Critical Release Notice

Publication number: 297-8991-030
Publication release: Standard 05.02

The content of this customer NTP supports the SN06 (DMS) and ISN06 (TDM) software releases.

Bookmarks used in this NTP highlight the changes between the baseline NTP and the current release. The bookmarks provided are color-coded to identify release-specific content changes. NTP volumes that do not contain bookmarks indicate that the baseline NTP remains unchanged and is valid for the current release.

Bookmark Color Legend

Black: Applies to new or modified content for the baseline NTP that is valid through the current release.

Red: Applies to new or modified content for NA017/ISN04 (TDM) that is valid through the current release.

Blue: Applies to new or modified content for NA018 (SN05 DMS)/ISN05 (TDM) that is valid through the current release.

Green: Applies to new or modified content for SN06 (DMS)/ISN06 (TDM) that is valid through the current release.

Attention!
Adobe® Acrobat® Reader™ 5.0 is required to view bookmarks in color.

Publication History

March 2004

Standard release 05.02 for software releases SN06 (DMS) and ISN06 (TDM). Updates made for this release are shown below:

Changes to configuration details for LIU7 paddle board NT9X77, due to CR Q00704883.

297-8991-030

LIU7 External Routing Activation Guide

User Guide

SN06 (DMS) Standard 05.01 September 2003

NORTEL NETWORKS

How the world shares ideas.

LIU7 External Routing Activation Guide

User Guide

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SN06 (DMS) Standard release 05.01. Added note for setting the dip switches for the NT9X77AB cards in the LIU7 per CR Q00 425265.

February 2000

TL13 Standard 04.01. Added note to section “32-Mbyte LIU7 routers” on page 19.

August 1999

TL12 Standard 03.01. Revised to reflect the following features:

- 59010705 (Multi-LPP External Routing)
- 59009996 (ITU SSP Link Expansion to 180 Channelized MLIU-based Links)

December 1998

TL11 Standard 02.01. Removed error messages regarding placement of linksand routers from "Chapter 2: Material Requirements".

July 1998

TL10 Standard 01.01. First release of this document.

Contents

Figures

About this document

When to use this document

Use this document to activate CCS7 link interface unit (LIU7) external routing on a digital multiplex system (DMS) switch. This document is intended for use by operating company maintenance personnel and system administrators.

References in this document

The following documents are referenced in this document:

- *Common Channel Signaling 7 Maintenance Guide,* 297-8991-545
- *DMS Translations Guide,* 297-xxxx-350
- *Software Optionality Control User Manual,* 297-8991-901
- *DMS-100 Product Documentation Directory,* 297-8991-001

Note: The document layer number, xxxx, denotes the product computing module load (PCL).

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.

The second two digits indicate the issue. The issue number increases each time the document is revised but rereleased in the same software release cycle. For example, the second release of a document in the same software release cycle is 01.02.

To determine which version of this document applies to the software in your office and how documentation for your product is organized, check the release information in DMS-100 *Product Documentation Directory,* 297-8991-001.

What precautionary messages mean

The types of precautionary messages used in Nortel (Northern Telecom) 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 task

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.
```

Chapter 1: Introduction

This document provides procedures for activating CCS7 link interface unit (LIU7) external routing on digital multiplex system (DMS) service switching points (SSP) integrated nodes (INode).

LIU7 external routing is functionality that transfers message transfer part (MTP) routing functions from the digital trunk controllers (DTC) or PCM30 digital trunk controllers (PDTC) to LIU7 routers that perform only MTP routing functions.

LIU7 external routing functionality provides the following advantages:

- increases the number of supported routesets in table C7RTESET from 255 up to 2047
- increases the number of supported DTCs or PDTCs from 140 up to 209
- when DTCs are present, LIU7 external routing allows link expansion from 108 to 180 links

For 8-Mbyte LIU7s, the maximum number of supported busy hour call attempts (BHCA) increases to 720 000, assuming an average message size of 25 bytes.

For 32-Mbyte LIU7s, the maximum number of supported BHCAs increases to 2 000 000, assuming an average message size of 25 bytes.

Background

Before the installation of LIU7 external routing, MTP routing is performed by every DTC or PDTC in an SSP or INode office. An MTP routing database is stored on each DTC or PDTC. These MTP routing databases are dynamically maintained by the computing module (CM) and periodically downloaded to the DTCs or PDTCs.

The process of downloading the MTP routing databases from the CM to the DTCs or PDTCs requires a large amount of bandwidth. The amount of bandwidth required for this procedure limits the number of routesets supported in table C7RTESET to 255, and limits the number of DTCs or PDTCs to 140.

LIU7 external routing transfers the task of MTP routing from DTCs or PDTCs to LIU7s that are dedicated to the task of performing routing functions. These LIU7s are called LIU7 external routers. When LIU7 external routing is active, DTCs or PDTCs deliver MTP messages to the LIU7 external routers. This transfer of routing functions eliminates the need to download the MTP routing databases from the CM to the DTCs or PDTCs, and thereby reduces the amount of bandwidth required for routing functions. The conservation of bandwidth increases the number of

- routesets supported in table C7RTESET from 255 to 2047
- supported DTCs or PDTCs from 140 to 209
- BHCAs to 720 000 (for 8-Mbyte LIU7s) or to 2 000 000 (for 32-Mbyte LIU7s)

Bouncing CCS7 links can cause DTC or PDTC to go into processor overload due to the processing of multiple routing update messages. When LIU7 external routing is active, this problem does not exist.

Note: Bouncing links are CCS7 links that continually go in and out of service due to problems in office-to-office transmission.

The functionality that allows more than 255 routesets to be datafilled in table C7RTESET is called routeset expansion. To activate routeset expansion, LIU7 external routing requires that the following conditions are met:

- between two and eight LIU7 external routers are datafilled, provisioned, and activated
- half of all routers in the office are in service
- if only two routers exist in the office, both must be in service

The exact number of LIU7 external routers required depends on individual office capacity. For more information, refer to Section “Determine the number of required LIU7 routers” on page 18.

Note: Enable software optionality control (SOC) order code TEL00004 before activating routeset expansion.

Activation overview

The procedure for activating LIU7 external routing consists of the following general steps.

1 Datafill LIU7 routers

a. Add LIU7s to table LIUINV

b. Add LIU7s to table C7ROUTER

2 Activate LIU7 routers and external routing

a. Bring LIU7s into service

b. Bring LIU7 into service as routers using command from MAP CI level C7ROUTER

c. Activate LIU7 external routing using CI command C7RTR

3 Wait 24 hours

4 Remove MTP routing databases from all DTCs or PDTCs using the C7RTR tool

When the preceding general steps have been completed and LIU7 external routing is active, routeset expansion can be enabled and additional DTCs or PDTCs can be added as necessary.

Attention

Contact your regional customer support to obtain all passcodes before starting this procedure. If you require assistance during this procedure contact Nortel Emergency Technical Assistance Service (ETAS).

Backing out

You can back out of the procedure for activating LIU7 external routing at any time. Instructions for backing out of the procedure are provided in the Appendix A.

Chapter 2: Material Requirements

This chapter describes the material requirements for activating Common Channel Signaling 7 (CCS7) link interface unit (LIU7) external routing. Ensure that all hardware and software requirements are met before beginning the procedure.

Software requirements

This document applies to software load CSP12 or higher.

This document can also be used for some older software loads. If your software load is older than CSP12, contact your next level of support to determine if you can use this document.

Passcode requirements

The following passcodes are required to activate LIU7 external routing.

Attention

Contact your regional customer support to obtain the SOC right-to-use (RTU) passcode and the C7RTR passcode before starting the procedure.

Software optionality control

LIU7 external routing is not controlled by software optionality control (SOC). However, the associated routeset expansion feature requires SOC.

To enable routeset expansion, enable SOC order code TEL00004.

Contact your next level of support to obtain the right-to-use (RTU) passcodes for SOC features. For more information on enabling SOC features, refer to the Software Optionality Control User Manual, 297-8991-901.

C7RTR

C7RTR is a resident command interpreter (CI) tool that is password-protected under tools support (TOOLSUP). This tool contains all the commands necessary to activate LIU7 routers. To obtain the RTU passcode for this tool, contact your next level of support. For more information on C7RTR refer to Signaling Transfer Point CCS7 Maintenance Guide, 297-8991-545.

CAUTION
Possible loss of service

Tool C7RTR has the potential to cause a partial or full office outage if used incorrectly. Read this guide fully before using any of the commands within this tool.

Determine the number of required LIU7 routers

Between two and eight dedicated LIU7s are required to activate LIU7 external routing. Half of all routers in the office must be datafilled and in service before LIU7 external routing is activated. If the office contains only two LIU7 routers, both must be datafilled and in service.

8-Mbyte LIU7 routers

To determine the number of 8-Mbyte LIU7 external routers your office requires, use the following formula:

$$\text{LIU7s} = \frac{\text{BHCA}}{90000}$$

where

LIU7s is the total number of LIU7s needed to become external routers. This value must be greater than or equal to 2 and less than or equal to 8.

BHCA is the total busy hour call attempts (BHCA) for the network element

90 000 is the maximum BHCAs per external router. This value is based on 100% tandem ISDN user part (ISUP) traffic at 6 messages per call, where the average message size is 25 bytes.

32-Mbyte LIU7 routers

To determine the number of 32-Mbyte LIU7 external routers your office requires, use the following formula:

$$\text{LIU7s} = \frac{\text{BHCA}}{250000}$$

where

LIU7s is the total number of LIU7s needed to become external routers. This value must be greater than or equal to 2 and less than or equal to 8.

BHCA is the total busy hour call attempts (BHCA) for the network element

250 000 is the maximum BHCAs per external router. This value is based on 100% tandem ISDN user part (ISUP) traffic at 6 messages per call, where the average message size is 25 bytes.

Contact your next level of support to confirm the number of LIU7s required by your office.

CAUTION
Possible loss of service

An insufficient number of in-service LIU7 external routers will cause service outage. Contact your next level of support to ensure that sufficient LIU7 external routers for the traffic requirements of the office are datafilled and in service.

Note: The 32-Mbyte LIU7 external router can coexist with the 8-Mbyte LIU7 external router in the same office. However, any 32-Mbyte LIU7 external router in service with the 8-Mbyte external routers also in service, behave as an 8-Mbyte external router. To achieve the 32-Mbyte router capacity, all 8-Mbyte external routers must be offline and decommissioned.

Hardware requirements

All CCS7 links in the office must be based on link peripheral processors (LPP), enhanced LPPs (ELPP), DMS SuperNode SEs (SNSE) link interface shelves (LIS), or fiberized link interface shelves (FLIS).

LIU7 external routers must not have CCS7 physical links. No additional hardware is required.

If the LIU7 paddle board is an NT9X77, enter variable DCE in field CLKCONFG in table LIUINV.

With the faceplate in your left hand, the following applies for the card clock configuration (DCE or DTE):

- The 9X77 card MUST be set for DCE for a C7ROUTER.
- NT9X77AA or NT9X77AB, switches S1, S2, and S3: All Down = DTE , All Up= DCE

Note: For external routing the DIP switches on the NT9X77 card need to be set for DCE. If you are not sure how to set the DIP switches, contact the next level of support.

Placements of LIU7 routers

There are no restrictions on the placement of LIU7 external routers and CCS7 links across all LPPs, ELPPs, fiberized LPPs (FLPP), SNSE LISs, and FLISs.

For example, in the same office you can have

- a router on one LPP and a link on another LPP
- a router on a FLIS and a router on a LPP

Nortel recommends that you distribute LIU7 external routers across all half-shelves of all LLPs, LISs, and FLISs in the office. Placing the LIU7 external routers on different half-shelves of the LPPs, LIS, and FLIS ensures that a single point failure within the cabinet, such as the loss of power to a half-shelf, will not bring down all the LIU7 external routers.

Note: Balanced distribution of LIU7 external routers is recommended but is not enforced by the system. Any system for maintaining balanced distribution may be used. However, if you datafill two LIU7 external routers on the same half-shelf, the following warning message appears:

```
WARNING: LIU7 routers are not balanced on LPP/SNSE-LIS/FLIS half
shelves
```

To clear the warning message identify the half-shelf with the least number of LIU7 external routers and add the new LIU7 external router to that shelf. Delete the old datafill from table LIUINV and datafill the LIU7 again.

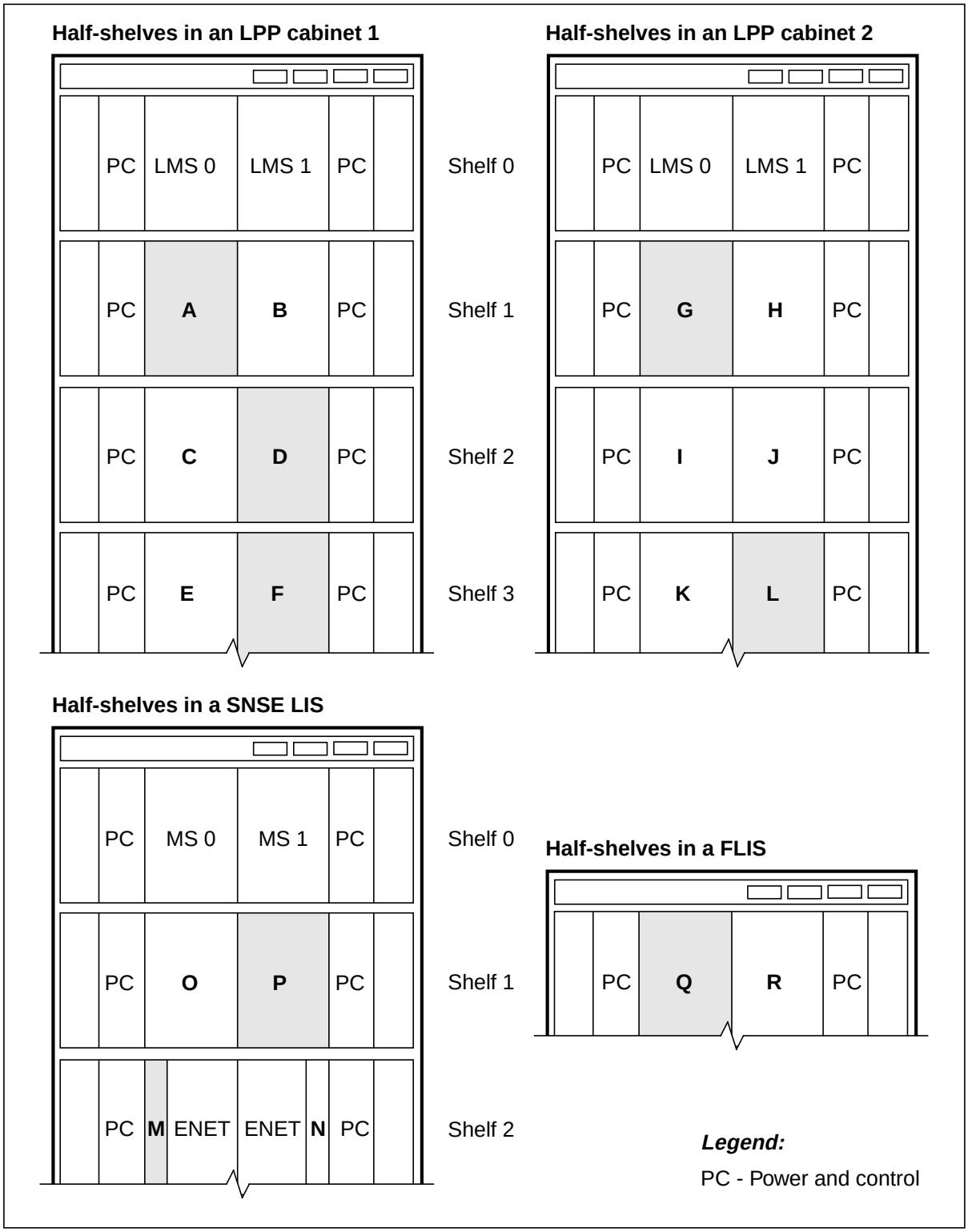
Note: This is a warning message only; it is used to identify that router placement is not balanced and that single shelf failures can cause an outage. The tuple is accepted if this is the only error.

Figure 1 illustrates an office that has two LPPs, a SNSE LIS, and a FLIS cabinet. For such an office, one possible distribution of eight LIU7 external routers is to place one on each of the following half-shelves: A, F, G, L, M, P, Q, D.

Note: The shaded half-shelves illustrate the placement of LIU7 external routers.

For information on how LIU7 external routers can be placed on individual platforms, refer to Appendix B.

Figure 1 Half-shelves within an LPP, SNSE LIS, and FLIS cabinets



Chapter 3: Precautions and preparations

This chapter contains the precautions and preparations required for activating Common Channel Signaling 7 (CCS7) link interface unit (LIU7) external routing. If all limitations, precautions, and steps described in this document are adhered to, no traffic loss or service outage will occur.

Precautions

Take the following precautions during the activation procedure.

- Read the whole document before beginning any procedures.
- Perform this procedure during periods of low traffic.
- Perform this procedure over two maintenance periods that are separated by at least 24 hours. The break between the procedure sections allows time for message transfer part (MTP) datafill to soak. Perform the steps described in Chapter 4: “Datafill and activate LIU7 external routing”, then wait 24 hours before performing the steps in Chapter 5: “Remove MTP routing databases and enable routeset expansion”.

If table C7NETWRK contains any tuples with value STP_SSP in field NODE TYPE, and a total external router outage (TRO) occurs, the STP traffic will stop because all signaling links will become system busy (SysB).

Preparations

Undertake the following preparations before starting the activation procedure.

- Ensure that all hardware is installed correctly. Refer to the diagrams in Chapter 2: “Material Requirements”.
- Contact your regional customer support to obtain passcodes for the C7RTR tool and software optionality control (SOC) option TEL00004.

Prepare LIU7s

Prepare the LIU7s according to the following instructions.

- Ensure that LIU7s to be datafilled as external routers are not already datafilled as links. Attempts to datafill LIU7s as external routers that are already datafilled as links produce the following error message:

  ```
  LIU7 <liu_no> is already datafilled as a link in
  table C7LINK.

  It is not allowed to be used as both a link and a
  router.
  ```

- Ensure that LIU7s to be datafilled as external routers do not have physical links.
- Determine the number of LIU7 external routers your office requires before beginning this procedure. Contact your next level of support to determine this number. Refer to Section “Determine the number of required LIU7 routers” on page 18.

CAUTION
Possible loss of service

An insufficient number of in service routers can cause service outage. Ensure that sufficient LIU7 routers are available throughout the activation procedure.

Chapter 4: Datafill and activate LIU7 external routing

This section describes the steps required to datafill and activate Common Channel Signaling 7 (CCS7) link interface unit (LIU7) external routing. Perform all the steps in this chapter during the first maintenance period.

Add datafill

Datafill table LIUINV

Add the LIU7s that are designated to become LIU7 external routers to table LIUINV using the following procedure.

1 Ensure that all LIU7s designated to become LIU7 external routers have been placed in the link peripheral processor (LPP), enhanced LPP (ELPP), fiberized LPP (FLPP), DMS SuperNode SE (SNSE) link interface shelf (LIS), or fiberized link interface shelf (FLIS) frame. Refer to section "Hardware requirements," in this document to determine the correct placement of the LIU7s.

2 Enter table LIUINV by typing

>TABLE LIUINV

and pressing the Enter key.

3 Add an LIU7 to table LIUINV by typing

>ADD liu7_no location load card PECs signaling info

and pressing the Enter key.

where:

liu7_no	is the number of the LIU7 to be added. This number is assigned to the LIU7 by the user at this time.
location	is the location of the card in the SNSE or LPP frame.
load	is the software load that exists on the switch.
card pecs	are the product engineering codes of the paddle board
signaling info	is signaling information. Refer to table LIUINV in the *DMS SuperNode Translations Guide*.

Example of command input for LPP (8-Mbyte LIU7):

> ADD LIU7 1 LIM 1 1 8 LRS12AJ NTEX22BB NT9X76AA NT9X78BA FBUS 56000 NIL

Example of command input for LPP (32-Mbyte LIU7):

> ADD LIU7 1 LIM 1 1 8 LTS12BV NTEX22CA NT9X76AA NT9X78BA FBUS 56000 NIL

4 of command input for SNSE LIS (8-Mbyte LIU7):

> ADD LIU7 1 MS 12 0 1 8 LRS12BV NTEX22BA NT9X76AA NT9X78BA FBUS 56000 NIL

Example of command input for FLIS (8-Mbyte LIU7):

> ADD LIU7 1 MS 7018 LRS12BV NTEX22BA NT9X76AA NT9X78BA FBUS 56000 NIL

5 Perform step 3 for each LIU7 designated to become an LIU7 external router in the LPP, SNSE LIS or FLIS.

6 Exit table LIUINV by typing:

> QUIT

and pressing the Enter key.

Datafill table C7ROUTER

Use the following procedure to designate the LIU7s as routers. If you require more information about table C7ROUTER, refer to *DMS SuperNode Translations Guide*.

1 Enter table C7ROUTER by typing

>TABLE C7ROUTER

and pressing the Enter key

2 Add the LIU7 to table C7ROUTER by typing

>ADD router_no pm_type liu7_no

and pressing the Enter key

where:

router_no — is the number of the router to be added. This number is assigned to the router by the user at this time.

pm_type — is the type of peripheral module. For this procedure, enter LIU7.

liu7_no — is the number of the LIU7 to be added. This number corresponds to one of the numbers assigned to the LIU7s added to table LIUINV.

Example of command input:

> ADD 1 LIU7 103

3 Repeat step 2 for each LIU7 added to table LIUINV.

4 Exit table C7ROUTER by typing:

> QUIT

and pressing the Enter key.

Activate LIU7s

Bring LIU7s into service

This section lists the steps for bringing the LIU7s into service.

1 Post an LIU7 by typing

> MAPCI;MTC;PM;POST LIU7 liu_no

and pressing the Enter key.

2 Bring the LIU7 into the manual busy (ManB) state by typing

> BSY

and pressing the Enter key.

3 Bring the LIU7 into the in service state by typing

> LOADPM

and pressing the Enter key.

> TST

and pressing the Enter key.

> RTS

and pressing the Enter key.

The following message appears on the MAP (maintenance and administration position) display.

```
CM      MS     IOD     Net      PM     CCS     Lns     Trks    Ext     APPL
 .       .      .       .        .      .       .       .       .       .

LIU7                                SysB    ManB    OffL    CBsy    ISTb    InSv
 0 Quit         PM                    0       0      74       0       0       1
 2 Post_        LIU7                  0       0      24       0       0       1
 3 ListSet
 4           LIU7   1   InsV       Rsvd
 5           RTS
 6 Tst_      LIU7 1 RTS Passed
 7 Bsy_
 8 RTS_
 9 OffL_
10 LoadPM_
11 Disp_
12 Next
13
14 QueryPM_
15 LoopBk_
16
17
18
  ADMIN
Time  22:18  >
```

4 Repeat steps 1, 2, and 3 for every LIU7 to be added.

5 Exit all MAP levels by typing

> QUIT ALL

and pressing the Enter key.

Bring LIU7s into service as routers

This section lists the steps for bringing LIU7s into service as external routers.

1 Access table C7ROUTER by typing

> MAPCI;MTC;CCS;CCS7;C7ROUTER

and pressing the Enter key.

The following message appears on the MAP display.

```
CM      MS     IOD     Net      PM     CCS     Lns     Trks    Ext     APPL
 .       .      .       .        .      .       .       .       .       .

C7Router        CCS7
 0 Quit          .
 2 Post_     External Routing    OffL
 3                                    1111111  11122222  22222333
 4                          12345678  90123456  78901234  56789012
 5           Router         OO------  --------  --------  --------
 6
 7 Bsy_      Rtr   State  Resource   PM State
 8 RTS_
 9 OffL_
10
11
12 Next
13
14 QueryRtr
15
16 QueryTrf
17
18
  ADMIN
Time  22:18  >
```

Note: The '-'s indicate that the respective LIU7 router is not equipped. The 'O's indicate that an LIU7 router is equipped and off line.

2 Post the LIU7 external routers by typing

> POST ALL

and pressing the Enter key.

Note: Routers can also be posted individually. To post an individual router, type

>POST router_no

and press the Enter key.

where

router_no is the number of the router to be posted.

3 Bring the routers into the ManB state by typing

> BSY ALL

and pressing the Enter key.

Note: Routers can also be busied individually. To busy an individual router, type

>BSY router_no

and press the Enter key.

where

router_no is the number of the router to be busied.

4 Return the routers to service by typing

> RTS ALL

and pressing the Enter key.

The following message appears on the MAP display.

```
CM      MS     IOD     Net      PM     CCS     Lns     Trks    Ext     APPL
 .       .      .       .        .      .       .       .       .       .

C7Router        CCS7
 0 Quit          .
 2 Post_     External Routing    Insv
 3                                    1111111  11122222  22222333
 4                          12345678  90123456  78901234  56789012
 5           Router         ..------  --------  --------  --------
 6
 7 Bsy_      Rtr   State  Resource   PM State
 8 RTS_      1     Insv   LIU7 120   Insv
 9 OffL_     Size of Posted Set = 2
10           rts all
11           Router 1: RTS passed.
12 Next      Router 2: Rts Passed.
13
14 QueryRtr
15
16 QueryTrf
17
18
  ADMIN
Time  22:18  >
```

Note: Routers can also be returned to service individually. To return an individual router to service, type

>RTS router_no

and press the Enter key.

where

router_no is the number of the router to be returned to service.

5 Verify that each new LIU7 external router is in service by referring to the MAP example in step 4. An in service router is indicated by a (.) located under the router number.

If	Do
all LIU7 external routers are in service	step 10
one or more LIU7 external routers are not in service	step 6

6 Post the LIU7 external router that is not in service by typing

>POST router_no

and pressing the Enter key.

where

router_no is the number of the LIU7 external router that is not in service.

7 Determine the number of the LIU7 used by the LIU7 external router that is not in service. To bring the LIU7 into service, refer to section "Bring LIU7s into service," in this document. When the LIU7 is in service, return to this point.

8 Determine whether the LIU7 router is in service (.) by referring to the MAP display.

If	Do
all LIU7 external routers are in service	step 10
the posted LIU7 external router is in service and other LIU7s are not in service	step 6
the LIU7 external router is not in service	step 9

9 Contact your next level of support.

10 Verify that the external routers are in service by referring to the MAP display in step 4.

Note: External routing is not in service yet.

11 Exit the MAP level by typing

> QUIT ALL

and pressing the Enter key.

Activate LIU7 external routing

This section contains the steps for activating LIU7 external routing on the DMS switch. When this procedure is finished all digital trunk controllers (DTC) or PCM30 digital trunk controllers (PDTC) route message transfer part (MTP) messages to the LIU7 external routers. The MTP routing databases still exist on and are maintained by the DTCs or PDTCs.

Preparations

A minimum of two LIU7 routers and half of all routers in the office must be datafilled and in service before LIU7 external routing is activated. If the office contains only two LIU7 routers, both must be datafilled and in service.

Ensure that the following activities do not take place during this part of the activation procedure:

- adding or deleting routesets in table C7RTESET
- busying or returning to service any DTCs, PDTCs, or CCS7 LIU7s
- busying or returning any routesets to service
- hardware maintenance

Attention

Ensure that REx is turned off during this procedure.

Activation steps

1 From your next level of support, obtain the TOOLSUP password to access the C7RTRT tool.

2 From the CI level, access the TOOLSUP level by typing

>TOOLSUP

and pressing the Enter key.

3 Make access to C7RTR tool available by typing

>ACCESS ON C7RTR password

and pressing the Enter key.

where

password is the obtained TOOLSUP password

The following message appears on the MAP display:

```
C7RTR permitted

C7RTR access will expire 48 hours from now.

**WARNING**
You have permitted access to command(s) that require skilled and knowledgeable
users. Proper use is required to avoid possible service degradations. Please
ensure that only fully trained and qualified personnel proceed.
```

4 Access the C7RTR directory by typing

>C7RTR

and pressing the Enter key.

5 Query the current routing status by typing

> QUERY_EXT_ROUTING LIST

and pressing the Enter key. One of three messages appears on the MAP display.

Example 1 of a MAP display

```
External Routing Status
-----------------------

External Routing:  Inactive.
MTP Databases:     Downloaded.
CCS7 DTCs:         DDM Stable.
```

Example 2 of a MAP display

```
External Routing Status
-----------------------

External Routing:  Active.
MTP Databases:     Downloaded.
CCS7 DTCs:         DDM Stable.
```

Example 3 of a MAP display

```
External Routing Status
-----------------------

External Routing:  Inactive.
MTP Databases:     Downloaded.
CCS7 DTCs:         DDM Transient.

These nodes are in transient states:

----> DTC1
----> DTC2
```

6 Your next step depends on the message on the MAP display.

If the message on the MAP display matches	Do
Example 1	step 8
Example 2	step 16
Example 3	step 7

7 The DTCs or PDTCs are in a transitional state. Wait for a distributed data manager (DDM) audit to change the CCS7 DTCs state from transient to stable. To determine if a DDM audit has changed the DTCs state, repeat step 5.

Note: The length of time a DDM audit takes to change the DTCs state from transient to stable can range from a few minutes to several hours.

8 Activate LIU7 external routing by typing

> ACTIVATE

and pressing the Enter key. One of four messages appears on the MAP display.

Example 4 of a MAP display

```
External Routing has been activated.
```

Example 5 of a MAP display

```
The C7ROUTER table must be datafilled with a minimum
of 2 routers to activate External Routing.
Please datafill more routers.

The Routing Status is not sufficient to activate External
Routing.  Bring more routers into service.
No action taken.
```

Example 6 of a MAP display

```
There are CCS7 DTCs or SPMs in transient states.
Use the C7RTR query_ext_routing command to find out
which ones, or check for DDM logs.
No action taken.
```

Example 7 of a MAP display

```
The External Routing Activation data was not distributed
successfully to all nodes.  Re-activate or wait
for a DDM audit to correct the data.  Also check for
DDM logs for specification of problem nodes.
```

9 Your next step depends on the message on the MAP display.

If the message on the MAP display matches	Do
Example 4	step 12
Example 5	step 10
Example 6	step 7
Example 7	step 11

10 Not enough LIU7 external routers are in service. To bring more LIU7 routers into service, refer to section "Bring LIU7s into service," in this chapter. When sufficient LIU7 external routers are in service return to step 4 of section "Activate LIU7 external routing," in this chapter.

11 LIU7 external routing is active, but some DTCs or PDTCs are still performing MTP routing functions. Wait for the DDM MTP audit to change the DTCs state from transient to stable. To determine if the audit has changed the DTCs state, repeat step 8.

Note: The length of time a DDM audit takes to change the DTCs state from transient to stable can range from a few minutes to several hours.

12 Verify that LIU7 external routing has been activated by typing

> QUERY_EXT_ROUTING LIST

and pressing the Enter key.

One of the following two messages appears on the MAP display.

Example 8 of a MAP display

```
External Routing Status
-----------------------

External Routing:  Active.
MTP Databases:     Downloaded.
CCS7 DTCs:         DDM Stable.
```

Example 9 of a MAP display

```
External Routing Status
-----------------------

External Routing:  Active.
MTP Databases:     Downloaded.
CCS7 DTCs:         DDM Transient.

These nodes are in transient states:

----> DTC1
----> DTC2
```

13 Your next step depends on the MAP display message.

If the message on the MAP display matches	Do
Example 8	step 15
Example 9	step 14

14 The DTCs or PDTCs are in a transitional state. Wait for a DDM audit to change the CCS7 DTCs state from transient to stable. To determine if a DDM audit has changed the DTCs state, repeat step 12.

15 The length of time a DDM audit takes to change the DTCs state can range from a few minutes to several hours.

16 External routing is active. Exit the C7RTR tool by typing

> QUIT

and pressing the Enter key.

Allow soaking time

MTP routing functions are now performed by the LIU7 external routers, but the MTP routing databases still exist on the DTCs or PDTCs.

As long as the MTP routing databases exist on the DTCs or PDTCs, routing functionality can be restored to them quickly if problems occur on the newly activated LIU7 external routers.

Nortel recommends leaving the MTP routing databases on the DTCs or PDTCs for one day after completing activating LIU7 external routing. Allow LIU7 external routing to soak for 24 hours before proceeding to Chapter 5 of this manual.

Chapter 5: Remove MTP routing databases and enable routeset expansion

This section provides steps to remove the message transfer part (MTP) routing databases from the digital trunk controllers (DTC) or PCM30 digital trunk controllers (PDTC) and to enable routeset expansion.

Perform this part of the procedure during the second scheduled maintenance period.

Remove MTP routing databases

Ensure that the following activities do not take place during this part of the activation procedure:

- adding or deleting routesets in table C7RTESET
- busying or returning to service any DTCs, PDTCs, or CCS7 link interface units (LIU7)
- busying or returning to service any routesets
- hardware maintenance

Attention

Ensure that REx is turned off during this procedure.

1 From your next level of support, obtain the TOOLSUP password to access the C7RTR tool.

2 From the CI level, access the TOOLSUP level by typing

>TOOLSUP

and pressing the Enter key.

3 Make access to C7RTR tool available by typing

>ACCESS ON C7RTR password

and pressing the Enter key.

where

password is the obtained TOOLSUP password

The following message appears on the MAP display:

```
C7RTR permitted

C7RTR access will expire 48 hours from now.

**WARNING**
You have permitted access to command(s) that require skilled and knowledgeable
users. Proper use is required to avoid possible service degradations. Please
ensure that only fully trained and qualified personnel proceed.
```

4 Access the C7RTR CI directory by typing

> C7RTR

and pressing the Enter key.

5 Query the current routing status by typing

> QUERY_EXT_ROUTING LIST

and pressing the Enter key.

One of the following messages appears on the MAP (maintenance and administration position) display.

Example 1 of a MAP display

```
External Routing Status
-----------------------

External Routing:  Active.
MTP Databases:     Downloaded.
CCS7 DTCs:         DDM Stable.
```

Example 2 of a MAP display

```
External Routing Status
-----------------------

External Routing:  Inactive.
MTP Databases:     Downloaded.
CCS7 DTCs:         DDM Stable.
```

Example 3 of a MAP display

```
External Routing Status
-----------------------

External Routing:  Active.
MTP Databases:     Downloaded.
CCS7 DTCs:         DDM Transient.

These nodes are in transient states:

----> DTC1
----> DTC2
```

6 Your next step depends on the message that appears on the MAP display.

If the message on the MAP display matches	Do
Example 1	step 9
Example 2	step 7
Example 3	step 8

7 LIU7 external routing has not been activated. Refer to section "Activate LIU7 external routing" in Chapter 4: Datafill and activate LIU7 external routing. When LIU7 external routing is active, return to step 4 of this section.

8 The DTCs or PDTCs are in a transitional state. Wait for a distributed data manager (DDM) audit to change the CCS7 DTCs state from transient to stable. To determine if the DDM audit has changed the DTCs state repeat step 5.

9 Remove the MTP databases by typing

> REMOVE_MTP

and pressing the Enter key.

One of the following messages appears on the MAP display.

Example 4 of a MAP display

```
MTP Databases are being removed.
The procedure will be complete when the CCS7 DTCs are stable.
```

Example 5 of a MAP display

```
DDM is in a transient state. Please enter
the command when DDM is stable. Use the
QUERY_EXT_ROUTING command to determine if
DDM is stable.
No action taken.
```

Example 6 of a MAP display

```
External Routing is not active.  It must be active
before the MTP databases can be removed from the CCS7 DTCs.
```

10 Your next step depends on the message that appears on the MAP display.

If the message on the MAP display matches	Do
Example 4	step 12
Example 5	step 11
Example 6	step 7

11 One or more LIU7 external routers were in a transient state during step 9. Consult logs to determine which LIU7 router was in a transient state. Go to step 5 of this procedure.

12 The command was successful, but the DTCs or PDTCs are still purging data. Wait for DDM to stabilize. Determine if the DDM has stabilized by typing

> QUERY_EXT_ROUTING LIST

and pressing the Enter key.

One of the following messages appears on the MAP display.

Example 7 of a MAP display

```
External Routing Status
-----------------------

External Routing:  Active.
MTP Databases:     Removed.
CCS7 DTCs:         DDM Transient.

These nodes are in transient states:

----> DTC1
----> DTC2
```

Example 8 of a MAP display

```
External Routing Status
-----------------------

External Routing:  Active.
MTP Databases:     Removed.
CCS7 DTCs:         DDM Stable.
```

13 Your next step depends on the message that appears on the MAP display.

If the message on the MAP display matches	Do
Example 7	step 14
Example 8	step 15

14 The command was successful, but the DTCs or PDTCs are not stable. Wait until the DTCs or PDTCs are stable, then repeat step 12.

The total amount of time required for the office to stabilize depends on the number of DTCs or PDTCs in the office. The total amount of time can range from a few minutes to several hours. If you require an estimate of the total time required to complete this procedure, contact your next level of support.

15 Exit the C7RTR tool by typing

> QUIT

and pressing the Enter key.

Enable routeset expansion

Although LIU7 external routing is now active and stable, routeset expansion must be activated before additional tuples can be datafilled in table C7RTESET.

Routeset expansion allows more than 255 routesets to be added to table C7RTESET. Software optionality control (SOC) code TEL00004 is required to turn on this functionality. Obtain the SOC password before beginning this part of the procedure.

Note: LIU7 external routing must be activated before more than 255 tuples can be added to table C7RTESET.

To enable routeset expansion, complete the following steps.

1 Access the C7RTR CI directory by typing

> SOC

and pressing the Enter key.

2 Display the status of routeset expansion by typing

> SELECT OPTION TEL00004

and pressing the Enter key.

The following message appears on the MAP display

```
GROUP:TEL
OPTION    NAME                  RTU STATE   USAGE   LIMIT    UNITS  LAST_CHG
------    ----                  --- -----   -----   -----    -----  --------
TEL00004  C7 Routeset Increment   Y     -       2     255      1RS 98/01/01
```

Note: In the above example the value under the heading LIMIT indicates the current maximum number of supported routesets.

3 Change the routeset usage limit by typing

> ASSIGN LIMIT size key TO TEL00004

and pressing the Enter key.

where

size is the new limit being assigned to TEL00004 (511 to 2047 in 256 increments)

key is a 20-character alphanumeric string that is specific to the <size> being assigned

The following message appears on the MAP display

```
Done.
```

4 Verify that the routeset limit has changed by typing

> SELECT OPTION TEL00004

and pressing the Enter key.

5 Exit SOC by typing

>QUIT

and pressing the Enter key.

You have completed this procedure. Add additional tuples to table C7RTESET as needed.

Additional DTCs or PDTCs can be added to the office as needed.

Appendix A: Backing out procedures

This appendix describes the steps for backing out of each section of the Common Channel Signaling 7 (CCS7) link interface unit (LIU7) external routing activation procedure.

You can back out of the activation procedure at any time. To back out of the activation procedure entirely, locate in this appendix the title that matches the section you have just completed. Complete the backing out procedures in that section and all subsequent sections to the end of the appendix.

If you wish to back out of only one section of the activation procedure, locate in this appendix the title that matches the procedure you have just completed. Complete the backing out procedures for that section only.

Attention

Contact your next level of support before backing out of the entire activation procedure.

Routeset expansion

Routeset expansion is the functionality that allows more than 255 routesets to be datafilled in table C7RTESET. To deactivate routeset expansion, complete the following steps.

CAUTION
Service restriction

When you deactivate routeset expansion the number of routesets supported in table C7RTESET is restricted to a maximum of 255. Traffic capabilities return to the level that existed before you started the LIU7 external routing activation procedure.

1 Reduce the number of entries in table C7RTESET to 255 tuples. Refer to table C7RTESET in the DMS Translations Guide.

2 Determine if expanded routesets exist in table C7RTESET by typing

>C7RTR;QUERY_EXP_RTESETS

and pressing the Enter key.

One of the following messages appears on the MAP (maintenance and administration position) display.

Example 1 of a MAP display

```
>query_exp_rtesets
No expanded routesets
```

Example 2 of a MAP display

```
>query_exp_rtesets
expanded routesets
-----> WTX90581
-----> ABC87388
```

3 Your next step depends of the message on the MAP display.

If	Do
the message matches Example 1	step 26
the message is similar to Example 2	step 4

4 Each entry listed in the MAP display message from step 2 is the name of a routeset in table C7RTESET that has an index number above 254. Each routeset listed on the MAP display must be moved to an index number that is under 254. If possible, create a program that will complete steps 4 to 26 automatically. Otherwise, complete the following steps manually.

5 Choose one of the listed routesets to work on.

6 Access table C7GTT. Record all references to the routeset found in table C7GTT.

7 Delete the routeset from all entries in table C7GTT. For additional information, refer to table C7GTT in DMS Translations Guide.

8 Access table C7RPLSSN. Record the full tuple character string for the routeset you are working on.

9 Delete the routeset from table C7RPLSSN.

10 Access table C7NETSSN. Record all references to the routeset found in table C7NETSSN.

11 Delete the routeset from all entries in table C7NETSSN. For additional information, refer to table C7NETSSN in DMS Translations Guide.

12 Access table ISUPDEST. Post and busy the ISUP route of the trunk group that is assigned to the routeset. Change the state of the ISUP route to installation busy.

13 Post, busy, and offline the routeset you are working on.

14 Access table C7TRKMEM. Record the full tuple character strings of the circuit identification codes (CIC) for the trunk group, then delete all of the CICs for the trunk group.

15 Access table ISUPDEST. Delete the routeset you are working on.

16 Access table C7RTESET. Record the full tuple character string of the routeset. Delete the routeset.

17 Add the routeset back to table C7RTESET using the tuple information obtained in step 16. The routeset is assigned to the lowest available index number. Note the new index number for the routeset.

18 Access table ISUPDEST. Add the routeset back to table ISUPDEST using the new index number of the routeset.

19 Access table C7TRKMEM. Add the CICs back to table C7TRKMEM using the tuple information obtained in step 14.

20 Post, busy, and return the routeset to service using the new index number of the routeset.

21 Post the circuits added in step 19 using the new index number of the circuit. Repeat this step for all circuits added in step 19. Busy the circuits and return them to service.

22 Access table C7NETSSN. Add the routeset you are working on back to the entries in table C7NETSSN that were noted in step 10. For additional information, refer to table C7NETSSN in DMS Translations Guide.

23 Access table C7RPLSSN. Add the routeset back to table C7RPLSSN using the tuple information obtained in step 8. Update the tuple information to include the new routeset index number.

24 Access table C7GTT. Add the routeset back to the entries in table C7GTT that were noted in step 6. Refer to table C7NETSSN in DMS Translations Guide.

25 Exit table C7GTT and go to step 2.

26 You have completed this procedure.

Replace MTP routing databases

To replace message transfer part (MTP) routing databases to the digital trunk controllers (DTC) or PCM30 digital trunk controllers (PDTC) and instruct the computing module (CM) to route future MTP routing updates to the DTCs or PDTCs, complete the following steps.

> ***Note:*** If any problems occur during this section of the procedure, complete all steps in the section and then return to step one of section "Replace MTP routing databases". Do not proceed to section "Deactivate LIU7 external routing" until you have successfully completed all steps in section "Replace MTP routing databases".

Ensure that the following activities do not take place during this part of the activation procedure:

- adding or deleting routesets in table C7RTESET
- busying or returning to service any CCS7 DTCs, PDTCs or LIU7s
- busying or returning to service any routesets
- hardware maintenance

Attention

Ensure that REx is turned off during this procedure.

1 Access the C7RTR CI directory level by typing

>C7RTR

and pressing the Enter key.

The following message appears on the MAP display.

Example of a MAP display

```
C7RTR: External Routing Activation Utility
 Type HELP for a list of commands.
```

2 Verify that distributed data manager (DDM) is stable by typing

> QUERY_EXT_ROUTING

and pressing the Enter key.

One of the following messages appears on the MAP display.

Example 1 of a MAP display

```
External Routing Status
-----------------------

External Routing:  Active.
MTP Databases:     Removed.
CCS7 DTCs:         DDM Stable.
```

Example 2 of a MAP display

```
External Routing Status
-----------------------

External Routing:  Active.
MTP Databases:     Removed.
CCS7 DTCs:         DDM Transient.

These nodes are in transient states:

----> DTC1
----> DTC2
```

3 Your next step depends on the message displayed in step 2.

If the message on the MAP display matches	Do
Example 1	step 5
Example 2	step 4

4 The DTCs or PDTCs are in a transitional state. Wait for a DDM audit to change the CCS7 DTCs state from transient to stable and repeat step 2.

Note: The length of time a DDM audit takes to change the DTCs state can range from a few minutes to several hours.

5 Ensure no expanded routesets exist by typing

> C7RTR;QUERY_EXP_RTESETS

and pressing the Enter key.

The following message appears on the MAP display.

```
>query_exp_rtesets
No expanded routesets
```

If the above MAP display does not appear, return to section "Routeset expansion" in this Appendix.

6 Download the MTP data by typing

> DOWNLOAD_MTP

and pressing the Enter key.

One of the following messages appear on the MAP display.

Example 3 of a MAP display

```
MTP Databases are being downloaded.
The procedure will be complete when the CCS7 DTCs are stable.
```

Example 4 of a MAP display

```
DDM is in a transient state. Please enter
the command when DDM is stable. Use the
QUERY_EXT_ROUTING command to determine if
DDM is stable.
No action taken.
```

Example 5 of a MAP display

```
Can not download MTP databases because there are greater than 108 links in C7LINK
and DTC datafilled in table LTCINV.
```

7 Your next step depends on the message displayed in 6.

If the message on the MAP display matches	Do
Example 3	step 10
Example 4	step 8
Example 5	step 9

8 One or more LIU7s were in a transient state during step 6. Consult logs to determine which LIU7 was in a transient state and return to step 2 of this procedure.

9 Reduce the number of links to 108 or less, or remove DTCs. Return to step 6.

10 The command was successful but data transfer is still in process. Wait for the DDM to stabilize then query the external routing state by typing

> QUERY_EXT_ROUTING LIST

and pressing the Enter key.

One of the following messages appears on the MAP display.

Example 6 of a MAP display

```
External Routing Status
-----------------------

External Routing:  Active.
MTP Databases:     Removed.
CCS7 DTCs:         DDM Transient.

These nodes are in transient states:

----> DTC1
----> DTC2
```

Example 7 of a MAP display

```
External Routing Status
-----------------------

External Routing:  Active.
MTP Databases:     Removed.
CCS7 DTCs:         DDM Stable.
```

11 Your next step depends on the message that appears on the MAP display.

If the message on the MAP display matches	Do
Example 6	step 12
Example 7	step 13

12 The command was successful, but the DTCs or PDTCs are not in a stable state. Wait until the DTCs or PDTCs are in a stable state, then repeat step 10.

The total amount of time required for the office to stabilize depends on the number of DTCs or PDTCs in the office. The total amount of time can range from a few minutes to several hours. If you require an estimate of the total time required to complete this procedure, contact your next level of support.

13 MTP routing data has been downloaded to the DTCs or PDTCs. Exit the C7RTR tool by typing

> QUIT

and pressing the Enter key.

Deactivate LIU7 external routing

To deactivate LIU7 external routing complete the following steps.

1 Access the C7RTR CI directory by typing

> C7RTR

and pressing the Enter key.

The following messages appears on the MAP display

```
C7RTR: External Routing Activation Utility
 Type HELP for a list of commands.
```

2 Verify that MTP databases are downloaded and stable. Enter the command

> QUERY_EXT_ROUTING

and pressing the Enter key.

One of the following messages appears on the MAP display.

Example 1 of a MAP display

```
External Routing Status
-----------------------

External Routing:  Active.
MTP Databases:     Downloaded.
CCS7 DTCs:         DDM Stable.
```

Example 2 of a MAP display

```
External Routing Status
-----------------------

External Routing:  Active.
MTP Databases:     Removed.
CCS7 DTCs:         DDM Stable.
```

Example 3 of a MAP display

```
External Routing Status
-----------------------

External Routing:  Inactive.
MTP Databases:     Downloaded.
CCS7 DTCs:         DDM Transient.

These nodes are in transient states:

----> DTC1
----> DTC2
```

3 Your next step depends on the message on the MAP display.

If the message on the MAP display matches	Do
Example 1	step 6
Example 2	step 5
Example 3	step 4

4 The DTCs or PDTCs are in a transitional state. Wait a few minutes for a DDM audit to change the DTCs or PDTCs state from transient to stable. When the DTCs or PDTCs are in stable state, go to step 2.

Note: The length of time a DDM audit takes to change the DTCS or PDTCs state can range from a few minutes to several hours.

5 MTP routing databases have not been downloaded to the DTCs or PDTCs. Go to section “Replace MTP routing databases” in this appendix.

6 Deactivate LIU7 external routing by typing

> DEACTIVATE

and pressing the Enter key. One of five messages appears on the MAP display.

Example 4 of a MAP display

```
External Routing has been deactivated.
```

Example 5 of a MAP display

```
The MTP databases must be re-added to the CCS7 DTCs before
External Routing can be deactivated.
No action taken.
```

Example 6 of a MAP display

```
There are expanded routesets in the office.
Use the C7RTR query_exp_rtesets command to
find which routesets must be deleted before
External Routing deactivation will be allowed.
No action taken.
```

Example 7 of a MAP display

```
There are CCS7 DTCs in transient states.
Use the C7RTR query_ext_routing command to find out
which ones, or check for DDM logs.
No action taken.
```

Example 8 of a MAP display

```
Cannot deactivate LIU7 external routing because there are greater than 108 links
in C7LINK and DTC datafilled in table LTCINV.
```

7 Your next step depends on the message on the MAP display.

If the message on the MAP display matches	Do
Example 4	step 11
Example 5	step 5
Example 6	step 8
Example 7	step 9
Example 8	step 10

8 Expanded routesets exist in the office. Go to section "Routeset expansion". Return to step 6.

9 One or more LIU7s were in a transient state during step 6. Consult logs to determine which LIU7 was in a transient state and return to step 2 of this procedure.

10 Reduce the number of links to 108 or less, or remove DTCs. Return to step 6.

11 Verify that LIU7 external routing is deactivated by typing

> QUERY_EXT_ROUTING

and pressing the Enter key.

The following message appears on the MAP display.

```
External Routing Status
-----------------------

External Routing:  Inactive.
MTP Databases:     Downloaded.
CCS7 DTCs:         DDM Stable.
```

12 LIU7 external routing is no longer active. Exit the C7RTR tool by typing

> QUIT

and pressing the Enter key.

Bring LIU7 routers out of service

To bring LIU7 routers out of service complete the following steps.

1 Post the LIU7 routers by typing

> MAPCI;MTC;CCS;CCS7;C7ROUTER

and pressing the Enter key. The following message appears on the MAP display.

```
CM      MS     IOD     Net      PM     CCS     Lns     Trks    Ext     APPL
 .       .      .       .        .      .       .       .       .       .

C7Router        CCS7
 0 Quit          .
 2 Post_     External Routing    Insv
 3                                1111111  11122222  22222333
 4                        12345678  90123456  78901234  56789012
 5           Router       ..------  --------  --------  --------
 6
 7 Bsy_      Rtr   State  Resource   PM State
 8 RTS_
 9 OffL_
10
11
12 Next
13
14 QueryRtr
15
16 QueryTrf
17
18
  ADMIN
Time  22:18  >
```

2 Post the routers by typing

> POST ALL

and pressing the Enter key.

The following message appears on the MAP display.

```
CM      MS     IOD     Net      PM     CCS     Lns     Trks    Ext     APPL
 .       .      .       .        .      .       .       .       .       .

C7Router        CCS7
 0 Quit          .
 2 Post_     External Routing    Insv
 3                                  1111111  11122222  22222333
 4                         12345678  90123456  78901234  56789012
 5           Router        ..------  --------  --------  --------
 6
 7 Bsy_      Rtr   State  Resource   PM State
 8 RTS_      1     Insv   LIU7 120   Insv
 9 OffL_     Size of Posted Set = 2
10
11
12 Next
13
14 QueryRtr
15
16 QueryTrf
17
18
  ADMIN
Time  22:18  >
```

3 Bring the routers into the manual busy (ManB) state by typing

> BSY ALL

and pressing the Enter key. The following message appears on the MAP display.

```
CM      MS     IOD     Net      PM     CCS     Lns     Trks    Ext     APPL
 .       .      .       .        .      .       .       .       .       .

C7Router        CCS7
 0 Quit          .
 2 Post_     External Routing    ManB
 3                                  1111111  11122222  22222333
 4                         12345678  90123456  78901234  56789012
 5           Router        MM------  --------  --------  --------
 6
 7 Bsy_      Rtr   State  Resource   PM State
 8 RTS_      1     ManB   LIU7 120   Insv
 9 OffL_     Size of Posted Set = 2
10           bsy all
11           Router 1: BSY passed.
12 Next      Router 2: BSY passed.
13
14 QueryRtr
15
16 QueryTrf
17
18
  ADMIN
Time  22:18  >
```

4 Bring the routers into the offline state by typing

> OFFL ALL

and pressing the Enter key. The following message appears on the MAP display.

```
CM      MS     IOD     Net      PM     CCS     Lns     Trks    Ext     APPL
 .       .      .       .        .      .       .       .       .       .

C7Router        CCS7
 0 Quit          .
 2 Post_     External Routing    OffL
 3                                    1111111  11122222  22222333
 4                          12345678  90123456  78901234  56789012
 5           Router         OO------  --------  --------  --------
 6
 7 Bsy_      Rtr   State  Resource   PM State
 8 RTS_      1     OffL   LIU7 120   Insv
 9 OffL_     Size of Posted Set = 2
10           offl all
11           Router 1: OffL passed.
12 Next      Router 2: OffL passed.
13
14 QueryRtr
15
16 QueryTrf
17
18
  ADMIN
Time  22:18  >
```

All LIU7 routers are now offline.

Bring LIU7s out of service

To bring the LIU7s that were acting as external routers out of service, complete the following steps.

1 View the LIU7s by typing

> MAPCI;MTC;PM;POST LIU7

and pressing the Enter key.

The following message appears on the MAP display.

```
CM      MS     IOD     Net      PM     CCS     Lns     Trks    Ext     APPL
 .       .      .       .        .      .       .       .       .       .

LIU7                              SysB    ManB    OffL    CBsy    ISTb    InSv
 0 Quit         PM                  0       0      74       0       0       1
 2 Post_        LIU7                0       0      24       0       0       1
 3 ListSet
 4           LIU7
 5           POST:
 6 Tst_      No PM posted
 7 Bsy_
 8 RTS_
 9 OffL_
10 LoadPM_
11 Disp_
12 Next
13
14 QueryPM_
15 LoopBk_
16
17
18
  ADMIN
Time  22:18  >
```

2 Post an LIU7 that was acting as an external router by typing

> POST LIU7 liu_no

and pressing the Enter key.

where

liu_no is the number of an LIU7.

The following message appears on the MAP display.

```
CM      MS     IOD     Net      PM     CCS     Lns     Trks    Ext     APPL
 .       .      .       .        .      .       .       .       .       .

LIU7                                SysB    ManB    OffL    CBsy    ISTb    InSv
 0 Quit         PM                    0       0      74       0       0       1
 2 Post_        LIU7                  0       0      24       0       0       1
 3 ListSet
 4           LIU7   1   InsV       Rsvd
 5           POST:
 6 Tst_
 7 Bsy_
 8 RTS_
 9 OffL_
10 LoadPM_
11 Disp_
12 Next
13
14 QueryPM_
15 LoopBk_
16
17
18
  ADMIN
Time  22:18  >
```

3 Bring the LIU7 offline by typing

> BSY

and pressing the Enter key.

> OFFL

and pressing the Enter key.

A message similar to the following appears on the MAP display.

```
CM      MS     IOD     Net      PM     CCS     Lns     Trks    Ext     APPL
 .       .      .       .        .      .       .       .       .       .

LIU7                                SysB    ManB    OffL    CBsy    ISTb    InSv
 0 Quit         PM                    0       0      75       0       0       0
 2 Post_        LIU7                  0       0      25       0       0       0
 3 ListSet
 4           LIU7   1   OffL       Rsvd
 5           OFFL
 6 Tst_      LIU7 1 OffL Passed
 7 Bsy_
 8 RTS_
 9 OffL_
10 LoadPM_
11 Disp_
12 Next
13
14 QueryPM_
15 LoopBk_
16
17
18
  ADMIN
Time  22:18  >
```

4 Repeat step 2 and step 3 for each LIU7.

5 Exit all MAP levels by typing

> QUIT ALL

and pressing the Enter key.

Table C7ROUTER

To remove LIU7 routers from table C7ROUTER, complete the following steps.

1 Enter table C7ROUTER by typing

>TABLE C7ROUTER

and pressing the Enter key.

2 Remove the router from table C7ROUTER by typing

>DEL LIU7 router_no

and pressing the Enter key.

where:

router_no is the number of the router to be deleted.

3 Repeat step 2 for each router you wish to delete. If you are backing out of this procedure entirely, remove all routers added in section "Datafill table C7ROUTER".

4 Exit table C7ROUTER by typing:

> QUIT

and pressing the Enter key.

Table LIUINV

To remove LIU7 datafill from table LIUINV, complete the following steps.

1 Enter table LIUINV by typing

>TABLE LIUINV

and pressing the Enter key.

2 Remove the LIU7 from table LIUINV by typing

>DEL LIU7 liu7_no

and pressing the Enter key

where:

liu7_no is the number of the LIU7 to be deleted

3 Repeat step 2 for each LIU7 you wish to delete. If you are backing out of this procedure entirely, remove all dedicated LIU7s added in section "Datafill table LIUINV".

4 Exit table LIUINV by typing

> QUIT

and pressing the Enter key.

Appendix B: Placement of LIU7 external routers

This chapter illustrates how LIU7 external routers can be placed on different hardware platforms.

Make sure that the dedicated LIU7 external routers are distributed evenly across all the half-shelves of all of the following cabinets that you have in your office:

- link peripheral processors (LPP), enhanced LPPs (ELPP), or fiberized LPPs (FLPP)
- DMS SuperNode SE (SNSE) link interface shelves (LIS)
- fiberized LISs (FLIS)

An even distribution ensures that a single point failure within the cabinet, such as the loss of power to a half-shelf, does not bring down all the LIU7 external routers.

LPP, ELPP, FLPP requirements

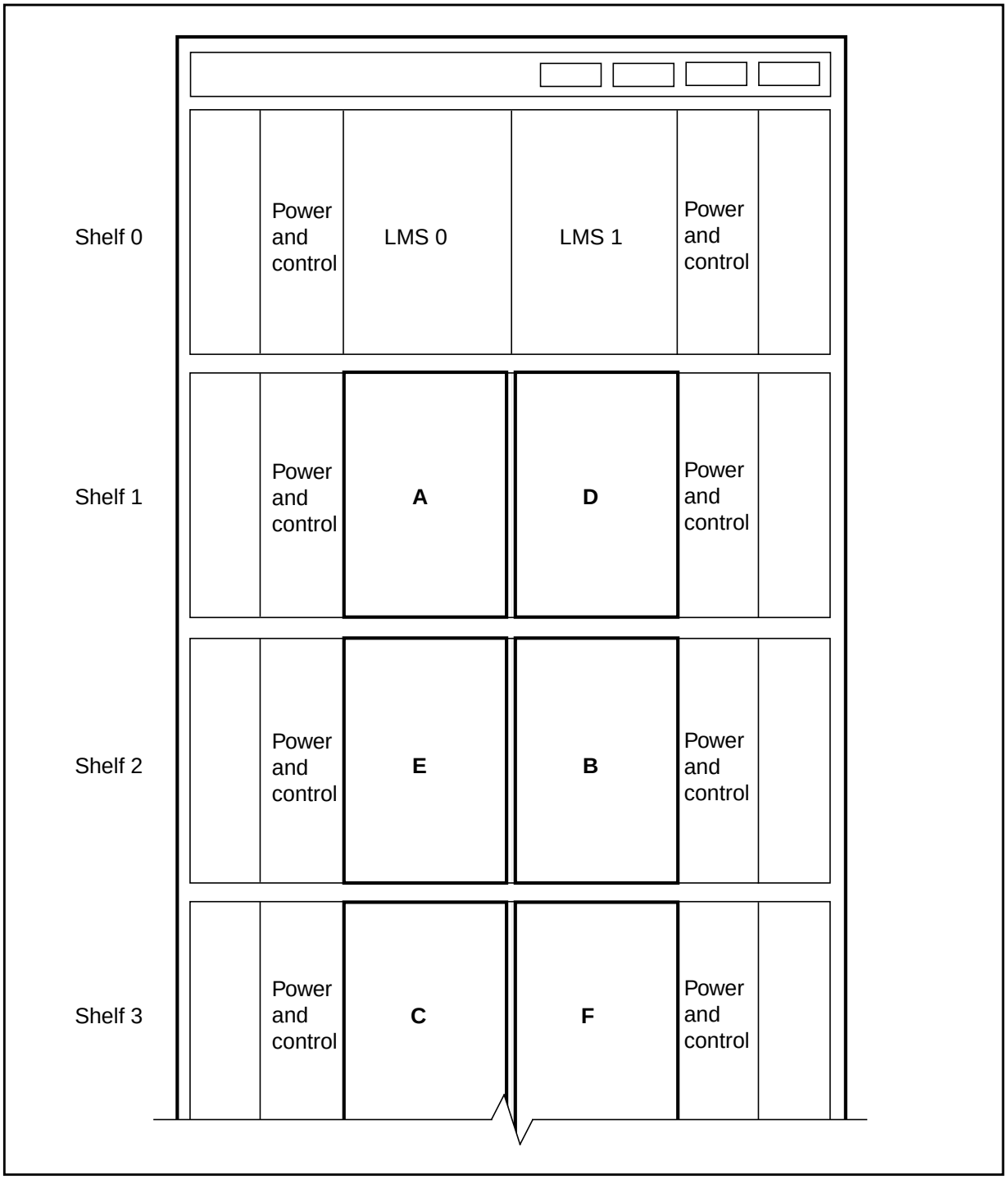
Nortel recommends the following procedure for adding LIU7 external routers to an LPP, ELPP, or FLPP cabinet:

1 Add the LIU7 external routers to an LPP, ELPP, or FLPP by following the order of half-shelves listed below:

A, B, C, D, E, F, A, B

2 Place one LIU7 on the first half-shelf listed, then continue to the next half-shelf listed. When you have placed one LIU7 on each of the half-shelves listed, begin again with the first half-shelf listed. Refer to Figure 1, “Half-shelves within an LPP, ELPP, or FLPP cabinet” to determine the location and letter name of each half-shelf.

Figure 1 Half-shelves within an LPP, ELPP, or FLPP cabinet



SNSE LIS requirements

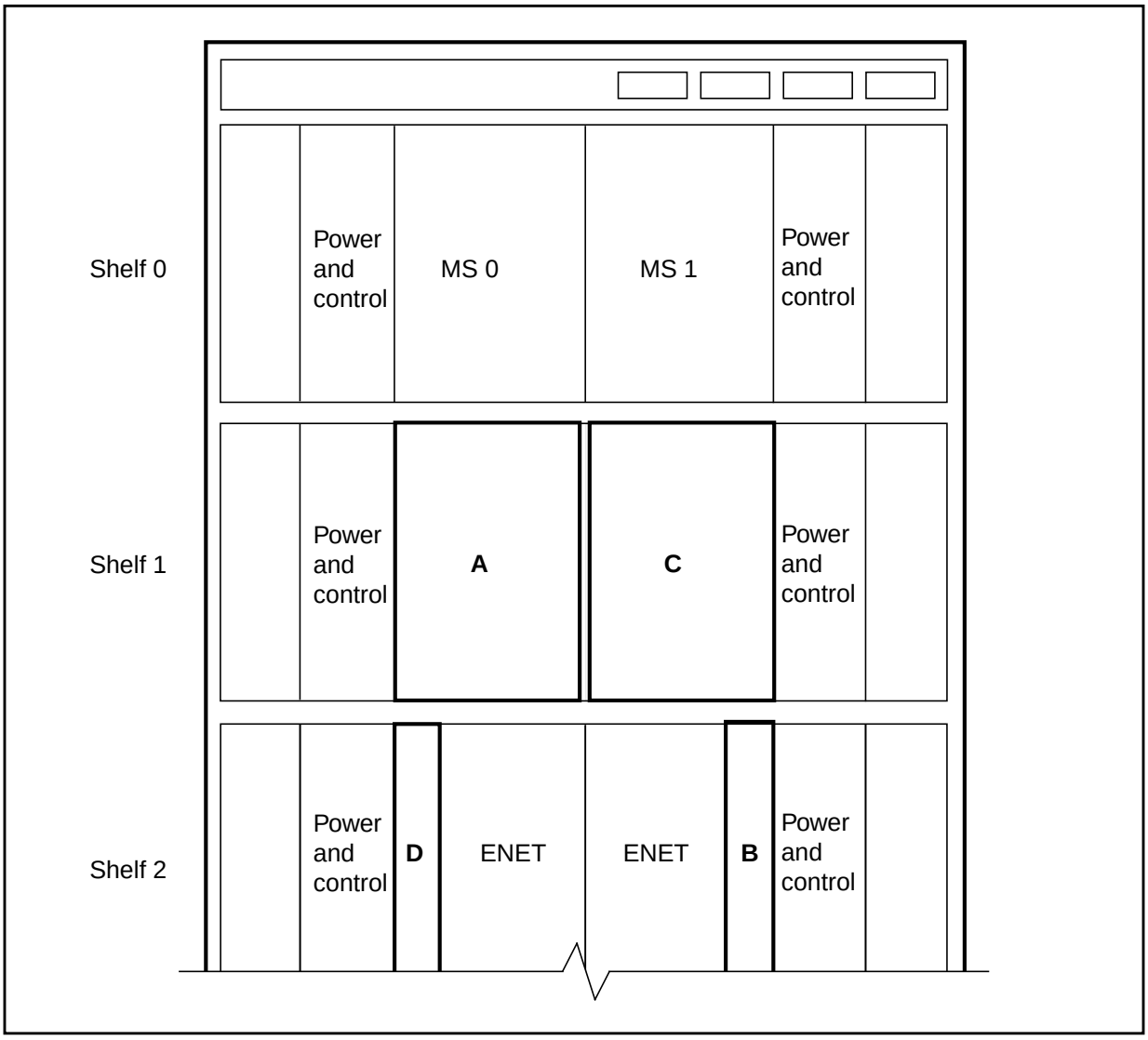
Nortel recommends the following procedure for adding LIU7 external routers to a SNSE LIS cabinet:

1 Add the LIU7 external routers to a SNSE LIS by following the order of half-shelves listed below:

A, B, C, D, A, C, A, C

2 Place one LIU7 on the first half-shelf listed, then continue to the next half-shelf listed. When you have placed one LIU7 on each of the half-shelves listed, begin again with the first half-shelf listed. Refer to Figure 2, “Half-shelves within a SNSE LIS cabinet” to determine the location and letter name of each half-shelf.

Figure 2 Half-shelves within a SNSE LIS cabinet



FLIS requirements

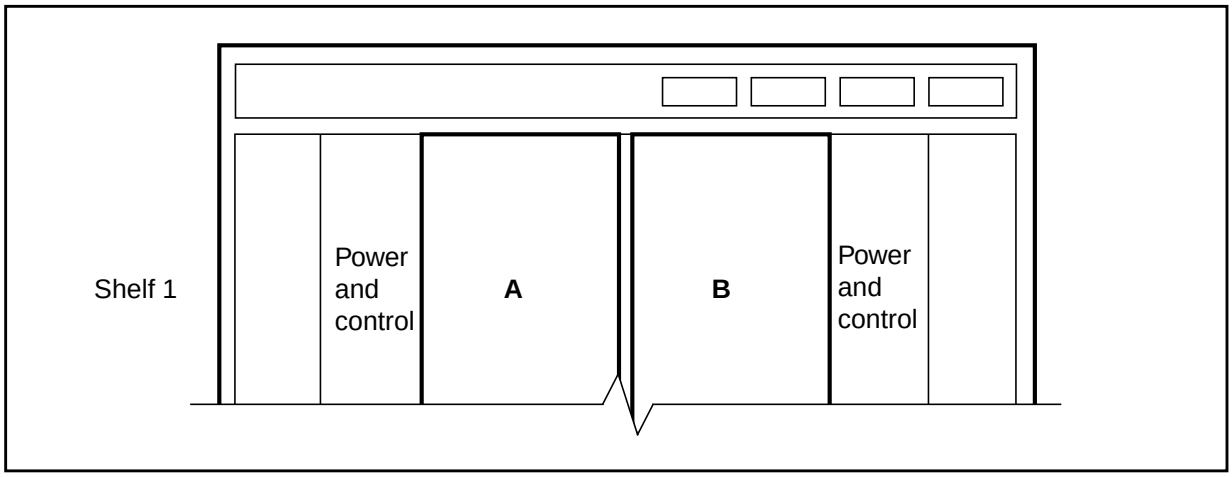
Nortel recommends the following procedure for adding LIU7 external routers to a FLIS cabinet:

1 Add the LIU7 external routers to a FLIS by following the order of half-shelves listed below:

A, B

2 Place one LIU7 on the first half-shelf listed, then continue to the next half-shelf listed. When you have placed one LIU7 on each of the half-shelves listed, begin again with the first half-shelf listed. Refer to Figure 3, “Half-shelves within a FLIS cabinet” to determine the location and letter name of each half-shelf.

Figure 3 Half-shelves within a FLIS cabinet



List of terms

CCS7

See Common Channel Signaling 7.

CCS7 link interface unit (LIU7)

A peripheral module (PM) that processes messages entering and leaving a link peripheral processor (LPP) through an individual signaling data link. Each LIU7 consists of a set of cards and a paddle board provisioned in one of the link interface shelves of the LPP.

CM

See computing module.

Common Channel Signaling 7 (CCS7)

A digital message-based network signaling standard, defined by the CCITT, that separates call signaling information from voice channels so that interoffice signaling is exchanged over a separate signaling link.

computing module (CM)

The processor and memory of the dual-plane combined core (DPCC) used by DMS SuperNode. Each CM consists of a pair of central processing units with associated memory that operate in a isochronous matched mode on two separate planes. Only one plane is active; it maintains overall control of the system while the other plane is on standby.

DDM

See distributed data manager.

Digital Multiplex System (DMS)

A central office (CO) switching system in which all external signals are converted to digital data and stored in assigned time slots. Switching is performed by reassigning the original time slots.

digital trunk controller

A peripheral module (PM) that connects DS30 links from the network with digital trunk circuits.

distributed data manager (DDM)
A utility that manages simultaneous updates of data to several DMS nodes.

DMS
See Digital Multiplex System.

DMS SuperNode system enhanced (SNSE)
A smaller version of DMS SuperNode designed to service smaller offices (maximum 20 000 lines). It is based on existing SuperNode technology and can be used in all existing applications of SuperNode, including Common Channel Signaling 7 (CCS7) and international. SNSE supports all SuperNode software features at a reduced call processing capacity.

DTC
See digital trunk controller.

ELPP
See enhanced link peripheral processor.

Emergency Technical Assistance Service (ETAS)
Nortel technical support provided to operating companies in Canada for emergencies, cutovers, software updates, and product verification.

enhanced link peripheral processor
An enhanced link peripheral processor with triple F-bus configuration uses SR128 sub-rate fiber links. A separate F-bus is provided for each link interface shelf (LIS).

ETAS
See Emergency Technical Assistance Service

fiberized link interface shelf (FLIS)
A physical housing unit for LIU7s that consists of one F-bus shelf, uses dual F-bus architecture, and houses up to twelve LIU7s.

FLIS
See fiberized link interface shelf.

INode
See integrated node.

ISDN user part (ISUP)
A Common Channel Signaling 7 (CCS7) message-based signaling protocol that acts as a transport carrier for ISDN services. The ISUP provides the functionality in a CCS7 network for voice and data services.

ISUP
See ISDN user part.

integrated node (INode)

A DMS product that combines the functionality of an SSP and an STP in a single node.

link peripheral processor (LPP)

The DMS equipment frame or cabinet that contains two types of peripheral modules (PM): a link interface module (LIM) and one or more application-specific units (ASU).

link interface shelf (LIS)

A physical housing unit for LIU7s in a SNSE office.

LIS

See link interface shelf (LIS).

LIU7

See CCS7 link interface unit (LIU7).

LIU7 external router

An LIU7 that is dedicated to the task of performing MTP routing functions for SSP or INode offices.

LPP

See link peripheral processor (LPP).

MAP

See Maintenance and administration position (MAP).

Maintenance and administration position

A group of components that provides a user interface between operating company personnel and the DMS-1 Family switches. The interface consists of a video display unit (VDU) and a keyboard, a voice communications module, test facilities, and special furniture.

message transfer part (MTP)

A CCITT no. 7 signaling (N7) protocol that provides a connectionless transport system for carrying common channel interoffice signaling no. 6 (CCIS6) and Common Channel Signaling 7 (CCS7) signaling messages between user locations or applications functions. Also known as message transport part.

MTP

See message transfer part (MTP).

PCM30 digital trunk controller

A digital trunk interface that has the hardware configuration of an international digital trunk controller (IDTC) but runs the software of a digital trunk controller (DTC).

PDTC

See PCM30 digital trunk controller (PDTC).

routeset expansion

Functionality that allows more than 255 routesets to exist in table C7RTESET.

service switching point (SSP)

A Common Channel Signaling 7 (CCS7) signaling node that interacts with the service control point (SCP) to implement special service code features.

signaling transfer point (STP)

A node in the Common Channel Signaling 7 (CCS7) network that routes messages between nodes. Signaling transfer points transfer messages between incoming and outgoing signaling links but, with the exception of network management (NWM) information, do not originate or terminate messages. Signaling transfer points are deployed in pairs. If one STP fails, the mate takes over, ensuring that service continues without interruption.

SOC

See software optionality control.

software optionality control (SOC)

A tool used to deliver the optional functionality available in a product computing module load (PCL). Refer to Software Optionality Control User Manual, 297-8991-901.

SSP

See service switching point.

STP

See signaling transfer point.

SNSE

See DMS SuperNode SE.

LIU7 External Routing Activation Guide

User Guide

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