.	.	1LCME	.	.	.	.	.

Indication

The alarm code 1LCME appears under the PM subsystem header at the MTC level of the MAP display. This alarm code indicates a minor alarm involving an enhanced ISDN line concentrating module (LCME).

Meaning

One of the LCME units is in the in-service trouble (ISTb) state.

Result

This condition does not affect subscriber service. There is no local backup if the other LCME units fail.

Common procedures

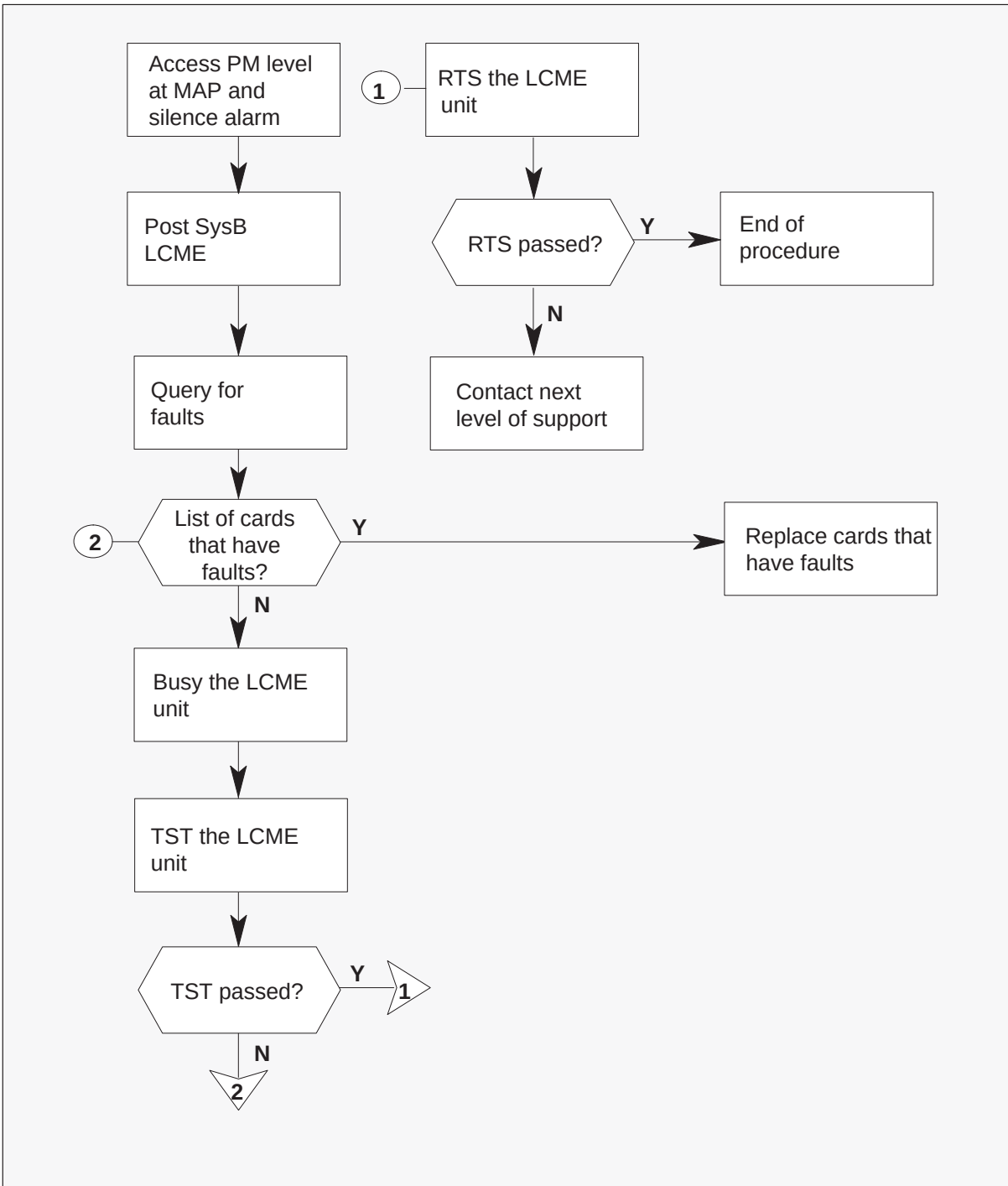
There are no common procedures.

Action

This procedure to clear the alarm contains a summary flowchart and a list of steps. Use the flowchart to review the procedure. Follow the steps to perform the procedure.

PM LCME minor (continued)

Summary of clearing a PM LCME minor alarm



PM LCME
minor (continued)

Clearing a PM LCME minor alarm

At the MAP terminal

1

ATTENTION

Enter this procedure from a PM system-level alarm clearing procedure step that identified an LCME-associated fault.

To silence the alarm, type

>MAPCI;MTC;PM;SIL

and press the Enter key.

2 To identify the LCME that has faults, type

>DISP STATE ISTB LCME

and press the Enter key.

Sample response on the MAP display:

ISTb LCME : 2

PM LCME
minor (continued)

- 3 To post the ISTb LCME identified in step 2, type
>POST LCME lcme_site_name lcme_frame_no lcme_no
and press the Enter key.

where

lcme_site_name is the site name for the LCME that has faults
lcme_frame_no is the number of the associated LCME equipment frame
lcme_no is the number of the LCME that has faults

Sample response on the MAP display:

CM	MS	IOD	Net	PM	CCS	Lns	Trks	Ext	APPL
.	.	.	.	1LCME	.	.	.	.	.
LCME			SysB	ManB	OffL	CBsy	ISTb	InSv	
0 Quit	PM	1	0	2	0	2	12		
2 Post_	LCME	0	0	2	0	2	9		
3 ListSet									
4 SwRG	LCME	RSCS 14	1 ISTb	Links_00S:	CSide	0	PSide	0	
5 TrnsL_	Unit0:	InSv	Takeover	/RG: 1					
6 Tst_	Unit1:	ISTb		/RG: 1					
7 Bsy_				11 11 11	RG:Pref	1	InSv		
8 RTS_	Drwr:	01 23 45 67 89	01 23 45	Stby	0	InSv			
9 OffL		.. ..	.. ..	.. ..	.. ..	.. ..			
10 LoadPM_									
11 Disp_									
12 Next									
13									
14 QueryPM									
15									
16									
17									
18									

PM LCME
minor (continued)

4 To check for fault indicators, type

>QUERYPM FLT

and press the Enter key.

Sample response on the MAP display:

CM	MS	IOD	Net	PM	CCS	Lns	Trks	Ext	APPL
.	.	.	.	1LCME	.	.	.	.	.
LCME									
0	Quit	PM	1	0	2	0	2	12	
2	Post_	LCME	0	0	2	0	2	9	
3	ListSet								
4	SwRG	LCME	RSCS 14	1 ISTb	Links_00S:	CSide	1	PSide	0
5	Trnsl_	Unit0:	InSv	Takeover	/RG:	1			
6	Tst_	Unit1:	ISTb		/RG:	1			
7	Bsy_				11	11	11	RG:Pref	1 InSv
8	RTS_	Drwr:	01 23	45 67	89	01 23	45	Stby	0 InSv
9	OffL	..	..	..	..	..	..	..	..
10	LoadPM_	QUERYPM FLT							
11	Disp_	Node inservice troubles exist:							
12	Next	One or both Units inservice trouble							
13		LCME	UNIT 0	Inservice No Troubles Exist:					
14	QueryPM	LCME	UNIT 1	Inservice Troubles Exist:					
15									
16									
17									
18									

If the system	Do
indicates a card that has faults	step 17
does not indicate a card that has faults	step 5

5 To manually busy the LCME posted in step 3, type

>BSY UNIT unit_no

and press the Enter key.

where

unit_no is the number of the ISTb LCME unit

PM LCME minor (continued)

- 6 To test the ManB LCME, type

>TST UNIT unit_no

and press the Enter key.

where

unit_no is the number of the LCME unit manually busied in step 5

Sample response on the MAP display:

Test Passed

or

Test Failed

If TST	Do
passed	step 16
failed	step 17
was not able to test CBsy	step 7

- 7 To identify C-side links in a SysB condition, type

>TRNSL C

and press the Enter key.

Sample response on the MAP display:

```
LINK 0    RC02 2 ;CAP MS;STATUS:  OK, ;MSGCOND:OPN
LINK 1    RC02 2  CAP S; STATUS:   SysB
LINK 2    RC02 2  CAP S; STATUS:   OK
LINK 3    RC02 2  CAP S; STATUS:   OK
LINK 4    RC02 2 ;CAP MS;STATUS:  OK, ;MSCOND:OPN,
```

If links	Do
are SysB	step 8
are open	step 21

PM LCME minor (continued)

- 8 To post the RCO2 unit associated with the LCME, type

>POST RCO2 rco2_no

and press the Enter key.

where

rco2_no is the RCO2 unit identified in step 7

Sample response on the MAP display:

CM	MS	IOD	Net	PM	CCS	Lns	Trks	Ext	APPL
.	.	.	.	1LCME	.	.	.	.	.
RCO2			SysB	ManB	OffL	CBsy	ISTb	InSv	
0 Quit	PM		0	0	0	0	4	12	
2 Post_	RCO2		0	0	0	0	2	9	
3 ListSet									
4	RCO2	2	ISTb	Links_00S:	CSide	0, PSide	1		
5 Trnsl_	Unit0:		Act	InSv					
6 Tst_	Unit1:		Inact	InSv					
7 Bsy_									
8 RTS_									
9 OffL									
10 LoadPM_									
11 Disp_									
12 Next									
13 SwAct									
14 QueryPM									
15									
16									
17									
18									

- 9 To identify the P-side links that have faults and to choose a link that has faults, type

>TRNSL P

and press the Enter key.

Sample response on the MAP display:

```

LINK 23:LCME 1 0;CAP MS;STATUS: OK;MSGCOND:OPN
LINK 24:LCME 1 1;CAP S;STATUS: SysB
LINK 25:LCME 1 2;CAP S;STATUS: OK
LINK 26:LCME 1 3;CAP S;STATUS: OK
LINK 27:LCME 2 0;CAP MS;STATUS: OK;MSGCOND:OPN
LINK 28:LCME 2 1;CAP S;STATUS: OK
LINK 29:LCME 2 2;CAP S;STATUS: OK

```

PM LCME minor (continued)

- 10 To busy the link that has faults, type

>BSY LINK link_no

and press the Enter key.

where

link_no is the number of the P-side link manually busied in step 9

- 11 To test the ManB link, type

>TST LINK link_no

and press the Enter key.

where

link_no is the number of the link that has faults manually busied in step 10

If TST	Do
passed	step 16
failed	step 12

- 12 To determine the next step, read the following table.

If the system	Do
indicates a card that has faults	step 17
does not indicate a card that has faults	step 13

**PM LCME
minor** (continued)

- 13** To return the ManB link to service, type

>RTS LINK link_no

and press the Enter key.

where

link_no is the number of the link tested in step 11

If RTS	Do
passed	step 22
failed	step 21

Note: The system can identify other links that have faults. Perform the procedures in steps 10 through 13 for each link until the system busies, tests, and returns to service all links.

- 14** To post the LCME identified in step 2, type

>POST LCME lcme_site_name lcme_frame_no lcme_no

and press the Enter key.

where

lcme_site_name is the site name for the LCME that has faults

lcme_frame_no is the number of the associated LCME

lcme_no is the number of the LCME that has faults

- 15** To test the LCME unit, type

>TST UNIT unit_no

and press the Enter key.

where

unit_no is the number of the LCME unit posted in step 14

If TST	Do
passed	step 16
failed	step 17

PM LCME
minor (continued)

- 16 To return the LCME unit to service, type

>RTS UNIT unit_no

and press the Enter key.

where

unit_no is the number of the LCME unit tested in step 15

If RTS	Do
passed	step 22
failed	step 21

- 17 Check the card listing in the MAP display.

Sample response on the MAP display:

SITE	FLR	RPOS	BAY_ID	SHF	DESCRIPTION	SLOT	EQPEC
RSCS0	01	A00	LCME	00 32	LCME :000	: 19	BX35
RSCS0	01	A00	LCME	00 32	LCME :000	: 20	BX35
RSCS0	01	A00	LCME	00 32	LCME :000	: 21	BX34

If you	Do
replaced all the cards on the list	step 18
did not replace all the cards on the list	step 20

- 18 The trouble can be the NTMX74 DS30A interface card in the RCO2 that connects to the link that has faults listed in step 9.

If you	Do
replaced the NTMX74 card	step 21
did not replace the NTMX74 card	step 19

Note: If the system indicates the NTMX74 card, check to see if one link or several links have faults. Repeat the alarm clearing procedure as required.

**PM LCME
minor (end)**

- 19** Each interface (I/F) chip on the NTMX74 card serves 4 DS30A links. The following chart shows the Link to chip relationship. You must separate message (MS) links by a minimum of 4 when you enter data for table LCMINV.

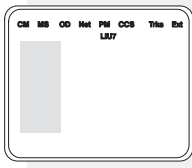
Chip number	DS30A Links
1	22, 23, 24, 25
2	26, 27, 28, 29
3	30, 31, 32, 33
4	34, 35, 36, 37
5	38, 39, 40, 41
6	42, 43, 44, 45
7	46, 47, 48, 49
8	50, 51, 52, 53

Go to the card replacement procedure for the NTMX74 circuit card in *Card Replacement Procedures*. Complete the card replacement procedures. Go to step 11 of this procedure.

- 20** Go to the card replacement procedure in *Card Replacement Procedures* for the next card on the card list. Complete the card replacement procedures. Go to step 15 of this procedure.
- 21** For additional help, contact the next level of support.
- 22** The procedure is complete. If the system displays other alarms, reference the correct alarm clearing procedures for the indicated alarms.

PM LCME(RG) Minor

Alarm display

	CM	MS	IOD	Net	PM	CCS	Lns	Trks	Ext	EIO
	.	.	.	.	1LCME	.	.	.	.	.

Indication

The alarm code 1LCME under the PM subsystem header at the MTC level of the MAP display indicates a minor alarm that involves an LCME ringing generator.

Meaning

One of the ringing generator units is in the in-service trouble (ISTb) state.

Result

This condition does not affect service. The system automatically switches support to a backup ringing generator (SwRG). If the backup ringing generator fails, the system will not produce ringing.

Common procedures

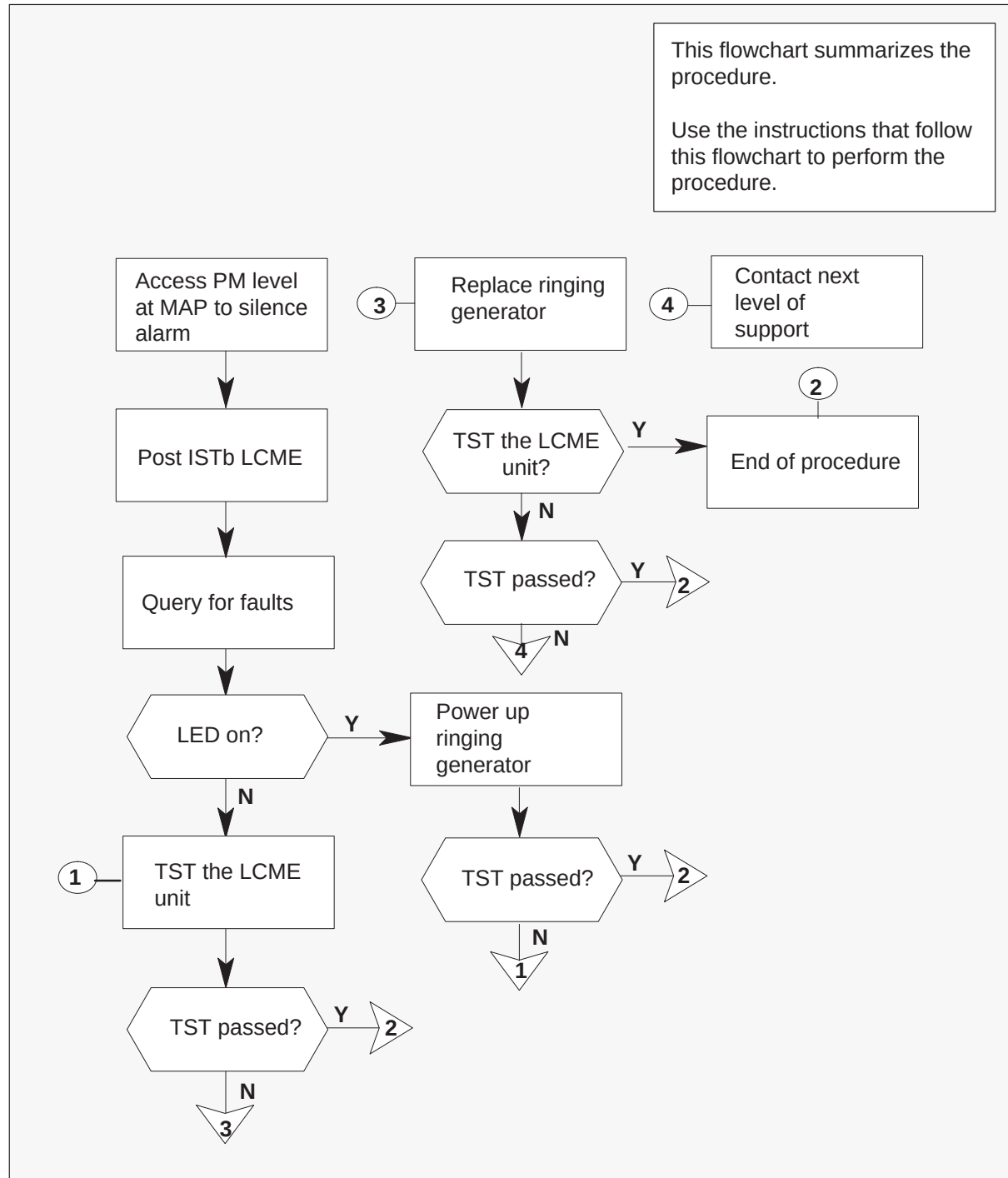
There are no common procedures.

Action

This procedure contains a summary flowchart and a list of steps. Use the flowchart to review the procedure. Follow the steps to perform the procedure.

PM LCME(RG) Minor (continued)

Summary of clearing a PM LCME(RG) minor alarm



PM LCME(RG) Minor (continued)

Clearing a PM LCME(RG) minor alarm

At the MAP display

1

ATTENTION

Enter this procedure from a PM system-level alarm clearing procedure step that identified an LCME-associated fault.

To silence the alarm, type

>MAPCI;MTC;PM;SIL

and press the Enter key.

2 To identify the LCME that has faults, type

>DISP STATE ISTB LCME

and press the Enter key.

Sample response on the MAP display:

ISTb LCME : 2

PM LCME(RG)
Minor (continued)

- 3 To post the ISTb LCME identified in step 2, type
>POST LCME lcme_site_name lcme_frame_no lcme_no
and press the Enter key.

where

lcme_site_name is the site name for the LCME that has faults
lcme_frame_no is the number of the associated LCME equipment frame
lcme_no is the number of the LCME that has faults

Sample response on the MAP display:

CM	MS	IOD	Net	PM	CCS	Lns	Trks	Ext
.	.	.	.	1LCME	.	.	.	.
LCME			SysB	ManB	OffL	CBsy	ISTb	InSv
0 Quit	PM	1	0	2	0	2	12	
2 Post_	LCME	0	0	2	0	2	9	
3 ListSet								
4 SwRG	LCME	RSCS 14	1 ISTb	Links_00S:	CSide	0	PSide	0
5 TrnsL_	Unit0:	InSv	Takeover	/RG: 1				
6 Tst_	Unit1:	ISTb		/RG: 1				
7 Bsy_				11 11 11 11 11	RG:Pref	1	InSv	
8 RTS_	Drwr:	01 23 45 67 89	01 23 45 67 89	Stby	0	ISTb		
9 OffL		.. ..	.. ..	.. ..	.. ..	.. ..		
10 LoadPM_								
11 Disp_								
12 Next								
13								
14 QueryPM								
15								
16								
17								
18								

PM LCME(RG)
Minor (continued)

- 4 To check for fault indicators, type

>QUERYPM FLT

and press the Enter key.

Sample response on the MAP display:

CM	MS	IOD	Net	PM	CCS	Lns	Trks	Ext
.	.	.	.	1LCME	.	.	.	.
LCME			SysB	ManB	OffL	CBsy	ISTb	InSv
0 Quit	PM	1	0	2	0	1	12	
2 Post_	LCME	0	0	2	0	1	9	
3 ListSet								
4 SwRG	LCME	RSCS	14 1	ISTb	Links_00S:	Cside	0	PSide 0
5 Trnsl_	Unit0:	InSv	Takeover	/RG: 1				
6 Tst_	Unit1:	ISTb	/RG: 1					
7 Bsy_				11 11	11 11	11 11	RG:Pref 1	InSv
8 RTS_	Drwr:	01 23 45	67 89	01 23 45	67 89	Stby 0	ISTb	
9 OffL		.. ..	.. ..	.. ..	.. ..	.. ..		
10 LoadPM_	QUERYPM FLT							
11 Disp_	Node in-service troubles exist:							
12 Next	One or both Units in-service trouble							
13	LCME UNIT 0 In-service Troubles Exist:							
14 QueryPM	Ringing Generator Failure :Ring Generator in Excess load							
15	LCME UNIT 1 In-service Troubles Exist:							
16	Ring Generator in Excess load							
17								
18								

If the system	Do
indicates a card that has faults	step 10
does not indicate a card that has faults	step 5

At the LCME

- 5 Make a visual inspection of the ringing generator. Check to see if the LED is on.

If LED	Do
is ON	step 6
is OFF	step 7

PM LCME(RG) Minor (continued)

- 6 To power up the ringing generator (RG), move the power switch to the ON position. The LED goes OFF. These switches are identified as RG 0 and RG 1.

If	Do
switching ON the RG restores power	step 15
switching ON the RG does not restore power	step 14

At the MAP display

- 7 To manually busy the LCME unit that is ISTb, type

>BSY UNIT unit_no

and press the Enter key.

where

unit_no is the number of the LCME unit posted in step 3

- 8 To test the ManB LCME, type

>TST UNIT unit_no

and press the Enter key.

where

unit_no is the number of the LCME unit manually busied in step 7

Sample response on the MAP display:

```
LCME      RSCS0      14    1      Unit 1      InSvc Test Initiated
LCME      RSCS0      14    1      Unit 1      Tst Failed: (Reason for
failure)
```

or

```
LCME      RSCS0      14    1      Unit 1      InSvc Test Initiated
LCME      RSCS0      14    1      Unit 1      Tst passed
```

If TST	Do
passed	step 9
failed	step 10

PM LCME(RG)
Minor (continued)

- 9 To return the ManB LCME to service, type

>RTS UNIT unit_no

and press the Enter key.

where

unit_no is the number of the LCME tested in step 8

If RTS	Do
passed	step 15
failed	step 10

- 10 Check the card list in the MAP display.

Sample response on the MAP display:

SITE	FLR	RPOS	BAY_ID	SHF	DESCRIPTION	SLOT	EQPEC	
RSCS0	01	A00	LCME	00	32	LCME :000	: 21	BX34
RSCS0	01	A00	LCME	00	32	LCME :000	: 19	BX35
RSCS0	01	A00	LCME	00	32	LCME :000	: 20	BX35

If you	Do
replaced all the cards	step 11
did not replace all the cards	step 13

- 11 Determine if you replaced the NT6X30 circuit card.

If you	Do
replaced the NT6X30 circuit card	step 14
did not replace the NT6X30 circuit card	step 12

- 12 Go to the card replacement procedure for the NT6X30 circuit card in *Card Replacement Procedures*. Complete the card replacement procedures. Go to step 8 of this procedure.

- 13 Go to the card replacement procedure in *Card Replacement Procedures* for the next card on the card list. Complete the card replacement procedures. Go to step 8 of this procedure.

PM LCME(RG)
Minor (end)

- 14 For additional help, contact the next level of support.
- 15 The procedure is complete. If the system displays other alarms, reference the correct alarm clearing procedures for the indicated alarms.

PM RCO2
minor

Alarm display

	CM	MS	IOD	Net	PM	CCS	Lns	Trks	Ext	EIO
	.	.	.	.	1RCO2	.	.	.	.	.

Indication

A 1RCO2 under the PM subsystem header indicates an RCO2 minor alarm. This header appears at the MTC level of the MAP display.

Meaning

The indicated number of RCO2 units are in the in-service trouble (ISTb) state.

Impact

This alarm does not affect service to the subscriber.

Common procedures

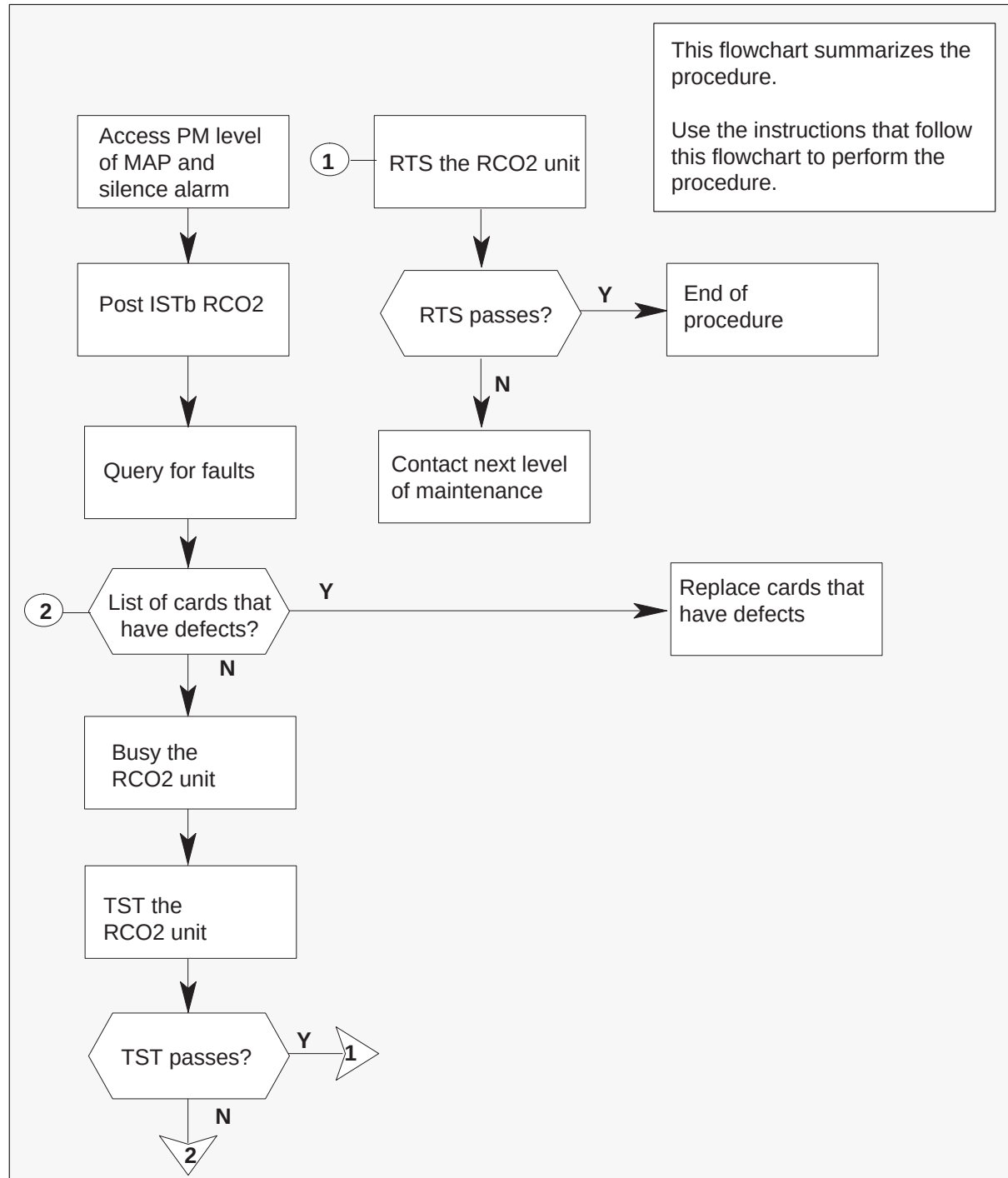
Does not apply

Action

This procedure contains a summary flowchart and a list of steps. Use the flowchart to review the procedure. Follow the steps to perform the procedure.

PM RCO2 minor (continued)

Summary of clearing a PM RCO2 minor alarm



PM RCO2
minor (continued)

Clearing a PM RCO2 minor alarm

At the MAP display

1

ATTENTION

Enter this procedure from a peripheral module (PM) system-level alarm clearing procedure. This step identifies an error associated with the RCO2.

To silence the alarm, type:

>MAPCI;MTC;PM;SIL
and press the Enter key.

2 To identify the defective RCO2, type:

>DISP STATE ISTB RCO2
and press the Enter key.

Typical response on the MAP display:

ISTb RCO2 : 2

3 To post the ISTb RCO2, type:

>POST RCO2 rco2_no
and press the Enter key.

where

rco2_no is the number of the RCO2 that appears in step 2

Typical response on the MAP display:

RCO2	SysB	ManB	Offl	CBsy	ISTb	InSv
PM	0	0	1	0	4	12
RCO2	0	0	2	0	2	9

PM RCO2
minor (continued)

- 4 To check for problem indicators, type:

>QUERYPM FLT
and press the Enter key.

Typical response on the MAP display:

CM	MS	IOD	Net	PM	CCS	Lns	Trks	Ext
.	.	.	.	1RCO2	.	.	.	.
RCO2			SysB	ManB	OffL	CBsy	ISTb	InSv
0 Quit	PM	0	0	1	0	1	12	
2 Post_	RCO2	0	0	2	0	1	9	
3 ListSet								
4	RCO2	2	ISTb	Links_OOS:	CSide	1,	PSide	0
5 TRNSL_	Unit0:	Act	InSv					
6 Tst_	Unit1:	Inact	ISTb					
7 Bsy_	QUERYPM FLT							
8 RTS_	Unit0	InSv						
9 OffL	Unit1	C-side	links out of service					
10 LoadPM_								
11 Disp_								
12 Next								
13								
14 QueryPM								
15								
16								
17								
18								

If the system	Do
indicates a defective card	step 26
does not indicate a defective card	step 5

- 5 To manually busy the ISTb RCO2 unit, type:

>BSY UNIT unit_no
and press the Enter key.

where

unit_no is the number of the ISTb RCO2 from step 4

PM RCO2
minor (continued)

- 6 To test the ManB RCO2, type:
- >TST UNIT unit_no**
and press the Enter key.
- where*
- unit_no is the number of the RCO2 unit manually busied in step 5
- Typical response on the MAP display:*
- Test Passed
or
Test Failed

If TST	Do
passes	step 25
fails and the system produces a card list	step 26
fails and the system does not produce a card list	step 7

- 7 To identify central-side (C-side) links to the host PM that have been busied by the system (SysB), type:
- >TRNSL C**
and press the Enter key.

Note: The host PM is a PCM-30 line group controller (PLGC).

Typical response on the MAP display:

```
LINK 0:  PLGC      1    0;CAP MS;STATUS:  OK,;MSGCOND: OPN,Restricted
LINK 1:  PLGC      1    1;CAP S;STATUS:   OK
LINK 2:  PLGC      1    2;CAP MS;STATUS:  OK,;MSGCOND:OPN,Unrestricted
LINK 4:  PLGC      1    4;CAP S;STATUS:   SysB
LINK 5:  PLGC      1    4;CAP S;STATUS:   OK
LINK 6:  PLGC      1    4;CAP S;STATUS:   OK
LINK 7:  PLGC      1    4;CAP S;STATUS:   OK
```

PM RCO2 minor (continued)

- 8 To post the host PM, type:

>POST host_pm host_pm_no
and press the Enter key.

where

host_pm is the PLGC

host_pm_no is the number of the PLGC

Typical response on the MAP display:

CM	MS	IOD	Net	PM	CCS	Lns	Trks	Ext
.	.	.	.	1RCO2	.	.	.	.
PLGC			SysB	ManB	OffL	CBsy	ISTb	InSv
0 Quit	PM	0	0	0	1	0	4	12
2 Post_	PLGC	0	0	0	2	0	2	9
3 ListSet								
4	PLGC	1	ISTb	Links_00S:	CSide	0, PSide	1	
5 Trnsl_	Unit0:		Act	InSv				
6 Tst_	Unit1:		Inact	InSv				
7 Bsy_								
8 RTS_								
9 OffL								
10 LoadPM_								
11 Disp_								
12 Next								
13 SwAct								
14 QueryPM								
15								
16								
17 Perform								
18								

- 9 To identify the P-side links that have defects, type:

>TRNSL P

and press the Enter key.

Typical response on the MAP display:

LINK 0:	RCO2	2	0;CAP MS;STATUS:	OK,;MSGCOND: OPN,Restricted
LINK 1:	RCO2	2	1;CAP S;STATUS:	OK
LINK 2:	RCO2	2	2;CAP MS;STATUS:	OK,;MSGCOND:OPN,Unrestricted
LINK 4:	RCO2	2	4;CAP S;STATUS:	ISTb
LINK 5:	RCO2	2	4;CAP S;STATUS:	OK
LINK 6:	RCO2	2	4;CAP S;STATUS:	OK
LINK 7:	RCO2	2	4;CAP S;STATUS:	OK

PM RCO2
minor (continued)

10 To busy the link that has defects, type:

>BSY LINK link_no
and press the Enter key.

where

link_no is the number of the P-side link identified in step 9

11 To test the link that has defects, type:

>TST LINK link_no
and press the Enter key.

where

link_no is the number of the link manually busied in step 10

If TST	Do
passes and alarm continues	step 30
passes and alarm clears	step 17
fails	step 12

12 To display links that can have defects, type:

>TRKS;CARRIER;POST;MANB
and press the Enter key.

Typical response on the MAP display:

CLASS	ML	OS	ALARM	SYSB	MANB	UNEQ	OFFL	CBSY	PBSY	INSV
TRUNKS	0	0	0	0	0	0	0	0	0	0
REMOTE	0	0	0	5	0	0	0	0	0	10

NO	CLASS	SITE	RCC	CKT	D	ALARM	SLIP	FRAME	BER	SES	STATE
0	TRUNKS	BRSCS	0	0	C		0	0	<-.7	0	INSV
1	REMOTE	BRSCS	0	1	C		0	0	<-.7	0	INSV
2	REMOTE	BRSCS	0	2	C		0	0	<-.7	0	MANB

MORE . . .

Note: The MORE . . . at the bottom of the display indicates that you can view additional links. To view additional links, type:

>NEXT
and press the Enter key.

PM RCO2
minor (continued)

- 13** To test the ManB link, type:

>TST link_no

and press the Enter key.

where

link_no is the number of the ManB link. This link number appears under the NO column that appears in the MAP display in step 12. The number for the ManB link in the example is 2.

If TST	Do
passes and alarm clears	step 16
fails	step 30

- 14** Perform the corrective procedure that the MAP display indicates in step 12.

Note: If the system indicates defective message links, these links must be in a ManB state before the links can return to service (RTS).

- 15** To post the host PM, type:

>PM;POST host_pm host_pm_no

and press the Enter key.

where

host_pm is the PLGC that appears in step 8

host_pm_no is the number of the PLGC

- 16** Use the information that appears in step 7 to determine which RCO2 unit associates with the SysB link. The unit must be *inactive* to continue.

If RCO2 unit	Do
is inactive	step 27
is active	step 17

PM RCO2 minor (continued)

- 17 To return the link to service, type:

>RTS LINK link_no

and press the Enter key.

where

link_no is the number of the link from step 9

- 18 To post the RCO2, type:

>POST rco2_no

and press the Enter key.

where

rco2_no is the number of the RCO2 from step 2

Note: This RCO2 must be SysB.

- 19 To return the *inactive* unit to service, type:

>RTS UNIT unit_no

and press the Enter key.

where

unit_no is the number of the RCO2 that appears in step 18

- 20 To post the host PM, type:

>POST host_pm host_pm_no

and press the Enter key.

where

host_pm is the PLGC

host_pm_no is the number of the PLGC

PM RCO2 minor (continued)

- 21 Switch activity (SwAct) the RCO2 units to make sure the unit you must test is *inactive*. To perform a SwAct, type:

>SWACT

and press the Enter key.

Typical response on the MAP display:

RCO2 2 A Warm SwAct will be performed
Please confirm ("YES" or "NO")

If the prompt indicates the occurrence of	Do
a warm SWACT	step 23
a cold SWACT	step 22

22



CAUTION

Loss of service

All calls this PM handles, including data calls, will be lost. Perform this step only during a period of low traffic.

Refer to the next step to continue this procedure.

- 23 To confirm the SwAct from step 21, type:

>YES

and press the Enter key.

After the two units are in-service, read the following table to determine your next action.

If SWACT	Do
passes	step 23
fails	step 30

PM RCO2 minor (continued)

- 24 To busy the *inactive* RCO2 unit, type:

>BSY UNIT unit_no

and press the Enter key.

where

unit_no is the number of the *inactive* RCO2 unit (from step 19)

- 25 To perform an out-of-service (OOS) test on the *inactive* RCO2 unit, type:

>TST UNIT unit_no

and press the Enter key.

where

unit_no is the number of the RCO2 unit busied in step 23

If TST	Do
passes	step 25
fails	step 26

- 26 To return the *inactive* RCO2 unit to service, type:

>RTS UNIT unit_no

and press the Enter key.

where

unit_no is the number of the RCO2 unit tested in step 24

If RTS	Do
passes	step 31
fails	step 30

PM RCO2 minor (end)

- 27 Observe the card list that appears in the following MAP display.

Typical response on the MAP display:

SITE	FLR	RPOS	BAY_ID	SHF	DESCRIPTION	SLOT	EQPEC
RSCS0	01	A00	RCE 00	32	RC02 : 000	: 09	MX82
RSCS0	01	A00	RCE 00	32	RC02 : 000	: 08	6X69
RSCS0	01	A00	RCE 00	32	RC02 : 000	: 11	MX73
RSCS0	01	A00	RCE 00	32	RC02 : 000	: 15	MX74
RSCS0	01	A00	RCE 00	32	RC02 : 000	: 17	MX73

If the cards on the list	Do
are replaced	step 27
are not replaced	step 29

- 28 Determine if the NTMX81 circuit card was replaced.

If the NTMX81 card	Do
is replaced	step 30
is not replaced	step 28

- 29 Refer to the card replacement procedure for the NTMX81 circuit card in *Card Replacement Procedures*. When you complete the card replacement procedures, go to step 24.
- 30 Refer to the card replacement procedure in *Card Replacement Procedures* for the next card on the card list. When you complete the card replacement procedures, go to step 24.
- 31 For additional help, contact the next level of maintenance.
- 32 This procedure is complete. If other alarms appear at the MAP display, refer to the correct alarm clearing procedures.

PM RMM
minor

Alarm display

	CM	MS	IOD	Net	PM 1CBsy	Lns	Trks	Ext	APPL
	.	.	.	.		.	.	.	.

Indication

The 1CBsy under the peripheral module (PM) subsystem header indicates a minor alarm associated with a remote maintenance module (RMM). This 1CBsy is at the maintenance (MTC) level of the MAP display.

Meaning

The indicated number of units are in the central-side busy (CBsy) state.

Impact

This CBsy state does not affect subscriber service. Local RMM backup is not available if the unit fails. Both RMM units can fail if the remote controller equipment (RCE) contains two RMMs.

Common procedures

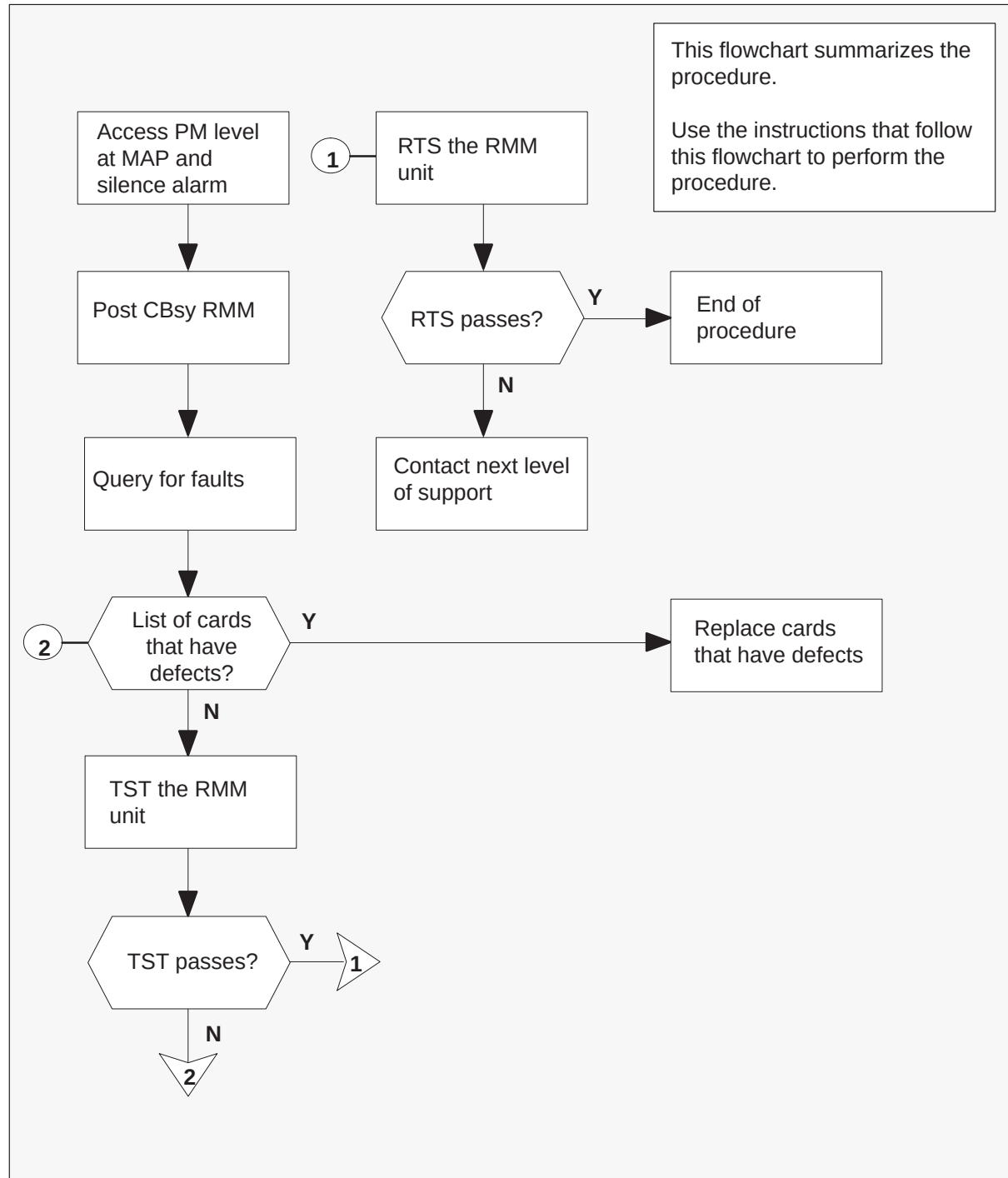
There are no common procedures.

Action

The procedure to clear an alarm contains a summary flowchart and a list of steps. Use the flowchart to review the procedure. Follow the steps to perform the procedure.

PM RMM minor (continued)

Summary of clearing PM RMM minor alarms



PM RMM minor (continued)

Clearing PM RMM minor alarms

At the MAP display

1

ATTENTION

Enter this procedure from a PM system-level alarm clearing procedure step that identifies an RMM-associated fault.

To silence the alarm, type

>MAPCI;MTC;PM;SIL

and press the Enter key.

2 To identify the RMM that has defects, type

>DISP STATE CBSY RMM

and press the Enter key.

Example of a MAP response:

CBsy RMM: 1

PM RMM
minor (continued)

3 To post the CBsy RMM identified in step 2, type

>POST RMM rmm_no

and press the Enter key.

where

rmm_no is the number of the RMM that has defects

Example of a MAP display:

CM	MS	IOD	Net	PM	CCS	Lns	Trks	Ext	APPL
.	.	.	.	1CBsy	.	.	.	.	.
RMM		SysB	ManB	OffL	CBsy	ISTb	InSv		
0 Quit	PM	3	0	0	1	4	12		
2 Post_	RMM	0	0	0	1	2	9		
3									
4	RMM	1	CBsy						
5 TrnsL_									
6 Tst_									
7 Bsy_									
8 RTS_									
9 OffL									
10 LoadPM_									
11 Disp_									
12 Next_									
13									
14 QueryPM									
15									
16									
17									
18									

PM RMM minor (continued)

- 4 To check for fault indicators or cards that have defects, type

>QUERYPM FLT

and press the Enter key.

Example of a MAP display:

CM	MS	IOD	Net	PM	CCS	Lns	Trks	Ext	APPL
.	.	.	.	1CBsy	.	.	.	.	.
RMM		SysB	ManB	OffL	CBsy	ISTb	InSv		
0 Quit	PM	3	0	0	0	4	12		
2 Post_	RMM	0	0	0	0	2	9		
3									
4	RMM	1	CBsy						
5 Trnsl_									
6 Tst_									
7 Bsy_	QUERYPM FLT								
8 RTS_									
9 OffL									
10 LoadPM_									
11 Disp_									
12 Next_									
13									
14 QueryPM									
15									
16									
17									
18									

If the system	Do
indicates a card that has defects	step 16
does not indicate a card that has defects	step 5

- 5 To busy the RMM posted in step 3, type

>BSY

and press the Enter key.

PM RMM
minor (continued)

- 6 To perform an in-service test on the RMM that has defects, type

>TST

and press the Enter key.

Example of a MAP response:

Test Passed

or

Test Failed

If TST	Do
passes	step 15
fails because of the C-side links	step 7
fails and the system generates a card list	step 16

- 7 To identify C-side links to the RCO2 that are in a busy condition, type

>TRNSL C

and press the Enter key.

Example of a MAP response:

LINK 22: RCO2 2 0;CAP S;STATUS: OK,;MSGCOND: OPN,Restricted
LINK 23: RCO2 2 1;CAP S;STATUS: CBSY

PM RMM
minor (continued)

8 To post the RCO2 unit associated with the RMM, type

>POST RCO2 rco2_no

and press the Enter key.

where

rco2_no is the RCO2 unit identified in step 7

Example of a MAP display:

CM	MS	IOD	Net	PM	CCS	LNS	Trks	Ext	APPL
.	.	.	.	1CBSy	.	.	.	.	.
RCO2			SysB	ManB	OffL	CBSy	ISTb	InSv	
0 Quit	PM	0	0	0	0	0	4	12	
2 Post_	RCO2	0	0	0	0	0	2	9	
3 ListSet									
4	RCO2	2	ISTb	Links_00S:	CSide	0, PSide	1		
5 TRNSL_	Unit0:	Act	ISTb						
6 TST_	Unit1:	Inact	InSv						
7 BSY_									
8 RTS_									
9 OffL									
10 LoadPM_									
11 Disp_									
12 Next									
13 SwAct									
14 QueryPM									
15									
16									
17									
18									

9 To identify the peripheral-side (P-side) links that have defects, type

>TRNSL P

and press the Enter key.

Example of a MAP response:

```
LINK 22:  RMM  1    0;CAP MS;STATUS:    OK,;MSGCOND:    OPN,Restricted
LINK 23:  RMM  1    1;CAP  S;STATUS:    CBSY
```

10 To choose and busy a link that has defects, type

>BSY LINK link_no

and press the Enter key.

where

link_no is the number of the link identified in step 9 (22 or 23)

PM RMM
minor (continued)

- 11** To test the manually busied (ManB) link, type

>TST LINK link_no
and press the Enter key.

where

link_no is the number of the link (22 or 23) manually busied in step 10

If TST	Do
passes	step 12
fails	step 16

- 12** To return the ManB link to service, type

>RTS LINK link_no
and press the Enter key.

where

link_no is the number of the link (22 or 23) tested in step 11

If RTS	Do
passes	step 13
fails	step 16

Note: If other links that have defects are identified, perform the procedures in steps 10 through 12 for each link. Perform these procedures until the system busies, tests and returns to service all links.

- 13** To post the ManB RMM, type

>POST RMM rmm_no
and press the Enter key.

where

rmm_no is the number of the RMM busied in step 5

PM RMM minor (continued)

- 14 To test the RMM unit, type

>TST

and press the Enter key.

If TST	Do
passes	step 15
fails	step 16

- 15 To return the ManB RMM to service, type

>RTS

and press the Enter key.

If RTS	Do
passes	step 21
fails	step 20

- 16 Check the card listing in the following MAP display.

Example of a MAP response:

SITE	FLR	RPOS	BAY_ID	SHF	DESCRIPTION	SLOT	EQPEC
RSCS0	01	A00	RCE 00	19	RMM:000	: 03	2X10
RSCS0	01	A00	RCE 00	19	RMM:000	: 04	2X11
RSCS0	01	A00	RCE 00	19	RMM:000	: 05	0X10
RSCS0	01	A00	RCE 00	19	RMM:000	: 06	3X09

If all cards on the list	Do
are replaced	step 17
are not replaced	step 19

PM RMM
minor (end)

- 17 Determine if the NTMX74 circuit card is replaced.

If the NTMX74 card	Do
is replaced	step 20
is not replaced	step 18

Note: If the system indicates the NTMX74 card, check to see if one link or several links have defects. Repeat the alarm clearing procedure as required.

- 18 Refer to the card replacement procedure for the NTMX74 circuit card in *Card Replacement Procedures*. When you complete the card replacement procedures, go to step 11 of this procedure.
- 19 Go to the card replacement procedure in *Card Replacement Procedures* for the next card on the card list. When the card replacement procedures are complete, go to step 14 of this procedure.
- 20 For additional help to clear this alarm, contact the next level of support.
- 21 This procedure is complete. If the system displays other alarms, refer to the correct alarm clearing procedures for the indicated alarms.

RSC-S card replacement procedures

This document contains the card replacement procedures for the DMS-100 remote switching center-SONET (RSC-S) for international applications. These procedures are used by maintenance personnel to remove and replace circuit packs.

NT0X10 in RSC-S RMM

Application

Use this procedure to replace an NT0X10 card in an RSC-S RMM.

PEC	Suffixes	Name
NT0X10	AA	Miscellaneous Scan Card (MSC)

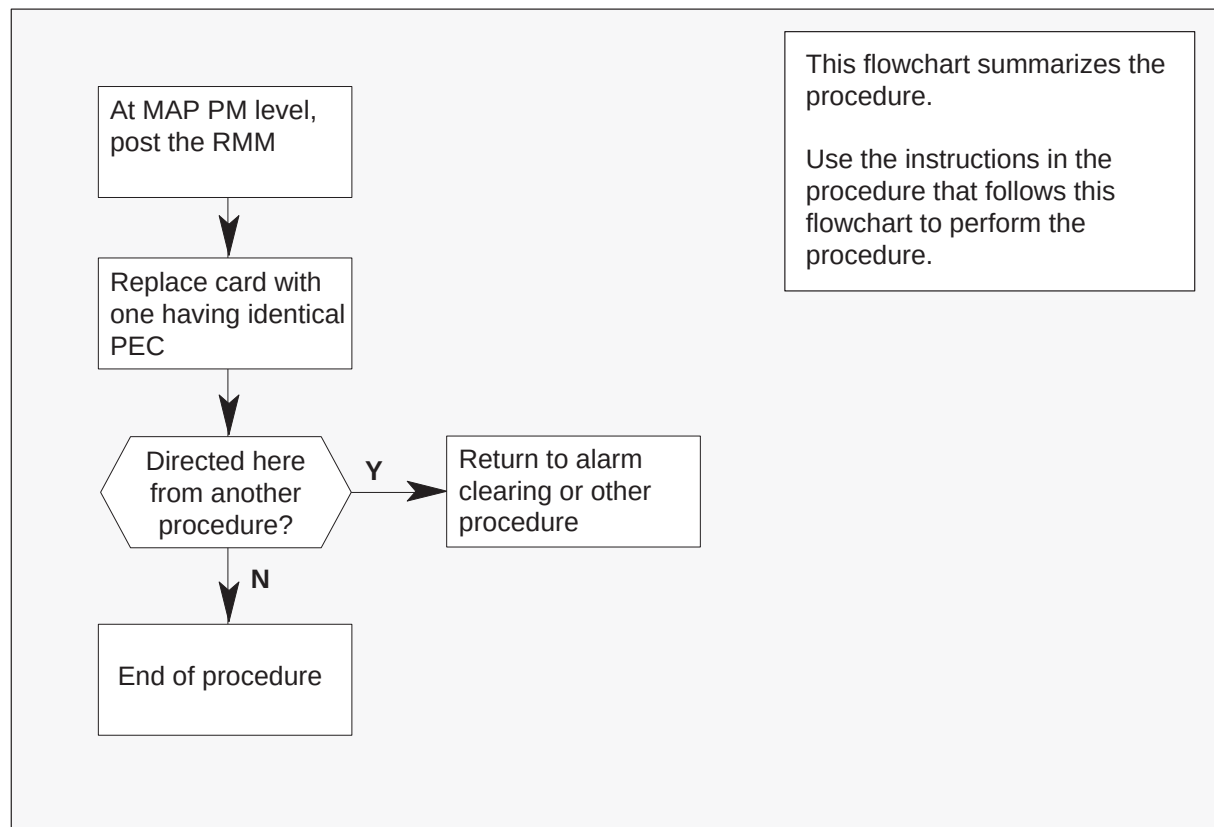
Common procedures

None

Action

The following flowchart is only a summary of the procedure. To replace the card, use the instructions in the procedure that follows the flowchart.

Summary of card replacement procedure for an NT0X10 card in RSC-S RMM



NT0X10
in RSC-S RMM (continued)

Replacing an NT0X10 card in RSC-S RMM

At the MAP terminal

- 1** Proceed only if you have been directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure for verifying or accepting cards, or have been directed to this procedure by your maintenance support group.
- 2** Obtain a replacement card. Ensure that the replacement card has the same product equipment code (PEC), including suffix, as the card to be removed.
- 3** Access the PM level and post the RMM by typing
>MAPCI;MTC;PM;POST RMM rmm_no
and pressing the Enter key.

where

rmm_no is the number of the RMM from which the card is to be removed

Example of a MAP display:

CM	MS	IOD	Net	PM	CCS	LNS	Trks	Ext	Appl
RMM			SysB	ManB	OffL	CBsy	ISTb	InSv	
0	Quit	PM	0	0	0	0	0	130	
2	Post_	RMM	0	0	0	0	0	0	
3									
4		RMM	5	INSV					
5	TrnsL								
6	Tst								
7	Bsy								
8	RTS								
9	OffL								
10	LoadPM								
11	Disp_								
12	Next								
13									
14	QueryPM								
15									
16									
17									
18									

NT0X10
in RSC-S RMM (continued)

- 4 Busy the RMM by typing
>BSY
and pressing the Enter key.

Example of a MAP display:

CM	MS	IOD	Net	PM	CCS	LNS	Trks	Ext	Appl
.	.	.	.	1ManB	.	.	.	.	.
RMM			SysB	ManB	OffL	CBsy	ISTb	InSv	
0 Quit	PM		4	0	10	0	0	130	
2 Post_	RMM		0	1	0	0	0	0	
3									
4	RMM	5	INSV						
5 Trnsl									
6 Tst									
7 Bsy									
8 RTS									
9 OffL									
10 LoadPM									
11 Disp_									
12 Next									
13									
14 QueryPM									
15									
16									
17									
18									

At the RMM shelf

5



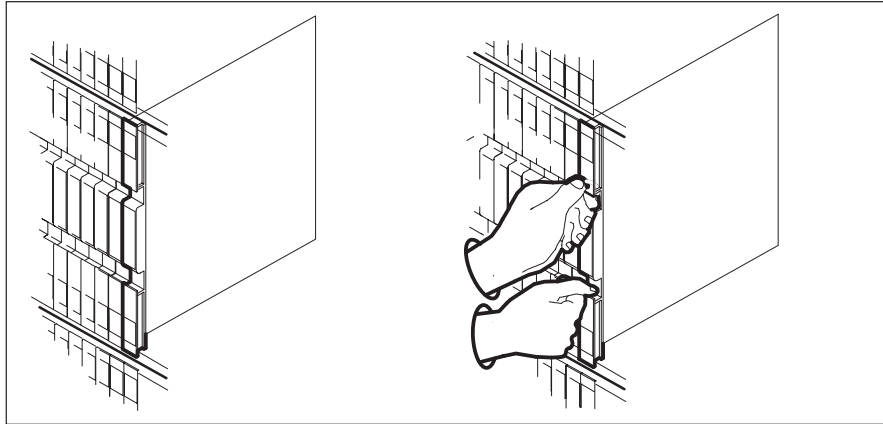
WARNING
Static discharge may cause damage to circuit packs
Put on a wrist strap and connect it to the frame of the RMM before removing any cards. This protects the RMM against service degradation caused by static electricity.

Put on a wrist strap.

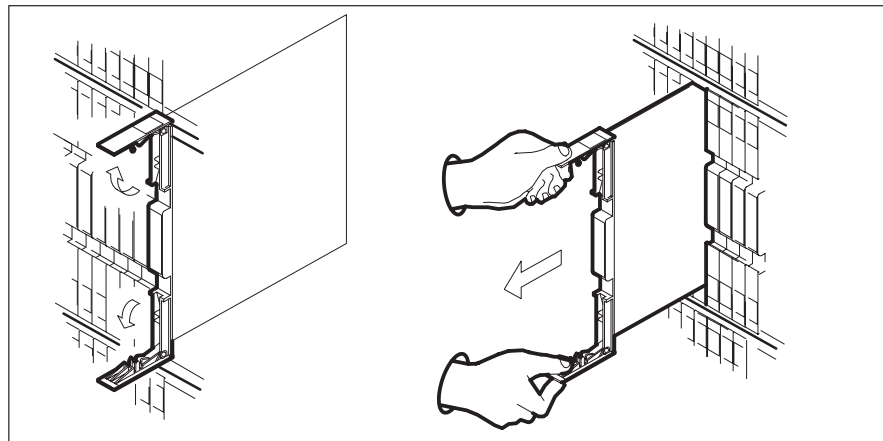
NT0X10 in RSC-S RMM (continued)

6 Remove the NT0X10 card as shown in the following figures.

a. Locate the card to be removed on the appropriate shelf.



b. Open the locking levers on the card to be replaced and gently pull the card toward you until it clears the shelf.

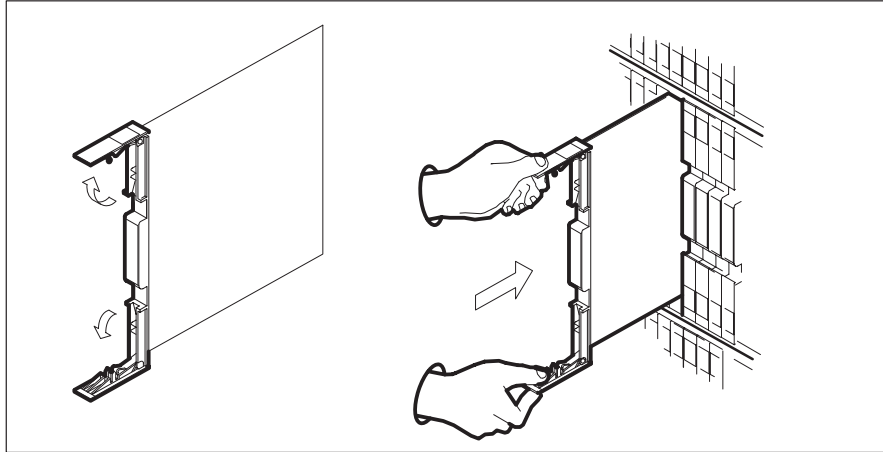


c. Ensure the replacement card has the same PEC, including suffix, as the card you just removed.

d. Set the switch settings on the card to match those of the card you are replacing.

NT0X10 in RSC-S RMM (continued)

- 7 Open the locking levers on the replacement card.
 - a. Align the card with the slots in the shelf.
 - b. Gently slide the card into the shelf.



8



WARNING

Equipment damage

Take these precautions when removing or inserting a card:

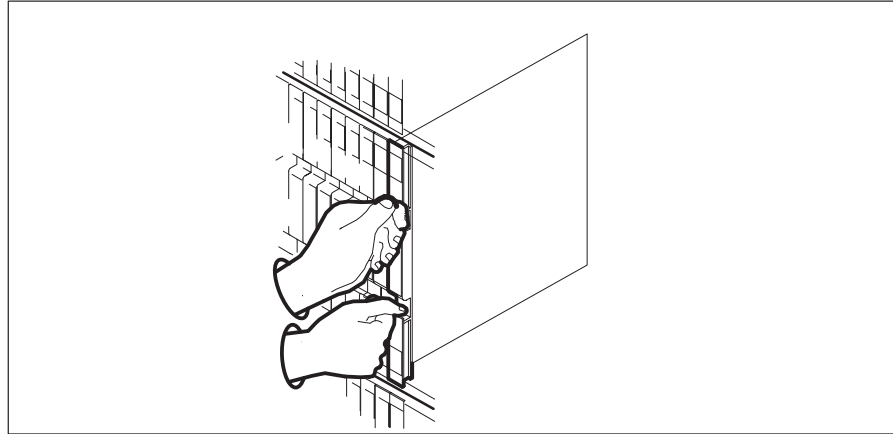
1. Do not apply direct pressure to the components.
2. Do not force the card into its slot.

Seat and lock the card.

- a. Using your fingers or thumbs, push on the upper and lower edges of the faceplate to ensure the card is fully seated in the shelf.

NT0X10
in RSC-S RMM (end)

- b. Close the locking levers.



- 9 Use the following information to determine what step to go to next in this procedure.

If you entered this procedure from	Do
alarm clearing procedures	step 12
other	step 10

- 10 Send any faulty cards for repair according to local procedure.
- 11 Record the date the card was replaced, the serial number of the card, and the symptoms prompted by replacement of the card. Go to step 14.
- 12 Return to the procedure that directed you to this procedure. At the point where a faulty card list was produced, identify the next faulty card on the list and go to the appropriate card replacement procedure for that card in this manual.
- 13 Obtain further assistance in replacing this card by contacting the personnel responsible for higher level of support.
- 14 You have successfully completed this procedure. Return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.

NT2X06 in RSC-S RMM

Application

Use this procedure to replace an NT2X06 card in an RSC-S RMM.

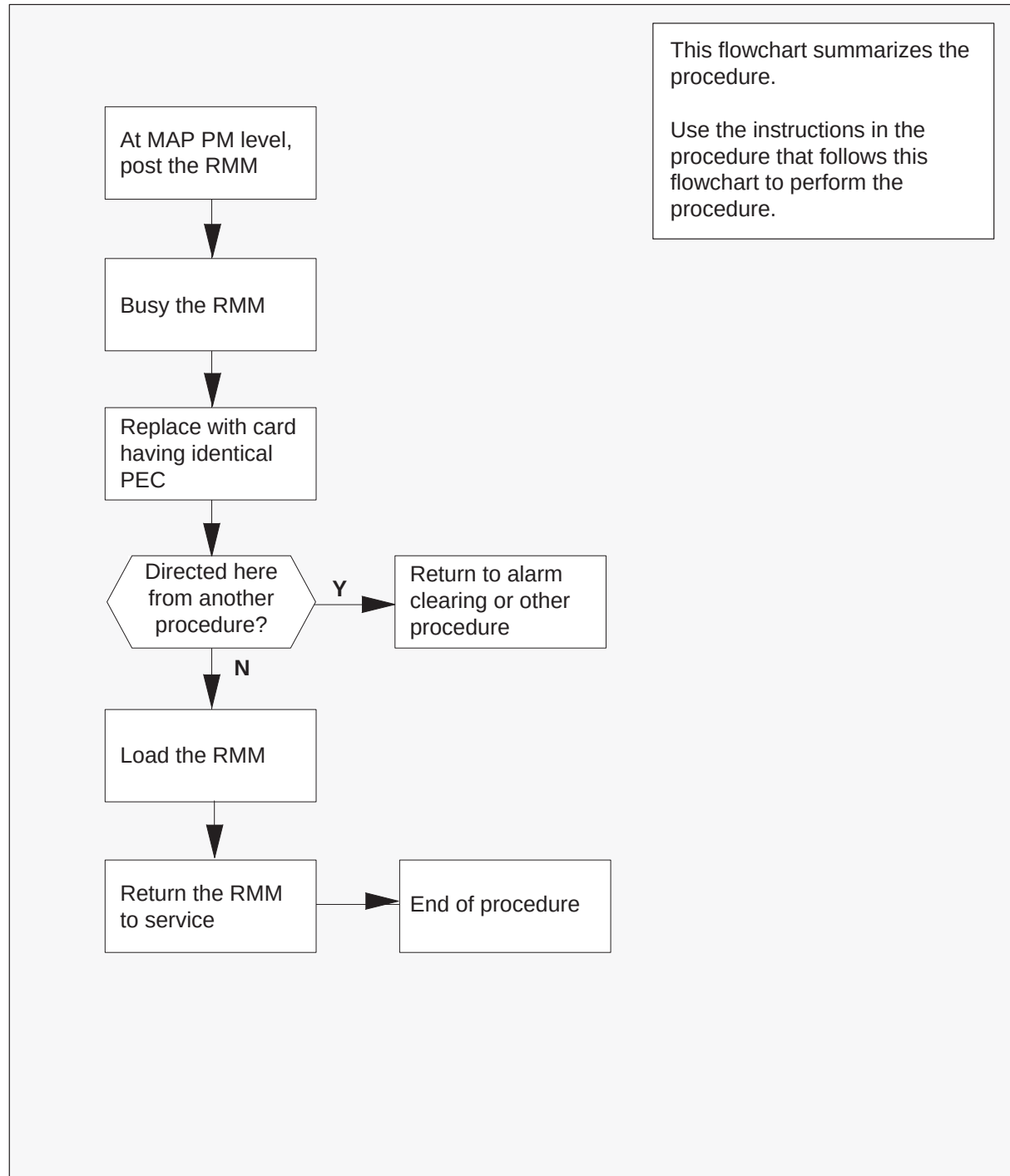
PEC	Suffixes	Name
NT2X06	AB	5V/40A Power Converter

Common procedures

None

Action

The following flowchart is only a summary of the procedure. To replace the card, use the instructions in the procedure that follows the flowchart.

NT2X06
in RSC-S RMM (continued)**Summary of card replacement procedure for an NT2X06 card in RSC-S RMM**

NT2X06
in RSC-S RMM (continued)

Replacing an NT2X06 card in RSC-S RMM

At your Current Location

- 1 Proceed only if you have been directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure for verifying or accepting cards, or have been directed to this procedure by your maintenance support group.
- 2 Obtain an NT2X06 replacement card. Ensure the replacement card has the same product equipment code (PEC), including suffix, as the card to be removed.

At the MAP terminal

- 3 Set the MAP display to PM level and post the RMM by typing
>MAPCI;MTC;PM;POST RMM rmm_no
and pressing the Enter key.

where

rmm_no is the number of the RMM where the card is to be removed

Example of a MAP display:

CM	MS	IOD	Net	PM	CCS	LNS	Trks	Ext	Appl
.	.	.	.	.	.	.	.	.	.
RMM			SysB	ManB	OffL	CBsy	ISTb	InSv	
0	Quit	PM	4	0	10	3	3	130	
2	Post_	RMM	0	1	1	0	0	2	
3									
4		RMM	5	INSV					
5	Trnsl								
6	Tst								
7	Bsy								
8	RTS								
9	OffL								
10	LoadPM								
11	Disp_								
12	Next								
13									
14	QueryPM								
15									
16									
17									
18									

NT2X06

in RSC-S RMM (continued)

- 4 Busy the RMM by typing

>BSY

and pressing the Enter key.

Example of a MAP display:

CM	MS	IOD	Net	PM	CCS	LNS	Trks	Ext	Appl
.	.	.	.	1ManB	.	.	.	.	.
RMM		SysB	ManB	OffL	CBsy	ISTb	InSv		
0 Quit	PM	4	0	10	0	0	130		
2 Post_	RMM	0	1	0	0	0	0		
3									
4	RMM	5	ManB						
5 TrnsL									
6 Tst									
7 Bsy									
8 RTS									
9 OffL									
10 LoadPM									
11 Disp_									
12 Next									
13									
14 QueryPM									
15									
16									
17									
18									

At the RMM shelf

- 5



CAUTION

Static discharge may cause damage to circuit packs
Put on a wrist strap and connect it to the frame of the RMM before removing any cards. This protects the RMM against service degradation caused by static electricity.

Put on a wrist strap.

- 6 Power down the unit by setting the ON/OFF switch on the power converter faceplate to the OFF position. Both the converter FAIL LED and FRAME FAIL lamp on the frame supervisory panel (FSP) will be ON. An audible alarm may sound. If an alarm does sound, return to the MAP terminal and silence the alarm by typing

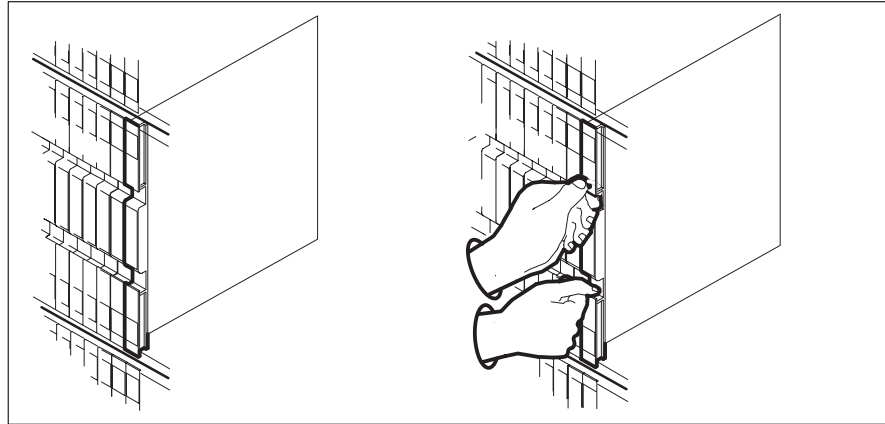
>SIL

and pressing the Enter key.

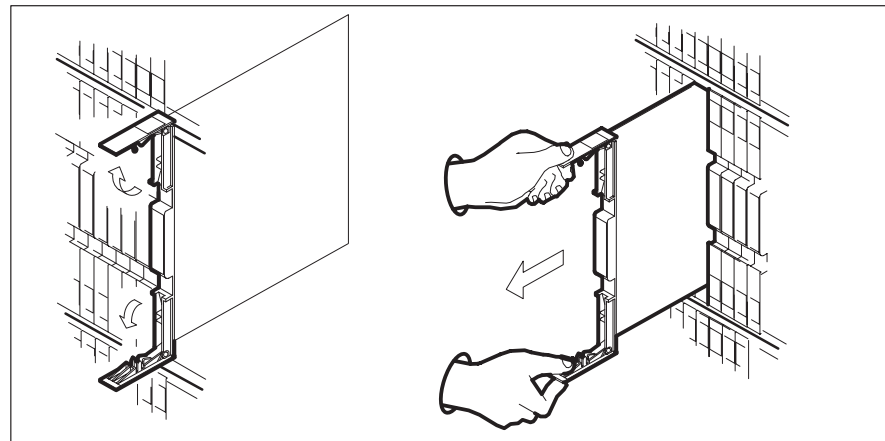
NT2X06 in RSC-S RMM (continued)

7 Remove the NT2X06 card as shown in the following figures.

a. Locate the card to be removed on the appropriate shelf.



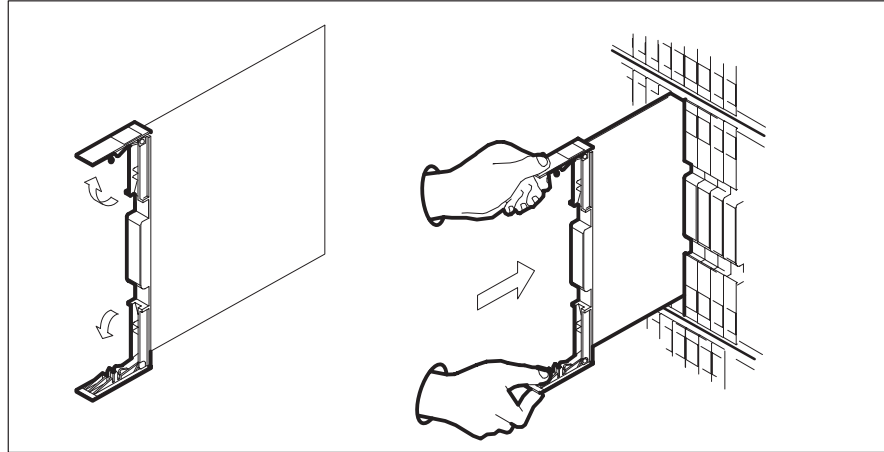
b. Open the locking levers on the card to be replaced and gently pull the card toward you until it clears the shelf.



c. Ensure the replacement card has the same PEC, including suffix, as the card you just removed.

NT2X06
in RSC-S RMM (continued)

- 8 Open the locking levers on the replacement card.
- Align the card with the slots in the shelf.
 - Gently slide the card into the shelf.



9

**WARNING****Equipment damage**

Take these precautions when removing or inserting a card:

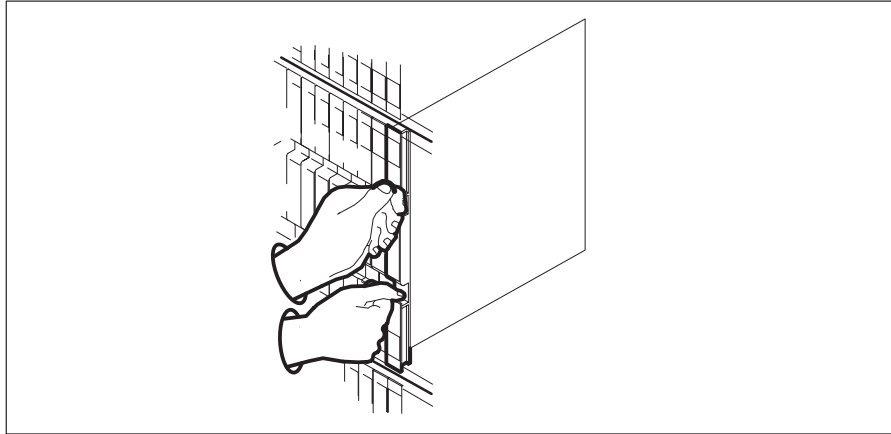
1. Do not apply direct pressure to the components.
2. Do not force the card into its slot.

Seat and lock the card.

- Using your fingers or thumbs, push on the upper and lower edges of the faceplate to ensure that the card is fully seated in the shelf.

NT2X06 in RSC-S RMM (continued)

- b. Close the locking levers.



- 10 Use the following information to determine where to proceed.

If you entered this procedure from	Do
alarm clearing procedures	step 23
other	step 11

At the RMM shelf

- 11 Power up the RMM as follows:

- a. Ensure the converter (NT2X06) is inserted. A major audible alarm may sound. This alarm is silenced when power is restored to the converter.
- b. Set the POWER switch to the ON position.

If FSP is equipped with	Do
fuses	step 12
circuit breakers	step 13

- 12 Press and hold the RESET button for 1 s. Both the converter FAIL LED and FRAME FAIL lamp on the FSP will be OFF.

Go to step 14.

NT2X06
in RSC-S RMM (continued)

- 13** Press the RESET button while setting the circuit breaker to the ON position. Both the converter FAIL LED and FRAME FAIL lamp on the FSP will be ON.

Go to step 14.

At the MAP terminal

- 14** Reload the RMM by typing

>LOADPM

and pressing the Enter key.

If	Do
message loadfile not found in directory is received	step 15
load passes	step 19
load fails	step 24

- 15** Use the following information to determine where to proceed.

If system load module	Do
version 1	step 16
version 2	step 17

- 16** List the loadfile in the directory by typing

>DSKUT;LISTVOL D000 file_name ALL

and pressing the Enter key.

or

>DSKUT;LISTVOL D010 file_name ALL

and pressing the Enter key.

where

file_name is the name of the loadfile

Local operating company policy determines where disk D000 or D010 is located.

Proceed to step 18.

NT2X06

in RSC-S RMM (continued)

- 17 List the loadfile in the directory by typing

>DISKUT;LV S00D

and pressing the Enter key.

>LF S00D file_name

and pressing the Enter key.

or

>DISKUT;LV S01D

and pressing the Enter key.

>LF S01D file_name

and pressing the Enter key.

where

file_name is the name of the loadfile

- 18 Leave the disk utility by typing

>QUIT

and pressing the Enter key.

Return to step 14.

- 19 Test the RMM by typing

>TST

and pressing the Enter key.

If TST	Do
passed	step 20
failed	step 23

- 20 Return the RMM to service by typing

>RTS

and pressing the Enter key.

If RTS	Do
passed	step 21
failed	step 24

NT2X06
in RSC-S RMM (end)

- 21 Send any faulty cards for repair according to local procedure.
- 22 Record the date the card was replaced, the serial number of the card, and the symptoms prompted by replacement of the card. Go to step 25.
- 23 Return to the procedure that directed you to this procedure. At the point where a faulty card list was produced, identify the next faulty card on the list and go to the appropriate card replacement procedure for that card in this manual.
- 24 Obtain further assistance in replacing this card by contacting operating company maintenance personnel.
- 25 You have successfully completed this procedure. Return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.

NT2X09 in RSC-S RMM

Application

Use this procedure to replace an NT2X09 card in an RSC-S RMM.

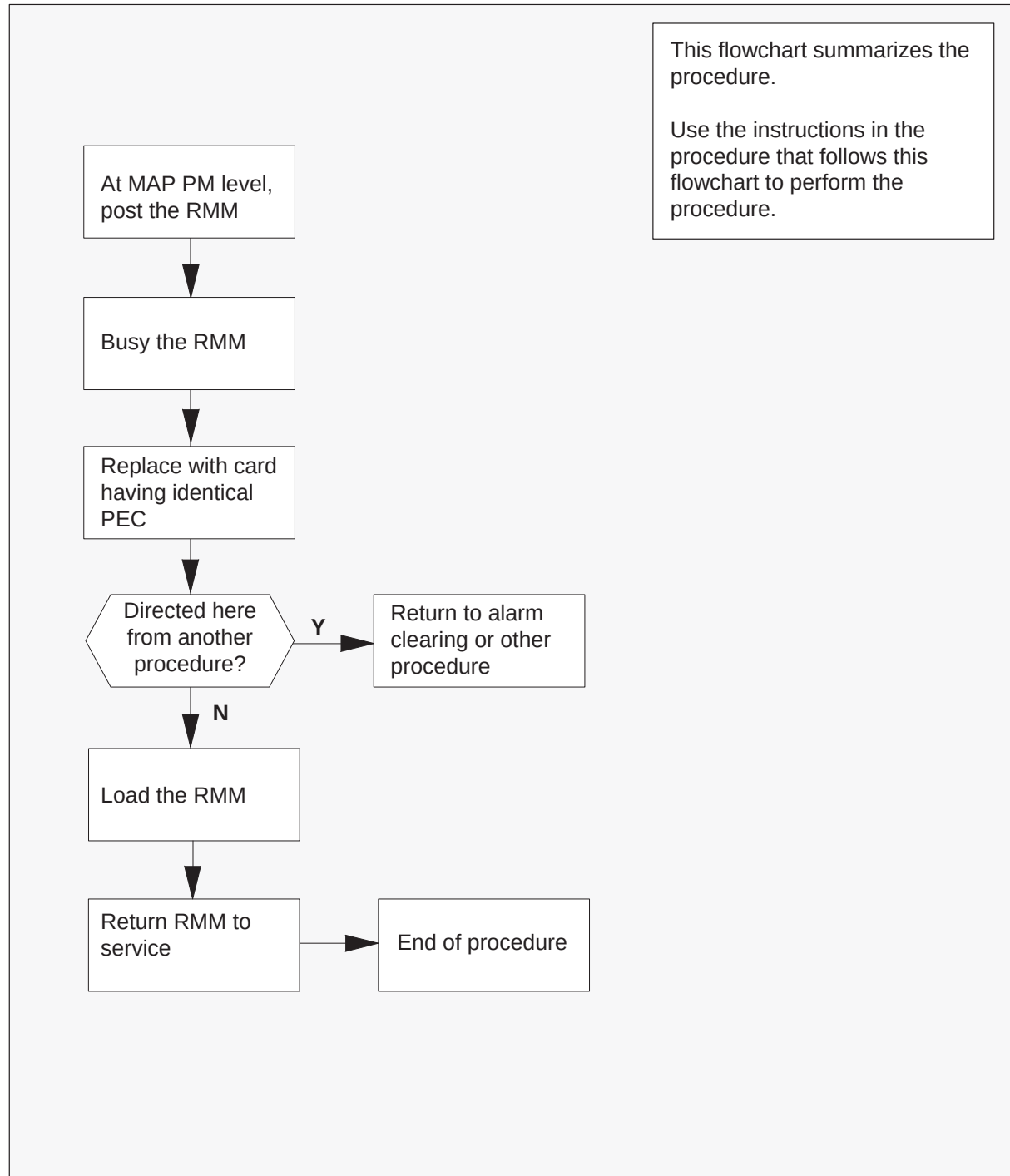
PEC	Suffixes	Name
NT2X09	AA	Power Converter

Common procedures

None

Action

The following flowchart is only a summary of the procedure. To replace the card, use the instructions in the procedure that follows the flowchart.

NT2X09
in RSC-S RMM (continued)**Summary of card replacement procedure for an NT2X09 card in RSC-S RMM**

NT2X09
in RSC-S RMM (continued)

Replacing an NT2X09 card in RSC-S RMM

At your Current Location

- 1 Proceed only if you have been directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure for verifying or accepting cards, or have been directed to this procedure by your maintenance support group.
- 2 Obtain an NT2X09 replacement card. Ensure the replacement card has the same product equipment code (PEC), including suffix, as the card to be removed.

At the MAP terminal

- 3 Set the MAP display to PM level by typing
>MAPCI;MTC;PM;POST RMM rmm_no
and pressing the Enter key.

where

rmm_no is the number of the RMM unit where the card is to be removed

Example of a MAP display:

CM	MS	IOD	Net	PM	CCS	LNS	Trks	Ext	Appl
.	.	.	.	.	.	.	.	.	.
RMM		SysB	ManB	OffL	CBsy	ISTb	InSv		
0 Quit	PM	4	0	10	3	3	130		
2 Post_	RMM	0	1	1	0	0	2		
3									
4	RMM	5	INSV						
5 TrnsL									
6 Tst									
7 Bsy									
8 RTS									
9 OffL									
10 LoadPM									
11 Disp_									
12 Next									
13									
14 QueryPM									
15									
16									
17									
18									

NT2X09 in RSC-S RMM (continued)

- 4 Busy the RMM by typing

>BSY

and pressing the Enter key.

Example of a MAP display:

CM	MS	IOD	Net	PM	CCS	LNS	Trks	Ext	Appl
.	.	.	.	1ManB	.	.	.	.	.
RMM			SysB	ManB	OffL	CBsy	ISTb	InSv	
0 Quit	PM	4		0	10	0	0	130	
2 Post_	RMM	0		1	0	0	0	0	
3									
4	RMM	5	ManB						
5 Trnsl									
6 Tst									
7 Bsy									
8 RTS									
9 OffL									
10 LoadPM									
11 Disp_									
12 Next									
13									
14 QueryPM									
15									
16									
17									
18									

- 5



CAUTION

Static discharge may cause damage to circuit packs
Put on a wrist strap and connect it to the frame of the RMM before removing any cards. This protects the RMM against service degradation caused by static electricity.

Put on a wrist strap.

- 6 Power down the unit by setting the ON/OFF switch on the power converter faceplate to the OFF position. Both the converter FAIL LED and FRAME FAIL lamp on the frame supervisory panel (FSP) will be ON. An audible alarm may sound. If an alarm does sound, return to the MAP terminal and silence the alarm by typing

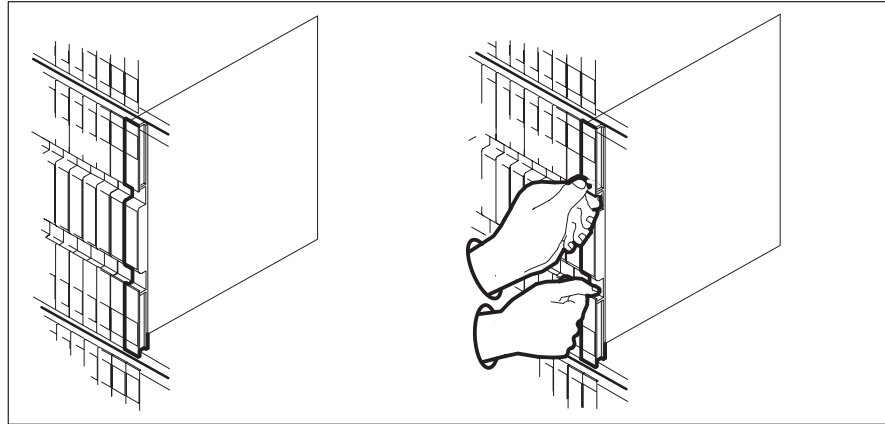
>SIL

and pressing the Enter key.

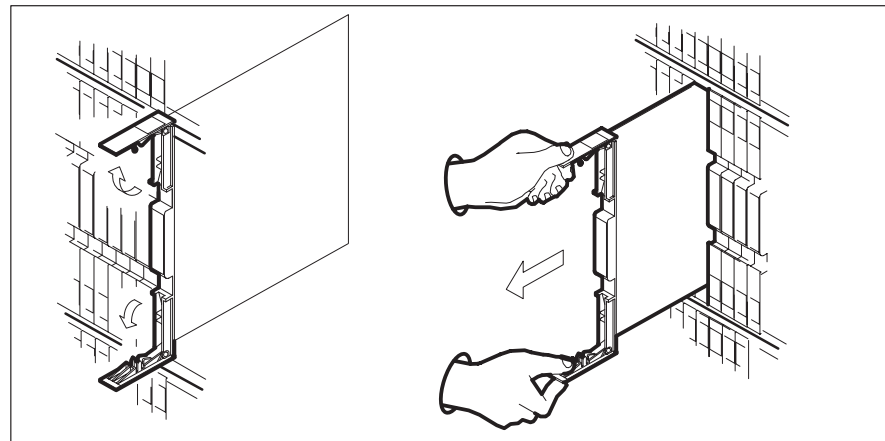
NT2X09 in RSC-S RMM (continued)

7 Remove the NT2X09 card as shown in the following figures.

a. Locate the card to be removed on the appropriate shelf.



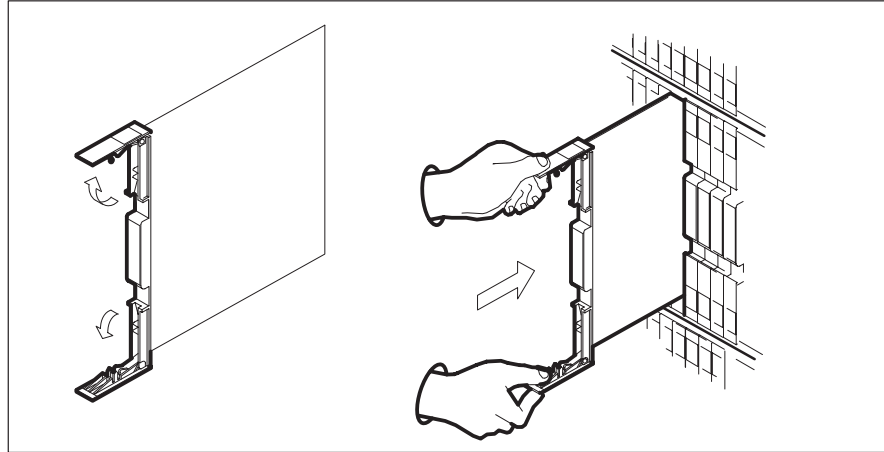
b. Open the locking levers on the card to be replaced and gently pull the card toward you until it clears the shelf.



c. Ensure the replacement card has the same PEC, including suffix, as the card you just removed.

NT2X09
in RSC-S RMM (continued)

- 8 Open the locking levers on the replacement card.
- Align the card with the slots in the shelf.
 - Gently slide the card into the shelf.



9

**WARNING****Equipment damage**

Take these precautions when removing or inserting a card:

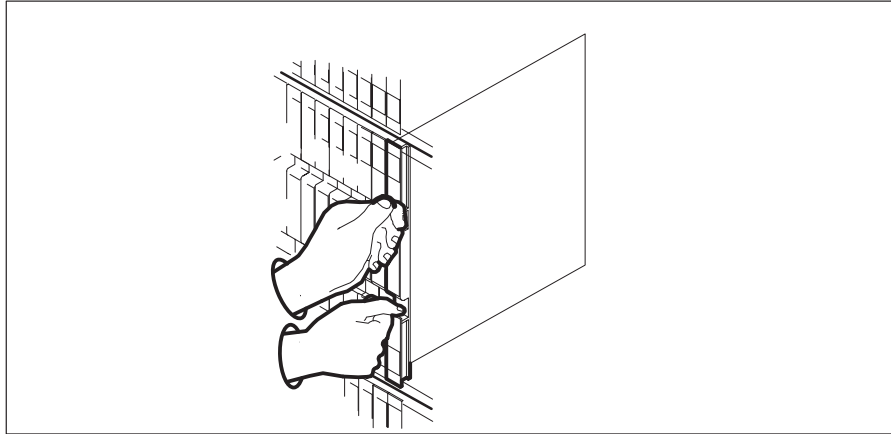
1. Do not apply direct pressure to the components.
2. Do not force the card into its slot.

Seat and lock the card.

- Using your fingers or thumbs, push on the upper and lower edges of the faceplate to ensure that the card is fully seated in the shelf.

NT2X09 in RSC-S RMM (continued)

- b. Close the locking levers.



- 10 Use the following information to determine where to proceed.

If you entered this procedure from	Do
alarm clearing procedures	step 23
other	step 11

- 11 Power up the RMM unit in the following sequence:

- a. Ensure the converter (NT2X09) is inserted. A major audible alarm may sound. This alarm is silenced when power is restored to the converter.
- b. Set the POWER switch to the ON position.

If FSP is equipped with	Do
fuses	step 12
circuit breakers	step 13

- 12 Press and hold the RESET button for 1 s. Both the converter FAIL LED and FRAME FAIL lamp on the FSP will be OFF. Go to step 14.

- 13 Press the RESET button while setting the circuit breaker to the ON position. Both the converter FAIL LED and FRAME FAIL lamp on the FSP will be ON.

NT2X09
in RSC-S RMM (continued)

At the MAP terminal

- 14** Reload the RMM by typing

>LOADPM

and pressing the Enter key.

If	Do
message loadfile not found in directory is received	step 15
load passes	step 19
load fails	step 24

- 15** Use the following information to determine where to proceed.

If system load module	Do
version 1	step 16
version 2	step 17

- 16** List the loadfile in the directory by typing

>DSKUT;LISTVOL D000 volume_name ALL

and pressing the Enter key.

or

>DSKUT;LISTVOL D010 volume_name ALL

and pressing the Enter key.

where

volume_name is the name of the loadfile

Local operating company policy determines where disk D000 or D010 is located.

Proceed to step 18.

NT2X09 in RSC-S RMM (continued)

- 17 List the loadfile in the directory by typing

>DISKUT;LV S00D

and pressing the Enter key.

>LF S00D file_name

and pressing the Enter key.

or

>DISKUT;LV S01D

and pressing the Enter key.

>LF S01D file_name

and pressing the Enter key.

where

file_name is the name of the loadfile

- 18 Leave the disk utility by typing

>QUIT

and pressing the Enter key.

Return to step 14.

- 19 Test the RMM by typing

>TST

and pressing the Enter key.

If TST	Do
passed	step 20
failed	step 23

- 20 Return the RMM to service by typing

>RTS

and pressing the Enter key.

If RTS	Do
passed	step 21
failed	step 24

NT2X09
in RSC-S RMM (end)

- 21 Send any faulty cards for repair according to local procedure.
- 22 Record the date the card was replaced, the serial number of the card, and the symptoms prompted by replacement of the card. Go to step 25.
- 23 Return to the procedure that directed you to this procedure. At the point where a faulty card list was produced, identify the next faulty card on the list and go to the appropriate card replacement procedure for that card in this manual.
- 24 Obtain further assistance in replacing this card by contacting operating company maintenance personnel.
- 25 You have successfully completed this procedure. Return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.

NT2X10 in RSC-S RMM

Application

Use this procedure to replace an NT2X10 card in an RSC-S RMM.

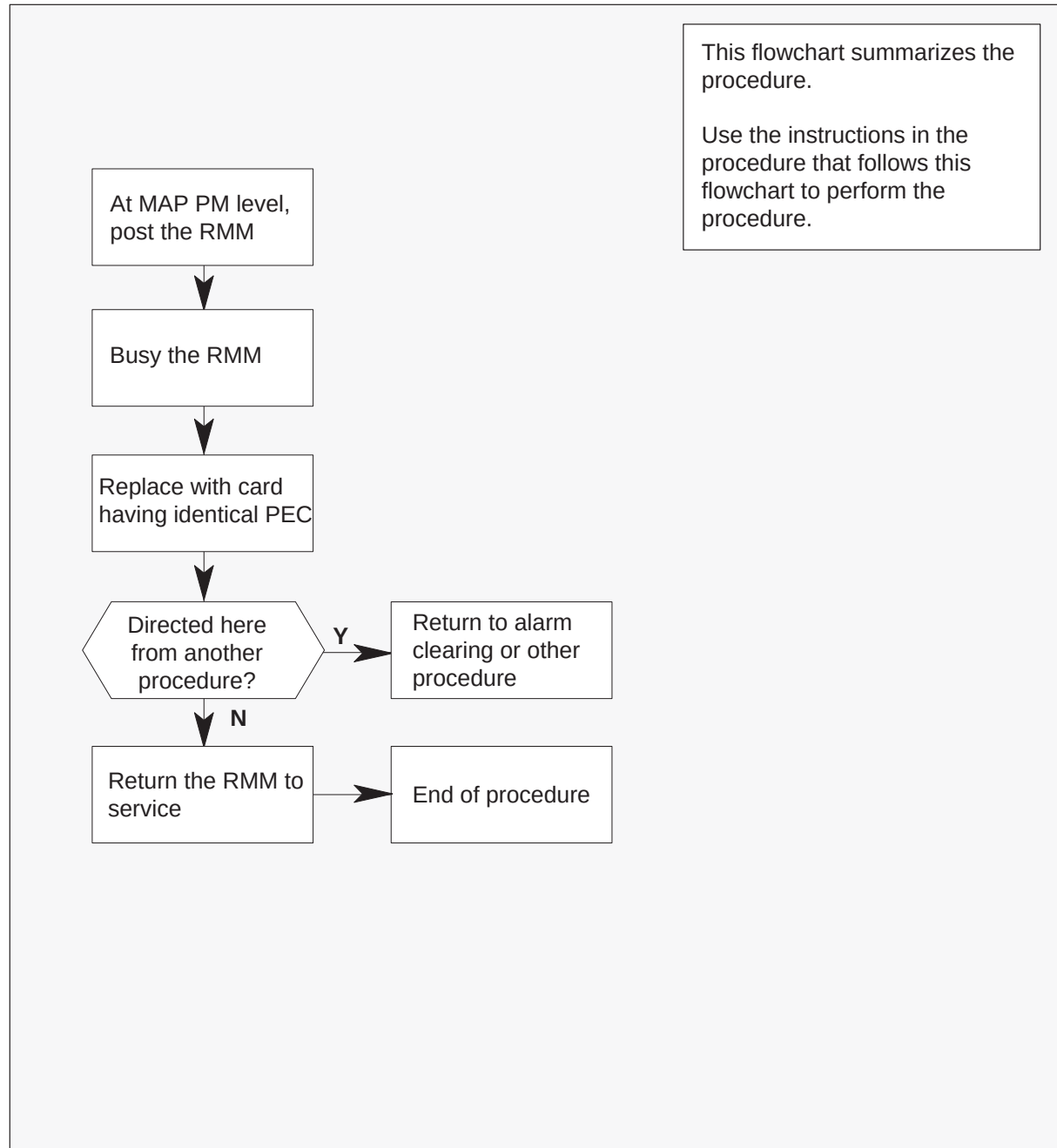
PEC	Suffixes	Name
NT2X10	BA	Line Test Unit (analog)

Common procedures

None

Action

The following flowchart is only a summary of the procedure. To replace the card, use the instructions in the procedure that follows the flowchart.

NT2X10
in RSC-S RMM (continued)**Summary of card replacement procedure for an NT2X10 card in RSC-S RMM**

NT2X10
in RSC-S RMM (continued)

Replacing an NT2X10 card in RSC-S RMM

At your current location

- 1 Proceed only if you have been directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure for verifying or accepting cards, or have been directed to this procedure by your maintenance support group.
- 2 Obtain an NT2X10 replacement card. Ensure the replacement card has the same product equipment code (PEC), including suffix, as the card that is to be removed.

At the MAP terminal

- 3 Set the MAP display to the PM level and post the RMM by typing
>MAPCI;MTC;PM;POST RMM rmm_no
and pressing the Enter key.

where

rmm_no is the number of the RMM where the card is to be removed

Example of MAP display:

CM	MS	IOD	Net	PM	CCS	LNS	Trks	Ext	Appl
RMM			SysB	ManB	OffL	CBsy	ISTb	InSv	
0	Quit	PM	0	0	0	0	0	130	
2	Post_	RMM	0	0	0	0	0	0	
3									
4		RMM	5	INSV					
5	Trnsl								
6	Tst								
7	Bsy								
8	RTS								
9	OffL								
10	LoadPM								
11	Disp_								
12	Next								
13									
14	QueryPM								
15									
16									
17									
18									

NT2X10
in RSC-S RMM (continued)

- 4 Busy the RMM by typing
>BSY
and pressing the Enter key.

Example of a MAP display:

CM	MS	IOD	Net	PM	CCS	LNS	Trks	Ext	Appl
.	.	.	.	1ManB	.	.	.	.	.
RMM		SysB	ManB	OffL	CBsy	ISTb	InSv		
0 Quit	PM	4	0	10	0	0	130		
2 Post_	RMM	0	1	0	0	0	0		
3									
4	RMM	5	ManB						
5 Trnsl									
6 Tst									
7 Bsy									
8 RTS									
9 OffL									
10 LoadPM									
11 Disp_									
12 Next									
13									
14 QueryPM									
15									
16									
17									
18									

At the RMM shelf

5



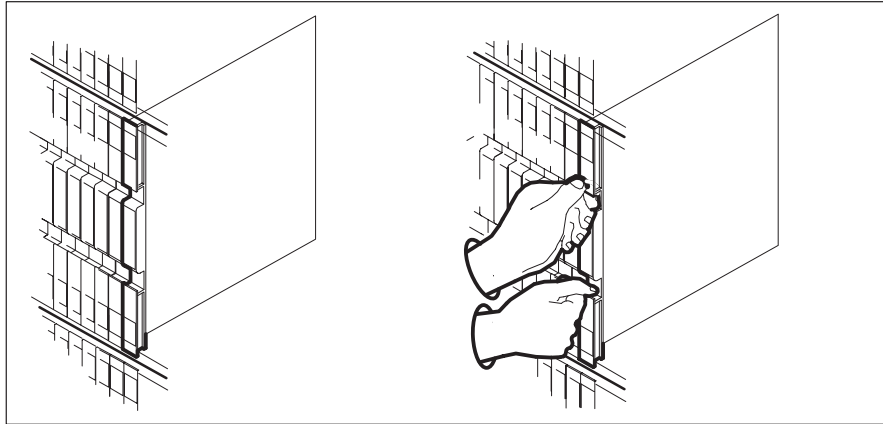
CAUTION
Static discharge may cause damage to circuit packs
Put on a wrist strap and connect it to the frame of the RMM before removing any cards. This protects the RMM against service degradation caused by static electricity.

Put on a wrist strap.

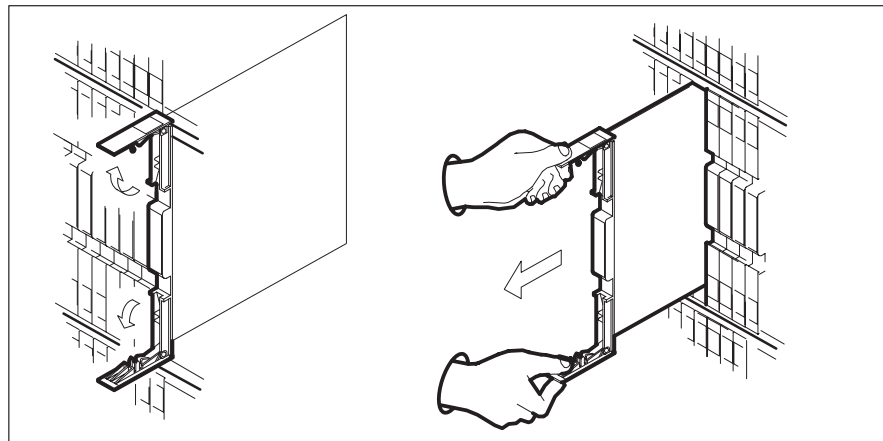
NT2X10 in RSC-S RMM (continued)

- 6 Remove the NT2X10 card as shown in the following figures.

- a. Locate the card to be removed on the appropriate shelf.



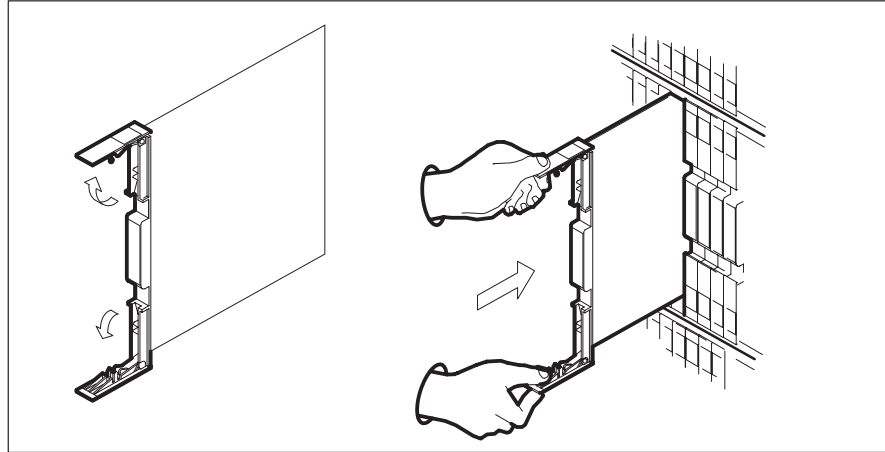
- b. Open the locking levers on the card to be replaced and gently pull the card toward you until it clears the shelf.



- c. Ensure the replacement card has the same PEC, including suffix, as the card you just removed.

NT2X10
in RSC-S RMM (continued)

- 7 Open the locking levers on the replacement card.
- Align the card with the slots in the shelf.
 - Gently slide the card into the shelf.



8

**WARNING****Equipment damage**

Take these precautions when removing or inserting a card:

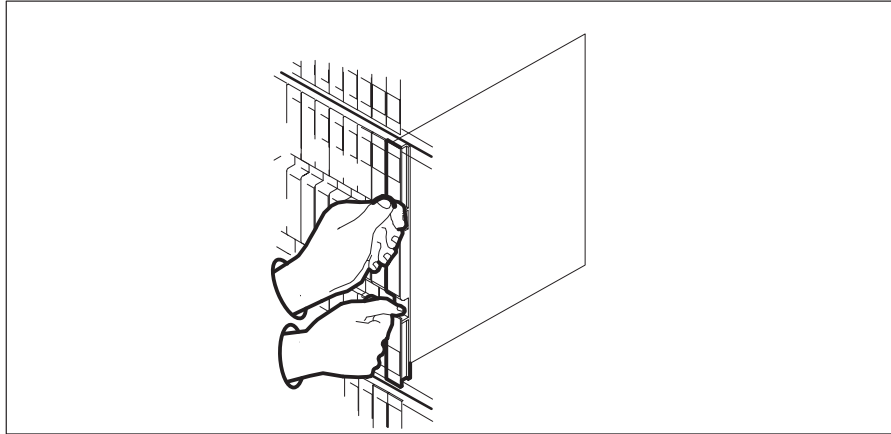
1. Do not apply direct pressure to the components.
2. Do not force the card into its slot.

Seat and lock the card.

- Using your fingers or thumbs, push on the upper and lower edges of the faceplate to ensure the card is fully seated in the shelf.

NT2X10
in RSC-S RMM (continued)

- b. Close the locking levers.



- 9 Use the following information to determine where to proceed.

If you entered this procedure from	Do
alarm clearing procedures	step 14
other	step 10

At the MAP terminal

- 10 Test the RMM by typing
>TST
and pressing the Enter key.

If TST	Do
passed	step 11
failed	step 14

NT2X10
in RSC-S RMM (end)

- 11** Return the RMM to service by typing

>RTS

and pressing the Enter key.

If RTS	Do
passed	step 12
failed	step 15

- 12** Send any faulty cards for repair according to local procedure.
- 13** Record the date the card was replaced, the serial number of the card, and the symptoms the prompted replacement of the card. Go to step 16.
- 14** Return to the procedure that directed you to this procedure. At the point where a faulty card list was produced, identify the next faulty card on the list and go to the appropriate card replacement procedure for that card in this manual.
- 15** Obtain further assistance in replacing this card by contacting operating company maintenance personnel.
- 16** You have successfully completed this procedure. Return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.

NT2X11 in RSC-S RMM

Application

Use this procedure to replace an NT2X11 card in an RSC-S RMM.

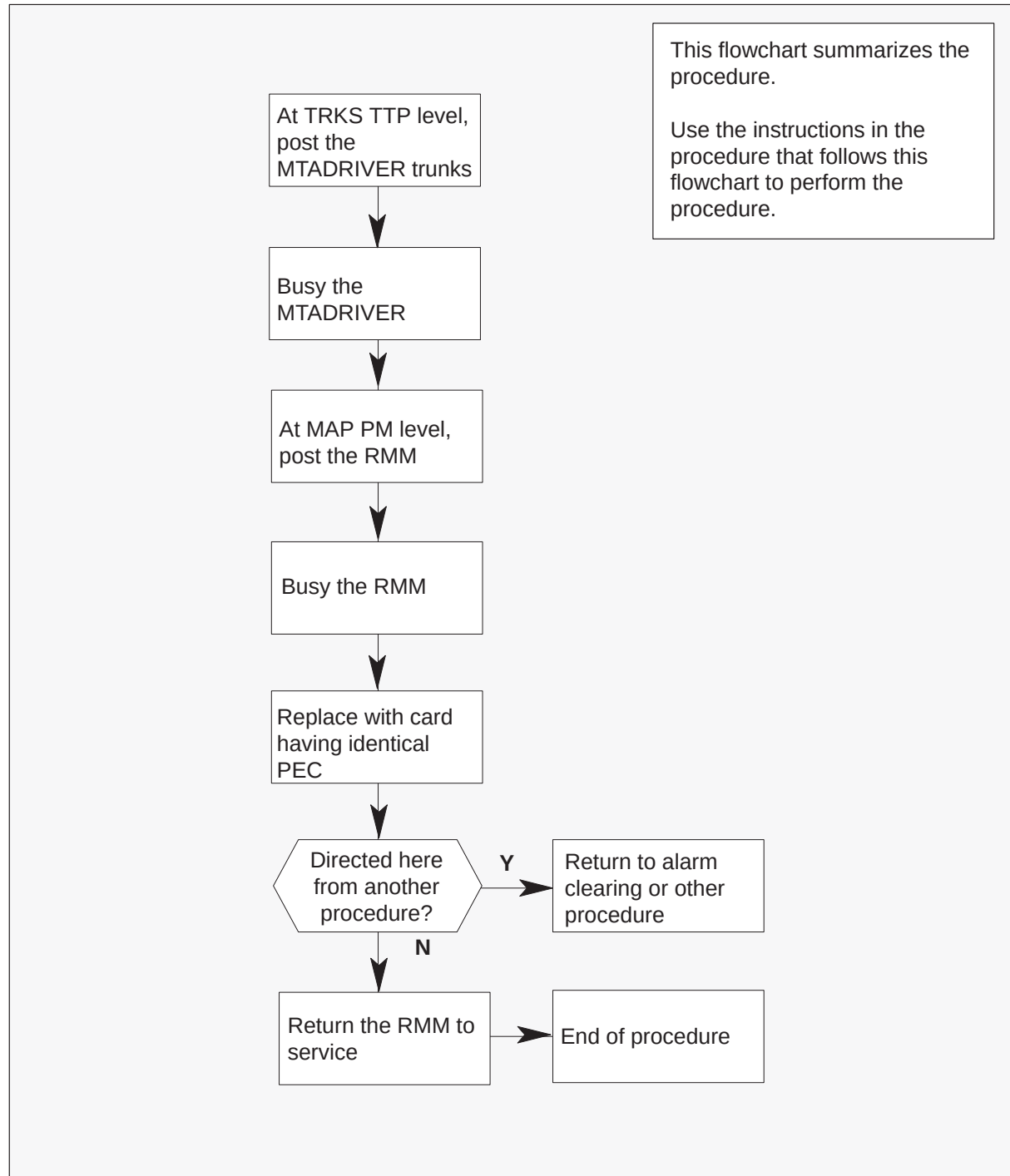
PEC	Suffixes	Name
NT2X11	BA	Line Test Unit (digital)

Common procedures

None

Action

The following flowchart is only a summary of the procedure. To replace the card, use the instructions in the procedure that follows the flowchart.

NT2X11
in RSC-S RMM (continued)**Summary of card replacement procedure for an NT2X11 card in RSC-S RMM**

NT2X11
in RSC-S RMM (continued)

Replacing an NT2X11 card in RSC-S RMM

At your Current Location

- 1 Proceed only if you have been directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure for verifying or accepting cards, or have been directed to this procedure by your maintenance support group.
- 2 Obtain an NT2X11 replacement card. Ensure the replacement card has the same product equipment code (PEC), including suffix, as the card that is to be removed.

At the MAP terminal

- 3 Set the MAP display to TTP level and post the RMM by typing
>MAPCI;MTC;TRKS;TTP;POST P RMM rmm_no ckt_no
and pressing the Enter key.

where

rmm_no is the number of the RMM with the faulty MTADriver card
ckt_no is the number of the faulty MTADriver card

Example of a MAP display:

CM	MS	IOD	Net	PM	CCS	LNS	Trks	Ext	Appl
.	.	.	.	.	.	.	.	.	.
TTP									
0 Quit		POST	1		DELQ		BUSYQ		DIG
2 Post_		TTP	6-009						
3 Seize_		CKT TYPE	PM NO.		COM LANG		STA S R	DOT TE	RESULT
4		MISC	RMM 0 16		MATDRIVER	0 IDL			
5 Bsy_									
6 RTS_									
7 Tst_									
8									
9 CktInfo									
10 CktLoc									
11 Hold		TTP ID IS:	6-009						
12 Next_		NO CKT, SET IS	EMPTY						
13 Rls_		TTP:							
14 Ckt_		LAST CKTN	= 1						
15 Trnslvf_		SHORT CLLI IS:	MTADRI						
16 Stksdr_		OK, CKT POSTED							
17 Pads_									
18 Level_									

NT2X11 in RSC-S RMM (continued)

- 4 Busy the MTADriver by typing

>BSY;BSY INB

and pressing the Enter key.

Example of a MAP display:

CM	MS	IOD	Net	PM	CCS	LNS	Trks	Ext	Appl
.	.	.	.	.	.	.	.	.	.
TTP									
0	Quit	POST	1		DELQ		BUSYQ		DIG
2	Post_	TTP	6-009						
3	Seize_	CKT TYPE	PM NO.	COM	LANG	STA	S	R	DOT TE RESULT
4		MISC	RMM	0	16	MATDRIVER	0	IDL	
5	Bsy_								
6	RTS_								
7	Tst_								
8									
9	CktInfo								
10	CktLoc								
11	Hold	TTP ID IS:	6-009						
12	Next_	NO CKT, SET IS EMPTY							
13	Rls_	TTP:							
14	Ckt_	LAST CKTN =	1						
15	Trnslvf_	SHORT CLLI IS:	MTADRI						
16	Stksdr_	OK, CKT POSTED							
17	Pads_								
18	Level_								

- 5 Set the MAP display to the PM level and post the RMM by typing

>PM;POST RMM rmm_no

and pressing the Enter key.

where

rmm_no is the number of the RMM where the card is to be removed

NT2X11
in RSC-S RMM (continued)

Example of a MAP display:

CM	MS	IOD	Net	PM	CCS	LNS	Trks	Ext	Appl
RMM		SysB	ManB	OffL	CBsy	ISTb	InSv		
0	Quit	PM	0	0	0	0	0	130	0
2	Post_	RMM	0	0	0	0	0	0	0
3									
4		RMM	5	INSV					
5	Trnsl								
6	Tst								
7	Bsy								
8	RTS								
9	OffL								
10	LoadPM								
11	Disp_								
12	Next								
13									
14	QueryPM								
15									
16									
17									
18									

- 6 Busy the RMM by typing
 >BSY
 and pressing the Enter key.

NT2X11 in RSC-S RMM (continued)

Example of a MAP display:

CM	MS	IOD	Net	PM	CCS	LNS	Trks	Ext	Appl
.	.	.	.	1ManB	.	.	.	.	.
RMM		SysB	ManB	OffL	CBsy	ISTb	InSv		
0 Quit	PM	4	0	10	0	0	130		
2 Post_	RMM	0	1	0	0	0	0		
3									
4	RMM	5	ManB						
5 TrnsL									
6 Tst									
7 Bsy									
8 RTS									
9 OffL									
10 LoadPM									
11 Disp_									
12 Next									
13									
14 QueryPM									
15									
16									
17									
18									

At the RMM shelf

7



CAUTION

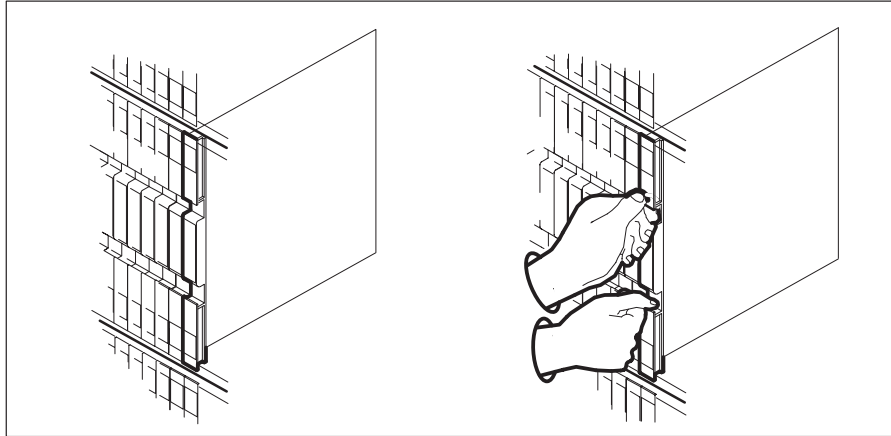
Static discharge may cause damage to circuit packs. Put on a wrist strap and connect it to the frame of the RMM before removing any cards. This protects the RMM against service degradation caused by static electricity.

Put on a wrist strap.

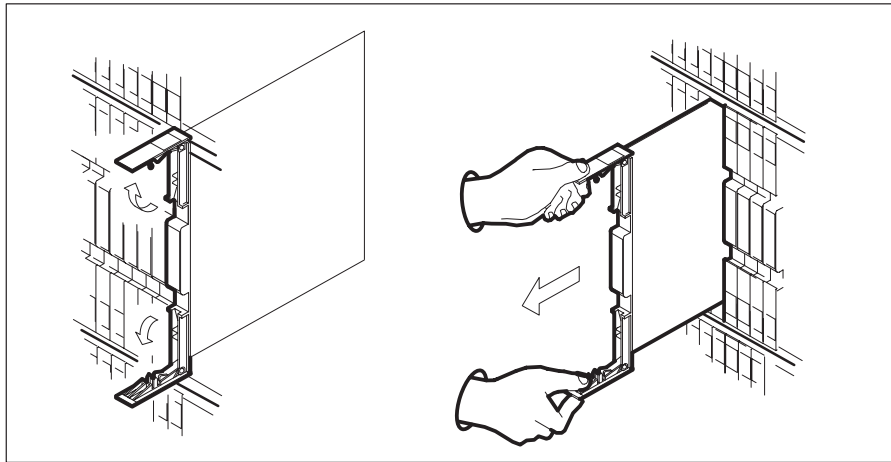
8 Remove the NT2X11 card as shown in the following figures.

NT2X11
in RSC-S RMM (continued)

- a. Locate the card to be removed on the appropriate shelf.



- b. Open the locking levers on the card to be replaced and gently pull the card toward you until it clears the shelf.



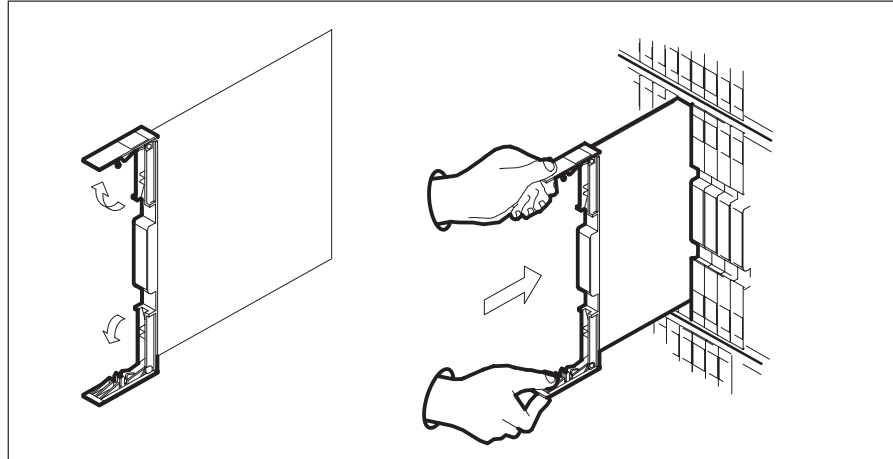
- c. Ensure the replacement card has the same PEC, including suffix, as the card you just removed.

9 Open the locking levers on the replacement card.

- a. Align the card with the slots in the shelf.

NT2X11
in RSC-S RMM (continued)

- b. Gently slide the card into the shelf.



10



WARNING

Equipment damage

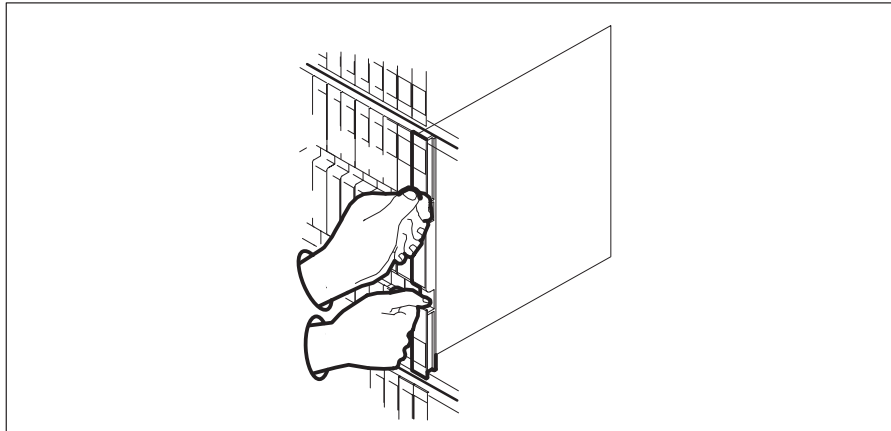
Take these precautions when removing or inserting a card:

1. Do not apply direct pressure to the components.
2. Do not force the card into the slot.

Seat and lock the card.

NT2X11 in RSC-S RMM (continued)

- a. Using your fingers or thumbs, push on the upper and lower edges of the faceplate to ensure the card is fully seated in the shelf.
- b. Close the locking levers.



- 11 Use the following information to determine where to proceed.

If you entered this procedure from	Do
alarm clearing procedures	step 18
other	step 12

At the MAP terminal

- 12 Test the RMM by typing
>TST
and pressing the Enter key.

If TST	Do
passed	step 13
failed	step 18

NT2X11
in RSC-S RMM (end)

- 13 Return the RMM to service by typing

>RTS

and pressing the Enter key.

If RTS	Do
passed	step 14
failed	step 19

- 14 Post the MTADriver by typing

>TRKS;TTP;POST P RMM rmm_no ckt_no

where

rmm_no is the number of the RMM with the new MTADriver card

ckt_no is the number of the new MTADriver card

and pressing the Enter key.

- 15 Return the MTADriver to service by typing

>BSY ALL;RTS ALL

and pressing the Enter key.

- 16 Send any faulty cards for repair according to local procedure.

- 17 Record the date the card was replaced, the serial number of the card, and the symptoms that prompted replacement of the card. Go to step 20.

- 18 Return to the **Alarm Clearing Procedures** that directed you to this procedure. At the point where a faulty card list was produced, identify the next faulty card on the list, and go to the appropriate card replacement procedure for that card in this manual.

- 19 Obtain further assistance in replacing this card by contacting operating company maintenance personnel.

- 20 You have successfully completed this procedure. Return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.

NT2X57 in RSC-S RMM

Application

Use this procedure to replace an NT2X57 card in an RSC-S RMM.

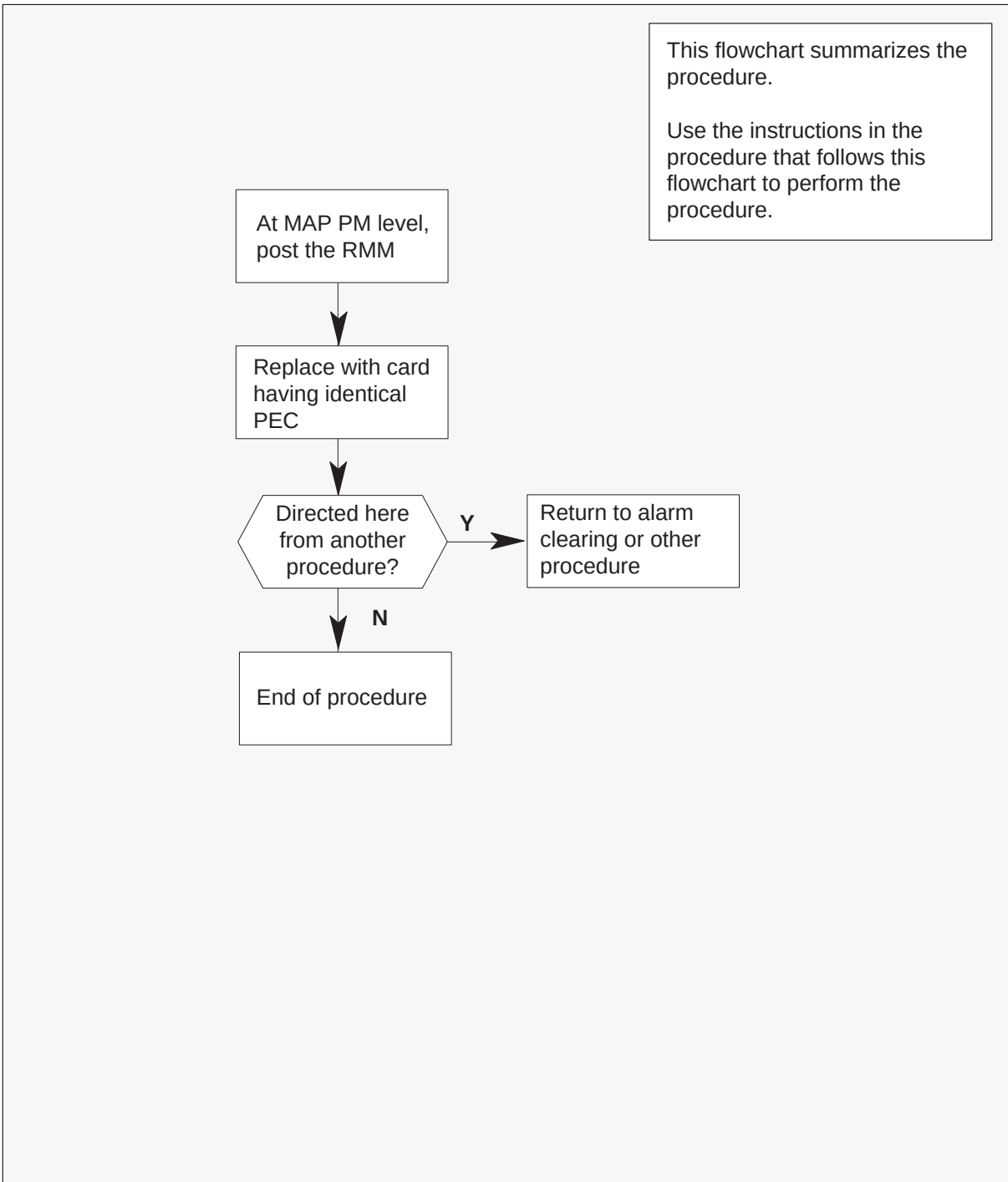
PEC	Suffixes	Name
NT2X57	AA	Signal Distribution

Common procedures

None

Action

The following flowchart is only a summary of the procedure. To replace the card, use the instructions in the procedure that follows the flowchart.

NT2X57
in RSC-S RMM (continued)**Summary of card replacement procedure for an NT2X57 card in RSC-S RMM**

NT2X57
in RSC-S RMM (continued)

Replacing an NT2X57 card in RSC-S RMM

At your Current Location

- 1 Proceed only if you have been directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure for verifying or accepting cards, or have been directed to this procedure by your maintenance support group.
- 2 Obtain an NT2X57 replacement card. Ensure the replacement card has the same product equipment code (PEC), including suffix, as the card that is to be removed.

At the MAP terminal

- 3 Set the MAP display to PM level and post the RMM by typing

>MAPCI;MTC;PM;POST RMM rmm_no
and pressing the Enter key.

where

rmm_no is the number of the RMM where the card is to be removed

Example of a MAP display:

CM	MS	IOD	Net	PM	CCS	LNS	Trks	Ext	Appl
RMM		SysB	ManB	OffL	CBsy	ISTb	InSv		
0	Quit	PM	0	0	0	0	130		
2	Post_	RM	0	0	0	0	0		
3									
4		RMM	5	INSV					
5	TrnsL								
6	Tst								
7	Bsy								
8	RTS								
9	OffL								
10	LoadPM								
11	Disp_								
12	Next								
13									
14	QueryPM								
15									
16									
17									
18									

- 4 Busy the RMM by typing
>BSY
and pressing the Enter key.

NT2X57 in RSC-S RMM (continued)

Example of a MAP display:

CM	MS	IOD	Net	PM	CCS	LNS	Trks	Ext	Appl
.	.	.	.	1ManB	.	.	.	.	.
RMM			SysB	ManB	OffL		CBsy	ISTb	InSv
0	Quit	PM	4	0	10		0	0	130
2	Post_	RMM	0	1	0		0	0	0
3									
4		RMM	5	ManB					
5	Trnsl								
6	Tst								
7	Bsy								
8	RTS								
9	OffL								
10	LoadPM								
11	Disp_								
12	Next								
13									
14	QueryPM								
15									
16									
17									
18									

At the RMM shelf

5



CAUTION

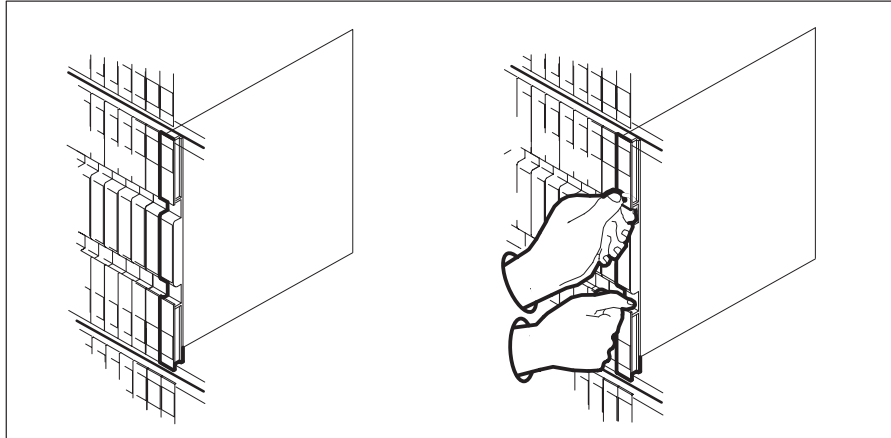
Static discharge may cause damage to circuit packs
Put on a wrist strap and connect it to the frame of the RMM before removing any cards. This protects the RMM against service degradation caused by static electricity.

Put on a wrist strap.

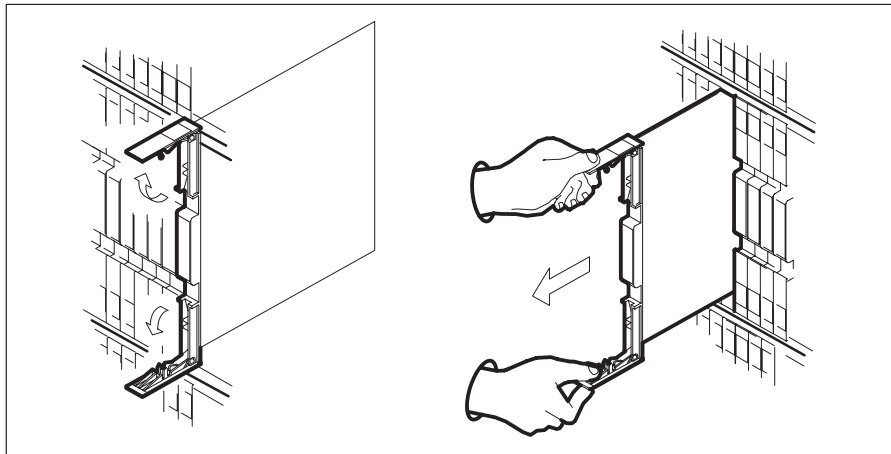
6 Remove the NT2X57 card as shown in the following figures.

NT2X57
in RSC-S RMM (continued)

- a. Locate the card to be removed on the appropriate shelf.



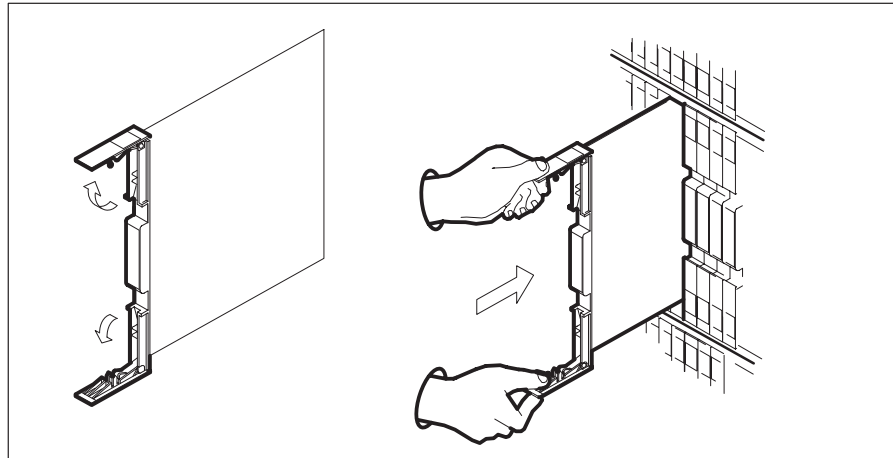
- b. Open the locking levers on the card to be replaced and gently pull the card toward you until it clears the shelf.



- c. Ensure the replacement card has the same PEC, including suffix, as the card you just removed.
- d. Set the switch settings on the card to match those of the card you are replacing.

NT2X57
in RSC-S RMM (continued)

- 7 Open the locking levers on the replacement card. Align the card with the slots in the shelf. Gently slide the card into the shelf.



8

**WARNING****Equipment damage**

Take these precautions when removing or inserting a card:

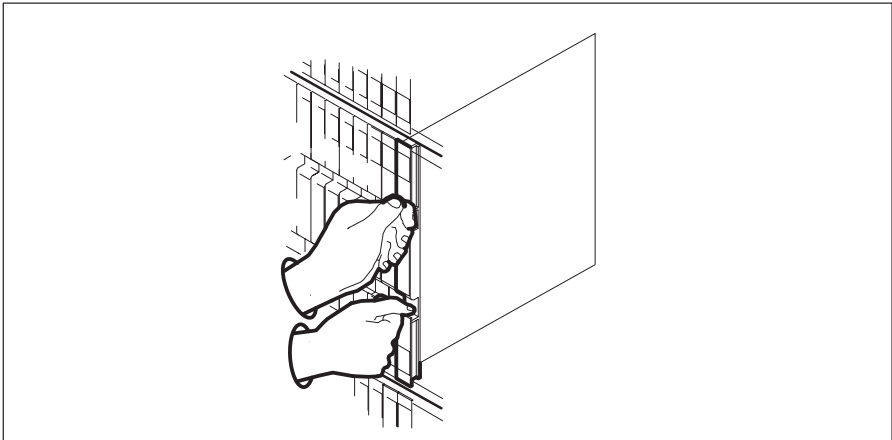
1. Do not apply direct pressure to the components.
2. Do not force the card into the slot.

Seat and lock the card.

- a. Using your fingers or thumbs, push on the upper and lower edges of the faceplate to ensure the card is fully seated in the shelf.

NT2X57
in RSC-S RMM (continued)

b. Close the locking levers.



9 Use the following information to determine where to proceed.

If you entered this procedure from	Do
alarm clearing procedures	step 14
other	step 10

At the MAP terminal

10 Test the RMM by typing
>TST
and pressing the Enter key.

If TST	Do
passed	step11
failed	step 15

NT2X57
in RSC-S RMM (end)

- 11** Return the RMM to service by typing

>RTS

and pressing the Enter key.

If RTS	Do
passed	step 12
failed	step 15

- 12** Send any faulty cards for repair according to local procedure.
- 13** Record the date the card was replaced, the serial number of the card, and the symptoms that prompted replacement of the card. Go to step 16.
- 14** Return to the procedure that directed you to this procedure. At the point where a faulty card list was produced, identify the next faulty card on the list, and go to the appropriate card replacement procedure for that card in this manual.
- 15** Obtain further assistance in replacing this card by contacting operating company maintenance personnel.
- 16** You have successfully completed this procedure. Return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.

NT2X59 in RSC-S RMM

Application

Use this procedure to replace an NT2X59 card in an RSC-S RMM.

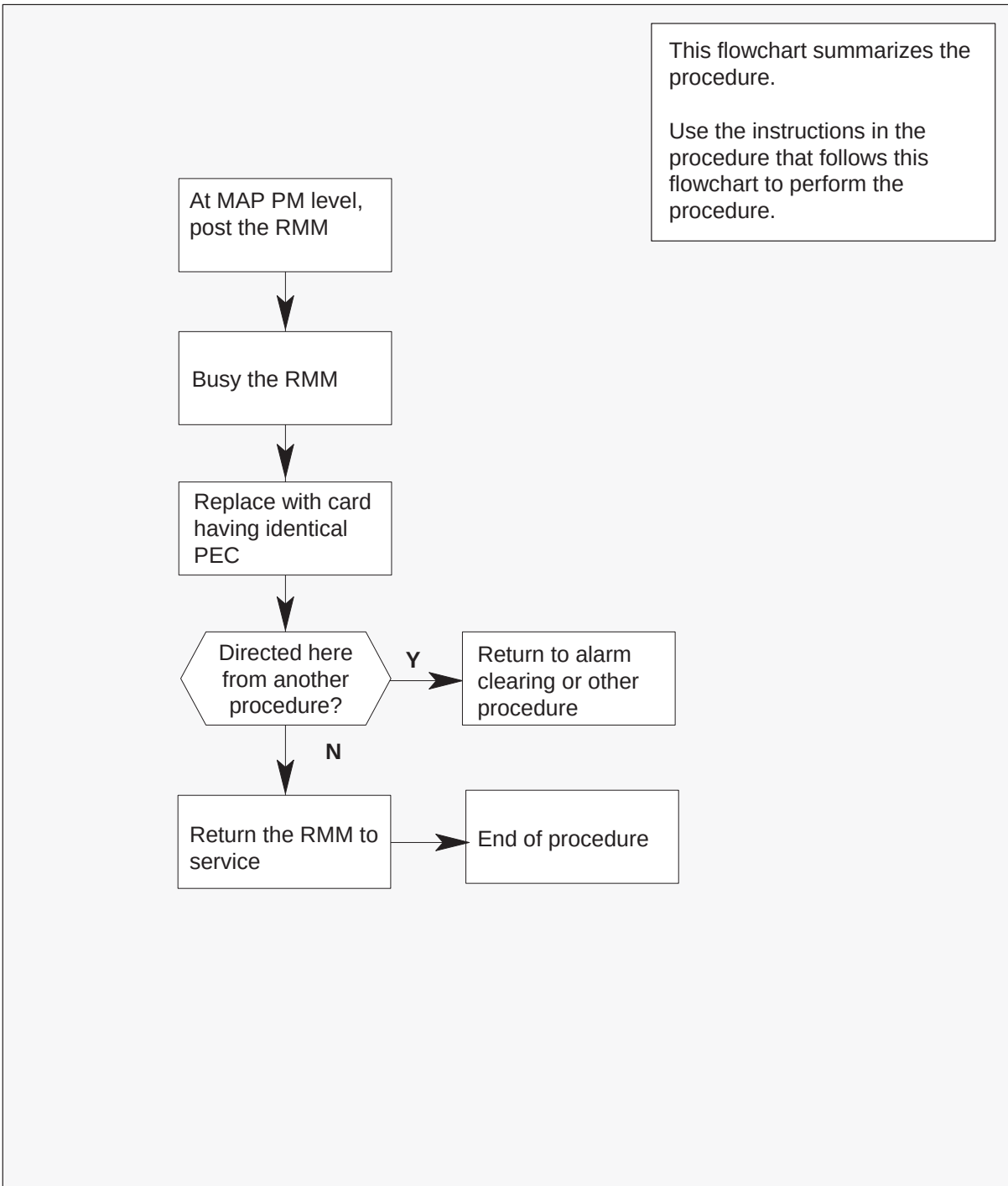
PEC	Suffixes	Name
NT2X59	AA	Group Codec

Common procedures

None

Action

The following flowchart is only a summary of the procedure. To replace the card, use the instructions in the procedure that follows the flowchart.

NT2X59
in RSC-S RMM (continued)**Summary of card replacement procedure for an NT2X59 card in RSC-S RMM**

NT2X59
in RSC-S RMM (continued)

Replacing an NT2X59 card in RSC-S RMM

At your Current Location

- 1 Proceed only if you have been directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure for verifying or accepting cards, or have been directed to this procedure by your maintenance support group.
- 2 Obtain an NT2X59 replacement card. Ensure the replacement card has the same product equipment code (PEC), including suffix, as the card that is to be removed.

At the MAP terminal

- 3 Set the MAP display to the PM level and post the RMM by typing
>MAPCI;MTC;PM;POST RMM rmm_no
and pressing the Enter key.

where

rmm_no is the number of the RMM where the card is to be removed

Example of a MAP display:

CM	MS	IOD	Net	PM	CCS	LNS	Trks	Ext	Appl
.	.	.	.	.	.	.	.	.	.
RMM		SysB		ManB	OffL	CBsy	ISTb	InSv	
0 Quit		PM 0		0	0	0	0	130	
2 Post_		RMM 0		0	0	0	0	0	
3									
4		RMM 5	INSV						
5 TrnsL									
6 Tst									
7 Bsy									
8 RTS									
9 OffL									
10 LoadPM									
11 Disp_									
12 Next									
13									
14 QueryPM									
15									
16									
17									
18									

- 4 Busy the RMM by typing
>BSY
and pressing the Enter key.

NT2X59
in RSC-S RMM (continued)

Example of a MAP display:

CM	MS	IOD	Net	PM	CCS	LNS	Trks	Ext	Appl
.	.	.	.	1ManB	.	.	.	.	.
RMM			SysB	ManB	OffL		CBsy	ISTb	InSv
0	Quit	PM	4	0	10		0	0	130
2	Post_	RMM	0	1	0		0	0	0
3									
4		RMM	5	ManB					
5	Trnsl								
6	Tst								
7	Bsy								
8	RTS								
9	OffL								
10	LoadPM								
11	Disp_								
12	Next								
13									
14	QueryPM								
15									
16									
17									
18									

At the RMM shelf

5



CAUTION

Static discharge may cause damage to circuit packs

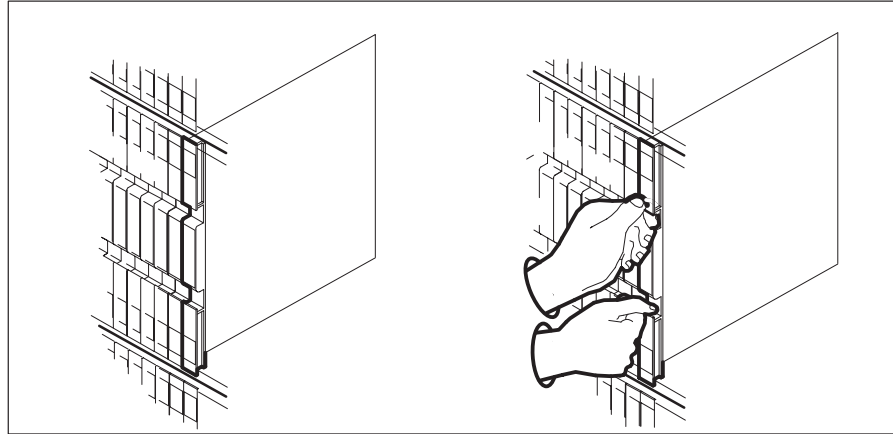
Put on a wrist strap and connect it to the frame of the RMM before removing any cards. This protects the RMM against service degradation caused by static electricity.

Put on a wrist strap.

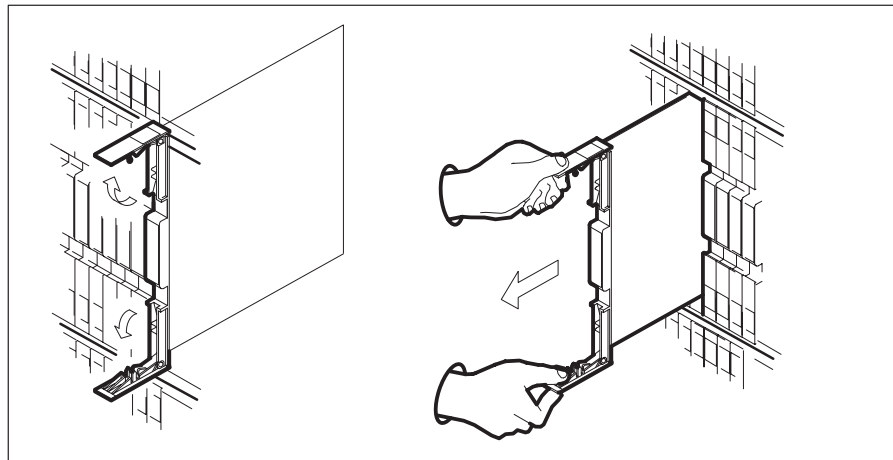
- 6
- Remove the NT2X59 card as shown in the following figures.

NT2X59
in RSC-S RMM (continued)

- a. Locate the card to be removed on the appropriate shelf.



- b. Open the locking levers on the card to be replaced and gently pull the card toward you until it clears the shelf.



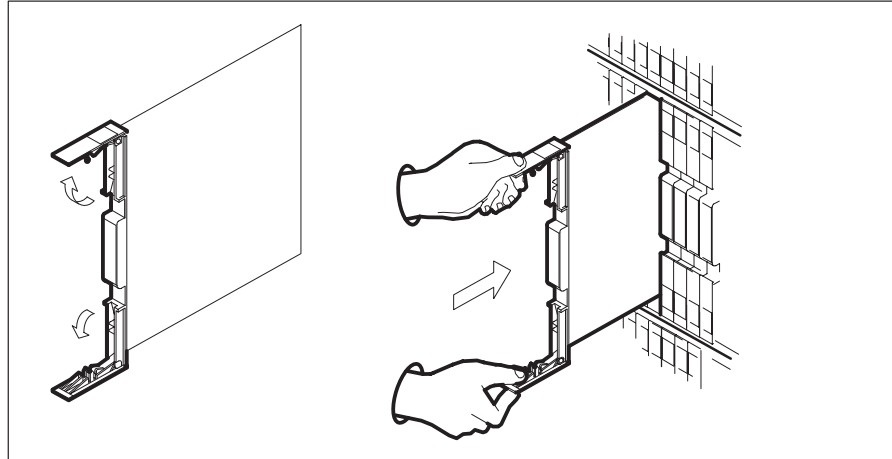
- c. Ensure the replacement card has the same PEC, including suffix, as the card you just removed.

7 Open the locking levers on the replacement card.

- a. Align the card with the slots in the shelf.

NT2X59
in RSC-S RMM (continued)

- b.** Gently slide the card into the shelf.



8



WARNING

Equipment damage

Take these precautions when removing or inserting a card:

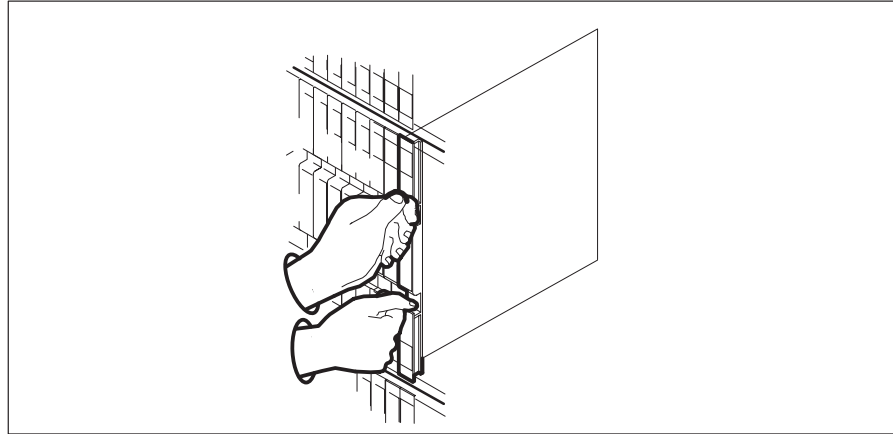
1. Do not apply direct pressure to the components.
2. Do not force the card into the slot.

Seat and lock the card.

- a.** Using your fingers or thumbs, push on the upper and lower edges of the faceplate to ensure the card is fully seated in the shelf.

NT2X59
in RSC-S RMM (continued)

- b. Close the locking levers.



- 9 Use the following information to determine where to proceed.

If you entered this procedure from	Do
alarm clearing procedures	step 14
other	step 10

At the MAP terminal

- 10 Test the RMM by typing
>TST
and pressing the Enter key.

If TST	Do
passed	step 11
failed	step 14

NT2X59
in RSC-S RMM (end)

- 11** Return the RMM to service by typing

>RTS

and pressing the Enter key.

If RTS	Do
passed	step 12
failed	step 15

- 12** Send any faulty cards for repair according to local procedure.
- 13** Record the date the card was replaced, the serial number of the card, and the symptoms that prompted replacement of the card. Go to step 16.
- 14** Return to the procedure that directed you to this procedure. At the point where a faulty card list was produced, identify the next faulty card on the list and go to the appropriate card replacement procedure for that card in this manual.
- 15** Obtain further assistance in replacing this card by contacting operating company maintenance personnel.
- 16** You have successfully completed this procedure. Return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.

NT2X90 in RSC-S RMM

Application

Use this procedure to replace an NT2X90 card in an RSC-S RMM.

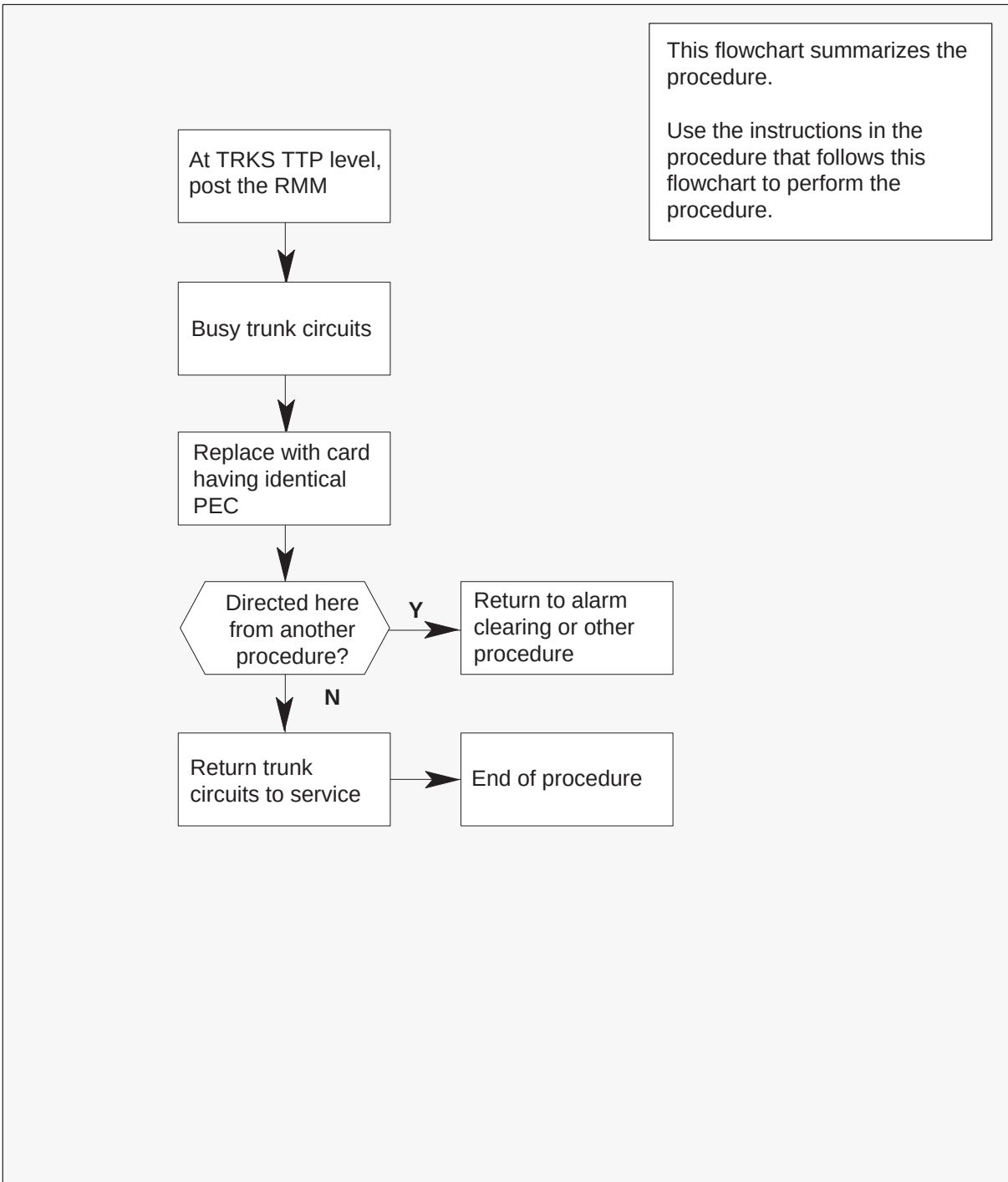
PEC	Suffixes	Name
NT2X90	AD	Test Trunk Circuit

Common procedures

None

Action

The following flowchart is only a summary of the procedure. To replace the card, use the instructions in the procedure that follows the flowchart.

NT2X90
in RSC-S RMM (continued)**Summary of card replacement procedure for an NT2X90 card in RSC-S RMM**

NT2X90 in RSC-S RMM (continued)

Replacing an NT2X90 card in RSC-S RMM

At your Current Location

- 1 Proceed only if you have been directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure for verifying or accepting cards, or have been directed to this procedure by your maintenance support group.
- 2 Obtain an NT2X90 replacement card. Ensure the replacement card has the same product equipment code (PEC), including suffix, as the card that is to be removed.

At the MAP terminal

- 3 Set the MAP display to the TRKS level and post the RMM by typing

>MAPCI;MTC;TRKS;TTP;POST P RMM

and pressing the Enter key.

Example of a MAP display:

CM	MS	IOD	Net	PM	CCS	LNS	Trks	Ext	Appl
.	.	.	.	.	.	.	.	.	.
TTP									
0	Quit	POST			DELQ		BUSYQ		DIG
2	Post_	TTP	6-018						
3	Seize_	CKT TYPE	PM NO.	COM	LANG	STA	S R	DOT TE	RESULT
4		OG	RMM 0 20		MLT		0 IDL		
5	Bsy_								
6	RTS_								
7	Tst_								
8									
9	CktInfo								
10	CktLoc								
11	Hold								
12	Next_								
13	Rls_								
14	Ckt_								
15	Trnslvf_								
16	Stksdr_								
17	Pads_								
18	Level_								

- 4 Busy the trunk circuit on the RMM by typing

>BSY;BSY;INB;ALL

and pressing the Enter key.

NT2X90 in RSC-S RMM (continued)

Example of a MAP display:

CM	MS	IOD	Net	PM	CCS	LNS	Trks	Ext	Appl
.	.	.	.	.	.	.	.	.	.
TTP									
0	Quit	POST			DELQ		BUSYQ		DIG
2	Post_	TTP	6-018						
3	Seize_	CKT TYPE	PM NO.		COM LANG	STA	S R	DOT TE	RESULT
4		OG	RMM 0 20		MLT		0 INB		
5	Bsy_								
6	RTS_								
7	Tst_								
8									
9	CktInfo								
10	CktLoc								
11	Hold								
12	Next_								
13	Rls_								
14	Ckt_								
15	Trnslvf_								
16	Stksdr_								
17	Pads_								
18	Level_								

At the RMM shelf

5



CAUTION

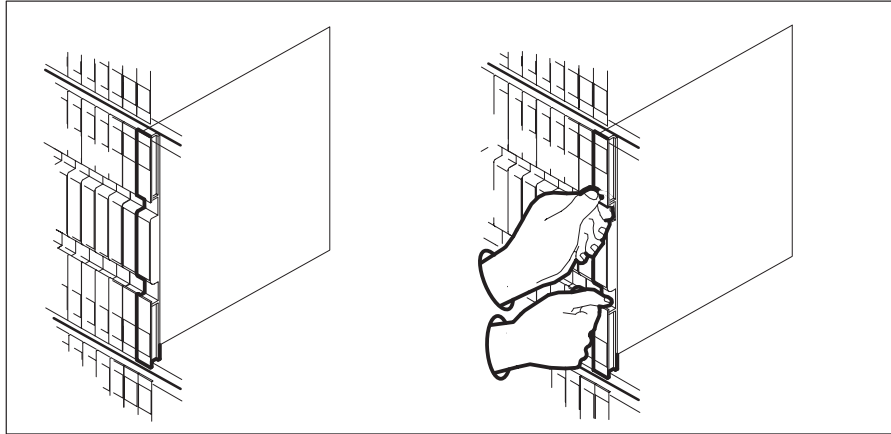
Static discharge may cause damage to circuit packs
Put on a wrist strap and connect it to the frame of the RMM before removing any cards. This protects the RMM against service degradation caused by static electricity.

Put on a wrist strap.

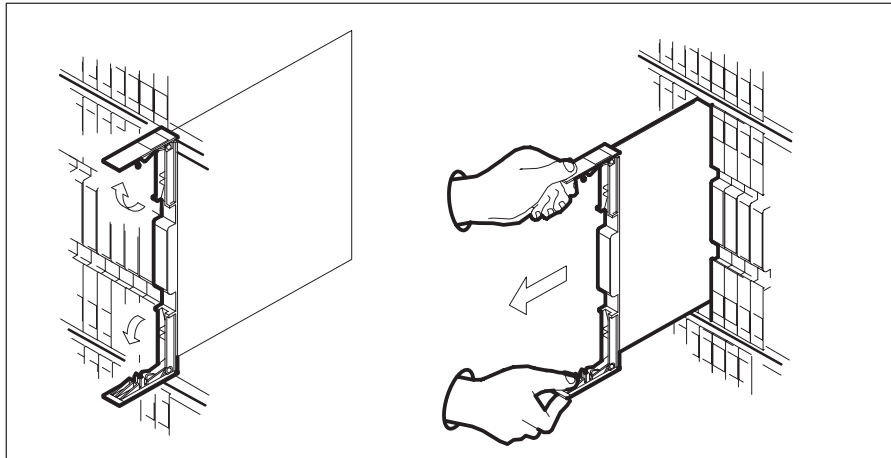
6 Remove the NT2X90 card as shown in the following figures.

NT2X90
in RSC-S RMM (continued)

- a. Locate the card to be removed on the appropriate shelf.



- b. Open the locking levers on the card to be replaced and gently pull the card toward you until it clears the shelf.



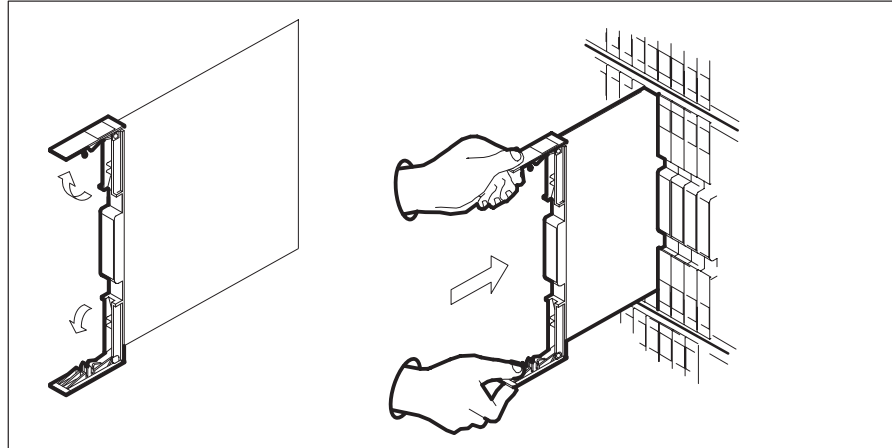
- c. Ensure the replacement card has the same PEC, including suffix, as the card you just removed.

7 Open the locking levers on the replacement card.

- a. Align the card with the slots in the shelf.

NT2X90
in RSC-S RMM (continued)

- b. Gently slide the card into the shelf.



8



WARNING

Equipment damage

Take these precautions when removing or inserting a card:

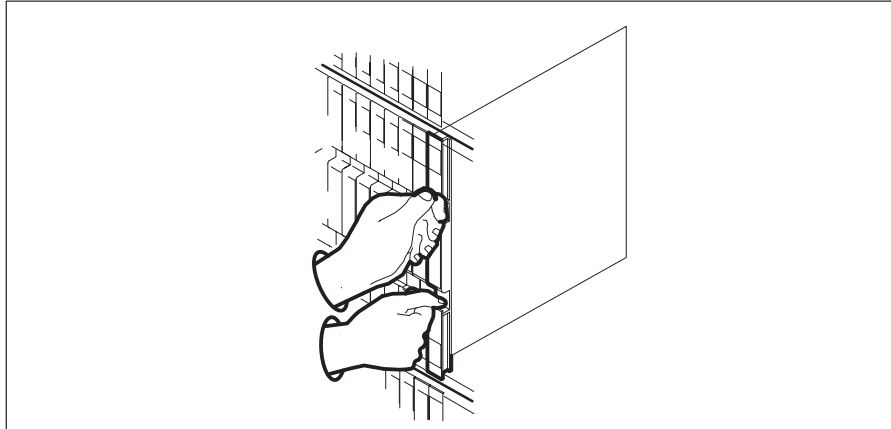
1. Do not apply direct pressure to the components.
2. Do not force the card into the slot.

Seat and lock the card.

- a. Using your fingers or thumbs, push on the upper and lower edges of the faceplate to ensure the card is fully seated in the shelf.

NT2X90
in RSC-S RMM (continued)

- b. Close the locking levers.



- 9 Use the following information to determine where to proceed.

If you entered this procedure from	Do
alarm clearing procedures	step 14
other	step 10

At the MAP terminal

- 10 Test the RMM by typing
>TST
and pressing the Enter key.

If TST	Do
passed	step 11
failed	step 14

NT2X90
in RSC-S RMM (end)

- 11** Return the RMM to service by typing

>RTS

and pressing the Enter key.

If RTS	Do
passed	step 12
failed	step 15

- 12** Send any faulty cards for repair according to local procedure.
- 13** Record the date the card was replaced, the serial number of the card, and the symptoms that prompted replacement of the card. Go to step 16.
- 14** Return to the procedure that directed you to this procedure. At the point where a faulty card list was produced, identify the next faulty card on the list and go to the appropriate card replacement procedure for that card in this manual.
- 15** Obtain further assistance in replacing this card by contacting operating company maintenance personnel.
- 16** You have successfully completed this procedure. Return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.

NT3X09 in RSC-S RMM

Application

Use this procedure to replace an NT3X09 card in an RSC-S RMM.

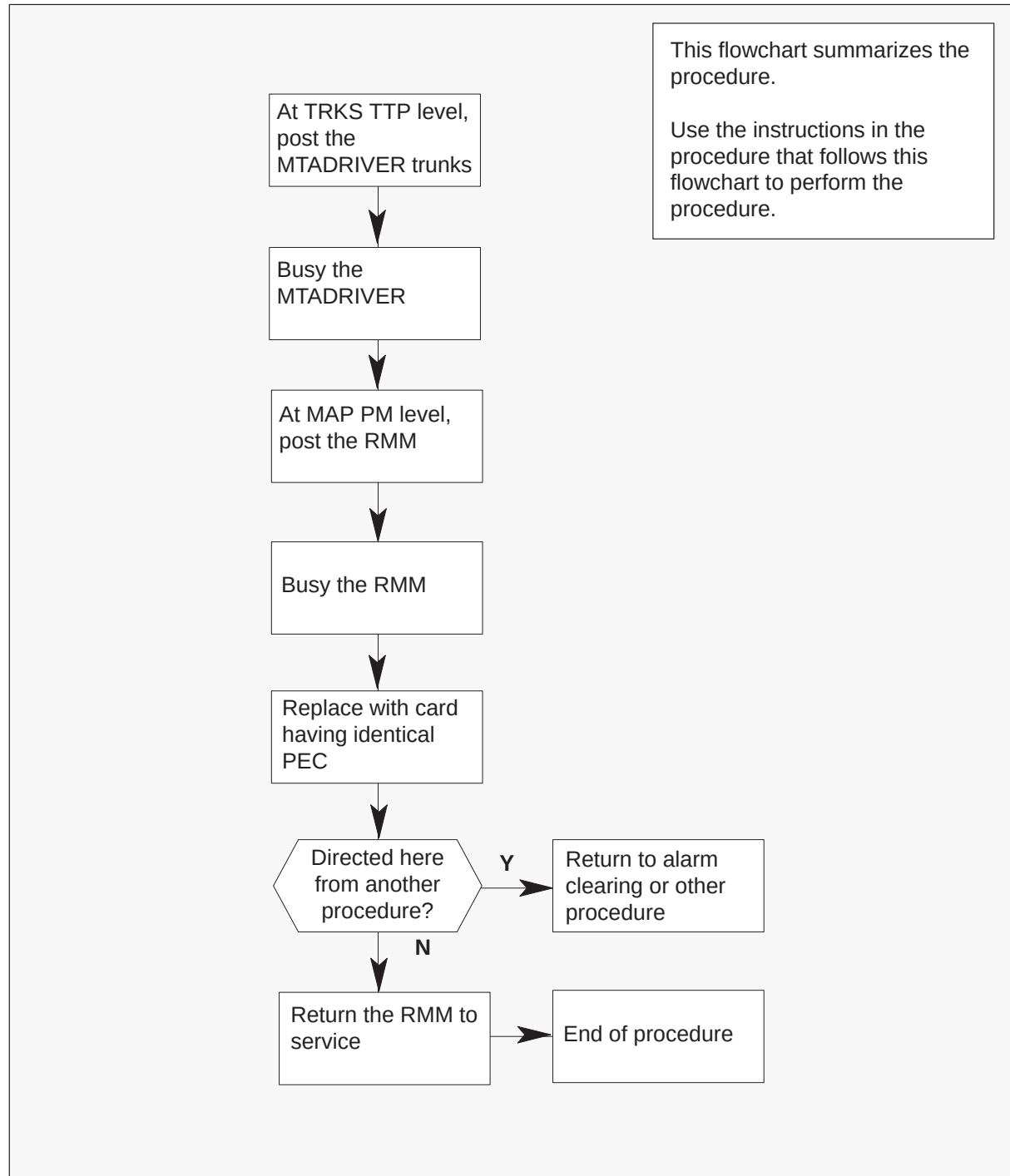
PEC	Suffixes	Name
NT3X09	BA	Remote Metallic Test Access

Common procedures

None

Action

The following flowchart is only a summary of the procedure. To replace the card, use the instructions in the procedure that follows the flowchart.

NT3X09
in RSC-S RMM (continued)**Summary of card replacement procedure for an NT3X09 card in RSC-S RMM**

NT3X09
in RSC-S RMM (continued)

Replacing an NT3X09 card in RSC-S RMM

At the MAP

- 1 Proceed only if you have been directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure for verifying or accepting cards, or have been directed to this procedure by your maintenance support group.
- 2 Obtain an NT3X09 replacement card. Ensure the replacement card has the same product equipment code (PEC), including suffix, as the card that is to be removed.

At the MAP terminal

- 3 Set the MAP display to the TTP level and post the trunk by typing
>MAPCI;MTC;TRKS;TTP;POST P RMM rmm_no ckt_no
and pressing the Enter key.

where

rmm_no is the number of the RMM with the faulty MTADRIVER card
ckt_no is the number of the faulty MTADRIVER card

Example of a MAP display:

```
CM      MS      IOD      Net      PM      CCS      LNS      Trks      Ext      Appl
.       .       .       .       .       .       .       .       .       .
TTP
0 Quit      POST      1              DELQ              BUSYQ              DIG
2 Post_     TTP      6-009
3 Seize_    CKT TYPE  PM NO. COM LANG STA S R DOT TE RESULT
4          MISC    RMM  0 16    MATDRIVER  0 IDL
5 Bsy_
6 RTS_
7 Tst_
8
9 CktInfo
10 CktLoc
11 Hold      TTP ID IS:   6-009
12 Next_     NO CKT, SET IS EMPTY
13 Rls_      TTP:
14 Ckt_      LAST CKTN = 1
15 Trnslvf_  SHORT CLLI IS: MTADRI
16 Stksdr_   OK, CKT POSTED
17 Pads_
18 Level_
```

- 4 Busy the MTADRIVER by typing
>BSY;BSY INB
and pressing the Enter key.

NT3X09 in RSC-S RMM (continued)

Example of a MAP display:

```

CM      MS      IOD      Net      PM      CCS      LNS      Trks      Ext      Appl
.       .       .       .       .       .       .       .       .       .
TTP
0 Quit      POST      1              DELQ      BUSYQ      DIG
2 Post_     TTP      6-009
3 Seize_    CKT TYPE  PM NO.  COM LANG  STA S R  DOT TE RESULT
4              MISC      RMM 0 16      MATDRIVER      0 INB
5 Bsy_
6 RTS_
7 Tst_
8
9 CktInfo
10 CktLoc
11 Hold      TTP ID IS:   6-009
12 Next_     NO CKT, SET IS EMPTY
13 Rls_      TTP:
14 Ckt_      LAST CKTN = 1
15 Trnslvf_  SHORT CLLI IS: MTADRI
16 Stksdr_   OK, CKT POSTED
17 Pads_
18 Level_

```

- 5 Set the MAP display to the PM level and post the RMM by typing

>MAPCI;MTC;PM;POST RMM rmm_no

and pressing the Enter key.

where

rmm_no is the number of the RMM where the card is to be removed

NT3X09
in RSC-S RMM (continued)

Example of a MAP display:

CM	MS	IOD	Net	PM	CCS	LNS	Trks	Ext	Appl
RMM		SysB		ManB	OffL	CBsy		ISTb	InSv
0	Quit	PM	0	0	0	0	0	0	130
2	Post_	RMM	0	0	0	0	0	0	0
3									
4		RMM	5	INSV					
5	TrnsL								
6	Tst								
7	Bsy								
8	RTS								
9	OffL								
10	LoadPM								
11	Disp_								
12	Next								
13									
14	QueryPM								
15									
16									
17									
18									

- 6 Busy the RMM by typing
 >BSY
 and pressing the Enter key.

NT3X09 in RSC-S RMM (continued)

Example of a MAP display:

CM	MS	IOD	Net	PM	CCS	LNS	Trks	Ext	Appl
.	.	.	.	1ManB	.	.	.	.	.
RMM		SysB		ManB	OffL		CBsy	ISTb	InSv
0	Quit	PM	4	0	10		0	0	130
2	Post_	RMM	0	1	0		0	0	0
3									
4		RMM							
5	ManB								
5	TrnsL								
6	Tst								
7	Bsy								
8	RTS								
9	OffL								
10	LoadPM								
11	Disp_								
12	Next								
13									
14	QueryPM								
15									
16									
17									
18									

At the RMM shelf

7



CAUTION

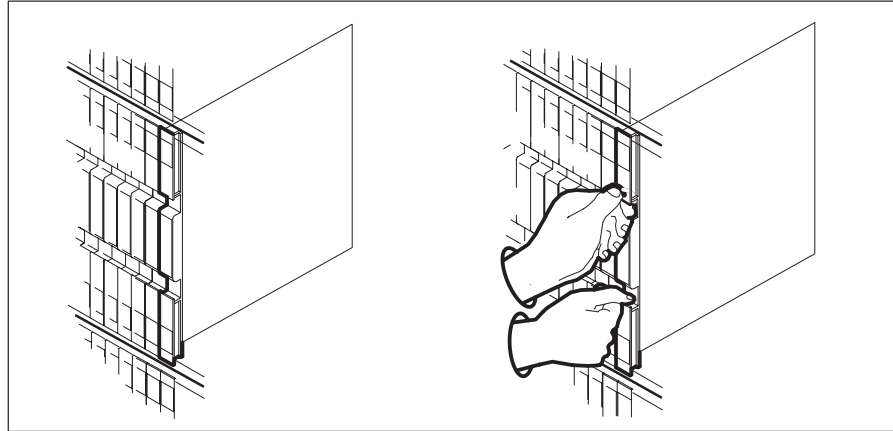
Static discharge may cause damage to circuit packs
Put on a wrist strap and connect it to the frame of the RMM before removing any cards. This protects the RMM against service degradation caused by static electricity.

Put on a wrist strap.

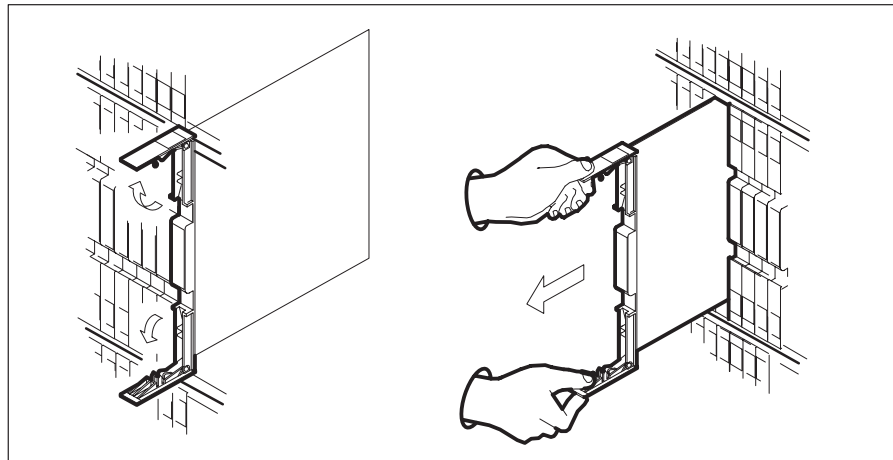
8 Remove the NT3X09 card as shown in the following figures.

NT3X09
in RSC-S RMM (continued)

- a. Locate the card to be removed on the appropriate shelf.



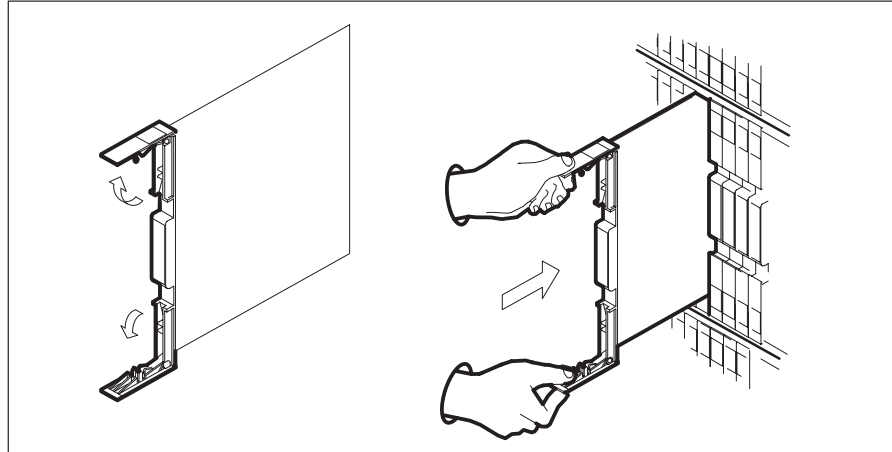
- b. Open the locking levers on the card to be replaced and gently pull the card toward you until it clears the shelf.



- c. Ensure the replacement card has the same PEC, including suffix, as the card you just removed.
- 9 Open the locking levers on the replacement card.
- a. Align the card with the slots in the shelf.

NT3X09
in RSC-S RMM (continued)

- b. Gently slide the card into the shelf.



10



WARNING

Equipment damage

Take these precautions when removing or inserting a card:

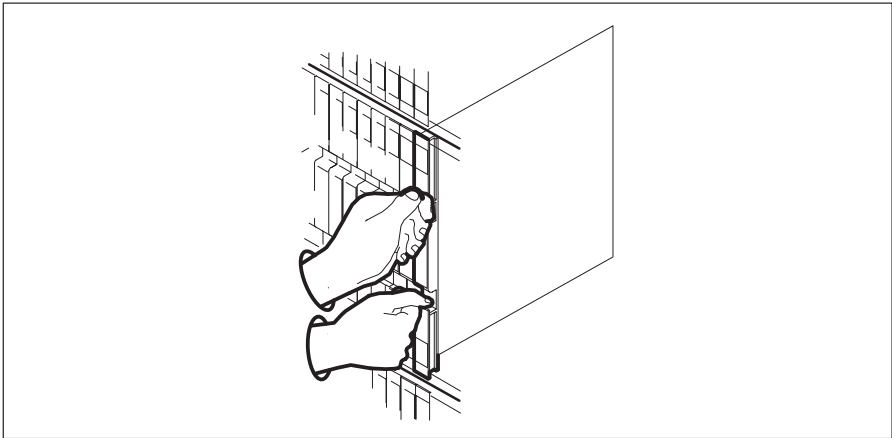
1. Do not apply direct pressure to the components.
2. Do not force the card into the slot.

Seat and lock the card.

- a. Using your fingers or thumbs, push on the upper and lower edges of the faceplate to ensure the card is fully seated in the shelf.

NT3X09
in RSC-S RMM (continued)

b. Close the locking levers.



11 Use the following information to determine where to proceed.

If you entered this procedure from	Do
alarm clearing procedures	step 18
other	step 12

At the MAP terminal

12 Test the RMM by typing
>TST
and pressing the Enter key.

If TST	Do
passed	step 13
failed	step 18

NT3X09
in RSC-S RMM (end)

- 13 Return the RMM to service by typing

>RTS

and pressing the Enter key.

If RTS	Do
passed	step 14
failed	step 19

- 14 Post the MTADRIVER by typing

>TRKS;TTP;POST P RMM rmm_no ckt_no

and pressing the Enter key.

where

rmm_no is the number of the RMM with the new MTADRIVER card

ckt_no is the number of the new MTADRIVER card

- 15 Return the MTADRIVER to service by typing

>BSY ALL;RTS ALL

and pressing the Enter key.

- 16 Send any faulty cards for repair according to local procedure.

- 17 Record the date the card was replaced, the serial number of the card, and the symptoms that prompted replacement of the card. Go to step 20.

- 18 Return to the procedure that directed you to this procedure. At the point where a faulty card list was produced, identify the next faulty card on the list and go to the appropriate card replacement procedure for that card in this manual.

- 19 Obtain further assistance in replacing this card by contacting operating company maintenance personnel.

- 20 You have successfully completed this procedure. Return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.

NT4X97 in RSC-S RMM

Application

Use this procedure to replace an NT4X97 card in an RSC-S RMM.

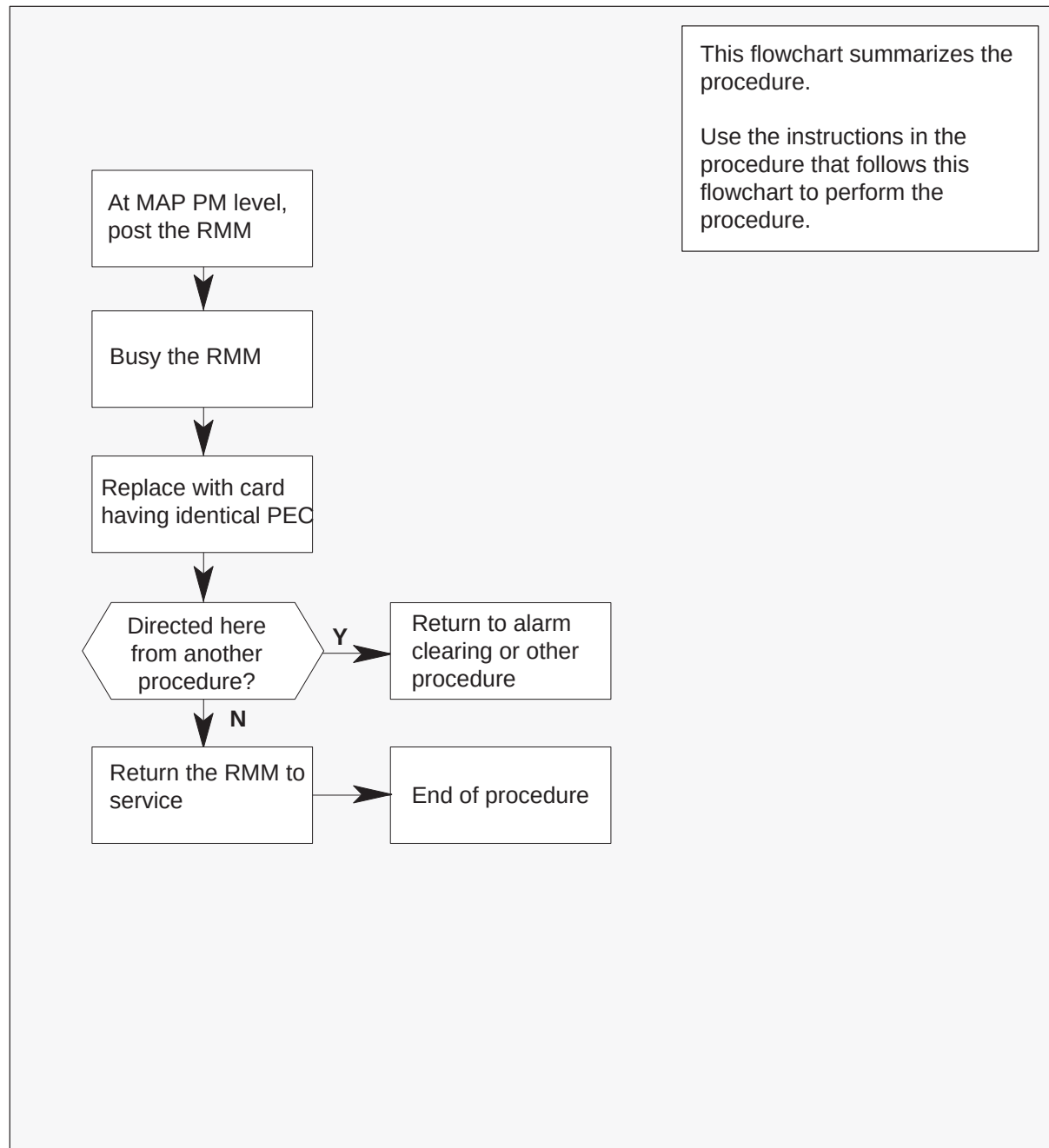
PEC	Suffixes	Name
NT4X97	AA	Line Test Unit (analog)

Common procedures

None

Action

The following flowchart is only a summary of the procedure. To replace the card, use the instructions in the procedure that follows the flowchart.

NT4X97
in RSC-S RMM (continued)**Summary of card replacement procedure for an NT4X97 card in RSC-S RMM**

NT4X97
in RSC-S RMM (continued)

Replacing an NT4X97 card in RSC-S RMM

At the MAP

- 1 Proceed only if you have been directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure for verifying or accepting cards, or have been directed to this procedure by your maintenance support group.
- 2 Obtain an NT4X97 replacement card. Ensure the replacement card has the same product equipment code (PEC), including suffix, as the card that is to be removed.

At the MAP terminal

- 3 Set the MAP display to the PM level and post the RMM by typing

>MAPCI;MTC;PM;POST RMM rmm_no

and pressing the Enter key.

where

rmm_no is the number of the RMM where the card is to be removed

Example of MAP display:

CM	MS	IOD	Net	PM	CCS	LNS	Trks	Ext	Appl
.	.	.	.	.	.	.	.	.	.
RMM			SysB	ManB	OffL	CBsy	ISTb		InSv
0	Quit	PM	0	0	0	0	0		130
2	Post_	RMM	0	0	0	0	0		0
3									
4		RMM	5	INSV					
5	Trnsl								
6	Tst								
7	Bsy								
8	RTS								
9	OffL								
10	LoadPM								
11	Disp_								
12	Next								
13									
14	QueryPM								
15									
16									
17									
18									

NT4X97 in RSC-S RMM (continued)

4 Busy the RMM by typing

>BSY

and pressing the Enter key.

Example of a MAP display:

CM	MS	IOD	Net	PM	CCS	LNS	Trks	Ext	Appl
.	.	.	.	1ManB	.	.	.	.	.
RMM		SysB		ManB	OffL	CBsy	ISTb		InSv
0 Quit	PM	4		0	10	0	0		130
2 Post_	RMM	0		1	0	0	0		0
3									
4	RMM	5	ManB						
5 Trnsl									
6 Tst									
7 Bsy									
8 RTS									
9 OffL									
10 LoadPM									
11 Disp_									
12 Next									
13									
14 QueryPM									
15									
16									
17									
18									

At the RMM shelf

5



CAUTION

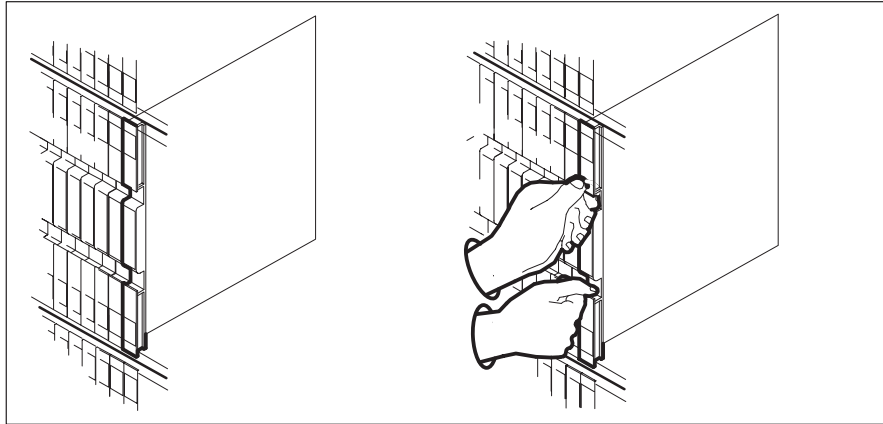
Static discharge may cause damage to circuit packs
Put on a wrist strap and connect it to the frame of the RMM before removing any cards. This protects the RMM against service degradation caused by static electricity.

Put on a wrist strap.

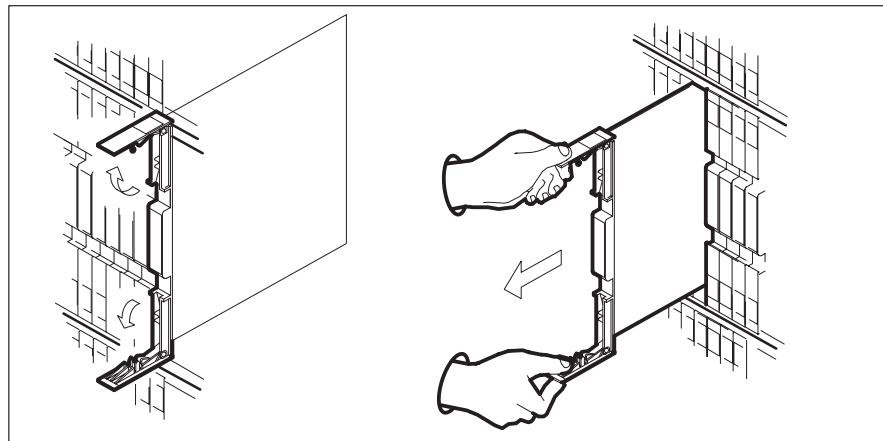
NT4X97 in RSC-S RMM (continued)

6 Remove the NT4X97 card as shown in the following figures.

a. Locate the card to be removed on the appropriate shelf.



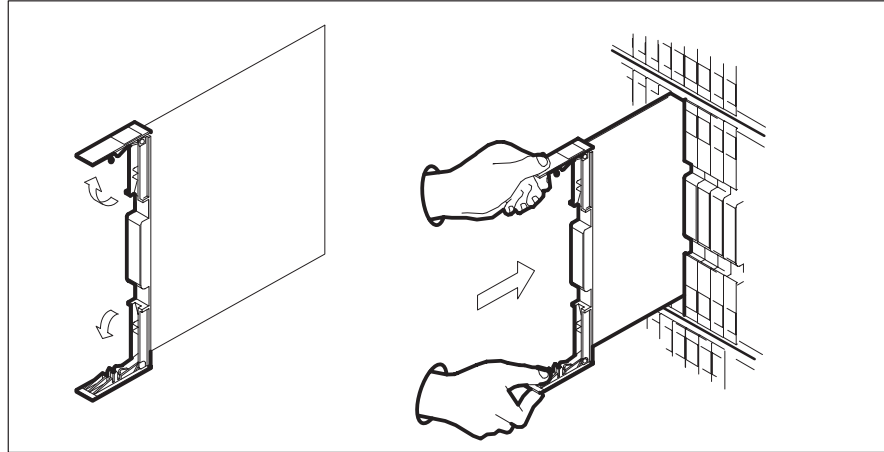
b. Open the locking levers on the card to be replaced and gently pull the card toward you until it clears the shelf.



c. Ensure the replacement card has the same PEC, including suffix, as the card you just removed.

NT4X97
in RSC-S RMM (continued)

- 7 Open the locking levers on the replacement card.
- Align the card with the slots in the shelf.
 - Gently slide the card into the shelf.



8

**WARNING****Equipment damage**

Take these precautions when removing or inserting a card:

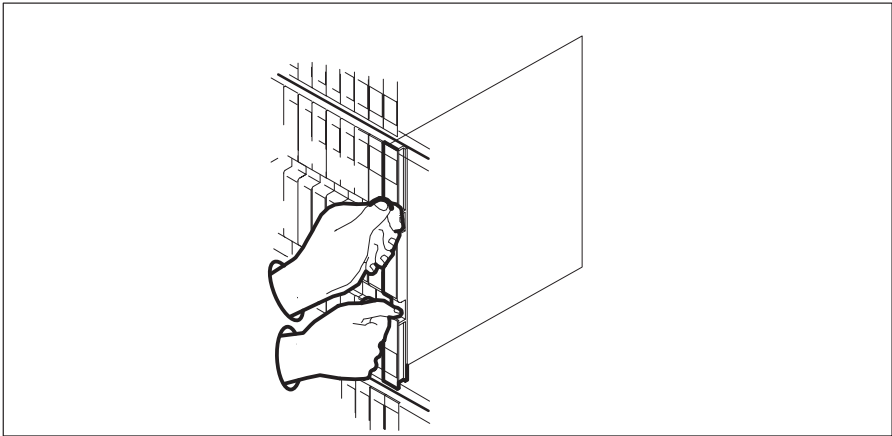
1. Do not apply direct pressure to the components.
2. Do not force the card into its slot.

Seat and lock the card.

- Using your fingers or thumbs, push on the upper and lower edges of the faceplate to ensure the card is fully seated in the shelf.

NT4X97
in RSC-S RMM (continued)

- b. Close the locking levers.



- 9 Use the following information to determine where to proceed.

If you entered this procedure from	Do
alarm clearing procedures	step 14
other	step 10

At the MAP terminal

- 10 Test the RMM by typing
>TST
and pressing the Enter key.

If TST	Do
passed	step 11
failed	step 14

NT4X97
in RSC-S RMM (end)

- 11** Return the RMM to service by typing

>RTS

and pressing the Enter key.

If RTS	Do
passed	step 12
failed	step 15

- 12** Send any faulty cards for repair according to local procedure.
- 13** Record the date the card was replaced, the serial number of the card, and the symptoms the prompted replacement of the card. Go to step 16.
- 14** Return to the *Alarm Clearing Procedures* that directed you to this procedure. At the point where a faulty card list was produced, identify the next faulty card on the list and go to the appropriate card replacement procedure for that card in this manual.
- 15** Obtain further assistance in replacing this card by contacting operating company maintenance personnel.
- 16** You have successfully completed this procedure. Return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.

NT4X98 in RSC-S RMM

Application

Use this procedure to replace an NT4X98 card in an RSC-S RMM.

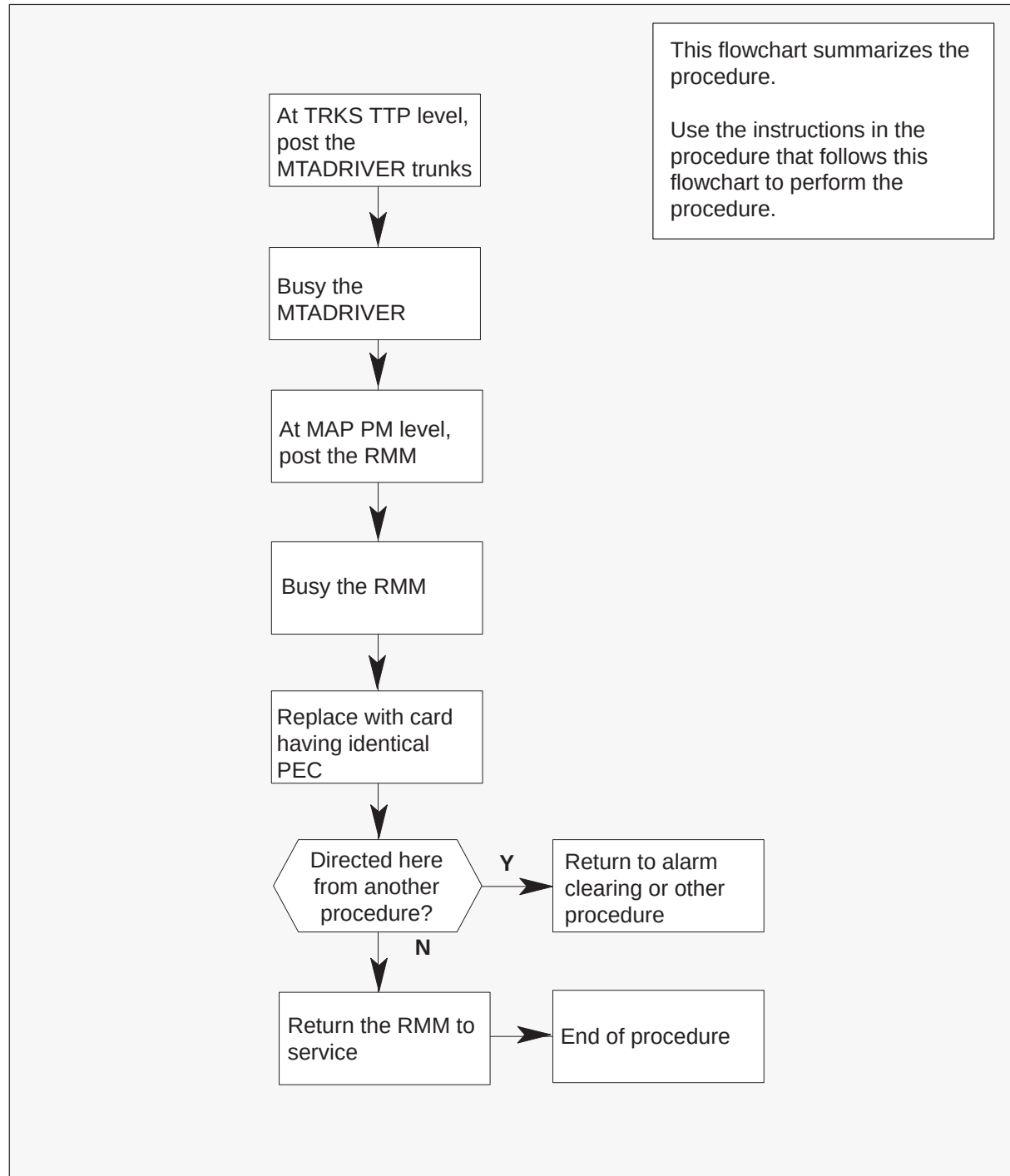
PEC	Suffixes	Name
NT4X98	AA	Line Test Unit (digital)

Common procedures

None

Action

The following flowchart is only a summary of the procedure. To replace the card, use the instructions in the procedure that follows the flowchart.

NT4X98
in RSC-S RMM (continued)**Summary of card replacement procedure for an NT4X98 card in RSC-S RMM**

NT4X98
in RSC-S RMM (continued)

Replacing an NT4X98 card in RSC-S RMM

At your current location

- 1 Proceed only if you have been directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure for verifying or accepting cards, or have been directed to this procedure by your maintenance support group.
- 2 Obtain an NT4X98 replacement card. Ensure the replacement card has the same product equipment code (PEC), including suffix, as the card that is to be removed.

At the MAP terminal

- 3 Set the MAP display to TTP level and post the RMM by typing

>MAPCI;MTC;TRKS;TTP;POST P RMM rmm_no ckt_no
where

rmm_no is the number of the RMM with the faulty MTADriver card
ckt_no is the number of the faulty MTADriver card
and pressing the Enter key.

Example of a MAP display:

CM	MS	IOD	Net	PM	CCS	LNS	Trks	Ext	Appl
.	.	.	.	.	.	.	.	.	.
TTP									
0	Quit	POST	1		DELQ		BUSYQ		DIG
2	Post_	TTP	6-009						
3	Seize_	CKT TYPE	PM NO.	COM LANG		STA	S R	DOT TE	RESULT
4		MISC	RMM 0 16	MATDRIVER	3	IDL			
5	Bsy_								
6	RTS_								
7	Tst_								
8									
9	CktInfo								
10	CktLoc								
11	Hold	TTP ID IS:	6-009						
12	Next_	TTP:							
13	Rls_	LAST CKTN =	1						
14	Ckt_	SHORT CLLI IS:	MTADRI						
15	Trnslvf_	OK, CKT POSTED							
16	Stksdr_								
17	Pads_								
18	Level_								

NT4X98 in RSC-S RMM (continued)

- 4 Busy the MTADriver by typing

>BSY; BSY INB

and pressing the Enter key.

Example of a MAP display:

CM	MS	IOD	Net	PM	CCS	LNS	Trks	Ext	Appl
.	.	.	.	.	.	.	.	.	.
TTP									
0	Quit	POST	1		DELQ		BUSYQ		DIG
2	Post_	TTP	6-009						
3	Seize_	CKT TYPE	PM NO.	COM	LANG	STA	S	R	DOT TE RESULT
4		MISC	RMM	0	16	MATDRIVER	3	IDL	
5	Bsy_								
6	RTS_								
7	Tst_								
8									
9	CktInfo								
10	CktLoc								
11	Hold	TTP ID IS:	6-009						
12	Next_	TTP:							
13	Rls_	LAST CKTN	=	1					
14	Ckt_	SHORT CLLI IS:	MTADRI						
15	Trnslvf_	OK, CKT POSTED							
16	Stksdr_								
17	Pads_								
18	Level_								

NT4X98
in RSC-S RMM (continued)

- 5 Set the MAP display to the PM level and post the RMM by typing
>PM;POST RMM rmm_no
and pressing the Enter key.
where
rmm_no is the number of the RMM where the card is to be removed

Example of a MAP display:

CM	MS	IOD	Net	PM	CCS	LNS	Trks	Ext	Appl
RMM		SysB	ManB	OffL	CBsy	ISTb	InSv		
0	Quit	PM	0	0	0	0	0	130	0
2	Post_	RMM	0	0	0	0	0		
3									
4		RMM	5	INSV					
5	Trnsl								
6	Tst								
7	Bsy								
8	RTS								
9	OffL								
10	LoadPM								
11	Disp_								
12	Next								
13									
14	QueryPM								
15									
16									
17									
18									

- 6 Busy the RMM by typing
>BSY
and pressing the Enter key.

NT4X98
in RSC-S RMM (continued)

Example of a MAP display:

CM	MS	IOD	Net	PM	CCS	LNS	Trks	Ext	Appl
.	.	.	.	1ManB	.	.	.	.	.
RMM		SysB	ManB	OffL	CBsy	ISTb	InSv		
0 Quit	PM	4	0	10	0	0	130		
2 Post_	RMM	0	1	0	0	0	0		
3									
4	RMM	5	ManB						
5 TrnsL									
6 Tst									
7 Bsy									
8 RTS									
9 OffL									
10 LoadPM									
11 Disp_									
12 Next									
13									
14 QueryPM									
15									
16									
17									
18									

At the RMM shelf

7



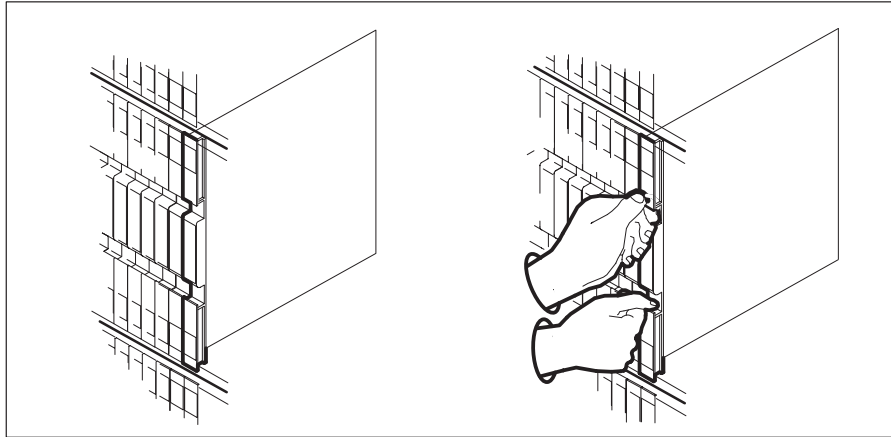
CAUTION
Static discharge may cause damage to circuit packs
Put on a wrist strap and connect it to the frame of the RMM before removing any cards. This protects the RMM against service degradation caused by static electricity.

Put on a wrist strap.

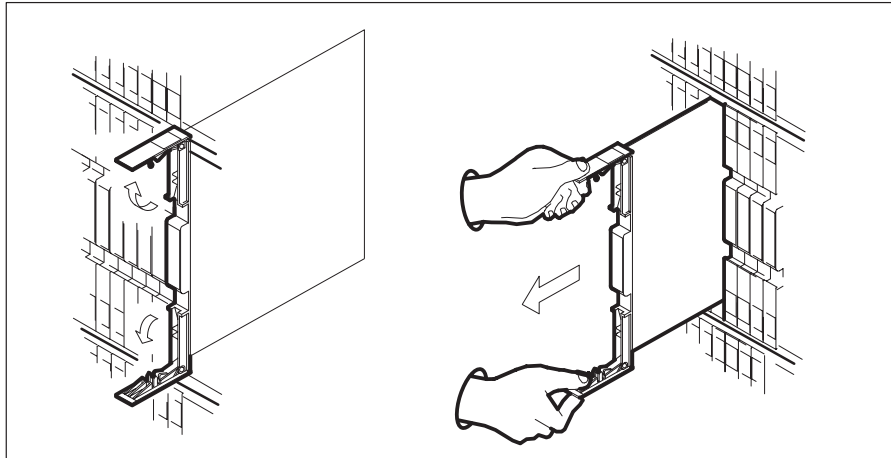
NT4X98 in RSC-S RMM (continued)

8 Remove the NT4X98 card as shown in the following figures.

a. Locate the card to be removed on the appropriate shelf.



b. Open the locking levers on the card to be replaced and gently pull the card toward you until it clears the shelf.



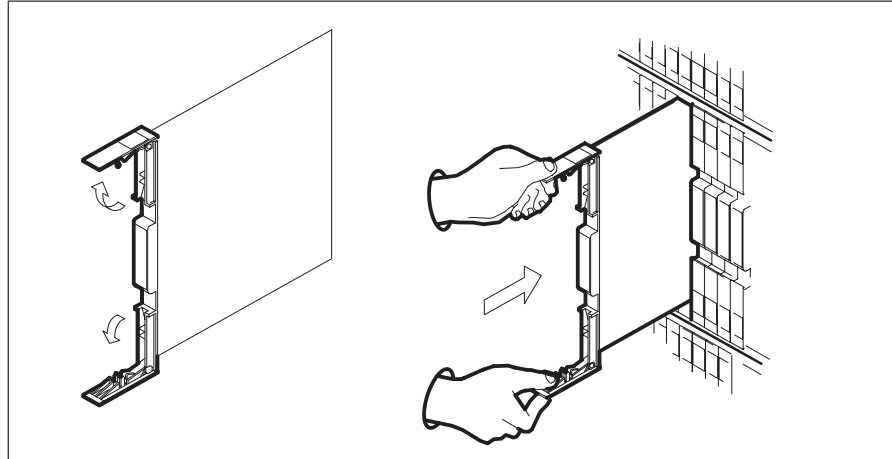
c. Ensure the replacement card has the same PEC, including suffix, as the card you just removed.

9 Open the locking levers on the replacement card.

a. Align the card with the slots in the shelf.

NT4X98
in RSC-S RMM (continued)

- b. Gently slide the card into the shelf.



10



WARNING

Equipment damage

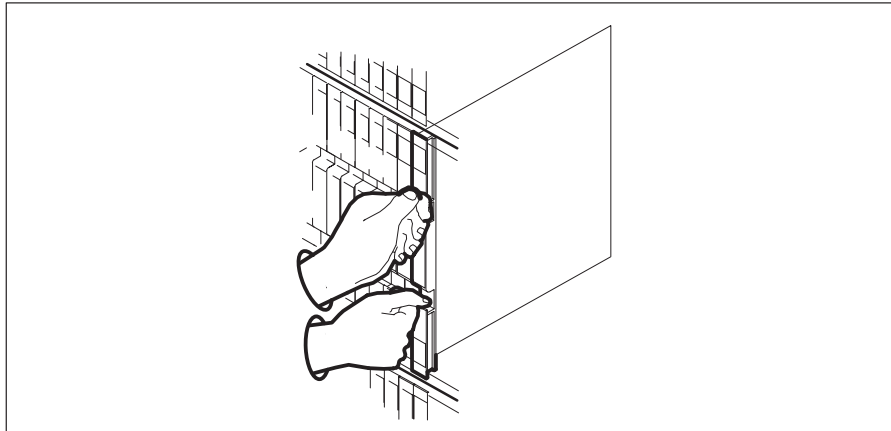
Take these precautions when removing or inserting a card:

1. Do not apply direct pressure to the components.
2. Do not force the card into the slot.

Seat and lock the card.

NT4X98 in RSC-S RMM (continued)

- a. Using your fingers or thumbs, push on the upper and lower edges of the faceplate to ensure the card is fully seated in the shelf.
- b. Close the locking levers.



- 11 Use the following information to determine where to proceed.

If you entered this procedure from	Do
alarm clearing procedures	step 18
other	step 12

At the MAP terminal

- 12 Test the RMM by typing
>TST
and pressing the Enter key.

If TST	Do
passed	step 13
failed	step 18

NT4X98
in RSC-S RMM (end)

- 13 Return the RMM to service by typing

>RTS

and pressing the Enter key.

If RTS	Do
passed	step 14
failed	step 19

- 14 Post the MTADriver by typing

>TRKS;TTP;POST P RMM rmm_no ckt_no

where

rmm_no is the number of the RMM with the new MTADriver card

ckt_no is the number of the new MTADriver card

and pressing the Enter key.

- 15 Return the MTADriver to service by typing

>BSY ALL;RTS ALL

and pressing the Enter key.

- 16 Send any faulty cards for repair according to local procedure.

- 17 Record the date the card was replaced, the serial number of the card, and the symptoms that prompted replacement of the card. Go to step 20.

- 18 Return to the *Alarm Clearing Procedures* that directed you to this procedure. At the point where a faulty card list was produced, identify the next faulty card on the list, and go to the appropriate card replacement procedure for that card in this manual.

- 19 Obtain further assistance in replacing this card by contacting operating company maintenance personnel.

- 20 You have successfully completed this procedure. Return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.

NT6X17 in RSC-S LCME

Application

Use this procedure to replace an NT6X17 card in an RSC-S LCME.

PEC	Suffixes	Name
NT6X17	AA, AB, AC	Standard Line Card Type A (POTS)
NT6X17	BA	World Line Card Type A

The NT6X17BA World Line Card Type A replaces the following cards:

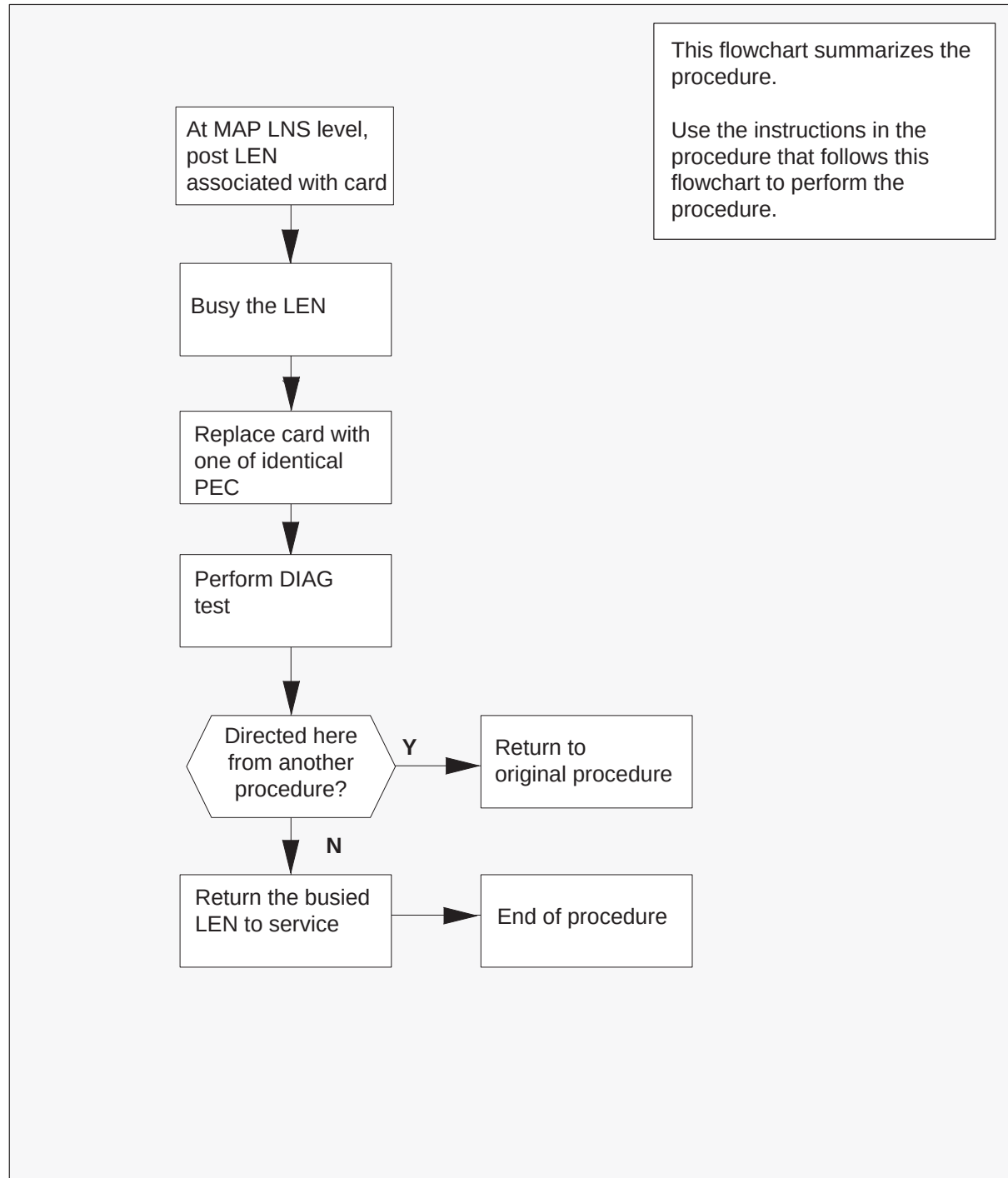
- NT6X17AC, North America
- NT6X93AA, Turkey, Belize
- NT6X93BA, Caribbean
- NT6X93CA, China
- NT6X93EA, Australia
- NT6X99AA, UK ScopeDial
- NTMX29AA, British Telephone

Common procedures

None

Action

The following flowchart is only a summary of the procedure. To replace the card, use the instructions in the procedure that follows the flowchart.

NT6X17
in RSC-S LCME (continued)**Summary of card replacement procedure for an NT6X17 card in RSC-S LCME**

NT6X17
in RSC-S LCME (continued)

Replacing an NT6X17 card in RSC-S LCME

At the MAP

- 1 Proceed only if you have been directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure for verifying or accepting cards, or have been directed to this procedure by your maintenance support group.
- 2 Obtain an NT6X17 replacement card. Ensure the replacement card has the same product equipment code (PEC), including suffix, as the card that is to be removed.

At the MAP terminal

- 3 Post the LEN of the card to be replaced by typing
>MAPCI;MTC;LNS;LTP;POST L site lcme_no unit_no lsg_no ckt_no
and pressing the Enter key.

where

site is the location name of the LCME with the faulty card
lcme_no is the number of the LCME with the faulty card
unit_no is the number of the LCME unit with the faulty card
lsg_no is the number of the LSG with the faulty card
ckt_no is the number of the circuit associated with the faulty card

Example of a MAP display:

```
CM      MS      IOD      Net      PM      CCS      LNS      Trks      Ext      Appl
.       .       .       .       .       .       .       .       .       .
LTP
0 Quit  Post      DELQ      BUSYQ      PREFIX
2 Post_
3      LCC PTY RNG...LEN...DN  STA F S  LTA  TE  RESULT
4      1FR HOST 00 0 03 03 4931082 IDL
5 BSY
6 RTS
7 DIAG
8
9 AIMStat
10 CKTL0C
11 Hold
12 Next_
13
14
15
16 Prefix
17 LCO
18 Level
```

NT6X17 in RSC-S LCME (continued)

- 4 Busy the NT6X17 line card by typing

>BSY

and pressing the Enter key.

Example of a MAP display:

CM	MS	IOD	Net	PM	CCS	LNS	Trks	Ext	Appl
.	.	.	.	.	.	.	.	.	.
LTP									
0	Quit		Post	DELQ	BUSYQ	PREFIX			
2	Post_								
3			LCC PTY RNG.....LEN.....DN			STA F S LTA TE RESULT			
4			1FR HOST 00 0 03 03 4931082 MB						
5	BSY								
6	RTS								
7	DIAG								
8									
9	AIMStat								
10	CKTLOC								
11	Hold								
12	Next_								
13									
14									
15									
16	Prefix								
17	LCO								
18	Level								

At the LCE frame

5



WARNING

Card damage—transport

Take these precautions to protect the circuit cards from electrical and mechanical damage while transporting cards.

When handling a circuit card not in an electrostatic discharge (ESD) protective container, stand on a conductive floor mat and wear a wrist strap connected, through a 1-megohm resistor, to a suitably grounded object, such as a metal workbench or a DMS switch frame (Northern Telecom Corporate Standard 5028). Store and transport circuit cards in an ESD protective container.

NT6X17 in RSC-S LCME (continued)



WARNING

Static electricity damage

Before removing any cards, put on a wrist strap and connect it to the wrist strap grounding point on the left side of the frame supervisory panel (FSP) of the LCME. This protects the equipment against damage caused by static electricity.



WARNING

Equipment damage

Take these precautions when removing or inserting a card:

1. Do not apply direct pressure to the components.
2. Do not force the card into the slot.



CAUTION

Special tools required

Card shrouds and removal tools are required for removing cards from the line drawers. For descriptions of these tools, refer to the following notes.

Descriptions of these shrouds follow.

Line card insertion / withdrawal tool for	Apparatus code	Common product code
3-inch cards	QTH56A	A0298291
6-inch cards	QTH58A	A0313317

NT6X17 in RSC-S LCME (continued)

Note: Card removal tools are required for removing cards from line drawers. Two sizes are available. Descriptions of these tools follow.

Card removal tool for	Apparatus code	Common product code
3–4 inch cards	QTH57A	A0298292
Note: For 4-inch or larger cards, use the large grip tool ITA9953.		

Put on a wrist strap.

6



DANGER
Hot materials

Exercise care when handling the line card. The line feed resistor may be very hot.

Prepare to remove the faulty card determined in step 1 by opening the line drawer and following these substeps:

- a. Face the drawer shelf and grasp the handle at the bottom of the drawer with your right hand.
- b. Push up on the drawer latch with your thumb and pull the drawer out until fully withdrawn. It is fully withdrawn when the drawer stop, at the top, prevents further travel.
- c. Maintain a slight pull on the handle and lift the faceplate of the drawer approximately 2.5 cm (1 in).
- d. While holding the drawer in this position, push the bottom of the drawer nearest the shelf with your left hand to a position about 1 cm (.5 in) to the right.
- e. Hold the drawer in this position with your left hand and lower the faceplate of the drawer by releasing the grip of your right hand.
- f. Ensure a card shroud and line card extractor are available.

7 Remove the line card to be replaced by using the following substeps:

- a. Slide a card shroud over the card to be removed and an adjacent card. If there is not an adjacent card on either side, do not use the card shroud.

NT6X17
in RSC-S LCME (continued)

- b.** Grasp the edge of the card with a line card extractor at a point midway between the top and bottom edges. Hold the extractor in your right hand.
 - c.** Squeeze the handles of the extractor together to grasp the card tightly.
 - d.** Hold the front cover of the line drawer to steady it using your left hand.
 - e.** Pull the extractor away from the drawer, and the card will become unplugged from its socket on the drawer backplane.
 - f.** Continue pulling the card with the extractor until the card is clear of the shroud.
 - g.** Insert the card removed into the ESD container and store using local procedures.
- 8** Replace the faulty card using the following substeps:
 - a.** Remove the replacement card from the ESD container.
 - b.** Slide the card in the shroud guide slots toward the drawer backplane.
 - c.** Hold the front cover of the line drawer with your left hand to steady it.
 - d.** Grasp the top and bottom edges of the card with the fingers of your right hand.
 - e.** Push the card toward the backplane until it plugs fully into the backplane socket.
- 9** Use the following information to determine where to proceed.

If you entered this procedure from	Do
alarm clearing procedures	step 14
other	step 10

NT6X17
in RSC-S LCME (end)

At the MAP terminal

- 10** Test the NT6X17 line card by typing

>DIAG

and pressing the Enter key.

If DIAG	Do
passed	step 11
failed	step 14

- 11** Return the NT6X17 card to service by typing

>RTS

and pressing the Enter key.

If RTS	Do
passed	step 12
failed	step 15

- 12** Send any faulty cards for repair according to local procedure.
- 13** Record the date the card was replaced, the serial number of the card, and the symptoms that prompted replacement of the card. Go to step 16.
- 14** Return to the procedure that directed you to this procedure. At the point where a faulty card list was produced, identify the next faulty card on the list and go to the appropriate *Card replacement procedure* for that card in this manual.
- 15** Obtain further assistance in replacing this card by contacting operating company maintenance personnel.
- 16** You have successfully completed this procedure. Return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.

NT6X19 in RSC-S LCME

Application

Use this procedure to replace an NT6X19 card in an RSC-S LCME.

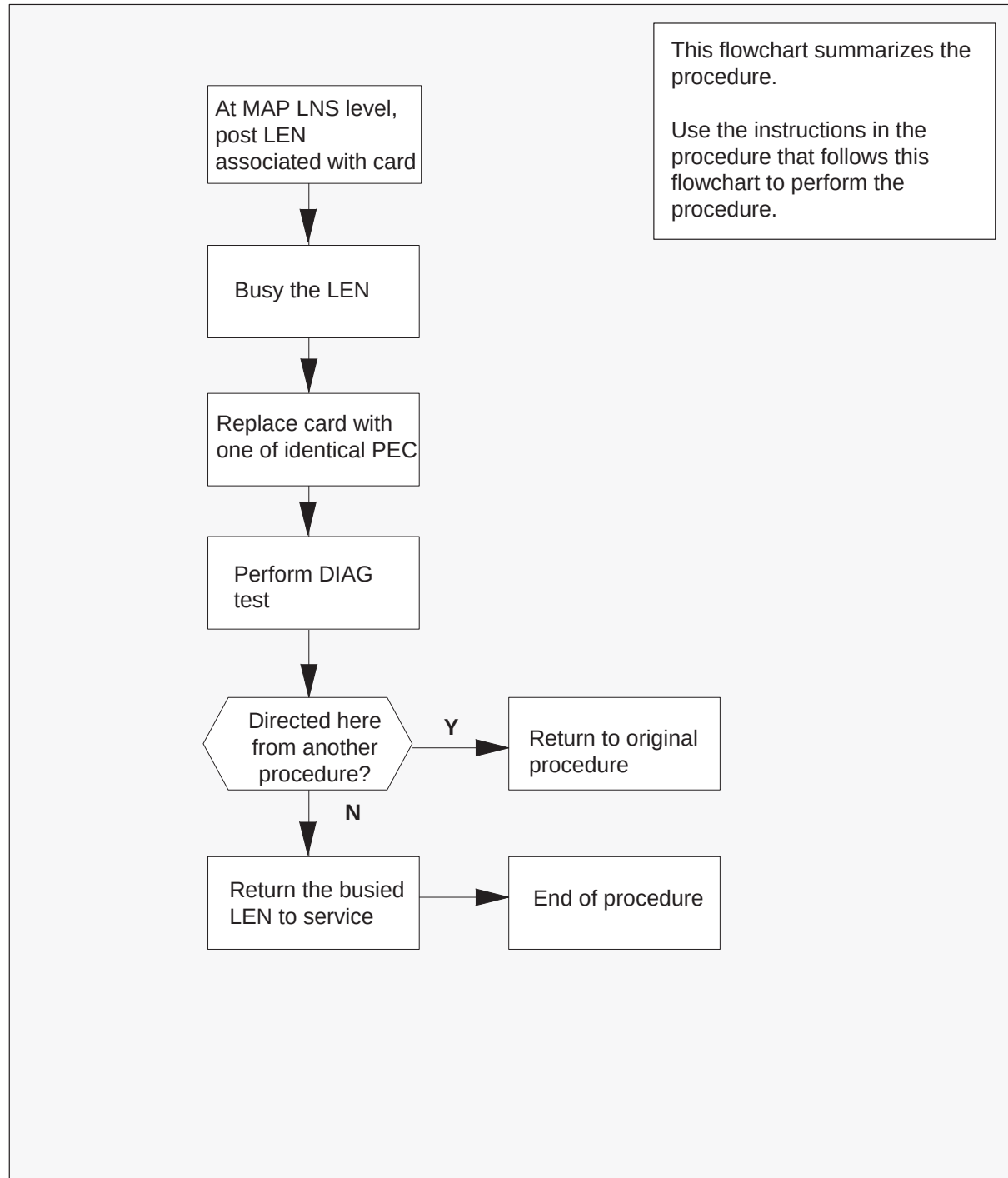
PEC	Suffixes	Name
NT6X19	AA	Message Waiting Line Circuit

Common procedures

None

Action

The following flowchart is only a summary of the procedure. To replace the card, use the instructions in the procedure that follows the flowchart.

NT6X19
in RSC-S LCME (continued)**Summary of card replacement procedure for NT6X19 card in RSC-S LCME**

NT6X19
in RSC-S LCME (continued)

Replacing an NT6X19 in RSC-S LCME

At your Current Location

- 1 Proceed only if you have been directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure for verifying or accepting cards, or have been directed to this procedure by your maintenance support group.
- 2 Obtain an NT6X19 replacement card. Ensure the replacement card has the same product equipment code (PEC), including suffix, as the card that is to be removed.

At the MAP terminal

- 3 Post the LEN of the card to be replaced by typing
>MAPCI;MTC;LNS;LTP;POST L site lcme_no unit_no lsg_no ckt_no
and pressing the Enter key.

where

site is the location name of the LCME with the faulty card
lcme_no is the number of the LCME with the faulty card
unit_no is the number of the LCME unit with the faulty card
lsg_no is the number of the LSG with the faulty card
ckt_no is the number of the circuit associated with the faulty card

Example of a MAP display:

```
CM      MS      IOD      Net      PM      CCS      LNS      Trks      Ext      Appl
.       .       .       .       .       .       .       .       .       .
LTP
0 Quit   Post      DELQ      BUSYQ      PREFIX
2 Post_
3        LCC PTY RNG....LEN..... DN   STA F S LTA TE RESULT
4        CKT TYPE FL   HOST 00 0 03 03 NO DIRN IDL
5 BSY
6 RTS
7 DIAG
8
9 AIMStat
10 CKTL0C
11 Hold
12 Next_
13
14
15
16 Prefix
17 LCO
18 Level
```

NT6X19 in RSC-S LCME (continued)

- 4 Busy the NT6X19 line card by typing

>BSY

and pressing the Enter key.

Example of a MAP display:

CM	MS	IOD	Net	PM	CCS	LNS	Trks	Ext	Appl
.	.	.	.	.	.	.	.	.	.
LTP									
0	Quit	Post	DELQ	BUSYQ	PREFIX				
2	Post_								
3	LCC PTY RNG....LEN.....				DN	STA F S	LTA TE	RESULT	
4	CKT TYPE FL				HOST 00 0 03 03	NO DIRN	MB		
5	BSY								
6	RTS								
7	DIAG								
8									
9	AIMStat								
10	CKTLLOC								
11	Hold								
12	Next_								
13									
14									
15									
16	Prefix								
17	LCO								
18	Level								

At the LCE frame

5



WARNING

Card damage—transport

Take these precautions to protect the circuit cards from electrical and mechanical damage while transporting cards.

When handling a circuit card not in an electrostatic discharge (ESD) protective container, stand on a conductive floor mat and wear a wrist strap connected, through a 1-megohm resistor, to a suitably grounded object, such as a metal workbench or a DMS switch frame (Northern Telecom Corporate Standard 5028).

Store and transport circuit cards in an ESD protective container.

NT6X19
in RSC-S LCME (continued)



WARNING
Equipment damage
Take these precautions when removing or inserting a card:
1. Do not apply direct pressure to the components.
2. Do not force the cards into the slots.

Put on a wrist strap.

6



WARNING
Hot materials
Exercise care when handling the line card. The line feed resistor may be very hot.



CAUTION
Special tools required
Card shrouds and removal tools are required for removing cards from the line drawers. For descriptions of these tools, see the following notes.

Descriptions of these shrouds are as follows.

Line card insertion / withdrawal tool for	Apparatus code	Common product code
3-inch cards	QTH56A	A0298291
6-inch cards	QTH58A	A0313317

Note: Card removal tools are required for removing cards from line drawers. Two sizes are available. Descriptions of these tools follow.

Card removal tool for	Apparatus code	Common product code
3–4 inch cards	QTH57A	A0298292
Note: For 4-inch or larger cards, use the large grip tool ITA9953.		

NT6X19
in RSC-S LCME (continued)

Prepare to remove the faulty card by opening the line drawer, determined in step 1, and following these substeps:

- a. Face the drawer shelf and grasp the handle at the bottom of the drawer with your right hand.
- b. Push up on the drawer latch with your thumb, and pull the drawer out until fully withdrawn. It is fully withdrawn when the drawer stop, at the top, prevents further travel.
- c. Maintain a slight pull on the handle and lift the faceplate of the drawer approximately 2.5 cm (1 in).
- d. While holding the drawer in this position, push the bottom of the drawer, nearest the shelf with your left hand, to a position about 1 cm (.5 in) to the right.
- e. Hold the drawer in this position with your left hand, and lower the faceplate of the drawer by releasing the grip of your right hand.
- f. Ensure a card shroud and line card extractor are available.

7 Remove the line card to be replaced by using the following substeps.

- a. Slide a card shroud over the card to be removed and an adjacent card. If there is not an adjacent card on either side, do not use the card shroud.
- b. Grasp the edge of the card with a line card extractor at a point midway between the top and bottom edges. Hold the extractor in your right hand.
- c. Squeeze the handles of the extractor together to grasp the card tightly.
- d. Hold the front cover of the line drawer to steady it using your left hand.
- e. Pull the extractor away from the drawer until the card becomes unplugged.
- f. Continue pulling the card with the extractor until the card is clear of the shroud.
- g. Insert the card removed into the ESD container and store using local procedures.

8 Replace the faulty card using the following substeps:

- a. Remove the replacement card from the ESD container.
- b. Slide the card in the shroud guide slots toward the drawer backplane.
- c. Hold the front cover of the line drawer with your left hand to steady it.

NT6X19 in RSC-S LCME (continued)

- d. Grasp the top and bottom edges of the card with the fingers of your right hand.
- e. Push the card toward the backplane until it plugs fully into the backplane socket.

At the MAP terminal

- 9 Use the following information to determine where to proceed.

If you entered this procedure from	Do
alarm clearing procedures	step 14
other	step 10

- 10 Test the NT6X19 line card by typing

>DIAG

and pressing the Enter key.

If DIAG	Do
passed	step 11
failed	step 14

- 11 Return the NT6X19 card to service by typing

>RTS

and pressing the Enter key.

If RTS	Do
passed	step 12
failed	step 16

- 12 Send any faulty cards for repair according to local procedure.
- 13 Record the date the card was replaced, the serial number of the card, and the symptoms that prompted replacement of the card. Go to step 16.

NT6X19
in RSC-S LCME (end)

- 14** Return to the procedure that directed you to this procedure. If necessary, go to the point where a faulty card list was produced, identify the next faulty card on the list, and go to the appropriate card replacement procedure for that card in this manual.
- 15** Obtain further assistance in replacing this card by contacting operating company maintenance personnel.
- 16** You have successfully completed this procedure. Return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.

NT6X20 in RSC-S LCME

Application

Use this procedure to replace an NT6X20 card in an RSC-S LCME.

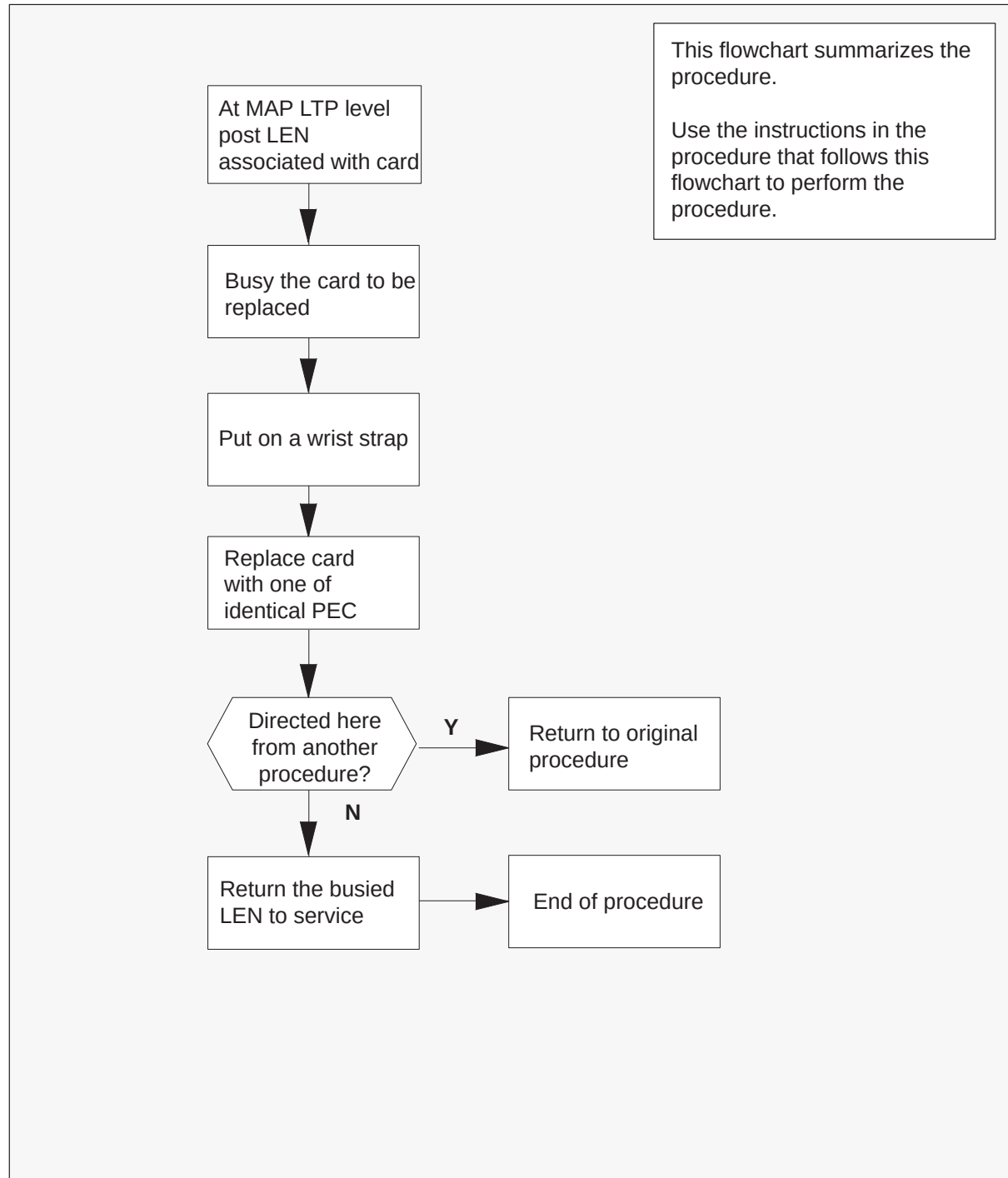
PEC	Suffixes	Name
NT6X20	AA	Message Waiting Converter

Common procedures

None

Action

The following flowchart is only a summary of the procedure. To replace the card, use the instructions in the procedure that follows the flowchart.

NT6X20
in RSC-S LCME (continued)**Summary of card replacement procedure for an NT6X20 card in an RSC-S LCME**

NT6X20
in RSC-S LCME (continued)

Replacing an NT6X20 card in an RSC-S LCME

At your Current Location

- 1 Proceed only if you have been directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure for verifying or accepting cards, or have been directed to this procedure by your maintenance support group.
- 2 Obtain a replacement card. Ensure the replacement card has the same product equipment code (PEC), including suffix, as the card that is to be removed.

At the MAP terminal

- 3 Post the LEN of the card to be replaced by typing
>MAPCI;MTC;LNS;LTP;POST LCME site lcme_no unit_no lsg_no ckt_no
and pressing the Enter key.

where

site is the location name of the LCME with the faulty card
lcme_no is the number of the LCME with the faulty card
unit_no is the number of the LCME unit with the faulty card
lsg_no is the number of the LSG with the faulty card
ckt_no is the number of the circuit associated with the faulty card

Example of a MAP display:

```
CM      MS      IOD      Net      PM      CCS      LNS      Trks      Ext      Appl
.       .       .       .       .       .       .       .       .       .
LTP
0 Quit   Post      DELQ      BUSYQ      PREFIX
2 Post_
3        LCC PTY RNG....LEN..... DN   STA F S LTA TE RESULT
4        CKT TYPE FL   HOST 00 0 03 03 NO DIRN IDL
5 BSY
6 RTS
7 DIAG
8
9 AIMStat
10 CKTL0C
11 Hold
12 Next_
13
14
15
16 Prefix
17 LCO
18 Level
```

NT6X20 in RSC-S LCME (continued)

- 4 Busy the NT6X20 line card by typing

>BSY

and pressing the Enter key.

Example of a MAP display:

CM	MS	IOD	Net	PM	CCS	LNS	Trks	Ext	Appl
.	.	.	.	.	.	.	.	.	.
LTP									
0	Quit	Post	DELQ	BUSYQ	PREFIX				
2	Post_								
3	LCC PTY RNG....LEN.....		DN	STA F S LTA TE	RESULT				
4	CKT TYPE FL		HOST 00 0 03 03	NO DIRN	MB				
5	BSY								
6	RTS								
7	DIAG								
8									
9	AIMStat								
10	CKTLLOC								
11	Hold								
12	Next_								
13									
14									
15									
16	Prefix								
17	LCO								
18	Level								

At the LCE frame

5



WARNING

Card damage—transport

Take these precautions to protect the circuit cards from electrical and mechanical damage while transporting cards.

When handling a circuit card not in an electrostatic discharge (ESD) protective container, stand on a conductive floor mat and wear a wrist strap connected, through a 1-megohm resistor, to a suitably grounded object, such as a metal workbench or a DMS switch frame (Northern Telecom Corporate Standard 5028).

Store and transport circuit cards in an ESD protective container.

NT6X20
in RSC-S LCME (continued)



WARNING
Equipment damage
Take these precautions when removing or inserting a card:
1. Do not apply direct pressure to the components.
2. Do not force the cards into the slots.

Put on a wrist strap.

6



WARNING
Hot materials
Exercise care when handling the line card. The line feed resistor may be very hot.



CAUTION
Special tools required
Card shrouds and removal tools are required for removing cards from the line drawers. For descriptions of these tools, see the following notes.

Descriptions of these shrouds are as follows.

Line card insertion / withdrawal tool for	Apparatus code	Common product code
3-inch cards	QTH56A	A0298291
6-inch cards	QTH58A	A0313317

Note: Card removal tools are required for removing cards from line drawers. Two sizes are available. Descriptions of these tools follow.

Card removal tool for	Apparatus code	Common product code
3–4 inch cards	QTH57A	A0298292
Note: For 4-inch or larger cards, use the large grip tool ITA9953.		

NT6X20
in RSC-S LCME (continued)

Prepare to remove the faulty card by opening the line drawer, determined in step 1, and following these substeps:

- a. Face the drawer shelf and grasp the handle at the bottom of the drawer with your right hand.
- b. Push up on the drawer latch with your thumb, and pull the drawer out until fully withdrawn. It is fully withdrawn when the drawer stop, at the top, prevents further travel.
- c. Maintain a slight pull on the handle and lift the faceplate of the drawer approximately 2.5 cm (1 in).
- d. While holding the drawer in this position, push the bottom of the drawer, nearest the shelf with your left hand, to a position about 1 cm (.5 in) to the right.
- e. Hold the drawer in this position with your left hand and lower the faceplate of the drawer by releasing the grip of your right hand.
- f. Ensure a card shroud and line card extractor are available.

7 Remove the line card to be replaced by following these substeps:

- a. Slide a card shroud over the card to be removed and an adjacent card. If there is not an adjacent card on either side, do not use the card shroud.
- b. Grasp the edge of the card with a line card extractor at a point midway between the top and bottom edges. Hold the extractor in your right hand.
- c. Squeeze the handles of the extractor together to grasp the card tightly.
- d. Hold the front cover of the line drawer to steady it using your left hand.
- e. Pull the extractor away from the drawer until the card becomes unplugged from its socket on the drawer backplane.
- f. Continue pulling the card with the extractor until the card is clear of the shroud.
- g. Insert the card removed into the ESD container and store using local procedures.

8 Replace the faulty card using the following substeps:

- a. Remove the replacement card from the ESD container.
- b. Slide the card in the shroud guide slots toward the drawer backplane.

NT6X20
in RSC-S LCME (continued)

- c. Hold the front cover of the line drawer with your left hand to steady it.
 - d. Grasp the top and bottom edges of the card with the fingers of your right hand.
 - e. Push the card toward the backplane until it plugs fully into the backplane socket.
- 9 Use the following information to determine where to proceed.

If you entered this procedure from	Do
alarm clearing procedures	step 11
other	step 14

At the MAP terminal

- 10 Test the NT6X20 line card by typing

>DIAG

and pressing the Enter key.

If DIAG	Do
passed	step 12
failed	step 15

- 11 Return the NT6X20 card to service by typing

>RTS

and pressing the Enter key.

If RTS	Do
passed	step 12
failed	step 15

- 12 Send any faulty cards for repair according to local procedure.

NT6X20
in RSC-S LCME (end)

- 13** Record the date the card was replaced, the serial number of the card, and the symptoms that prompted replacement of the card. Go to step 16.
- 14** Return to the procedure that directed you to this procedure. If necessary, go to the point where a faulty card list was produced, identify the next faulty card on the list, and go to the appropriate card replacement procedure for that card in this manual.
- 15** Obtain further assistance in replacing this card by contacting operating company maintenance personnel.
- 16** You have successfully completed this procedure. Return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.

NT6X21 in RSC-S LCME

Application

Use this procedure to replace an NT6X21 card in an RSC-S LCME.

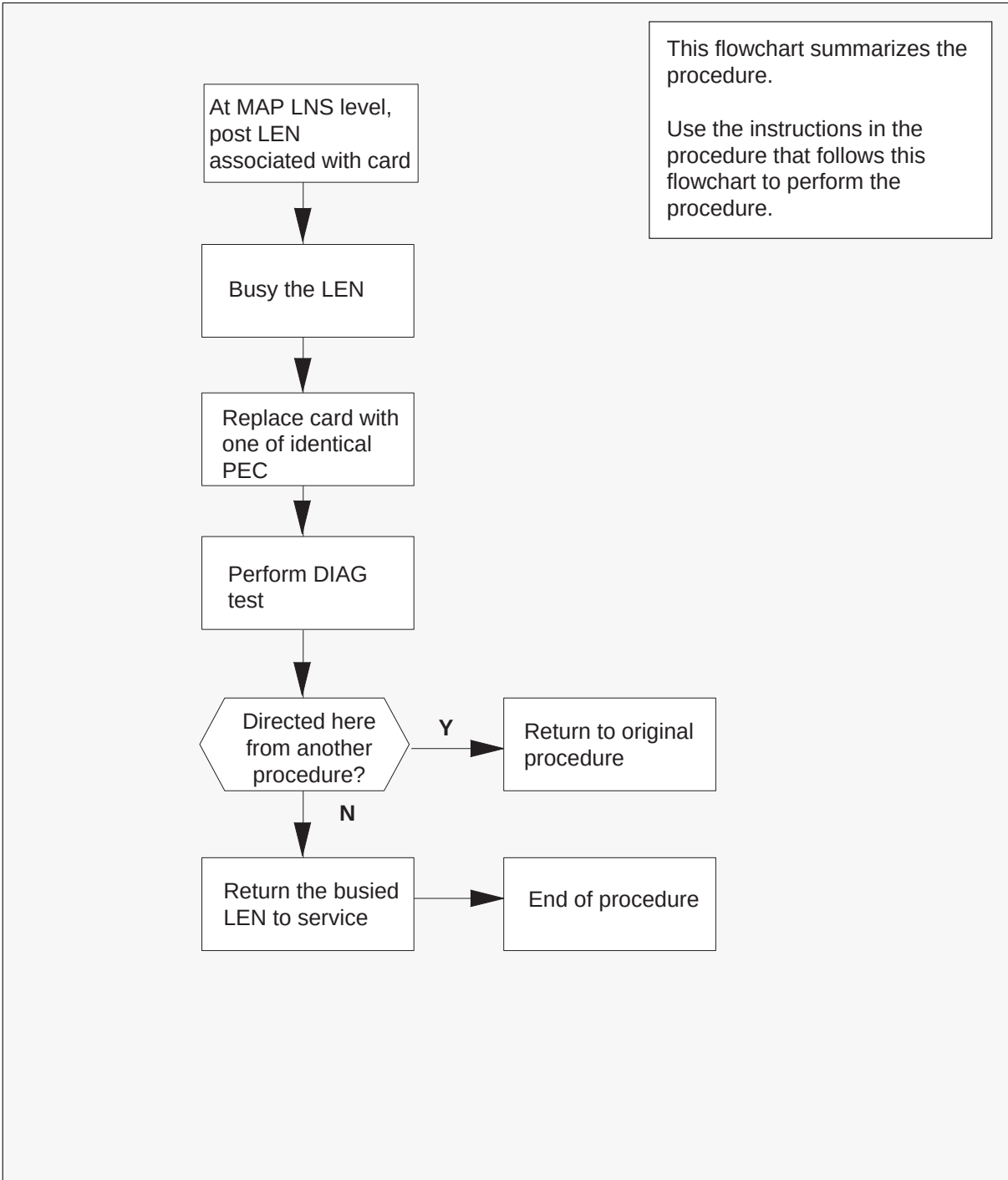
PEC	Suffixes	Name
NT6X21	AA, AB, AC	Line Card Type C (IBN Electronic Business Set)
NT6X21	AD	Enhanced EBS Line Card for Universal Digital Loop Carriers

Common procedures

None

Action

The following flowchart is only a summary of the procedure. To replace the card, use the instructions in the procedure that follows the flowchart.

NT6X21
in RSC-S LCME (continued)**Summary of card replacement procedure for an NT6X21 card in RSC-S LCME**

NT6X21
in RSC-S LCME (continued)

Replacing an NT6X21 card in an RSC-S LCME

At your current location

- 1 Proceed only if you have been directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure for verifying or accepting cards, or have been directed to this procedure by your maintenance support group.
- 2 Obtain an NT6X21 replacement card. Ensure the replacement card has the same product equipment code (PEC), including suffix, as the card that is to be removed.

At the MAP terminal

- 3 Post the LEN of the card to be replaced by typing
>MAPCI;MTC;LNS;LTP;POST L site lcme_no unit_no lsg_no ckt_no
and pressing the Enter key.

where

- site is the location name of the LCME with the faulty card
- lcme_no is the number of the LCME with the faulty card
- unit_no is the number of the LCME unit with the faulty card
- lsg_no is the number of the LSG with the faulty card
- ckt_no is the number of the circuit associated with the faulty card

Example of a MAP display:

```
CM      MS      IOD      Net      PM      CCS      LNS      Trks      Ext      Appl
.       .       .       .       .       .       .       .       .       .
LTP
0 Quit   Post      DELQ      BUSYQ      PREFIX
2 Post_
3        LCC PTY RNG....LEN..... DN   STA F S LTA TE RESULT
4        CKT TYPE FL   HOST 00 0 03 03 NO DIRN IDL
5 BSY
6 RTS
7 DIAG
8
9 AIMStat
10 CKTL0C
11 Hold
12 Next_
13
14
15
16 Prefix
17 LCO
18 Level
```

NT6X21 in RSC-S LCME (continued)

- 4 Busy the NT6X21 line card by typing

>BSY

and pressing the Enter key.

Example of a MAP display:

CM	MS	IOD	Net	PM	CCS	LNS	Trks	Ext	Appl
.	.	.	.	.	.	.	.	.	.
LTP									
0	Quit	Post	DELQ	BUSYQ	PREFIX				
2	Post_								
3	LCC	PTY	RNG....	LEN.....	DN	STA	F	S	LTA TE RESULT
4	CKT	TYPE	FL	HOST	00 0 03 03	NO	DIRN	MB	
5	BSY								
6	RTS								
7	DIAG								
8									
9	AIMStat								
10	CKTLLOC								
11	Hold								
12	Next_								
13									
14									
15									
16	Prefix								
17	LCO								
18	Level								

At the LCE frame

5



WARNING

Card damage—transport

Take these precautions to protect the circuit cards from electrical and mechanical damage while transporting cards.

When handling a circuit card not in an electrostatic discharge (ESD) protective container, stand on a conductive floor mat and wear a wrist strap connected, through a 1-megohm resistor, to a suitably grounded object, such as a metal workbench or a DMS switch frame (Northern Telecom Corporate Standard 5028).

Store and transport circuit cards in an ESD protective container.

NT6X21
in RSC-S LCME (continued)



WARNING

Equipment damage

Take these precautions when removing or inserting a card:

1. Do not apply direct pressure to the components.
2. Do not force the cards into the slots.

Put on a wrist strap.

6



WARNING

Hot materials

Exercise care when handling the line card. The line feed resistor may be very hot.



CAUTION

Special tools required

Card shrouds and removal tools are required for removing cards from the line drawers. For descriptions of these tools, see notes below.

Descriptions of these shrouds are as follows.

Line card insertion / withdrawal tool for	Apparatus code	Common product code
3-inch cards	QTH56A	A0298291
6-inch cards	QTH58A	A0313317

Note: Card removal tools are required for removing cards from line drawers. Two sizes are available. Descriptions of these tools follow.

Card removal tool for	Apparatus code	Common product code
3–4 inch cards	QTH57A	A0298292
Note: For 4-inch or larger cards, use the large grip tool ITA9953.		

NT6X21
in RSC-S LCME (continued)

Prepare to remove the faulty card by opening the line drawer and following these substeps:

- a. Face the drawer shelf and grasp the handle at the bottom of the drawer with your right hand.
- b. Push up on the drawer latch with your thumb and pull the drawer out until fully withdrawn. It is fully withdrawn when the drawer stop, at the top, prevents further travel.
- c. Maintain a slight pull on the handle and lift the faceplate of the drawer approximately 2.5 cm (1 in).
- d. While holding the drawer in this position, push the bottom of the drawer, nearest the shelf with your left hand, to a position about 1 cm (.5 in) to the right.
- e. Hold the drawer in this position with your left hand and lower the faceplate of the drawer by releasing the grip of your right hand.
- f. Ensure a card shroud and line card extractor are available.

7 Remove the line card to be replaced by following these substeps:

- a. Slide a card shroud over the card to be removed and an adjacent card. If there is not an adjacent card on either side, do not use the card shroud.
- b. Grasp the edge of the card with a line card extractor at a point midway between the top and bottom edges. Hold the extractor in your right hand.
- c. Squeeze the handles of the extractor together to grasp the card tightly.
- d. Hold the front cover of the line drawer to steady it using your left hand.
- e. Pull the extractor away from the drawer until the card becomes unplugged from its socket on the drawer backplane.
- f. Continue pulling the card with the extractor until the card is clear of the shroud.
- g. Insert the card removed into the ESD container and store using local procedures.

8 Replace the faulty card using the following substeps:

NT6X21
in RSC-S LCME (continued)

- a. Remove the replacement card from the ESD container.

If the line card suffix is	Do
AA, AB, or AC	step c.
AD	step b.

- b. Make DIP switch changes to the new replacement NT6X21AD line card to match the DIP switch settings of the card being replaced, or as defined in the following table.
- c. Slide the card in the shroud guide slots toward the drawer backplane.
- d. Hold the front cover of the line drawer with your left hand to steady it.
- e. Grasp the top and bottom edges of the card with the fingers of your right hand.
- f. Push the card toward the backplane until it plugs fully into the backplane socket.

NT6X21 in RSC-S LCME (continued)

Recommended NT6X21AD S1 DIP switch settings

Recommended application	D/A voice S1		Balance S2		Signaling level S3 and S4			
	switch position ON OFF		switch position ON OFF		Both ON	Only S4 ON	Only S3 ON	Both OFF
	0dB	-3.5dB	NL	9+2	1.3Vpp	0.8Vpp	0.6Vpp	0.14Vpp
P-phone sets long loop: 19–24dB EML	X		X		X			
P-phone sets medium loop: 17–19dB EML	X		X			X		
P-phone sets medium loop: 4–17dB EML		X		X			X	
P-phone sets short loops: 0–4dB EML		X		X				X
Northern Telecom UDLCs		X	X					X
Other vendors UDLCs	X			X			X	
6X21AC equivalent mode		X	X		X			
Note: dB=decibel, NL = non-loaded, Vpp=voltage peak to peak, EML= estimated measured loss, as defined in NTP 297–2011–180 BCS35 version 01.02								

NT6X21 in RSC-S LCME (continued)

- 9 Use the following information to determine where to proceed.

If you entered this procedure from	Do
alarm clearing procedures	step 14
other	step 10

At the MAP terminal

- 10 Test the NT6X21 line card by typing

>DIAG

and pressing the Enter key.

If DIAG	Do
passed	step 11
failed	step 15

- 11 Return the NT6X21 card to service by typing

>RTS

and pressing the Enter key.

If RTS	Do
passed	step 12
failed	step 15

- 12 Send any faulty cards for repair according to local procedure.
- 13 Record the date the card was replaced, the serial number of the card, and the symptoms that prompted replacement of the card. Go to step 16.
- 14 Return to the procedure that directed you to this procedure. If necessary, go to the point where a faulty card list was produced, identify the next faulty card on the list, and go to the appropriate card replacement procedure for that card in this manual.

NT6X21
in RSC-S LCME (end)

- 15** Obtain further assistance in replacing this card by contacting operating company maintenance personnel.
- 16** You have successfully completed this procedure. Return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.

NT6X30 in RSC-S LCME

Application

Use this procedure to replace an NT6X30 card in an RSC-S LCME.

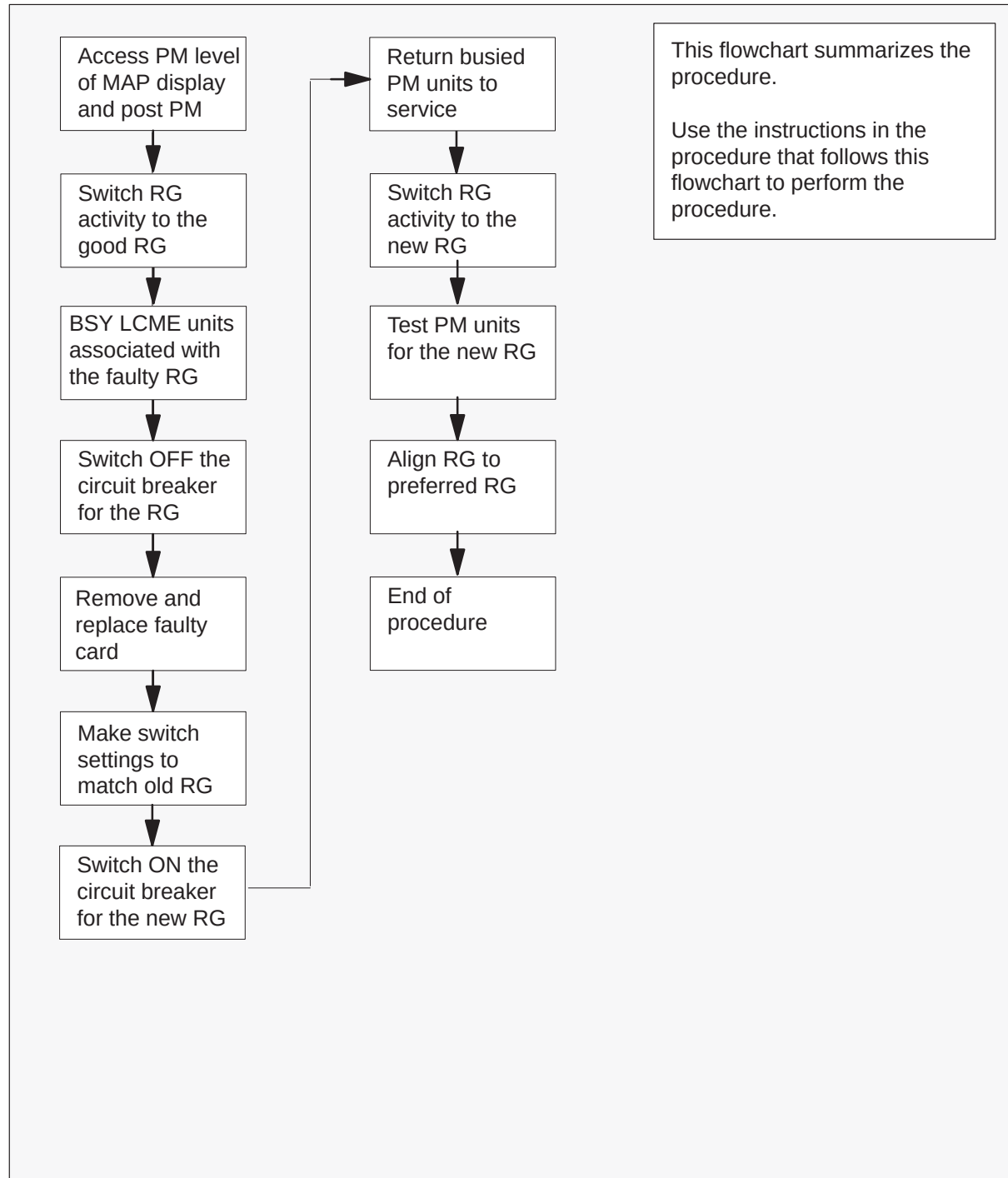
PEC	Suffixes	Name
NT6X30	HA	Ringin Generator

Common procedures

None

Action

The following flowchart is only a summary of the procedure. To replace the card, use the instructions in the procedure that follows the flowchart.

NT6X30
in RSC-S LCME (continued)**Summary of replacing an NT6X30 card in RSC-S LCME**

NT6X30 in RSC-S LCME (continued)

Replacing an NT6X30 in RSC-S LCME

At your Current Location

1



CAUTION

Loss of service

This procedure includes directions to manually busy one or more peripheral module (PM) units. Since manually busying a PM unit can cause service degradation, perform this procedure only if necessary to restore out-of-service components. Otherwise, carry out this procedure during periods of low traffic.

Proceed only if you were either directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure for verifying or accepting cards, or were directed to this procedure by your maintenance support group.

- 2 Obtain a replacement card. Ensure that the replacement card has the same product equipment code (PEC), including suffix, as the card that is to be removed.

At the MAP terminal

- 3 Access the PM level and post the LCME by typing

>MAPCI;MTC;PM;POST LCME lcme_site_name lcme_frame_no lcme_no
and pressing the Enter key.

where

lcme_site_name	is the name of the site at which the LCME is located
lcme_frame_no	is the number of the frame in which the LCME is located
lcme_no	is the number of the LCME with the faulty card

Example of a MAP display

```
LCME RSC-S 14 0 ISTb Links 00S: Cside 0 Pside 0
Unit 0: ISTb      /RG:0
Unit 1: InSv      /RG:0
                                11 11 11  RG: Pref 0 ISTb
Drwr: 01 23 45 67 89 01 23 45      Stby 1 InSv
      .. .. .. .. .. .. .. ..
```

NT6X30
in RSC-S LCME (continued)

- 4 Check the state of the PM units.

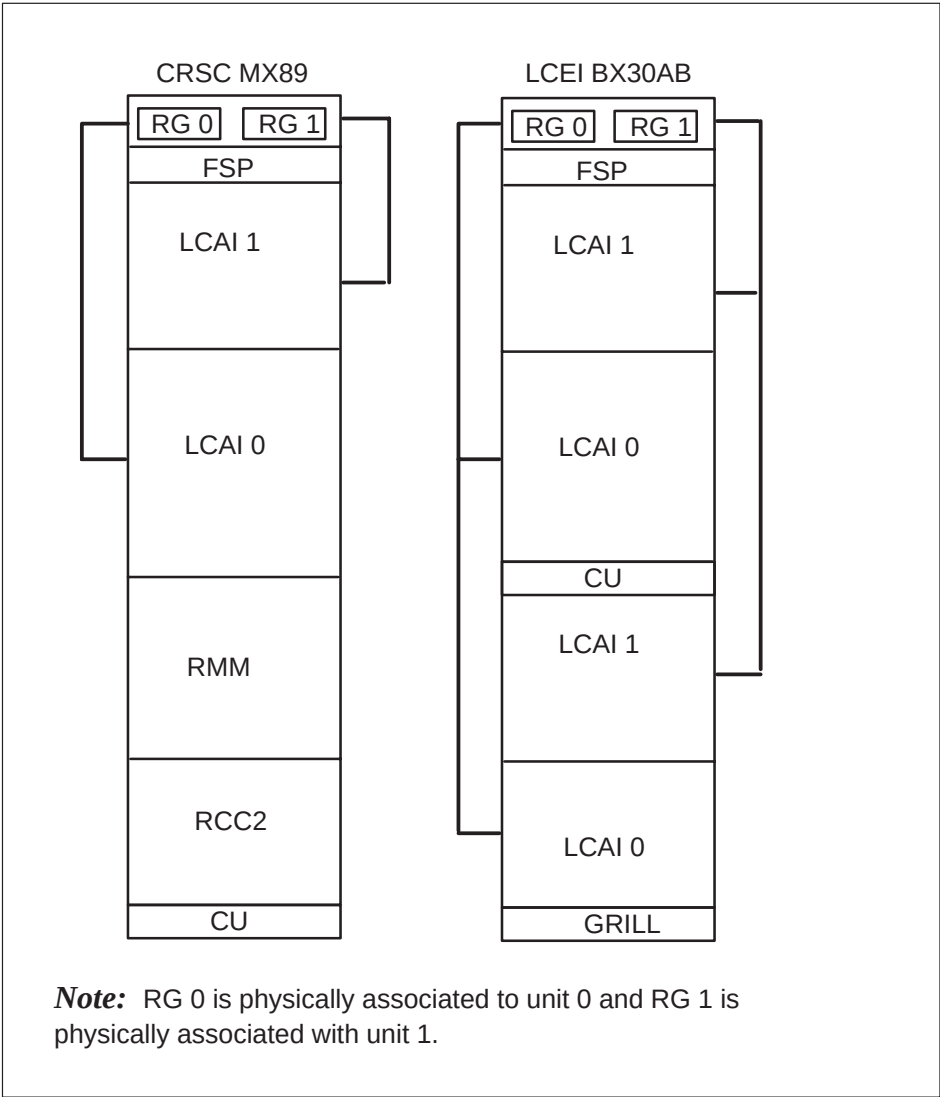
If the PM or PM units are	Do
offl or SysB	step 5
One unit is InSv or ISTb the other unit is ISTb or SysB	step 6

- 5 Check the state of the other PM in the frame.

If the other PM is	Do
offl or SysB	step 37
InSv or ISTb	step 6

NT6X30
in RSC-S LCME (continued)

- 6 Record the numbers of the PM units serviced by the faulty RG you are replacing.



- 7 The next action depends on the type of LCM alarm indicated.

If the alarm is	Do
critical	step 9
major or minor	step 8

NT6X30 in RSC-S LCME (continued)

- 8 Switch ringing generator activity from the faulty unit, if necessary, by typing

>SWRG UNIT unit_no

and pressing the Enter key.

where

unit_no is the PM unit number (0 or 1) assigned to the faulty RG

If the SWRG command	Do
passed	step 9
failed	step 38

- 9 Manually-busy (ManB) the PM unit associated with the faulty RG by typing

>BSY UNIT unit_no

and pressing the Enter key.

where

unit_no is the PM unit number (0 or 1) associated with the faulty RG

Note: If clearing a critical alarm choose either unit to work on.

Example of a MAP response:

LCME RSC-S 14 0 Unit 0 Bsy Passed

Note: Repeat this command for the other PM in the frame.

- 10 The next action depends on how many LCMEs are provisioned in the equipment frame.

If there	Do
is one LCME provisioned in the frame	step 14
two LCMEs provisioned in the frame, and you have not switched RG activity for both LCMEs	step 11
two LCMEs provisioned in the frame, and you have switched RG activity for both LCMEs	step 12

- 11 Repeat step 3 through step 10 for the other LCME provisioned in the equipment frame.

NT6X30 in RSC-S LCME (continued)

- 12 Post both PMs in the frame and ensure all units are now on the good RG by typing

>POST LCME site frame_no lcme_no site frame_no lcme_no
and pressing the Enter key.

where

site is the PM location (alphanumeric) of the first LCME
frame_no is the frame number (00 to 511) of the first LCME
lcme_no is the number of the first LCM (0 or 1) in the frame,
site is the LCM location (alphanumeric) of the second LCME
frame_no is the frame number (00 to 511) of the second LCME
lcme_no is the number of the second LCM (0 or 1) in the frame,

Example of command

>POST LCME RSC-S 14 0 RSC-S 14 1

Example of a MAP display:

```
LCME RSC-S 14 0 ISTb Links 00S: Cside 0 Pside 0
Unit 0: ISTb /RG:1
Unit 1: InSv /RG:1
Drwr: 01 23 45 67 89 01 23 45 RG: Pref 0 ISTb
      .. .. .. .. .. Stby 1 InSv
```

Examine the other PM in the frame by typing

>NEXT

and pressing the Enter key.

Example of a MAP display:

```
LCME RSC-S 14 1 ISTb Links 00S: Cside 0 Pside 0
Unit 0: ISTb /RG:1
Unit 1: InSv /RG:1
Drwr: 01 23 45 67 89 01 23 45 RG: Pref 0 ISTb
      .. .. .. .. .. Stby 1 InSv
```

If both PMs are	Do
on the good RG	step 14
not on the good RG	step 13

- 13 Repeat step 3 through step 12 for the other PM provisioned in the equipment frame.

NT6X30
in RSC-S LCME (continued)

At the RCE/LCEI frame

14



WARNING

Static electricity damage

Before removing any cards, put on a wrist strap and connect it to the wrist strap grounding point on the left side of the modular supervisory panel (MSP) of the LCME. This protects the equipment against damage caused by static electricity.

Put on a wrist strap.

15



DANGER

Risk of personal injury

Ensure that you switch off the correct circuit breaker on the MSP as described below. Do not proceed until you have located and switched OFF the correct circuit breaker for the RG you are replacing.

Turn the circuit breaker that powers the faulty ringing generator OFF. Ensure that ringing generator 0 is on circuit breaker 03-65-01. Ensure that ringing generator 1 is on circuit breaker 03-65-02.

NT6X30
in RSC-S LCME (continued)

16

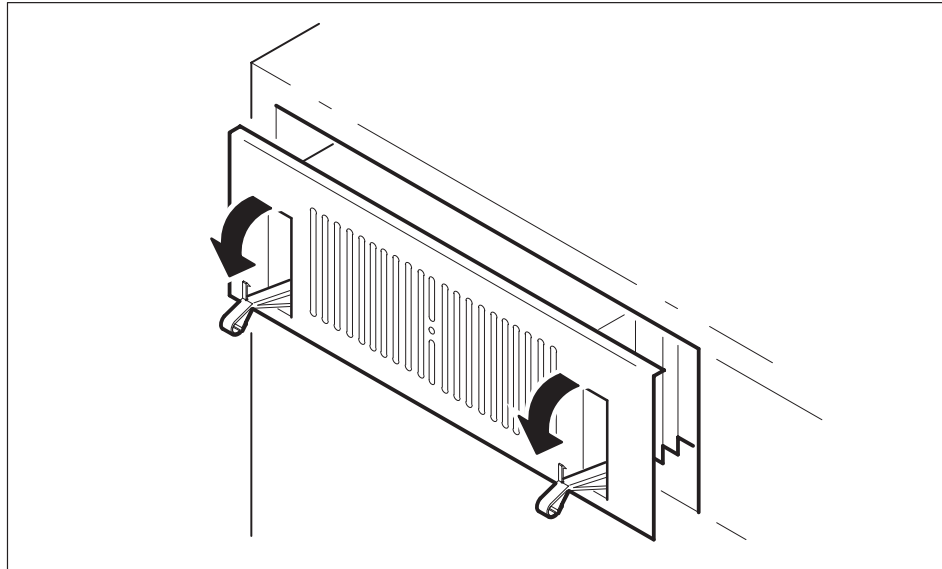


WARNING

Do not hold the card by the levers only

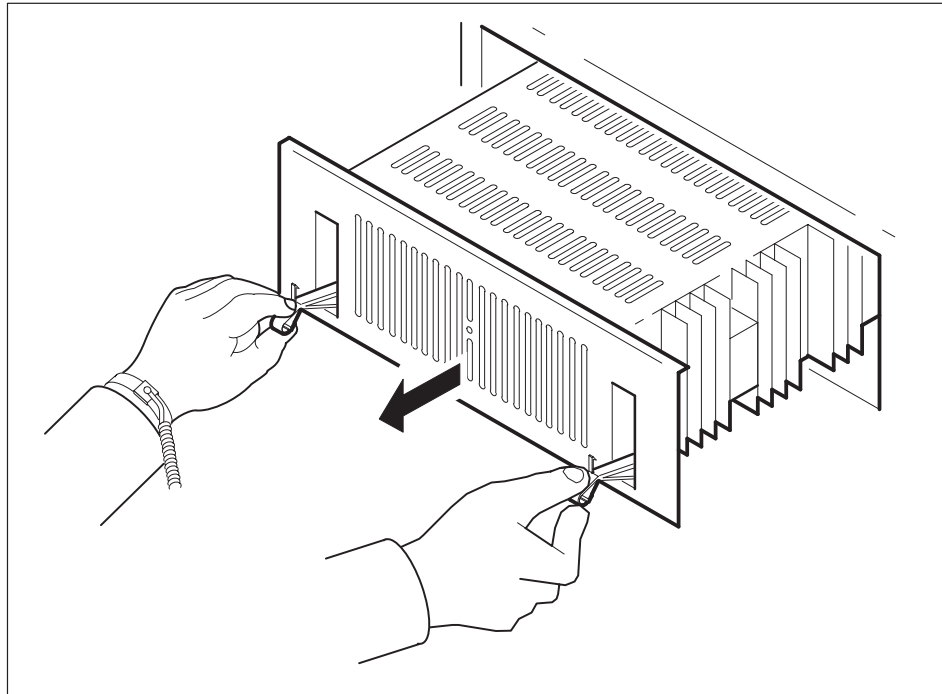
Holding a card by the locking levers only may break one or both levers. Once the card has been pulled half way out of the shelf, carefully grasp the card underneath for more secure support and continue to remove the card from the shelf. Avoid touching any wires or internal parts on the card.

Open the locking levers on the face of the card.



NT6X30
in RSC-S LCME (continued)

- 17 While grasping the locking levers, gently pull the card towards you until it protrudes approximately half-way out of the shelf.



- 18 While grasping the card by the face plate with one hand and supporting the card from the bottom with the other hand, gently pull the card towards you until it clears the shelf.
- 19 Place the card you have removed in an electrostatic discharge (ESD) protective container.

20

**WARNING****Potential equipment damage**

The newer versions of the ringing generator (versions with suffixes BB, CA, DB, HA, or JA) use switch 8. Ensure that switch 8 is in the ON position on the replacement card.

Make Switch settings on the replacement card to match the faulty card just removed.

Ensure that the replacement card has the same PEC, including suffix, as the card you just removed.

NT6X30 in RSC-S LCME (continued)

Note: If you are replacing an older version of the NT6X30 with a newer version (newer versions have suffixes BB, CA, DB, HA, or JA), switch 8 must be in the ON position on the replacement card. If in doubt, contact your next level of support.

21



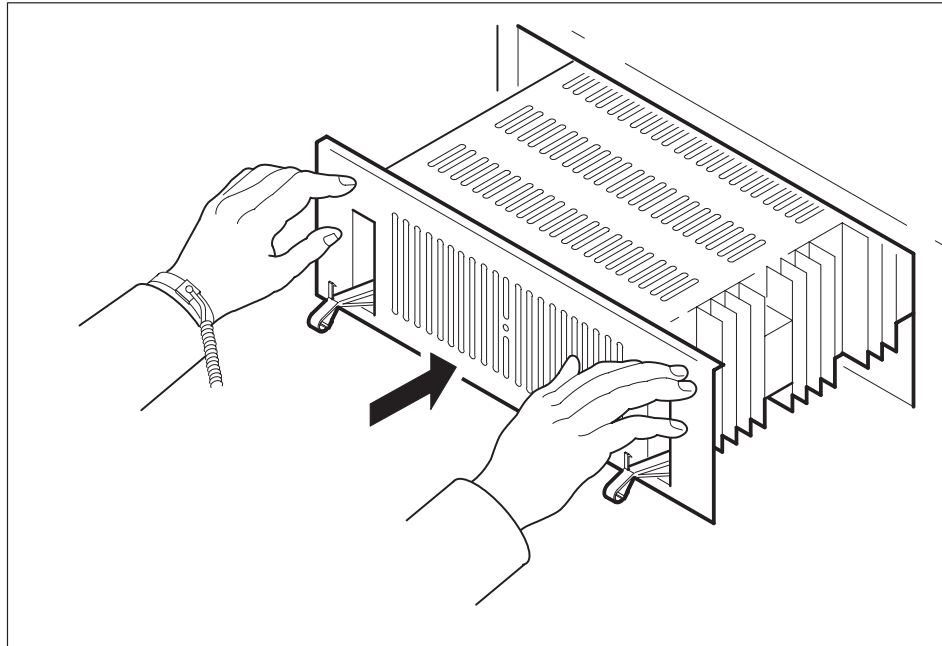
WARNING

Equipment damage

Take the following precautions when removing or inserting a card:

1. Do not apply direct pressure to the components.
2. Do not force the cards into the slots.

Open the locking levers on the replacement card. Align the card with the right slot in the shelf and gently slide the card into the shelf.

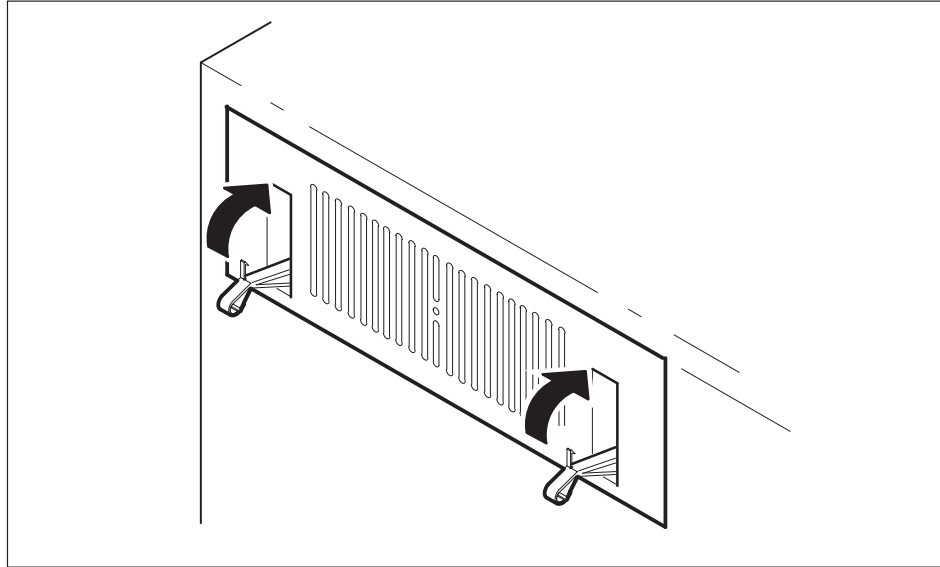


22 Seat and lock the card.

- a. Using your fingers or thumbs, push on the upper and lower edges of the faceplate to ensure that the card is fully seated in the shelf.

NT6X30
in RSC-S LCME (continued)

- b. Close the locking levers to secure the card.



- 23** Turn circuit breakers back ON. Ensure that ringing generator 0 is on circuit breaker 03-65-01. Ensure that ringing generator 1 is on circuit breaker 03-65-02.

If	Do
the circuit breaker remains switched and the LED light on the FSP goes out	step 24
the circuit breaker trips or the LED light on the FSP does not go out	step 38

- 24** The next action depends on your reason for performing this procedure.

If you were	Do
directed to this procedure from a maintenance procedure	step 25
not directed to this procedure from a maintenance procedure	step 26

NT6X30 in RSC-S LCME (continued)

- 25 Return to the maintenance procedure that sent you to this procedure and continue as directed.

At the MAP terminal

- 26 Post an LCME in the frame by typing

>POST LCME site frame_no lcme_no

and pressing the Enter key.

where

site is the PM location (alphanumeric)

frame_no is the frame number (00 to 511)

lcme_no is the number of the LCME unit posted in step 3

- 27 Wait until there is no system-initiated maintenance on the unit.

- 28 Return the ManB unit to service by typing

>RTS UNIT unit_no

and pressing the Enter key.

where

unit_no is the number (0 or 1) of the LCME unit

- 29 Switch ringing generator activity to the new NT6X30 card by typing

>SWRG UNIT unit_no

and pressing the Enter key.

where

unit_no is the PM unit number (0 or 1)

Example of a MAP display:

```
LCME RSC-S 14 0 InSv Links 00S: Cside 0 Pside 0
Unit 0: InSv /RG:1
Unit 1: InSv /RG:1
Drwr: 01 23 45 67 89 01 23 45 RG: Pref 0 InSv
      .. .. .. .. .. Stby 1 InSv
```

If the SWRG command	Do
passed, and RG activity must be switched for the other unit	step 30
passed, and RG activity is acceptable for both PM units	step 31
failed	step 38

NT6X30 in RSC-S LCME (continued)

30 Repeat step 29 for the other PM unit.

31 Test the new RG by typing

>TST PM

and pressing the Enter key.

Example of a MAP response:

```
LCME RSC-S 14 0 Unit 1 InSvce Tests Initiated
LCME RSC-S 14 0 Unit 0 InSvce Tests Initiated
LCME RSC-S 14 0 Unit 1 Tst Passed
LCME RSC-S 14 0 Unit 0 Tst Passed
```

If the TST command	Do
passed	step 32
failed	step 35

32 Align RG activity to the preferred RG by typing

>SWRG UNIT unit_no

and pressing the Enter key.

where

unit_no is the PM unit number (0 or 1)

Example of a MAP display:

```
LCME RSC-S 14 0 InSv Links 00S: Cside 0 Pside 0
Unit 0: InSv /RG:0
Unit 1: InSv /RG:0
Drwr: 01 23 45 67 89 11 11 11 RG: Pref 0 InSv
      .. .. .. .. .. Stby 1 InSv
```

NT6X30 in RSC-S LCME (end)

- 33** The next action depends on how many LCMEs are provisioned in the equipment frame.

If there	Do
one LCME provisioned in the frame	step 35
two LCMEs provisioned in the frame, and you have not switched RG activity for both LCMEs	step 34
two LCMEs provisioned in the frame, and you have switched RG activity for both LCMEs	step 35

- 34** Repeat steps 28 to 33 for the other LCME provisioned in the equipment frame.
- 35** Send any faulty cards for repair according to local procedure.
- 36** Record the date the card was replaced, the serial number of the card, and the symptoms that prompted replacement of the card. Go to step 39.
- 37** Consult office personnel to determine why the component is offline. Continue as directed by office personnel.
- 38** Obtain further assistance in replacing this card by contacting the personnel responsible for higher level of support.
- 39** You have successfully completed this procedure. Return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.

**NT6X51
in RSC-S LCM**

Application

Use this procedure to replace an NT6X51 card in an RSC-S LCM.

PEC	Suffixes	Name
NT6X51	AB, AC	Extended LCM Processor

Common procedures

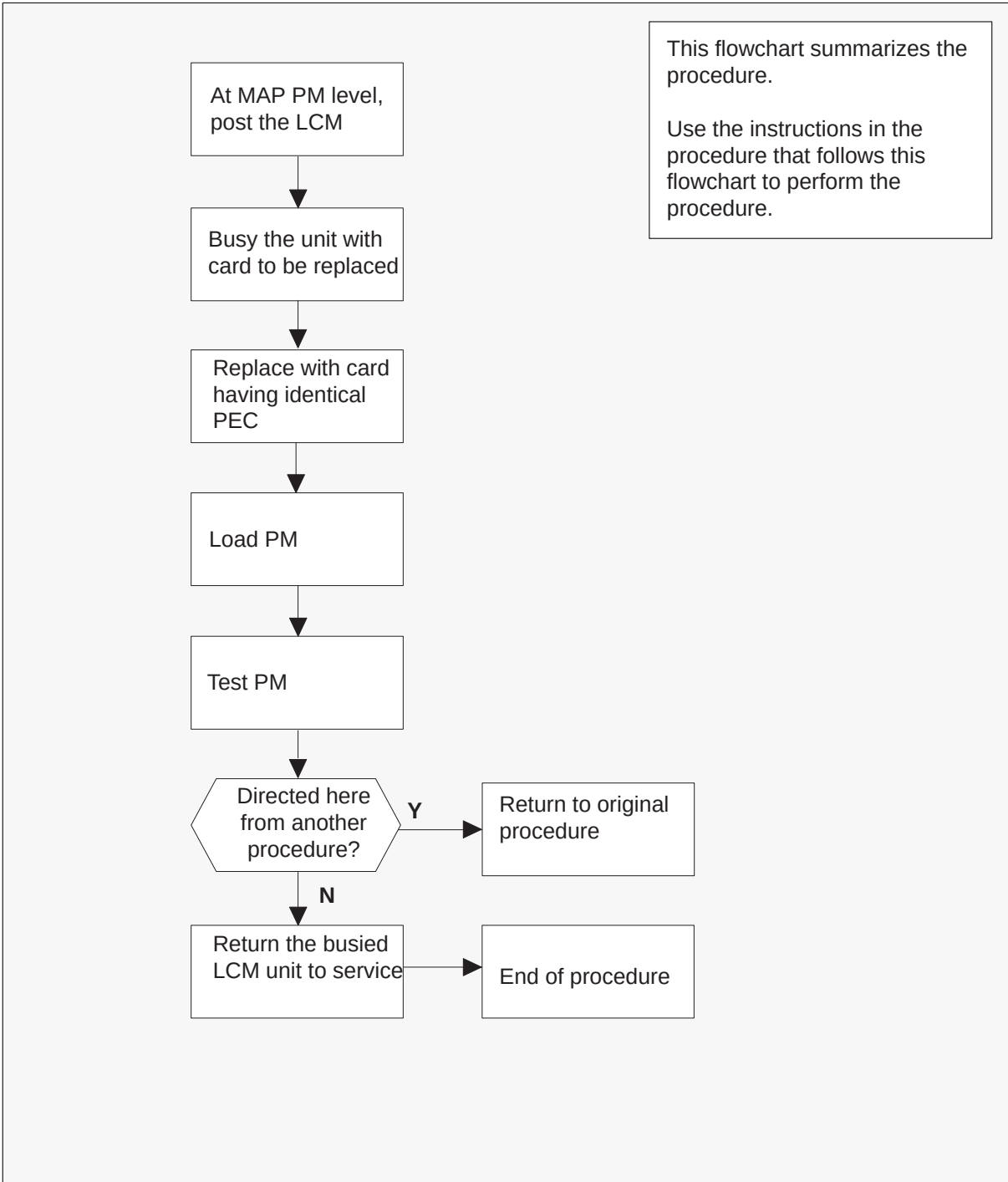
None

Action

The following flowchart is only a summary of the procedure. To replace the card, use the instructions in the procedure that follows the flowchart.

NT6X51 in RSC-S LCM (continued)

Summary of card replacement procedure for an NT6X51 card in RSC-S LCM



NT6X51 in RSC-S LCM (continued)

Replacing an NT6X51 card in an RSC-S LCM

ATTENTION

Proceed only if you have been directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure for verifying or accepting cards, or have been directed to this procedure by your maintenance support group.

At your Current Location

1



CAUTION

Loss of service

This procedure includes directions to manually busy one or more peripheral module (PM) units. Since manually busying a PM unit can cause service degradation, perform this procedure only if necessary to restore out-of-service components. Otherwise, carry out this procedure during periods of low traffic.

Obtain an NT6X51 replacement card. Ensure the replacement card has the same product equipment code (PEC), including suffix, as the card that is to be removed.

At the MAP terminal

- 2 Set the MAP to the PM level and post the LCM by typing

>MAPCI;MTC;PM;POST LCM lcm_site_name lcm_frame_no lcm_no
and pressing the Enter key.

where

`lcm_site_name` is the name of the site at which the LCM is located

`lcm_frame_no` is the number of the frame in which the LCM is located

`lcm_no` is the number of the LCM with the faulty card

- 3 Busy the LCM by typing

>BSY UNIT lcm_unit_no
and pressing the Enter key.

where

`lcm_unit_no` is the number of the LCM unit

NT6X51
in RSC-S LCM (continued)

Example of a MAP response:

```
LCM      RemL  00 0 ISTb  Links_00S: CSide 1 PSide 0
Unit 0:  InSv  Mtce TakeOver  /RG:  0
Unit 1:  ManB  Mtce           /RG:  0
              11 11 11 11 11
Drwr:   01 23 45 67 89 01 23 45 67 89      RG:Pref:0 InSv
              . . . . .                  Stby:1 InSv
              . . . . .
```

At the LCE frame

4



WARNING
Card damage—transport

Take these precautions to protect the circuit cards from electrical and mechanical damage while transporting cards.

When handling a circuit card not in an electrostatic discharge (ESD) protective container, stand on a conductive floor mat and wear a wrist strap connected, through a 1–megohm resistor, to a suitably grounded object, such as a metal workbench or a DMS switch frame (Northern Telecom Corporate Standard 5028).

Store and transport circuit cards in an ESD protective container.



WARNING
Equipment damage

Take these precautions when removing or inserting a card:

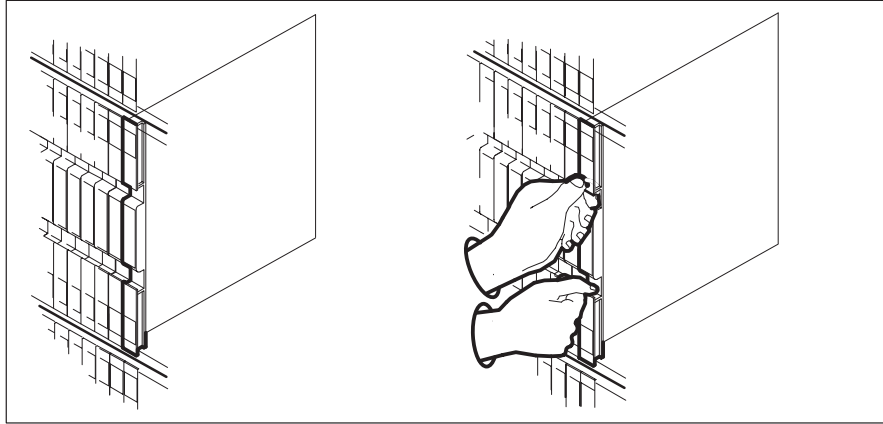
1. Do not apply direct pressure to the components.
2. Do not force the cards into the slots.

Put on a wrist strap.

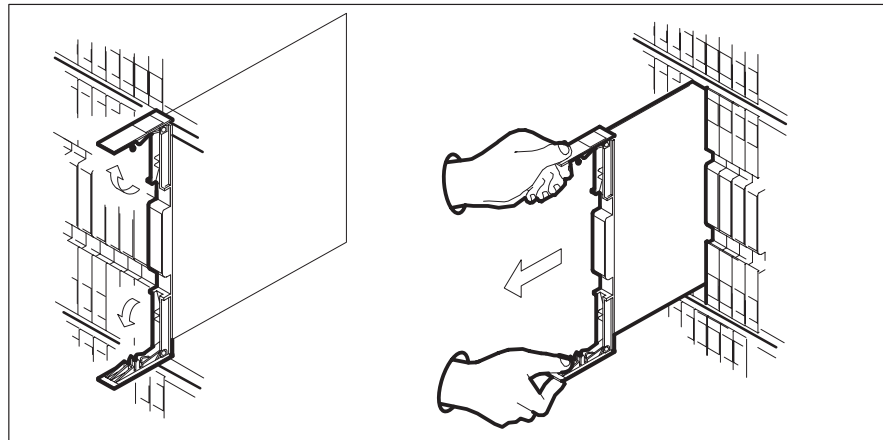
NT6X51 in RSC-S LCM (continued)

5 Remove the NT6X51 card as shown in the following figures.

a. Locate the card to be removed on the appropriate shelf.



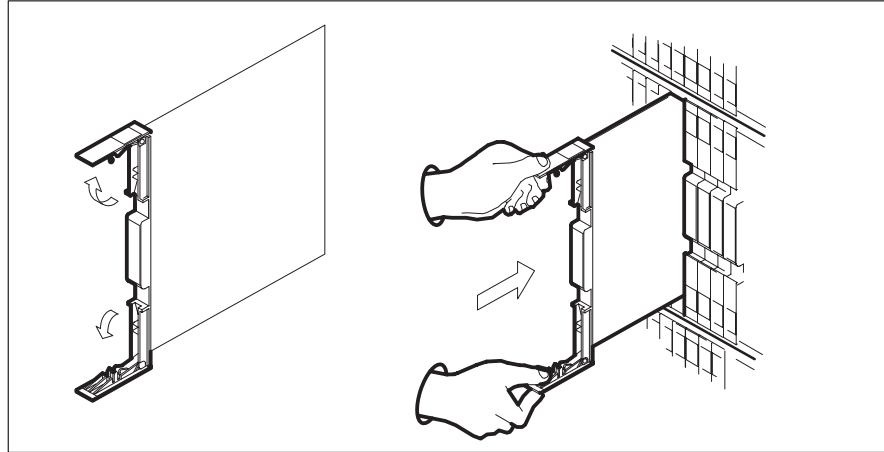
b. Open the locking levers on the card to be replaced and gently pull the card toward you until it clears the shelf.



c. Ensure the replacement card has the same PEC, including suffix, as the card you just removed.

NT6X51 in RSC-S LCM (continued)

- 6 Open the locking levers on the replacement card.
 - a. Align the card with the slots in the shelf.
 - b. Gently slide the card into the shelf.



7



WARNING

Equipment damage

Take these precautions when removing or inserting a card:

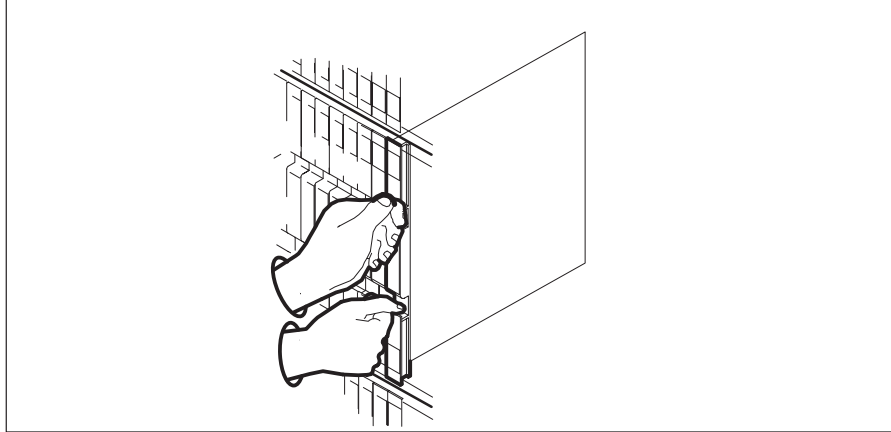
1. Do not apply direct pressure to the components.
2. Do not force the cards into the slots.

Seat and lock the card.

- a. Using your fingers or thumbs, push on the upper and lower edges of the faceplate to ensure the card is fully seated in the shelf.

NT6X51
in RSC-S LCM (continued)

- b. Close the locking levers



- 8 Use the following information to determine where to proceed.

If you entered this procedure from	Do
alarm clearing procedures	step 13
other	step 9

At the MAP terminal

- 9 Load the inactive LCM unit by typing
>LOADPM UNIT lcm_unit_no CC
and pressing the Enter key.

where

`lcm_unit_no` is the number of the LCM unit busied in step 3

If load	Do
passed	step 10
failed	step 14

NT6X51 in RSC-S LCM (end)

- 10 Return the LCM unit to service by typing

>RTS UNIT lcm_unit_no

and pressing the Enter key.

where

lcm_unit_no is the number of the LCM unit busied in step 3

If RTS	Do
passed	step 11
failed	step 14

- 11 Send any faulty cards for repair according to local procedure.
- 12 Record the date the card was replaced, the serial number of the card, and the symptoms that prompted replacement of the card. Go to step 15.
- 13 Return to the procedure that directed you to this procedure. At the point where a faulty card list was produced, identify the next faulty card on the list and go to the appropriate card replacement procedure for that card in *Card Replacement Procedures*.
- 14 Obtain further assistance in replacing this card by contacting operating company maintenance personnel.
- 15 You have successfully completed this procedure. Return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.

**NT6X52
in RSC-S LCME**

Application

Use this procedure to replace an NT6X52 card in an RSC-S LCME.

PEC	Suffixes	Name
NT6X52	AA	Digroup Control card

Common procedures

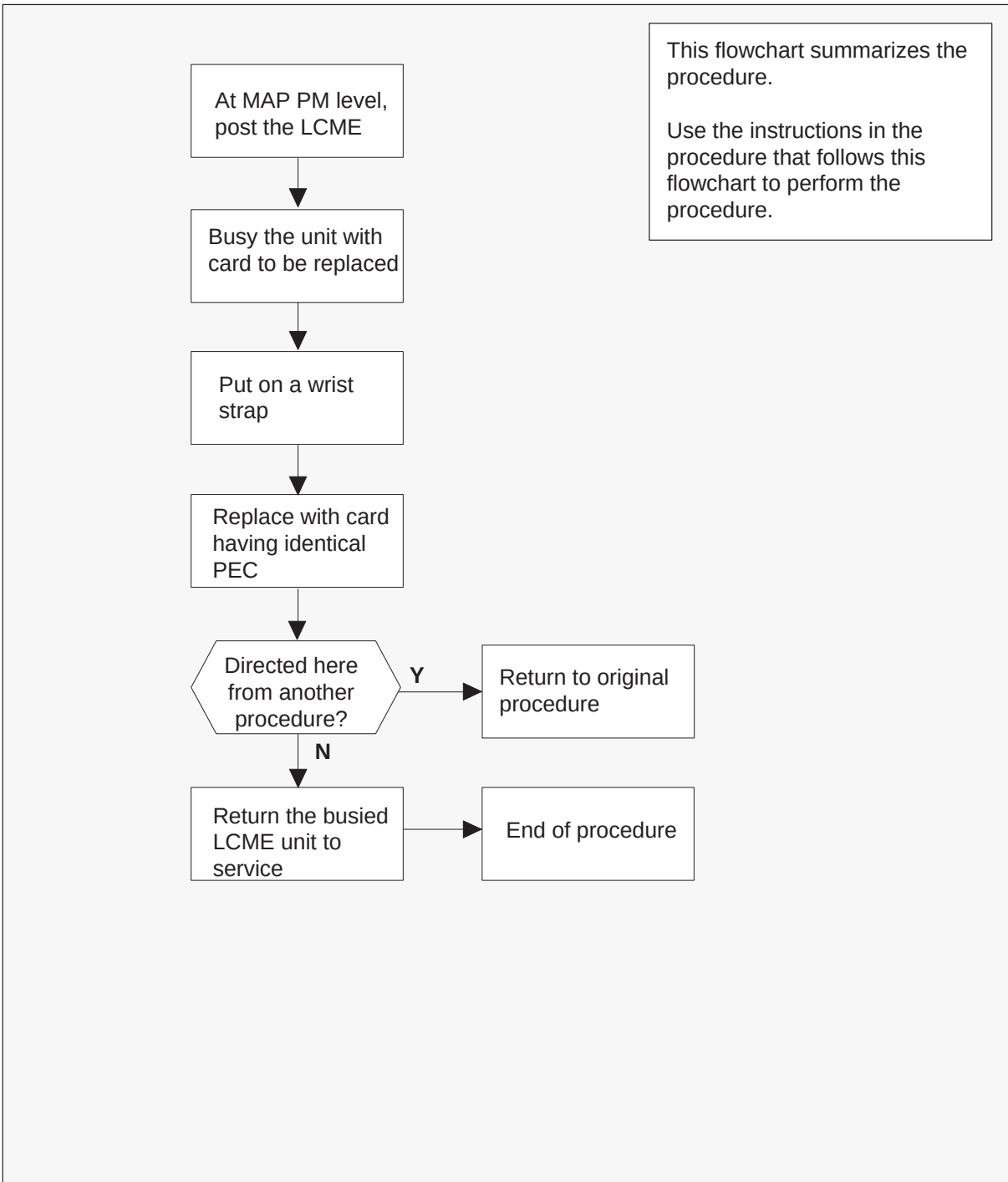
None

Action

The following flowchart is only a summary of the procedure. To replace the card, use the instructions in the procedure that follows the flowchart.

NT6X52 in RSC-S LCME (continued)

Summary of card replacement procedure for an NT6X52 card in RSC-S LCME



NT6X52 in RSC-S LCME (continued)

Replacing an NT6X52 card in RSC-S LCME

At your Current Location

- 1 Proceed only if you have been directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure for verifying or accepting cards, or have been directed to this procedure by your maintenance support group.
- 2 Obtain a replacement card. Ensure the replacement card has the same product equipment code (PEC), including suffix, as the card that is to be removed.

At the MAP terminal

- 3 Set the MAP to the PM level and post the LCME by typing
>MAPCI;MTC;PM;POST LCME lcme_site_name lcme_frame_no lcme_no
 and pressing the Enter key.

where

lcme_site_name is the name of the site at which the LCME is located
 lcme_frame_no is the number of the frame in which the LCME is located
 lcme_no is the number of the LCME unit with the faulty card

Example of a MAP response:

```

CM      MS      IOD      Net      PM      CCS      LNS      Trks      Ext      Appl
.       .       .       .       .       .       .       .       .       .
LCME
0 Quit      PM          0          0          0          0          0          130
2 Post_     LCME       0          0          0          0          0          0
3
4 Swrg_
5 TrnsL_    LCME      RemL  00 0 Links_00S:  CSide 0
6 Tst_      Unit 0:  InSv          /RG:  0
7 Bsy_      Unit 1:  InSv          /RG:  1
8 RTS_      Drwr: 01 23 45 67 89 01 23 45      RG:Pref:0 InSv
9 OffL_
10 LoadPM_
11 Disp_
12 Next_
13
14 QueryPM
15
16
17
18

```

NT6X52
in RSC-S LCME (continued)

- 4 Busy the LCME by typing
 >BSY UNIT lcme_unit_no
 and pressing the Enter key.
 where
 lcme_unit_no is the number of the LCME posted in step 3
 Example of a MAP response:

CM	MS	IOD	Net	PM	CCS	LNS	Trks	Ext	Appl
.	.	.	.	1LCME	.	.	.	.	.
LCME			SysB	ManB	OffL	CBsy	ISTb	InSv	
0 Quit	PM		0	1	0	0	0	130	
2 Post_	LCME		0	1	0	0	0	0	
3									
4 SwRg			LCME	RemL	00 0	ISTb	Links_00S:	CSide 1	PSide 0
5 Trnsl			Unit-0:	InSv	Mtce	TakeOver	/RG:	0	
6 Tst			Unit-1:	ManB	Mtce		/RG:	0	
7 Bsy						11 11 11		RG:Pref:0	InSv
8 RTS			Drwr:	01 23 45 67 89	01 23 45			Stby:1	InSv
9 OffL			.. . . . .						
10 LoadPM									
11 Disp_									
12 Next									
13									
14 QueryPM									
15									
16									
17									
18									

NT6X52
in RSC-S LCME (continued)*At the LCE frame*

5

**WARNING****Card damage—transport**

Take these precautions to protect the circuit cards from electrical and mechanical damage while transporting cards.

When handling a circuit card not in an electrostatic discharge (ESD) protective container, stand on a conductive floor mat and wear a wrist strap connected, through a 1-megohm resistor, to a suitably grounded object, such as a metal workbench or a DMS switch frame (Northern Telecom Corporate Standard 5028).

Store and transport circuit cards in an ESD protective container.

**WARNING****Equipment damage**

Take these precautions when removing or inserting a card:

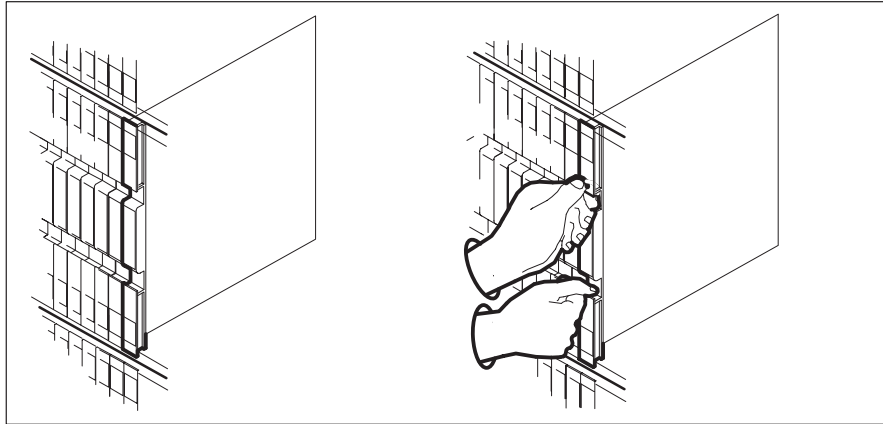
1. Do not apply direct pressure to the components.
2. Do not force the cards into the slots.

Put on a wrist strap.

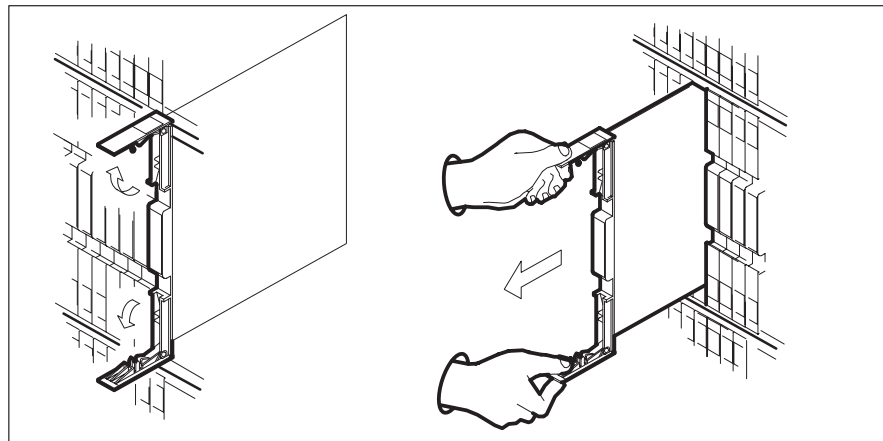
NT6X52 in RSC-S LCME (continued)

6 Remove the NT6X52 card as shown in the following figures.

a. Locate the card to be removed on the appropriate shelf.



b. Open the locking levers on the card to be replaced and gently pull the card toward you until it clears the shelf.

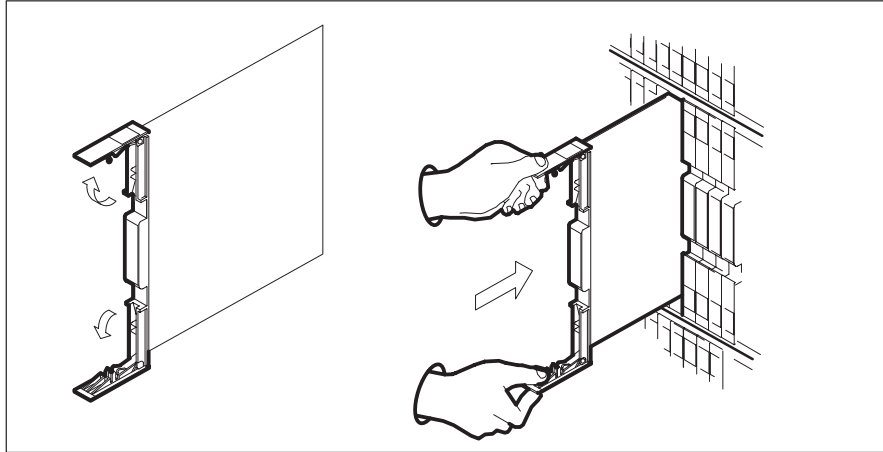


c. Ensure the replacement card has the same PEC, including suffix, as the card you just removed.

NT6X52
in RSC-S LCME (continued)

7 Open the locking levers on the replacement card.

- a. Align the card with the slots in the shelf.
- b. Gently slide the card into the shelf.



8

**WARNING****Equipment damage**

Take these precautions when removing or inserting a card:

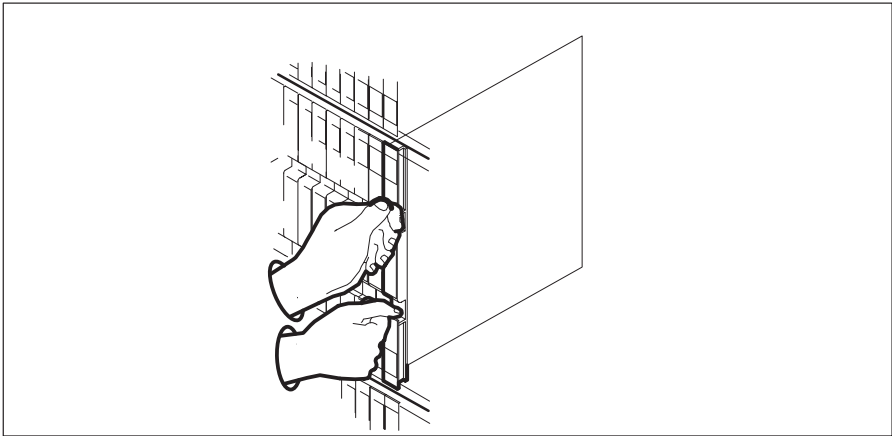
1. Do not apply direct pressure to the components.
2. Do not force the cards into the slots.

Seat and lock the card.

- a. Using your fingers or thumbs, push on the upper and lower edges of the faceplate to ensure the card is fully seated in the shelf.

NT6X52
in RSC-S LCME (continued)

b. Close the locking levers



At the MAP terminal

9 Load the inactive LCME unit by typing

>LOADPM UNIT lcme_unit_no CC

and pressing the Enter key.

where

lcme_unit_no is the number of the LCME unit busied in step 4

If load	Do
passed	step 10
failed	step 16

10 Test the LCME unit by typing

>TST UNIT lcme_unit_no

and pressing the Enter key.

where

lcme_unit_no is the number of the LCME unit loaded in step 9

If TST	Do
passed	step 11
failed	step 15

NT6X52
in RSC-S LCME (end)

- 11 Use the following information to determine where to proceed.

If you entered this procedure from	Do
alarm clearing procedures	step 15
other	step 12

- 12 Return the LCME unit to service by typing

>RTS UNIT lcme_unit_no

and pressing the Enter key.

where

lcme_unit_no is the number of the LCME unit tested in step 10

If RTS	Do
passed	step 13
failed	step 16

- 13 Send any faulty cards for repair according to local procedure.
- 14 Record the date the card was replaced, the serial number of the card, and the symptoms that prompted replacement of the card. Go to step 17.
- 15 Return to the procedure that directed you to this procedure. At the point where a faulty card list was produced, identify the next faulty card on the list and go to the appropriate card replacement procedure for that card in *Card Replacement Procedures*.
- 16 Obtain further assistance in replacing this card by contacting operating company maintenance personnel.
- 17 You have successfully completed this procedure. Return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.

NT6X53 in RSC-S LCM(E)

Application

Use this procedure to replace an NT6X53 card in an RSC-S LCM(E).

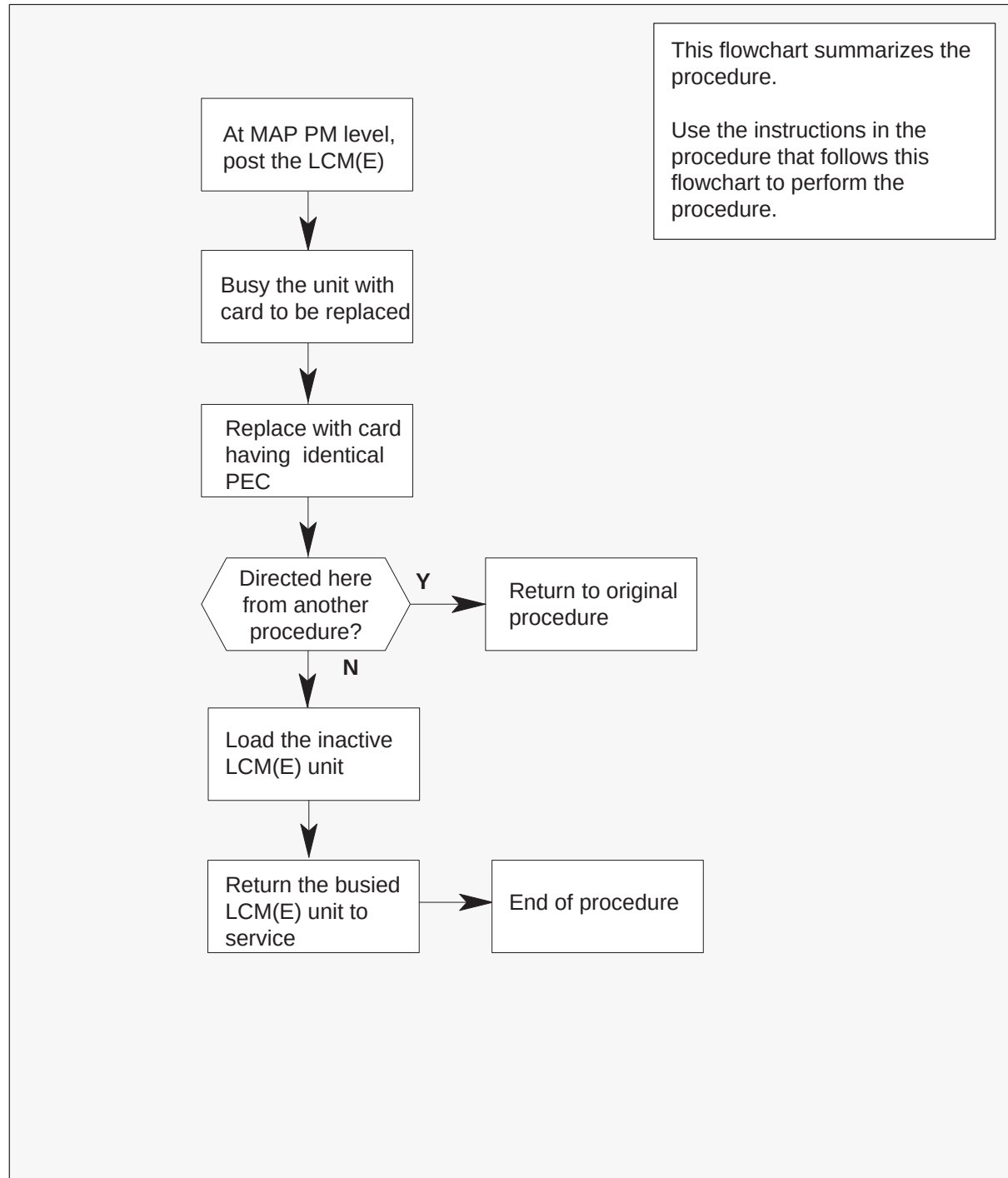
PEC	Suffixes	Name
NT6X53	CA	Power Converter

Common procedures

None

Action

The following flowchart is only a summary of the procedure. To replace the card, use the instructions in the procedure that follows the flowchart.

NT6X53
in RSC-S LCM(E) (continued)**Summary of card replacement procedure for an NT6X53 card in RSC-S LCM(E)**

NT6X53 in RSC-S LCM(E) (continued)

Replacing an NT6X53 card in RSC-S LCM(E)

At your Current Location

- 1 Proceed only if you have been directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure for verifying or accepting cards, or have been directed to this procedure by your maintenance support group.
- 2 Obtain an NT6X53 replacement card. Ensure the replacement card has the same product equipment code (PEC), including suffix, as the card that is to be removed.

At the MAP terminal

- 3 Set the MAP display to the PM level and post the LCM(E) unit by typing
>MAPCI;MTC;PM;POST LCM(E) lcm(e)_site_name lcm(e)_frame_no lcm(e)_no
 and pressing the Enter key.

where

lcm(e)_site_name is the name of the site at which the LCM(E) is located
 lcm(e)_frame_no is the number of the frame in which the LCM(E) is located
 lcm(e)_no is the number of the LCM(E) with the faulty card

Example of a MAP response:

CM	MS	IOD	Net	PM	CCS	LNS	Trks	Ext	Appl
.	.	.	.	.	.	.	.	.	.
LCME		SysB	ManB	OffL	CBsy	ISTb	InSv		
0 Quit	PM	4	0	10	3	3	130		
2 Post_	LCME	1	0	5	0	1	9		
3									
4 Swrg_	LCME	RemL	00 0	ISTb	Links_00S:	CSide	1		
5 TrnsL_	Unit-0:	InSv			/RG:	0			
6 Tst_	Unit-1:	InSv			/RG:	0			
7 Bsy_				11 11 11					
8 RTS_	Drwr:	01 23 45 67 89 01 23 45				RG:Pref:0	InSv		
9 OffL_		.. .. .				Stby:1	InSv		
10 LoadPM_									
11 Disp_									
12 Next_									
13									
14 QueryPM									
15									
16									
17									
18									

NT6X53 in RSC-S LCM(E) (continued)

- 4 Busy the LCM(E) by typing

>BSY UNIT lcm(e)_unit_no
and pressing the Enter key.

where

lcm(e)_unit_no is the number of the LCM(E) unit

Example of a MAP response:

CM	MS	IOD	Net	PM	CCS	LNS	Trks	Ext	Appl
.	.	.	.	1LCME	.	.	.	.	.
LCME		SysB	ManB	OffL	CBsy	ISTb	InSv		
0 Quit	PM	4	1	10	3	3	130		
2 Post_	LCME	1	1	5	0	1	9		
3									
4 SwRg		LCME	RemL	00 0	ISTb	Links_00S:	CSide	1	
5 Trnsl		Unit-0:	InSv	Mtce	TakeOver	/RG:	0		
6 Tst		Unit-1:	ManB	Mtce		/RG:	0		
7 Bsy				11 11 11		RG:Pref:0	InSv		
8 RTS		Drwr:	01 23 45 67 89	01 23 45		Stby:1	InSv		
9 OffL			.. .. .	.. .. .					
10 LoadPM									
11 Disp_									
12 Next									
13									
14 QueryPM									
15									
16									
17									
18									

NT6X53 in RSC-S LCM(E) (continued)

At the LCE frame

5



WARNING

Card damage—transport

Take these precautions to protect the circuit cards from electrical and mechanical damage while transporting cards.

When handling a circuit card not in an electrostatic discharge (ESD) protective container, stand on a conductive floor mat and wear a wrist strap connected, through a 1-megohm resistor, to a suitably grounded object, such as a metal workbench or a DMS switch frame (Northern Telecom Corporate Standard 5028).

Store and transport circuit cards in an ESD protective container.



WARNING

Equipment damage

Take these precautions when removing or inserting a card:

1. Do not apply direct pressure to the components.
2. Do not force the cards into the slots.

Put on a wrist strap.

- 6 Power down the shelf by setting the ON/OFF switch on the circuit breaker shelf to the OFF position. Both the converter FAIL LED and FRAME FAIL lamp on the FSP will be ON. An audible alarm may sound. If an alarm does sound, silence it by typing

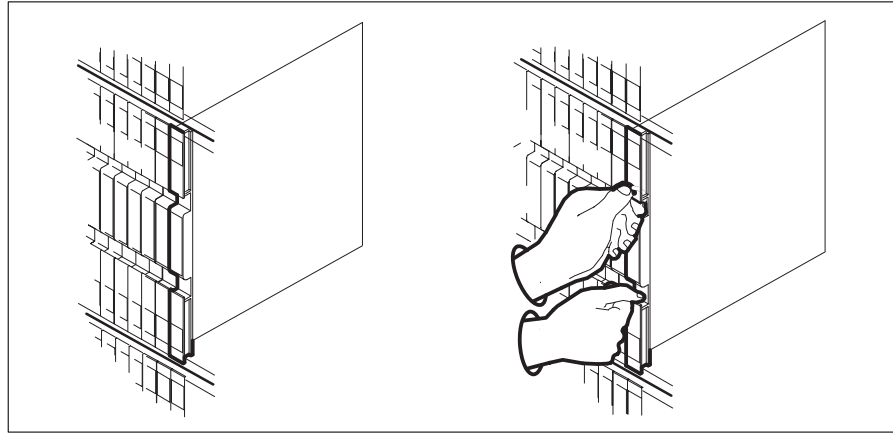
>SIL

and pressing the Enter key.

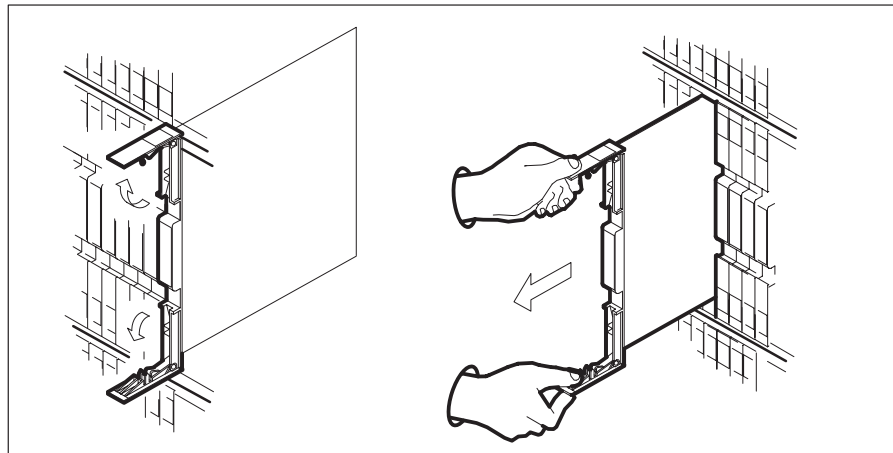
NT6X53 in RSC-S LCM(E) (continued)

7 Remove the NT6X53 card as shown in the following figures.

- a. Locate the card to be removed on the appropriate shelf.



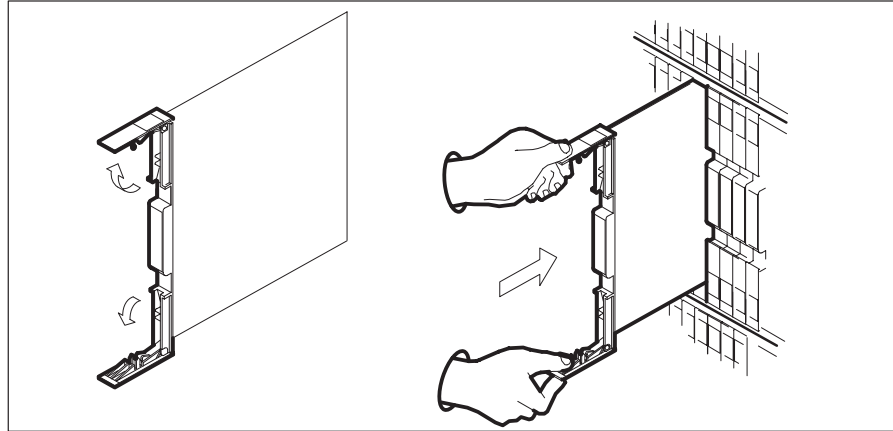
- b. Open the locking levers on the card to be replaced and gently pull the card toward you until it clears the shelf.
- c. Ensure the replacement card has the same PEC, including suffix, as the card you just removed.



NT6X53 in RSC-S LCM(E) (continued)

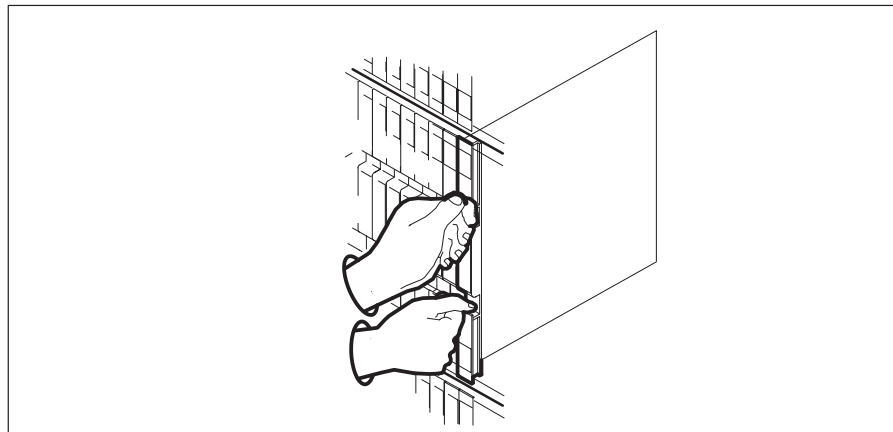
8 Open the locking levers on the replacement card.

- a. Align the card with the slots in the shelf.
- b. Gently slide the card into the shelf.



9 Seat and lock the card.

- a. Using your fingers or thumbs, push on the upper and lower edges of the faceplate to ensure the card is fully seated in the shelf.
- b. Close the locking levers.



NT6X53
in RSC-S LCM(E) (continued)

10 Power up the LCM(E) unit as follows:

- a. Ensure the power converter (NT6X53) is inserted. A major audible alarm may sound. This alarm is silenced when power is restored to the converter.
- b. Set the POWER switch on the circuit breaker to the ON position.

At the MAP terminal

11 Load the LCM(E) unit by typing

>LOADPM UNIT lcm(e)_unit_no CC
and pressing the Enter key.

where

lcm(e)_unit_no is the number of the LCM(E) unit busied in step 4

If load	Do
passed	step 12
failed	step 18

12 Test the LCM(E) unit by typing

>TST UNIT lcm(e)_no
and pressing the Enter key.

where

lcm(e)_unit_no is the number of the LCM(E) unit loaded in step 11

If TST	Do
passed	step 13
failed	step 17

13 Use the following information to determine what step to go to next in this procedure.

If you entered this procedure from	Do
alarm clearing procedures	step 17
other	step 14

NT6X53 in RSC-S LCM(E) (end)

- 14 Return the LCM(E) unit to service by typing

>RTS UNIT lcm(e)_unit_no
and pressing the Enter key.

where

lcm(e)_unit_no is the number of the LCM(E) unit tested in step 12

If RTS	Do
passed	step 15
failed	step 18

- 15 Send any faulty cards for repair according to local procedure.
- 16 Record the date the card was replaced, the serial number of the card, and the symptoms that prompted replacement of the card. Go to step 19.
- 17 Return to *Alarm and Performance Monitoring Procedures* or the other procedure that directed you to this procedure. At the point where a faulty card list was produced, identify the next faulty card on the list and go to the appropriate card replacement procedure for that card in this manual.
- 18 Obtain further assistance in replacing this card by contacting operating company maintenance personnel.
- 19 You have successfully completed this procedure. Return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.

**NT6X54
in RSC-S LCM(E)**

Application

Use this procedure to replace an NT6X54 card in an RSC-S LCM(E).

PEC	Suffixes	Name
NT6X54	AA	Bus Interface Card (BIC)

Common procedures

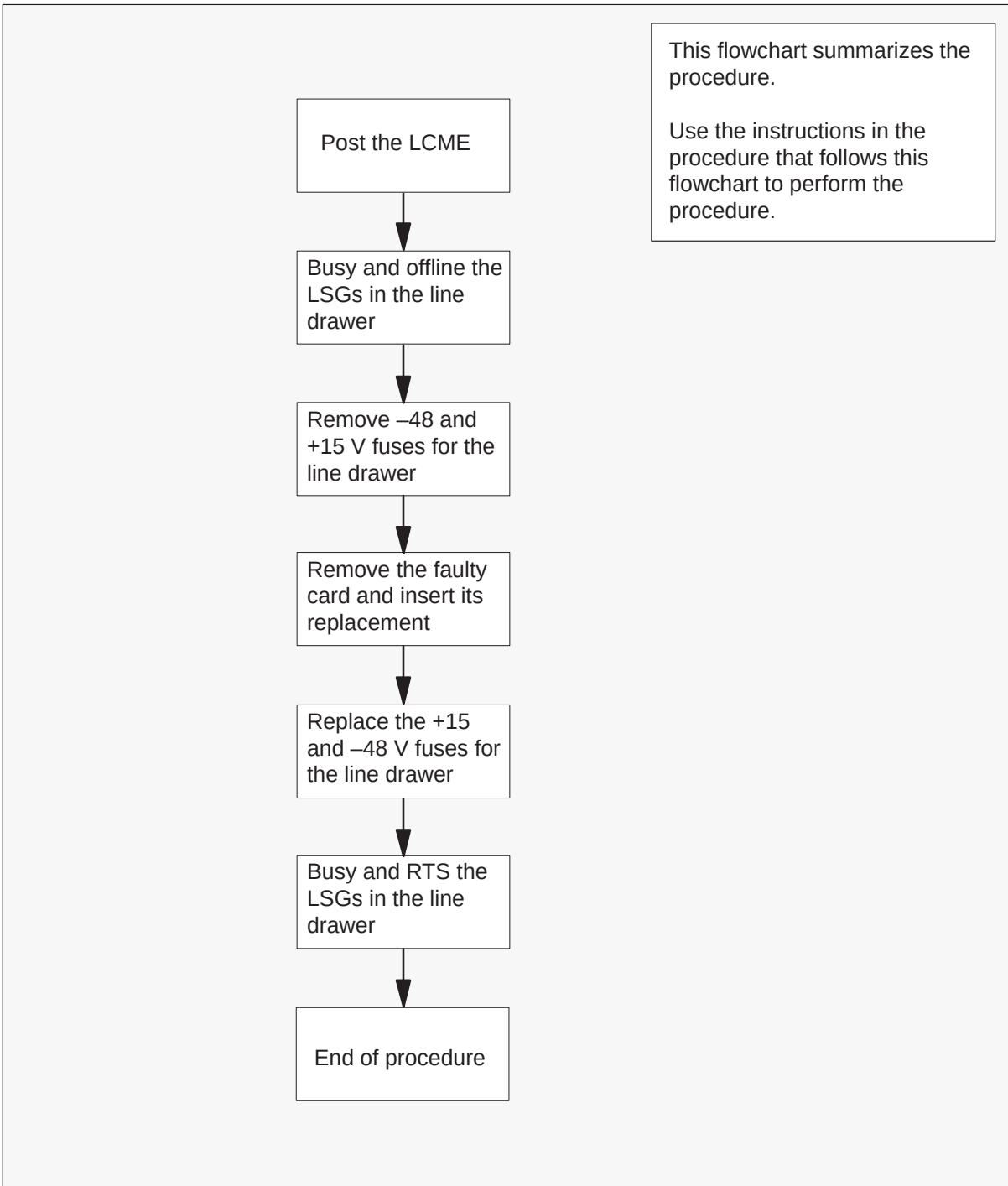
None

Action

The following flowchart is only a summary of the procedure. To replace the card, use the instructions in the procedure that follows the flowchart.

NT6X54 in RSC-S LCM(E) (continued)

Summary of card replacement procedure for an NT6X54 card in RSC-S LCM(E)



NT6X54 in RSC-S LCM(E) (continued)

Replacing an NT6X54 card in RSC-S LCM(E)

At your Current Location

- 1 Proceed only if you have been directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure for verifying or accepting cards, or have been directed to this procedure by your maintenance support group.
- 2 Obtain a replacement card. Ensure that the replacement card has the same product equipment code (PEC), including suffix, as the card that is to be removed.

At the MAP terminal

- 3 Post the LCME with the LCA shelf containing the card to be replaced by typing
>MAPCI;MTC;PM;POST LCME lcme_site_name lcme_frame_no lcme_no
 and pressing the Enter key.

where

lcme_site_name is the name of the site at which the LCME is located
 lcme_frame_no is the number of the frame in which the LCME is located
 lcme_no is the number of the LCME with the faulty card

Example of a MAP display:

CM	MS	IOD	Net	PM	CCS	LNS	Trks	Ext	Appl
.	.	.	.	1LCM	.	.	.	.	.
LCM		SysB	ManB	OffL	CBsy	ISTb	InSv		
0 Quit	PM	0	0	0	0	0	130		
2 Post_	LCME	0	0	0	0	0	0		
3									
4 SwRg	LCME	RemL	00 0	ISTb	Links_00S:	CSide	1		
5 TrnsL	Unit0:	InSv			/RG:	0			
6 Tst	Unit1:	InSv			/RG:	0			
7 Bsy				11 11 11	RG:Pref	0	InSv		
8 RTS	Drwr:	01 23 45 67 89	01 23 45		RG:Stby:	1	InSv		
9 OffL		.. .. .	.. .. .						
10 LoadPM									
11 Disp_									
12 Next									
13									
14 QueryPM									
15									
16									
17									
18									

NT6X54 in RSC-S LCM(E) (continued)

- 4 Busy both line subgroups (LSG) associated with the LCME drawer in which the card is being replaced by typing

>BSY DRWR lsg

and pressing the Enter key.

where

lsg is a line subgroup associated with the drawer

Example of a MAP response:

Please confirm ("YES" or "NO")

Confirm the system prompt by typing

>YES

and pressing the Enter key.

Repeat this step for other line subgroups associated with the drawer.

- 5 Offline the LSGs busied in step 4 by typing

>OFFL DRWR lsg

and pressing the Enter key.

where

lsg is a line subgroup busied in step 4

At the LCE frame

- 6 Remove the -48V fuse for the line drawer containing the bus interface card (BIC) to be replaced.
- 7 Remove the +15V fuse for the line drawer containing the BIC to be replaced.

NT6X54
in RSC-S LCM(E) (continued)

8

**WARNING****Card damage—transport**

Take these precautions to protect the circuit cards from electrical and mechanical damage while transporting cards.

When handling a circuit card not in an electrostatic discharge (ESD) protective container, stand on a conductive floor mat and wear a wrist strap connected, through a 1-megohm resistor, to a suitably grounded object, such as a metal workbench or a DMS switch cabinet (Northern Telecom Corporate Standard 5028).

Store and transport circuit cards in an ESD protective container.

**WARNING****Static electricity damage**

Before removing any cards, put on a wrist strap and connect it to the wrist strap grounding point on the left side of the frame supervisory panel (FSP) of the LCME. This protects the equipment against damage caused by static electricity.

**WARNING****Equipment damage**

Take these precautions when removing or inserting a card:

1. Do not apply direct pressure to the components.
2. Do not force the cards into the slots.

Put on a wrist strap.

9 Open the line drawer by following these substeps:

- a. Face the drawer shelf and grasp the lip at the bottom of the drawer.

NT6X54 in RSC-S LCM(E) (continued)

- b. Push up on the drawer latch with your thumb and pull the drawer out approximately 15 cm (about 6 in).

10



WARNING

Hot materials

Exercise care when handling the line card. The line feed resistor may be very hot.

Remove the BIC to be replaced by following these substeps:

- a. Open the locking levers on the BIC.
- b. Grasping the open locking levers, remove the card from the line drawer in one steady motion. The card will unplug from its socket.

Note: Do not use a rocking motion to remove the card.

11 Replace the faulty card by following these substeps:

- a. Remove the replacement card from the ESD container.
- b. Close the locking levers on the card.
- c. Position the card in its backplane socket. In one steady motion, push against the closed locking levers with your thumbs until the card plugs fully into the backplane socket.

Note: Do not use a rocking motion to insert the card.

- d. Close the line drawer.

12 Replace the +15V fuse associated with the line drawer.

13 Replace the -48V fuse associated with the line drawer.

14 Use the following information to determine what step to go to next in this procedure.

If you entered this procedure from	Do
an alarm clearing procedure	step 19
other	step 15

NT6X54
in RSC-S LCM(E) (end)

At the MAP terminal

- 15** Busy the offline LSGs associated with the LCME drawer by typing

>BSY DRWR lsg

and pressing the Enter key.

where

lsg is a line subgroup associated with the drawer

Repeat this step for other LSGs associated with the drawer.

- 16** Return the LSGs to service by typing

>RTS DRWR lsg

and pressing the Enter key.

where

lsg is a line subgroup associated with the drawer

If RTS	Do
passed	step 17
failed	step 20

- 17** Send any faulty cards for repair according to local procedure.
- 18** Record the date the card was replaced, the serial number of the card, and the symptoms that prompted replacement of the card. Go to step 21.
- 19** Return to *Alarm and Performance Monitoring Procedures* or the other procedure that directed you to this procedure. At the point where a faulty card list was produced, identify the next faulty card on the list and go to the appropriate card replacement procedure for that card in this manual.
- 20** Obtain further assistance in replacing this card by contacting the personnel responsible for higher level of support.
- 21** You have successfully completed this procedure. Return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.

NT6X69 in RSC-S RCO2

Application

Use this procedure to replace the following card in an RSC-S RCO2.

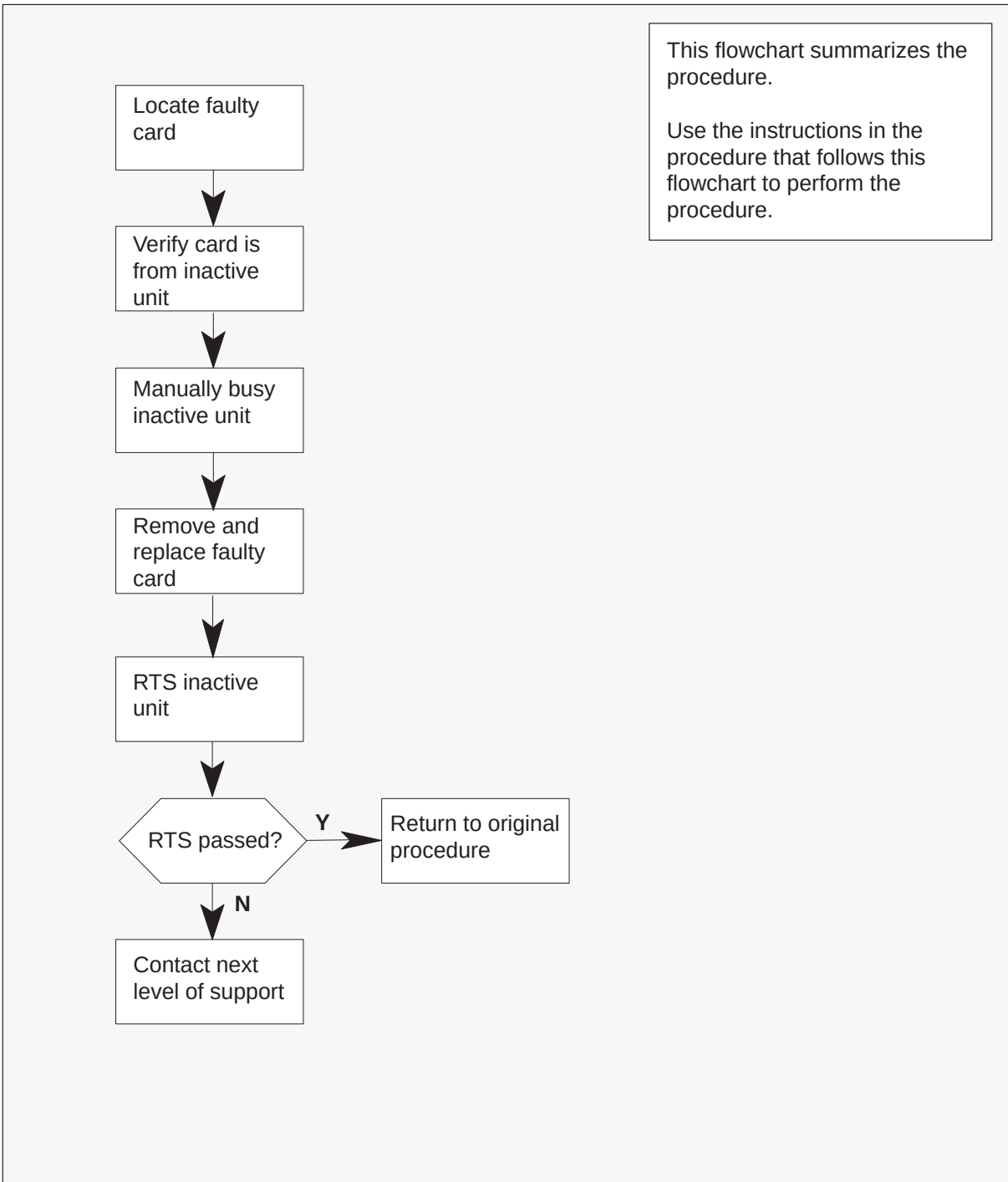
PEC	Suffixes	Name
NT6X69	AC, AD, QA	Message and Tone Card

Common procedures

None

Action

The following flowchart is only a summary of the procedure. To replace the card, use the instructions in the procedure that follows the flowchart.

NT6X69
in RSC-S RCO2 (continued)**Summary of card replacement procedure for an NT6X69 card in RSC-S RCO2**

NT6X69 in RSC-S RCO2 (continued)

Replacing an NT6X69 in an RSC-S RCO2

At your Current Location

- 1 Proceed only if you have been directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure for verifying or accepting cards, or have been directed to this procedure by your maintenance support group.

2



CAUTION

Loss of service

When replacing a card in the RCO2, ensure that the unit in which you are replacing the card is *inactive* and that the mate unit is *active*.

Obtain a replacement card. Ensure that the replacement card has the same product equipment code (PEC), including suffix, as the card that is to be removed.

At the MAP terminal

- 3 Ensure the PM level of the MAP display is currently displayed by typing
>MAPCI;MTC;PM;POST RCO2 rco2_no
and pressing the Enter key.
where
rco2_no is the number of the rco2 with the faulty card

NT6X69 in RSC-S RCO2 (continued)

Example of a MAP display:

CM	MS	IOD	Net	PM	CCS	LNS	Trks	Ext	Appl
.	.	.	.	.	.	.	.	.	.
RCO2			SysB	ManB	OffL	CBsy	ISTb	InSv	
0 Quit	PM	0	0	0	0	0	0	25	
2 Post_	RCO2	0	0	0	0	0	0	0	
3 ListSet									
4	RCO2	0 InSv	Links_00S:						
5 TRNSL	Unit0:	Inact	InSv						
6 TST	Unit1:	Act	InSv						
7 BSY									
8 RTS									
9 OffL									
10 LoadPM_									
11 Disp_									
12 Next_									
13									
14 QueryPM									
15									
16									
17									
18									

- 4 By observing the MAP display, be sure that the card to be removed is on the inactive unit.

If faulty card is on	Do
active unit	step 5
inactive unit	step 8

- 5 Switch the processing activity (SWACT) to the inactive unit by typing

>SWACT

and pressing the Enter key.

Note: If the system recommends using the SWACT command with the FORCE option, consult office personnel to determine if use of the FORCE option is advisable.

- 6 Confirm the system prompt by typing

>YES

and pressing the Enter key.

After both units are in service, proceed to step 8.

NT6X69 in RSC-S RCO2 (continued)

- 7 Confirm the system prompt by typing

>YES

and pressing the Enter key.

After both units are in service, proceed to the next step.

At the RCE

- 8 Put a sign on the *active* unit bearing the words “Active unit—Do not touch.”
This sign should not be attached by magnets or tape.

At the MAP terminal

- 9 Busy the inactive PM unit by typing

>BSY UNIT rco2_unit_no

and pressing the Enter key.

where

rco2_unit_no is the number of the inactive RCO2 unit (0 or 1)

- 10 Set the PM to the ROM level and inhibit messaging by typing

>PMRESET UNIT rco2_unit_no NORUN

and pressing the Enter key.

where

rco2_unit_no is the number of the inactive RCO2 unit (0 or 1)

NT6X69
in RSC-S RCO2 (continued)*At the RCE*

11

**WARNING****Static electricity damage**

Before removing any cards, put on a wrist strap and connect it to the wrist strap grounding point on the left side of the modular supervisory panel (MSP) of the RCO2. This protects the equipment against damage caused by static electricity.

**WARNING****Equipment damage**

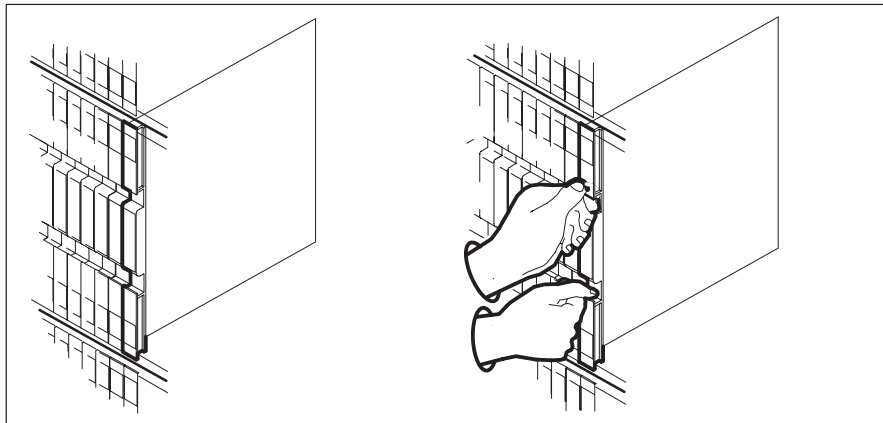
Take these precautions when removing or inserting a card:

1. Do not apply direct pressure to the components.
2. Do not force the card into its slot.

Put on a wrist strap.

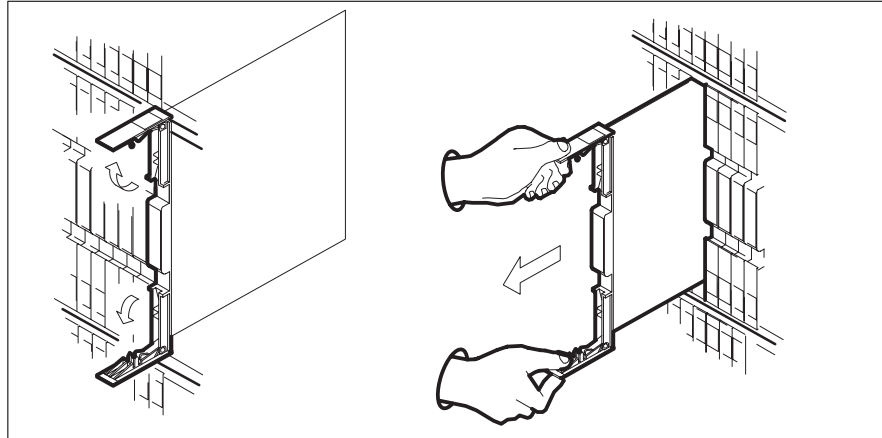
12 Remove the NT6X69 card as shown in the following figures.

a. Locate the card to be removed on the appropriate shelf.



NT6X69
in RSC-S RCO2 (continued)

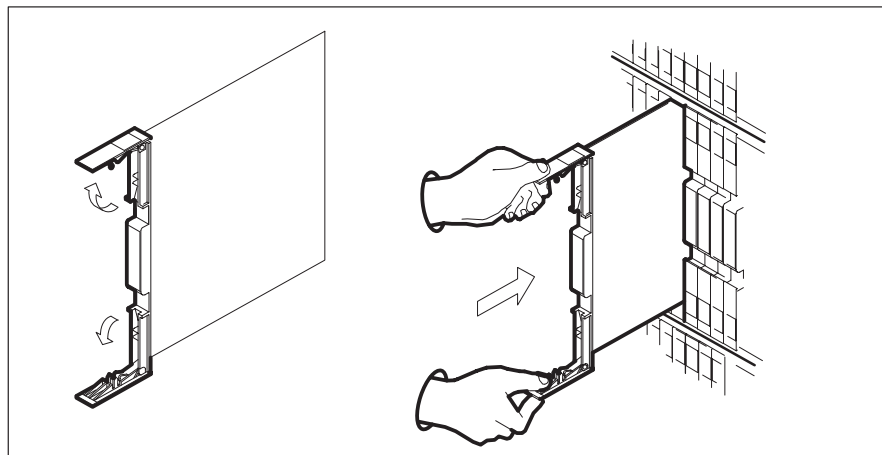
- b. Open the locking levers on the card to be replaced and gently pull the card toward you until it clears the shelf.



- c. Ensure the replacement card has the same PEC, including suffix, as the card you just removed.

13 Open the locking levers on the replacement card.

- a. Align the card with the slots in the shelf.
- b. Gently slide the card into the shelf.



NT6X69
in RSC-S RCO2 (continued)

14



CAUTION

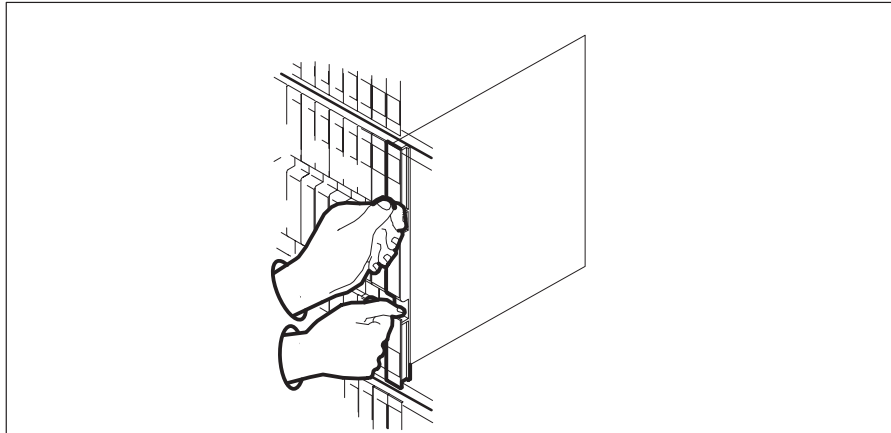
Loss of subscriber service

Subscriber service may be lost in the active unit when reseating the NT6X69 card.

It is recommended that this procedure be performed during low traffic periods.

Seat and lock the card.

- a. Using your fingers or thumbs, push on the upper and lower edges of the faceplate to ensure that the card is fully seated in the shelf.
- b. Close the locking levers.



NT6X69 in RSC-S RCO2 (continued)

At the MAP terminal

- 15** Perform a full reset of the inactive unit by typing

>PMRESET UNIT rco2_unit_no
and pressing the Enter key.

where

rco2_unit_no is the number of the inactive RCO2 unit (0 or 1)

If PMRESET	Do
passed	step 18
fails, try reloading this unit	step 16
fails with a card list	step 21

- 16** Load the inactive unit by typing

>LOADPM UNIT rco2_unit_no CC
and pressing the Enter key.

where

rco2_unit_no is the number of the inactive RCO2 unit (0 or 1)

If LOADPM	Do
passed	step 17
failed	step 22
fails with a card list	step 21

- 17** Use the following information to determine what step to go to next in this procedure.

If you entered this procedure from	Do
alarm clearing procedures	step 21
other	step 18

NT6X69
in RSC-S RCO2 (end)

- 18** Return the inactive RCO2 unit to service by typing

>RTS UNIT rco2_unit_no

and pressing the Enter key.

where

rco2_unit_no is the number of the inactive RCO2 unit (0 or 1)

If RTS	Do
passed	step 19
failed	step 22

- 19** Send any faulty cards for repair according to local procedure.
- 20** Record the date the card was replaced, the serial number of the card, and the symptoms that prompted replacement of the card. Go to step 23.
- 21** Return to the procedure that directed you to this procedure. At the point where a faulty card list was produced, identify the next faulty card on the list and go to the appropriate card replacement procedure for that card in this manual.
- 22** Obtain further assistance in replacing this card by contacting the personnel responsible for higher level of support.
- 23** You have successfully completed this procedure. Remove the sign from the active unit and return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.

NT6X71 in RSC-S LCME

Application

Use this procedure to replace an NT6X71 card in an RSC-S LCME.

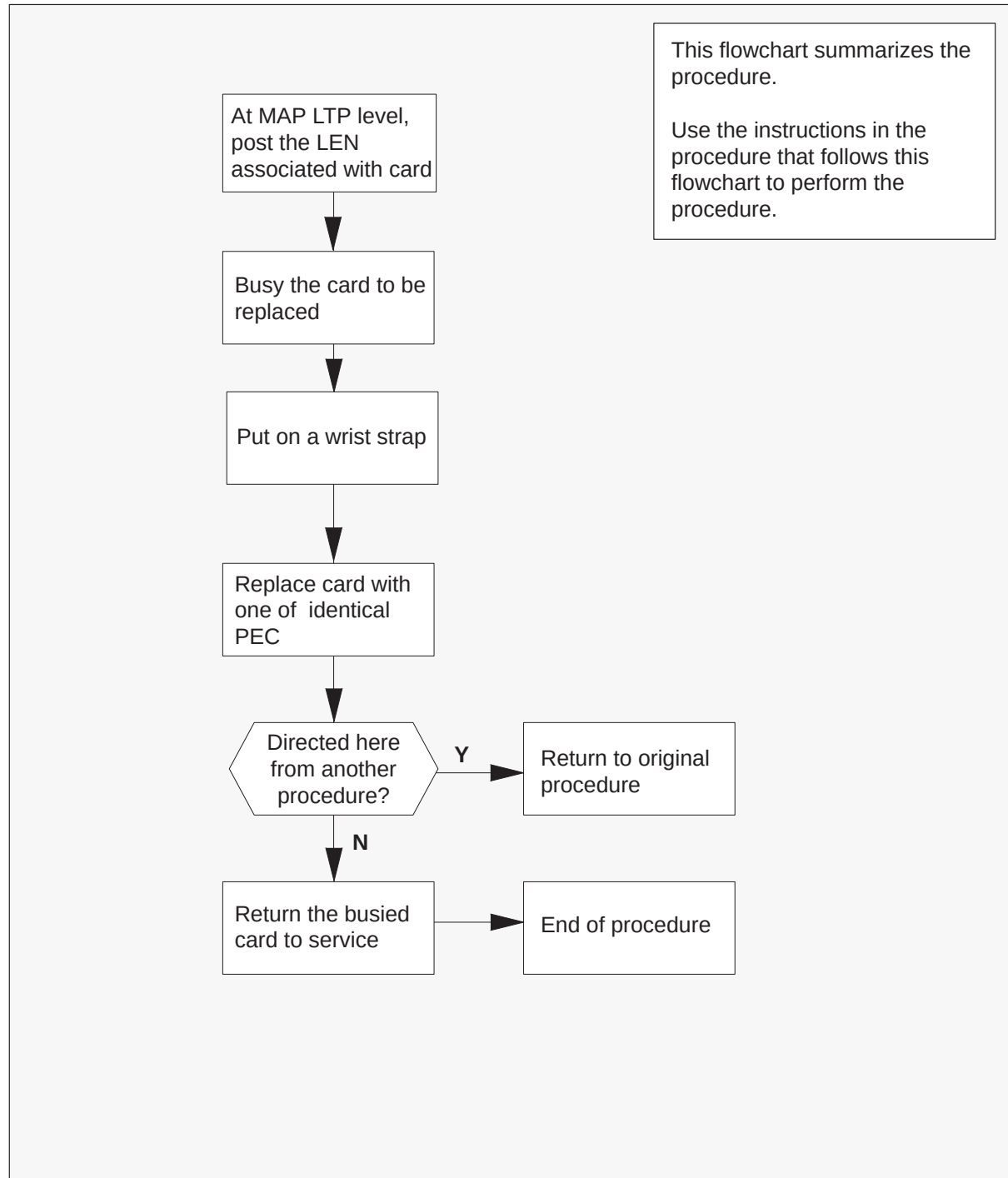
PEC	Suffixes	Name
NT6X71	AA, AB	Data Line card (DLC)

Common procedures

None

Action

The following flowchart is only a summary of the procedure. To replace the card, use the instructions in the procedure that follows the flowchart.

NT6X71
in RSC-S LCME (continued)**Summary of card replacement procedure for an NT6X71 card in RSC-S LCME**

NT6X71
in RSC-S LCME (continued)

Replacing an NT6X71 card in RSC-S LCME

At your Current Location

- 1 Proceed only if you have been directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure for verifying or accepting cards, or have been directed to this procedure by your maintenance support group.
- 2 Obtain a replacement card. Ensure the replacement card has the same product equipment code (PEC), including suffix, as the card that is to be removed.

At the MAP terminal

- 3 Post the LEN of the card to be replaced by typing
>MAPCI;MTC;LNS;LTP;POST L site lcme_no unit_no lsg_no ckt_no
and pressing the Enter key.

where

site is the location name of the LCME with the faulty card
lcme_no is the number of the LCME with the faulty card
unit_no is the number of the LCME unit with the faulty card
lsg_no is the number of the LSG with the faulty card
ckt_no is the number of the circuit associated with the faulty card

Example of a MAP display:

CM	MS	IOD	Net	PM	CCS	LNS	Trks	Ext	Appl
.	.	.	.	.	.	.	.	.	.
LTP									
0	Quit	Post	DELQ		BUSYQ		PREFIX		
2	Post_								
3		LCC	PTY	RNG....LEN...		DN	STA	F	S
4		CKT	TYPE	FL	HOST	00 0 03 03	4931082	IDL	RESULT
5	BSY								
6	RTS								
7	DIAG								
8									
9	AIMStat								
10	CKTLOC								
11	Hold								
12	Next_								
13									
14									
15									
16	Prefix								
17	LCO								
18	Level								

NT6X71 in RSC-S LCME (continued)

- 4 Busy the NT6X71 line card by typing

>BSY

and pressing the Enter key.

Example of a MAP display:

CM	MS	IOD	Net	PM	CCS	LNS	Trks	Ext	Appl
.	.	.	.	.	.	.	.	.	.
LTP									
0 Quit		Post		DELQ		BUSYQ		PREFIX	
2 Post_									
3		LCC PTY RNG.....	LEN.....	DN		STA F S LTA TE	RESULT		
4		CKT TYPE FL	HOST 00 0 03	03	4931082	IDL			
5 BSY									
6 RTS									
7 DIAG									
8									
9 AIMStat									
10 CKTLOC									
11 Hold									
12 Next_									
13									
14									
15									
16 Prefix									
17 LCO									
18 Level									

At the LCE frame

5



WARNING

Card damage—transport

Take these precautions to protect the circuit cards from electrical and mechanical damage while transporting cards.

When handling a circuit card not in an electrostatic discharge (ESD) protective container, stand on a conductive floor mat and wear a wrist strap connected, through a 1-megohm resistor, to a suitably grounded object, such as a metal workbench or a DMS switch frame.

Store and transport circuit cards in an ESD protective container.

NT6X71
in RSC-S LCME (continued)



WARNING
Equipment damage
Take these precautions when removing or inserting a card:
1. Do not apply direct pressure to the components.
2. Do not force the cards into the slots.



WARNING
Hot materials
Exercise care when handling the line card. The line feed resistor may be very hot.



CAUTION
Special tools required
Card shrouds and removal tools are required for removing cards from the line drawers.

Put on a wrist strap.

Line card insertion / withdrawal tool for	Apparatus code	Common product code
3-inch cards	QTH56A	A0298291
6-inch cards	QTH58A	A0313317

Note 1: Card shrouds are required for inserting or removing cards in line drawers. Two sizes are available for use with 3-inch and 6-inch cards. Descriptions of these shrouds follow.

Note 2: Card removal tools are required for removing cards from line drawers. Two sizes are available. Descriptions of these tools follow.

Card removal tool for	Apparatus code	Common product code
3–4 inch cards	QTH57A	A0298292
Note: For 4-inch or larger cards, use the large grip tool ITA9953.		

NT6X71
in RSC-S LCME (continued)

- 6 Prepare to remove the faulty card by opening the line drawer, determined in step 1, and following these substeps:
 - a. Face the drawer shelf and grasp the handle at the bottom of the drawer with your right hand.
 - b. Push up on the drawer latch with your thumb and pull the drawer out until fully withdrawn. It is fully withdrawn when the drawer stop, at the top, prevents further travel.
 - c. Maintain a slight pull on the handle and lift the faceplate of the drawer approximately 2.5 cm (1 in).
 - d. While holding the drawer in this position, push the bottom of the drawer, nearest the shelf with your left hand, to a position about 1 cm (.5 in) to the right.
 - e. Hold the drawer in this position with your left hand and lower the faceplate of the drawer by releasing the grip of your right hand.
 - f. Ensure a card shroud and line card extractor are available.
- 7 Remove the line card to be replaced by following these substeps:
 - a. Slide a card shroud over the card to be removed and an adjacent card. If there is not an adjacent card on either side, do not use the card shroud.
 - b. Grasp the edge of the card with a line card extractor at a point midway between the top and bottom edges. Hold the extractor in your right hand.
 - c. Squeeze the handles of the extractor together to grasp the card tightly.
 - d. Hold the front cover of the line drawer to steady it using your left hand.
 - e. Pull the extractor away from the drawer, and the card will become unplugged from its socket on the drawer backplane.
 - f. Continue pulling the card with the extractor until the card is clear of the shroud.
 - g. Insert the removed card into the ESD container and store using local procedures.
- 8 Replace the faulty card by following these substeps:
 - a. Remove the replacement card from the ESD container.
 - b. Slide the card in the shroud guide slots toward the drawer backplane.

NT6X71 in RSC-S LCME (continued)

- c. Hold the front cover of the line drawer with your left hand to steady it.
 - d. Grasp the top and bottom edges of the card with the fingers of your right hand.
 - e. Push the card toward the backplane until it plugs fully into the backplane socket.
- 9 Use the following information to determine where to proceed.

If you entered this procedure from	Do
alarm clearing procedures	step 14
other	step 10

At the MAP terminal

- 10 Test the NT6X71 line card by typing

>DIAG

and pressing the Enter key.

If DIAG	Do
passed	step 11
failed	step 14

- 11 Return the NT6X71 card to service by typing

>RTS

and pressing the Enter key.

If RTS	Do
passed	step 12
failed	step 15

- 12 Send any faulty cards for repair according to local procedure.
- 13 Record the date the card was replaced, the serial number of the card, and the symptoms that prompted replacement of the card. Go to step 16.

NT6X71
in RSC-S LCME (end)

- 14 Return to *Alarm Clearing Procedures* or another procedure that directed you to this procedure. If necessary, go to the point where a faulty card list was produced, identify the next faulty card on the list, and go to the appropriate card replacement procedure for that card in this manual.
- 15 Obtain further assistance in replacing this card by contacting operating company maintenance personnel.
- 16 You have successfully completed this procedure. Return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.

NT6X74 in RSC-S RMM

Application

Use this procedure to replace an NT6X74 card in an RSC-S RMM.

PEC	Suffixes	Name
NT6X74	AB	RMM Control Card (RMMC)

Common procedures

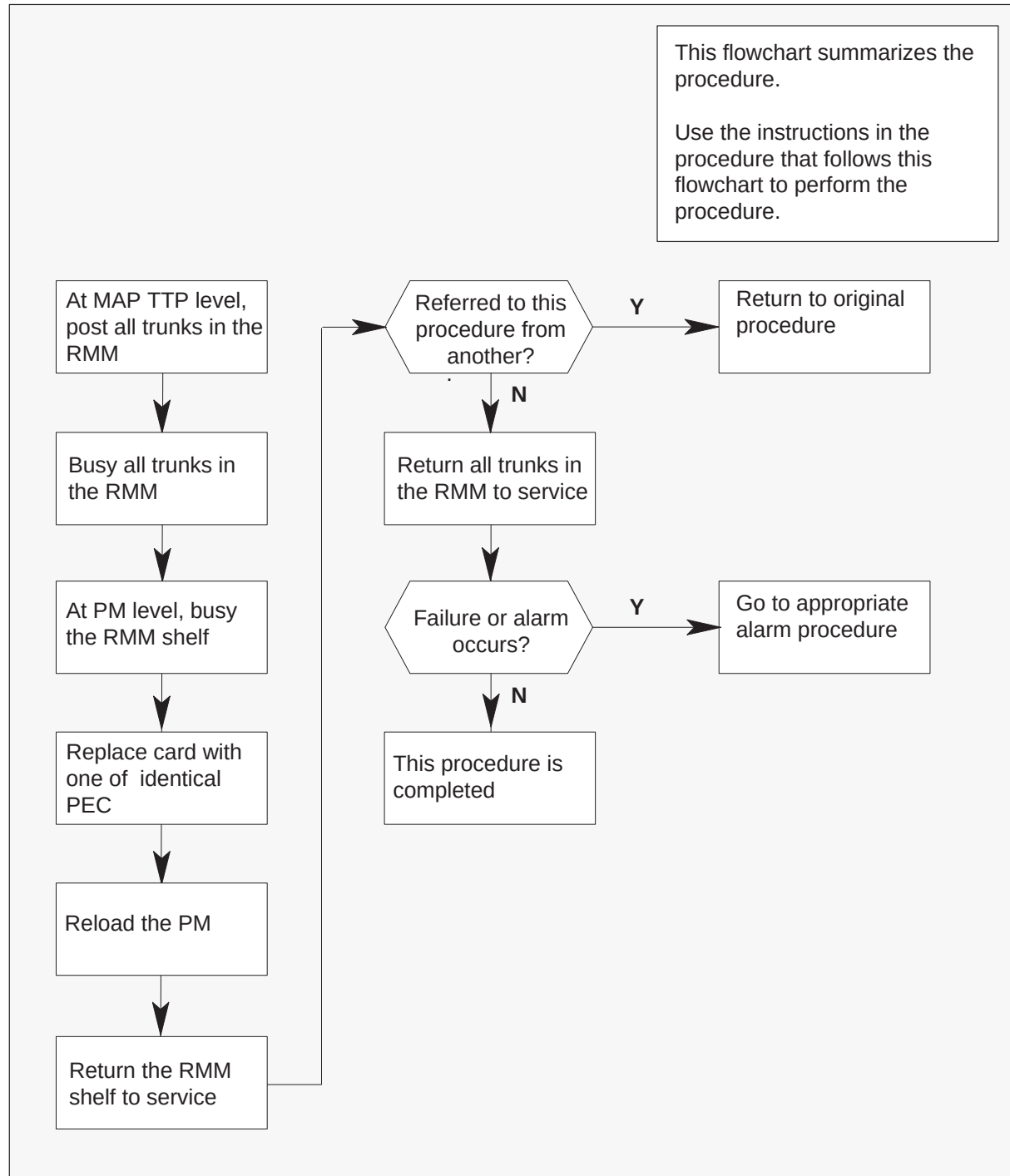
None

Action

The following flowchart is only a summary of the procedure. To replace the card, use the instructions in the procedure that follows the flowchart.

NT6X74 in RSC-S RMM (continued)

Summary of card replacement procedure for an NT6X74 card in RSC-S RMM



NT6X74 in RSC-S RMM (continued)

Replacing an NT6X74 card in an RSC-S RMM

At the MAP terminal

- 1 Proceed only if you have been directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure for verifying or accepting cards or have been directed to this procedure by your maintenance support group.
- 2 Set the MAP display to the PM level and post the RMM by typing
>MAPCI;MTC;TRKS;TTP;POST TM rmm_no
and pressing the Enter key.
where
rmm_no is the number of the RMM in which the card is to be replaced
- 3 Busy all trunks in the RMM by typing
>BSY INB ALL
and pressing the Enter key.
- 4 At the PM level, busy the RMM shelf by typing
>PM;POST RMM rmm_no;BSY
and pressing the Enter key.
where
rmm_no is the number of the RMM in which the card is to be replaced

NT6X74
in RSC-S RMM (continued)

Example of a MAP display:

CM	MS	IOD	Net	PM	CCS	LNS	Trks	Ext	APPL
.	.	.	.	4SysB	.	.	.	.	.
RMM			SysB	ManB	OffL	CBsy	ISTb	InSv	
0	Quit	PM	4	1	10	3	3	130	
2	Post_	RMM	0	1	1	0	0	2	
3									
4		RMM	5	ManB					
5	Trnsl								
6	Tst								
7	Bsy								
8	RTS								
9	OffL								
10	LoadPM								
11	Disp_								
12	Next								
13									
14	QueryPM								
15									
16									
17									
18									

At the RMM shelf

5



WARNING
Static electricity damage
Before removing any cards, put on a wrist strap and connect it to the wrist strap grounding point on the left side of the frame supervisory panel (FSP) of the RMM. This protects the equipment against damage caused by static electricity.



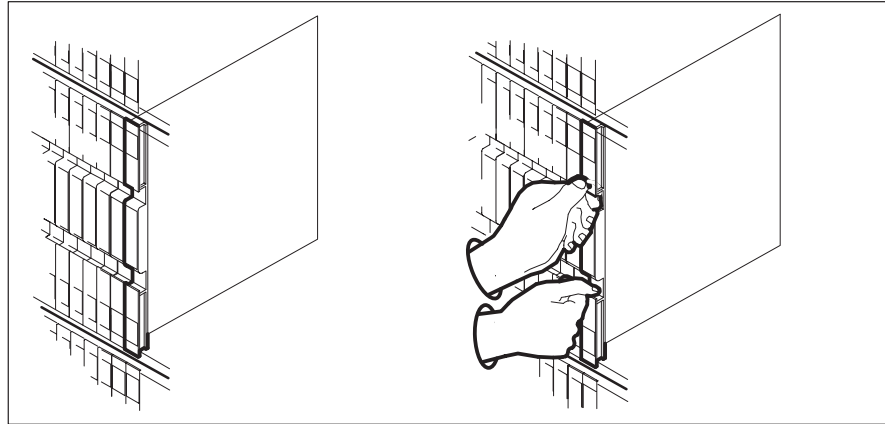
WARNING
Improper insertion may cause damage to circuit packs
1. Do not apply direct pressure to the components.
2. Do not force the card into its slot.

Put on a wrist strap.

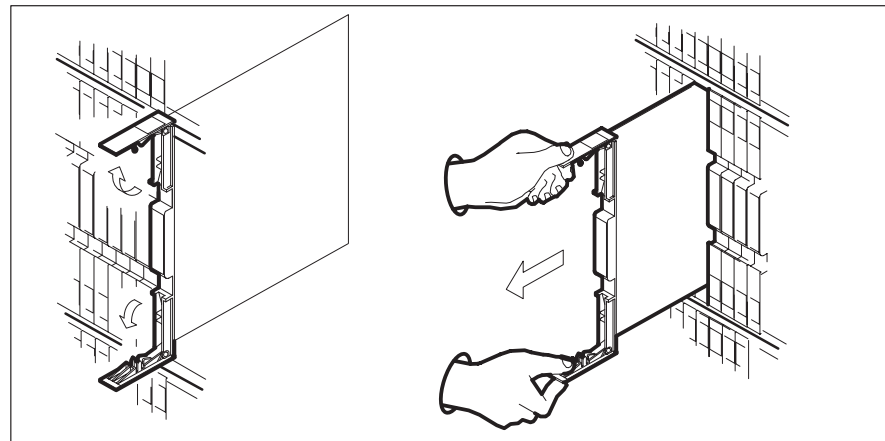
NT6X74 in RSC-S RMM (continued)

6 Remove the NT6X74 card as shown in the following figures.

a. Locate the card to be removed on the appropriate shelf.



b. Open the locking levers on the card to be replaced and gently pull the card toward you until it clears the shelf.

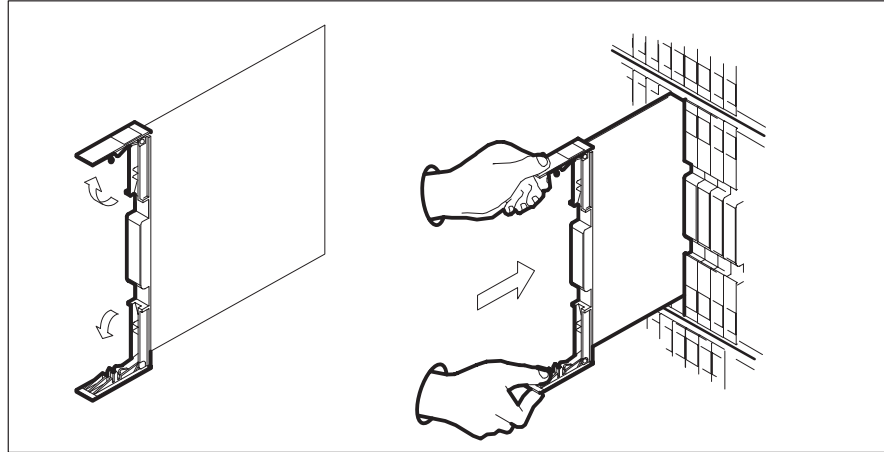


c. Ensure the replacement card has the same PEC, including suffix, as the card you just removed.

NT6X74
in RSC-S RMM (continued)

7 Open the locking levers on the replacement card.

- a. Align the card with the slots in the shelf.
- b. Gently slide the card into the shelf.



8



WARNING

Equipment damage

Take these precautions when removing or inserting a card:

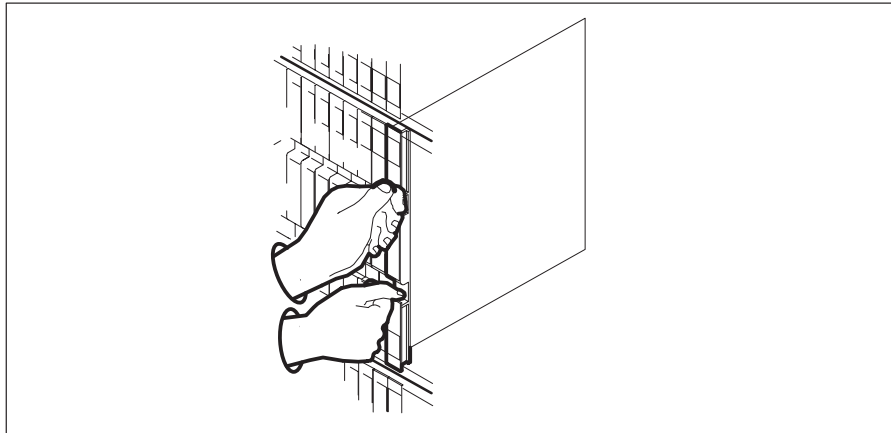
1. Do not apply direct pressure to the components.
2. Do not force the card into its slot.

Seat and lock the card.

- a. Using your fingers or thumbs, push on the upper and lower edges of the faceplate to ensure the card is fully seated in the shelf.

NT6X74
in RSC-S RMM (continued)

- b. Close the locking levers.



- 9 Reload the RMM by typing
>LOADPM
and pressing the Enter key.
- 10 Use the following information to determine where to proceed.

If	Do
loadfile not found in directory	step 11
load passes	step 15
load fails	step 22

- 11 Refer to the following table to determine the next step in this procedure.

If the system load module is	Do
version 1	step 12
version 2	step 13

NT6X74
in RSC-S RMM (continued)

- 12** List the loadfile in the directory by typing

>DSKUT;LISTVOL D000 ALL
and pressing the Enter key.

or

>DSKUT;LISTVOL D010 ALL
and pressing the Enter key.

Local operating company policy determines which disk, D000 or D010, the loadfile will be on.

Proceed to step 14.

- 13** List the loadfile in the directory by typing

>DISKUT;LV S00D
>LF
and pressing the Enter key.

or

>DISKUT;LV S01D
>LF
and pressing the Enter key.

- 14** Leave the disk utility by typing

>QUIT
and pressing the Enter key.
Return to step 9.

- 15** Return the RMM shelf to service by typing

>RTS
and pressing the Enter key.

If RTS	Do
passed	step 16
failed	step 22

NT6X74 in RSC-S RMM (end)

- 16 Continue this procedure depending on where you were directed to this procedure.

If directed to this procedure from	Do
an alarm clearing procedure	step 21
other	step 17

At the MAP terminal

- 17 Post all trunks in the RMM in order to return to them service by typing
>TRKS;TTP;POST TM RMM rmm_no
and pressing the Enter key.
where
rmm_no is the number of the RMM in which the card has been replaced
- 18 Busy and return to service all trunks by typing
>BSY ALL;RTS ALL
and pressing the Enter key.
- 19 Use the following information to determine where to proceed.

If RTS	Do
passed	step 20
failed	step 22

- 20 Observe the alarm that is produced and go to the appropriate procedure in *Alarm CLearing Procedures*. Go to step 23.
- 21 Return to the procedure that directed you to this procedure. At the point where a faulty card list was produced, identify the next faulty card on the list and go to the appropriate card replacement procedure for that card in *Card Replacement Procedures*.
- 22 Obtain further assistance in replacing this card by contacting the personnel responsible for higher level of support.
- 23 You have successfully completed this procedure. Return to the maintenance procedure that directed you to this procedure and continue as directed.

**NT6X76
in RSC-S LCME**

Application

Use this procedure to replace an NT6X76 card in an RSC-S LCME.

PEC	Suffixes	Name
NT6X76	AC	Asynchronous Interface Line card

Common procedures

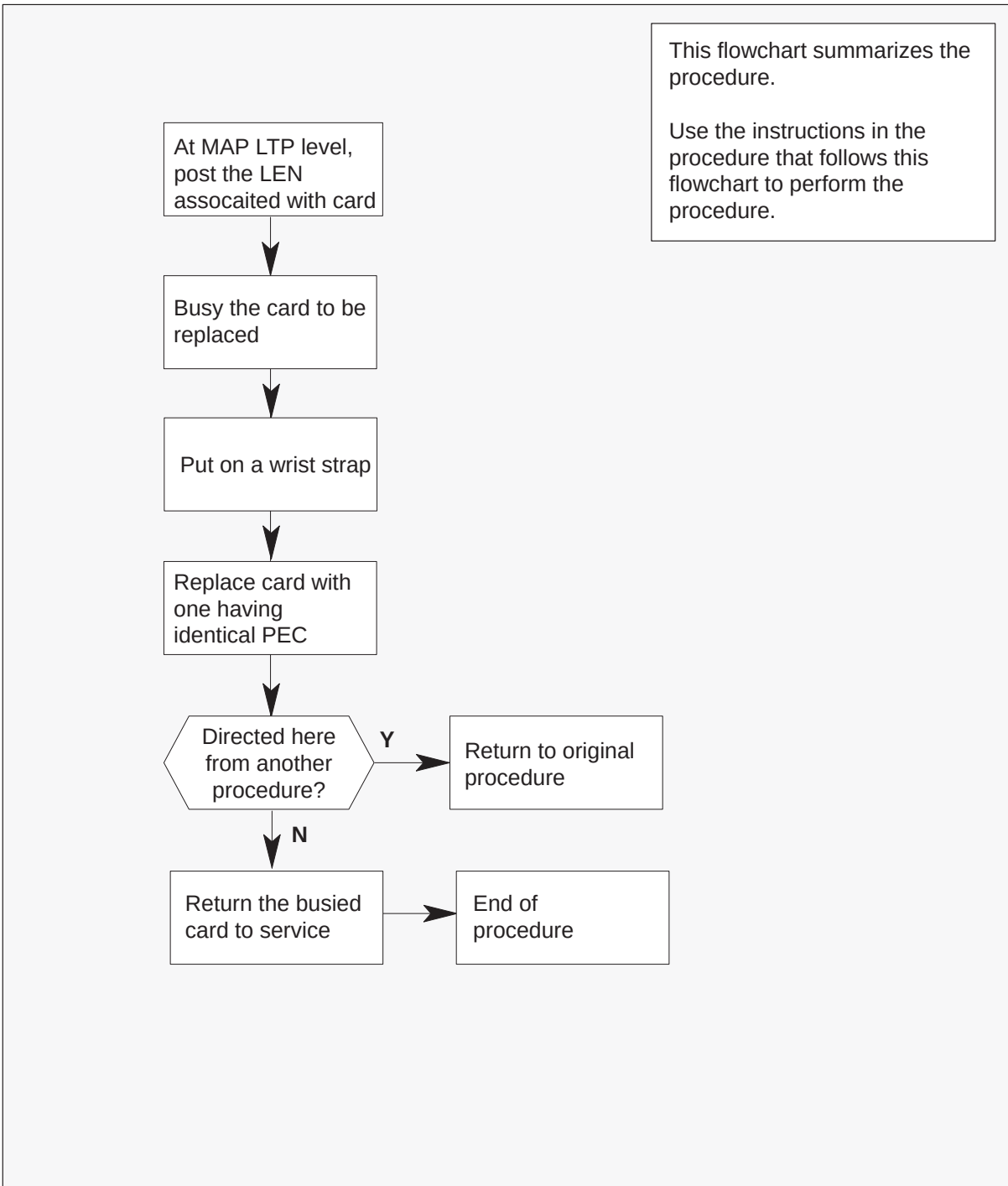
None

Action

The following flowchart is only a summary of the procedure. To replace the card, use the instructions in the procedure that follows the flowchart.

NT6X76 in RSC-S LCME (continued)

Summary of card replacement procedure for an NT6X76 card in RSC-S LCME



NT6X76 in RSC-S LCME (continued)

Replacing an NT6X76 card in RSC-S LCME

At your Current Location

- 1 Proceed only if you have been directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure for verifying or accepting cards, or have been directed to this procedure by your maintenance support group.
- 2 Obtain a replacement card. Ensure the replacement card has the same product equipment code (PEC), including suffix, as the card that is to be removed.

At the MAP terminal

- 3 Post the LEN of the card to be replaced by typing
>MAPCI;MTC;LNS;LTP;POST LCME site lcm(e)_no unit_no lsg_no ckt_no
 and pressing the Enter key.

where

site	is the location name of the LCME with the faulty card
lcm(e)_no	is the number of the LCME with the faulty card
unit_no	is the number of the LCME unit with the faulty card
lsg_no	is the number of the LSG with the faulty card
ckt_no	is the number of the circuit associated with the faulty card

Example of a MAP response:

CM	MS	IOD	Net	PM	CCS	LNS	Trks	Ext	Appl
.	.	.	.	.	.	.	.	.	.
LTP									
0	Quit	Post		DELQ		BUSYQ		PREFIX	
2	Post_								
3		LCC	PTY	RNG....	LEN...		DN	STA	F S LTA TE RESULT
4		CKT	TYPE	FL	HOST	00 0 03 03			
5	BSY								
6	RTS								
7	DIAG								
8									
9	AIMStat								
10	CKTLOC								
11	Hold								
12	Next_								
13									
14									
15									
16	Prefix								
17	LCO								
18	Level								

NT6X76
in RSC-S LCME (continued)

- 4 Busy the NT6X76 line card by typing

>BSY

and pressing the Enter key.

Example of a MAP display:

CM	MS	IOD	Net	PM	CCS	LNS	Trks	Ext	Appl
.	.	.	.	.	.	.	.	.	.
LTP									
0	Quit	Post	DELQ	BUSYQ	PREFIX				
2	Post_								
3		LCC	PTY	RNG.....	LEN.....	DN	STA	F	S
4		CKT	TYPE	FL	HOST	00	0	03	03
5	BSY								
6	RTS								
7	DIAG								
8									
9	AIMStat								
10	CKTLOC								
11	Hold								
12	Next_								
13									
14									
15									
16	Prefix								
17	LC0								
18	Level								

At the LCE frame

- 5



WARNING

Card damage—transport

Take these precautions to protect the circuit cards from electrical and mechanical damage while transporting cards.

When handling a circuit card not in an electrostatic discharge (ESD) protective container, stand on a conductive floor mat and wear a wrist strap connected, through a 1-megohm resistor, to a suitably grounded object, such as a metal workbench or a DMS switch frame (Northern Telecom Corporate Standard 5028).

Store and transport circuit cards in an ESD protective container.

NT6X76
in RSC-S LCME (continued)**WARNING****Equipment damage**

Take these precautions when removing or inserting a card:

1. Do not apply direct pressure to the components.
2. Do not force the cards into the slots.

**WARNING****Hot materials**

Exercise care when handling the line card. The line feed resistor may be very hot.

**CAUTION****Special tools required**

Card shrouds and removal tools are required for removing cards from the line drawers. For descriptions of these tools, see the following notes.

Put on a wrist strap.

Line card insertion / withdrawal tool for	Apparatus code	Common product code
3-inch cards	QTH56A	A0298291
6-inch cards	QTH58A	A0313317

Note 1: Card shrouds are required for inserting or removing cards in line drawers. Two sizes are available for use with 3-inch and 6-inch cards. Descriptions of these shrouds follow.

NT6X76 in RSC-S LCME (continued)

Note 2: Card removal tools are required for removing cards from line drawers. Two sizes are available. Descriptions of these tools follow.

Card removal tool for	Apparatus code	Common product code
3–4 inch cards	QTH57A	A0298292
Note: For 4-inch or larger cards, use the large grip tool ITA9953.		

- 6 Prepare to remove the faulty card by opening the line drawer and following these substeps:
 - a. Face the drawer shelf and grasp the handle at the bottom of the drawer with your right hand.
 - b. Push up on the drawer latch with your thumb and pull the drawer out until fully withdrawn. It is fully withdrawn when the drawer stop, at the top, prevents further travel.
 - c. Maintain a slight pull on the handle and lift the faceplate of the drawer approximately 2.5 cm (1 in).
 - d. While holding the drawer in this position, push the bottom of the drawer, nearest the shelf with your left hand, to a position about 1 cm (.5 in) to the right.
 - e. Hold the drawer in this position with your left hand and lower the faceplate of the drawer by releasing the grip of your right hand.
 - f. Ensure a card shroud and line card extractor are available.
- 7 Remove the line card to be replaced by following these substeps:
 - a. Slide a card shroud over the card to be removed and an adjacent card. If there is not an adjacent card on either side, do not use the card shroud.
 - b. Grasp the edge of the card with a line card extractor at a point midway between the top and bottom edges. Hold the extractor in your right hand.
 - c. Squeeze the handles of the extractor together to grasp the card tightly.
 - d. Hold the front cover of the line drawer to steady it using your left hand.
 - e. Pull the extractor away from the drawer, and the card will become unplugged from its socket on the drawer backplane.

NT6X76
in RSC-S LCME (continued)

- f. Continue pulling the card with the extractor until the card is clear of the shroud.
 - g. Insert the card removed into the ESD container and store using local procedures.
- 8 Replace the faulty card by following these substeps:
- a. Remove the replacement card from the ESD container.
 - b. Slide the card in the shroud guide slots toward the drawer backplane.
 - c. Hold the front cover of the line drawer with your left hand to steady it.
 - d. Grasp the top and bottom edges of the card with the fingers of your right hand.
 - e. Push the card toward the backplane until it plugs fully into the backplane socket.
- 9 Use the following information to determine where to proceed.

If you entered this procedure from	Do
alarm clearing procedures	step 14
other	step 10

At the MAP terminal

- 10 Test the NT6X76 line card by typing
>DIAG
and pressing the Enter key.

If DIAG	Do
passed	step 11
failed	step 15

NT6X76
in RSC-S LCME (end)

- 11** Return the NT6X76 card to service by typing
>RTS
and pressing the Enter key.

If RTS	Do
passed	step 12
failed	step 15

- 12** Send any faulty cards for repair according to local procedure.
- 13** Record the date the card was replaced, the serial number of the card, and the symptoms that prompted replacement of the card. Go to step 16.
- 14** Return to the procedure that directed you to this procedure. If necessary, go to the point where a faulty card list was produced, identify the next faulty card on the list, and go to the appropriate card replacement procedure for that card in this manual.
- 15** Obtain further assistance in replacing this card by contacting operating company maintenance personnel.
- 16** You have successfully completed this procedure. Return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.

NT6X78 in RSC-S RCO2

Application

Use this procedure to replace an NT6X78 card in a Remote Switching Center (RSC)-SONET Remote Switching Center Offshore (RCO) 2.

PEC	Suffixes	Name
NT6X78	AA, AB, BA	CLASS Modem Resource (CMR)

Common procedures

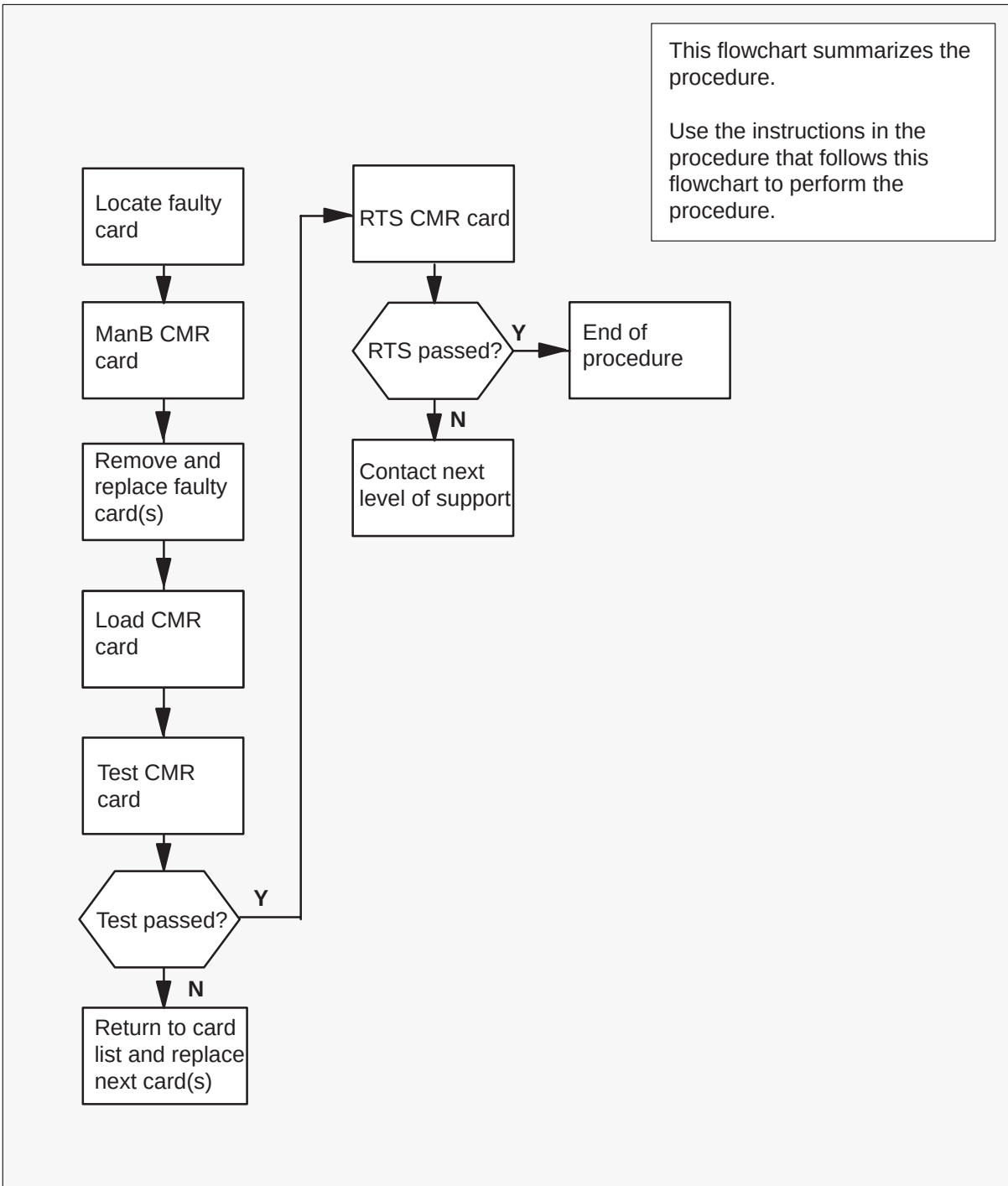
None

Action

The following flowchart is only a summary of the procedure. To replace the card, use the instructions in the procedure that follows the flowchart.

NT6X78 in RSC-S RCO2 (continued)

Summary of card replacement procedure for an NT6X78 card in RSC-S RCO2



NT6X78 in RSC-S RCO2 (continued)

Replacing an NT6X78 card in RSC-S RCO2

At your Current Location

- 1 Proceed only if you have been directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure for verifying or accepting cards, or have been directed to this procedure by your maintenance support group.

2



CAUTION

Loss of service

When replacing a card in the RCO2, ensure that the unit in which you are replacing the card is *inactive* and that the mate unit is *active*.

Obtain an NT6X78 replacement card. Ensure that the replacement card has the same product engineering code (PEC), including suffix, as the card to be removed.

At the MAP terminal

- 3 Access the PM level to find out which RCO2 is ISTb by typing
>MAPCI;MTC;PM;DISP STATE ISTB RCO2
 and pressing the Enter key.
- 4 Access the ISTb RCO2 by typing
>POST RCO2 0-127 or 0-255
 and pressing the Enter key.
where
 variable is 0-127 range with an NT40 and 0-255 with a DMS SuperNode
- 5 Busy the CMR card by typing
>BSY UNIT unit_no CMR
 and pressing the Enter key.
where
 unit_no is the number of the unit containing the faulty CMR card

NT6X78 in RSC-S RCO2 (continued)

At the RCE

6



WARNING

Static electricity damage

Before removing any cards, put on a wrist strap and connect it to the wrist strap grounding point on the left side of the modular supervisory panel (MSP) of the RCO2. This protects the equipment against damage caused by static electricity.



WARNING

Equipment damage

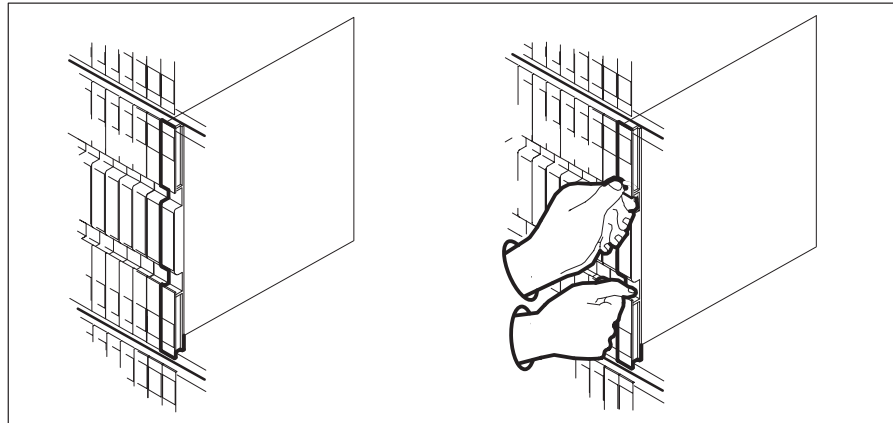
Take the following precautions when removing or inserting a card:

1. Do not apply direct pressure to the components.
2. Do not force the card into its slot.

Put on a wrist strap.

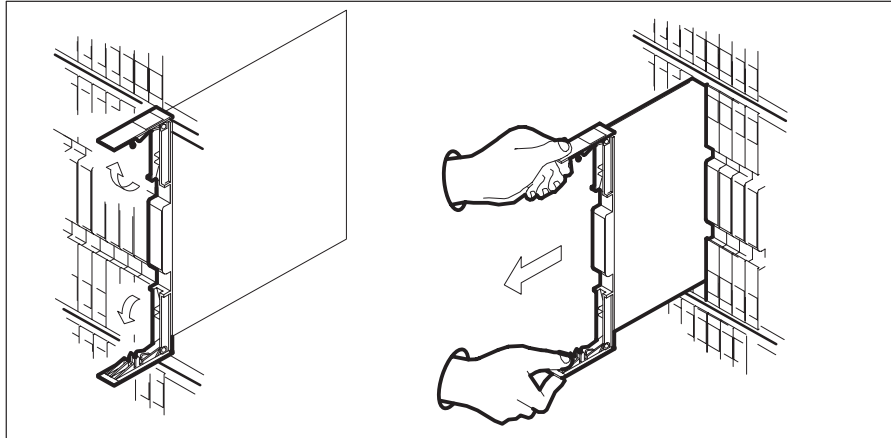
7 Remove the NT6X78 card as shown in the following figures.

a. Locate the card to be removed on the appropriate shelf.



NT6X78
in RSC-S RCO2 (continued)

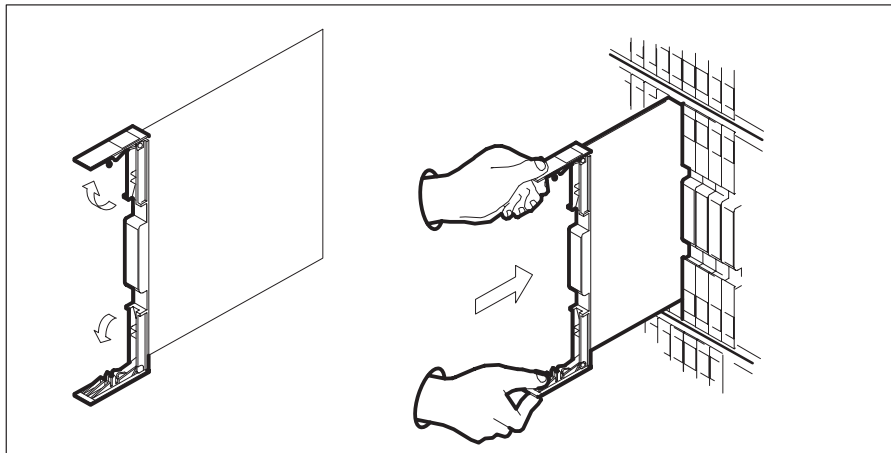
- b. Open the locking levers on the card to be replaced and gently pull the card toward you until it clears the shelf.



- c. Ensure the replacement card has the same PEC, including suffix, as the card you just removed.

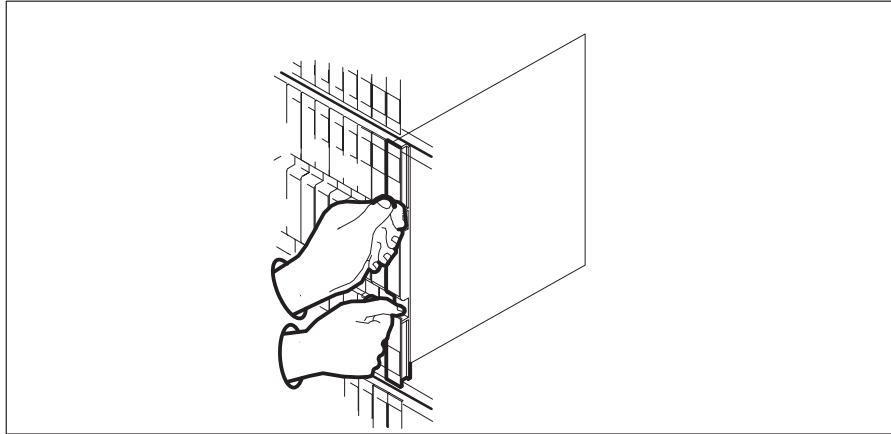
8 Open the locking levers on the replacement card.

- a. Align the card with the slots in the shelf.
- b. Gently slide the card into the shelf.



NT6X78 in RSC-S RCO2 (continued)

- 9 Seat and lock the card.
 - a. Using your fingers or thumbs, push on the upper and lower edges of the faceplate to ensure the card is fully seated in the shelf.
 - b. Close the locking levers.



At the MAP terminal

- 10 Load the CMR card by typing
>LOADPM UNIT unit_no CMR
and pressing the Enter key.
where
unit_no is the number of the unit containing the faulty CMR card

If LOADPM	Do
passed	step 11
failed	step 17

- 11 Use the following information to determine where to proceed.

If you entered this procedure from	Do
alarm clearing procedures	step 16
other	step 12

NT6X78
in RSC-S RCO2 (end)

- 12** Test the CMR card by typing

>TST UNIT unit_no CMR

and pressing the Enter key.

where

unit_no is the number of the unit containing the faulty CMR card

If TST	Do
passed	step 13
failed	step 17

- 13** Return the CMR card to service by typing

>RTS UNIT unit_no CMR

and pressing the Enter key.

where

unit_no is the number of the unit containing the faulty CMR card

If RTS	Do
passed	step 14
failed	step 17

- 14** Send any faulty cards for repair according to local procedure.
- 15** Record the date the card was replaced, the serial number of the card, and the symptoms that prompted replacement of the card. Go to step 18.
- 16** Return to the procedure that directed you to this procedure. At the point where a faulty card list was produced, identify the next faulty card on the list and go to the appropriate card replacement procedure for that card in this manual.
- 17** Obtain further assistance in replacing this card by contacting operating company maintenance personnel.
- 18** You have successfully completed this procedure. Return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.

NT6X87 in RSC-S LCME

Application

Use this procedure to replace an NT6X87 card in an RSC-S LCME.

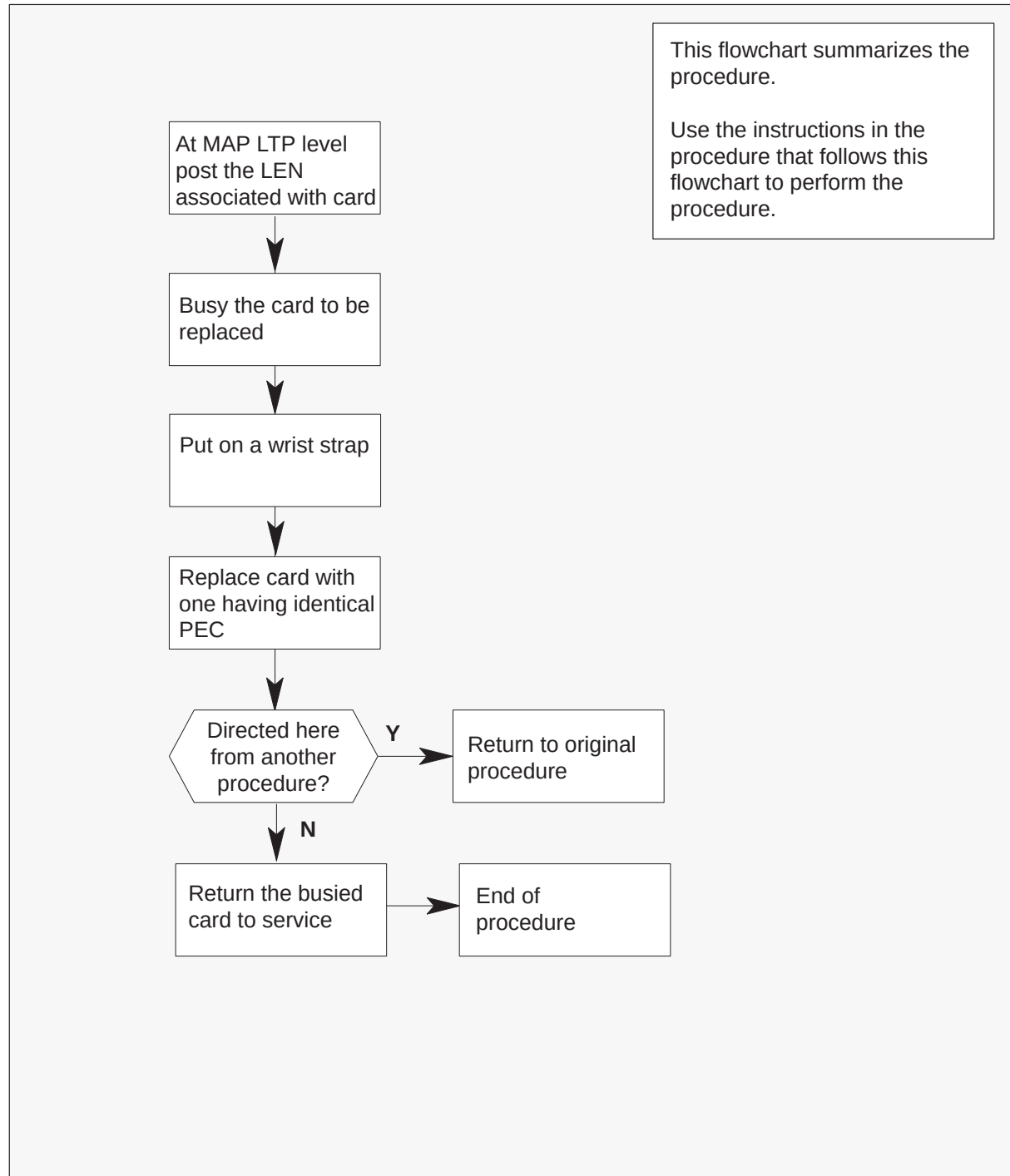
PEC	Suffixes	Name
NT6X87	AA	Data Voice Line card

Common procedures

None

Action

The following flowchart is only a summary of the procedure. To replace the card, use the instructions in the procedure that follows the flowchart.

NT6X87
in RSC-S LCME (continued)**Summary of card replacement procedure for an NT6X87 card in in RSC-S LCME**

NT6X87
in RSC-S LCME (continued)

Replacing an NT6X87 card in an in RSC-S LCME

At your Current Location

- 1 Proceed only if you have been directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure for verifying or accepting cards, or have been directed to this procedure by your maintenance support group.
- 2 Obtain a replacement card. Ensure the replacement card has the same product equipment code (PEC), including suffix, as the card that is to be removed.

At the MAP terminal

- 3 Post the line equipment number (LEN) of the card to be replaced by typing
>MAPCI;MTC;LNS;LTP;POST L site lcme_no unit_no lsg_no ckt_no
and pressing the Enter key.

where

site is the location name of the LCME with the faulty card
lcme_no is the number of the LCME with the faulty card
unit_no is the number of the LCME unit with the faulty card
lsg_no is the number of the LSG with the faulty card
ckt_no is the number of the circuit associated with the faulty card

Example of a MAP response:

CM	MS	IOD	Net	PM	CCS	LNS	Trks	Ext	Appl
.	.	.	.	.	.	.	.	.	.
LTP									
0	Quit	Post	DELQ		BUSYQ		PREFIX		
2	Post_								
3		LCC	PTY	RNG	....	LEN	.....	DN	STA F S LTA TE RESULT
4		CKT	TYPE	FL		HOST	00 0 03 03	4931082	IDL
5	BSY								
6	RTS								
7	DIAG								
8									
9	AIMStat								
10	CKTLOC								
11	Hold								
12	Next_								
13									
14									
15									
16	Prefix								
17	LCO								
18	Level								

NT6X87 in RSC-S LCME (continued)

- 4 Busy the NT6X87 line card by typing

>BSY

and pressing the Enter key.

Example of a MAP display:

CM	MS	IOD	Net	PM	CCS	LNS	Trks	Ext	Appl
.	.	.	.	.	.	.	.	.	.
LTP									
0	Quit		Post	DELQ	BUSYQ		PREFIX		
2	Post_								
3			LCC PTY RNG.....LEN.....	DN			STA F S LTA TE	RESULT	
4			CKT TYPE FL	HOST 00 0 03 03	4931082	IDL			
5	BSY								
6	RTS								
7	DIAG								
8									
9	AIMStat								
10	CKTLOC								
11	Hold								
12	Next_								
13									
14									
15									
16	Prefix								
17	LC0								
18	Level								

At the LCE frame

5



WARNING

Card damage—transport

Take these precautions to protect the circuit cards from electrical and mechanical damage while transporting cards.

When handling a circuit card not in an electrostatic discharge (ESD) protective container, stand on a conductive floor mat and wear a wrist strap connected, through a 1-megohm resistor, to a suitably grounded object, such as a metal workbench or a DMS switch frame (Northern Telecom Corporate Standard 5028).

Store and transport circuit cards in an ESD protective container.

NT6X87
in RSC-S LCME (continued)



WARNING
Equipment damage
Take these precautions when removing or inserting a card:
1. Do not apply direct pressure to the components.
2. Do not force the cards into the slots.



WARNING
Hot materials
Exercise care when handling the line card. The line feed resistor may be very hot.



CAUTION
Special tools required
Card shrouds and removal tools are required for removing cards from the line drawers. For descriptions of these tools, see the following notes.

Put on a wrist strap.

Line card insertion / withdrawal tool for	Apparatus code	Common product code
3-inch cards	QTH56A	A0298291
6-inch cards	QTH58A	A0313317

Note 1: Card shrouds are required for inserting or removing cards in line drawers. Two sizes are available for use with 3-inch and 6-inch cards. Descriptions of these shrouds follow.

NT6X87
in RSC-S LCME (continued)

Note 2: Card removal tools are required for removing cards from line drawers. Two sizes are available. Descriptions of these tools follow.

Card removal tool for	Apparatus code	Common product code
3–4 inch cards	QTH57A	A0298292
Note: For 4-inch or larger cards, use the large grip tool ITA9953.		

- 6 Prepare to remove the faulty card by opening the line drawer and following these substeps:
 - a. Face the drawer shelf and grasp the handle at the bottom of the drawer with your right hand.
 - b. Push up on the drawer latch with your thumb and pull the drawer out until fully withdrawn. It is fully withdrawn when the drawer stop, at the top, prevents further travel.
 - c. Maintain a slight pull on the handle and lift the faceplate of the drawer approximately 2.5 cm (1 in).
 - d. While holding the drawer in this position, push the bottom of the drawer, nearest the shelf with your left hand, to a position about 1 cm (.5 in) to the right.
 - e. Hold the drawer in this position with your left hand and lower the faceplate of the drawer by releasing the grip of your right hand.
 - f. Ensure a card shroud and line card extractor are available.
- 7 Remove the line card to be replaced by following these substeps:
 - a. Slide a card shroud over the card to be removed and an adjacent card. If there is not an adjacent card on either side, do not use the card shroud.
 - b. Grasp the edge of the card with a line card extractor at a point midway between the top and bottom edges. Hold the extractor in your right hand.
 - c. Squeeze the handles of the extractor together to grasp the card tightly.
 - d. Hold the front cover of the line drawer to steady it using your left hand.
 - e. Pull the extractor away from the drawer, and the card will become unplugged from its socket on the drawer backplane.

NT6X87 in RSC-S LCME (continued)

- f. Continue pulling the card with the extractor until the card is clear of the shroud.
 - g. Insert the card removed into the ESD container and store using local procedures.
- 8 Replace the faulty card by following these substeps:
 - a. Remove the replacement card from the ESD container.
 - b. Slide the card in the shroud guide slots toward the drawer backplane.
 - c. Hold the front cover of the line drawer with your left hand to steady it.
 - d. Grasp the top and bottom edges of the card with the fingers of your right hand.
 - e. Push the card toward the backplane until it plugs fully into the backplane socket.
- 9 Use the following information to determine where to proceed.

If you entered this procedure from	Do
alarm clearing procedures	step 14
other	step 10

At the MAP terminal

- 10 Test the NT6X87 line card by typing
>DIAG
and pressing the Enter key.

If DIAG	Do
passed	step 11
failed	step 15

NT6X87
in RSC-S LCME (end)

- 11** Return the NT6X87 card to service by typing

>RTS

and pressing the Enter key.

If RTS	Do
passed	step 12
failed	step 15

- 12** Send any faulty cards for repair according to local procedure.
- 13** Record the date the card was replaced, the serial number of the card, and the symptoms that prompted replacement of the card. Go to step 16.
- 14** Return to procedure that directed you to this procedure. If necessary, go to the point where a faulty card list was produced, identify the next faulty card on the list, and go to the appropriate card replacement procedure for that card in this manual.
- 15** Obtain further assistance in replacing this card by contacting operating company maintenance personnel.
- 16** You have successfully completed this procedure. Return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.

NT6X92 in RSC-S RC02

Application

Use this procedure to replace an NT6X92 card in an RSC-S RC02.

ATTENTION

To ensure peak performance, do not install the UTR and GTR on the same RSC-S RC02. Presently, there is no way of knowing which receiver is used to interpret tones. Some call processing tones may be degraded if designed for use with a GTR.

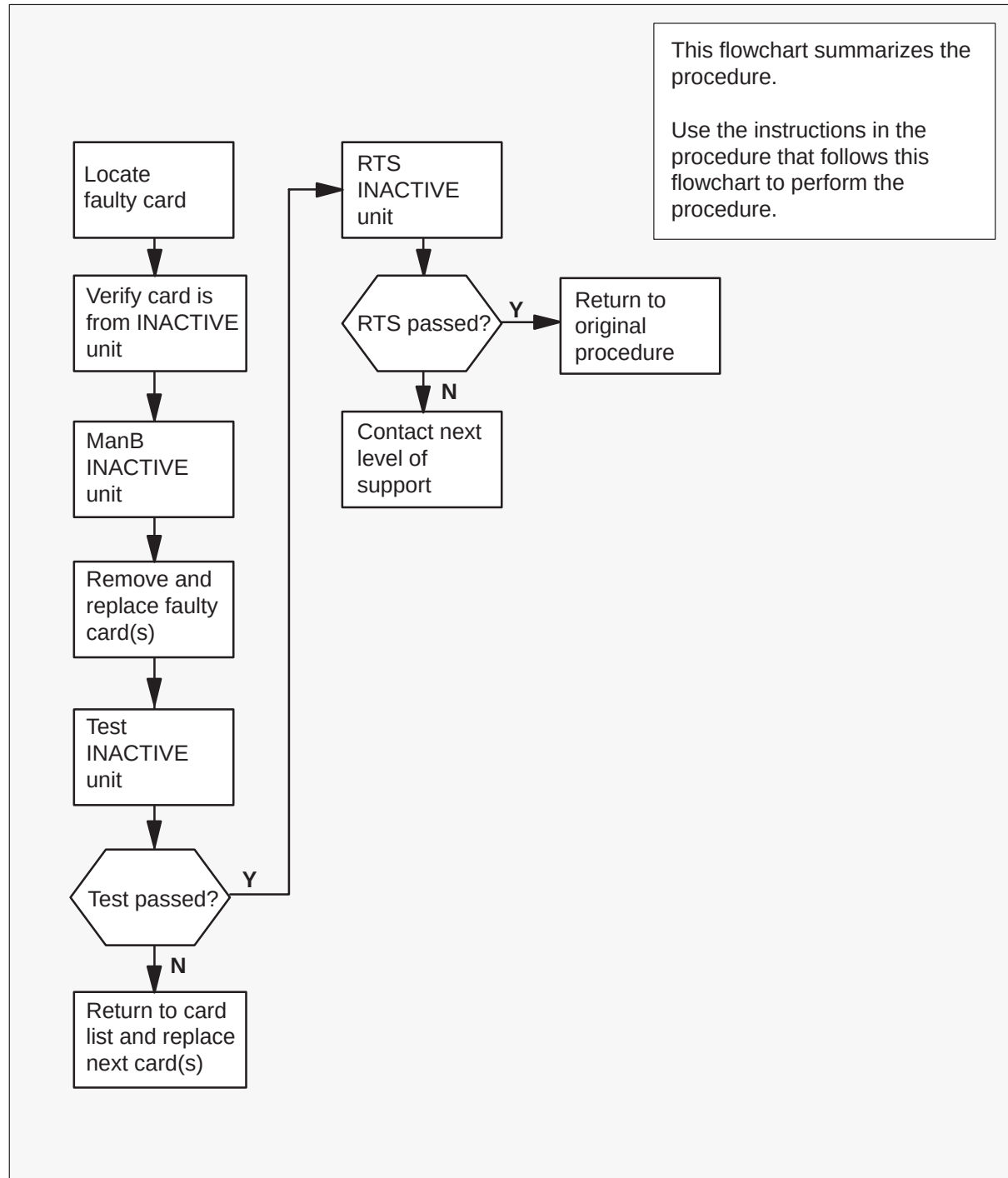
PEC	Suffixes	Name
NT6X92	CA	Universal Tone Receiver (UTR)
NT6X92	EA	Global Tone Receiver (GTR)

Common procedures

None

Action

The following flowchart is only a summary of the procedure. To replace the card, use the instructions in the procedure that follows the flowchart.

NT6X92
in RSC-S RCO2 (continued)**Summary of card replacement procedure for an NT6X92 card in RSC-S RCO2**

NT6X92 in RSC-S RCO2 (continued)

Replacing an NT6X92 card in an RSC-S RCO2

At your Current Location

- 1 Proceed only if you have been directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure for verifying or accepting cards, or have been directed to this procedure by your maintenance support group.

2



CAUTION

Loss of service

When replacing a card in the RCO2, ensure that the unit in which you are replacing the card is *inactive* and that the mate unit is *active*.

Obtain an NT6X92 replacement card. Ensure the replacement card has the same product equipment code (PEC), including suffix, as the card that is to be removed.

- 3 Ensure the PM level of the MAP display is currently displayed and the RCO2 is posted by typing

>MAPCI;MTC;PM;POST RCO2 rco2_unit_no

and pressing the Enter key.

where

rco2_unit_no is the number of the RCO2 with the faulty card

NT6X92 in RSC-S RCO2 (continued)

Example of a MAP display:

CM	MS	IOD	Net	PM	CCS	LNS	Trks	Ext	Appl
.	.	.	.	1RC02	.	.	.	.	.
RC02			SysB	ManB	OffL	CBsy	ISTb		InSv
0 Quit	PM		0	0	2	0	2		25
2 Post_	RC02		0	0	0	0	1		1
3 ListSet									
4	RC02	0	ISTb	Links_OOS:	Cside	1,	PSide	1	
5 TRNSL	Unit0:		Inact	InSv					
6 TST	Unit1:		Act	InSv					
7 BSY									
8 RTS									
9 OffL									
10 LoadPM_									
11 Disp_									
12 Next_									
13									
14 QueryPM									
15									
16									
17									
18									

- 4 By observing the MAP display, be sure the card to be removed is on the inactive unit.

If faulty card is on	Do
active unit	step 7
inactive unit	step 5

- 5 Switch the processing activity (SWACT) to the inactive unit by typing

>SWACT

and pressing the Enter key.

Note: If the system recommends using the SWACT command with the FORCE option, consult office personnel to determine if use of the FORCE option is advisable.

- 6 Answer the prompt by typing

>YES

and pressing the Enter key.

NT6X92 in RSC-S RCO2 (continued)

At the RCE frame

- 7 Put a sign on the *active* unit bearing the words “Active unit—Do not touch.”
This sign should not be attached by magnets or tape.

At the MAP terminal

- 8 Busy the inactive PM unit by typing

>BSY UNIT rco2_unit_no

and pressing the Enter key.

where

rco2_unit_no is the number of the inactive RCO2 unit (0 or 1)

At the RCE frame

9



WARNING

Static electricity damage

Before removing any cards, put on a wrist strap and connect it to the wrist strap grounding point on the left side of the modular supervisory panel of the RCO2. This protects the equipment against damage caused by static electricity.



WARNING

Equipment damage

Take these precautions when removing or inserting a card:

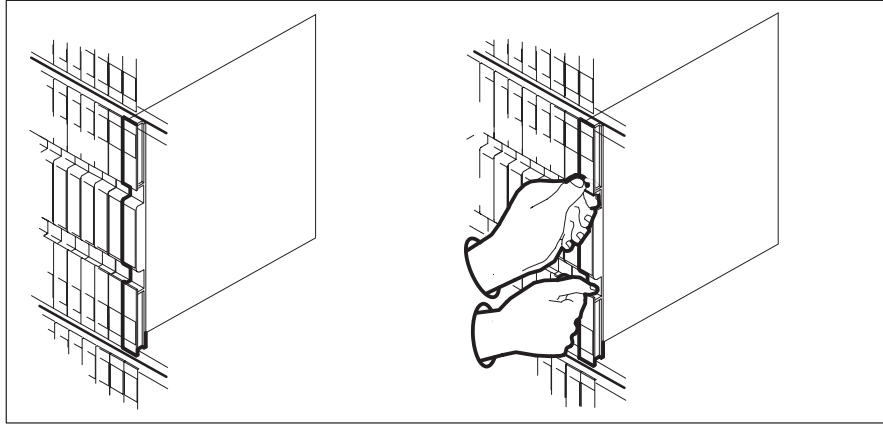
1. Do not apply direct pressure to the components.
2. Do not force the card into its slot.

Put on a wrist strap.

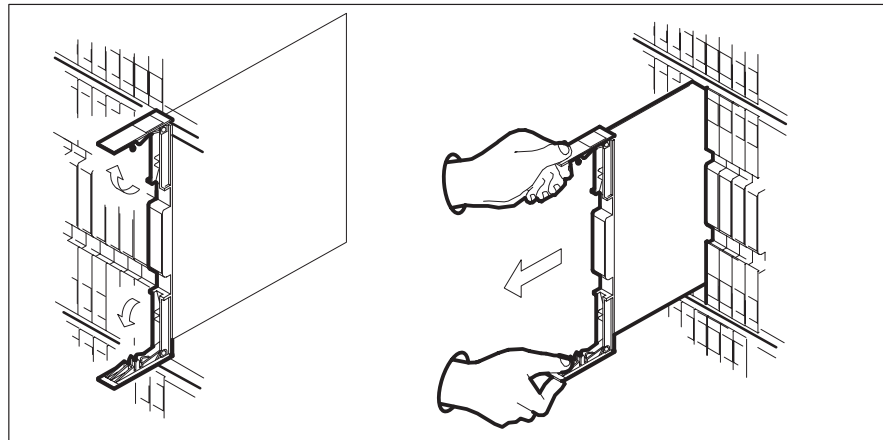
NT6X92 in RSC-S RCO2 (continued)

10 Remove the NT6X92 card as shown in the following figures.

- a.** Locate the card to be removed on the appropriate shelf.



- b.** Open the locking levers on the card to be replaced and gently pull the card toward you until it clears the shelf.

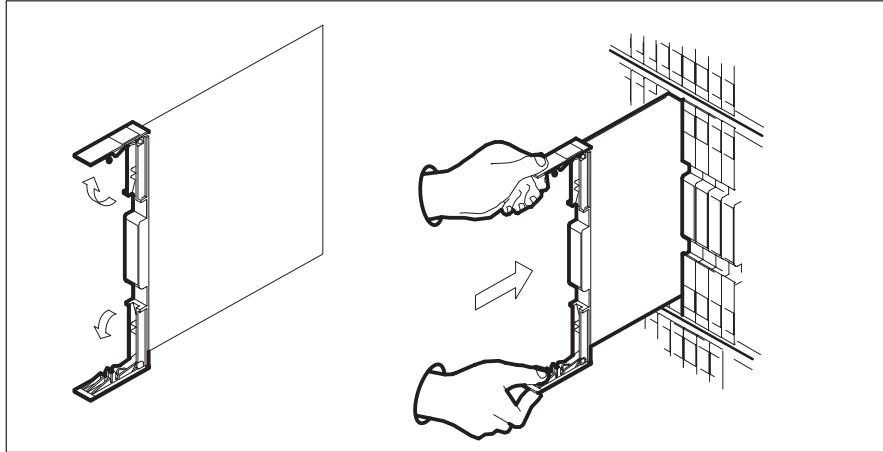


- c.** Ensure the replacement card has the same PEC, including suffix, as the card you just removed.

NT6X92 in RSC-S RCO2 (continued)

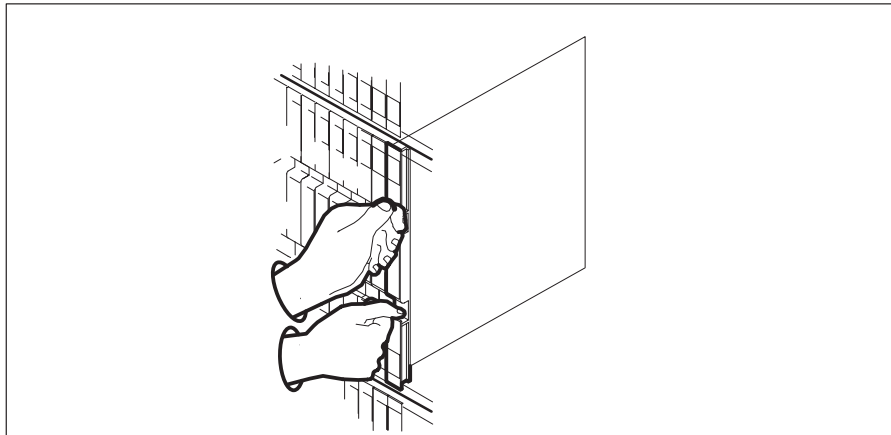
11 Open the locking levers on the replacement card.

- a.** Align the card with the slots in the shelf.
- b.** Gently slide the card into the shelf.



12 Seat and lock the card.

- a.** Using your fingers or thumbs, push on the upper and lower edges of the faceplate to ensure the card is fully seated in the shelf.
- b.** Close the locking levers.



NT6X92
in RSC-S RCO2 (end)

- 13 Use the following information to determine the next step in this procedure.

If you entered this procedure from	Do
alarm clearing procedures	step 17
other	step 14

At the MAP terminal

- 14 Return the inactive RCO2 unit to service by typing

>RTS UNIT rco2_unit_no

and pressing the Enter key.

where

rco2_unit_no is the number of the inactive RCO2 unit

If RTS	Do
passed	step 15
failed	step 18

- 15 Send any faulty cards for repair according to local procedure.
- 16 Record the date the card was replaced, the serial number of the card, and the symptoms that prompted replacement of the card. Go to step 19.
- 17 Return to the procedure that directed you to this procedure. At the point where a faulty card list was produced, identify the next faulty card on the list and go to the appropriate card replacement procedure for that card in this manual.
- 18 Obtain further assistance in replacing this card by contacting operating company maintenance personnel.
- 19 You have successfully completed this procedure. Remove the sign from the active unit and return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.

NT6X99 in RSC-S LCME

Application

Use this procedure to replace an NT6X99 card in an RSC-S LCME.

PEC	Suffixes	Name
NT6X99	AA	Datapath Bit Error Rate Tester Line Card

Common procedures

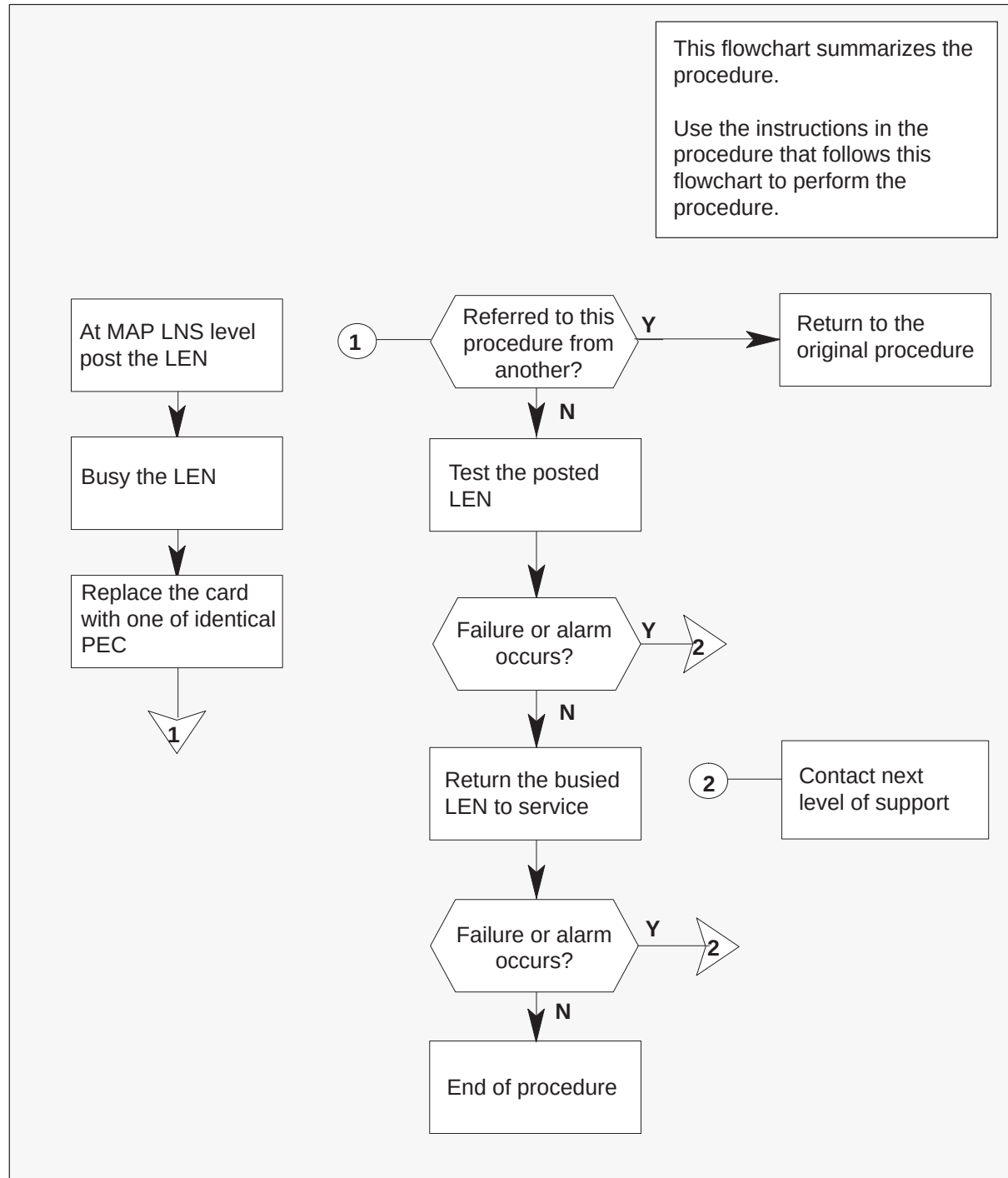
None

Action

The following flowchart is only a summary of the procedure. To replace the card, use the instructions in the procedure that follows the flowchart.

NT6X99 in RSC-S LCME (continued)

Summary of card replacement procedure for an NT6X99 card in RSC-S LCME



NT6X99
in RSC-S LCME (continued)

Replacing an NT6X99 card in RSC-S LCME

At your Current Location

- 1 Proceed only if you have been directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure for verifying or accepting cards, or have been directed to this procedure by your maintenance support group.
- 2 Obtain an NT6X99 replacement card. Ensure the replacement card has the same product equipment code (PEC), including suffix, as the card that is to be removed.

At the MAP terminal

- 3 Post the line equipment number (LEN) from the line test position by typing
>MAPCI;MTC;LNS;LTP;POST L site lcme_no unit_no lsg_no ckt_no
and pressing the Enter key.

where

- site is the site name assigned to the remote location
- lcme_no is the number of the LCME
- unit_no is the number of the LCME unit (0 or 1)
- lsg_no is the number of line subgroup (00–19)
- ckt_no is the circuit number (00–31)

```
CM      MS      IOD      Net      PM      CCS      LNS      Trks      EXT      Appl
.       .       .       .       .       .       .       .       .       .
LTP
0 Quit
2 Post_      POST      DELQ      BusyQ      PREFIX
3
4            LCC      PTY RNG      LEN      DN      STA FS LTA TE RESULT
5 Bsy_      CKT TYPE FL Host 00 0 03 03 No DIRN Idl
6 RTS_
7 Diag_
8
9 Almstat
10 CKTLOC
11 Hold
12 Next_
13
14
15
16 Prefix_
17 LCO_
18 Level_
```


NT6X99 in RSC-S LCME (continued)

- 4 Busy the LEN posted by typing

>BSY

and pressing the Enter key.

Example of a MAP display:

CM	MS	IOD	Net	PM	CCS	LNS	Trks	Ext	Appl
.	.	.	.	.	.	.	.	.	.
LTP									
0 Quit		POST	DELQ	BusyQ	PREFIX				
2 Post_									
3		LCC	PTY RNG	LEN	DN	STA FS	LTA TE	RESULT	
4		CKT TYPE	FL Host	00 0 03	03 No DIRN	MB			
5 Bsy_									
6 RTS_									
7 Diag_									
8									
9 Almstat									
10 CKTLLOC									
11 Hold									
12 Next_									
13									
14									
15									
16 Prefix_									
17 LCO_									
18 Level_									

At the LCE frame

5



WARNING

Card damage—transport

Take these precautions to protect the circuit cards from electrical and mechanical damage while transporting cards.

When handling a circuit card not in an electrostatic discharge (ESD) protective container, stand on a conductive floor mat and wear a wrist strap connected, through a 1-megohm resistor, to a suitably grounded object, such as a metal workbench or a DMS switch frame (Northern Telecom Corporate Standard 5028).

Store and transport circuit cards in an ESD protective container.

NT6X99 in RSC-S LCME (continued)



WARNING

Improper insertion may cause damage to circuit packs

1. Do not apply direct pressure to the components.
2. Do not force the cards into the slots.



WARNING

Possible injury from hot materials

Exercise care when handling the line card. The line feed resistor may be hot.



CAUTION

Special tools required

Card shrouds and removal tools are required for removing cards from the line drawers. For descriptions of these tools, see the following notes.

Put on a wrist strap.

Line card insertion / withdrawal tool for	Apparatus code	Common product code
3-inch cards	QTH56A	A0298291
6-inch cards	QTH58A	A0313317

Note 1: Card shrouds are required for inserting or removing cards in line drawers. Two sizes are available for use with 3-inch and 6-inch cards. Descriptions of these shrouds follow.

Note 2: Card removal tools are required for removing cards from line drawers. Two sizes are available. Descriptions of these tools follow.

Card removal tool for	Apparatus code	Common product code
3–4 inch cards	QTH57A	A0298292
Note: For 4-inch or larger cards, use the large grip tool ITA9953.		

NT6X99
in RSC-S LCME (continued)

- 6 Open the line drawer and prepare to remove the faulty card by following these substeps:
 - a. Face the drawer shelf and grasp the handle at the bottom of the drawer with your right hand.
 - b. Push up on the drawer latch with your thumb and pull the drawer out until fully withdrawn. It is fully withdrawn when the drawer stop, at the top, prevents further travel.
 - c. Maintain a slight pull on the handle and lift the faceplate of the drawer approximately 2.5 cm (1 in).
 - d. While holding the drawer in this position, push the bottom of the drawer, nearest the shelf with your left hand, to a position about 1 cm (.5 in) to the right.
 - e. Hold the drawer in this position with your left hand and lower the faceplate of the drawer by releasing the grip of your right hand.
 - f. Ensure a card shroud and line card extractor are available.
- 7 Remove the line card to be replaced by following these substeps:
 - a. Slide a card shroud over the card to be removed and an adjacent card. If there is not an adjacent card on either side, do not use the card shroud.
 - b. Grasp the edge of the card with a line card extractor at a point midway between the top and bottom edges. Hold the extractor in your right hand.
 - c. Squeeze the handles of the extractor together to grasp the card tightly.
 - d. Hold the front cover of the line drawer to steady it using your left hand.
 - e. Pull the extractor away from the drawer, and the card will become unplugged from its socket on the drawer backplane.
 - f. Continue pulling the card with the extractor until the card is clear of the shroud.
 - g. Insert the card removed into the ESD container and store using local procedures.
- 8 Replace the faulty card by following these substeps:
 - a. Remove the replacement card from the ESD container.
 - b. Slide the card in the shroud guide slots toward the drawer backplane.

NT6X99
in RSC-S LCME (continued)

- c. Hold the front cover of the line drawer with your left hand to steady it.
 - d. Grasp the top and bottom edges of the card with the fingers of your right hand.
 - e. Push the card toward the backplane until it plugs fully into the backplane socket.
- 9 Continue this procedure depending on where you were when you were directed to this procedure.

If you entered this procedure from	Do
alarm clearing procedures	step 14
other	step 10

- 10 Test the line card just replaced by typing
>DIAG
and pressing the Enter key.

If DIAG	Do
passes	step 11
fails	step 15

- 11 Return the line card to service by typing
>RTS
and pressing the Enter key.

If RTS	Do
passes	step 12
fails	step 15

- 12 Send any faulty cards for repair according to local procedure.
- 13 Record the date the card was replaced, the serial number of the card, and the symptoms that prompted replacement of the card. Go to step 16.

NT6X99
in RSC-S LCME (end)

- 14** Return to the procedure that directed you to this procedure. At the point where a faulty card list was produced, identify the next faulty card on the list and go to the appropriate card replacement procedure for that card in this manual.
- 15** Obtain further assistance in replacing this card by contacting the personnel responsible for higher level of support.
- 16** You have successfully completed this procedure. Return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.

NT7X05 in RSC-S RCO2

Application

Use this procedure to replace the following card in an RCO2.

PEC	Suffixes	Name
NT7X05	AA	Peripheral/Remote Loader-16
Note: NT7X05 functionality is supported only when the RCO2 is provisioned with the NTMX77 Unified Processor (UP). NT7X05 functionality is <i>not</i> supported when the RCO2 is provisioned with the optional NTAX74 Cellular Access Processor (CAP) instead of the NTMX77 UP.		

Common procedures

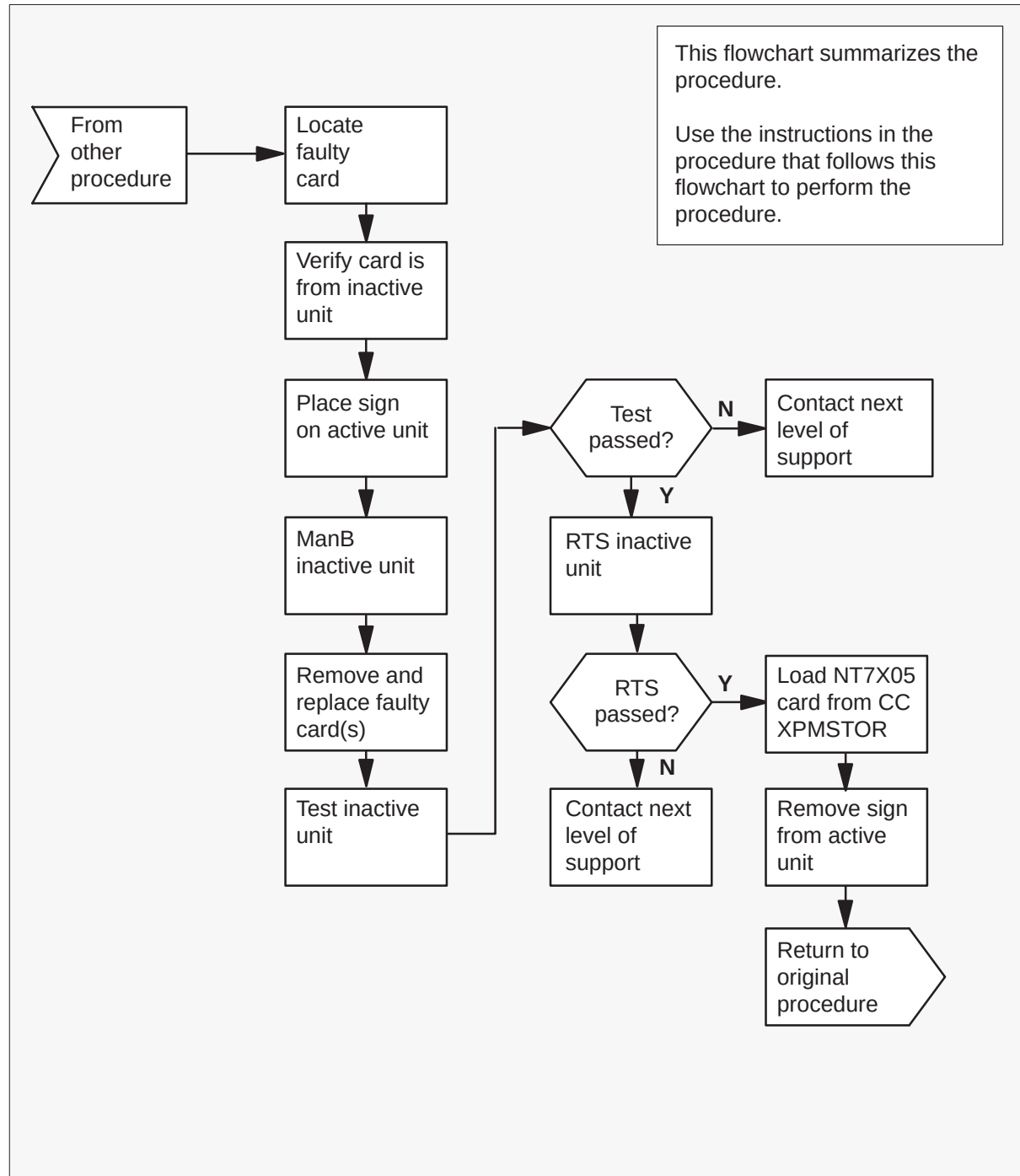
None

Action

The following flowchart is only a summary of the procedure. To replace the card, use the instructions in the procedure that follows the flowchart.

NT7X05 in RSC-S RCO2 (continued)

Summary of card replacement procedure for an NT7X05 card in an RCO2



NT7X05 in RSC-S RCO2 (continued)

Replacing a/an NT7X05 in RSC-S RCO2

At your current location

- 1 Proceed only if you were either directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure to verify or accept cards, or were directed to this procedure by your maintenance support group.

2



CAUTION

Loss of service

When replacing a card in the RCO2 ensure the unit where you are replacing the card is **INACTIVE** and the mate unit is **ACTIVE**.

Obtain a replacement card. Ensure the replacement card has the same product equipment code (PEC) including suffix, as the card to be removed.

At the MAP display

- 3 Access the PM level and post the RCO2 by typing

>MAPCI;MTC;PM;POST RCO2 rc2_no

and pressing the Enter key.

where

rc2_no is the number of the RCO2 to be busied

NT7X05 in RSC-S RC02 (continued)

Example of a MAP display:

CM	MS	IOD	Net	PM	CCS	LNS	Trks	Ext	APPL
.	.	.	.	1RC02	.	.	.	.	.
RC02			SysB	ManB	OffL	CBsy	ISTb	InSv	
0 Quit	PM		0	0	2	0	2	25	
2 Post_	RC02		0	0	0	0	1	1	
3 ListSet									
4	RC02		0 ISTb	Links_00S:	CSide	0,	PSide	0	
5 TRNSL_	Unit0:		Inact	ISTb					
6 TST_	Unit1:		Act	InSv					
7 BSY_									
8 RTS_									
9 OffL									
10 LoadPM_									
11 Disp_									
12 Next									
13									
14 QueryPM									
15									
16 IRLINK									
17 Perform									
18									

- 4 By observing the MAP display, be sure the card to be removed is on the inactive unit.

If the faulty card is on an	Do
ACTIVE unit	step 5
INACTIVE unit	step 8

- 5 Switch the processing activity to the inactive unit by typing

>SWACT

and pressing the Enter key.

The system determines the type of SWACT it can perform and displays a confirmation prompt for the selected SWACT.

If SWACT	Do
can continue at this time	step 6
cannot continue at this time	step 21

NT7X05 in RSC-S RCO2 (continued)

- 6 Switch the activity of the unit by typing

>YES

and pressing the Enter key.

The system runs a pre-SWACT audit to determine the ability of the inactive unit to accept activity reliably.

Note: A maintenance flag appears when maintenance tasks are in progress. Wait until the flag disappears before proceeding with the next maintenance action.

If the message is	Do
SWACT passed	step 8
SWACT failed	step 7
SWACT failed	step 7
Reason: XPM SWACTback	
SWACT refused by SWACT controller	step 7

- 7 Return to the *Alarm Clearing Procedure*, to clear the alarm condition on the inactive unit. When the alarm is cleared, return to step 1 of this procedure.

At the frame

- 8 Put a sign on the active unit bearing the words **Active unit—Do not touch.**

At the MAP display

- 9 Busy the inactive RCO2 unit by typing

>BSY INACTIVE

and pressing the Enter key.

NT7X05
in RSC-S RCO2 (continued)*At the frame*

10

**WARNING****Static electricity damage**

Before removing any cards, put on a wrist strap and connect it to the wrist strap grounding point on the left side of the frame supervisory panel of the RCO2. This protects the equipment against damage caused by static electricity.

**WARNING****Equipment damage**

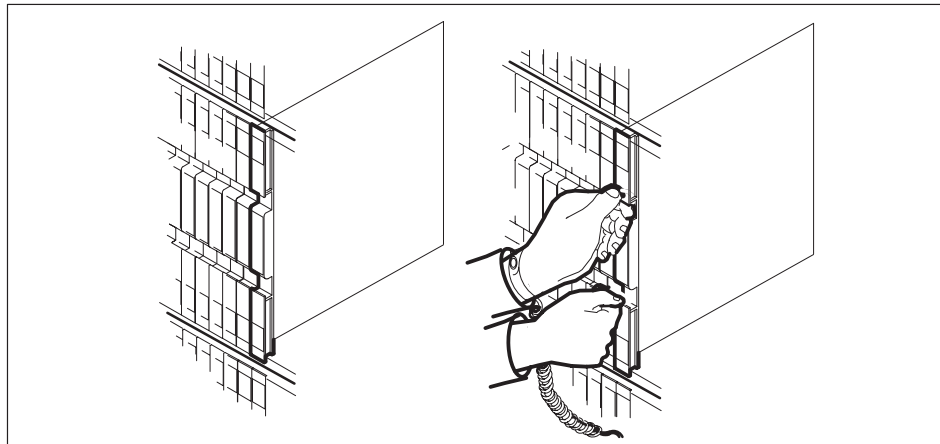
Take the following precautions when removing or inserting a card:

1. Do not apply direct pressure to the components.
2. Do not force the cards into the slots.

Put on a wrist strap.

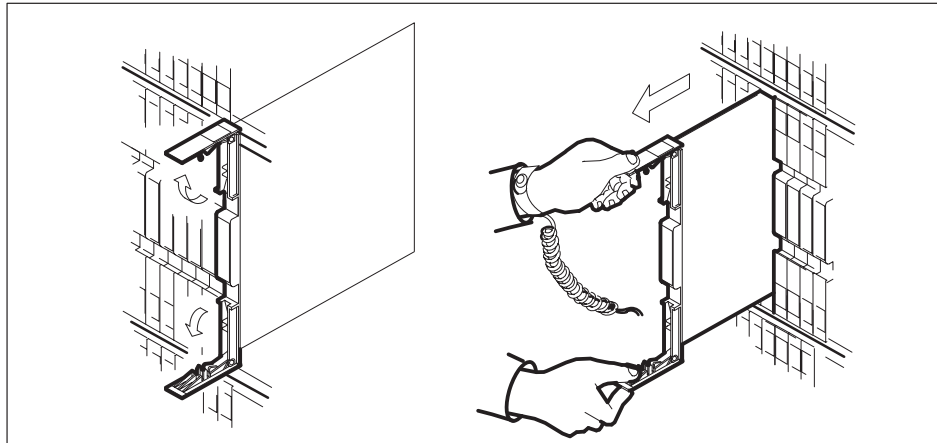
11 Remove the NT7X05 card as shown in the following figures.

- a. Locate the card to be removed on the appropriate shelf.



NT7X05
in RSC-S RCO2 (continued)

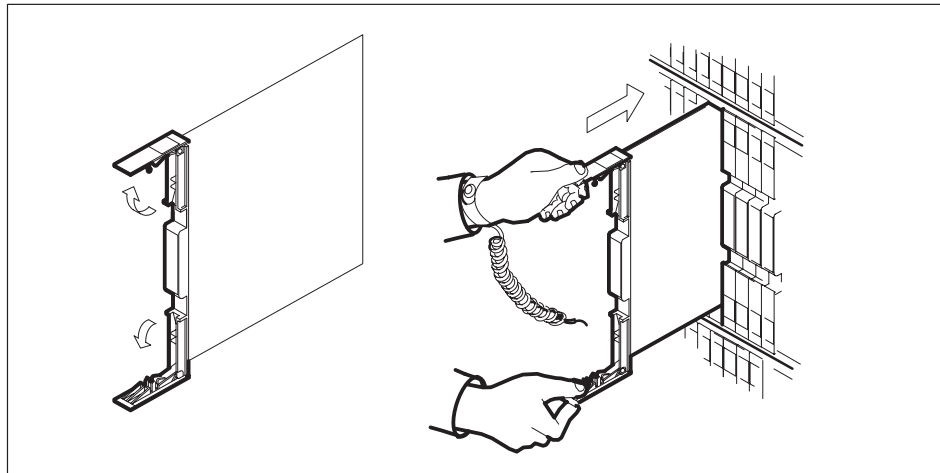
- b. Open the locking levers on the card to be replaced and gently pull the card towards you until it clears the shelf.



- c. Ensure the replacement card has the same PEC, including suffix, as the card you just removed.

12 Open the locking levers on the replacement card.

- a. Align the card with the slots in the shelf and gently slide the card into the shelf.

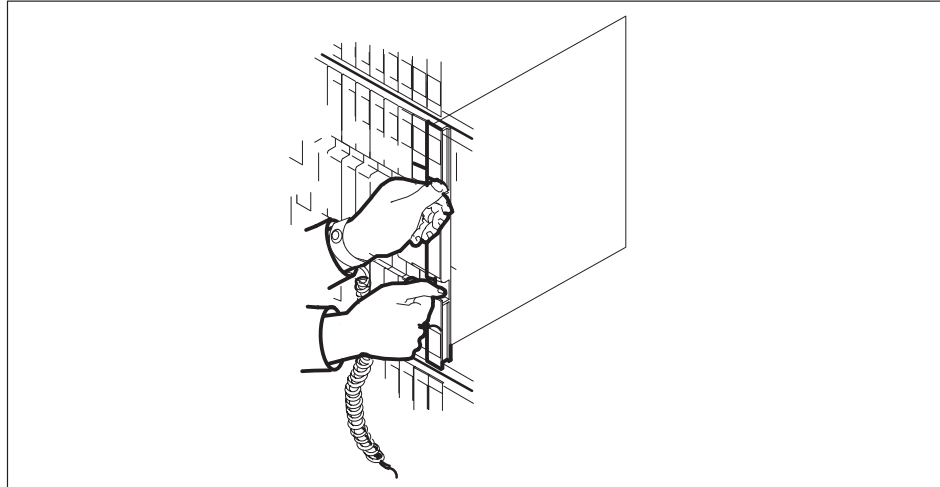


13 Seat and lock the card.

- a. Using your fingers or thumbs, push on the upper and lower edges of the faceplate to ensure the card is fully seated in the shelf.

NT7X05
in RSC-S RCO2 (continued)

- b. Close the locking levers.

***At the MAP display***

- 14** Test the inactive RCO2 unit by typing

>TST UNIT RCO2_unit_no

and pressing the Enter key.

where

rc02_unit_no is the number of the inactive RCO2 unit

Example of a MAP response:

Test Passed

or

Test Failed

If TST	Do
passed	step 15
failed	step 19

- 15** Return the inactive RCO2 unit to service by typing

>RTS UNIT unit_no

and pressing the Enter key.

where

NT7X05 in RSC-S RCO2 (end)

unit_no is the number of the RCO2 unit (0 or 1) tested in step 14

If TST	Do
passed	step 16
failed	step 19

- 16** Load the inactive RCO2 unit by typing

>XPMSTOR INACTIVE CC [load_file_name]

and pressing the Enter key.

where

load_file_name is the name of the file datafilled in field, LOAD, of the inventory table.

If load	Do
passed	step 17
failed	step 19

- 17** Send any faulty cards for repair according to local procedure.

- 18** Record the following items in office records:

- date the card was replaced
- serial number of the card
- symptoms that prompted replacement of the card

Go to step 20.

- 19** Obtain further assistance in replacing this card by contacting personnel responsible for higher level of support.
- 20** You have successfully completed this procedure. Return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.
- 21** For further assistance with switch of activity, contact the personnel responsible for the next level of support.

Note: If the system recommends using the SWACT command with the FORCE option, consult office personnel to determine if use of the FORCE option is advisable.

**NTAX74
in RSC-S RCO2**

Application

Use this procedure to replace an NTAX74 card in an RCO2.

PEC	Suffixes	Name
NTAX74	AA	Cellular Access Processor with 16Mb Memory

Common procedures

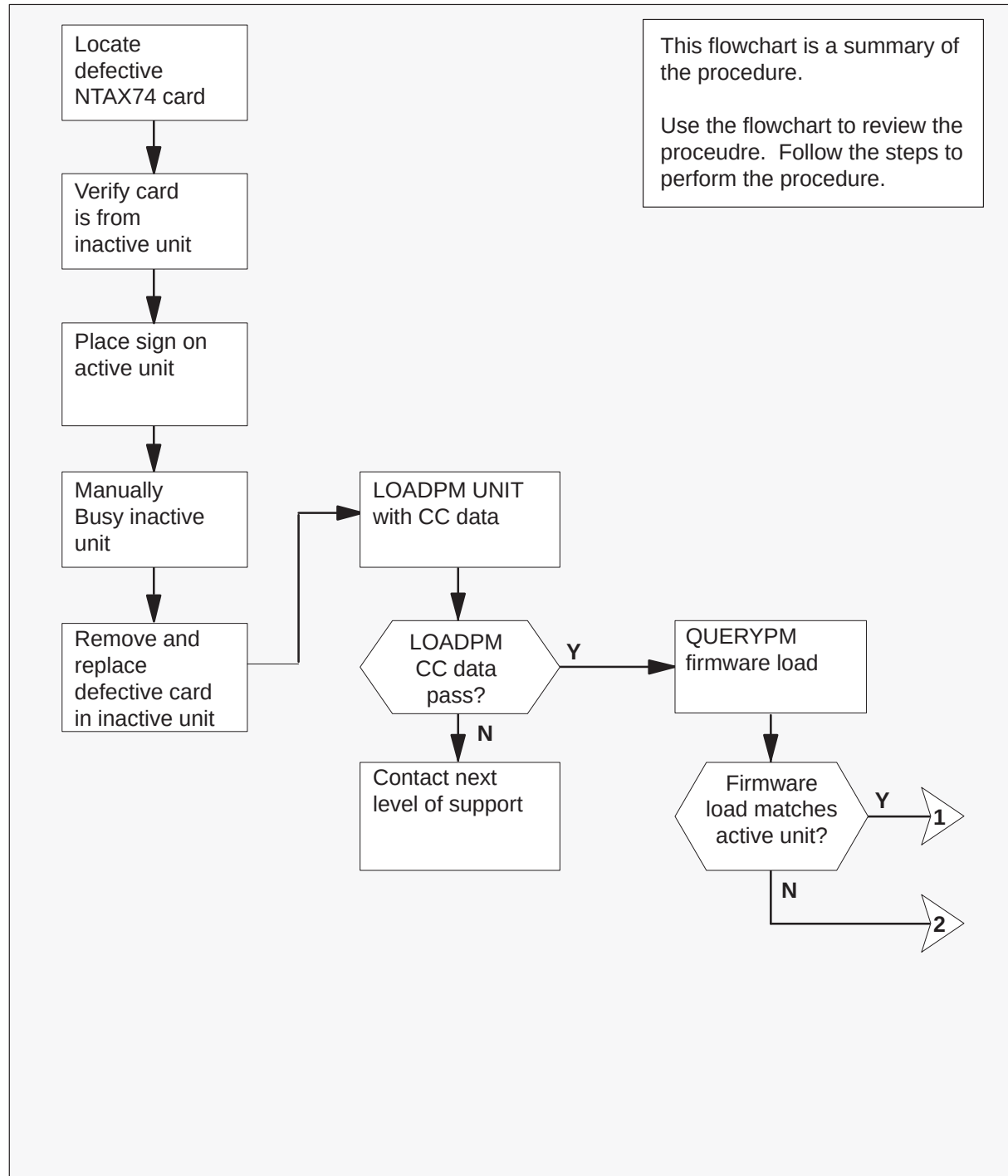
Does not apply

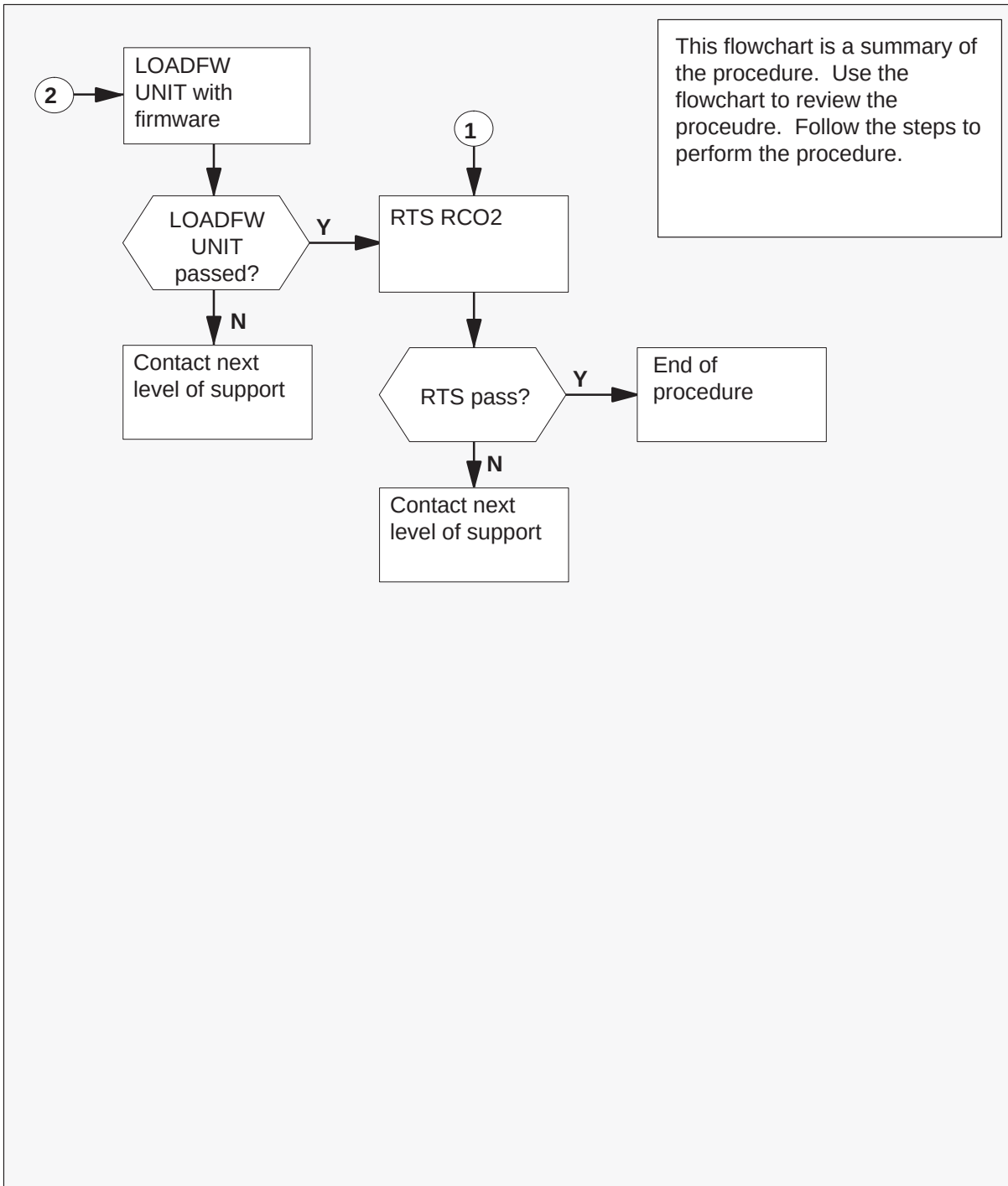
Action

This procedure contains a summary flowchart and a list of steps. Use the flowchart to review the procedure. Follow the steps to perform the procedure.

NTAX74 in RSC-S RCO2 (continued)

Summary of card replacement procedure for an NTAX74 card in RSC-S RCO2



NTAX74
in RSC-S RCO2 (continued)**Summary of card replacement procedure for an NTAX74 card in RSC-S RCO2 (continued)**

NTAX74 in RSC-S RCO2 (continued)

To replace an NTAX74 in RSC-S RCO2

At your current location

- 1 Proceed if one of the following conditions apply:
 - a step in a maintenance procedure directed you to this card replacement procedure
 - you use this procedure to verify or accept cards
 - the maintenance support group directed you to this procedure.

- 2



CAUTION
Loss of service
When you replace a card in an RCO2, make sure the unit in which you replace the card is *inactive* and the mate unit is *active*.

Obtain an NTAX74 replacement card. Make sure the replacement card has the same product engineering code (PEC) and PEC suffix, as the card to be removed.

At the MAP terminal

- 3 To make sure the current MAP display is at the peripheral module (PM) level and to post the RCO2, type:

>MAPCI;MTC;PM;POST RCO2 rco2_no

and press the Enter key.

where

rco2_no is the number of the RCO2 to be busied

NTAX74 in RSC-S RCO2 (continued)

Example of a MAP display:

CM	MS	IOD	Net	PM	CCS	LNS	Trks	Ext	APPL
.	.	.	.	1RCO2	.	.	.	.	.
RCO2			SysB	ManB	OffL	CBsy	ISTb	InSv	
0 Quit	PM		0	0	2	0	2	25	
2 Post_	RCO2		0	0	0	0	1	1	
3 ListSet									
4	RCO2	0	ISTb	Links_00S:	CSide	0,	PSide	0	
5 TRNSL_	Unit0:		Inact	SysB					
6 TST_	Unit1:		Act	InSv					
7 BSY_									
8 RTS_									
9 OffL									
10 LoadPM_									
11 Disp_									
12 Next_									
13 SwAct									
14 QueryPM									
15									
16 IRLINK									
17 Perform									
18									

- 4 To verify that the defective NTAX74 card is in the inactive unit, make sure the light-emitting Diode (LED) labeled ACTIVE is OFF or check the MAP display.

If the defective card	Do
is in the active unit	step 5
is in the inactive unit	step 9

- 5 To switch the processing activity (SWACT) to the inactive unit, type:

>SWACT

and press the Enter key.

A confirmation prompt for the SWACT command appears at the MAP terminal.

If SWACT	Do
cannot continue at this time	step 6
can continue at this time	step 7

NTAX74 in RSC-S RCO2 (continued)

- 6 To reject the prompt to SWACT the units, type:

>NO

and press the Enter key.

The system stops the SWACT.

Return to step 5 during periods of low traffic.

- 7 To confirm the system prompt, type:

>YES

and press the Enter key.

The system runs a pre-SWACT audit to determine if the inactive unit can accept activity accurately.

Note: A maintenance flag appears when maintenance tasks are in progress. Wait until the flag disappears before you proceed with the next maintenance action.

If the message	Do
is SWACT passed	step 9
is SWACT failed Reason: XPM SWACTback	step 8
is SWACT refused by SWACT Controller	step 8

- 8 Return to the *Alarm Clearing Procedures* to clear the alarm condition on the inactive unit. When you clear the alarm, return to step 1 of this procedure.

At the RCE frame

- 9 Place a sign with the words **Active unit–Do not touch** on the active unit. Do not attach this sign with magnets or tape.

At the MAP terminal

- 10 Check the MAP display and determine the state of the inactive unit.

If state	Do
is SysB, CBsy, ISTb, or InSv	step 11
is ManB	step 13

NTAX74
in RSC-S RCO2 (continued)

- 11 To busy the inactive PM unit, type:

>BSY UNIT unit_no

and press the Enter key.

where

unit_no is the number of the inactive RCO2 unit zero or one

- 12 To prevent the PM from trapping, type:

>PMRESET UNIT rco2_unit_no NORUN

and press the Enter key.

where

rco2_unit_no is the number of the inactive RCO2 unit zero or one

At the RCE frame

- 13



WARNING

Static electricity damage

Before you remove cards, wear a wrist strap that connects to the wrist-strap grounding point on the left side of the frame supervisory panel (FSP) of the RCO2. This protects the equipment against static electricity damage.



WARNING

Equipment damage

Take the following precautions when you remove or insert a card:

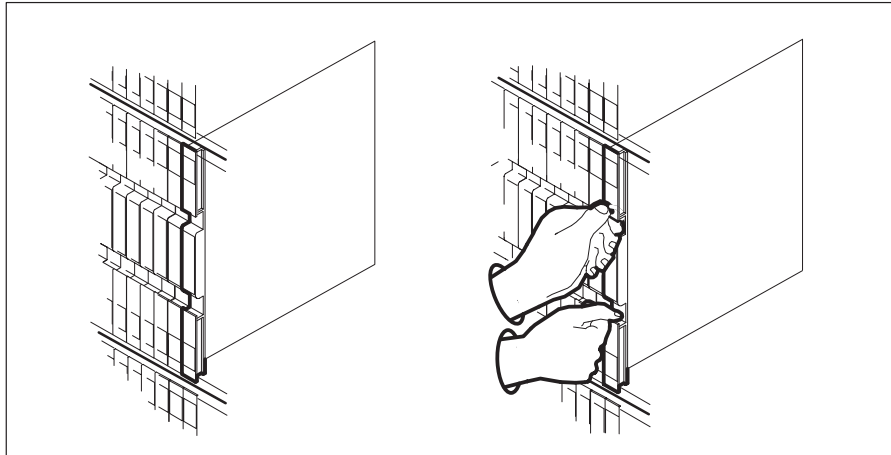
1. Do not apply direct pressure to the components.
2. Do not force the cards into the slots.

Wear a wrist strap.

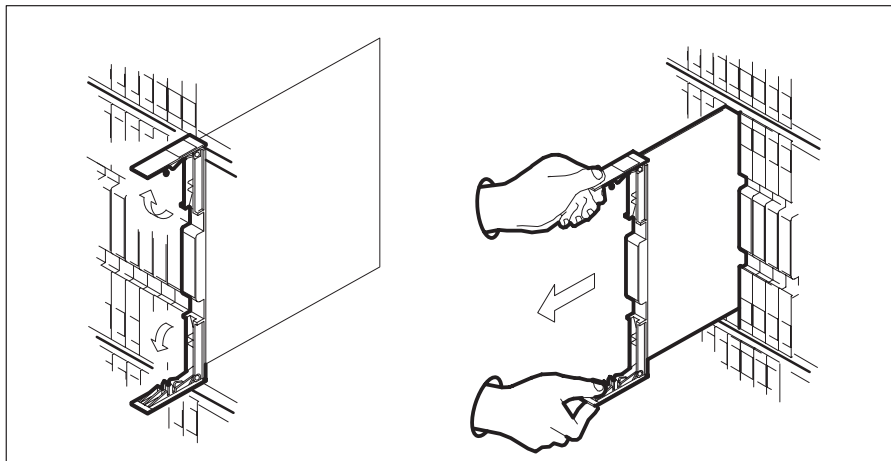
NTAX74 in RSC-S RCO2 (continued)

14 The following figures show how to remove the NTAX74 card:

- a. Locate the card to be removed on the appropriate shelf.



- b. Open the locking levers on the card to be replaced and carefully pull the card toward you until the card clears the shelf.



- c. Make sure the replacement card has the same PEC and PEC suffix, as the card you removed. Make sure all replacement card DIP switch settings match settings of the card you removed.

Note: If the NTAX74 circuit card has a DIP switch, set the DIP switch S1 to the common peripheral module (CPM).

NTAX74
in RSC-S RCO2 (continued)

15

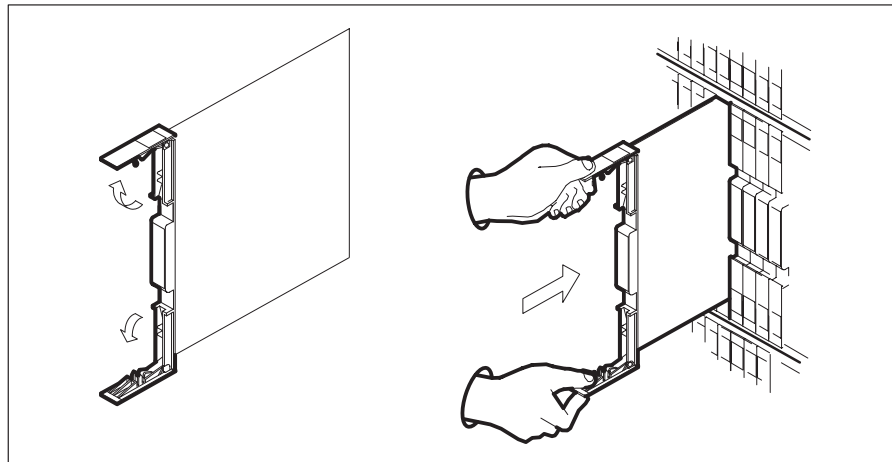
**WARNING****Possible loss of P-side nodes**

When you install the replacement NTAX74, monitor the LEDs on the faceplate of the NTAX74 for the following indicators:

1. The INSV and ESA LEDs come ON and remain ON until loading starts.
2. The ACT LED can come ON and light for less than 1 s. If the ACT LED remains ON for more than 1 s, remove the NTAX74 circuit card and return to this step. If the NTAX74 circuit card remains with both units that have an active processor, a condition of dual activity occurs. This condition causes the loss of P-side nodes.

Open the locking levers on the replacement card.

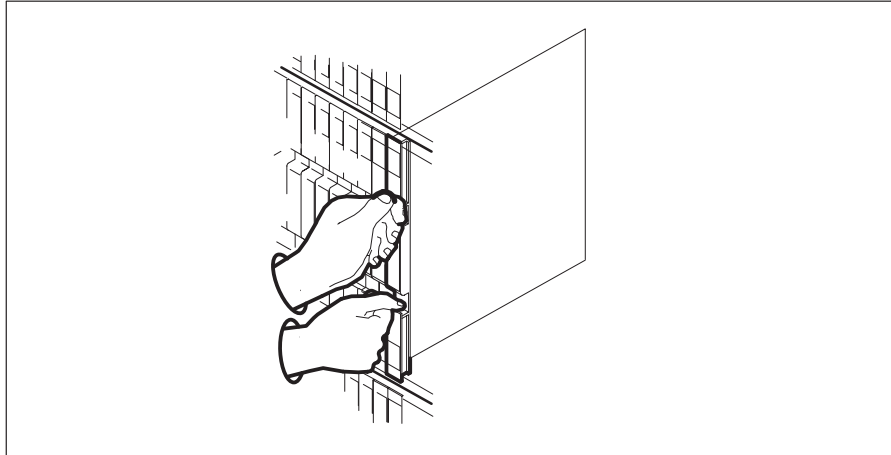
- a. Align the card with the slots in the shelf.
- b. Carefully slide the card in the shelf.



NTAX74 in RSC-S RCO2 (continued)

16 Seat and lock the card.

- a. Use your fingers or thumbs to push on the upper and lower edges of the faceplate. Make sure the card sits completely in the shelf.
- b. Close the locking levers.



17 Use the following information to determine the next step:

If you were directed here from	Do
alarm clearing procedures	step 26
other	step 18

At the MAP terminal

18 To load the inactive RCO2 unit, type:

>LOADPM UNIT rco2_unit_no

and press the Enter key.

where

rco2_unit_no is the number of the busied RCO2 unit

If load	Do
passed	step 19
failed	step 27

NTAX74 in RSC-S RCO2 (continued)

- 19 To query the XMS-based peripheral module (XPM) counters for the firmware load on the NTAX74, type:

>QUERYPM CNTRS

and press the Enter key.

Example of a MAP response

```

Unsolicited MSG limit = 250, Unit 0 = 0, Unit 1 = 0
Unit 0:
Ram Load: WRI07BE
EProm Version: AB02
EEPROM Load: Loadable: AX74XE01, Executable: AX74XE01
CMR Load: CMR03A
CAP:AX74AA
Unit 1:
Ram Load: WRI07BE
EProm Version: AB02
EEPROM Load: Loadable: [AX74XE01] , Executable: [AX74XE01]
CMR Load: CMR03A
CAP:AX74AA
  
```

└─ NTAX74 firmware load name ─┘

If firmware	Do
is valid	step 22
is invalid	step 20

- 20 To load the inactive unit firmware, type:

>LOADFW INACTIVE

and press the Enter key.

Note: If the firmware load is not specified with the LOADFW command, the command applies the firmware file datafilled in the appropriate inventory table.

If LOADFW	Do
passed	step 21
failed	step 27

NTAX74 in RSC-S RCO2 (continued)

- 21 To upgrade the inactive unit firmware, type:

>LOADFW INACTIVE UPGRADE

and press the Enter key.

If LOADFW UPGRADE	Do
passed	step 22
failed	step 27

- 22 To return the inactive RCO2 unit to service, type

>RTS UNIT unit_no

and pressing the Enter key.

where

unit_no is the number of the inactive RCO2 unit

If RTS	Do
passed	step 23
failed	step 27

At the RCE frame

- 23 Remove the sign from the active RCO2 unit.
- 24 Send the defective cards for repair according to local procedure.
- 25 Note the following in the office records:
- date the card is replaced
 - serial number of the card
 - problems that prompted replacement of the card.

Go to step 28.

- 26 Return to the *Clearing an Alarm Procedure* or other procedure that directed you to this procedure. If necessary, go to the point where the system produced the defective card list. Identify the next defective card on the list, and go to the appropriate procedure for that card in this manual.
- 27 For additional help, contact the next level of support.

NTAX74
in RSC-S RCO2 (end)

- 28** This procedure is complete. Return to the maintenance procedure that directed you to this card replacement procedure. Continue as directed.

NTBX01 in RSC-S RCO2

Application

Use this procedure to replace an NTBX01 card in an RSC-S RCO2.

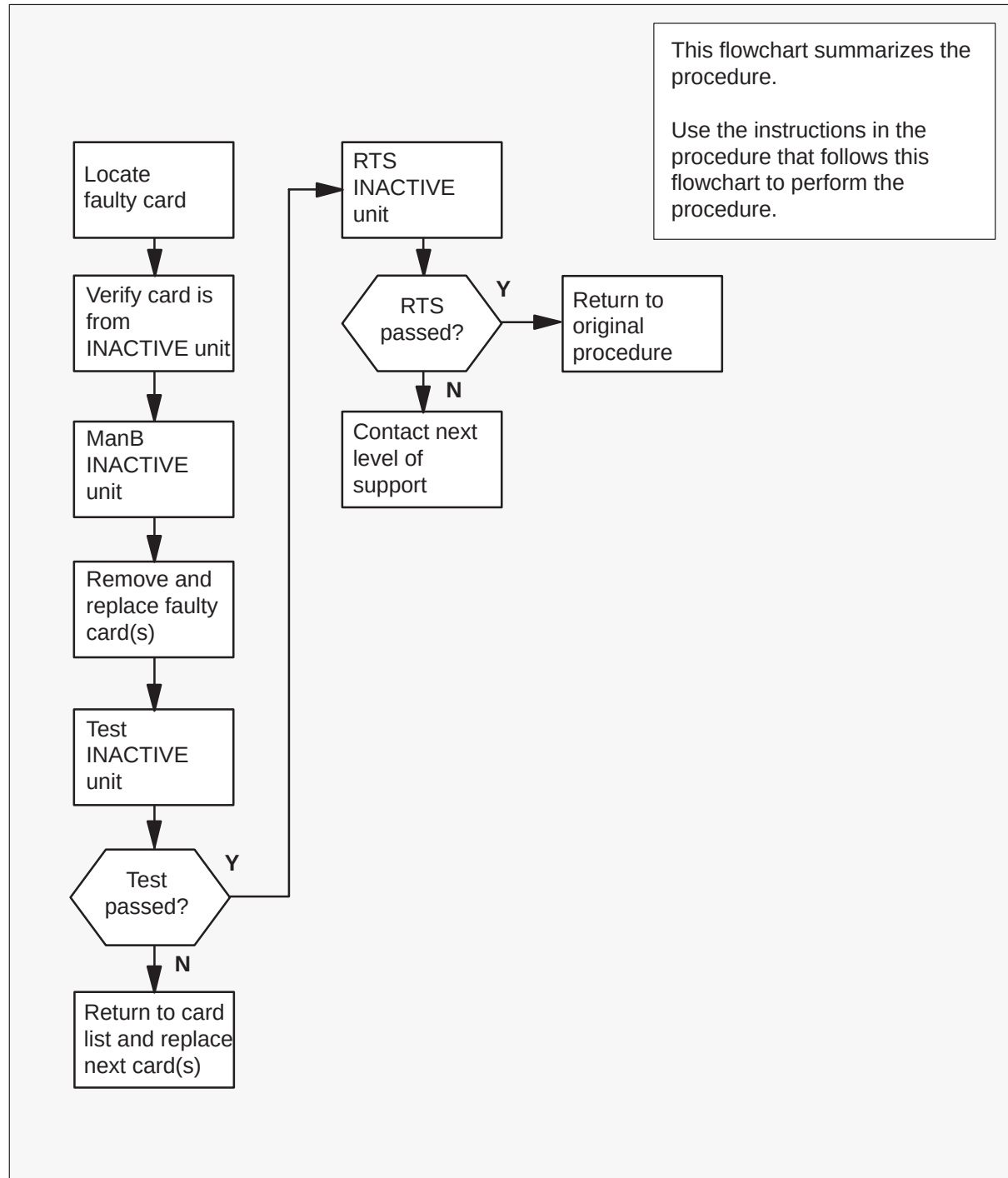
PEC	Suffixes	Name
NTBX01	AB, AC, BA	ISDN Signaling Preprocessor
Note: NTBX01AC or NTBX01BA is required when the RCO2 is configured with the optional processor NTAX74AA instead of the NTMX77AA.		

Common procedures

None

Action

The following flowchart is only a summary of the procedure. To replace the card, use the instructions in the procedure that follows the flowchart.

NTBX01
in RSC-S RCO2 (continued)**Summary of card replacement procedure for an NTBX01 card in RSC-S RCO2**

NTBX01 in RSC-S RCO2 (continued)

Replacing an NTBX01 card in RSC-S RCO2

At your Current Location

- 1 Proceed only if you have been directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure for verifying or accepting cards, or have been directed to this procedure by your maintenance support group.

2



CAUTION

Loss of service

When replacing a card in the RCO2, ensure that the unit in which you are replacing the card is *inactive* and that the mate unit is *active*.

Obtain an NTBX01 replacement card. Ensure the replacement card has the same product equipment code (PEC), including suffix, as the card that is to be removed.

At the MAP terminal

- 3 Ensure the PM level of the MAP display is currently displayed and the RCO2 is posted by typing

>MAPCI;MTC;PM;POST RCO2 rco2_unit_no

and pressing the Enter key.

where

rco2_unit_no is the number of the RCO2 with the faulty card

NTBX01 in RSC-S RCO2 (continued)

Example of a MAP display:

CM	MS	IOD	Net	PM	CCS	LNS	Trks	Ext	Appl
.	.	.	.	.	.	.	.	.	.
RCO2			SysB	ManB	OffL	CBsy	ISTb	InSv	
0 Quit	PM		0	0	0	0	0	25	
2 Post_	RCO2		0	0	0	0	0	0	
3 ListSet									
4	RCO2	0	ISTb	Links_00S:	CSide	0,	PSide	0	
5 TRNSL	Unit0:		Inact	InSv					
6 TST	Unit1:		Act	InSv					
7 BSY									
8 RTS									
9 OffL									
10 LoadPM_									
11 Disp_									
12 Next_									
13									
14 QueryPM									
15									
16									
17									
18									

- 4 By observing the MAP display, be sure that the card to be removed is on the inactive unit.

If faulty card is on	Do
active unit	step 5
inactive unit	step 7

- 5 Switch the processing activity (SWACT) to the inactive unit by typing

>SWACT

and pressing the Enter key.

Note: If the system recommends using the SWACT command with the FORCE option, consult office personnel to determine if use of the FORCE option is advisable.

- 6 Confirm the system prompt by typing

>YES

and pressing the Enter key.

NTBX01 in RSC-S RCO2 (continued)

At the RCE frame

- 7 Put a sign on the *active* unit bearing the words “Active unit—Do not touch.”
This sign should not be attached by magnets or tape.

At the MAP terminal

- 8 Busy the inactive PM unit by typing

>BSY UNIT rco2_unit_no

and pressing the Enter key.

where

rco2_unit_no is the number of the inactive RCO2 unit (0 or 1)

At the RCE frame

9



WARNING

Static electricity damage

Before removing any cards, put on a wrist strap and connect it to the wrist strap grounding point on the left side of the modular supervisory panel of the RCO2. This protects the equipment against damage caused by static electricity.



WARNING

Equipment damage

Take these precautions when removing or inserting a card:

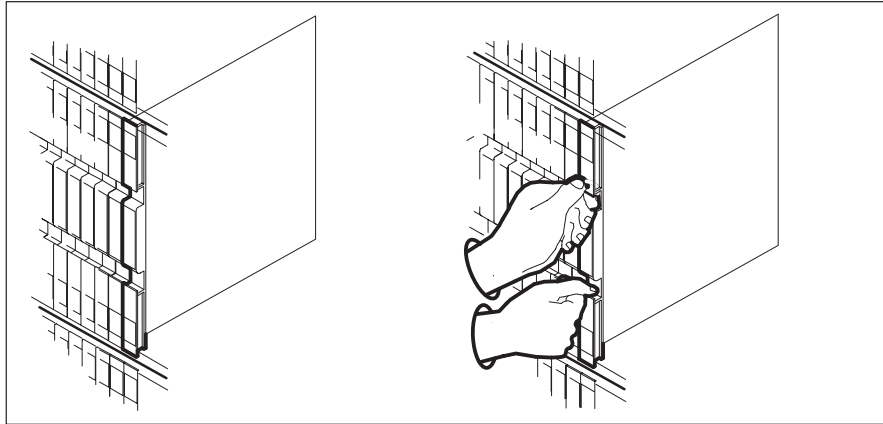
1. Do not apply direct pressure to the components.
2. Do not force the card into its slot.

Put on a wrist strap.

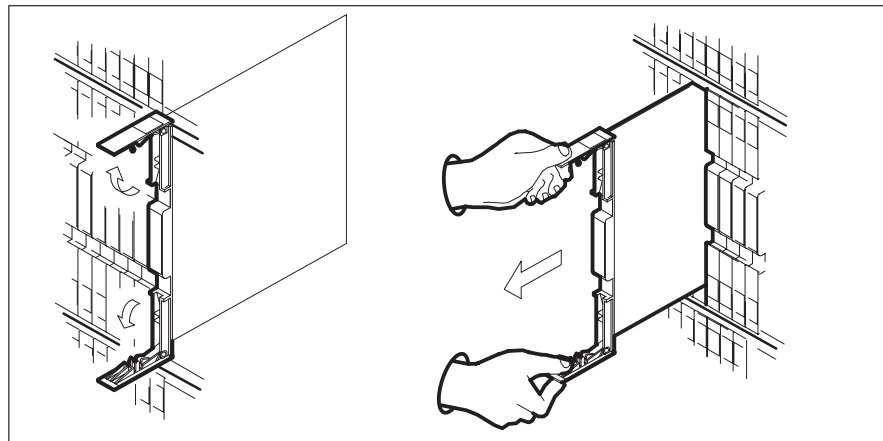
NTBX01 in RSC-S RCO2 (continued)

10 Remove the NTBX01 card as shown in the following figures.

- a.** Locate the card to be removed on the appropriate shelf.



- b.** Open the locking levers on the card to be replaced and gently pull the card toward you until it clears the shelf.

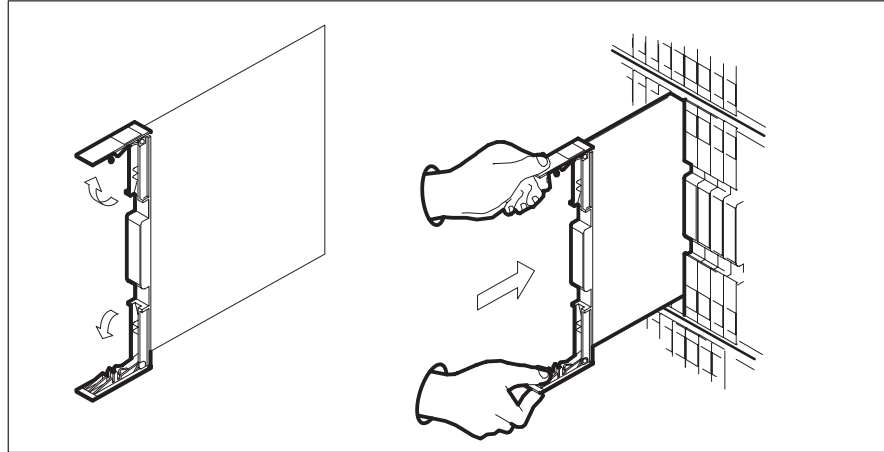


- c.** Ensure the replacement card has the same PEC, including suffix, as the card you just removed.

NTBX01
in RSC-S RCO2 (continued)

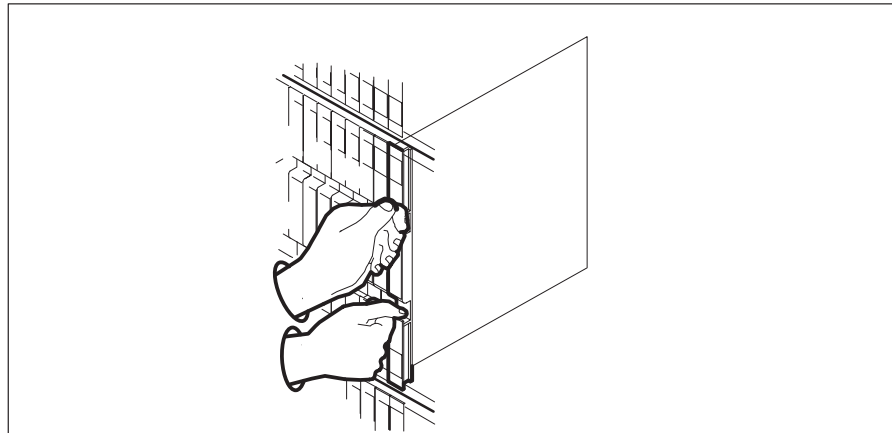
11 Open the locking levers on the replacement card.

- a. Align the card with the slots in the shelf.
- b. Gently slide the card into the shelf.



12 Seat and lock the card.

- a. Using your fingers or thumbs, push on the upper and lower edges of the faceplate to ensure the card is fully seated in the shelf.
- b. Close the locking levers.



NTBX01
in RSC-S RCO2 (continued)

At the MAP terminal

- 13** After replacing the faulty card, load the inactive RCO2 unit by typing

>LOADPM UNIT rco2_unit_no CC

and pressing the Enter key.

where

rco2_unit_no is the number of the RCO2 unit busied in step 8

- 14** Use the following information to determine where to proceed.

If LOADPM	Do
passed	step 15
failed	step 23

- 15** Test the inactive unit by typing

>TST UNIT rco2_unit_no

and pressing the Enter key.

where

rco2_unit_no is the number of the RCO2 unit loaded in step 13

- 16** Use the following information to determine where to proceed.

If TST	Do
passed	step 17
failed	step 22

- 17** Use the following information to determine where to proceed.

If you entered this procedure from	Do
alarm clearing procedures	step 22
other	step 18

NTBX01
in RSC-S RCO2 (end)

- 18 Return the inactive RCO2 unit to service by typing

>RTS UNIT rco2_unit_no

and pressing the Enter key.

where

rco2_unit_no is the number of the RCO2 unit tested in step 15

- 19 Use the following information to determine where to proceed.

If RTS	Do
passed	step 20
failed	step 24

- 20 Send any faulty cards for repair according to local procedure.
- 21 Record the date the card was replaced, the serial number of the card, and the symptoms that prompted replacement of the card. Go to step 24.
- 22 Return to the procedure that directed you to this procedure. At the point where a faulty card list was produced, identify the next faulty card on the list and go to the appropriate card replacement procedure for that card in this manual.
- 23 Obtain further assistance in replacing this card by contacting operating company maintenance personnel.
- 24 You have successfully completed this procedure. Remove the sign from the active unit and return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.

NTBX02 in RSC-S RCO2

Application

Use this procedure to replace an NTBX02 card in an RSC-S RCO2.

PEC	Suffixes	Name
NTBX02	AA	D-Channel Handler
NTBX02	BA	Enhanced D-Channel Handler
Note: NTBX02BA is required when the RCO2 is configured with the optional processor NTAX74AA instead of the NTMX77AA.		

Common procedures

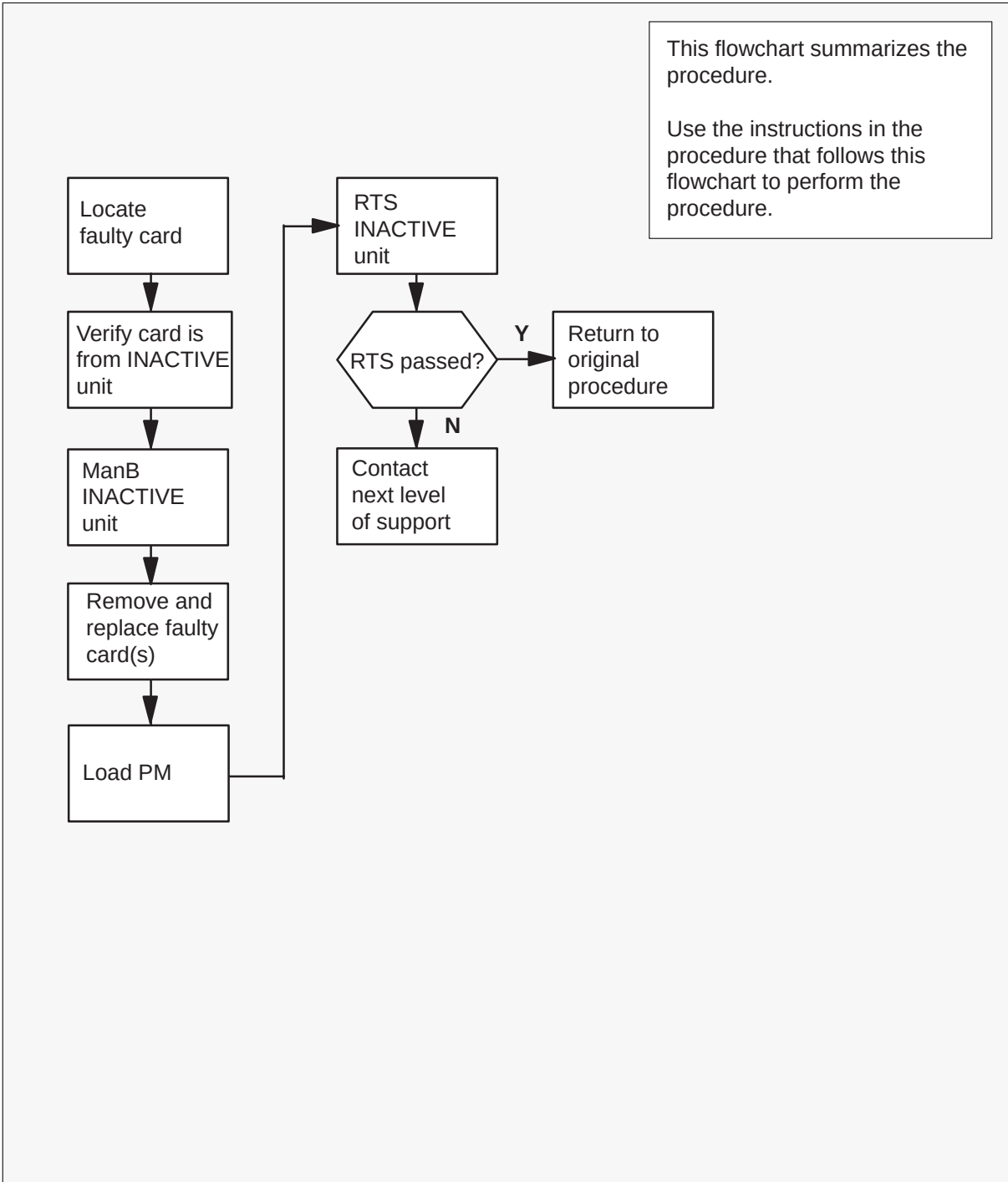
None

Action

The following flowchart is only a summary of the procedure. To replace the card, use the instructions in the procedure that follows the flowchart.

NTBX02 in RSC-S RCO2 (continued)

Summary of card replacement procedure for an NTBX02 card in an RSC-S RCO2



NTBX02 in RSC-S RCO2 (continued)

Replacing an NTBX02 card in an RSC-S RCO2

At your Current Location

- 1 Proceed only if you have been directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure for verifying or accepting cards, or have been directed to this procedure by your maintenance support group.

2



CAUTION

Loss of service

When replacing a card in the RCO2, ensure that the unit in which you are replacing the card is *inactive* and that the mate unit is *active*.

Obtain a replacement card. Ensure that the replacement card has the same product equipment code (PEC), including suffix, as the card that is to be removed.

If the faulty card is	Do
in an extension (EXT) shelf	step 3
not in an EXT shelf	step 4

NTBX02 in RSC-S RCO2 (continued)

At the MAP terminal

- 3 For an extension shelf, refer to the slot positions in the following table to determine which unit contains the faulty NTBX02 card, and proceed to step 4.

EXT shelf slot number	CPM unit number
3 / 24	0
4 / 23	0
5 / 22	0
6 / 21	0
7 / 20	0
8 / 19	1
9 / 18	1
10 / 17	1
11 / 16	1
12 / 15	1

- 4 Ensure the PM level of the MAP display is currently displayed and the RCO2 with the faulty DCH card is posted by typing

>MAPCI;MTC;PM;POST RCO2 rco2_no

and pressing the Enter key.

where

rco2_no is the number of the RCO2 with the faulty card

NTBX02 in RSC-S RCO2 (continued)

Example of a MAP display:

CM	MS	IOD	Net	PM	CCS	LNS	Trks	Ext	Appl
.	.	.	.	.	.	.	.	.	.
RCO2			SysB	ManB	OffL	CBsy	ISTb	InSv	
0 Quit	PM		0	0	0	0	0	25	
2 Post_	RCO2		0	0	0	0	0	0	
3 ListSet									
4	RCO2	0	Links_00S:	CSide	0,	PSide	0		
5 TRNSL	Unit0:	Inact	InSv						
6 TST	Unit1:	Act	InSv						
7 BSY									
8 RTS									
9 OffL									
10 LoadPM_									
11 Disp_									
12 Next_									
13									
14 QueryPM									
15 DCH									
16									
17									
18									

- 5 Refer to the MAP display posted in step 4 to see if the faulty NTBX02 card is in the active or inactive unit.

If faulty card is in	Do
active unit	step 6
inactive unit	step 10

- 6 Switch the processing activity (SWACT) to the inactive unit by typing **>SWACT** and pressing the Enter key.

If SWACT	Do
cannot continue at this time	step 7
can continue at this time	step 8

NTBX02 in RSC-S RCO2 (continued)

- 7 Do not switch activity of the units. Reject the SWACT by typing

>NO

and pressing the Enter key.

The system discontinues the SWACT.

Return to step 6 during a period of low traffic.

- 8 Confirm the system prompt by typing

>YES

and pressing the Enter key.

The system runs a pre-SWACT audit to determine the ability of the inactive unit to accept activity reliably.

Note: A maintenance flag appears when maintenance tasks are in progress. Wait until the flag disappears before proceeding to the next maintenance action.

If the message is	Do
SWACT passed	step 10
SWACT failed	step 9
SWACT refused by SWACT controller	step 9

- 9 Return to the *Alarm Clearing Procedures* to clear the alarm condition on the inactive unit. When the alarm is cleared, return to step 1 of this procedure.

At the RCE frame

- 10 Put a sign on the *active* unit bearing the words "Active unit—Do not touch."
This sign should not be attached by magnets or tape.

At the MAP terminal

- 11 Busy the inactive PM unit by typing

>BSY UNIT unit_no

and pressing the Enter key.

where

unit_no is the number of the inactive RCO2 unit (0 or 1) containing the faulty BX02 card

NTBX02 in RSC-S RCO2 (continued)

- 12** Access the DCH level of the MAP display by typing

>DCH

and pressing the Enter key.

Example of a MAP display:

CM	MS	IOD	Net	PM	CCS	LNS	Trks	Ext	Appl
.	.	.	.	.	.	.	.	.	.
DCH			SysB	ManB	OffL	CBsy	ISTb	InSv	
0 Quit	PM		0	0	0	0	0	25	
2 Post_	RCO2		0	0	0	0	0	0	
3									
4		RCO2 0	Links_00S:	CSide	0,	PSide	0		
5 TRNSL	Unit0:	InSv							
6 TST	Unit1:	InSv							
7 BSY									
8 RTS	DCH	0	0	0	1	0	0		
9 OffL									
10 LoadPM_									
11 Disp_									
12 Next_									
13 SwAct									
14 QueryPM									
15 DCH									
16									
17 Perform									
18									

- 13** Using the information in the MAP display in step 12, identify and post the faulty DCH card state by typing

>POST dch_card_state

and pressing the Enter key.

where

dch_card_state is either CBsy, SysB or ISTb. The example in step 12 shows the DCH card as being CBsy.

NTBX02
in RSC-S RC02 (continued)

Example of a MAP display

CM	MS	IOD	Net	PM	CCS	LNS	Trks	Ext	Appl
.	.	.	.	.	.	.	.	.	.
DCH			SysB	ManB	OffL		CBsy	ISTb	InSv
0 Quit	PM		0	0	0		0	0	25
2 Post_	RC02		0	0	0		0	0	0
3									
4	RC02	0	Links_00S:	CSide	0,	PSide	0		
5 TRNSL	Unit0:		InSv						
6 TST	Unit1:		InSv						
7 BSY									
8 RTS	DCH	0		0	0		1	0	0
9 OffL									
10 LoadPM_	DCH	0	ISG	1	CBSY	RC02	2	PORT	15
11 Disp_									
12 Next_									
13 SwAct									
14 QueryPM									
15 DCH									
16									
17 Perform									
18									

- 14 Identify the DCH load file name by typing

>QUERYPM
and pressing the Enter key.

Example of a MAP response

Site	Flr	RPos	Bay_id	Shf	Description	Slot	EqPEC
HOST	01	R09	LTEI 00	32	PLGC : 002	02	BX02

Loadnames : DCHINV - DCH32BT : INTL INDEX : 8

The DCH load file name in the example is *DCH32BT*.

- 15 Use the following information to determine the next step in this procedure.

If system load module is	Do
version 1	step 16
version 2	step 17

NTBX02
in RSC-S RCO2 (continued)

- 16 List the loadfile in the directory by typing

>DSKUT;LISTVOL D000_dch_load_file_name ALL
and pressing the Enter key.

or

>DSKUT;LISTVOL D010_dch_load_file_name ALL
and pressing the Enter key.

Local operating company policy determines which disk, D000 or D010, the loadfile will be on.

Example of a MAP response:

TAPE\$DIR
DCH32BT

Proceed to step 18.

- 17 List the loadfile in the directory by typing

>DISKUT;LV S00D
and pressing the Enter key.

>LF S00D file_name
and pressing the Enter key.

or

>DISKUT;LV S01D
and pressing the Enter key.

>LF S01D file_name
and pressing the Enter key.

- 18 Leave the disk utility by typing

>QUIT
and pressing the Enter key.

- 19 Compare the information in the example in step 14 with the information in the example in step 16 or 17 to verify the DCH file name exists. For instance, the file name in step 16 is *DCH32BT*, which corresponds with the file name in step 14.

- 20 Busy the faulty card by typing

>BSY
and pressing the Enter key.

NTBX02 in RSC-S RCO2 (continued)

At the RCE frame

21



CAUTION

Static discharge may cause damage to circuit packs
Put on a wrist strap and connect it to the frame of the RMM before removing any cards. This protects the RMM against service degradation caused by static electricity.



WARNING

Equipment damage

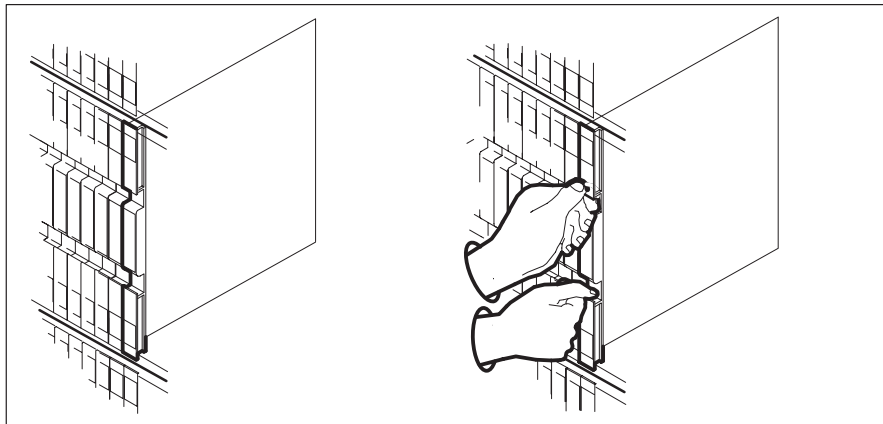
Take these precautions when removing or inserting a card:

1. Do not apply direct pressure to the components.
2. Do not force the cards into the slots.

Put on a wrist strap.

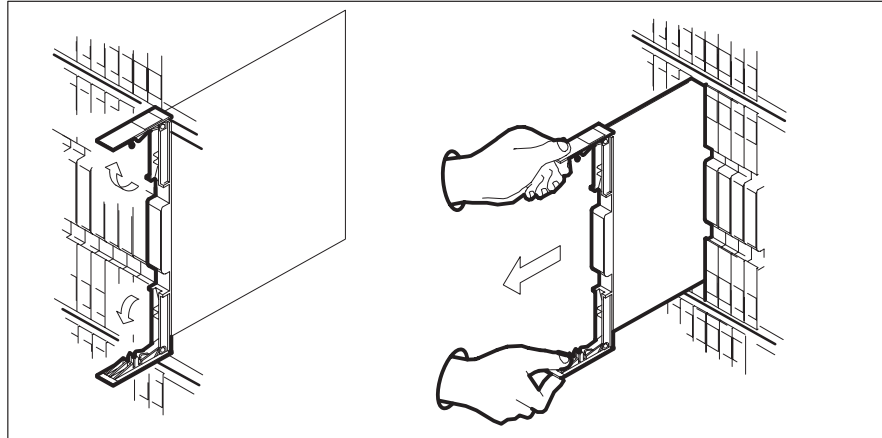
22 Remove the NTBX02 card as shown in the following figures.

a. Locate the card to be removed on the appropriate shelf.



NTBX02
in RSC-S RCO2 (continued)

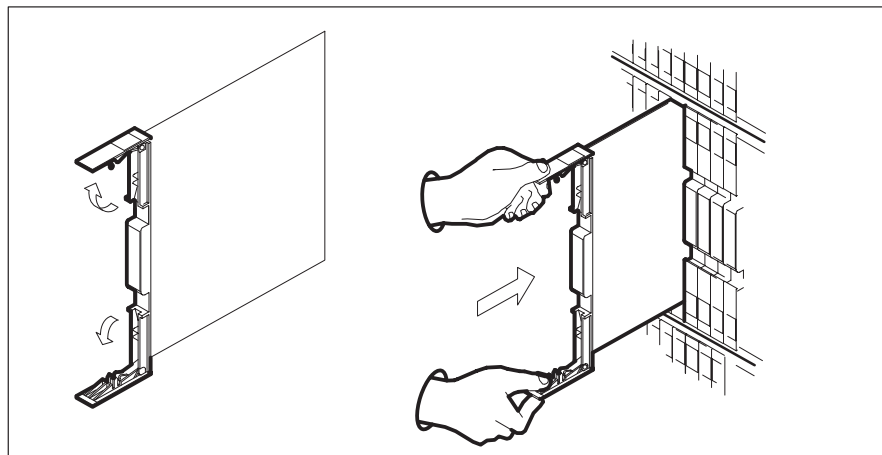
- b. Open the locking levers on the card to be replaced and gently pull the card toward you until it clears the shelf.



- c. Ensure the replacement card has the same PEC, including suffix, as the card you just removed.

23 Open the locking levers on the replacement card.

- a. Align the card with the slots in the shelf.
- b. Gently slide the card into the shelf.



NTBX02 in RSC-S RCO2 (continued)

24



CAUTION

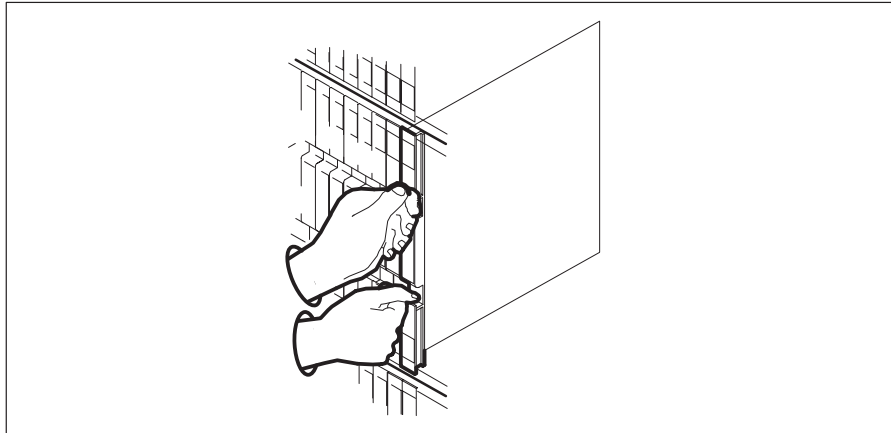
Loss of subscriber service

Subscriber service may be lost in the active unit when reseating the NTBX02 card.

It is recommended that this procedure be performed during low traffic periods.

Seat and lock the card.

- a. Using your fingers or thumbs, push on the upper and lower edges of the faceplate to ensure that the card is fully seated in the shelf.
- b. Close the locking levers.



At the MAP terminal

25 Load the DCH card by typing

>LOADPM

and pressing the Enter key.

26 Use the following information to determine the next step in this procedure.

If load	Do
passed	step 27
failed	step 34

NTBX02
in RSC-S RCO2 (continued)

- 27 Return the DCH card to service by typing

>RTS

and pressing the Enter key.

If RTS	Do
passed	step 28
failed	step 34

- 28 Leave the DCH level of the MAP display and return to the RCO2 level by typing

>QUIT

and pressing the Enter key.

- 29 Return to service the PM unit busied in step 11 by typing

>RTS UNIT unit_no

and pressing the Enter key.

where

unit_no is the number of the inactive RCO2 unit (0 or 1) containing the
new BX02 card

- 30 Ensure that the RCO2 unit is in service by typing

>QUERYPM FLT

and pressing the Enter key.

NTBX02

in RSC-S RCO2 (continued)

Example of a MAP display:

CM	MS	IOD	Net	PM	CCS	Lns	Trks	Ext	Appl
.	.	.	.	.	.	.	.	.	.
RCO2			SysB	ManB	OffL	CBsy	ISTb	InSv	
0 Quit	PM	0	0	0	0	0	0	25	
2 Post_	RCO2	0	0	0	0	0	0	1	
3 ListSet									
4	RCO2	0	InSv	Links_00S:	CSide	0,	PSide	0	
5 TRNSL_	Unit0:	Act	InSv						
6 Tst_	Unit1:	Inact	InSv						
7 Bsy_	QUERYPM	FLT							
8 RTS_	Unit0	No troubles exist							
9 OffL	Unit1	No troubles exist							
10 LoadPM_									
11 Disp_									
12 Next									
13									
14 QueryPM									
15 DCH									
16									
17									
18									

Use the following information to determine the next step in this procedure.

If faults are	Do
not indicated	step 31
indicated	step 34

- 31** Send any faulty cards for repair according to local procedure.
- 32** Record the date the card was replaced, the serial number of the card, and the symptoms that prompted replacement of the card.

If you entered this procedure from	Do
alarm clearing procedures	step 33
other	step 35

NTBX02
in RSC-S RCO2 (end)

- 33** Return to *Alarm and Performance Monitoring Procedures* or other procedure that directed you to this procedure. At the point where a faulty card list was produced, identify the next faulty card on the list and go to the appropriate card replacement procedure for that card in this manual.
- 34** Obtain further assistance in replacing this card by contacting the personnel responsible for higher level of support.
- 35** You have successfully completed this procedure. Remove the sign from the active unit and return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.

NTBX26 in RSC-S LCME

Application

Use this procedure to replace an NTBX26 card in an RSC-S LCME.

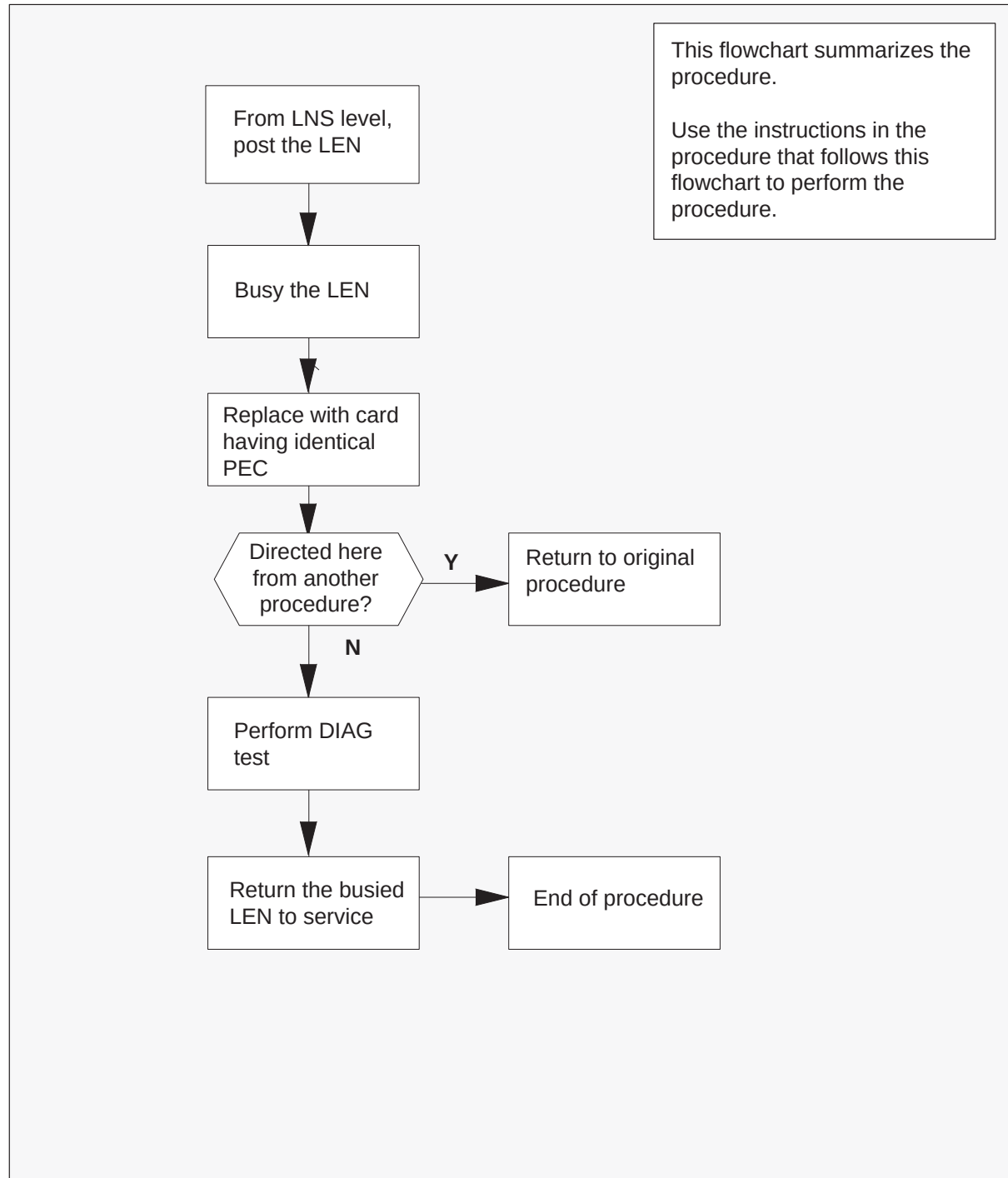
PEC	Suffixes	Name
NTBX26	AA	ISDN S/T Interface Line card

Common procedures

None

Action

The following flowchart is only a summary of the procedure. To replace the card, use the instructions in the procedure that follows the flowchart.

NTBX26
in RSC-S LCME (continued)**Summary of card replacement procedure for an NTBX26 card in an RSC-S LCME**

NTBX26
in RSC-S LCME (continued)

Replacing an NTBX26 card in an RSC-S LCME

At your Current Location

- 1 Proceed only if you have been directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure for verifying or accepting cards, or have been directed to this procedure by your maintenance support group.
- 2 Obtain an NTBX26 replacement card. Ensure the replacement card has the same product equipment code (PEC), including suffix, as the card that is to be removed.

At the MAP terminal

- 3 Post the line equipment number (LEN) of the card to be replaced by typing
>MAPCI;MTC;LNS;LTP;POST L site lcme_no unit_no lsg_no ckt_no
and pressing the Enter key.

where

site is the location name of the LCME with the faulty card
lcme_no is the number of the LCME with the faulty card
unit_no is the number of the LCME unit with the faulty card
lsg_no is the number of the LSG with the faulty card
ckt_no is the number of the circuit associated with the faulty card

Example of a MAP display:

CM	MS	IOD	Net	PM	CCS	LNS	Trks	Ext	Appl
.	.	.	.	.	.	.	.	.	.
LTP									
0 Quit		Post	DELQ		BUSYQ		PREFIX		
2 Post_									
3		LCC PTY RNG....LEN.....DN				STA F S LTA TE	RESULT		
4		ISDN Loop HOST 00 0 03 03			4931082	IDL			
5 BSY									
6 RTS									
7 DIAG									
8									
9 AIMStat									
10 CKTLOC									
11 Hold									
12 Next_									
13									
14									
15									
16 Prefix									
17 LCO									
18 Level									

NTBX26 in RSC-S LCME (continued)

- 4 Busy the NTBX26 line card by typing

>BSY

and pressing the Enter key.

Example of a MAP display:

CM	MS	IOD	Net	PM	CCS	LNS	Trks	Ext	Appl								
.	.	.	.	.	.	.	.	.	.								
LTP																	
0	Quit	Post	DELQ	BUSYQ	PREFIX												
2	Post_																
3	LCC PTY	RNG....LEN.....DN	STA F S	LTA TE	RESULT												
4	ISDN Loop	HOST 00 0 03 03	4931082	MB													
5	BSY																
6	RTS																
7	DIAG																
8																	
9	AIMStat																
10	CKTLOC																
11	Hold																
12	Next_																
13																	
14																	
15																	
16	Prefix																
17	LCO																
18	Level																

At the LCE frame

5

NTBX26
in RSC-S LCME (continued)



WARNING

Card damage—transport

Take these precautions to protect the circuit cards from electrical and mechanical damage while transporting cards.

When handling a circuit card not in an electrostatic discharge (ESD) protective container, stand on a conductive floor mat and wear a wrist strap connected, through a 1-megohm resistor, to a suitably grounded object, such as a metal workbench or a DMS switch frame (Northern Telecom Corporate Standard 5028).

Store and transport circuit cards in an ESD protective container.



WARNING

Equipment damage

Take these precautions when removing or inserting a card:

1. Do not apply direct pressure to the components.
2. Do not force the cards into the slots.



WARNING

Hot materials

Exercise care when handling the line card. The line feed resistor may be very hot.



CAUTION

Special tools required

Card shrouds and removal tools are required for removing cards from the line drawers.

Put on a wrist strap.

NTBX26 in RSC-S LCME (continued)

Line card insertion / withdrawal tool for	Apparatus code	Common product code
3-inch cards	QTH56A	A0298291
6-inch cards	QTH58A	A0313317

Note 1: Card shrouds are required for inserting or removing cards in line drawers. Two sizes are available for use with 3-inch and 6-inch cards. Descriptions of these shrouds follow.

Note 2: Card removal tools are required for removing cards from line drawers. Two sizes are available. Descriptions of these tools follow.

Card removal tool for	Apparatus code	Common product code
3–4 inch cards	QTH57A	A0298292
Note: For 4-inch or larger cards, use the large grip tool ITA9953.		

- 6 To prepare to remove the faulty card, open the line drawer and do the following substeps:
 - a. Face the drawer shelf and grasp the handle at the bottom of the drawer with your right hand.
 - b. Push up on the drawer latch with your thumb and pull the drawer out until fully withdrawn. It is fully withdrawn when the drawer stop, at the top, prevents further travel.
 - c. Maintain a slight pull on the handle and lift the faceplate of the drawer approximately 2.5 cm (1 in).
 - d. While holding the drawer in this position, push the bottom of the drawer, nearest the shelf with your left hand, to a position about 1 cm (.5 in) to the right.
 - e. Hold the drawer in this position with your left hand and lower the faceplate of the drawer by releasing the grip of your right hand.
 - f. Ensure a card shroud and line card extractor are available.
- 7 Remove the line card to be replaced by following these substeps:
 - a. Slide a card shroud over the card to be removed and an adjacent card. If there is not an adjacent card on either side, do not use the card shroud.

NTBX26 in RSC-S LCME (continued)

- b. Grasp the edge of the card with a line card extractor at a point midway between the top and bottom edges. Hold the extractor in your right hand.
 - c. Squeeze the handles of the extractor together to grasp the card tightly.
 - d. Hold the front cover of the line drawer to steady it using your left hand.
 - e. Pull the extractor away from the drawer, and the card will become unplugged from its socket on the drawer backplane.
 - f. Continue pulling the card with the extractor until the card is clear of the shroud.
 - g. Insert the card removed into the ESD container and store using local procedures.
- 8 Replace the faulty card by following these substeps:
 - a. Remove the replacement card from the ESD container.
 - b. Slide the card in the shroud guide slots toward the drawer backplane.
 - c. Hold the front cover of the line drawer with your left hand to steady it.
 - d. Grasp the top and bottom edges of the card with the fingers of your right hand.
 - e. Push the card toward the backplane until it plugs fully into the backplane socket.
- 9 Use the following information to determine where to proceed.

If you entered this procedure from	Do
alarm clearing procedures	step 15
other	step 10

At the MAP terminal

- 10 Test the NTBX26 line card by typing
>DIAG
and pressing the Enter key.

NTBX26
in RSC-S LCME (end)

- 11** Use the following information to determine where to proceed.

If DIAG	Do
passed	step 12
failed	step 15

- 12** Return the NTBX26 card to service by typing

>RTS

and pressing the Enter key.

If RTS	Do
passed	step 13
failed	step 16

- 13** Send any faulty cards for repair according to local procedure.
- 14** Record the date the card was replaced, the serial number of the card, and the symptoms that prompted replacement of the card. Go to step 17.
- 15** Return to the procedure that directed you to this procedure. At the point where a faulty card list was produced, identify the next faulty card on the list and go to the appropriate card replacement procedure for that card in this manual.
- 16** Obtain further assistance in replacing this card by contacting operating company maintenance personnel.
- 17** You have successfully completed this procedure. Return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.

NTBX27 in RSC-S LCME

Application

Use this procedure to replace an NTBX27 card in an RSC-S LCME.

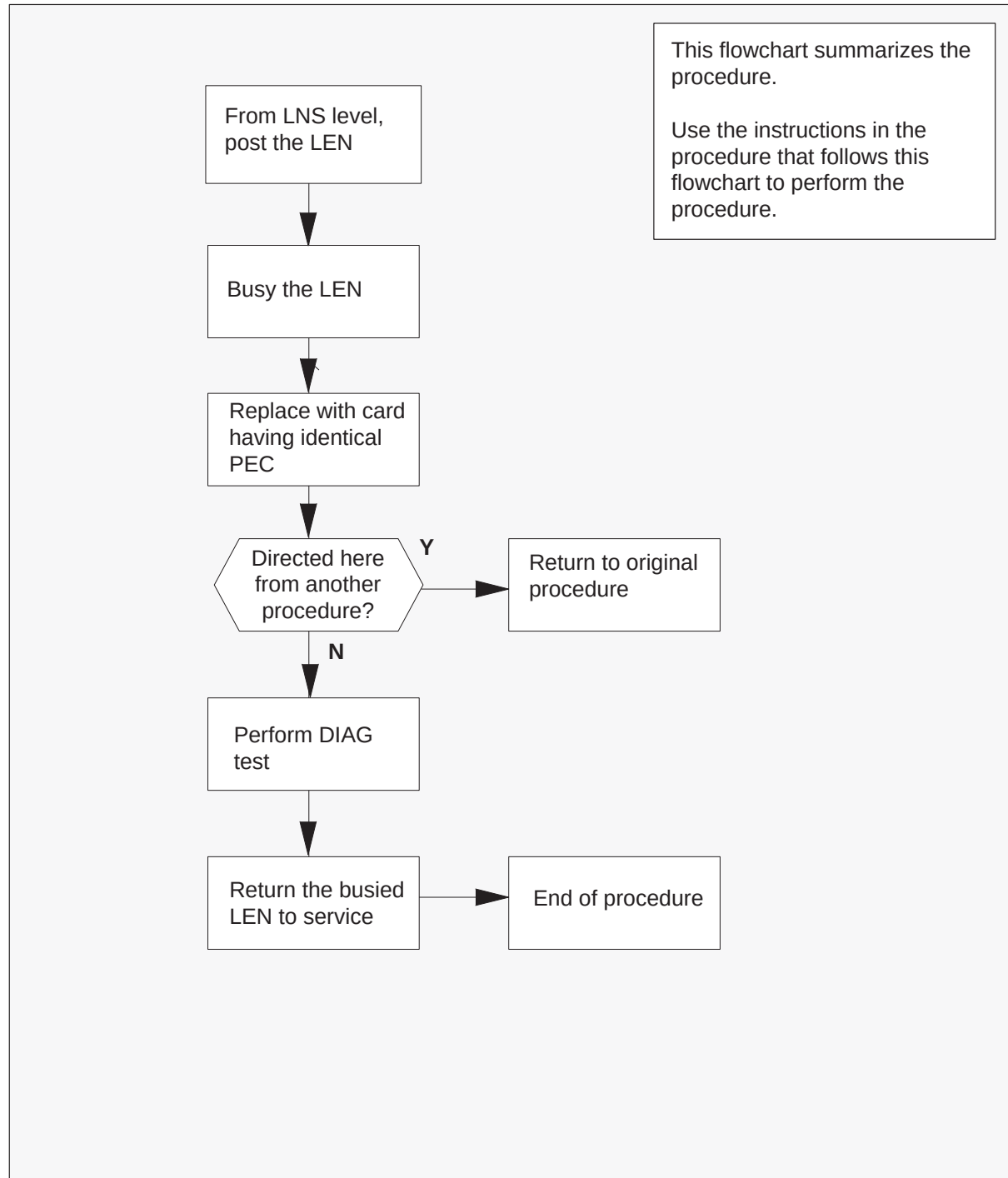
PEC	Suffixes	Name
NTBX27	AA	SDN 2B1Q U Interface Line card

Common procedures

None

Action

The following flowchart is only a summary of the procedure. To replace the card, use the instructions in the procedure that follows the flowchart.

NTBX27
in RSC-S LCME (continued)**Summary of card replacement procedure for an NTBX27 card in an RSC-S LCME**

NTBX27
in RSC-S LCME (continued)

Replacing an NTBX27 card in an RSC-S LCME

At your Current Location

- 1 Proceed only if you have been directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure for verifying or accepting cards, or have been directed to this procedure by your maintenance support group.
- 2 Obtain an NTBX27 replacement card. Ensure the replacement card has the same product equipment code (PEC), including suffix, as the card that is to be removed.

At the MAP terminal

- 3 Post the LEN of the card to be replaced by typing
>MAPCI;MTC;LNS;LTP;POST L site lcme_no unit_no lsg_no ckt_no
and pressing the Enter key.

where

site is the location name of the LCME with the faulty card
lcme_no is the number of the LCME with the faulty card
unit_no is the number of the LCME unit with the faulty card
lsg_no is the number of the LSG with the faulty card
ckt_no is the number of the circuit associated with the faulty card

Example of a MAP display:

CM	MS	IOD	Net	PM	CCS	LNS	Trks	Ext	Appl
.	.	.	.	.	.	.	.	.	.
LTP									
0	Quit	Post	DELQ		BUSYQ		PREFIX		
2	Post_								
3		LCC PTY RNG....LEN.....DN				STA F S LTA TE	RESULT		
4		ISDN Loop	HOST 00 0 03 03		4931082	IDL			
5	BSY								
6	RTS								
7	DIAG								
8									
9	AIMStat								
10	CKTLOC								
11	Hold								
12	Next_								
13									
14									
15									
16	Prefix								
17	LCO								
18	Level								

NTBX27 in RSC-S LCME (continued)

- 4 Busy the NTBX27 line card by typing

>BSY

and pressing the Enter key.

Example of a MAP display:

CM	MS	IOD	Net	PM	CCS	LNS	Trks	Ext	Appl
.	.	.	.	.	.	.	.	.	.
LTP									
0	Quit	Post	DELQ	BUSYQ	PREFIX				
2	Post_								
3	LCC PTY RNG....LEN.....DN	STA F S LTA TE RESULT							
4	ISDN Loop	HOST 00 0 03 03 4931082 MB							
5	BSY								
6	RTS								
7	DIAG								
8									
9	AIMStat								
10	CKTLOC								
11	Hold								
12	Next_								
13									
14									
15									
16	Prefix								
17	LCO								
18	Level								

NTBX27 in RSC-S LCME (continued)

At the LCE frame

5



WARNING

Equipment damage

Take these precautions when removing or inserting a card:

1. Do not apply direct pressure to the components.
2. Do not force the cards into the slots.



WARNING

Card damage—transport

Take these precautions to protect the circuit cards from electrical and mechanical damage while transporting cards.

When handling a circuit card not in an electrostatic discharge (ESD) protective container, stand on a conductive floor mat and wear a wrist strap connected, through a 1-megohm resistor, to a suitably grounded object, such as a metal workbench or a DMS switch frame (Northern Telecom Corporate Standard 5028).

Store and transport circuit cards in an ESD protective container.



WARNING

Hot materials

Exercise care when handling the line card. The line feed resistor may be very hot.



CAUTION

Special tools required

Card shrouds and removal tools are required for removing cards from the line drawers.

NTBX27 in RSC-S LCME (continued)

Put on a wrist strap.

Line card insertion / withdrawal tool for	Apparatus code	Common product code
3-inch cards	QTH56A	A0298291
6-inch cards	QTH58A	A0313317

Note 1: Card shrouds are required for inserting or removing cards in line drawers. Two sizes are available for use with 3-inch and 6-inch cards. Descriptions of these shrouds follow.

Note 2: Card removal tools are required for removing cards from line drawers. Two sizes are available. Descriptions of these tools follow.

Card removal tool for	Apparatus code	Common product code
3–4 inch cards	QTH57A	A0298292
Note: For 4-inch or larger cards, use the large grip tool ITA9953.		

- 6 To prepare to remove the faulty card, open the line drawer and follow these substeps:
 - a. Face the drawer shelf and grasp the handle at the bottom of the drawer with your right hand.
 - b. Push up on the drawer latch with your thumb and pull the drawer out until fully withdrawn. It is fully withdrawn when the drawer stop, at the top, prevents further travel.
 - c. Maintain a slight pull on the handle and lift the faceplate of the drawer approximately 2.5 cm (1 in).
 - d. While holding the drawer in this position, push the bottom of the drawer, nearest the shelf with your left hand, to a position about 1 cm (.5 in) to the right.
 - e. Hold the drawer in this position with your left hand and lower the faceplate of the drawer by releasing the grip of your right hand.
 - f. Ensure a card shroud and line card extractor are available.
- 7 Remove the line card to be replaced by following these substeps:

NTBX27 in RSC-S LCME (continued)

- a. Slide a card shroud over the card to be removed and an adjacent card. If there is not an adjacent card on either side, do not use the card shroud.
 - b. Grasp the edge of the card with a line card extractor at a point midway between the top and bottom edges. Hold the extractor in your right hand.
 - c. Squeeze the handles of the extractor together to grasp the card tightly.
 - d. Hold the front cover of the line drawer to steady it using your left hand.
 - e. Pull the extractor away from the drawer, and the card will become unplugged from its socket on the drawer backplane.
 - f. Continue pulling the card with the extractor until the card is clear of the shroud.
 - g. Insert the card removed into the ESD container and store using local procedures.
- 8 Replace the faulty card by following these substeps:
- a. Remove the replacement card from the ESD container.
 - b. Slide the card in the shroud guide slots toward the drawer backplane.
 - c. Hold the front cover of the line drawer with your left hand to steady it.
 - d. Grasp the top and bottom edges of the card with the fingers of your right hand.
 - e. Push the card toward the backplane until it plugs fully into the backplane socket.
- 9 Use the following information to determine where to proceed.

If you entered this procedure from	Do
alarm clearing procedures	step 15
other	step 10

At the MAP terminal

- 10 Test the NTBX27 line card by typing
>DIAG
and pressing the Enter key.

NTBX27
in RSC-S LCME (end)

- 11** Use the following information to determine where to proceed.

If DIAG	Do
passed	step 12
failed	step 16

- 12** Return the NTBX27 card to service by typing

>RTS

and pressing the Enter key.

If RTS	Do
passed	step 13
failed	step 16

- 13** Send any faulty cards for repair according to local procedure.
- 14** Record the date the card was replaced, the serial number of the card, and the symptoms that prompted replacement of the card. Go to step 17.
- 15** Return to the procedure that directed you to this procedure. At the point where a faulty card list was produced, identify the next faulty card on the list and go to the appropriate card replacement procedure for that card in this manual.
- 16** Obtain further assistance in replacing this card by contacting operating company maintenance personnel.
- 17** You have successfully completed this procedure. Return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.

NTBX34 in RSC-S LCME

Application

Use this procedure to replace an NTBX34 card in an RSC-S LCME.

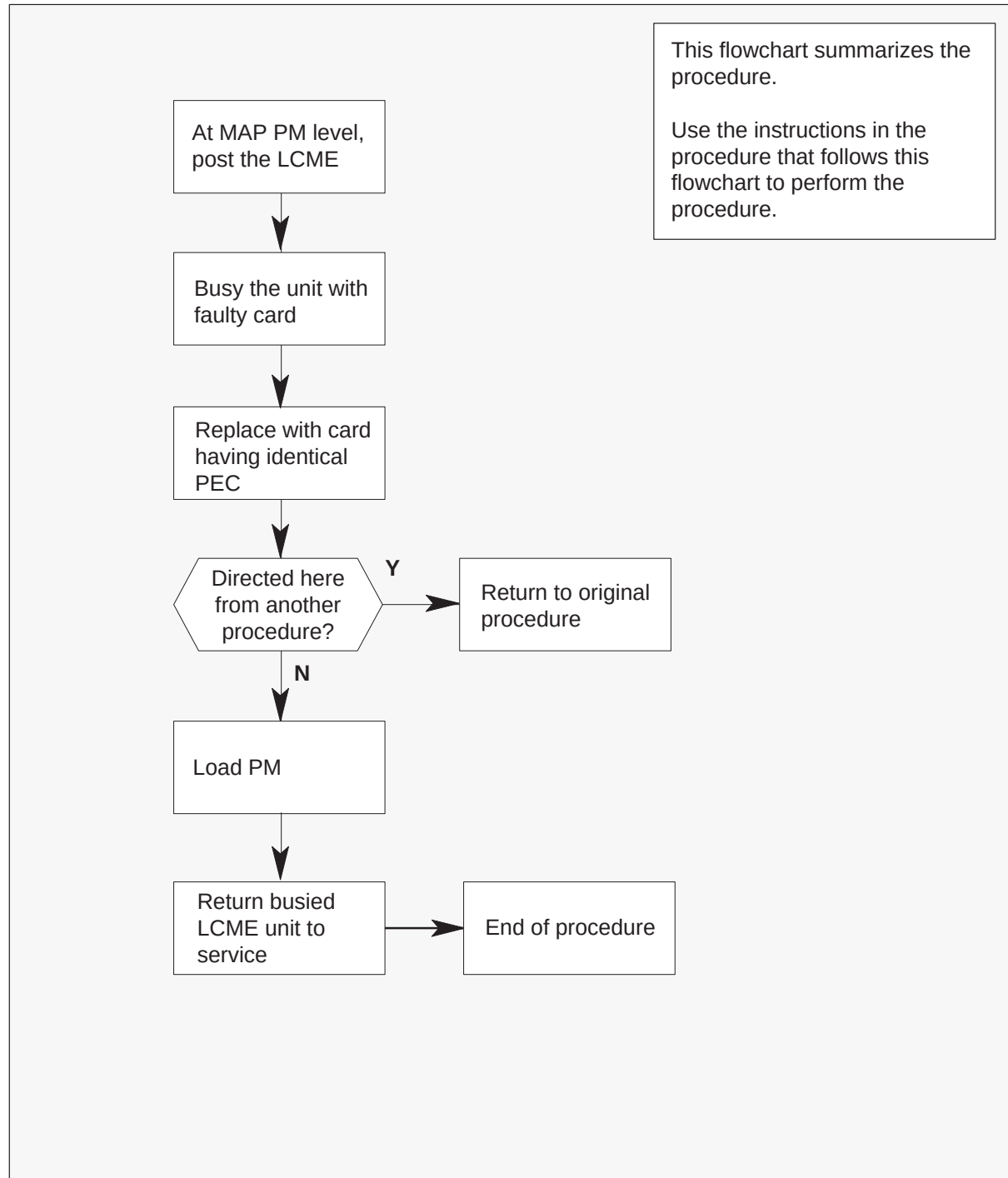
PEC	Suffixes	Name
NTBX34	BA	ISDN Enhanced LCM Processor

Common procedures

None

Action

The following flowchart is only a summary of the procedure. To replace the card, use the instructions in the procedure that follows the flowchart.

NTBX34
in RSC-S LCME (continued)**Summary of card replacement procedure for an NTBX34 card in an RSC-S LCME**

NTBX34
in RSC-S LCME (continued)

Replacing an NTBX34 card in an RSC-S LCME

At your Current Location

- 1 Proceed only if you have been directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure for verifying or accepting cards, or have been directed to this procedure by your maintenance support group.
- 2 Obtain an NTBX34 replacement card. Ensure the replacement card has the same product equipment code (PEC), including suffix, as the card that is to be removed.

At the MAP terminal

- 3 Set the MAP display to the PM level and post the LCME by typing
>MAPCI;MTC;PM;POST LCME site_frame_no lcme_no
and pressing the Enter key.

where

site is the name of the site at which the LCME is located
frame_no is the number of the frame at which the LCME is located
lcme_no is the number of the LCME with the faulty card

Example of a MAP display:

CM	MS	IOD	Net	PM	CCS	LNS	Trks	Ext	Appl
.	.	.	.	.	.	.	.	.	.
LCME			SysB	ManB	OffL	CBsy	ISTb	InSv	
0 Quit	PM	0	0	0	0	0	0	130	
2 Post_	LCME	0	0	0	0	0	0	0	
3									
4 Swrg_	LCME	RemL	00 0	Links_00S:	CSide	0			
5 TrnsL_	Unit-0:	InSv		/RG:	0				
6 Tst_	Unit-1:	InSv		/RG:	0				
7 Bsy_	RG: Preferred	0:	InSv	Standby1:	InSv				
8 RTS_									
9 OffL_									
10 LoadPM_									
11 Disp_									
12 Next_									
13									
14 QueryPM									
15									
16									
17									
18									

NTBX34 in RSC-S LCME (continued)

- 4 Busy the LCME unit by typing

>BSY UNIT unit_no

and pressing the Enter key.

where

unit_no is the number of the LCME unit with the faulty card

Example of a MAP display:

CM	MS	IOD	Net	PM	CCS	LNS	Trks	Ext	Appl
.	.	.	.	.	.	.	.	.	.
LCME			SysB	ManB	OffL	CBsy	ISTb	InSv	
0 Quit	PM		0	0	0	0	0	130	
2 Post_	LCME		0	1	0	0	0	0	
3									
4 Swrg_		LCME	RemL	00 0	Links_00S:	CSide	0		
5 TrnsL_		Unit-0:	InSv	Mtce	Takeover	/RG:	0		
6 Tst_		Unit-1:	ManB	Mtce		/RG:	0		
7 Bsy_		RG: Preferred	0:	InSv	Standby1:	InSv			
8 RTS_									
9 OffL_									
10 LoadPM_									
11 Disp_									
12 Next_									
13									
14 QueryPM									
15									
16									
17									
18									

At the LCE frame

5



WARNING

Equipment damage

Take these precautions when removing or inserting a card:

1. Do not apply direct pressure to the components.
2. Do not force the cards into the slots.

NTBX34 in RSC-S LCME (continued)



WARNING

Card damage—transport

Take these precautions to protect the circuit cards from electrical and mechanical damage while transporting cards.

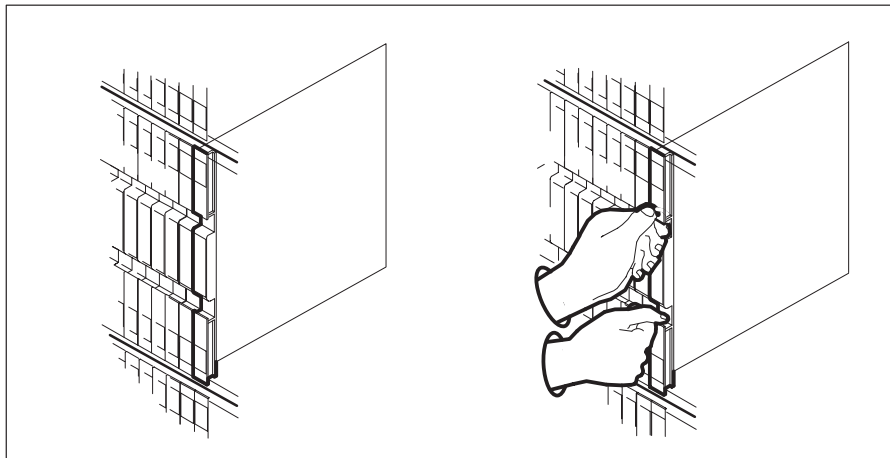
When handling a circuit card not in an electrostatic discharge (ESD) protective container, stand on a conductive floor mat and wear a wrist strap connected, through a 1-megohm resistor, to a suitably grounded object, such as a metal workbench or a DMS switch frame (Northern Telecom Corporate Standard 5028).

Store and transport circuit cards in an ESD protective container.

Put on a wrist strap.

6 Remove the NTBX34 card as shown in the following figures.

a. Locate the card to be removed on the appropriate shelf.

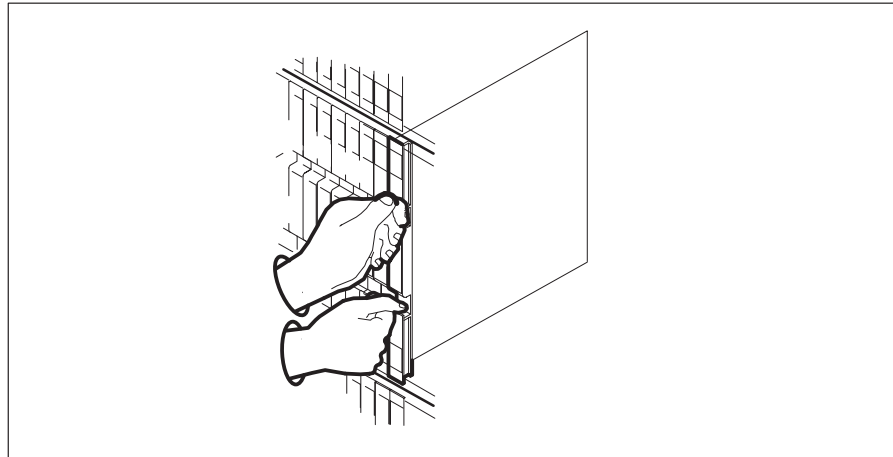


-

-

NTBX34 in RSC-S LCME (continued)

- 8 Seat and lock the card.
 - a. Using your fingers or thumbs, push on the upper and lower edges of the faceplate to ensure the card is fully seated in the shelf.
 - b. Close the locking levers.



At the MAP terminal

- 9 Load the LCME unit by typing
>LOADPM UNIT unit_no CC
and pressing the Enter key.
where
unit_no is the number of the LCME unit busied in step 4
- 10 Use the following information to determine where to proceed.

If load	Do
passed	step 11
failed	step 19

- 11 Test the LCME unit by typing
>TST UNIT unit_no
and pressing the Enter key.
where
unit_no is the number of the LCME unit loaded in step 9

NTBX34
in RSC-S LCME (continued)

- 12 Use the following information to determine where to proceed.

If TST	Do
passed	step 13
failed	step 18

- 13 Use the following information to determine where to proceed.

If you entered this procedure from	Do
alarm clearing procedures	step 18
other	step 14

- 14 Return the LCME unit to service by typing

>RTS UNIT lcme_unit_no
and pressing the Enter key.

where

lcme_unit_no is the number of the LCME unit tested in step 12

- 15 Use the following information to determine where to proceed.

If RTS	Do
passed	step 16
failed	step 19

- 16 Send any faulty cards for repair according to local procedure.
- 17 Record the date the card was replaced, the serial number of the card, and the symptoms that prompted replacement of the card. Go to step 20.
- 18 Return to the procedure that directed you to this procedure. At the point where a faulty card list was produced, identify the next faulty card on the list and go to the appropriate card replacement procedure for that card in this manual.
- 19 Obtain further assistance in replacing this card by contacting operating company maintenance personnel.

NTBX34
in RSC-S LCME (end)

- 20 You have successfully completed this procedure. Return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.

**NTBX35
in RSC-S LCME**

Application

Use this procedure to replace an NTBX35 card in an RSC-S LCME.

PEC	Suffixes	Name
NTBX35	AA	ISDN LCM Digroup Controller

Common procedures

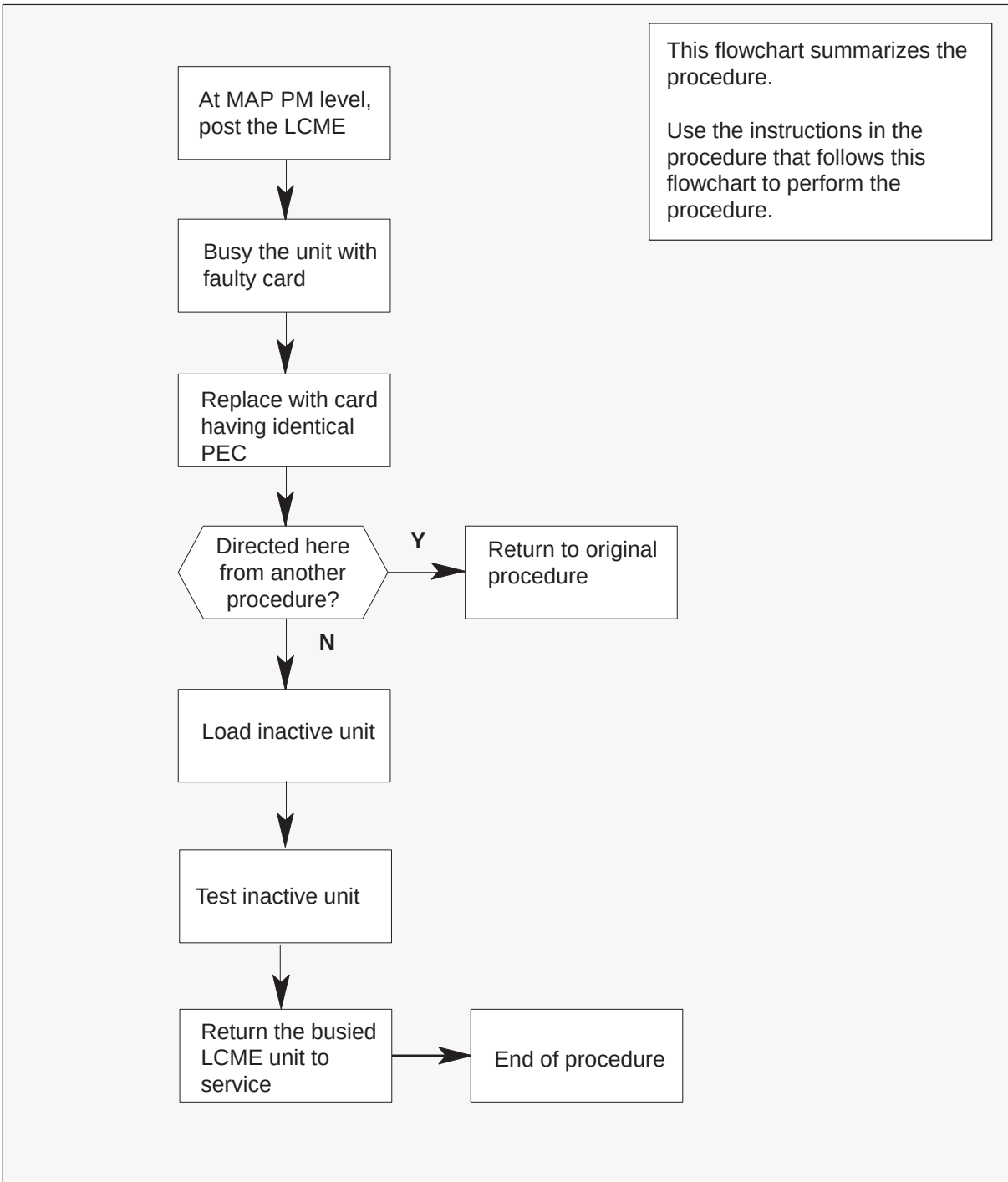
None

Action

The following flowchart is only a summary of the procedure. To replace the card, use the instructions in the procedure that follows the flowchart.

NTBX35 in RSC-S LCME (continued)

Summary of card replacement procedure for an NTBX35 card in an RSC-S LCME



NTBX35 in RSC-S LCME (continued)

Replacing an NTBX35 card in an RSC-S LCME

At your Current Location

- 1 Proceed only if you have been directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure for verifying or accepting cards, or have been directed to this procedure by your maintenance support group.
- 2 Obtain an NTBX35 replacement card. Ensure the replacement card has the same product equipment code (PEC), including suffix, as the card that is to be removed.

At the MAP terminal

- 3 Set the MAP to the PM level and post the LCME by typing

>MAPCI;MTC;PM;POST LCME site frame_no unit_no

and pressing the Enter key.

where

site is the name of the site at which the LCME is located

frame_no is the number of the frame in which the LCME is located

unit_no is the number of the LCME with the faulty card

Example of a MAP display:

CM	MS	IOD	Net	PM	CCS	LNS	Trks	Ext	Appl
LCME	.	.	.	.	.	.	.	.	.
0 Quit	PM		SysB	ManB	OffL		CBsy	ISTb	InSv
2 Post_	LCME		0	0	0		0	0	130
3									0
4 Swrg_									
5 TrnsL_									
6 Tst_									
7 Bsy_									
8 RTS_									
9 OffL_									
10 LoadPM_									
11 Disp_									
12 Next_									
13									
14 QueryPM									
15									
16									
17									
18									

LCME RemL 00 0 Links_00S: CSide 0
Unit-0: InSv /RG: 0
Unit-1: InSv /RG: 0
RG: Preferred 0: InSv Standby1: InSv

NTBX35
in RSC-S LCME (continued)

- 4 Busy the LCME unit by typing
 >BSY UNIT unit_no
 and pressing the Enter key.
 where
 unit_no is the number of the LCME unit with the faulty card

 Example of a MAP display:

CM	MS	IOD	Net	PM	CCS	LNS	Trks	Ext	Appl
LCME			SysB	ManB	OffL		CBsy	ISTb	InSv
0 Quit	PM		0	0	0		0	0	130
2 Post_	LCME		0	1	0		0	0	0
3									
4 SwRg			LCME	RemL	00 0	Links_00S:	CSide	0	
5 Trnsl			Unit-0:	InSv	Mtce	TakeOver	/RG:	0	
6 Tst			Unit-1:	ManB	Mtce		/RG:	0	
7 Bsy			RG: Preferred	0:	InSv	Standby1:	InSv		
8 RTS									
9 OffL									
10 LoadPM									
11 Disp_									
12 Next									
13									
14 QueryPM									
15									
16									
17									
18									

NTBX35
in RSC-S LCME (continued)

At the LCE frame

5



WARNING

Card damage—transport

Take these precautions to protect the circuit cards from electrical and mechanical damage while transporting cards.

When handling a circuit card not in an electrostatic discharge (ESD) protective container, stand on a conductive floor mat and wear a wrist strap connected, through a 1-megohm resistor, to a suitably grounded object such as a metal workbench or a DMS switch frame (Northern Telecom Corporate Standard 5028).

Store and transport circuit cards in an ESD protective container.



WARNING

Equipment damage

Take these precautions when removing or inserting a card:

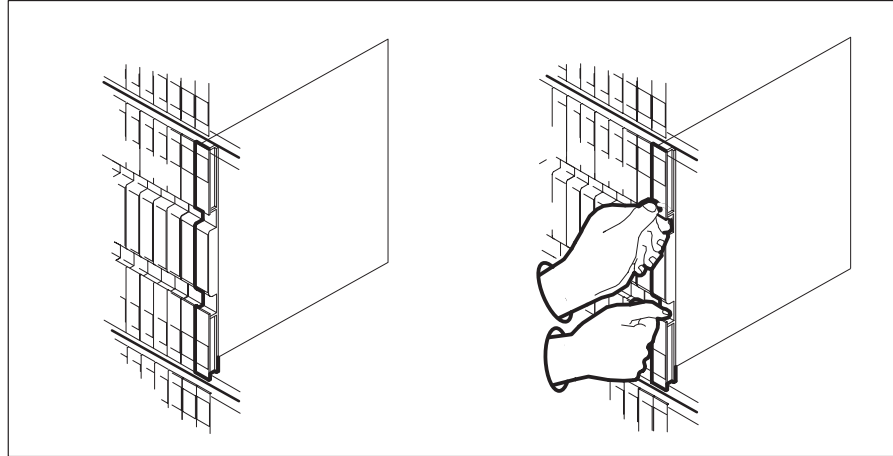
1. Do not apply direct pressure to the components.
2. Do not force the cards into the slots.

Put on a wrist strap.

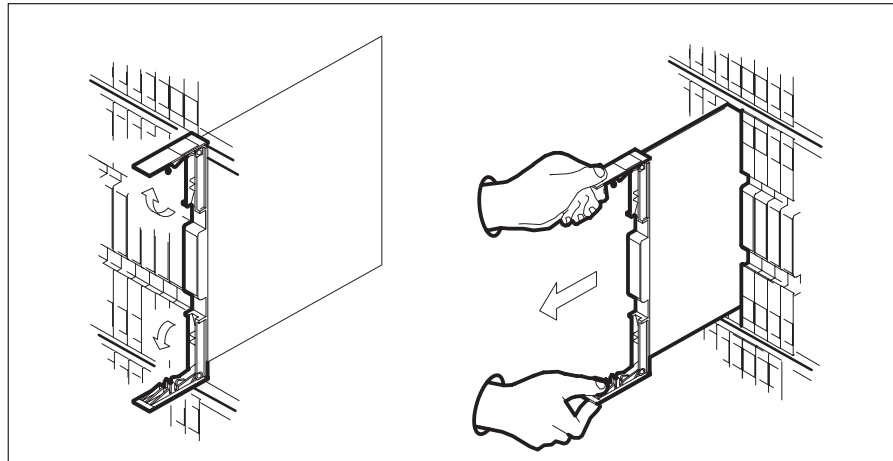
NTBX35 in RSC-S LCME (continued)

6 Remove the NTBX35 card as shown in the following figures.

a. Locate the card to be removed on the appropriate shelf.



b. Open the locking levers on the card to be replaced and gently pull the card toward you until it clears the shelf.

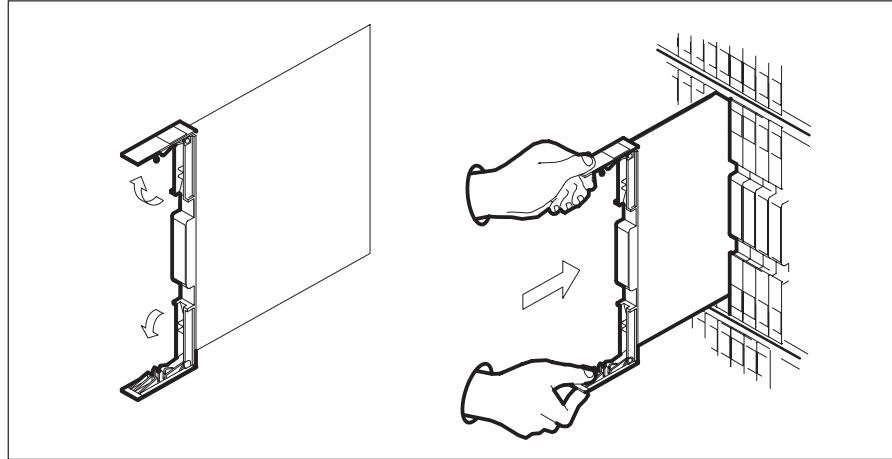


c. Ensure the replacement card has the same PEC, including suffix, as the card you just removed.

NTBX35 in RSC-S LCME (continued)

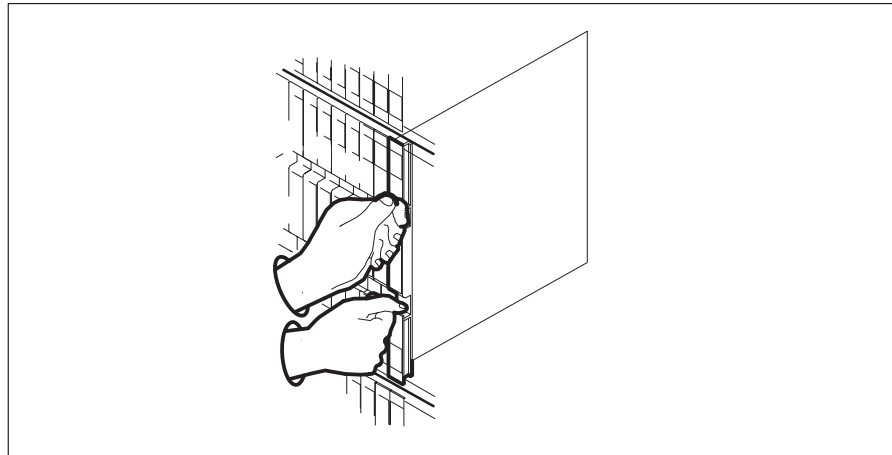
7 Open the locking levers on the replacement card.

- a. Align the card with the slots in the shelf.
- b. Gently slide the card into the shelf.



8 Seat and lock the card.

- a. Using your fingers or thumbs, push on the upper and lower edges of the faceplate to ensure the card is fully seated in the shelf.
- b. Close the locking levers.



NTBX35 in RSC-S LCME (continued)

At the MAP terminal

- 9 Load the LCME unit by typing

>LOADPM UNIT unit_no CC
and pressing the Enter key.

where

unit_no is the number of the LCME unit busied in step 4

If load	Do
passed	step 10
failed	step 16

- 10 Test the LCME unit by typing

>TST UNIT unit_no
and pressing the Enter key.

where

unit_no is the number of the LCME unit loaded in step 9

If TST	Do
passed	step 11
failed	step 15

- 11 Use the following information to determine where to proceed.

If you entered this procedure from	Do
alarm clearing procedures	step 15
other	step 12

NTBX35
in RSC-S LCME (end)

- 12** Return the LCME unit to service by typing

>RTS UNIT lcme_unit_no
and pressing the Enter key.

where

lcme_unit_no is the number of the LCME unit tested in step 10

If RTS	Do
passed	step 13
failed	step 16

- 13** Send any faulty cards for repair according to local procedure.
- 14** Record the date the card was replaced, the serial number of the card, and the symptoms that prompted replacement of the card. Go to step 17.
- 15** Return to the procedure that directed you to this procedure. At the point where a faulty card list was produced, identify the next faulty card on the list and go to the appropriate card replacement procedure for that card in this manual.
- 16** Obtain further assistance in replacing this card by contacting operating company maintenance personnel.
- 17** You have successfully completed this procedure. Return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.

NTBX36 in RSC-S LCME

Application

Use this procedure to replace an NTBX36 card in an RSC-S LCME.

PEC	Suffixes	Name
NTBX36	BA	Bus Interface Card (BIC)

Common procedures

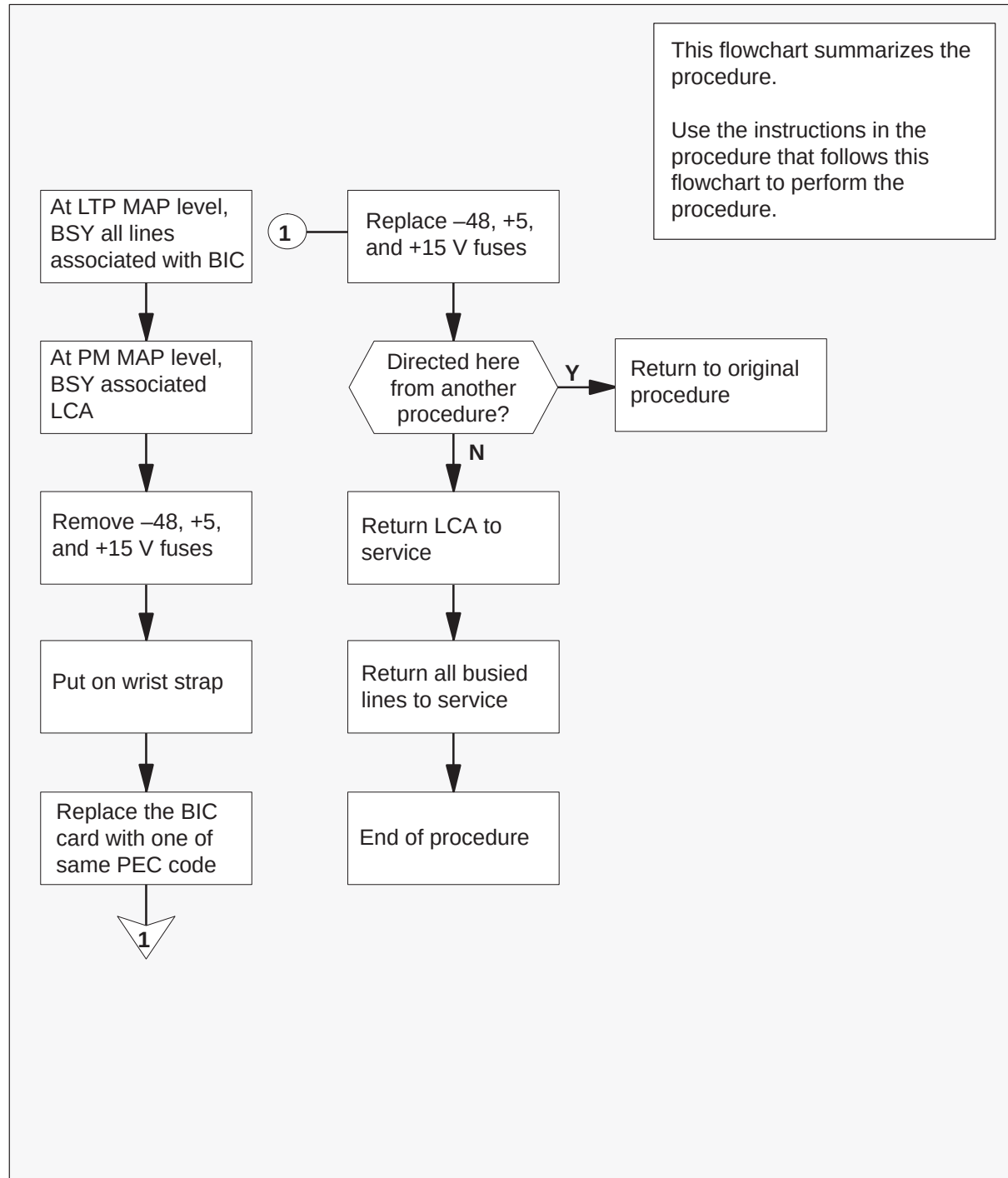
None

Action

The following flowchart is only a summary of the procedure. To replace the card, use the instructions in the procedure that follows the flowchart.

NTBX36 in RSC-S LCME (continued)

Summary of card replacement procedure for an NTBX36 card in RSC-S LCME



NTBX36 in RSC-S LCME (continued)

Replacing an NTBX36 card in RSC-S LCME

At your Current Location

- 1 Proceed only if you were either directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure for verifying or accepting cards, or were directed to this procedure by your maintenance support group.
- 2 Obtain a replacement card. Ensure that the replacement card has the same product equipment code (PEC) including suffix, as the card that is to be removed.

At the MAP terminal

- 3 Access the LTP level and post the first line subgroup (LSG) of the line drawer that contains the bus interface card (BIC) to be replaced by typing

>MAPCI;MTC;LNS;LTP;POST L site frame_no unit_no lcm_dr LSG

and pressing the Enter key.

where

site_ is the name of the site at which the LCME is located

frame_no is the number of the frame in which the LCME is located

unit_no is the number of the LCME unit with the faulty card

lcm_dr is the number of the drawer with the faulty card

- 4 Busy all lines in the first LSG by typing

>BSY ALL

and pressing the Enter key.

- 5 Post the next LSG of the same line drawer by typing

>NEXT D

and pressing the Enter key.

- 6 Repeat step 4 and step 5 until all LSGs of the same line drawer are busied.

NTBX36

in RSC-S LCME (continued)

- 7 Post the LCME with the LCA shelf containing the card to be replaced by typing

>PM;POST LCME site frame_no unit_no

and pressing the Enter key.

where

site is the name of the site at which the LCME is located

frame_no is the number of the frame in which the LCME is located

unit_no is the number of the LCME unit with the faulty card

Example of a MAP display:

```

CM      MS      IOD      Net      PM      CCS      LNS      Trks      Ext      Appl
.      .      .      .      1LCME      .      .      .      .      .
LCME
0 Quit      PM      SysB      ManB      OffL      CBsy      ISTb      InSv
2 Post_     LCME      0      0      0      0      0      130
3
4 SwRg      LCME      ReMl      00 0  ISTb      Links_00S:  CSide 1
5 Trnsl      Unit0:      InSv      /RG: 0
6 Tst      Unit1:      InSv      /RG: 0
7 Bsy
8 RTS      Drwr: 01 23 45 67 89 01 23 45      RG:Pref 0 InSv
9 OffL      .. .. .
10 LoadPM
11 Disp_
12 Next
13
14 QueryPM
15
16
17
18

```

NTBX36
in RSC-S LCME (continued)

- 8 Busy all LSGs associated with the LCME drawer in which the card is being replaced by typing

>BSY DRWR x

and pressing the Enter key.

>BSY DRWR y

and pressing the Enter key.

>BSY DRWR z

and pressing the Enter key.

where

x is the first line subgroup

y is the next line subgroup

z is the next line subgroup (if an LCMI)

Example of a MAP response:

Please confirm ("YES" or "NO")

- 9 Confirm the busied LSGs by typing

>YES

and pressing the Enter key.

Example of a MAP display:

CM	MS	IOD	Net	PM	CCS	LNS	Trks	Ext	Appl
.	.	.	.	1LCME	.	.	.	.	.
LCME			SysB	ManB	OffL	CBsy	ISTb	InSv	
0 Quit	PM		0	1	0	0	0	130	
2 Post_	LCME		0	1	0	0	0	0	
3									
4 SwRg		LCME	RemL	00	0	ISTb	Links_00S:	CSide	1
5 Trnsl		Unit 0:	InSv				/RG:	0	
6 Tst		Unit 1:	InSv				/RG:	0	
7 Bsy						11 11 11	RG:Pref	0	InSv
8 RTS		Drwr:	01 23 45 46 67 89	01 23 45			Stby:1	InSv	
9 OffL			 MM						
10 LoadPM									
11 Disp_									
12 Next									
13									
14 QueryPM									
15									
16									
17									
18									

NTBX36
in RSC-S LCME (continued)*At the LCE frame*

10

**WARNING****Card damage—transport**

Take these precautions to protect the circuit cards from electrical and mechanical damage while transporting cards.

When handling a circuit card not in an electrostatic discharge (ESD) protective container, stand on a conductive floor mat and wear a wrist strap connected, through a 1-megohm resistor, to a suitably grounded object, such as a metal workbench or a DMS switch frame (Northern Telecom Corporate Standard 5028).

Store and transport circuit cards in an ESD protective container.

**WARNING****Equipment damage**

Take these precautions when removing or inserting a card:

1. Do not apply direct pressure to the components.
2. Do not force the cards into the slots.

**WARNING****Hot materials**

Exercise care when handling the line card. The line feed resistor may be very hot.

**CAUTION****Special tools required**

Card shrouds and removal tools are required for removing cards from the line drawers.

Remove the -48V fuse for the line drawer containing the BIC to be replaced.

NTBX36
in RSC-S LCME (continued)

Remove the +5V fuse for the line drawer containing the BIC to be replaced.

Remove the +15V fuse for the line drawer containing the BIC to be replaced.

Put on a wrist strap.

Line card insertion / withdrawal tool for	Apparatus code	Common product code
3-inch cards	QTH56A	A0298291
6-inch cards	QTH58A	A0313317

Note 1: Card shrouds are required for inserting or removing cards in line drawers. Two sizes are available for use with 3-inch and 6-inch cards. Descriptions of these shrouds follow.

Note 2: Card removal tools are required for removing cards from line drawers. Two sizes are available. Descriptions of these tools follow.

Card removal tool for	Apparatus code	Common product code
3–4 inch cards	QTH57A	A0298292
Note: For 4-inch or larger cards, use the large grip tool ITA9953.		

- 11 To prepare to remove the faulty card, open the line drawer and follow these substeps:
 - a. Face the drawer shelf and grasp the handle at the bottom of the drawer with your right hand.
 - b. Push up on the drawer latch with the thumb and pull the drawer out until fully withdrawn. It is fully withdrawn when the drawer stop, at the top, prevents further travel.
 - c. Maintain a slight pull on the handle and lift the faceplate of the drawer approximately 2.5 cm (1 in).
 - d. While holding the drawer in this position, push the bottom of the drawer, nearest the shelf with your left hand, to a position about 1 cm (.5 in) to the right.
 - e. Hold the drawer in this position with your left hand and lower the faceplate of the drawer by releasing the grip of your right hand.
 - f. Ensure a card shroud and line card extractor are available.

NTBX36
in RSC-S LCME (continued)

- 12** Remove the line card to be replaced by following these substeps:
- a.** Slide a card shroud over the card to be removed and an adjacent card. If there is not an adjacent card on either side, do not use the card shroud.
 - b.** Grasp the edge of the card with a line card extractor at a point midway between the top and bottom edges. Hold the extractor in your right hand.
 - c.** Squeeze the handles of the extractor together to grasp the card tightly.
 - d.** Hold the front cover of the line drawer to steady it using your left hand.
 - e.** Pull the extractor away from the drawer, and the card will become unplugged from its socket on the drawer backplane.
 - f.** Continue pulling the card with the extractor until the card is clear of the shroud.
 - g.** Insert the card removed into the ESD container and store using local procedures.
- 13** Replace the faulty card by following these substeps:
- a.** Remove the replacement card from the ESD container.
 - b.** Slide the card in the shroud guide slots toward the drawer backplane.
 - c.** Hold the front cover of the line drawer with your left hand to steady it.
 - d.** Grasp the top and bottom edges of the card with the fingers of your right hand.
 - e.** Push the card toward the backplane until it plugs fully into the backplane socket.
 - f.** Close the line drawer.

NTBX36 in RSC-S LCME (continued)

- 14 Replace the –48V fuse for the line drawer containing the BIC that was replaced.
Replace the +5V fuse for the line drawer containing the BIC that was replaced.
Replace the +15V fuse for the line drawer containing the BIC that was replaced.
- 15 Use the following information to determine the next step in this procedure.

If you entered this procedure from	Do
alarm clearing procedures	step 26
other	step 16

At the MAP terminal

- 16 Return the LSGs to service by typing
>RTS DRWR x
and pressing the Enter key.
>RTS DRWR y
and pressing the Enter key.
where
x is the first line subgroup busied in step 8
y is the next line subgroup busied in step 8
- 17 Access the PM level of the MAP display and post the first LSG of the line drawer that contains the BIC to be replaced by typing
>MAPCI;MTC;PM;LNS;LTP;POST L site frame_no unit_no lcm_dr
and pressing the Enter key.
where
site is the name of the site at which the LCME is located
frame_no is the number of the frame in which the LCME is located
unit_no is the number of the LCME unit with the faulty card
lcm_dr is the number of the drawer with the faulty card
- 18 Return the busied lines in the first LSG to service by typing
>RTS ALL
and pressing the Enter key.
- 19 Post the next LSG of the same line drawer by typing
>NEXT D
and pressing the Enter key.

NTBX36

in RSC-S LCME (continued)

- 20 Repeat step 18 and step 19 until all busied lines in the drawer are returned to service.

- 21 Post the LCME with the LCA shelf containing the replaced card by typing
>PM;POST LCME site frame_no unit_no
 and pressing the Enter key.

where

site is the name of the site at which the LCME is located

frame_no is the number of the frame in which the LCME is located

unit_no is the number of the LCME unit with the faulty card

- 22 Test the LCME unit by typing

>TST UNIT lcm_unit_no
 and pressing the Enter key.

where

lcm_unit_no is the number of the LCME unit posted in step 21

If TST	Do
passed	step 23
failed	step 26

- 23 Return the LCME unit to service by typing

>RTS lcm_unit_no
 and pressing the Enter key.

where

lcm_unit_no is the number of the LCME unit tested in step 22

If RTS	Do
passed	step 24
failed	step 27

- 24 Send any faulty cards for repair according to local procedure.
- 25 Record the date the card was replaced, the serial number of the card, and the symptoms that prompted replacement of the card. Go to step 28.

NTBX36
in RSC-S LCME (end)

- 26 Return to the alarm clearing or other procedure that directed you to this procedure. If necessary, go to the point where the faulty card list was produced, identify the next faulty card on the list and go to the appropriate card replacement procedure for that card in this manual.
- 27 Obtain further assistance in replacing this card by contacting personnel responsible for a higher level of support.
- 28 You have successfully completed this procedure. Return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.

**NTBX72
in RSC-S LCME**

Application

Use this procedure to replace an NTBX72 card in an RSC-S LCME.

PEC	Suffixes	Name
NTBX72	AA	ISDN LCME Battery and Ring Router

Common procedures

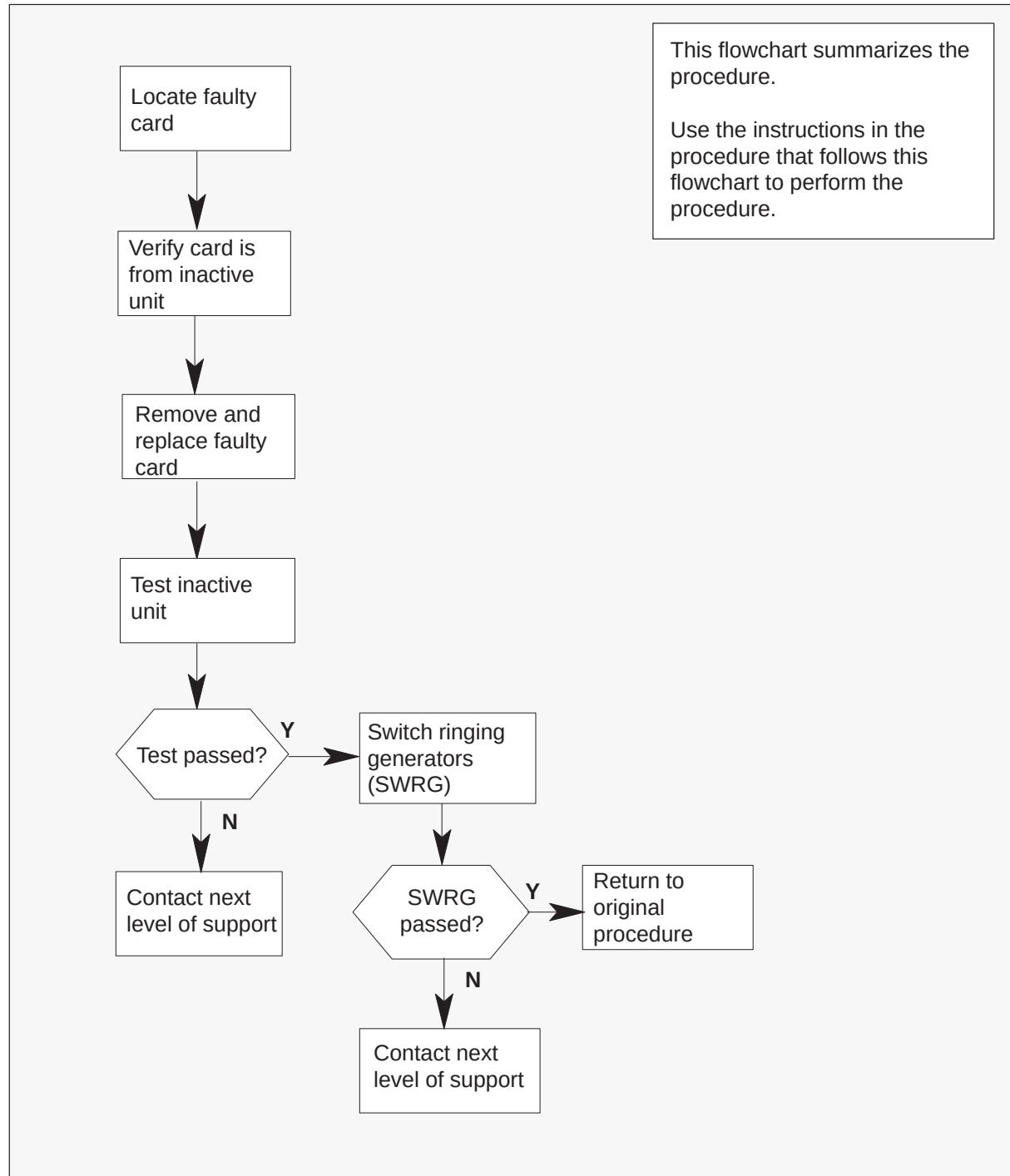
None

Action

The following flowchart is only a summary of the procedure. To replace the card, use the instructions in the procedure that follows the flowchart.

NTBX72 in RSC-S LCME (continued)

Summary of card replacement procedure for an NTBX72 card in an RSC-S LCME



NTBX72 in RSC-S LCME (continued)

Replacing an NTBX72 card in an RSC-S LCME

At your Current Location

- 1 Proceed only if you have been directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure for verifying or accepting cards, or have been directed to this procedure by your maintenance support group.
- 2 Obtain an NTBX72 replacement card. Ensure the replacement card has the same product equipment code (PEC), including suffix, as the card that is to be removed.

At the MAP terminal

- 3 Set the MAP display to the PM level and post the LCME by typing

>MAPCI;MTC;PM;POST LCME site_frame_no unit_no

and pressing the Enter key.

where

site is the name of the site at which the LCME is located

frame_no is the number of the frame in which the LCME is located

unit_no is the number of the LCME with the faulty card

Example of a MAP display:

CM	MS	IOD	Net	PM	CCS	Lns	Trks	Ext	Appl
.	.	.	.	1LCME	.	.	.	.	.
LCME			SysB	ManB	OffL	CBsy	ISTb	InSv	
0 Quit	PM	1	0	2	0	2	12		
2 Post_	LCME	0	0	2	0	2	9		
3 ListSet									
4 SwRG	LCME	RSC-S	14 1	ISTb	Links_00S:	CSide	0	PSide	0
5 Trnsl_	Unit0:	InSv			/RG: 1				
6 Tst_	Unit1:	InSv			/RG: 1				
7 Bsy_					11 11 11 11 11	RG:Pref	1	ISTB	
8 RTS_	Drwr: 01 23 45 67 89				01 23 45 67 89	Stby	0	InSv	
9 OffL									
10 LoadPM_									
11 Disp_									
12 Next									
13									
14 QueryPM									
15									
16									
17									
18									

NTBX72
in RSC-S LCME (continued)

- 4 Check for fault indicators by typing

>QUERYPM FLT

and pressing the Enter key.

Example of a MAP display:

CM	MS	IOD	Net	PM	CC	Ln	Trks	Ext	Appl
.	.	.	.	1LCME	.	.	.	.	.
LCME			SysB	ManB	OffL	CBsy	ISTb	InSv	
0 Quit	PM	1	0	2	0	2	12		
2 Post_	LCME	0	0	2	0	2	9		
3 ListSet									
4 SwRG	LCME	RSC-S 14	1 ISTb	Links_00S:	CSide	0	PSide	0	
5 TrnsL_	Unit0:	InSv	Takeover	/RG: 1					
6 Tst_	Unit1:	ISTb	/RG: 1						
7 Bsy_				11 11 11	RG:Pref	1	ISTb		
8 RTS_	Drwr:	01 23 45 67 89	01 23 45	Stby	0	InSv			
9 OffL		.. ..	.. ..	.. ..	.. ..	.. ..			
10 LoadPM_	QUERYPM FLT								
11 Disp_	Node inservice troubles exist:								
12 Next	One or both Units inservice trouble								
13	LCME UNIT 0 Inservice								
14 QueryPM	LCME UNIT 1 Inservice								
15	Ringing Generator 1 failure								
16									
17									
18									

- 5 Switch ringing generator activity from the unit with the faulty NTBX72 card by typing

>SWRG PM

and pressing the Enter key.

If SWRG	Do
passed	step 6
failed	step 20

NTBX72
in RSC-S LCME (continued)

- 6 Busy the LCME unit by typing

>BSY UNIT lcme_unit_no
and pressing the Enter key.

where

lcme_unit_no is the number of the LCME unit with the faulty card

At the RCE

7



WARNING

Static electricity damage

Before removing any cards, put on a wrist strap and connect it to the wrist strap grounding point on the left side of the frame supervisory panel (FSP) of the LCME. This protects the equipment against damage caused by static electricity.

Put on a wrist strap.

8



WARNING

Equipment damage

Take these precautions when removing or inserting a card:

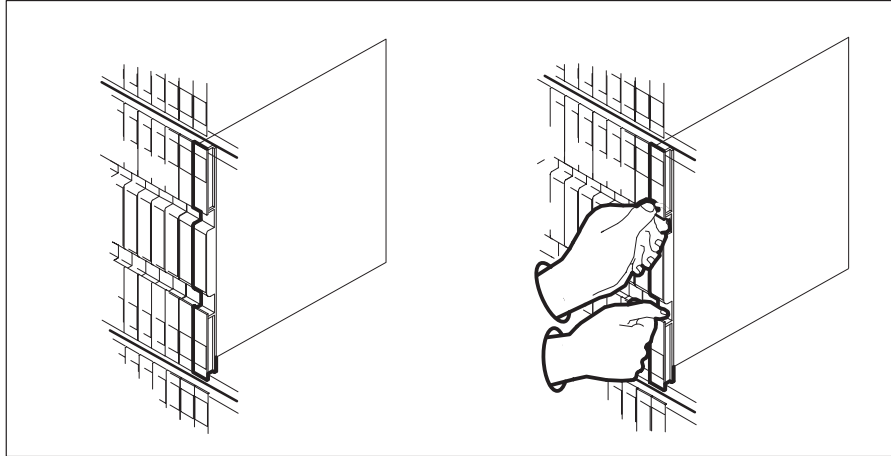
1. Do not apply direct pressure to the components.
2. Do not force the cards into the slots.

Power down the NT6X53 power converter by setting the POWER switch to the OFF position.

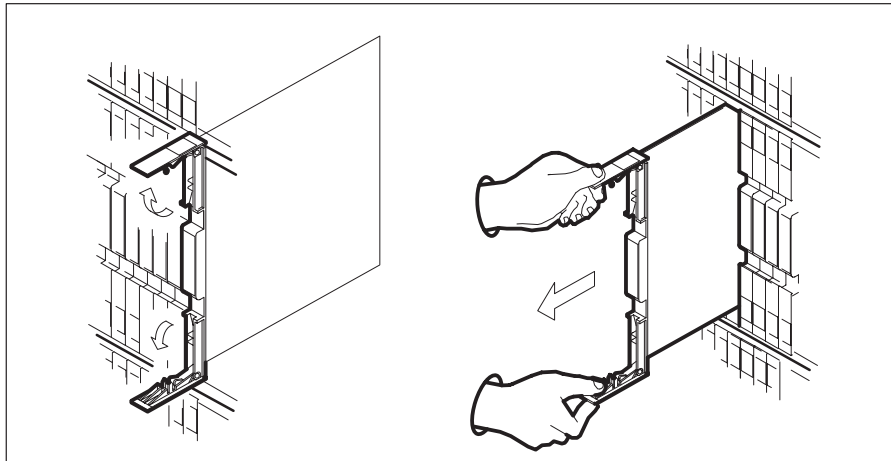
NTBX72 in RSC-S LCME (continued)

9 Remove the NTBX72 card as shown in the following figures.

a. Locate the card to be removed on the appropriate shelf.



b. Open the locking levers on the card to be replaced and gently pull the card toward you until it clears the shelf.



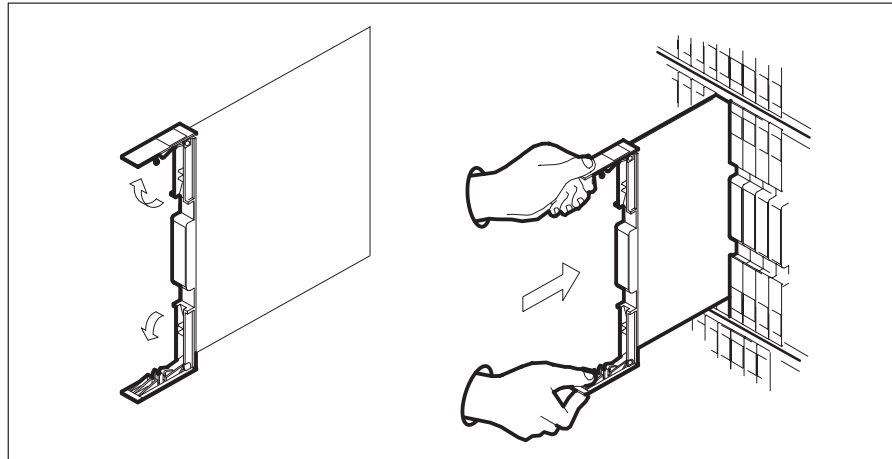
c. Ensure the replacement card has the same PEC, including suffix, as the card you just removed.

10 Open the locking levers on the replacement card.

a. Align the card with the slots in the shelf.

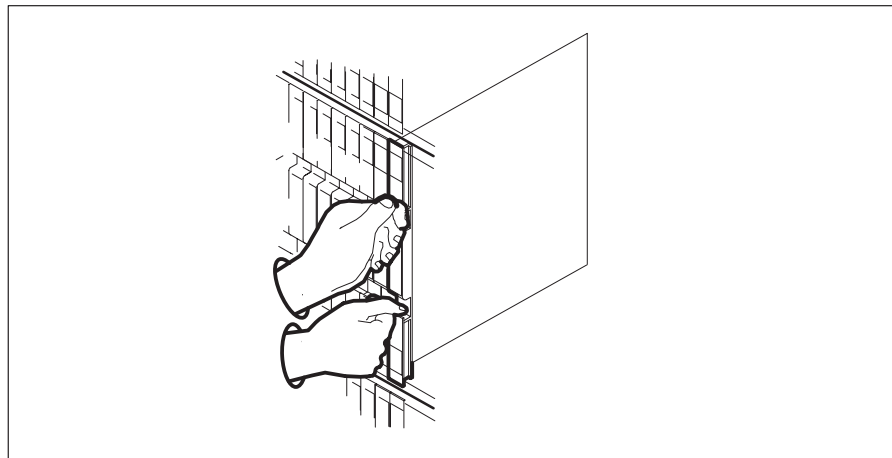
NTBX72 in RSC-S LCME (continued)

- b. Gently slide the card into the shelf.



11 Seat and lock the card.

- a. Using your fingers or thumbs, push on the upper and lower edges of the faceplate to ensure the card is fully seated in the shelf.
- b. Close the locking levers.



12 Power up the LCME unit as follows:

- a. Ensure the power converter (NT6X53) is inserted. A major audible alarm may sound. This alarm is silenced when power is restored to the converter.
- b. Set the circuit breaker switch to the ON position.

NTBX72 in RSC-S LCME (continued)

- 13 Use the following information to determine the next step in this procedure.

If you entered this procedure from	Do
alarm clearing procedures	step 19
other	step 14

At the MAP terminal

- 14 Test the unit by typing

>TST UNIT lcme_unit_no
and pressing the Enter key.

where

lcme_unit_no is the number of the LCME unit posted in step 3

If TST	Do
passed	step 15
failed	step 19

- 15 Return the LCME unit to service by typing

>RTS UNIT lcme_unit_no
and pressing the Enter key.

where

lcme_unit_no is the number of the LCME unit tested in step 14

If RTS	Do
passed	step 16
failed	step 20

NTBX72
in RSC-S LCME (end)

- 16** Switch ringing generator activity to the new NTBX72 card by typing
>SWRG PM
and pressing the Enter key.

If SWRG	Do
passed	step 17
failed	step 20

- 17** Send any faulty cards for repair according to local procedure.
- 18** Record the date the card was replaced, the serial number of the card, and the symptoms that prompted replacement of the card. Go to step 21.
- 19** Return to the procedure that directed you to this procedure. At the point where a faulty card list was produced, identify the next faulty card on the list and go to the appropriate card replacement procedure for that card in this manual.
- 20** Obtain further assistance in replacing this card by contacting operating company maintenance personnel.
- 21** You have successfully completed this procedure. Return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.

NTMX72 in RSC-S RCO2

Application

Use this procedure to replace an NTMX72 card in an RSC-S RCO2.

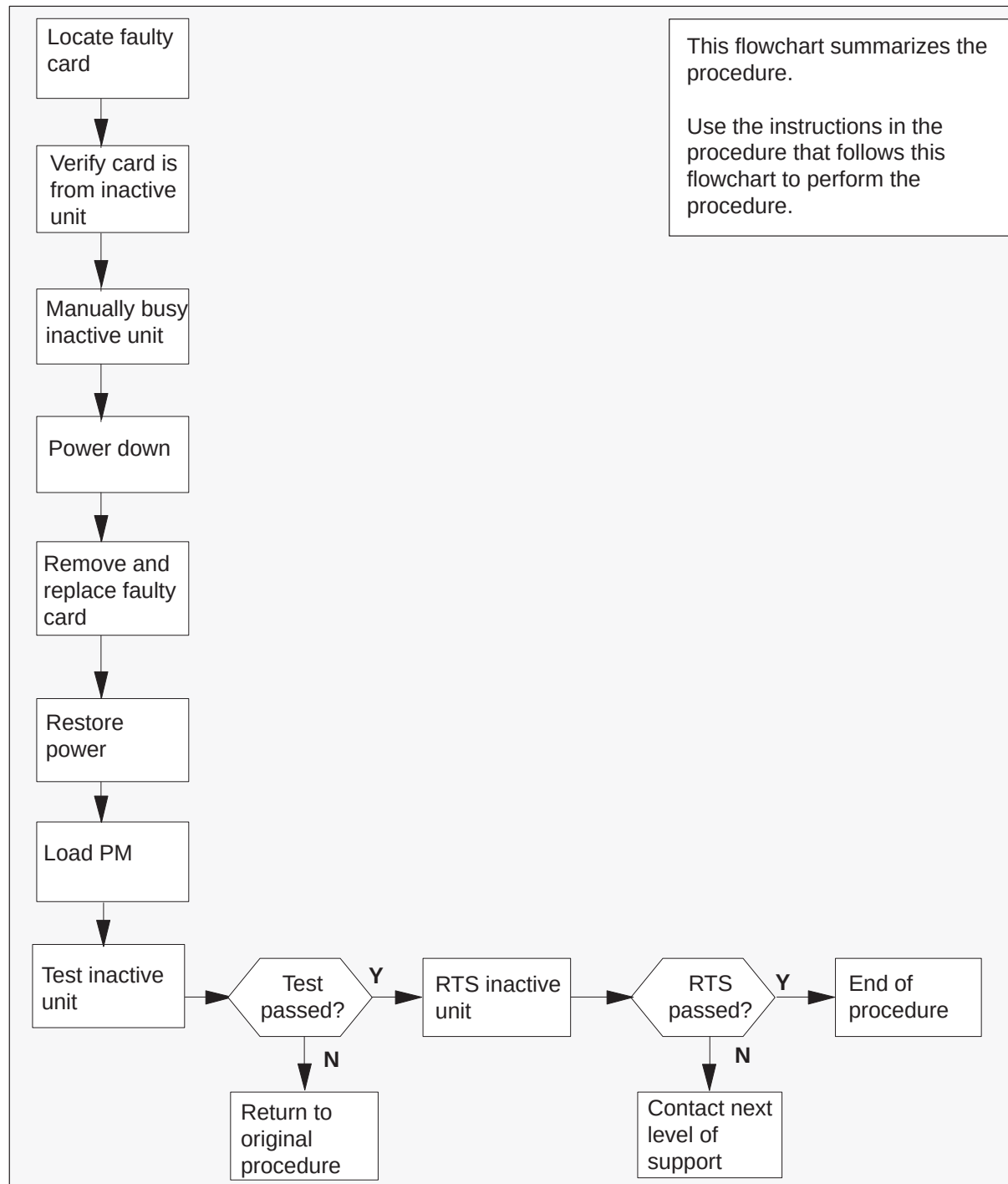
PEC	Suffixes	Name
NTMX72	AA, AB	Power Converter

Common procedures

None

Action

The following flowchart is only a summary of the procedure. To replace the card, use the instructions in the procedure that follows the flowchart.

NTMX72
in RSC-S RCO2 (continued)**Summary of card replacement procedure for an NTMX72 card in an RSC-S RCO2**

NTMX72 in RSC-S RCO2 (continued)

Replacing an NTMX72 card in an RSC-S RCO2

At your Current Location

- 1 Proceed only if you have been directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure for verifying or accepting cards, or have been directed to this procedure by your maintenance support group.

2



CAUTION

Loss of service

When replacing a card in the RCO2, ensure that the unit in which you are replacing the card is *inactive* and that the mate unit is *active*.

Obtain an NTMX72 replacement card. Ensure the replacement card has the same product engineering code (PEC), including suffix, as the card that is to be removed.

At the MAP terminal

- 3 Set the MAP display to the PM level and post the RCO2 by typing

>MAPCI;MTC;PM;POST RCO2 rco2_no

and pressing the Enter key.

where

rco2_no is the number of the RCO2 with the faulty card

NTMX72 in RSC-S RCO2 (continued)

Example of a MAP display:

CM	MS	IOD	Net	PM	CCS	LNS	Trks	Ext	Appl
.	.	.	.	.	.	.	.	.	.
RC02			SysB	ManB	OffL	CBsy	ISTb	InSv	
0 Quit	PM	0	0	0	0	0	0	25	
2 Post_	RC02	0	0	0	0	0	0	0	
3 ListSet									
4	RC02	0	ISTb	Links_00S:	CSide	0,	PSide	0	
5 TRNSL	Unit0:	Inact	InSv						
6 TST	Unit1:	Act	InSv						
7 BSY									
8 RTS									
9 OffL									
10 LoadPM_									
11 Disp_									
12 Next_									
13									
14 QueryPM									
15									
16									
17									
18									

- 4 By observing the MAP display, be sure that the card to be removed is on the inactive unit.

If faulty card is on	Do
active unit	step 5
inactive unit	step 7

- 5 Switch the processing activity (SWACT) to the inactive unit by typing

>SWACT

and pressing the Enter key.

Note: If the system recommends using the SWACT command with the FORCE option, consult office personnel to determine if use of the FORCE option is advisable.

- 6 Answer the prompt by typing

>YES

and pressing the Enter key.

- 7 Place a sign on the active unit bearing the words "Active unit—Do not touch." This sign should not be attached by magnets or tape.

NTMX72 in RSC-S RCO2 (continued)

- 8 Busy the inactive PM unit by typing

>BSY UNIT unit_no

and pressing the Enter key.

where

unit_no is the number of the faulty RCO2 unit

- 9 Use the following information to determine where to proceed:

If the card you are replacing has a suffix of	Do
AA	step 10
AB	step 11

10



WARNING

Static electricity damage

Before removing any cards, put on a wrist strap and connect it to the wrist strap grounding point on the left side of the modular supervisory panel (MSP) of the RCO2. This protects the equipment against damage caused by static electricity.

Power down the NTMX72 power converter by setting the POWER switch on the face plate to the OFF position.

Go to step 12.

11



WARNING

Equipment damage

Take the following precautions when removing or inserting a card:

1. Do not apply direct pressure to the components.
2. Do not force the cards into the slots.

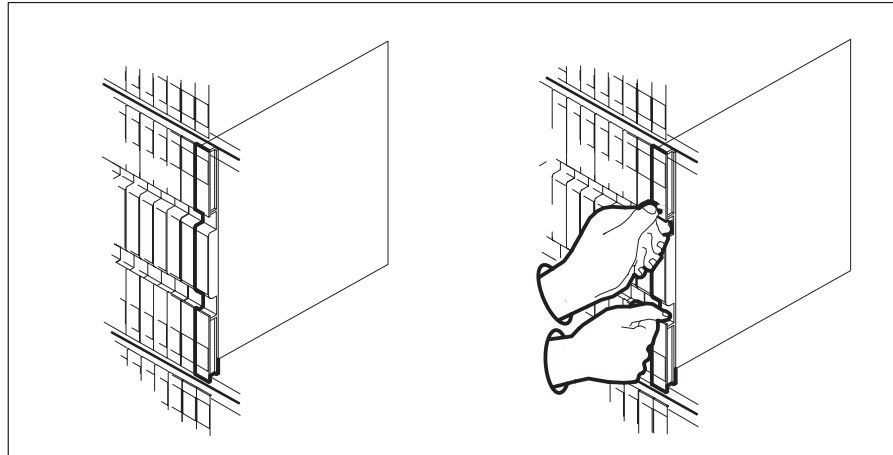
Power down the NTMX72AB power converter by setting the circuit breaker on the MSP for the inactive unit to the OFF position.

Go to step 12.

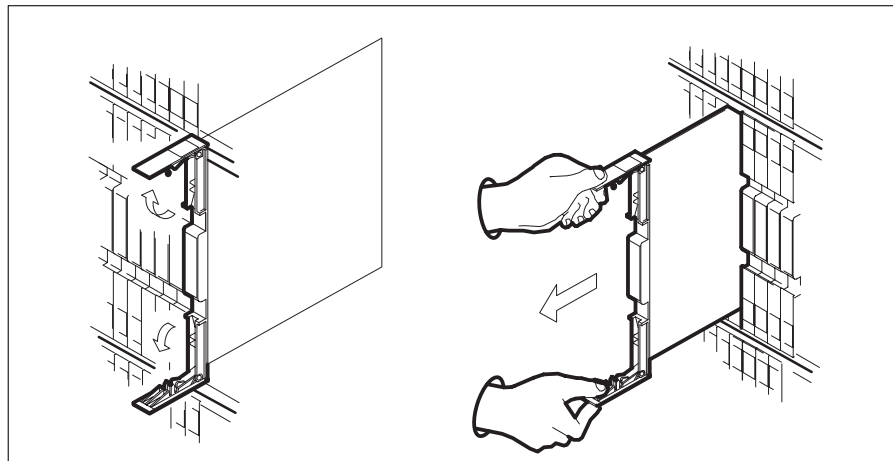
NTMX72
in RSC-S RCO2 (continued)

12 Remove the NTMX72 card as shown in the following figures.

a. Locate the card to be removed on the appropriate shelf.



b. Open the locking levers on the card to be replaced and gently pull the card toward you until it clears the shelf.



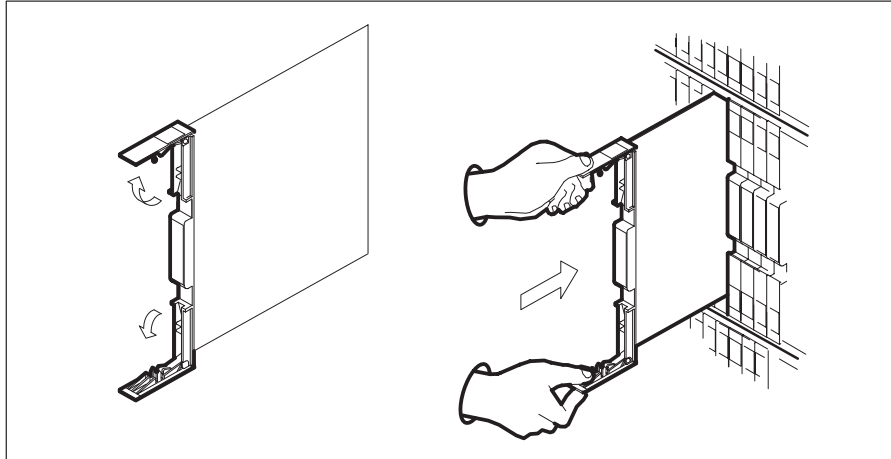
c. Ensure the replacement card has the same PEC, including suffix, as the card you just removed.

13 Open the locking levers on the replacement card.

a. Align the card with the slots in the shelf.

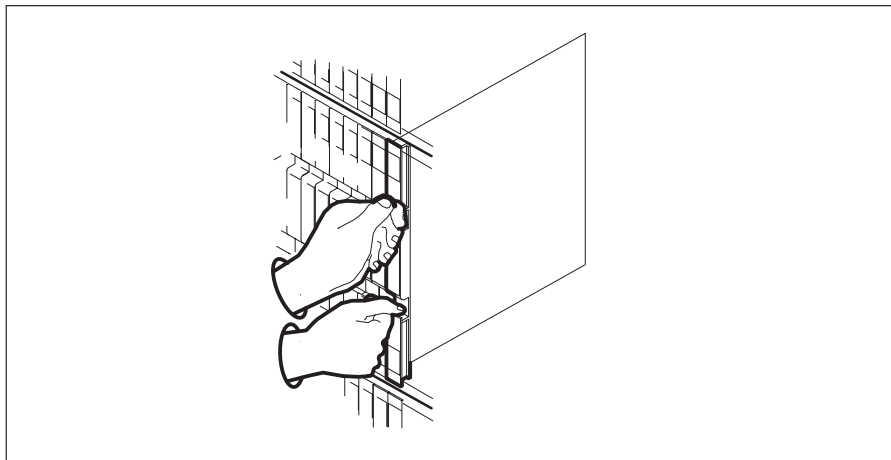
NTMX72 in RSC-S RCO2 (continued)

- b. Gently slide the card into the shelf.



14 Seat and lock the card.

- a. Using your fingers or thumbs, push on the upper and lower edges of the faceplate to ensure the card is fully seated in the shelf.
- b. Close the locking levers.



15 Power up the inactive RCO2 unit as follows:

- a. Ensure the power converter (NTMX72) is inserted. A major audible alarm may sound. This alarm is silenced when power is restored to the converter.

NTMX72 in RSC-S RCO2 (continued)

- b. If the power converter you replaced is an NTMX72AA, set the POWER switch to the ON position. Set the POWER switch to RESET when setting the circuit breaker on the MSP to the ON position.
- c. If the power converter you replaced is an NTMX72AB, set the circuit breaker on the MSP to the ON position for the NTMX72AB that was powered down in step 11.

16 After replacing the faulty card, load the inactive RCO2 unit by typing

>LOADPM UNIT unit_no
and pressing the Enter key.

where

unit_no is the number of the inactive RCO2 unit

If LOADPM	Do
passed	step 17
failed	step 24

17 Test the inactive unit by typing

>TST UNIT unit_no
and pressing the Enter key.

where

unit_no is the number of the inactive RCO2 unit

If TST	Do
passed	step 18
failed	step 23

18 Use the following information to determine where to proceed.

If you entered this procedure from	Do
alarm clearing procedures	step 23
other	step 19

NTMX72 in RSC-S RCO2 (end)

- 19 Return the inactive RCO2 unit to service by typing

>RTS UNIT unit_no

and pressing the Enter key.

where

unit_no is the number of the inactive RCO2 unit

If RTS	Do
passed	step 20
failed	step 24

- 20 Remove the sign from the active RCO2 unit.
- 21 Send any faulty cards for repair according to local procedure.
- 22 Record the date the card was replaced, the serial number of the card, and the symptoms that prompted replacement of the card. Go to step 25.
- 23 Return to the procedure that directed you to this procedure. At the point where a faulty card list was produced, identify the next faulty card on the list and go to the appropriate card replacement procedure for that card in this manual.
- 24 Obtain further assistance in replacing this card by contacting operating company maintenance personnel.
- 25 You have successfully completed this procedure. Return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.

**NTMX73
in RSC-S RCO2**

Application

Use this procedure to replace an NTMX73 card in an RSC-S RCO2.

PEC	Suffixes	Name
NTMX73	AA	PCM Signaling Processor

Common procedures

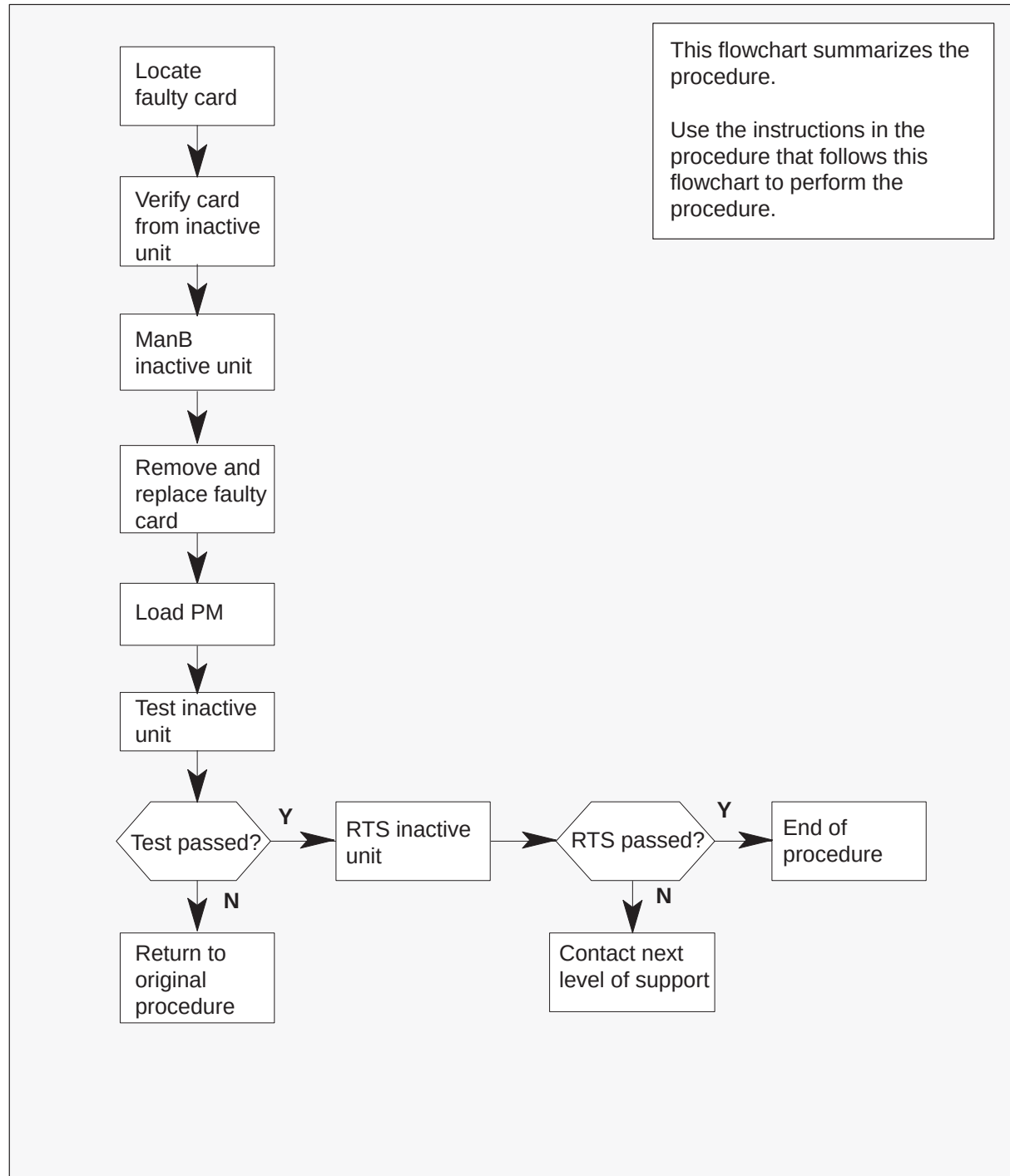
None

Action

The following flowchart is only a summary of the procedure. To replace the card, use the instructions in the procedure that follows the flowchart.

NTMX73 in RSC-S RCO2 (continued)

Summary of card replacement procedure for an NTMX73 card in RSC-S RCO2



NTMX73 in RSC-S RCO2 (continued)

Replacing an NTMX73 card in RSC-S RCO2

At your Current Location

- 1 Proceed only if you have been directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure for verifying or accepting cards, or have been directed to this procedure by your maintenance support group.

2



CAUTION

Loss of service

When replacing a card in the RCO2, ensure that the unit in which you are replacing the card is *inactive* and that the mate unit is *active*.

Obtain an NTMX73 replacement card. Verify that the replacement card has the same product engineering code (PEC), including suffix, as the card that is to be removed.

At the MAP display

- 3 Set the MAP display to the PM level and post the RCO2 by typing
>MAPCI;MTC;PM;POST RCO2 rco2_no
 and pressing the Enter key.
where
 rco2_no is the number of the RCO2 to be posted (0 or 1)
- 4 By observing the MAP display, be sure that the card to be removed is on the inactive unit.

If faulty card is on	Do
active unit	step 5
inactive unit	step 7

NTMX73 in RSC-S RCO2 (continued)

Example of a MAP display:

CM	MS	IOD	Net	PM	CCS	LNS	Trks	Ext	App1
.	.	.	.	.	.	.	.	.	.
RCO2			SysB	ManB	OffL	CBsy	ISTb	InSv	
0 Quit	PM	0	0	0	0	0	0	25	
2 Post_	RCO2	0	0	0	0	0	0	0	
3 ListSet									
4	RCO2	0	ISTb	Links_00S:	CSide	0,	PSide	0	
5 TRNSL	Unit0:	Inact	InSv						
6 TST	Unit1:	Act	InSv						
7 BSY									
8 RTS									
9 OffL									
10 LoadPM_									
11 Disp_									
12 Next_									
13									
14 QueryPM									
15									
16									
17									
18									

- Switch the processing activity (SWACT) to the inactive unit by typing

>SWACT

and pressing the Enter key.

Note: If the system recommends using the SWACT command with the FORCE option, consult office personnel to determine if use of the FORCE option is advisable.

- Confirm the system prompt by typing

>YES

and pressing the Enter key.

After both units are in-service, proceed to the next step.

- Place a sign on the *active* unit bearing the words "Active unit—Do not touch." This sign should not be attached by magnets or tape.

At the MAP display

- Busy the inactive PM unit by typing

>BSY UNIT unit_no

and pressing the Enter key.

where

unit_no is the number of the unit to be busied (0 or 1)

NTMX73
in RSC-S RCO2 (continued)

When both units are in-service, proceed to the next step.

At the frame**9****WARNING****Static electricity damage**

Before removing any cards, put on a wrist strap and connect it to the wrist strap grounding point on the left side of the modular supervisory panel (MSP) of the RCO2. This protects the equipment against damage caused by static electricity.

Put on a wrist strap.

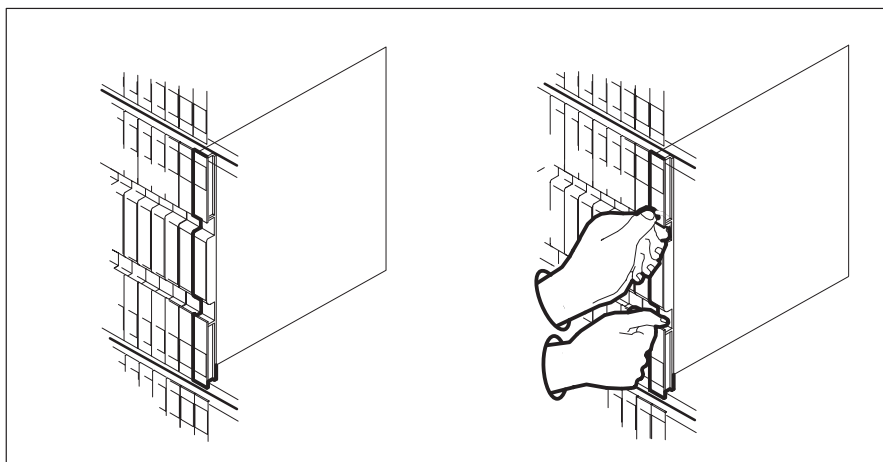
10**WARNING****Equipment damage**

Take the following precautions when removing or inserting a card:

1. Do not apply direct pressure to the components.
2. Do not force the cards into the slots.

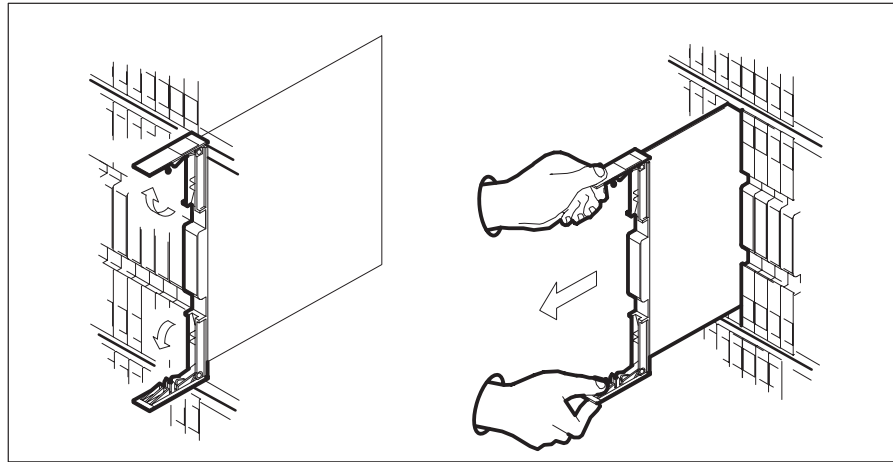
Remove the NTMX73 card as shown in the following figures.

- a.** Locate the card to be removed on the appropriate shelf.



NTMX73 in RSC-S RCO2 (continued)

- b. Open the locking levers on the card to be replaced and gently pull the card toward you until it clears the shelf.

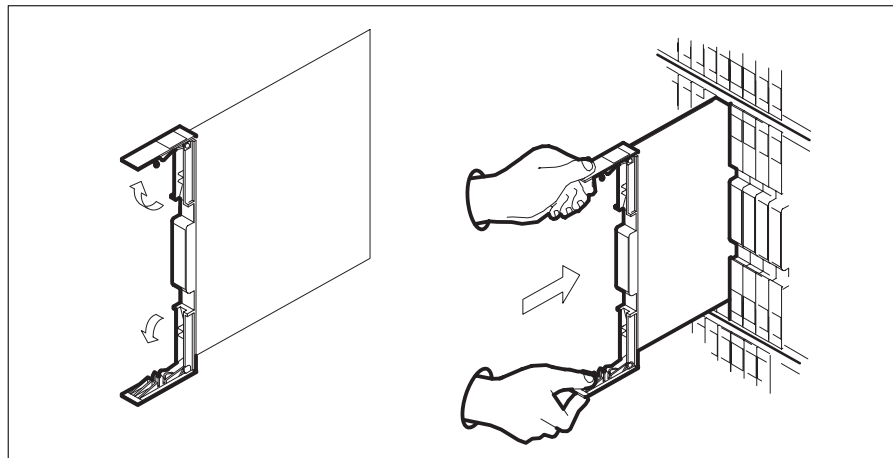


- c. Ensure the replacement card has the same PEC, including suffix, as the card you just removed.

Note: Set dip switch S1 toward IC U1.

- 11 Open the locking levers on the replacement card.

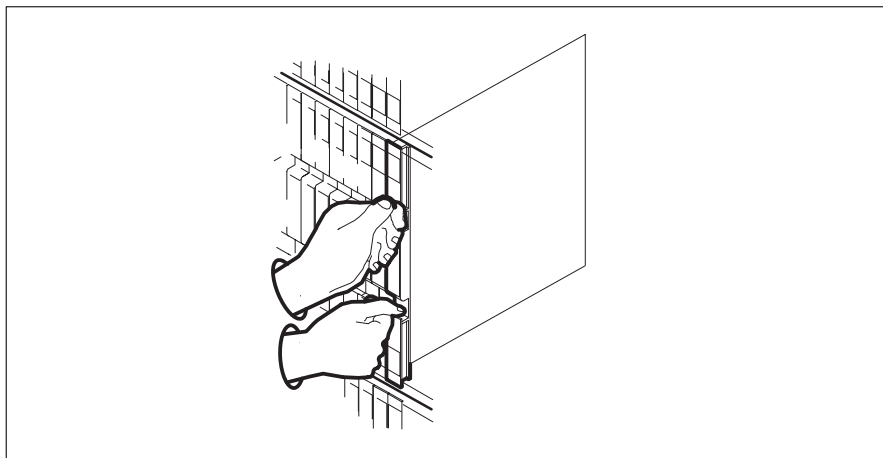
- a. Align the card with the slots in the shelf.
b. Gently slide the card into the shelf.



- 12 Seat and lock the card.

NTMX73
in RSC-S RCO2 (continued)

- a. Using your fingers or thumbs, push on the upper and lower edges of the faceplate to ensure the card is fully seated in the shelf.
- b. Close the locking levers.

***At the MAP display***

- 13** Load the inactive RCO2 unit by typing

>LOADPM UNIT unit_no CC
and pressing the Enter key.

where

unit_no is the number of the faulty RCO2 unit

If LOADPM	Do
passed	step 14
failed	step 18

- 14** Test the inactive unit by typing

>TST UNIT unit_no
and pressing the Enter key.

where

unit_no is the number of the faulty RCO2 unit

NTMX73 in RSC-S RCO2 (continued)

If TST	Do
passed	step 15
failed	step 17

- 15 Use the following information to determine where to proceed.

If you entered this procedure from	Do
alarm clearing procedures	step 17
other	step 16

- 16 Return the inactive RCO2 unit to service by typing

>RTS UNIT unit_no

and pressing the Enter key.

where

unit_no is the number of the faulty RCO2 unit

If RTS	Do
passed	step 19
failed	step 18

- 17 Return to the procedure that directed you to this procedure. At the point where a faulty card list was produced, identify the next faulty card on the list and go to the appropriate card replacement procedure for that card in this manual.
- 18 Obtain further assistance in replacing this card by contacting operating company maintenance personnel.
- 19 Remove the sign from the active RCO2 unit.
- 20 Send any faulty cards for repair according to local procedure.
- 21 Note in office records the date the card was replaced, the serial number of the card, and the symptoms that prompted replacement of the card.

NTMX73
in RSC-S RCO2 (end)

- 22** You have successfully completed this procedure. Return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.

NTMX74 in RSC-S RCO2

Application

Use this procedure to replace an NTMX74 card in an RSC-S RCO2.

PEC	Suffixes	Name
NTMX74	AA	DS30A Interface card

Common procedures

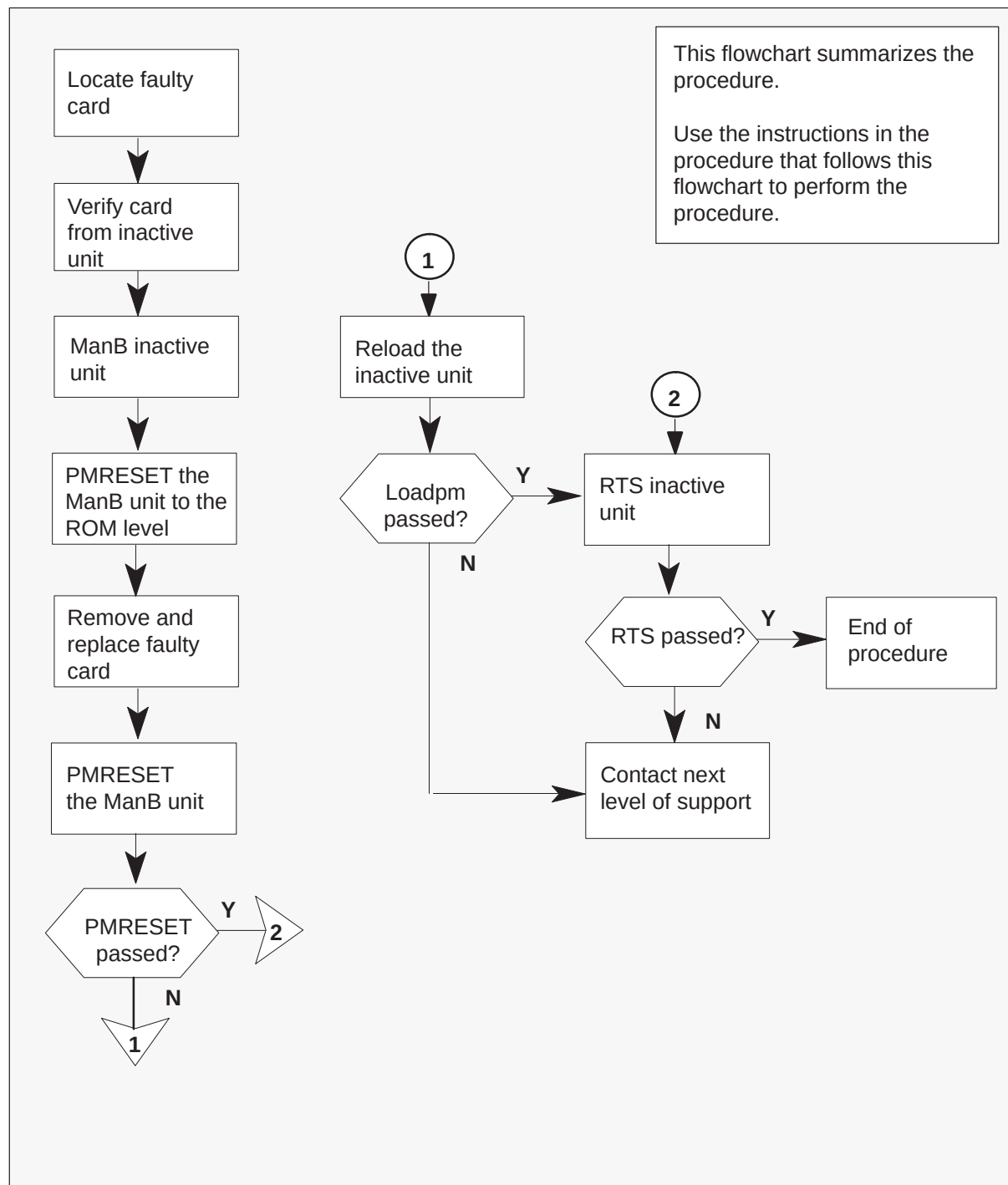
None

Action

The following flowchart is only a summary of the procedure. To replace the card, use the instructions in the procedure that follows the flowchart.

NTMX74 in RSC-S RCO2 (continued)

Summary of card replacement procedure for an NTMX74 card in RSC-S RCO2



NTMX74 in RSC-S RCO2 (continued)

Replacing an NTMX74 card in RSC-S RCO2

At your Current Location

- 1 Proceed only if you have been directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure for verifying or accepting cards, or have been directed to this procedure by your maintenance support group.

2



CAUTION

Loss of service

When replacing a card in the RCO2, ensure that the unit in which you are replacing the card is *inactive* and that the mate unit is *active*.

Obtain an NTMX74 replacement card. Verify the replacement card has the same product engineering code (PEC), including suffix, as the card that is to be removed.

At the MAP terminal

- 3 Set the MAP display to the PM level and post the RCO2 by typing

>MAPCI;MTC;PM;POST RCO2 rco2_no

and pressing the Enter key.

where

rco2_no is the number of the RCO2 with the faulty card

NTMX74 in RSC-S RCO2 (continued)

Example of a MAP display:

CM	MS	IOD	Net	PM	CCS	LNS	Trks	Ext	Appl
.	.	.	.	1RCO2	.	.	.	.	.
RCO2			SysB	ManB	OffL	CBsy	ISTb	InSv	
0 Quit	PM	0	0	2	0	2	25		
2 Post_	RCO2	0	0	0	0	1	1		
3 ListSet									
4	RCO2	0	ISTb	Links_00S:	CSide	1, PSide	1		
5 TRNSL	Unit0:	Inact	InSv						
6 TST	Unit1:	Act	InSv						
7 BSY									
8 RTS									
9 OffL									
10 LoadPM_									
11 Disp_									
12 Next_									
13									
14 QueryPM									
15									
16									
17									
18									

- 4 By observing the MAP display, be sure that the card to be removed is on the inactive unit.

If faulty card is on	Do
active unit	step 5
inactive unit	step 7

- 5 Switch the processing activity (SWACT) to the inactive unit by typing

>SWACT

and pressing the Enter key.

Note: If the system recommends using the SWACT command with the FORCE option, consult office personnel to determine if use of the FORCE option is advisable.

- 6 Confirm the system prompt by typing

>YES

and pressing the Enter key.

After both units are in-service, proceed to the next step.

NTMX74 in RSC-S RCO2 (continued)

At the RCE frame

- 7 Place a sign on the *active* unit bearing the words “Active unit—Do not touch.” This sign should not be attached by magnets or tape.

At the MAP terminal

- 8 Busy the inactive PM unit by typing

>BSY INACTIVE

and pressing the Enter key.

- 9 Set the ManB RCO2 unit to the ROM level to prevent trapping by typing

>PMRESET UNIT unit_no NORUN

and pressing the Enter key.

where

unit_no is the number of the inactive RCO2 unit busied in step 8

At the RCE frame

10



WARNING

Static electricity damage

Before removing any cards, put on a wrist strap and connect it to the wrist strap grounding point on the left side of the modular supervisory panel (MSP) of the RCO2. This protects the equipment against damage caused by static electricity.

Put on a wrist strap.

11



WARNING

Equipment damage

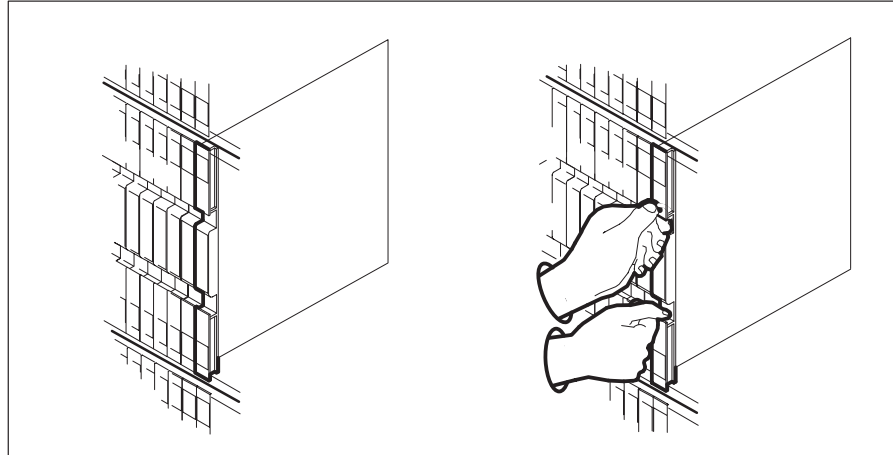
Take the following precautions when removing or inserting a card:

1. Do not apply direct pressure to the components.
2. Do not force the cards into the slots.

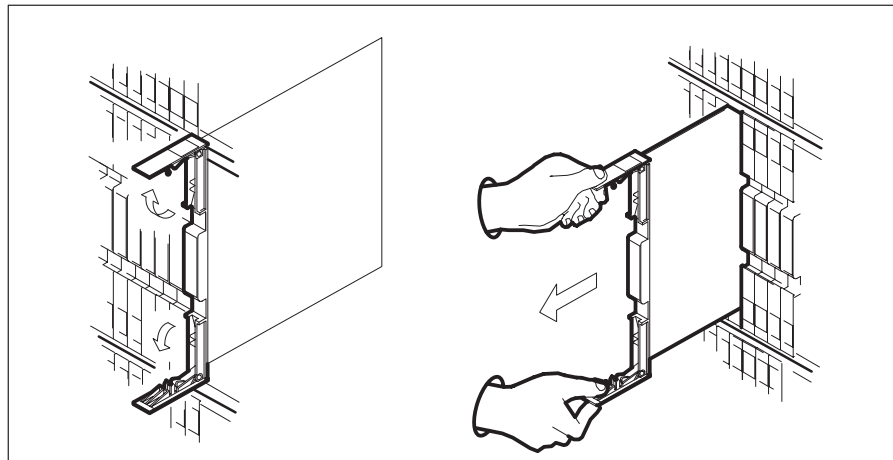
Remove the NTMX74 card as shown in the following figures.

NTMX74
in RSC-S RCO2 (continued)

- a. Locate the card to be removed on the appropriate shelf.



- b. Open the locking levers on the card to be replaced and gently pull the card toward you until it clears the shelf.



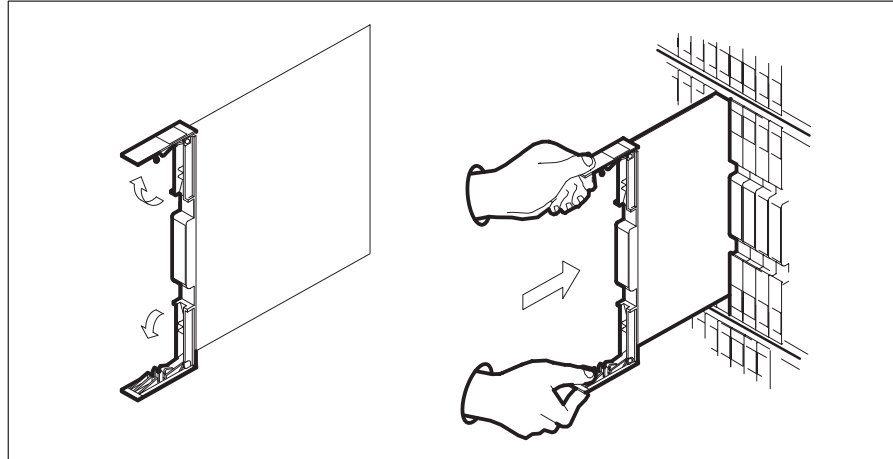
- c. Ensure the replacement card has the same PEC, including suffix, as the card you just removed.

12 Open the locking levers on the replacement card.

- a. Align the card with the slots in the shelf.

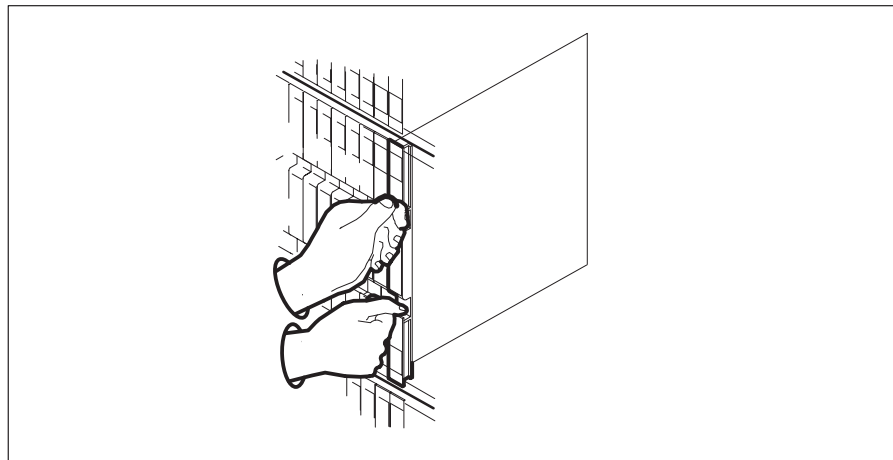
NTMX74 in RSC-S RCO2 (continued)

- b. Gently slide the card into the shelf.



13 Seat and lock the card.

- a. Using your fingers or thumbs, push on the upper and lower edges of the faceplate to ensure the card is fully seated in the shelf.
- b. Close the locking levers.



NTMX74
in RSC-S RCO2 (continued)

- 14 Refer to the following table to determine the next step

If you entered this procedure from	Do
alarm clearing procedure	step 20
other	step 15

- 15 Reset the inactive RCO2 unit by typing

>PMRESET UNIT unit_no

and pressing the Enter key.

where

unit_no is the number of the inactive RCO2 unit (0 or 1)

If the PMRESET command	Do
passed	step 17
failed	step 16

- 16 Reload the inactive RCO2 unit by typing

>LOADPM UNIT unit_no

and pressing the Enter key.

where

unit_no is the number of the inactive RCO2 unit (0 or 1)

If the LOADPM command	Do
passed	step 17
failed	step 21

NTMX74 in RSC-S RCO2 (end)

- 17 Return the inactive RCO2 unit to service by typing

>RTS UNIT rco2_unit_no

and pressing the Enter key.

where

rco2_unit_no is the number of the RCO2 unit (0 or 1)

If RTS	Do
passed	step 18
failed	step 21

- 18 Send any faulty cards for repair according to local procedure.
- 19 Record the date the card was replaced, the serial number of the card, and the symptoms that prompted replacement of the card. Go to step 22.
- 20 Return to the procedure that directed you to this procedure. At the point where a faulty card list was produced, identify the next faulty card on the list and go to the appropriate card replacement procedure for that card in this manual.
- 21 Obtain further assistance in replacing this card by contacting operating company maintenance personnel.
- 22 You have successfully completed this procedure. Return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.

**NTMX75
in RSC-S RCO2**

Application

Use this procedure to replace an NTMX75 card in an RSC-S RCO2.

PEC	Suffixes	Name
NTMX75	AA	Enhanced Matrix

Common procedures

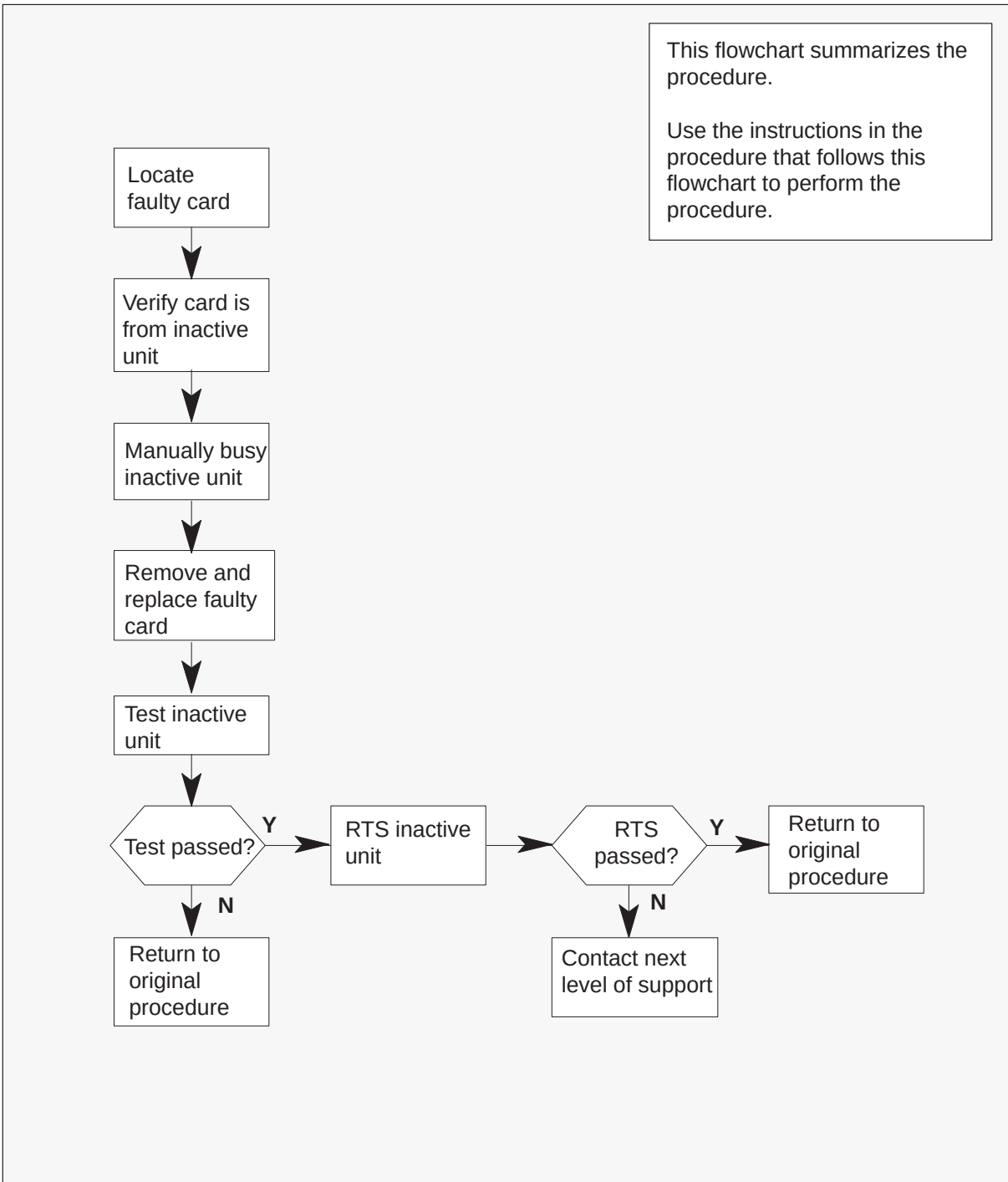
None

Action

The following flowchart is only a summary of the procedure. To replace the card, use the instructions in the procedure that follows the flowchart.

NTMX75 in RSC-S RCO2 (continued)

Summary of card replacement procedure for an NTMX75 card in RSC-S RCO2



NTMX75 in RSC-S RCO2 (continued)

Replacing an NTMX75 card in RSC-S RCO2

At your Current Location

- 1 Proceed only if you have been directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure for verifying or accepting cards, or have been directed to this procedure by your maintenance support group.

2



CAUTION

Loss of service

When replacing a card in the RCO2, ensure that the unit in which you are replacing the card is *inactive* and that the mate unit is *active*.

Obtain an NTMX75 replacement card. Verify the replacement card has the same product equipment code (PEC), including suffix, as the card that is to be removed.

At the MAP terminal

- 3 Set the MAP display to the PM level and post the RCO2 by typing

>MAPCI;MTC;PM;POST RCO2 rco2_no

and pressing the Enter key.

where

rco2_no is the number of the RCO2 to be busied

NTMX75 in RSC-S RCO2 (continued)

Example of a MAP display:

CM	MS	IOD	Net	PM	CCS	LNS	Trks	Ext	Appl
.	.	.	.	1RC02	.	.	.	.	.
RC02			SysB	ManB	OffL	CBsy	ISTb	InSv	
0 Quit	PM	0	0		2	0	2	25	
2 Post_	RC02	0	0		0	0	1	1	
3 ListSet									
4	RC02	0 InSv	Links_00S:	CSide	1,	PSide	1		
5 TRNSL	Unit0:	Inact	InSv						
6 TST	Unit1:	Act	InSv						
7 BSY									
8 RTS									
9 OffL									
10 LoadPM_									
11 Disp_									
12 Next_									
13									
14 QueryPM									
15									
16									
17									
18									

- Determine from the MAP display if the card to be removed is on the inactive unit.

If faulty card is on	Do
active unit	step 5
inactive unit	step 7

- Switch the processing activity (SWACT) to the inactive unit by typing

>SWACT

and pressing the Enter key.

Note: If the system recommends using the SWACT command with the FORCE option, consult office personnel to determine if use of the FORCE option is advisable.

- Confirm the system prompt by typing

>YES

and pressing the Enter key.

After both units are in-service, proceed to the next step.

NTMX75
in RSC-S RCO2 (continued)***At the RCE frame***

- 7 Place a sign on the active unit bearing the words “Active unit—Do not touch.” This sign should not be attached by magnets or tape.

At the MAP terminal

- 8 Busy the inactive PM unit by typing

>BSY unit_no

and pressing the Enter key.

where

unit_no is the number of the unit to be busied (0 or 1)

When both units are in-service, proceed to the next step.

At the RCE frame

9

**WARNING****Static electricity damage**

Before removing any cards, put on a wrist strap and connect it to the wrist strap grounding point on the left side of the modular supervisory panel (MSP) of the RCO2. This protects the equipment against damage caused by static electricity.

**WARNING****Equipment damage**

Take the following precautions when removing or inserting a card:

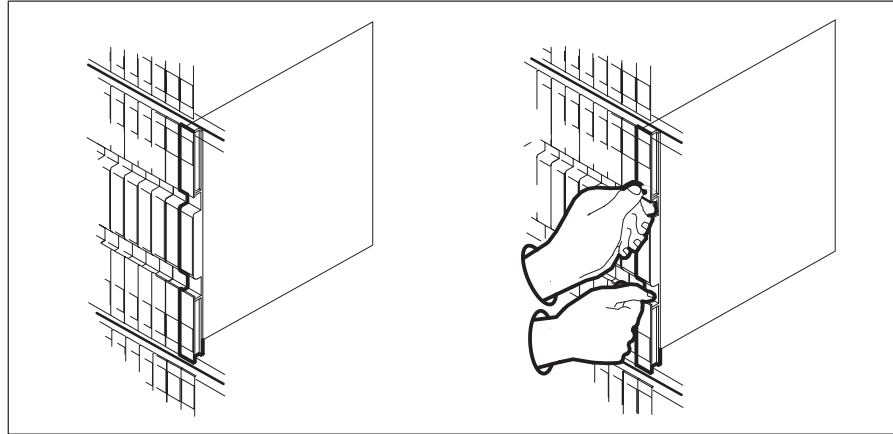
1. Do not apply direct pressure to the components.
2. Do not force the cards into the slots.

Put on a wrist strap.

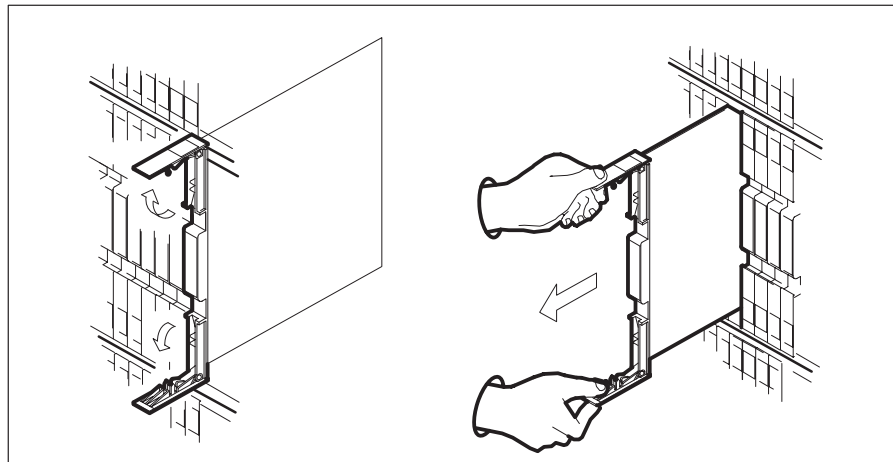
- 10 Unseat the NTMX73 card.
- 11 Remove the NTMX75 card as shown in the following figures.

NTMX75
in RSC-S RCO2 (continued)

- a. Locate the card to be removed on the appropriate shelf.



- b. Open the locking levers on the card to be replaced and gently pull the card toward you until it clears the shelf.



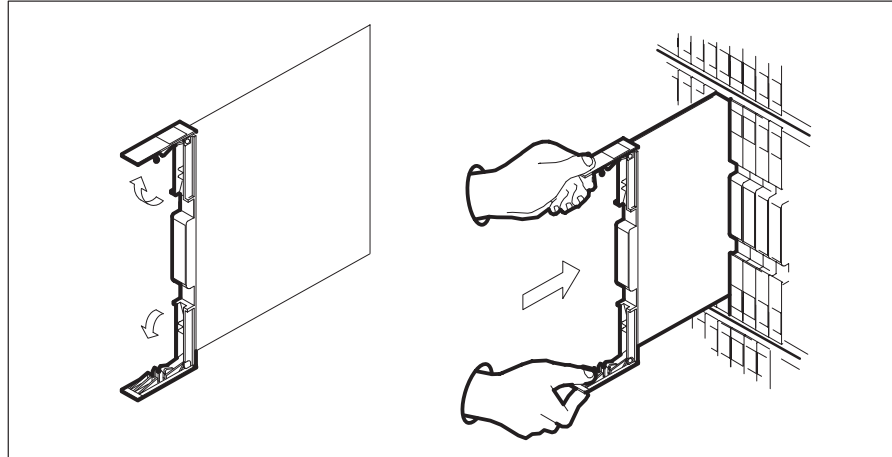
- c. Ensure that the replacement card has the same PEC, including suffix, as the card you just removed.

12 Open the locking levers on the replacement card.

- a. Align the card with the slots in the shelf.

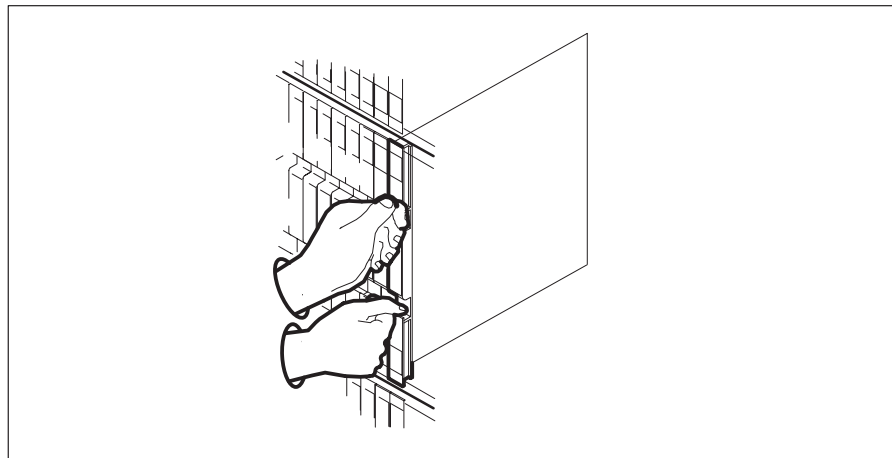
NTMX75 in RSC-S RCO2 (continued)

- b. Gently slide the card into the shelf.



13 Seat and lock the card.

- a. Using your fingers or thumbs, push on the upper and lower edges of the faceplate to ensure the card is fully seated in the shelf.
- b. Close the locking levers.



14 Reseat the NTMX73 card.

At the MAP terminal

- 15** Load the inactive RCO2 by typing
>LOADPM UNIT unit_no CC
and pressing the Enter key.

NTMX75 in RSC-S RCO2 (continued)

where

unit_no is the number of the RCO2 busied in step 8

If LOADPM	Do
passed	step 16
failed	step 22

- 16** Test the inactive RCO2 unit by typing

>TST UNIT unit_no

and pressing the Enter key.

where

unit_no is the number of the RCO2 unit loaded in step 15

If TST	Do
passed	step 17
failed	step 21

- 17** Use the following information to determine what step to go to next in this procedure.

If you entered this procedure from	Do
alarm clearing procedures	step 21
other	step 18

- 18** Return the inactive RCO2 unit to service by typing

>RTS UNIT rco2_unit_no

and pressing the Enter key.

where

rco2_unit_no is the number of the RCO2 unit being returned to service

NTMX75
in RSC-S RCO2 (end)

If RTS	Do
passed	step 19
failed	step 21

- 19 Send any faulty cards for repair according to local procedure.
- 20 Record the date the card was replaced, the serial number of the card, and the symptoms that prompted replacement of the card. Go to step 23.
- 21 Return to the procedure that directed you to this procedure. At the point where a faulty card list was produced, identify the next faulty card on the list and go to the appropriate card replacement procedure for that card in this manual.
- 22 Obtain further assistance in replacing this card by contacting the personnel responsible for higher level of support.
- 23 You have successfully completed this procedure. Remove the sign from the active unit and return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.

NTMX76 in RSC-S RCO2

Application

Use this procedure to replace an NTMX76 card in an RSC-S RCO2.

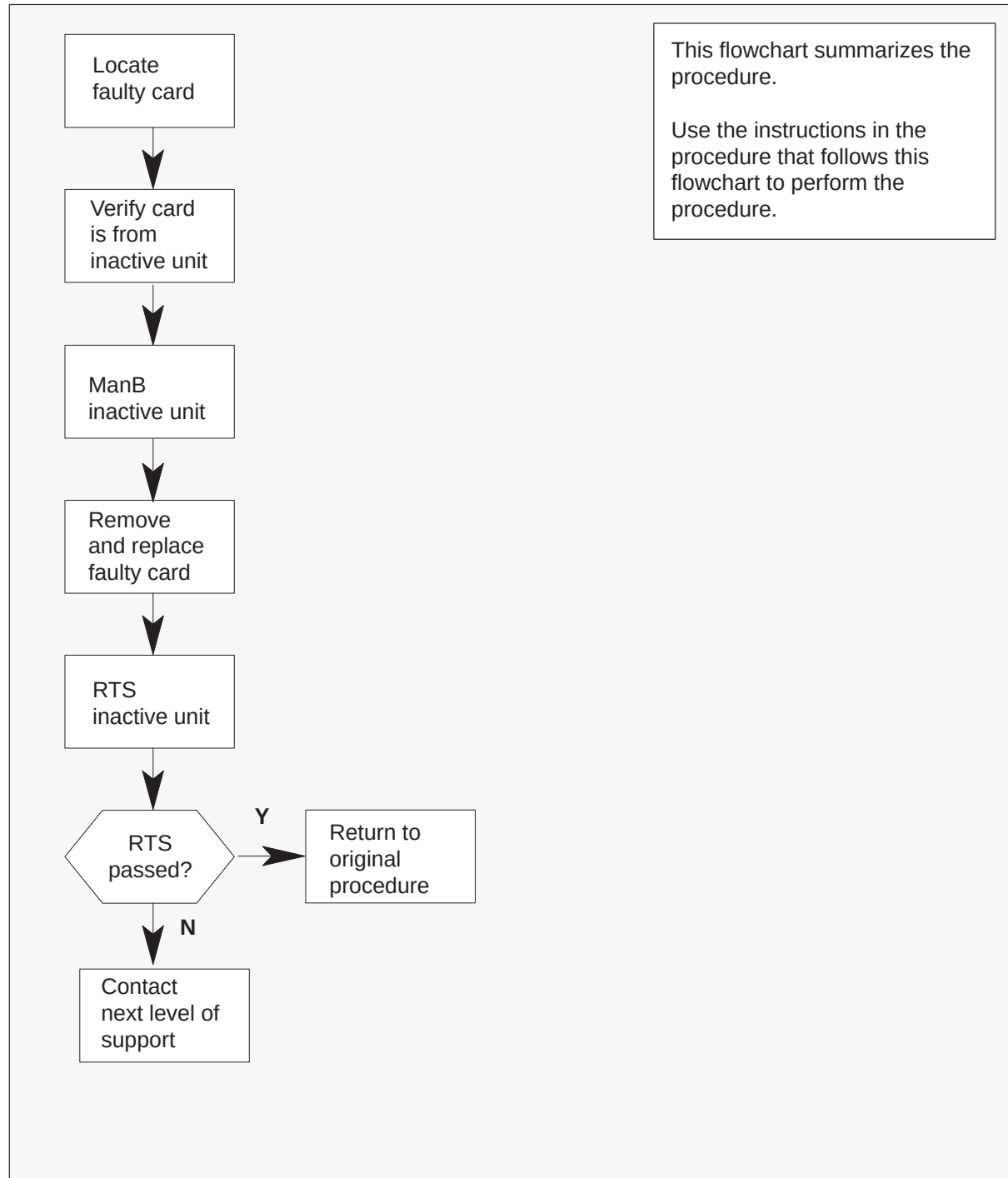
PEC	Suffixes	Name
NTMX76	AA, AB	Message and Tone card

Common procedures

None

Action

The following flowchart is only a summary of the procedure. To replace the card, use the instructions in the procedure that follows the flowchart.

NTMX76
in RSC-S RCO2 (continued)**Summary of card replacement procedure for an NTMX76 card in RSC-S RCO2**

NTMX76 in RSC-S RCO2 (continued)

Replacing an NTMX76 card in RSC-S RCO2

At your Current Location

- 1 Proceed only if you have been directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure for verifying or accepting cards, or have been directed to this procedure by your maintenance support group.

2



CAUTION

Loss of service

When replacing a card in the RCO2, ensure that the unit in which you are replacing the card is *inactive* and that the mate unit is *active*.

Obtain an NTMX76 replacement card. Verify the replacement card has the same product engineering code (PEC), including suffix, as the card that is to be removed.

At the MAP terminal

- 3 Set the MAP display to the PM level and post the RCO2 by typing
>MAPCI;MTC;PM;POST RCO2 rco2_no
and pressing the Enter key.
where
rco2_no is the number of the RCO2 with the faulty card(s)

NTMX76 in RSC-S RCO2 (continued)

Example of a MAP display:

CM	MS	IOD	Net	PM	CCS	LNS	Trks	Ext	Appl
.	.	.	.	1RC02	.	.	.	.	.
RC02			SysB	ManB	OffL	CBsy	ISTb	InSv	
0 Quit	PM	0	0	0	2	0	2	25	
2 Post_	RC02	0	0	0	0	0	1	1	
3 ListSet									
4	RC02	0	ISTb	Links_00S:	CSide	1,	PSide	1	
5 TRNSL	Unit0:	Inact	InSv						
6 TST	Unit1:	Act	InSv						
7 BSY									
8 RTS									
9 OffL									
10 LoadPM_									
11 Disp_									
12 Next_									
13									
14 QueryPM									
15									
16									
17									
18									

- 4 Determine the location of the RCO2 containing the circuit card you are replacing by typing

>QUERYPM

and pressing the Enter key.

Example of a MAP response:

```
PM Type: RCO2 PM No.: 0 PM Int. No.: 9 Node_No: 24
PMs Equipped: 53 Loadname: UK00ADU6 EEPROM Load:
BNK0N205
WARM SWACT is supported and available
RCO2 0 is included in the REX schedule.
REX on RCO2 0 has not been performed.
Node Status: {OK, FALSE}
Unit 0 Act, Status: {OK, FALSE}
Unit 1 Inact, Status: {OK, FALSE}
Site Flr RPos Bay_id Shf Description Slot EqPEC
RSC-M 00 C02 RSC-M 00 05 RCO2: 000 MX85AA
RSC-M 00 C02 RSC-M 00 47 EXT:LEFT 01:13 MX86AA
```

NTMX76 in RSC-S RCO2 (continued)

- 5 By observing the MAP display, be sure that the card to be removed is on the inactive unit.

If faulty card is on	Do
active unit	step 6
inactive unit	step 9

- 6 Switch the processing activity (SWACT) to the inactive unit by typing
>SWACT
and pressing the Enter key.

Note: If the system recommends using the SWACT command with the FORCE option, consult office personnel to determine if use of the FORCE option is advisable.

- 7 Confirm the system prompt by typing
>YES
and pressing the Enter key.

Example of a MAP response:

```
Unit0:  Inact SysB Mtce
Unit1:  Act   ISTb
```

```
RCO2 0      SwAct Passed
```

If the MAP response is	Do
SWACT passed	step 8
anything else	step 22

- 8 A maintenance flag (Mtce) may appear, indicating system-initiated maintenance tasks are in progress. Wait until the flag disappears from the status lines for both RCO2 units before proceeding to the next step.

NTMX76 in RSC-S RCO2 (continued)

At the RCE frame

- 9 Put a sign on the active unit bearing the words **Active unit—Do not touch**. This sign should not be attached by magnets or tape.

At the MAP terminal

- 10 Busy the inactive PM unit by typing

>BSY INACTIVE
and pressing the Enter key.

Example of a MAP response:

```
RCO2      0 ISTb  Links_00S: CSide  0 , PSide  1
Unit0:    Inact ManB
Unit1:    Act   ISTb
Bsy INACTIVE
RCO2 0 Unit 0      Bsy Passed
```

If the BSY command	Do
passed	step 11
failed	step 22

- 11 Reset the inactive RCO2 unit by typing

>PMRESET UNIT unit_no NORUN
and pressing the Enter key.

where

unit_no is the number of the inactive RCO2 unit (0 or 1)

At the RCE frame

- 12



WARNING

Static electricity damage

Before removing any cards, put on a wrist strap and connect it to the wrist strap grounding point on the left side of the modular supervisory panel (MSP) of the RCO2. This protects the equipment against damage caused by static electricity.

Put on a wrist strap.

NTMX76 in RSC-S RCO2 (continued)

13



WARNING

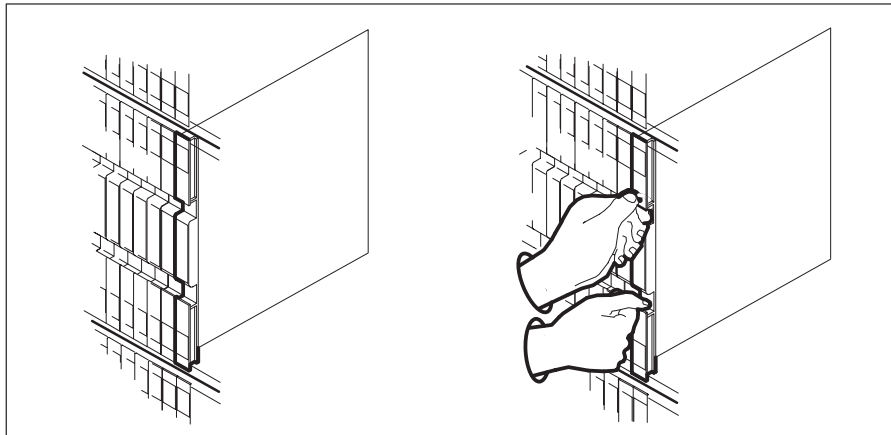
Equipment damage

Take the following precautions when removing or inserting a card:

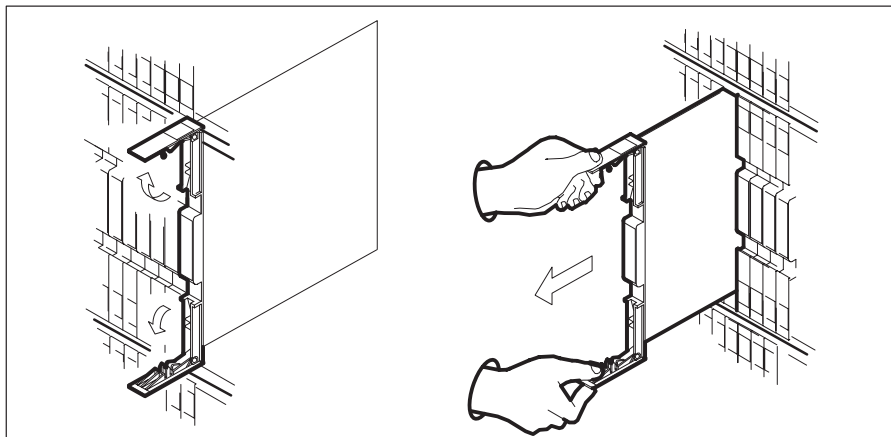
1. Do not apply direct pressure to the components.
2. Do not force the cards into the slots.

Remove the NTMX76 card as shown in the following figures.

- a. Locate the card to be removed on the appropriate shelf.



- b. Open the locking levers on the card to be replaced and gently pull the card towards you until it clears the shelf.



NTMX76
in RSC-S RCO2 (continued)

- c. Ensure the replacement card has the same PEC, including suffix, as the card you just removed.

14

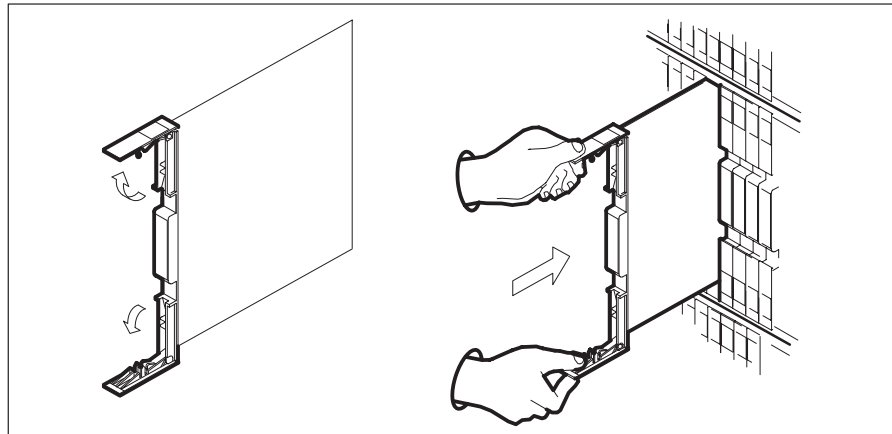
**WARNING****Equipment damage**

Take these precautions when removing or inserting a card:

1. Do not apply direct pressure to the components.
2. Do not force the cards into the slots.

Open the locking levers on the replacement card.

- a. Align the card with the slots in the shelf.
- b. Gently slide the card into the shelf.



15

**CAUTION****Loss of subscriber service**

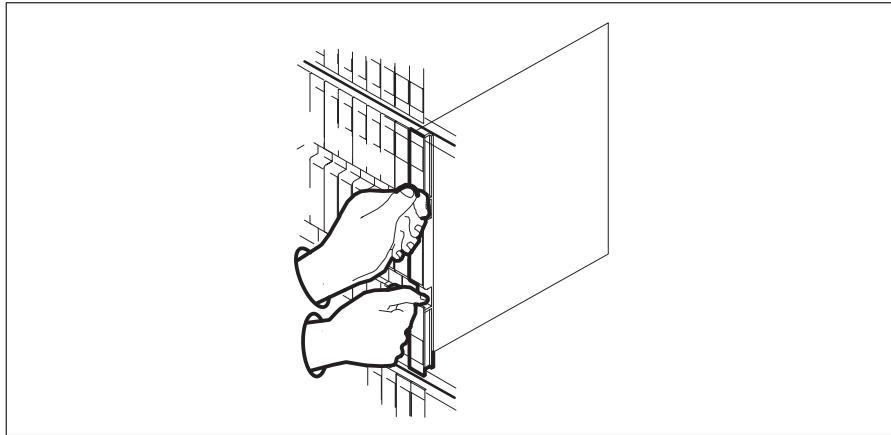
Subscriber service may be lost in the active unit when reseating the MX76 card.

It is recommended that this procedure be performed during low traffic periods.

Seat and lock the card.

NTMX76 in RSC-S RCO2 (continued)

- a. Using your fingers or thumbs, push on the upper and lower edges of the faceplate to ensure the card is fully seated in the shelf.
- b. Close the locking levers.



At the MAP terminal

- 16 Reset the inactive unit by typing

>PMRESET UNIT unit_no
and pressing the Enter key.

where

unit_no is the number of the RCO2 unit busied in step 10

If PMRESET	Do
passed	step 17
failed	step 22

- 17 Use the following information to determine what step to go to next in this procedure.

If you entered this procedure from	Do
alarm clearing procedures	step 21
other	step 18

NTMX76
in RSC-S RCO2 (end)

- 18** Return the inactive RCO2 unit to service by typing

>RTS INACTIVE

and pressing the Enter key.

If RTS	Do
passed	step 19
failed	step 22

- 19** Send any faulty cards for repair according to local procedure.
- 20** Record the date the card was replaced, the serial number of the card, and the symptoms that prompted replacement of the card. Go to step 23.
- 21** Return to *Alarm and Performance Monitoring Procedures* or other procedure that directed you to this procedure. At the point where a faulty card list was produced, identify the next faulty card on the list and go to the appropriate card replacement procedure for that card in this manual.
- 22** Obtain further assistance in replacing this card by contacting operating company maintenance personnel.
- 23** You have successfully completed this procedure. Remove the sign from the active unit and return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.

NTMX77 in RSC-S RCO2

Application

Use this procedure to replace an NTMX77 card in an RSC-S RCO2.

PEC	Suffixes	Name
NTMX77	AA	Unified Processor

Common procedures

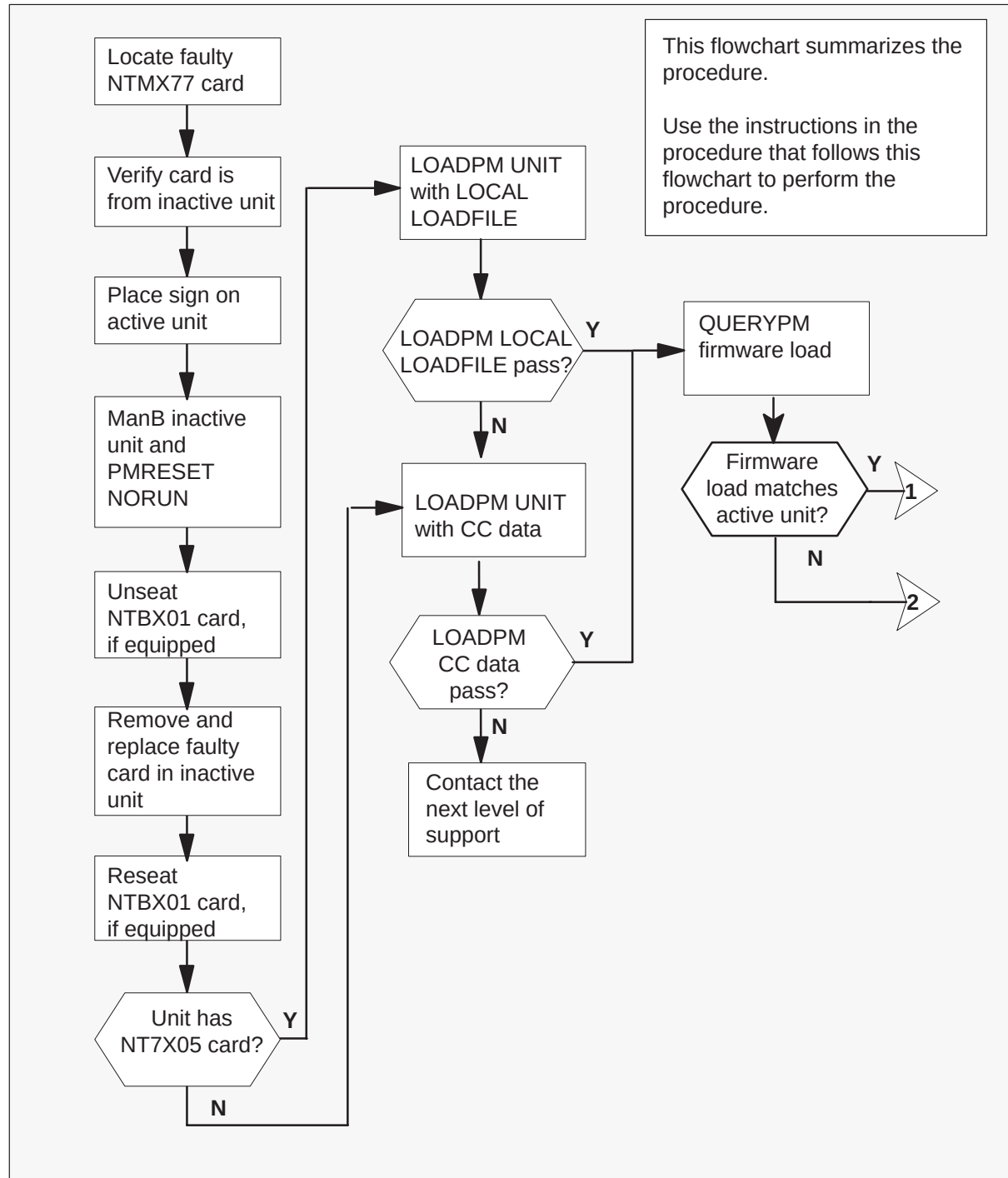
None

Action

The following flowchart is only a summary of the procedure. To replace the card, use the instructions in the procedure that follows the flowchart.

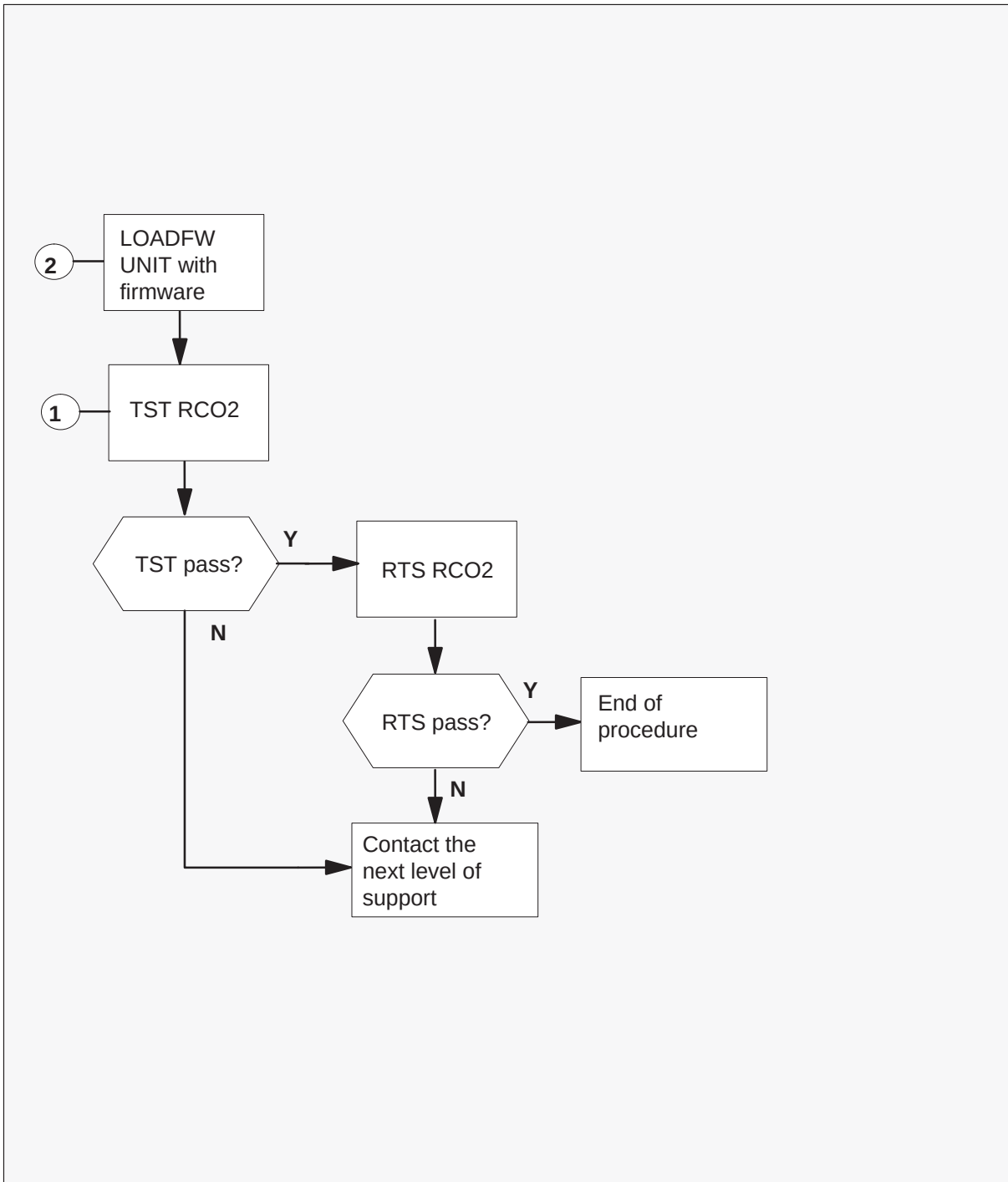
NTMX77 in RSC-S RCO2 (continued)

Summary of card replacement procedure for an NTMX77 card in RSC-S RCO2 (1 of 2)



NTMX77 in RSC-S RCO2 (continued)

Summary of card replacement procedure for an NTMX77 card in RSC-S RCO2(2 of 2)



NTMX77
in RSC-S RCO2 (continued)

Replacing an NTMX77 card in RSC-S RCO2

At your Current Location

- 1 Proceed only if you have been directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure for verifying or accepting cards, or have been directed to this procedure by your maintenance support group.

2



CAUTION

Loss of service

When replacing a card in the RCO2, make sure the unit in which you are replacing the card is *inactive* and that the mate unit is *active*.

Get a replacement card. Make sure the replacement card has the same product equipment code (PEC), including suffix, as the card to be removed.

At the MAP terminal

- 3 Access the PM level of the MAP terminal and post the RCO2. To post the RCO2, type

>MAPCI;MTC;PM;POST RCO2 rco2_no

and press the Enter key.

where

rco2_no is the number of the RCO2 to be busied (0 or 1)

NTMX77
in RSC-S RC02 (continued)

Example of a MAP display:

CM	MS	IOD	Net	PM	CCS	LNS	Trks	Ext	Appl
.	.	.	.	1RC02	.	.	.	.	.
RC02			SysB	ManB	OffL	CBsy	ISTb	InSv	
0 Quit	PM	0	0	0	2	0	2	25	
2 Post_	RC02	0	0	0	0	0	1	1	
3 ListSet									
4	RC02	0	ISTb	Links_00S:	CSide	1,	PSide	1	
5 TRNSL	Unit0:		Inact	InSv					
6 TST	Unit1:		Act	InSv					
7 BSY									
8 RTS									
9 OffL									
10 LoadPM_									
11 Disp_									
12 Next_									
13									
14 QueryPM									
15									
16									
17									
18									

- 4 Check that the NTMX77AA card with faults is in the inactive unit. Make sure the LED labeled ACTIVE is OFF or observe the MAP display.

If the NTMX77AA card with faults is in	Do
active unit	step 5
inactive unit	step 9

- 5 Switch the processing activity (SWACT) to the inactive unit. To SWACT the unit, type

>SWACT
and press the Enter key.

If SWACT	Do
cannot continue now	step 6
can continue now	step 7

NTMX77 in RSC-S RCO2 (continued)

- 6 Do not switch activity of the units. To reject the SWACT, type

>NO

and press the Enter key.

The system discontinues the SWACT.

Return to step 5 during a period of low traffic.

- 7 To confirm the system prompt, type

>YES

and press the Enter key.

The system runs a pre-SWACT audit to determine the ability of the inactive unit to accept activity reliably.

Note: A maintenance flag appears when maintenance tasks are in progress. Wait until the flag disappears before continuing to the next maintenance action.

If the message is	Do
SWACT passed	step 9
SWACT failed	step 8
SWACT not accepted by SWACT controller	step 8

- 8 Return to the Alarm Clearing Procedures in this manual to clear the alarm condition on the inactive unit. When the alarm clears, return to step 1 of this procedure.

At the RCE frame

- 9 Place a sign on the active unit with the words **Active unit—Do not touch**. This sign must not be attached by magnets or tape.

At the MAP terminal

- 10 Busy the inactive PM unit. To busy the unit, type

>BSY UNIT unit_no

and press the Enter key.

where

unit_no is the number of the inactive RCO2 unit (0 or 1)

NTMX77 in RSC-S RCO2 (continued)

- 11 Set the inactive unit to the ROM level. To set the unit to the ROM level, type
>PMRESET UNIT rco2_unit_no NORUN
and press the Enter key.

where

rco2_unit_no is the number of the inactive RCO2 unit (0 or 1)

At the RCE frame

12



WARNING

Static electricity damage

Before removing any cards, put on a wrist strap and connect it to the wrist strap grounding point on the left side of the modular supervisory panel (MSP) of the RCO2. This protects the equipment against damage caused by static electricity.



WARNING

Equipment damage

Take the following precautions when removing or inserting a card:

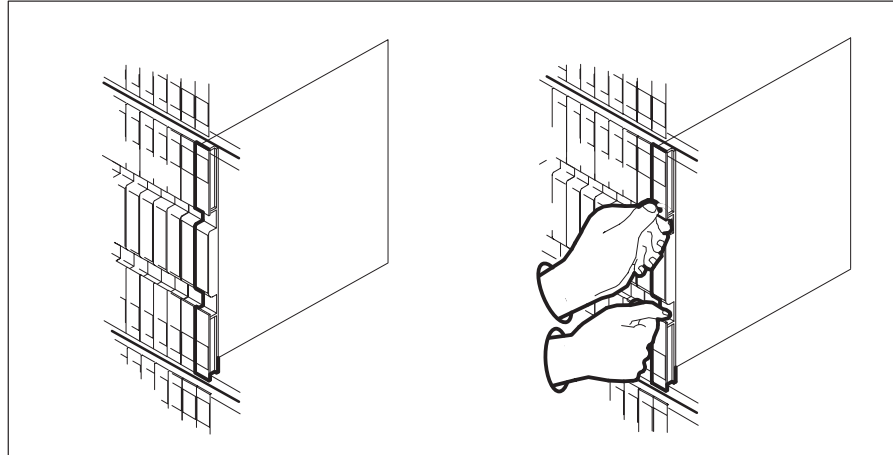
1. Do not apply direct pressure to the components.
2. Do not force the cards into the slots.

Put on a wrist strap.

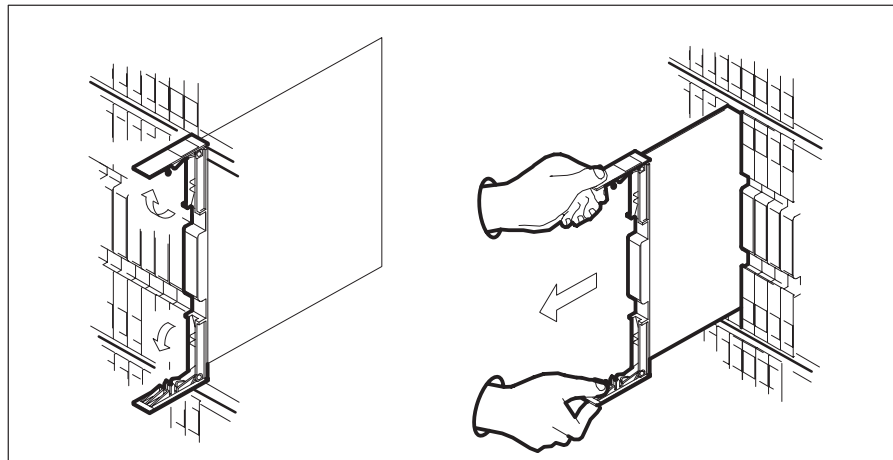
- 13 Unseat the NTBX01 card, if equipped.
- 14 Remove the NTMX77 card as shown in the following figures.

NTMX77
in RSC-S RCO2 (continued)

- a. Locate the card to be removed on the appropriate shelf.



- b. Open the locking levers on the card to be replaced. Carefully pull the card toward you until it clears the shelf.



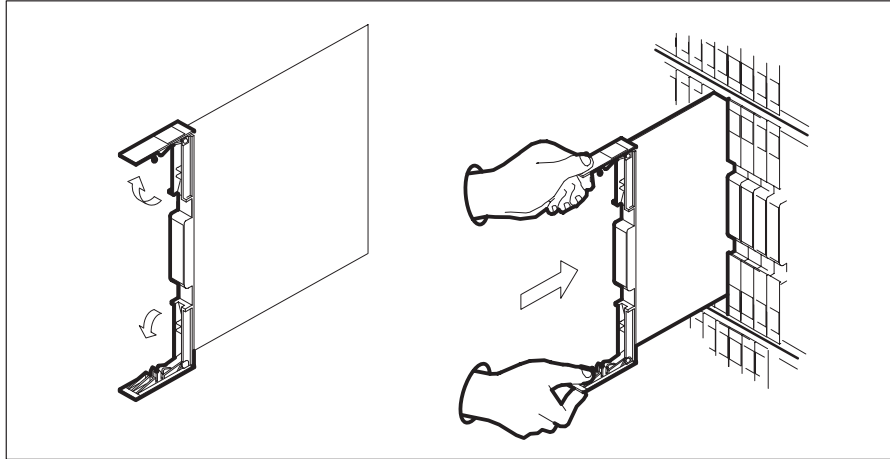
- c. Make sure the replacement card has the same PEC, including suffix, as the card you just removed. Also make sure the DIP switch settings on the replacement card match the settings of the card just removed.

Note: If the NTMX77 circuit card has a DIP switch, set DIP switch S1 to CPM.

NTMX77 in RSC-S RCO2 (continued)

15 Open the locking levers on the replacement card.

- a. Align the card with the slots in the shelf.
- b. Carefully slide the card into the shelf.



16



WARNING

Possible loss of P-side nodes

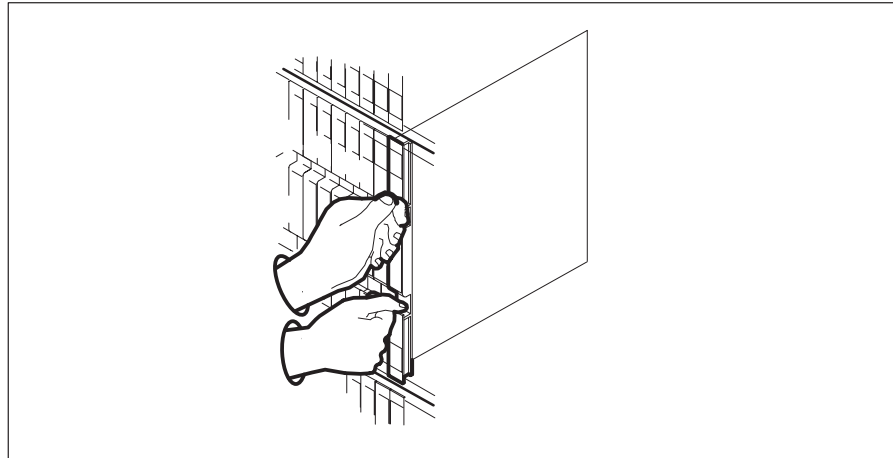
Monitor the LEDs on the faceplate of the replacement NTMX77 when installing.

1. The INSV and ESA LEDs may come ON and must go OFF in less than 4 seconds.
2. The ACT LCD may come ON and light for less than 1 second. If the ACT LED remains ON for more than 1 second, immediately remove the NTMX77 card and return to step 14 c. with a new NTMX77 card. If the NTMX77 card is allowed to remain with both units having an active processor, this is a condition of dual activity, which will result in the loss of P-side nodes.

Seat and lock the card.

NTMX77
in RSC-S RCO2 (continued)

- a. Use your fingers or thumbs to push on the upper and lower edges of the faceplate to make sure the card is fully seated in the shelf.
- b. Close the locking levers.



- 17 Reseat the NTB01 card, if equipped.
- 18 Use the following information to determine the next step in this procedure.

If you entered this procedure from	Do
an alarm clearing procedure	step 28
other	step 19

NTMX77
in RSC-S RCO2 (continued)

At the MAP terminal

- 19 The peripheral/remote loader 16 card (NT7X05) allows local loading of RCO2 data which reduces recovery time. To check if the NT7X05 card is provisioned, type

>QUERYPM FILES

and press the Enter key.

Example of a MAP display:

```
CM  MS  IOD  Net  PM  CCS  LNS  Trks  Ext  APPL
.    .    .    .    1RCO2  .    .    .    .    .
      *C*
RCO2      SysB  ManB  OffL  CBsy  ISTb  InSv
0 Quit      PM    2      0      2      0      25
2 Post      RCO2  1      0      0      0      1
3 ListSet
4           RCO2      0 ISTb Links_00S: CSide 0, PSide 0
5 TRNSL_    Unit 0:  Inact ManB
6 TST_      Unit 1:  Inact InSv
7 BSY_
8 RTS_      QUERYPM files
9 OffL      Unit 0:
10 LoadPM_  NT7X05 load File: KRI05AU
11 Disp_    NT7X05 Image File:KRI05AU
12 Next_
13 SwAct    Unit 1:
14 QueryPM  NT7X05 load File: [KRI05AU]
15          NT7X05 Image File:KRI05AU
16 IRLINK
17 Perform
18
```

(NT7X05 load file name)

Note: If the NT7X05 card is not provisioned, the MAP response is:
Nt7X05 not datafilled, QueryPm files invalid

If the NT7X05 card is	Do
provisioned	step 20
not provisioned	step 21

NTMX77 in RSC-S RCO2 (continued)

20

**WARNING****Possible service interruption**

The LOCAL LOADFILE option of the LOADPDM command has a parameter of [<file> string]. When this parameter is used, the loadfile named in the parameter is not patched. Do not use this parameter unless the NOPATCH option of the loadfile is desired.

Load the inactive RCO2 unit from the local loadfile. To load the inactive RCO2 unit from the local loadfile, type

>LOADPDM UNIT unit_no LOCAL IMAGE

and press the Enter key.

where

rco2_unit_no is the number of the inactive RCO2 unit

If the load	Do
passed	step 22
failed	step 21

21 To load the inactive RCO2 unit, type

>LOADPDM UNIT rco2_unit_no

and press the Enter key.

where

rco2_unit_no is the number of the inactive RCO2 unit

If the load	Do
passed	step 22
failed	step 29

NTMX77
in RSC-S RCO2 (continued)

- 22 Query the XPM counters for the firmware load on the NTMX77. To query XPM counters, type

>QUERYPM CNTRS

and press the Enter key.

Example of a MAP display:

```
Unsolicited MSG limit = 250, Unit 0 = 0, Unit 1 = 0
Unit 0:
Ram Load: KRI05AU
EPRom Version: AB02
EEProm Load: Loadable: MX77NG03, Executable: MX77NG03
CMR LOAD: CMR33A15
UP:MX77AA
IP:BX01
Unit 1:
Ram Load: KRI05AU
EPRom Version: AB02
EEProm Load: Loadable: [MX77NG03], Executable: [MX77NG03]
CMR LOAD: CMR33A15
UP:MX77AA
IP:BX01
```

(NTMX77 firmware load name)

If firmware is	Do
valid	step 25
invalid	step 23

- 23 To load the firmware on the inactive unit, type

>LOADFW INACTIVE

and press the Enter key.

If LOADFW	Do
passed	step 24
failed	step 29

NTMX77
in RSC-S RCO2 (end)

- 24 To upgrade the firmware on the inactive unit, type

>LOADFW INACTIVE UPGRADE

and press the Enter key.

If LOADFW UPGRADE	Do
passed	step 25
failed	step 29

- 25 Return the inactive RCO2 unit to service. To RTS the RCO2 unit, type

>RTS UNIT rco2_unit_no

and press the Enter key.

where

rco2_unit_no is the number of the inactive RCO2 unit

If RTS	Do
passed	step 26
failed	step 29

- 26 Send any faulty cards for repair according to local procedure.

- 27 Record the following information in office records:

- date the card was replaced
- serial number of the card
- indications that prompted replacement of the card

Go to step 30.

- 28 Return to the alarm clearing procedure that directed you to this procedure. At the point where a card list was produced, identify the next card on the list and go to the appropriate card replacement procedure for that card in this manual.

- 29 Get additional help in replacing this card by contacting operating company maintenance personnel.

- 30 You have correctly completed this procedure. Remove the sign from the active unit and return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.

NTMX79 in RSC-S EXT

Application

Use this procedure to replace an NTMX79 card in an RSC-S EXT.

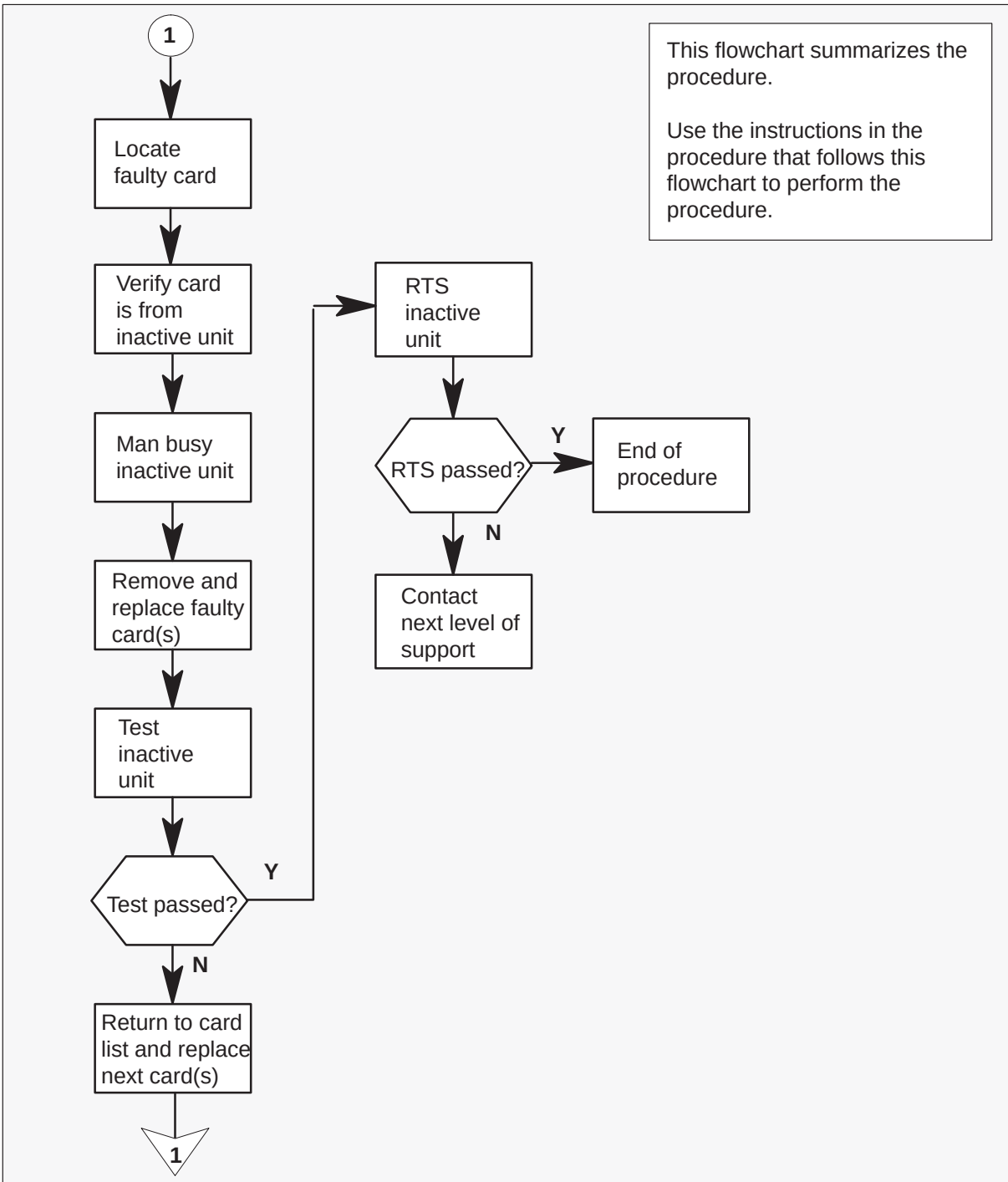
PEC	Suffixes	Name
NTMX79	AA	DS60 Extender

Common procedures

None

Action

The following flowchart is only a summary of the procedure. To replace the card, use the instructions in the procedure that follows the flowchart.

NTMX79
in RSC-S EXT (continued)**Summary of card replacement procedure for an NTMX79 card in RSC-S EXT**

NTMX79 in RSC-S EXT (continued)

Replacing an NTMX79 card in an RSC-S EXT

At your Current Location

- 1 Proceed only if you have been directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure for verifying or accepting cards, or have been directed to this procedure by your maintenance support group.

2



CAUTION

Loss of service

When replacing a card in the RCO2, ensure that the unit in which you are replacing the card is *inactive* and that the mate unit is *active*.

Obtain an NTMX79 replacement card. Verify the replacement card has the same product engineering code (PEC), including suffix, as the card that is to be removed.

At the MAP terminal

- 3 Set the MAP display to the PM level and post the RCO2 by typing

>MAPCI;MTC;PM;POST RCO2 rco2_no

and pressing the Enter key.

where

rco2_no is the number of the RCO2 with the faulty card

- 4 Determine on which side of the extension shelf (right or left side) the faulty card is located by typing

QUERYPM

and pressing the Enter key.

Example of a MAP response:

```
PM Type: RCO2 PM Nol.: 0 PM Int. No.: 2 Node_No.: 126
PMs Equipped: 61 Loadname: KRI05AU
ESA equipped: YES IntraSwitching is ON
WARM SWACT is supported and available.
REX on RCO2 0 is included in the REX schedule.
Node Status; {OK, FALSE}
Unit 0 Act, Status; {OK, FALSE}
Unit 1 Inact, Status; {OK, FALSE}
Site Flr RPos Bay_id Shf Description Slot EqPEC
R113 01 AA00 CRSC 00 05 RCO2 : 000 MX85AA
R113 01 AA01 CEXT 00 05 EXT : [LEFT] MX86AA
```

(Extension shelf location of faulty card) —

NTMX79
in RSC-S EXT (continued)

- 5 By observing the LED on the extension shelf, be sure that the card to be removed is on the inactive unit. The LED is lit (ON) on the active unit, and not lit (OFF) on the inactive unit.

If faulty card is on	Do
active unit	step 6
inactive unit	step 8

- 6 Switch the processing activity (SWACT) to the inactive unit by typing

>SWACT

and pressing the Enter key.

Note: If the system recommends using the SWACT command with the FORCE option, consult office personnel to determine if use of the FORCE option is advisable.

- 7 Confirm the system prompt by typing

>YES

and pressing the Enter key.

After both units are in-service, proceed to the next step.

At the RCE frame

- 8 Place a sign on the active unit bearing the words **Active unit—Do not touch**. This sign should not be attached by magnets or tape.

At the MAP terminal

- 9 Busy the inactive PM unit by typing

>BSY UNIT unit_no

and pressing the Enter key.

where

unit_no is the number of the unit to be busied (0 or 1)

NTMX79 in RSC-S EXT (continued)

At the RCE frame

10



WARNING

Static electricity damage

Before removing any cards, put on a wrist strap and connect it to the wrist strap grounding point on the left side of the modular supervisory panel (MSP) of the RCO2. This protects the equipment against damage caused by static electricity.

Put on a wrist strap.

11



WARNING

Equipment damage

Take the following precautions when removing or inserting a card:

1. Do not apply direct pressure to the components.
2. Do not force the cards into the slots.

Power down the NTMX72 card in the inactive RCO2.

12



CAUTION

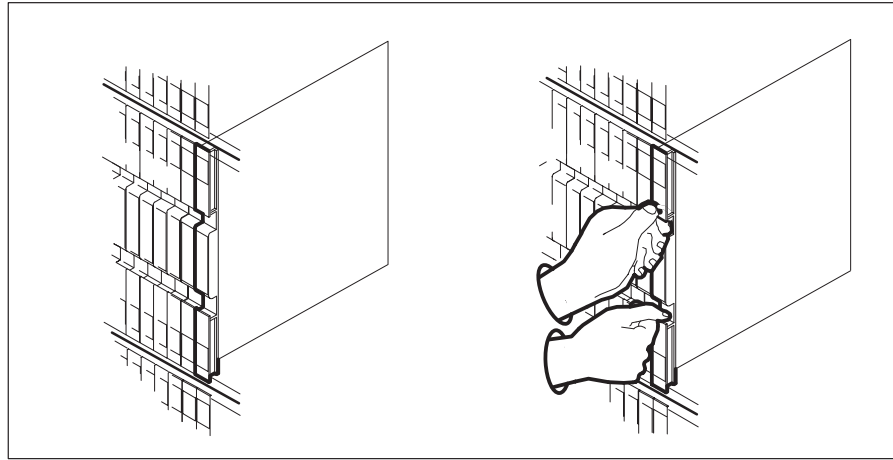
Loss of subscriber service

To prevent the D-channel handler (DCH) card from being set system busy (SysB), which causes a loss of subscriber service, make sure the toggle switch on the MX79 card is set to the ON position before removing the NTMX79 card.

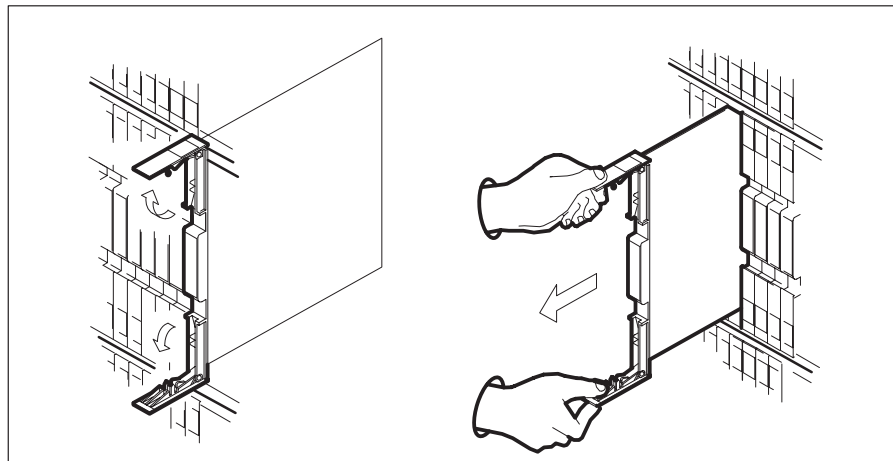
Remove the NTMX79 card as shown in the following figures.

- a. Locate the card to be removed on the appropriate shelf.

NTMX79
in RSC-S EXT (continued)



- b.** Open the locking levers on the card to be replaced and gently pull the card toward you until it clears the shelf.



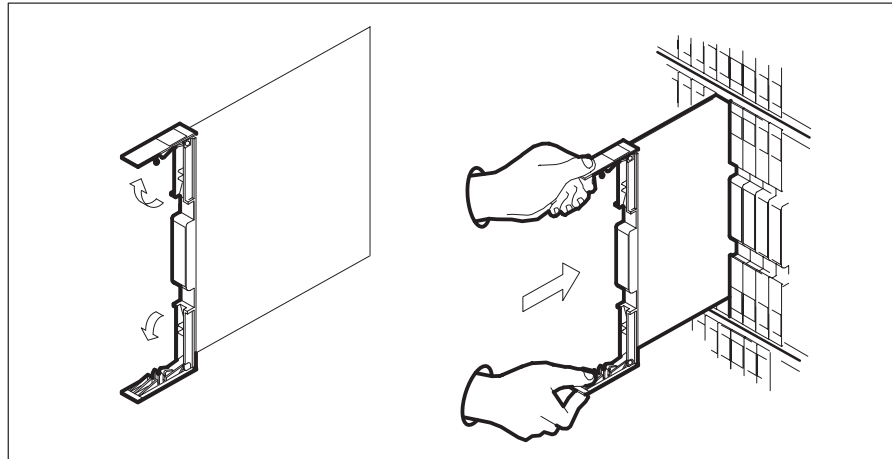
- c.** Ensure the replacement card has the same PEC, including suffix, as the card you just removed.

13 Open the locking levers on the replacement card.

- a.** Align the card with the slots in the shelf.

NTMX79 in RSC-S EXT (continued)

- b. Gently slide the card into the shelf.



14



CAUTION

Loss of subscriber service

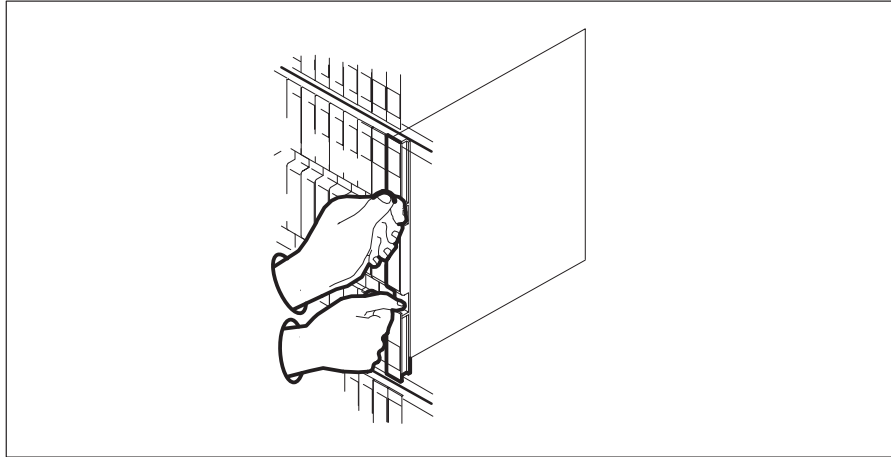
To prevent the D-channel handler (DCH) card from being set system busy (SysB), which causes a loss of subscriber service, make sure the toggle switch on the MX79 card is set to the OFF position before seating the NTMX79 card.

Seat and lock the card.

- a. Using your fingers or thumbs, push on the upper and lower edges of the faceplate to ensure the card is fully seated in the shelf.

NTMX79
in RSC-S EXT (continued)

- b.** Close the locking levers.



- 15** Power up the inactive RCO2 unit as follows:
- a.** Ensure that the power converter (NTMX72) is inserted. A major audible alarm may sound. This alarm is silenced when power is restored to the converter.
 - b.** Set the POWER switch of the inactive unit to the ON position.
- 16** Press the RESET button while setting the circuit breaker to the ON position. Both the converter FAIL LED and FRAME FAIL lamp on the MSP will be ON.

NTMX79
in RSC-S EXT (continued)

- 17 The peripheral loader card (NT7X05) allows local loading of the RCO2 data. Local data loading reduces recovery time. Determine if an NT7X05 is located in slot 12. Check if the NT7X05 card is provisioned by typing

>QUERYPM FILES

and pressing the Enter key.

Example of a MAP display:

CM	MS	IOD	Net	PM	CCS	LNS	Trks	Ext	APPL
.	.	.	.	1RCO2	.	.	.	.	.
				C					
RCO2			SysB	ManB	OffL	CBsy	ISTb	InSv	
0 Quit		PM	2	0	2	0	2	25	
2 Post		RCO2	1	0	0	0	1	1	
3 ListSet									
4		RCO2	0	ISTb	Links_00S:	CSide	0,	PSide	0
5 TRNSL_		Unit 0:	Inact	ManB					
6 TST_		Unit 1:	Inact	InSv					
7 BSY_									
8 RTS_		QUERYPM files							
9 OffL		Unit 0:							
10 LoadPM_		NT7X05	load	File:	KRI05AU				
11 Disp_		NT7X05	Image	File:	KRI05AU				
12 Next_									
13 SwAct		Unit 1:							
14 QueryPM		NT7X05	load	File:	KRI05AU				
15		NT7X05	Image	File:	KRI05AU				
16 IRLINK									
17 Perform									
18									

Note: If the NT7X05 card is not provisioned the MAP response is:
NT7X05 not datafilled, QueryPm files invalid

If the NT7X05 card is	Do
provisioned	step 18
not provisioned	step 20

NTMX79
in RSC-S EXT (continued)

- 18 Load the inactive RCO2 unit from the local image by typing

>LOADPM UNIT rco2_unit_no LOCAL IMAGE

and pressing the Enter key.

where

rco2_unit_no is the number of the inactive RCO2 unit

If the load	Do
passed	step 21
failed	step 19

- 19 Load the inactive RCO2 unit from the local loadfile by typing

>LOADPM UNIT unit_no LOCAL LOADFILE

and pressing the Enter key.

where

rco2_unit_no is the number of the inactive RCO2 unit

If the load	Do
passed	step 21
failed	step 20

- 20 After replacing the faulty card, load the inactive unit by typing

>LOADPM UNIT unit_no CC

and pressing the Enter key.

where

unit_no is the number of the inactive unit

If LOAD	Do
passed	step 21
failed	step 29

NTMX79 in RSC-S EXT (continued)

- 21 Test the inactive unit by typing

>TST UNIT unit_no

and pressing the Enter key.

where

unit_no is the number of the inactive RCO2 unit

If TST	Do
passed	step 22
failed	step 28

- 22 Use the following information to determine what step to go to next in this procedure.

If you entered this procedure from	Do
alarm clearing procedures	step 28
other	step 23

- 23 Return the inactive RCO2 unit to service by typing

>RTS UNIT unit_no

and pressing the Enter key.

where

unit_no is the number of the inactive RCO2 unit

- 24 Use the following information to determine where to proceed.

If RTS	Do
passed	step 25
failed	step 29

- 25 Remove the sign from the active RCO2 unit.

- 26 Send any faulty cards for repair according to local procedure.

NTMX79
in RSC-S EXT (end)

- 27** Record the date the card was replaced, the serial number of the card, and the symptoms that prompted replacement of the card. Go to step 30.
- 28** Return to the procedure that directed you to this procedure. At the point where a faulty card list was produced, identify the next faulty card on the list and go to the appropriate card replacement procedure for that card in this manual.
- 29** Obtain further assistance in replacing this card by contacting operating company maintenance personnel.
- 30** You have successfully completed this procedure. Return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.

NTMX82 in RSC-S RCO2

Application

Use this procedure to replace an NTMX82 card in an RSC-S RCO2.

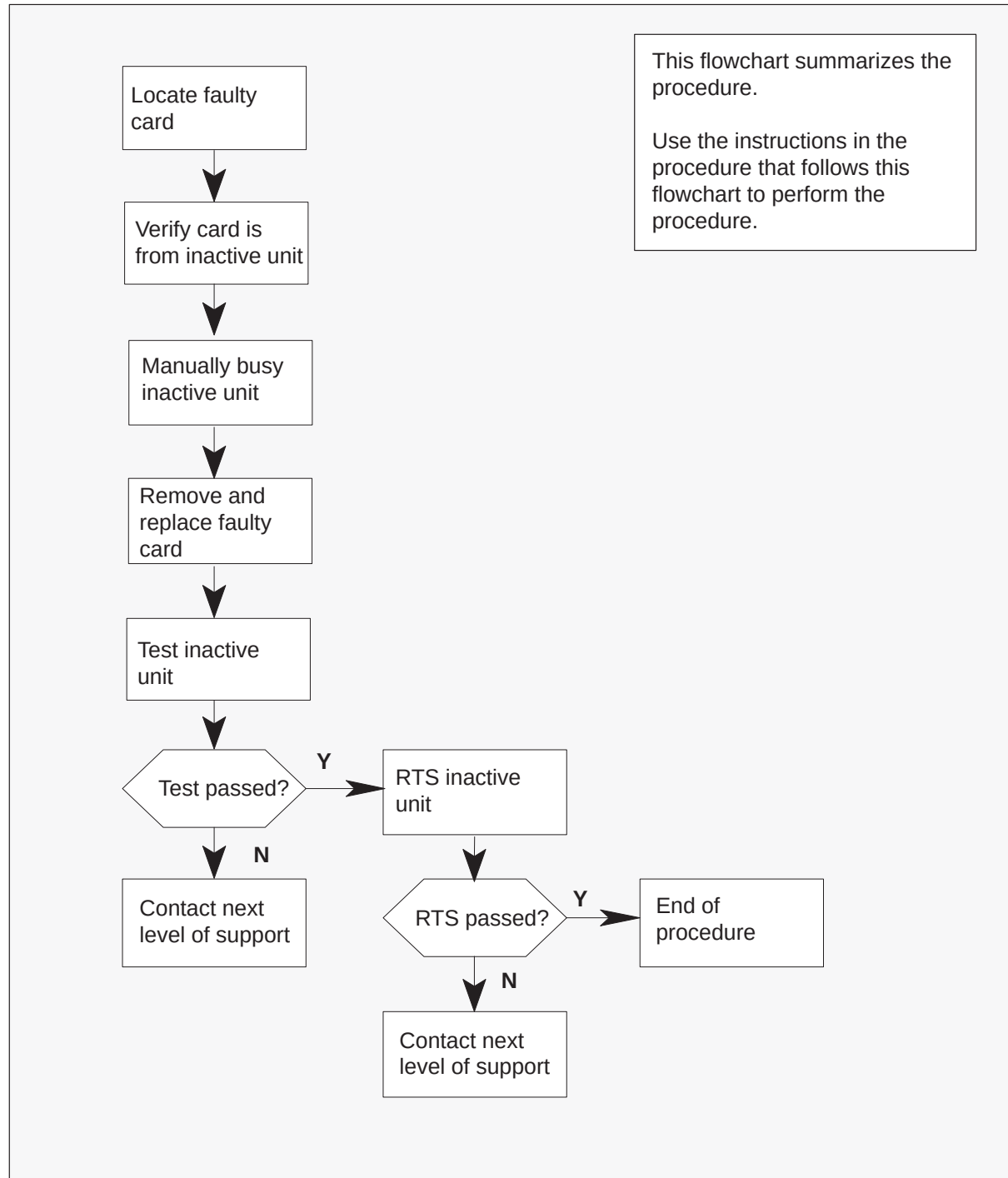
PEC	Suffixes	Name
NTMX82	AA	Dual PCM-30 Interface

Common procedures

None

Action

The following flowchart is only a summary of the procedure. To replace the card, use the instructions in the procedure that follows the flowchart.

NTMX82
in RSC-S RCO2 (continued)**Summary of card replacement procedure for an NTMX82 card in RSC-S RCO2**

NTMX82 in RSC-S RCO2 (continued)

Replacing an NTMX82 card in RSC-S RCO2

At your Current Location

- 1 Proceed only if you have been directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure for verifying or accepting cards, or have been directed to this procedure by your maintenance support group.

2



CAUTION

Loss of service

When replacing a card in the RCO2, ensure that the unit in which you are replacing the card is *inactive* and that the mate unit is *active*.

Obtain an NTMX82 replacement card. Ensure that the replacement card has the same product equipment code (PEC), including suffix, as the card that is to be removed.

At the MAP terminal

- 3 Ensure the PM level of the MAP display is currently displayed by typing
>MAPCI;MTC;PM;POST RCO2 rco2_no
and pressing the Enter key.
where
rco2_no is the number of the RCO2 with the faulty card

NTMX82 in RSC-S RCO2 (continued)

Example of a MAP display:

CM	MS	IOD	Net	PM	CCS	LNS	Trks	Ext	Appl
.	.	.	.	1RC02	.	.	.	.	.
RC02		SysB	ManB	OffL	CBsy	ISTb	InSv		
0 Quit	PM	0	0	2	0	2	25		
2 Post_	RC02	0	0	0	0	1	1		
3 ListSet									
4	RC02	0	ISTb	Links_00S:	CSide	1, PSide	1		
5 TRNSL	Unit0:	Inact	InSv						
6 TST	Unit1:	Act	InSv						
7 BSY									
8 RTS									
9 OffL									
10 LoadPM_									
11 Disp_									
12 Next_									
13									
14 QueryPM									
15									
16									
17									
18									

- 4 By observing the MAP display, be sure that the card to be removed is in the inactive unit.

If faulty card is in the	Do
active unit	step 5
inactive unit	step 7

- 5 Switch the processing activity (SWACT) to the inactive unit by typing

>SWACT

and pressing the Enter key.

Note: If the system recommends using the SWACT command with the FORCE option, consult office personnel to determine if use of the FORCE option is advisable.

- 6 Confirm the system prompt by typing

>YES

and pressing the Enter key.

After both units are in-service, proceed to the next step.

NTMX82
in RSC-S RCO2 (continued)

At the RCE frame

- 7 Place a sign on the active unit bearing the words “Active unit—Do not touch.” This sign should not be attached by magnets or tape.

At the MAP terminal

- 8 Busy the inactive PM unit by typing

>BSY UNIT unit_no

and pressing the Enter key.

where

unit_no is the number of the inactive RCO2 unit (unit 0 or 1)

When both units are in-service, proceed to the next step.

- 9 Display the C-side links associated with the DS-1 card by typing

>TRNSL C

and pressing the Enter key.

Example of a MAP response:

LINK	0	PLGC	0	0;CAP	MS:STATUS OK	MSGCOND	OPN
LINK	1	PLGC	0	1;CAP	S:STATUS SBsy		
LINK	2	PLGC	0	2;CAP	MS:STATUS OK	MSGCOND	OPN
LINK	3	PLGC	0	3;CAP	S:STATUS OK		
LINK	4	PLGC	0	4;CAP	S:STATUS OK		
LINK	5	PLGC	0	5;CAP	S:STATUS SBsy		

If C-side links are	Do
faulty	step 11
not faulty	step 10

- 10 Display the P-side links associated with the DS-1 card by typing

>TRNSL P

and pressing the Enter key.

NTMX82 in RSC-S RCO2 (continued)

Example of a MAP response

```
LINK 0    RCO2 0 5 27;CAP    MS:STATUS OK    MSGCOND OPN
LINK 1    RCO2 1 5 27;CAP    MS:STATUS SBsy  MSGCOND CLS
LINK 2    RCO2 0 7 47;CAP    MS:STATUS OK
LINK 3    RCO2 1 7 47;CAP    MS:STATUS OK
LINK 4    RCO2 0 5 50;CAP    MS:STATUS OK    MSGCOND OPN
LINK 5    RCO2 1 5 50;CAP    MS:STATUS SBsy  MSGCOND CLS
```

If P-side links are	Do
faulty	step 12
not faulty	step 26

11 Post the host PM by typing

>POST host_pm host_pm_no

and pressing the Enter key.

where

host_pm is a PCM-30 line group controller (PLGC)

host_pm_no is the number of the PLGC with the faulty card

Example of a MAP display:

```
CM      MS      IOD      Net      PM      CCS      Lns      Trks      Ext      Appl
.       .       .       .       1RCO2    .       .       .       .       .

PLGC
0 Quit   PM      0      0      1      0      4      12
2 Post_  PLGC    0      0      2      0      2      9
3 ListSet
4        PLGC  1 ISTb Links_00S: CSide 0, PSide 1
5 TrnsL_ Unit0: Act InSv
6 Tst_   Unit1: Inact InSv
7 Bsy_
8 RTS_
9 OffL
10 LoadPM_
11 Disp_
12 Next
13 SwAct
14 QueryPM
15
16
17 Perform
18
```

NTMX82 in RSC-S RCO2 (continued)

- 12 Manually busy the links connected to the faulty card by typing

>BSY LINK link_no

and pressing the Enter key.

where

link_no is the number of the link associated with the faulty MX82 card

Note 1: Each NTMX82 card has two links associated with it. Therefore, each link must be manually busied. Possible link number pairs are as follows: 0,1; 2,3; 4,5; or 6,7.

Note 2: To busy the other links associated with the RCO2, execute this step for each link until all links are busied.

At the RCE frame

13



WARNING

Static electricity damage

Before removing any cards, put on a wrist strap and connect it to the wrist strap grounding point on the left side of the modular supervisory panel (MSP) of the RCO2. This protects the equipment against damage caused by static electricity.



WARNING

Equipment damage

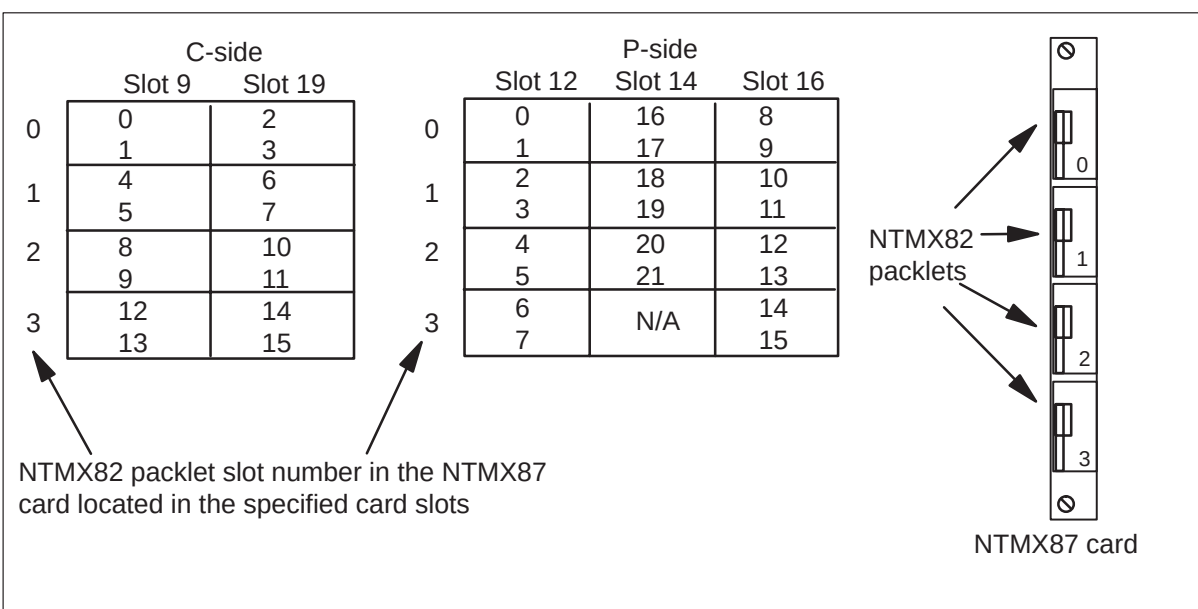
Take the following precautions when removing or inserting a card:

1. Do not apply direct pressure to the components.
2. Do not force the cards into the slots.

Put on a wrist strap.

NTMX82 in RSC-S RCO2 (continued)

- 14** After identifying the faulty link, use the following charts to determine which NTMX82 is to be removed by first identifying whether the link is a C-side or P-side link, then by matching the link number with the slot number and the packet number to the left of each respective table.



Remove the NTMX82 card as described in the following steps:

- a. Locate the packet to be removed on the appropriate NTMX87 card slot.
- b. Open the locking lever on the packet to be replaced and gently pull the card toward you until it clears the shelf.
- c. Ensure that the replacement card has the same PEC, including suffix, as the card you just removed.

NTMX82 in RSC-S RCO2 (continued)

- 15 Before inserting the replacement card ensure the switch settings are the same as on the card that was removed. The following table describes the PCM-30 DIP switch settings on the NTMX82. Set switch S2 positions 1 & 2 on to enable messaging.

Port	Impedance	Input	Output
Even port	75 OHM	Switch S3 pos 1,2, & 3 ON	Switch S3 pos 4 ON Switch S3 pos 5 OFF
Even port	120 OHM	Switch S3 pos 1 ON pos 2 & 3 OFF	Switch S3 pos 4 OFF Switch S3 pos 5 ON
Odd port	75 OHM	Switch S1 pos 1,2, & 3 ON	Switch S1 pos 4 ON Switch S1 pos 5 OFF
Odd port	120 OHM	Switch S1 pos 1 ON pos 2 & 3 OFF	Switch S1 pos 4 OFF Switch S1 pos 5 ON
Note: Switch position 6 of both switches is not used and should be set to OFF.			

- 16 Open the locking lever on the replacement packlet.
- Align the packlet with the slots in the shelf.
 - Gently slide the packlet into the card slot in the NTMX87 card.
- 17 Seat and lock the packlet.
- Using your fingers or thumbs, push on the upper and lower edges of the faceplate of the packlet to ensure that the packlet is fully seated in the slot.
 - Close the locking lever.

NTMX82
in RSC-S RCO2 (continued)

- 18 Use the following information to determine what step to go to next in this procedure.

If you entered this procedure from	Do
alarm clearing procedures	step 25
other	step 19

At the MAP terminal

- 19 Test the busied network links from step 12 by typing

>TST LINK link_no
and pressing the Enter key.
where

link_no is the number of the link that was manually busied in step 12

Note 1: This step must be performed for each link that is manually busied.

Note 2: To test the other links associated with the RCO2, execute the procedures in this step for each link until all links are tested.

If the test of the link(s)	Do
passed	step 20
failed	step 26

- 20 Return to service the P-side links by typing

>RTS Link 0
and pressing the Enter key.

Note: To RTS the other links associated with the RCO2, execute the procedures in this step for each link until all links are returned to service.

If RTS	Do
passed	step 21
failed	step 26

NTMX82 in RSC-S RCO2 (end)

- 21 Post the inactive RCO2 in which the NTMX82 card is located by typing

>POST RCO2 rco2_no

and pressing the Enter key.

where

rco2_no is the number of the RCO2 associated with the faulty card

- 22 Return the inactive RCO2 unit to service by typing

>RTS UNIT unit_no

and pressing the Enter key.

where

unit_no is the number of the RCO2 unit posted in step 21

If RTS	Do
passed	step 23
failed	step 26

- 23 Send any faulty cards for repair according to local procedure.
- 24 Record the date the card was replaced, the serial number of the card, and the symptoms that prompted replacement of the card. Go to step 27.
- 25 Return to *Alarm Clearing Procedures* or other procedure that directed you to this procedure. At the point where a faulty card list was produced, identify the next faulty card on the list and go to the appropriate card replacement procedure for that card in this manual.
- 26 Obtain further assistance in replacing this card by contacting the personnel responsible for higher level support.
- 27 You have successfully completed this procedure. Remove the sign from the active unit and return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.

**NTMX87
in RSC-S RCO2**

Application

Use this procedure to replace an NTMX87 card in an RSC-S RCO2.

PEC	Suffixes	Name
NTMX87	AA	Quad Frame Carrier

Common procedures

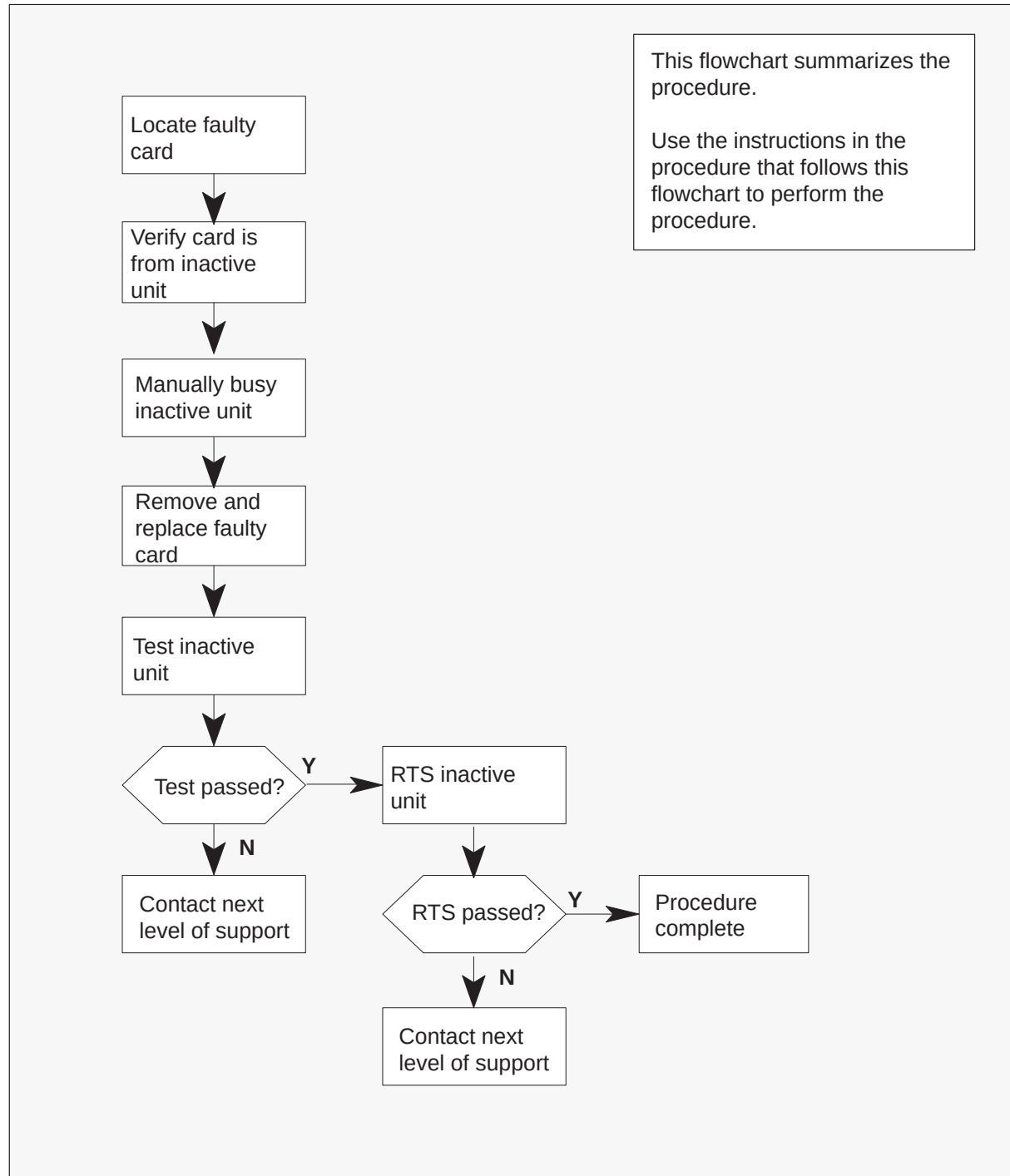
None

Action

The following flowchart is only a summary of the procedure. To replace the card, use the instructions in the procedure that follows the flowchart.

NTMX87 in RSC-S RCO2 (continued)

Summary of card replacement procedure for an NTMX87 card in RSC-S RCO2



NTMX87 in RSC-S RCO2 (continued)

Replacing an NTMX87 card in RSC-S RCO2

At your Current Location

- 1 Proceed only if you have been directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure for verifying or accepting cards, or have been directed to this procedure by your maintenance support group.

2



CAUTION

Several configurations of the NTMX87 quad frame carrier card are detailed in this procedure.

Be sure you are using the steps for the configuration of your RCO2, such as a single or dual RCO2 (DRCO2), main or extension shelf, or links versus carrier trunks.



CAUTION

Loss of service

When replacing a card in the RCO2, ensure that the unit in which you are replacing the card is *inactive* and that the mate unit is *active*.

Obtain an NTMX87 replacement card. Ensure that the replacement card has the same product equipment code (PEC), including suffix, as the card that is to be removed.

Note: The dual RCO2 configuration for the international RSC-S will be available in a future release.

At the MAP terminal

- 3 Ensure the PM level of the MAP display is currently displayed by typing

>MAPCI;MTC;PM;POST RCO2 rco2_no

and pressing the Enter key.

where

rco2_no is the number of the RCO2 with the faulty card

NTMX87
in RSC-S RCO2 (continued)

Example of a MAP display:

CM	MS	IOD	Net	PM	CCS	LNS	Trks	Ext	Appl
.	.	.	.	1RCO2	.	.	.	.	.
RCO2			SysB	ManB	OffL	CBsy	ISTb	InSv	
0 Quit	PM	0	0		2	0	2	25	
2 Post_	RCO2	0	0		0	0	1	1	
3 ListSet									
4	RCO2	0	ISTb	Links_00S:	CSide	1,	PSide	1	
5 TRNSL	Unit0:		Inact	InSv					
6 TST	Unit1:		Act	InSv					
7 BSY									
8 RTS									
9 OffL									
10 LoadPM_									
11 Disp_									
12 Next_									
13									
14 QueryPM									
15									
16									
17									
18									

- 4 Display and record the C-side link status of the posted RCO2 associated with the faulty NTMX87 quad carrier card by typing

>TRNSL C

and pressing the Enter key.

Example of a MAP response

```
LINK 0  PLGC 0 0;CAP MS: STATUS SysB MSGCOND CLS RESTRICT
LINK 1  PLGC 0 1;CAP S: STATUS SysB
LINK 2  PLGC 0 2;CAP MS: STATUS OK MSGCOND OPN UNRESTRICT
LINK 3  PLGC 0 3;CAP S: STATUS OK
LINK 4  PLGC 0 4;CAP S: STATUS SysB
LINK 5  PLGC 0 5;CAP S: STATUS SysB
```


NTMX87 in RSC-S RCO2 (continued)

- 5 Display and record the P-side link status of the posted RCO2 associated with the faulty NTMX87 quad carrier card by typing

>TRNSL P

and pressing the Enter key.

Example of a MAP response

```
LINK 1   Carrier of Class - Trunk      ;Status;OK
LINK 2   Carrier of Class - Trunk      ;Status;OK
LINK 3   Carrier of Class - Trunk      ;Status;OK
LINK 10  DCH 6; Status :OK
LINK 13  DCH 7; Status :OK
LINK 17  DCH 4; Status :OK
LINK 22  RMM 6          0;CAP MS;Status OK MSGCOND OPN
LINK 24  LCME RSCS 00 0  0;CAP MS;Status OK MSGCOND OPN
LINK 25  LCME RSCS 00 0  1;CAP MS;Status OK MSGCOND OPN
LINK 26  LCME RSCS 00 0  2;CAP S;Status OK
```

- 6 By observing the MAP display, be sure the card that is to be removed is in the inactive unit.

If faulty card is in the	Do
active unit	step 7
inactive unit	step 9

- 7 Switch the processing activity (SWACT) to the inactive unit by typing

>SWACT

and pressing the Enter key.

Note: If the system recommends using the SWACT command with the FORCE option, consult office personnel to determine if use of the FORCE option is advisable.

- 8 Confirm the system prompt by typing

>YES

and pressing the Enter key.

After both units are in-service, proceed to the next step.

NTMX87 in RSC-S RCO2 (continued)

At the RCE frame

- 9 Place a sign on the active unit bearing the words “Active unit—Do not touch.” This sign should not be attached by magnets or tape.

If faulty card is	Do
C-side of RCO2	step 10
P-side faulty	step 16

At the MAP terminal

- 10 Busy the inactive PM unit by typing
>BSY UNIT unit_no
and pressing the Enter key.
where
unit_no is the number of the inactive RCO2 unit (unit 0 or 1)
- 11 Post the host PM by typing
>POST host_pm host_pm_no
and pressing the Enter key.
where
host_pm is a PCM-30 line group controller (PLGC)
host_pm_no is the number of a PLGC

NTMX87 in RSC-S RCO2 (continued)

Example of a MAP display:

CM	MS	IOD	Net	PM	CCS	Lns	Trks	Ext	Appl
.	.	.	.	1RCO2	.	.	.	.	.
PLGC			SysB	ManB	OffL	CBsy	ISTb	InSv	
0 Quit	PM		0	0	1	0	4	12	
2 Post_	PLGC		0	0	2	0	2	9	
3 ListSet									
4	PLGC	1	ISTb	Links_00S:	CSide	0,	PSide	1	
5 Trnsl_	Unit0:		Act	InSv					
6 Tst_	Unit1:		Inact	InSv					
7 Bsy_									
8 RTS_									
9 OffL									
10 LoadPM_									
11 Disp_									
12 Next									
13 SwAct									
14 QueryPM									
15									
16									
17 Perform									
18									

- 12** Display the host peripherals P-side links associated with the RCO2 by typing

>TRNSL P

and pressing the Enter key.

Example of a MAP response

```
LINK 0 RCO2 0 0;CAP MS:STATUS SysB MSGCOND CLS RESTRICT
LINK 1 RCO2 0 1;CAP      S:STATUS SBsy
LINK 2 RCO2 0 2;CAP MS:STATUS OK MSGCOND OPN UNRESTRICT
LINK 3 RCO2 0 3;CAP      S:STATUS OK
LINK 4 RCO2 0 4;CAP      S:STATUS SysB
LINK 5 RCO2 0 5;CAP      S:STATUS Sysb
```

- 13** Manually busy the links connected to the faulty NTMX87 card by typing

>BSY LINK link_no

and pressing the Enter key.

where

link_no is the number of the link associated with the faulty NTMX87 card

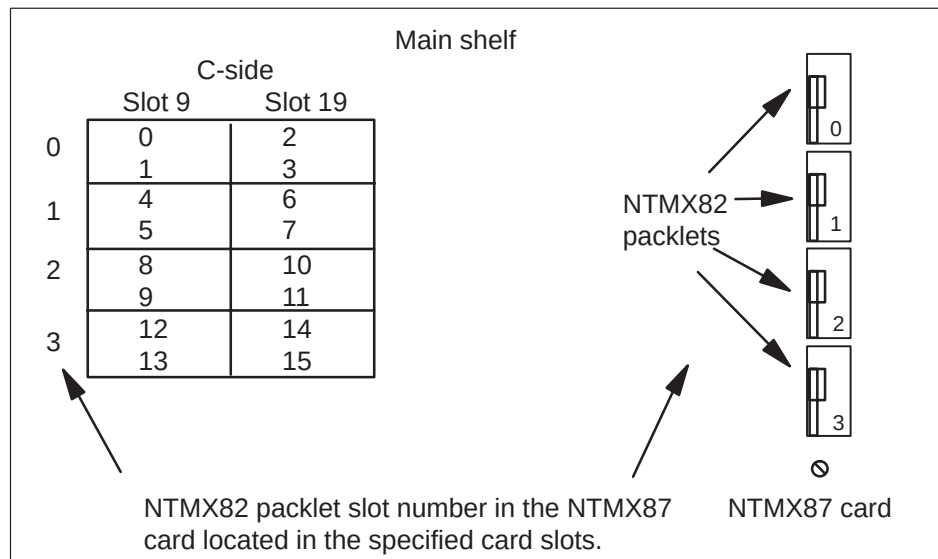
Note 1: All provisioned links in the slot must be busied.

Note 2: Reference the chart in step 14 for the RCO2 C-side link-to-slot assignments.

NTMX87 in RSC-S RCO2 (continued)

At the RCE frame

- 14 Use the following charts to determine which NTMX87 card is to be removed by matching the provisioned link number with the slot number and the packet number to the left of each respective table.



15



WARNING

Static electricity damage

Before removing any cards, put on a wrist strap and connect it to the wrist strap grounding point on the left side of the modular supervisory panel (MSP) of the RCO2. This protects the equipment against damage caused by static electricity.

Remove the NTMX82 packet as described in the following steps:

- a. Locate the NTMX82 packet to be removed on the appropriate NTMX87 quad carrier card slot.
- b. Open the locking lever on the NTMX82 packet and gently pull the packet toward you until it clears the shelf.
- c. Ensure the NTMX82 packets are stored in an electrostatic discharge (ESD) container for protection of the circuit card until it is reinstalled in the NTMX87 quad carrier card.

Go to step 32.

NTMX87 in RSC-S RCO2 (continued)

At the MAP terminal

- 16** Determine if the RCO2 is in a single or dual configuration by typing

>POST RCO2 rco2_no ;IRLINK

and pressing the Enter key.

where

rco2_no is the number of the RCO2 associated with the faulty NTMX87 card

Note: If the posted RCO2 is in a single RCO2 configuration, the system will respond with the following message:

NO IRLINKS DATAFILLED, IRLINK LEVEL CANNOT BE ENTERED.

If the RCO2 is in a	Do
single configuration	step 17
dual configuration	step 30

- 17** Determine if P-side ports are links or carrier trunks by observing the information obtained in step 5.

If P-side port is	Do
links	step 18
trunks	step 20

- 18** Manually busy all provisioned links connected to the faulty NTMX87 circuit card by typing

>BSY LINK link_no

and pressing the Enter key.

where

link_no is the number of the link associated with the faulty NTMX87 circuit card

Note 1: Each NTMX82 card has two links, and each link must be manually busied. Possible link pairs are 0 and 1, 2 and 3, 4 and 5, 6 and 7. This pair relationship continues throughout all 54 P-side links.

Note 2: Reference the charts in steps 26 and 28 for P-side link-to-slot assignments. All provisioned links in the slot must be busied.

NTMX87
in RSC-S RCO2 (continued)

- 19 Determine if the faulty NTMX87 circuit card is on the main or extension shelf. P-side ports 0 to 23, and 48 to 54 are on the main shelf. Ports 24 to 47 are on the extension shelf.

If the faulty NTMX87 is on the	Do
main shelf	step 26
extension shelf	step 28

- 20 Access the TRKS;TTP MAP display level, and busy the trunks assigned to the P-side carriers associated with the faulty NTMX87 by typing

>TRKS;TTP;POST D RCO2 rco2_no carrier_no

and pressing the Enter key.

where

rco2_no is the number of the RCO2 associated with the faulty NTMX87

carrier_no is the number of the P-side carrier assigned

Example of a MAP response

LAST CIRCUIT = 27

POST CKT IDLED

SHORT CLLI IS: 1125

OK, CLLI POSTED

POST 18 DELQ BUSY Q DIG

TTP 6-006

CKT TYPE PM NO. COM LANG STA S R DOT TE R

OG RCO2 0 1 WADEOUT796 11 LO

- 21 Busy the trunks associated with the faulty NTMX87 circuit card by typing

>BSY ALL

and pressing the Enter key.

Note 1: Wait for the busy queue to clear.

Note 2: To busy other carriers associated with the faulty NTMX87 circuit card, reference the link-to-slot assignment charts in steps 26 and 28.

NTMX87
in RSC-S RCO2 (continued)

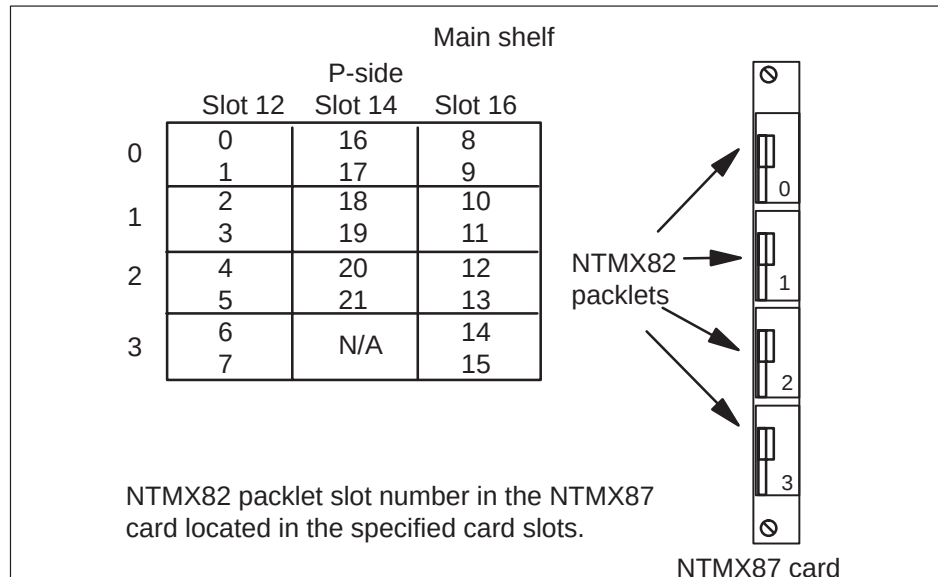
- 22 Installation busy all the trunks to prevent carrier alarms by typing
>BSY INB ALL
and pressing the Enter key.
- 23 Access the CARRIER level and post the P-side carriers associated with the faulty NTMX87 circuit card by typing
>CARRIER;POST RCO2 rco2_no carrier_no
and pressing the Enter key.
- where*
- rco2_no is the number of the RCO2 associated with the faulty NTMX87
carrier_no is the number of the P-side carrier assigned
- Note:** Perform this step for each carrier span in the faulty NTMX87 circuit card.
- 24 Busy and offline the P-side carriers associated with the faulty NTMX87 circuit card by typing
>BSY carrier_no ;OFFL carrier_no
and pressing the Enter key.
- where*
- carrier_no is the number of the P-side carrier assigned
- Note:** Perform this step for each carrier span in the faulty NTMX87 circuit card.
- 25 Determine if the faulty NTMX87 circuit card is on the main or extension shelf. P-side ports 0 to 23, and 48 to 54 are on the main shelf. Ports 24 to 47 are on the extension shelf.

If the faulty NTMX87 is on the	Do
main shelf	step 26
extension shelf	step 28

NTMX87 in RSC-S RCO2 (continued)

At the RCE frame

- 26 Use the following figure to determine slot assignments on the P-side of the main shelf.



27



WARNING

Static electricity damage

Before removing any cards, put on a wrist strap and connect it to the wrist strap grounding point on the left side of the modular supervisory panel (MSP) of the RCO2. This protects the equipment against damage caused by static electricity.

Remove the NTMX82 packet as described in the following steps:

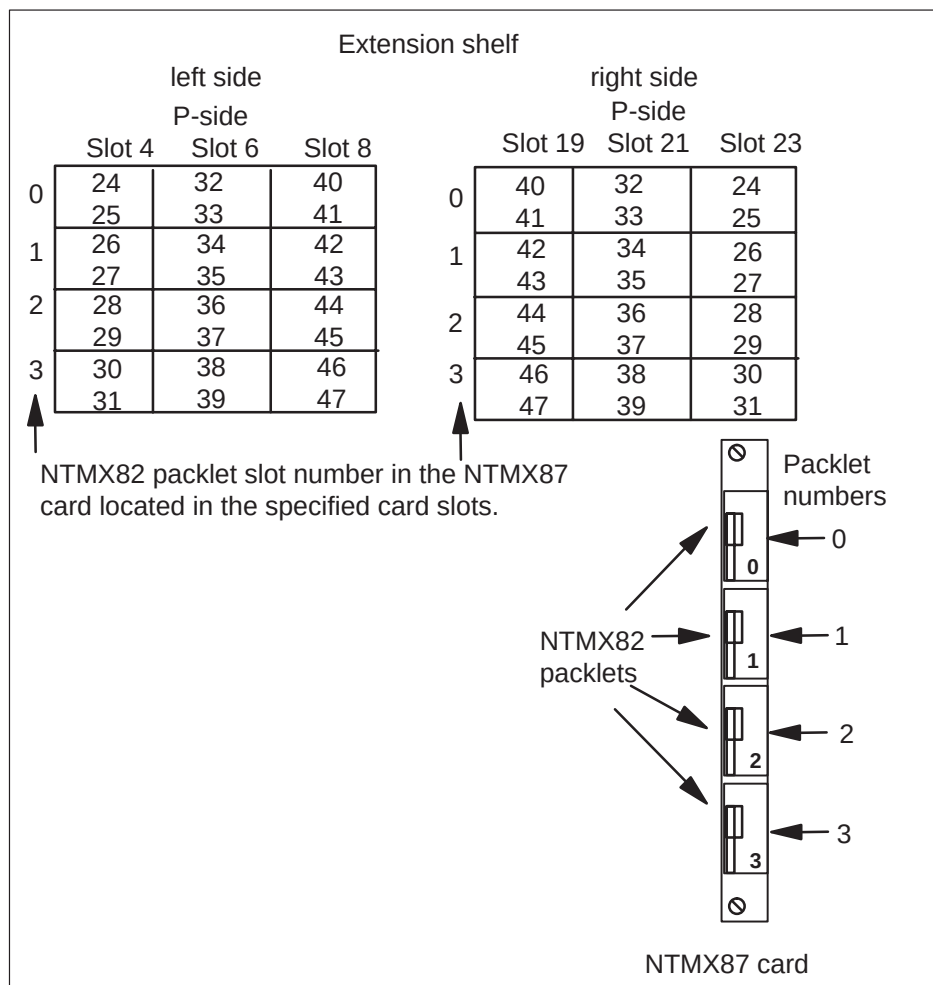
- a. Locate the NTMX82 packet to be removed on the appropriate NTMX87 quad carrier card slot.
- b. Open the locking lever on the NTMX82 packet and gently pull the packet toward you until it clears the shelf.
- c. Ensure the NTMX82 packets are stored in an electrostatic discharge (ESD) container for protection of the circuit card until it is reinstalled in the NTMX87 quad carrier card.

Go to step 32.

NTMX87 in RSC-S RCO2 (continued)

At the RCE frame

- 28 Determine which side of the extension shelf the faulty NTMX87 circuit card is located by referencing field SIDE of table RCCINV.



29



WARNING

Static electricity damage

Before removing any cards, put on a wrist strap and connect it to the wrist strap grounding point on the left side of the modular supervisory panel (MSP) of the RCO2. This protects the equipment against damage caused by static electricity.

NTMX87 in RSC-S RCO2 (continued)

Remove the NTMX82 packet as described in the following steps:

- a. Locate the NTMX82 packet to be removed on the appropriate NTMX87 quad carrier card slot.
- b. Open the locking lever on the NTMX82 packet and gently pull the packet toward you until it clears the shelf.
- c. Ensure the NTMX82 packets are stored in an electrostatic discharge (ESD) container for protection of the circuit card until it is reinstalled in the NTMX87 quad carrier card.

Go to step 32.

30 Translate the dual RCO2s IRLINKS by typing

>TRNSL

and pressing the Enter key.

Example of a MAP response

CM	MS	IOD	Net	PM	CCS	LNS	Trks	Ext	Appl
.	.	.	.	1RCO2	.	.	.	.	.
IRLINK		SysB	ManB	OffL	CBsy	ISTb	InSv		
0 Quit	PM	0	0	2	0	2	25		
2	RCO2	0	0	0	0	1	1		
3									
4	RCO2	0	ISTb	Links_00S:	Cside	1, Pside	1		
5 TRNSL	Unit0:	Inact	InSv						
6 TST_	Unit1:	Act	InSv						
7 BSY_									
8 RTS_									
9									
10	IR	From	To		CAP	STATE	MSGCOND		
11	0	RCO2 0,	0	RCO2 1,	0	MS	OK	OPN	
12	1	RCO2 0,	8	Rcc2 1,	8	MS	OK	OPN	
13	2	RCO2 0,	12	RCO2 1,	12	S	OK		
14 QueryIR	3	RCO2 0,	13	RCO2 1,	13	S	OK		
15									
16									
17									
18									

NTMX87
in RSC-S RCO2 (continued)

- 31 Busy IRLINKS in the faulty NTMX87 circuit card by typing

>BSY irlink_no

and pressing the Enter key.

where

irlink_no is the number of the irlink that must be busied

Note 1: This step must be performed for each provisioned link in the slot position.

Note 2: For link-to-slot assignments, reference step 26 for the main shelf, and step 28 for the extension shelf.

At the RCE frame

32



WARNING

Static electricity damage

Before removing any cards, put on a wrist strap and connect it to the wrist strap grounding point on the left side of the modular supervisory panel (MSP) of the RCO2. This protects the equipment against damage caused by static electricity.



WARNING

Equipment damage

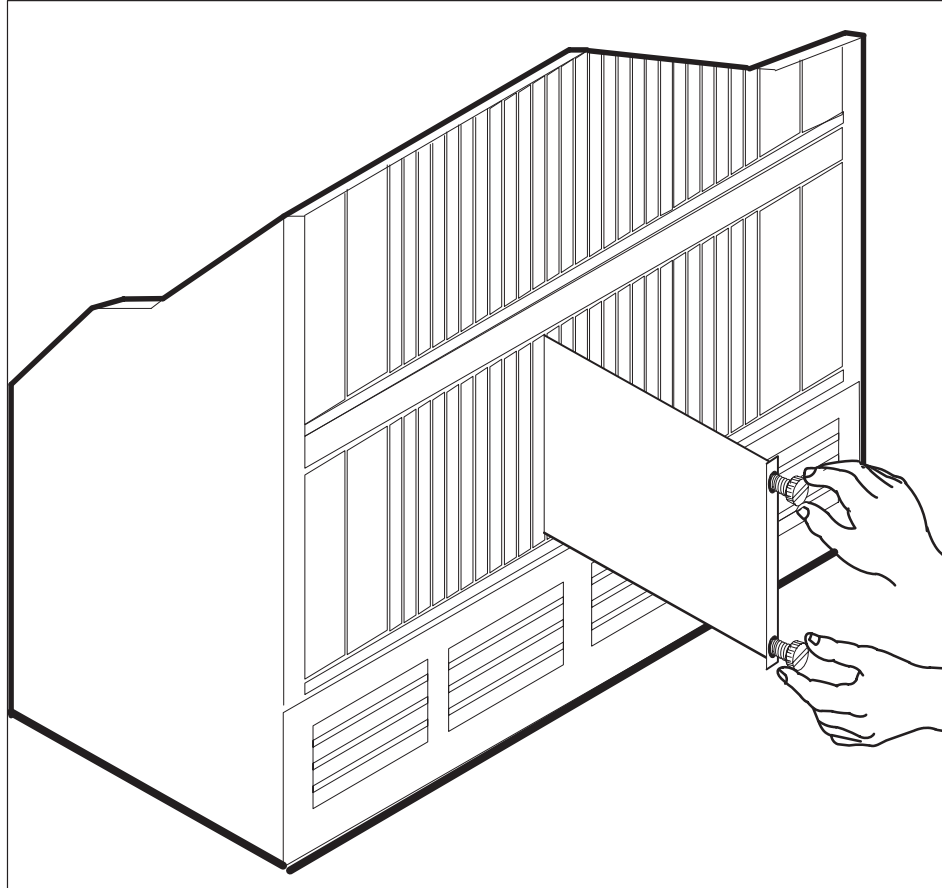
Take the following precautions when removing or inserting a card:

1. Do not apply direct pressure to the components.
2. Do not force the cards into the slots.

Put on a wrist strap.

NTMX87 in RSC-S RCO2 (continued)

- 33 Using the T9908 wrist grounding strap and a T1324 screwdriver, remove the NTMX87 quad frame carrier circuit card. Insert the new quad frame carrier card and secure.



- 34 Replace the NTMX82 packlets previously removed. Align the packlet with the slots in the shelf and gently slide the packlet into the circuit card slot in the NTMX87 circuit card.

NTMX87
in RSC-S RCO2 (continued)

- 35** Seat and lock the packlet.
- a.** Using your fingers or thumbs, push on the upper and lower edges of the faceplate of the packlet to ensure that the packlet is fully seated in the slot.
 - b.** Close the locking lever.
- 36** Use the following information to determine what step to go to next in this procedure.

If you entered this procedure from	Do
alarm clearing procedures	step 53
other	step 37

- 37** Use the following information to determine what step to go to next in this procedure.

If you entered this section of the procedure from	Do
step 15 for a single RCO2 with C-side links affected	step 38
step 27 or 29 for an RCO2 with P-side trunks affected	step 46
step 27 or 29, for a single RCO2 with P-side links affected	step 42
step 31 for a DRCO2 with irlinks affected	step 44

NTMX87 in RSC-S RCO2 (continued)

At the MAP terminal

- 38** Test the busied network links from step 13 by typing

>TST LINK link_no
and pressing the Enter key.
where

link_no is the number of the link associated with the new NTMX87 quad frame carrier card

Note 1: This step must be performed for each manually busied link.

Note 2: To test the other links associated with the RCO2, execute this step for each link until all links are tested.

If TST	Do
passed	step 39
failed	step 53

- 39** Return to service the P-side links by typing

>RTS LINK link_no
and pressing the Enter key.
where

link_no is the number of the link manually busied in step 13

Note 1: This step must be performed for each link that is manually busied.

Note 2: To RTS the other links associated with the RCO2, execute the procedures in this step for each link until all links are returned to service.

If RTS	Do
passed	step 40
failed	step 53

NTMX87
in RSC-S RCO2 (continued)

- 40** Post the inactive RCO2 in which the NTMX87 card is located by typing

>POST RCO2 rco2_no
and pressing the Enter key.

where

rco2_no is the number of the RCO2 associated with the faulty card

- 41** Return the inactive RCO2 unit to service by typing

>RTS UNIT unit_no
and pressing the Enter key.

where

unit_no is the number of the RCO2 unit posted in step 40

If RTS	Do
passes	step 51
fails	step 53

At the MAP terminal

- 42** Test the busied links from step 18 by typing

>TST LINK link_no
and pressing the Enter key.

where

link_no is the number of the link associated with the new NTMX87 quad frame carrier card

Note 1: This step must be performed for each manually busied link.

Note 2: To test the other links associated with the RCO2, execute this step for each link until all links are tested.

If TST	Do
passed	step 43
failed	step 53

NTMX87
in RSC-S RCO2 (continued)

43 Return to service the P-side links by typing

>RTS LINK link_no
and pressing the Enter key.

where

link_no is the number of the link manually busied in step 13

Note 1: This step must be performed for each link that is manually busied.

Note 2: To RTS the other links associated with the RCO2, execute the procedures in this step for each link until all links are returned to service.

If RTS	Do
passed	step 51
failed	step 53

At the MAP terminal

44 Test the IRLINKS by typing

>TST irlink_no
and pressing the Enter key.

where

irlink_no is the number of the link busied in step 31

Note 1: This step must be performed for each manually busied link.

Note 2: To test the other irlinks associated with the RCO2, execute this step for each irlink until all links are tested.

If TST	Do
passed	step 45
failed	step 53

NTMX87
in RSC-S RCO2 (continued)

- 45 Return to service the IRLINKS by typing

>RTS irlink_no

and pressing the Enter key.

where

irlink_no is the number of the link manually busied in step 31

Note 1: This step must be performed for each irlink that is manually busied.

Note 2: To RTS the other links associated with the RCO2, execute this step for each link until all links are returned to service.

If RTS	Do
passed	step 51
failed	step 53

At the MAP terminal

- 46 Busy and return to service P-side carriers that were offlined in step 24 by typing

>BSY carrier_no; RTS carrier_no

and pressing the Enter key.

where

carrier_no is the number of the P-side carrier assigned

If carrier RTS	Do
passed	step 47
failed	step 53

NTMX87
in RSC-S RCO2 (continued)

- 47 Access the TTP MAP level to post the P-side links associated with the new NTMX87 circuit card by typing

>TTP;POST D RCO2 rco2_no carrier_no

and pressing the Enter key.

where

rco2_no is the number of the RCO2 associated with the new NTMX87 circuit card

carrier_no is the number of the P-side link trunks are assigned

Example of a MAP response

LAST CIRCUIT = 27

POST CKT IDLED

SHORT CLLI IS: 1125

OK, CLLI POSTED

```
POST 18 DELQ BUSY Q DIG
TTP 6-006
CKT TYPE PM NO. COM LANG STA S R DOT TE R
OG RCO2 0 1 WADEOUT796 11 INB
```

- 48 Busy the trunks associated with the new NTMX87 circuit card by typing

>BSY ALL

and pressing the Enter key.

Note 1: Wait for the busy queue to clear.

Note 2: Busy the other carriers associated with the faulty NTMX87 circuit card. Reference the link-to-slot assignment charts in steps 26 and 28.

- 49 Test the trunks associated with the new NTMX87 circuit card by typing

>TST;NEXT

and pressing the Enter key.

Note: Perform this step for each carrier span associated with the new NTMX87 circuit card.

If trunks TST	Do
passed	step 50
failed	step 53

NTMX87
in RSC-S RCO2 (end)

- 50** Return-to-service trunks assigned to links on the new NTMX87 circuit card by typing

>RTS ALL

and pressing the Enter key.

If RTS	Do
passed	step 51
failed	step 53

- 51** Send any faulty cards for repair according to local procedure.
- 52** Record the date the card was replaced, the serial number of the card, and the symptoms that prompted replacement of the card. Go to step 55.
- 53** Return to *Alarm and Performance Monitoring Procedures* or the other procedure that directed you to this procedure. At the point where a faulty card list was produced, identify the next faulty card on the list and go to the appropriate card replacement procedure for that card in this manual.
- 54** Obtain further assistance in replacing this card by contacting the personnel responsible for higher level support.
- 55** You have successfully completed this procedure. Remove the sign from the active unit and return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.

NTRX41 in RSC-S MSP

Application

Use this procedure to replace an NTRX41 card in a modular supervisory panel (MSP) located in a:

- cabinetized extension module (CEXT)
- cabinetized line concentrating equipment (CLCE)
- cabinetized line module ISDN (CLMI)
- cabinetized power distribution center (CPDC)
- cabinetized remote switching center (CRSC)
- cabinetized miscellaneous equipment (CMIS)
- cabinetized remote miscellaneous equipment (CRME)

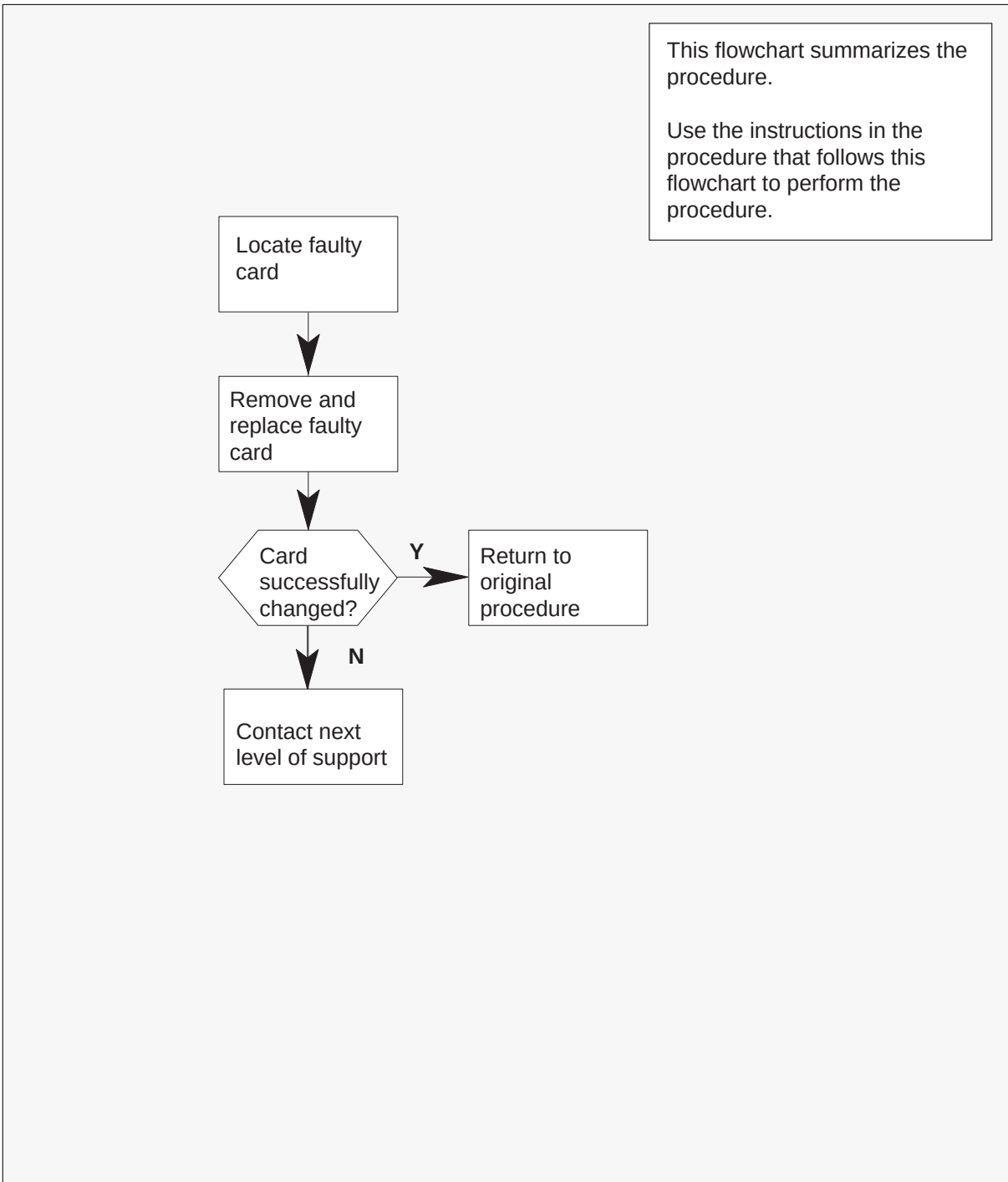
PEC	Suffixes	Name
NTRX41	AA, BA, CA	Alarm Module

Common procedures

None

Action

The following flowchart is only a summary of the procedure. To replace the card, use the instructions in the step-action procedure that follows the flowchart.

NTRX41
in RSC-S MSP (continued)**Summary of card replacement procedure for an NTRX41 card in RSC-S MSP**

NTRX41 in RSC-S MSP (continued)

Replacing an NTRX41 card in RSC-S MSP

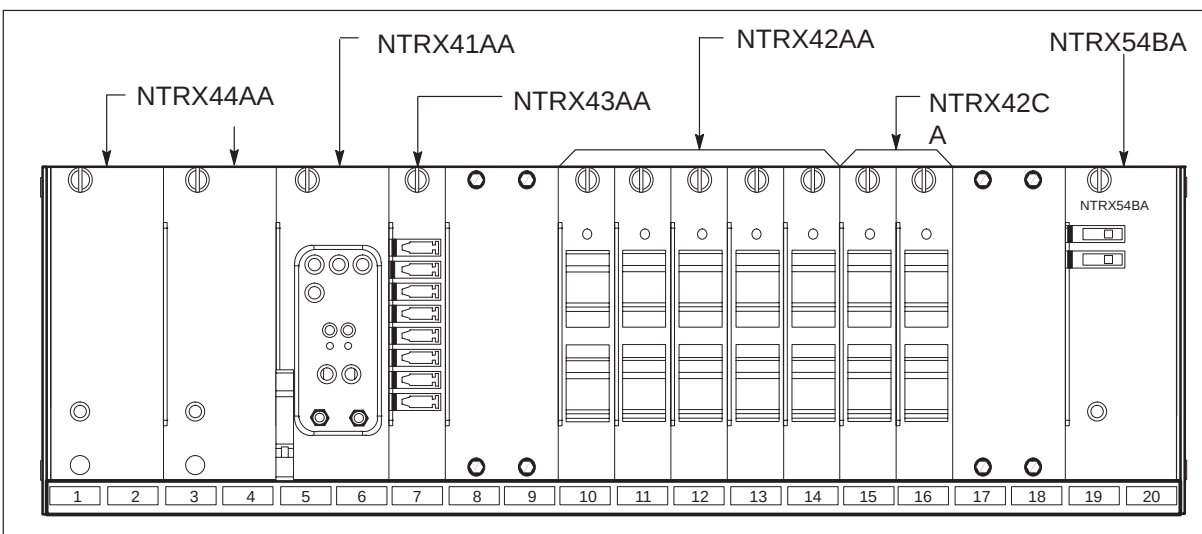
At your Current Location

- 1 Proceed only if you have been directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure for verifying or accepting cards, or have been directed to this procedure by your maintenance support group.
- 2 Obtain a replacement card. Ensure that the replacement card has the same product equipment code (PEC), including suffix, as the card that is to be removed.

At the front panel of the cabinet

- 3 Open the front cover of the MSP. Release the two cover latches and swing the cover down to the open position.

Note: The illustrations in this card replacement procedure are for the MSP shelf in an CRSC or CEXT module. The circuit breaker designation may vary depending on the type of cabinet you are working in.



NTRX41
in RSC-S MSP (continued)

4



WARNING

Risk of injury from high energy levels, static electricity damage

Before removing any cards, put on a wrist strap and connect it to the wrist strap grounding point on the left side of the modular supervisory panel (MSP). This protects the equipment against damage caused by static electricity.



WARNING

Risk of injury from high energy levels, equipment damage

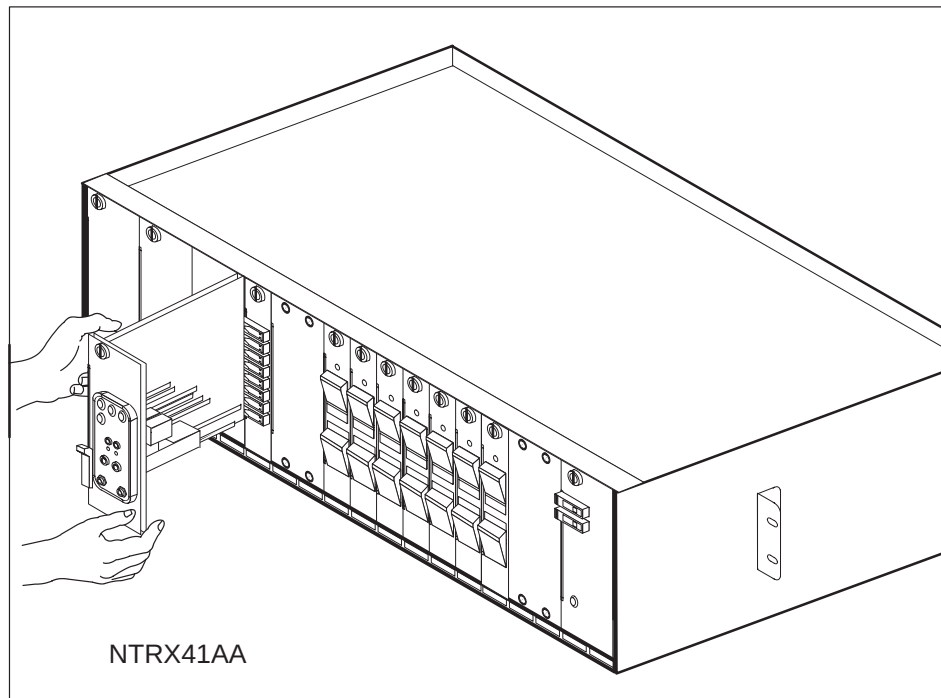
Take these precautions when removing or inserting a card:

1. Do not apply direct pressure to the components.
2. Do not force the cards into the slots.

Put on a wrist strap.

NTRX41 in RSC-S MSP (continued)

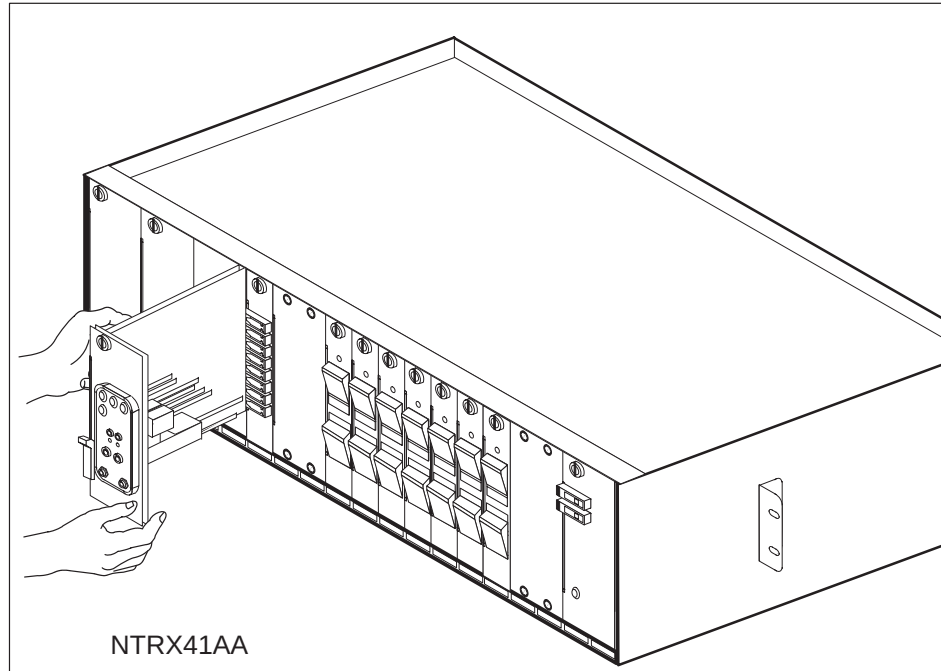
- 5 Remove the NTRX41 circuit card as shown in the following figure.
 - a. Open the front doors of the cabinet and locate the circuit card, it will be in slots 05 and 06.



- b. At the front of the MSP, disengage the knurled thumbscrew at the top of the circuit card.
 - c. Pull out the lever on the upper left side of the alarm module.
 - d. Gently pull the circuit card toward you until it clears the shelf.

NTRX41
in RSC-S MSP (continued)

- 6 Ensure the replacement circuit card has the same PEC, including suffix, as the circuit card just removed.



- a. Align the circuit card with the slots in the shelf and gently slide the circuit card into the shelf.
- b. Gently but firmly seat the circuit card.
- c. Push in lever on the upper left side of alarm module.
- d. Tighten the knurled thumbscrew at the top of the circuit card.

If alarm lights	Do
remain off	step 7
light up	step 9

- 7 Send any faulty cards for repair according to local procedure.
- 8 Record the date the card was replaced, the serial number of the card, and the symptoms that prompted replacement of the card. Go to step 10.

NTRX41
in RSC-S MSP (end)

- 9 Obtain further assistance in replacing this card by contacting the personnel responsible for the next higher level of support.
- 10 You have successfully completed this procedure. Return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.

NTRX42 in RSC-S MSP

Application

Use this procedure to replace an NTRX42 card in a modular supervisory panel (MSP) located in the following cabinets:

- Cabinetized Extension Module (CEXT)
- Cabinetized Line Concentrating Equipment (CLCE)
- Cabinetized Line Module ISDN (CLMI)
- Cabinetized Power Distribution Center (CPDC)
- Cabinetized Remote Switching Center (CRSC)
- Cabinetized Miscellaneous Equipment (CMIS)
- Cabinetized Remote Miscellaneous Equipment (CRME)

PEC	Suffixes	Name
NTRX42	AA, CA	Circuit Breaker Module

Common procedures

None

Action

A connector removal tool is available to facilitate removal of the AMP Faston receptacles from the power input and output connectors of the MSP modules. This tool comes in two lengths: P0746192 152 mm (6 in.) and P0747552 254 mm (10 in.). The shorter tool is used when access to the rear of the MSP is very limited. An example of limited access is MSP modules located directly behind the cabinet bulkhead.

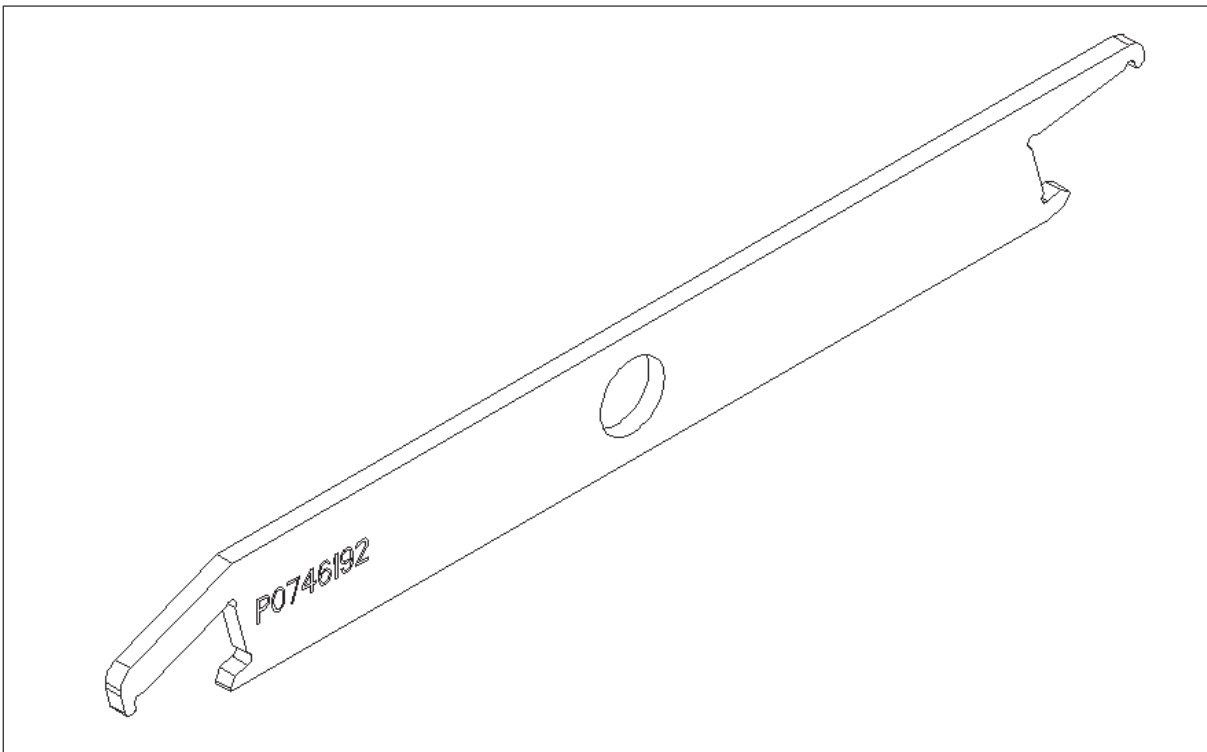
This tool is approximately 2 mm (0.090 in.) thick and 17 mm (0.65 in.) wide, with a jaw-like cut-out at each end. The cut-out profile conforms to the shape of the Faston receptacle. The shorter tip of each profile is used to position the receptacle in the tool.

NTRX42 **in RSC-S MSP** (continued)

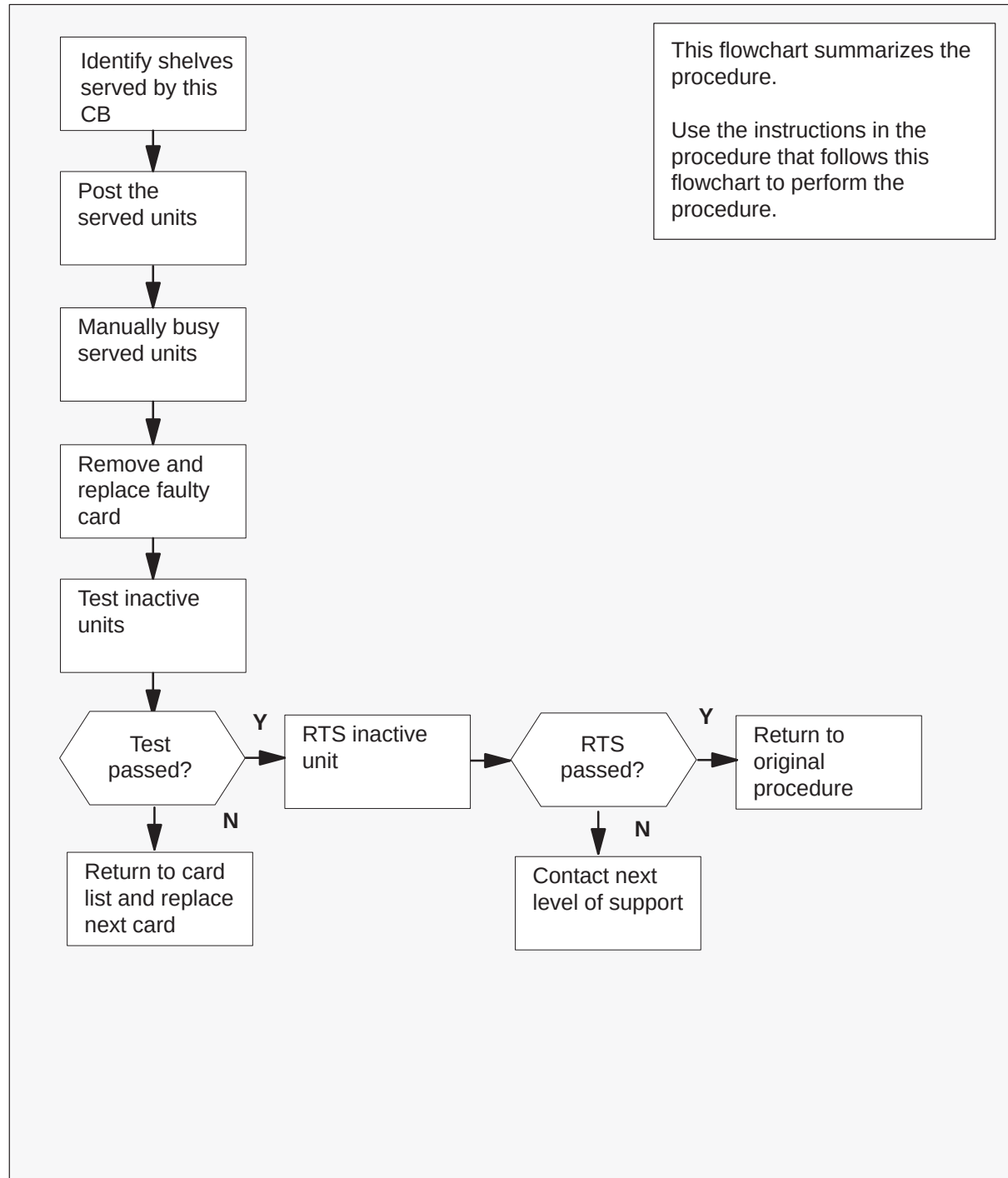
The first meeting point of the tool serves as the pivot point. By rotating the tool around this pivot point, the longer tip of the profile which has a hook on its end is engaged with the action-arm of the power connector. As the action-arm of the connector is depressed, the receptacle is disengaged from the connector tab. The receptacle is removed by pulling the tool with the receptacle trapped in its jaw away from the connector. The tool is disengaged from the receptacle by rotating the tool's hook off the action-arm of the receptacle.

Although the shape of the cut-out is the same on each end of the tool, the orientation of the profile is off by 15 degrees. This difference allows for the use of the tool at different angles, which may be required due to limited access to the connectors.

Connector removal tool



The following flowchart is a summary of this procedure. Use the instructions in the procedure that follows the flowchart to perform the procedure. The detailed procedure depends on which circuit cards are served by the breaker module circuit card (NTRX42). You will be directed to the appropriate steps depending on your configuration.

NTRX42
in RSC-S MSP (continued)**Summary of card replacement procedure for an NTRX42 card in an RSC-S MSP**

NTRX42 in RSC-S MSP (continued)

Replacing an NTRX42 card in RSC-S MSP

At your Current Location

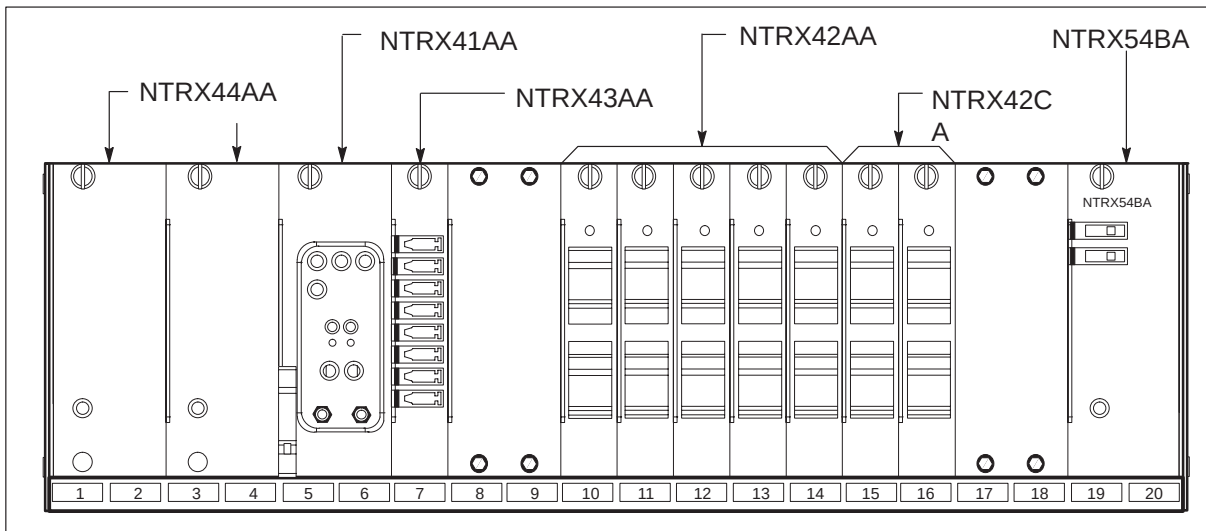
- 1 Proceed only if you have been directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure for verifying or accepting cards, or have been directed to this procedure by your maintenance support group.
- 2 Obtain a replacement card. Ensure that the replacement card has the same product equipment code (PEC), including suffix, as the card that is to be removed.

At the front panel of the cabinet

- 3 Open the front cover of the MSP. Release the two cover latches and swing the cover down to the open position.

Note: The illustrations in this card replacement procedure are for the MSP shelf in an CRSC or CEXT module. The circuit breaker designation may vary depending on the type of cabinet you are working in.

MSP



- 4 Use the breaker designation label to identify which cards are serviced by each circuit breaker (CB). For example, the label CB01–47–01 identifies circuit breaker 01 as controlling circuit card position 01 on shelf 47. Many RX42 modules service two separate devices (or units); both units must be powered down prior to removal of the associated RX42 circuit card.

NTRX42 in RSC-S MSP (continued)

- 5 Use the following table to determine which step to do next.

If the CB powers the	Do
RMM shelf containing 2X09 or 2X06 cards	step 6
RCO2 shelf containing MX72 card	step 9
LCME shelf containing 6X30, 6X53, or BX72 cards	step 15

At the MAP terminal

- 6 Set the MAP display to the PM level and post the RMM by typing

>MAPCI;MTC;PM;POST RMM rmm_no

and pressing the Enter key.

where

rmm_no is the number of the RMM unit from which the card is to be removed

Example of a MAP display:

CM	MS	IOD	Net	PM	CCS	LNS	Trks	Ext	Appl
RMM	.	.	SysB	ManB	OffL	.	CBsy	ISTb	InSv
0 Quit	PM	4	0	10	3	3	130		
2 Post_	RMM	0	1	1	0	0	2		
3									
4	RMM	5	INSV						
5 TrnsL									
6 Tst									
7 Bsy									
8 RTS									
9 OffL									
10 LoadPM									
11 Disp_									
12 Next									
13									
14 QueryPM									
15									
16									
17									
18									

NTRX42
in RSC-S MSP (continued)

- 7 Busy the RMM by typing
>BSY
and pressing the Enter key.

Example of a MAP display:

CM	MS	IOD	Net	PM	CCS	LNS	Trks	Ext	Appl
.	.	.	.	1ManB	.	.	.	.	.
RMM			SysB	ManB	OffL		CBsy	ISTb	InSv
0	Quit	PM	4	0	10	0	0	0	130
2	Post_	RMM	0	1	0	0	0	0	0
3									
4		RMM	5	ManB					
5	Trnsl								
6	Tst								
7	Bsy								
8	RTS								
9	OffL								
10	LoadPM								
11	Disp_								
12	Next								
13									
14	QueryPM								
15									
16									
17									
18									

At the RMM shelf

- 8 Power down the unit by setting the ON/OFF switch on the power converter faceplate to the OFF position. Both the converter FAIL LED and FRAME FAIL lamp on the MSP will be ON. An audible alarm may sound. If an alarm does sound, silence it by typing

>SIL
and pressing the Enter key.
Go to step 28.

- 9 Access the PM level and post the RCO2 by typing

>MAPCI;MTC;PM;POST rco2_no
and pressing the Enter key.

where

rco2_no is the number of the RCO2 unit that will be busied

NTRX42 in RSC-S MSP (continued)

Example of a MAP display:

CM	MS	IOD	Net	PM	CCS	LNS	Trks	Ext	Appl
.	.	.	.	1RC02	.	.	.	.	.
RC02			SysB	ManB	OffL	CBsy	ISTb	InSv	
0 Quit	PM	0	0	0	2	0	2	25	
2 Post_	RC02	0	0	0	0	0	1	1	
3 ListSet									
4	RC02	0	ISTb	Links_00S:	CSide	1,	PSide	1	
5 TRNSL	Unit0:	Inact	InSv						
6 TST	Unit1:	Act	InSv						
7 BSY									
8 RTS									
9 OffL									
10 LoadPM_									
11 Disp_									
12 Next_									
13									
14 QueryPM									
15									
16									
17									
18									

- 10 The NTRX42 you are replacing should be controlling the inactive side of the RCO2.

If NTRX42 card is on the	Do
active unit	step 11
inactive unit	step 13

- 11 Switch the processing activity (SWACT) to the inactive unit by typing

>SWACT

and pressing the Enter key.

Note: If the system recommends using the SWACT command with the FORCE option, consult office personnel to determine if use of the FORCE option is advisable.

- 12 Confirm the system prompt by typing

>YES

and pressing the Enter key.

After both units are in-service, proceed to the next step.

NTRX42
in RSC-S MSP (continued)

At the RCE frame

- 13** Place a sign on the active unit bearing the words **Active unit—Do not touch**. This sign should not be attached by magnets or tape.

At the MAP terminal

- 14** Busy the inactive PM unit by typing

>BSY UNIT unit_no

where

unit_no is the number of the inactive RCO2 unit that will be busied

Go to step 28.

- 15** Use the following information to determine where to proceed.

If top circuit breaker of NTRX42 powers	Do
NT6X53 or NTBX72	step 17
NT6X30	step 21

- 16** Use the following information to determine where to proceed.

If bottom circuit breaker of NTX42 powers	Do
NT6X53 or NTBX72	step 17
NT6X30	step 21

- 17** Set the MAP display to the PM level and post the LCME powered by the circuit breaker by typing

>MAPCI;MTC;PM;POST LCME site lcme_frame_no lcme_no

and pressing the Enter key.

where

site is the name of the site at which the LCME is located

lcme_frame_no is the number of the frame in which the LCME is located

lcme_no is the number of LCME the circuit breaker supplies power to

NTRX42 in RSC-S MSP (continued)

Example of a MAP display:

CM	MS	IOD	Net	PM	CCS	LNS	Trks	Ext	Appl
LCME	.	.	SysB	ManB	OffL	CBsy	ISTb	InSv	.
0 Quit	PM	4	0	10	3	3	130		
2 Post_	LCME	1	0	5	0	1	9		
3									
4 Swrg_	LCME	RemL	00 0	ISTb	Links_OOS:	CSide	1		
5 Trnsl_	Unit-0:	InSv			/RG:	0			
6 Tst_	Unit-1:	InSv			/RG:	0			
7 Bsy_				11 11 11		RG:Pref:0	InSv		
8 RTS_	Drwr:	01 23 45 67 89 01 23 45				Stby:1	InSv		
9 OffL_									
10 LoadPM_									
11 Disp_									
12 Next_									
13									
14 QueryPM									
15									
16									
17									
18									

- 18** Busy the LCME unit powered by the circuit breaker by typing

>BSY UNIT lcme_unit_no

and pressing the Enter key.

where

lcme_unit_no is the unit number of the LCME to which the circuit breaker supplies power

NTRX42
in RSC-S MSP (continued)

Example of a MAP display:

```
CM      MS      IOD      Net      PM      CCS      LNS      Trks      Ext      Appl
.       .       .       .       1LCME   .       .       .       .       .
LCME
0 Quit      PM          SysB      ManB      OffL      CBsy      ISTb      InSv
2 Post_     LCME       1       1       5       0       3       130
3
4 SwRg      LCME      RemL  00 0 ISTb  Links_OOS: CSide 1
5 Trnsl     Unit-0:  InSv  Mtce TakeOver /RG: 0
6 Tst       Unit-1:  ManB Mtce          /RG: 0
7 Bsy
8 RTS       Drwr: 01 23 45 67 89 01 23 45  RG:Pref:0 InSv
9 OffL
10 LoadPM
11 Disp_
12 Next
13
14 QueryPM
15
16
17
18
```

- 19 An alarm may sound. If this occurs, silence the alarm by typing
 >SIL
 and pressing the Enter key.
- 20 Use the following information to determine where to proceed.

If	Do
circuits associated with bottom circuit breaker of NTRX42 have not been busied or otherwise addressed	step 16
circuits associated with both circuit breakers of NTRX42 have been busied or otherwise addressed	step 28

NTRX42

in RSC-S MSP (continued)

- 21 Set the MAP display to the PM level and post the LCME in the same frame as the circuit breaker by typing

>MAPCI;MTC;PM;POST LCME site lcme_frame_no lcme_no

and pressing the Enter key.

where

site is the name of the site at which the LCME is located

lcme_frame_no is the number of the frame in which the LCME is located

lcme_no is the number of the LCME in the same frame as the circuit breaker

Example of a MAP display:

CM	MS	IOD	Net	PM	CCS	LNS	Trks	Ext	Appl
LCME	.	.	SysB	ManB	.	OffL	CBsy	ISTb	InSv
0 Quit	PM		4	0		10	3	3	130
2 Post_	LCME		1	0		5	0	1	9
3									
4 Swrg_		LCME	RemL	00 0	ISTb	Links_00S:	CSide	1	
5 TrnsL_		Unit-0:	InSv				/RG:	0	
6 Tst_		Unit-1:	InSv				/RG:	0	
7 Bsy_					11 11 11			RG:Pref:0	InSv
8 RTS_		Drwr:	01 23 45 67 89 01 23 45					Stby:1	InSv
9 OffL_			.. .. .						
10 LoadPM_									
11 Disp_									
12 Next_									
13									
14 QueryPM									
15									
16									
17									
18									

NTRX42
in RSC-S MSP (continued)

22 Busy the LCME unit associated with the ringing generator by typing

>BSY UNIT lcme_unit_no

and pressing the Enter key.

where

lcme_unit_no is zero when the circuit breaker powers ringing generator zero,
and is one when the circuit breaker powers ringing generator
one

Example of a MAP display:

CM	MS	IOD	Net	PM	CCS	LNS	Trks	Ext	Appl
.	.	.	.	1LCME	.	.	.	.	.
LCME			SysB	ManB	OffL		CBsy	ISTb	InSv
0	Quit	PM	4	1	10		3	3	130
2	Post_	LCME	1	1	5		0	1	9
3									
4	SwRg	LCME	RemL	00 0	ISTb	Links_00S:	CSide	1	
5	Trnsl	Unit-0:	InSv	Mtce	TakeOver	/RG:	0		
6	Tst	Unit-1:	ManB	Mtce		/RG:	0		
7	Bsy				11 11 11		RG:Pref:0	InSv	
8	RTS	Drwr:	01 23 45 67 89	01 23 45			Stby:1	InSv	
9	OffL		.. .. .	.. .. .					
10	LoadPM								
11	Disp_								
12	Next								
13									
14	QueryPM								
15									
16									
17									
18									

23 An alarm may sound. If this occurs, silence the alarm by typing

>SIL

and pressing the Enter key.

NTRX42 in RSC-S MSP (continued)

- 24 If there is a second LCME in the same frame as the circuit breaker, post the other LCME by typing

>MAPCI;MTC;PM;POST LCME site lcme_frame_no lcme_unit_no

and pressing the Enter key.

where

site is the name of the site at which the LCME is located

lcme_frame_no is the number of the frame in which the LCME is located

lcme_unit_no is the number of the LCME in the same frame as the circuit breaker

- 25 Busy the LCME unit associated with the ringing generator by typing

>BSY UNIT lcme_unit_no

and pressing the Enter key.

where

lcme_unit_no is zero when the circuit breaker powers ringing generator zero, and is one when the circuit breaker powers ringing generator one

- 26 An alarm may sound. If this occurs, silence the alarm by typing

>SIL

and pressing the Enter key.

- 27 Use the following information to determine where to proceed.

If	Do
circuits associated with bottom circuit breaker of NTRX42 have not been busied or otherwise addressed	step 16
circuits associated with both circuit breakers of NTRX42 have been busied or otherwise addressed	step 28

At the front panel of the cabinet

- 28 Verify and switch off the associated power converter.

Note: This step does not apply to the CPDC and CRME.

NTRX42 in RSC-S MSP (continued)

- 29 Determine the faulty circuit breaker on the MSP and switch both breakers on that circuit card to the OFF position. Safety tag the front of the circuit breaker.
- 30 An alarm may sound. If this occurs, silence the alarm by typing
>SIL
and pressing the Enter key.
- 31 Power down and safety tag the ABS fuse in the power room.
Note: This step applies to the CPDC and CRME.
- 32 Pull out the corresponding line shelf approximately 152 mm (6 in.). The line shelf is located below the MSP. This approach permits easier hand access to the connectors on the rear of the MSP.

Note: This step does not apply to the CMIS, CPDC, and CRME.

At the rear panel of the cabinet

33



WARNING

Risk of injury from high energy levels, static electricity damage

Before removing any cards, put on a wrist strap and connect it to the wrist strap grounding point on the left side of the modular supervisory panel (MSP). This protects the equipment against damage caused by static electricity.



WARNING

Risk of injury from high energy levels, equipment damage

Take these precautions when removing or inserting a card:

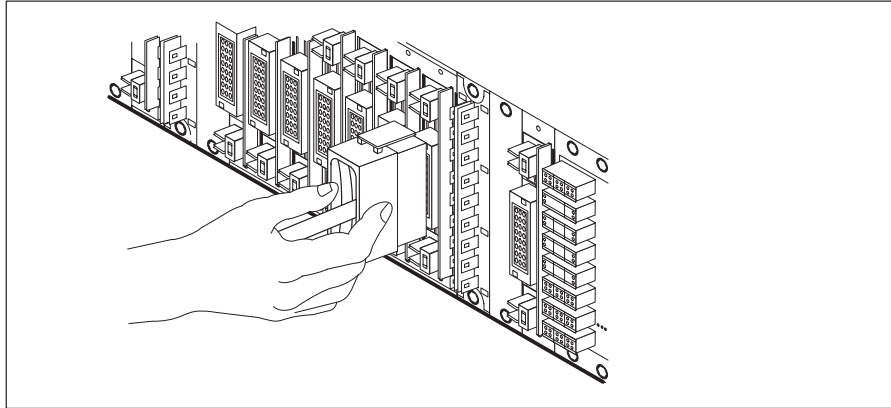
- 1 Do not apply direct pressure to the components.
2. Do not force the cards into the slots.
3. Do not insert metallic objects into the black connectors. Voltage is present and equipment damage could result.

Put on a wrist strap.

- 34 Open the rear door and locate the NTRX42 circuit card. Verify the card location by checking the slot number stamped into the chassis.

NTRX42
in RSC-S MSP (continued)

- a. Note the wire color and the location to facilitate re-connection.



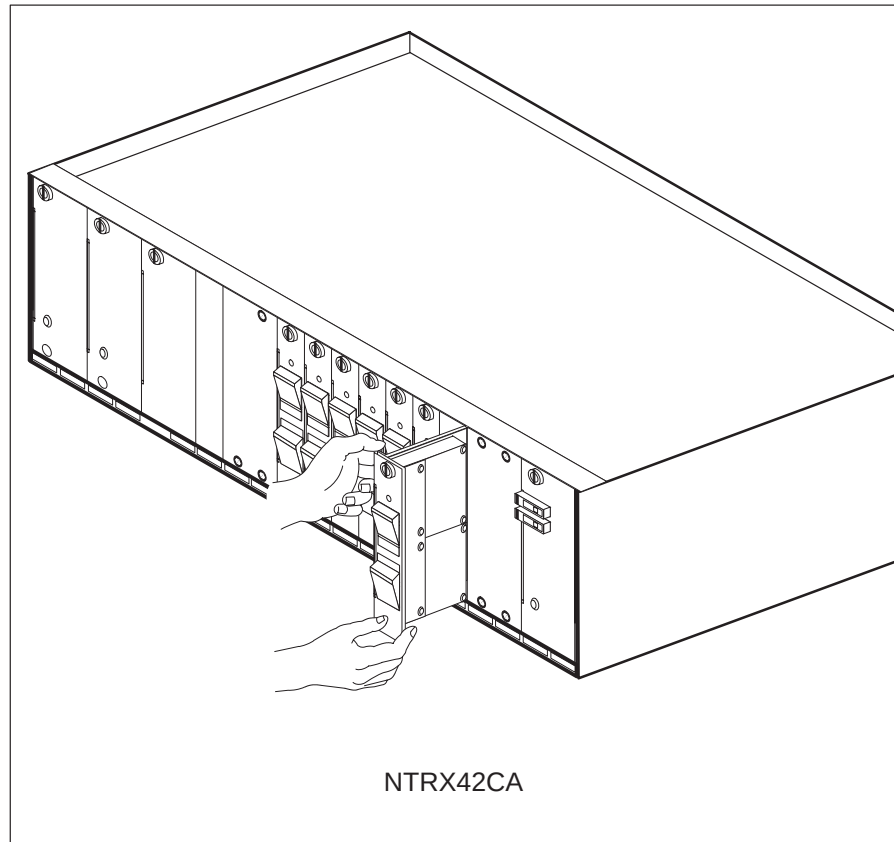
- b. Safety tag the front of the circuit breaker to indicate maintenance activity.
- c. Using the connector removal tool, manually disconnect the power connectors to the circuit card. Working from the bottom of the MSP shelf to the top of the MSP shelf, manually disconnect and tag the smaller black power connectors located below the larger blue power connector. Manually disconnect and tag the large blue power connector. Disconnect and tag the smaller black power connectors located above the large blue power connector. Ensure you disconnect the black connectors *before* removing the circuit card.
- d. Although the connectors have voltage present on them, they are insulated. Secure the connectors to the power-connector bundle with a line-tie until it is time to reconnect them.
- 35 Disconnect and tag any jumper connectors and cables that may be present and set them aside for use on the replacement unit.

At the front panel of the cabinet

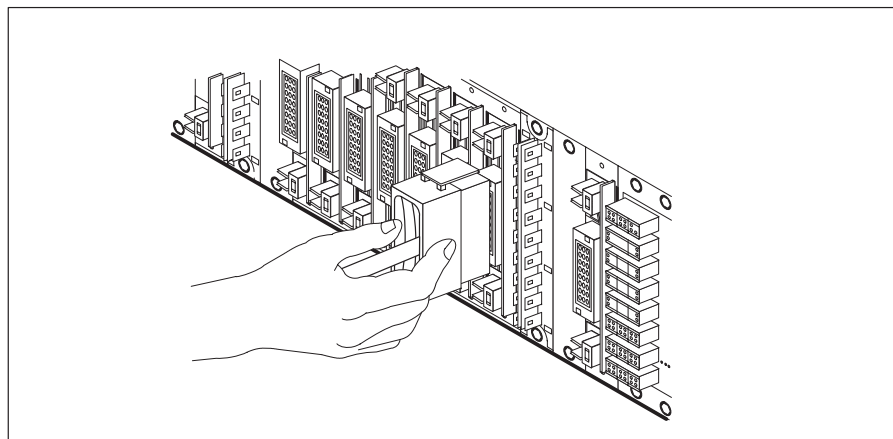
- 36 Remove the NTRX42 card.
- a. Disengage the spring-loaded captive screw at the top of the circuit card.
- b. Grasping the top and bottom of unit, gently pull the circuit card toward you until it clears the shelf.
- c. Replace the circuit card. Ensure the replacement circuit card has the same PEC, including suffix, as the circuit card being replaced.

NTRX42 in RSC-S MSP (continued)

- d. Tighten the spring-loaded captive screw at the top of the circuit card.

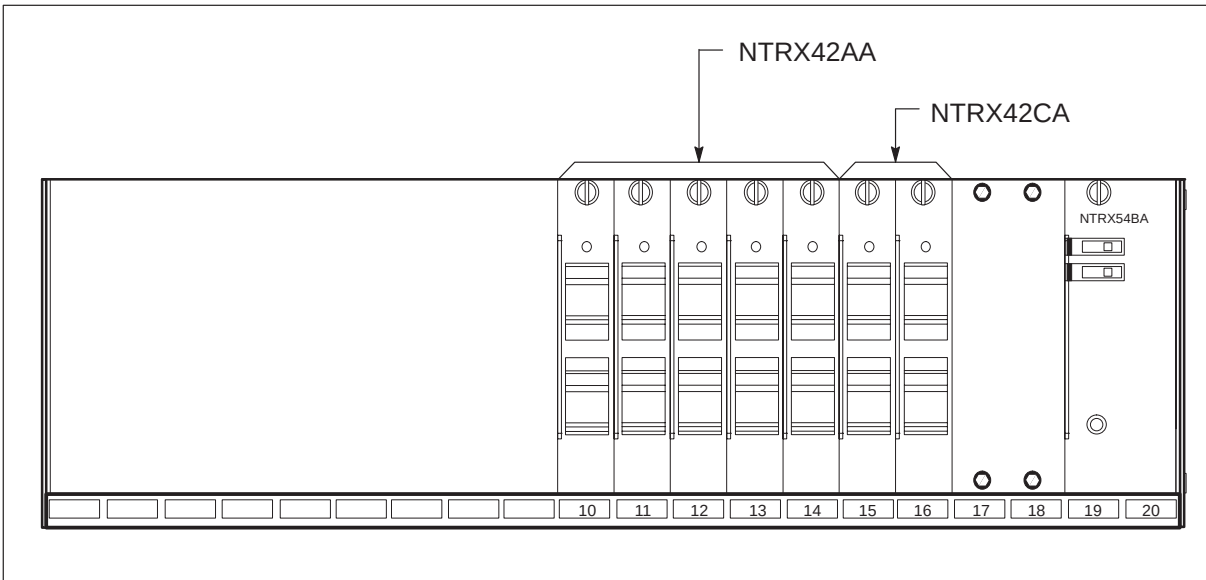


- 37 Replace any jumper connectors and cables removed in step 35. Reinsert the power connectors at the rear of the circuit card.



NTRX42 in RSC-S MSP (continued)

- 38 Push in the corresponding line shelf. This step does *not* apply to the CMIS, CPDC, and CRME.



- 39 Apply the appropriate label from the spare parts on the replacement NTRX42 circuit card.
- 40 Power up the ABS fuse in the power room, and remove the safety tag from the ABS fuse.
- Note:** This step applies to the CPDC and CRME.
- 41 Switch on the associated power converter.
- Note:** This step does not apply to the CPDC and CRME.
- 42 Reset the circuit breakers to ON (upward). If any card controlled by this breaker includes a reset switch, hold the RESET button downward while setting the circuit breaker to the ON position.
- 43 Remove the safety tag from the front of the circuit breaker.
- 44 Close the front cover of the MSP. Swing the cover up to the closed position and lock the two cover latches.

NTRX42 in RSC-S MSP (continued)

- 45 Read the following table to determine where to proceed.

If circuit breakers power the	Do
LCME shelf containing 6X30, 6X53, or BX72 cards	step 46
RCO2 shelf containing MX72 card	step 51
RMM shelf containing 2X09 or 2X06 cards	step 56

- 46 Test the LCME unit by typing

>TST UNIT lcme_unit_no
and pressing the Enter key.

where

lcme_unit_no is the number of the LCME unit busied

If TST	Do
passed	step 47
failed	step 65

- 47 Return the LCME unit to service by typing

>RTS UNIT lcme_unit_no
and pressing the Enter key.

where

lcme_unit_no is the number of the LCME unit tested in step 46

If RTS	Do
passed	step 48
failed	step 65

- 48 Send any faulty cards for repair according to local procedure.
- 49 Record the date the card was replaced, the serial number of the card, and the symptoms that prompted replacement of the card.

NTRX42
in RSC-S MSP (continued)

50 Go to step 66.

51 Test the RCO2 unit by typing

>TST UNIT rco2_unit_no

and pressing the Enter key.

where

rco2_unit_no is the number of the RCO2 unit

If TST	Do
passed	step 52
failed	step 65

52 Return the RCO2 unit to service by typing

>RTS UNIT rco2_unit_no

and pressing the Enter key.

where

rco2_unit_no is the number of the RCO2 unit tested in step 51

If RTS	Do
passed	step 53
failed	step 65

53 Send any faulty cards for repair according to local procedure.

54 Record the date the card was replaced, the serial number of the card, and the symptoms that prompted replacement of the card.

55 Go to step 66.

NTRX42 in RSC-S MSP (continued)

At the MAP terminal

- 56 Determine the system load version.

If system load module is	Do
version 1	step 57
version 2	step 58

- 57 List the loadfile in the directory by typing

>DSKUT;LISTVOL D000 ALL
and pressing the Enter key.

or

>DSKUT;LISTVOL D010 ALL
and pressing the Enter key.

Local operating company policy determines which disk, D000 or D010, the loadfile will be on.

Proceed to step 59.

- 58 List the loadfile in the directory by typing

>DISKUT;LV S00d
>LF
and pressing the Enter key.

or

>DISKUT;LV S01D
>LF
and pressing the Enter key.

- 59 Leave the disk utility by entering

>QUIT
and pressing the Enter key.

NTRX42
in RSC-S MSP (continued)

- 60** Reload the RMM by entering

>LOADPM

and pressing the Enter key.

If LOAD	Do
passed	step 61
failed	step 65

- 61** Test the RMM unit by typing

>TST UNIT rmm_unit_no

and pressing the Enter key.

where

rmm_unit_no is the number of the RCO2 unit

If RTS	Do
passed	step 62
failed	step 65

- 62** Return the RMM shelf to service by typing

>RTS UNIT rmm_unit_no

and pressing the Enter key.

where

rmm_unit_no is the number of the RCO2 unit tested in step 61

If RTS	Do
passed	step 63
failed	step 65

- 63** Send any faulty cards for repair according to local procedure.
- 64** Record the date the card was replaced, the serial number of the card, and the symptoms that prompted replacement of the card. Go to step 66.

NTRX42
in RSC-S MSP (end)

- 65 Obtain further assistance in replacing this card by contacting the personnel responsible for the next higher level of support.
- 66 You have successfully completed this procedure. Return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.

NTRX43 in RSC-S MSP

Application

Use this procedure to replace an NTRX43 card in a modular supervisory panel (MSP) located in the following cabinets:

- Cabinetized Extension Module (CEXT)
- Cabinetized Line Concentrating Equipment (CLCE)
- Cabinetized Line Module ISDN (CLMI)
- Cabinetized Power Distribution Center (CPDC)
- Cabinetized Remote Switching Center (CRSC)
- Cabinetized Miscellaneous Equipment (CMIS)
- Cabinetized Remote Miscellaneous Equipment (CRME)

PEC	Suffixes	Name
NTRX43	AA	Fuse Module

Common procedures

None

Action

A connector removal tool is available to facilitate removal of the AMP Faston receptacles from the power input and output connectors of the MSP modules. This tool comes in two lengths: P0746192 152 mm (6 in.) and P0747552 254 mm (10 in.). The shorter tool is used when access to the rear of the MSP is very limited. An example of limited access is MSP modules located directly behind the cabinet bulkhead.

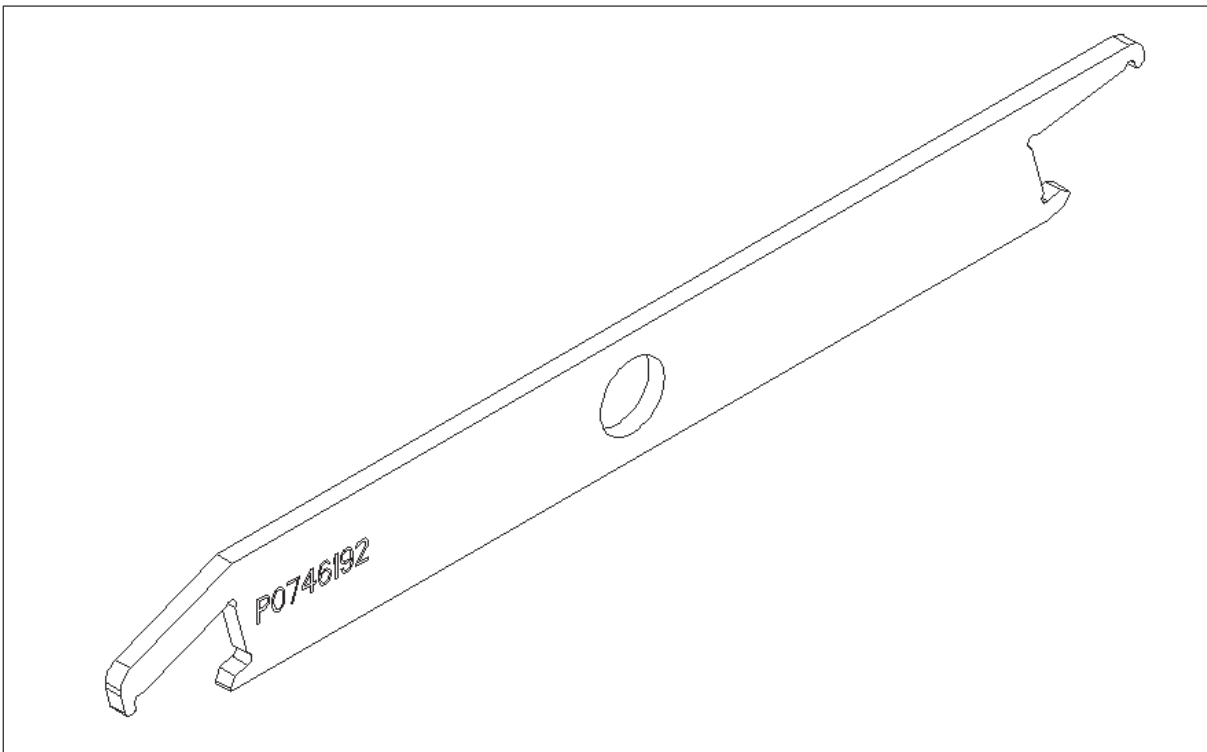
This tool is approximately 2 mm (0.090 in.) thick and 17 mm (0.65 in.) wide, with a jaw-like cut-out at each end. The cut-out profile conforms to the shape of the Faston receptacle. The shorter tip of each profile is used to position the receptacle in the tool.

NTRX43 **in RSC-S MSP** (continued)

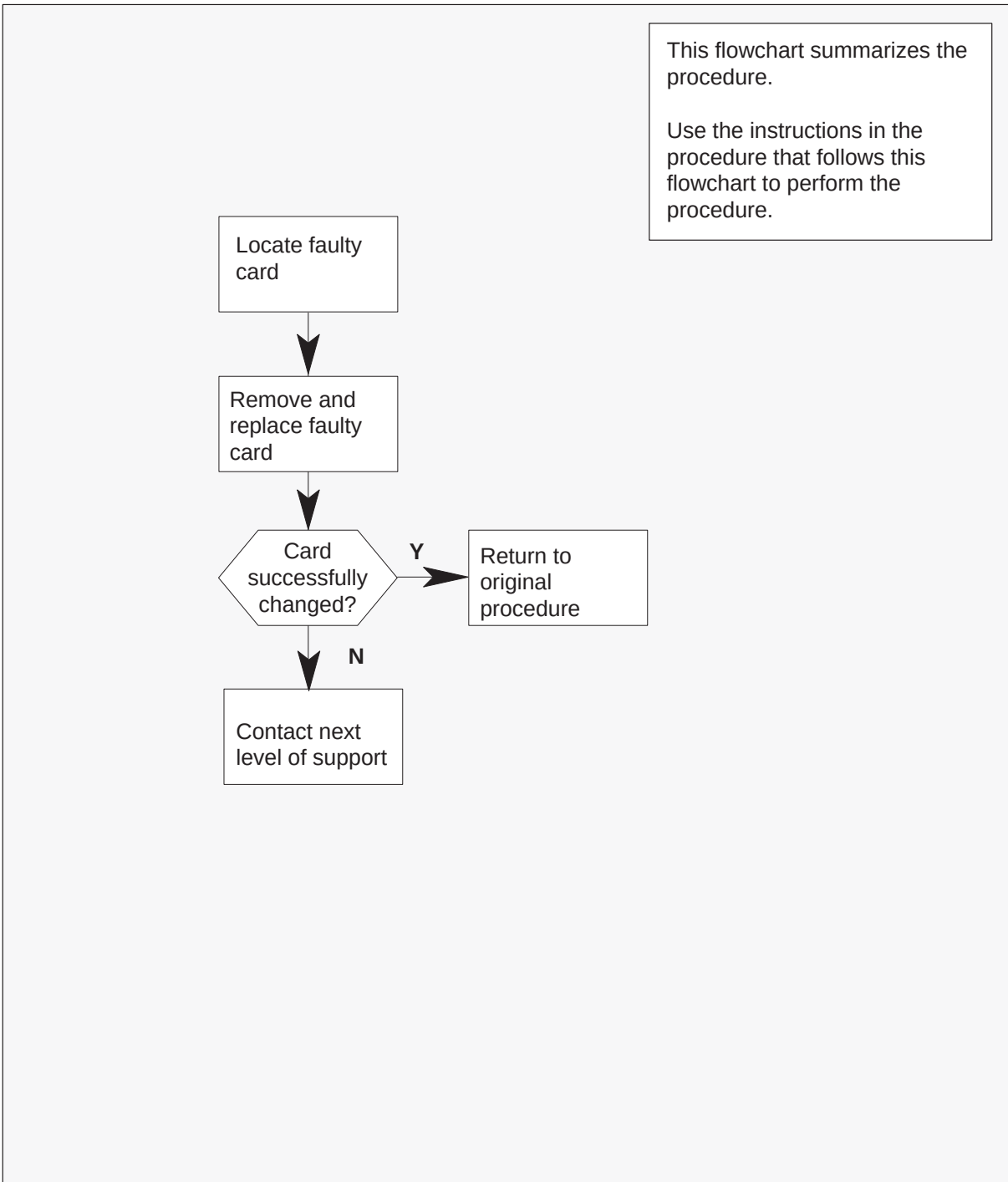
The first meeting point of the tool serves as the pivot point. By rotating the tool around this pivot point, the longer tip of the profile which has a hook on its end is engaged with the action-arm of the power connector. As the action-arm of the connector is depressed, the receptacle is disengaged from the connector tab. The receptacle is removed by pulling the tool with the receptacle trapped in its jaw away from the connector. The tool is disengaged from the receptacle by rotating the tool's hook off the action-arm of the receptacle.

Although the shape of the cut-out is the same on each end of the tool, the orientation of the profile is off by 15 degrees. This difference allows for the use of the tool at different angles, which may be required due to limited access to the connectors.

Connector removal tool



The following flowchart is a summary of this procedure. Use the instructions in the procedure that follows the flowchart to perform the procedure.

NTRX43
in RSC-S MSP (continued)**Summary of card replacement procedure for an NTRX43 card in RSC-S MSP**

NTRX43 in RSC-S MSP (continued)

Replacing an NTRX43 card in RSC-S MSP

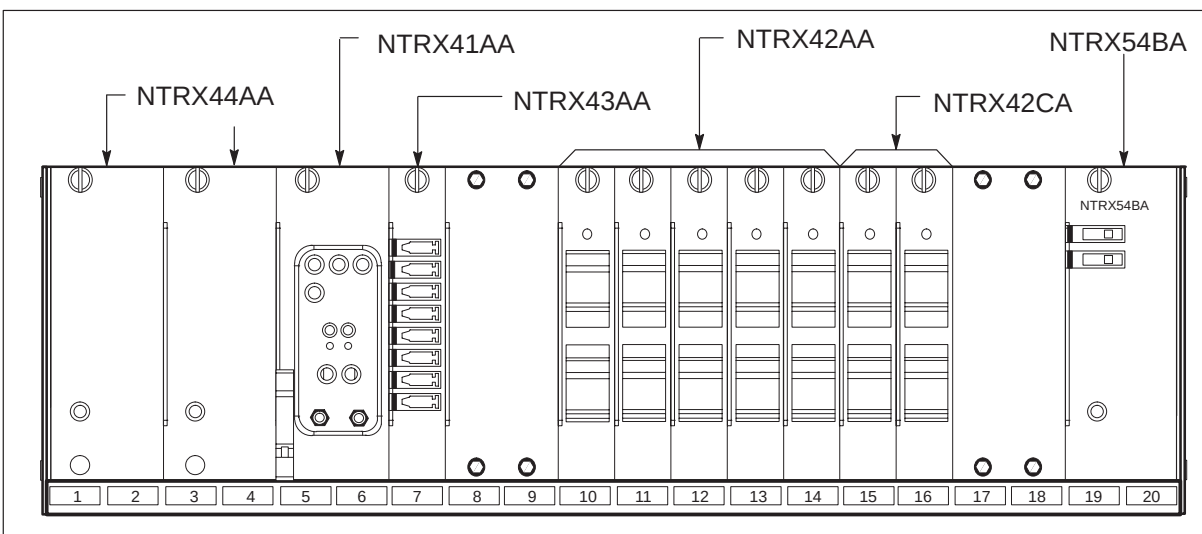
At your Current Location

- 1 Proceed only if you have been directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure for verifying or accepting cards, or have been directed to this procedure by your maintenance support group.
- 2 Obtain a replacement card. Ensure that the replacement card has the same product equipment code (PEC), including suffix, as the card that is to be removed.

At the front panel of the cabinet

- 3 Open the front cover of the MSP. Release the two cover latches and swing the cover down to the open position.

Note: The illustrations in this card replacement procedure are for the MSP shelf in an CRSC or CEXT module. The circuit breaker designation may vary depending on the type of cabinet you are working in.



- 4 Power down the circuit breaker supplying the fuse module. Safety tag the front of the circuit breaker. When servicing the fuse module, fans may shut down, alarms may sound, or a loss of alarms may occur.

NTRX43
in RSC-S MSP (continued)

5

**WARNING****Risk of injury from high energy levels, static electricity damage**

Before removing any cards, put on a wrist strap and connect it to the wrist strap grounding point on the left side of the modular supervisory panel (MSP). This protects the equipment against damage caused by static electricity.

**WARNING****Risk of injury from high energy levels, equipment damage**

Take these precautions when removing or inserting a card:

1. Do not apply direct pressure to the components.
2. Do not force the cards into the slots.

Put on a wrist strap.

- 6 Remove the fuses from the fuse module.

Note: Observe fuse colors, values, and positions before removing fuses from the fuse module.

- 7 Pull out the corresponding line shelf approximately 152 mm (6 in.). The line shelf is located below the MSP. This approach permits easier hand access to the connectors on the rear of the MSP.

Note: This step does not apply to the CMIS, CPDC, and CRME.

NTRX43 in RSC-S MSP (continued)

At the rear panel of the cabinet

8

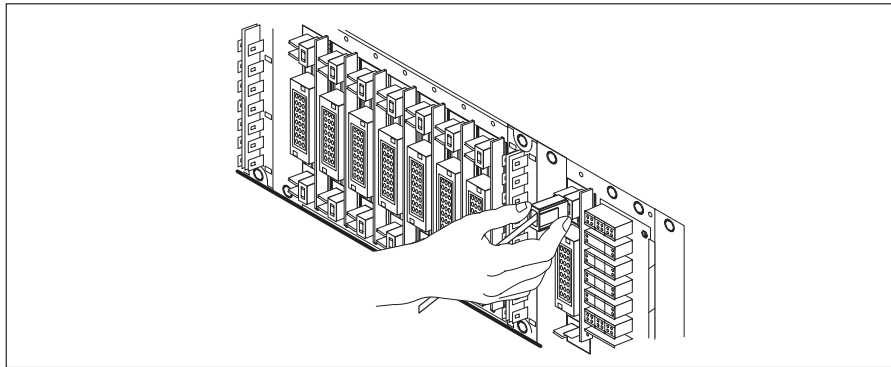


WARNING

Risk of injury from high energy levels, voltage present
Do not insert metallic objects into the black connectors. Voltage is present and equipment damage could result.

Remove the NTRX43 circuit card as shown in the following figures.

- a. Open the rear doors of the cabinet and locate the back of the card to be replaced.
- b. Note the wire color and the location to facilitate re-connection.



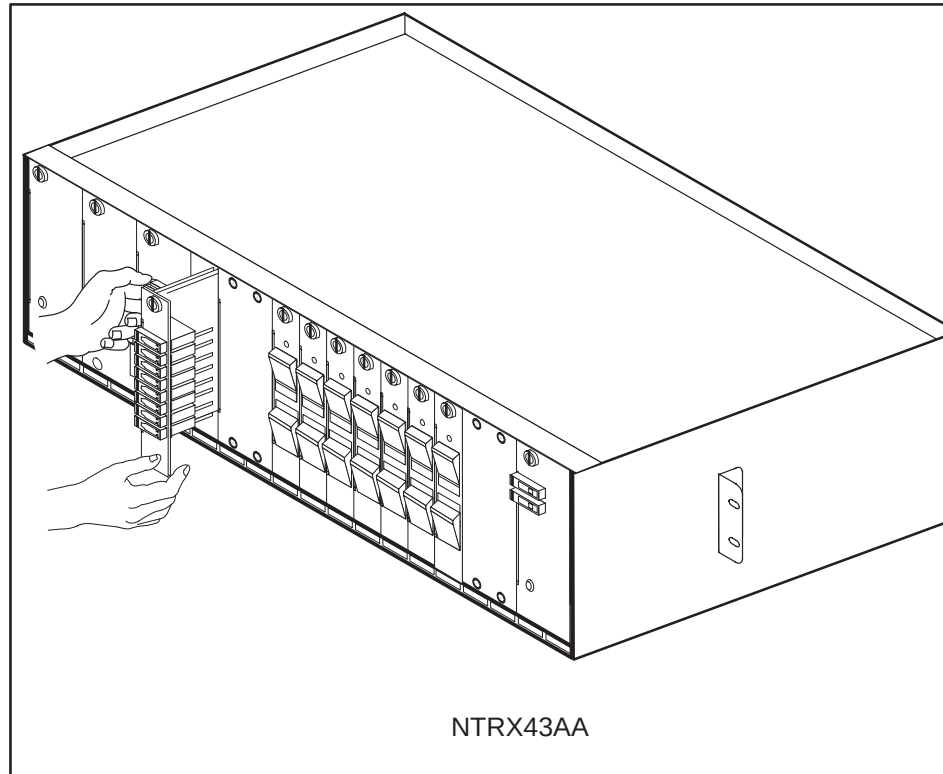
- c. Using the connector removal tool, manually disconnect the power connectors to the circuit card. Working from the bottom of the MSP shelf to the top of the MSP shelf, manually disconnect the smaller black power connectors located below the larger blue power connector. Manually disconnect the large blue power connector. Disconnect the smaller black power connectors located above the large blue power connector. Ensure you disconnect the black connectors *before* removing the circuit card.
- d. Although the connectors have voltage present on them, they are insulated. Secure the connectors to the power-connector bundle with a line-tie until it is time to reconnect them.
- e. Remove and tag the jumper connectors and cables that may be present on the back of the circuit card, and save them for use on the replacement circuit card.

At the front panel of the cabinet

- 9 Remove the NTRX43 card.

NTRX43 in RSC-S MSP (continued)

- a. Disengage the knurled thumbscrew at the top of the card.
- b. Gently pull the card toward you until it clears the shelf.

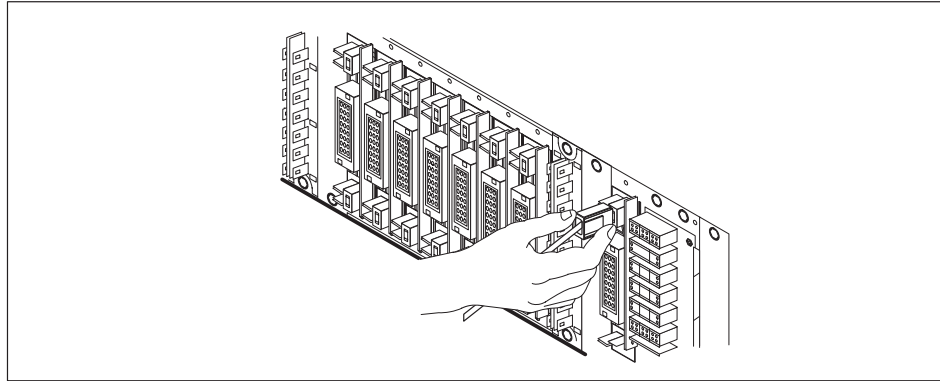


- 10 Ensure the replacement circuit card has the same PEC, including suffix, as the circuit card just removed.
 - a. Align the circuit card with the slots in the shelf and gently slide the circuit card into the shelf.
 - b. Gently but firmly seat the circuit card.
 - c. Tighten the knurled thumbscrew at the top of the circuit card.

NTRX43 in RSC-S MSP (continued)

At the rear panel of the cabinet

- 11 Locate the replaced circuit card and re-attach the power connectors.



- 12 Install the jumper connectors and cables removed in step 8 onto the replacement circuit card.

At the front of the cabinet

- 13 Push in the corresponding line shelf.

Note: This step does not apply to the CMIS, CPDC, and CRME.

- 14 Replace the fuses removed in step 6.

- 15 Power up the circuit breaker supplying the fuse module and remove the safety tag.

If fuses	Do
do not blow	step 16
blow (protrude)	step 18

- 16 Send any faulty cards for repair according to local procedure.
- 17 Record the date the card was replaced, the serial number of the card, and the symptoms that prompted replacement of the card. Go to step 19.
- 18 Obtain further assistance in replacing this card by contacting the personnel responsible for the next higher level of support.

NTRX43
in RSC-S MSP (end)

- 19 You have successfully completed this procedure. Return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.

NTRX44 in RSC-S MSP

Application

Use this procedure to replace an NTRX44 card in a modular supervisory panel (MSP) located in the following cabinets:

- Cabinetized Extension Module (CEXT)
- Cabinetized Line Concentrating Equipment (CLCE)
- Cabinetized Line Module ISDN (CLMI)
- Cabinetized Power Distribution Center (CPDC)
- Cabinetized Remote Switching Center (CRSC)
- Cabinetized Miscellaneous Equipment (CMIS)

PEC	Suffixes	Name
NTRX44	AA	Talk Battery Module

Common procedures

None

Action

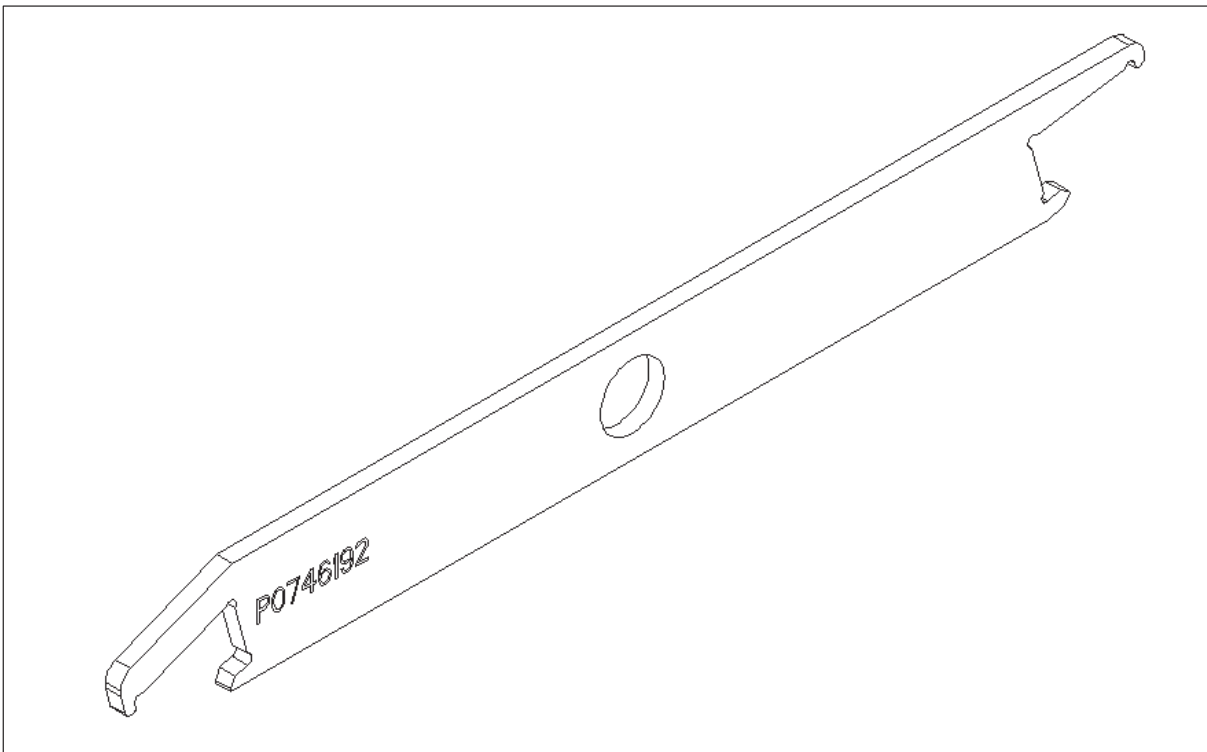
A connector removal tool is available to facilitate removal of the AMP Faston receptacles from the power input and output connectors of the MSP modules. This tool comes in two lengths: P0746192 152 mm (6 in.) and P0747552 254 mm (10 in.). The shorter tool is used when access to the rear of the MSP is very limited. An example of limited access is MSP modules located directly behind the cabinet bulkhead.

This tool is approximately 2 mm (0.090 in.) thick and 17 mm (0.65 in.) wide, with a jaw-like cut-out at each end. The cut-out profile conforms to the shape of the Faston receptacle. The shorter tip of each profile is used to position the receptacle in the tool.

NTRX44
in RSC-S MSP (continued)

The first meeting point of the tool serves as the pivot point. By rotating the tool around this pivot point, the longer tip of the profile which has a hook on its end is engaged with the action-arm of the power connector. As the action-arm of the connector is depressed, the receptacle is disengaged from the connector tab. The receptacle is removed by pulling the tool with the receptacle trapped in its jaw away from the connector. The tool is disengaged from the receptacle by rotating the tool's hook off the action-arm of the receptacle.

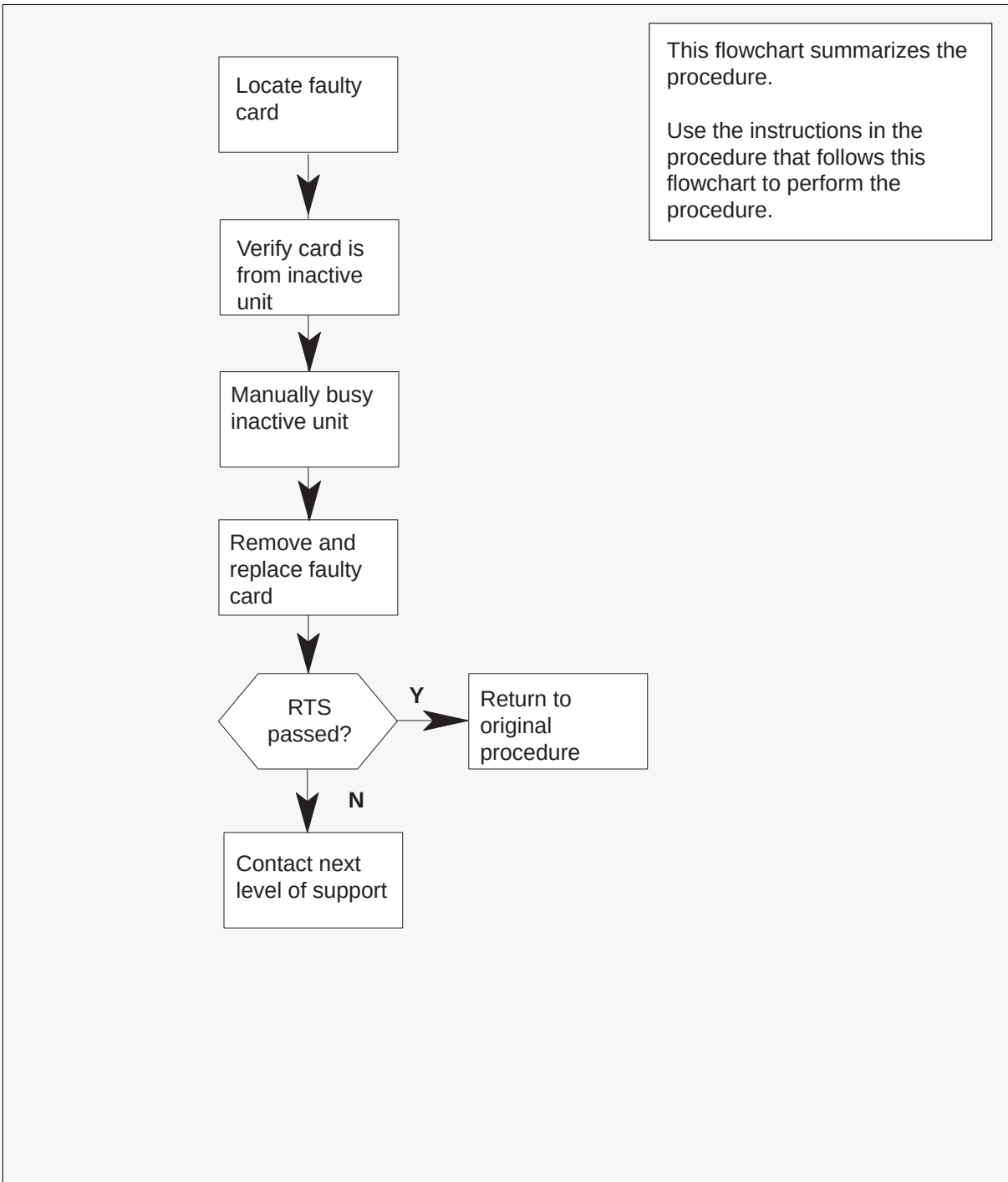
Although the shape of the cut-out is the same on each end of the tool, the orientation of the profile is off by 15 degrees. This difference allows for the use of the tool at different angles, which may be required due to limited access to the connectors.

Connector removal tool

The following flowchart is a summary of this procedure. Use the instructions in the procedure that follows the flowchart to perform the procedure.

NTRX44 in RSC-S MSP (continued)

Summary of card replacement procedure for an NTRX44 card in RSC-S MSP



NTRX44 in RSC-S MSP (continued)

Replacing an NTRX44 card in RSC-S MSP

At your Current Location

- 1 Proceed only if you have been directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure for verifying or accepting cards, or have been directed to this procedure by your maintenance support group.
- 2 Obtain a replacement card. Ensure that the replacement card has the same product equipment code (PEC), including suffix, as the card that is to be removed.

At the MAP terminal

- 3 Set the MAP display to the PM level and post the LCME powered by the talk battery module by typing

>MAPCI;MTC;PM;POST LCME site lcme_frame_no lcme_no
and pressing the Enter key.

where

site is the name of the site at which the LCME is located

lcme_frame_no is the number of the frame in which the LCME is located

lcme_no is the number of the LCME powered by the talk battery module

Example of a MAP display:

CM	MS	IOD	Net	PM	CCS	Lns	Trks	Ext	APPL
.	.	.	.	1LCME	.	.	.	.	.
LCME			SysB	ManB	OffL	CBsy	ISTb	InSv	
0 Quit	PM	1	0	2	0	2	12		
2 Post_	LCME	0	0	2	0	2	9		
3 ListSet									
4 SwRG	LCME	RSC-S	14 1	ISTb	Links_00S:	CSide	0	PSide	0
5 TrnsL_	Unit0:	InSv			/RG: 1				
6 Tst_	Unit1:	InSv			/RG: 1				
7 Bsy_					11 11 11	RG:Pref	1	ISTB	
8 RTS_	Drwr:	01 23	45 67	89	01 23 4	Stby	0	InSv	
9 OffL		.. ..	.. ..	.. ..	.. ..				
10 LoadPM_									
11 Disp_									
12 Next									
13									
14 QueryPM									
15									
16									
17									
18									

NTRX44 in RSC-S MSP (continued)

- 4 Busy the affected in-service PM unit by typing

>BSY UNIT lcme_unit_no
and pressing the Enter key.

where

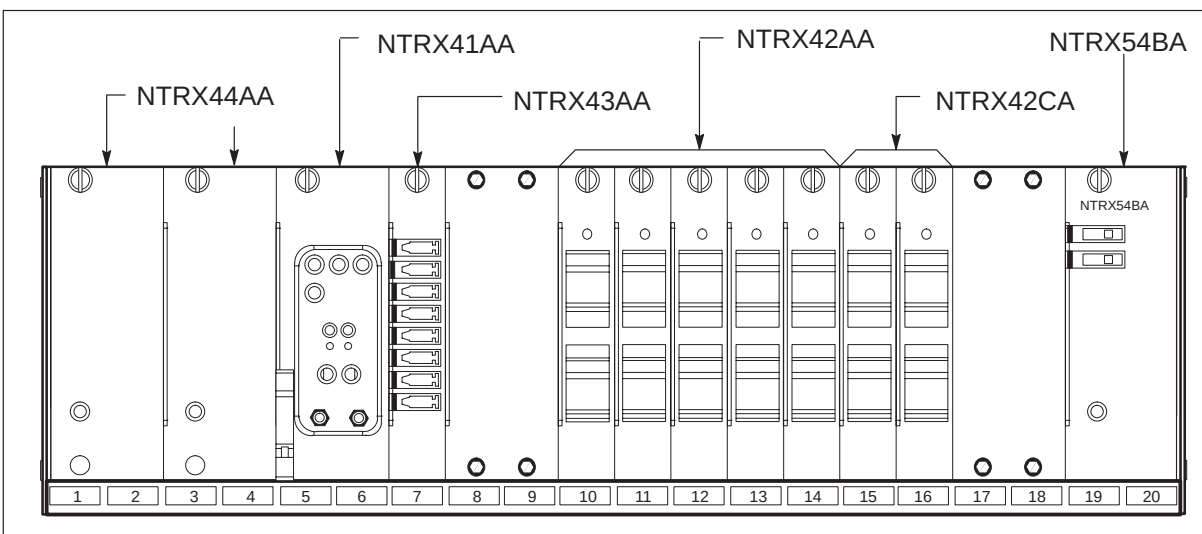
lcme_unit_no is the number of the LCME unit

Note: The talk battery module in slots 1 and 2 controls unit number 0; the module in slots 3 and 4 controls unit number 1.

At the front panel of the cabinet

- 5 Open the front cover of the MSP. Release the two cover latches and swing the cover down to the open position.

Note: The illustrations in this card replacement procedure are for the MSP shelf in an CRSC or CEXT module.



6



WARNING

Risk of injury from high energy levels, static electricity damage

Before removing any cards, put on a wrist strap and connect it to the wrist strap grounding point on the left side of the modular supervisory panel (MSP). This protects the equipment against damage caused by static electricity.

NTRX44
in RSC-S MSP (continued)**WARNING**

Risk of injury from high energy levels, equipment damage

Take these precautions when removing or inserting a card:

1. Do not apply direct pressure to the components.
2. Do not force the cards into the slots.

Put on a wrist strap.

- 7 Turn off the circuit breaker at slot 15 (circuit breaker 12) if replacing the talk battery module in slots 1 and 2. Turn off the circuit breaker at slot 16 (circuit breaker 14) if replacing the talk battery module in slots 3 and 4. These circuit breaker locations correspond to the CRSC and CEXT modules.

Note: The circuit breaker designation may vary depending on the type of cabinet where you are replacing the talk battery module. Please verify the circuit breaker designation at shelf position 61 before replacing the talk battery.

- 8 Pull out the corresponding line shelf approximately 152 mm (6 in.). The line shelf is located below the MSP. This approach permits easier hand access to the connectors on the rear of the MSP.

Note: This step does not apply to the CMIS, CPDC, and CRME.

At the rear panel of the cabinet

9

**WARNING**

Risk of injury from high energy levels, voltage present

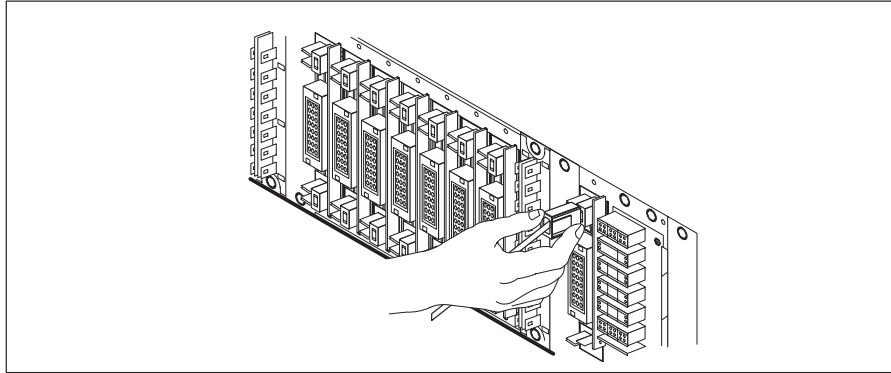
Do not insert metallic objects into the black connectors. Voltage is present and equipment damage could result.

Remove the NTRX44 circuit card as shown in the following figures.

- a. Open the rear doors of the cabinet and locate the back of the circuit card to be replaced. The circuit card is located in slots 1 and 2 for talk battery A or in slots 3 and 4 for talk battery B.

NTRX44 in RSC-S MSP (continued)

- b. Note the wire color and the location to facilitate re-connection.

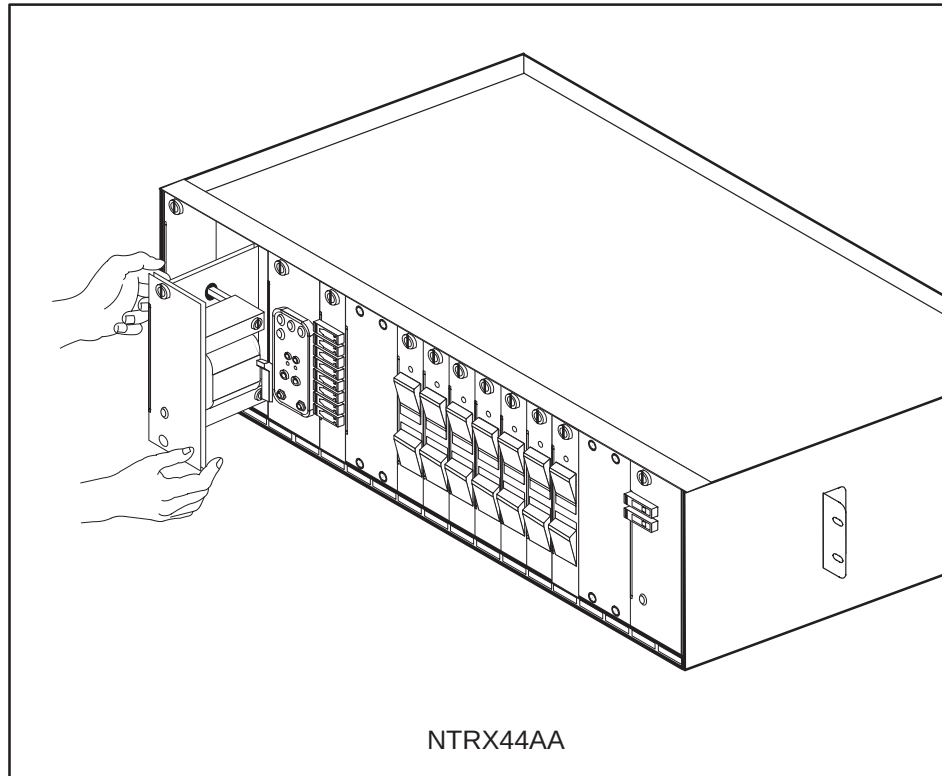


- c. Using the connector removal tool, manually disconnect the power connectors to the circuit card. Working from the bottom of the MSP shelf to the top of the MSP shelf, manually disconnect the smaller black power connectors located below the larger blue power connector. Manually disconnect the large blue power connector. Disconnect the smaller black power connectors located above the large blue power connector. Ensure you disconnect the black connectors *before* removing the circuit card.
- d. Although the connectors have voltage present on them, they are insulated. Secure the connectors to the power-connector bundle with a line-tie until it is time to reconnect them.

NTRX44 **in RSC-S MSP** (continued)

At the front panel of the cabinet

- 10** Remove the NTRX44 card.
 - a.** Disengage the knurled thumbscrew at the top of the card.
 - b.** Gently pull the card toward you until it clears the shelf.

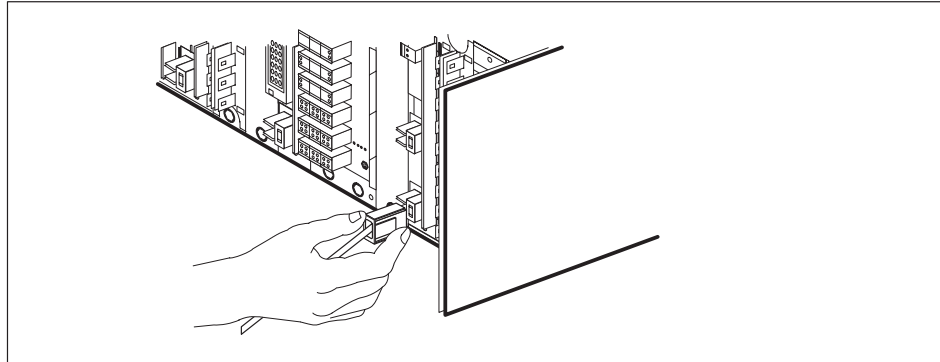


- 11** Ensure the replacement circuit card has the same PEC, including suffix, as the circuit card just removed.
 - a.** Align the circuit card with the slots in the shelf and gently slide the circuit card into the shelf.
 - b.** Gently but firmly seat the circuit card.
 - c.** Tighten the knurled thumbscrew at the top of the circuit card.

NTRX44 in RSC-S MSP (continued)

At the rear panel of the cabinet

- 12 Locate the replaced circuit card and re-attach the power connectors.



- 13 Install the jumper connectors and cables removed in step 9 onto the replacement circuit card.

At the front of the cabinet

- 14 If talk battery A, in slots 1 and 2, was replaced, turn on the circuit breaker at slot 15 (circuit breaker 12). If talk battery B, in slots 3 and 4, was replaced, turn on the circuit breaker at slot 16 (circuit breaker 14).

Note: The circuit breaker designation may vary depending on the type of cabinet where you are replacing the talk battery module. Please verify the circuit breaker designation at shelf position 61 before replacing the talk battery.

- 15 Push in the corresponding line shelf.

Note: This step does *not* apply to the CMIS, CPDC, and CRME.

At the MAP terminal

- 16 Return the LCME to service by typing

>RTS UNIT lcme_unit_no

and pressing the Enter key.

where

lcme_unit_no is the number of the LCME unit

If RTS	Do
passed	step 17
failed	step 19

NTRX44
in RSC-S MSP (end)

- 17 Send any faulty cards for repair according to local procedure.
- 18 Record the date the card was replaced, the serial number of the card, and the symptoms that prompted replacement of the card. Go to step 20.
- 19 Obtain further assistance in replacing this card by contacting the personnel responsible for the next higher level of support.
- 20 You have successfully completed this procedure. Return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.

NTRX54 in RSC-S MSP

Application

Use this procedure to replace an NTRX54 card in a modular supervisory panel (MSP) located in a:

- cabinetized extension module (CEXT)
- cabinetized line concentrating equipment (CLCE)
- cabinetized line module ISDN (CLMI)
- cabinetized power distribution center (CPDC)
- cabinetized remote switching center (CRSC)
- cabinetized miscellaneous equipment (CMIS)

PEC	Suffixes	Name
NTRX54	BA	Fan Power Control Module

Common procedures

None

Action

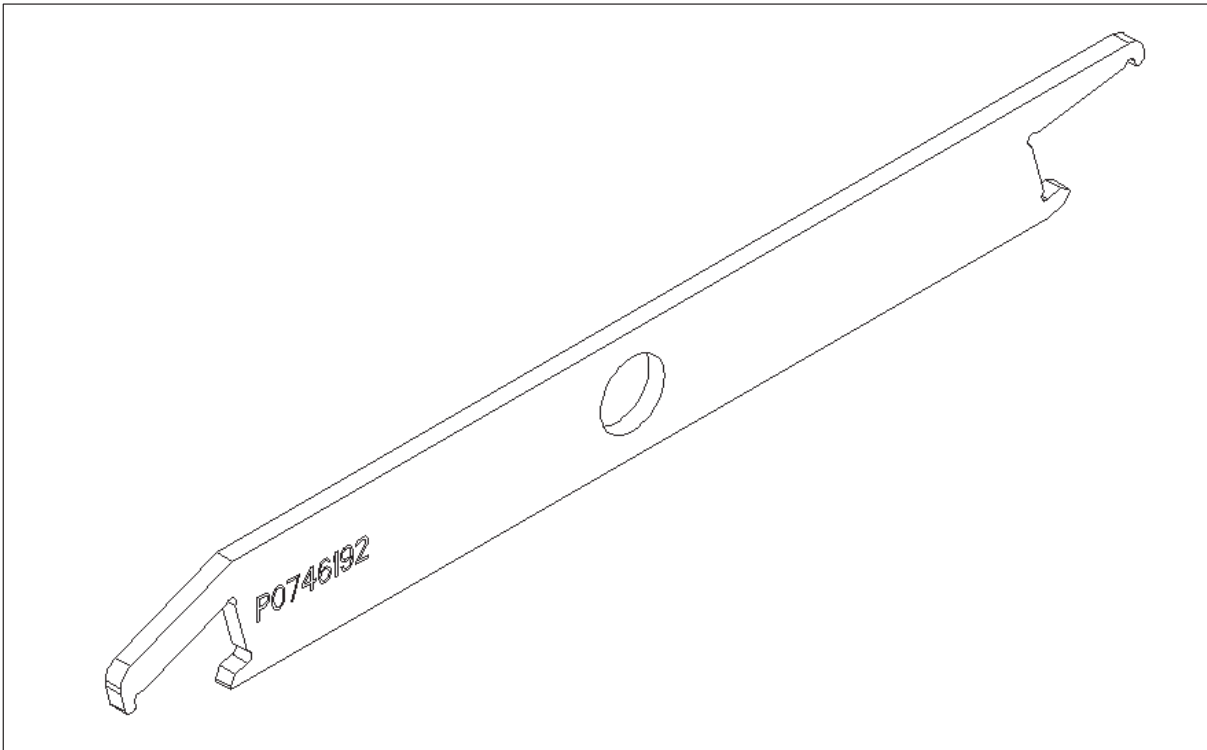
A connector removal tool is available to facilitate removal of the AMP Faston receptacles from the power input and output connectors of the MSP modules. This tool comes in two lengths: P0746192 152 mm (6 in.), and P0747552 254 mm (10 in.). The shorter tool is used when access to the rear of the MSP is very limited. An example of limited access is, MSP modules located directly behind the cabinet bulkhead.

This tool is approximately 2 mm (.090 in.) thick and 17 mm (.65 in.) wide, with a jaw-like cut-out at each end. The cut-out profile conforms to the shape of the Faston receptacle. The shorter tip of each profile is used to position the receptacle in the tool.

NTRX54
in RSC-S MSP (continued)

The first meeting point of the tool serves as the pivot point. By rotating the tool around this pivot point, the longer tip of the profile which has a hook on its end, is engaged with the action-arm of the power connector. As the action-arm of the connector is depressed, the receptacle is disengaged from the connector tab. The receptacle is removed by pulling the tool with the receptacle trapped in its jaw, away from the connector. The tool is disengaged from the receptacle by rotating the tool's hook off the action-arm of the receptacle.

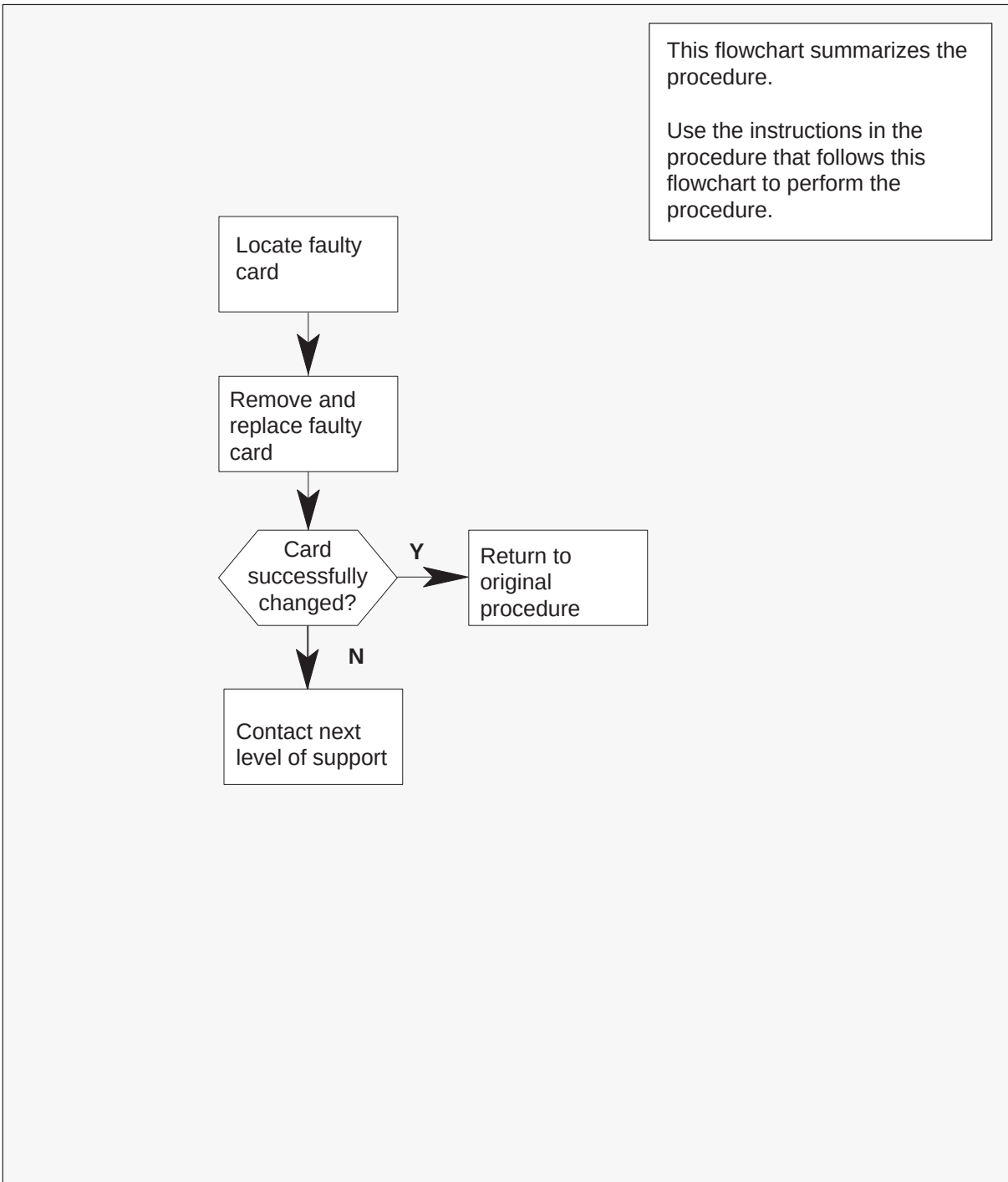
Although the shape of the cut-out is the same on each end of the tool, the orientation of the profile is off by 15 degrees. This difference allows for the use of the tool at different angles, which may be required due to limited access to the connectors.

Connector removal tool

The following flowchart is a summary of this procedure. Use the instructions in the step-action table that follows the flowchart to perform the procedure.

NTRX54 in RSC-S MSP (continued)

Summary of card replacement procedure for an NTRX54 card in RSC-S MSP



NTRX54 in RSC-S MSP (continued)

Replacing an NTRX54 card in RSC-S MSP

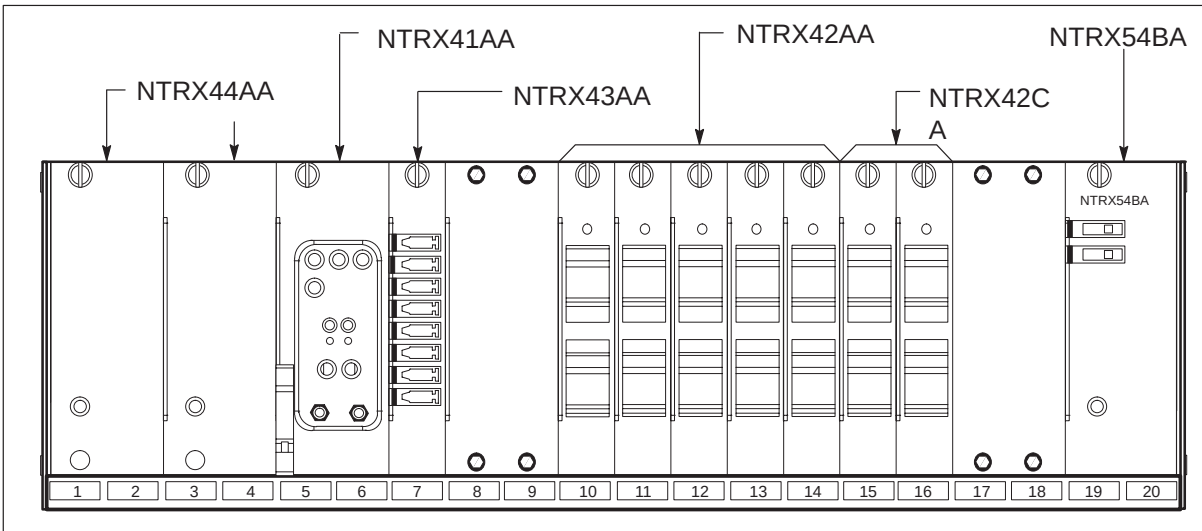
At your Current Location

- 1 Proceed only if you have been directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure for verifying or accepting cards, or have been directed to this procedure by your maintenance support group.
- 2 Obtain a replacement card. Ensure that the replacement card has the same product equipment code (PEC), including suffix, as the card that is to be removed.

At the front panel of the cabinet

- 3 Open the front cover of the MSP. Release the two cover latches and swing the cover down to the open position.

Note: The illustrations in this card replacement procedure are for the MSP shelf in an CRSC or CEXT module. The circuit breaker designation may vary depending on the type of cabinet you are working in.



NTRX54 in RSC-S MSP (continued)

4



WARNING

Risk of injury from high energy levels, static electricity damage

Before removing any cards, put on a wrist strap and connect it to the wrist strap grounding point on the left side of the modular supervisory panel (MSP). This protects the equipment against damage caused by static electricity.



WARNING

Risk of injury from high energy levels, equipment damage

Take these precautions when removing or inserting a card:

1. Do not apply direct pressure to the components.
2. Do not force the cards into the slots.



WARNING

Heat damage

Avoid leaving this card out of service for more than 30 minutes. Extensive damage to the entire cabinet may occur if cooling is lost for more than 30 minutes.

Put on a wrist strap.

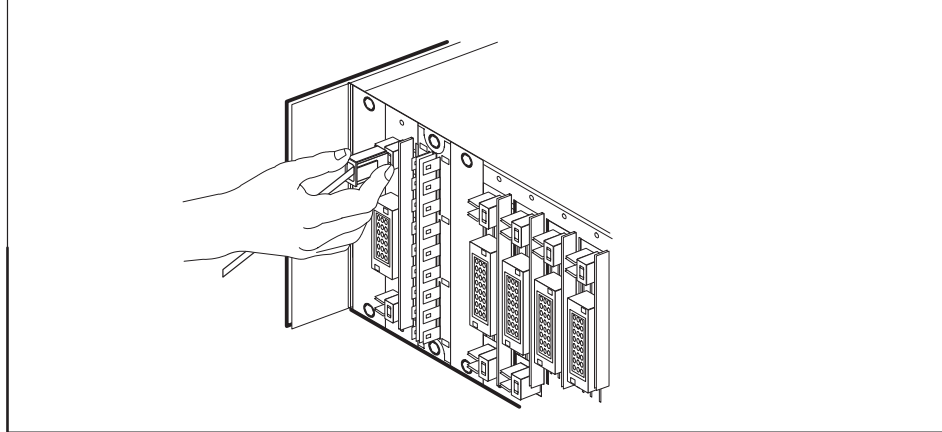
- 5 Remove the two fuses in the fan power control module.

At the rear panel of the cabinet

- 6 Remove the NTRX54 circuit card as shown in the following figures.
- a. Open the rear doors of the cabinet and locate the circuit card, it will be in slots 19 and 20.

NTRX54
in RSC-S MSP (continued)

- b.** Note the wire color and location to facilitate re-connection.

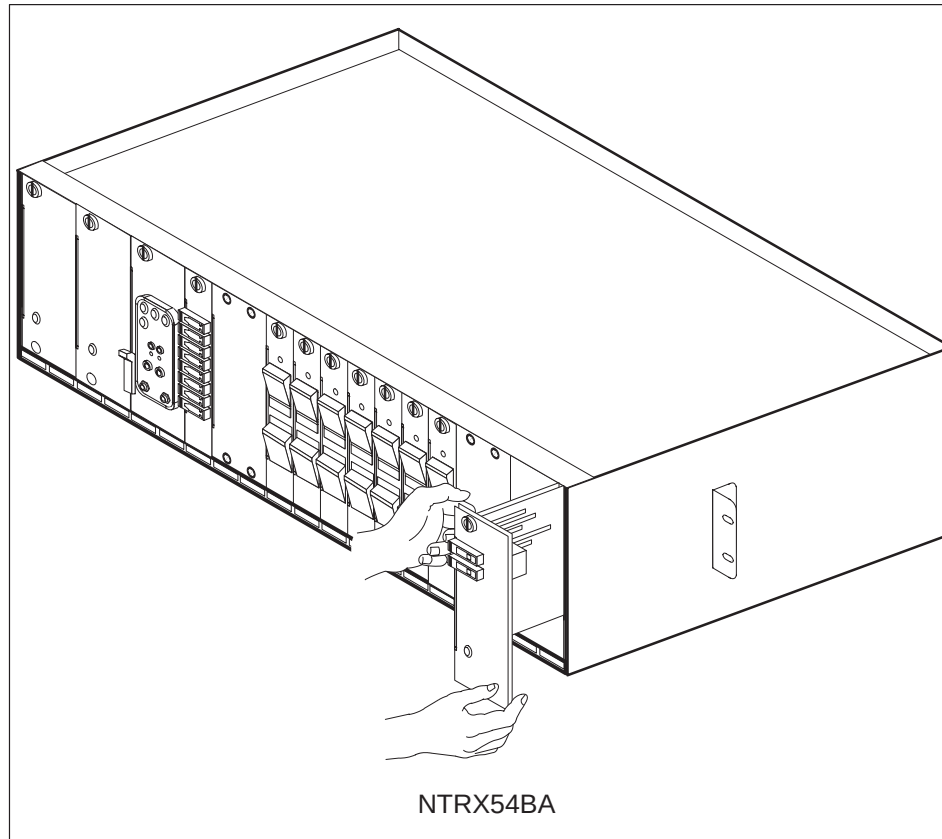


- c.** Using the connector removal tool, manually disconnect the power connectors to the circuit card. Working from the bottom of the MSP shelf to the top of the MSP shelf, manually disconnect the smaller black power connectors located below the larger blue power connector. Manually disconnect the large blue power connector. Disconnect the smaller black power connectors located above the large blue power connector. Ensure you disconnect the black connectors *before* removing the circuit card.
- d.** Although the connectors have voltage present on them, they are insulated. Secure the connectors to the power-connector bundle with a line-tie until it is time to reconnect them.

NTRX54 in RSC-S MSP (continued)

At the front panel of the cabinet

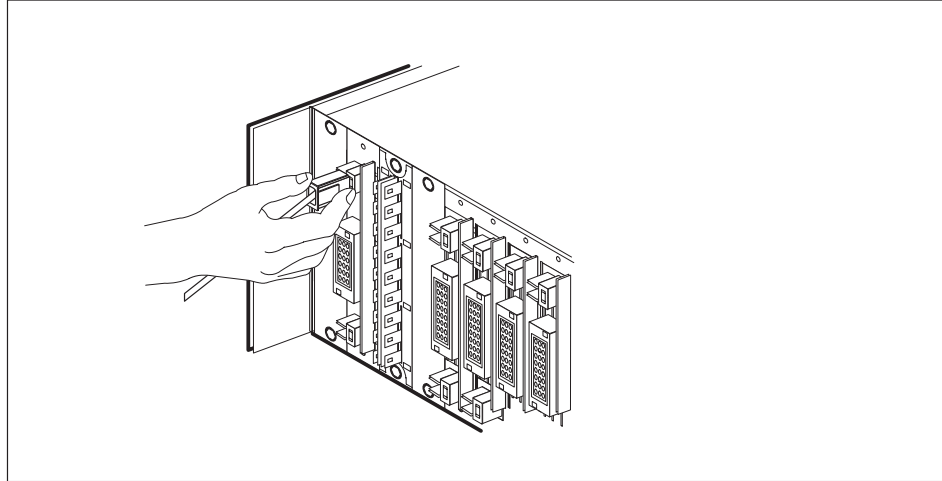
- 7 Remove the NTRX54 card.
 - a. Disengage the knurled thumbscrew at the top of the card.
 - b. Gently pull the card towards you until it clears the shelf.



- 8 Ensure the replacement circuit card has the same PEC, including suffix, as the circuit card just removed.
 - a. Align the circuit card with the slots in the shelf and gently slide the circuit card into the shelf.
 - b. Gently but firmly seat the circuit card.
 - c. Tighten the knurled thumbscrew at the top of the circuit card.

NTRX54
in RSC-S MSP (end)***At the rear panel of the cabinet***

- 9 Locate the replaced circuit card and re-attach the power connectors, as noted in step 6.



- 10 Replace the two fuses removed in step 5.

If fuses	Do
do not blow	step 11
blow (protrude)	step 13

- 11 Send any faulty cards for repair according to local procedure.
- 12 Record the date the card was replaced, the serial number of the card, and the symptoms that prompted replacement of the card. Go to step 14.
- 13 Obtain further assistance in replacing this card by contacting the personnel responsible for the next higher level of support.
- 14 You have successfully completed this procedure. Return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.

Locating and clearing trouble in the RSC-S

The section Locating and clearing trouble in the Remote Switching Center-SONET (RSC-S), is for maintenance engineering and field maintenance personnel use. This section is for personnel that have a basic knowledge of the RSC-S for international applications only.

Trouble isolation and correction

The Remote Switching Center-Synchronous Optical Network (SONET), or RSC-S, consists of the Remote Center Offshore #2 (RCO2) or the RCO2 with integrated services digital network (ISDN). The RSC-S also consists of line concentrating devices (LCD), trunks and the links that connect the components. This chapter describes procedures on how to troubleshoot for these components.

Description of troubleshooting procedures

The RCO2 is the primary component in an RSC-S configuration. The state of the RCO2 normally determines the state of the other RSC-S components.

Locating and clearing faults

This section describes fault location and clearance in terms of trouble condition indicators and trouble conditions.

Trouble condition indicators

Trouble condition indicators are as follows:

- operational measurements (OM)
- log reports
- alarms

Operational measurements

The OMs monitor and count events in the system and detect actual and potential system troubles. Use the OM thresholding feature to monitor and report key RSC-S with ISDN activity. Use these reports each daily or week. Use OMs as the primary method of trouble detection.

Log reports

Use log reports as an analysis tool. Log reports provide information on call errors, diagnostic results and system state. Log reports are good indicators of trouble conditions when the following conditions occur:

- sudden increase in volume of logs
- message not printed reports
- large number of like logs

Alarms

Audible and visual alarms indicate correction action is required. Routine system maintenance and the use of OMs and logs minimizes the occurrence of alarms.

The level of the alarm indicates the seriousness of the alarm and the value of correction. Alarm levels are minor, major, or critical. The following table describes alarm conditions.

Alarm description

Alarms	Map display	Description
Minor	(blank)	Normally does not affect service.
Major	(M)	Normally indicates a condition that causes service degradation.
Critical	(*C*)	Normally indicates a service outage or potential service outage.

Assessing alarms

The MAP terminal subsystems for the RSC-S configuration, produce alarms. The following table lists the alarms and alarm meanings. The table also lists the log reports that normally accompany the alarm.

Assessing PM alarms from the MAP display

MTC level	PM level	Possible descriptions
PM RCO2	ISTb 1	One or both units experience minor problems, normally does not involve the peripheral processor (PP). A static data mismatch is present between an RCO2 unit and the central control (CC). A nonmessaging central side (C-side) link is out-of-service (OOS). A peripheral side (P-side) link is OOS.
PM RCO2 M	ISTb 1	One of the units is system busy (SysB), normally caused by a PP card failure. If the unit is the active unit, the peripheral module (PM) software performs a switch of activity (SWACT) on the units. Check for PM128 logs.
PM RCO2 *C*	SysB 1	Both units are SysB. If communication with the host causes the units to go SysB, the RCO2 enters emergency stand-alone (ESA). The system generates the following sequence of logs when ESA is entered: • PM109—The carrier is busy. • PM128—The RCO2 is in-service trouble (ISTb). • PM107—The RCO2 is C-side busy (CBsy). • PM107—The line concentrating modules (LCM) are CBsy. • PM102—The RCO2 is SysB. • PM181—The RCO2 tries to restart the message links. Another possible reason is that both PPs have faults, and both units are SysB.
—continued—		

Assessing PM alarms from the MAP display (continued)

MTC level	PM level	Possible descriptions
PM RCO2	ISTb 1	One, or both units have minor problems, normally does not involve the PP. When the RCO2 has ISDN capability, the following problems can occur: • The D-channel handler (DCH) card malfunctioned. If a spare DCH is present, the system puts the spare DCH in service (InSv). If a spare DCH is not present, D-channel capability is lost. The RCO2 is set ISTb. • The ISDN signaling preprocessor (ISP) card malfunctioned. The RCO2 cannot process ISDN calls, and the system processes plain ordinary telephone service (POTS) calls.
PM RCO2 M	ISTb 1	One of the RCO2 units is OOS. The RCO2 can process both voice and data calls when this condition occurs.
PM RCO2 *C*	SysB 1	Both RCO2 units are OOS. Voice and data services are lost. If the RCO2 enters ESA, the ability to process data calls depends on the location of the packet handler (PH).
—end—		

Clearing alarms

Use the following guidelines when you respond to alarms:

- When more than one alarm of the same level appears on the MAP display, clear the alarms from the left of the display to the right.
- If, when you fix an alarm, an alarm of greater seriousness occurs, respond to the new alarm. Do not continue attempts to clear the less critical alarm.

For procedures on how to clear alarms, see *Alarm and Performance Monitoring Procedures*.

Trouble conditions

The following trouble conditions can occur in an RSC-S:

- data mismatch
- lines
- DS30A
- pulse code modulation 30 (PCM-30) links
- dual remote center offshore #2 (DRCO2)—available at a future batch change supplement (BCS) release
- forced ESA
- RCO2 with ISDN
- ISDN lines

Data mismatch

When the RCO2 has data mismatch you can busy and return to service (RTS) the RCO2. An example of a data mismatch problem can be a static data mismatch. Operating company personnel can minimize the time to correct data in both RCO2 units through the NODATASYNC parameter with RTS.

When you issue the RTS NODATASYNC command for the inactive unit, the following events occur:

- The system blocks the node translation table transfer from the active to the inactive unit. The node tables are checked to see if the tables match.
- The system loads tatic data from the CC to the inactive unit.
- When the inactive unit returns to service, the system disables data synchronization between the active and inactive unit is disabled.

Note: The NODATASYNC option is valid only for the inactive unit.

When these actions complete, the RCO2 is set ISTb. If the node table does not match, the system produces another PM128 log with the following message:

Node table mismatch.

To cause the static data and node tables to match, perform the following:

- 1 To busy the inactive unit, type

>BSY UNIT n

ATTENTION

The RTS procedures with the NODATASYNC option apply only to XPMs that are not converted to XPM configuration data table (CDT) management. The CDT was introduced in feature AF5678, XPM Node Table SYNC Redesign, to improve synchronization of XPM units. The XPMs with software loads that contain this feature synchronize the node and port tables of both units with the CM, and does not synchronize unit to unit. Feature AF5678 eliminates most out-of-sync causes except hardware failure. An ISTb condition with configuration download clears and associated synchronization of both units occurs when the entire XPM is busied and returned to service. Perform this action only during periods of low traffic to minimize out-of-service impact. For a complete description of this feature, refer to the *Maintenance overview section in this document*.

- 2 To RTS the inactive unit with the NODATASYNC option, type

>RTS UNIT N NODATASYNC

Note: The inactive unit returns to service. If, during the RTS, static data changes, the system produces a PM128 log with the following message:

Mismatch found in node table between the two units.

The QUERYPM FLT command shows a node table mismatch.

- 3 **>SWACT**

All trouble indicators associated with the data mismatch clear as the RCO2 returns to service.

Lines

When a fault is isolated to an LCD, maintenance procedures are like maintenance procedures at the host office. Operating company personnel must make sure faults in an LCM are not the result of a different fault.

DS30A

The DS30A links are on the P-side of the RCO2, and the C-side of the enhanced line concentrating module (LCME). The DS30A links are also on

the LCM and the remote maintenance module (RMM). When these links have faults, this condition also affects associated components.

PCM-30 links

The PCM-30 links are used on the C-side and P-side of the RCO2. The links on the C-side of the RCO2 send voice and messages to the host. The system can use some of the channels as trunks. Channel 0 on ports 1 and 2 are only for messages.

The links on the P-side of the RCO2 connect remote line concentrating modules (RLCM) or other offices that function as trunks. These trunks can be static or dynamic.

Note: The RLCM capability offer occurs at a future BCS release.

DRCO2

A source of trouble for the DRCO2 is the condition of the interlinks. In addition, the condition of the messaging links to the host office can cause the RCO2 to enter dual ESA (DESA). The DRCO2 and DESA are available in a future BCS release.

Forced ESA

When an RCO2 is forced into ESA, the system sends a PM189 log to the host. The PM108 log has a FORCE DOWN message and simulates link faults on messaging links 0 and 2. If these links are posted at the CARRIER level of the MAP display, like POST PLGC 2, the links show the alarm RCGA.

A RCGA is a real alarm if you receive the PM189 log. If links 0 and 2 break while the RCO2 is in forced ESA, the links at the CARRIER level have the LCGA alarm.

Note: Real faults at the RCO2 can be one-way. If the alarm continues to be RCGA, operating company personnel have the PM189 log only. The PM189 log can be wrong. In most occurrences, real faults on the messaging links are two-way and produce LCGA alarms.

RCO2 with ISDN

The following list contains procedures to troubleshoot the RCO2 with ISDN:

- B-channel packet service, ISDN line to Data Packet Network (DPN)
- provisioned B-channel data service, ISDN line to ISDN line
- D-channel packet service
- B-channel voice service
- B-channel circuit-switched data service

The main difference between an RCO2 that does not have ISDN and an RCO2 that has ISDN is the ISP. If the ISP is at fault, the RCO2 with ISDN does not work. Use the QUERY PM FAULT command to check for defective cards before you take other maintenance action.

ISDN lines

The following table contains a list of possible states for the ISDN line card, equipment that is most likely OOS and suggested maintenance actions.

Restoring service to the line

ISLC	OOS equipment	Suggested maintenance action
CUT	Line	Post the ISDN line by the line equipment number (LEN). Enter the DIAG command to determine if the relay is stuck. If the relay is stuck, replace the line card.
LMB	RCO2, LCME, or message link between RCO2 and LCME	Post the ISDN line by the LEN. Enter the CKTLOC command to display the state of all PMs and links associated with the line. Access the MAP level associated with the item that does not have the correct state. Use MAP commands to test suspect components.
DMB	DCH is OOS	Use the CKTLOC command in the LTP level to identify where the fault occurs. Perform one of the following actions: Access DCH and ISG levels of the MAP display. Post the appropriate DCH. Use MAP commands to locate defective components.
—continued—		

Restoring service to the line (continued)

ISLC	OOS equipment	Suggested maintenance action
	Speech link is OOS	Access the PM level of the MAP display. Identify the defective speech link. Test the speech link and return the link to service to restore all LENS associated with the speech link.
	ISG channel	Busy and RTS the ISDN services group (ISG) channel at the ISG level of the MAP display.
	Path fault in RCO2	Perform a SWACT to see if the fault remains present.
	Path fault in LCME	Busy and return the LCME to service if required.
	I-flag is set	Use MAP commands to test for a defective connection or a babbling terminal.
LO	Line	Loss of synchronization between the ISDN line card and the network termination 1 (NT1). This condition is a system-detected fault. The change out of this state occurs when the system detects a synchronization condition. Use commands available at the LTP level of the MAP display to locate defective hardware.
INB	Line	Line undergoes office data modifications. An entry is present in table LNINV. If you cannot take the line out of the INB state, use the CKTLOC command. The CKTLOC verifies the following conditions: • a DCH channel associates with the ISDN line • the path between the DCH and the LEN is not broken
MB	Line	Line is ready for routine maintenance. Enter commands at the LTP level of the MAP display or the line is removed from service. The line is removed from service for maintenance because of a customer complaint. Line undergoes tests that find faults.
—continued—		

Restoring service to the line (continued)

ISLC	OOS equipment	Suggested maintenance action
CPD	Line	Line processes a circuit-switched call. Remove the line from service for possible maintenance activity when the call stops. Access the line from any MAP display for maintenance activity when the state changes to MB. To cancel maintenance activity, post the deload queue at the LTP level of the MAP display.
NEQ	Line	Use the table editor to enter datafill in tables LNINV and DCHINV.
—end—		

Fault isolation tests

This section describes fault isolation tests for the following:

- RCO2
- lines
- RCO2 with ISDN

RCO2

When you troubleshoot the RCO2, you normally access the RCO2 level of the MAP display and enter the QUERYPM FLT command. The following table lists reasons for a SysB RCO2 alarm and the possible conditions. In most occurrences, the log report is the same as the QUERYPM FLT response.

Assessing SysB alarms for the RCO2

Message at RCO2 level	Possible conditions
All C-side Links are Down	The C-side PM cannot talk with the RCO2.
Audit Detected Inconsistent PM Activity	For example, the CC thinks unit 0 is active. Unit 0 is not active. Unit 1 is active. The CC does not know a SWACT occurs. The CC busies and returns both units to service. The units come back with the original CC active/inactive unit configuration.
Audit Detected Inconsistent PM State	The internal state of the active unit is not ready. The state is busy, restart, or synchronizing. This condition is normally a software error. The CC busies and returns the RCO2 and the C-side links to service.
Autonomous Activity Drop	The system generates a SWAC, normally because of a trap or facility audit.
Diagnostics Failed	Unit fails TST or RTS.
Inact Unit Lost Data Synch	Unit-to-unit communication fails. The system cannot perform a SWACT.
PM Audit Detect Fault	A background hardware audits detects a fault.
PM SWACT	A SWACT occurred.
Require Data Load	An error occurs on a PCM-30 link to the unit. The unit waits for a reset by the maintenance system to perform a reset.
Reset WhileIn-Service	An error occurs on a PCM-30 link to the unit. The unit waits for a reset by the maintenance system.
REx Incomplete (Terminated)	The routine exercise (REx) test cannot complete the tests because of an abnormal condition.
	One or more units are ISTb
	The inactive unit is BSY
—continued—	

Assessing SysB alarms for the RCO2 (continued)

Message at RCO2 level	Possible conditions
REx Failed Achieving superframe data synch Inactive OOS Tests Inactive RTS Warm SWACT Inactive OOS Tests after SWACT	A failure occurs when a test runs. The system compensates for the failure. This action generates the message.
Self Test Failed	A background hardware audits detects a fault.
Trap Message Received From PM	Unit sends an initiation complete message to the CC after an auto-restart.
Unsolicited Message Limit Exceeded	Unit sends more than 100 unsolicited messages to the CC in 1 min.
—end—	

The following table lists the possible reasons for an ISTb RCO2 alarm and the possible conditions. In most occurrences, the log report is the same as the QUERYPM FLT response.

Assessing ISTb alarms for the RCO2

Message at RCO2 level	Alarm	Possible conditions
One/Both Unit(s) ISTb	Minor	One or both units are ISTb.
PM Overloaded	Minor	Traffic load exceeds the ability of the PM to process calls.
CSLinks Out of Service	Minor	The C-side message links fail the periodic InSv C-side links test. One test occurs for each minute.
PSLinks Out of Service	Minor	A P-side link like to the LCME or RMM is SysB.
Node Redundancy Lost	Major	A unit is OOS. The RCO2 cannot perform a SWACT if necessary.
Major CSLink Failure	Major	A C-side link failure causes a major alarm.
—continued—		

Assessing ISTb alarms for the RCO2 (continued)

Message at RCO2 level	Alarm	Possible conditions
Critical CSLink Failure	Critical	A C-side link failure causes a critical alarm.
Interlinks out of service	Minor	A DRCO2 interlink is SysB.
Bad MX77 IMC link	Minor	An intermodule communication link is bad.
Bad 6X69 IMC link	Minor	An intermodule communication link is bad.
PM node table mismatch	Minor	The node table data in the RCO2 and in the CC do not match.
Dynamic data sync	Minor	The RCO2 does not achieve dynamic data synchronization.
ESADATA	Minor	The RCO2 does not have an ESA load, or the current load is corrupted or does not match the CC.
Static data mismatch with CC	Minor	The RCO2 static data does not match CC static data.
Data mismatch with inventory table	Minor	The load in table RCCINV does not match the load name according to the CC.
—end—		

Lines

When an LCM alarm appears at the MAP display, enter the LCM level and post the LCMs that match that state. Post the LCM by site to make sure the LCM with the alarm is part of the RSC-S configuration.

If the LCM is part of the RSC-S configuration, post the C-side RCO2 and enter the QUERYPM FLT command. If a response indicates a problem, perform an INSV test. If the test fails, perform normal RCO2 maintenance. After you perform maintenance, the LCM maintenance is the same as the host office.

RCO2 with ISDN

When you troubleshoot the RCO2, operating company personnel normally access the RCO2 level of the MAP display and enter the QUERYPM FLT command.

Diagnostic tests

The following sections describe RSC-S diagnostics.

P-side PCM-30 diagnostics

Diagnostic tests are provided for PCM-30 packet NTMX82. These tests make sure the PCM-30 cards located on the P-side of the RCO2 operate correctly. The CC, XMS-based peripheral module (XPM) maintenance or the XPM monitor implement PCM-30 diagnostic tests.

The following is a list of PCM-30 P-side diagnostics:

- NTMX82 fault detection
- NTMX82 fault isolation

The PCM-30 diagnostics report defects to the unified processor (UP) card (NTMX77). Defects are logged with standard diagnostic format.

The PCM-30 P-side diagnostics use module state and module activity to determine the tests to perform. The type of test depends on the following module states or activity:

- INSV or active state
 - command registers check test
 - channel 12 loop-around to channel 16 test
- busy or active state
 - diagroup loop test
 - international signaling test
 - remote frame alignment test
 - remote multiframe alignment test
 - alarm indication signal test
 - alarm indication signal 16 indication test
 - local loss multiframe alignment test
 - command register check test
- busy or inactive state
 - channel 12 loop-around to channel 16 test

Correct operation of the PCM-30 P-side diagnostics requires the following cards:

- NT6X69 – Universal Tone Receiver (UTR) card
- NTMX73 – PCM Signaling card
- NTMX75 – Matrix card
- NTMX82 – Dual PCM-30 Packlet card

Other diagnostic tests for the RCO2 include:

- universal tone receiver (UTR) test
- extension test
- matrix test (MTX)
- XBERTPSL (OOS carriers only)
- XBERTHLP

The following section describes the signaling diagnostic test.

The CC, XPM diagnostic system or PMDEBUG implement the signaling diagnostic test. The signaling diagnostic test provides a set of diagnostic routines to detect faults in the signaling components of the RCO2 shelf. These tests verify that signaling bits transmit and receive correctly from or to each PCM-30 link. This action includes P-side or C-side of the RCO2.

The signaling diagnostic test performs the following tests:

- 2-ms interrupt test
- ABCD transmit random access memory (RAM) test
- signaling loop test on the signaling circuit card
- signaling loop test on the PCM-30 circuit card

The NTMX73 and NTMX82 cards implement the ABCD bits hardware on the RCO2 shelf. Time Switch 16 of each PCM-30 link connects to the NTMX73 card. The PCM-30 link is the C-side or P-side of the RCO2. A nailed-up connection in the NTMX75 card connects the Time Switch 16. This connection permits the transfer of signaling bits from or to the signaling RAM on the NTMX73 card. This RAM is accessible by the NTMX77 card and the signaling processors.

XPM diagnostic history

Extended Peripheral Modules Diagnostics History, feature number AF5006, provides a resident database to record selected diagnostic results of XPMs. This feature captures diagnostic results that indicate XPM sanity. The data in this database can be used to influence DMS switch maintenance. This database provides operating company personnel with MAP command access to data on the accumulated results of diagnostics. The system retains data in the history data base, over warm, cold and reload restarts. This feature is part of software package New Peripheral Maintenance (NTX270AA) and is not an optional feature.

An XPM can execute diagnostics to test the functionality of hardware. Diagnostics can run because of CC or XPM requests. Diagnostics the XPM performs are normally part of XPM audits. Operating company personnel use diagnostic results from feature AF5006 for system analysis.

Operating company personnel analysis

Feature AF5006 provides data on the failure history of diagnostics. This data consists of the number of failures that occur and the cards at fault. The feature provides the MAP commands to display data for a specified XPM or for all XPMs this feature supports. Short-term failure counts and long-term failure counts data sets are available through the use of MAP commands.

Short-term failure counts Short-term failure counts accumulate from the last time a unit gains activity. Operating company personnel use this data to guide maintenance activities. Supporting organizations use this data for outage analysis. If an outage occurs, include the XPM Diagnostics History data for the peripheral, with other important data.

Long-term failure counts Long-term failure counts accumulate from the last time manual action or BCS application reset long-term failure counts. Long-term failure counts occur for the life of the BCS. This data is channeled back to the designers to provide data for additional diagnostic system improvements.

Functionality this feature describes is implemented on SuperNode and BNR Reduced Instruction Set Computing (BRISC) platforms. For the NT-40 platform, the diagnostic results and suspect cards captured is smaller than the SuperNode or BRISC platforms. The NT-40 data store requirements causes this restriction.

Description of diagnostics

Different PMs contain different hardware. Different diagnostics are run on every type of PM. There are approximately 75 diagnostics for XPMs. Only a part of the 75 diagnostics are run on any specified PM.

This feature captures failures for the following types of diagnostics:

- InSv
- OOS
- single diagnostic
- facility audit
- other audits

Each diagnostic indicates zero or more cards. The XPM determines the number of cards. In some instances, the CC generates card lists for display at the MAP terminal or in logs. A list of card failures includes cards an XPM diagnostic or audit reports to the CC

Note: Feature AF5006 records cards an XPM indicates. Feature AF5006 does not record cards the CC generates.

Diagnostics can run as a set of diagnostics, or as a single test. Defined diagnostic sets are as follows:

- INSV tests
- OOS tests
- facility audit tests
- mate diagnostics
- ROM diagnostics

In-service and out-of-service tests

The INSV and OOS tests are solicited tests. The tests run as a result of CC requests. The CC can request to test an XPM unit with the manual TST command, manual or system RTS, SWACT, BSY or REX commands. The XPM runs a set of diagnostics. The PM type and the state and activity of the XPM unit determine the diagnostics in the set. If the unit is INSV, the XPM runs a set of INSV diagnostics. If the unit is OOS, the XPM runs a set of OOS diagnostics.

The results of each diagnostic return to the CC with a final result for the complete set. If any cards are defective, the system generates a card list. The system transfers the card list to the CC at the termination of the set of tests.

Facility audit

The facility audit is a set of diagnostics the XPM runs as a self-test. If the audit encounters problems, the system transmits a message to the CC. The message indicates the problem and includes a list of defective cards.

Mate diagnostics

If communications are lost with one unit, the mate unit can diagnose the unit. The mate unit sends the results to the CC.

ROM diagnostics

If the XPM is at ROM level, a set of ROM diagnostics can be implemented.

This feature does not capture failures. This feature does not capture the cards that mate and ROM diagnostics indicate. For each diagnostic, the system generates a card list or log at the MAP terminal. Card list or diagnostic failures do not appear in the diagnostic history.

The following table lists and describes diagnostics this feature supports. The diagnostics are classified as solicited, audit or both.

Diagnostics this feature supports

Diagnostic name	Description	Type (solicited or audit)
AB DIAG	A/B Bits	Solicited
AMUDIAG	NT6X50 External Loop	Solicited
CSD1DG	C-Side DS-1	Solicited
CMRDIAG	CLASS modem resource (CMR) card	Both
CONT DG	Continuity Diag	Solicited
CS SPCH	Network Links	Solicited
DCHIALB	DCH Inactive Loopback	Solicited
DS1DIAG	P-Side DS-1	Solicited
DS30A	NT6X48/NTMX74 Audit	Audit
FAC AUD	Facility Audit	Audit
FORMATR	Local Formatter	Solicited
ISPHDLC	ISP High-level Data Link Control (HDLC) Diag	Solicited
ISPSPI	ISP Speech Bus Internal	Solicited
ISPSPHF	ISP Speech Bus Full	Solicited
MSGDIAG	NT6X69 Messaging Card	Solicited
—continued—		

Diagnostics this feature supports (continued)

Diagnostic name	Description	Type (solicited or audit)
MSG IMC	Intermodule Communication (IMC) Link	Both
MX76 MSG	NTMX76 Messaging Card	Solicited
PADRING	NT6X80 Pad/Ring	Solicited
PARITY	Parity Audit	Audit
PS LOOP	P-Side Loops	Solicited
PS SPCH	P-Side Speech Links	Solicited
RCC FMT	Remote Formatter	Solicited
SCM AB	NT6X81 A/B Bits	Solicited
SCM MSG	SCM A/B DDL Msg	Solicited
SPCH DG	Speech Path	Solicited
STRDIAG	Special Tone Receiver	Solicited
SYNC DG	Sync Diag	Both
TONES DG	Tone Diag	Both
TS DIAG	Time Switch Diag	Solicited
UTRDIAG	UTR Card	Solicited
—end—		

The following table lists the cards this feature supports.

Cards this feature supports

Card name	Description
NT6X40	Net Interface Link
NT6X42	Channel Supervision Message (CSM)
NT6X44	Timeswitch and A/B Bit Logic
NTMX77	Unified Processor and Memory
NT6X48	DS30A Interface
NT6X50	DS-1 Interface
NT6X55	DS-0 Interface
NT6X62	Selective Trunk Reservation (STR) Card
NT6X69	Messaging Card
NT6X70	Continuity Card
NT6X72	Remote Cluster Controller (RCC) Host Link Formatter
NT6X78	CMR
NT6X79	Tone Generator
NT6X80	SCM Pad/Padring
NT6X81	SCM A/B Bit
NT6X85	SCM DS-1
NT6X86	SCM MSG
NT6X92	UTR
NT8X18	Subscriber Carrier Module-100S Remote (SMSR) C-side DS30A Interface
NTBX01	ISP
NTBX02	DCH
NTMX76	CSM + MSG Card
NTMX77	68020 Processor (UP)

How diagnostics are stored

This feature stores diagnostic results in the form of counters. Each unit of each peripheral this feature supports, has a set of counters. Counters are kept for diagnostic failures and for defective cards. Three types of counters are kept:

- diag—the number of times a diagnostic fails
- card—the number of times a card is reported as defective
- diag and card combination—the number of times a diagnostic and card combination occurs

Two subcounters are kept for each of the three counters. The sub counters are a short-term failure counter and a long-term failure counter. Short-term failure counters are reset in the BCS cycle. Long-term failure counters record the diagnostic history of a peripheral or office over an extended period of time. The QUERYPM DIAGHIST RESET command or a BCS application reset long-term failure counters.

A single test failure can report one or more diagnostic failures and zero or more defective cards. A diagnostic that runs in one unit can report cards in that unit and in the mate unit. Only specified diagnostics report failures on the mate unit. When a diagnostic fails, each diagnostic sends the failure information to the history database.

Resets and time stamps

The history database stores five time stamps for each peripheral:

- for the node
 - the time when long-term failure counters are last reset
- for unit 0
 - the time when short-term failure counters for unit 0 are last reset
 - the time when the last diagnostic failure occurs on unit 0
- for unit 1
 - the time when short-term failure counters for unit 1 are last reset
 - the time when the last diagnostic failure occurs on unit 1

Short-term counters are reset (set to zero) internally for a unit when a unit gains activity. This gain of activity can occur because of an RTS or SWACT command. Long-term counters are reset for a node from an XPM posted at the MAP terminal. When long-term counters are reset, the system generates a log. The log contains a summary of the data collected for that node before the reset occurred.

A BCS application resets all diagnostic history data. This data includes short- and long-term failure counts. In this occurrence, the system does not generate a log with long-term failure counts.

Diagnostic tests for the RSC-S and RSC-S with ISDN are performed on the following components:

- RCO2
- lines
- DRCO2
- RCO2 with ISDN
- ISDN lines

RCO2

The diagnostic tests for the RCO2 occur when the user issues the TST command.

Lines

When the user performs a test on a subscriber line, the user must perform the command several times. This action makes sure the PCM-30 links do not affect the results of the test.

DRCO2

The diagnostic tests for the interlinks of the DRCO2 occur when the IRLINK level issues the TST command.

RCO2 with ISDN

The diagnostic tests for the RCO2 occur when the user issues the TST command.

ISDN lines

When the user performs a test on a subscriber line, the user must perform the command several times. This action makes sure the PCM-links do not affect the results of the test.

RSC-S Enhanced Line Testing 1

Feature AF4838, RSC-S Enhanced Line Testing 1, verifies the functionality provided in phases 1 and 2 of the DMS-100 switch translation language 1 project is provided for ISDN 2B1Q loops subtending LCMEs attached to an ISDN RCO2.

An operating system is the system of an operating company that supports operation, administration and maintenance (OAM) of subscriber loops, trunks, POTS and special services. The operating system also supports other services the DMS-100 switch provides. An operating system communicates with a DMS-100 switch with an X.25 data link. The interface between an operating system and DMS-100 switch is the translation language 1, command and response set.

The ISDN translation language 1 project provides the following abilities:

- support X.25 data links between operating systems and the DMS-100 switch
- ability to decode and encode translation language 1 commands and responses
- execution of maintenance activities translation language 1 commands specify, and generation of responses that contain the results of maintenance activities
- support of test equipment required to execute maintenance activities
- support of commands at the LTPISDN and LTPLTA levels of the MAP display to allow support of ISDN 2B1Q loop and line activities

The TEST command is a menu command available at the LTPISDN MAP level. The test command requires an ISDN 2B1Q loop to be posted in order to function. The TEST command consists of many options, which are also referred to as unlisted menu commands. Each option or unlisted menu of the TEST command is a test provided in support of a translation language 1 command. These tests implement ISDN loop and line maintenance activities.

All tests are implemented at the LTPISDN MAP level, except for the ac resistance test. The ac resistance test is implemented at the LTPLTA MAP level. The user implements each test at the LTPISDN MAP level with the TEST command and a specified option. The user implement the ac resistance test with the RES command with ac as an option. The RES command is a menu command that requires a posted line in order to function.

The following table describes the commands and options.

MAP commands, options and activities

Command	Option and activity
CONN-DTAC-ISDN	Indicates the start of a test session. Tests and measurements that require digital test access next can occur. The system seizes the tested line and keeps the line OOS for the duration of the test.
CONN-MTAC-ISDN	Indicates the start of a test session. Tests and measurements that require metallic test access (MTA) can occur. The system seizes the tested line and keeps the line OOS for the duration of the test.
DGN-DET-TOTS	Requests a complete set of tests on the ISDN 2B1Q line card, digital subscriber loop and 2B1Q NT1. This command determines if a fault is present in a 2B1Q loop component. The system stops this command when a fault is found.
DISC-TACC	Indicates the end of a test session. Connections set up with the connect commands are released. The line returns to the previous state.
MEAS IMPNSE	Measures impulse noise on the loop for a specified time.
MEAS-LOOP-LOSS	Measures the 2B1Q signal level the NT1 generates. Identifies the presence of load coils on the loop and verifies if the amount of loss is acceptable
MEAS-NSE	Measures wideband noise interference on the digital subscriber loop.
MEAS-SCUR-DSL	Measures the sealing current that the ISDN 2B1Q line card on the digital subscriber loop generates.
REPT-ALM	The DMS-100 switch generates this command when a failure appears on one or more test sessions.
REPT-INITZN	An autonomous command the operating system or the DMS-100 switch sends. The operating system uses this command to verify the DMS-100 switch is online and reinitialization is complete. The DMS-100 switch uses this command to report the switch went through a reinitialization.
REPT-STAT	Checks the X.25 data link operation. The operating system automatically sends this command to the DMS-100 switch if additional messages are not sent in the last 60 s.
—continued—	

MAP commands, options and activities (continued)

Command	Option and activity
RES AC	Implements the measurement of two-terminal ac resistance. This measurement calculates a three-terminal resistance to identify terminations and high resistance open circuits.
RMV-TOTS	Removes services from an ISDN 2B1Q line and places the line in a manual OOS state.
RST-TOTS	Restores service to an ISDN 2B1Q line and places the line in an idle INSV state.
RTRV-COND-ISDNL2	Instructs the DMS-100 switch to retrieve the current line state and standing condition (alarm or status) associated with one or more lines.
RTRV-DNCT	Retrieves the physical equipment associated with the directory number (DN) and call type of the line.
RTVR-PM-TOTS	Retrieves the current set of performance monitoring data associated with an ISDN 2B1Q line. The data consists of block errors, errored seconds and severely errored seconds in both directions of the transmission path.
RTRV-TRNSL	Retrieves the translation information associated with an ISDN line. This information helps to determine if an ISDN 2B1Q line does not work because of datafill problems.
TEST ALM	Verifies the ability of the DMS-100 switch to detect and report loss of signal without an NT1 dying gasp.
TEST COLDST	Implements the cold start test. The cold start test checks the ability of the ISDN 2B1Q line card to train the echo cancellers and equalizers to an NT1 over a maximum length in 15 s.
TEST DCSIG	Implements the NT1 signature test. This command measures the direct current metallic termination characteristic of the NT1.
TEST DET	Implements the performance monitoring test. This command checks the ability of the ISDN 2B1Q line card to detect bit block errors, errored and severely errored seconds for a specified direction of transmission.
—continued—	

MAP commands, options and activities (continued)

Command	Option and activity
TEST ILOSS	Implements the measurement of insertion loss test. This command implements the measurement of insertion loss on an ISDN 2B1Q digital subscriber loop.
TEST IMP	Implements the impulse noise measurement test. This command implements the measurement of impulse noise on an ISDN 2B1Q digital subscriber loop.
TEST NSE	Implements the measurement of wideband noise interference test. Use this command to implement the measurement of wideband noise interference on an ISDN 2B1Q digital loop subscriber.
TEST SCUR	Implements the sealing current measurement test on an ISDN 2B1Q line card. During this test, sealing current is applied when the test equipment verifies the current is in the acceptable range.
TEST THR	Implements the performance monitoring threshold test. This command checks the ability of the ISDN 2B1Q line card to report threshold crossings for bit block errors and errored seconds. This command checks the ability of the ISDN 2B1Q line card to report threshold crossings for severely errored seconds for a specified direction of transmission.
TST-LPBK-ISDN	Performs bit error tests on an ISDN line card and the digital subscriber loop to the NT1
TST-PM	Checks the ability of the ISDN 2B1Q line card to detect bit block error, errored seconds and severely errored seconds for a specified direction of transmission.
TST-QISDN	Performs loop measurements on the ISDN 2B1Q digital subscriber loop.
TST-THRS	Checks the ability of the ISDN 2B1Q line card to report threshold crossings for bit block errors, errored seconds and severely errored seconds for a specified direction of transmission.
—end—	

RSC-S Layer 1 Performance Monitoring

Feature AF4842, RSC-S Layer 1 Performance Monitoring, provides the following layer 1 performance monitoring abilities to the RCO2:

- Bd-channel logical loopback
- DCH performance OMs
- layer 1 performance monitoring
- multipoint embedded operations channel (EOC)

Note: Refer to the *Operational Measurements Reference Manual* for information on DCH OMs.

Bd-channel logical loopback

The Bd-channel logical loopback provides logical loopback ability between a DCH and the PH in the DPN. The Bd-channel logical loopback allows operating company personnel to place the P-side link of a logical terminal into a loopback mode. A logical loopback helps determine if a fault is present inside or outside the DCH.

This loopback is asserted at the DCH end of the connection, not the PH end. When the logical loopback is implemented for a logical terminal, the DCH loops back the test frame or test packet that the PH sends. Operating company personnel perform this loopback with the logical terminal identifier (LTID) for that logical terminal.

A command at the LTPISDN level of the MAP display places the P-side link of a logical terminal in the logical loopback mode. The system places the P-side link of a logical terminal in a logical loopback mode. The DCH makes sure the logical terminal cannot use that P-side link. The DCH makes sure the logical terminal cannot use the P-side link to establish new packet-switched virtual calls (SVC). The DPN PH drops active SVCs on the P-side link before the system places the P-side link in the loopback mode. Current permanent virtual circuits (PVC) on the P-side link are also dropped while the P-side link is in the loopback mode.

The logical terminal can send link access procedures on D-channel (LAPD) frames when the P-side link is not in a logical loopback mode. The DPN PH must logically enable the P-side link for this action to occur. The P-side link comes out of the loopback mode when the loopback timer associated with the logical timer expires. The P-side link comes out of the loopback mode when the LTLOOPBK command at the LTPISDN level of the MAP display is implemented. If the PH sends any LAPD frames on this LTID, the frames loop back to the PH.

Note 1: The loopback timer is one of the parameters the user enters when the P-side of logical terminal is in the logical loopback mode.

Note 2: This feature does not support an attempt to loop back a P-side of a logical terminal, that stops on a DMS switch.

Emergency stand-alone effects In ESA, SWACT, and restart conditions, the result of loopback maintenance is not known. Remove all Bd-channel loopbacks before or after these maintenance activities.

Layer 1 performance monitoring

Layer 1 performance monitoring provides layer 1 monitoring abilities for a 2B1Q loop. Layer 1 monitoring comprises performance monitoring of cyclic redundancy checks (CRC) and block error events. In addition, layer 1 monitoring comprise the monitoring of loop conditions like synchronization, signal occurrence and NT1 power status. Performance monitoring includes loop state monitoring for each loop and each office. Performance monitoring includes the ability to set one of 16 performance monitoring threshold sets for a 2B1Q loop. This section describes monitoring abilities.

Monitoring capabilities

Monitoring capabilities include the ability to enable or disable reports of performance monitoring alerts and status alarms. Logs for each loop and each office make the reports.

Loop state monitoring permits loops to report the following abnormal layer 1 conditions:

- loss of synchronization word (LOSW)
- loss of signal with no dying gasp (LOS)
- loss of signal with dying gasp (LOSDG)
- change of NT1 test mode (NTM)
- S/T interface synchronization lost (TSYNC)
- performance monitor reporting (PERF)

The following abilities are provided for handling performance monitoring data:

- The ability to define a maximum of 16 performance monitoring threshold sets for use in the generation of alerts by subscriber loops. Each set contains a maximum of four thresholds, which are listed below:
 - errored seconds—hourly (1 through 4095)
 - errored seconds—daily (1 through 16383)
 - severely errored seconds—hourly (1 through 4095)

— severely errored seconds—daily (1 through 16383)

Note: An errored second occurs when one or more CRC problems in a single direction of transmission during a 1 s interval. A severely errored second occurs when three or more CRC problems in a single direction of transmission during a 1 s interval.

- The ability to set one of 16 predefined threshold sets to any 2B1Q loop. Performance monitoring thresholding for each loop, is provided but not limited to prethreshold set values. Threshold data is delivered to line card hardware. Each threshold information of a loop is preserved over a BCS application.

Note: If a threshold parameter for far-end block error meets or exceeds the threshold level on an ISDN line card, the system generates a log. If a threshold parameter for near-end block error meets or exceeds the threshold level on an ISDN line card, the system generates a log. Near-end refers to the parameters collected for the NT1 to ISDN line card of data transmission on a U-loop. Far-end refers to the parameters collected from the opposite direction of transmission.

- the ability for the time-of-day (TOD) reference clock of each 2B1Q loop to synchronize with the master clock of the DMS-100 switch
- the ability to detect and correct threshold and TOD values on line cards with a periodic line by line audit
- the 2B1Q diagnostic functionality verifies threshold levels in the ISDN line card. The user implements this functionality from the MAP display.

Tables added or modified for layer 1 performance monitoring

Tables BLMTHRSR and LNTHRSR are added to support 2B1Q lines off an RCO2.

Table BLMTHRSR assists in the definition of threshold combinations for 2B1Q loops. Table LNTHRSR supports the preservation of threshold and alarm report data over a BCS application for 2B1Q and S/T loops. There is an entry for each 2B1Q loop with a nondefault threshold combination or nondefault alarm reporting capability.

Table Office Variable (OFCVAR) controls the default alarm reporting state of loops with datafill. The following OFCVAR parameters support 2B1Q lines off an RCO2:

- The ISDN_PERFORMANCE_MON_ALARM controls reports of performance monitoring log LINE131 on an office basis
- The ISDN_LOSS_OF_SYNC_WORD_ALARM, controls reports of layer 1 loss of synchronization

- The ISDN_LOSS_OF_SIG_NO_DGASP_ALARM, controls reports of layer 1 loss of signal without dying gasp by 2B1Q loops for each office
- The ISDN_LOSS_OF_SIG_DGASP_ALARM, controls reports of layer 1 loss of signal with dying gasp by 2B1Q loops on an office basis
- ISDN_NT1_TEST_MODE_ALARM controls reports of NT1 test mode by 2B1Q loops for each office
- ISDN_T_SYNC_LOST_ALARM, controls reports of T-SYNC by 2B1Q and S/T loops on an office basis

Emergency stand-alone effects Data changes that occur when the RSC-S is in ESA are not guaranteed in the subtending nodes of the remote after a warm ESA exit. When communications are restored with the host office, the state of the RSC-S is guaranteed to equal that state before the RSC-S enters ESA.

Table BLMTHRSH contains 16 PM threshold sets. These values do not change often. These values rarely change when the RSC-S is in ESA. If data updates of the LCME with changed data does not occur, the lines from the LCME use old threshold values.

Table LNTHRSH contains lines that do not use default values. If you perform changes on a line while the RSC-S is in ESA, the line uses the old value or default value. An audit corrects mismatches between ISDN line cards and the CC. The LCDI_SYNC_BURST and LCDI_SYNC_DELAY office parameters in table OFCENG determine the frequency of this audit. To disable this audit, set the LCDI_SYNC_BURST office parameter to zero. It is not recommended that you disable this audit. The system generates log report LINE148 if the audit detects and corrects mismatches.

The current procedure to restore all the data in the RSC-S and subtending nodes is in the following procedure. You do not always want to update the data of the LCME after you warm exit ESA with this procedure. This decision depends on the data that changes during ESA. Operating company personnel must determine if the changed data requires an update in the LCME.

Updating the LCME data after ESA warm exit

- 1 Wait for the inactive unit of the RSC-S to RTS. The active RSC-S unit does not receive a copy of the static data of the current CC. The inactive RSC-S unit undergoes a full RTS. Static data is updated.
- 2 Perform a SWACT on the RSC-S. This SWACT switches activity between the active and inactive units. The active unit becomes inactive and undergoes an initialization. Static data is downloaded.

- 3 For each LCME that attaches to the RSC-S, busy and RTS each unit in sequence. This action allows the other unit to control call processing during the busy and RTS procedure. This process makes sure new data downloads to both units of the PM.
- 4 The procedure is complete.

Multipoint embedded operations channel

Multipoint embedded operations channel (EOC) permits operating company personnel to determine the multipoint EOC configuration of a 2B1Q loop. The EOC permits operating company personnel to perform diagnostics on 2B1Q lines with multipoint EOC. Multipoint EOC also permits operating company personnel to set and release a B1, B2 or 2B+D loopback at the multipoint EOC nodes.

The EOC was first proposed for the digital subscriber line to give access to necessary operations functionality in the NT1. The following EOC configurations are possible:

- standard EOC
- multipoint EOC

Standard EOC

The standard EOC defines the operations interface to send operation messages across the customer to network interface. Standard EOC is point-to-point EOC. Point-to-point EOC occurs when two end nodes access the EOC. When you use point-to-point capability the NT1 connects to the ISDN line card. The associated channel between the ISDN line card and the NT1 for OAM purposes, is the point-to-point EOC channel. Use the EOC channel to conduct exercises like logical loopback on each B-channel or all 2B+D loop.

Multipoint EOC

Multipoint EOC occurs when additional nodes are placed on the 2B1Q loop between the ISDN line card and NT1. These additional nodes access the same EOC and allow the transport of basic rate 2B+D information over a T1 span line. The additional nodes pass EOC signals unaltered from a digital subscriber line to a digital carrier facility. Signals also pass unaltered from a digital carrier facility to a digital subscriber line. The additional nodes can monitor information on an ISDN line card and store errors.

With enhanced EOC messaging, data transfer occurs between these nodes and the ISDN line card. This messaging allows the DMS-100 switch to monitor the performance of an ISDN loop at a specified node. This messaging allows the DMS-100 switch to instruct a node to set a loopback on a specified channel. The EOC specification for multipoint EOC expands

on the point-to-point EOC specification. There can be from one to six multipoint EOCs on a 2B1Q line.

Note: Differences are present between point-to-point EOC and multipoint EOC. With multipoint EOC, loopback can occur at points in the loop.

Multipoint EOC provides the following abilities:

- a table that allows operating company personnel to list all 2B1Q loops with multipoint EOC nodes

Note: The name node also refers to line unit.

- the ability to determine the multipoint EOC configuration of the loop
- improved SUSTATE and QLEN commands display multipoint EOC configurations and state information
- the ability to perform diagnostics on 2B1Q lines with multipoint EOC line units
- the ability to set and release a B1, B2 or 2B+D loopback at a multipoint EOC node

A 2B1Q loop has multipoint capability when the LEN and the number of nodes in the loop are in table LNMPEOC. Table LNMPEOC supports 2B1Q lines off an RCO2. Multipoint EOC messages from the LCME automatically enter datafill in table LNMPEOC. The user reads table LNMPEOC. The LENs that support multipoint EOC are in sequence. All 480 lines on an LCME can support multipoint EOC capability. Multipoint EOC data in table LNMPEOC is maintained over all restarts and BCS applications.

When multipoint hardware is on a loop, the LCME detects this change and reports the change to the computing module (CM). An audit in the LCME reports this detection of hardware. The audit cycles through all 2B1Q loops on an LCME to check for multipoint EOC nodes. When the CM receives this message, the data is validated and the system adds a tuple to table LNMPEOC. The system generates log report LINE149 that states the loop contains multipoint EOC nodes. When a change to the multipoint EOC configuration of a loop occurs, the LCME informs the CM. The change is applied in table LNMPEOC. The system generates log report LINE149. The LCME performs a second audit to make sure of multipoint EOC accuracy between the LCME and the CM.

The time required to poll a multipoint EOC loop depends on the location of the loop in the LCME. When a logical drawer has 2B1Q loops, the audit can take 8 min to detect a change in the multipoint EOC configuration. You

must spread the 2B1Q loops evenly across all logical drawers. This action makes sure reports of 2B1Q loops occur in the same time period.

Note: Multipoint EOC physical loopbacks are released and the loop returns to the idle state with restarts.

Emergency stand-alone effects

Physical loopbacks set before ESA entry are maintained on ESA exit. The loop remains manually busy (ManB). If you add or delete multipoint EOC line units from a LEN while the RSC-S is in ESA, line diagnostics are affected. In addition, this action affects output from the SUSTATE command. The QLEN command receives information from CC. The QLEN is not affected.

Examples that can appear at the MAP display when loopbacks are set and released at a multipoint EOC line unit, are as follows.

The following figure describes LTPdata MAP display of an ISDN loop where a B1 loopback is set at multipoint EOC line unit 3. To set this loopback, issue the following command:

>LOOPBK MPLU 3 B1

Example of LOOPBK MPLU 3 B1 MAP display

CM	MS	IOD	NET	PM	CCS	LNS	Trks 10 GC	Ext	APPL	E:
.	.	.	.	.	.	.	*C*	.	.	.
LTPDATA										
1 Quit_		POST		DELQ		BSYQ	PREFIX			
2 Post_										
3		LCC PTY RNG		.LEN DN		STA	F S LTA	TE	RESULT	
4 Equip_	ISDN	LOOP		HOST 67 0 08 15			7226345	MB	.	
5 Connect_										
6 Sustate										
7 LoopBk_										
8 BERT										
9										
10 BPVO_										
11 Hold		B1		Loopback activated at MPLU 3						
12 Next_										
13										
14										
15										
16										
17										
18										

The following figure describes the LTPdata MAP display of an ISDN loop where a B1 loopback is set at multipoint EOC line unit 3. In addition, a loopback query is issued. To query this loopback, issue the following command:

>LOOPBK QUERY

Example of LOOPBK QUERY MAP display

CM	MS	IOD	NET	PM	CCS	LNS	Trks 10 GC	Ext	APPL
.	.	.	.	.	.	.	*C*	.	.
LTPDATA									
1	Quit_	POST		DELQ		BSYQ	PREFIX		
2	Post_								
3		LCC PTY	RNG	LEN.....	DN	STA	F S LTA TE	RESULT	
4	Equip_	ISDN	LOOP	HOST	67 0 08 15		7226345	MB	.
5	Connect_								
6	Sustate								
7	LoopBk_								
8	BERT								
9									
10	BPVO_								
11	Hold	B1	Loopback on	HOST	67 0 08 15		722 6345	at MPLU	3
12	Next_								
13									
14									
15									
16									
17									
18									

The following figure describes the LTPdata MAP display of an ISDN loop where a B1 loopback is released from multipoint EOC line unit 3. To release this loopback, issue the following command:

>LOOPBK RLS

Example of LOOPBK RLS MAP display

CM	MS	IOD	NET	PM	CCS	LNS	Trks 10 GC	Ext	APPL
.	.	.	.	.	.	.	*C*	.	.
LTPDATA									
1	Quit_	POST		DELQ		BSYQ	PREFIX		
2	Post_								
3		LCC PTY RNG		LEN.....	DN	STA	F S LTA TE	RESULT	
4	Equip_	ISDN	LOOP	HOST	67 0 08 15		7226345	IDL	.
5	Connect_								
6	Sustate								
7	LoopBk_								
8	BERT								
9									
10	BPVO_								
11	Hold	B1	Loopback at MPLU 3 released						
12	Next_								
13									
14									
15									
16									
17									
18									

The following figure describes the LTPdata MAP display of an ISDN loop where a 2B+D loopback is set at multipoint EOC line unit 6. To set this loopback, issue the following command:

>LOOPBK MPLU 6 BBD

Example of LOOPBK MPLU 6 BBD MAP display

CM	MS	IOD	NET	PM	CCS	LNS	Trks 10 GC	Ext	APPL
.	.	.	.	.	.	.	*C*	.	.
LTPDATA									
1	Quit_	POST		DELQ		BSYQ	PREFIX		
2	Post_								
3		LCC PTY RNG	.....	LEN.....	DN	STA	F S LTA TE	RESULT	
4	Equip_	ISDN	LOOP	HOST	67 0 08 15		7226345	MB	.
5	Connect_								
6	Sustate								
7	LoopBk_								
8	BERT								
9									
10	BPVO_								
11	Hold		Bl	Loopback activated at MPLU 6					
12	Next_								
13									
14									
15									
16									
17									
18									

Ring pretrip on LCM lines

A ring pretrip is a premature ring trip. It is a false indication that the ringing phone was answered.

In NA009, the PRETRIP nonmenu command is added to the LCM level. The PRETRIP command provides operating company personnel the

- option to enable or disable pretrip log reports on the posted LCM or all LCMs in the posted set
- option to enable or disable extension of the ring trip filter timing on all 4FR lines on the posted LCM or all LCMs in the posted set
- ability to query the status of the two previous pretrip options

Note: When a new LCM tuple is entered in table LCMINV, the value for LOGS and 4FR are set to DISABLE by default.

In response to the command string **HELP PRETRIP**, the command syntax is displayed at the MAP terminal as follows.

```
>help pretrip
PRETRIP : AVAILABLE RINGING PRETRIP OPTIONS
  LOGS: Enable/Disable Pretrip LOG Reporting for
        the posted PM or posted set of PMs.
  4FR:  Used to reduce Ring Pretrip occurrences on
        long loop length 4FR lines. Enabling this
        command results in extension of the Ring
        Trip filter timing for ALL lines serviced
        by the posted PM or posted set of PMs.
  Query: Displays the status of Pretrip options
  Params: <OPTION>      {LOGS      <ACTION> {ENABLE   [<OPTION> {ALL}},
                        {DISABLE  [<OPTION> {ALL}]} [<NOWAIT>{NOWAIT}],
        4FR      <ACTION> {ENABLE   [<OPTION> {ALL}},
                        {DISABLE  [<OPTION> {ALL}]} [<NOWAIT> {NOWAIT}]
        QUERY}
```

Pretrip log reports

Pretrip log reports are enabled or disabled for a posted LCM or all LCMs in the posted set. If the LCM is in service, the effect is immediate. Otherwise, the LCM is updated during the next RTS. You must enter one of the following actions with the command string **PRETRIP LOGS**.

- **ENABLE** – This enables recording of LINE113 log reports for the posted LCM when the system detects a pretrip.
- **DISABLE** – This prevents any LINE113 log reports from being generated when the system detects a pretrip on a posted LCM.

You can enter the following optional parameters with either of the previous actions.

- **ALL** – This results in the selected action being applied to all LCMs in the posted set.
- **NOWAIT** – This option prevents waiting for confirmation that the command has been completed.

For example, to record LINE113 logs for all pretrips detected on all LCMs in the posted set, activate the logs feature by typing

>PRETRIP LOGS ENABLE ALL
and pressing the Enter key.

When a pretrip occurs and the pretrip logs are enabled, a LINE113 log is output. An example of a LINE113 log follows.

```
LINE113  JAN27 09:14:14 6220 TBL
          KRCM 03 0 19 04      DN 6195441578
          TROUBLE CODE = RINGING_FAILED
          RINGING TROUBLE = PRETRIP
          CALLID = 98776
```

When a pretrip occurs on a line that connects to an LCM, a LINE138 log is output. A LINE138 log identifies the call that was routed to a treatment. An example of a LINE138 log follows.

```
LINE138  JAN27 09:14:14 6321 INFO TRMT
          KRCM 03 0 00 08      DN 6195441579
          TREATMENT SET = SYFL   CALLED NO = 5441578
          CALLID= 01D8 0003
```

After two pretrips occur, the line is scheduled for a diagnostic. If the diagnostic fails, a LINE101 log is generated. An example of a LINE101 log follows.

```
LINE101  JAN27 09:16:05 3782 FAIL LN_DIAG
          KRCM 03 0 01 06      DN 6195441586
          DIAGNOSTIC RESULT Ringing Failed Pre Trip
          ACTION REQUIRED  Chk Ringing
          CARD TYPE  6X17AC
```

Pretrip on 4FR lines

The command string PRETRIP 4FR ENABLE is used to reduce ring pretrip occurrences on long loop length 4FR lines served from the posted LCM or all LCMs in the posted set. The effect of this command is not immediate and will not be realized until the next RTS of the LCM. You must enter one of the following actions with the command string PRETRIP 4FR.

- **ENABLE** – This extends 4FR line ring filter timing.
- **DISABLE** – This returns to non-extended 4FR line ring filter timing.

The following optional parameters can be entered with either of the previous actions.

- **ALL** – This results in the selected action being applied to all LCMs in the posted set.
- **NOWAIT** – This option prevents waiting for confirmation that a command has been completed.

For example, extend 4FR line ring filter timing for all LCMs in the posted set by typing

>PRETRIP 4FR ENABLE ALL
and pressing the Enter key.

Display status of pretrip options logs and 4FR

Display the status of options LOGS and 4FR by typing

>PRETRIP QUERY
and pressing the Enter key.

An example of a system response to the PRETRIP QUERY command string follows.

CM	MS	IOD	Net	PM	CCS	Lns	Trks	Ext	APPL
.	.	.	.	1LCM *C*	.	.	.	.	.
LCM			SysB	ManB	OffL	CBsy	ISTb	InSv	
0 Quit		PM	0	0	2	0	2	42	
2 Post_		LCM	0	0	0	0	2	9	
3 ListSet									
4 SwRG	LCM	HOST 00 0	InSv		Links_00S:	CSide	0	PSide	0
5 TrnsL_	Unit0:	InSv			/RG: 1				
6 Tst_	Unit1:	InSv			/RG: 1				
7 Bsy_					11 11 11 11 11	RG:Pref	1	InSv	
8 RTS_	Drwr:	01 23 45 67 89	01 23 45 67 89					Stby	0 Insv
9 OffL		.. .. .. ..	.. .. .. ..						
10 LoadPM_	pretrip query								
11 Disp_	LCM HOST 00 0	-	PRETRIP LOGS are DISABLED						
12 Next			PRETRIP 4FR is DISABLED						
13									
14 QueryPM									
15									
16									
17									
18									

Product-specific test tools

The test tools provided for XPMs also apply for RSC-S components.

Real-time Performance Monitoring for NTMX73AA and NTMX76AA

Feature AF4903, Real-time Performance Monitoring for NTMX73AA and NTMX76AA, supplies real-time performance information. This feature supplies information on the PCM Signaling circuit card (NTMX73AA) and the Message Processor and Tone Generator circuit card (NTMX76AA). the feature provides this information to operating company personnel. This information reflects real-time use in each circuit card.

The performance tool provides operating company personnel with information on performance and activity on posted peripherals. The data this feature supplies appears at the performance level of the MAP display, sublevel PMact. The PMact sublevel provides information that indicates the processor activity in the posted peripheral. The PMact sublevel divides the real time used to the two categories call processing occupancy and low priority background. These two categories apply to the UP and EISP.

At the PMact sublevel, information for the NTMX73AA circuit card displays as the amount of time (percent) spent in the interrupt level (call processing occupancy) during the last minute. Information for the NTMX76AA circuit card appears as the amount of time (percent) used to communicate with the HDLC protocol during the last minute. The real time used for the NTMX73AA and NTMX76AA processors is not classified into categories. For both circuit cards, the average time provided is for the elapsed time from the start of the recording. If the elapsed time is greater than 15 min, the average time is provided for the last 15 min.

An example of the command that monitors the performance in RCO2 unit 1 follows:

>MAPCI;MTC;PM;POST RCO2 1;PERFORM;PMACT;START

The following figure describes the MAP display for the previous command.

Example of an RCO2 MAP display

CM	MS	IOD	NET	PM	CCS	LNS	Trks	Ext	APPL
.	.	.	.	.	.	.	.	.	.
PMACT				Sysb	Manb	OffL	Cbsy	ISTb	InSv
0	Quit	PM		0	0	0	0	0	5
2	Strt	RCO2		0	0	0	0	0	1
3	Strtlog								
4	Stoplog	RCO2	1 InSv	Links_00S:	CSide	0	PSide	0	
5	Stop	Unit 0:	Act	InSv					
6		Unit 1:	Inact	InSv					
7		LOAD NAME:							
8		STATUS:		REASON:		LOGS:		TIME:xx:xx:xx	
9				UP AVG	ISP AVG	SIGP AVG	MX76 AVG		
10									
11		CALL PROCESSING	xxx	xxx	xxx	xxx	xxx	xxx	xxx
12		LOW PRIO BGND	xxx	xxx	xxx	xxx			
13			ORIG	ORIGAVG	TERM	TERMAVG			
14			xxx	xxx	xxx	xxx			
15			AVAIL	INUSE	HIGH				
16		PS_CHNL	xxx		xxx	xxx			
17		UTR	xxx		xxx	xxx			
18									

An example of the command that monitors the performance in LTC unit 1 follows:

>MAPCI;MTC;PM;POST LTC 1;PERFORM;PMACT;START

The following figure describes the MAP display for the previous command.

Example of an LTC MAP display

CM	MS	IOD	NET	PM	CCS	LNS	Trks	Ext	APPL
.	.	.	.	.	.	.	.	.	.
PMACT				Sysb	Manb	OffL	Cbsy	ISTb	InSv
0	Quit	PM		0	0	0	0	0	5
2	Strt	LTC		0	0	0	0	0	1
3	Strtlog								
4	Stoplog	LTC	1 InSv	Links_00S:	CSide	0	PSide	0	
5	Stop	Unit 0:	Act	InSv					
6		Unit 1:	Inact	InSv					
7		LOAD NAME:							
8		STATUS:		REASON:		LOGS:		TIME:xx:xx:xx	
9				UP AVG		ISP AVG		MX76 AVG	
10									
11		CALL PROCESSING	xxx xxx	xxx xxx	xxx xxx	xxx xxx	xxx xxx	xxx xxx	
12		LOW PRIO BGND	xxx xxx	xxx xxx	xxx xxx	xxx xxx	xxx xxx	xxx xxx	
13			ORIG	ORIGAVG	TERM	TERMAVG			
14			xxx	xxx	xxx	xxx	xxx	xxx	
15			AVAIL	INUSE	HIGH				
16		PS_CHNL	xxx	xxx	xxx	xxx	xxx	xxx	
17		UTR	xxx	xxx	xxx	xxx	xxx	xxx	
18									

Troubleshooting chart

This chapter contains tables to help troubleshoot conditions that cause alarms in the Remote Switching Center-SONET (RSC-S). This chapter contains separate tables for each RSC-S component. These tables include the remote center offshore #2 (RCO2) or RCO2 with integrated services digital network (ISDN). These tables also include line concentrating modules (LCM) or enhanced line concentrating modules (LCME), and the remote maintenance module (RMM).

The following table lists the possible cause and action to take to clear LCM or LCME alarms.

Clearing a RSC-S alarm for an LCM or an LCME

Alarm condition	Possible cause	Action
Critical	Indicates the number of system busy (SysB) or central-side (CBSy), LCM (or LCME) units.	Proceed as follows: 1 Refer to <i>Alarm and Performance Monitoring Procedures</i>. Follow the procedure to clear an LCME critical alarm. 2 Check for any peripheral module (PM), ISDN, or LINE logs that indicates problems in the LCM or LCME. 3 Check any operational measurements (OM) that can indicate problems in the LCM or LCME.
—continued—		

Clearing a RSC-S alarm for an LCM or an LCME (continued)

Alarm condition	Possible cause	Action
Critical (continued)	Both LCM or LCME ringing generators (RG or LCMERG) are in-service trouble (ISTb).	Proceed as follows: 1 Refer to <i>Alarm and Performance Monitoring Procedures</i>. Follow the procedure to clear an LCM/LCME critical alarm. 2 Check for any PM, ISDN, or LINE logs that indicates problems in the LCM or LCME. 3 Check any OMs that indicates problems in the LCM or LCME.
Major	Indicates the number of ISTb or SysB, LCM (or LCME) units.	Proceed as follows: 1 Refer to <i>Alarm and Performance Monitoring Procedures</i>. Follow the procedure to clear an LCME major alarm. 2 Check for any PM, ISDN, or LINE logs that indicates problems in the LCM or LCME. 3 Check any OMs that can indicate problems in the LCM or LCME.
—continued—		

Clearing a RSC-S alarm for an LCM or an LCME (continued)

Alarm condition	Possible cause	Action
Major (continued)	One of the two RGs in an LCM (or LCME) is ISTb.	Proceed as follows: 1 Refer to <i>Alarm and Performance Monitoring Procedures</i>. Follow the procedure to clear an LCM/LCME(RG) major alarm. 2 Check for any PM, ISDN, or LINE logs that indicate problems in the LCM or LCME. 3 Check any OMs that can indicate problems in the LCM or LCME.
Minor	Indicates the number of LCMs or LCMEs that are ISTb.	Proceed as follows: 1 Refer to <i>Alarm and Performance Monitoring Procedures</i>. Follow the procedure to clear an LCME minor alarm. 2 Check for any PM, ISDN, or LINE logs that indicate problems in the LCM or LCME. 3 Check any OMs that can indicate problems in the LCM or LCME.
—end—		

The following table lists the possible cause and action to take to clear RCO2 or RCO2 with ISDN alarms.

Clearing a RSC-S alarm for an RCO2 or an RCO2 with ISDN

Alarm condition	Possible cause	Action
Critical	Indicates SysB or CBsy, RCO2 (or RCO2 with ISDN) units. Loss of subscribers service occurs.	Proceed as follows: 1 Refer to <i>Alarm and Performance Monitoring Procedures</i>. Follow the procedure to clear an RCO2 or RCO2 with ISDN critical alarm. 2 Refer to <i>Recovery Procedures</i>. Follow the procedures to recover an RCO2. 3 Check for emergency stand-alone (ESA) or PM logs that indicate problems in the RCO2. Logs ESA101-ESA109, PM181, and PM171 indicate RCO2 problems. For dual RCO2 (DRCO2), check for PM logs that associate with dual ESA (DESA). Logs PM221-PM223, and PM189 associate with DESA. The DRCO2 configuration becomes available in a future batch change supplement (BCS) release. 4 If ISDN is present, check for ISDN or LINE logs that indicate problems in the RCO2. Logs ISDN100-ISDN109, and LINE131 indicate RCO2 problems.
—continued—		

Clearing a RSC-S alarm for an RCO2 or an RCO2 with ISDN (continued)

Alarm condition	Possible cause	Action
Critical (continued)	The RCO2 is in ESA. Communication to the CC in the host switch is not available.	5 Check for OMs that indicate problems in the RCO2. Proceed as follows: 1 Refer to <i>Recovery Procedures</i>. Follow the procedures to recover an RCO2 in ESA. 2 Check for ESA or PM logs, that indicate problems in the RCO2. Logs ESA101–ESA109, PM181, and PM171 indicate problems in the RCO2. For DRCO2, check for PM logs that associate with DESA. Logs PM221–PM223, and PM189 associate with DESA. The DRCO2 configuration becomes available in a future BCS release. 3 Check for OMs that indicate problems in the RCO2.
—continued—		

Clearing a RSC-S alarm for an RCO2 or an RCO2 with ISDN (continued)

Alarm condition	Possible cause	Action
Major	Indicates the number of CBsy or SysB, RCO2 units. This alarm does not affect subscriber service. Loss of subscriber service occurs when RCO2s or units fail.	Proceed as follows: 1 Refer to <i>Alarm and Performance Monitoring Procedures</i>. Follow the procedure to clear an RCO2 major alarm. 2 Check for PM logs that indicate problems in the RCO2. 3 Check for OMs that indicate problems in the RCO2.
Minor	Indicates the number of ISTb, RCO2 units. This alarm does not affect subscriber service.	Proceed as follows: 1 Refer to <i>Alarm and Performance Monitoring Procedures</i>. Follow the procedure to clear an RCO2 minor alarm. 2 Check for PM181 and PM128 logs that indicate problems in the RCO2. 3 Check for OMs that indicate problems in the RCO2.
—end—		

The following table lists the possible cause and action to take to clear RMM alarms.

Clearing a RSC-S alarm for an RMM

Alarm condition	Possible cause	Action
Major	Indicates the number of SysB, RMM units.	Refer to the <i>Alarm and Performance Monitoring Procedures</i> . Follow the procedure to clear an RMM major alarm.
Minor	Indicates the number of CBSy units.	Refer to the <i>Alarm and Performance Monitoring Procedures</i> . Follow the procedure to clear an RMM minor alarm.

Advanced troubleshooting procedures

Advanced trouble locating procedures

Maintenance personnel use advanced trouble locating procedures when normal troubleshooting procedures do not clear the problem. You can perform a PMRESET more than one time for the remote center offshore #2 (RCO2). If an error message occurs after each PMRESET attempt, you must use advanced troubleshooting procedures. Use the PMDEBUG tool to perform the procedure.

Refer to the *PMDEBUG User Guide*, TAM-1001-004 for additional information.

Bigfoot utility

The Bigfoot utility stores information on diagnostics that passed and failed. The system implements feature AF5008, XPM REx Control and Trouble Notification Improvements. The Bigfoot utility maintains information on error log information that occurred as a result of diagnostics that failed. This utility improves debugging attempts. The diagnostics code maintains results graphs for each set of diagnostics that runs. The results graph contains data on each diagnostic test in a diagnostics run. The results graph identifies a diagnostic as passed, failed, not run, or test not defined.

Diagnostics results graph output

An example of the diagnostics results graph display output follows:

```
<001>          CLASS      EVENT    CC TIME OF EVENT
          DIAG GRAPH (#0F)    #00    00:00:06:34:58
```

```
Diag_id =did_cmr_diag(#7) - CMR Card Diagnostics.
res_num=FF(P=Pass,F=Fail,N=Not Run|Test Undefined,0=Other)
Diag Results Graph: PFNNNNNNNNNNNNNNNNNNNN
```

Powering up the RSC-S

Use this procedure when you take components of the Remote Switching Center-Synchronous Optical Network (SONET), or RSC-S, out-of-service. Use this procedure when you cut power to the components. These steps are the reverse of the steps in the power-down procedure. In this procedure, start with the RCO2 central side (C-side) and work toward the peripheral side (P-side)

Refer to the following procedure for instructions to power up the RSC-S.

Powering up the RSC-S

At the RSC-S

- 1 To begin the first part of the RSC-S power-up procedure, post the C-side peripheral of the RCO2 to the RCO2. Post the RTS message links to the RCO2. Busy these links when the RSC-S powers down.
- 2 Set the power switch to ON for one of the RCO2 units.
- 3 Set the reset button of this RCO2 unit to the RESET position. At the same time, flip the associated circuit breaker (CB) to the up position. Release the CB. The CB must stay in the up position. If the CB does not stay in the up position, a problem is present in the power circuitry.
- 4 Repeat steps 2 and 3 for the other RCO2 unit.
- 5 Post the correct RCO2. The RCO2 must be offline.
- 6 Busy both units of the RCO2.
- 7 Load one of the RCO2 units. Make sure that you list the correct device like S01DPMLOADS. Make sure that you use the central control (CC) option. For example:
>LOADPM UNIT n CC
- 8 Return the unit to service. Do not use parameters. Make sure the RTS sequence includes diagnostics.
- 9 Return the other unit to service. Do not use parameters. Make sure the RTS sequence includes diagnostics.
- 10 Perform a switch of activity (SWACT). This action completes the first part of the RSC-S power-up procedure.
- 11 Begin the second part of the RSC-S power-up procedure. Set the CB on the modular supervisory panel (MSP) of one of the LCME/LCM units to ON. The CB must stay in the up position. If the CB does not stay in the up position, a problem is present in the power circuitry.
- 12 Repeat step 11 for the other LCME/LCM unit.
- 13 Post the first LCME/LCM.

- 14 Load one of the LCME/LCM units. Make sure you list the correct device like S01DPMLOADS. Make sure that you use the CC option.
For example
>LOADPM UNIT n CC
- 15 Return the unit to service. Do not use parameters. Make sure the RTS sequence includes diagnostics.
- 16 Repeat steps 14 and 15 for the other LCME/LCM unit.
- 17 Repeat steps 11 through 16 until the system returns all LCME(s)/LCM(s) to service. This action completes the second part of the RSC-S power-up procedure.
- 18 Begin the third part of the RSC-S power-up procedure. Set the power switch on the NT2X09 power converter of the RMM to ON.
- 19 Press and hold the reset button of the power converter. At the same time, flip the associated CB to the up position. Release the CB and RESET switch. The CB must stay in the up position. If the CB does not stay in the up position, a problem is present in the power circuitry.
- 20 Load the RMM. Make sure that you list the correct device like S01DPMLOADS. For example:
>LOADPM
- 21 Return the unit to service. Do not use parameters. Make sure the RTS sequence includes diagnostics.
- 22 Repeat steps 18 through 21 if the RSC-S uses two RMMs.
- 23 Post the RCO2 and RTS all P-side PCM-30 links. Busy the links when the RSC-S powers down.
- 24 This procedure is complete.

Powering down the RSC-S

The RSC-S is a separate switching system. Normally, do not power down the RSC-S. If you power down the RCO2, loss of communication with other offices occurs. If you must power down the RCO2, use the following procedure.

Powering down the RSC-S

At the RSC-S

- 1 Inform all appropriate personnel that you plan to perform a powering down procedure. Notify personnel at the host office and at offices that connect to the RCO2 over P-side trunks.
- 2 Busy all P-side peripheral modules (PM) off of the RCO2. Busy all RMMs and line concentrating devices (LCD).
- 3 Offline all P-side PMs off the RCO2. Offline all RMMs and LCDs.
- 4 Busy all P-side links off the RCO2. Busy all PCM-30 links to other offices and the packet handler (PH).
- 5 Power down P-side PMs. Set the switch to the associated power converter to OFF.
- 6 Busy the inactive unit of the RCO2.
- 7 Post the associated PCM-30 line group controller (PLGC). Busy the message link that connects to the busied RCO2 unit.
- 8 Power down the inactive unit of the RCO2. Set the power converter of the unit to OFF.
- 9 Busy the active unit of the RCO2. Override any warning.
- 10 Post the associated PLGC. Busy the message link that connects to the busied RCO2 unit.
- 11 Power down the formerly active unit of the RCO2. Set the power converter of the unit to OFF.
- 12 Post and Offl the whole RCO2.
- 13 This procedure is complete.

RSC-S routine maintenance procedures

This chapter contains the routine maintenance procedures for the remote switching center-synchronous optical network (SONET) (RSC-S) for international applications. These procedures describe preventive maintenance tasks. These procedures are for maintenance engineering and field maintenance personnel. Maintenance engineering and field maintenance personnel perform these procedures at scheduled intervals.

Checking torque on grounding bolts

Application

Use this procedure to check the correct torque of grounding bolts.

Interval

Perform this procedure every month.

Common procedures

There are no common procedures.

Action

This procedure contains a summary flowchart and a list of steps. Use the flowchart to review the procedure. Follow the steps to perform the procedure.

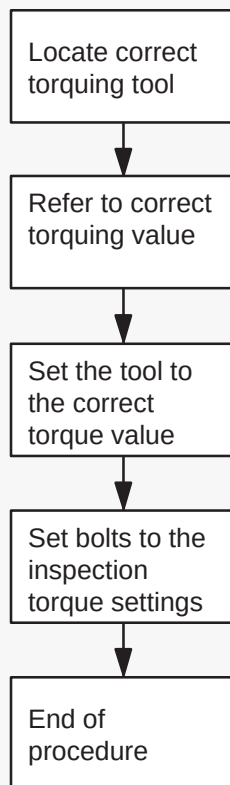
Checking torque on grounding bolts

(continued)

Summary of Checking torque on grounding bolts

This flowchart summarizes the procedure.

Use the instructions that follow this flowchart to perform the procedure.



Checking torque on grounding bolts (end)

Checking torque on grounding bolts

At your Current Location

- 1 Locate the T9958 click-type preset torque wrench.
- 2 Line up the small fractions on the edge of the handle with the center of the main torque scale.
- 3 Set the correct inspection torque value. Turn the handle clockwise to increase the value. Turn the handle counter-clockwise to decrease the value.

If grounding bolts are type	Do
1/4-20 backplane, –48 V ground first nut	step 4
1/4-20 backplane, –48 V ground second nut	step 5

- 4 Set inspection torque to 5 ft/lb. Proceed to step 6.
- 5 Set inspection torque to 25 in/lb.
- 6 Position the wrench on the grounding bolts and tighten to the specified inspection torque.
- 7 Return the T9958 torque wrench to the correct location.
- 8 The procedure is complete.

Inspecting cooling unit filters

Application

Use this procedure to inspect cooling unit filters in the following cabinetized frames:

- NTMX89FA, Cabinetized Remote Switching Center/Line Concentrating Module (CRSC/LCM)
- NTMX89FB, Cabinetized Remote Switching Center/Integrated Services Digital Network (CRSC/ISDN)
- NTMX89FC, Cabinetized Extension Module (CEXT)
- NTRX30CA, Cabinetized Line Concentrating Equipment (CLCE)
- NTRX30DA, Cabinetized Line Module ISDN (CLMI)
- NTRX34BA, Cabinetized Miscellaneous Equipment (CMIS)
- NTRX31AA, Cabinetized Power Distribution Cabinet (CPDC)

Interval

Perform this procedure in two week intervals.

Common procedures

There are no common procedures.

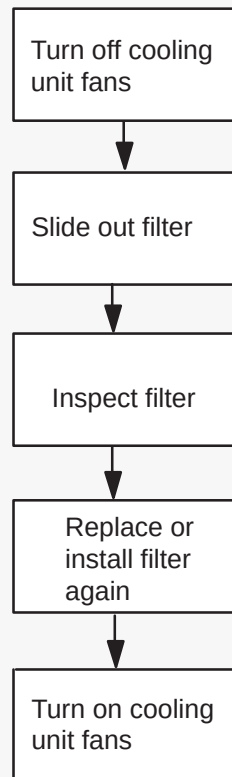
Action

This procedure contains a summary flowchart and a list of steps. Use the flowchart to review the procedure. Follow the steps to perform the procedure.

Inspecting cooling unit filters

(continued)

Summary of Inspecting cooling unit filters



This flowchart summarizes the procedure.

Use the instructions that follow this flowchart to perform the procedure.

Inspecting cooling unit filters (continued)

Inspecting cooling unit filters

At your current location

1



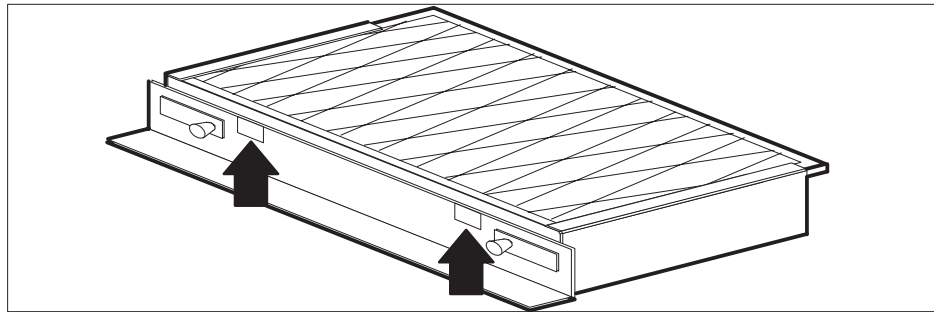
WARNING

To prevent overheating

Do not leave the cooling unit fans off for more than 30 min.

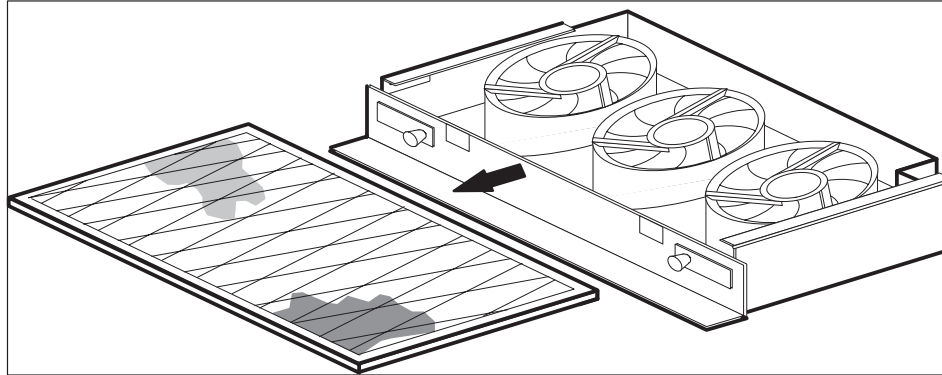
To make sure the cooling unit fans are OFF, remove the two fuses in slot position 19 on the faceplate of the modular supervisory panel (MSP).

2 Use the two filter access tabs to grip the filter.



Inspecting cooling unit filters (end)

- 3 Slide the filter from the cabinet.



If filter surfaces	Do
appear dirty	step 4
appear clean	step 5

- 4 Replace the filter with the same part number as the old unit. Go to step 6.
- 5 Install the filter in the cabinet again.
- 6 Replace the two fuses removed in step 1.
- 7 The procedure is complete.

Fuse replacement in the LCME

Application

Use this procedure to replace fuses in the enhanced line concentrating module (LCME) fuse panel. This fuse panel is the LCME fuse panel of the CRSC and CEXT cabinets on a remote switching center-SONET (RSC-S) site.

Interval

Perform this procedure as required.

Common procedures

There are no common procedures.

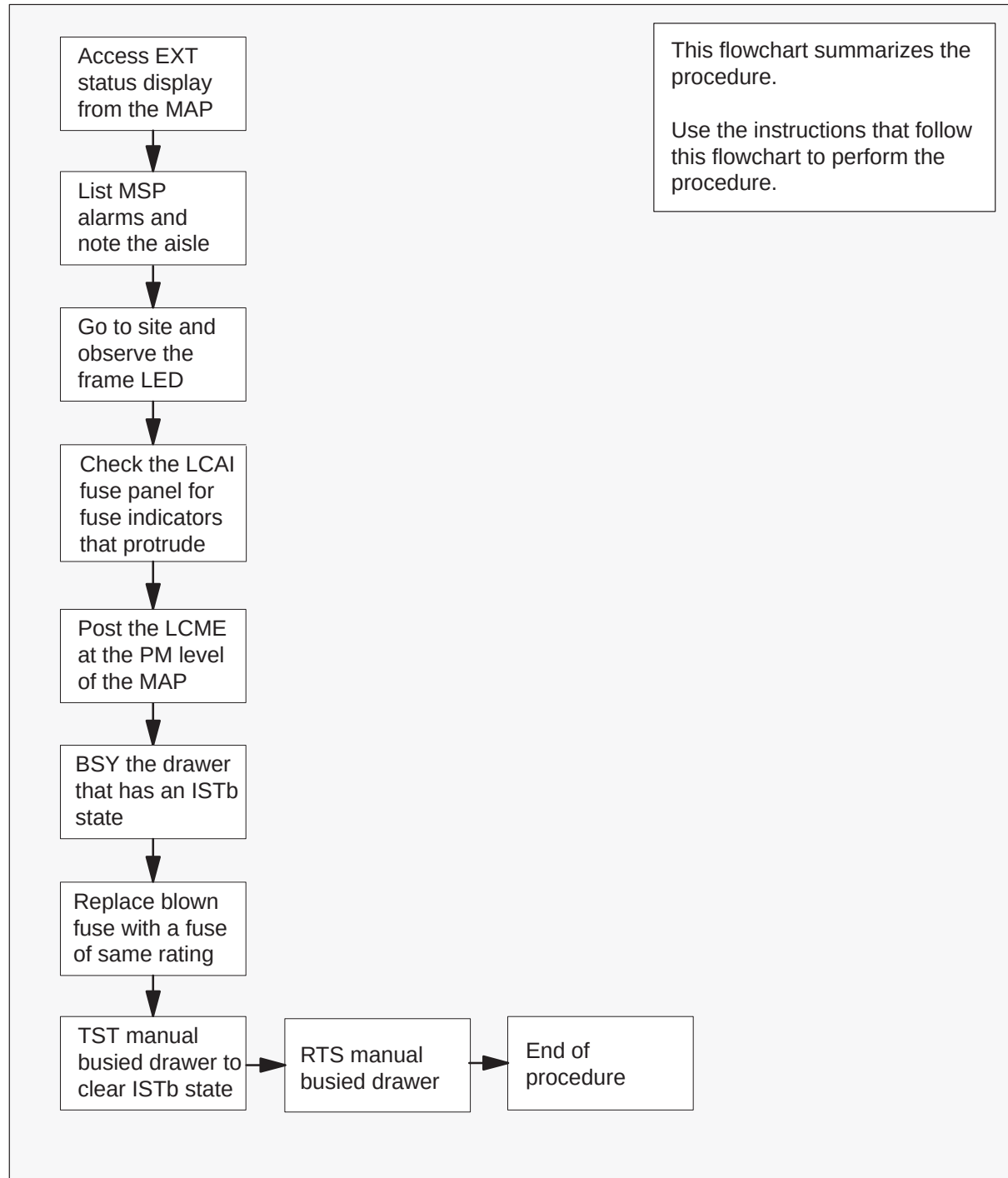
Action

This procedure contains a summary flowchart and a list of steps. Use the flowchart to review the procedure. Follow the steps to perform the procedure.

Fuse replacement in the LCME

(continued)

Summary of fuse replacement in the LCME



Fuse replacement in the LCME

(continued)

Fuse replacement in the LCME

At the MAP terminal

- 1 To access the EXT level of the MAP terminal, type
>MAPCI;MTC;EXT
and press the Enter key.
- 2 To list the MSP alarm, type
>LIST FSP
and press the Enter key.

- 3 Note the location of the MSP alarm.

At the RSC-S site

- 4 Observe the frame light emitting diode (LED). The LED must be ON.
- 5 Check both ISDN line concentrating array (LCAI) fuse panels for fuse indicators that protrude.
- 6 To post the LCME, type
>POST LCME site cabinet module
and press the Enter key.

where

site is the name of the RSC-S site
cabinet is the CRSC or CEXT cabinet number
module is the LCME module number

Example of a MAP display:

```
LCME    RemL  00 0 ISTb   Links_00S:  CSide 1
Unit0:   InSv                      /RG:   0
Unit1:   InSv                      /RG:   0
                                11 11 11   RG:Pref 0 InSv
Drwr: 01 23 45 67 89 01 23 45           Stby:1 InSv
      II .. .. .. .. .. .. .. .. ..
```

- 7 To busy (BSY) the drawers that have an in-service trouble (ISTb) condition, type
>BSY DRWR number
and press the Enter key.

where

number is the line subgroup number

Fuse replacement in the LCME

(continued)

At the LCME

- 8 Replace the blown fuse with a new fuse of the same rating. Refer to the LCME fuse panel figure.

If the fuse	Do
blows again, suspect defective NTBX36 card	<i>Card Replacement Procedures</i> for card replacement
does not blow and alarm clears	step 9

- 9 To test the drawer with the new fuse installed, type
>TST DRWR number
and press the Enter key.
where
number is the line subgroup number
- 10 To return to service (RTS) the drawer with new fuse installed, type
>RTS DRWR number
and press the Enter key.
where
number is the line subgroup number
- 11 This procedure is complete.
The following figure shows an LCME fuse panel and fuse assignments.

Fuse replacement in the LCME

(end)

LCME fuse panel

Fuse panel		LCME/LCAI fuse assignments
F1 	F2 	-48 V battery return <i>F1 to drawer 0 or 4</i> <i>F2 to drawer 1 or 5</i> <i>F3 to drawer 2 or 6</i> <i>F4 to drawer 3 or 7</i>
F3 	F4 	
F5 	F6 	
F7 	F8 	
F9 	F10 	-48 V battery <i>F5 to drawer 0 or 4</i> <i>F6 to drawer 1 or 5</i> <i>F7 to drawer 2 or 6</i> <i>F8 to drawer 3 or 7</i>
F11 	F12 	
F13 	F14 	
F15 	F16 	
F9 	F10 	+15 Volts <i>F9 to drawer 0 or 4</i> <i>F10 to drawer 1 or 5</i> <i>F11 to drawer 2 or 6</i> <i>F12 to drawer 3 or 7</i>
F11 	F12 	
F13 	F14 	
F15 	F16 	
F13 	F14 	-48 V talk battery <i>F13 to drawer 0 or 4</i> <i>F14 to drawer 1 or 5</i> <i>F15 to drawer 2 or 6</i> <i>F16 to drawer 3 or 7</i>
F15 	F16 	
F17 	F18 	
F17 	F18 	
F17 	F18 	Ringling <i>F17 even/odd subgroup ringling</i> <i>F18 not used</i>

Note: Drawers: 0–3, shelf position 33; 4–7, shelf position 47

Inspecting and changing bulbs

Application

Use the following procedure to inspect and replace defective fan fail, aisle end, and modular supervisory panel (MSP) bulbs.

Interval

Perform this procedure every month.

Common procedures

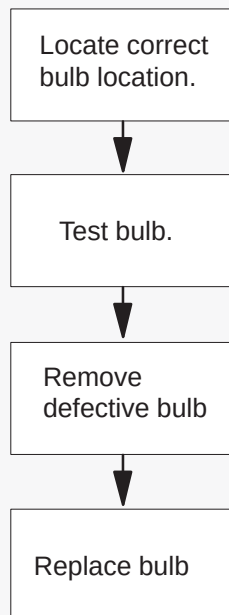
There are no common procedures.

Action

This procedure contains a summary flowchart and a list of steps. Use the flowchart to review the procedure. Follow the steps to perform this procedure.

Inspecting and changing bulbs (continued)

Summary of Inspecting and changing bulbs



This flowchart summarizes the procedure.

Use the instructions that follow this flowchart to perform the procedure.

Inspecting and changing bulbs

(continued)

Inspecting and changing bulbs

At your Current Location

- 1 Use the following procedures to inspect the fan fail, aisle end and MSP bulbs.

If bulbs	Do
are fan fail bulbs	step 2
are aisle end bulbs	step 3
are MSP bulbs	step 4

- 2 Flip the alarm (ALM) override switch on the MSP to ON.

If fan fail bulb	Do
does not light	step 5
lights	step 9

- 3 Press a fuse on the fuse pad on the MSP.

If aisle end bulb	Do
does not light	step 6
lights	step 9

- 4 Press a fuse on the fuse pad on the MSP.

If MSP bulb	Do
does not light	step 6
lights	step 9

- 5 Remove the bulb cover. Grasp the bulb with two fingers, squeeze and pull out. Go to step 5.
- 6 Remove the bulb frame casing. Grasp the aisle end or MSP bulb with two fingers, squeeze and pull out. Go to step 5.

Inspecting and changing bulbs (end)

- 7** Replace with new bulb.
- 8** Attach the bulb cover or bulb frame casing again.
- 9** The procedure is complete.

Inspecting spare fuse holders

Application

Use this procedure to inspect spare fuse holders. Fill the fuse holders again as needed.

Interval

Perform this procedure in one week intervals.

Common procedures

There are no common procedures.

Action

This procedure contains a summary flowchart and a list of steps. Use the flowchart to review the procedure. Follow the steps to perform the procedure.

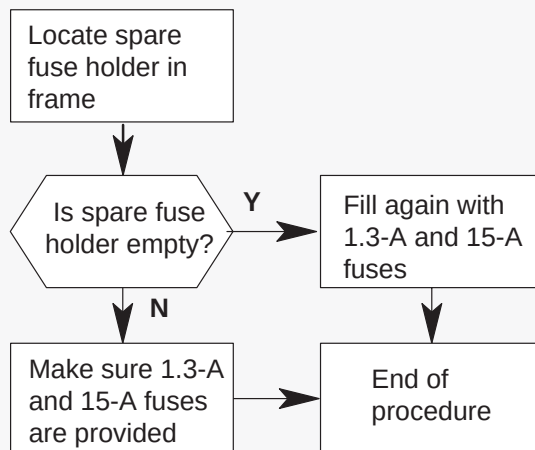
Inspecting spare fuse holders

(continued)

Summary of Inspecting spare fuse holders

This flowchart summarizes the procedure.

Use the instructions that follow this flowchart to perform the procedure.



Inspecting spare fuse holders (end)

Inspecting spare fuse holders

At your current location

- 1 Locate the spare fuse holder in the MSP.

If spare fuse holder	Do
is empty	step 2
is not empty	step 3

- 2 Fill the spare fuse holder again with the following fuses and circuit breakers:

- 15-A circuit breakers for the –48 V shelf feeds
- 1.3-A fuses for the alarm battery supply (ABS) feeds

Go to step 4.

- 3 Make sure that enough of the following fuses and circuit breakers are provided:

- 15-A circuit breakers for the –48 V shelf feeds
- 1.3-A fuses for the ABS feeds

- 4 The procedure is complete.

Replacing cooling unit filters

Application

Use this procedure to replace cooling unit filters in the following cabinetized frames:

- NTMX89FA, Cabinetized Remote Switching Center/Line Concentrating Module (CRSC/LCM)
- NTMX89FB, Cabinetized Remote Switching Center/Integrated Services Digital Network (CRSC/ISDN)
- NTMX89FC, Cabinetized Extension Module (CEXT)
- NTRX30CA, Cabinetized Line Concentrating Equipment (CLCE)
- NTRX30DA, Cabinetized Line Module ISDN (CLMI)
- NTRX34BA, Cabinetized Miscellaneous Equipment (CMIS)
- NTRX31AA, Cabinetized Power Distribution Cabinet (CPDC)

Interval

Perform this procedure at intervals of three months.

Common procedures

There are no common procedures.

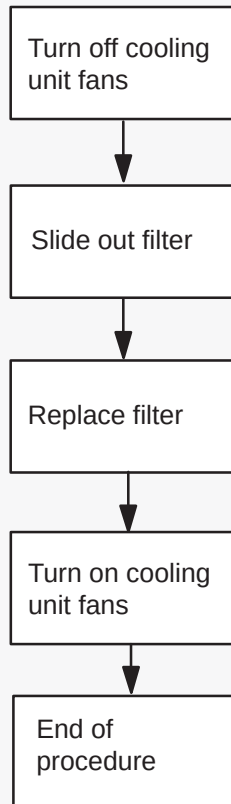
Action

This procedure contains a summary flowchart and a list of steps. Use the flowchart to review the procedure. Follow the steps to perform the procedure.

Replacing cooling unit filters

(continued)

Summary of Replacing cooling unit filters



This flowchart summarizes the procedure.

Use the instructions that follow this flowchart to perform the procedure.

Replacing cooling unit filters (continued)

Replacing cooling unit filters

At your Current Location

1



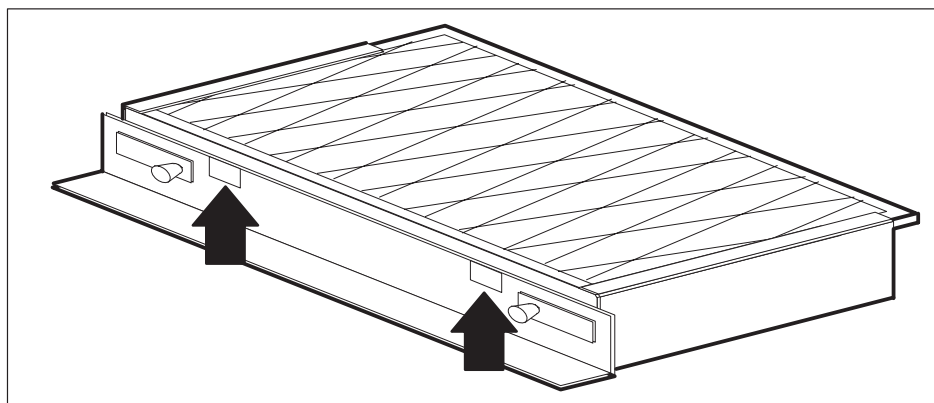
WARNING

To prevent overheating

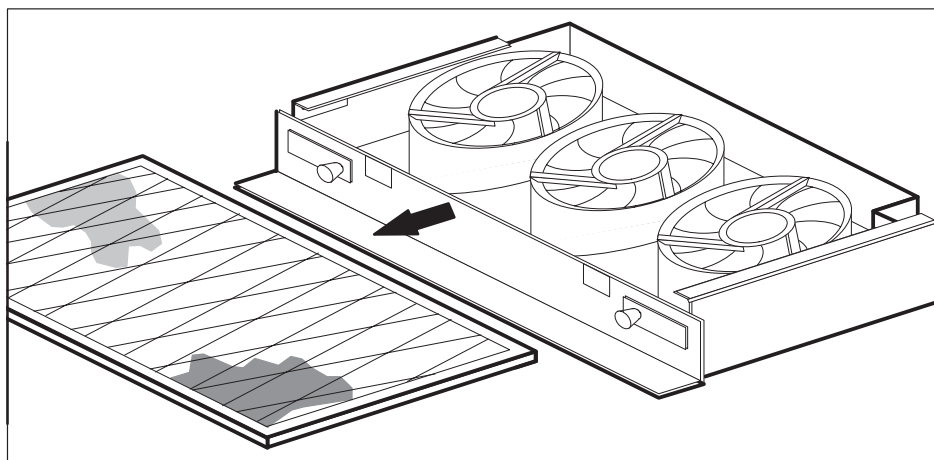
Do not leave the cooling fans off for more than 30 min.

To make sure the cooling unit fans are OFF, remove the two fuses in slot position 19 on the faceplate of the MSP.

2 Use the two filter access tabs to grip the filter.



3 Slide the filter out of the cabinet.



Replacing cooling unit filters

(end)

- 4 Replace the filter with the same part number as the part number of the old unit.
- 5 Replace the fuses removed in step 1.
- 6 The procedure is complete.

Replacing the cooling unit

Application

Use this procedure to replace a defective cooling unit (NTRX91AA) in the following cabinetized frames:

- NTMX89FA, Cabinetized Remote Switching Center/Line Concentrating Module (CRSC/LCM)
- NTMX89FB, Cabinetized Remote Switching Center/Integrated Services Digital Network (CRSC/ISDN)
- NTMX89FC, Cabinetized Extension Module (CEXT)
- NTRX30CA, Cabinetized Line Concentrating Equipment (CLCE)
- NTRX30DA, Cabinetized Line Module ISDN (CLMI)
- NTRX34BA, Cabinetized Miscellaneous Equipment (CMIS)
- NTRX31AA, Cabinetized Power Distribution Cabinet (CPDC)

Interval

Perform this procedure when a cooling unit fails to operate. An illuminated fan fail indicator on the front of the MSP indicates a defective cooling unit.

Common procedures

There are no common procedures.

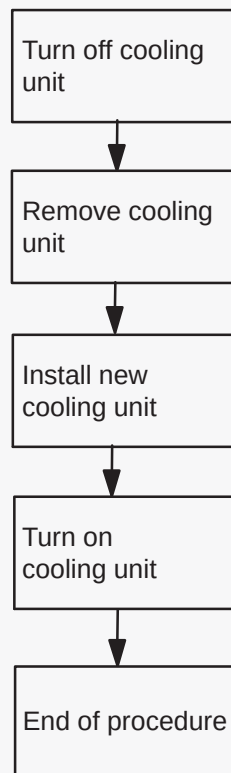
Action

This procedure contains a summary flowchart and a list of steps. Use the flowchart to review the procedure. Follow the steps to perform the procedure.

Replacing the cooling unit

(continued)

Summary of Replacing the cooling unit



This flowchart summarizes the procedure.

Use the instructions that follow this flowchart to perform the procedure.

Replacing the cooling unit (end)

Cooling unit replacement

At your current location

1



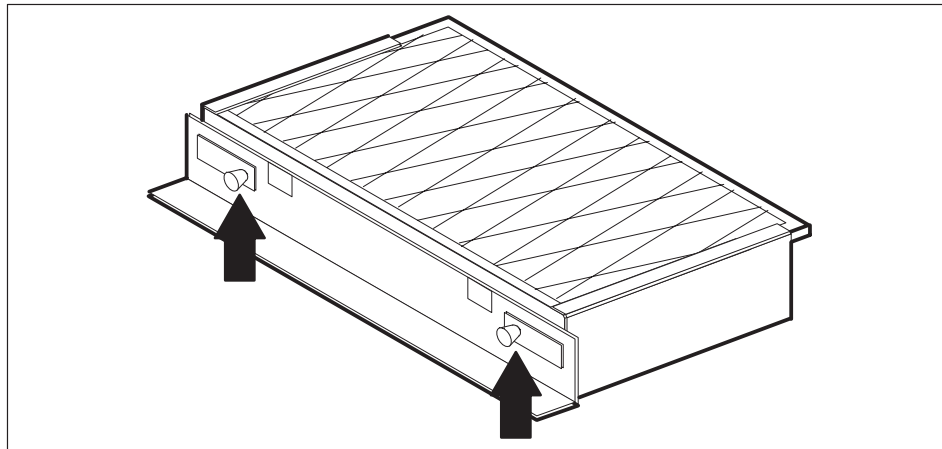
WARNING

To prevent overheating

Do not leave the cooling unit fans off for longer than 30 min.

Make sure that you remove the two fuses on the faceplate of the MSP to turn the cooling unit fans OFF.

- 2 Turn the two knobs on the front panel of the cooling unit counterclockwise and slide the cooling unit out.



- 3 Replace with the same part number as the part number of the old unit. Slide in the new cooling unit until both sides lock into place.
- 4 Replace the two fuses that you removed in step 1.
- 5 This procedure is complete.

Testing power converter voltages

Application

Use this procedure to test power converter voltages for power converters in Remote Switching Center-SONET (RSC-S) cabinets.

Interval

Perform this procedure in six month intervals.

Common procedures

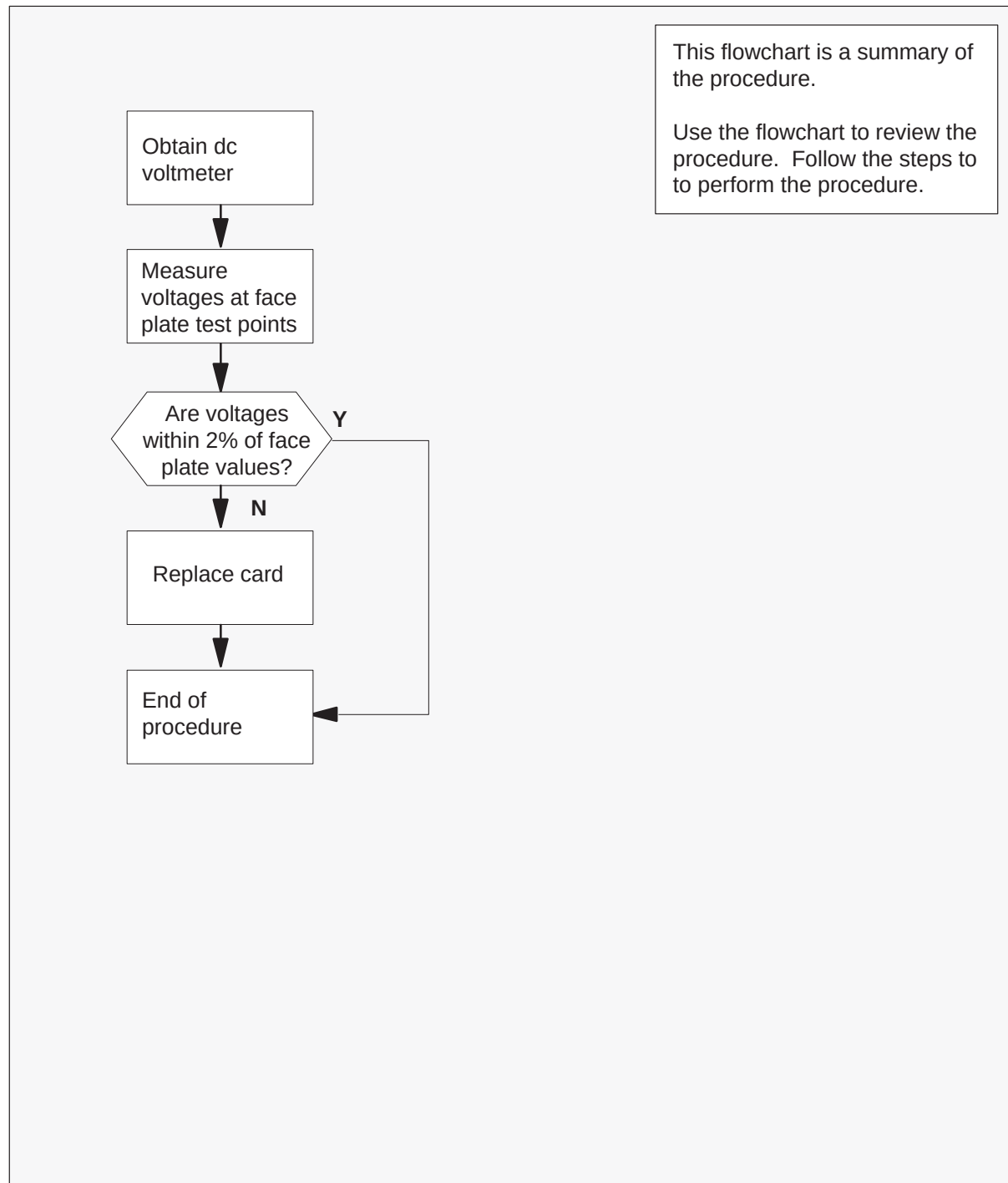
Does not apply

Action

This procedure contains a summary flowchart as an overview of the procedure. Follow the exact steps to perform this procedure.

Testing power converter voltages (continued)

Summary of Testing power converter voltages



Testing power converter voltages

(continued)

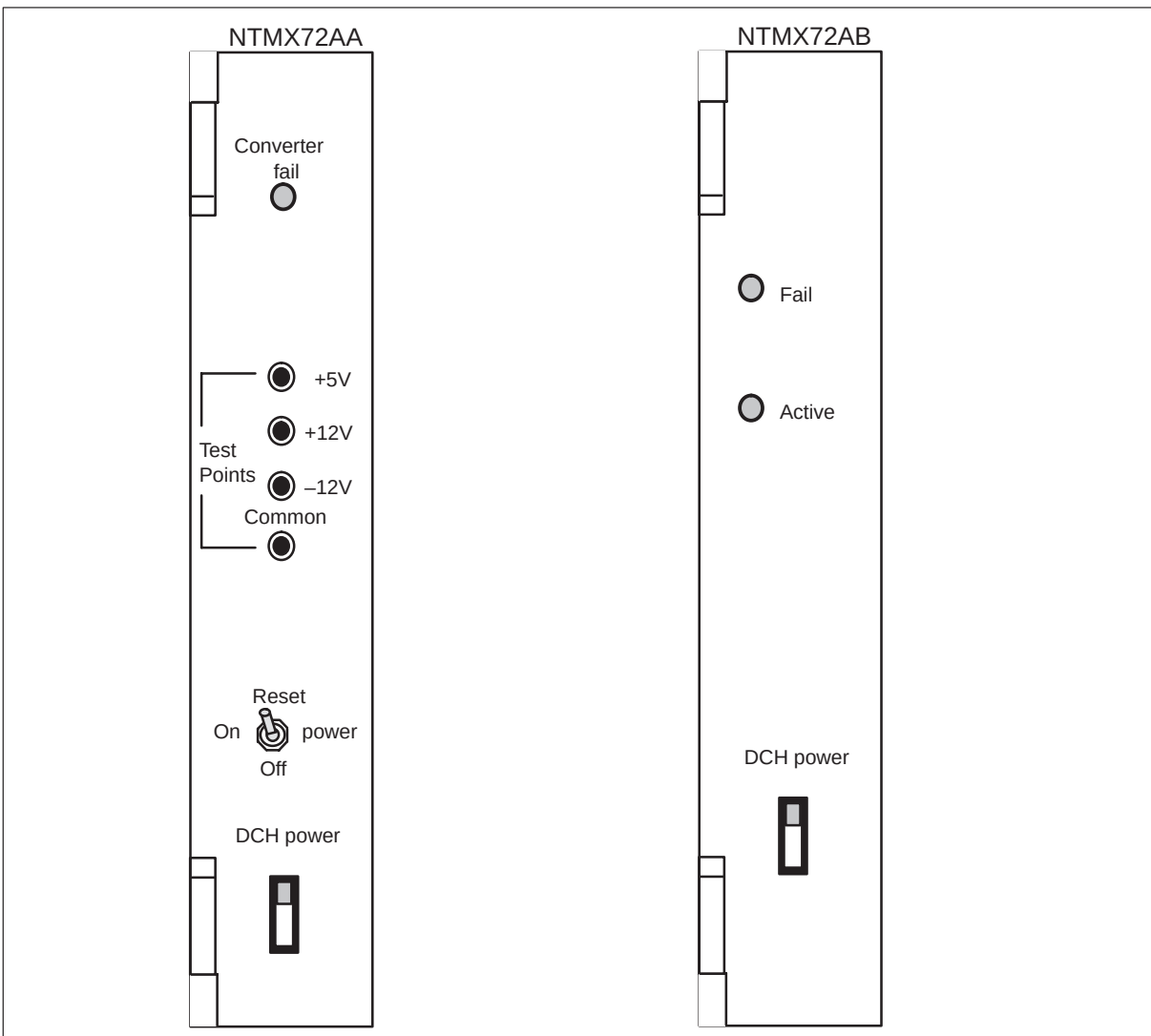
Testing power converter voltages

At your Current Location

- 1 Obtain a dc voltmeter.
- 2 Measure the voltage at the test points on the face plates of all power converters in the equipment frame.

Note: This procedure applies to the NTMX72AA power converter. The NTMX72AB does not have test points on the faceplate to support testing power converter voltages.

Circuit cards with status indicators



Testing power converter voltages

(end)

- 3 The voltages must be within 2% of the nominal values printed on the faceplate. Compare the voltages measured in step 2 with the following acceptable voltage ranges:

Test point voltage	Acceptable range
+12 V	+11.76 V to + 12.24 V
–12 V	–12.24 V to –11.76 V
+ 5 V	+4.9 V to +5.1 V
– 5 V	–5.1 V to –4.9 V

If test point voltages are	Do
within acceptable range	step 5
not within acceptable range	step 4

- 4 Replace the power converter as *Card Replacement Procedures* directs..
- 5 This procedure is complete.

Testing wrist strap grounding cords

Application

Use this procedure to verify that the resistance of wrist strap grounding cords is at the correct level. This resistance must be low enough for static electricity to discharge from a person. This resistance must be high enough to prevent electrocution if the equipment develops a short-circuit while the person wears wrist strap.

Interval

Perform this procedure one time every month.

Common procedures

There are no common procedures.

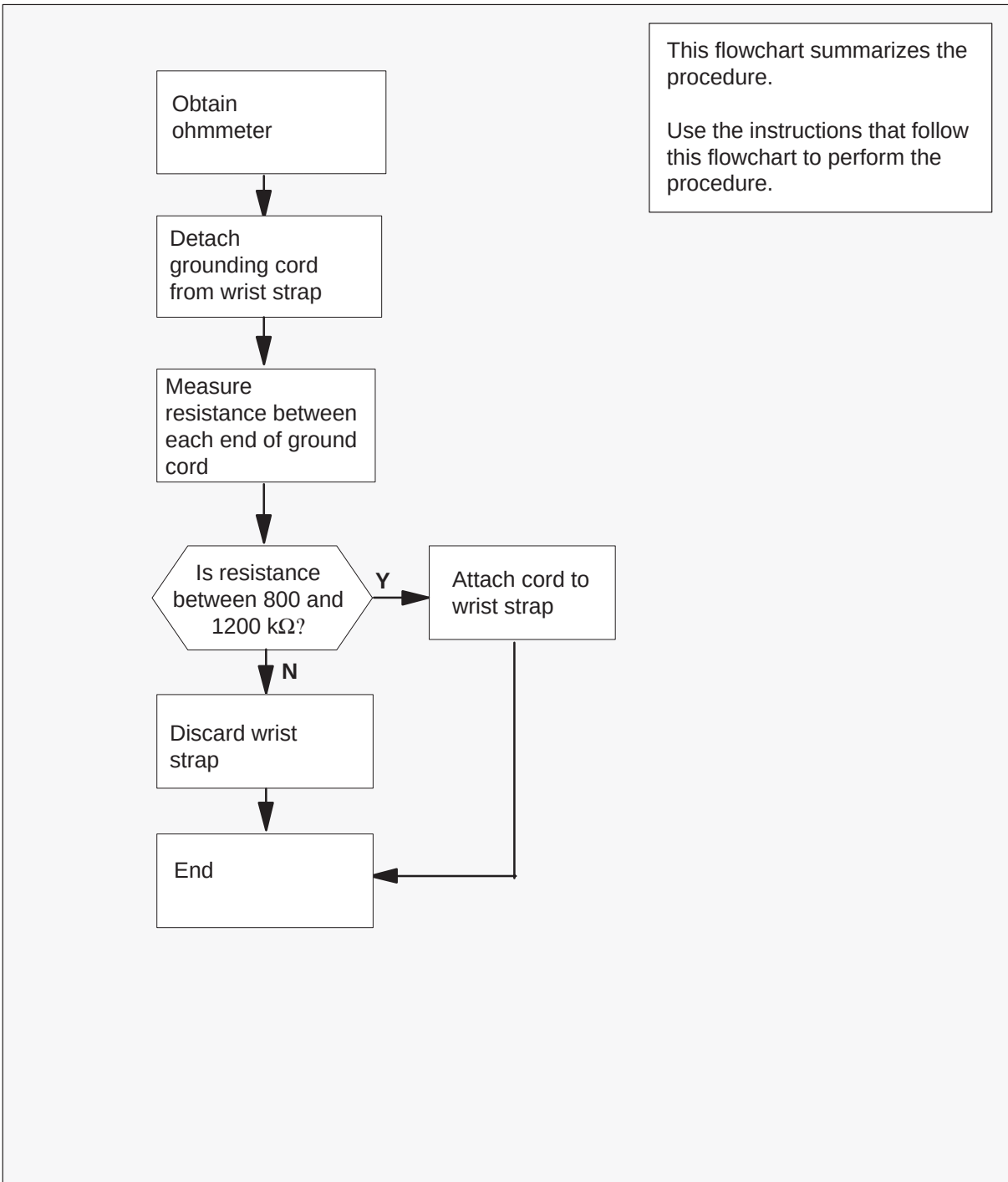
Action

This procedure contains a summary flowchart and a list of steps. Use the flowchart to review the procedure. Follow the steps to perform the procedure.

Testing wrist strap grounding cords

(continued)

Summary of Testing wrist strap grounding cords



Testing wrist strap grounding cords

(end)

Testing wrist strap grounding cords

At your Current Location

- 1 Obtain an ohmmeter.
- 2 Detach the grounding cord from the wrist strap.
- 3 Measure the resistance between opposite ends of the grounding cord with the ohmmeter.

If resistance	Do
is between 800 kΩ and 1200 kΩ	step 4
is not between 800 kΩ and 1200 kΩ	step 5

- 4 You can use the grounding cord and wrist strap assembly. Assemble the wrist strap to the grounding cord.
Go to step 6.

5



DANGER

Risk of electrocution

The grounding cord is safe to use if the cord resistance measures higher than 800 kohm. A lower resistance exposes the person that wears the wrist strap to the risk of electrocution if equipment short-circuits.



WARNING

Damage to electronic equipment

A grounding cord that has a resistance higher than 1200 kohm cannot conduct enough static charges to the ground. This cord does not protect sensitive electronic equipment against build-ups of static charges that can cause damage.

Discard the complete assembly. *Do not attempt to use the assembly.*

- 6 The procedure is complete.

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