Critical Release Notice

Publication number: 297-2663-347
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The content of this customer NTP supports the SN06 (DMS) software release.

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 that is valid through the current release.

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

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

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

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Digital Switching Systems

DMS-500

PRI RLT Feature Application Guide

LLT00008 and up Standard 02.03 August 1998

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DMS-500

PRI RLT Feature Application Guide

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About this document

This application guide describes the release link trunk (RLT) capability between the DMS-250 side of the DMS-500 switch and the customer premise equipment (CPE). The CPE must include a services platform in order to initiate release link trunking, although the switches provide the RLT capability.

During release link trunking, a DMS-500 switch bridges the originating trunk of one call to the terminating trunk of a second call, then releases the trunks, switches, and the CPE involved in the calls. After release link trunking, the CPE is available for other calls. Without release link trunking, the CPE and the trunks involved must maintain at least one call connection until the call is over.

This guide includes Primary Rate Interface (PRI) messaging and commands that directly affect RLT functionality on the DMS-250 side of the DMS-500 switch. For information on PRI RLT on the DMS-100 side of the DMS-500 switch, see the *DMS-100F ISDN PRI User-Network Interface Specification*, NIS–A211–1.

References to unsupported features

Beginning with software release LLT00009, you will find references to the following **unsupported** hardware, applications, and features in some of the DMS-500 documentation:

- Series 20-50 Processor
- Mixed Memory
- MSB7
- INODE
- Billing Server (AP/FP)
- EOPS
- FlexDial
- SL-100 Integrated Peripheral Equipment (IPE) digital phone
- AFT (will be available with SDM on SDMC11)

DMS-500 software is made up of local features of DMS-100 and long-distance features of DMS-250. The NTPs, and other technical documents issued with each software release, include information on new software features and new hardware introduced with the release. NTPs that do not require revisions, but are still pertinent to the DMS-500 switch, are also included with each release.

Note: Although documentation or references appear in the NTPs, the features, applications, and hardware listed above are **unsupported** on the DMS-500 switch.

Who needs this manual?

This manual is for personnel who are responsible for setting up, administering, and maintaining the DMS-500 switch**.**

To use this manual fully

- Ensure the DMS-500 switch you are working with is installed, commissioned, and active.
- Receive Nortel (Northern Telecom)-approved training for Table Editor, datafill, translations, and maintenance.

How is this manual arranged?

The information in this manual is arranged as follows:

Chapter 1, PRI RLT functionality

Chapter 1 introduces RLT, defines important terms, describes common call scenarios, and details important limitations and restrictions.

Chapter 2, PRI RLT implementation

Chapter 2 assists you in filling data tables required for RLT functionality.

Chapter 3, PRI RLT messages and protocol

Chapter 3 describes the messages, messaging requirements, and information elements for PRI RLT.

Chapter 4, Common PRI RLT call scenarios

Chapter 4 summarizes the flow of PRI messages between a DMS-500 switch and CPE and diagrams each of the common PRI RLT call scenarios.

Chapter 5, List of terms

Chapter 5 provides a list of terms used in this manual and their meanings.

Appendix A, Ordering information

Appendix A contains information on how to order Nortel (Northern Telecom) Publications (NTPs) and Product Content Loads (PCLs).

Where does this manual fit in the document suite?

This manual is written specifically for the DMS-500 switch and is part of a suite of documents for the DMS-500 switch. The documentation suite for DMS products reflect the common architecture of the DMS software. This suite includes application guides and reference guides. Application guides provide information on specific DMS-500 features and products. Technical reference guides contain information about logs, commands, operational measurements, and office parameters that are common to the DMS family. The *DMS-500 Master Index of Publications,* 297-2663-001, explains how the documentation suite for the switch is organized.

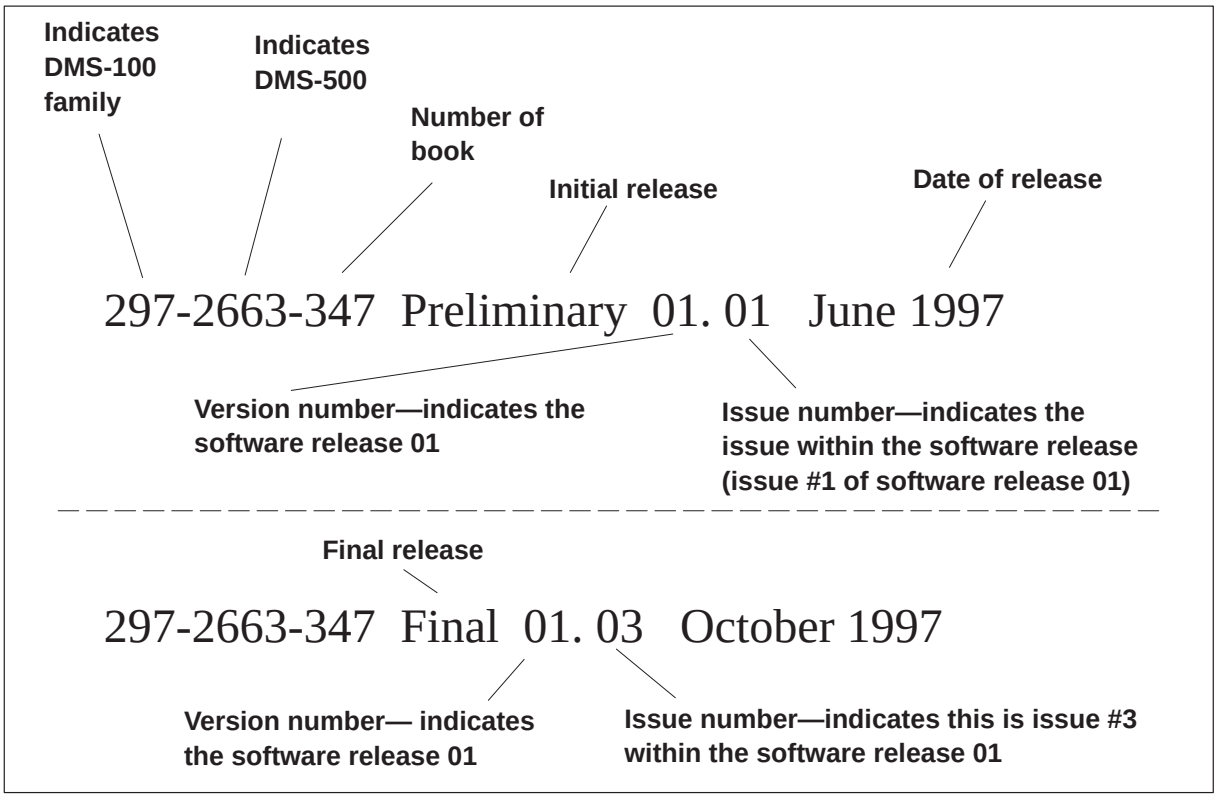
What software release does this manual apply to?

This manual applies to DMS-500 offices that have software release LLT00008 and up. Unless revised, this manual also applies to offices with software releases later than LLT00008 and up.

How to understand document numbers

As shown in the following graphic, the document naming and numbering indicates:

- the document number consisting of the family (297—for DMS family), the product (2663—for DMS-500), and the type of book (last three digits of document number)
- the release (preliminary or final)
- the software release version and the issue number within that release (01.01)
- the date the document was released



How to determine the latest version

More than one version of this manual may exist. To determine whether you have the latest version of this manual, check the release information in the *DMS-500 Master Index of Publications*, 297-2663-001.

What documents are referred to in this manual?

The following document is referred to in this manual:

- *DMS-100F ISDN PRI User-Network Interface Specification*, NIS-A211-1
- *DMS-500 Data Schema Reference Manual*, 297-2663-451

Information about related documents can be found in either the *DMS-500 Master Index of Publications*, 297-2663-001, or the *Product Documentation Directory*, 297-8991-001.

Document conventions

This document conforms 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.

Optional variables and parameters

Optional variables and parameters are shown in brackets ([ ]):

>SS setname [INSVSYNC]

Optional variables and parameters shown in brackets use the syntax described above. Each optional variable or parameter 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

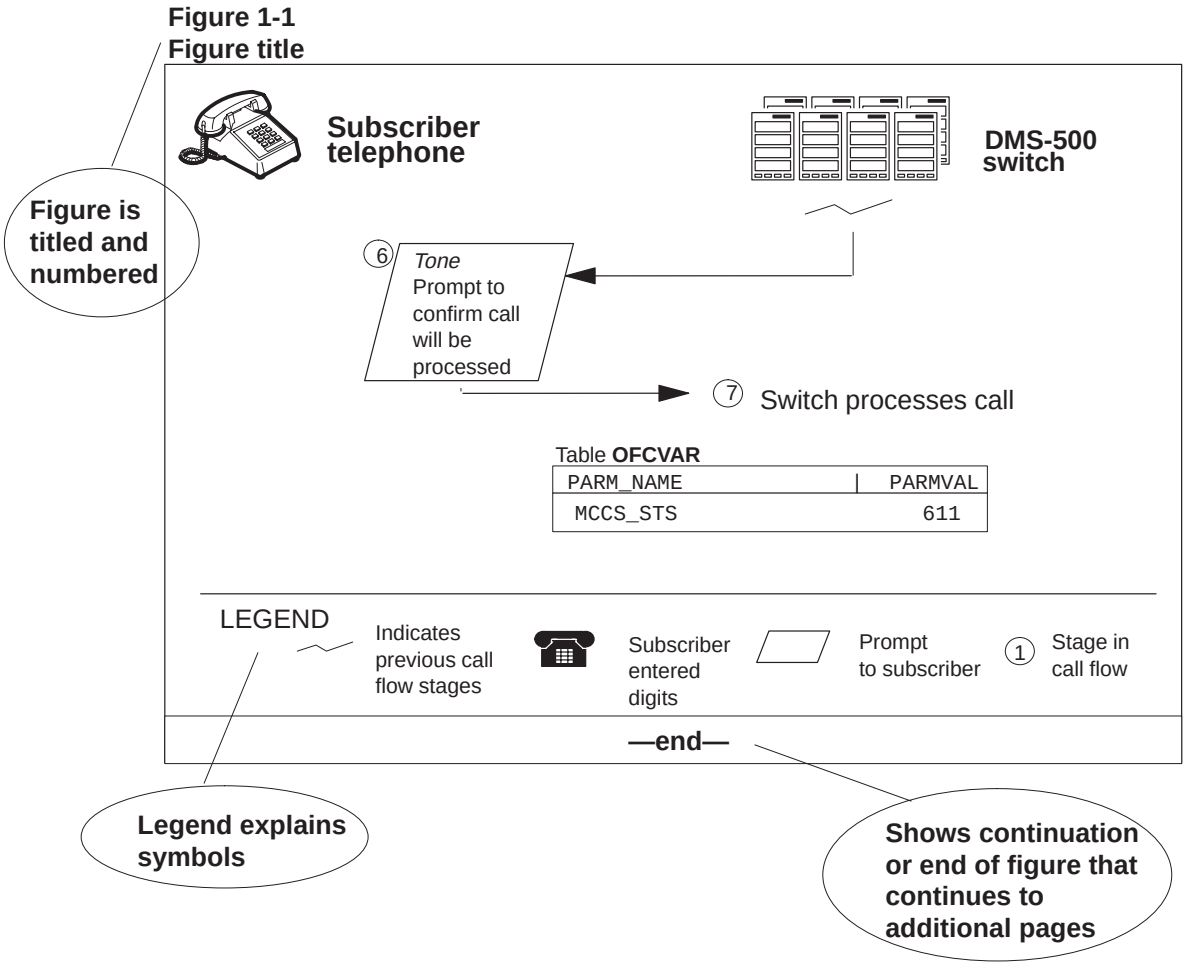
ctrl_no is the number of the CTRL (0 or 1)

Example of a MAP response:

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

Illustrations in figures

The following shows the figure conventions.



Numbering ranges for dialing plans

The following numbering ranges apply for any dialing plan listed in this manual:

- N = 2–9
- W = 0–1
- X = 0–9
- Z = 2–8

PRI RLT functionality

This chapter describes the release link trunk (RLT) functionality for the DMS-500 switch.

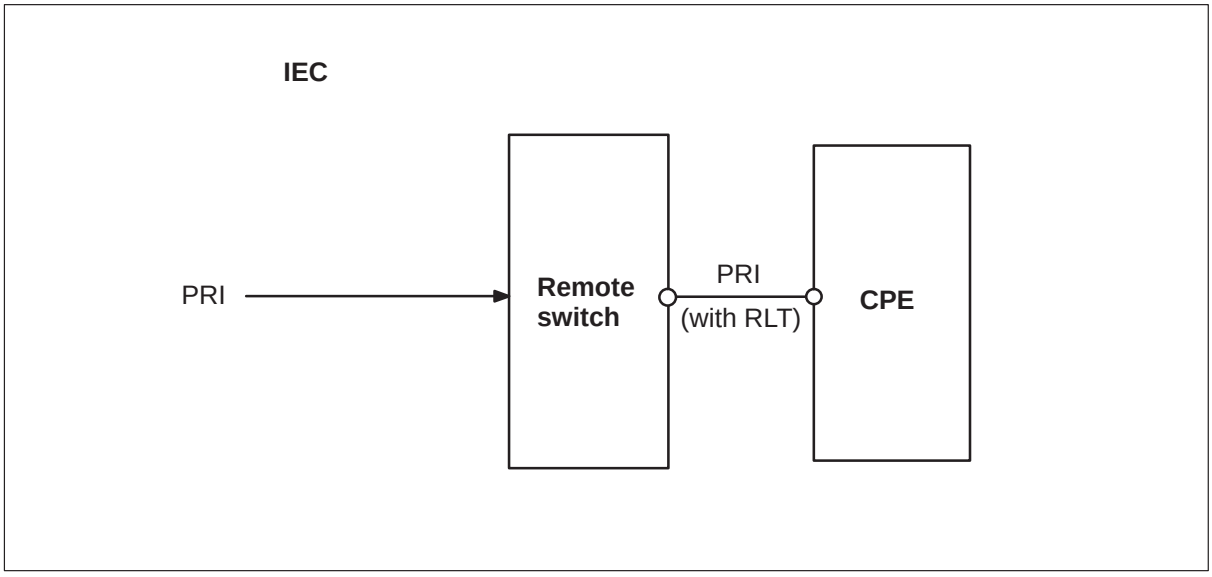
RLT capability for PRI trunks

A PRI trunk with RLT functionality connects a remote DMS-500 switch to customer premises equipment (CPE).

RLT functionality allows a DMS-500 switch to release a PRI trunk while it bridges one call's originator to a second call's terminator. After release link trunking, the CPE is available for other calls. RLT functionality increases a DMS-500 switch's traffic handling capacity and saves resources during call routing. Without release link trunking, the CPE and trunks involved must maintain at least one call connection until a call is over.

Figure 1-1 shows the trunk interworkings for the remote DMS-500 switch and its connection to the CPE. This figure indicates the types of trunk group originations for calls entering the network.

Figure 1-1
PRI trunk interworkings for RLT at a DMS-500 switch



Protocols that support RLT capabilities

The DMS-500 switch uses the Q.932 FACILITY message and Facility information element to provide RLT capability.

Explanations for important RLT terms

The following subsections define important RLT terms that this publication uses frequently.

Bridging and the bridging switch

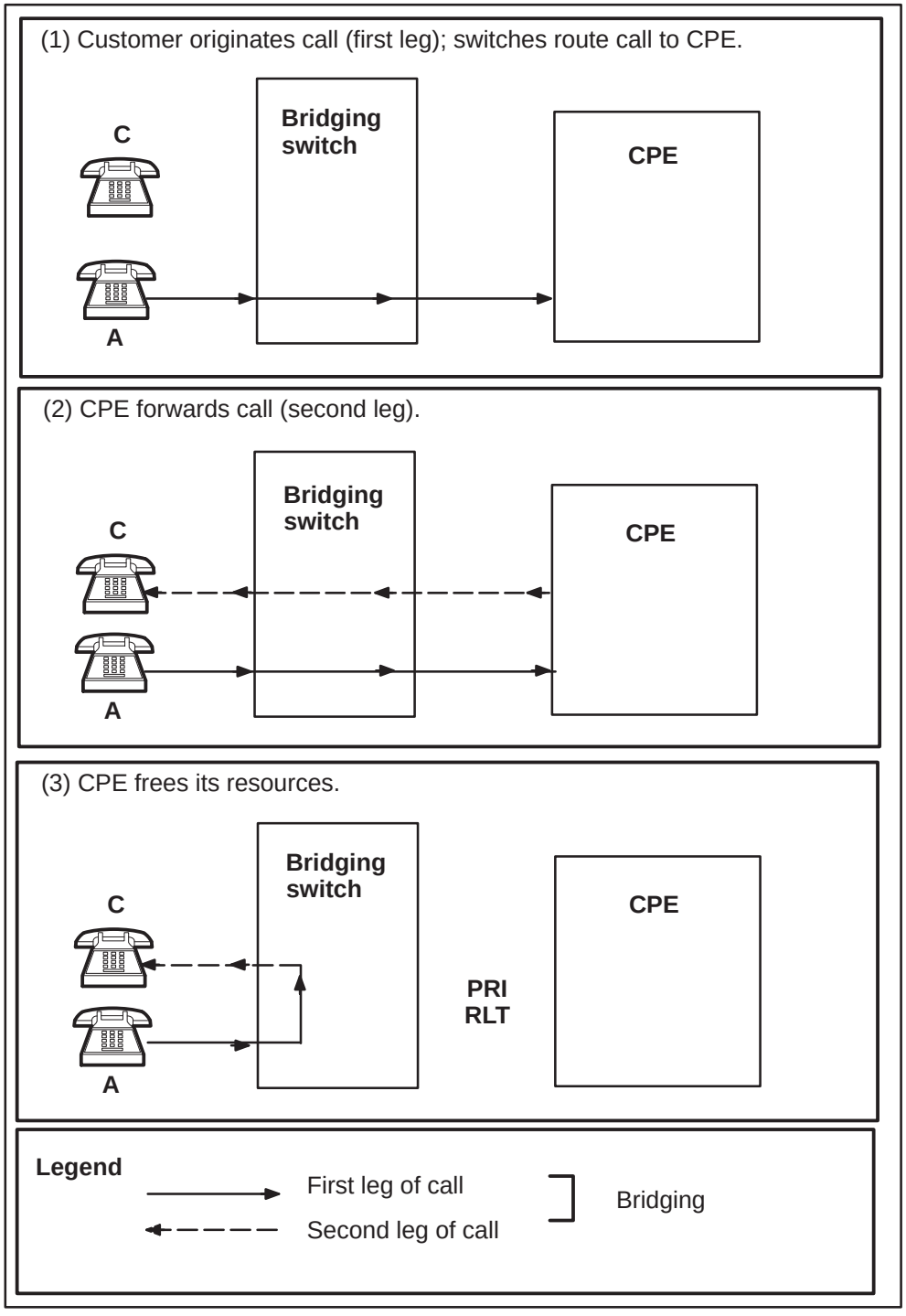
When a switch bridges a call with RLT functionality, it connects the originating trunk of one call to the terminating trunk of a second call. The bridging DMS-500 switch is the switch that bridges the call and maintains the call connection. A switch only bridges calls when it cannot remove itself from the call connection by passing the bridge request to another switch. To bridge calls, a switch between the bridging and host switches must have RLT capability.

Originating switch, terminating switch, and call legs

A switch that connects to the calling party is an originating switch. A switch that connects to the called party is a terminating switch. A call's first leg connects to the originating switch. A call's second leg connects to the terminating switch. The bridging switch makes a call to the terminating switch before it connects a call to the originating switch, establishing the second call leg before the first call leg. A call's point of connection, not the

order in which the network establishes a call, defines it as a first or second leg. Figure 1-2 shows an example of call legs in an RLT scenario.

Figure 1-2
Example of call legs between the bridging DMS-500 switch and the CPE



Common PRI RLT call scenarios

The following scenarios summarize the most common call scenarios that involve RLT functionality. For details about these call scenarios, see Chapter 4, “Common PRI RLT call scenarios.”

Call forwarding scenario

In this scenario, the DMS-500 switch routes a call to the CPE over PRI trunks. The CPE then redirects the call to the same DMS-500 switch. When the parties are in conference, the CPE requests release link trunking. The release link trunking capability frees the CPE resources.

Call transfer scenario

In this scenario, the CPE transfers a call to its destination and requests release link trunking. The release link trunking capability frees the CPE resources.

Billing descriptions for common RLT call scenarios

Using RLT functionality, when the DMS-500 bridges two calls into one call, it retains both call detail records (CDR). The first CDR (CDR1) reflects the first leg of the call and the second CDR (CDR2) reflects the second leg of the call and the redirected call.

RLT support capabilities

DMS-500 switches with RLT functionality on the DMS-250 side support reorigination on the following agencies:

- dedicated access line (DAL)
- FGA
- FGB
- FGC
- per-trunk signaling (PTS) FGD
- ISUP FGD
- Inter IMT for Universal Access (UA) calls

Limitations and restrictions

The following limitations and restrictions exist regarding PRI RLT functionality on the DMS-250 side of the DMS-500 switch:

- The RLT option must be datafilled on both PRI trunks for RLT to function properly.
- The RLT functionality will not be provided if the SOC option (PRLT0001) for this feature is in IDLE state.

- The DMS-500 switch does not have any way of knowing if the redirected call from the CPE has an associated call, other than the CALLID sent back from the CPE in the FACILITY message. For the CALLID to be valid at the host DMS-500 switch, both PRI trunks should be connected to the same DMS-500 switch. One way of ensuring this is to have to the PRI RLT trunks in the same trunk group.
- The DMS-500 switch does not support RLT to CCS7 interworking.
- RLT is not compatible with Call Forwarding on the Meridian 1 CPE.

Common PRI RLT failure conditions

Several failure conditions can prevent the RLT operation between the CPE and the DMS-500 switch from ending successfully. In these cases, the DMS-500 switch does not bridge the call or activate release link trunking, but does allow the call to continue.

- If the Facility information element in the SETUP message received on the second leg of the call contains any operation code other than RLT_OPERTIONIND, the DMS-500 switch returns a FACILITY message with a Return Error component to the CPE.
- The DMS-500 switch sends CALLID to the CPE in the ALERT message of the second call. This is in response to a SETUP message with a FAC information element. The switch only allows RLT operation for PRI trunks that are datafilled as RLT trunks. If the CPE requests RLT in the SETUP message for a call whose originator is not a PRI RLT trunk, the DMS-500 prevents the RLT operation and will return a FACILITY message with a Return Error component to the CPE.
- The DMS-500 requires that the CALLID of the second leg of the call be sent to the CPE in the ALERT/PROGRESS message, for the RLT operation to be successful. While the DMS-500 switch is sending the ALERT/PROGRESS message on an RLT-possible call, if it determines that the CALLID of the current call is NIL, then the DMS-500 switch returns a FACILITY message with a Return Error component to the CPE.
- When the CPE initiates RLT, it sends a FACILITY message with an Invoke component to the DMS-500 switch to start RLT operations. If the switch cannot parse the message properly, the DMS-500 switch returns a FACILITY message with a Reject component to the CPE.
- If the FACILITY message from the CPE on the first leg of the call contains an invalid CALLID, the DMS-500 switch returns a FACILITY message with a Return Error component to the CPE.

PRI RLT implementation

Because DMS-500 data tables are interactive, operating company personnel must datafill them in a specific order. This chapter presents the data tables and information elements that release link trunk (RLT) functionality requires.

Data tables and datafill for RLT functionality

The following data table contains datafill for the RLT functionality:

- TRKGRP (trunk group)

TRKGRP (PRI trunk group type)

The following fields in table TRKGRP relate specifically to RLT:

- ISUPIDX
- CUSTOMER
- OPTIONS.RLT

Functional description

Primary rate interface (PRI) trunk groups connect the DMS-500 switches to other interexchange carrier (IEC) switches in the network. The DMS-500 switch supports originating, terminating, and two-way access over PRI trunks. Subscribers can originate PRI calls on the DMS-500 switch and allow compatibility between the customer network and the electronic tandem network (ETN) switches for private network configurations.

Datafill sequence and implications

Operating company personnel must datafill the CLLI and CLLICDR tables before table TRKGRP.

The DMS-500 switch activates release link trunking when the RLT option is datafilled in the TRKGRP table. The switch only uses the RLT option when the SOC option is in the ON state. For additional datafill information, see the *DMS-500 Data Schema Reference Manual*, 297–2663–851.

PRI RLT messages and protocol

This chapter describes the Primary Rate Interface (PRI) release link trunk (RLT) messages that provide connectivity between switching elements in a network. It describes each PRI message along with the information elements that these messages use. These information elements use remote operations service element (ROSE) encoding.

This chapter defines PRI message formats, messaging requirements, and information elements for PRI RLT. For descriptions of specific RLT events and their messaging requirements, see the call examples in Chapter 4, "Common PRI RLT call scenarios."

PRI message formats and messaging requirements

This section provides PRI message information and describes the format, encoding, and RLT application of each message. Table 3-1 lists the messages. For easy reference, each message format description begins on a new page. This section does not present all the PRI messages that the DMS-500 switch supports. It describes only the basic set of messages that affect RLT.

Table 3-1
PRI RLT message summary

Symbol	Message name
FACILITY	Facility
SETUP	Setup
CALL PROC	Call Proceeding
ALERT	Alerting
CONNECT	Connect
CONNECT ACK	Connect Acknowledge
DISC	Disconnect

—continued—

Table 3-1
PRI RLT message summary (continued)

Symbol	Message name
REL	Release
REL COM	Release Complete
	—end—

General message information

In general, the PRI messages implement RLT requirements. The PRI messages for the DMS-500 switching environment allow signaling to either request call-related information or invoke customer or network services. These messages also transfer user information through the network.

Understanding PRI message formats

The type or length column in each of the tables in the following sections includes a key that defines the length of the PRI message. The three possible message length codes are

- F = mandatory fixed-length
- V = mandatory variable-length
- O = optional, of fixed or variable length

Each message description includes an abbreviation after the full message name heading. Each description also includes a hexadecimal code and an equivalent binary code for the message.

Directions of messages

Some of the message descriptions include the terms “forward” and “backward” to indicate the direction in which the switches pass the messages. The term “forward” indicates that the switches send the message toward the call’s terminator, the called party. The term “backward” indicates that the switches send the message toward the call’s originator, the calling party.

Mandatory and optional status of PRI messages

Some messages for ISDN PRI are mandatory. Some PRI messages also use optional information elements, depending on the message's specific function. Each information element description specifies the value for the length in octets (bytes), defined as follows:

- Fixed-length information elements specify the length, in bytes, of the information element data.
- Variable-length information elements specify the sum, in bytes, of the length of the length indicator (1 byte) plus the length of the information element contents.
- Optional information elements specify the sum, in bytes, of the length of the information element name (1 byte), the size of the length indicator (1 byte), and the length of the information element content.

Facility (FACILITY) message

The customer premises equipment (CPE) sends a FACILITY message to a network to request a supplementary service such as release link trunking (RLT). The FACILITY information element in the FACILITY message contains the service to be requested.

Information elements

Table 3-2 shows the information elements of the FACILITY message.

Table 3-2
Information elements within the FACILITY message

Information element name	Type	Length	Description
Protocol Discriminator	F	1 byte	See page 3-10
Call Reference	F	2–3 bytes	See page 3-11
Message Type	F	1 byte	See page 3-13
Facility*	F	7–n bytes	See page 3-26

Note: RLT functionality involves the information elements marked by an asterisk (*).

Setup (SETUP) message

A DMS-500 switch sends a SETUP message forward to initiate call establishment. This message contains call handling and routing data.

Information elements

Table 3-3 shows the information elements of the SETUP message.

Table 3-3
SETUP format

Information element name	Type	Length	Description
Protocol Discriminator	F	1 byte	See page 3-10
Call Reference	F	2–3 bytes	See page 3-11
Message Type	F	1 byte	See page 3-13
Bearer Capability	F	4–6 bytes	See page 3-14
Channel Identification	F	5–6 bytes	See page 3-21
Progress Indicator	O	4 bytes	See page 3-32
Network-Specific Facility	O	5–6 bytes	See page 3-28
Display	O	3–18 bytes	See page 3-24
Calling Party Number	O	4–16 bytes	See page 3-17
Called Party Number	F	4–27 bytes	See page 3-17
Original Called Number	O	4–15 bytes	See page 3-29
Redirecting Number	O	4–15 bytes	See page 3-34
Facility *	O	7–n bytes	See page 3-26

Note: RLT functionality involves information elements marked by an asterisk (*).

Call Proceeding (CALL PROC) message

A DMS-500 switch sends a CALL PROC message backward when it receives the address information it requires to route the call to the called party.

Information elements

Table 3-4 shows the information elements of the CALL PROC message.

Table 3-4
CALL PROC information elements

Information element name	Type	Length	Description
Protocol Discriminator	F	1 byte	See page 3-10
Call Reference	F	2–3 bytes	See page 3-11
Message Type	F	1 byte	See page 3-13
Channel Identification	F	5–6 bytes	See page 3-21

Alerting (ALERT) message

A DMS-500 switch sends the ALERT message backward after the switch accepts the SETUP message.

Information elements

Table 3-5 shows the information elements of the ALERT message.

Table 3-5
ALERT information elements

Information element name	Type	Length	Description
Protocol Discriminator	F	1 byte	See page 3-10
Call Reference	F	2–3 bytes	See page 3-11
Message Type	F	1 byte	See page 3-13
Channel Identification	O	5–6 bytes	See page 3-21
Facility *	O	7-n bytes	See page 3-26

Note: RLT functionality involves information elements marked by an asterisk (*).

Connect (CONN) message

A DMS-500 switch or the calling party sends the CONN message backward and forward to indicate that the switch has accepted the called party information.

Information elements

Table 3-6 shows the information elements of the CONN message.

Table 3-6
CONN information elements

Information element name	Type	Length	Description
Protocol Discriminator	F	1 byte	See page 3-10
Call Reference	F	2–3 bytes	See page 3-11
Message Type	F	1 byte	See page 3-13
Channel Identification	O	5–6 bytes	See page 3-21

Connect Acknowledge (CONN ACK) message

A DMS-500 switch and the CPE send the CONN ACK message back and forth confirming the receipt of a CONN message.

Information elements

Table 3-7 shows the information elements of the CONN ACK message.

Table 3-7
CONN information elements

Information element name	Type	Length	Description
Protocol Discriminator	F	1 byte	See page 3-10
Call Reference	F	2–3 bytes	See page 3-11
Message Type	F	1 byte	See page 3-13

Disconnect (DISC) message

A DMS-500 switch and the CPE send the DISC message back and forth as an invitation to release the PRI trunks.

Information elements

Table 3-8 shows the information elements of the DISC message.

Table 3-8
DISC Information elements

Information element name	Type	Length	Description
Protocol Discriminator	F	1 byte	See page 3-10
Call Reference	F	2–3 bytes	See page 3-11
Message Type	F	1 byte	See page 3-13
Cause	O	4–6 bytes	See page 3-19

Release (REL) message

A DMS-500 switch sends a REL message either forward or backward to indicate that it is releasing the circuit. The REL message defines the cause for the release.

Information elements

Table 3-9 shows the information elements of the REL message.

Table 3-9
REL information elements

Information element name	Type	Length	Description
Protocol Discriminator	F	1 byte	See page 3-10
Call Reference	F	2–3 bytes	See page 3-11
Message Type	F	1 byte	See page 3-13
Cause	O	4–6 bytes	See page 3-19

Release Complete (REL COMP) message

A DMS-500 switch sends a REL COMP message either forward or backward to indicate that it has released the circuit and that the receiver of the message should also release the circuit.

Information elements

Table 3-10 shows the information elements of the REL COMP message.

Table 3-10
REL COMP information elements

Information element name	Type	Length	Description
Protocol Discriminator	F	1 byte	See page 3-10
Call Reference	F	2–3 bytes	See page 3-11
Message Type	F	1 byte	See page 3-13
Cause	O	4–6 bytes	See page 3-19

PRI message information elements required by RLT

This section contains format and coding information for the PRI message information elements that implement RLT. Table 3-11 lists the information elements. For easy reference, each information element format description begins on a new page. Each information element description includes a hexadecimal code and an equivalent binary code for the message.

Table 3-11
PRI RLT message information element summary

Information element name	Hex code	Messages
Protocol Discriminator	08	All messages
Call Reference	01	All messages
Message Type	Varies	All messages
Bearer Capability	04	SETUP
Called Party Number	70	SETUP
Calling Party Number	6C	SETUP
Cause	08	REL, REL COMP
Channel Identification	18	ALERT, CALL PROC, CONN, SETUP
Display	28	SETUP
Facility*	1C	ALERT, SETUP, FACILITY
Network-Specific Facility	20	SETUP
Original Called Number	73	SETUP
Progress Indicator	1E	SETUP
Redirecting number	74	SETUP

Note: RLT functionality involves the information elements marked by an asterisk (*).

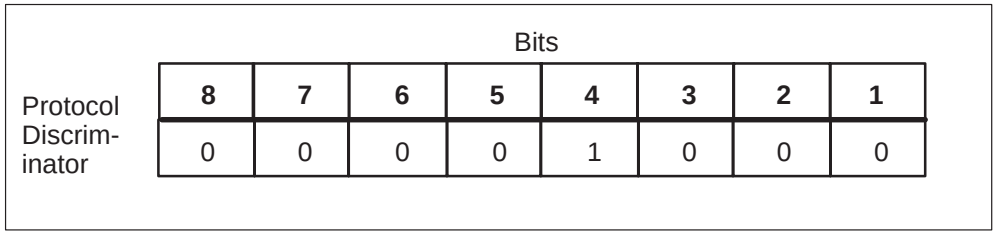
Protocol Discriminator information element

The Protocol Discriminator information element distinguishes messages for call control and maintenance from other messages. This information element is the first part of every message.

Information element code

The hexadecimal code for the Protocol Indicator information element is 08. Figure 3-1 shows the binary equivalent for the hexadecimal code.

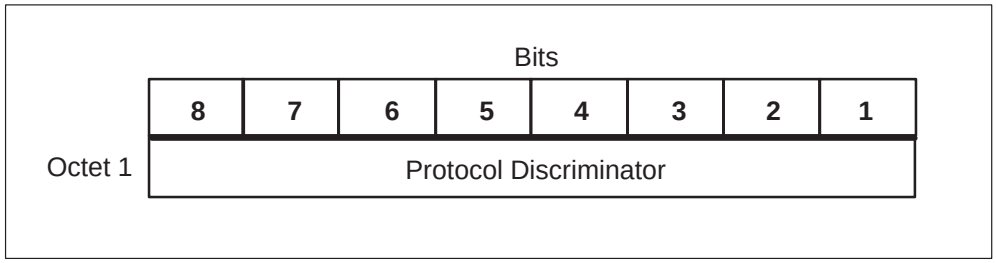
Figure 3-1
Binary code for Protocol Discriminator information element



Information element field

Figure 3-2 shows the format of the Protocol Discriminator information element field.

Figure 3-2
Format of the Protocol Discriminator information element field



Call Reference information element

The Call Reference information element conveys circuit-independent information that identifies a particular call. This information element is the second part of every message.

The originating side of the interface sets the call reference values for a call. By using a call reference flag, the DMS-500 switch can use two identical call reference values on the same circuit when call values pertain to calls originated on opposite ends of the circuit. The call reference flag can take the values of “0” or “1”. The call reference flag is used to identify which end originated a call reference. The originating side always sets the call reference flag to “0”. The destination side always sets the call reference flag to a “1”.

Information element code

The hexadecimal code for the Call Reference information element is 01. Figure 3-3 shows the binary equivalent for the hexadecimal code.

Figure 3-3
Binary code for Call Reference information element

	Bits							
	8	**7**	**6**	**5**	**4**	**3**	**2**	**1**
Call Reference	0	0	0	0	0	0	0	1

Information element field

Figure 3-4 shows the format of the Call Reference information element field.

Figure 3-4
Format of the Call Reference information element field

	Bits							
	8	**7**	**6**	**5**	**4**	**3**	**2**	**1**
Octet 1	0	0	0	0	0	0	0	1
Octet 2	Flag 0/1	0	0	0	0	0	0	0

Table 3-12 describes the codes in the Call Reference information element. The DMS-500 switch codes these fields at call time.

Table 3-12
Field codes for the Call Reference information element

Field	Codes and descriptions
Flag	0 = The calling party sent the message. 1 = The calling party received the message.

Message Type information element

The Message Type information element identifies the type of PRI message. All PRI messages include this mandatory, fixed-length information element.

Information element code

Each type of PRI message has a unique hexadecimal code that defines its type. The message descriptions earlier in this section define the hexadecimal code for each Message Type information element. Figure 3-5 shows the format of the Message Type information element.

Information element field

Figure 3-5 shows the format of the Message Type information element field.

Figure 3-5
Format of the Message Type information element field

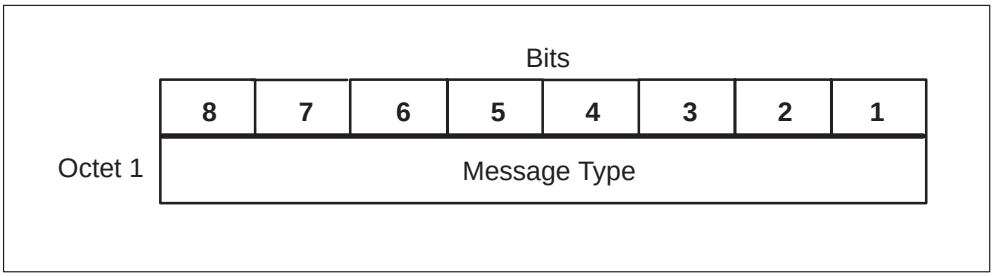


Table 3-13 describes the codes in the Message Type information element.

Table 3-13
Field codes for the Message Type information element

Hex value	Description
01	ALERT message
02	CALL PROC message
07	CONN message
05	SETUP message
45	DISC message
4D	REL message
5A	REL COM message

Bearer Capability information element

A DMS-500 switch or the CPE use the Bearer Capability information element to indicate it has provisioned a bearer capability.

Information element code

The hexadecimal code for the Bearer Capability information element is 04. Figure 3-6 shows the binary equivalent for the hexadecimal code.

Figure 3-6
Binary code for the Bearer Capability information element

	Bits							
	8	**7**	**6**	**5**	**4**	**3**	**2**	**1**
Bearer Capability	0	0	0	0	0	1	0	0

Information element field

Figure 3-7 shows the format of the Bearer Capability information element field.

Figure 3-7
Format of the Bearer Capability information element field

	Bits							
	8	**7**	**6**	**5**	**4**	**3**	**2**	**1**
Octet 1	0	0	0	0	0	1	0	0
Octet 2	Length of Bearer Capability information element							
Octet 3	1	Coding Standard		Information Transfer Capability				

Called Party Number information element

The Called Party Number information element identifies the called party. It is a mandatory, variable-length information element for the SETUP message.

Information element code

The hexadecimal code for the Called Party Number information element is 70. Figure 3-8 shows the binary equivalent for the hexadecimal code.

Figure 3-8
Binary code for the Called Party Number information element

	Bits							
	8	**7**	**6**	**5**	**4**	**3**	**2**	**1**
Called Party Number	0	1	1	1	0	0	0	0

Information element field

Figure 3-9 shows the format of the Called Party Number information element field.

Figure 3-9
Format of the Called Party Number information element field

	Bits							
	8	**7**	**6**	**5**	**4**	**3**	**2**	**1**
Octet 1	0	1	1	1	0	0	0	0
Octet 2	Length of Called Party Number information element							
Octet 3	1 Ext.	Type of Address			Numbering Plan Identification			
Octet 4	0 Spare	Numbering Digits						

Table 3-14 describes the codes in the Called Party Number information element.

Table 3-14
Field codes for the Called Party Number information element

Field	Codes and descriptions
Type of address	000=Unknown
	001=International number
	010=National number
	100=Local (directory) number
Numbering plan indicator	4321=Numbering plan
	0000=Unknown
	0001=ISDN/Telephony numbering plan
	1001=Private numbering plan
Number Digits	0110000=Address digit value 0
	0110001=Address digit value 1
	0110010=Address digit value 2
	0110011=Address digit value 3
	0110100=Address digit value 4
	0110101=Address digit value 5
	0110110=Address digit value 6
	0110111=Address digit value 7
	0111000=Address digit value 8
	0111001=Address digit value 9
	0101010=Address digit value *
	0100011=Address digit value #

Calling Party Number information element

The Calling Party Number information element provides information that identifies the calling party. Switches include this optional information element in the SETUP message.

Information element code

The hexadecimal code for the Calling Party Number information element is 6C. Figure 3-10 shows the binary equivalent for the hexadecimal code.

Figure 3-10
Binary code for the Calling Party Number information element

	Bits							
	8	**7**	**6**	**5**	**4**	**3**	**2**	**1**
Calling Party Category	0	1	1	0	1	1	0	0

Information element field

Figure 3-11 shows the format of the Calling Party Number information element field.

Figure 3-11
Format of the Called Party Number information element field

	Bits							
	8	**7**	**6**	**5**	**4**	**3**	**2**	**1**
Octet 1	0	1	1	0	1	1	0	0
Octet 2	Length of Calling Party Number information element							
Octet 3	0/1 Ext.	Type of Address			Numbering Plan Identification			
Octet 4	0 Spare	Numbering Digits						

Table 3-15 describes the codes in the Calling Party Number information element.

Table 3-15
Field codes for the Calling Party Number information element

Field	Codes and descriptions
Type of address	000=Unknown
	001=International number
	010=National number
	100=Local (directory) number
Numbering plan indicator	4321=Numbering plan
	0000=Unknown
	0001=ISDN/Telephony numbering plan
	1001=Private numbering plan
Number Digits	0110000=Address digit value 0
	0110001=Address digit value 1
	0110010=Address digit value 2
	0110011=Address digit value 3
	0110100=Address digit value 4
	0110101=Address digit value 5
	0110110=Address digit value 6
	0110111=Address digit value 7
	0111000=Address digit value 8
	0111001=Address digit value 9
	0101010=Address digit value *
	0100011=Address digit value #

Cause information element

The Cause information element provides the coding standard, location, and cause value for the call. It also provides diagnostics, but the DMS-250 side of the DMS-500 switch does not support diagnostics. This mandatory, variable-length information element describes why the switch sent the REL or REL COM message that contains it. This information element also identifies the network that originated the message.

Information element code

The hexadecimal code for the Cause information element is 08. Figure 3-12 shows the binary equivalent for the hexadecimal code.

Figure 3-12
Binary code for Cause information element

	Bits							
	8	**7**	**6**	**5**	**4**	**3**	**2**	**1**
Cause information element	0	0	0	0	1	0	0	0

Information element field

Figure 3-13 shows the format of the Cause information element field.

Figure 3-13
Format of the Cause information element field

	Bits							
	8	**7**	**6**	**5**	**4**	**3**	**2**	**1**
Octet 1	0	0	0	0	1	0	0	0
Octet 2	Length of Cause information element							
Octet 3	1 Ext.	Coding Standard		0 Spare	Location			
Octet 4	1 Ext.	Cause Value						

Table 3-16 describes the codes in the Cause information element field.

Table 3-16
Field codes for the Cause information element

Field	Codes and descriptions
Coding standard	00=ITU-T standard
General Location	0000=User 0001=Private network serving the local user 0010=Public network serving the local user 0011=Transit (public) network 0100=Public network serving the remote user 0101=Private network serving the remote user 0111=International network 1000=Network beyond interworking point 1010=Unknown

Channel Identification information element

The Channel Identification information element identifies the channel within the interface controlled by the PRI procedures.

Information element code

The hexadecimal code for the Channel Identification information element is 18. Figure 3-14 shows the binary equivalent for the hexadecimal code.

Figure 3-14
Binary code for Channel Identification information element

	Bits							
	8	**7**	**6**	**5**	**4**	**3**	**2**	**1**
Channel Iden-tification	0	0	0	1	1	0	0	0

Information element field

Figure 3-15 shows the format of the Channel Identification information element field.

Figure 3-15
Format of the Channel Identification information element field

	Bits							
	8	**7**	**6**	**5**	**4**	**3**	**2**	**1**
Octet 1	0	0	0	1	1	0	0	0
Octet 2	Length of Channel Identification information element							
Octet 3	1 Ext.	Int. ID Pres	1 Int. Type	0 Spare	1 Pref Excl	0 D-ch	Info. Ch Selection	
Octet 4	1 Ext.	Interface Identifier						
Octet 5	1 Ext.	Coding Standard		Num. Map	Channel Type/ Map Element Type			
Octet 6	1 Ext.	Channel Number						

Table 3-17 describes the codes in the Channel Identification information element.

Table 3-17
Field codes for the Channel Identification information element

Field	Codes and descriptions
Interface Identifier Present (Octet 3)	0=Interface implicitly identified (the interface that includes the D-channel carrying this information element) 1=Interface explicitly identified with one or more octets beginning in octet 4 (interface identifier)
Interface Type (Octet 3)	0=Reserved 1=Primary Rate Interface (PRI)
Preferred/Exclusive (Octet 3)	0=Preferred. The indicated channel is preferred. 1=Exclusive. Only the indicated B-channel is acceptable.
D-Channel Indicator (Octet 3)	0=Channel identified is not a D-channel. 1=Channel identified is a D-channel.
Information Channel Selection (Octet 3)	21=Primary Interface 01=As shown below 00=No channel
Interface Identifier (Octet 4)	The interface identifier is a binary code in the range 0 to 31 assigned to the DS-1 link at subscription time.
Coding Standard (Octet 5)	00=ITU-T standard
Number Map (Octet 5)	0=Channel indicated by number 1=Reserved

—continued—

Table 3-17
Field codes for the Channel Identification information element (continued)

Field	Codes and descriptions
Channel Type/Map Element Type (Octet 5)	0011=B-channel units
Channel Number (Octet 6)	The binary number assigned to the channel, ranging from 1 to 24.
	—end—

Display information element

The Display information element supplies information that the user can display. As a subscription option, the display may be passed from user to user without network interaction.

Information element code

The hexadecimal code for the Display information element is 28. Figure 3-16 shows the binary equivalent for the hexadecimal code.

Figure 3-16
Binary code for the Display information element

	Bits							
	8	**7**	**6**	**5**	**4**	**3**	**2**	**1**
Display information element	0	0	1	0	1	0	0	0

Information element field

Figure 3-17 shows the format of the Display information element field.

Figure 3-17
Format of the Display information element field

	Bits							
	8	**7**	**6**	**5**	**4**	**3**	**2**	**1**
Octet 1	0	0	1	0	1	0	0	0
Octet 2	Length of Information information element							
Octet 3a	Associated Information				Display Type			
Octet 3b	0 Spare	Display Information						

Note: The encoding of octet 3a is specific to the DMS-250 side of the DMS-500 switch.

Table 3-18 describes the codes in the Display information element field.

Table 3-18
Field codes for the Display information element

Field	Codes and descriptions
Associated Information (Octet 3a, bits 5–8)	0000=Undefined 0001=Requested 0010=Not requested 0011=Included 0100=Not included 0101=Information unavailable 0110=Denied 0111=Reserved
Display Type (Octet 3a, bits 1–4)	0000=Unknown 0001=Original called party number 0010=Calling party name 0011=Called party name 0100=Redirecting party name 0101=Redirection party name 0110=Connected party name 0111=Message retrieval 1000=Miscellaneous display information 1001=Electronic directory

Facility information element

The Facility information element requests or acknowledges a supplementary service such as release link trunking. The Facility information element uses Remote Operations Service Element (ROSE) encoding, that allows the Facility information element to have a handshaking protocol to implement the supplementary services.

Information element code

The hexadecimal code for the Facility information element is 1C. Figure 3-18 shows the binary equivalent for the hexadecimal code.

Figure 3-18
Binary code for Facility information element

	Bits							
	8	**7**	**6**	**5**	**4**	**3**	**2**	**1**
Facility information element	0	0	0	1	1	1	0	0

Information element field

Figure 3-19 shows the format of the Facility information element field.

Figure 3-19
Format of the Facility information element field

	Bits							
	8	**7**	**6**	**5**	**4**	**3**	**2**	**1**
Octet 1	0	0	0	1	1	1	0	0
Octet 2	Length of Information Identifier							
Octet 3	0/1 Ext.	0 Spare			Service Discriminator			
Octet 3a	0/1 Ext.	Service Identifier						
Octet 4	Component(s)							

Table 3-19 describes the codes in the Facility information element.

Table 3-19
Field codes for the Facility information element

Field	Codes and descriptions
Service Dis-criminator (Octet 3)	10001=Supplementary Applications (ROSE) 10010=Supplementary Applications (TCAP)
Service Identifier (Octet 3a)	10111110=Release Link Trunk (RLT) 00000011=Switch to Computer Application Interface (SCAI) 11111101=Network Attendant Services (NAS) 11111110=NACD 11111111=NRAG
Com-ponents (Octet 4)	Invoke=Switch uses this to initiate an operation. Return Result=Switch returns this when it completes an operation. Return Error=Switch returns this when an error occurs. It indicates that the switch did not complete the operation. Reject=Switch returns this to indicate protocol errors.

Network-Specific Facilities information element

The Network-Specific Facilities information element indicates what network facilities a DMS-500 switch is invoking at a specific network.

Information element code

The hexadecimal code for the Network-Specific Facilities information element is 20. Figure 3-20 shows the binary equivalent for the hexadecimal code.

Figure 3-20
Binary code for Network-Specific Facilities information element

	Bits							
	8	**7**	**6**	**5**	**4**	**3**	**2**	**1**
Network-Specific Facilities	0	0	1	0	0	0	0	0

Information element field

Figure 3-21 shows the format of the Network-Specific facilities information element field.

Figure 3-21
Format of the Network-Specific Facilities information element field

	Bits							
	8	**7**	**6**	**5**	**4**	**3**	**2**	**1**
Octet 1	0	0	1	0	0	0	0	0
Octet 2	Length of Network-Specific Facilities information element							
Octet 3	Length of Network Identification							

Original Called Number information element

The Original Called Number information element identifies the number from which the first redirection/diversion was invoked. As a subscription option, the Original Called Number information element can be passed from user to user without network interaction.

Information element code

The hexadecimal code for the Original Called Number information element is 73. Figure 3-22 shows the binary equivalent for the hexadecimal code.

Figure 3-22
Binary code for Original Called Number information element

	Bits							
	8	**7**	**6**	**5**	**4**	**3**	**2**	**1**
Original Called Number	0	1	1	1	0	0	1	1

Information element field

Figure 3-23 shows the format of the Original Called Number information element field.

Figure 3-23
Format of the Original Called Number information element field

	Bits							
	8	**7**	**6**	**5**	**4**	**3**	**2**	**1**
Octet 1	0	1	1	1	0	0	1	1
Octet 2	Length of Original Called Number information element							
Octet 3	0/1 Ext.	Type of Number			Numbering Identification Plan			
Octet 3a	0/1 Ext.	Presentation Indicator		Spare			Screen Indicator	
Octet 3b	0/1 Ext.	Spare			Reason for Redirection			
Octet 3c	0/1 Ext.	CFW No rep	Spare				Redirection Counter	
Octet 4	0 Ext.	Number Digits						

Table 3-20 describes the codes in the Original Called Number information element.

Table 3-20
Field codes for the Original Called Number information element

Field	Codes and descriptions
Type of Number (Octet 3)	000=Undefined 001=International number 010=National number 100=Local number
Numbering Identification Plan (Octet 3)	0000=Unknown 0001=ISDN/Telephony numbering plan (Rec. E. 164) 1001=Private numbering plan
Presentation Indicator (Octet 3a)	00=Presentation allowed 01=Presentation restricted 10=Number not available due to interworking 11=Reserved
Screening Indicator (Octet 3a)	00=User-provided, not screened 11=Network-provided
Reason for Redirection (Octet 3b)	0001=Call Forwarding Busy 0010=Call Forwarding No Reply 0100=Call Transfer 0101=Call Pickup 1001=Called CPE out of order 1010=Call Forwarding by the called CPE 1111=Call Forwarding unconditional or systematic call redirection

—continued—

Table 3-20
Field codes for the Original Called Number information element (continued)

Field	Codes and descriptions
Call Forwarding No Reply Indicator (Octet 3c)	0=False 1=True
Redirection Counter (Octet 3c)	000=Counter=0 001=Counter=1 010=Counter=2 011=Counter=3 100=Counter=4 101=Counter=5
—end—	

Progress Indicator information element

The Progress Indicator information element describes a specific event that occurs during the life of a call. This information element is optional in the ALERT message.

Information element code

The hexadecimal code for the Progress Indicator information element is 1E. Figure 3-24 shows the binary equivalent for the hexadecimal code.

Figure 3-24
Binary code for Progress Indicator information element

	Bits							
	8	**7**	**6**	**5**	**4**	**3**	**2**	**1**
Progress Indicator	0	0	0	1	1	1	1	0

Information element field

Figure 3-25 shows the format of the Progress Indicator information element field.

Figure 3-25
Format of the Progress Indicator information element field

	Bits							
	8	**7**	**6**	**5**	**4**	**3**	**2**	**1**
Octet 1	0	0	0	1	1	1	1	0
Octet 2	Length of Progress Indicator information element							
Octet 3	1 Ext.	Coding Standard		0 Spare	Location			
Octet 4	1 Ext.	Progress Description						

Table 3-21 describes the codes in the Progress Indicator information element.

Table 3-21
Field codes for the Progress Indicator information element

Field	Codes and descriptions
Coding Standard (Octet 3)	00=CCITT Standard
General Location (Octet 3)	0000=User 0001=Private network serving the local user 0010=Public network serving the local user 0011=Transit network 0100=Public network serving the remote user 0101=Private network serving the remote user 0111=International network 1000=Network beyond interworking point
Progress Description Bits (Octet 4)	0000001=1. Call is not end-to-end ISDN; further call progress information may be available in-band 0001000=8. In-band information or pattern is now available

Redirecting Number information element

The Redirecting Number information element identifies the number from which the DMS-500 switch invoked call redirection/diversion. As a subscription option, the Redirecting Number information element can be passed from user to user in an ALERT message without network interaction (see Table 3-5).

Information element code

The hexadecimal code for the Redirecting Number information element is 74. Figure 3-26 shows the binary equivalent for the hexadecimal code.

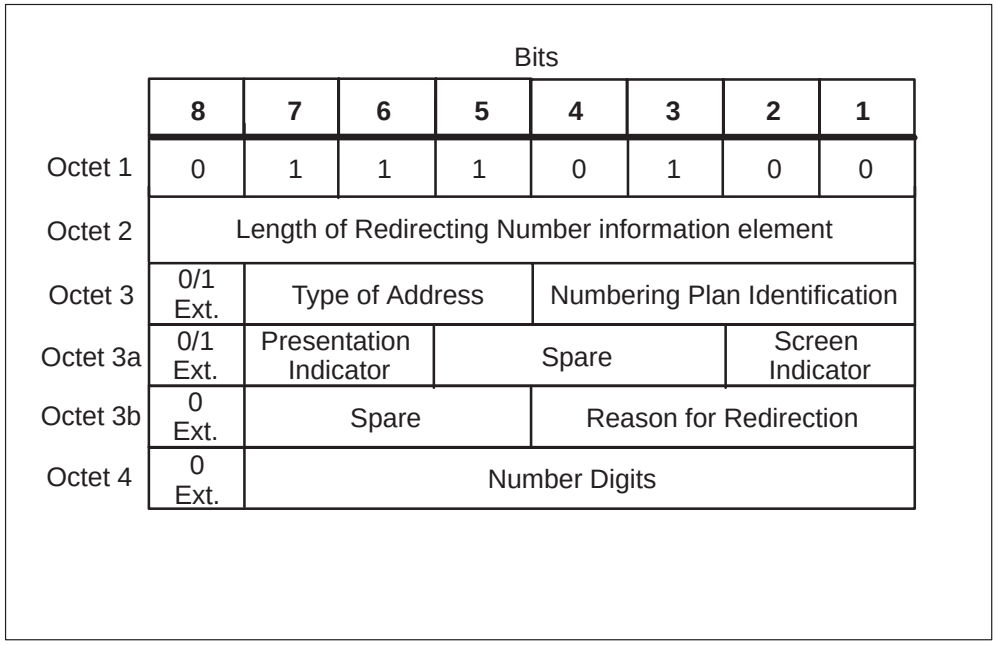
Figure 3-26
Binary code for Redirecting Number information element

	Bits							
	8	**7**	**6**	**5**	**4**	**3**	**2**	**1**
Redirecting Number	0	1	1	1	0	1	0	0

Information element field

Figure 3-27 shows the format of the Redirecting Number information element field.

Figure 3-27
Format of the Redirecting Number information element field



The contents of the Redirecting Number information element, other than octets 3a, 3b, and 4, are coded as shown for the Called Party Number. Table 3-22 describes the codes in octets 3a, 3b, and 4 of the Redirecting Number information element.

Table 3-22
Field codes for the Redirecting Number information element

Field	Codes and descriptions
Presen-tation indicator Bits (Octet 3a)	00=Presentation allowed 01=Presentation restricted 10=Number not available due to interworking 11=Reserved
Screening Indicator (Octet 3a)	00=User–provided, not screened 11=Network–provided
Reason for Redirection (Octet 3b)	0001=Call Forwarding Busy 0010=Call Forwarding No Reply 0100=Call Transfer 0101=Call Pickup 1001=Called CPE out of order 1010=Call Forwarding by the called CPE 1111=Call Forwarding unconditional

Common PRI RLT call scenarios

This chapter summarizes the flow of Primary Rate Interface (PRI) messages between DMS-500 switches and customer premises equipment (CPE).

This chapter provides high-level diagrams and message flow diagrams for each of the common PRI release link trunking (RLT) call scenarios. Each message flow diagram illustrates the PRI messaging between a bridging DMS-500 switch and the CPE. The message flow diagrams highlight information elements that the PRI messages contain. For technical descriptions of messages and information elements, see Chapter 3, “PRI RLT messages and protocol.”

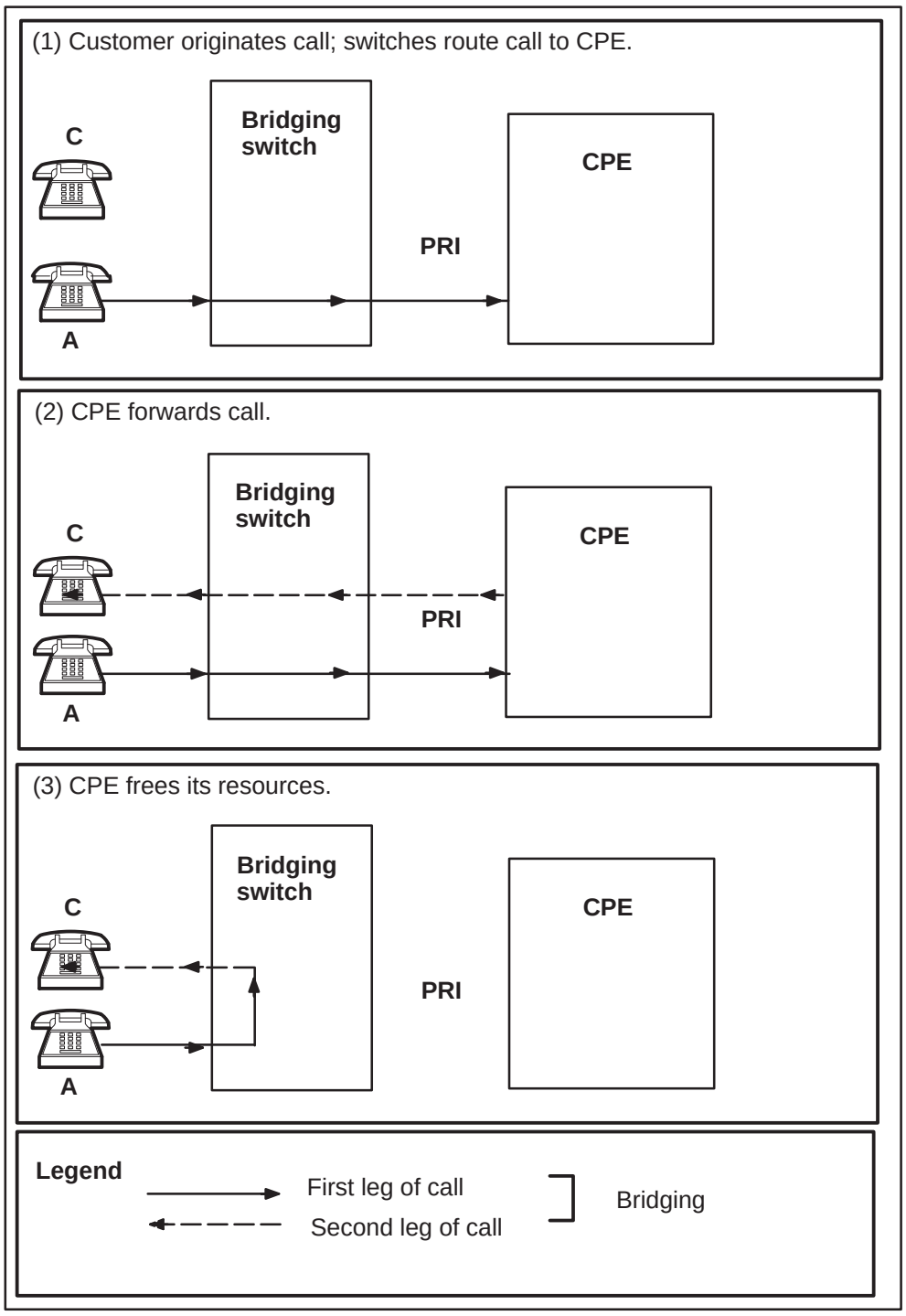
Call Forwarding Scenario

In this scenario, the DMS-500 switch routes a call to the CPE over PRI trunks. The CPE then redirects the call to the same DMS-500 switch. The CPE then requests release link trunking. The release link trunking capability frees the CPE resources.

The trunks connecting the bridging DMS-500 switch and the CPE are all PRI trunks with RLT functionality. The trunk connecting the caller to the bridging switch is also a PRI trunk.

Figure 4-1 is a high-level diagram of the scenario.

Figure 4-1
Call Forwarding scenario on the DMS-500 switch



Message flow for call forwarding

Figure 4-2 is a comprehensive message flow diagram for the call forwarding scenario. It shows the sequence for the exchange of messages between the bridging DMS-500 switch and the customer premises equipment (CPE).

Specifically, the message exchange occurs as follows:

1 A DMS-500 switch, the bridging switch in this scenario, receives a call. Based on the nature of the call, the bridging switch formats a SETUP message and sends it to the CPE.

2 The CPE returns a Call Proceeding (CALL PROC) message to the bridging switch. The CALL PROC message confirms that the CPE received the information needed to route the call to its destination.

3 When the CPE determines that the called party has forwarded the call, it sends a SETUP message to the bridging switch to initiate the second leg of the call.

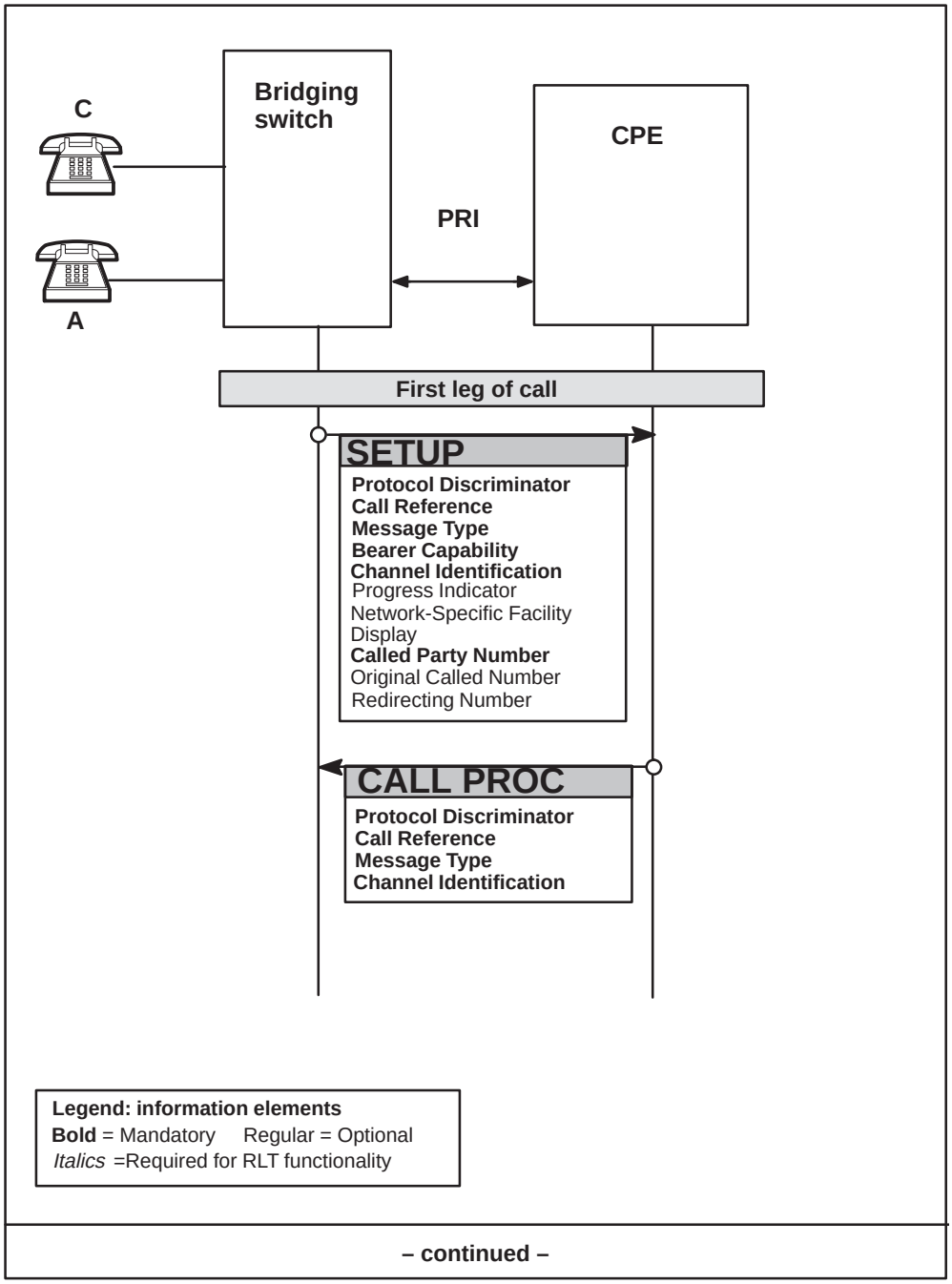
4 Once it receives the SETUP message, the bridging switch seizes a terminator. The SETUP message contains an RLT indicator in the Facility information element that tells the bridging switch to include the CALLID of the second leg of the call in the ALERT/PROGRESS message it sends back to the bridging switch. If the PRI trunk allows RLT, the bridging switch marks the call as RLT-possible and continues to normally process the call. Table 4-1 shows important information elements that affect RLT functionality.

Table 4-1
Important RLT information elements in this second leg SETUP message

RLT information element	Comments
Facility	This information element requests or acknowledges a supplementary service such as RLT. This information element contains the RLT indicator in the form of an Invoke (INV1) component.

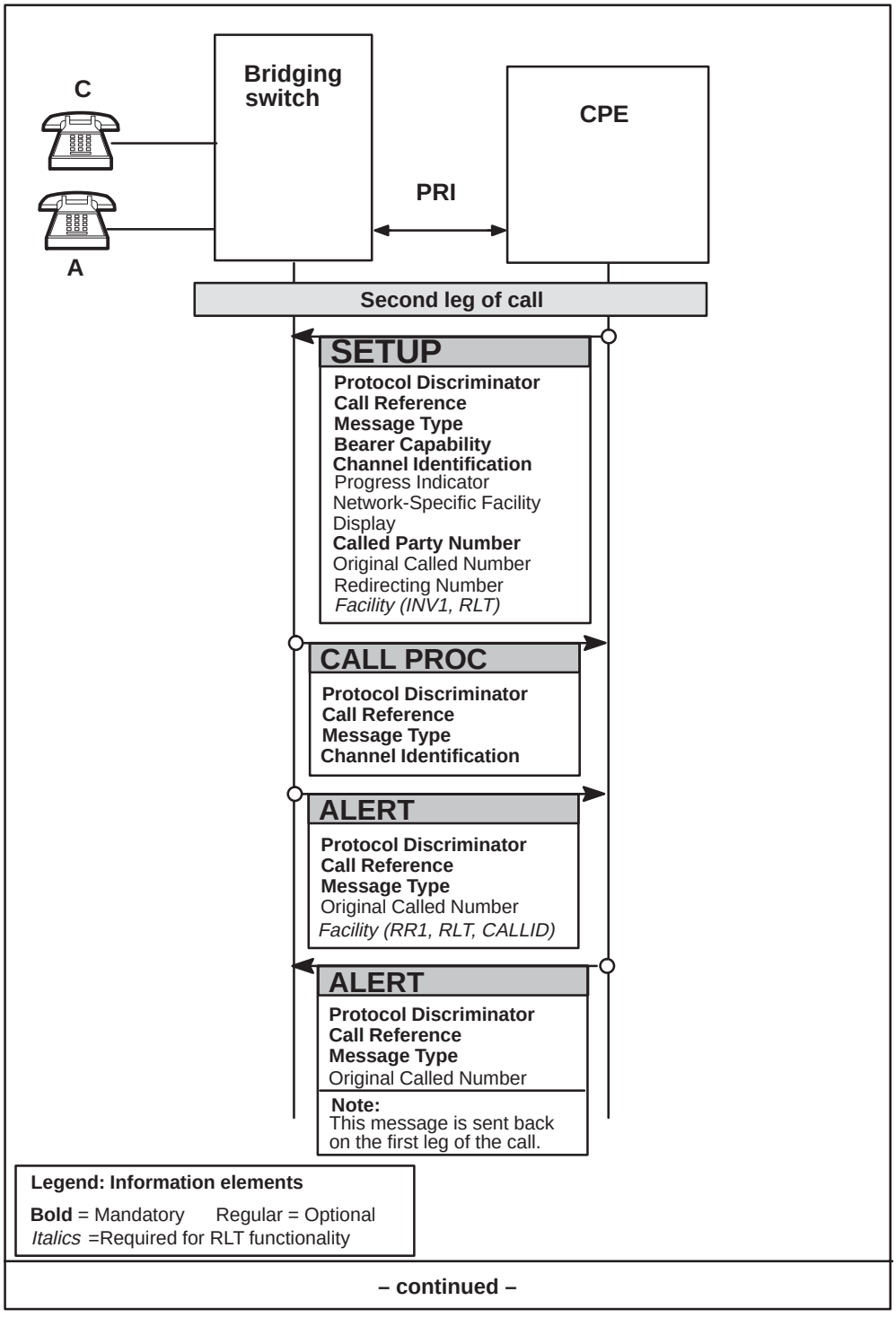
5 The bridging switch then returns a CALL PROC message to the CPE.

Figure 4-2
Message flow for call forwarding on a DMS-500 switch



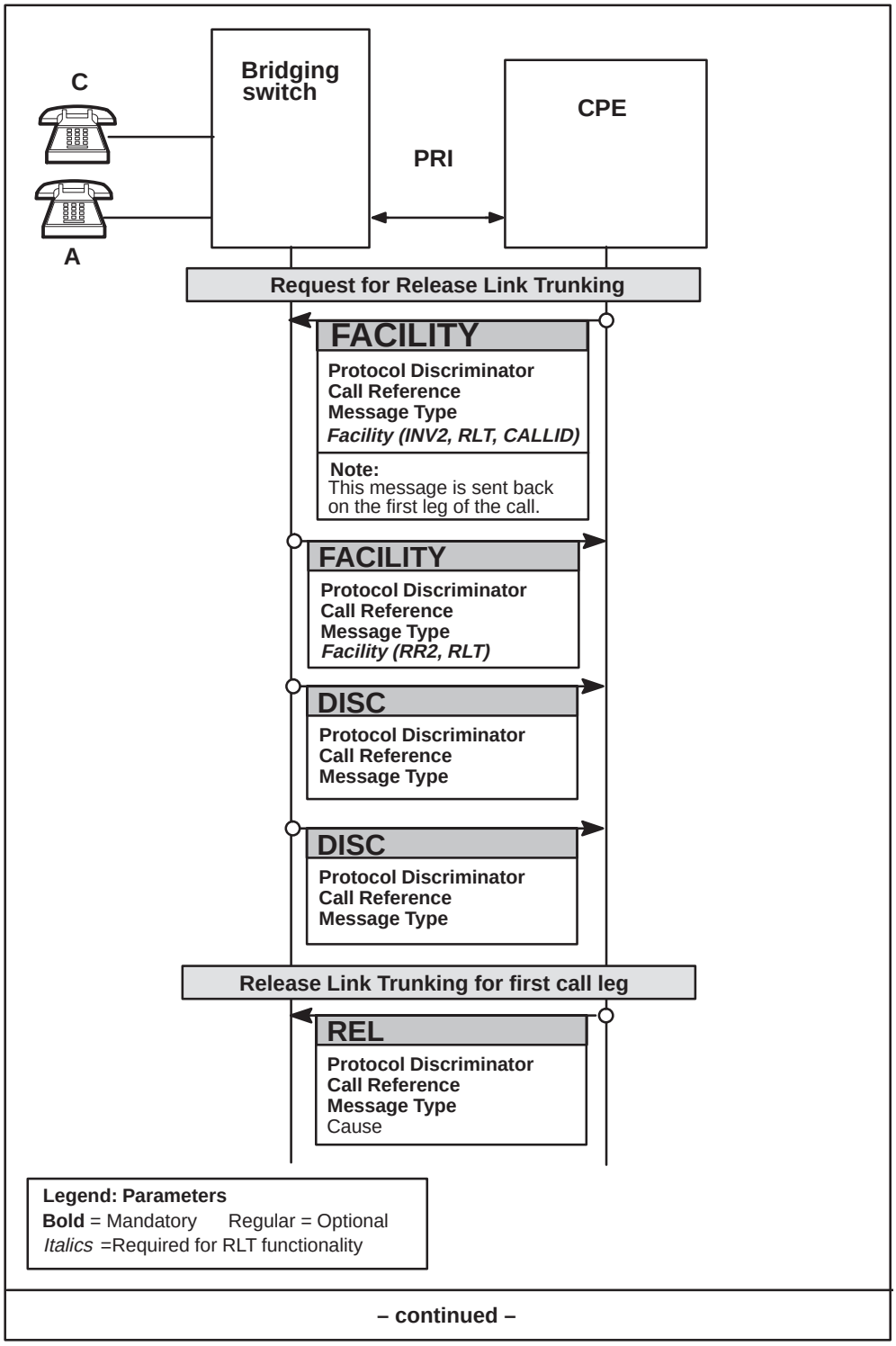
– continued –

Figure 4-2
Message flow for call forwarding on a DMS-500 switch (continued)



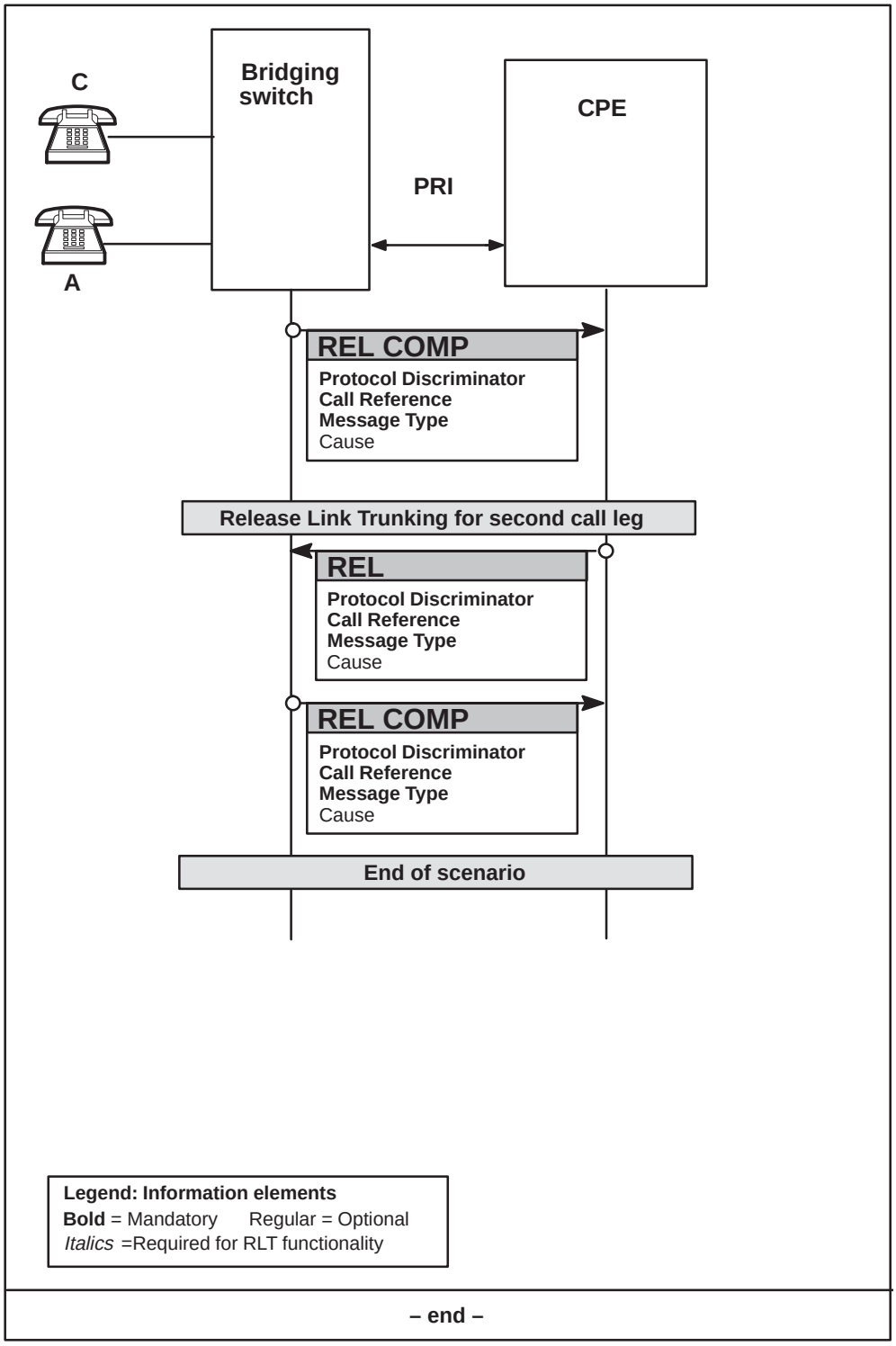
– continued –

Figure 4-2
Message flow for call forwarding on a DMS-500 switch (continued)



– continued –

Figure 4-2
Message flow for call forwarding on a DMS-500 switch (continued)



6 When the bridging switch connects to the called party on the second leg of the call, it sends an ALERT message to the CPE. Before it sends the ALERT message, however, the bridging switch verifies that this is an RLT-possible call. If the call is an RLT possible call, the bridging switch includes the CALLID of the second leg in a Facility information element with a Return Result component. Table 4-2 shows important information elements that affect RLT functionality.

Note: If ISDN PRI trunks are interworking with non-ISDN PRI trunks, the bridging switch returns a PROGRESS message instead of the ALERT message. In this case, the PROGRESS message contains the Facility information element with the appropriate data.

Table 4-2
Important RLT information elements in this second leg ALERT message

RLT information element	Comments
Facility	This information element requests or acknowledges a supplementary service such as RLT. This information element contains the RLT indicator in the form of a Return Result component.

7 In response to the ALERT message, the CPE sends another ALERT message to indicate alerting on the first leg of the call.

8 The CPE then sends a FACILITY message on the first leg of the call to initiate RLT. This FACILITY message contains the Facility information element with an Invoke component (INV2) that contains the CALLID of the second leg. This CALLID was sent in the previous ALERT/PROGRESS message. Table 4-3 shows information elements in this FACILITY message that affect RLT functionality.

Table 4-3
Important RLT information elements in this second leg FACILITY message

RLT information element	Comments
Facility	This information element requests or acknowledges a supplementary service such as RLT. This information element contains the RLT indicator in the form of an Invoke (INV2) component.

9 When the bridging switch receives the FACILITY message, it checks the table TRKGRP RLT option to see if the PRI trunk can allow RLT. If the trunk allows RLT, the bridging switch finds the second leg of the call using the CALLID received in the FACILITY message. The switch then bridges the call.

Note: The bridging switch retains the CDRs for each leg of the call prior to bridging, until the bridged call is taken down. The first CDR reflects the first leg of the call, the second CDR (CDR2) reflects the second leg of the call as well as the redirected call (call from party A to party C). The RLTCDR field of CDR1 would be blank, and the RLTCDR field of CDR2 would by Y.

10 After bridging the calls, the bridging switch sends a FACILITY message back to the CPE. The FACILITY message contains a Facility information element with a Return Result component (RR2). This message indicates that the bridging switch successfully completed RLT. Table 4-4 shows information elements in this message that affect RLT functionality.

Table 4-4
Important RLT information elements in this FACILITY message

RLT information element	Comments
Facility	This information element requests or acknowledges a supplementary service such as RLT. This information element contains the RLT indicator in the form of a Return Result (RR2) component.

11 The bridging switch then sends a Disconnect (DISC) message to the CPE. This message tells the CPE to release the PRI trunk for the first leg of the call.

12 The bridging switch then sends another Disconnect (DISC) message to the CPE, telling the CPE to release the PRI trunk for the second leg of the call.

13 The CPE sends a Release (REL) message to the bridging switch to indicate that it has disconnected the PRI trunk for the first leg of the call, and that the bridging switch can continue with the release operation.

14 The bridging switch releases the PRI trunk for the first leg of the call and completes the release operation by sending a Release Complete (REL COM) message to the CPE.

15 The CPE sends a REL message to the bridging switch to indicate that it has disconnected the PRI trunk for the second leg of the call, and that the bridging switch can continue with the release operation.

16 The bridging switch releases the PRI trunk for the second leg of the call and completes the release operation by sending a REL COM message to the CPE.

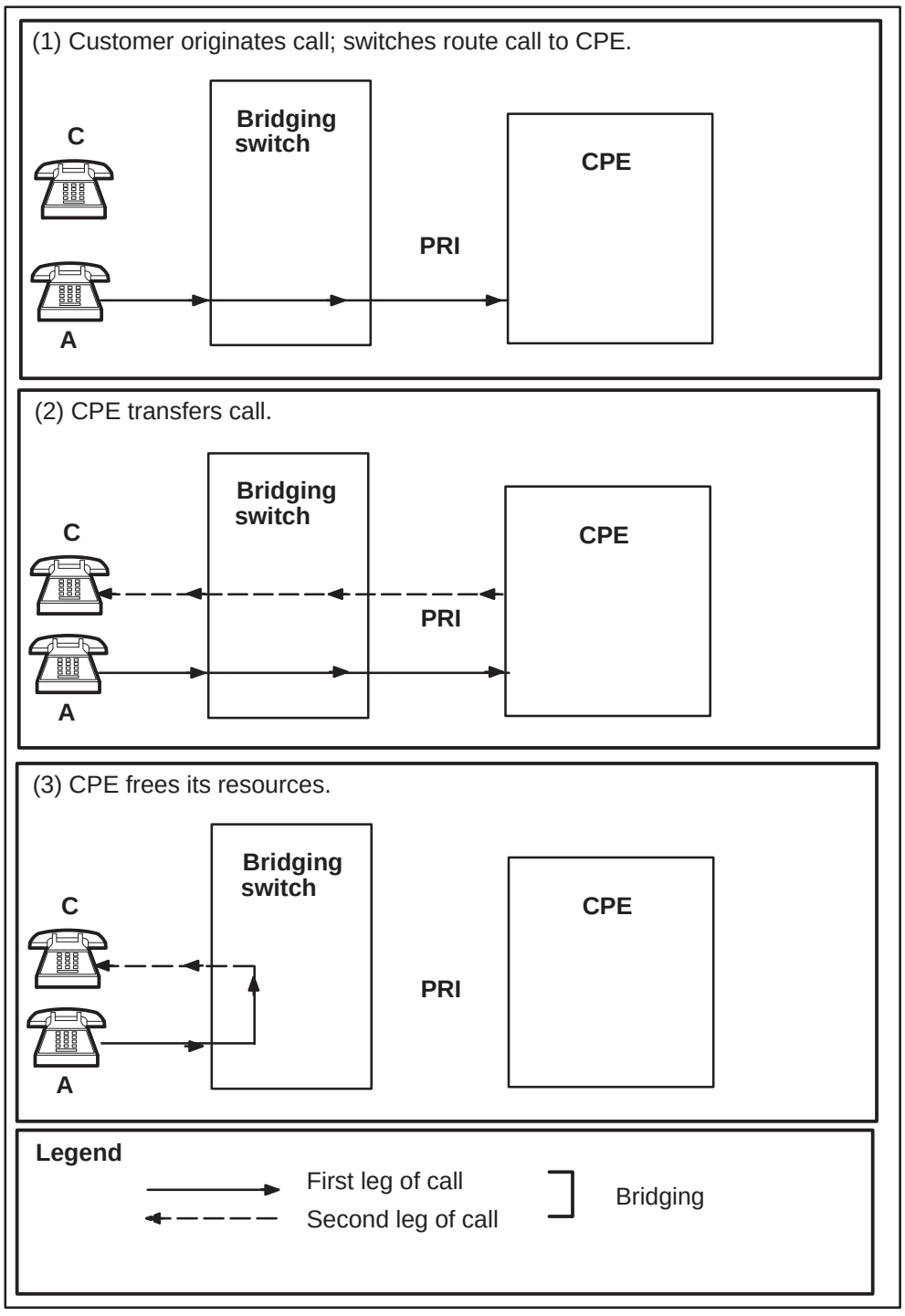
Call transfer scenario

In this scenario, the CPE transfers a call to its destination and requests release link trunking. The release link trunking capability frees the CPE resources.

The trunks connecting the bridging DMS-500 switch and the CPE are all PRI trunks with RLT functionality. The trunk connecting the caller to the bridging switch is also PRI.

Figure 4-3 is a high-level diagram of the scenario.

Figure 4-3
Call Transfer scenario on a DMS-500 switch



Message flow for call transfer

Figure 4-4 is a comprehensive message flow diagram for the call transfer scenario. It shows the sequence for the exchange of messages between the bridging DMS-500 switch and the customer premises equipment (CPE).

Specifically, the message exchange occurs as follows:

1 A DMS-500 switch, the bridging switch in this scenario, receives a call. Based on the nature of the call, the bridging switch formats a SETUP message and sends it to the CPE.

2 The CPE returns a Call Proceeding (CALL PROC) message to the bridging switch. The CALL PROC message confirms that the CPE received the information needed to route the call to its destination.

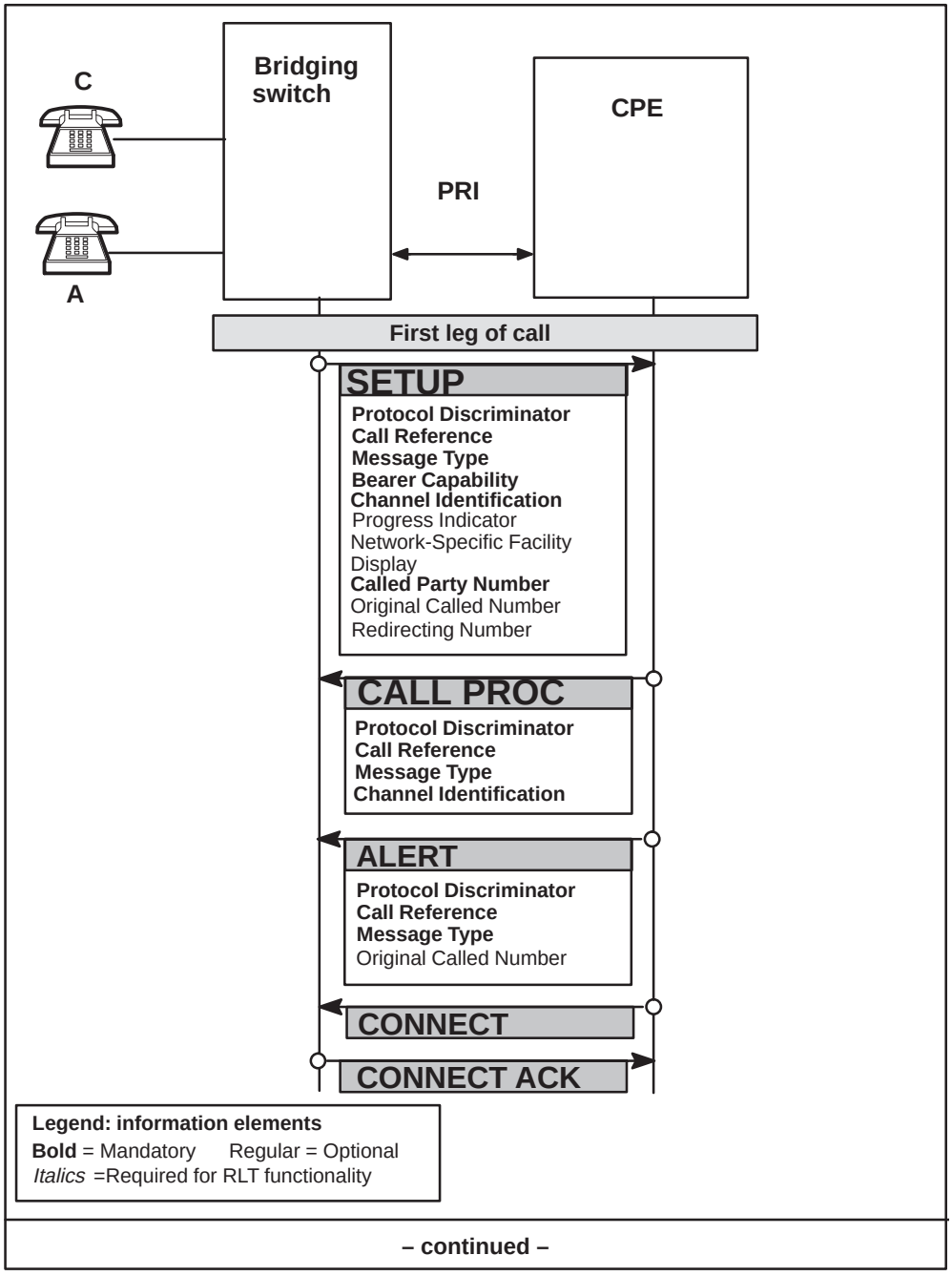
3 The CPE then sends an ALERT message to the bridging switch to indicate that it has initiated called party alerting.

4 After the called party has answered, the CPE sends a CONNECT message to the bridging switch.

5 The bridging switch then acknowledges the CONNECT message with a Connect Acknowledge (CONNECT ACK) message, establishing the first leg of the call.

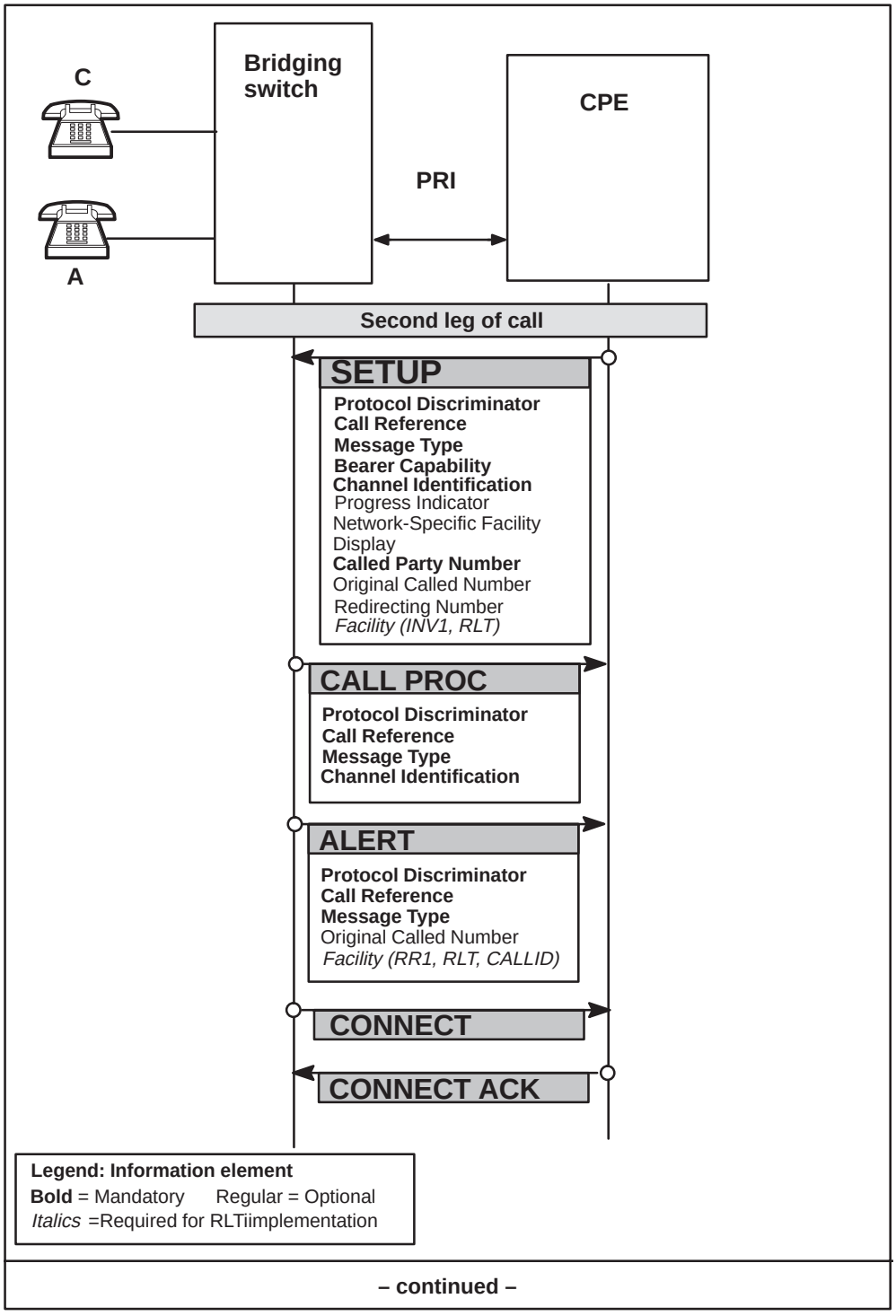
6 The CPE then initiates a call to party C over a PRI trunk that is connected to the bridging switch. The CPE then sends a SETUP message to the bridging switch. The SETUP message includes an RLT indicator to inform the bridging switch to include the CALLID of the second leg of the call when it sends the upcoming ALERT message. The bridging switch checks the table TRKGRP RLT option to see if this is an RLT-possible call. If the call is an RLT call, the bridging switch marks the call as RLT-possible and continues processing the call. Table 4-5 shows important information elements that affect RLT functionality.

Figure 4-4
Message flow for call transfer on a DMS-500 switch



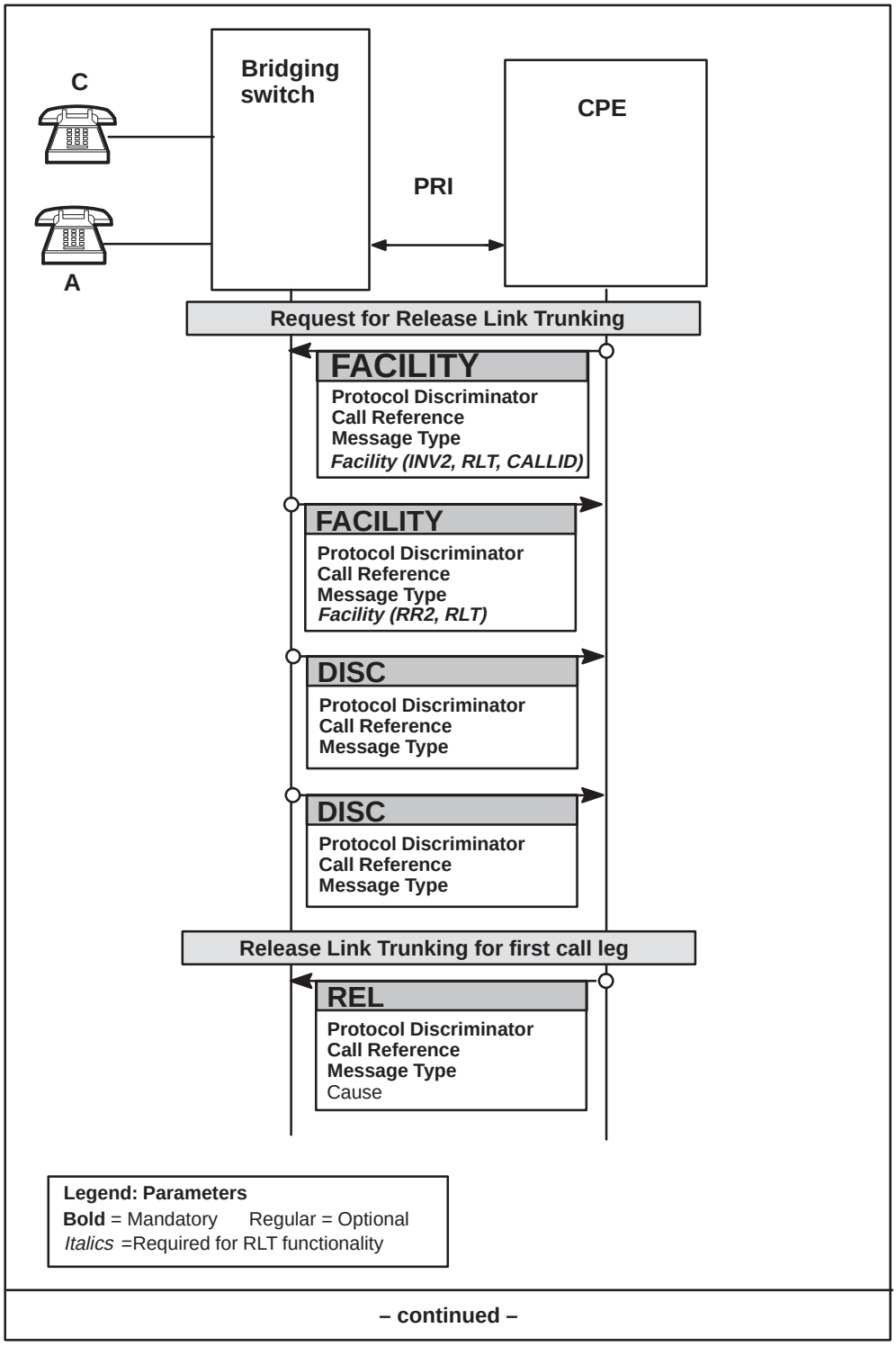
– continued –

Figure 4-4
Message flow for call transfer on a DMS-500 switch (continued)



– continued –

Figure 4-4
Message flow for call transfer on a DMS-500 switch (continued)



– continued –

Figure 4-4
Message flow for call transfer on a DMS-500 switch (continued)

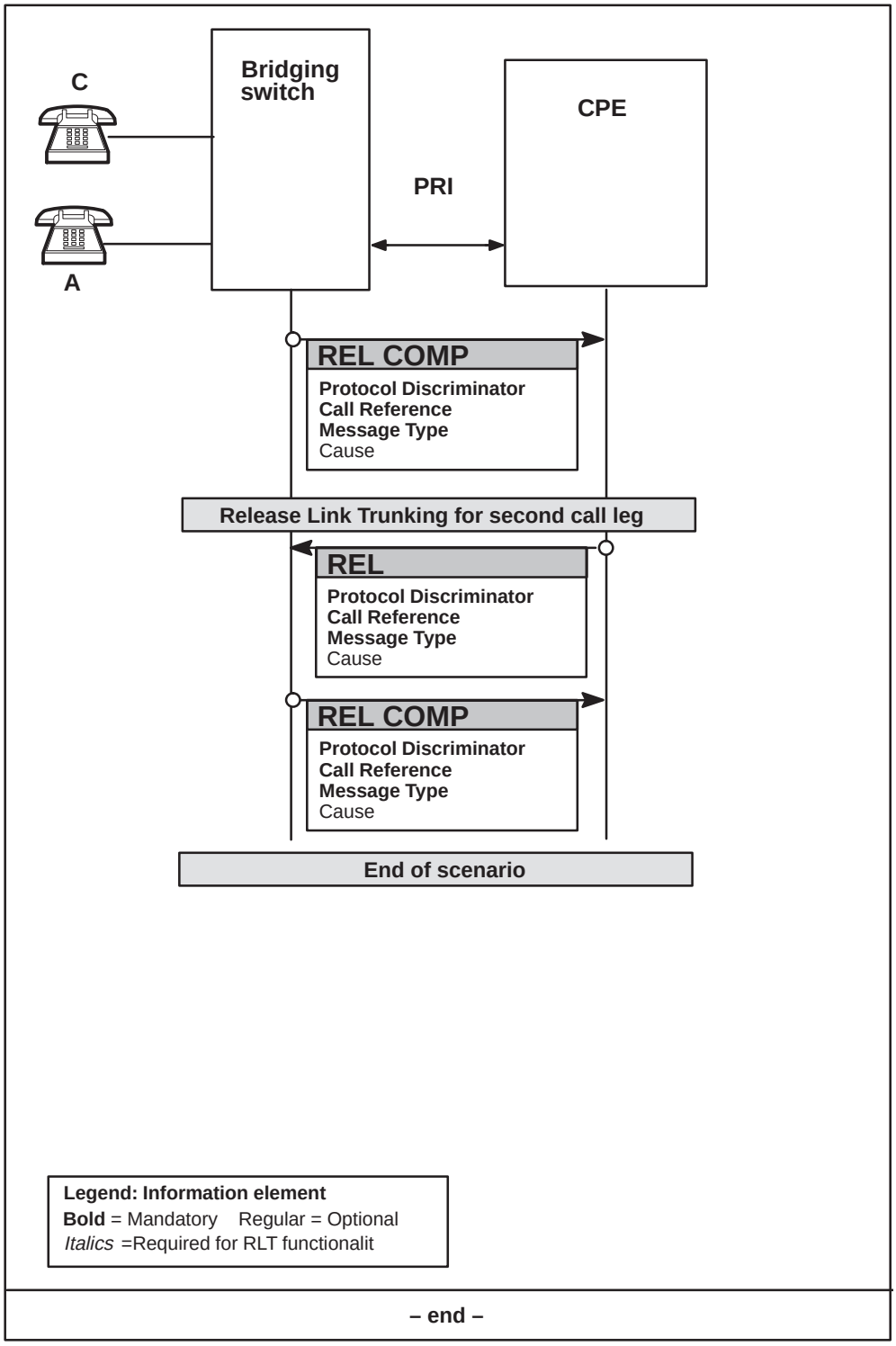


Table 4-5
Important RLT information elements in this second leg SETUP message

RLT information element	Comments
Facility	This information element requests or acknowledges a supplementary service such as RLT. This information element contains the RLT indicator in the form of an Invoke (INV1) component.

7 In response to the SETUP message, the bridging switch sends a CALL PROC message. The bridging switch uses the information in the SETUP message to seize a terminator.

8 When the bridging switch connects to the called party on the second leg of the call, it sends an ALERT message to the CPE. Before it sends the ALERT message, however, the bridging switch verifies that this is an RLT-possible call. If the call is an RLT call, the bridging switch includes the CALLID of the second leg of the call in a Facility information element with a Return result component. Table 4-6 shows important information elements that affect RLT functionality.

Table 4-6
Important RLT information elements in this second leg ALERT message

RLT information element	Comments
Facility	This information element requests or acknowledges a supplementary service such as RLT. This information element contains the RLT indicator in the form of a Return Result component.

9 If party C answers before the bridging switch bridges the call, the bridging switch sends a CONNECT message to the CPE.

10 The CPE then returns a connect acknowledge (CONN ACK) message.

11 When the CPE completes the call transfer by hanging up, the bridging switch begins RLT. The CPE then sends a FACILITY message on the first leg of the call to initiate RLT. This FACILITY message contains the Facility information element with an Invoke component (INV2) that contains the CALLID of the second leg, that was sent in the previous ALERT/PROGRESS message. Table 4-7 shows information elements in this FACILITY message that affect RLT functionality.

Table 4-7
Important RLT information elements in this second leg FACILITY message

RLT parameter	Comments
Facility	This parameter requests or acknowledges a supplementary service such as RLT. This parameter contains the RLT indicator in the form of an Invoke (INV2) component.

12 When the bridging switch receives the FACILITY message, it checks the table TRKGRP RLT option to verify that the PRI trunk can allow RLT. If the trunk allows RLT, the bridging switch finds the second leg of the call using the CALLID received in the FACILITY message. The switch then bridges the call.

Note: The bridging switch retains the CDRs for each leg of the call prior to bridging, until the bridged call is taken down. The first CDR reflects the first leg of the call, the second CDR (CDR2) reflects the second leg of the call as well as the redirected call (call from party A to party C). The RLTCDR field of CDR1 would be blank, and the RLTCDR field of CDR2 would be Y.

13 After bridging the calls, the bridging switch sends a FACILITY message back to the CPE, with a Facility information element that contains a Return Result component (RR2). This message indicates that the bridging switch successfully completed RLT. Table 4-8 shows information elements in this message that affect RLT functionality.

Table 4-8
Important RLT information elements in this FACILITY message

RLT information element	Comments
Facility	This information element requests or acknowledges a supplementary service such as RLT. This information element contains the RLT indicator in the form of a Return Result (RR2) component.

14 The bridging switch then sends a Disconnect (DISC) message to the CPE. This message tells the CPE to release the PRI trunks for the first leg of the call.

15 The bridging switch then sends another DISC message to the CPE, telling the CPE to release the PRI trunk for the second leg of the call.

16 The CPE sends a Release (REL) message to the bridging switch to indicate that it has disconnected the PRI trunk for the first leg of the call, and that the bridging switch can continue with the release operation.

17 The bridging switch releases the PRI trunk for the first leg of the call and completes the release operation by sending a Release Complete (REL COM) message to the CPE.

18 The CPE sends a REL message to the bridging switch to indicate that it has disconnected the PRI trunk for the second leg of the call, and that the bridging switch can continue with the release operation.

19 The bridging switch releases the PRI trunk for the second leg of the call and completes the release operation by sending a REL COM message to the CPE.

List of terms

ADIN
authcode database index

bridge
Connecting the originating or terminating trunk of one call to the terminating trunk of a second call

bridging switch
A switch that bridges calls and maintains the call connection

CALLID
Call Identifier used within the DMS-500 switch

CCS7
Common Channel Signaling System Number 7

CCITT
Consultative Committee on International Telephony and Telegraph

CDR
call detail record

CPE
customer premises equipment (includes Enhanced Services Provider)

DMS
Telephone switching equipment; specifically, digital switching units for interconnecting telephone subscribers and control terminals. A Nortel (Northern Telecom) trademark.

ESP
Enhanced Services Provider

ETN
electronic tandem network

IEC

interexchange carrier

ISDN

Integrated Services Digital Network

NACD

network automatic call distribution

PRI

primary rate interface. An interface that carries nB+D channels over a digital DS-1 facility (23B+D in North America and 30B+D in Europe). PRI is used to link private networking facilities, such as private branch exchanges, local area networks, and host computers with a standardized architecture acting as the bridge between private switching equipment and the public network. Formerly known as primary rate access.

PTS

per-trunk signaling

REL

release

REL COM

release complete

RLT

release link trunk

ROSE

remote operations service element

terminating switch

Switch to which the call returns: the call's destination

TRKGRP

trunk group

Appendix A
Ordering information

Use the following table for ordering Nortel NTPs (Northern Telecom Publications) and PCLs (Product Content Loads):

Type of product	Source	Phone	Cost
Technical documents (paper or CD-ROM)	Nortel Product Documentation	1-877-662-5669, Option 4 + 1	Yes
Individual NTPs (paper)	Merchandising Order Service	1-800-347-4850	Yes
Marketing documents	Sales and Marketing Information Center (SMIC)	1-800-4NORTEL (1-800-466-7835 * ESN 444-5930)	No
Training documents	Nortel Technical Education Center	1-800-NT-TRAIN (1-800-688-7246)	Yes
PCL software	Nortel	Consult your Nortel sales representative * Employee	Yes

When ordering publications on CD

Please have the CD number and software version available, for example, **HLM-2663-001 02.03**.

When ordering individual paper documents

Please have the document name and number available, for example, **297-2663-900, DMS-500 TOPS User Guide**.

When ordering software

Please have the eight-digit ordering code, for example, **LLT0B005**, as well as the ordering codes for the features you wish to purchase. Contact your Nortel representative for assistance.

Digital Switching Systems

DMS-500

PRI RLT Feature Application Guide

Product Documentation—Dept 3423
Northern Telecom
P.O. Box 13010
RTP, NC 27709–3010
1-877-662-5669, Option 4 + 1

Publication number: 297-2663-347
Product release: LLT00008 and up
Document release: Standard 02.03
Date: August 1998
Printed in the United States of America

NORTEL
NORTHERN TELECOM