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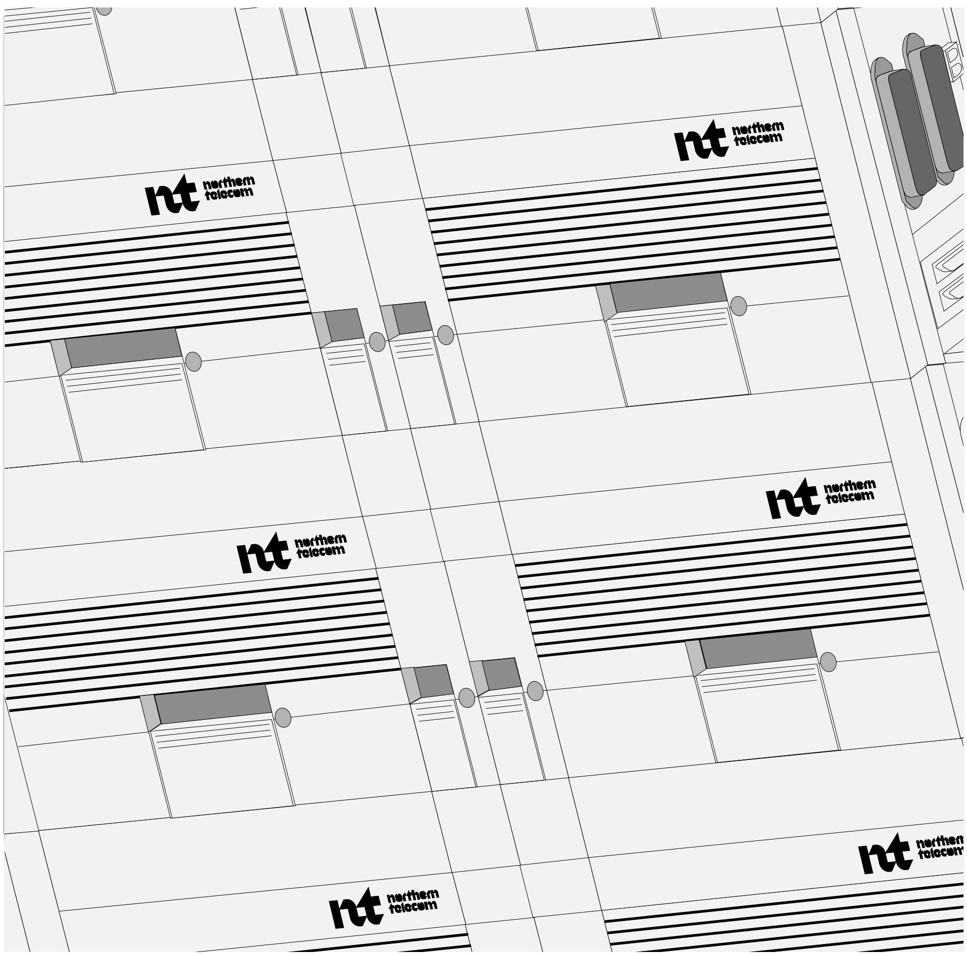
SONET Products

AccessNode

TL1 Interface Description

Issue 1.0 June 1999



NORTEL NETWORKS™

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TL1 Interface Description

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Publication history

June 1999

AN17 Standard Issue 1.0 of the document. This document is being released with a new CPC number, so it is keeping its Issue 1.0 status. The following information was added or changed:

- 3DSO ISDN
- TL1 parity
- UE9000
- TR-08
- IDSL
- GR-303 service provisioning
- Asynchronous TIC

February 1999

Release-Independent Standard Issue 1.0 of the document. For this release, the following information was updated or added:

- TIRS/TIM
- TL1 over TCP/IP
- OPC alarms
- GR-303
- Performance monitoring
- TL1 enhanced security

Note: With the February 1999 release, references to the software release number (such as AN15 or AN16) have been deleted, making this document release-independent. This document will be rereleased only when technical changes occur.

June 1998

AN 15 Standard 01.01 release of the document. Added a table for Data Direct facility alarm after TR-08 alarm table.

September 1997

AN14 Standard 01.01 release of the document. For this release, the following information has been added:

- Changes to the TL1 introduction in Chapter 1
- Changes to commands in Chapter 3
- AccessNode Express AID definitions

July 1996

AN12 Standard 01.01 release of the document.

November 1995

AN11 Standard 02.01 release of the document.

April 1995

Standard AN10 release of the document.

December 1994

Standard AN08 release of the document.

November 1994

Reissue of AN07 standard.

April 1994

Standard AN07 release of the document.

Contents

About this document

This document provides details of the Transaction Language 1 (TL1) network operations, administration, maintenance, and provisioning (OAM&P) implementation on AccessNode. Topics covered include:

- TL1 message common structure, syntax, and description
- configuration details for both TL1 and X.25 interfaces
- TL1 alarm and performance monitoring messages and parameters
- cross references between alarms and performance monitoring results, and TL1 equivalent messages
- TL1 provisioning messages and parameters
- TL1 line and loop testing messages and parameters

Audience

This document is intended for:

- planners
- provisioners
- network administrators
- transmission standards engineers

References in this document

This document refers to the following documents:

Engineering, Configuration and Ordering Guide, Volume 1

- *Engineering and Ordering Information*, 323-3001-032

Description, Volume 2A

- *Alarms and Surveillance Description*, 323-3001-104

Commissioning and Testing, Volume 3

Operations, Administration, and Provisioning, Volume 4A

- *System Administration Procedures*, 323-3001-302

AccessNode Express separately-bound document

- *TL1 User Guide*, 323-3051-312

Introduction

Transaction Language 1 (TL1) is a set of generic messages exchanged between network elements (NEs) and operations systems (OSs) to support network surveillance, provisioning, and line/loop testing. TL1 also allows OSs to communicate with different vendors' equipment through a common language protocol, eliminating the need for vendor-specific interfaces.

Chapter contents

This chapter introduces the TL1 interface. It contains the following topics:

Note: For information about TL1 for AccessNode Express, see *TL1 User Guide*, 323-3051-312.

TL1 functions

The TL1 implementation on the AccessNode equipment allows the OS to perform the following functions:

- alarm surveillance
- performance monitoring
- tributary provisioning
- line and loop testing

The AccessNode system uses the TL1 interface in an AccessNode Operations Controller (OPC) to allow an OS to monitor and control the group of NEs under the OPC span of control.

TL1 message notation

The following notation is used to define the syntax of the TL1 messages.

ASCII carriage return	cr
ASCII line feed	lf
ASCII space	^
designates optional expression	[ ]
variable expression	< >

TL1/OPC interfaces

The OPC, using TL1, acts as an OS gateway, or mediation device, for communication between the AccessNode network elements and external network OSs. The OSs can communicate through the OPC to the NEs using an X.25 connection or an Ethernet LAN.

See “TL1 interface configurations” on page 2-1 for descriptions of the X.25 and Ethernet TL1 interfaces.

Standards compliance

The TL1 interface on the AccessNode equipment complies with the following standards:

Bellcore

- Bellcore NMA OS release 3.4
- TR-NWT-000199 Issue 1, Memory Administration Messages
- TR-NWT-000831 Issue 3, Language for Operations Applications Messages
- TR-NWT-000833 Issue 4: Network Maintenance - Network Element and Transport Surveillance Messages
- TR-NWT-000834 Issue 4: Network Maintenance: Access and Testing Messages
- TR-TSY-000830 Issue 1, Operations Interworking
- SR-OPT-001665 Issue 2

X.25

The X.25 interface complies with the following standards:

- CCITT Recommendation X.25, CCITT Blue Book 1988
- ISO/IEC 8208 X.25 Packet Layer Protocol 1990

Ethernet

The Ethernet interface complies with the following standard:

- Institute of Electronics and Electrical Engineers (IEEE) 802.3.

SARTS/TA201:XL

The AccessNode has been tested against the following SARTS and TA201:XL releases:

- SARTS Release GI10.0 and TA201:XL Release 7.0; extensive testing
- SARTS Release GI9.1 and TA201:XL Release 6 Version 6.1; brief testing
- SARTS Release GI8.1 and TA201:XL Release 7.0; brief testing
- SARTS Release GI8.1 and TA201:XL Release 6 Version 6.1; extensive testing

DARTS

The AccessNode has also been tested against DARTS Release 4.01 produced by Bell Sygma Telecom Solutions.

TL1 feature description

The TL1 interface in an AccessNode operations controller (OPC) provides surveillance and control, provisioning, and testing capabilities between AccessNode network elements (NE) and a remote operations system (OS).

Surveillance functions include real-time alarm reports, event reports, threshold crossing alerts, logs, and performance statistic reports. Control functions include manual and forced-switch capabilities on both the high-speed optical and low-speed tributary channels.

Provisioning functions include creating, editing, retrieving, and deleting DS0, DS1, DS3, DS0 cross-connect, and equipment objects.

Testing functions provide analog testing support for AccessNode voiceband and voiceband data circuits from external operating systems such as SARTS and DARTS.

TL1 connectivity

You can configure OPC port 1 (port B) of the NEs equipped with an OPC as a user interface port or as an X.25 TL1 port. Refer to *System Administration Procedures*, 323-3001-302, in *Operations, Administration, and Provisioning*, Volume 4A, for instructions on the method of configuring the OPC port 1 for X.25 TL1 use.

OPC port 1 can not be simultaneously used as a VT100 terminal user interface and an X.25 TL1 interface. However, once the port has been configured for TL1, it does not prevent access to the OPC user interface. Access to the OPC user interface can still be achieved through user interface ports 2 or 3, and through the Ethernet port located on the OPC module faceplate.

Every OPC module contains an Ethernet 802.3 LAN port on the faceplate of the OPC. The Ethernet port on the OPC provides an interface for a third-party X11 terminal or workstation, providing an enhanced graphics interface to the OPC. The connector is a shielded RJ-45 connector. The data rate supported is 10 Mbit/s, with a distance limitation of 100 m.

Loss of communication

The time period for valid link failure or loss of communications detection is 3 minutes for surveillance and provisioning, and 1.25 minutes for line and loop testing.

TL1 Over TCP/IP

You can access the TL1 interface through true TCP/IP, or you can use a telnet session to access the TL1 interface over telnet TCP/IP. A telnet session is required for the TL1 shell or to log in as an NMA or OPS user.

If you use a telnet session to access TL1, you must establish the telnet session using the Ethernet port on the OPC faceplate. The Ethernet TL1 interface

- supports the same functionality and messages as the X.25 TL1 interface
- allows for a faster rate of transmission
- frees port B to be used as a printer or terminal port

The advantages of TL1 over TCP/IP are

- reduced cost by eliminating the need for end-to-end X.25 circuits
- significant increase in bandwidth
- multiple login capabilities for users in remote locations

Each TL1 session is protected with a userID and password. To start a TL1 interface session, open a telnet session to connect to the OPC, and log in with the appropriate userID for the type of TL1 session.

Simultaneous sessions

The following limitations apply to TL1 sessions:

- You cannot run more than four concurrent TL1 sessions on an OPC. This limitation applies to both X.25 sessions and TCP/IP sessions and includes
  - — surveillance sessions (NMA)
  - — provisioning sessions (OPS)
  - — surveillance and provisioning sessions (BTH)
- You can run four NMA sessions at the same time.
- You cannot run more than one OPS or BTH session at a time.
- You can run a maximum of two OPC user interface sessions at the same time if four TL1 sessions are active. Table 1-1 on page 1-6 shows the correlation between the number of concurrent TL1 and OPC sessions.

  Note: The limitations do not apply to testing (SARTS/DARTS) sessions, nor do active testing sessions contribute to the combined total of OPS/NMA sessions.

Table 1-1
Concurrent TL1 and OPC sessions

Maximum TL1 sessions	Maximum OPC user interface sessions
0	4
1	4
2	3
3	3
4	2
Note: Only one of the four TL1 sessions can be a provisioning (OPS) or combination (BTH) session.	

Interface descriptions

For information on X.25 and Ethernet interfaces, see “TL1 interface configurations” on page 2-1.

TL1 messages

This section describes the TL1 message types, the common elements present in all TL1 messages, and the OPC response to TL1 non-autonomous requests.

TL1 message types

There are two types of TL1 messages: autonomous and non-autonomous. Autonomous messages are generated by the OPC as a result of activity on the NEs (such as alarms, protection switch activity, threshold alert, and warnings) and reported to the OS automatically. Autonomous messages are generated by the surveillance message set only (with the exception of one autonomous message provided by the line and loop testing interface).

Non-autonomous messages consist of a request from the OS and a response message from the OPC, and are generated by all message sets.

TL1 response header

The first two lines of all TL1 message responses have a common format. The first line always contains the target identifier (TID), which is the NE name, the date, and the time the TL1 response was sent to the OS. An example of the first line follows:

TID	Date and time of message	
FCOT1	92-08-13 13:39:32	1st line (NE name)

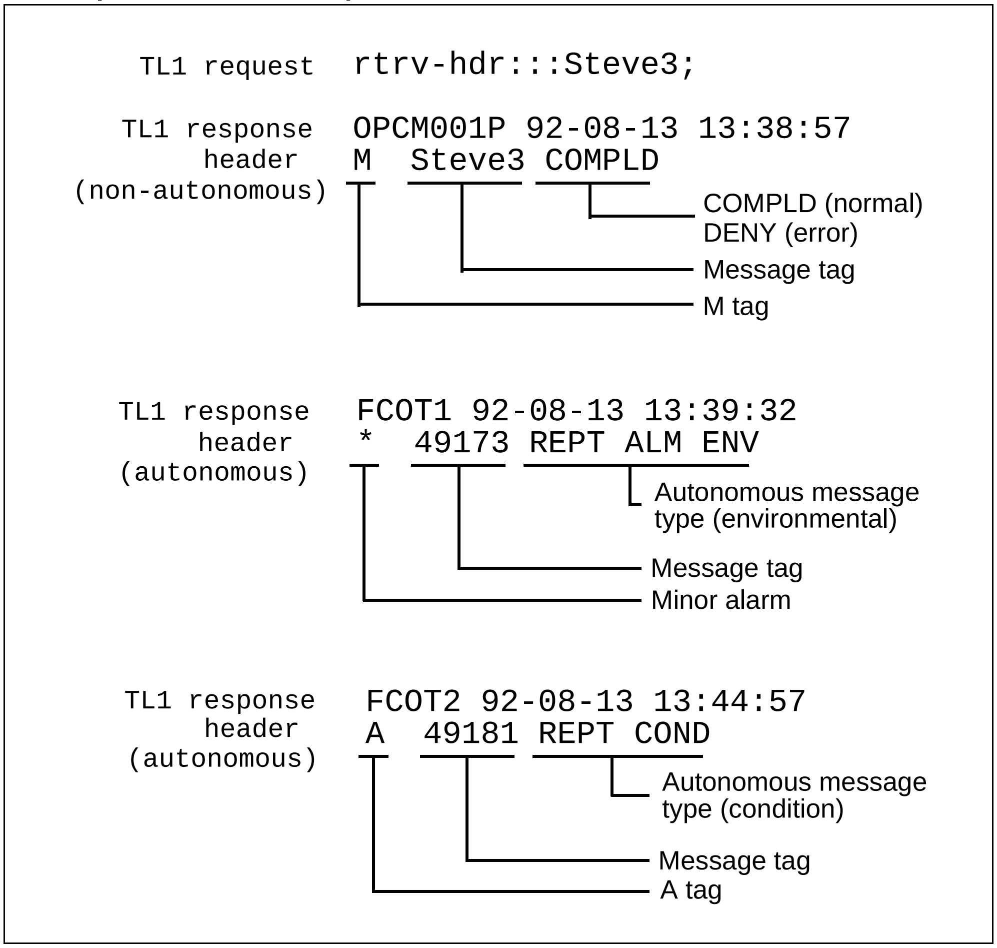
The second line of TL1 messages is different for autonomous and non-autonomous messages. For autonomous messages, the second line in most messages begin with an **A** tag. Exceptions to this are the alarm messages which begin with an alarm code (which is an asterisk in one of the following examples).

The second line of autonomous messages also contains a numerical message tag, which is automatically generated, and the TL1 message type. (The numerical message tag is the same correlation tag as the TL1 request for non-autonomous responses.)

For non-autonomous messages, the second line always begins with an **M** tag followed by either COMPLD to indicate a normal response, or DENY to indicate an error response.

Figure 1-1 on page 1-8 presents three examples of TL1 response headers.

Figure 1-1
TL1 response header examples



TL1 case sensitivity

All TL1 parameter fields in line and loop testing messages are case sensitive, while in surveillance and provisioning, only some fields are case sensitive. The only TL1 parameter which is not case sensitive is the Second Command Code Modifier (SCCM) used in surveillance messages. Some TL1 message types, for instance RTRV-HDR, are not case sensitive.

For example:

```
rtrv-alm-com:FCOT1::Ctag12::MN,CONTCOM,NSA;
```

and

```
RTRV-ALM-COM:FCOT1::Ctag12::MN,CONTCOM,NSA;
```

are both valid TL1 non-autonomous messages. However,

`rtrv-alm-com:FCOT1::Ctag12::MN,`**`contcom`**`,NSA;`

is not a valid TL1 message.

TL1 acknowledgment messages

When a TL1 non-autonomous message is issued to the OPC, an acknowledgment message is sent back to the OS before the actual TL1 response. This acknowledgment indicates that the TL1 request has actually been received by the OPC. The four possible TL1 acknowledgment messages are listed in the following table.

Acknowledgment	Indicates that
PF	the TL1 request has been received
NA	although the TL1 request was received, no TL1 response will be sent back because the selected OPC was not active, or that received commands were incorrectly formatted (applicable to line and loop testing only)
RL	the TL1 request can not be handled and to retry later (applicable to provisioning only)
OK	the data link between the OPC and OS is working properly (applicable to line and loop testing only)

Acknowledgment request format

The format of the acknowledgment request is as follows:

PF cr lf
<

For provisioning and line and loop testing, the “PF” and “NA” messages are followed by an optional correlation tag (CTAG) associated to the issued command.

For details on the acknowledgment messages for a particular interface, see “Supported TL1 error responses and codes” on page 4-90 for provisioning, and “Supported TL1 error responses and codes” on page 5-113 for line and loop testing.

Target identifier TL1 parameter

In non-autonomous TL1 messages, the target identifier (TID) specifies the network element for which a message is intended. It is equivalent to the source identifier (SID) in autonomous TL1 messages. Both the TID and the SID have the same possible values: a defined name, the network element name, or the network element identification number (network element ID).

- Defined name. You can define a name of up to 20 characters for the TID alias. For the testing interface, you assign the name through the OS Connection Manager at the OPC. For the non-testing interfaces, you define the name through tidmap, an OPC Session Manager UNIX command. See *System Administration Procedures*, 323-3001-302, in *Operations, Administration, and Provisioning*, Volume 4A, for directions.

  Note: When you define the name, you must manually synchronize it between the primary operations controller (OPC) and the backup OPC.

- Network element name. If you do not define a name for a non-testing interface, the OPC assigns the network element name as the TID alias when you bring up the interface for the first time. If you do not define a name for a testing interface, the network element name is not assigned as the TID alias. You can, however, use the network element name as the TID.

  Note 1: The network element name must meet the TL1 requirement of containing only letters, digits, hyphens (-), underscores (_), and periods. Spaces (blanks) are invalid. For example, `SHELF 1` is invalid, but `SHELF_1` is valid.

  Note 2: Because Switched-Access Remote Test System (SARTS) does not accept TIDs longer than 10 characters, you must define a TID name if the network element name exceeds 10 characters.

  Note 3: If you change the network element name, the TID alias does not change.

- Network element ID. If the network element does not have a name or if the name contains invalid TL1 characters, the OPC assigns the network element ID as the TID alias.

Table 1-2 on page 1-11 summarizes the order of each identifier for non-testing interfaces.

Table 1-2
TL1 network element identification

TID value	Non-testing interfaces
defined name	TID
network element name	default for TL1 TID if the TID is not defined
network element ID	default for TL1 TID if the TID is not defined and the network element name is undefined or invalid

Each network element has only one TID. The OPC does not have a TID.

Using TL1 to administer OPC user accounts

This section describes the administrative functions of the Centralized User Administration (CUA) tool through a TL1 connection. The admin user group tool set on the active OPC contains the CUA tool. For more information, see the *System Administration Procedures*, 323-3001-302, in *Operations, Administration, and Provisioning*, Volume 4A.

User accounts belong to user groups. These groups can be default user groups in the CUA tool, or they can be other user groups that were created through the CUA tool. Each user group has access to various toolsets.

The CUA tool lets you

- create and manage user accounts and user groups through the OPC user interface
- control network element access privileges, userIDs, and user passwords that access that OPC user interface
- define user accounts that have read, write, and administrative privileges for the network elements in the OPC span of control

Table 1-3 shows the maximum number of CUA tool accounts available.

Table 1-3
Maximum number of CUA tool user accounts

User account allocation	Maximum number of accounts
user accounts for a network element	32
user accounts in a user group	100
user accounts for all network elements in a span of control	200

Users in the admin and root user groups can perform user administration functions through TL1 as well as through the CUA tool.

A user profile, as defined in the CUA tool, is made up of several parameters. Each user belongs to a user group. The user has Read, Read/Write, Read/Write/Admin, or no access privileges for the network elements in its span of control. In the TL1 syntax

- uap denotes network element privileges (or user access privileges)
- grp denotes the user group
- uid denotes the user identifier
- pid denotes the user password (or password identifier)

In order for the first TL1 administrator to open a TL1 administration session, that user must belong to an existing admin user account or must be the root user. After that, additional TL1 administrators can be added, modified, and deleted through either the TL1 interface or through the CUA tool.

Table 1-4
CUA accessibility and access classes mapped to TL1 user access privileges (UAP)

Accessibility	Access class	UAP
Yes	Read	R
Yes	Read/Write	RW
Yes	Read/Write/Admin	RWA
No	Read	Null
No	Read/Write	Null
No	Read/Write/Admin	Null

This chapter contains the following procedures:

Procedure	Topic	See
1-1	Opening a TL1 administration session	page 1-13
1-2	Closing a TL1 administration session	page 1-15
1-3	Retrieving security parameters for a user	page 1-16
1-4	Adding a user account to the CUA	page 1-18
1-5	Changing security parameters for a CUA user	page 1-21
1-6	Deleting a CUA user	page 1-24

Procedure 1-1
Opening a TL1 administration session

Use this procedure to open a TL1 administration session and enable the administrator TL1 commands. Only users from the admin and root user groups can open a TL1 administration session. You must issue an activate user (act-user) command to open a TL1 administration session.

After you activate an administrative user, the system does not allow another user on that TL1 connection until someone issues the cancel user (canc-user) command. See Procedure 1-2, “Closing a TL1 administration session” on page 1-15 for information about closing a TL1 administration session.

You can open a TL1 administration session from either the surveillance or provisioning TL1 interfaces.

Requirements

Before you start this procedure

- obtain a user identifier (uid) that belongs to the admin or root user groups
- obtain a user password (pid). It is the responsibility of the operations system or the application accessing TL1 to hide this password from view. Passwords have the following restrictions:
  - passwords must be exactly eight characters. Valid characters are a to z, A to Z, 0 to 9, $, and _ (underscore).
  - the first character must be alphabetic
  - passwords must not contain the associated userID
  - passwords must contain at least one of the following: a numeric character, $, or _ (underscore)
  - passwords assigned by the system administrator have an associated accreditation period

Action

Step	Action
1	Connect to a TL1 interface of the OPC.

—continued—

Procedure 1-1 (continued)
Opening a TL1 administration session

Step	Action
2	To open a TL1 administration session, enter

act-user:[tid]:<uid>:<ctag>::<pid>;crlf

where

tid	is the target identifier (optional) If the tid is specified, it must be a valid identifier in the OPC span of control
uid	is the user identifier of a user in either the admin or root user group
ctag	is the correlation tag
pid	is the password for the user

The following message appears:

```
crlf
lf
^^^<sid>^<date>^<time> crlf
M^^<ctag>^COMPLD crlf
^^^"<uid>" crlf
;
```

where

sid	is the source identifier
date	is the TL1 message origination date
time	is the TL1 message origination time
ctag	is the correlation tag
uid	is the user identifier

—end—

Procedure 1-2
Closing a TL1 administration session

Use this procedure to close a TL1 administration session and disable the TL1 administrator commands. You must be an admin and a root user to close a TL1 administration session.

Requirements

Before you start this procedure, you must have an active TL1 administration session. For instructions on how to activate a TL1 administration session, refer to Procedure 1-1, “Opening a TL1 administration session” on page 1-13.

Action

Step	Action
1	To close a TL1 administration session, enter:

canc-user:[tid]:[uid]:<ctag>;crlf

where

tid	is the target identifier (optional). If the tid is specified, it must be a valid identifier in the OPC span of control.
uid	is the user identifier (optional). If the uid is specified, it must specify the current user. If it uid is not specified, the current user is assumed.
ctag	is the correlation tag

The following message appears:

```
crlf
lf
^^^<sid>^<date>^<time> crlf
M^^<ctag>^COMPLD crlf
^^^”<uid>” crlf
```

where

sid	is the source identifier
date	is the TL1 message origination date
time	is the TL1 message origination time
ctag	is the correlation tag
uid	is the user identifier

—end—

Procedure 1-3
Retrieving security parameters for a user

Use this procedure during a TL1 administration session to retrieve the security parameters associated with a user. You cannot retrieve a user's password.

If you issue a request to retrieve all users for a specified network element, then the TL1 response lists both active and expired accounts.

Requirements

Before you start this procedure, you must have an active TL1 administration session. For instructions on how to activate a TL1 administration session, refer to Procedure 1-1, "Opening a TL1 administration session" on page 1-13.

Action

Step	Action
1	To retrieve security parameters, enter:

rtrv-user-secu:<tid>:[uid]:<ctag>;crlf

where

tid	is the target identifier (required) The TL1 response includes user access privileges for the target identifier
uid	is the user identifier (optional) If you specify the uid, the TL1 response includes the security parameters for the user. If you do not specify the uid, the TL1 response includes the security parameters for all user accounts.
ctag	is the correlation tag

—continued—

Procedure 1-3 (continued)
Retrieving security parameters for a user

Step	Action

If the command succeeds, the following message appears:

```
crlf
lf
^^^<sid>^<date>^<time> crlf
M^^<ctag>^RTRV crlf
^^^”<uid>:,<uap>:<grp>” crlf
;
```

where

sid is the source identifier

date is the TL1 message origination date

time is the TL1 message origination time

ctag is the correlation tag

uid is the user identifier

uap is the user access privilege for the listed user account

The options are
R read access only
RW read/write access only
RWA read/write/admin access
NULL no access

grp is the user group that contains the listed user account

—end—

Procedure 1-4
Adding a user account to the CUA

Use this procedure during a TL1 administration session to add a user account to the Centralized User Administration (CUA) tool. You need to specify the following parameters:

- user id (uid)
- group (grp)
- password (pid)
- user access privileges (uap) for each network element in the span of control

You cannot use TL1 to add a user account if an operations controller (OPC) CUA session is in progress.

Requirements

Before you start this procedure, you must

- establish an active TL1 administration session. See Procedure 1-1 on page 1-13.
- obtain the user id (uid) of the new user account
- obtain the user group (grp) to contain the new user account
- obtain the user access privileges (uap) for the new user account. See Procedure 1-3 on page 1-16.
- obtain the password (pid) for the new user account. It is the responsibility of the operations system or the application accessing TL1 to hide this password from view. Passwords have the following restrictions:
  - — passwords must be exactly eight characters. Valid characters are a to z, A to Z, 0 to 9, $, and _ (underscore).
  - — the first character must be alphabetic
  - — passwords must not contain the associated userID
  - — passwords must contain at least one of the following: a numeric character, $, or _ (underscore)
  - — passwords assigned by the system administrator have an associated accreditation period

—continued—

Procedure 1-4 (continued)
Adding a user account to the CUA

Action

Step	Action

1 To add a user account to the CUA, enter:

ent-user-secu:[tid]:<uid>:<ctag>:<grp>:<pid>,,<uap>;crlf

where

tid	is the target identifier (optional). If you specify a tid, it must be a valid identifier in the OPC span of control. The tid has no significance when used with this command.
uid	is the user identifier for the user to be added. This user identifier must be unique to the CUA.
ctag	is the correlation tag
grp	is the group to contain the added user. This value must be a valid group in the CUA (such as admin or slat).
pid	is the password for the new user account
uap	is the user access privilege for the new user account. The options are **R** read access only **RW** read/write access only **RWA** read/write/admin access **NULL** no access TL1 applies these privileges to each network element in the span of control as a default. To define different privileges for each network element, see Procedure 1-5 on page 1-21.

—continued—

Procedure 1-4 (continued)
Adding a user account to the CUA

Step	**Action**

The following message appears:

```
crlf
lf
^^^<sid>^<date>^<time crlf
M^^<ctag>^COMPLD crlf
^^^"<uid>:<pid>:<uap>" crlf
;
```

where

sid	is the source identifier
date	is the TL1 message origination date
time	is the TL1 message origination time
ctag	is the correlation tag
uid	is the user identifier
uap	is the user access privilege for the listed user account The options are **R** read access only **RW** read/write access only **RWA** read/write/admin access **NULL** no access
grp	is the user group that contains the listed user account

—end—

Procedure 1-5
Changing security parameters for a CUA user

Use this procedure during a TL1 administration session to modify a Centralized User Administration (CUA) tool user account. You can change the following parameters:

- user id (uid)
- group (grp)
- password (pid)
- user access privilege (uap), for each network element in the span of control

You cannot modify user accounts if an operations controller (OPC) CUA session is in progress.

If you disable a user's access to a network element (NE) and the user account is being used for an NE session, be aware of the following consequences:

- The account is deleted from the NE.
- The current NE session is not disturbed.
- The user's password immediately expires.
- The user cannot log in to the NE again.
- The user account is deleted from the NE when the Centralized User Administration audit is performed.

Requirements

Before you start this procedure, you must:

- establish an active TL1 administration session. See Procedure 1-1, "Opening a TL1 administration session" on page 1-13.
- obtain the user id (uid) of the new user account
- obtain the user group (grp) to contain the new user account

—continued—

Procedure 1-5 (continued)
Changing security parameters for a CUA user

- obtain the user access privileges (uap) for the new user account. See Procedure 1-3 on page 1-16.
- obtain the password (pid) for the new user account. It is the responsibility of the operations system or the application accessing TL1 to hide this password from view. Passwords have the following restrictions:
  - — passwords must be exactly eight characters. Valid characters are a to z, A to Z, 0 to 9, $, and _ (underscore).
  - — the first character must be alphabetic
  - — passwords must not contain the associated userID
  - — passwords must contain at least one of the following: a numeric character, $, or _ (underscore)
  - — passwords assigned by the system administrator have an associated accreditation period

Action

Step	Action
1	To modify a CUA user account, enter:

ed-user-secu:<tid>:<uid>:<ctag>:[ngrp]:,[npid],,[nuap];crlf

where

tid	is the target identifier of the network element where you want to change the user’s security parameters
uid	is the user identifier for the user that you want to change
ctag	is the correlation tag
ngrp	is the new group for this user. This parameter is optional. If you specify a group, it must exist in the CUA (for example, admin).
npid	is the new password for this user. This parameter is optional.
nuap	is the new user access privilege for this user. This parameter is optional. The options are **R** read access only **RW** read/write access only **RWA** read/write/admin access **NULL** no access

—continued—

Procedure 1-5 (continued)
Changing security parameters for a CUA user

Step	Action

The following message appears:

```
crlf
lf
^^^<sid>^<date>^<time> crlf
M^^<ctag>^COMPLD crlf
^^^<uid>:<uap>:<grp>" crlf
;
```

where

sid	is the source identifier
date	is the TL1 message origination date
time	is the TL1 message origination time
ctag	is the correlation tag
uid	is the user identifier
uap	is the user access privilege for the listed user account
grp	is the user group that contains the listed user account

—end—

Procedure 1-6
Deleting a CUA user

Use this procedure during a TL1 administration session to delete a user account from the Centralized User Administration (CUA) tool.

OPC users

When you delete a user account being used for an operations controller (OPC) session, be aware of the following consequences:

- the current OPC session is not disturbed.
- the user cannot log in again after logging out.

NE users

When you delete a user account being used for a network element (NE) session, be aware of the following consequences:

- the current NE session is not disturbed.
- the user’s password immediately expires.
- the user account is deleted from the OPC.
- the user cannot log in to the NE again.
- the user cannot log in to the OPC to change the password.
- the user account is deleted from the NE when the Centralized User Administration audit is performed.

Requirements

Before you start this procedure, you must

- establish an active TL1 administration session. See Procedure 1-1 on page 1-13.
- obtain the user id (uid) of the new user account

—continued—

Procedure 1-6 (continued)
Deleting a CUA user

Action

Step	Action
1	To delete a CUA user account, enter:

dlt-user-secu:[tid]:<uid>:<ctag>;crlf

where

tid	is the target identifier (optional). If you specify the tid, it must be a valid identifier in the OPC span of control. The tid has no significance when used with this command.
uid	is the user identifier of the user to be deleted
ctag	is the correlation tag

The following message appears:

```
crlf
lf
^^^<sid>^<date>^<time> crlf
M^^<ctag>^<COMPLD crlf
;
```

where

sid	is the source identifier
date	is the TL1 message origination date
time	is the TL1 message origination time
ctag	is the correlation tag

—end—

TL1 interface configurations

You must perform certain steps must to ensure that the TL1 interface is functioning correctly before the TL1 interface on the AccessNode systems becomes operational. This chapter describes the TL1 interfaces and configuration requirements for both the X.25 and Ethernet interfaces.

Chapter contents

Use the table below to go directly to the information you require.

TL1 X.25 interface

The following list describes the configuration requirements for both the primary and backup TL1 interfaces for X.25. Configuration procedures are in *System Administration Procedures*, 323-3001-302, in *Operations, Administration, and Provisioning*, Volume 4A.

TL1 X.25 communication requirements

The following requirements must be met, in the sequence shown, in order for TL1 communications to occur over an X.25 interface:

- The X.25 communications must be initialized before the TL1 interface can be used.
- X.25 configuration requirements must be met (see “X.25 configuration requirements” on page 2-3).
- The operations controller (OPC) must be active and communicating to the network elements, so that there are no “loss of association” errors.

TL1 verification

Once the TL1/X.25 communication requirements have been met, and TL1 communication has been established, you must verify that the TL1 interface is working correctly by issuing a RTRV-HDR command. You can issue this command from any Operations System (OS) interface.

> ***Note:*** The backup interface will not report any TL1 messages while the backup OPC is inactive. A non-autonomous message must be issued to the OPC in order to check that the TL1 connection is established. If an “NA” acknowledgment response (as explained in the Introduction) is received by the OS, then the backup TL1 interface is operational upon activation of the backup OPC. If no response is received, then the TL1 checklist should be verified to pinpoint the trouble area.

TL1 Default configuration

The TL1 interface will automatically report messages once the X.25 connection has been established. The entire TL1 message set is available to the OS. Performance monitoring reports are enabled by default, but they can be disabled if desired.

TL1 Interface Router Service

You can use an OPC to control any network element in that OPC span of control. In addition, you can use an OPC as a gateway to route TL1 messages to a remote OPC and control a network element in the remote OPC span of control. Each OPC can have up to 34 network elements in its span of control, and each gateway OPC can communicate with up to three remote OPCs.

Each connection between an OPC and a network element can be one of the following types:

- NMA, which handles surveillance data
- OPS, which handles provisioning commands and data
- BTH, which handles both surveillance data and provisioning commands and data

TL1 Interface Merge

You can set up a single X.121 address or internet protocol (IP) address to allow both the surveillance (NMA) and provisioning (OPS) interfaces. This function lets you transmit surveillance and provisioning information with an OPC, over a single X.121 connection through the X.25 link or the TCP/IP connection.

To configure an X.121 address to the option “BTH” (both interfaces) for the TL1 Interface Merge operation, see *System Administration Procedures*, 323-3001-302, in *Provisioning, Operations, and Administration*, Volume 4A.

X.25 configuration

X.25 is an international telecommunications standard for data packet switching. The X.25 standard is defined by the Consultative Committee for International Telephony and Telegraphy (CCITT) which ensures that the information sent from a data terminal equipment (DTE), such as the TL1 interface on the OPC, can be understood when it is received by the data packet network. The X.25 packet protocol is used for TL1 messaging between the OPC and the OS and it is defined in the ISO/IEC 8208 X.25 Packet Layer Protocol for Data Terminal Equipment document.

The X.25 configuration should be set prior to verifying the TL1 interface. Once the X.25 communications is configured, add the valid X.121 user addresses into the OPC. For the procedure to create an OS connection profile, refer to *System Administration Procedures*, 323-3001-302, in *Operations, Administration, and Provisioning*, Volume 4A.

X.25 configuration requirements

By using the OPC as a gateway for the TL1 messages to and from the NEs, a separate X.25 link to each of the NEs is not required. Port 1 of the OPC (also referred to as port B) can be provisioned as an X.25 port, hence providing the required connectivity to the OS without the need of additional hardware.

The following list describes the X.25 configuration requirements that must be met in order for X.25 communications to occur. The requirements should be met in the order which they appear.

- The network has been successfully commissioned and tested.
- The appropriate X.25 and TL1 equipment and services have been provided. These may include TL1 cables, synchronous modems, modem eliminators, X.25 data lines, OC-3/OC-12 software (release FWP04 or higher), and protocol analyzers.
- The X.25 parameters required on both the OPC and the OS have been determined using the X.25 interface worksheet in the *System Administration Procedures*, 323-3001-302, in *Operations, Administration, and Provisioning*, Volume 4A. (The default configuration parameters are listed on page 2-4.)
- The X.25 parameters, such as X.121 address, on the OPC have been configured (refer to *System Administration Procedures*, 323-3001-302, in *Operations, Administration, and Provisioning*, Volume 4A).
- Port 1 is configured as an X.25 port (refer to *System Administration Procedures*, 323-3001-302, in *Operations, Administration, and Provisioning*, Volume 4A). The Ethernet port on the faceplate of the OPC can also be used for X.25.

Note: After configuring port 1 as an X.25 port, the OPC must be rebooted using the OPC Shutdown tool as described in *System Administration Procedures*, 323-3001-302, in *Operations, Administration, and Provisioning*, Volume 4A.

- One end of the TL1 cable is connected to port 1 and other end to the DCE equipment (modem, data line, modem eliminator).
- Link access protocol B (LAPB, link layer) is initialized (verify using a protocol analyzer).
- The valid X.121 addresses of the OS have been added into the OPC (refer to *System Administration Procedures*, 323-3001-302, in *Operations, Administration, and Provisioning*, Volume 4A). This is required to provide user security. If the X.121 address of the OS is not entered in the OPC, then the X.25 call request from the OS will be refused. See note following.
- The OS has issued a call request to the OPC and established the X.25 switched virtual circuit (SVC).

Note: The X.121 parameter must be defined for the OPC and it may be an assigned number from the data packet network administrator. The device and name parameters should not be modified. The t1, t3, t4, framesize, n2, and l2window level 2 parameters are all configurable. The networktype parameter can be either DTE 84 or DCE 84. Only SVCs should be provisioned under the circuit table definition with a maximum number of 16 for the max circuits parameter. All the other parameters are configurable, but one should be careful to match the X.25 parameters on the OPC to those on the OS.

Default configuration

The default OPC X.25 parameters are listed in *System Administration Procedures*, 323-3001-302, in *Operations, Administration, and Provisioning*, Volume 4A, and are as follows:

```
# X.25 Initialization File
# Global Parameters
x.121   12345678
device /dev/x25_0
name    scc0

# Level 2 Parameters
t1             3000
t3             60000
t4             0
framesize      263
n2             10
l2window       7

# Level 3 Parameters
networktype    DTE_84
```

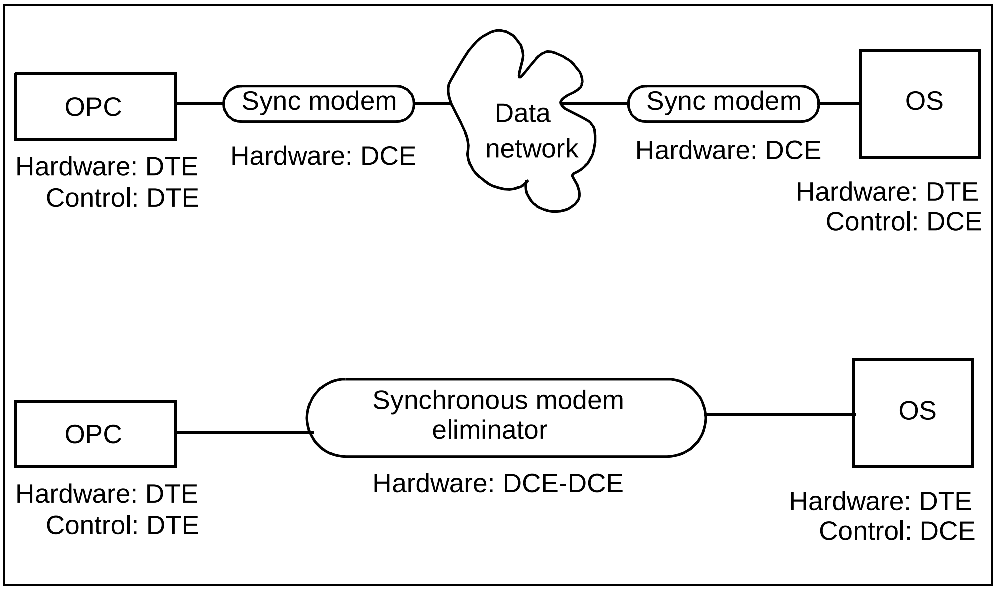
```
# Circuit Table Definition
#       LCI     TYPE    HOW MANY
lci     1       svc     8
max_circuits   8

flowcontrol          on
thruputclass         on
fast_select_accept   disabled
reverse_charge       disabled
def_inpacketsize     128
def_outpacketsize    128
def_inwindow         2
def_outwindow        2
def_inthruputclass   10
def_outthruputclass  10
neg_inpacketsize     256
neg_outpacketsize    256
neg_inwindow         2
neg_outwindow        2
neg_inthruputclass   10
neg_outthruputclass  10
```

X.25 communication

In X.25 communications, there is both DTE (data terminal equipment) and DCE (data circuit-terminating equipment) at the physical level and at the handshaking and flow control level. The OPC X.25 port is a DTE device which should be connected to a synchronous modem (DCE). In the case of a direct connection (no modems) to an OS which is also DTE, a synchronous modem eliminator is needed. Both configurations are shown in Figure 2-1.

Figure 2-1
X.25 communication between the OPC and the OS



The OPC is normally configured as DTE for flow control purposes. The OS DCE X.29/X.3 PAD facilities should not be specified in the call request packet originated from the OS since the OPC does not support PAD services. (X.29/X.3 PAD facilities are normally required for asynchronous access such as using a VT100 terminal and they should not be required in an OS environment.) The OPC will reject the incoming X.25 call if X.29/X.3 facilities have been defined.

The OPC only supports switched virtual circuits (SVC) and not permanent virtual circuits (PVC). SVC connections require call establishment handshaking (call request and call acceptance packets) between the OPC and the OS, while PVC connections do not require call control. A good analogy is to think of SVC as a regular phone line on which user A has to dial a number to start a conversation with user B, and PVC as a direct phone line on which user A just picks up the phone to talk to user B.

X.25 troubleshooting guidelines

The following guidelines assume that the user is relatively familiar with the X.25 protocol and that there is a protocol analyzer readily available. If a problem arises, check the following:

- that the cable is the correct model, and that it is connected to the correct port (port 1, or B, on the shelf containing the OPC)
- that the OPC Shutdown procedure was executed after the port was configured for X.25 and that no cable was attached to port 1 during the shutdown
- the X.25 configuration by using the tstatc utility. At the UNIX prompt on the OPC, type **tstatc** ↵. Type **x** for the X.25 status screen. The following screen should appear:

OSI Protocol Monitor X25 Stats on Fri May 21 17:54:45 1993

Node: (OPCM014P)

X25 is configured on scc0 (Port B)

Num	Name	packets	IN errors	OUT packets	errors	Status	State	Ckts
0:	scc0	821	0	470	0	0	**Initialized**	0
1:	scc1	0	0	0	0	0	Level2 down	0
2:	scc2	0	0	0	0	0	Level 2 down	0

Note: The display should show that X.25 is configured on scc0 and it is in an initialized state.

— If the state is not initialized, type **0** ↵ to view the X.25 parameters. Check that the values which were specified for the OPC match the values displayed on the screen. If the values differ, re-execute the **/etc/x25init** command. (The default packet sizes are significant only during call setup negotiation. In the absence of packet size facility, the default packet size is 128.)

— Check that the X.25 protocol to be used is the 1984 (not 1980) version (DCE 84/DTE 84) for both the OPC, the data line, and the OS.

— If the X.25 parameters are correct, type **q** ↵ to return to the main menu and type **l** ↵ (small L) to display the LAPB frame exchange statistics. If an X.25 call cannot be established, then the problem lies outside the scope of the OPC. If LAPB is not initialized, the problem may lie in the cable pinout (DTE-DTE instead of DTE-DCE), the DCE modem, or the clocking signal.

If a problem still persists after the above has been checked, a protocol analyzer should be connected between the OPC and the DCE device to monitor the packet exchanges. The user must then check:

- that the X.25 connection is a SVC and not a PVC
- if any call request packets are received by the OPC
- that the protocol ID (PID) in the call request packet matches the OPC
- that the calling and caller X.121 addresses are specified in the call request packet
- that the X.29/X.3 PAD facility bit is not set in the call request packet (the OPC does not support X.29/X.3 PAD)
- if SABM or UA packets, or both, are continuously received/transmitted. If so, there is a problem at the LAPB layer 2 level.
- if the OPC issues a call acceptance packet and then a clear request packet. If so, the user X.121 address is not defined in the OPC, or there is a problem with the facilities requested.

If a problem still exists, please contact Nortel Networks support.

TL1 Ethernet interface

Every OPC module contains an Ethernet 802.3 LAN port on the faceplate of the OPC. The Ethernet port on the OPC provides an interface for a third-party X11 terminal or workstation, providing an enhanced graphics interface to the OPC. The connector is a shielded RJ-45 connector. The data rate supported is 10 Mbit/s, with a distance limitation of 100 m (330 ft.).

Ethernet requirements

The following requirements must be met in order for TL1 communications to occur over an Ethernet interface:

- You must have the enhanced administration software package for the OPC which supports the Ethernet port and the X11 terminals. This software is included in an optional software feature package provided to support the OPC.

  Note: For information on ordering this software feature, see *Engineering and Ordering Information*, 323-3001-032, in *Engineering, Configuration and Ordering Guide,* Volume 1.

- You must have an Ethernet LAN TCP/IP interface which supports Telnet.
- OPC support of X terminals is limited to NCD19 and NCD19R. Both terminal types must have Xserver PROM.

Accessing TL1 by Ethernet

For information and procedures about how to set up and access TL1 interfaces over an Ethernet network, see *System Administration Procedures*, 323-3001-302, in *Operations, Administration, & Provisioning*, Volume 4A.

TL1 verification

Once the TL1/Ethernet communication requirements have been met, and TL1 communication has been established, you must verify that the TL1 interface is working correctly by issuing a RTRV-HDR command. You can issue this command from any Operations System (OS) interface.

Note: The backup interface will not report any TL1 messages while the backup OPC is inactive. A non-autonomous message must be issued to the OPC in order to check that the TL1 connection is established. If an “NA” acknowledgment response (as explained in the Introduction) is received by the OS, then the backup TL1 interface is operational upon activation of the backup OPC. If no response is received, then the TL1 checklist should be verified to pinpoint the trouble area.

Default configuration

The TL1 interface will automatically report messages once the Ethernet connection has been established. The entire TL1 message set is available to the OS. Performance monitoring reports are enabled by default, but they can be disabled if desired.

Surveillance interface

This chapter explains alarm surveillance and performance monitoring (PM) through the TL1 interface. It defines TL1 messages and parameters. It also defines the association between AccessNode network element alarms and performance monitoring measurements and their equivalent TL1 messages.

> ***Note:*** *Alarms and Surveillance Description*, 323-3001-104, in *Description*, Volume 2A, describes how alarms are related to each other and the order in which alarms of higher severity mask (do not raise) alarms of lower severity. For example, equipment alarm points mask all facility alarm points.

Chapter contents

This chapter contains the following topics:

Surveillance preview

This section provides details on the message types available through the TL1 surveillance interface, as well as other useful information.

Message types

There are two types of TL1 alarm and PM messages, autonomous and non-autonomous.

Autonomous messages

Autonomous messages are generated by the OPC as a result of activity on the NEs (such as alarms, protection switch activity, threshold alert, warnings) and are reported to the OS automatically. No request is required from the OS to receive an autonomous message. As a result, autonomous messages have a unidirectional data flow to the OS from the OPC. The autonomous surveillance message types are as follows:

- report alarm
- report alarm environment
- report event
- report performance monitoring
- report condition
- report switch

Non-autonomous messages

Non-autonomous messages consist of a request message from the OS and a response message from the OPC and therefore have a bidirectional flow between the OS and the OPC. For example, the OS message can be a user request for any outstanding minor alarms for a specified NE, and the OPC will output the appropriate response message. The non-autonomous surveillance message types are as follows:

- retrieve alarm
- retrieve alarm environment
- retrieve performance monitoring
- retrieve header
- switch to protection
- switch to working
- allow performance monitoring
- inhibit performance monitoring
- operate synchronization switch
- release synchronization switch
- operate external control

- release external control
- edit date
- retrieve condition
- retrieve PM threshold values
- set PM threshold values
- initialize PM registers
- retrieve PM mode
- set PM mode
- exercise protection switching a remote element remotely
- operate loopback
- release loopback
- remove facility from service
- restore facility to service
- set source identifier

ALLOW/INHIBIT PM REPORTS messages

The Report Performance Monitoring reports can be enabled or disabled using the ALW PMREPT and INH PMREPT messages. The autonomous PM REPT messages can be selectively controlled on a per NE and per facility type basis. The status of the PM reports (allowed or inhibited) is unique for each TL1/X.25 connection to the OPC. The PM reporting status is stored in the OPC database, and it is restored when a connection is reestablished or the OPC database is restored from tape. The default status is to allow all performance monitoring reports.

You can use the **npcstate** command to query, enable, or disable PM collection for a particular NE. You can also use this command to clear PM collection data from the OPC.

The syntax of the command is as follows:

```
npcstate
```

option: -q=query, e=enable, -d=disable, -r<neid>, [<neid><neid>...]=remove data

where

`-q`	shows the present status of the PM collection activity
`-e`	enables PM collection
`-d`	disables PM collection
`-r`	clears PM collection data from the OPC

The command is executed from the UNIX shell prompt and it takes effect within fifteen minutes.

The **npcstate** command does not affect the TL1 PM reporting. If the PM collection to the OPC is disabled, PM REPT messages are still sent through the TL1 interface, but no PM statistics are present. To disable TL1 PM reports, the Inhibit Performance Monitoring Report message must still be used. The threshold alerts are always reported even if the OPC PM collection is disabled.

Retrieving PM Registers

This message allows you to retrieve performance monitoring registers.

PM data is accumulated for three time periods: 15 minutes, 1 day, and an untimed period. For the 15 minute period there is a current accumulation bin and 32 historical accumulation bins. For the 1 day time period, there is a current accumulation bin and one historical accumulation bin. There is only one untimed accumulation bin.

The input syntax of this message is as follows:

```
RTRV-PM-<sccm>:[<tid>]:[<aid>]:<ctag>::[<montype>],
[<monlev>],[<locn>],[<dirn>],[<tmper>],[<mondat>],[<montm>],
[<index>]
```

The TL1 response (COMPLD or DENY) to a Retrieve PM message depending on the state in which the OPC PM collection is shown in Table 3-1. ENRI is an error code as defined under the ERRCDE type in the TL1 parameter reference.

Table 3-1
RTRV-PM response versus OPC npcstate

TL1 Command	MONTYPE	All OPC PM disabled	All OPC PM enabled
rtrv-pm-ALL	null	DENY (ENRI)	COMPLD
	PSC or PSD	DENY (ENRI)	COMPLD
	all other MONTYPES	DENY (ENRI)	COMPLD
rtrv-pm-T3	null	DENY (ENRI)	COMPLD
	PSC or PSD	DENY (ENRI)	COMPLD
	all other MONTYPES	DENY (ENRI)	COMPLD
rtrv-pm-OC3/OC12	null	DENY (ENRI)	COMPLD
	PSC or PSD	DENY (ENRI)	COMPLD
	all other MONTYPES	DENY (ENRI)	COMPLD

Backup TL1 connection

The surveillance interface supports a backup TL1 connection that can be used to provide a warm standby link to the active connection. The backup link originates from port 1 on the backup OPC and remains inactive until the backup OPC becomes active, such as in a fiber cut scenario. No TL1 messages are issued from an inactive link, and any TL1 requests sent to the backup TL1 connection (while it is inactive) will be denied.

When the backup OPC becomes active, the backup TL1 connection becomes active and a Report Switch (REPT-SW) autonomous message is sent to the OS indicating that the backup link is now active. If, however, the X.25 connection to the backup OPC is not established before the backup OPC becomes active, the REPT-SW message will not be issued.

Engineering notes

The following may affect TL1 surveillance on AccessNode.

- Certain alarms are raised temporarily while circuit packs are initializing after rare double failures. For TL1 surveillance users, the alarm integration window for AccessNode should be set to one minute to prevent spurious trouble tickets.
- The OPC, which provides the OS interfaces, receives alarm indications from the main duplex processors. Any alarms which occur during a loss of association between the OPC and the processors will not be picked up by the OPC and therefore will not be reported immediately in TL1. These alarms however, will be included later in the Report Condition message which is sent automatically every fifteen minutes.

  There are two causes for a loss of association: processor failure and a fiber cut. When one processor fails there is an initialization period of less than one second before the backup processor creates its association with the OPC. Alarms reported by the backup processor during this time, including the alarm for the primary processor failure, are not reported when they occur, but appear in the next Report Condition message.

  If both duplex processors in an NE fail, that NE can no longer report alarms to the OPC for inclusion in TL1 messages. If the processors fail on the RFT, TL1 will report a SONET DCC Link Fail alarm indicating that the RFT has lost operations communications with the FCOT and OPC.

  When a fiber cut occurs, the RFT is invisible to the OPC and OSs. Alarm reporting by the RFT resumes when the fiber is restored.

- When a loss of association between the OPC and a network element occurs, the AccessNode does not respond to non-autonomous commands addressed to that network element.
- In the unlikely event that both duplex power units on a copper-distribution shelf (CDS) fail, alarms will be raised against the four NLICs of that CDS shelf. Surveillance users can set NMA OS patterning parameters to map the four NLIC alarms into a CDSP double failure trouble ticket.

Autonomous surveillance messages

This section describes the autonomous alarm and PM messages for the TL1 interface. Autonomous messages include:

Note: Refer “Retrieve PM Threshold Values” on page 3-52 for details about the parameters used in each message.

Report Alarm

The Report Alarm message is an autonomous message used to report non-environmental alarms with severities of critical, major, minor, and clear. Each alarm is reported in a separate Report Alarm message. All other alarms (such as warnings), event logs, and PM threshold crossings are reported using Report Event messages.

The syntax of Report Alarm message is as follows:

```
crlf
lf
^^^<sid>^<date>^<time> crlf
<almcde>^<atag>^REPT^ALM^<sccm> crlf
^^^”[<aid>]:<ntfcncde>,<condtype>,<srveff>,<ocrdat>,<ocrtm>,
    [<locn>],<dirn>:<conddescr>” crlf
;
```

Message parameters	**Description**
<sid>	source identifier
<date>	TL1 message origination date
<time>	TL1 message origination time
<almcde>	alarm code
<atag>	automatic message tag
<sccm>	second command code modifier
<aid>	access identifier
<ntfcncde>	notification code
<condtype>	type of alarm indication
<srveff>	effect on service
<ocrdat>	date of event occurrence
<ocrtm>	time of event occurrence
<locn>	alarm location
<dirn>	alarm direction
<conddescr>	text description

An example of the Report Alarm message is as follows:

```
þFCOT1 92-09-24 11:40:08
*37180 REPT ALM EQPT
þ"1-CE1-3G1-S3:MN,IMPROPRMVL,NSA,09-24,11-40-08,,NA:
                                  \”Circuit_pack_missing.\”
 ;
```

Report Alarm Environment

The Report Alarm Environment message is an autonomous message used to report environmental alarms. Environmental alarms include scan points, shelf temperature, 48V battery supply, and fan alarms. Each alarm is reported in a separate Report Alarm Environment message.

The syntax of Report Alarm Environment message is as follows:

```
crlf
lf
^^^<sid>^<date>^<time> crlf
<almcde>^<atag>^REPT^ALM^ENV crlf
^^^"<aid>:<ntfcncde>,<almtype>,<ocrdat>,<ocrtm>,<almmsg>"crlf
;
```

Message parameters	Description
`<sid>`	source identifier
`<date>`	TL1 message origination date
`<time>`	TL1 message origination time
`<almcde>`	alarm code
`<atag>`	automatic message tag
`<aid>`	access identifier
`<ntfcncde>`	notification code
`<almtype>`	type of alarm indication
`<ocrdat>`	date of event occurrence
`<ocrtm>`	time of event occurrence
`<almmsg>`	text description

An example of a Report Alarm Environment message is as follows:

```
þþþFCOT1 92-09-24 11:41:08
 *þ37182 REPT ALM ENV
þþþ"1-CE1:CR,HITEMP,09-24,11-41-08,\"high_shelf_temperature.\"
  ;
```

Report Event

The Report Event message is an autonomous message used to report event logs, alarms of severity warning or indeterminate, and PM threshold alerts. Each event is reported in a separate Report Event message. There are two formats for this message, one for alarms/alerts, and the other for event logs.

The syntax of the Report Event message for alarms/alerts is as follows:

```
crlf
lf
^^^<sid>^<date>^<time> crlf
A^^<atag>^REPT^EVT^<sccm> crlf
^^^”[<aid>]:<condtype>,<conddeff>,<ocrdat>,<ocrtm>,[<locn>],
    <dirn>,[<monval>],[<thlev>][,<tmper>]:<conddescr>”crlf
;
```

The syntax of the Report Event log message is as follows:

```
crlf
lf
^^^<sid>^<date>^<time> crlf
A^^<atag>^REPT^EVT^COM crlf
^^^”:MISC,,<ocrdat>,<ocrtm>:<conddescr>”crlf
;
```

Message parameters	Description
<sid>	source identifier
<date>	TL1 message origination date
<time>	TL1 message origination time
<atag>	automatic message tag
<sccm>	second command code modifier
<aid>	access identifier
<condtype>	type of alarm indication
<conddeff>	effect on condition
<ocrdat>	date of event occurrence
<ocrtm>	time of event occurrence
<locn>	alarm location
<dirn>	alarm direction
<monval>	value of PM parameter
<thlev>	PM threshold value
<tmper>	PM accumulation time period
<conddescr>	text description

An example of a Report Event message for alarms/alerts (warning/indeterminate) is as follows:

```
þþþFCOT1 92-09-24 11:40:08
 Aþ37184 REPT EVT EQPT
þþþ”1-CE1-3G1-S3:WKSWPR,SC,09-24,11-40-08,,NA:
                                \”Protection_switch_complete.\
   ;
```

An example of a Report Event Log message is as follows:

```
þþþFCOT1 93-05-18 15:22:14
 A 54841 REPT EVT COM
   “:MISC,,05-18,15-22-14:
              \”STBY507 OPC to OPC link established.\””
   ;
```

Report Performance Monitoring

The Report Performance Monitoring message is an autonomous message used to report PM counts every fifteen minutes on the hour. Only the non-zero PM counts are reported and a REPT PM message is sent per NE.

For further information on this message type, see the introductory sections of this chapter.

The syntax of the Report Performance Monitoring message is as follows:

```
crlf
lf
^^^<sid>^<date>^<time> crlf
A^^<atag>^REPT^PM^<sccm> crlf
[^^^”<aid>:<montype>,<monval>,<vldty>,<locn>,<dirn>,<tmper>,
    <mondat>,<montm>”crlf]...
^^^”<aid>:<montype>,<monval>,<vldty>,<locn>,<dirn>,<tmper>,
    <mondat>,<montm>”crlf
;
```

Message parameters	Description
<sid>	source identifier
<date>	TL1 message origination date
<time>	TL1 message origination time
<atag>	automatic message tag
<sccm>	second command code modifier
<aid>	access identifier
<montype>	type of monitored parameter
<monval>	value of monitored parameter
<vldty>	validity indicator
<locn>	alarm location
<dirn>	alarm direction
<tmper>	accumulation time period
<mondat>	date of beginning of PM period
<montm>	time of beginning of PM period

An example of a Report Performance Monitoring message is as follows:

```
 FCOT1 93-04-14 11:40:08
A 37185 REPT PM T3
   “1-CE1-3G1-3:CVP,4469,COMPL,NEND,ZA,1-HR,05-18,13-00”
   “1-CE1-3G1-1:CVP,2262,COMPL,NEND,AZ,1-HR,05-18,13-00”
;
```

Report Condition

The Report Condition message is an autonomous message used to report standing alarms with a severity level of warning or higher. It is reported on a per NE basis every fifteen minutes (unless manually provisioned as warning).

Although the interval between REPT COND messages from a NE is guaranteed to be fifteen minutes, the actual time which the REPT COND message is issued depends both on the time the TL1 connection was established, and on the number of network elements in the system.

If the system contains N network elements, then the OS will not receive N REPT COND messages every fifteen minutes on the hour. Instead, the OS will receive N REPT COND messages spread out over the fifteen minutes with an interval of 15/N minutes.

> ***Note:*** The environmental alarms are not reported in this message.

The syntax of the Report Condition message is as follows:

```
crlf
lf
^^^<sid>^<date>^<time> crlf
A^^<atag>^REPT^COND^<sccm> crlf
^^^"[<aid>]:<ntfcncde>,<condtype>,<srveff>,<ocrdat>,<ocrtm>,
    [<locn>],<dirn>"crlf
;
```

Message parameters	Description
<sid>	source identifier
<date>	date of translation of the TL1 message
<time>	time of translation of the TL1 message
<atag>	automatic message tag
<sccm>	second command code modifier
<aid>	access identifier
<ntfcncde>	notification code
<condtype>	type of alarm indication
<srveff>	effect on service
<ocrdat>	date of event occurrence
<ocrtm>	time of event occurrence
<locn>	alarm location
<dirn>	alarm direction

An example of a Report Condition message is as follows:

```
 þþþFCOT1 92-09-24 11:40:08
 A 37188 REPT COND OC12
þþþ"1-CE1-G1:MN,LOS,NSA,09-24,09-35-31,NEND,ZA"
  ;
```

Report Switch

The Report Switch message is an autonomous message used to indicate that an OPC module has switched from an inactive state to an active state. This switch message will occur in situations such as fiber cuts and manual OPC switch over. The STBYID parameter of the Report Switch message will always have an NA value.

The syntax of the Report Switch message is as follows:

```
crlf
lf
^^^<sid>^<date>^<time> crlf
A^^<atag>^REPT^SW crlf
^^^”<actid>,[<stbyid>]”crlf
;
```

Message parameters	Description
<sid>	source identifier
<time>	time of translation of the TL1 message
<date>	date of translation of the TL1 message
<atag>	automatic message tag
<actid>	identifier of the active OPC module
<stbyid>	identifier of the backup OPC module. It is always NA.

An example of a Report Switch message is as follows:

```
þþþFCOT1 92-08-13 16:38:18
A 59899 REPT SW
þþþ”OPCM001P,NA”
   ;
```

Non-autonomous surveillance messages

This section describes the non-autonomous alarm and PM messages for the TL1 interface. Non-autonomous messages include the following:

Non-autonomous message	**Page**
Exercise Protection Switching on a Network Element Remotely	3-16
Operate Loopback	3-17
Remove Facility from Service	3-19
Restore Facility to Service	3-21
Set Source Identifier	3-23
Release Loopback	3-24
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Retrieve Alarm Environment	3-28
Retrieve Performance Monitoring	3-30
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Switch to Protection	3-34
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Allow Performance Monitoring Report	3-36
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Operate Synchronization Switch	3-41
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Retrieve Condition	3-49
Retrieve PM Threshold Values	3-52
Set PM Threshold Values	3-55
Initialize PM Registers	3-61
Retrieve PM Mode	3-63
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EX-SW-EQPT (exercise protection switching on a network element remotely)

The EX-SW-EQPT command allows the equipment of a network element to be exercised remotely. This command initiates, from the surveillance OS, the protection switch exerciser on a particular network element that is accessible over the network under an OPC span of control.

The response message resulting from the EX-SW-EQPT command does not report the result of the exercises; it reports success or failure in initiating the protection exerciser on the network element.

When the command is successful, individual equipment log reports are generated. When the command is unsuccessful, no alarm messages are generated.

> ***Note 1:*** The EX-SW-EQPT command operates on one network element at a time; it cannot be used to initiate the exercisers on different network elements at the same time.
>
> ***Note 2:*** Once the command is issued, the targeted exerciser will be run on all provisioned equipment of the network element under focus; individual equipment on that network element cannot be selected.
>
> ***Note 3:*** Equipment, only, is exercised with the EX-SW-EQPT command; the command cannot be used to exercise facilities.

The syntax of the EX-SW-EQPT input message is:

```
EX-SW-EQPT:<tid>::<ctag>::;crlf
```

The syntax of the EX-SW-EQPT normal response output message is:

```
crlf
lf
^^^<sid>^<date>^<time>crlf
M^^<ctag>^COMPLD crlf
;
```

The syntax of the EX-SW-EQPT error response output message is:

```
crlf
lf
^^^<sid>^<date>^<time>crlf
M^^<ctag>^DENY crlf
^^^<errcde>crlf
[^^^/*error_text*/crlf]*
;
```

The parameters listed in the following table have restricted values.

Parameter	Details
ctag	Only ctags of the normal or error response message match the ctag of the input message. The ctag from any autonomous alarm message is independent (for example, the ctag for a message that is generated if the sqlchETmode is unsuccessful).

Example

An example EX-SW-EQPT normal response output message is:

```
EX-SW-EQPT:NE1::102::;

   NE1 92-09-14 11:10:23
M  0102 COMPLD
;
```

An example EX-SW-EQPT error response output message is:

```
EX-SW-EQPT:NE1::102::;

   NE1 92-09-14 11:10:23
M  0102 DENY
   IIDT
   /*Input, Invalid DaTa parameter.*/
;
```

OPR-LPBK (operate loopback)

The OPR-LPBK command enables a surveillance operations system (OS) to instruct an NE to operate a loopback on a specified facility. The loopback can be performed at either the near end or far end. The specified facility must be in a state that allows a loopback to occur (out of service). If the facility is not out of service when the command to operate the loopback is sent, an error response is issued.

> ***Note:*** This command operates only on DS1 (T1), DS3 (T3), or electrical STS-1 (EC1) facilities.

The following is the syntax of the OPR-LPBK command:

```
OPR-LPBK-<sccm>:<tid>:<aid>:<ctag>::<locn>;crlf
```

The following is the syntax of a normal response to the OPR-LPBK command:

```
crlf
lf
^^^<sid>^<date>^<time>crlf
M^^<ctag>^COMPLDcrlf
;
```

The following is the syntax of an error response to the OPR-LPBK command:

```
crlf
lf
^^^<sid>^<date>^<time>crlf
M^^<ctag>^DENY crlf
^^^<errcde>crlf
[^^^/*error_text*/crlf]
;
```

Refer to the following table for a listing of all valid SCCMs and AIDs.

> ***Note:*** A location (LOCN) code of NEND indicates that a terminal loopback was executed, and a location code of FEND indicates that a facility loopback was executed.

Table 3-2
Valid SCCM and AID values for the OPR-LPBK command

SCCM	Description	AID range
EC1	STS-1 facility at an STS-1 interface	1-CE1-SG[1..4]-[1..3]
T1	DS1 facility	1-CE1-1G[1..12]-[1..14]
T3	DS3 facility	1-CE1-3G[1..4]-[1..3]

The following table lists specific parameter details.

Parameter	Description
AID	Identification of the equipment/facility
CTAG	Correlation identifier
LOCN	Location of the event
ERRCDE	Error code
TID	Target network element identifier
SCCM	Second command code modifier
DATE	Date of origination of the message
TIME	Time of the origination of the message

The following is an example of a normal response to the OPR-LPBK command:

```
opr-lpbk-t3:ne73:1-ce1-3g1-1:001::nend;

   NE73 95-06-30 08:26:18
M  001 COMPLD
;
```

The following is an example of an error response to the OPR-LPBK command:

```
opr-lpbk-t3:ne73:1-ce1-3g1-1:001::nend;

   NE73 95-06-30 08:28:55
M  001 DENY
   SROF
   /*Status,Requested Operation Failed.*/
;
```

RMV (remove facility from service)

The RMV command enables a surveillance operations system (OS) to instruct the target NE to remove the following facilities from service:

- DS1
- DS3
- electrical STS-1 (EC1)

No alarms are generated at the near end office as a result of the remove command. Once an entity is removed from service, service-affecting diagnostic routines or physical replacement of defective equipment can be initiated. See “RST (restore facility to service)” on page 3-21 for the surveillance OS command to place the facility back in service.

> ***Note 1:*** This command operates on only DS1, DS3 or electrical STS-1 facilities (EC1).
>
> ***Note 2:*** This command enables the OS to change a facility status only from being in service (IS) to out of service (OOS).

The following is the syntax of the RMV command:

```
RMV-<sccm>:<tid>:<aid>:<ctag>[::<mode>[,<state>]];crlf
```

The following is the syntax of a normal response to the RMV command:

```
crlf
lf
^^^<sid>^<date>^<time>crlf
M^^<ctag>^DENYcrlf
^^^<errcde>crlf
[^^^/*error_text*/crfl]f
;
```

The following is the syntax of an error response to the RMV command:

```
crlf
lf
^^^<sid>^<date>^<time>crlf
M^^<ctag>^DENYcrlf
^^^<errcde>crlf
[^^^/*error_text*/crlf]
;
```

Refer to the following table for a listing of all valid SCCMs and AIDs.

Parameter	**Details**
MODE	The valid switch mode value is NORM.
STATE	The valid service state value is OOS.
AID	Identification of the equipment/facility
CTAG	Correlation identifier
ERRCDE	Error code
TID	Target network element identifier
SCCM	Second command code identifier
DATE	Date of origination of the message
TIME	Time of origination of the message

Table 3-3
Valid SCCM and AID values for the RMV command

SCCM	**Description**	**AID range**
EC1	STS-1 facility at an STS-1 interface	1-CE1-SG[1..4]-[1..3]
T1	DS1 facility	1-CE1-1G[1..12]-[1..14]
T3	DS3 facility	1-CE1-3G[1..4]-[1..3]

Example

The following is an example of a normal response to the RMV command:

```
rmv-t1:NE_20_VER_RIN:1-ce1-1g2-3:razmi::norm,oos;
NE_20_VER_RIN 98-11-23 01:41:22
M  RAZMI COMPLD
;
```

The following is an example of an error response to the RMV command:

```
rmv-ec1:NE_20_VER_RIN:1-ce1-sg2-1:razmi::norm,oos;
NE_20_VER_RIN 98-11-23 01:51:52
M  RAZMI DENY
SROF
/*Status, Requested Operation Failed.*/
;
```

RST (restore facility to service)

The RST command enables a surveillance operations system (OS) to instruct the target NE to restore facilities to service. The facility is taken from a maintenance state (OOS) and placed in an in-service state (IS).

> ***Note 1:*** If there is an attempt to restore a facility that is already in service (IS), a completed (COMPLD) response is returned.
>
> ***Note 2:*** This command operates only on DS1, DS3, or electrical STS-1 facilities (EC1).

The following is the syntax of the RST command:

```
RST-<sccm>:<tid>:<aid>:<ctag>[::<mode>];crlf
```

The following is the syntax of a normal response to the RST command:

```
rst-t1:NE_20_VER_RIN:1-ce1-1g2-3:razmi::norm,oos;
NE_20_VER_RIN 98-11-23 01:41:22
M  RAZMI COMPLD
;
```

The following is an example of an error response to the RMV command:

```
rst-ec1:NE_20_VER_RIN:1-ce1-sg2-1:razmi::norm,oos;
NE_20_VER_RIN 98-11-23 01:51:52
M  RAZMI DENY
SROF
/*Status, Requested Operation Failed.*/
;
```

Refer to the following tables for specific information about the parameters in this command and for the valid SCCMs and AIDs.

Parameter	Details
MODE	The valid switch mode value is NORM.
AID	Identification of the equipment/facility
CTAG	Correlation identifier
ERRCDE	Error code
TID	Target network element identifier
SCCM	Second command code identifier
DATE	Date of origination of the message
TIME	Time of origination of the message

Table 3-4
Valid SCCM and AID values for the RST command

SCCM	Description	AID range
EC1	STS-1 facility at an STS-1 interface	1-CE1-SG[1..4]-[1..3]
T1	DS1 facility	1-CE1-1G[1..12]-[1..14]
T3	DS3 facility	1-CE1-3G[1..4]-[1..3]

Example
The following is an example of a normal response to the RST command:

```
rst-t3:ne73:1-ce1-1g2-3:001::norm,oos;

   NE73 95-06-30 11:22:28
M  001 COMPLD
;
```

The following is an example of an error response to the RST command:

```
rst-t3:ne73:1-ce1-sg2-1:001::norm,oos;

   NE73 95-06-30 11:23:15
M  001 DENY
   SROF
   /*Status, Requested Operation Failed.*/
;
```

SET-SID (set source identifier)

The SET-SID command sets the source identifier (which is also used as the target identifier [TID]) on an NE to the value provided in the input message. The changed name is not reflected on the NE user interface, but is reflected in the TL1 interface. If the source identifier specified in the command is greater than 20 characters or contains invalid characters, the request is denied and an error response is given.

> ***Note:*** The procedure to set a TL1 TID for the surveillance or provisioning interfaces from an operations system (OS) is described in Chapter 1 of this document.

The following is the syntax of the SET-SID command:

```
set-sid:<tid>::<ctag>::<sid>;crlf
```

The following is the syntax of a normal response to the SET-SID command:

```
crlf
lf
^^^<sid>^<date>^<time> crlf
M^^<ctag>^COMPLD crlf
;
```

The following is the syntax of an error response to the SET-SID command:

```
crlf
lf
^^^<sid>^<date>^<time> crlf
M^^<ctag>^DENY crlf
^^^<errcde> crlf
[^^^/* <optional free format text>*/ crlf]
;
```

The following table contains information about the parameters used in this command.

Parameter	Details
tid	the current target identifier of the network element
sid	the new target identifier of the network element

Examples

The following is an example of the SET-SID command:

```
set-sid:West_ChP::1234::Prague;
```

The following is an example of a normal response to the above variation of the SET-SID command:

```
   PRAGUE 92-09-24 11:40:23
M  1234 COMPLD
;
```

The following is an example of an error response to the above variation of the SET-SID command:

```
   WEST_CHP 92-09-24 11:40:23
M  1234 DENY
   IIDT
   /*Input, Invalid DaTa parameter.*/
;
```

RLS-LPBK (release loopback)

The RLS-LPBK command enables a surveillance operations system (OS) to instruct an NE to release a loopback on a specified facility. The loopback may have been established at the near end or the far end.

> ***Note:*** This command operates only on DS1(T1), DS3(T3) or electrical STS-1 (EC1) facilities.

The following is the syntax of the RLS-LPBK command:

```
RLS-LPBK-<sccm>:<tid>:<aid>:<ctag>;crlf
```

The following is the syntax of a normal response to the RLS-LPBK command:

```
crlf
lf
^^^<sid>^<date>^<time>crlf
M^^<ctag>^COMPLDcrlf
;
```

The following is the syntax of an error response to the RLS-LPBK command:

```
crlf
lf
^^^<sid>^<date>^<time>crlf
M^^<ctag>^DENYcrlf
^^^<errcde>crlf
[^^^/*error_text*/ crlf]*
;
```

The following table lists specific parameter details.

Parameter	Details
AID	Identification of the equipment/facility
CTAG	Correlation identifier
LOCN	Location of the event
ERRCDE	Error code

Table 3-5
Valid SCCM and AID values for the RLS-LPBK command

SCCM	Description	AID range
EC1	STS-1 facility at an STS-1 interface	1-CE1-SG[1..4]-[1..3]
T1	DS1 facility	1-CE1-1G[1..12]-[1..14]
T3	DS3 facility	1-CE1-3G[1..4]-[1..3]

Example
The following is an example of a normal response to the RLS-LPBK command:

```
RLS-LPBK-t3:NE1:1-ce1-3g1-1:102;
crlf
lf
^^^NE1 94-08-03 15:10:23 M^^102^COMPLD
;
```

The following is an example of an error response to the RLS-LPBK command:

```
rls-lpbk-t3:ne73:1-3g3-1:001-nend;

   NE73 95-06-30 08:29:43
M  001 DENY
   SROF
   /*Status,Requested Operation Failed.*/
;
```

Retrieve Alarm

The Retrieve Alarm message is a non-autonomous message used to manually retrieve active alarms with a higher severity than warning. The response message provides information similar to the Report Alarm message. All alarms autonomously reported by means of the Report Alarm message may also be retrieved using the Retrieve Alarm message.

The input syntax of the Retrieve Alarm message is as follows:

```
RTRV-ALM-<sccm>:<tid>:[<aid>]:<ctag>::[<ntfcncde>],
        [<condtype>],[<srveff>],[<locn>],[<dirn>];
```

Message parameters	**Description**
`<sccm>`	second command code modifier
`<tid>`	target identifier
`<aid>`	access identifier
`<ctag>`	correlation tag
`<ntfcncde>`	notification code
`<condtype>`	type of alarm indication
`<srveff>`	effect on service
`<locn>`	alarm location
`<dirn>`	alarm direction

The normal response syntax of the Retrieve Alarm message is as follows:

```
crlf
lf
^^^<sid>^<date>^<time> crlf
M^^<ctag>^COMPLD crlf
[^^^"[<aid>][,<aidtype>]:<ntfcncde>,<condtype>,<srveff>,
       <ocrdat>,<ocrtm>,[<aidtype>] <conddescr>"] crlf
^^^"[<aid>][,<aidtype>]:<ntfcncde>,<condtype>,<srveff>,
       <ocrdat>,<ocrtm>,[<locn>],[<dirn>] crlf
;
```

The error response syntax of the Retrieve Alarm message is as follows:

```
crlf
lf
^^^<sid>^<date>^<time> crlf
M^^<ctag>^DENY crlf
^^^<errcde> crlf”
[^^^ /*error text*/ crlf]
;
```

Message parameters	Description
<sid>	source identifier
<date>	TL1 message origination date
<time>	TL1 message origination time
<aid> <ctag> <ntfcncde> <condtype> <srveff> <locn> <dirn>	are previously defined
<aidtype>	type of access identifier
<ocrdat>	date of event occurance
<ocrtm>	date of event occurance
<conddescr>	text description
<errcde>	error code

An example of a Retrieve Alarm message is as follows:

```
    RTRV-ALM-EQPT:FCOT1:1-CE1-3G1-S3:0100::MN;
    FCOT1 92-09-24 11:40:23
M   0100 COMPLD
   “1-CE1-3G1-S3,EQPT:MN,IMPROPRMVL,NSA,09-24,
 ;                   11-40-07,,NA:\”Circuit_pack_missing.\”
```

An example of a Retrieve Alarm error message is as follows:

```
RTRV-ALM-oc196:FCOT2: : Steve3;

FCOT2 92-08-13 11:45:06
M2  Steve31 DENY
   3IICM
   3/* Input, Invalid Second Command Code Modifier.*/
;
```

Retrieve Alarm Environment

The Retrieve Alarm Environment message is a non-autonomous message used to manually retrieve active environmental alarms. Environmental alarms include scan points, shelf temperature, 48V battery supply, and fan alarms. The response message provides information similar to the Report Alarm Environment message.

The input syntax of a Retrieve Alarm Environment message is as follows:

```
RTRV-ALM-ENV:<tid>:[<aid>]:<ctag>::[<ntfcncde>],[<almtype>];
```

Message parameters	Description
`<tid>`	target identifier
`<aid>`	access identifier
`<ctag>`	correlation tag
`<ntfcncde>`	notification code
`<almtype>`	alarm type

The normal response syntax of a Retrieve Alarm Environment message is as follows:

```
crlf
lf
^^^<sid>^<date>^<time> crlf
M^^<ctag>^COMPLD crlf
[^^^"<aid>:<ntfcncde>,<almtype>,<ocrdat>,<ocrtm>,<almmsg>"
     crlf]
;
```

The error response syntax of the Retrieve Alarm Environment message is as follows:

```
crlf
lf
^^^<sid>^<date>^<time> crlf
M^^<ctag>^DENY crlf
^^^<errcde> crlf
[^^^ /*error text*/ crlf]
;
```

Message parameters	Description
`<sid>`	source identifier
`<date>`	TL1 message origination date
`<time>`	TL1 message origination time

`<aid>`
`<ctag>`
`<ntfcncde>`
`<almtype>`
	are previously defined

`<ocrdat>`	date of event occurrence
`<ocrtm>`	time of event occurrence
`<almmsg>`	text description
`<errcde>`	error code

An example of a Retrieve Alarm Environment message is as follows:

```
RTRV-ALM-ENV:FCOT1:1-F2:0149::MN,CLFAN;

     FCOT1 92-09-24 11:40:23
M    0149 COMPLD
     “1-F2:MN,CLFAN,09-24,11-43-48,\”Fan 2 fail.\””
    ;
```

An example of a Retrieve Alarm Environment error message is as follows:

```
RTRV-ALM-ENV:FCOT1:1-BA:123::MN,BATTERI;

FCOT1 92-08-13 13:48:31
M  123 DENY
   IIDT
  /*Input, Invalid Data parameter ALMTYPE.*/
;
```

Retrieve Performance Monitoring

The Retrieve Performance Monitoring message is a non-autonomous message used to manually retrieve non-zero PM counts from the OPC. The response message provides information similar to the Report Performance Monitoring message. All performance monitoring counts autonomously reported by the Report PM message may also be retrieved.

The OPC stores only the last 32 fifteen minute interval statistics and the last 7 daily statistics. However, if a RTRV PM message requests PM counts older than 32 fifteen minute intervals or 7 days, all the PM counts available for the full 28 hours or 7 days will be given in the response.

If the RTRV PM request does not specify a day or time period (MONDAT or MONTM), the TL1 response will be COMPLD without returning any PM counts. If the RTRV PM request specifies a time period (MONTM) less than present fifteen minutes -2 (that is, PM counts within the last two fifteen minute intervals), or a day period (MONDAT) of the present day, the TL1 response will also be COMPLD without returning any PM counts.

The input syntax for a Retrieve Performance Monitoring message is as follows:

```
RTRV-PM-<sccm>:<tid>:[<aid>]:<ctag>::[<montype>],[<monlev>],
       [<locn>],[<dirn>],[<tmper>],[<mondat>],[<montm>];
```

Message parameters	Description
`<sccm>`	second command code modifier
`<tid>`	target identifier
`<aid>`	access identifier
`<ctag>`	correlation tag
`<montype>`	type of monitored parameter
`<monlev>`	level of values requested
`<locn>`	alarm location
`<dirn>`	alarm direction
`<tmper>`	accumulation time period
`<mondat>`	date of beginning of PM period
`<montm>`	time of beginning of PM period

The normal response syntax for a Retrieve Performance Monitoring message is as follows:

```
crlf
lf
^^^<sid>^<date>^<time> crlf
M^^<ctag>^COMPLD crlf
[^^^"<aid>,<aidtype>:<montype>,<monlev>,<vldty>,<locn>,
     <dirn>,<tmper>,<mondat>,<montm>"] crlf
^^^"<aid>,<aidtype>:<montype>,<monlev>,<vldty>,<locn>,<dirn>
     <tmper>,<mondat>,<montm>" crlf
;
```

The error response syntax for a Retrieve Performance Monitoring message is as follows:

```
crlf
lf
^^^<sid>^<date>^<time> crlf
M^^<ctag>^DENY crlf
^^^<errcde> crlf
[^^^ /*error text*/ crlf]
;
```

Message parameters	**Description**
<sid>	SID (source identifier)
<date>	TL1 message origination date
<time>	TL1 message origination time
<ctag> <aid> <montype> <monlev> <locn> <dirn> <tmper> <mondat> <montm>	are previously defined
<aidtype>	AIDTYPE (type of access identifier)
<monval>	MONVAL (value of monitored parameter)
<vldty>	VLDTY (validity indicator)
<errcde>	ERRCDE (error code)

An example of a Retrieve Performance Monitoring message is as follows:

```
RTRV-PM-OC3:FCOT1:1-CE1-A:0123::LBCL,,NEND,,1-HR,04-14,09-00;
   FCOT1 93-04-14 11:49:53
M  0123 COMPLD
   "1-CE1-G1,OC3:LBCL,182,PRTL,NEND,AZ,1-HR,04-14,10-00"
```

An example of a Retrieve Performance Monitoring error message is as follows:

```
RTRV-PM-T1:FCOT1::Steve1::,,,,,,;";

   FCOT1 92-08-13 15:23:27
M  Steve1  DENY
   ENPM
   /*Equipage, Not equipped for performance monitoring.*/
;
```

Retrieve Header

The Retrieve Header message is a non-autonomous message used to verify the identifier (name) of the NE specified in the input message. If no identifier is specified, the identifier of the active OPC is returned.

The input message syntax of a Retrieve Header message is as follows:

```
RTRV-HDR:[<tid>]::<ctag>;
```

Message parameters	Description
<tid>	target identifier
<ctag>	correlation tag

The normal response syntax of a Retrieve Header message is as follows:

```
crlf
lf
^^^<sid>^<date>^<time> crlf
M^^<ctag>^COMPLD crlf
;
```

The error response syntax of a Retrieve Header message is as follows:

```
crlf
lf
^^^<sid>^<date>^<time> crlf
M^^<ctag>^DENY crlf
^^^<errcde> crlf
[^^^ /*error text*/ crlf]
;
```

Message parameters	Description
`<sid>`	source identifier
`<date>`	TL1 message origination date
`<time>`	TL1 message origination time
`<ctag>`	is previously defined
`<errcde>`	error code

An example of a Retrieve Header message is as follows:

```
RTRV-HDR:FCOT1::0100;
   FCOT1 92-09-24 11:40:23
M   0100 COMPLD
;
```

An example of a Retrieve Header message (without specified source identifier) is as follows:

```
RTRV-HDR:::0101;
    OPCM001P 92-09-24 11:40:23
M   0101 COMPLD
;
```

Since no NE source identifier is provided, the system returns the source identifier of the OPC

An example of a Retrieve Header error message is as follows:

```
RTRV-HDR:BADTID::Steve5;”;

BADTID 92-08-13 11:30:44
M  Steve5  DENY
   IITA
   /*Input, Invalid Target identifier.*/
;
```

Switch to Protection

The Switch to Protection message is a non-autonomous message used to perform a manual or forced protection switch on the OC-3, OC-12, DS1, DS3, ESI, and TXC equipment.

The input message syntax for a Switch to Protection message is as follows:

```
SW-TOPROTN-<sccm>:<tid>:<aid>:<ctag>::[<mode>],,<dirn>;
```

Message parameters	Description
<sccm>	second command code modifier
<tid>	target identifier
<aid>	access identifier
<ctag>	correlation tag
<mode>	switch mode
<dirn>	alarm direction

The normal response syntax for a Switch to Protection message is as follows:

```
crlf
lf
^^^<sid>^<date>^<time> crlf
M^^<ctag>^COMPLD crlf
;
```

The error response syntax for a Switch to Protection message is as follows:

```
crlf
lf
^^^<sid>^<date>^<time> crlf
M^^<ctag>^DENY crlf
^^^<errcde> crlf
[^^^ /*error text*/ crlf]
;
```

Message parameters	Description
<sid>	source identifier
<date>	TL1 message origination date
<time>	TL1 message origination time
<ctag>	is previously defined
<errcde>	error code

An example of a Switch to Protection message is as follows:

```
SW-TOPROTN-T3:FCOT1:1-CE1-3G2:0102::NORM,,BTH;

   FCOT1 92-09-24 11:40:23
M  0102 COMPLD
;
```

Switch to Working

For revertive protection equipment (DS1, DS3), this command initiates a switch from the protection circuit pack to the working circuit pack. For non-revertive protection equipment (OC-3, OC-12, ESI, TXC), this command releases a forced protection switch initiated by the SW-TOPROTN command in FRCD mode, but does not initiate any switching activity.

The input message syntax for a Switch to Working message is as follows:

```
SW-TOWKG-<sccm>:<tid>:<aid>:<ctag>::[<mode>],<dirn>;
```

Message parameters	Description
<sccm>	second command code modifier
<tid>	target identifier
<aid>	access identifier
<ctag>	correlation tag
<mode>	switch mode
<dirn>	alarm direction

The normal response syntax for a Switch to Working message is as follows:

```
crlf
lf
^^^<sid>^<date>^<time> crlf
M^^<ctag>^COMPLD crlf
;
```

The error response syntax for a Switch to Working message is as follows:

```
crlf
lf
^^^<sid>^<date>^<time> crlf
M^^<ctag>^DENY crlf
^^^<errcde> crlf
[^^^ /*error text*/ crlf]
;
```

An example of a Switch to Working message is as follows:

```
SW-TOWKG-T3:FCOT1:1-CE1-3G2:0102::NORM,BTH;

   FCOT1 92-09-14 11:10:23
M  0102 COMPLD
;
```

Message parameters	Description
`<sid>`	source identifier
`<date>`	TL1 message origination date
`<time>`	TL1 message origination time
`<ctag>`	is previously defined
`<errcde>`	error code

An example of a Switch to Working error message is as follows:

```
SW-TOWKG-OC3:FCOT1:1-CE1-A:Steve5::norm,neither;

   FCOT1 92-08-13 15:46:15
M  Steve5 DENY
   IIDT
   /*Input, Invalid DaTa parameter.*/
;
```

Allow Performance Monitoring Report

The Allow Performance Monitoring Report message is a non-autonomous message used to resume autonomous reporting of performance monitoring counts through the REPT PM message. The PM reporting can be selectively enabled per NE (using the TID parameter) and per facility type (OC-3, OC-12, or DS3). The default status is to allow all PM reporting using the REPT PM message.

For further information on this message type, see the introductory sections of this chapter.

The input syntax of an Allow Performance Monitoring Report message is as follows:

```
ALW-PMREPT-<sccm>:<tid>::<ctag>;
```

Message parameters	**Description**
<sccm>	second command code modifier
<tid>	target identifier
<ctag>	correlation tag

The normal response syntax of an Allow Performance Monitoring Report message is as follows:

```
crlf
lf
^^^<sid>^<date>^<time> crlf
M^^<ctag>^COMPLD crlf
;
```

The error response syntax of an Allow Performance Monitoring Report message is as follows:

```
crlf
lf
^^^<sid>^<date>^<time> crlf
M^^<ctag>^DENY crlf
^^^<errcde> crlf
[^^^ /*error text*/ crlf]
;
```

An example of an Allow Performance Monitoring report message is as follows:

```
ALW-PMREPT-T3:FCOT1::1102;

   FCOT1 92-09-23 15:10:23
M  1102 COMPLD
;
```

Message parameters	Description
<sid>	source identifier
<date>	TL1 message origination date
<time>	TL1 message origination time
<ctag>	is previously defined
<errcde>	error code

An example of an Allow Performance Monitoring error message is as follows:

```
ALW-PMREPT-T3:FCOT2::1235;

   FCOT2 92-08-13 15:46:15
M  1235 DENY
   SAAL
   /*Status, Already ALlowed.*/
;
```

Inhibit Performance Monitoring Report

The Inhibit Performance Monitoring Report message is a non-autonomous message used to disable autonomous reporting of performance monitoring counts through the REPT PM message. The PM reporting can be selectively disabled per NE (using the TID parameter) and per facility type (OC-3, OC-12, DS3). The default status is to allow all PM reporting using the REPT PM message.

For further information on this message type, see the introductory sections of this chapter.

The input syntax of an Inhibit Performance Monitoring Report message is as follows:

```
INH-PMREPT-<sccm>:<tid>::<ctag>;
```

Message parameters	**Description**
`<sccm>`	second command code modifier
`<tid>`	target identifier
`<ctag>`	correlation tag

The output syntax of an Input Performance Monitoring Report message is as follows:

```
crlf
lf
^^^<sid>^<date>^<time> crlf
M^^<ctag>^COMPLD crlf
;
```

The error syntax of an Input Performance Monitoring Report message is as follows:

```
crlf
lf
^^^<sid>^<date>^<time> crlf
M^^<ctag>^DENY crlf
^^^<errcde> crlf
[^^^ /*error text*/ crlf]
;
```

Message parameters	Description
`<sid>`	source identifier
`<date>`	TL1 message origination date
`<time>`	TL1 message origination time
`<ctag>`	is previously defined
`<errcde>`	error code

An example of an Inhibit Performance Monitoring Report message is as follows:

```
INH-PMREPT-ALL:FCOT1::102;

   FCOT1 92-08-23 15:10:23
M  102 COMPLD
;
```

An example of an Inhibit Performance Monitoring Report error message is as follows:

```
INH-PMREPT-ALL:FCOT1::123;

   FCOT1 92-08-13 15:46:15
M  123 DENY
   SAIN
   /*Status, Already INhibited.*/
;
```

Operate Synchronization Switch

This command instructs a SONET NE or DFA RFT to switch synchronization references. The switch mode used for Operate Synchronization Switch is forced by default.

> ***Note:*** This command cannot be applied to RFTs in single-ended or point-to-point systems.

The input syntax of an Operate Synchronization Switch message is as follows:

```
opr-syncnsw:<tid>::<ctag>::<ref>;crlf
```

Message parameters	**Description**
<tid>	target identifier
<ctag>	correlation tag
<ref>	synchronization reference: 1, 2, 3, and 4. The four integers correspond to BITSA, BITSB, G1, and G2. You can configure up to four references.

The normal response syntax of an Operate Synchronization Switch message is as follows:

```
crlf
lf
^^^<sid>^<date>^<time> crlf
M^^<ctag>^COMPLD crlf
;
```

The error response syntax of an Operate Synchronization Switch message is as follows:

```
crlf
lf
^^^<sid>^<date>^<time> crlf
M^^<ctag>^DENY crlf
^^^crlf
^^^<errcde> crlf
^^^/*error text*/ crlf
;
```

Message parameters	Description
`<sid>`	source identifier
`<date>`	TL1 message origination date
`<time>`	TL1 message origination time
`<ctag>`	is previously defined
`<errcde>`	error code

An example of an Operate Synchronization Switch message is as follows:

```
OPR-SYNCNSW:FCOT1::123::3;

   FCOT1 93-08-24 19:35:54
M   123 COMPLD
;
```

An example of an Operate Synchronization Switch error message is as follows:

```
OPR-SYNCNSW:FCOT1::1234:3;

   FCOT1 93-08-24 20:59:17
M   1234 DENY
ENSS   /*Equipage, Not Equipped with
                                Synchronization Switching*/
;
```

Release Synchronization Switch

This command instructs a SONET NE or DFA RFT to release (for example, switch back to the previous synchronization reference) a synchronization reference switch request that was initiated previously. This can be done if the previous synchronization reference is not in a failure state.

> ***Note:*** This command cannot be applied to RFTs in single-ended or point-to-point systems.

The input syntax of a Release Synchronization Switch message is as follows:

```
rls--syncnsw:<tid>::<ctag>::<ref>;crlf
```

Message parameters	Description
<tid>	target identifier
<ctag>	correlation tag
<ref>	synchronization reference: 1, 2, 3, and 4. The four integers correspond to BITSA, BITSB, G1, and G2. You can configure up to four references.

The normal response syntax of a Release Synchronization Switch message is as follows:

```
crlf
lf
^^^<sid>^<date>^<time> crlf
M^^<ctag>^COMPLD crlf
;
```

The error response syntax of a Release Synchronization Switch message is as follows:

```
crlf
lf
^^^<sid>^<date>^<time> crlf
M^^<ctag>^DENY crlf
^^^crlf
^^^<errcde> crlf
^^^ /*error text*/ crlf
;
```

Message parameters	Description
`<sid>`	source identifier
`<date>`	TL1 message origination date
`<time>`	TL1 message origination time
`<ctag>`	is previously defined
`<errcde>`	error code

An example of a Release Synchronization Switch message is as follows:

```
RLS-SYNCNSW:FCOT1::123::3;

   FCOT1 93-08-24 19:35:54
M   123 COMPLD
;
```

An example of a Release Synchronization Switch error message is as follows:

```
RLS-SYNCNSW:FCOT1::1234::3;

   FCOT1 93-08-24 20:59:17
M   1234 DENY
ENSS   /*Equipage, Not Equipped with
                                Synchronization Switching*/
;
```

Edit Date

This command changes the date and time on the OPC. It is intended to keep the Time of Day (TOD) clocks on the OPC and NE synchronized with the TOD clock of the Operations System (OS).

> **CAUTION**
> **Potential loss of service**
> Changing the OPC time could result in a loss of service for all network elements under its span of control. Use this command with caution and only when absolutely necessary.

Note 1: When this command is sent to an NE in an OPC's span of control, the TOD on the active OPC changes (the inactive OPC's time cannot be changed).

Note 2: The time cannot be changed by more than a half hour (in both directions) from the current date.

Note 3: Time change requests will not occur instantaneously. A gradual drift will occur until the requested time is reached.

The input syntax of an Edit Date message is as follows:

```
ED-DAT:<tid>::<ctag>::[<date>],[<time>];
```

Message parameters	Description
`<tid>`	target identifier
`<ctag>`	correlation tag
`<date>`	date to which the NE date is to be changed
`<time>`	time to which the NE time is to be changed

The normal response syntax of an Edit Date message is as follows:

```
crlf lf
^^^<sid>^<date>^<time> crlf
M^^<ctag>^COMPLD crlf
;
```

The error response syntax of an Edit Date message is as follows:

```
cr lf lf
^^^<sid>^<date>^<time> crlf
M^^<ctag>^DENY crlf
^^^<errcde> cr lf
[^^^"<error description>" crlf]*
[^^^/*error text*/ crlf]*
;
```

Message parameters	Description
`<sid>`	source identifier
`<date>`	TL1 message origination date
`<time>`	TL1 message origination time
`<ctag>`	is previously defined
`<errcde>`	error code

Operate External Control

This command instructs a network element to operate external control on the parallel telemetry ports, such as a relay activation. External control is applied continuously.

OC-12 AccessNode network elements have 18 external relay outputs, which are connected by a 44-pin D-type connector (J11 for ABM or J12 for TBM) on the left side of the shelf. By default, the external relay outputs communicate the state of internal AccessNode alarms to external equipment. (The default of the first external relay indicates an OC-12 signal failure.)

You can modify the functions of the external relays from the admin ip screen in the network element user interface. If you modify the relays to control external equipment, the relays act as switches, and the Operate External Control command turns the switches on. (You can also turn the switches on from the network element user interface.)

The Operate External Control command returns an Invalid State response under the following conditions:

- the external control is mapped to an internal alarm point. To avoid this problem, delete the mapping to an internal alarm point through the network element user interface.
- the external control is out of service. To avoid this problem, place the external control in service through the network element user interface.

  Note: Only continuous latching of the relay contacts is possible from the surveillance operations system.

The input syntax of an Operate External Control message is as follows:

```
OPR-EXT-CONT:<tid>:<aid>:<ctag>::,[<dur>];crlf
```

Message parameters	Description
`<tid>`	target identifier
`<aid>`	access identifier: 1–X<1..18>
`<ctag>`	correlation tag
`<dur>`	duration of external control: continuous (CONTS), which is the default, is the only valid value

The AID parameter determines the relay contact to operate. Because the AID parameter implies only one relay contact, the contact type parameter (CONTTYPE) is not required.

The DUR parameter specifies duration. If you leave the parameter blank, it defaults to continuous (CONTS).

The comma before the DUR parameter is a placeholder for the CONTTYPE parameter, which is not required in this command. You must include the comma.

The normal response syntax of an Operate External Control message is as follows:

```
crlf lf
^^^<sid>^<date>^<time> crlf
M^^<ctag>^COMPLD crlf
;
```

The error response syntax of an Operate External Control message is as follows:

```
cr lf lf
^^^<sid>^<date>^<time> crlf
M^^<ctag>^DENY crlf
^^^<errcde> cr lf
[^^^"<error description>" crlf]*
[^^^/*error text*/ crlf]*
;
```

Message parameters	Description
`<sid>`	source identifier
`<date>`	TL1 message origination date
`<time>`	TL1 message origination time
`<ctag>`	is previously defined
`<errcde>`	error code

Release External Control

This command instructs a network element to release external control on the parallel telemetry ports, such as a relay deactivation. It turns off relays that were turned on by the Operate External Control command. (You can also turn the switches off through the network element user interface.)

The input syntax of a Release External Control message is as follows:

```
RLS-EXT-CONT:<tid>:<aid>:<ctag>::,[<dur>];
```

Message parameters	Description
`<tid>`	target identifier
`<aid>`	access identifier: 1–X<1..18>
`<ctag>`	correlation tag
`<dur>`	duration of external control

The AID parameter determines the relay contact to operate. Because the AID parameter implies only one relay contact, the contact type parameter (CONTTYPE) is not required.

The DUR parameter specifies duration. If you leave the parameter blank, it defaults to continuous (CONTS).

The comma before the DUR parameter is a placeholder for the CONTTYPE parameter, which is not required in this command. You must include the comma.

The normal response syntax of a Release External Control message is as follows:

```
crlf lf
^^^<sid>^<date>^<time> crlf
M^^<ctag>^COMPLD crlf
;
```

The error response syntax of a Release External Control message is as follows:

```
cr lf lf
^^^<sid>^<date>^<time> crlf
M^^<ctag>^DENY crlf
^^^<errcde> cr lf
[^^^"<error description>" crlf]*
[^^^/*error text*/ crlf]*
;
```

Message parameters	Description
<sid>	source identifier
<date>	TL1 message origination date
<time>	TL1 message origination time
<ctag>	is previously defined
<errcde>	error code

Retrieve Condition

This command instructs an NE to return the current standing condition and/or state associated with one or more specified equipment units or facilities on the NE. Standing conditions are defined as alarms of any severity, or threshold crossing alerts that have been manually provisioned as warning alarms.

The input syntax of a Retrieve Condition message is as follows:

```
RTRV-COND-<sccm>:<tid>:[<aid>]:<ctag>::[<typereq>],[<locn>],
                                            [<dirn>],[<tmper>];
```

Message parameters	Description
<sccm>	second command code modifier
<tid>	target identifier
<aid>	access identifier (value ‘ALL’ or ‘COM’ is not supported)
<ctag>	correlation tag
<typereq>	type of condition retrieved
<locn>	location of the information desired
<dirn>	direction of the specified condition
<tmper>	accumulation time period

The normal response syntax of a Retrieve Condition message, if no conditions are reported, is as follows:

```
crlf lf
^^^<sid>^<date>^<time> crlf
M^^<ctag>^COMPLD crlf
;
```

The normal response syntax of a Retrieve Condition message, if at least one condition is to be reported, is as follows:

```
crlf lf
^^^<sid>^<date>^<time> crlf
M^^<ctag>^COMPLD crlf
[^^^"<aid>[,<aidtype>]:[<ntfcncode>],<typereq>,[<srveff>],
     [<ocrdat>],[<ocrtm>],[<locn>],[<dirn>],[<tmper>],
     [<conddescr>]" cr lf
;
```

The error response syntax of a Retrieve Condition message is as follows:

```
cr lf lf
^^^<sid>^<date>^<time> crlf
M^^<ctag>^DENY crlf
^^^<errcde> cr lf
[^^^"<error description>" crlf]*
[^^^/*error text*/ crlf]*
;
```

Message parameters	Description
`<sid>`	source identifier
`<date>`	TL1 message origination date
`<time>`	TL1 message origination time
`<ctag>`	is previously defined
`<aid>`	is previously defined
`<aidtype>`	access identifier type
`<ntfcncde>`	notification code
`<typereq>`	is previously defined
`<srveff>`	service effect
`<ocrdat>`	date of event occurrence
`<ocrtm>`	time of event occurrence
`<locn>,<dirn>,` `<tmper>`	are previously defined
`<conddescr>`	condition text description
`<errcde>`	error code

Retrieve PM Threshold Values

The RTRV-TH command allows a surveillance operations system to instruct the target network element to report the current threshold level of one or more monitored parameters.

> ***Note 1:*** The “Untimed” interval is not recognized by TL1 and cannot be retrieved using the RTRV-TH command.
>
> ***Note 2:*** If the receive (ZA) and transmit (AZ) facilities are provisioned on the network element, and if the TMPER values of the thresholds match the value specified in the command, the RTRV-TH command will retrieve both thresholds. If both facilities are provisioned and the TMPER matches for only one direction, only the matching threshold will be returned. If neither time period matches the TMPER requested in the command, the command fails and a DENY message is returned. If only one facility (receive or transmit) is provisioned on the network element, and the TMPER value of the threshold matches the value specified in the command, the threshold for the existing facility will be retrieved. If the actual TMPER doesn’t match the TMPER requested in the command, the command fails and a DENY message is returned.

The syntax of the RTRV-TH message is:

```
RTRV-TH-<sccm>:<tid>:<aid>:<ctag>::<montype>,[<locn>],
                                              [<tmper>];crlf
```

The syntax of the RTRV-TH normal response output message is:

```
crlf
lf
^^^<sid>^<date>^<time>crlf
M^^<ctag>^COMPLDcrlf
<response block>+
;
```

The response block has the following format. The normal response must contain at least one occurrence of such a block:

```
^^^“<aid>,<aidtype>:<montype>,<locn>,<dirn>,<thlev>,
                                        <tmper>”crlf
```

The syntax of the RTRV-TH error response output message is:

```
crlf
lf
^^^<sid>^<date>^<time>crlf
M^^<ctag>^DENY rlf
^^^<errcode>crlf
^^^"<error description"crlf
;
```

Message parameters	**Description**
aid	See Table 3-7 for values supported.
dirn	The direction parameter is sent only in the response and cannot be specified in the request. The thresholds for both directions, transmit and receive, are sent in the response if they are available. The receive and transmit directions are monitored only for DS3 path PM parameters.
locn	Only the NEND thresholds are retrieved. A null value defaults to NEND.
montype	The PM type is used to specify which threshold should be retrieved. This parameter must not be null. See Table 3-6 on page 3-54 for values supported.
sccm	See Table 3-6 and Table 3-7 on page 3-54 for values supported.
tmper	The time period parameter is either 1-DAY or 15-MIN. A null value specifies the default value of 15-MIN. Note that "untimed" interval that is available on the network element is not supported by this command. DS3 path PM parameters support both the receive (ZA) and transmit (AZ) directions. The RTRV-TH command does not provide the option to select the direction, and both are retrieved, provided that either direction has the same TMPER value (15-MIN or 1-DAY). If neither of the TMPER values matches the value specified in the command, the command fails and a DENY message is returned.

Table 3-6
SCCM and MONTYPE parameter values

Description	SCCM	MONTYPE(DIR=ZA)	MONTYPE(DIR=AZ)
DS1 line facility	T1	CVL,ESL,SESL	
DS1 path facility	T1	CVP,ESP,SESP,UASP,SASP	
DS3 line facility	T3	CVL, ESL, SESL	
DS3 path facility	T3	CVP, ESP, SESP, UASP, AISSP,SEFSP	CVP, ESP, SESP, UASP, AISSP,SEFSP
OC3 line facility	OC3	CVL, ESL, SESL, UASL, FCL	
OC3 span facility	OC3	CVS, ESS, SESS, SEFSS	
OC12 line facility	OC12	CVL, ESL, SESL, UASL, FCL	
OC12 span facility	OC12	CVS, ESS, SESS, SEFSS	
STS1 line facility	EC1	CVL, ESL, SESL, UASL, BCVL, BESL, BSESL, FCL	

Table 3-7
Valid SCCM and AID values for the RTRV-TH command

SCCM	Description	AID range
EC1	STS-1 facility at an STS-1 interface	1-CE1-SG[1..4]-[1..3]
T1	DS1 facility Virtual tributary 1.5 facility	1-CE1-1G[1..12]-[1..14] 1-CE1-V1G[1..12]-[1..14]
T3	DS3 facility	1-CE1-3G[1..4]-[1..3]
OC-3	OC-3 transport facility at an OC-3 terminal OC-3 transport facility at an OC-3 linear ADM	1-CE1-[A, B] 1-CE1-[A, B, AS, BS]
OC12	OC-12 transport facility at an OC-12 terminal OC-12 transport facility at an OC-12 linear ADM	1-CE1-[A, B] 1-CE1-[A, B, AS, BS]

Example

To retrieve the 15-minute line coding violation (CVL) of DS3 (T3) facility G4 port 3 (3G4-3), near end (NEND) in NE1, the command would be:

```
RTRV-TH-T3:NE1:1-CE1-3G4-3:steve1::CVL,NEND,15-MIN;
```

A normal response for this example would be:

```
NE1 93-08-13 10:20:35
M  steve1 COMPLD
   "1-CE1-3G4-3,T3:CVL,NEND,ZA,13000,15-MIN"
;
```

Since the direction (DIRN) is not specified in the command, for the DS3 path both the transmit and receive threshold values are retrieved with a single command. For example, to retrieve the daily path severe error seconds (SESP) thresholds of DS3 (T3) facility G4 port 2 (3G4-2), near end (NEND) in NE1, the command would be:

```
RTRV-TH-T3:NE1:1-CE1-3G4-2:steve1::SESP,NEND,1-DAY;
```

```
A normal response for this example would be:
```

```
NE1 93-08-13 10:20:35
M  STEVE1 COMPLD
   "1-CE1-3G4-2,T3:SESP,NEND,AZ,40,1-DAY"
   "1-CE1-3G4-2,T3:SESP,NEND,ZA,40,1-DAY"
;
```

If both time the transmit and receive thresholds are set to a time period other than the one specified in the command, an error response is returned. In this example, only if both thresholds were set to a time period other than 1-DAY, would the following error response be sent:

```
   NE1 93-08-13 15:23:27
M  STEVE1 DENY
   SROF
   /*Invalid TMPER set for 1-DAY threshold.*/
```

Set PM Threshold Values

The SET-TH command allows a surveillance operations system to instruct the target network element to change performance-monitoring (PM) parameter threshold levels on the target network element. If a threshold level is exceeded, an autonomous message is sent to the operations system. This command changes the threshold only at the network element: no threshold values are stored in the PM database on the OPC.

Note 1: Threshold-crossing alerts or alarms cannot be turned on or off using the SET-TH command.

Note 2: The manner in which threshold-crossings are reported (as alerts or alarms) cannot be changed using the SET-TH command.

Note 3: The “Untimed” interval is not recognized by TL1 and cannot be set using the SET-TH command.

The syntax of the SET-TH message is:

```
SET-TH-<sccm>:<tid>:<aid>:<ctag>::<montype>,<thlev>,
                              [<locn>],[<dirn>],[<tmper>];crlf
```

The syntax of the SET-TH normal response output message is:

```
crlf
lf
^^^<sid>^<date>^<time>crlf
M^^<ctag>^COMPLD crlf
;
```

The syntax of the SET-TH error response output message is:

```
crlf
lf
^^^<sid>^<date>^<time>crlf
M^^<ctag>^DENYcrlf
^^^<errcode>crlf
^^^”<error description”crlf
;
```

Parameter	Details
aid	See Table 3-9 on page 3-58 for values supported.
dirn	The direction can be AZ (transmit) or ZA (receive). The value of DIRN depends on MONTYPE as shown in Table 3-8 on page 3-58. A null value defaults to ZA (receive).
locn	Only the NEND (near end) PM counts are monitored. A null value defaults to NEND.
montype	The PM type is used to specify which threshold should be set (for example, CVL and SESS). MONTYPE must not be null. See Table 3-8 on page 3-58 for valid values.
sccm	The second command code modifier cannot be set to ALL and it must not be null. SeeTable 3-8 and Table 3-9 on page 3-58 for valid values.
thlev	The new threshold value (positive integer) for the target PM type (MONTYPE). See Table 3-8 on page 3-59 for threshold ranges and default values. THLEV must not be null.
TMPER	The time period is either 15-MIN or 1-DAY. A null value defaults to 15-MIN. The “untimed” interval is not supported by this command. If TMPER is specified as 15-MIN, the “timed” interval is set for threshold 1 on the network element, possibly changing the definition of the time period (day or untimed), which may have been set by some other means (for example, on the NE UI), to “timed”. If TMPER is specified as 1-DAY, the “day” interval is set for threshold 2 on the network element, possibly changing the definition of the time period (timed or untimed), which may have been set by some other means (for example, on the NE UI), to “day”.

Table 3-8
SCCM and MONTYPE parameter values

Description	SCCM	MONTYPE(DIR=ZA)	MONTYPE(DIR=AZ)
DS1 line facility	T1	CVL,ESL,SESL	
DS1 path facility	T1	CVP,ESP,SESP,UASP,SASP	
DS3 line facility	T3	CVL, ESL, SESL	
DS3 path facility	T3	CVP, ESP, SESP, UASP, AISSP,SEFSP	CVP, ESP, SESP, UASP, AISSP,SEFSP
OC3 line facility	OC3	CVL, ESL, SESL, UASL, FCL	
OC3 span facility	OC3	CVS, ESS, SESS, SEFSS	
OC12 line facility	OC12	CVL, ESL, SESL, UASL, FCL	
OC12 span facility	OC12	CVS, ESS, SESS, SEFSS	
STS1 line facility	EC1	CVL, ESL, SESL, UASL, BCVL, BESL, BSESL, FCL	

Table 3-9
Valid SCCM and AID values for the SET-TH command

SCCM	Description	AID range
EC1	STS-1 facility at an STS-1 interface	1-CE1-SG[1..4]-[1..3]
T1	DS1 facility Virtual tributary 1.5 facility	1-CE1-1G[1..12]-[1..14] 1-CE1-V1G[1..12]-[1..14]
T3	DS3 facility	1-CE1-3G[1..4]-[1..3]
OC-3	OC-3 transport facility at an OC-3 terminal OC-3 transport facility at an OC-3 linear ADM	1-CE1-[A, B] 1-CE1-[A, B, AS, BS]
OC12	OC-12 transport facility at an OC-12 terminal OC-12 transport facility at an OC-12 linear ADM	1-CE1-[A, B] 1-CE1-[A, B, AS, BS]

Example

To set the 15-minute line coding violation (CVL) of DS3 (T3) facility G4 port 2 (1-3G4-2), near end (NEND), receive direction (ZA) in NE1 to 13000, the command would be:

```
SET-TH-T3:NE1:1-CE1-3G4-2:Steve1::CVL,13000,NEND,ZA,15-MIN;
```

A normal response would be:

```
   NE1 93-08-13 15:23:27
M  STEVE1 COMPLD
;
```

An error response would be:

```
   NE1 93-08-13 15:23:27
M  STEVE1 DENY
   SROF
   /*Facility specified does not exist.*/
;
```

Table 3-10
Threshold range values

SCCM	**Threshold**	**Range value**	**Threshold**	**Default value**
Parameter	15-MIN	1-DAY	15-MIN	1-DAY
T1(DS1)				
LineCV (CVL)	1 to 1,388,700	1 to 133,315,200	13,340	133,400
LineES(ESL)	1 to 900	1 to 65,535	65	648
LineSES(SESL)	1 to 900	1 to 65,535	10	100
PathCV(CVP)	1 to 6,300	1 to 604,800	72	691
PathES(ESP)	1 to 900	1 to 65,535	65	648
PathSES(SESP)	1 to 900	1 to 65,535	10	100
PathSAS(SASP)	1 to 900	1 to 65,535	2	17
PathUAS(UASP)	1 to 900	1 to 65,535	10	10
T3 (DS3)				
LineCV (CVL)	1 to 38,700	1 to 3,705,200	387	3,865
LineES (ESL)	1 to 900	1 to 65,535	25	250
LineSES (SESL)	1 to 900	1 to 65,535	4	40
PathCV (CVP)	1 to 38,700	1 to 3,705,200	382	3,820
PathES (ESP)	1 to 900	1 to 65,535	25	250
PathSES (SESP)	1 to 900	1 to 65,535	4	40
PathUAS (UASP)	1 to 900	1 to 65,535	10	10
PathSEFS(SEFSP)	1 to 900	1 to 65,535	7	17

—continued—

Table 3-10 (continued)
Threshold range values

SCCM	Threshold	Range value	Threshold	Default value
PathAISS(AISSP)	1 to 900	1 to 65,535	7	17
EC1 (STS-1)				
LineBCV (BCVL)	1 to 45,000	1 to 4,320,000	387	3,865
LineBES (BESL)	1 to 900	1 to 65,535	25	250
LineBSES (BSESL)	1 to 900	1 to 65,535	4	40
LineCV (CVL)	1 to 2,249,100 1	1 to 215,913,600	328	3,820
LineES (ESL)	1 to 900	1 to 65,535	25	250
LineSES (SESL)	1 to 900	1 to 65,535	4	40
LineUAS (UASL)	1 to 900	1 to 65,535	10	10
OC3 (OC-3)				
SectionCV (CVS)	1 to 2,250,000	1 to 216,000,000	1,772	4,430
SectionES (ESS)	1 to 900	1 to 65,535	346	864
SectionSES (SESS)	1 to 900	1 to 65,535	2	4
SectionSEFS (SEFSS)	1 to 900	1 to 65,535	7	17
LineCV (CVL)	1 to 2,250,000	1 to 216,000,000	1,772	4,430
LineES (ESL)	1 to 900	1 to 65,535	346	864
LineSES (SESL)	1 to 900	1 to 65,535	2	4
LineUAS (UASL)	1 to 900	1 to 65,535	10	10
OC12 (OC-12)				
SectionCV (CVS)	1 to 2,250,000	1 to 216,000,000	1,772	4,430
SectionES (ESS)	1 to 900	1 to 65,535	346	864
SectionSES (SESS)	1 to 900	1 to 65,535	2	4
SectionSEFS (SEFSS)	1 to 900	1 to 65,535	7	17
LineCV (CVL)	1 to 2,250,000	1 to 216,000,000	1,772	4,430
LineES (ESL)	1 to 900	1 to 65,535	346	864
LineSES (SESL)	1 to 900	1 to 65,535	2	4
LineUAS (UASL)	1 to 900	1 to 65,535	10	10

—end—

Initialize PM Registers

The INIT-REG command allows a surveillance operations system to instruct the target network element to initialize all of the registers (also referred to as bins) containing current, history, or both current and history performance monitoring (PM) counts.

The syntax of the INIT-REG input message is:

```
INIT-REG-<sccm>:<tid>:<aid>:<ctag>::,,,,[<tmper>];crlf
```

The commas before the optional TMPER parameter must be included as this is a positional parameter block. The commas are placeholders for parameters that are not required in this command.

The syntax of the INIT-REG normal response output message is:

```
crlf
lf
^^^<sid>^<date>^<time>crlf
M^^<ctag>^COMPLD crlf
;
```

The syntax of the INIT-REG error response output message is:

```
crlf
lf
^^^<sid>^<date>^<time>crlf
M^^<ctag>^DENYcrlf
^^^<errcde>crlf
^^^/*<error description>*/crlf
;
```

Parameter	Details
tmper	tmper - The valid values of the time period register or bin to be reset are HIS (history), CNT (current), and BTH (both history and current). CNT resets the current 15-minute and current day bins on the network element to zero for all PM types for the specified AID. HIS resets all history 15-minute and day bins to zero. BTH resets all bins, current as well as history, to zero. A null value is taken to mean BTH.

Table 3-11
Valid SCCM and AID values for the INIT-REG command

SCCM	Description	AID range
EC1	STS-1 facility at an STS-1 interface	1-CE1-SG[1..4]-[1..3]
T1	DS1 facility Virtual tributary 1.5 facility	1-CE1-1G[1..12]-[1..14] 1-CE1-V1G[1..12]-[1..14]
T3	DS3 facility	1-CE1-3G[1..4]-[1..3]
OC-3	OC-3 transport facility at an OC-3 terminal OC-3 transport facility at an OC-3 linear ADM	1-CE1-[A, B] 1-CE1-[A, B, AS, BS]
OC12	OC-12 transport facility at an OC-12 terminal OC-12 transport facility at an OC-12 linear ADM	1-CE1-[A, B] 1-CE1-[A, B, AS, BS]

Example

To zero all 15-minute PM counts for OC3 (NE1) channel G2, the command would be:

```
init-reg-OC3:NE1:1-B:Steve1::,,,,BTH;
```

A normal response would be:

```
   NE1 93-08-13 15:23:27
M  STEVE1 COMPLD
;
```

An error response would be:

```
   NE1 93-08-13 15:23:27
M  STEVE1 DENY
   SROF
   /*Facility specified does not exist.*/
;
```

Retrieve PM Mode

The RTRV-PMMODE command is a non-autonomous command used to retrieve the state of PM collection on the OPC. The state of PM collection can be set on the OPC by using the SET-PMMODE (set performance monitoring mode) TL1 command or by using the PM Collection Filter tool available in the OPCUI tool set.

Since the state of PM collection is set for all network elements in the entire span of control, the TID and AID usually associated with TL1 commands have no meaning and must be null. If the SCCM is specified as EQPT, the protection switching parameters and/or physical PM parameters (laser bias current, optical power) may be affected for all OCn (n = 3, 12, 48, 192) facility types which support such parameters. To distinguish between the two cases, two modetypes, PROT and PHYS for the protection switching counts and physical PM counts, respectively, have been defined. These two modetypes have not been defined in Bellcore standards.

The syntax of the RTRV-PMMODE message is:

```
RTRV-PMMODE-<sccm>:::<ctag>::[<locn>],[<modetype>],
[<pmstate>];
```

The syntax of the RTRV-PMMODE normal response output message is:

```
crlf
lf
^^^<sid>^<date>^<time>crlf
M^^<ctag>^COMPLDcrlf
<response block>+
;
```

The response block has the following format. The normal response must contain at least one occurrence of such a block:

```
^^^“<aidtype>:<locn>,<modetype>,<pmstate>”crlf
;
```

The syntax of the RTRV-PMMODE error response output message is:

```
crlf
lf
^^^<sid>^<date>^<time>crlf
M^^<ctag>^DENYcrlf
^^^<errcode>crlf
^^^”<error description>”crlf
;
```

Parameter	Details
locn	The location is either NEND (near end), FEND (far end), or BTH (both near and far end). A null value defaults to all that apply.
modetype	The PM type should be turned ON or OFF.A null value defaults to ALL. The parameters supported are: ALL all parameters which apply for the SCCM specified P all path parameters L all line parameters S all section parameters PROT all protection switching parameters PHYS all physical PM parameters
pmstate	The PM collection state is either ON or OFF. A null value defaults to ON.
sccm	The sccm can be one of the following: T1,T3, OC3, OC12, EC1, EQPT, or ALL

Examples

An example of a normal response message to retrieve the status of PM collection for all facilities, locations, modetypes, and states would be:

```
rtrv-pmmode-all:::1234;

NE2 96-08-13 10:20:35

M 1234 COMPLD

“T3:NEND,L,ON”

“T3:NEND,P,OFF”

“EC1:NEND,L,ON”

“OC3:NEND,L,OFF”

“OC3:NEND,S,OFF”

“OC12:NEND,L,ON”

“OC12:NEND,S,OFF”

“EQPT:NEND,PHYS,ON”

“EQPT:NEND,PROT,OFF”
```

An example RTRV-PMMODE error output message is:

```
rtrv-pmmode-oc48:::1234::nend,l,junk;

NE2 96-08-13 10:20:35
M  1234 DENY
   IDNV
   /*Input, Data Not Valid PMSTATE*/
;
```

Set PM Mode

The SET-PMMODE command is a non-autonomous command used to set the state of PM collection on the OPC. The command allows TL1 to instruct the PM collector to turn PM collection ON or OFF for the entire span of control for certain facilities, locations, and layers. It serves the same purpose as the PM Collection Filter tool available in the User Session Manager.

Since the state of PM collection is set for all network elements in the entire span of control, the TID and AID usually associated with TL1 commands have no meaning and must be null or OPCTID. If the SCCM is specified as EQPT, the protection switching parameters and/or physical PM parameters (laser bias current, optical power) may be affected for all OCn (n = 3, 12, 48, 192) facility types which support such parameters. To distinguish between the two cases, two modetypes, PROT and PHYS for the protection switching counts and physical PM counts, respectively, have been defined. These two modetypes have not been defined in Bellcore standards.

The syntax of the SET-PMMODE message is:

```
SET-PMMODE-<sccm>:::<ctag>::[<locn>],[<modetype>],[<pmstate>];
```

The syntax of the SET-PMMODE normal response output message is:

```
crlf
lf
^^^<sid>^<date>^<time>crlf
M^^<ctag>^COMPLD crlf
;
```

The syntax of the SET-PMMODE error response output message is:

```
crlf
lf
^^^<sid>^<date>^<time>crlf
M^^<ctag>^DENYcrlf
^^^<errcode>crlf
^^^”<error description”crlf
;
```

Parameter	Details
locn	The location is either NEND (near end), FEND (far end), or BTH (both near and far end). A null value defaults to all that apply.
modetype	The PM type should be turned ON or OFF.A null value defaults to ALL. The parameters supported are: ALL all parameters which apply for the SCCM specified P all path parameters L all line parameters S all section parameters PROT all protection switching parameters PHYS all physical PM parameters
pmstate	The PM collection state is either ON or OFF. A null value defaults to ON.
sccm	The sccm can be one of the following: T1,T3, OC3, OC12, EC1, EQPT, or ALL

Examples

An example of a normal response message to turn PM collection on for a DS3 line, near end, would be:

```
set-pmmode-t3:::1234::nend,l,on;

NE2 96-08-13 10:20:35
M  1234 COMPLD
;
```

An example SET-PMMODE error output message is:

```
set-pmmode-t3:::1234::nend,l,on;

NE2 96-08-13 10:20:35
M  1234 DENY
   IIDT
   /*Input, Invalid DaTa parameter.*/
;
```

Surveillance message parameters

This section describes the message parameters used in TL1 alarm and PM commands and responses.

All TL1 alarm and PM message parameters are listed in the following table. A description of each parameter is given in the following pages.

TL1 Parameter	Description
ACTID	Identification of the active OPC
AID	Identification of the circuit pack or port
AIDTYPE	Type of access identifier
ALMCDE	Identification of the alarm severity
ALMMSG	Alarm message text
ALMTYPE	Identification of the environmental alarm
ATAG	Automatic transaction identifier
CONDDESCR	Condition text description
CONDEFF	Indication of the condition
CONDTYPE	Type of event
CTAG	Correlation identifier
Date	Date of origination of the message
DIRN	Direction of the event
DUR	Duration of external control
ERRCDE	Error code
LOCN	Location of the event
MODE	Switch mode
MONDAT	Month and day of the beginning of the PM period
MONLEV	Monitor level
MONTM	Time of origination of the message
MONTYPE/MONVAL	PM type and value of the monitored parameter
NTFCNCDE	Alarm notification code
OCRDAT	Date of the event occurrence
OCRTM	Time of the event occurrence
—continued—	

TL1 Parameter	Description
SCCM	Second command code modifier
SID	Source identifier
SRVEFF	Service effect
STBYID	Identification of the standby OPC
THLEV	Threshold level
TYPEREQ	Type of condition to be retrieved
TID	Target NE identifier
Time	Time of origination of the message
TMPER	PM accumulation time period
VLDTY	PM validity indicator
—end—	

ACTID

This parameter contains the name of the active OPC module.

Format

Up to 20 characters of ASCII text that follows the syntax restrictions of the AID parameter.

AID

This parameter identifies a particular instance of the specified administrative view, which is specified by the Second Command Code Modifier (SCCM). AID also identifies a circuit pack or port.

Table 3-12
SCCMs and associated AIDs parameters

SCCM	AID
ALL	null
COM	null
ENV	null <Eq_id> <Eq_id>-<fan_id> <Eq_id>-<Battery_id> <Eq_id>-<shelf>-<Scan_point_id>
EQPT	<Eq_id>-<shelf>-<CP_name>[-<Slot_id>[-<Slot_id>]]
OC3	<Eq_id>-<shelf>-<CP_name>
OC12	<Eq_id>-<shelf>-<CP_name>
STS1 electrical	<Eq_id>-<shelf>-<CP_name>-<Port_id>
T1	<Eq_id>-<shelf>-<CP_name>-<Port_id>
T3	<Eq_id>-<shelf>-<CP_name>-<Port_id>
VT1.5	<Eq_id>-<shelf>-<CP_name>-<Port_id>

The variables used in the previous AIDs are described in the following table:

Table 3-13
AID parameter descriptions

AID parameter	Description
<Battery_id>	BA for battery A or BB for battery B
<CP_name>	1G1 to 1G12 or 1P for a DS1 circuit pack 3G1 to 3G4 or 3P for a DS3 circuit pack G1 or G2 for an OC-3/OC-12 terminal circuit pack V1G1-1 to V1G12-14 for a VT1.5 facility carried by a DS1 circuit pack V1TIC -1 to V1TIC-56 for VT1.5 terminations on the TIC card S1TIC-1 to S1TIC-2 for STS-1 terminations on the TIC card S1G1 to S1G12 for an STS1 facility on a DS1 circuit pack S3G1 to S3G4 for an STS1 facility carried by a DS3 circuit pack PROCA and PROCB for a Processor card ESIG1 or ESIG2 for an ESI circuit pack MIC for a maintenance interface circuit pack OPC for an operations controller module TIC[A,B] for a transport interface card AIC[A,B] for an access interface card PGTC for a pair gain test controller TAC for a test access card TAP for a test access path card TXC[G1, G2] for a timing and cross connect card IRTU for an integrated remote test unit NLIC[A-D] for a narrowband line interface card CDSP[A,B] for a copper-distribution shelf power card MTAC[A,B] for a metallic test access card TRG[1,2] for a timing reference card PRI for a primary timing reference SEC for a secondary timing reference EOC[1,2] for an embedded OPNS channel CSC[1,2] for a common signaling channel SDCC[1,2] for a SONET data communications channel X[1-18] for signal distribution (SD) points 1-CDS[1-7]-[1-96] for line cards
<shelf>	CE1 or CDS[1-7]
<Eq_id>	is an integer digit from 1 to N (normally equals 1). N represents the variable nature of the upper limit of the parameter value.
<Fan_id>	is F1 to F3
<Port_id>	is 1 to 3 for DS3 equipment
<Scan_point_id	is S1 to S11
<Slot_id>	is S1 to S55
<Subslot_id>	is 1 to 14 for the DS1 equipment ports is 1 to 3 for the DS3 equipment ports

In the Retrieve Alarm Environment message, the AID parameter has no meaning or value whenever the ALMTYPE parameter is null. In such cases, the AID parameter will also be null. Refer to the ALMTYPE parameter description for further information. The value of the ALMTYPE parameter determines the format of the AID parameter for all messages related to environmental alarms.

In the Retrieve Alarm Environment message, the ENV value is used instead of the SCCM to indicate environmental alarms. The AID parameter may also take on a null value to indicate a request for all environmental alarms.

Whenever the SCCM or the ALMTYPE parameter has the value COM, the AID parameter has no meaning and takes on a null value. Whenever the SCCM has the value ALL in a TL1 message, the AID parameter has no meaning and takes on a null value.

AIDTYPE

The AIDTYPE parameter indicates the type of access identifier. It is only used in the response to Retrieve Alarm or Retrieve Performance Monitoring messages. AIDTYPE assumes the same value as the Second Command Code Modifier (SCCM) in the corresponding autonomous Report Alarm message or Report Performance Monitoring message.

Parameter value	Description
COM	Common
EQPT	Equipment unit
LINE	Subscriber line
OC3	OC-3 facility
OC12	OC-12 facility
STS1	Synchronous Transport Signal 1 facility
T1	DS1 facility
T3	DS3 facility
VT1	Virtual tributary 1.5

Note: Performance monitoring is only supported for OC3, OC12, T1, and T3 facilities, as well as the STS1 path facilities.

ALMCDE

This is the alarm severity code for the TL1 message.

Parameter value	Description
*C	Critical alarm
**	Major alarm
*◊	Minor alarm
A◊	Autonomous message

Note: If multiple alarms are reported, the ALMCDE parameter assumes the highest severity of the alarms reported. The ALMCDE parameter takes the value A◊only when the value of the NTFCNCDE is CL.

ALMMSG

This is the alarm text description for the TL1 message.

Format

Up to 40 characters of ASCII text enclosed within escaped quotes (\").

ALMTYPE

This is the type of alarm indication for the TL1 message.

Parameter value	Description
null	All environmental alarms
BATTERY	Battery failure
CLFAN	Cooling fan failure
HITEMP	Shelf over temperature
MISC	Miscellaneous environmental alarm

Note: The null value is meaningful only in the Retrieve Alarm Environment message. The value of ALMTYPE determines the format of the AID parameter for all messages related to environmental alarms. When the ALMTYPE parameter has a null value, the AID parameter has no meaning.

ATAG

The ATAG parameter is an integer number ranging from 1 to 999999 used in the TL1 autonomous messages to uniquely identify each of the TL1 messages which are generated. It is an automatic message counter which is incremented by one for each autonomous message. The ATAG value of the first TL1 autonomous message is a random number and it will wrap around from 999999 to 1.

The REPT COND TL1 message will increment the ATAG differently depending on the SCCM parameter. If the SCCM value is ALL, the ATAG parameter will increment by 10 for the REPT COND message. If there are no standing alarms to be reported, the ATAG parameter is incremented by one.

The REPT PM TL1 message will increment the ATAG parameter by one for each of the PM values reported.

Format

Integer number of up to six digits.

CONDDESCR

This is the condition text description for the TL1 message.

Format

Up to 64 characters of ASCII text enclosed within escaped quotes (\").

CONDEFF

The CONDEFF parameter indicates the effect of the event on the condition of the network element (NE).

Parameter value	Description
CL	Clear standing condition
SC	Standing condition
TC	Transient condition

CONDTYPE

This is the type of condition event.

Parameter value	Description
ACTLPBK	Active loopback in effect
AIS	Alarm indication signal detected
APSB	Protection switching byte failure
APSC	Protection switching channel failure
AUTOLOCKE	Equipment autolockout
AUTOLOCKR	Timing reference autolockout
BKUPMEMP	Primary non-volatile backup memory failure
BUERR	Bus error
CCBPV	Composite clock bipolar violation density error
CONTBUS	Control bus failure
CONTCOM	Control communications equipment failure
CONTEQPT	Control equipment failure
CONTR	Control processor failure
CONTRDUP	Duplex control processor failure
CNVT	Power converter failure
DATAFLT	Data integrity fault
EOC	Embedded Operations Channel failure
EXT	Failure detected external to the NE
FAILTOSW	Switch to protection failure
FERF	Line far end receive failure
FRCDSWTREF	Forced timing reference switch
FRCDWKSWPR	Forced switch to protection channel/equipment
FRNGSYNC	Free running synchronization mode
FRNGSYNCG	Free running synchronization mode - SONET clock
FRNGSYNCR	Free running synchronization mode - Timing gen
FRNGSYNCS	Free running synchronization mode - System clock

—continued—

Parameter value	Description
FSTSYNC	Fast start synchronization mode
HLDOVRSYNC	Holdover synchronization mode
INCFAD	Incoming failure due to fading
INHSWPR	Protection switch inhibited
INIT	Initialization executed
INT	Internal hardware fault or failure
INTMSGERR	Internal message error
INTSFT	Internal software fault
IMPROPRMVL	Improper removal
LOCKOUTOFPR	Lockout of protection requested
LOCKOUTOFWK	Lockout of working requested
LOF	Loss of frame
LOP	Loss of pointer
LOS	Loss of signal
LOTRI	Loss of timing reference input
MANWKSWPR	Manual switch to protection channel/equipment
MANSWTOPRI	Manual switch to primary synchronization reference
MANSWTOSEC	Manual switch to secondary sync reference
MANWSWTREF	Manual timing reference switch
MISC	Miscellaneous condition (used with logs)
MISC-1	Miscellaneous condition
MISC-2	Miscellaneous condition
NNTTST	NT1 returned to no test mode
ORDRWR	Orderwire channel failure
OC3TERM	OC-3 facility termination equipment failure
OC12TERM	OC-12 facility termination equipment failure
PAINTGRT	Path integrity failure
PRCDRERR	Procedure error

—continued—

Parameter value	Description
PRGFLT	Software fault or failure
RCVR	Receiver failure
SFI	Synchronization failure indication detected
STS1TERM	STS1 facility termination equipment failure
SWEQPT	Protection switching equipment failure
SWEX	Equipment/Facility switch exerciser failure
SYNC	Loss of timing on synchronization link
SYNCCLK	Synchronization unit failure
SYNCCLKA	Synchronization unit failure - Acquire mode
SYNCCLKF	Synchronization unit failure - Component
SYNCCLKL	Synchronization unit failure - Lock on
SYNCCLKV	Synchronization unit failure - Voltage Range
SYNCEQPT	Synchronization switching equipment failure
SYNCPRI	Synchronization to primary reference failure
SYNCSEC	Synchronization to secondary reference failure
T1TERM	DS1 facility termination equipment failure
T3TERM	DS3 facility termination equipment failure
T-AISS	Section AIS threshold exceeded
T-AISSP	DS3 Path Rx AISS threshold 1 exceeded
T-ALSP	VT path Rx ALS threshold 2 exceeded
T-BCVL	STS Line Rx BCV threshold 2 exceeded
T-BESL	STS Line Rx BES threshold 1 exceeded
T-BIPS	Section BIP threshold exceeded
T-BSESL	STS Line Rx BSES threshold 2 exceeded
T-CSSP	DS1 Path FE Rx CSS threshold 2 exceeded
T-CVL	Line code violation threshold exceeded
T-CVP	Path code violation threshold exceeded
T-CVS	Section code violation threshold exceeded

—continued—

Parameter value	Description
T-ESL	Line error seconds threshold exceeded
T-ESP	Path error seconds threshold exceeded
T-ESS	Section error seconds threshold exceeded
T-LBCL	Laser bias current level threshold exceeded
T-LPT	Laser power transmit threshold exceeded
T-OOF	Section severely error frame threshold exceeded
T-OPRS	OC12 Section Rx threshold exceeded
T-SASP	DS1 Path Tx SAS threshold 1 exceeded
T-SEFSP	DS3 Path Tx SEFS threshold 2 exceeded
T-SEFSS	OC12 Section Rx SEFS threshold 1 exceeded
T-SESS	Section severely error seconds threshold exceeded
T-SESP	Path severely error seconds threshold exceeded
T-SESL	Line severely error seconds threshold exceeded
T-UASL	STSn Line Rx UAS threshold 2 exceeded
T-UASP	Path UAS threshold exceeded
TEST_ALMCR	Test of critical alarm
TEST_ALMMJ	Test of major alarm
TEST_ALMMN	Test of minor alarm
TEST_ALMW	Test of warning alarm
TRMT	Transmitter failure
TSA	Test session active
TSTACC	Test access equipment failure
VT1TERM	VT1.5 facility termination equipment failure
WKSWPR	Working facility/equipment switch to protection
WKSWPRE	Equipment switch to protection
WKSWPRR	Timing reference switch to protection
YEL	Yellow signal received
—end—	

CTAG

The CTAG parameter is a numeric correlation identifier similar to the ATAG parameter. The TL1 software in the OPC keeps track of correlation identifiers for outstanding non-autonomous requests.

The CTAG is used to correlate non-autonomous command and response messages.

Format

Up to 6 ASCII characters.

Date

This is the date of origination of the TL1 message. The format is <yy>-<mm>-<dd>.

Parameter value	Description
<yy>	are the last two digits of the year [00 to 99]
<mm>	is the month [01 to 12]
<dd>	is the day of the month [01 to 31]

DIRN

This is the direction of the event.

Parameter value	Description
AZ	From A office to Z office (Transmit)
ZA	From Z office to A office (Receive)
BTH	Both directions (Transmit and Receive)
NA	Not applicable

DUR

DUR indicates the duration that the switch is operational.

Parameter value	Description
CONT	Continuous

ERRCDE

This is the associated error code of the message.

Parameter value	Description
ENPS	Equipage, not equipped with protection switching
ENPM	Equipage, not equipped for performance monitoring
ENRI	Equipage, not equipped for retrieving specified info
ENSS	Equipage, Not Equipped with Synchronization Switching
IBMS	Input, Block missing
IBNC	Input, Block not consistent
ICNV	Input, Command Not Valid
IDNV	Input, Data Not Valid
IDRG	Input, Invalid Data RanGe
IIAC	Input, invalid access identifier
IICM	Input, invalid command
IICT	Input, invalid correlation tag
IIDT	Input, invalid data parameter
IIFM	Input, invalid data format
IIPG	Input, Invalid Parameter Grouping
IISP	Input, invalid syntax or punctuation
IITA	Input, invalid target identifier
INUP	Input, non-null unimplemented parameter
IPNV	Input, Parameter not valid
RALB	Resource, all units busy
SARB	Status, All Resources Busy
SAAL	Status, already allowed
SAIN	Status, already inhibited
SNPR	Status, Not in Protection state
SNVS	Status, Not in Valid State
SROF	Status, requested operation failed
SSTP	Status, Stopped

LOCN

This is the location of the event.

Parameter value	Description
NEND	Near end
FEND	Far end

MODE

This is the switch mode of the event.

Parameter value	Description
NORM	Manual switch
FRCD	Forced switch

MONDAT

This is the date of the beginning of the PM period.

Format

<mm>-<dd>

Parameter value	Description
<mm>	is the month [01 to 12]
<dd>	is the day of the month [01 to 31]

MONLEV

This is the monitor level of the PM data to be reported.

Format

<lev>-<dir>

Parameter value	Description
<lev>	is a decimal number (level)
<dir>	has either the value UP indicating that monitored parameters with a value equal to or greater than the value of <lev> will be reported; or the value DN indicating that monitored parameters with a value lesser than the value of <lev> will be reported.

MONTM

This is the time of origination of the message.

Format

<hh>-<mm>

Parameter value	Description
<hh>	is the hour of the day [00 to 23]
<mm>	is the minute of the hour [00 to 59]

MONTYPE, MONVAL

This is the PM type and value of the monitored PM parameter.

MONTYPE	MONVAL	Description
AISS	integer-1	Alarm indication signal - seconds
BIPS	integer-1	Bit interleaved parity error count - Section
CVL	integer-1	Coding violation count - Line
CVP	integer-1	Coding violation count - Path
CVS	integer-1	Coding violation count - Section
ESL	integer-1	Error second count - Line
ESP	integer-1	Error second count - Path
ESS	integer-1	Error second count - Section
LBCL	decimal-2	Laser bias current level
LPR	decimal-2	laser power intensity received
LPT	decimal-2	laser power intensity transmitted
OOF	integer-1	Out of frame second count (SEFS)
PSC	integer-1	Protection switch count
PSD	integer-1	Protection switch duration - seconds
SESL	integer-1	Severely errored second count - Line
SESP	integer-1	Severely errored second count - Path
SESS	integer-1	Severely errored second count - Section
UASP	integer-1	Unavailable second count - Path
Note: Integer-1 is an integer number restricted to less than ten digits. Decimal-2 is a decimal number without any restrictions.		

NTFCNCDE

This is the notification code of the message.

Parameter value	Description
CR	Critical alarm
MJ	Major alarm
MN	Minor alarm
CL	Cleared alarm

Note: The CL value is not used in the Report Condition, Retrieve Alarm, and Retrieve Alarm Environment messages.

OCRDAT

This is the date the event occurred.

Format

<mm>-<dd>

Parameter value	Description
<mm>	is the month [01 to 12]
<dd>	is the day of the month [01 to 31]

OCRTM

This is the time the event occurred.

Format

<hh>-<mm>-<ss>

Parameter value	Description
<hh>	is the hour of the day [01 to 23]
<mm>	is the minute of the hour [00 to 59]
<ss>	are the seconds of the minute [00 to 59]

SCCM

The Second Command Code Modifier (SCCM) specifies the administrative view of a given TL1 message.

Parameter value	Description
ALL	All facilities
COM	Common
ENV	Environmental
EQPT	Equipment unit
OC3	OC-3 facility
OC12	OC-12 facility
EC1	STS1 electrical facility
STS1	STS1 SONET facility
T1	DS1 facility
T3	DS3 facility
VT1	Virtual tributary 1.5 facility

Note 1: The value ALL is meaningful only in the Retrieve Alarm message and the Retrieve Performance Monitoring messages.

Note 2: Performance monitoring is supported on OC-3, OC-12, DS0, DS1, STS1, and VT1.5 facilities. The value ALL is a short form to indicate all SCCM values applicable and supported by the performance monitoring applications in the particular NE configuration.

Note 3: In order to accommodate Bellcore NMA TL1 interface releases 2.4 and 3.3, the SONET-specific rates are mapped into asynchronous equivalent rates.

SID (Source identifier)

The source identifier (SID) contains the name which identifies the source of the data in the TL1 message. The format is identical to the target identifier (TID) parameter.

The source identifier typically contains the NE name that was provisioned on the shelf that originated the TL1 message. An exception to this rule is a response to a Retrieve Header command without a TID; in this case the source identifier contains the name of the responding OPC.

Format

Up to 20 ASCII characters.

SRVEFF

The SRVEFF parameter indicates the effect on service. The possible values are:

- SA (service-affecting)
- NSA (non service-affecting)

STBYID

This parameter contains the name of the standby OPC (always NA).

Format

Up to 20 ASCII characters that meets the syntax of the AID parameter.

THLEV

This parameter has the same syntax as the MONVAL parameter.

TID

The target identifier (TID) contains the name of the NE that is the target of the TL1 message. The NE name is set while commissioning a network element.

The TID can be a string of up to 13 ASCII characters including uppercase or lowercase letters, numerical digits, as well as certain special characters including the hyphen, underscore, period, and comma.

Spaces (blanks) should not be used. For example, `SHELF 1` is invalid, but `SHELF_1` is valid. If the network elements do not have a name assigned, no TL1 messages will be available from that NE.

Time

This is the time the TL1 message originated.

Format

<hh>:<mm>:<ss>

Parameter value	Description
<hh>	is the hour of the day [01 to 23]
<mm>	is the minute of the hour [00 to 59]
<ss>	are the seconds of the minute [00 to 59]

TMPER

This is the PM accumulation time period.

Parameter value	Description
1-DAY	1 day accumulation
1-HR	1 hour accumulation

TYPEREQ

This is the type of condition to be retrieved. This parameter uses the same values as the CONDTYPE parameter. See page 3-74.

VLDTY

This is the PM measurement validity indicator.

Parameter value	Description
COMPL	data accumulated over the entire period
NA	not available
PRTL	data accumulated over some portion of the time period

Supported surveillance AIDs

The following table lists the possible AIDs used in TL1 surveillance on AccessNode. For each equipment type, the associated AID is given, along with possible entities and their associated AIDs.

> ***Note:*** AID elements that include more than one entry appear in brackets. For example, an OC3/OC12 facility can have an AID of 1-CE1-G1 or 1-CE1-G2.

Table 3-14
Possible AIDs in TL1 Surveillance Commands

Equipment	Equipment AID	Entity	Entity AID
Bay	1	Battery	1-BA, 1-BB
		Fan	1-F1, 1-F2
		Scan point	1-S1, 1-S2
		CE shelf	1-CE1
CE shelf	1-CE1	OC3/OC12 facilities	1-CE1-[G1. .G2]
		OC3 trib facilities	1-CE1-03[G1S..G2S] 1-CE1-03[G3..G8]
		OC3 trib equipment	1-CE1-03[G1S-S5] 1-CE1-03[G2S-S7] 1-CE1-03[G3-S1] 1-CE1-03[G4-S3] 1-CE1-03[G5-S11] 1-CE1-03[G6-S13] 1-CE1-03[G7-S15] 1-CE1-03[G8-S17]
		DS1/VT mapper	1-CE1-1G[1..14]- S[1..8]
		DS3/STS mapper	1-CE1-3G[1..4]- S[1, 3, 5, 7]
		AIC	1-CE1-AIC[A,B]-S[13,16]
		CSC	1-CE1-CSC-[1..14]
		DS1 Input card	see “DS1/VT mapper” and “DS3/STS mapper” equipment, later in the table, for AIDs for each circuit pack group
		DS1 Output card	
		DS1B	
		DS3 I/O card	

—continued—

Table 3-14 (continued)
Possible AIDs in TL1 Surveillance Commands

Equipment	Equipment AID	Entity	Entity AID
CE shelf continued		EOC	1-CE1-EOC-[1..14]
		ESI	1-CE1-ESIG[1..4]
		IRTU	1-CE1-IRTU-S21
	1-CE1	MIC	1-CE1-MIC-S19
		OPC	1-CE1-OPC
		PROC	1-CE1-PROC[A, B] -S[17,18]
		SDCC	1-CE1-SDCC-[1..14]
		TIC	1-CE1-TIC[A,B]-S[11,14]
		TAC	1-CE1-TAC
		TAP	1-CE1-TAP-S53
		PGTC	1-CE1-PGTC-S52
		TBP	1-CE1-TBP-S51
		TMC Link	1-CE1-TMC-[1-14]
DS1/VT mapper (Group 1)	TBM: not applicable ABM: 1-CE1-1G1-S1	DS1 ports (facilities)	1-CE1-1G1-[1..14]
		STS-1	1-CE1-S1G1
		DS1I DS1O	1-CE1-1G1-S30 1-CE1-1G1-S32
DS1/VT mapper (Group 2)	TBM:not applicable ABM: 1-CE1-1G2-S2	DS1 ports (facilities)	1-CE1-1G2-[1..14]
		STS-1	1-CE1-S1G2
		DS1I DS1O	1-CE1-1G2-S31 1-CE1-1G2-S33
DS1/VT mapper (Group 3)	TBM: 1-CE1-1G3-S3 ABM: not applicable	DS1 ports (facilities)	1-CE1-1G3-[1..14]
		STS-1	1-CE1-S1G3
		DS1I DS1O	1-CE1-1G3-S34 1-CE1-1G3-S36
DS1/VT mapper (Group 4)	TBM: 1-CE1-1G4-S4 ABM: 1-CE1-1G4-S4	DS1 ports (facilities)	1-CE1-1G4-[1..14]
		STS-1	1-CE1-S1G4

—continued—

Table 3-14 (continued)
Possible AIDs in TL1 Surveillance Commands

Equipment	Equipment AID	Entity	Entity AID
		DS1I DS1O (TBM and ABM shelf)	1-CE1-1G4-S35 1-CE1-1G4-S37
DS1/VT mapper (Group 5)	TBM: 1-CE1-1G5-S11 ABM: 1-CE1-1G5-S5	DS1 ports (facilities)	1-CE1-1G5-[1..14]
		STS-1	1-CE1-S1G5
		DS1I DS1O (TBM and ABM shelf)	1-CE1-1G5-S38 1-CE1-1G5-S40
DS1/VT mapper (Group 6)	TBM: 1-CE1-1G6-S12 ABM: 1-CE1-1G6-S6	DS1 ports (facilities)	1-CE1-1G6-[1..14]
		STS-1	1-CE1-S1G6
		DS1I DS1O (TBM and ABM shelf)	1-CE1-1G6-S39 1-CE1-1G6-S41
DS1/VT mapper (Group 7)	TBM: not applicable ABM: 1-CE1-1G7-S7	DS1 ports (facilities)	1-CE1-1G7-[1...14]
		STS-1	1-CE1-S1G7
		DS1I DS1O	1-CE1-1G7-S42 1-CE1-1G7-S44
DS1/VT mapper (Group 8)	TBM: 1-CE1-1G8-S14 ABM: 1-CE1-1G8-S8	DS1 ports (facilities)	1-CE1-1G8-[1..14]
		STS-1	1-CE1-S1G8
		DS1I DS1O (TBM and ABM shelf)	1-CE1-1G8-S43 1-CE1-1G8-S45
DS1/VT mapper (Group 9)	TBM: 1-CE1-1G9-S12 ABM: not applicable	DS1 ports (facilities)	1-CE1-1G9-[1..14]
		STS-1	1-CE1-S1G9
		DS1I DS1O	1-CE1-1G9-S46 1-CE1-1G9-S48
DS1/VT mapper (Group 10)	TBM: 1-CE1-1G10-S16 ABM: not applicable	DS1 ports (facilities)	1-CE1-1G10-[1..14]
		STS-1	1-CE1-S1G10
		DS1I DS1O	1-CE1-1G10-S47 1-CE1-1G10-S49

—continued—

Table 3-14 (continued)
Possible AIDs in TL1 Surveillance Commands

Equipment	Equipment AID	Entity	Entity AID
DS1/VT mapper (Group 11)	TBM: 1-CE1-1G11-S17 ABM: not applicable	DS1 ports (facilities)	1-CE1-1G11-[1..14]
		STS-1	1-CE1-S1G11
		DS1I DS1O	1-CE1-1G11-S50 1-CE1-1G11-S52
DS1/VT mapper (Group 12)	TBM: 1-CE1-1G12-S18 ABM: not applicable	DS1 ports (facilities)	1-CE1-1G12-[1..14]
		STS-1	1-CE1-S1G12
		DS1I DS1O	1-CE1-1G12-S51 1-CE1-1G12-S53
DS1/VT mapper (protection)	TBM: 1-CE1-1P-S13 ABM: 1-CE1-1P-S3	DS1 ports (facilities)	1-CE1-1P[1..14]
		DS1B DS1B (TBM and ABM shelf)	1-CE1-1P-S34 1-CE1-1P-S36
DS1 ports (for DS1 groups G1-12)	1-CE1-1G[1..12]- {1..14}	VT1.5s	1-CE1-V1G[1..12]- [1..14]
STS-1 (for DS1 groups G1-12)	1-CE1-S1G[1..12]	VT1.5s	1-CE1-V1G[1..12]- [1...14]
STS-1 (for TIC ports)	1-CE1-S1TIC-1	VT1.5s	1-CE1-V1TIC-[1..28]
	1-CE1-S1TIC-2	VT1.5s	1-CE1-V1TIC-[29..56]
	1-CE1-S1TIC-3	VT1.5s	1-CE1-V1TIC-[57..84]
DS3/STS mapper (Group 1)	TBM: 1-CE1-3G1-S11 ABM: 1-CE1-3G3-S3	DS3 ports (facilities)	1-CE1-3G1-[1..3]
		STS-1	1-CE1-S1G1-[1..3]
		DS3I/O (for TBM shelf)	1-CE1-3G1-S[38..40]
		DS3I/O (for ABM shelf)	1-CE1-3G1-S[34..36]
DS3/STS mapper (Group 2)	TBM: 1-CE1-3G2-S13 ABM: 1-CE1-3G2-S5	DS3 ports (facilities)	1-CE1-3G2-[1..3]
		STS-1	1-CE1-S3G1-[1..3]
		DS3I/O (for ABM shelf)	1-CE1-3G2-S[38..40]

—continued—

Table 3-14 (continued)
Possible AIDs in TL1 Surveillance Commands

Equipment	Equipment AID	Entity	Entity AID
DS3/STS mapper (Group 3)	TBM: 1-CE1-3G3-S15 ABM: 1-CE1-3G3-S7	DS3 ports (facilities)	1-CE1-3G3-[1..3]
		STS-1	1-CE1-S3G3-[1..3]
		DS3I/O (for TBM shelf)	1-CE1-3G3-S[46..48]
		DS3I/O (for ABM shelf)	1-CE1-3G3-S[42..44]
DS3/STS mapper (Group 4)	TBM: 1-CE1-3G4-S17 ABM: not applicable	DS3 ports (facilities)	1-CE1-3G4-[1..3]
		STS-1	1-CE1-S3G4-[1..3]
		DS3I/O (for TBM shelf)	1-CE1-3G4-S[50..52]
DS3/STS mapper (protection)	TBM: 1-CE1-3P-S1 ABM: 1-CE1-3P-S1	DS1 ports (facilities)	1-CE1-3P-[1..3]
CDS1-CDS7	1-CDS[1..7]	Line cards	1-1-[1..96]
		NLIC	1-CDS[1..7]- NLIC[A...D]
		MTAC	1-CDS[1..7]- MTAC[A..B]
—end—			

AccessNode Express AID definitions

Table 3-15 lists the access identifier (AID) formats for AccessNode Express (ANX). Use these AIDs when you monitor ANX equipment.

> ***Note:*** The ANX AID only identifies the circuit pack within a voice module (LC-[1...48]).

Table 3-15
ANX AID formats

ANX shelf equipment	AID format
Voice module shelf	1-VM(1-28)
OC-1 Shelf processor	1-VM(1-28)-SPX(A,B)
External DS1 Facility	1-VM(1-28)-(1-6)
Internal DS1 Facility	1-VM(1-28)-(1-6)
Integrated test unit	1-VM(1-28)-ITU
Power supply A	1-VM(1-28)-PSUA
Power supply B	1-VM(1-28)-PSUB
Line cards	1-VM(1-28)-(1-48)

AccessNode AID definitions

Table 3-16 lists the AID formats for AccessNode. Use these AIDs when you monitor AccessNode equipment.

> ***Note:*** The CDS AID identifies the position of the equipment for the CDS system by shelf and line card slot within the shelf (CDS-[1...7]-[1...96]).

Table 3-16
CDS AID formats

CDS shelf equipment	AID format
Line card	[1...7]-[1...96]

Surveillance message association

This section includes Alarm and Performance Monitoring tables that allow you to cross-reference the network element alarm points and the performance monitoring (PM) measurements to their TL1 equivalent messages.

Alarm tables

The following is a list of the available TL1 alarm tables. They permit you to quickly identify which TL1 messages are associated with a particular alarm point and the range of parameter values.

Performance Monitoring (PM) tables

The following is a list of the available TL1 PM tables. They permit you to identify the TL1 parameter values associated with a particular PM type.

Common-equipment alarms

The following table correlates common-equipment alarms to TL1 messages. The table lists alarms for the MIC, PROC, and OPC.

Table 3-17
Common-equipment alarm TL1 correlations

Alarm text	TL1 message	SCCM	AID	CONDTYPE	NTFCN CDE*	SRV EFF**	DIRN
Alarm relay fail	REPT ALM	EQPT	1-CE1-MIC	CONTCOM	MN	NSA	NA
Autoprovision mismatch	REPT ALM	COM		CONTEQPT	MN	NSA	NA
Circuit pack fail	REPT ALM	EQPT	1-CE1-MIC	CONTCOM	MN	NSA	NA
Circuit pack mismatch	REPT ALM	EQPT	1-CE1-MIC	CONTCOM	MN	NSA	NA
Circuit pack missing	REPT ALM	EQPT	1-CE1-MIC	IMPROPRMVL	MN	NSA	NA
Firmware version mismatch	REPT ALM	EQPT	1-CE1-MIC	CONTEQPT	MN	NSA	NA
Local craft interface port fail	REPT ALM	EQPT	1-CE1-MIC	CONTCOM	MN	NSA	NA
LED driver fail	REPT ALM	EQPT	1-CE1-MIC	CONTEQPT	MN	NSA	NA
Non-volatile store fail	REPT ALM	EQPT	1-CE1-MIC	BKUPMEMP	MN	NSA	NA
Non-volatile store mismatch	REPT ALM	EQPT	1-CE1-MIC	BKUPMEMP	MN	NSA	NA
Orderwire fail	REPT ALM	EQPT	1-CE1-MIC	ORDRWR	MN	NSA	NA
Parallel telemetry relay fail	REPT ALM	EQPT	1-CE1-MIC	CONTEQPT	MN	NSA	NA
Performance monitor clock fail	REPT ALM	EQPT	1-CE1-MIC	CONTEQPT	MN	NSA	NA
Protection switch relay fail	REPT ALM	EQPT	1-CE1-MIC	CONTEQPT	MN	NSA	NA
Serial telemetry port fail	REPT ALM	EQPT	1-CE1-MIC	CONTCOM	MN	NSA	NA
Time of day clock fail	REPT ALM	EQPT	1-CE1-MIC	CONTEQPT	MN	NSA	NA
E2A input fail	REPT ALM	EQPT	1-CE1-MIC	CONTCOM	MN	NSA	NA
Both C-bus access fail	REPT ALM	EQPT	1-CE1-PROC[A, B]	CONTBUS	CR MN	SA NSA	NA
C-bus-A access fail	REPT ALM	EQPT	1-CE1-PROC[A, B]	CONTBUS	MJ MN	NSA	NA
C-bus-B access fail	REPT ALM	EQPT	1-CE1-PROC[A, B]	CONTBUS	MJ MN	NSA	NA
Circuit pack missing	REPT ALM	EQPT	1-CE1-PROC[A, B]	IMPROPRMVL	MN	NSA	NA
CNET link fail	REPT ALM	EQPT	1-CE1-PROC[A, B]	CONTCOM	MN	NSA	NA
CNET performance degraded	REPT EVT REPT ALM	EQPT	1-CE1-PROC[A, B]	CONTCOM	(*1) CL	(*2) NSA	NA

—continued—

Table 3-17 (continued)
Common-equipment alarm TL1 correlations

Alarm text	TL1 message	SCCM	AID	CONDTYPE	NTFCN CDE*	SRV EFF**	DIRN
Communication processor fail	REPT ALM	EQPT	1-CE1-PROC[A, B]	CONTCOM	CR MN	SA NSA	NA
Database not restored. Type Q APPROVE at NE	REPT ALM	COM	1-CE1-PROC[A, B]	CONTEQPT	MN	NSA	NA
Datasync fail	REPT-ALM	EQPT	1-OPC	DBMEMTRF	MN	NSA	NA
Degraded communication processor	REPT ALM	EQPT	1-CE1-PROC[A, B]	CONTCOM	MJ MN	NSA	NA
Degraded host processor	REPT ALM	EQPT	1-CE1-PROC[A, B]	CONTR	MJ MN	NSA	NA
Degraded master CBIC-A	REPT ALM	EQPT	1-CE1-PROC[A, B]	CONTEQPT	MJ MN	NSA	NA
Degraded master CBIC-B	REPT ALM	EQPT	1-CE1-PROC[A, B]	CONTEQPT	MJ MN	NSA	NA
Firmware version mismatch	REPT ALM	EQPT	1-CE1-PROC[A, B]	CONTEQPT	MN	NSA	NA
Firmware PROM fail	REPT ALM	EQPT	1-CE1-PROC[A, B]	CONTEQPT	CR MN	SA NSA	NA
Interprocessor comm fail		EQPT	1-CE1-PROC[A, B]	CONTCOM	MJ MN	NSA NSA	NA
Loss of data synchronization	REPT EVT REPT ALM	COM	1-CE1-PROC[A, B]	PRGFLT	WR	NSA	NA
Loss of duplex	REPT ALM	EQPT	1-CE1-PROC[A, B]	CONTRDUP	MN	NSA	NA
Loss of mate communication	REPT EVT EVNT ALM	EQPT	1-CE1-PROC[A, B]	CONTCOM	WR	NSA	NA
Lost peer OPC	REPT-ALM	EQPT	1-OPC	CONTCOM	MN	NSA	NA
OPC alarm(s) active	REPT-ALM	COM		AIS	MN, MU, CR	NSA	NA
OPC alarm(s) active (severity as “warning”)	REPT-EVT	COM		AIS	NA	NA	NA
OPC circuit pack fail	REPT ALM	EQPT	1-CE1-OPC	CONTR	MN	NSA	NA
OPC circuit pack mismatch	REPT ALM	EQPT	1-CE1-OPC	CONTR	MN	NSA	NA
OPC circuit pack missing	REPT ALM	EQPT	1-CE1-OPC	IMPROPRMVL	MN	NSA	NA
OPC CNET loss of signal	REPT ALM	EQPT	1-CE1-OPC	CONTCOM	MN	NSA	NA
OPC Ethernet loss of signal	REPT ALM	EQPT	1-CE1-OPC	CONTCOM	MN	NSA	NA

—continued—

Table 3-17 (continued)
Common-equipment alarm TL1 correlations

Alarm text	TL1 message	SCCM	AID	CONDTYPE	NTFCN CDE*	SRV EFF**	DIRN
OPC hardware reset	REPT ALM	EQPT	1-CE1-OPC	INIT	MN	NSA	NA
OPC OAM software fail	REPT ALM	EQPT	1-CE1-OPC	INTSFT	MN	-	NA
OPC serial I/O card mismatch	REPT ALM	EQPT	1-CE1-S[38, 40, 30, 32]	CONTCOM	MN	-	-
OPC serial I/O card missing	REPT ALM	EQPT	1-CE1-S[38, 40, 30, 32]	IMPROPRMVL	MN	-	-
Tape backup/restore fail	REPT-ALM	EQPT	1-OPC	BKUPMEMS	MN	NSA	NA

* The TL1 parameter NTFCNCDE is not used in REPT EVT messages. Instead, the CONDEFF parameter is used with a value of SC. In addition, when two values are given for the NTFCNCDE parameter, the top value is for unprotected and the bottom value is for protected.

** The TL1 parameter SRVEFF is not used in REPT EVT messages.

—end—

AIC alarms

The following table correlates AIC alarms to TL1 messages.

Table 3-18
AIC alarm TL1 correlations

Alarm text	TL1 message	SCCM	AID	CONDTYPE	NTFCNCDE	SRVEFF	DIRN
Circuit pack fail	REPT ALM	EQPT	1-CE1-AIC[A..B]	CONTEQPT	CR MN	SA NSA	NA
Circuit pack mismatch	REPT ALM	EQPT	1-CE1-AIC[A..B]	CONTEQPT	CR MN	SA NSA	NA
Circuit pack missing	REPT ALM	EQPT	1-CE1-AIC[A..B]	IMPROPRMVL	CR MN	SA NSA	NA
Comm overhead clock/frame loss	REPT ALM	EQPT	1-CE1-AIC[A..B]	CONTEQPT	CR MN	SA NSA	NA
Comm overhead parity error	REPT ALM	EQPT	1-CE1-AIC[A..B]	CONTEQPT	CR MN	SA NSA	NA
D-link interface fail	REPT ALM	EQPT	1-CE1-AIC[A..B]	CONTEQPT	CR MN	SA NSA	NA
D-link interface fail	REPT EVT REPT ALM	EQPT	1-CE1-AIC[A..B]	CONTEQPT	(*1) CL	(*2) NSA	NA
Plane messaging corruption	REPT ALM	EQPT	1-CE1-AIC[A..B]	INTMSGERR	CR MN	SA NSA	NA
Plane messaging corruption	REPT EVT REPT ALM	EQPT	1-CE1-AIC[A..B]	INTMSGERR	(*1) CL	(*2) NSA	NA
T-link interface fail	REPT ALM	EQPT	1-CE1-AIC[A..B]	CONTEQPT	CR MN	SA NSA	NA
T-link interface fail	REPT EVT REPT ALM	EQPT	1-CE1-AIC[A..B]	CONTEQPT	(*1) CL	(*2) NSA	NA

CDSP alarms

The following table correlates CDSP alarms to TL1 messages.

Table 3-19
CDSP alarm TL1 correlations

Alarm text	TL1 message	SCCM	AID	CONDTYPE	NTFCN CDE	SRVE FF	DIRN
Access failure	REPT EVT REPT ALM	EQPT	1-CDS[1..7]-CDSP[A..B]	CNVT	(*1) CL	(*2) NSA	NA
Circuit pack fail	REPT ALM	EQPT	1-CDS[1..7]-CDSP[A..B]	CNVT	MJ MN	SA NSA	NA
Circuit pack mismatch	REPT ALM	EQPT	1-CDS[1..7]-CDSP[A..B]	CNVT	MJ MN	SA NSA	NA
Circuit pack missing	REPT ALM	EQPT	1-CDS[1..7]-CDSP[A..B]	IMPROPRMVL	MJ MN	SA NSA	NA
Clock failure	REPT EVT REPT ALM	EQPT	1-CDS[1..7]-CDSP[A..B]	CNVT	(*1) CL	(*2) NSA	NA

DS1 equipment alarms

The following table correlates DS1 equipment alarms to TL1 messages.

> ***Note:*** The TL1 parameter LOCN contains no value for DS1 equipment alarms.

Table 3-20
DS1 equipment alarm TL1 correlations

Alarm text	TL1 message	SCCM	AID	CONDTYPE	NTFC NCDE*	SRV EFF**	DIRN
Circuit pack fail	REPT ALM	EQPT	1-CE1-1G1-S1 1-CE1-1G2-S2 1-1CE1-G3-S3 1-CE1-1G4-S4 1-CE1-1G5-S5 1-CE1-1G6-S6 1-CE1-1G7-S7 1-CE1-1G8-S8 1-CE1-1G5-S11 1-CE1-1G6-S12 1-CE1-1P-S13 1-CE1-1G8-S14 1-CE1-1G9-S15 1-CE1-1G10-S16 1-CE1-1G11-S17 1-CE1-1G12-S18	T1TERM	CR MN	SA NSA	NA
Circuit pack mismatch	REPT ALM	EQPT	Same as above	T1TERM	CR MN	SA NSA	NA
Circuit pack missing	REPT ALM	EQPT	Same as above	IMPROPRMVL	CR MN	SA NSA	NA
Forced switch request	REPT ALM	EQPT	1-CE1-1G[1..12}	FRCDWKSWPR	MN	NSA	NA

—continued—

Table 3-20 (continued)
DS1 equipment alarm TL1 correlations

Alarm text	TL1 message	SCCM	AID	CONDTYPE	NTFC NCDE*	SRV EFF**	DIRN
Input card mismatch	REPT ALM	EQPT	1-CE1-1G1-S30 1-CE1-1G2-S31 1-1CE1-G3-S34 1-CE1-1G4-S35 1-CE1-1G5-S38 1-CE1-1G6-S39 1-CE1-1G7-S42 1-CE1-1G8-S43 1-CE1-1G9-S46 1-CE1-1G10-S47 1-CE1-1G11-S50 1-CE1-1G12-S51	T1TERM	CR MN	SA NSA	NA
Input card missing	REPT ALM	EQPT	Same as above	IMPROPRMVL	CR MN	SA NSA	NA
Input card fail - DoNotRemove	REPT ALM	EQPT	Same as above	T1TERM	CR MN	SA NSA	NA
Lockout request	REPT ALM	EQPT	1-1G[1..12]	INHSWPR	MN	NSA	NA
Manual switch request	REPT ALM	EQPT	1-1G[1..12]	MANWKSWPR	MN	NSA	NA
Output card mismatch	REPT ALM	EQPT	1-CE1-1G1-S32 1-CE1-1G2-S33 1-CE1-1G3-S36 1-CE1-1G4-S37 1-CE1-1G5-S40 1-CE1-1G6-S41 1-CE1-1G7-S44 1-CE1-1G8-S45 1-CE1-1G9-S48 1-CE1-1G10-S49 1-CE1-1G11-S52 1-CE1-1G12-S53	T1TERM	CR MN	SA NSA	NA
Output card missing	REPT ALM	EQPT	Same as above	IMPROPRMVL	CR MN	SA NSA	NA
Output card fail - DoNotRemove	REPT ALM	EQPT	Same as above	T1TERM	CR MN	SA NSA	NA
Prot bridge in card mismatch	REPT ALM	EQPT	1-CE1-1P-S34 1-CE1-1P-S42	T1TERM	CR MN	SA NSA	NA
Prot bridge in card missing	REPT ALM	EQPT	Same as above	IMPROPRMVL	CR MN	SA NSA	NA
Prot bridge in card fail -DoNotRemove	REPT ALM	EQPT	Same as above	T1TERM	MJ MN	NSA	NA
Prot bridge out card mismatch	REPT ALM	EQPT	1-CE1-1P-S36 1-CE1-1P-S44	T1TERM	CR MN	SA NSA	NA
Prot bridge out card missing	REPT ALM	EQPT	Same as above	IMPROPRMVL	CR MN	SA NSA	NA
Prot bridge out card fail -DoNotRemove	REPT ALM	EQPT	Same as above	T1TERM	MJ MN	NSA	NA
Protection path fail	REPT ALM	EQPT	1-CE1-1G[1..12]	SWEQPT	MN MJ	NSA SA	NA
Protection switch complete	REPT EVT REPT ALM	EQPT	1-CE1-1G[1..12]	WKSWPR	(*1) CL	(*2) NSA	NA

—continued—

Table 3-20 (continued)
DS1 equipment alarm TL1 correlations

Alarm text	TL1 message	SCCM	AID	CONDTYPE	NTFC NCDE*	SRV EFF**	DIRN
Protection switch fail	REPT ALM	EQPT	1-CE1-1G[1..12]	FAILTOSW	MN	NSA	NA
Protection version mismatch	REPT ALM	EQPT	1-CE1-1G[1..12]-S[1..8, 11..18]	T1TERM	CR MN	SA NSA	NA
STS-1 intercard fail	REPT ALM	EQPT	1-CE1-1G1-S1 1-CE1-1G2-S2 1-1CE1-G3-S3 1-CE1-1G4-S4 1-CE1-1G5-S5 1-CE1-1G6-S6 1-CE1-1G7-S7 1-CE1-1G8-S8 1-CE1-1G5-S11 1-CE1-1G6-S12 1-CE1-1P-S13 1-CE1-1G8-S14 1-CE1-1G9-S15 1-CE1-1G10-S16 1-CE1-1G11-S17 1-CE1-1G12-S18	T1TERM	CR MN	SA NSA	NA

* The TL1 parameter NTFCNCDE is not used in REPT EVT messages. Instead, the CONDEFF parameter is used with a value of SC.

** The TL1 parameter SRVEFF is not used in REPT EVT messages.

—end—

DS3 equipment alarms

The following table correlates DS3 equipment alarms to TL1 messages.

Note: The TL1 parameter LOCN contains no value for DS3 equipment alarms.

Table 3-21
DS3 equipment alarm TL1 correlations

Alarm text	TL1 message	SCCM	AID	CONDTYPE	NTFC NCDE*	SRV EFF**	DIRN
Circuit pack fail	REPT ALM	EQPT	1-CE1-3G1-S3 1-CE1-3G2-S5 1-CE1-3G3-S7 1-CE1-3G1-S11 1-CE1-3G2-S13 1-CE1-3G3-S15 1-CE1-3P-S1	T3TERM	CR MN	SA NSA	NA
Circuit pack mismatch	REPT ALM	EQPT	1-CE1-3G1-S3 1-CE1-3G2-S5 1-CE1-3G3-S7 1-CE1-3G1-S11 1-CE1-3G2-S13 1-CE1-3G3-S15 1-CE1-3P-S1	T3TERM	CR MN	SA NSA	NA
Circuit pack missing	REPT ALM	EQPT	1-CE1-3G1-S3 1-CE1-3G2-S5 1-CE1-3G3-S7 1-CE1-3G1-S11 1-CE1-3G2-S13 1-CE1-3G3-S15 1-CE1-3P-S1	IMPROPRMVL	CR MN	SA NSA	NA
Circuit pack problem suspected	REPT ALM	EQPT	1-CE1-3G1-S3 1-CE1-3G2-S5 1-CE1-3G3-S7 1-CE1-3G1-S11 1-CE1-3G2-S13 1-CE1-3G3-S15 1-CE1-3P-S1	T3TERM	MJ MN	SA NSA	NA
Forced switch request	REPT ALM	EQPT	1-CE1-3G[1..3]	FRCDWKSWPR	MN	SA	NA
BNC I/O card 1 mismatch	REPT ALM	EQPT	1-CE1-3G1-S38 1-CE1-3G2-S42 1-CE1-3G3-S46	T3TERM	MJ	SA NSA	NA
BNC I/O card 1 missing	REPT ALM	EQPT	1-CE1-3G1-S38 1-CE1-3G2-S42 1-CE1-3G3-S46	IMPROPRMVL	MJ	SA NSA	NA
BNC I/O card 1 fail - DoNotRemove	REPT ALM	EQPT	1-CE1-3G1-S[33..36, 38..40, 42..44] 1-CE1-3G1-S[38..40, 46..48, 50..52]	T3TERM	MJ MN	NSA	NA

—continued—

Table 3-21 (continued)
DS3 equipment alarm TL1 correlations

Alarm text	TL1 message	SCCM	AID	CONDTYPE	NTFC NCDE*	SRV EFF**	DIRN
BNC I/O card 2 mismatch	REPT ALM	EQPT	1-CE1-3G1-S39 1-CE1-3G2-S43 1-CE1-3G3-S47	T3TERM	MJ	SA NSA	NA
BNC I/O card 2 missing	REPT ALM	EQPT	1-CE1-3G1-S39 1-CE1-3G2-S43 1-CE1-3G3-S47 1-CE1-3G4-S51	IMPROPRMVL	MJ	SA NSA	NA
BNC I/O card 2 fail - DoNotRemove	REPT ALM	EQPT	1-CE1-3G1-S[33.. 36, 38..40, 42..44] 1-CE1-3G1-S[38.. 40, 46..48, 50..52]	T3TERM	MJ MN	NSA	NA
BNC I/O card 3 mismatch	REPT ALM	EQPT	1-CE1-3G1-S40 1-CE1-3G2-S44 1-CE1-3G3-S48 1-CE1-3G4-S52	T3TERM	MJ	SA NSA	NA
BNC I/O card 3 missing	REPT ALM	EQPT	1-CE1-3G1-S40 1-CE1-3G2-S44 1-CE1-3G3-S48 1-CE1-3G4-S52	IMPROPRMVL	MJ	SA NSA	NA
BNC I/O card 3 fail - DoNotRemove	REPT ALM	EQPT	1-CE1-3G1-S[33.. 36, 38..40, 42..44] 1-CE1-3G1-S[38.. 40, 46..48, 50..52]	T3TERM	MJ MN	NSA	NA
Lockout request	REPT ALM	EQPT	1-CE1-3G[1..3]	INHSWPR	MN	NSA	NA
Manual switch request	REPT ALM	EQPT	1-CE1-3G[1..3]	MANWKSWPR	MN	NSA	NA
Protection path fail	REPT ALM	EQPT	1-CE1-3G[1..3]	SWEQPT	MN MJ	NSA SA	NA
Protection switch complete	REPT EVT REPT ALM	EQPT	1-CE1-3G[1..3]	WKSWPR	(*1) CL	(*2) NSA	NA
Protection switch fail	REPT ALM	EQPT	1-CE1-3G[1..3]	FAILTOSW	MN	NSA	NA
STS-1 intercard fail	REPT ALM	EQPT	1-CE1-3G1-S3 1-CE1-3G2-S5 1-CE1-3G3-S7 1-CE1-3G1-S11 1-CE1-3G2-S13 1-CE1-3G3-S15 1-CE1-3P-S1	T3TERM	CR MN	SA NSA	NA
Switcher circuit pack mismatch	REPT ALM	EQPT	1-CE1-3P-S2	T3TERM	CR MN	SA NSA	NA
Switcher circuit pack missing	REPT ALM	EQPT	1-CE1-3P-S2	IMPROPRMVL	CR MN	SA NSA	NA
VT connection provisioning mismatch	REPT ALM	EQPT	1-CE1-3G[1..3]	T3TERM	MN	NSA	NA

* The TL1 parameter NTFCNCDE is not used in REPT EVT messages. Instead, the CONDEFF parameter is used with a value of SC.

** The TL1 parameter SRVEFF is not used in REPT EVT messages.

—end—

ESI equipment alarms

The following table correlates ESI equipment alarms to TL1 messages.

Note: The TL1 parameter LOCN contains no value for ESI equipment alarms.

Table 3-22
ESI equipment alarm TL1 correlations

Alarm text	TL1 message	SCCM	AID	CONDTYPE	NTFCN CDE*	SRV EFF**	DIRN
End VCO range	REPT EVT REPT ALM	EQPT	1-CE1-ESIG[1..2]	SYNCLKV	(*1) CL	(*2) NSA	NA
Entry to SONET clock freerun***	REPT EVT REPT ALM	COM	N/A	FRNGSYNCS	(*1) CL	(*2) NSA	NA
Entry to SONET clock freerun***	REPT EVT REPT ALM	COM	N/A	FRNGSYNCG	(*1) CL	(*2) NSA	NA
Equipment forced switch request	REPT ALM	EQPT	1-CE1-ESIG[1..2]	FRCDWKSWPR	MN	NSA	NA
Equipment lockout request	REPT ALM	EQPT	1-CE1-ESIG[1..2]	INHSWPR	MN	NSA	NA
Equipment manual switch request	REPT ALM	EQPT	1-CE1-ESIG[1..2]	MANWKSWPR	MN	NSA	NA
Equipment protection switch complete	REPT EVT REPT ALM	EQPT	1-CE1-ESIG[1..2]	WKSWPR	(*1) CL	(*2) NSA	NA
Equipment protection switch fail	REPT ALM	EQPT	1-CE1-ESIG[1..2]	FAILTOSW	MN	NSA	NA
Failure to lock	REPT ALM	EQPT	1-CE1-ESIG[1..2]	SYNCCLKL	MJ MN	SA NSA	NA
Intercard failure	REPT ALM	EQPT	1-CE1-ESIG[1..2]	BUERR	MJ MN	SA NSA	NA
Subunit missing	REPT ALM	EQPT	1-CE1-ESIG[1..2]	IMPROPRMVL	MJ MN	SA NSA	NA
Subunit mismatch	REPT ALM	EQPT	1-CE1-ESIG[1..2]	T1TERM	MJ MN	SA NSA	NA
Subunit fail	REPT ALM	EQPT	1-CE1-ESIG[1..2]	SYNCCLKF	MJ MN	SA NSA	NA
Timing generation entry to acquire	REPT EVT REPT ALM	EQPT	1-CE1-ESIG[1..2]	SYNCCLKA	(*1) CL	(*2) NSA	NA
Timing generation entry to fast	REPT EVT REPT ALM	EQPT	1-CE1-ESIG[1..2]	FSTSYNC	(*1) CL	(*2) NSA	NA

—continued—

Table 3-22 (continued)
ESI equipment alarm TL1 correlations

Alarm text	TL1 message	SCCM	AID	CONDTYPE	NTFCN CDE*	SRV EFF**	DIRN
Timing generation entry to freerun	REPT EVT REPT ALM	EQPT	1-CE1-ESIG[1..2]	FRNGSYNC	(*1) CL	(*2) NSA	NA
Timing generation entry to holdover	REPT EVT REPT ALM	EQPT	1-CE1-ESIG[1..2]	HLDOVRSYNC	(*1) CL	(*2) NSA	NA
Timing generation primary reference fail	REPT ALM	COM	N/A	SYNCPRI	MJ MN	SA NSA	NA
Timing generation secondary reference fail	REPT ALM	EQPT	1-CE1-ESIG[1..2]	SYNCSEC	MJ MN	SA NSA	NA

* The TL1 parameter NTFCNCDE is not used in REPT EVT messages. Instead, the CONDEFF parameter is used with a value of SC.

** The TL1 parameter SRVEFF is not used in REPT EVT messages.

***The “Entry to SONET clock freerun” alarm can come from two distinct events, either an ESI subunit failure (CONDTYPE=FRNGSYNCS), or an invalid OC-n timing reference signal (CONDTYPE=FRNGSYNCG).

—end—

IRTU alarms

The following table correlates IRTU alarms to TL1 messages.

Table 3-23
IRTU alarm TL1 correlations

Alarm text	TL1 message	SCCM	AID	CONDTYPE	NTFCN CDE	SRV EFF	DIRN
Circuit pack fail	REPT ALM	EQPT	1-CE1-IRTU	INT	MN	NSA	NA
Circuit pack mismatch	REPT ALM	EQPT	1-CE1-IRTU	INT	MN	NSA	NA
Circuit pack missing	REPT ALM	EQPT	1-CE1-IRTU	IMPROPRMVL	MN	NSA	NA
Common circuitry fail	REPT ALM	EQPT	1-CE1-IRTU	INT	MN	NSA	NA
Test head 1 fail	REPT ALM	EQPT	1-CE1-IRTU	INT	MN	NSA	NA
Test head 2 fail	REPT ALM	EQPT	1-CE1-IRTU	INT	MN	NSA	NA
Software download fail	REPT ALM	EQPT	1-CE1-IRTU	INT	MN	NSA	NA

LIC alarms

The following table correlates LIC alarms to TL1 messages.

Table 3-24
LIC alarm TL1 correlations

Alarm text	TL1 message	SCCM	AID	CONDTYPE	NTFCN CDE	SRV EFF	DIRN
Circuit pack fail	REPT ALM	EQPT	1-CDS[1..7]-NLIC[A..D]	CONTEQPT	MJ MN	SA NSA	NA
Circuit pack mismatch	REPT ALM	EQPT	1-CDS[1..7]-NLIC[A..D]	CONTEQPT	MJ MN	SA NSA	NA
Circuit pack missing	REPT ALM	EQPT	1-CDS[1..7]-NLIC[A..D]	IMPROPRMVL	MJ MN	SA NSA	NA
D-link interface fail	REPT ALM	EQPT	1-CDS[1..7]-NLIC[A..D]	CONTEQPT	MJ MN	SA NSA	NA
D-link interface fail	REPT EVT REPT ALM	EQPT EQPT	1-CDS[1..7]-NLIC[A..D]	CONTEQPT CONTEQPT	(*1) CL	(*2) NSA	NA
Inter-plane fail	REPT ALM	EQPT	1-CDS[1..7]-NLIC[A..D]	CONTEQPT	MJ MN	SA NSA	NA
Plane messaging corruption	REPT ALM	EQPT	1-CDS[1..7]-NLIC[A..D]	INTMSGERR	MJ MN	NSA	NA
Plane messaging corruption	REPT EVT REPT ALM	EQPT	1-CDS[1..7]-NLIC[A..D]	INTMSGERR	(*1) CL	(*2) NSA	NA

MIC alarms

The following table correlates MIC alarms to TL1 messages.

Table 3-25
MIC alarm TL1 correlations

Alarm text	TL1 message	SCCM	AID	CONDTYPE	NTFCN CDE	SRV EFF	DIRN
Alarm relay fail	REPT ALM	EQPT	1-CE1-MIC	CONTCOM	MN	NSA	NA
Circuit pack fail	REPT ALM	EQPT	1-CE1-MIC	CONTCOM	MN	NSA	NA
Circuit pack mismatch	REPT ALM	EQPT	1-CE1-MIC	CONTCOM	MN	NSA	NA
Circuit pack missing	REP TALM	EQPT	1-CE1-MIC	IMPROPRMVL	MJ	NSA	NA
E2A input fail	REPT ALM	EQPT	1-CE1-MIC	CONTCOM	MN	NSA	NA
Firmware version mismatch	REPT ALM	EQPT	1-CE1-MIC	CONTCOM	MN	NSA	NA
Local craft interface port fail	REPT ALM	EQPT	1-CE1-MIC	CONTCOM	MN	NSA	NA
LED driver fail	REPT ALM	EQPT	1-CE1-MIC	CONTEQPT	MN	NSA	NA
Non-volatile store fail	REPT ALM	EQPT	1-CE1-MIC	BKUPMEMP	MN	NSA	NA
Non-volatile store mismatch	REPT ALM	EQPT	1-CE1-MIC	BKUPMEMP	MN	NSA	NA
Orderwire fail	REPT ALM	EQPT	1-CE1-MIC	ORDRWR	MN	NSA	NA
Parallel telemetry relay fail	REPT ALM	EQPT	1-CE1-MIC	CONTEQPT	MN	NSA	NA
Performance monitor clock fail	REPT ALM	EQPT	1-CE1-MIC	CONTEQPT	MN	NSA	NA
Protection switch relay fail	REPT ALM	EQPT	1-CE1-MIC	CONTEQPT	MN	NSA	NA
Serial telemetry port fail	REPT ALM	EQPT	1-CE1-MIC	CONTCOM	MN	NSA	NA
Time of day clock fail	REPT ALM	EQPT	1-CE1-MIC	CONTEQPT	MN	NSA	NA

MTAC alarms

The following table correlates MTAC alarms to TL1 messages.

Table 3-26
MTAC alarm TL1 correlations

Alarm text	TL1 message	SCCM	AID	CONDTYPE	NTFCN CDE	SRV EFF	DIRN
Circuit pack fail	REPT ALM	EQPT	1-CDS[1..7]-MTAC[A..B]	TSTACC	MN	NSA	NA
Circuit pack mismatch	REPT ALM	EQPT	1-CDS[1..7]-MTAC[A..B]	TSTACC	MN	NSA	NA
Circuit pack missing	REPT ALM	EQPT	1-CDS[1..7]-MTAC[A..B]	IMPROPRMVL	MN	NSA	NA

OC-3/OC-12 equipment alarms

The following table correlates OC-3, OC-3 trib, and OC-12 terminal equipment alarms to TL1 messages.

> ***Note:*** Except where noted below, the TL1 parameter LOCN is not shown as it contains no value for AccessNode equipment alarms.

Table 3-27
OC-3/OC-12 equipment alarm TL1 correlations

Alarm text	TL1 message	SCCM	AID	CONDTYPE	NTFCN CDE*	SRV EFF**	DIRN
SP_line_card_missing	REPT ALM	EQPT	1-CE1-03[G1S-S] 1-CE1-03[G2S-S] 1-CE1-03[G3-S1] 1-CE1-03[G4-S3] 1-CE1-03[G5-S11] 1-CE1-03[G6-S13] 1-CE1-03[G7-S15] 1-CE1-03[G8-S17]	IMPROPRMVL	CR MN	SA NSA	NA
Channel match fail	REPT ALM	EQPT	1-CE1-G1-S9 1-CE1-G2-S10	OC12TERM	CR MN	SA NSA	NA
Circuit pack fail	REPT ALM	EQPT	1-CE1-G1-S9 1-CE1-G2-S10	OC12TERM	CR MN	SA NSA	NA
Circuit pack mismatch	REPT ALM	EQPT	1-CE1-G1-S9 1-CE1-G2-S10	OC12TERM	CR MN	SA NSA	NA
Circuit pack missing	REPT ALM	EQPT	1-CE1-G1-S9 1-CE1-G2-S10	IMPROPRMVL	CR MN	SA NSA	NA
Circuit pack reach mismatch	REPT ALM	EQPT	1-CE1-G1-S9 1-CE1-G2-S10	OC12TERM	MN	NSA	NA
Entry to SONET clock freerun	REPT EVT REPT ALM	COM	1-CE1-G1-S9 1-CE1-G2-S10	FRNGSYNC	(*1) CL	(*2) NSA	NA

—continued—

Table 3-27 (continued)
OC-3/OC-12 equipment alarm TL1 correlations

Alarm text	TL1 message	SCCM	AID	CONDTYPE	NTFCN CDE*	SRV EFF**	DIRN
Fiber connection error	REPT ALM	EQPT	1-CE1-G1-S9 1-CE1-G2-S10	OC12TERM	CR	SA	NA
Fiber loopback	REPT ALM	EQPT	1-CE1-G1-S9 1-CE1-G2-S10	OC12TERM	CR	SA	NA
Firmware corrupt	REPT ALM	EQPT	1-CE1-G1-S9 1-CE1-G2-S10	OC12TERM	CR MN	SA NSA	NA
Firmware/software incompatible	REPT ALM	EQPT	1-CE1-G1-S9 1-CE1-G2-S10	OC12TERM	CR MN	SA NSA	NA
Firmware trap	REPT ALM	EQPT	1-CE1-G1-S9 1-CE1-G2-S10	INTSFT	MN	NSA	NA
Firmware version mismatch	REPT ALM	EQPT	1-CE1-G1-S9 1-CE1-G2-S10	OC12TERM	MN	NSA	NA
Forced switch request	REPT ALM	EQPT	1-CE1-G1 1-CE1-G2	FRCDWKSWP R	MN	NSA	NA
Intercard serial link fail	REPT ALM	EQPT	1-CE1-G1-S9 1-CE1-G2-S10	OC12TERM	MJ	NSA	NA
Laser degrade	REPT EVT REPT ALM	EQPT	1-CE1-G1 1-CE1-G2	OC12TERM	(*1) CL	(*2) NSA	NA
Lockout request	REPT ALM	EQPT	1-CE1-G1 1-CE1-G2	INHSWPR	MN	NSA	NA
Manual switch request	REPT ALM	EQPT	1-CE1-G1 1-CE1-G2	MANWKSWPR	MN	NSA	NA
Maps invalid	REPT ALM	EQPT	1-CE1-G1 1-CE1-G2	OC12TERM	MJ	NSA	NA
NE id mismatch	REPT ALM	EQPT	1-CE1-G1 1-CE1-G2	OC12TERM	CR MN	SA NSA	NA
Performance clock monitor fail	REPT EVT	EQPT	1-CE1-G1-S9 1-CE1-G2-S10	CONTEQPT	(*1)	NSA	NA
Protection oscillation control activated	REPT ALM	EQPT	1-CE1-G1 1-CE1-G2	INHSWPR	MN	NSA	NA
Protection path fail	REPT ALM	EQPT	1-CE1-G1 1-CE1-G2	SWEQPT	MN	NSA	NA
Protection scheme mismatch	REPT ALM	EQPT	1-CE1-G1	SWEQPT	MN	NSA	NA
Protection switch complete	REPT EVT REPT ALM	EQPT	1-CE1-G1 1-CE1-G2	WKSWPR	(*1) CL	(*2) NSA	NA
Protection switch fail	REPT ALM	EQPT	1-CE1-G1 1-CE1-G2	FAILTOSW	CR	SA	NA
Protection switching byte fail	REPT ALM	EQPT	1-CE1-G1-S9 1-CE1-G2-S10	OC12TERM	CR MN	SA NSA	NA

—continued—

Table 3-27 (continued)
OC-3/OC-12 equipment alarm TL1 correlations

Alarm text	TL1 message	SCCM	AID	CONDTYPE	NTFCN CDE*	SRV EFF**	DIRN
Protection switching byte inconsistent	REPT ALM	EQPT	1-CE1-G1-S9 1-CE1-G2-S10	OC12TERM	CR MN	SA NSA	NA
Receive fail	REPT ALM	EQPT	1-CE1-G1-S9 1-CE1-G2-S10	RCVR	CR MN	SA NSA	NA
Reference input clock fail	REPT ALM	EQPT	1-CE1-G1-S9 1-CE1-G2-S10	OC12TERM	CR MN	SA NSA	NA
STS-1 intercard fail	REPT ALM	EQPT	1-CE1-G1-S9 1-CE1-G2-S10	OC12 TERM	CR MN	SA NSA	NA
Switch mode mismatch	REPT EVT REPT ALM	EQPT	1-CE1-G1-S9 1-CE1-G2-S10	SWEQPT	(*1) CL	(*2) NSA	NA
Synchronization clock fail	REPT ALM	EQPT	1-CE1-G1-S9 1-CE1-G2-S10	OC12TERM	MJ	NSA	NA
System clock reference fail	REPT ALM	EQPT	1-CE1-G1-S9 1-CE1-G2-S10	SYNCCLK	CR MN	SA NSA	NA
Transmission rate mismatch	REPT EVT REPT ALM	EQPT	1-CE1-G1-S9 1-CE1-G2-S10	OC12TERM	(*1) CL	(*2) NSA	NA
Transmit fail	REPT ALM	EQPT	1-CE1-G1-S9 1-CE1-G2-S10	TRMT	CR MN	SA NSA	NA
VT connection provisioning mismatch	REPT ALM	EQPT	1-CE1-G1 1-CE1-G2	OC12TERM	MN	NSA	NA

* The TL1 parameter NTFCNCDE is not used in REPT EVT messages. Instead, the CONDEFF parameter is used with a value of SC.

** The TL1 parameter SRVEFF is not used in REPT EVT messages.

—end—

Shelf alarms

The following table correlates shelf alarms to TL1 messages.

Table 3-28
Shelf alarm TL1 correlations

Alarm text	TL1 message	SCCM	AID	CONDTYPE	NTFCN CDE	SRV EFF	DIRN
Both planes non-operational	REPT ALM	EQPT	1-CE1	INT	CR	SA	NA
Exerciser fail	REPT ALM	EQPT	1-CE1	SWEX	MN	NSA	NA
Plane A non-operational	REPT EVT REPT ALM	EQPT	1-CE1	INT	WR	NSA	NA
Plane B non-operational	REPT EVT REPT ALM	EQPT	1-CE1	INT	WR	NSA	NA
Power filter A missing	REPT ALM	EQPT	1-CE1	IMPROPRMVL	MJ	SA	NA
Power filter B missing	REPT ALM	EQPT	1-CE1	IMPROPRMVL	MJ	SA	NA
Shelf assembly fail	REPT ALM	EQPT	1-CE1	IMPROPRMVL	CR	SA	NA
Shelf id bus fail	REPT ALM	EQPT	1-CE1	INT	MJ	NSA	NA
SONET overhead clock loss	REPT ALM	EQPT	1-CE1	INT	MN	NSA	NA
Talk battery A loss	REPT ALM	EQPT	1-CE1	BATTERY	MJ	SA	NA
Talk battery B loss	REPT ALM	EQPT	1-CE1	BATTERY	MJ	SA	NA
Timing reference interface fail	REPT ALM	EQPT	1-BITS[A,B], 1-[A,B]	SYNCCLK	MJ MN	SA NSA	
Traffic upgrade in progress	REPT EVT REPT ALM	EQPT	1-CE1	CONTCOM	(*1) CL	(*2) NSA	NA

SOAM alarms

The following table correlates SOAM alarms to TL1 messages.

Table 3-29
SOAM alarm TL1 correlations

Alarm text	TL1 message	SCCM	AID	CONDTYPE	NTFCN CDE	SRV EFF	DIRN
Line card fail	REPT ALM	EQPT	1-[1..7]-[1..96]	INT	MN	SA	NA
Line card missing	REPT ALM	EQPT	1-[1..7]-[1..96]	IMPROPRMVL	MN	SA	NA
Loss of power at NT1	REPT ALM	LINE	1-[1..7]-[1..96]	EXT	MN	SA	NA
NT1 power status changed	REPT ALM	LINE	1-[1..7]-[1..96]	EXT	MN	SA	NA
NT1 test mode changed	REPT ALM	LINE	1-[1..7]-[1..96]	NNTTST	MN	SA	NA
Sync lost with NT1	REPT ALM	LINE	1-[1..7]-[1..96]	EXT	MN	SA	NA

TAC alarms

The following table correlates TAC alarms to TL1 messages.

Table 3-30
TAC alarm TL1 correlations

Alarm text	TL1 message	SCCM	AID	CONDTYPE	NTFCN CDE	SRV EFF	DIRN
Circuit pack fail	REPT ALM	EQPT	1-CE1-TAC	TSTACC	MN	NSA	NA
Circuit pack mismatch	REPT ALM	EQPT	1-CE1-TAC	TSTACC	MN	NSA	NA
Circuit pack missing	REPT ALM	EQPT	1-CE1-TAC	IMPROPRMVL	MN	NSA	NA
Digital side fail	REPT ALM	EQPT	1-CE1-TAC	TSTACC	MN	NSA	NA
Metallic side fail	REPT ALM	EQPT	1-CE1-TAC	TSTACC	MN	NSA	NA
PGTIC I/O card mismatch	REPT ALM	EQPT	1-CE1-PGTC	TSTACC	MN	NSA	NA
Software download fail	REPT ALM	EQPT	1-CE1-TAC	TSTACC	MN	NSA	NA
TAP I/O card mismatch	REPT ALM	EQPT	1-CE1-TAC	TSTACC	MN	NSA	NA
TBP I/O card mismatch	REPT ALM	EQPT	1-CE1-TAC	TSTACC	MN	NSA	NA

TIC alarms

The following table correlates TIC alarms to TL1 messages.

Table 3-31
TIC alarm TL1 correlations

Alarm text	TL1 message	SCCM	AID	CONDTYPE	NTFCN CDE	SRV EFF	DIRN
Backplane parity error	REPT ALM	EQPT	1-CE1-TIC	CONTEQPT	CR MN	SA NSA	NA
Circuit pack fail	REPT ALM	EQPT	1-CE1-TIC	CONTEQPT	CR MN	SA NSA	NA
Circuit pack mismatch	REPT ALM	EQPT	1-CE1-TIC	CONTEQPT	CR MN	SA NSA	NA
Circuit pack missing	REPT ALM	EQPT	1-CE1-TIC	IMPROPRMVL	CR MN	SA NSA	NA
Loss of signal synchronization	REPT ALM	EQPT	1-CE1-TIC	CONTEQPT	MJ	SA	NA
T-link interface fail	REPT ALM	EQPT	1-CE1-TIC	CONTEQPT	CR MN	SA NSA	NA
T-link interface fail	REPT EVT REPT ALM	EQPT	1-CE1-TIC	CONTEQPT	(*1) CL	(*2) NSA	NA
TR-08 circuit pack mismatch	REPT ALM	EQPT	1-CE1-TIC(A,B)	CONTEQPT	MN	SA	NA

TXC alarms

The following table correlates TXC alarms to TL1 messages.

Table 3-32
TXC alarm TL1 correlations

Alarm text	TL1 message	SCCM	AID	CONDTYPE	NTFC NCDE	SRV EFF	DIRN
Circuit pack missing	REPT EVT	EQPT	1-CE1-TXCG[1..2]	IMPROPRMVL	CR MN	SA NSA	NA
Circuit pack failure	REPT EVT	EQPT	1-CE1-TXCG[1..2]	CONTEQPT	CR MN	SA NSA	NA
Circuit pack mismatch	REPT EVT	EQPT	1-CE1-TXCG[1..2]	CONTEQPT	CR MN	SA NSA	NA
End VCO range	REPT EVT	EQPT	1-CE1-TXCG[1..2]	SYNCCLKV			NA
Timing generation primary reference fail	REPT EVT	COM	n/a	SYNCPRI	MJ MN	SA, NSA	NA
Timing generation secondary reference fail	REPT EVT	COM	n/a	SYNCSEC	MJ MN	SA, NSA	NA
Failure to lock	REPT EVT	EQPT	1-CE1-TXCG[1..2]	SYNCCLKL	MJ MN	SA, NSA	NA
Serial link failure	REPT EVT	EQPT	1-CE1-TXCG[1..2]	CONTCOM	MN	NSA	NA

—continued—

Table 3-32 (continued)
TXC alarm TL1 correlations

Alarm text	TL1 message	SCCM	AID	CONDTYPE	NTFC NCDE	SRV EFF	DIRN
Manual equipment switch request	REPT EVT	EQPT	1-CE1-TXCG[1..2]	MANWKSWPR	MN	NSA	NA
Manual timing reference switch request	REPT EVT	EQPT	1-CE1-PRI 1-CE1-SEC	MANSWTREF	MN	NSA	NA
Forced equipment switch request	REPT EVT	EQPT	1-CE1-TXCG[1..2)	FRCDWKSWPR	MN	NSA	NA
Forced timing reference switch request	REPT EVT	EQPT	1-CE1-PRI 1-CE1-SEC	PRCDSWTREF	MN	NSA	NA
Equipment protection switch complete	REPT EVT	EQPT	1-CE1-TXCG[1..2]	WKSWPRE			NA
Timing ref prot switch complete	REPT EVT	EQPT	1-CE1-PRI 1-CE1-SEC	WKSWPRR			NA
Equipment protection switch fail	REPT EVT	EQPT	1-CE1-TXCG[1..2]	FAILTPSW	MN	NSA	NA
Equipment lockout request	REPT EVT	EQPT	1-CE1-TXCG[1..2]	INHSWPRE	MN	NSA	NA
Timing ref lockout request	REPT EVT	EQPT	1-CE1-PRI 1-CE1-SEC	INHSWPRR	MN	NSA	NA
Equipment prot oscillation control activated	REPT EVT	EQPT	1-CE1-TXCG[1..2]	AUTOLOCKE	MN	NSA	NA
Timing ref prot oscillation control activated	REPT EVT	EQPT	1-CE1-PRI 1-CE1-SEC	AUTOLOCKR	MN	NSA	NA
Sys clock src entry to freerun	REPT EVT	EQPT	1-CE1	FRGSYNCS			NA
Timing gen entry to freerun mode	REPT EVT	EQPT	1-CE1-TXCG[1..2]	FRGSYNCR			NA
Timing gen entry to acquire mode	REPT EVT	EQPT	1-CE1-TXCG[1..2]	SYNCCLKA			NA
Timing gen entry to fast mode	REPT EVT	EQPT	1-CE1-TXCG[1..2]	FSTSYNC			NA
Timing gen entry to holdover mode	REPT EVT	EQPT	1-CE1-TXCG[1..2]	HOLDOVERSY NC			NA
Partial circuit pack fail	REPTEVT	EQPT	1-CE1-TXCG[1..2]	CONTEQPT			NA
Timing ref prot switch fail	REPT EVT	EQPT	1-CE1-PRI 1-CE1-SEC	SYNCEQPT	MN	NSA	
Transmission rate mismatch	REPT EVT	EQPT	1-CE1-TXCG[1..2]	T1TERM			NA
Intercard failure: STS1 PE or clock	REPT EVT	EQPT	1-CE1-TXCG[1..2]	BUERR			
—end—							

DATACOMM facility alarms

The following table correlates DATACOMM facility alarms to TL1 messages.

Table 3-33
DATACOMM facility alarm TL1 correlations

Alarm text	TL1 message	SCCM	AID	CONDTYPE	NTFCN CDE	SRV EFF	DIRN
Faulty path	REPT ALM	T1	1-CE1-EOC-[1..14] 1-CE1-CSC-[1..14]	EXT	MJ MN	SA NSA	NA
No active path	REPT ALM	T1	1-CE1-EOC-[1..14] 1-CE1-CSC-[1..14]	EXT	MJ	SA	NA
SONET DCC link fail	REPT ALM	OC3/ OC12	1-CE1-SDCC-1	LOS	MN	NSA	NA
SONET DCC performance degraded	REPT EVT	OC3/ OC12	1-CE1-SDCC-1	EXT	WR	NSA	NA
OMC performance degraded	REPT EVT	T1	1-CE1-OMC-[1..10]	EXT			ZA
OMC link fail	REPT EVT		1-CE1-OMC-[1..10]	LOS	MN	NSA	ZA

DS1 facility alarms

The following table correlates DS1 facility alarms to TL1 messages.

Note: The TL1 parameter LOCN contains NEND for DS1 Facility alarms.

Table 3-34
DS1 facility alarm TL1 correlations

Alarm text	TL1 message	SCCM	AID	CONDTYPE	NTFCN CDE*	SRV EFF**	DIRN
Line Rx CV threshold 1	REPT EVT	T1	1-CE1-1G[1..12]-[1..14]	T-CVL	(*1)	(*2)	ZA
Line Rx CV threshold 2	REPT EVT	T1	1-CE1-1G[1..12]-[1..14]	T-CVL	(*1)	(*2)	ZA
Line Rx ES threshold 1	REPT EVT	T1	1-CE1-1G[1..12]-[1..14]	T-ESL	(*1)	(*2)	ZA
Line Rx ES threshold 2	REPT EVT	T1	1-CE1-1G[1..12]-[1..14]	T-ESL	(*1)	(*2)	ZA
Line Rx SES threshold 1	REPT EVT	T1	1-CE1-1G[1..12]-[1..14]	T-SESL	(*1)	(*2)	ZA
Line Rx SES threshold 2	REPT EVT	T1	1-CE1-1G[1..12]-[1..14]	T-SESL	(*1)	(*2)	ZA
Loopback	REPT ALM	T1	1-CE1-1G[1..12]-[1..14]	ACTLPBK	MN	NSA	ZA
Rx bipolar violation	REPT ALM	T1	1-CE1-1G[1..12]-[1..14]	CCBPV	MJ	SA	ZA
Rx loss of frame	REPT ALM	T1	1-CE1-1G[1..12]-[1..14]	LOF	MJ	SA	ZA
Rx loss of signal	REPT ALM	T1	1-CE1-1G[1..12]-[1..14]	LOS	MJ	SA	ZA
Rx yellow	REPT EVT REPT ALM	T1	1-CE1-1G[1..12]-[1..14]	YEL	(*1) CL	(*2) NSA	AZ
Rx AIS	REPT EVT REPT ALM	T1	1-CE1-1G[1..12]-[1..14]	AIS	(*1) CL	(*2) NSA	ZA

* The TL1 parameter NTFCNCDE is not used in REPT EVT messages. Instead, the CONDEFF parameter is used with a value of SC for warnings and TC for alerts.

** The TL1 parameter SRVEFF is not used in REPT EVT messages.

DS3 facility alarms

The following table correlates DS3 facility alarms to TL1 messages.

Note: The TL1 parameter LOCN contains NEND for DS3 Facility alarms.

Table 3-35
DS3 facility alarm TL1 correlations

Alarm text	TL1 message	SCCM	AID	CONDTYPE	NTFCN CDE*	SRV EFF**	DIRN
Loopback	REPT ALM	T3	1-CE1-3G[1..3]-[1..3]	ACTLPBK	MN	NSA	ZA
Parity error	REPT ALM	T3	1-CE1-3G[1..3]-[1..3]	T3TERM	MN	NSA	ZA
Rx bipolar violation	REPT ALM	T3	1-CE1-3G[1..3]-[1..3]	CCBPV	MJ	SA	ZA
Rx loss of frame	REPT ALM	T3	1-CE1-3G[1..3]-[1..3]	LOF	MJ	SA	ZA
Rx loss of signal	REPT ALM	T3	1-CE1-3G[1..3]-[1..3]	LOS	MJ	SA	ZA
Rx AIS	REPT EVT REPT ALM	T3	1-CE1-3G[1..3]-[1..3]	AIS	(*1) CL	(*2) SA	ZA
Tx loss of frame	REPT ALM	T3	1-CE1-3G[1..3]-[1..3]	LOF	MJ	SA	AZ
Tx AIS	REPT EVT REPT ALM	T3	1-CE1-3G[1..3]-[1..3]	AIS	(*1) CL	(*2) SA	AZ
Line Rx CV threshold 1	REPT EVT	T3	1-CE1-3G[1..3]-[1..3]	T-CVL	(*1)	(*2)	ZA
Line Rx CV threshold 2	REPT EVT	T3	1-CE1-3G[1..3]-[1..3]	T-CVL	(*1)	(*2)	ZA
Line Rx ES threshold 1	REPT EVT	T3	1-CE1-3G[1..3]-[1..3]	T-ESL	(*1)	(*2)	ZA
Line Rx ES threshold 2	REPT EVT	T3	1-CE1-3G[1..3]-[1..3]	T-ESL	(*1)	(*2)	ZA
Line Rx SES threshold 1	REPT EVT	T3	1-CE1-3G[1..3]-[1..3]	T-SESL	(*1)	(*2)	ZA
Line Rx SES threshold 2	REPT EVT	T3	1-CE1-3G[1..3]-[1..3]	T-SESL	(*1)	(*2)	ZA
Path Rx AISS threshold 1	REPT EVT	T3	1-CE1-3G[1..3]-[1..3]	T-AISS	(*1)	(*2)	ZA
Path Rx AISS threshold 2	REPT EVT	T3	1-CE1-3G[1..3]-[1..3]	T-AISS	(*1)	(*2)	ZA
Path Rx CV threshold 1	REPT EVT	T3	1-CE1-3G[1..3]-[1..3]	T-CVP	(*1)	(*2)	ZA
Path Rx CV threshold 2	REPT EVT	T3	1-CE1-3G[1..3]-[1..3]	T-CVP	(*1)	(*2)	ZA
Path Rx ES threshold 1	REPT EVT	T3	1-CE1-3G[1..3]-[1..3]	T-ESP	(*1)	(*2)	ZA
Path Rx ES threshold 2	REPT EVT	T3	1-CE1-3G[1..3]-[1..3]	T-ESP	(*1)	(*2)	ZA
Path Rx SEFS threshold 1	REPT EVT	T3	1-CE1-3G[1..3]-[1..3]	T-OOF	(*1)	(*2)	ZA
Path Rx SEFS threshold 2	REPT EVT	T3	1-CE1-3G[1..3]-[1..3]	T-OOF	(*1)	(*2)	ZA
Path Rx SES threshold 1	REPT EVT	T3	1-CE1-3G[1..3]-[1..3]	T-SESP	(*1)	(*2)	ZA
Path Rx SES threshold 2	REPT EVT	T3	1-CE1-3G[1..3]-[1..3]	T-SESP	(*1)	(*2)	ZA
Path Rx UAS threshold 1	REPT EVT	T3	1-CE1-3G[1..3]-[1..3]	T-UASP	(*1)	(*2)	ZA

—continued—

Table 3-35 (continued)
DS3 facility alarm TL1 correlations

Alarm text	TL1 message	SCCM	AID	CONDTYPE	NTFCN CDE*	SRV EFF**	DIRN
Path Rx UAS threshold 2	REPT EVT	T3	1-CE1-3G[1..3]-[1..3]	T-UASP	(*1)	(*2)	ZA
Path Tx AISS threshold 1	REPT EVT	T3	1-CE1-3G[1..3]-[1..3]	T-AISS	(*1)	(*2)	AZ
Path Tx AISS threshold 2	REPT EVT	T3	1-CE1-3G[1..3]-[1..3]	T-AISS	(*1)	(*2)	AZ
Path Tx CV threshold 1	REPT EVT	T3	1-CE1-3G[1..3]-[1..3]	T-CVP	(*1)	(*2)	AZ
Path Tx CV threshold 2	REPT EVT	T3	1-CE1-3G[1..3]-[1..3]	T-CVP	(*1)	(*2)	AZ
Path Tx ES threshold 1	REPT EVT	T3	1-CE1-3G[1..3]-[1..3]	T-ESP	(*1)	(*2)	AZ
Path Tx ES threshold 2	REPT EVT	T3	1-CE1-3G[1..3]-[1..3]	T-ESP	(*1)	(*2)	AZ
Path Tx SEFS threshold 1	REPT EVT	T3	1-CE1-3G[1..3]-[1..3]	T-OOF	(*1)	(*2)	AZ
Path Tx SEFS threshold 2	REPT EVT	T3	1-CE1-3G[1..3]-[1..3]	T-OOF	(*1)	(*2)	AZ
Path Tx SES threshold 1	REPT EVT	T3	1-CE1-3G[1..3]-[1..3]	T-SESP	(*1)	(*2)	AZ
Path Tx SES threshold 2	REPT EVT	T3	1-CE1-3G[1..3]-[1..3]	T-SESP	(*1)	(*2)	AZ
Path Tx UAS threshold 1	REPT EVT	T3	1-CE1-3G[1..3]-[1..3]	T-UASP	(*1)	(*2)	AZ
Path Tx UAS threshold 2	REPT EVT	T3	1-CE1-3G[1..3]-[1..3]	T-UASP	(*1)	(*2)	AZ

* The TL1 parameter NTFCNCDE is not used in REPT EVT messages. Instead, the CONDEFF parameter is used with a value of SC for warnings and TC for alerts.

** The TL1 parameter SRVEFF is not used in REPT EVT messages.

—end—

ESI facility alarms

The following table correlates DS1 equipment alarms to TL1 messages.

Note: The TL1 parameter LOCN contains NEND for ESI Facility alarms.

Table 3-36
ESI facility alarm TL1 correlations

Alarm text	TL1 message	SCCM	AID	CONDTYPE	NTFCN CDE*	SRV EFF**	DIRN
Bipolar violation	REPT ALM	T1	1-CE1-BITS[A, B]	CCBPV	MN	NSA	NA
Degraded clock carrier	REPT ALM	T1	1-CE1-BITS[A, B]	SYNCCLK	MN	NSA	NA
Degraded timing reference	REPT ALM	T1	1-CE1-BITS[A, B]	SYNC	MJ MN	SA NSA	NA
Loss of frame	REPT ALM	T1	1-CE1-BITS[A, B]	SYNC	MN	NSA	NA
Loss of signal	REPT ALM	T1	1-CE1-BITS[A, B]	SYNC	MN	NSA	NA
Oscillating sync status message	REPT ALM	T1	1-CE1-BITS[A, B]	SYNC	MJ MN	SA NSA	NA
Reference forced switch request	REPT ALM	T1	1-[1....4]	FRCDWKSWPR	MN	NSA	NA
Reference lockout request	REPT ALM	T1	1-CE1-[PRI, SEC]	INHSWPR	MN	NSA	NA
Reference manual switch request	REPT ALM	T1	1-CE1-[PRI, SEC]	MANWKSWPR	MN	NSA	NA
Reference switch complete	REPT EVT REPT ALM	T1	1-CE1-[1,2]	WKSWPR	(*1) CL	(*2) NSA	NA
Reference switch fail	REPT ALM	T1	1-CE1-[PRI, SEC]	FAILTOSW	MN	NSA	NA
Rx AIS	REPT ALM	T1	1-CE1-BITS[A, B]	SFI	MN	NSA	ZA
Timing reference interface fail	REPT ALM	T1	1-BITS[A, B] 1-[A, B]	SYNCCLK	MJ MN	SA NSA	NA
Tx AIS	REPT ALM	T1	1-CE1-TRG[1..2]	SFI	MN	NSA	ZA
Undefined sync status message	REPT ALM	T1	1-CE1-BITS[A, B]	SYNC	MJ MN	SA NSA	NA

* The TL1 parameter NTFCNCDE is not used in REPT EVT messages. Instead, the CONDEFF parameter is used with a value of SC for warnings and TC for alerts.

** The TL1 parameter SRVEFF is not used in REPT EVT messages.

OC-3/OC-12 facility alarms

The following table correlates OC-3/OC-12 facility alarms to TL1 messages.

> ***Note:*** The TL1 parameter LOCN contains NEND for AccessNode Facility alarms.

Table 3-37
OC-3/OC-12 facility alarm TL1 correlations

Alarm text	TL1 message	SCCM	AID	CONDTYPE	NTFCN CDE	SRV EFF	DIRN
SP_line_card_missing	REPT ALM	OC3/ OC12	1-CE1-03[G1S..G2S] 1-CE1-03[G3..G8]	IMPROPRVL	CR MN	SA NSA	ZA
Loss of frame	REPT ALM	OC3/ OC12	1-CE1-G1 1-CE1-G2	LOF	CR MN	SA NSA	ZA
Rx loss of signal	REPT ALM	OC3/ OC12	1-CE1-G1 1-CE1-G2	LOS	CR MN	SA NSA	ZA
Line FERF	REPT ALM	OC3/ OC12	1-CE1-G1 1-CE1-G2	FERF	CR WR	SA NSA	ZA
Rx AIS	REPT ALM	OC12	1-A, I-B 1-AS, 1-BS	AIS	CR (*1)	SA (*2)	ZA
Signal degrade	REPT ALM	OC3/ OC12	1-CE1-G1 1-CE1-G2	INCFAD	MN	SA NSA	ZA
Laser bias current	REPT EVT	OC3/ OC12	1-CE1-G1 1-CE1-G2	T-LBCL	CR MN	SA NSA	ZA
Sect Rx CV threshold 1	REPT EVT	OC3/ OC12	1-CE1-G1 1-CE1-G2	T-CVS	CR MN	SA NSA	ZA
Sect Rx CV threshold 2	REPT EVT	OC3/ OC12	1-CE1-G1 1-CE1-G2	T-CVS	CR MN	SA NSA	ZA
Sect Rx ES threshold 1	REPT EVT	OC3/ OC12	1-CE1-G1 1-CE1-G2	T-ESS	CR WR	SA NSA	ZA
Sect Rx ES threshold 2	REPT EVT	OC3/ OC12	1-CE1-G1 1-CE1-G2	T-ESS	CR WR	SA NSA	ZA
Sect Rx SEFS threshold 1	REPT EVT	OC3/ OC12	1-CE1-G1 1-CE1-G2	T-OOF	MN	SA NSA	ZA
Sect Rx SEFS threshold 2	REPT EVT	OC3/ OC12	1-CE1-G1 1-CE1-G2	T-OOF	CR MN	SA NSA	ZA
Sect Rx SEF threshold 1	REPT EVT	OC3/ OC12	1-CE1-G1 1-CE1-G2	T-SESS	CR MN	SA NSA	ZA
Sect Rx SEF threshold 2	REPT EVT	OC3/ OC12	1-CE1-G1 1-CE1-G2	T-SESS	CR MN	SA NSA	ZA
Signal fail (BIP-8 saturation)	REPT ALM	OC3/ OC12	1-CE1-G1 1-CE1-G2	T-BIPS	CR MN	SA NSA	ZA
Timing Reference InterfaceFail	REPT ALM	OC12	1-A, 1-B 1-SA, 1-BS		MJ	NSA	

Note 1:The REPT EVT messages do not use the TL1 NTFCNCDE parameter. They use the CONDEFF parameter instead with a value of SC for warnings and TC for alerts.

Note 2:REPT EVT messages do no use the TL1 SRVEFF parameter.

STSn facility alarms

The following table correlates STSn facility alarms to TL1 messages

Table 3-38
STSn facility alarm TL1 correlations

Alarm text	TL1 message	SCCM	AID	CONDTYPE	NTFCN CDE	SRV EFF	DIRN
SP_line_card_missing	REPT ALM	OC3/ OC12	1-CE1-03[G1S..G2S] 1-CE1-03[G3..G8]	IMPROPRVL			
Line FERF	REPT EVT REPT ALM	OC3/ OC12	1-CE1-G1 1-CE1-G2	FERF	CR WR	SA NSA	ZA
Rx AIS	REPT ALM REPT EVT	OC3/ OC12	1-CE1-G1 1-CE1-G2	AIS	CR (*1)	SA (*2)	ZA
Signal degrade	REPT ALM	OC3/ OC12	1-CE1-G1 1-CE1-G2	INCFAD	MN	SA NSA	ZA
Line Rx CV threshold 1	REPT EVT	OC3/ OC12	1-CE1-G1 1-CE1-G2	T-CVL	(*1)	(*2)	ZA
Line Rx CV threshold 2	REPT EVT	OC3/ OC12	1-CE1-G1 1-CE1-G2	T-CVL	(*1)	(*2)	ZA
Line Rx ES threshold 1	REPT EVT	OC3/ OC12	1-CE1-G1 1-CE1-G2	T-ESL	(*1)	(*2)	ZA
Line Rx ES threshold 2	REPT EVT	OC3/ OC12	1-CE1-G1 1-CE1-G2	T-ESL	(*1)	(*2)	ZA
Line Rx SES threshold 1	REPT EVT	OC3/ OC12	1-CE1-G1 1-CE1-G2	T-SESL	(*1)	(*2)	ZA
Line Rx SES threshold 2	REPT EVT	OC3/ OC12	1-CE1-G1 1-CE1-G2	T-SESL	(*1)	(*2)	ZA

STS-1 facility alarms

The following table correlates STS-1 facility alarms to TL1 messages.

> ***Note:*** Except where noted below, the TL1 parameter LOCN contains NEND for STS1 facility alarms. The LOCN parameter is FEND for the following alarms:
>
> — STS1 path FE CV threshold 1
> — STS1 path FE CV threshold 2
> — STS1 path FE ES threshold 1
> — STS1 path FE ES threshold 2
> — STS1 path FE SES threshold 1
> — STS1 path FE SES threshold 2

Table 3-39
STS-1 facility alarm TL1 correlations

Alarm text	TL1 message	SCCM	AID	CONDTYPE	NTFC NCDE*	SRV EFF**	DIRN
STS1 path trace failure	REPT ALM	T3X1	1-CE1-S3G[1..3]-[1..3] 1-CE1-S1G[1,3,7,9,11] 1-CE1-S1TIC-[1..2]	PAINTGRT	MJ	SA	ZA
STS1 Rx unequipped	REPT ALM	T3X1	1-CE1-S3G[1..3]-[1..3] 1-CE1-S1G[1,3,7,9,11] 1-CE1-S1TIC-[1..2]	STS1TERM	MJ	SA	ZA
STS1 Rx yellow	REPT ALM	T3X1	1-CE1-S3G[1..3]-[1..3] 1-CE1-S1G[1,3,7,9,11] 1-CE1-S1TIC-[1..2]	YEL	MJ	SA	AZ
STS1 path CV threshold 1	REPT EVT	STS1	1-CE1-S3G[1..3]-[1..3] 1-CE1-S1G[1,3,7,9,11] 1-CE1-S1TIC-[1..2]	T-CVP		NSA	ZA
STS1 path CV threshold 2	REPT EVT	STS1	1-CE1-S3G[1..3]-[1..3] 1-CE1-S1G[1,3,7,9,11] 1-CE1-S1TIC-[1..2]	T-CVP		NSA	ZA
STS1 path ES threshold 1	REPT EVT	STS1	1-CE1-S3G[1..3]-[1..3] 1-CE1-S1G[1,3,7,9,11] 1-CE1-S1TIC-[1..2]	T-ESP		NSA	ZA
STS1 path ES threshold 2	REPT EVT	STS1	1-CE1-S3G[1..3]-[1..3] 1-CE1-S1G[1,3,7,9,11] 1-CE1-S1TIC-[1..2]	T-ESP		NSA	ZA
STS1 path SES threshold 1	REPT ALM	STS1	1-CE1-S3G[1..3]-[1..3] 1-CE1-S1G[1,3,7,9,11] 1-CE1-S1TIC-[1..2]	T-SESP		NSA	ZA
STS1 path SES threshold 2		STS1	1-CE1-S3G[1..3]-[1..3] 1-CE1-S1G[1,3,7,9,11] 1-CE1-S1TIC-[1..2]	T-SESP		NSA	ZA
STS1 path UAS threshold 1	REPT EVT	STS1	1-CE1-SG[1..2]-[1..12]	T-USAP		NSA	ZA
STS1 path UAS threshold 2	REPT EVT	STS1	1-CE1-SG[1..2]-[1..12]	T-USAP		NSA	ZA
STS1 signal label mismatch	REPT ALM	STS1	1-CE1-S3G[1..3]-[1..3] 1-CE1-S1G[1,3,7,9,11] 1-CE1-S1TIC-[1..2]	STS1TERM	MJ	SA	ZA

* The TL1 parameter NTFCNCDE is not used in REPT EVT messages. Instead, the CONDEFF parameter is used with a value of SC for warnings and TC for alerts. The NTFCNCDE parameter is also not used for the STS1 path FE SES and SES threshold REPT ALM messages.

** The TL1 parameter SRVEFF is not used in REPT EVT messages.

TR-08 facility alarms

The following table correlates TR-08 facility alarms to TL1 messages.

Table 3-40
TR-08 facility alarm TL1 correlations

Alarm text	TL1 message	SCCM	AID	CONDTYPE	NTFCN CDE	SRV EFF	DIRN
TR-08 System 1 far end major (same for Systems 2-7)	REPT ALM	VT1	1-CE1-V1TIC[1..28]	YEL	MJ	SA	AZ
TR-08 System 1 loss of Rx DDL (same for Systems 2-7)	REPT ALM	VT1	1-CE1-V1TIC[1..28]	LOF	MJ	SA	ZA
TR-08 System 1 loss of Rx DDL (same for Systems 2-7)	REPT ALM	VT1	1-CE1-V1TIC[1..28]	LOS	MJ	SA	ZA

VT1.5 facility alarms

The following table correlates VT1.5 facility alarms to TL1 messages.

> ***Note:*** The TL1 parameter LOCN contains NEND for VT1.5 facility alarms.

Table 3-41
VT1.5 facility alarm TL1 correlations

Alarm text	TL1 message	SCCM	AID	CONDTYPE	NTFC NCDE*	SRV EFF**	DIRN
VT Rx AIS	REPT EVT REPT ALM	VT1	1-CE1-V1G[1..12]-[1..14] 1-CE1-V1TIC-[1..28] 1-CE1-V1TIC-[29..56]	AIS	(*1) CL	(*2) NSA	ZA
VT Rx loss of pointer	REPT ALM	VT1	1-CE1-V1G[1..12]-[1..14] 1-CE1-V1TIC-[1..28] 1-CE1-V1TIC-[29..56]	LOP	MJ	SA	ZA
VT Rx unequipped	REPT ALM	VT1	1-CE1-V1G[1..12]-[1..14] 1-CE1-V1TIC-[1..28] 1-CE1-V1TIC-[29..56]	VT1TERM	MJ	SA	ZA
VT Rx yellow	REPT EVT REPT ALM	VT1	1-CE1-V1G[1..12]-[1..14] 1-CE1-V1TIC-[1..28] 1-CE1-V1TIC-[29..56]	YEL	(*1) CL	(*2) NSA	AZ

* The TL1 parameter NTFCNCDE is not used in REPT EVT messages. Instead, the CONDEFF parameter is used with a value of SC for warnings and TC for alerts.

** The TL1 parameter SRVEFF is not used in REPT EVT messages.

Environmental alarms

The following table correlates Environmental alarms to TL1 messages.

Note: The TL1 parameter DIRN contains no value for environmental alarms.

Table 3-42
Environmental alarm TL1 correlations

Alarm text	TL1 message	SCCM	AID	ALMTYPE	NTFCN CDE	LOCN
48V Battery A CE supply fail	REPT ALM ENV	ENV	1-BA	BATTERY	MN	A
48V Battery B CE supply fail	REPT ALM ENV	ENV	1-BB	BATTERY	MN	B
48V CDS breaker tripped main bay		ENV		BATTERY	MJ	A
48V CE, Cu or TB CE breaker tripped main bay		ENV		BATTERY	MN	A
Fan 1 fail	REPT ALM ENV	ENV	1-F1	CLFAN	MN	1
Fan 2 fail	REPT ALM ENV	ENV	1-F2	CLFAN	MN	2
Fan 3 fail	REPT ALM ENV	ENV	1-F3	CLFAN	MN	3
High bay temperature	REPT ALM ENV	ENV	1	HITEMP	CR	-
High CE shelf temperature		ENV		HITEMP	CR	-
Talk battery filter fail	REPT ALM ENV	ENV	1	BATTERY	MN	-
Telemetry input N	REPT ALM ENV	ENV	1-S[1..11]	MISC	MN	-

OC-3 performance monitoring

The following table correlates OC-3 performance monitoring to TL1 messages.

Table 3-43
OC-3 performance monitoring TL1 correlations

Performance measurement text	PM type	TL1 message	SCCM	MONTYPE	LOCN	DIRN
Protection Switch Count	PSC	REPT PM	OC3	PSC	NEND	NA
Protection Switch Duration	PSD	REPT PM	OC3	PSD	NEND	NA

OC-12 performance monitoring

The following table correlates OC-12 performance monitoring to TL1 messages.

Table 3-44
OC-12 performance monitoring TL1 correlations

Performance measurement text	PM type	TL1 message	SCCM	MONTYPE	LOCN	DIRN
Line Coding Violation	Line CV	REPT PM	OC12	CVL	NEND	ZA
Line Error Second	Line ES	REPT PM	OC12	ESL	NEND	ZA
Line Severely Errored Second	Line SES	REPT PM	OC12	SESL	NEND	ZA
Section Coding Violation	Section CV	REPT PM	OC12	CVS	NEND	ZA
Section Error Second	Section ES	REPT PM	OC12	ESS	NEND	ZA
Section Severely Errored Second	Section SES	REPT PM	OC12	SESS	NEND	ZA
Section Severely Errored Frame Second	Section SEFS	REPT PM	OC12	OOF	NEND	ZA
Protection Switch Count	PSC	REPT PM	OC12	PSC	NEND	NA
Protection Switch Duration	PSD	REPT PM	OC12	PSD	NEND	NA

DS1 performance monitoring

The following table correlates DS1 performance monitoring to TL1 messages.

Table 3-45
DS1 performance monitoring TL1 correlations

Performance measurement text	PM type	TL1 message	SCCM	MONTYPE	LOCN	DIRN
Line Coding Violation	Line CV	REPT PM	T1	CVL	NEND	ZA
Line Error Second	Line ES	REPT PM	T1	ESL	NEND	ZA
Line Severely Errored Second	Line SES	REPT PM	T1	SESL	NEND	ZA
Path Coding Violation	Path CV	REPT PM	T1	CVP	NEND	ZA AZ
Path Error Second	Path ES	REPT PM	T1	ESP	NEND	ZA AZ
Path Severely Errored Second	Path SES	REPT PM	T1	SESP	NEND	ZA AZ
Path Severely Errored Frame Second	Path SEFS	REPT PM	T1	OOF	NEND	ZA AZ
Path AIS Seconds	Path AISS	REPT PM	T1	AISS	NEND	ZA AZ
Path Unavailable Seconds	Path UAS	REPT PM	T1	UASP	NEND	ZA AZ
Path Fail Count	PFC	REPT PM	T1	PFC	NEND	NA

DS3 performance monitoring

The following table correlates DS3 performance monitoring to TL1 messages.

Table 3-46
DS3 performance monitoring TL1 correlations

Performance measurement text	PM type	TL1 message	SCCM	MONTYPE	LOCN	DIRN
Line Coding Violation	Line CV	REPT PM	T3	CVL	NEND	ZA
Line Error Second	Line ES	REPT PM	T3	ESL	NEND	ZA
Line Severely Errored Second	Line SES	REPT PM	T3	SESL	NEND	ZA
Path Coding Violation	Path CV	REPT PM	T3	CVP	NEND	ZA AZ
Path Error Second	Path ES	REPT PM	T3	ESP	NEND	ZA AZ
Path Severely Errored Second	Path SES	REPT PM	T3	SESP	NEND	ZA AZ
Path Severely Errored Frame Second	Path SEFS	REPT PM	T3	OOF	NEND	ZA AZ
Path AIS Seconds	Path AISS	REPT PM	T3	AISS	NEND	ZA AZ
Path Unavailable Seconds	Path UAS	REPT PM	T3	UASP	NEND	ZA AZ
Protection Switch Count	PSC	REPT PM	T3	PSC	NEND	NA
Protection Switch Duration	PSD	REPT PM	T3	PSD	NEND	NA

Threshold defaults and ranges for performance monitoring

Table 3-47 lists the default PM threshold values for facilities.

Table 3-47
Default threshold values for parameters with two thresholds

Parameter	Threshold 1: errors per timed interval (15 min.)	Threshold 2: errors per day
for DS1		
DS1 line CV	13,340	133,400
DS1 line ES	65	648
DS1 line SES	10	100
DS1 path CV for framing format: superframe extended superframe	 72 13,296	 691 132,960
DS1 path ES	65	648
DS1 path SES	10	100
DS1 path SAS	2	17
DS1 path UAS	10	10
DS1 path FC	See Note.	
for DS3		
DS3 line CV	387	3,865
DS3 line ES	25	250
DS3 line SES	4	40
DS3 path CV	382	3,820
DS3 path ES	25	250
DS3 path SES	4	40
DS3 path SEFS	7	17
DS3 path AISS	7	17
DS3 path UAS	10	10
for STS-1		
STS-1 line BCV	387	3,865
—continued—		

Table 3-47 (continued)
Default threshold values for parameters with two thresholds

Parameter	Threshold 1: errors per timed interval (15 min.)	Threshold 2: errors per day
(for STS-1 cont'd)		
STS-1 line BES	25	250
STS-1 line BSES	4	40
STS-1 line CV	1772	4,430
STS-1 line ES	346	864
STS-1 line SES	2	4
STS-1 line UAS	10	10
STS-1 path CV	443	4,430
STS-1 path ES	65	648
STS-1 path SES	10	100
STS-1 path UAS	10	10
STS-1 path FC	See Note.	
for OC-12 or OC-3		
Section CV	1,772	4,430
Section ES	346	864
Section SES	2	4
Section SEFS	7	17
Line CV	1,772	4,430
Line ES	346	864
Line SES	2	4
Line UAS	10	10
Line FC	See Note.	
Note: DS1 path FC, OC-3 line FC, STS-1 path FC, and OC-12 line FC have no thresholds.		
—end—		

Table 3-48 shows the range of threshold values allowed for parameters with two thresholds.

Table 3-48
Ranges of allowed threshold values for parameters with two thresholds

Parameter	Errors per 1-minute interval	Errors per 15-minute interval	Errors per day	Errors per untimed interval
for DS1				
DS1 line CV		1 to 1,388,700	1 to 133,315,200	1 to 4,294,967,295
DS1 line ES		1 to 900	1 to 65,535	1 to 65,535
DS1 line SES		1 to 900	1 to 65,535	1 to 65,535
DS1 path CV for framing format: superframe extended superframe		 1 to 6,300 1 to 287,100	 1 to 604,800 1 to 27,561,600	 1 to 4,294,967,295 1 to 4,294,967,295
DS1 path ES		1 to 900	1 to 65,535	1 to 65,535
DS1 path SES		1 to 900	1 to 65,535	1 to 65,535
DS1 path SAS		1 to 900	1 to 65,535	1 to 65,535
DS1 path UAS		1 to 900	1 to 65,535	1 to 65,535
DS1 path FC		See Note.		
VT1.5 PathES		1 to 900	1 to 65,535	1 to 65,535
VT1.5 PathALS		1 to 900	1 to 65,535	1 to 65,535
VT1.5 PathFC		See Note.		
for DS3				
DS3 line CV		1 to 38,700	1 to 3,705,200	1 to 4,294,967,295
DS3 line ES		1 to 900	1 to 65,535	1 to 65,535
DS3 line SES		1 to 900	1 to 65,535	1 to 65,535
DS3 path CV		1 to 38,700	1 to 3,705,200	1 to 4,294,967,295
DS3 path ES		1 to 900	1 to 65,535	1 to 65,535
DS3 path SES		1 to 900	1 to 65,535	1 to 65,535
DS3 path SEFS		1 to 900	1 to 65,535	1 to 65,535
DS3 path AISS		1 to 900	1 to 65,535	1 to 65,535
DS3 path UAS		1 to 900	1 to 65,535	1 to 65,535

—continued—

Table 3-48 (continued)
Ranges of allowed threshold values for parameters with two thresholds

Parameter	Errors per 1-minute interval	Errors per 15-minute interval	Errors per day	Errors per untimed interval
for STS-1				
STS-1 line BCV		1 to 45,000	1 to 4,320,000	1 to 4,294,967,295
STS-1 line BES		1 to 900	1 to 65,535	1 to 65,535
STS-1 line BSES		1 to 900	1 to 65,535	1 to 65,535
STS-1 line CV		1 to 2,249,100	1 to 215,913,600	1 to 4,294,967,295
STS-1 line ES		1 to 900	1 to 65,535	1 to 65,535
STS-1 line SES		1 to 900	1 to 65,535	1 to 65,535
STS-1 line UAS		1 to 900	1 to 65,535	1 to 65,535
STS-1 path CV		1 to 2,159,100	1 to 207,273,600	1 to 1,048,575
STS-1 path ES		1 to 900	1 to 65,535	1 to 65,535
STS-1 path SES		1 to 900	1 to 65,535	1 to 65,535
STS-1 path UAS		1 to 900	1 to 65,535	1 to 65,535
STS-1 path FC		See Note.		
for OC-3				
OC-3 section CV	1 to 4,294,967,295	1 to 2,250,000	1 to 216,000,000	1 to 4,294,967,295
OC-3 section ES	1 to 60	1 to 900	1 to 65,535	1 to 65,535
OC-3 section SES	1 to 60	1 to 900	1 to 65,535	1 to 65,535
OC-3 section SEFS	1 to 60	1 to 900	1 to 65,535	1 to 65,535
OC-3 line CV	1 to 4,294,967,295	1 to 2,250,000	1 to 216,000,000	1 to 4,294,967,295
OC-3 line ES	1 to 60	1 to 900	1 to 65,535	1 to 65,535
OC-3 line SES	1 to 60	1 to 900	1 to 65,535	1 to 65,535
OC-3 line FC		See Note.		
OC-3 line UAS	1 to 60	1 to 63	1 to 4,095	1 to 65,535
for OC-12				
OC-12 section CV	1 to 4,294,967,29	1 to 7,920,000	1 to 760,320,000	1 to 4,294,967,295
OC-12 section ES	1 to 60	1 to 900	1 to 65,535	1 to 65,535
—continued—				

Table 3-48 (continued)
Ranges of allowed threshold values for parameters with two thresholds

Parameter	Errors per 1-minute interval	Errors per 15- minute interval	Errors per day	Errors per untimed interval
for OC-12 (cont.)				
OC-12 section SES	1 to 60	1 to 900	1 to 65,535	1 to 65,535
OC-12 section SEFS	1 to 60	1 to 900	1 to 65,535	1 to 65,535
OC-12 line CV	1 to 4,294,967,295	1 to 9,000,000	1 to 864,000,000	1 to 4,294,967,295
OC-12 line ES	1 to 60	1 to 900	1 to 65,535	1 to 65,535
OC-12 line SES	1 to 60	1 to 900	1 to 65,535	1 to 65,535
OC-12 line UAS	1 to 60	1 to 900	1 to 65,535	1 to 65,535
OC-12 line FC		See Note.		
Note: DS1 path FC, STS-1 path FC, OC-3 line FC, and OC-12 line FC have no thresholds.				
—end—				

Table 3-49 shows the range of values allowed for parameters with only one threshold.

Table 3-49
Ranges of allowed threshold values for parameters with only one threshold

Parameter	Quantifiable item or rate	Range
Laser bias current	Normal bias current (as percent)	1% to 65,535%
Optical power received	Normal output power (as percent)	1% to 65,535%

TL1 Provisioning

This chapter provides the required information for provisioning the AccessNode through the TL1 interface. This chapter contains definitions of the TL1 provisioning messages and parameters, and provides the provisionable attributes for the various AccessNode object types. This chapter also defines the acknowledgment/error responses and error codes supported by the TL1 provisioning interface.

AccessNode provides two type of TL1 interfaces:

- TL1 command interpreter (TL1CI)
- Operations System (OS) interface

Chapter contents

This chapter includes the following topics:

—continued—

TL1 provisioning communications

Provisioning of the AccessNode can be performed at the network element (NE), as well as from an external operations system (OS) through the TL1 interface. When using an external OS, provisioning requests are converted to a series of TL1 commands. These commands are automatically sent via an X.25 packet switched network (PSN) to create and provision the circuits at the target network element (NE).

For AccessNode, before the TL1 requests are sent on to the target NE, the controlling operations controller (OPC) accepts the TL1 requests and translates them to an internal (NE) format. Responses from the NE are then translated from the internal format back to a TL1 response and sent back to the OS by the same route.

The messages used for provisioning DS0, DS1, DS3, DS0 cross-connect, and equipment objects on AccessNode are non-autonomous messages consisting of a request from the OS and a response from the OPC. The message types available for point-to-point configurations include:

- create object
- retrieve object
- edit object
- delete object
- retrieve header
- set source identifier

> ***Note:*** Not all message types are applicable for each object type. For example you can not edit an equipment object.

DS1-fed AccessNode (DFA) configurations support the same OPS/INE message types as listed above (except DS3 messages) at the remote fiber terminal (RFT), and the retrieve header and set source identifier at the OPC shelf. Single-ended AccessNode configurations also support the OPS/INE message types listed above.

Provisioning information for the AccessNode is given in *Operations, Administration, and Provisioning,* Volume 4.

CAUTION
Provisioning should be performed at the same interface.
If both TL1 and NE provisioning is being performed, ensure that the existing configuration is known before changing data. In TL1 provisioning, this can be achieved by issuing the retrieve command before any other commands.

Provisioning using the TL1 Command Interpreter

This section describes how to perform provisioning using the TL1 Command Interpreter.

TL1 command interpreter (TL1CI)

The TL1CI is a command-line user interface which allows users to send TL1 commands to an AccessNode network element. Some of the TL1 commands have been standardized with Telcordia so that they may be supported on the OS interface described in a later section. However, many of the TL1 commands supported on this interface have not been standardized, and therefore they are only supported on this interface and not on the OS interface.

Table 4-1 lists the TL1 commands described in this section.

Table 4-1
TL1 commands supported only by the TL1CI

Command	Notes
DGN-EQPT	Diagnose a line card
RMV-EQPT	Change line card state to “out-of-service”
RST-EQPT	Change line card state to “in-service”

GSFN attributes for GR-303 services (command line only)

The following tables describe the valid attributes for each GSFN for GR-303 services.

Note: These attributes apply only for use on the command line.

Fblock keywords

Table 4-2 lists the Fblock attributes (provisionable and read only) for each GSFN.

> ***Note:*** All attributes in bold are provisionable. All others are read only.

Table 4-2
Fblock keywords - provisionable and read only

LOOPTYPE/GSFN	FBLOCK ATTRIBUTES	ATTRIBUTE VALUES	DEFAULT VALUES
2W/COIN	**SIGMETHOD**	LS,GS	LS
	HOSTID	1 TO 5	1
	LCCRS	CLOSED,OPEN	CLOSED
	HYBBAL	0 TO 1	1
2W/*MVICOIN*	**CRV**	1 TO 2048	1
	GSFC	gsfc_gs,gsfc_ls	gsfc_ls
	HOSTID	1 TO 5	1
	ONHKTRAN	N,Y	Y
2W/MVILRB	**CRV**	1 TO 2048	1
	GSFC	gsfc_rvti gsfc_rvtd gdfc_rvtw	gsfc_rvti
	HOSTID	1 TO 5	1
	EQLZ	0 TO 6	0
	HYBBAL	0 TO 121	69
	IMPED	600,900	600
	RGAIN	-100 TO 35	0
	TRKCOND	OFFHK,ONHK	OFFHK
	TGAIN	-50 TO 65	0

—continued—

Table 4-2 (continued)
Fblock keywords - provisionable and read only

LOOPTYPE/GSFN	FBLOCK ATTRIBUTES	ATTRIBUTE VALUES	DEFAULT VALUES
2W/MVIUVG	**CRV**	1 TO 2048	1
	GSFC	gsfc_gs,gsfc_ls	gsfc_ls
	HOSTID	1 TO 5	1
	ONHKTRAN	N,Y	Y
	RXOHTGN	-10 TO 0	-10
	TXOHTGN	-10 TO 0	-10
2W/MVIPOTS	**CRV**	1 TO 2048	1
	GSFC	gsfc_gs,gsfc_ls	gsfc_ls
	HOSTID	1 TO 5	1
	ONHKTRAN	N,Y	Y
2W/LSR	FLASH	N,Y	N
	HOSTID	1 TO 5	1
	HYBBAL	0 to 136	69
	IMPED	600,900	600
	LCCRS	CLOSED,OPEN	CLOSED
	ONHKTRAN	N,Y	Y
	RINGTYPE	SINGLE,TWO-PARTY,FOUR-PARTY	SINGLE
	RGAIN	-100 TO 35	0
	TGAIN	-50 TO 65	0
2WLGB	CPGAIN	-10 TO 0	0
	FLASH	N,Y	Y
	HOSTID	1 TO 5	1
	HYBBAL	0 TO 1	0
	IMPED	600,900	900
	LCCRS	CLOSED,OPEN	CLOSED

—continued—

Table 4-2 (continued)
Fblock keywords - provisionable and read only

LOOPTYPE/GSFN	FBLOCK ATTRIBUTES	ATTRIBUTE VALUES	DEFAULT VALUES
2WLGB (cont'd)	ONHKTRAN	N,Y	Y
	RXOHGTN	-10 TO 0	-5
	SIGMETHOD	LS,GS	LS
	TOLLDIV	N,Y	Y
	TOOLDIVTYPE	REVERSE,WINK	WINK
	TRKCOND	OFFHK,ONHK	OFFHK
	TXOHGTN	-10 TO 0	-5
2W/EBS	LCCRS	CLOSED,OPEN	CLOSED
	HOSTID	1 TO 5	1
	HYBBAL	0 TO 136	69
—end—			

Note: Linetype is a required field with LOOPTYPE and GSFN.

In addition to the above commands, the following commands are supported on both the TL1 Command Interpreter and the OS interface, but are documented in the sections of this chapter that describe the OS interface. The table below lists these commands, a cross-reference to the pages on which they are documented, and any differences between the OS interface and TL1CI for these commands.

Table 4-3
TL1 commands supported by the TL1CI and OS interface

Command	Purpose	Where documented	TL1CI differences
ENT-T0	Create a DS0 line termination	page 4-51	1. The GSFNs listed in Table 4-2 are supported on TL1CI, but not on the OS interface. 2. TL1CI does not support the provisioning of UDLC, DS1 Tandem, and TR-08 services on CDS shelves.
ED-T0	Edit a DS0 line termination	page 4-54	
RTRV-T0	Retrieve a DS0 line termination	page 4-52	
DLT-T0	Delete a DS0 line termination	page 4-49	
ENT-CRS-T0	Create a DS0 cross-connect	page 4-46	TL1CI does not support the provisioning of cross-connects for UDLC, DS1 Tandem, and TR-08 services on CDS shelves.
RTRV-CRS-T0	Retrieve a DS0 cross-connect	page 4-47	
DLT-CRS-T0	Delete a DS0 cross-connect	page 4-44	

DGN-EQPT

Use the DGN-EQPT command to initiate a diagnostic routine on a line card. Before executing this command, to remove the line card from service use the RMV-EQPT command.

> ***Note:*** This command is used on the command line only, but is not specific to the GR-303 service.

Security level

Level 3.

Input syntax

```
DGN-EQPT:[TID]:[AID]:[CTAG];
```

Table 4-4
Syntax description

Field	Description
TID	Network element to which the command is directed
AID	Slot of CDS line card within the given shelf to which the command is directed
CTAG	Correlation tag, an alphanumeric identifier to correlate the command and response messages

Example input

Diagnose line card #9 on network element 16:

```
DGN-EQPT:NE16:CDS-1-9:TAG123;
```

Response syntax

Normal response

```
<cr> <lf> <lf>
^^^<sid>^<date>^<time> <cr> <lf>
M^^<ctag>^COMPLD <cr> <lf>
^^^"<aid>:<rslt>" <cr> <lf>;
```

Example response:

```
<cr> <lf> <lf>
^^^MYSAS^97-04-01^10:27:25 <cr> <lf>
M^^TAG123^COMPLD <cr> <lf>
^^^"LC-9:PASSED" <cr> <lf>;
```

Error response

```
<cr> <lf> <lf>
^^^<sid>^<date>^<time> <cr> <lf>
M^^<ctag>^DENY <cr> <lf>
^^^<errcde> <cr> <lf>
^^^/*error text*/ <cr> <lf>
;
```

Table 4-5
Error code and error text description

Error code	Error text	Description
SNOS	Circuit is not Out Of Service	DGN valid only when the circuit is not in service
IIAC	Input Invalid Access Identifier	specified circuit does not exist

RMV-EQPT

Use the RMV-EQPT command to remove the specified type of equipment module from an in-service state and puts it in an out-of-service management state.

> ***Note:*** This command is used on the command line only, but is not specific to the GR-303 service.

Security level

Level 3.

Input syntax

```
RMV-EQPT:[TID]:[AID]:[CTAG];
```

Table 4-6
Syntax descriptions

Field	Description
TID	Network element to which the command is directed
AID	Slot of CDS line card within the given shelf to which the command is directed
CTAG	Correlation tag, an alphanumeric identifier to correlate the command and response messages

Example input

Put the line card 13 on network element 12 out-of-service:

```
RMV-EQPT:NE12:CDS-1-13:123;
```

Response syntax

Normal response

```
<cr> <lf> <lf>
^^^<sid>^<date>^<time> <cr> <lf>
M^^<ctag>^COMPLD <cr> <lf>
;
```

Error response

```
<cr> <lf> <lf>
^^^<sid>^<date>^<time> <cr> <lf>
M^^<ctag>^DENY <cr> <lf>
^^^<errcde> <cr> <lf>
^^^/*error text*/ <cr> <lf>
;
```

RST-EQPT

Use the RST-EQPT command to bring a given type of equipment module back in-service from an out-of-service management state.

> ***Note:*** This command is used on the command line only, but is not specific to the GR-303 service.

Security level

Level 3.

Input syntax

```
RST-EQPT:[TID]:[AID]:[CTAG];
```

Table 4-7
Syntax descriptions

Field	Descriptions
TID	Network element to which the command is directed
AID	Slot of CDS line card within the given shelf to which the command is directed
CTAG	Correlation tag, an alphanumeric identifier to correlate the command and response messages

Example input

Put the line card 13 on network element 12 back in service:

```
RST-EQPT:NE12:CDS-1-13:123;
```

Response syntax

Normal response

```
<cr> <lf> <lf>
^^^<sid>^<date>^<time> <cr> <lf>
M^^<ctag>^COMPLD <cr> <lf>
;
```

Error response

```
<cr> <lf> <lf>
^^^<sid>^<date>^<time> <cr> <lf>
M^^<ctag>^DENY <cr> <lf>
^^^<errcde> <cr> <lf>
^^^/*error text*/ <cr> <lf>
;
```

Provisioning using the operations system (OS) interface

This section describes how to perform provisioning using the operations system interface.

Operations system (OS) interface

The OS interface is an X.25 or IP connection which allows an operations system (OS) to send TL1 commands to the OPC for all AccessNodes in its span of control. All TL1 commands supported on this interface have been standardized with Telcordia (formerly known as Bellcore) for use with the Regional Bell Operating Companies' (RBOCs) operations systems.

GSFN attributes for GR-303 services

The following tables describe the valid attributes for each GSFN for GR-303 services.

Fblock keywords

Table 4-8 lists the Fblock attributes (provisionable and read only) for each GSFN.

Note: All attributes in bold are provisionable. All others are read only.

Table 4-8
Fblock keywords - provisionable and read only

LOOPTYPE/GSFN	FBLOCK ATTRIBUTES	ATTRIBUTE VALUES	DEFAULT VALUES
2W/COINI	**GND**	Y, N	N
2W/UVGI	**GND**	Y, N	N

Note: Linetype is a required field with LOOPTYPE and GSFN.

Provisioning message parameters

This section describes the message parameters used in TL1 provisioning commands and responses.

All TL1 provisioning message parameters are listed in the following table. A description of each parameter is given in the following pages.

DS0 Parameters	Description
AID	Identification of the equipment/facility
CTAG	Correlation identifier
Date	Date of origination of the message
ERRCDE	Error code

DS0 Parameters	Description
SID	Source identifier which originated the message
TID	Target NE identifier
Time	Time of origination of the message

AID

The Access Identifier is unique for DS0, DS1, and DS3 object types. The following details the AID for each object type.

AID for DS0 line terminations

The AID formats for DS0 line terminations are:

Table 4-9
AIDs for DS0 line terminations

Shelf and Network Element type	AID format	AID field	Range
CDS on RFT	RT1-<shelf>-<slot>	shelf	1-7
		slot	1-96
CDS on FCOT	CO1-<shelf>-<slot>	shelf	1-7
		slot	1-96
ANX on RFT	RT1-VM<shelf>-<slot>	shelf	1-56
		slot	01-48
ANX on FCOT	CO1-VM<shelf>-<slot>	shelf	1-56
		slot	01-48
UE9000 on RFT	RT1-UE<shelf>-<slot>-<circuit>	shelf	1-14
		slot	01-16

AID for DS0 cross-connects

The AID formats for DS0 cross-connects are:

Table 4-10
AIDs for DS0 cross-connects

Type of cross-connect	AID format (FromAID,ToAID)	AID field	Range
DS1 Tandem or TR-08 on CDS	CO1-CE1-<DS1>-<port>-<channel>,RT1-<shelf>-<slot>	DS1	1-18
		port	1-14
		channel	1-24
		shelf	1-7
		slot	1-96
GR-303 on CDS	<IG>-<CRV>,RT1-<shelf>-<slot>	IG	1-5
		CRV	1-2048
		shelf	1-7
		slot	1-96
UDLC on point-to-point systems with CDS	CO1-<cshelf>-<cslot>,RT1-<rshelf>-<rslot>	cshelf	1-7
		cslot	1-96
		rshelf	1-7
		rslot	1-96
UDLC on point-to-point systems with ANX	CO1-VM<cshelf>-<cslot>,RT1-VM<rshelf>-<rslot>	cshelf	1-56
		cslot	01-48
		rshelf	1-56
		rslot	01-48
DS1 Tandem or TR-08 on ANX	CO1-CE1-<DS1>-<port>-<channel>,RT1-VM<shelf>-<slot>	DS1	1-18
		port	1-14
		channel	1-24
		shelf	1-56
		slot	01-48

—continued—

Table 4-10
AIDs for DS0 cross-connects

Type of cross-connect	AID format (FromAID,ToAID)	AID field	Range
GR-303 on ANX	<IG>-<CRV>,RT1-VM<shelf>-<slot>	IG	1-5
		CRV	1-2048
		shelf	1-56
		slot	01-48
DS1 Tandem or TR-08 on UE9000	CO1-CE1-<DS1>-<port>-<channel> ,RT1-UE<shelf>-<slot>-<circuit>	DS1	1-18
		port	1-14
		channel	1-24
		shelf	1-14
		slot	01-16
		circuit	01-24
GR-303 on UE9000	<IG>-<CRV>,RT1-UE<shelf>-<slot> -<circuit>	IG	1-5
		CRV	1-2048
		shelf	1-14
		slot	01-16
		circuit	01-24
—end—			

The DS0 Access Identifier is composed of three fields separated by hyphens as shown following:

<bay>-<shelf>-<slot>

The possible values for each of the AID parameter fields are as follows:

AID Field	Point-to-Point UDLC on FCOT	Point-to-Point RFT, DFA, and Single-ended
<bay>	CO1	RT1
<shelf>	1–7	1–7
<slot>	1–96	1–96

Note 1: 2-wire cards may use any of the 96 slots as their address.

Note 2: 4-wire cards may use only even-numbered slots as their address.

Note 3: 6/8-wire cards may use only even-numbered slots (with the exception of slots, 24, 48, 72, and 96) as their address. In addition, out of the two possible even-numbered slots that can be used in the address (6/8-wire cards take up four slots), the lower-numbered slot must be used as their address.

AID parameter for DS0 channel within a DS1 Tandem

The AID parameter for a DS0 channel within a DS1 Tandem is composed of five fields. In addition to the three DS0 fields previously described, two more fields are required to specify the channel and DS1 port, as follows:

<bay>-<shelf>-<slot>-<port>-<channel>

AID Field	Range ABM (with OPC)	Range ABM (no OPC)	Range TBM
<bay>	CO1	CO1	CO1
<shelf>	CE1	CE1	CE1
<slot>	1, 2, 4	1–8	1, 2, 3, 4, 11, 12, 14, 15, 16, 17, 18
<port>	1–14	1–14	1–14
<channel>	1–24	1–24	1–24

AID for DS1 line terminations

The TL1 Access Identifier for DS1 line terminations or facilities is a series of four fields. The fields include the frame, shelf, slot, and port identifiers. Each parameter has the following format:

<bay>-<shelf>-<slot>-<port>

The possible values for each of the AID parameter fields are as follows:

AID Field	Range ABM (with OPC)	Range ABM (no OPC)	Range TBM
<bay>	1	1	1
<shelf>	CE1	CE1	CE1
<slot> –point-to-point –DFA RFT –DFA OPC shelf	 1, 2, 4 not applicable 1	 1–8 1, 2, 4 not applicable	 1, 2, 3, 4, 11, 12, 14, 15, 16, 17, 18 not applicable not applicable
<port>	1–14	1–14	1–14

AID for DS3 line terminations

The TL1 Access Identifier for DS3 line terminations or facilities is a series of four fields. The fields include the frame, shelf, slot, and port identifiers. Each parameter has the following format:

<bay>-<shelf>-<slot>-<port>

The possible values for each of the AID parameter fields is listed in the following table:

AID Field	Range ABM (with OPC)	Range ABM (no OPC)	Range TBM
<bay>	1	1	1
<shelf>	CE1	CE1	CE1
<slot>	3	3, 5, 7	11, 15, 17
<port>	1–3	1–3	1–3

AID for equipment objects

The TL1 Access Identifier for equipment objects is a series of three fields. The fields include the bay, shelf, and slot identifiers. Each parameter has the following format:

<bay>-<shelf>-<slot>

The possible values for each of the AID parameter fields for DS1/VT and DS3/STS mappers are listed in the following tables:

Equipment AID for DS1/VT mappers			
AID Field	**Range ABM (with OPC)**	**Range ABM (no OPC)**	**Range TBM**
<bay>	1	1	1
<shelf>	CE1	CE1	CE1
<slot> –point-to-point –DFA RFT –DFA OPC shelf	 1, 2, 4 not applicable 1	 1–8 1, 2, 4 not applicable	 1, 2, 3, 4, 11, 12, 14, 15, 16, 17, 18 not applicable not applicable

Equipment AID for DS3/STS mappers			
AID Field	**Range ABM (with OPC)**	**Range ABM (no OPC)**	**Range TBM**
<bay>	1	1	1
<shelf>	CE1	CE1	CE1
<slot>	3	3, 5, 7	11, 15, 17

In Retrieve commands for each object type, a range of AIDs may also be specified. The format for specifying a range is as follows:

<start_aid>&&<end_aid>

To include all possible AIDs, specify the AID as “ALL”.

> ***Note 1:*** The && and ALL ranging can be used for RTRV of line terminations and facilities.
>
> ***Note 2:*** The && can be used for RTRV-EQPT of DS0 equipment, but ALL cannot.
>
> ***Note 3:*** No ranging can be used with RTRV-EQPT of DS1/DS3 equipment.
>
> ***Note 4:*** The Start AID must not be greater than the End AID. If it is, the Retrieve command will be denied.
>
> ***Note 5:*** The Start AID and End AID can indicate ports on different mappers. In this case, OPS/INE will range from the slot and port on the mapper indicated in the Start AID, across all slots and ports in any intervening mappers, to the port and slot on the mapper indicated in the End AID.
>
> ***Note 6:*** When retrieving DS0 cross-connect information (using RTRV-CRS-TO command), the AIDs only indicate one side of the cross-connect (either the RFT drop side or RFT CO side).

Note 7: If a range of AIDs is specified, the normal response may include zero or more entries of:

[^^^'[<aid>]:<descriptor>=<text> cr lf]

CTAG

The CTAG parameter is a numeric correlation identifier similar to the ATAG parameter. The TL1 software in the OPC keeps track of correlation identifiers for outstanding non-autonomous requests.

The CTAG is used to correlate non-autonomous command and response messages.

The format of the CTAG is a string of up to six alphanumeric characters.

Date

This is the date of origination of the TL1 message. The format is as follows:

<yy>-<mm>-<dd>

ERRCDE

Parameter values	Description
<yy>	are the last two digits of the year [00 to 99]
<mm>	is the month [01 to 12]
<dd>	is the day of the month [01 to 31]

The associated error code of the message. Descriptions and examples of each error response are given in "Supported TL1 error responses and codes" on page 4-90.

ERRCDE	Description
EQWT	Equipment, wrong type
IBEX	Input, block, extra
IBMS	Input, block, missing
IBNC	Input, block, not consistent
ICNC	Input, command, non consistent
ICNV	Input, command, not valid
IDNC	Input, data, not consistent
IDNV	Input, data, not valid
—continued—	

ERRCDE	Description
IDRG	Input, data, range error
IISP	Input, invalid syntax or punctuation
IPEX	Input, parameter, extra
IPMS	Input, parameter, missing
IPNV	Input, parameter, not valid
IPNC	Input, parameter, not consistent
MERR	Multiple error
SABT	Status, aborted
SARB	Status, all resource busy
SDNC	Status, data, not consistent
SLBM	Status, list, below minimum
SLEM	Status, list, exceed maximum
SNVS	Status, not in valid state
SSRE	Status, system resources exceeded
SSTP	Status, stopped
—end—	

Eblock, Fblock, Gblock

The Eblock, Fblock, and Gblock are parameter blocks which contain parameters required for command execution.

There are two types of parameter blocks, positional and keyword. Positional parameter blocks contain parameters, separated by commas, that appear in a specific order. Both the Eblock and Gblock are positional parameter blocks.

Keyword parameter blocks contain a series of parameters, separated by commas, that have the format “keyword=value”. The value of the keyword is used for parameter recognition rather than position. The Fblock is a keyword parameter block.

For details on the values of the Eblock, Fblock, and Gblock for each object type, refer to the sections beginning on page 4-20.

SID (Source Identifier)

The source identifier contains the name which identifies the source of the data in the TL1 message. The format is identical to the target identifier (TID) parameter.

The source identifier typically contains the NE name that was provisioned on the shelf that originated the TL1 message. An exception to this rule is a response to a Retrieve Header command without a TID; in this case the source identifier contains the name of the responding OPC.

The format of the SID is a string of up to 13 ASCII characters.

TID

The target identifier contains the name of the network element (NE) that is the target of the TL1 message. The NE name is set while commissioning a network element.

The TID can be a string of up to 13 ASCII characters including uppercase or lowercase letters, numerical digits, as well as certain special characters including the hyphen, underscore, period, and comma

Spaces (blanks) should not be used. For example, SHELF 1 is invalid, but SHELF_1 is valid. If a network element does not have an assigned name, no TL1 messages will be available from it.

Time

The origination time of the TL1 message. The format is as follows:

<hh>:<mm>:<ss>

Parameter values	**Description**
<hh>	is the hour of the day [00 to 23]
<mm>	is the minute of the hour [00 to 59]
<ss>	are the seconds of the minute [00 to 59]

Provisionable attributes for DS0 object types

This section includes tables which list valid attributes that appear in the E, F, and G parameter blocks in DS0 provisioning messages. Tables listing associated information are also included.

Eblock

The following table contains keywords, ranges, and descriptions for attributes returned in the Eblock of a RTRV-T0 request. These keywords should not be used in the Fblock of a ENT-T0 or ED-T0 request.

Keyword	Range	Description
CLEI	See the table on the next page	Common Language Equipment Identifier. Indicates the type of equipment. Each type of equipment card is assigned a different CLEI. A valid CLEI is returned only if a card is plugged into the slot and PRL can read the CLEI from the card. A series of question marks (?) will be returned as the CLEI value if PRL can not read the CLEI. If no card is plugged into the slot, a CLEI will not be returned.
PST	IS IS-ANR OOS-MA-AS OOS-MT	Primary State of DS0 termination. Values include: IS - In Service, Normal IS-ANR - In Service, Abnormal OOS-MA-AS - Out of Service, memory administration assigned OOS-MT - Out of Service, Maintenance
RDLD	N Y	Indicates whether the DS0 termination is red-lined or not. Values include: N - termination is not red-lined Y - termination is red-lined. ***Note:*** A DS0 termination command does not prompt the user to confirm the termination, regardless of the value for this keyword.
EQ	N Y	Indicates whether the DS0 termination is equipped or unequipped. Values include: N - termination is unequipped Y - termination is equipped
MEA	Y N	Indicates that a mismatch exists between the line card in the slot and the OPC's preprovisioned data. Values include: Y - mismatch exists N - no mismatch exists

The following table lists the Common Language Equipment Identifier (CLEI) codes for DS0 line cards supported on AccessNode.

Card	CLEI	NT PEC Code	Description
O2WS	SAIUE40A SAIUET0A NT4K67AC	NT4K67AA	2-wire station line card.
O2WO	SAIUD20A SAIUD2BA SAIUD2CA	NT4K68AA	2-wire office line card. The 2-wire office Omega line card has several versions.
O4W	SAIUF30A	NT4K69AA	4-wire line card (used for office or station)
O68W	SAIUC10A SAIUC1DA	NT4K77AA	6/8-wire line card (used for office or station)
MRD	SAIUSE0A	NT4K78AA	Manual ring down card
E2WS	SAIUTF0A SAIUTR0A	NT4K65AA NT4K65AB	2-wire Epsilon station card
U2WS	SAIUU70A SAIUUS0A	NT4K79AA NT4K79AB	2-wire universal voice grade station card

Fblock

The Fblock contains the TL1 code for the service being provisioned on the line card. Supported line cards are listed in the above table. The TL1 interface supports both designed and nondesigned special services. Designed special services for AccessNode are summarized in the first of the following tables. Subsequent tables list the possible values for each of those services.

Note 1: O2WS also supports ISDN-U and MBS (P-phone), but these and the other GR-303 functions (POTS, Coin, and UVG) are not currently provisioned over the TL1 interface. They are provisioned from the switch GR-303 embedded operations channel.

Note 2: TL1 provisions all of the listed O2WS and O2WO GSFNs on UDLC, but only the designed special service GSFNs on DS1 tandem circuits.

Note 3: For 4W or 6/8W, the AID refers to the lowest even-numbered slot. Messages with an odd AID for 4W or 6/8W will be denied.

Note 4: For 4W, the line termination comprises the slot identified by the AID in the TL1 message plus AID–1, where AID is even.

Note 5: For 6/8W, the line termination implied by a TL1 message comprises the slots AID–1, AID, AID+1, and AID+2, where AID is even.

Nondesigned special services are described on page 4-32.

The following tables list the Fblock attributes used for each designed special service offered on AccessNode. The attributes are used in the responses of RTRV-T0 (except INCL), ENT-T0, or ED-T0 requests.

> ***Note 1:*** Fblock attributes are described in "Fblock attributes and their values" on page 4-33.
>
> ***Note 2:*** For ENT, ED, and DLT-T0 on 6/8W functions, if the AID+1 = slot 25, 49, 73, or 97, the message will be denied. For RTRV-T0, the NE will respond with an empty COMPLD message, same as for an invalid AID.

The following table lists the designed special services provisionable for line cards.

Linecard	**Looptype**	**GSFN**	**Description**
O2WS	2W	COINS	2-wire coin station line card
	2W	DPO	2-wire loop reverse battery supervision, NE supplies battery
	2W	FXS	2-wire loop/ground start, current feed signaling
	2W	TOS	2-wire transmission only-source
	2W	ETOS	2-wire equalized transmission only-source
	2W	POTSS	2-wire POTS-Station line card
	2W	PLAR1	2-wire private line automatic ringdown
	2W	PLAR2	2-wire private line automatic ringdown
	2W	3DS0 ISDN	2-wire 3-DS0 integrated services digital network
O2WO	2W	COINO	2-wire coin office line card
	2W	DPT	2-wire loop reverse battery supervision, connecting equipment supplies battery (for DID trunks)
	2W	FXO	2-wire loop/ground start, current sink signaling
	2W	TOO	2-wire transmission only-sink
	2W	ETOO	2-wire equalized transmission only-sink
	2W	POTSO	2-wire POTS-Office line card
	2W	UVGO	2-wire universal voice grade-office line card

—continued—

Linecard	Looptype	GSFN	Description
O4W	4W	DX	4-wire DX (duplex) signaling
	4W	FXS	4-wire ground start, current feed signaling
	4W	FXO	4-wire ground start, current sink signaling
	4W	TO	4-wire transmission only
	4W	ETO	4-wire equalized transmission only
	4W	DDS	4-wire DDS DS0DP interface (remote) or DDS OCUDP (office channel unit)
O68W	6/8W	PLR1	6-wire interface Type I E&M signaling, connecting equipment originates on E lead
	6/8W	PLR2	8-wire interface Type II E&M signaling, connecting equipment originates on E lead
	6/8W	E&M1	6-wire interface Type I E&M signaling, connecting equipment originates on M lead
	6/8W	E&M2	8-wire interface Type II E&M signaling, connecting equipment originates on M lead
	6/8W	E&M3	8-wire interface Type III E&M signaling, connecting equipment originates on M lead
	6/8W	TDM1	6-wire both office and station, 2-state signaling
	6/8W	TDM2	8-wire both office and station, 2-state signaling
	6/8W	TDM1S	6-wire station tandem, 3-state signaling
	6/8W	TDM1O	6-wire office tandem, 3-state signaling
	6/8W	TDM2S	8-wire station tandem, 3-state signaling
	6/8W	TDM2O	8-wire office tandem, 3-state signaling
MRD	2W	MRD	2-wire manual ringdown card
E2WS	2W	POTSS POTSI	2-wire Epsilon line card
U2WS	2W	UVGS UVGI POTSS POTSI	2-wire universal voice grade station line card
—end—			

2W FXS

The following attributes are available for the 2W FXS (2-wire loop/ground start, current feed signaling 0) line card service.

Attribute	Setting Range	Default
TGAIN	–5 to +6.5 dB	0 dB
RGAIN	–10 to +3.5 dB	0 dB
TRKCOND	ONHK, OFFHK	OFFHK
IMPED	600, 900	600
ONHKTRAN	Y, N	Y
TXOHTGN (1.0 dB steps)	0 to –10 dB	–10 dB
RXOHTGN	0 to –10 dB	–10 dB
HYBBAL	[0–135]	38
EQLZ	[0–6]	0

2W FXO

The following attributes are available for the 2W FXO (2-wire loop/ground start, current sink signaling line) card service.

Attribute	Setting range	Default
TGAIN	–5 to +6.5 dB	0 dB
RGAIN	–10 to +3.5 dB	0 dB
TRKCOND	ONHK, OFFHK	OFFHK
IMPED	600, 900	900
ONHKTRAN	Y, N	Y
HYBBAL	[0–121]	66
EQLZ	[0–6]	0

2W PLAR1, 2W PLAR2

The following attributes are available for the 2WPLAR1 2WPLAR2 (2-wire private line automatic ringdown) line card services.

Attribute	Setting range	Default
TGAIN	–5 to +6.5 dB	+1 dB
RGAIN	–10 to +3.5 dB	–1 dB
TRKCOND	ONHK, OFFHK	OFFHK
IMPED	600, 900	600
HYBBAL	[0–135]	38
PLAREQ	[0–6]	0
BUSY	Y, N	N

2W MRD

The following attributes are available for the 2W MRD (2-wire manual ringdown card) line card services.

Note: The MRD card is a variation of the existing Omega 2W station card and uses the same settings.

Attribute	Setting range	Default
TGAIN	–5 to 0 dB	–1 dB
RGAIN	–10 to +0 dB	–1 dB

2W DPO

The following attributes are available for the 2W DPO (2-wire loop reverse battery supervision, NE supplies battery) line card service.

Note: Dial Pulse Mode (DPMODE) is a new attribute used only with the 2W DPO function. Values include:

— LOOP, which indicates normal Loop Pulsing

— BATGND, which indicates Battery Ground Pulsing for the Loop Reverse Battery signaling interface. BATGND may be used on very long loops to reduce pulse distortion.

Attribute	Setting range	Default
TGAIN	–5 to +6.5 dB	–2 dB
RGAIN	–10 to +3.5 dB	–2 dB
DPMODE	LOOP, BATGND	LOOP
TRKCOND	ONHK, OFFHK	OFFHK
IMPED	600, 900	900
HYBBAL	[0–135]	2
EQLZ	[0, 6]	0

2W DPT

The following attributes are available for the 2W DPT (2-wire loop reverse battery supervision, connecting equipment supplies battery (for DID trunks)) line card.

Attribute	Setting range	Default
TGAIN	–5 to +6.5 dB	0 dB
RGAIN	–10 to +3.5 dB	0 dB
TRKCOND	ONHK, OFFHK	OFFHK
IMPED	600, 900	600
HYBBAL	[0–121]	69
EQLZ	[0, 6]	0

2W ETOS

The following attributes are available for the 2W ETOS (2-wire equalized transmission only-source) line card service.

Attribute	Setting range	Default
TGAIN	–5 to +6.5 dB	–2 dB
RGAIN	–10 to +3.5 dB	–2 dB
IMPED	600, 900	600
HYBBAL	[0–135]	38
TXBLOCKDIS	Y, N	Y
RXBLOCKDIS	Y, N	Y
EQLZ	[0, 6]	0

2W ETOO

The following attributes are available for the 2W ETOO (2-wire equalized transmission only-sink) line card service.

Attribute	Setting range	Default
TGAIN	–5 to +6.5 dB	0 dB
RGAIN	–10 to +3.5 dB	0 dB
IMPED	600, 900	900
HYBBAL	[0–121]	66
TXBLOCKDIS	Y, N	Y
RXBLOCKDIS	Y, N	Y
EQLZ	[0, 6]	0

2W TOS

The following attributes are available for the 2W TOS (2-wire transmission only-source) line card service.

Attribute	Setting range	Default
TGAIN	–5 to +6.5 dB	–2 dB
RGAIN	–10 to +3.5 dB	–2 dB
IMPED	600, 900	600
HYBBAL	[0–15]	38
TXBLOCKDIS	Y, N	Y
RXBLOCKDIS	Y, N	Y

2W TOO

The following attributes are available for the 2W TOO (2-wire transmission only-sink) line card service.

Attribute	Setting range	Default
TGAIN	–5 to +6.5 dB	0 dB
RGAIN	–10 to +3.5 dB	0 dB
IMPED	600, 900	900
HYBBAL	[0–121]	66
TXBLOCKDIS	Y, N	Y
RXBLOCKDIS	Y, N	Y

4W FXS, 4W FXO

The following attributes are available for the 4W FXS and 4W FXO (4-wire ground start, current feed signaling and 4-wire ground start, current sink signaling) line card services.

Attribute	Setting range	Default
TGAIN (in 0.1 dB steps)	–7 to +17.5 dB	0 dB
RGAIN (in 0.1 dB steps)	–16 to +8.5 dB	0 dB
TRKCOND	ONHK, OFFHK	OFFHK
IMPED	150, 600, 1200	600
SIGLEADS	NORM, REV	NORM
TXSL	[0–15]	0

Attribute	Setting range	Default
TXHT	[0–16]	0
TXBW	[0–16]	0
RXSL	[0–15]	0
RXHT	[0–16]	0
RXBW	[0–16]	0
CABLE	L, NL	NL

4W DX

The following attributes are available for the 4W DX (4-wire DX (duplex) signaling) line card service.

Attribute	Setting range	Default
TGAIN (in 0.1 dB steps)	–7 to +17.5 dB	0 dB
RGAIN (in 0.1 dB steps)	–16 to +8.5 dB	0 dB
TRKCOND	ONHK, OFFHK	OFFHK
IMPED	150, 600, 1200	600
SIGLEADS	NORM, REV	NORM
DXBAL	[1300–3700]	1300
TXSL	[0–15]	0
TXHT	[0–16]	0
TXBW	[0–16]	0
RXSL	[0–15]	0
RXHT	[0–16]	0
RXBW	[0–16]	0
CABLE	L, NL	NL

4W TO

The following attributes are available for the 4W TO (4-wire transmission only) line card service.

Attribute	Setting range	Default
TGAIN (in 0.1 dB steps)	–7 to +17.5 dB	0 dB
RGAIN (in 0.1 dB steps)	–16 to +8.5 dB	0 dB
IMPED	150, 600, 1200	600
SIGLEADS	NORM, REV	NORM
SRCRNT	OFF, CONT, REV, SINK	OFF

4W ETO

The following attributes are available for the 4W ETO (4-wire equalized transmission only) line card service.

Attribute	Setting range	Default
TGAIN (in 0.1 dB steps)	–7 to +17.5 dB	0 dB
RGAIN (in 0.1 dB steps)	–16 to +8.5 dB	0 dB
IMPED	150, 600, 1200	600
SIGLEADS	NORM, REV	NORM
TXSL	[0–15]	0
TXHT	[0–16]	0
TXBW	[0–16]	0
RXSL	[0–15]	0
RXHT	[0–16]	0
RXBW	[0–16]	0
CABLE	L, NL	NL
SLCRNT	OFF, CONT, REV, SINK	OFF

4W DDS

The following attributes are available for the 4W DDS (4-wire DDS DS0DP interface (remote) or DDS OCUDP (office channel unit)) line card service.

> ***Note:*** The attributes SECONDARY and CUSTREMTEST are used for the linetype OCUDP only, and are not valid for a rate of 64K.

Attribute	Setting range	Default
LINETYPE	OCUDP, DS0DP	–
RATE	24, 48, 96, 192, 56K, 64K	64K
ERRCORR	Y, N	N
ZCS (not valid for 64K)	Y, N	N
LLB	Y, N	N
SECONDARY	Y, N	N
CUSTREMTEST	Y, N	N

6/8W E&M1, E&M2, E&M3, PLR1, PLR2, TDM1, TDM2, TDM1S, TDM1O, TDM2S, TDM2O

The following attributes are available for the 6/8W E&M1, E&M2, E&M3, PLR1, PLR2, TDM1, TDM2, TDM1S, TDM1O, TDM2S, TDM2O line card services.

Attribute	Setting range	Default
TGAIN (in 0.1 dB steps)	–7 to +17.5 dB	0 dB
RGAIN (in 0.1 dB steps)	–16 to +8.5 dB	0 dB
TRKCOND	ONHK, OFFHK	OFFHK

Nondesigned special services

Nondesigned service functions are provisioned through TL1. The only provisionable line card attributes are LOOPTYPE, GSFN, ONHKTRAN (Onhook Transmission), and, for UVGS, only TXOHTGN and RXOHTGN (Transmit Onhook Transmission Gain and Receive Onhook Transmission Gain) are provisionable. Provisionable attributes are listed in the following table. Values enclosed in brackets indicate the default.

> ***Note:*** These UDLC functions cannot be provisioned onto DS1 Tandems, which are used only for nonswitched/non-locally switched services.

Fblock attributes and their values

LOOPTYPE	GSFN	ONHKTRAN	TXOGTGN	RXOHTGN
2W	POTSS	Y, (N)	n/a	n/a
2W	POTSO	Y, (N)	n/a	n/a
2W	UVGS	Y, (N)	(–10) to 0	(–10) to 0
2W	UVGO	Y, (N)	n/a	n/a
2W	COINS	Y, (N)	n/a	n/a
2W	COINO	Y, (N)	n/a	n/a

The following table describes the attributes used in the Fblock of DS0 provisioning messages and their possible values.

Attribute	Range	Default	Description
BUSY	N Y	N	Busy Tone. Values include: N - no busy tone Y - fast busy tone applied after two minutes with no answer.
CABLE	L NL	NL	Indicates Loaded (L) or Non-loaded (NL) cable in the loop portion of the circuit.
CKTID	Alpha-numeric string		An alphanumeric string of up to 40 characters used as a circuit identifier in cross-connects.
CTYPE	D, B1, B2	D	Channel type for ISDN-BRI
CUSTREMTEST	N Y	N	Customer Remote Test. Allows a customer to loop back the far end of a DDS circuit. This attribute is valid for LINETYPE=OCUDP only.
DPMODE	LOOP BATGND	LOOP	Dial Pulse Mode. Values include: LOOP - normal Loop Pulsing BATGND - Battery Ground Pulsing for the Loop Reverse Battery signaling interface. May be used on long loops to reduce pulse distortion.
DXBAL	1300 to 3700 Ohms in 200 Ohm increments	1300	DX Balance Resistance (in ohms), used to match the simplex resistance of the loop

—continued—

Attribute	Range	Default	Description
EQLZ	0 to 6	0	Slope equalization for 2-wire circuits
ERRCORR	N Y	N	Indicates whether Error Correction is being used
GSFN			Type of special service the card is to provide. Used with LOOPTYPE to determine the card type.
HYBBAL	Depends on service. See appropriate service tables.	Depends on service. See appropriate service tables.	Hybrid Balance - sets the precision balance network on 2-wire circuits
IMPED	Depends on service. See appropriate service tables.	Depends on service. See appropriate service tables.	Impedance of line card in ohms
INCL	N Y	N	Inclusive flag in TL1 command. Recognized by NE but not a provisionable NE attribute. Values include: Y - allows edit or delete of red-lined termination N - forbids edit or deletion of red-lined termination
LINETYPE	OCUDP DS0DP		Specifies OCUDP or DS0 DP function ***Note:*** DS0DP is only valid on FCOT.
LLB	Y N	Y	Latching Loopback enabled for DDS
LOOPTYPE	2W 4W 6-8W		Number of wires on circuit. Combines with GSFN attribute to indicate function. For example, 2-wire FXS as opposed to 4-wire FXS.

—continued—

Attribute	Range	Default	Description
ONHKTRAN	Y N	Y	Onhook Transmission (full time). Values include: Y - data transmission or reception allowed full time while the telephone is onhook N - onhook transmission allowed only during ringing and open switch interval
PLAREQ	0 to 6	0	Slope equalization for 2W PLAR circuits
RATE	24 48 96 192 56K 64K	64K	Rate specifies the speed of the DDS channel. Values include: 24 - 2400 bps 48 - 4800 bps 96 - 9600 bps 192 - 19200 bps 56k - 56000 bps 64k - 64000 bps
RGAIN	Depends on service. See appropriate service tables.	Depends on service. See appropriate service tables.	Receive Gain
RXBLOCKDIS	Y N	Y	Receive Blocking Disabled - disables blocking in the digital to analog direction of the voice path. Values include: Y - Disabled N - Enabled
RXBW	0 to 16	0	Receive Bandwidth pre-equalization setting
RXHT	0 to 16	0	Receive Height pre-equalization setting
RXOHTGN	-10 to 0	-10	Receive On Hook Transmission Gain - gain in the data receive signal path when the telephone is onhook.
RXSL	0 to 15	0	Receive Slope pre-equalization setting

—continued—

Attribute	Range	Default	Description
SECONDARY	Y N	N	Secondary Channel - indicates whether secondary channel is being used for a DDS circuit. (Not valid for 64K rate.)
SIGLEADS	NORM REV	NORM	Signaling Leads - indicates whether the derived signaling leads are normal or reversed
SLCRNT	OFF CONT REV SINK	OFF	Sealing Current - indicates the type of sealing current used. Values include: OFF - Off CONT - Continuous REV - Reversed SINK - Sink
TRKCOND	ONHK OFFHK	OFFHK	TRKCOND - (CGA) describes the line interface action when an alarm occurs. Values include: ONHK - line interface idles the loop when an alarm occurs OFFHK - line interface idles the loop for 2.5 seconds, then busies out the loop
TGAIN	Depends on service. See appropriate service tables.	Depends on service. See appropriate service tables.	Transmit Gain
TXBLOCKDIS	N Y	Y	Transmit Blocking Disabled - disables blocking in the analog to digital direction of the voice path. Values include: Y - Disabled N - Enabled
TXBW	0 to 16	0	Transmit Bandwidth post-equalization setting
TXHT	0 to 16	0	Transmit Height post-equalization setting

—continued—

Attribute	Range	Default	Description
TXOHTGN	-10 to 0	-10	Transmit On Hook Transmission Gain - gain in the data transmit signal path when the telephone is onhook.
TXSL	0 to 15	0	Transmit Slope post-equalization setting
ZCS	Y N	Y	Indicate whether Zero Code Suppression is used on a DDS circuit
—end—			

Gblock

The following table contains the ranges and descriptions for the parameters in the Gblock of ENT-T0 and ED-T0 requests.

Position	Range	Default	Description
1	null IS OOS	IS	Primary state of DS0 termination. If null (not specified), then set to default. Values include: IS - In Service OOS - Out of Service
2	null RDLD RDLD-DEA	null	Secondary state of DS0 Termination. Indicates whether the DS0 termination is to be red-lined or not. Values include: null - use default for GSFN/LOOPTYPE RDLD - make termination red-lined RDLD-DEA - remove red-lined state ***Note:*** A DS0 termination command does not prompt the user to confirm the termination, regardless of the value in this position.

Provisionable attributes for DS1 object types

This section includes tables which list valid attributes that appear in the E, F, and G parameter blocks in DS1 provisioning messages.

Eblock

The following table contains keywords, ranges, and descriptions for attributes that will be returned in the Eblock of a RTRV-T1 request. These keywords should not be used in the Fblock of a ENT-T1 or ED-T1 request.

Keyword	Range	Description
LPBK	NOTEST NELB FELB	Indicates type of loopback in which a DS1 line termination point has been placed. Values include: NOTEST - line is not currently looped back. NELB - Near End LoopBack FELB - Far End LoopBack
PST	IS IS-ANR OOS-MA-AS OOS-MT	Primary State of DS1 termination. Values include: IS - In Service, Normal IS-ANR - In Service, Abnormal OOS-MA-AS - Out of Service, memory administration assigned OOS-MT - Out of Service, Maintenance
EQ	N Y	Indicates whether the DS1 termination is equipped or unequipped. Equipped means there is a mapper card in the slot along with DS1 port cards for the mapper plugged in. Values include: N - termination is unequipped Y - termination is equipped
MEA	Y N	Indicates that a mismatch exists between the line card in the slot and the OPC's preprovisioned data. Y - mismatch exists N - no mismatch exists

Fblock

The following table contains the keywords, ranges, and descriptions for attributes returned in the Fblock of a RTRV-T1 request (excluding the INCL keyword), ENT-T1, or ED-T1 request.

Keyword	Range	Default	Description
ALRMENC	ONES ZEROS	ONES	Specifies code used to indicate an upstream alarm. Values include: ONES - Alarm Indication Signal (all ones) ZEROS - All Zeros Code
FMT	NULL ESF SF	SF	Framing format of DS1 path. Values include: ESF - Extended SuperFrame SF - SuperFrame NULL is only valid when SYNC=ASYNC.
LBO	SHORT MEDIUM LONG	SHORT	Line Build Out attenuates DS1 signal for line lengths under 655 feet. Values include: SHORT - 0 to 150 feet MEDIUM - 150 to 450 feet LONG - 450 to 655 feet
LINECDE	B8ZS AMI AMI-ZCS	B8ZS	DS1 line encoding. Values include: B8ZS - Bipolar with 8 Zero Substitution (valid only if ALRMENC=ONES) AMI - Alternate Mark Inversion AMI-ZCS - Alternate Mark Inversion–Zero Code Suppression
SYNC	BYTE ASYNC	BYTE	Synchronization of VT1.5 which carries the DS1 signal. Values include: BYTE - Byte-Synchronous ASYNC - Asynchronous

Gblock

The following table contains the ranges and descriptions for the parameters in the Gblock of a ENT-T1 or ED-T1 request.

Position	Range	Default	Description
1	null IS OOS	IS	Primary State of DS1 termination. Values include: IS - In Service OOS - Out of Service ***Note:*** If null (not specified), then set to default.

Provisionable attributes for DS3 object types

This section includes tables which list valid attributes that appear in the E, F, and G parameter blocks in DS3 provisioning messages.

Eblock

The following table contains keywords, ranges, and descriptions for attributes that will be returned in the Eblock of a RTRV-T3 request. These keywords should not be used in the Fblock of a ENT-T3 or ED-T3 request.

Keyword	Range	Description
LPBK	NOTEST NELB FELB	Indicates type of loopback in which a DS3 line termination point has been placed. Values include: NOTEST - line is not currently looped back. NELB - Near End LoopBack FELB - Far End LoopBack
—continued—		
PST	IS IS-ANR OOS-MA-AS OOS-MT	Primary State of DS3 termination. Values include: IS - In Service, Normal IS-ANR - In Service, Abnormal OOS-MA-AS - Out of Service, memory administration assigned OOS-MT - Out of Service, Maintenance

Keyword	Range	Description
EQ	N Y	Indicates whether the DS3 termination is equipped or unequipped. Equipped means there is a mapper card in the slot along with DS3 port cards for the mapper plugged in. Values include: N - termination is unequipped Y - termination is equipped
MEA	Y N	Indicates that a mismatch exists between the line card in the slot and the OPC's preprovisioned data. Y - mismatch exists N - no mismatch exists
—end—		

Fblock

The following table contains the keywords, ranges, and descriptions for attributes returned in the Fblock of a RTRV-T3, ENT-T3, or ED-T3 request.

Keyword	Range	Default	Description
LBO	SHORT LONG	SHORT	Line Build Out attenuates signal depending on line length.
FMT	ONASYNC OFF	ONASYNC	Framing format of DS3 path
LINECDE	B3ZS	B3ZS	Line encoding. For DS3, the only valued entry is B3ZS (bipolar with 3 Zero Substitution)
RXPARITY	N Y	N	Receive Parity correction
TXPARITY	N Y	N	Transmit Parity correction

Gblock

The following table contains the ranges and descriptions for the parameters in the Gblock of a ENT-T3 or ED-T3 request.

Position	Range	Default	Description
1	null IS OOS	IS	Primary State of DS3 termination. Values include: IS - In Service OOS - Out of Service ***Note:*** If null (not specified), then set to default.

Provisionable attributes for equipment object types

This section includes tables which list valid attributes in equipment provisioning messages.

RTRV-EQPT

The following table contains keywords, ranges, and descriptions for attributes that will be returned by a RTRV-EQPT request. These keywords should not be used in the Fblock of an ENT-EQPT request.

Keyword	Range	Description
TYPE (see Note)	 CLEI code MAP1 MAP3	Specifies the type of common equipment, CDS shelf line cards, and mapper card equipment: CLEI code - Refer to CDS and CE shelf AIDs MAP1 - DS1 Mapper Card MAP3 - DS3 Mapper Card
PST	IS IS-ANR OOS-MA-AS OOS-MT	Primary State of Equipment termination. Values include: IS - In Service, Normal IS-ANR - In Service, Abnormal OOS-MA-AS - Out of Service, memory administration assigned OOS-MT - Out of Service, Maintenance
EQ	N Y	Indicates whether the Equipment termination is equipped or unequipped. Equipped means there is a mapper card in the slot. Values include: N - termination is unequipped Y - termination is equipped
MEA	Y N	Indicates that a mismatch exists between the line card in the slot and the OPC’s preprovisioned data. Y - mismatch exists N - no mismatch exists
PEC	see Description column Note	For DS0 equipment only. ***Note:*** See NT PECs (product engineering codes) for DS0 line cards in the table under the heading “Provisionable attributes for DS0 object types” on page 4-20)
Note: For DS0 equipment types, see Common Language Equipment Identifier (CLEI) codes for DS0 line cards in the table under the heading “Provisionable attributes for DS0 object types” on page 4-20).		

Eblock

The following table contains the ranges and descriptions for the parameters in the Eblock for ENT-EQPT and DLT-EQPT requests.

Position	Range	Default	Description
1	MAP1 MAP3		Specifies the type of mapper card equipment. Values include: MAP1 - DS1 Mapper Card MAP3 - DS3 Mapper Card

DS0 cross-connect provisioning messages

This section describes the messages and parameters used for DS0 cross-connect provisioning through the TL1 interface.

> ***Note:*** For supported TL1 error responses and codes, see “Supported TL1 error responses and codes” on page 4-90.

DLT-CRS-T0

The DLT-CRS-T0 command is used to delete an existing DS0 cross-connect.

> ***Note 1:*** For 3DS0 ISDN or IDSL service, the AID parameter must specify both the RT and CO sides of the cross-connect and the TID must specify the TID of the RFT.
>
> ***Note 2:*** The Fblock parameter can contain a single attribute, namely INCL. When INCL =Y, the cross-connect is deleted even if any of the cross-connected DS0 line terminations are red-lined. If any of the line-terminations are red-lined, the command will fail unless INCL=Y.

The input syntax of the DLT-CRS-T0 message is:

```
DLT-CRS-T0:<tid>:<aid>:<ctag>:::[<Fblock>];
```

Message parameters	Description
<tid>	target identifier for the network element to which a command is directed. See page 4-20 for more information on TID.
<aid>	access identifier of the position of the equipment being addressed. Format of the AID varies depending on the target object. See page 4-12 for more information on AID.
<ctag>	correlation tag used to correlate input and output messages. This is a one to six alphanumeric character code. See page 4-18 for more information on CTAG.
<Fblock>=INCL	keyword parameter, which, when enabled (“Y”), forces a deletion of a cross-connect even when one or both of the DS0 line terminations cross-connected are red-lined. This field is optional. See page 4-22 for more information on Fblock.

The normal response syntax of the Delete cross-connect message is:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^COMPLD cr lf
;
```

The error response syntax of the DLT-CRS-T0 message is:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^DENY cr lf
^^^<errcde> cr lf
[^^^’[<aid>]:<descriptor>=<text> cr lf]
[^^^/*<optional free format text>*/ cr lf]
;
```

Message parameters	Description
<sid>	NE name or OPC that originated the TL1 message
<date>	TL1 message origination date
<time>	TL1 message origination time
<aid>,<ctag>	are previously defined
<errcde>	error code

Example of DLT-CRS-T0 message:

```
DLT-CRS-T0:RFT:RT1-1-1,CO1-CE1-1-5-2:0001;

   RFT 93-12-20 11:45:06
M  0001 COMPLD
;
```

ENT-CRS-T0

The ENT-CRS-T0 command is used to create a DS0 cross-connect. This command creates a connection between a DS0 line termination on the remote fiber terminal (RFT) and a DS0 line termination on the fiber central office terminal (FCOT), or a connection between a DS0 line termination on the RFT and a DS0 channel within a DS1 Tandem on the FCOT.

> ***Note 1:*** In order to cross-connect a DS0 on the RFT to a DS1 Tandem channel on the FCOT, the target DS1 Facility must be set as Tandem using the Facility Assignment Manager Tool in the OPC.
>
> ***Note 2:*** The AID parameter must specify both the RT and CO sides of the cross-connect, and the TID must be the TID of the RFT.
>
> ***Note 3:*** For VT-level connections in a BLSR ring, the TID parameter must specify an FCOT as the target. For all other configurations, the TID must specify an RFT.

The input syntax of the Enter cross-connect message is:

```
ENT-CRS-T0:<tid>:<aid>:<ctag>:::<Fblock>;
```

Message parameters	**Description**
`<tid>`	target identifier for the network element to which a command is directed
`<aid>`	access identifier of the position of the equipment being addressed. Format of the AID varies depending on the target object.
`<ctag>`	correlation tag used to correlate input and output messages. This is a one to six alphanumeric character code.
`<Fblock>`	keyword parameter containing the attribute CKTID=X, where X is the circuit identifier (of up to 40 alphanumeric characters)

The normal response syntax of the Enter cross-connect message is:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^COMPLD cr lf
;
```

The error response syntax of the Enter cross-connect message is:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^DENY cr lf
^^^<errcde> cr lf
[^^^'[<aid>]:<descriptor>=<text> cr lf]
[^^^/*<optional free format text>*/ cr lf]
;
```

Message parameters	Description
<sid>	source identifier
<date>	TL1 message origination date
<time>	TL1 message origination time
<aid>,<ctag>	are previously defined
<errcde>	error code

Example of the Enter DS0 cross-connect message:

```
ENT-CRS-T0:RFT:RT1-1-1,CO1-CE1-1-5-2:0001;

   RFT 93-12-20 11:45:06
M  0001 COMPLD
;
```

RTRV-CRS-T0

The RTRV-CRS-T0 command is used to return information concerning which slots between the FCOT and RFT are cross-connected.

Certain conditions apply for the TID and SID (source identifier) fields in the Retrieve DS0 cross-connect message:

- The AID field for this command can specify either the FCOT side, RFT side, or both.
- If the AID contains both FCOT and RFT, the TID specified must be an RFT's TID.
- If the TID specified is the RFT, the AID type may be either RFT or FCOT.
- If the TID specified is the FCOT, the AID type must be FCOT.

The input syntax of the Retrieve cross-connect message is:
RTRV-CRS-T0:<tid>:<aid>:<ctag>;

Message parameters	Description
`<tid>`	target identifier for the network element to which a command is directed
`<aid>`	access identifier of the position of the equipment being addressed. Format of the AID varies depending on the target object. A range of AIDs may also be specified.
`<ctag>`	correlation tag used to correlate input and output messages. This is a one to six alphanumeric character code.

The normal response syntax of the Retrieve cross-connect message (for an existing termination or object) is:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^COMPLD cr lf
^^^’<aid>:<DATABLOCK>’ cr lf
;
```

The normal response syntax of the Retrieve cross-connect message (for a nonexisting termination or object) is:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^COMPLD cr lf
;
```

The error response syntax of the Retrieve cross-connect message is:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^DENY cr lf
^^^<errcde> cr lf
[^^^’[<aid>]:<descriptor>=<text> cr lf]
[^^^/*<optional free format text>*/ cr lf]
;
```

Message parameters	Description
`<sid>`	source identifier
`<date>`	TL1 message origination date
`<time>`	TL1 message origination time
`<aid>,<ctag>`	are previously defined
`<errcde>`	error code

Example of the RTRV-CRS-T0 message:

```
RTRV-CRS-T0:FCOT:CO1-1-1:0001;
```

```
   FCOT 93-12-20 11:45:06
M  0001 COMPLD
;
```

DS0 line terminations provisioning messages

The following are valid commands and their corresponding responses used for provisioning DS0 line terminations.

DLT-T0

The DLT-T0 command is used to delete existing DS0 line terminations.

> ***Note 1:*** Before deleting a DS0 line termination, the DS0 cross-connect for the line termination must be deleted (if it exists).
>
> ***Note 2:*** To delete a red-lined DS0 line termination, the Fblock of the TL1 request must contain the INCL=Y parameter.

The input syntax of the DLT-T0 message is:

```
DLT-T0:<tid>:<aid>:<ctag>:::[<Fblock>];
```

Message parameters	Description
`<tid>`	target identifier for the network element to which a command is directed
`<aid>`	access identifier of the position of the equipment being addressed. Format of the AID varies depending on the target object.
`<ctag>`	correlation tag used to correlate input and output messages. This is a one to six alphanumeric character code.
`<Fblock>=INCL`	keyword parameter, which, when enabled (“Y”), forces a deletion of a line termination even when one or both of the DS0 line terminations cross-connected are red-lined. This field is optional.

The normal response syntax of the DLT-T0 message is:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^COMPLD cr lf
;
```

The error response syntax of the DLT-T0 message is:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^DENY cr lf
^^^<errcde> cr lf
[^^^’[<aid>]:<descriptor>=<text> cr lf]
[^^^/*<optional free format text>*/ cr lf]
;
```

Message parameters	Description
`<sid>`	source identifier
`<date>`	TL1 message origination date
`<time>`	TL1 message origination time
`<aid>,<ctag>`	are previously defined
`<errcde>`	error code

Example of the DLT-T0 message:

```
DLT-T0:RFT:CO1-1-1:0001;

   RFT 93-12-20 11:45:06
M  0001 COMPLD
;
```

ENT-T0

The ENT-T0 command is used to create a DS0 Line Termination (including red-lined). This command can set all provisionable DS0 attributes listed in “Provisionable attributes for DS0 object types” on page 4-20.

> ***Note 1:*** The Fblock must be specified in order to indicate the type of card being provisioned.
>
> ***Note 2:*** If the GSFN parameter is used and its value is DDS, the LINETYPE must be specified.
>
> ***Note 3:*** If the destination slot is equipped with a line card that does not support the GSFN/LOOPTYPE parameter combination, then the request will be denied. For example, an Epsilon line card does not support non-POTS services, therefore a provisioning command specifying a non-POTS service for a slot with an Epsilon line card will be denied.

The input syntax of the ENT-T0 message is:

```
ENT-T0:<tid>:<aid>:<ctag>:::<Fblock>:<Gblock>;
```

Message parameters	Description
`<tid>`	target identifier for the network element to which a command is directed
`<aid>`	access identifier of the position of the equipment being addressed. Format of the AID varies depending on the target object.
`<ctag>`	correlation tag used to correlate input and output messages. This is a one to six alphanumeric character code.
`<Fblock>`	keyword parameter specifying the special service being provisioned
`<Gblock>`	positional parameter specifying if the object is being put in service (IS) or out of service (OOS). It may also provide red-lined information.

The normal response syntax of the ENT-T0 message is:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^COMPLD cr lf
;
```

The error response syntax of the ENT-T0 is:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^DENY cr lf
^^^<errcde> cr lf
[^^^'[<aid>]:<descriptor>=<text> cr lf]
[^^^/*<optional free format text>*/ cr lf]
;
```

Message parameters	**Description**
<sid>	source identifier
<date>	TL1 message origination date
<time>	TL1 message origination time
<aid>,<ctag>	are previously defined
<errcde>	error code

Example of the ENT-T0 message:

```
ENT-T0:FCOT:CO1-1-1:0001:::GSFN=FXO,LOOPTYPE=2W;
```

```
   FCOT 93-12-20 11:45:06
M  0001 COMPLD
;
```

RTRV-T0

The RTRV-T0 command is used to return the current value of all provisionable DS0 attributes listed in the sections describing parameter blocks for DS0, DS1 and DS3 object types (see sections in this chapter starting on pages 4-20, 4-37, and 4-40).

The input syntax of the RTRV-T0 message is:

```
RTRV-T0:<tid>:<aid>:<ctag>;
```

Message parameters	Description
<tid>	target identifier for the network element to which a command is directed
<aid>	access identifier of the position of the equipment being addressed. Format of the AID varies depending on the target object. A range of AIDs may also be specified. See page 4-12 for a description of the ranges available for AID.
<ctag>	correlation tag used to correlate input and output messages. This is a one to six alphanumeric character code.

The normal response syntax of the RTRV-T0 message (for an existing termination or object) is:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^COMPLD cr lf
^^^'<aid>:<DATABLOCK>,<DATABLOCK>,<DATABLOCK>' cr lf
;
```

The normal response syntax of the RTRV-T0 message (for a nonexisting termination or object) is:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^COMPLD cr lf
;
```

The error response syntax of the RTRV-T0 message is:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^DENY cr lf
^^^<errcde> cr lf
[^^^'[<aid>]:<descriptor>=<text> cr lf]
[^^^/*<optional free format text>*/ cr lf]
;
```

Message parameters	Description
`<sid>`	source identifier
`<date>`	TL1 message origination date
`<time>`	TL1 message origination time
`<aid>,<ctag>`	are previously defined
`<errcde>`	error code

Example of the RTRV-T0 message:

```
RTRV-T0:FCOT:CO1-1-1:0001;

   FCOT 93-12-20 11:45:06
M  0001 COMPLD
;
```

ED-T0

The ED-T0 command is used to set the DS0 attributes listed in the following sections describing the parameter blocks for DSO, DS1 and DS3 object types (see sections starting on pages 4-20, 4-37, and 4-40).

> ***Note 1:*** The Fblock must always be specified since the command must indicate what type of card is being provisioned.
>
> ***Note 2:*** If the Gblock is specified, the Fblock must specify either GSFN or LOOPTYPE.
>
> ***Note 3:*** The ED-T0 command only sets the IG, and GSFC values for MVI services. For the GR-303 DMS service, you can edit all other parameters except GSFN/LOOPTYPE at a DS0 line termination.

The input syntax of the ED-T0 message is:

```
ED-T0:<tid>:<aid>:<ctag>:::<Fblock>:<Gblock>;
```

Message parameters	**Description**
`<tid>`	target identifier for the network element to which a command is directed
`<aid>`	access identifier of the position of the equipment being addressed. Format of the AID varies depending on the target object.
`<ctag>`	correlation tag used to correlate input and output messages. This is a one to six alphanumeric character code.
`<Fblock>`	keyword parameter specifying the special service being provisioned
`<Gblock>`	positional parameter specifying if the object is being put in service (IS) or out of service (OOS). It may also provide red-lined information.

The normal response syntax of the ED-T0 message is:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^COMPLD cr lf
;
```

The error response syntax of the ED-T0 message is:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^DENY cr lf
^^^<errcde> cr lf
[^^^'[<aid>]:<descriptor>=<text> cr lf]
[^^^/*<optional free format text>*/ cr lf]
;
```

Message parameters	Description
<sid>	source identifier
<date>	TL1 message origination date
<time>	TL1 message origination time
<aid>,<ctag>	are previously defined
<errcde>	error code

Example of the ED-T0 message:

```
ED-T0:FCOT:CO1-1-1:0001:::GSFN=FX0,LOOPTYPE=4W:OOS;
```

```
   FCOT 93-12-20 11:45:06
M  0001 COMPLD
;
```

DS1 provisioning messages

This section describes the messages and parameters used for provisioning DS1 line terminations through the TL1 interface.

> ***Note:*** For supported TL1 error responses and codes, see "Supported TL1 error responses and codes" on page 4-90.

DLT-T1

The DLT-T1 command is used to delete an existing DS1 facility.

> ***Note:*** Before a DS1 line termination can be deleted, any associated cross-connects must be deleted.

The input syntax of the DLT-T1 message is:

```
DLT-T1:<tid>:<aid>:<ctag>;
```

Message parameters	Description
<tid>	target identifier for the network element to which a command is directed
<aid>	access identifier of the position of the equipment being addressed. Format of the AID varies depending on the target object.
<ctag>	correlation tag used to correlate input and output messages. This is a one to six alphanumeric character code.

The normal response syntax of the DLT-T1 message is:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^COMPLD cr lf
;
```

The error response syntax of the DLT-T1 message is:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^DENY cr lf
^^^<errcde> cr lf
```

[^^^’[<aid>]:<descriptor>=<text> cr lf]
[^^^/*<optional free format text>*/ cr lf]
;

Message parameters	Description
`<sid>`	source identifier
`<date>`	TL1 message origination date
`<time>`	TL1 message origination time
`<aid>,<ctag>`	are previously defined
`<errcde>`	error code

Example of the DLT-T1 message:

```
DLT-T1:FCOT:1-CE1-1-1:0001;
```

```
   FCOT 93-12-20 11:45:06
M  0001 COMPLD
;
```

ENT-T1

The ENT-T1 command is used to change the provisioning of an already existing DS1 facility. This message can set all provisionable DS1 attributes listed in “Provisionable attributes for DS1 object types” on page 4-37.

> ***Note:*** If this message is issued against a line termination that already exists, the existing line termination will be deleted (overwritten).

The input syntax of the ENT-T1 message is:

```
ENT-T1:<tid>:<aid>:<ctag>:::[<Fblock>]:[<Gblock>];
```

Message parameters	Description
<tid>	target identifier for the network element to which a command is directed
<aid>	access identifier of the position of the equipment being addressed. Format of the AID varies depending on the target object.
<ctag>	correlation tag used to correlate input and output messages. This is a one to six alphanumeric character code.
<Fblock>	keyword parameter specifying the special service being provisioned. This field is optional and is not used when the Gblock field is specified.
<Gblock>	positional parameter specifying if the object is being put in service (IS) or out of service (OOS). This field is optional and is not used when the Fblock field is specified.

The normal response syntax of the ENT-T1 message is:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^COMPLD cr lf
;
```

The error response syntax of the ENT-T1 message is:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^DENY cr lf
^^^<errcde> cr lf
[^^^'[<aid>]:<descriptor>=<text> cr lf]
[^^^/*<optional free format text>*/ cr lf]
;
```

Message parameters	Description
<sid>	source identifier
<date>	TL1 message origination date
<time>	TL1 message origination time
<aid>,<ctag>	are previously defined
<errcde>	error code

Example of the ENT-T1 message:

```
ENT-T1:FCOT:CE1-1-1:0001:::FMT=SF;

   FCOT 93-12-20 11:45:06
M  0001 COMPLD
;
```

RTRV-T1

The RTRV-T1 command is used to return the current value of all provisionable DS1 attributes listed in “Provisionable attributes for DS1 object types” on page 4-37.

> ***Note:*** If a retrieve is issued against a non-existent DS1, a slot that does not have an existing equipment object, or a slot that has an equipment object that can only be set from the switch, the response will return a COMPLD status but no DS1 information will be returned.

The input syntax of the RTRV-T1 message is:

```
RTRV-T1:<tid>:<aid>:<ctag>;
```

Message parameters	Description
<tid>	target identifier for the network element to which a command is directed
<aid>	access identifier of the position of the equipment being addressed. Format of the AID varies depending on the target object. A range of AIDs may also be specified.
<ctag>	correlation tag used to correlate input and output messages. This is a one to six alphanumeric character code.

The normal response syntax of the RTRV-T1 message (for an existing termination or object) is:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^COMPLD cr lf
^^^'<aid>:<DATABLOCK>,<DATABLOCK>,<DATABLOCK>' cr lf
;
```

The normal response syntax of the RTRV-T1 message (for a non-existing termination or object) is:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^COMPLD cr lf
;
```

The error response syntax of the RTRV-T1 message is:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^DENY cr lf
^^^<errcde> cr lf
[^^^'[<aid>]:<descriptor>=<text> cr lf]
[^^^/*<optional free format text>*/ cr lf]
;
```

Message parameters	Description
`<sid>`	source identifier
`<date>`	TL1 message origination date
`<time>`	TL1 message origination time
`<aid>,<ctag>`	are previously defined
`<errcde>`	error code

Example of the RTRV-T1 message:

```
RTRV-T1:FCOT:1-CE1-1-1:0001;

   FCOT 93-12-20 11:45:06
M  0001 COMPLD
;
```

ED-T1

The ED-T1 command is used to change the provisioning on an existing DS1 facility. It can set all provisionable DS1 attributes listed in "Provisionable attributes for DS1 object types" on page 4-37.

Note 1: This message will be denied if issued against a tandem DS1 facility with existing cross-connects.

Note 2: If the Gblock is specified, no parameters are allowed in the Fblock. Similarly if the Fblock is specified, no parameters are allowed in the Gblock.

The input syntax of the ED-T1 message is:

```
ED-T1:<tid>:<aid>:<ctag>:::<Fblock>:<Gblock>;
```

Message parameters	Description
<tid>	target identifier for the network element to which a command is directed
<aid>	access identifier of the position of the equipment being addressed. Format of the AID varies depending on the target object.
<ctag>	correlation tag used to correlate input and output messages. This is a one to six alphanumeric character code.
<Fblock>	keyword parameter specifying the special service being provisioned. This field is optional and is not used when the Gblock field is specified.
<Gblock>	positional parameter specifying if the object is being put in service (IS) or out of service (OOS). This field is optional and is not used when the Fblock field is specified.

The normal response syntax of the ED-T1 message is:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^COMPLD cr lf
;
```

The error response syntax of the ED-T1 message is:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^DENY cr lf
^^^<errcde> cr lf
[^^^’[<aid>]:<descriptor>=<text> cr lf]
[^^^/*<optional free format text>*/ cr lf]
;
```

Message parameters	Description
<sid>	source identifier
<date>	TL1 message origination date
<time>	TL1 message origination time
<aid>,<ctag>	are previously defined
<errcde>	error code

Example of the ED-T1 message:

```
ED-T1:FCOT:1-CE1-1-1:0001:::FMT=SF,ALRMENC=ONES;

   FCOT 93-12-20 11:45:06
M  0001 COMPLD
;
```

DS3 provisioning messages

This chapter describes the messages and parameters used for provisioning DS3 line terminations through the TL1 interface.

> ***Note:*** For supported TL1 error responses and codes, see “Supported TL1 error responses and codes” on page 4-90.

DLT-T3

The DLT-T3 command is used to delete an existing DS3 facility.

The input syntax of the DLT-T3 message is:

```
DLT-T3:<tid>:<aid>:<ctag>;
```

Message parameters	Description
<tid>	target identifier for the network element to which a command is directed
<aid>	access identifier of the position of the equipment being addressed. Format of the AID varies depending on the target object.
<ctag>	correlation tag used to correlate input and output messages. This is a one to six alphanumeric character code.

The normal response syntax of the DLT-T3 message is:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^COMPLD cr lf
;
```

The error response syntax of the DLT-T3 message is:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^DENY cr lf
^^^<errcde> cr lf
[^^^'[<aid>]:<descriptor>=<text> cr lf]
[^^^/*<optional free format text>*/ cr lf]
;
```

Message parameters	Description
`<sid>`	source identifier
`<date>`	TL1 message origination date
`<time>`	TL1 message origination time
`<aid>,<ctag>`	are previously defined
`<errcde>`	error code

Example of the DLT-T3 message:

```
DLT-T3:FCOT:1-CE1-3-1:0001;

   FCOT 93-12-20 11:45:06
M  0001 COMPLD
;
```

ENT-T3

The ENT-T3 command is used to change the provisioning of an already existing DS3 facility. This command can set all provisionable DS3 attributes listed in “Provisionable attributes for DS3 object types” on page 4-40.

The input syntax of the ENT-T3 message is:

```
ENT-T3:<tid>:<aid>:<ctag>:::<Fblock>:<Gblock>;
```

Message parameters	**Description**
`<tid>`	target identifier for the network element to which a command is directed
`<aid>`	access identifier of the position of the equipment being addressed. Format of the AID varies depending on the target object.
`<ctag>`	correlation tag used to correlate input and output messages. This is a one to six alphanumeric character code.
`<Fblock>`	keyword parameter specifying the special service being provisioned. This field is optional.
`<Gblock>`	positional parameter specifying the primary state of the object being provisioned. This field is optional.

The normal response syntax of the ENT-T3 message is:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^COMPLD cr lf
;
```

The error response syntax of the ENT-T3 message is:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^DENY cr lf
^^^<errcde> cr lf
[^^^'[<aid>]:<descriptor>=<text> cr lf]
[^^^/*<optional free format text>*/ cr lf]
;
```

Message parameters	**Description**
`<sid>`	source identifier
`<date>`	TL1 message origination date
`<time>`	TL1 message origination time
`<aid>,<ctag>`	are previously defined
`<errcde>`	error code

Example of the ENT-T3 message:

```
ENT-T3:FCOT:1-CE1-3-1:0001:::LBO=LONG:OOS;

   FCOT 93-12-20 11:45:06
M  0001 COMPLD
;
```

RTRV-T3

The RTRV-T3 command is used to return the current value of all provisionable DS3 attributes listed in “Provisionable attributes for DS3 object types” on page 4-40.

> ***Note:*** If a retrieve is issued against a non-existent DS1 or a slot that does not have an existing equipment object, the response will return a COMPLD status but no DS3 information will be returned.

The input syntax of the RTRV-T3 message is:

```
RTRV-T3:<tid>:<aid>:<ctag>;
```

Message parameters	Description
<tid>	target identifier for the network element to which a command is directed
<aid>	access identifier of the position of the equipment being addressed. Format of the AID varies depending on the target object. A range of AIDs may also be specified.
<ctag>	correlation tag used to correlate input and output messages. This is a one to six alphanumeric character code.

The normal response syntax of the RTRV-T3 message (for an existing termination or object) is:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^COMPLD cr lf
^^^’<aid>:<DATABLOCK>,<DATABLOCK>,<DATABLOCK>’ cr lf
;
```

The normal response syntax of the RTRV-T3 message (for a non-existing termination or object) is:

```
cr lf lf
^^^<tid>^<date>^<time> cr lf
M^^<ctag>^COMPLD cr lf
;
```

The error response syntax of the RTRV-T3 message is:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^DENY cr lf
^^^<errcde> cr lf
[^^^'[<aid>]:<descriptor>=<text> cr lf]
[^^^/*<optional free format text>*/ cr lf]
;
```

Message parameters	Description
<sid>	source identifier
<date>	TL1 message origination date
<time>	TL1 message origination time
<aid>,<ctag>	are previously defined
<errcde>	error code

Example of the RTRV-T3 message:

```
RTRV-T3:FCOT:1-CE1-3-1:0001;
```

```
   FCOT 93-12-20 11:45:06
M  0001 COMPLD
;
```

ED-T3

The ED-T3 command is used to change the provisioning on an existing DS3 facility. It can set all provisionable DS3 attributes listed in “Provisionable attributes for DS3 object types” on page 4-40.

> ***Note:*** If the Gblock is specified, no parameters are allowed in the Fblock. Similarly if the Fblock is specified, no parameters are allowed in the Gblock.

The input syntax of the ED-T3 message is:

```
ED-T3:<tid>:<aid>:<ctag>:::<Fblock>:<Gblock>;
```

Message parameters	Description
<tid>	target identifier for the network element to which a command is directed
<aid>	access identifier of the position of the equipment being addressed. Format of the AID varies depending on the target object.
<ctag>	correlation tag used to correlate input and output messages. This is a one to six alphanumeric character code.
<Fblock>	keyword parameter specifying the special service being provisioned. This field is optional.
<Gblock>	positional parameter specifying the primary state of the object being provisioned. This field is optional.

The normal response syntax of the ED-T3 message is:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^COMPLD cr lf
;
```

The error response syntax of the ED-T3 message is:

```
cr lf lf
^^^<tid>^<date>^<time> cr lf
M^^<ctag>^DENY cr lf
^^^<errcde> cr lf
[^^^'[<aid>]:<descriptor>=<text> cr lf]
[^^^/*<optional free format text>*/ cr lf]
;
```

Message parameters	Description
<sid>	source identifier
<date>	TL1 message origination date
<time>	TL1 message origination time
<aid>,<ctag>	are previously defined
<errcde>	error code

Example of the ED-T3 message:

```
ED-T3:FCOT:1-CE1-3-1:0001:::RXPARITY=Y,TXPARITY=Y;

   FCOT 93-12-20 11:45:06
M  0001 COMPLD
;
```

Equipment provisioning messages

This section describes the messages and parameters used for provisioning DS1 and DS3 equipment and the network element (NE) name. The message types available for equipment provisioning include:

- delete object
- enter object
- retrieve object

> ***Note:*** In order to provision DS1 or DS3 facilities, an equipment object of that kind (DS1 or DS3) must exist.

DLT-EQPT

The Delete Equipment command is used to delete the equipment object specified.

> ***Note:*** Before an equipment object can be deleted, all of the facilities attached to the equipment object must be deleted.

The input syntax of the DLT-EQPT message is:

```
DLT-EQPT:<tid>:<aid>:<ctag>::<Eblock>;
```

Message parameters	Description
`<tid>`	target identifier for the network element to which a command is directed
`<aid>`	access identifier of the position of the equipment being addressed. Format of the AID varies depending on the target object.
`<ctag>`	correlation tag used to correlate input and output messages. This is a one to six alphanumeric character code.
`<Eblock>`	positional parameter specifying the type of equipment being provisioned. This field is optional.

The normal response syntax of the DLT-EQPT message is:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^COMPLD cr lf
;
```

The error response syntax of the DLT-EQPT message is:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^DENY cr lf
^^^<errcde> cr lf
[^^^'[<aid>]:<descriptor>=<text> cr lf]
[^^^/*<optional free format text>*/ cr lf]
;
```

Message parameters	Description
<sid>	source identifier
<date>	TL1 message origination date
<time>	TL1 message origination time
<aid>,<ctag>	are previously defined
<errcde>	error code

Example of the DLT-EQPT message:

```
DLT-EQPT:FCOT:1-CE1-1:0001::MAP1;

   FCOT 93-12-20 11:45:06
M  0001 COMPLD
;
```

ENT-EQPT

The ENT-EQPT command is used to create an equipment object (DS1 or DS3) at a particular slot.

> ***Note:*** This command will also create DS1 or DS3 facilities (depending on which is specified in the Eblock) which will have default provisioning.

The input syntax of the ENT-EQPT message is:

```
ENT-EQPT:<tid>:<aid>:<ctag>::<Eblock>;
```

Message parameters	Description
`<tid>`	target identifier for the network element to which a command is directed
`<aid>`	access identifier of the position of the equipment being addressed. Format of the AID varies depending on the target object.
`<ctag>`	correlation tag used to correlate input and output messages. This is a one to six alphanumeric character code.
`<Eblock>`	positional parameter specifying the type of equipment being provisioned. This field is optional.

The normal response syntax of the ENT-EQPT message is:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^COMPLD cr lf
;
```

The error response syntax of the ENT-EQPT message is:

```
cr lf lf
^^^<tid>^<date>^<time> cr lf
M^^<ctag>^DENY cr lf
^^^<errcde> cr lf
[^^^'[<aid>]:<descriptor>=<text> cr lf]
[^^^/*<optional free format text>*/ cr lf]
;
```

Message parameters	Description
`<sid>`	source identifier
`<date>`	TL1 message origination date
`<time>`	TL1 message origination time
`<aid>,<ctag>`	are previously defined
`<errcde>`	error code

Example of the ENT-EQPT message:

```
ENT-EQPT:FCOT:1-CE1-1:0001::MAP1;

   FCOT 93-12-20 11:45:06
M  0001 COMPLD
;
```

RTRV-EQPT

The RTRV-EQPT command is used to return the current type of an equipment object.

> ***Note:*** A retrieve issued against a non-existing equipment object will return with a COMPLD status, but no equipment information will be returned.

The input syntax of the RTRV-EQPT message is:

```
RTRV-EQPT:<tid>:<aid>:<ctag>;
```

Message parameters	Description
`<tid>`	target identifier for the network element to which a command is directed
`<aid>`	access identifier of the position of the equipment being addressed. Format of the AID varies depending on the target object.
`<ctag>`	correlation tag used to correlate input and output messages. This is a one to six alphanumeric character code.

The normal response syntax of the RTRV-EQPT message (for an existing object) is:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^COMPLD cr lf
^^^'<aid>:<DATABLOCK>,<DATABLOCK>,<DATABLOCK>' cr lf
;
```

The normal response syntax of the RTRV-EQPT message (for a non-existing object) is:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^COMPLD cr lf
;
```

The error response syntax of the RTRV-EQPT message is:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^DENY cr lf
^^^<errcde> cr lf
[^^^'[<aid>]:<descriptor>=<text> cr lf]
[^^^/*<optional free format text>*/ cr lf]
;
```

Message parameters	**Description**
<sid>	source identifier
<date>	TL1 message origination date
<time>	TL1 message origination time
<aid>,<ctag>	are previously defined
<errcde>	error code

Example of the RTRV-EQPT message:

```
RTRV-EQPT:FCOT:1-CE1-1:0001;
```

```
   FCOT 93-12-20 11:45:06
M  0001 COMPLD
;
```

VT1.5 facility provisioning messages

RTRV-VT1

The RTRV-VT1 command retrieves attributes for the VT1.5 facility identified by the AID.

The following is the input syntax of the RTRV-VT1 command:

```
rtrv-vt1:<tid>:<aid>:<ctag>;crlf
```

The following is the syntax of the normal response to the RTRV-VT1 command:

```
crlf
lf
^^^<sid>^<date>^<time> crlf
M^^<ctag>^COMPLD (crlf
^^^"<aid>:(<keyword>=<value>)+")* crlf
;
```

The following is the syntax of the error response to the RTRV-VT1 command:

```
crlf
lf
^^^<sid>^<date>^<time crlf
M^^<ctag>^DENY crlf
^^^<errcde> crlf
[^^^"(<aid>:<descriptor>=<value>" crlf]*
[^^^/*optional free format text*/]* crlf
;
```

The valid access identifier (AID) for the RTRV- VT1 command is 1-CE1-V1G[1..12]-[1..14].

Table 4-11
VT1.5 parameters

Keyword	Range	Description
PST	IS IS - ANR OOS-MA-AS OOS-MT	Indicates the primary state of the facility. IS = In Service, Normal IS-ANR = In Service, Abnormal OOS-MA-AS = Out of Service, memory administration assigned OOS-MT = Out of Service, Maintenance

Example

The following is an example of the RTRV-VT1 command:

```
RTRV-VT1:BERMUDA:1-V1G12-14:0001

   BERMUDA 93-09-24 11:40:23
M  0001 COMPLD
   ”AID:PST=IS”
;
```

STS-1 facility provisioning messages

RTRV-STS1

The RTRV-STS1 command retrieves the attributes for a STS-1 facility identified by the AID.

The following is the input syntax of the RTRV-STS1 command:

```
rtrv-sts1:<tid>:<aid>:<ctag>;crlf
```

The following is the syntax of the normal response to the RTRV-STS1 command:

```
crlf
lf
^^^<sid>^<date>^<time> crlf
M^^<ctag>^COMPLD crlf
^^^”<aid>:(<keyword>=<value>)+” crlf
;
```

The following is the syntax of the error response to the RTRV-STS1 command:

```
crlf
lf
^^^<sid>^<date>^<time crlf
M^^<ctag>^DENY crlf
^^^<errcde> crlf
[^^^/*<optional free format text>*/ crlf]
;
```

The valid access identifier (AID) for the RTRV- STS1 command is shown as follows.

Description	AID range
STS-1 facility at a DS1 mapper	1-CE1-S1G[1, 3, 5, 7, 9, 11)
STS-1 facility at a DS3 mapper	1-CE1-S3G[1..4]-[1..3]

The following table contains keywords, ranges, and descriptions for attributes that are returned for a RTRV-STS1 request.

Table 4-12
STS-1 parameters

Keyword	Range	Default	Description
PST	IS IS-TRBL OOS OOS-MTCE	-	Primary State of STS-1 path termination. IS = In Service, Normal IS-TRBL = In Service, Trouble OOS = Out of Service OOS-MTCE = Out of Service, Maintenance.

Example

The following is an example of the RTRV-STS1 command:

```
RTRV-STS1:BERMUDA:1-CE1-S3G1-1:0001

   BERMUDA 93-09-24 11:40:23 crlf
M  0001^COMPLD crlf
   ”1-CE1-S3G1-1:PST=IS”
;
```

Electrical STS-1 facility provisioning messages

RTRV-EC1

The RTRV-EC1 command retrieves the attributes for an electrical STS-1 facility identified by the AID.

The following is the input syntax of the RTRV-EC1 command:

```
rtrv-ec1:<tid>:<aid>:<ctag>[:::<f block>];crlf
```

The following is the syntax of the normal response to the RTRV-EC1 command:

```
crlf
lf
^^^<sid>^<date>^<time> crlf
M^^<ctag>^COMPLD crlf
^^^”<aid>:(<keyword>=<value>)+” crlf
;
```

The following is the syntax of the error response to the RTRV-EC1 command:

```
crlf
lf
^^^<sid>^<date>^<time crlf
M^^<ctag>^DENY crlf
^^^<errcde> crlf
[^^^/*<optional free format text>*/ crlf]
;
```

The valid access identifier (AID) for the RTRV-EC1 command is as follows.

Description	AID range
Electrical STS-1 facility	1-CE1-SG[1..4]-[1..3]

Example

The following is an example of the RTRV-EC1 command:

```
RTRV-EC1:BERMUDA:1-CE1-SG1-1:AM0001;

BERMUDA 93-09-24 11:40:23
M  AM0001 COMPLD
   "1-CE1-SG1-1:CKTID=EXAMPLECLFI,LBO=SHORT,LINECDE=B3ZS,LPBK=
NOTEST,PST=OOS,SST=FAF"
;
```

ENT-EC1

The ENT-EC1 command creates an electrical STS-1 facility identified by the AID.

CAUTION
Rick of traffic loss
A request to enter a DS3 tributary for a circuit pack group that already exists is accepted. The existing facility is placed out of service, deleted, and a new one created with the new parameters. Any traffic carried by the deleted facility is lost.

Note 1: For valid ENT-EC1 requests, parameters which are not specified take their default value.

Note 2: This command requires that the appropriate STS-1 equipment already be provisioned. Otherwise, an error response is returned.

The following is the input syntax of the ENT-EC1 command:

```
ent-ec1:<tid>:<aid>:<ctag>[:::[<fBlock>][:<gBlock>]];crlf
```

The following is the syntax of the normal response to the ENT-EC1 command:

```
crlf
lf
^^^<sid>^<date>^<time>crlf
M^^<ctag>^COMPLD crlf
;
```

The following is the syntax of the error response to the ENT-EC1 command:

```
crlf
lf
^^^<sid>^<date>^<time>crlf
M^^<ctag>^DENY crlf
^^^<errcde> crlf
[^^^/*<optional free format text>*/crlf]
;
```

The valid access identifier (AID) for the ENT-EC1 command is as follows.

Description	**AID range**
Electrical STS-1 facility	1-CE1-SG[1..4]-[1..3]

Example

The following is an example of the ENT-EC1 command:

```
ENT-EC1:BERMUDA:1-CE1-SG1-1:AM0001:::CKTID=EXAMPLECLFI,L8O =
LONG:IS;

   BERMUDA 93-09-24 11:40:23
M  AM0001 COMPLD
;
```

ED-EC1

The ED-EC1 command is used to change the provisionable attributes and states of an existing electrical STS-1 facility, identified by the AID.

> ***Note 1:*** For a facility, if the gBlock is specified, no parameters are allowed in the fBlock. Similarly, if the fBlock is specified, no parameters are allowed in the gBlock.
>
> ***Note 2:*** When using the ED-EC1 command, with the exception of the CKTID keyword (CLFI) the facility must be placed in an out of service state before the changes can take place. If the facility is not first placed out of service, the changes do not take place and an error message results.

The following is the input syntax of the ED-EC1 command:

```
ed-ec1:<tid>:<aid>:<ctag>:::[<fBlock][:gBlock];crlf
```

The following is the syntax of the normal response to the ED-EC1 command:

```
crlf
lf
^^^<sid>^<date>^<time>crlf
M^^<ctag>^COMPLD crlf
;
```

The following is the syntax of the error response to the ED-EC1 command:

```
crlf
lf
^^^<sid>^<date>^<time>crlf
M^^<ctag>^DENY crlf
^^^<errcde> crlf
[^^^/*<optional free format text>*/crlf]
;
```

The valid access identifier (AID) for the ED-EC1 command is as follows.

Description	AID range
Electrical STS-1 facility	1-CE1-SG[1..4]-[1..3]

Example

The following is an example of the ED-EC1 command (placing an electrical STS1 facility OOS):

```
ED-EC1:Bermuda:1-CE1-SG1-1:AM0001::::OOS;

   Bermuda 94-05-24 11:40:23
M  AM0001 COMPLD
;
```

DLT-EC1

The DLT-EC1 command deletes an existing electrical STS-1 facility identified by the AID.

> ***Note 1:*** Before an electrical STS-1 facility can be deleted, any associated cross-connects must be deleted (which can be done using the DLT-CRS command), and the electrical STS-1 facility must be placed OOS (which can be done using the ED-EC1 command). If the electrical STS-1 facility is not placed out of service before being deleted, an error results.

The following is the input syntax of the DLT-EC1 command:

```
dlt-ec1:<tid>:<aid>:<ctag>[:::<fBlock>];crlf
```

The following is the syntax of the normal response to the DLT-EC1 command:

```
crlf
lf
^^^<sid>^<date>^<time>crlf
M^^<ctag>^COMPLD crlf
;
```

The following is the syntax of the error response to the DLT-EC1 command:

```
crlf
lf
^^^<sid>^<date>^<time>crlf
M^^<ctag>^DENY crlf
^^^<errcde> crlf
[^^^/*<optional free format text>*/crlf]
;
```

The valid access identifier (AID) for the DLT-EC1 command is as follows:

Description	AID range
Electrical STS-1 facility	1-CE1-SG[1..4]-[1..3]

Example

The following is an example of the DLT-EC1 command:

```
DLT-EC1:BERMUDA:1-CE1-SG1-1:AM0001;

   BERMUDA 93-09-24 11:40:23
M  AM0001 COMPLD
;
```

OC-3 facility provisioning commands

This section describes the commands and parameters used for provisioning OC-3 transport and tributary facilities through the TL1 interface.

> ***Note:*** The retrieve OC-3 facility command (RTRV-OC3) applies to both transport and tributary OC-3 facilities. The enter, edit, and delete OC-3 facility commands (ENT-OC3, ED-OC3, and DLT-OC3) apply only to tributary OC-3 facilities.

Parameter block for OC-3 provisioning commands

Table 4-13 contains keywords, ranges, and descriptions for attributes that are used in OC-3 facility provisioning commands.

Table 4-13
OC-3/OC-12 parameters

Keyword	Range	Default	Description	Valid commands
Read-only parameters				
LBCL		—	The laser bias current level (absolute value)	RTRV-OC3
LPT	0 - 100	—	The laser bias transmitted (absolute value)	RTRV-OC3
—continued—				

Table 4-13 (continued)
OC-3/OC-12 parameters

Keyword	Range	Default	Description	Valid commands
LINECDE	NRZ, RZ		Line encoding of the optical interface to either Return to Zero (RZ) or Non-Return to Zero (NRZ)	RTRV-OC3
LEVEL	3	3	The number of STS-1 paths which compose the OC line digital bit rate.	RTRV-OC3
PST	IS IS-TRBL OOS OOS-MTCE	-	Primary State of OC-3 termination. IS = In Service, Normal IS-ANR = In Service, Trouble OOS-MA-AS = Out of Service OOS-MTCE = Out of Service, Maintenance	RTRV-OC3
SST	PF FAF FEF null	-	PF = Partial Fail FAF = Facility Fail FEF = Family Equipment Fail	RTRV-OC3
fBlock parameters				
CKTID	String of ASCII characters	null	Common Language Facility Identifier (CLFI) = unique identifier for the optical facility. The CLFI code is represented by a 38-character string. The first 16 characters represent a description of the facility. The next two sets of 11 characters are the CLLI codes for the NE terminating the near end and far end of the facility respectively.	ENT-OC3 ED-OC3 RTRV-OC3
SGNDEG	4 to 10	6	Signal degrade threshold exponent value (from 10^{-4} to 10^{-6})	ENT-OC3 ED-OC3 RTRV-OC3
gBlock parameters				
	null IS OOS	IS	Primary state of the OC-3 termination. If null (not specified), the default is used. IS = in service OOS = out of service	ENT-OC3 ED-OC3 RTRV-OC3
—end—				

RTRV-OC3

The RTRV-OC3 command retrieves the attributes for an OC-3 facility identified by the AID.

The following is the input syntax of the RTRV-OC3 command:

```
rtrv-oc3:<tid>:<aid>:<ctag>;crlf
```

The following is the syntax of the normal response to the RTRV-OC3 command:

```
crlf
lf
^^^<sid>^<date>^<time>crlf
M^^<ctag>^COMPLD crlf
^^^"<aid>:(<keyword>=<value>)+" crlf
;
```

The following is the syntax of the error response to the RTRV-OC3 command:

```
crlf
lf
^^^<sid>^<date>^<time>crlf
M^^<ctag>^DENY crlf
^^^<errcde> crlf
[^^^/*<optional free format tex>t*/crlf]
;
```

The valid access identifiers (AID) for the RTRV-OC3 command are as follows.

Description	**AID range**
OC-3 transport facility at an OC-3 terminal (FCOT, RFT)	1-CE1-[A, B]
OC-3 tributary facility at an OC-12 terminal or VTM ring ADM	1-CE1-03G[1S, 2S, 3..8]

The following is an example of the RTRV-OC3 command:

```
RTRV-OC3:BERMUDA:1-CE1-03G3:AM0001;

   BERMUDA 93-09-24 11:40:23
M  AM0001 COMPLD
   " 1-CE1-03G3:CKTID=EXAMPLECLFI,LEVEL=3,PST=IS,
SST=,SGNDEG=7"
;
```

ENT-OC3

The ENT-OC3 command creates an OC-3 tributary facility identified by the AID.

> **CAUTION**
> **Risk of service loss**
> A request to enter an OC-3 tributary facility for a circuit pack that already exists is accepted. The existing facility is placed out of service, deleted, and a recreated with new parameters.

Note 1: For valid ent-oc3 requests, parameters which are not specified take their default value.

Note: This command requires that the appropriate OC-3 equipment already be provisioned. Otherwise, an error response is returned.

The following is the input syntax of the ENT-OC3 command:

```
ent-oc3:<tid>:<aid>:<ctag>[:::[<fBlock][:<gBlock>]];crlf
```

The following is the syntax of the normal response to the ENT-OC3 command:

```
crlf
lf
^^^ <sid>^<date>^<time>crlf
M^^<ctag>^COMPLD crlf
;
```

The following is the syntax of the error response to the ENT-OC3 command:

```
crlf
lf
^^^<sid>^<date>^<time>crlf
M^^<ctag>^DENY crlf
^^^<errcde> crlf
^^^/*<optional free format tex>t*/crlf
;
```

Parameter description

The valid access identifiers (AID) for the ENT-OC3 command are as follows.

Description	AID range
OC-3 transport facility at an OC-3 terminal (FCOT, RFT)	1-CE1-[A, B]
OC-3 tributary facility at an OC-12 terminal or VTM ring ADM	1-CE1-03G[1S, 2S, 3..8]

Example

The following is an example of the ENT-OC3 command:

```
ENT-OC3:BERMUDA:1-CE1-03G3:AM0001:::CKTID=EXAMPLECLFI,SD=6:IS;

   BERMUDA 93-09-24 11:40:23
M  AM0001 COMPLD
;
```

ED-OC3

The ED-OC3 command is used to change the provisionable attributes and state of an existing OC-3 facility identified by the AID.

> ***Note 1:*** When using ED-OC3 to modify the primary state, this parameter should be the only one appearing in the state block of the command: the other data parameter blocks should be empty.
>
> ***Note 2:*** When using the ED-OC3 command, all termination point objects, with the exception of the CKTID keyword (CLFI) and the Signal Degrade Threshold must be placed in an OOS state before the changes can take place. If the facility is not first placed OOS, the changes do not take place and an error message results.

The following is the input syntax of the ED-OC3 command:

```
ed-oc3:<tid>:<aid>:<ctag>:::[<fBlock>][:<gBlock>];crlf
```

The following is the syntax of the normal response to the ED-OC3 command:

```
crlf
lf
^^^ <sid>^<date>^<time>crlf
M^^<ctag>^COMPLD crlf
;
```

The following is the syntax of the error response to the ED-OC3 command:

```
crlf
lf
^^^<sid>^<date>^<time>crlf
M^^<ctag>^DENY crlf
^^^<errcde> crlf
[^^^/*<optional free format text>*/crlf]
;
```

The valid access identifiers (AID) for the ED-OC3 command are as follows.

Description	AID range
OC-3 transport facility at an OC-3 terminal (FCOT, RFT)	1-CE1-[A, B]
OC-3 tributary facility at an OC-12 terminal or VTM ring ADM	1-CE1-03G[1S, 2S, 3..8]

Example

The following is an example of the ED-OC3 command (placing an OC-3 tributary OOS):

```
ED-OC3:BERMUDA:1-CE1-03G3:AM0001::::OOS;

   BERMUDA 93-09-24 11:40:23
M  AM0001 COMPLD
;
```

DLT-OC3

The DLT-OC3 command deletes an OC-3 facility identified by the AID.

> ***Note:*** Before an OC-3 facility can be deleted, any associated cross-connects must be deleted (which can be done using the DLT-CRS command), and the OC-3 tributary facility must be placed OOS (which can be done using the ED-OC3 command). If the OC-3 tributary facility is not placed out of service before being deleted, an error results.

The following is the input syntax of the DLT-OC3 tributary command:

```
dlt-oc3:<tid>:<aid>:<ctag>;crlf
```

The following is the syntax of the normal response to the DLT-OC3 command:

```
crlf
lf
^^^ <sid>^<date>^<time>crlf
M^^<ctag>^COMPLD crlf
;
```

The following is the syntax of the error response to the DLT-OC3 command:

```
crlf
lf
^^^<sid>^<date>^<time>crlf
M^^<ctag>^DENY crlf
^^^<errcde> crlf
^^^/*<optional free format text>*/crlf
;
```

The valid access identifiers (AID) for the DLT-OC3 command are as follows.

Description	**AID range**
OC-3 transport facility at an OC-3 terminal (FCOT, RFT)	1-CE1-[A, B]
OC-3 tributary facility at an OC-12 terminal or VTM ring ADM	1-CE1-03G[1S, 2S, 3..8]

Example

The following is an example of the DLT-OC3 command:

```
DLT-OC3:BERMUDA:1-CE1-03G3:AM0001;

   BERMUDA 93-09-24 11:40:23
M  AM0001 COMPLD
;
```

OC-12 facility provisioning commands

This section describes the commands and parameters used for provisioning OC-12 transport facilities through the TL1 interface.

> ***Note:*** The retrieve OC-12 facility command (RTRV-OC12) applies only to OC-12 transport facilities. Enter, edit, and delete facility commands do not apply to OC-12 transport facilities, and are not described here.

RTRV-OC12

The RTRV-OC12 command retrieves the attributes for the OC-12 transport facility and optical line identified by the AID.

The following is the input syntax of the RTRV-OC12 command:

```
rtrv-oc12:<tid>:<aid>:<ctag>;crlf
```

The following is the syntax of the normal response to the RTRV-OC12 command:

```
crlf
lf
^^^ <sid>^<date>^<time>crlf
M^^<ctag>^COMPLD (crlf
^^^”<aid>:(<keyword>=<value>)+” [crlf
;
```

The following is the syntax of the error response to the RTRV-OC12 command:

```
crlf
lf
^^^<sid>^<date>^<time>crlf
M^^<ctag>^DENY( [crlf
^^^<errcde> ( [crlf
[^^^/*<optional free format text>*/crlf
;
```

The valid access identifiers (AID) for the RTRV-OC12 command are as follows.

Description	AID range
OC-12 transport facility at an OC-12 terminal (FCOT, RFT)	1-CE1-[A, B]
OC-12 transport facility at an OC-12 VTM ring ADM	1-CE1-[A, B]

Table 4-14
OC-3/OC-12 parameters

Keyword	Range	Default	Description	Valid commands
Read-only parameters				
LEVEL	12	12	The number of STS-1 paths which compose the OC line digital bit rate.	RTRV-OC12
PST	IS IS-ANR OOS-MA-AS OOS-MT	-	Primary State of OC-12 termination IS = In Service, Normal IS-ANR = In Service, Abnormal OOS-MA-AS = Out of Service, memory administration assigned OOS-MT = Out of Service, Maintenance	RTRV-OC12
fBlock parameters				
SST	PF FAF FEF null		Secondary state of the OC-12 facility. PF = partial state FAF = facility fail FEF = family equipment fail	RTRV-OC12
CKTID	String of ASCII characters	null	Common Language Facility Identifier (CLFI) = unique identifier for the optical facility. The CLFI code is represented by a 38-character string. The first 16 characters represent a description of the facility. The next two sets of 11 characters are the CLLI codes for the NE terminating the near end and far end of the facility respectively.	RTRV-OC12
SGNDEG	4 TO 10	6	Signal degrade threshold exponent value (from 10^{-4} to 10^{-10})	RTRV-OC12
gBlock parameters				
	null IS OOS	IS	Primary state of the OC-3 termination. If null (not specified), the default is used. IS = in service OOS = out of service	RTRV-OC12

Example

The following is an example of the RTRV-OC12 command:

```
RTRV-OC12:BERMUDA 1-CE1-A:AM0001;

   BERMUDA 93-09-24 11:40:23
M  AM0001 COMPLD
   ”1-CE1-A:CKTID=EXAMPLECLFI,LEVEL=12,PST=IS,SST=,SGNDEG=6”
crlf
;
```

Network Element (NE) provisioning messages

This section details the messages used for provisioning the network element (NE) name.

RTRV-HDR

The RTRV-HDR command is used to retrieve the name of an NE or host OPC.

> ***Note:*** If the TID is present, then a particular NE name will be retrieved. The NE name must be for an NE within the OPC’s span of control.

The input syntax of the RTRV-HDR message is:

```
RTRV-HDR:<tid>::<ctag>;
```

Message parameters	Description
`<tid>`	target identifier for the network element to which a command is directed
`<ctag>`	correlation tag used to correlate input and output messages. This is a one to six alphanumeric character code.

The normal response syntax of the RTRV-HDR message is:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^COMPLD cr lf
^^^’<aid>:<DATABLOCK>,<DATABLOCK>,<DATABLOCK>’ cr lf
;
```

The error response syntax of the RTRV-HDR message is:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^DENY cr lf
^^^<errcde> cr lf
[^^^'[<aid>]:<descriptor>=<text> cr lf]
[^^^/*<optional free format text>*/ cr lf]
;
```

Message parameters	Description
<sid>	source identifier
<date>	TL1 message origination date
<time>	TL1 message origination time
<ctag>	is previously defined
<aid>	access identifier
<errcde>	error code

Example of the RTRV-HDR message:

```
RTRV-HDR:FCOT::0001;
```

```
   FCOT 93-12-20 11:45:06
M  0001 COMPLD
;
```

SET-SID

The SET-SID command is used to set the source identifier for the target NE. This command changes the name of the target NE to the new name. After this command has been issued, any following SET SID commands must use the new NE name.

The input syntax of the SET-SID message is:

```
SET-SID:<tid>::<ctag>::<newsid>;
```

Message parameters	Description
`<tid>`	target identifier for the network element to which a command is directed
`<ctag>`	correlation tag used to correlate input and output messages. This is a one to six alphanumeric character code.
`<newsid>`	new source identifier

The normal response syntax of the SET-SID message is:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^COMPLD cr lf
;
```

The error response syntax of the SET-SID message is:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^DENY cr lf
^^^<errcde> cr lf
[^^^'[<aid>]:<descriptor>=<text> cr lf]
[^^^/*<optional free format text>*/ cr lf]
;
```

Message parameters	Description
`<sid>`	source identifier
`<date>`	TL1 message origination date
`<time>`	TL1 message origination time
`<ctag>`	is previously defined
`<aid>`	access identifier
`<errcde>`	error code

Example of the SET-SID message:

```
SET-SID:FCOT1::1::FCOT2;

   FCOT 93-12-20 11:45:06
M  0001 COMPLD
;
```

Supported TL1 error responses and codes

This section defines acknowledgment/error responses and error codes supported by the TL1 provisioning interface.

Acknowledgment/error responses

The following acknowledgment/error responses are used by the provisioning interface. These messages are sent back to the OS before an actual TL1 response to indicate that the TL1 request has actually been received by the OPC.

Printout Follows

A response of some kind must be sent to the originator of the TL1 command within 2 seconds of receiving the command. If the response to the TL1 request can not be sent in the time out period, then the TL1 task must send a “printout follows” acknowledgment as in:

PF^<CTAG> cr lf <

The left angle bracket (<) after the lf is a special character that is part of the message. The field <CTAG> is the CTAG from the message that is in progress.

Not Acknowledged

If the TL1 task receives a TL1 request before initialization is completed, it will send a “NA response” indicating it is not ready to process TL1 request.

NA^<CTAG> cr lf <

The left angle bracket (<) after the lf is a special character that is part of the message. The field <CTAG> is the CTAG from the message that is to be retried later.

Retry Later

If, for some reason, the TL1 task can not handle a particular TL1 transaction at the time it is sent (due to a transient problem), then the task must send a ‘retry later’ acknowledgment. The retry later informs the requestor that for some reason the TL1 request can not be processed now, but will be retried at a later time.

RL^<CTAG> cr lf <

The left angle bracket (<) after the lf is a special character that is part of the message. The field <CTAG> is the CTAG from the message that is to be retried later.

Error codes

If an error occurs, the proper error code is determined by using the following precedence when translating a TL1 request:

IISP (Input, Invalid Syntax or Punctuation). A character or punctuation mark appearing in an input command has violated the syntax rules.

```
cr lf lf
^^^<SID>^<YY-MM-DD>^<HH:MM:SS> cr lf
M^^<CTAG>^DENY cr lf
^^^IISP cr lf
^^^"[<AID>]:PREIDENT=<string>" cr lf
;
```

IPNV (Input, Parameter, Not Valid). A parameter name appearing in an input command is not valid (not recognizable by the NE according to the view in the command code).

```
cr lf lf
^^^<SID>^<YY-MM-DD>^<HH:MM:SS> cr lf
M^^<CTAG>^DENY cr lf
^^^IPNV cr lf
^^^"[<AID>]:PRMTR=<keyword>" cr lf
;
```

IPNC (Input, Parameter, Not Consistent). Two valid parameter names appearing in an input command are mutually exclusive with each other.

```
cr lf lf
^^^<SID>^<YY-MM-DD>^<HH:MM:SS> cr lf
M^^<CTAG>^DENY cr lf
^^^IPNC cr lf
^^^"[<AID>]:PRMTR=<keyword>&<keyword>" cr lf
;
```

IPMS (Input, Parameter, Missing). A required parameter is missing from an input command.

```
cr lf lf
^^^<SID>^<YY-MM-DD>^<HH:MM:SS> cr lf
M^^<CTAG>^DENY cr lf
^^^IPMS cr lf
^^^"[<AID>]:PRMTR=<keyword>" cr lf
;
```

IPEX (Input, Parameter, Extra). A valid parameter is illegally used or repeated (according to the command code) in an input command.

```
cr lf lf
^^^<SID>^<YY-MM-DD>^<HH:MM:SS> cr lf
M^^<CTAG>^DENY cr lf
^^^IPEX cr lf
^^^"[<AID>]:PRMTR=<keyword>" cr lf
;
```

IDNV (Input, Data, Not Valid). A simple or compound parameter value appearing in an input command is invalid (given that it is within its allowable range).

```
cr lf lf
^^^<SID>^<YY-MM-DD>^<HH:MM:SS> cr lf
M^^<CTAG>^DENY cr lf
^^^IDNV cr lf
^^^"[<AID>]:<keyword>=<value>" cr lf
;
```

IDNC (Input, Data, Not Consistent). A segment of input data appearing in an input command is inconsistent with another segment of input data (given that their two parameter names are not mutually exclusive).

```
cr lf lf
^^^<SID>^<YY-MM-DD>^<HH:MM:SS> cr lf
M^^<CTAG>^DENY cr lf
^^^IDNC cr lf
^^^"[<AID>]:<keyword>=<value>" cr lf
;
```

IDRG (Input, Data, Range Error). A parameter value appearing in an input command is inconsistent with its defined type or falls outside its allowable range.

```
cr lf lf
^^^<SID>^<YY-MM-DD>^<HH:MM:SS> cr lf
M^^<CTAG>^DENY cr lf
^^^IDRG cr lf
^^^"[<AID>]:<keyword>=<value>" cr lf
;
```

ICNV (Input, Command, Not Valid). The command verb or a modifier is invalid (not recognizable by the NE according to the domain of command verb, first modifier or second modifier).

```
cr lf lf
^^^<SID>^<YY-MM-DD>^<HH:MM:SS> cr lf
M^^<CTAG>^DENY cr lf
^^^ICNV cr lf
;
```

ICNC (Input, Command, Not Consistent). The valid command verb is mutually exclusive with a valid modifier or the two valid modifiers are mutually exclusive with each other.

```
cr lf lf
^^^<SID>^<YY-MM-DD>^<HH:MM:SS> cr lf
M^^<CTAG>^DENY cr lf
^^^ICNC cr lf
;
```

IBNC (Input, Block, Not Consistent). Given that the number of parameter blocks in the input command is correct, the type of a parameter block appearing in an input command is found to be inconsistent with what has been defined (whether it is a name defined parameter block or positional defined parameter block). The blockname is one of TIDB (TID block), AIDB (AID block), CTAGB (CTAG block), GB (Dblock - General block), GDATAB (Eblock), CDATAB (Fblock), or STATEB (Gblock).

```
cr lf lf
^^^<SID>^<YY-MM-DD>^<HH:MM:SS> cr lf
M^^<CTAG>^DENY cr lf
^^^IBNC cr lf
^^^"[<AID>]:BLOCK=<blockname>" cr lf
;
```

IBEX (Input, Block, Extra). The number of parameter blocks in the input command is more than what has been expected.

```
cr lf lf
^^^<SID>^<YY-MM-DD>^<HH:MM:SS> cr lf
M^^<CTAG>^DENY cr lf
^^^IBEX cr lf
^^^/*<free format text>*/ cr lf
;
```

IBMS (Input, Block, Missing). The number of parameter blocks in the input command is less than what has been expected.

```
cr lf lf
^^^<SID>^<YY-MM-DD>^<HH:MM:SS> cr lf
M^^<CTAG>^DENY cr lf
^^^IBMS cr lf
^^^/*<free format text>*/ cr lf
;
```

EQWT (Equipment, Wrong Type). The specified equipment is the wrong type.

```
cr lf lf
^^^<SID>^<YY-MM-DD>^<HH:MM:SS> cr lf
M^^<CTAG>^DENY cr lf
^^^EQWT cr lf
^^^/*<free format text>*/ cr lf
;
```

SABT (Status, Aborted). The execution of an action requested by an input command was aborted. (Upon receiving such error code, the OS will retry the input command.)

```
cr lf lf
^^^<SID>^<YY-MM-DD>^<HH:MM:SS> cr lf
M^^<CTAG>^DENY cr lf
^^^SABT cr lf
^^^/*<free format text>*/ cr lf
;
```

SDNC (Status, Data, Not consistent). A piece of input data is not consistent with a piece of data stored in the database in the NE.

```
cr lf lf
^^^<SID>^<YY-MM-DD>^<HH:MM:SS> cr lf
M^^<CTAG>^DENY cr lf
^^^SDNC cr lf
^^^/*<free format text>*/ cr lf
;
```

SNVS (Status, Not in Valid State). The requested job can not be done due to improper state status of the specified entity.

```
cr lf lf
^^^<SID>^<YY-MM-DD>^<HH:MM:SS> cr lf
M^^<CTAG>^DENY cr lf
^^^SNVS cr lf
^^^”[<AID>]:PST=<primarystate>,
^^^/*<free format text>*/ cr lf
;
```

SLEM (Status, List, Exceed Maximum). The number of members in the specified list or table exceeds the maximum limit.

```
cr lf lf
^^^<SID>^<YY-MM-DD>^<HH:MM:SS> cr lf
M^^<CTAG>^DENY cr lf
^^^SLEM cr lf
^^^”[<AID>]:PRMTR=<keyword>” cr lf
;
```

SLBM (Status, List, Below Minimum). The number of members in the specified list or table is below the minimum limit.

```
cr lf lf
^^^<SID>^<YY-MM-DD>^<HH:MM:SS> cr lf
M^^<CTAG>^DENY cr lf
^^^SLBM cr lf
^^^”[<AID>]:PRMTR=<keyword>” cr lf
;
```

SSRE (Status, System Resources Exceeded). The execution of an action requested by an input command was aborted due to limitation of system resources. (Upon receiving such error code, the OS will retry the input command.)

```
cr lf lf
^^^<SID>^<YY-MM-DD>^<HH:MM:SS> cr lf
M^^<CTAG>^DENY cr lf
^^^SSRE cr lf
^^^/*<free format text>*/ cr lf
;
```

SARB (Status, All Resource Busy). The system is busy or overloaded. As a result, no input command can be accepted or executed. (Upon receiving such error code, the OS will retry the input command.)

```
cr lf lf
^^^<SID>^<YY-MM-DD>^<HH:MM:SS> cr lf
M^^<CTAG>^DENY cr lf
^^^SARB cr lf
^^^/*<free format text>*/ cr lf
;
```

SSTP (Status, Stopped). The execution of the command was stopped due to a software or hardware problem.

```
cr lf lf
^^^<SID>^<YY-MM-DD>^<HH:MM:SS> cr lf
M^^<CTAG>^DENY cr lf
^^^SSTP cr lf
^^^/*<free format text>*/ cr lf
;
```

MERR (Multiple Error). There is more than one error condition to be described. The description text will contain a four character error code followed by the error description text for that error code. There are multiple lines of descriptive text, one per error condition.

```
cr lf lf
^^^<SID>^<YY-MM-DD>^<HH:MM:SS> cr lf
M^^<CTAG>^DENY cr lf
^^^MERR cr lf
^^^”[<AID>]:ERCDE=<errorcode>,<description>” cr l
;
```

Line and loop testing interface

This chapter outlines the messages and corresponding parameters for TL1 line and loop testing.

Chapter contents

This chapter contains the following topics:

SARTS and DARTS testing interface

Line and loop testing on AccessNode is provided by the test system controller (TSC) functionality on the operations controller (OPC). The TSC supports metallic testing for voiceband and voiceband data circuits from external operating systems (OSs), such as Switched Access Remote Test System (SARTS) and Digital Analog Remote Test System (DARTS), through the TL1 message interface on the OPC.

The set of messages used for AccessNode line and loop testing are a subset of the TR-834 message set. DARTS uses all of the TR-834 capability offered plus a few extra proprietary messages.

Basic test head behavior rules

The following rules are provided for assistance during TL1 testing.

Rule 1 a) During active MEAS- and TST- commands, only DISC-MEAS and DISC-TACC commands are accepted. (REPT-RSLT is an exception for certain MEAS-commands.)

b) During active CONN-BATT, CONN-GND, and CONN-SHORT commands, only DISC-TERM and DISC-TACC are accepted.

c) During an active CONN-LPBK command, only DISC-LPBK and DISC-TACC commands are accepted.

Rule 2 The test head can be active (monitoring, measuring, or applying test signal) in only one direction at time.

Rule 3 a) The test head generates only one test signal at a time.

b) The test head makes only one measurement at a time.

Rule 4 The test head does not source test signal and monitor or measure on the same pair of a 4-wire circuit.

Deviations from TR834 requirements

The following commands have deviations from standard TR834 requirements.

- CHG-SPLTSUPV — if the test pair is E or M, the A and B pairs are not affected. (TR834 requirement is to split and apply LPO.)
- MEAS-VG, MEAS-RES, MEAS-CAPNC, MEAS-CUR — the E and M leads are not bridged as a result of a bridged measurement on the A and B pairs. (TR834 requirement is to place the circuit in the monitor bridged condition.)
- CHG-SPLTSUPV — does not remove tone or test signal unless SFF supervision is applied on a pair that currently has tone or test signal active. (TR834 CONN-TN says CHG-SPLTSUPV removes tone.)
- TST-OUTPLSE — this command has been implemented to cycle on-hook and off-hook prior to outpulsing. (TR834 does not explicitly require this.)

AccessNode Express AID definitions

Table 5-1 lists the access identifier (AID) formats for AccessNode Express (ANX). Use these AIDs when you test ANX equipment.

Note: The access identifier (AID) identifies the position of the equipment for the CDS system by shelf and line card slot within the shelf. The ANX AID only identifies the circuit pack within a voice module.

Table 5-1
ANX AID formats

ANX shelf equipment	AID format
Shelf processor	SPX [A, B, ALL, WRK, STBY]
Integrated test unit	ITU
Power supply unit	PSU [A, B, ALL]
Line card	[1...48]

AccessNode AID definitions

Table 5-2 lists the AID formats for AccessNode. Use these AIDs when you monitor AccessNode equipment.

Note: The CDS AID identifies the position of the equipment for the CDS system by shelf and line card slot within the shelf.

Table 5-2
CDS AID formats

CDS shelf equipment	AID format
Line card	[1...7]-[1...96]

Line and loop testing messages

This section describes the command and response messages used for line and loop testing through the TL1 interface. The messages are summarized in the following table.

In the table, the OS source (“S” for SARTS and “D” for DARTS) and response mode for each message is given. A single response mode is defined as one COMPLD normal response message with a last character of “;”. A multiple response mode is defined as more than one COMPLD normal response message with all messages having a last character of “>” (with the exception of the last which ends with a “;” character).

Message	Message code	Source	Response mode	Page
Change Monitor Filter	CHG-MONFLT	D	Single	5-6
Change Monitor Level	CHG-MONLEV	D	Single	5-7
Change Port Parameters	CHG-PRTPAR	S, D	Single	5-9
Change Port Restore	CHG-PTRST	S, D	Single	5-11
Change Split and Supervision	CHG-SPLTSUPV	S, D	Single	5-12
Connect -48V Battery	CONN-BATT	D	Single	5-14
Connect Ground	CONN-GND	D	Single	5-16
Connect Intermodulation Signal	CONN-IMDSIG	D	Single	5-18
Connect 4-wire Loopback	CONN-LPBK	D	Single	5-20
Connect Monitor Bridged	CONN-MONBRDGD	S, D	Single	5-22
Connect Monitor Establish	CONN-MONEST	S, D	Single	5-23
Connect Monitor Listen	CONN-MONLIST	S, D	Single	5-25
Connect Peak to Average Ratio Test Signal	CONN-PARSIG	S, D	Single	5-27
Connect Short	CONN-SHORT	D	Single	5-29
Connect Test Access	CONN-TACC	S, D	Single	5-31
Connect Talk Split	CONN-TLKSPLT	S, D	Single	5-33
Connect Tone	CONN-TN	S, D	Single	5-35
Disconnect Loopback	DISC-LPBK	D	Single	5-37
Disconnect Measurement	DISC-MEAS	S, D	Single	5-38
Disconnect Monitor	DISC-MON	D	Single	5-40

—continued—

Message	**Message code**	**Source**	**Response mode**	**Page**
Disconnect Test Access	DISC-TACC	S, D	Single	5-41
Disconnect Special Termination	DISC-TERM	D	Single	5-42
Disconnect Test Signal	DISC-TSTSIG	S, D	Single	5-44
Measure Capacitance	MEAS-CAPNC	S, D	Both	5-46
Measure Current	MEAS-CUR	S, D	Both	5-49
Measure Intermodulation Distortion	MEAS-IMD	D	Single	5-51
Measure Impulse Noise	MEAS-IMPNSE	S, D	Multiple	5-53
Measure Noise	MEAS-NSE	S, D	Both	5-55
Measure Outpulse	MEAS-OUTPLSE	D	Multiple	5-57
Measure Peak to Average Ratio	MEAS-PAR	S	Single	5-59
Measure Phase Jitter	MEAS-PHJTR	S, D	Single	5-61
Measure Resistance	MEAS-RES	S, D	Both	5-63
Measure Resistance Simplex	MEAS-RESSX	D	Both	5-65
Measure Return Loss	MEAS-RLOSS	D	Both	5-67
Measure Signaling Resistance	MEAS-SIGRES	D	Both	5-69
Measure Signaling Voltage	MEAS-SIGVG	D	Both	5-71
Measure Tone	MEAS-TN	S, D	Both	5-73
Measure Transients	MEAS-TRSNTS	D	Multiple	5-75
Measure Voltage	MEAS-VG	S, D	Both	5-77
Measure Voltage Simplex	MEAS-VGSX	D	Both	5-79
Report Initialization	REPT-INITZN	S, D	Single	5-81
Report Result	REPT-RSLT	S, D	Single	5-82
Report Status	REPT-STAT	S	Single	5-83
Report Supervision Status	REPT-SUPVSTAT	D	Multiple	5-84
Test Outpulse	TST-OUTPLSE	S, D	Single	5-86
Test Ringing Signal	TST-RINGSGNL	S, D	Single	5-88
—end—				

Change Monitor Filter (D)

The Change Monitor Filter command is used to remove or insert the 2600 Hz notch filter in the monitor path.

Note the following:

- the filter is initially not active
- the command can be executed with or without monitor being active
- reset with the CHG-PTRST command

The input syntax of the Change Monitor Filter message is as follows:

```
CHG-MONFLT::<tsn>:<ctag>:<act>;
```

Message parameters	Description
<tsn>	test session number
<ctag>	correlation tag
<act>	requested action

The normal response syntax of the Change Monitor Filter message is as follows:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^COMPLD cr lf
;
```

The error response syntax of the Change Monitor Filter message is as follows:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^DENY cr lf
^^^<errcde> cr lf
^^^/*<supplier_free_form_error_explanation>*/ cr lf
;
```

Message parameters	Description
<sid>	source identifier
<date>	TL1 message origination date
<time>	TL1 message origination time
<ctag>	is previously defined
<errcde>	error code

Change Monitor Level (D)

The Change Monitor Level command is used to change the level of the monitor connection previously set by other monitor and talk commands. The monitor level may be increased or decreased in 5 dB steps.

Note the following:

- the monitor level is initially zero
- the command can be executed with or without the monitor being active
- reset the port condition with the CHG-PTRST command
- the command may have no affect if the test head gain/attenuation limits are met. Limits on monitoring, including TLP adjustment, are:
  - — single pair monitor: +25 dB to –25 dB
  - — single pair talk and monitor: +10 dB to –10 dB
  - — two pair (4-wire) monitor: +10 dB to –25 dB
  - — two pair (4-wire) talk and monitor: +10 dB to –25 dB

The input syntax of the Change Monitor Level message is as follows:

```
CHG-MONLEV::<tsn>:<ctag>:<chg>;
```

Message parameters	Description
<tsn>	test session number
<ctag>	correlation tag
<chg>	requested action

The normal response syntax of the Change Monitor Level message is as follows:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^COMPLD cr lf
;
```

The error response syntax of the Change Monitor Level message is as follows:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^DENY cr lf
^^^<errcde> cr lf
^^^/*<supplier_free_form_error_explanation>*/ cr lf
;
```

Message parameters	Description
`<sid>`	source identifier
`<date>`	TL1 message origination date
`<time>`	TL1 message origination time
`<ctag>`	is previously defined
`<errcde>`	error code

Change Port Parameters (D, S)

The Change Port Parameters command is used to change the impedance parameter of the circuit, as well as the test level point and the signaling operation parameters previously established with a Connect Test Access (CONN-TACC) command.

Note the following:

- this command affects any existing test signal and/or talk/monitor level if TLP is changed
- this command affects existing ac termination if circuit impedance is changed
- port parameters may be changed to conflict actual circuit provisioning. If this is done, test head and/or circuit functionality may become unreliable.

The input syntax of the Change Port Parameters message is as follows:

```
CHG-PRTPAR::<tsn>:<ctag>:<sig>,<ope>,<opf>,
                              <rngdi>:<imp>,<tlpe>,<tlpf>;
```

Message parameters	Description
`<tsn>`	test session number
`<ctag>`	correlation tag
`<sig>`	signal code
`<ope>`	signaling operation in Equipment (E) direction
`<opf>`	signaling operation in Facility (F) direction
`<rngdi>`	ringing direction
`<imp>`	impedance of circuit
`<tlpe>`	transmission level point at access for transmission from F to E
`<tlpf>`	transmission level point at access for transmission from E to F

The normal response syntax of the Change Port Parameters message is as follows:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^COMPLD cr lf
;
```

The error response syntax of the Change Port Parameters message is as follows:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^DENY cr lf
^^^<errcde> cr lf
^^^/*<supplier_free_form_error_explanation>*/ cr lf
;
```

Message parameters	**Description**
<sid>	source identifier
<date>	TL1 message origination date
<time>	TL1 message origination time
<ctag>	is previously defined
<errcde>	error code

Change Port Restore (D, S)

The Change Port Restore command is used to remove any previously applied port condition, and restore the transmission and signaling pairs back to the condition that existed following the initial access.

This command:

- reapplies MTA high impedance monitor
- resets monitor level and filter values
- restores original port parameters

The input syntax of the Change Port Restore message is as follows:

```
CHG-PTRST::<tsn>:<ctag>;
```

Message parameters	Description
<tsn>	test session number
<ctag>	correlation tag

The normal response syntax of the Change Port Restore message is as follows:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^COMPLD cr lf
;
```

The error response syntax of the Change Port Restore message is as follows:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^DENY cr lf
^^^<errcde> cr lf
^^^/*<supplier_free_form_error_explanation>*/ cr lf
;
```

Message parameters	Description
<sid>	source identifier
<date>	TL1 message origination date
<time>	TL1 message origination time
<ctag>	is previously defined
<errcde>	error code

Change Split and Supervision (D, S)

The Change Split and Supervision command is used to provide metallic split test access, and apply a specified supervision. Note the following:

- The ability to split and apply supervision is dependent on current circuit parameters. Refer to “Valid conditions for CHG-SLPTSUPV command” on page 5-118 for valid conditions.
- Test signals (including SFN) survive dc configuration changes. SFF supervision removes a test signal if applied on the same pair in the same direction.
- SFN supervision removes CONN-TLKSPLT in the same direction. CONN-MONLIST in the same direction on the other pair survives.
- E and/or M splits do not affect A or B conditions and vice-versa.
- Splitting a bridged pair removes CONN-MONBRDG. For CONN-MONLIST, the monitor remains in the direction specified in the requested CONN-MONLIST state.
- Parameters <nre> and <nrf> are ignored except when <supve> or <supvf> values of LCG, LB4, DNN, or DNF are being applied.

The input syntax of the Change Split and Supervision message is as follows:

```
CHG-SPLTSUPV::<tsn>:<ctag>:<supve>,<supvf>,<sigdir>,[<lr>],
                                 [<pr>],<nre>,<nrf>;
```

Message parameters	Description
<tsn>	test session number
<ctag>	correlation tag
<supve>	supervision required in the Equipment direction
<supvf>	supervision required in the Facility direction
<sigdir>	signaling direction
<lr>	load resistance for all signaling formats. The value of LR used is 200 ohms.
<pr>	pair/lead selection for supervision. If this parameter is not used, the entire circuit is split.
<nre>	apply normal or reverse battery and ground lead conditions in the Equipment direction
<nrf>	apply normal or reverse battery and ground lead conditions in the Facility direction

The normal response syntax of the Change Split and Supervision message is as follows:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^COMPLD cr lf
;
```

The error response syntax of the Change Split and Supervision message is as follows:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^DENY cr lf
^^^<errcde> cr lf
^^^/*<supplier_free_form_error_explanation>*/ cr lf
;
```

Message parameters	Description
<sid>	source identifier
<date>	TL1 message origination date
<time>	TL1 message origination time
<ctag>	is previously defined
<errcde>	error code

Connect -48V Battery (D)

The Connect -48V Battery command is used to apply a 48V battery to a single lead of the circuit under test while leaving all other leads open. The Tip (T) or Ring (R) of either the A, B, or C pair, in either the E or F direction, may be selected. The supervisory conditions in the other direction are unchanged.

This termination remains until a Disconnect Termination (DISC-TERM) command is received or until the test session is terminated with a Disconnect Test Access (DISC-TACC) command.

Note the following:

- this command splits pairs if bridged, and applies termination in the specified direction and LPN (open to ac and DC) supervision in the opposite direction
- on previously split pairs, opposite direction supervision is unaffected
- BATT is through 650 ohms

The input syntax of the Connect -48V Battery message is as follows:

```
CONN-BATT::<tsn>:<ctag>:<dir>[,<pr>]:<lead>;
```

Message parameters	**Description**
`<tsn>`	test session number
`<ctag>`	correlation tag
`<dir>`	indicates the side of the lead to which the battery is connected
`<pr>`	the pair to which the battery should be applied. This field is not valid for 2-wire circuits.
`<lead>`	the lead of the pair to which the battery should be applied

The normal response syntax of the Connect -48V Battery message is as follows:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^COMPLD cr lf
;
```

The error response syntax of the Connect -48V Battery message is as follows:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^DENY cr lf
^^^<errcde> cr lf
^^^/*<supplier_free_form_error_explanation>*/ cr lf
;
```

Message parameters	Description
`<sid>`	source identifier
`<date>`	TL1 message origination date
`<time>`	TL1 message origination time
`<ctag>`	is previously defined
`<errcde>`	error code

Connect Ground (D)

The Connect Ground command is used to apply ground to a single lead of the circuit under test while leaving all other leads open. The Tip (T) or Ring (R) of either the A, B, or C pair, in either the E or F direction, may be selected. The supervisory conditions in the other direction are unchanged.

This termination remains until a Disconnect Termination (DISC-TERM) command is received or until the test session is terminated with a Disconnect Test Access (DISC-TACC) command.

Note the following:

- this command splits pairs if bridged, and applies termination in the specified direction and LPN (open to ac and DC) supervision in the opposite direction
- on previously split pairs, opposite direction supervision is unaffected
- GND is through 650 ohms

The input syntax of the Connect Ground message is as follows:

```
CONN-GND::<tsn>:<ctag>:<dir>[,<pr>]:<lead>;
```

Message parameters	**Description**
`<tsn>`	test session number
`<ctag>`	correlation tag
`<dir>`	indicates the side of the pair to which ground is connected
`<pr>`	the pair to which the ground should be applied. This field is not valid for 2-wire circuits.
`<lead>`	the lead of the pair to which the ground should be applied

The normal response syntax of the Connect Ground message is as follows:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^COMPLD cr lf
;
```

The error response syntax of the Connect Ground message is as follows:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^DENY cr lf
^^^<errcde> cr lf
^^^/*<supplier_free_form_error_explanation>*/ cr lf
;
```

Message parameters	Description
`<sid>`	source identifier
`<date>`	TL1 message origination date
`<time>`	TL1 message origination time
`<ctag>`	is previously defined
`<errcde>`	error code

Connect Intermodulation Signal (D)

The Connect Intermodulation Signal command is used to control the transmission of the test signals used in Intermodulation Distortion (IMD) measurements.

This command:

- is rejected if the parameter <pr> is not split
- is rejected if the test head is busy in the opposite direction (Rule 2 on page 5-2). This includes:
  - CONN-MONLIST
  - CONN-TLKSPLT
  - test signal (including SFN)
- is rejected if the test signal (including SFN) exists in the same direction on the other pair (Rule 3a on page 5-2)
- is rejected if CONN-MONLIST is active in the same direction on the same pair of a 4-wire circuit (Rule 4 on page 5-2)
- removes CONN-TLKSPLT in the same direction. CONN-MONLIST in the same direction on the other pair survives.
- overrides any existing test signal (including SFN) on the same pair in the same direction

The input syntax of the Connect Intermodulation Signal message is as follows:

```
CONN-IMDSIG::<tsn>:<ctag>:<tnset>,<lev>:<dir>[,<pr>];
```

Message parameters	Description
`<tsn>`	test session number
`<ctag>`	correlation tag
`<tnset>`	tone set to be connected
`<lev>`	level of applied tone specified in dBm0 with1 dB increments
`<dir>`	the direction in which the test signal is connected
`<pr>`	transmission pair to which the tone is applied. This parameter is not present for 2-wire circuits.

The normal response syntax of the Connect Intermodulation Signal message is as follows:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^COMPLD cr lf
;
```

The error response syntax of the Connect Intermodulation Signal message is as follows:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^DENY cr lf
^^^<errcde> cr lf
^^^/*<supplier_free_form_error_explanation>*/ cr lf
;
```

Message parameters	**Description**
`<sid>`	source identifier
`<date>`	TL1 message origination date
`<time>`	TL1 message origination time
`<ctag>`	is previously defined
`<errcde>`	error code

Connect Loopback (D)

The Connect Loopback command is used to loopback the two transmission pairs of a 4-wire or 6-wire circuit in either the Equipment or Facility direction.

Note the following:

- this command splits pairs if bridged, and applies termination in the specified direction and LPN (open to ac and DC) supervision in the opposite direction
- on previously split pairs, opposite direction supervision is unaffected
- this command is rejected on 2-wire circuits

The input syntax of the Connect Loopback message is as follows:

```
CONN-LPBK::<tsn>:<ctag>:<dir>:<gain>;
```

Message parameters	Description
<tsn>	test session number
<ctag>	correlation tag
<dir>	direction in which the loopback is provided
<gain>	the gain to be provided in the loopback path

The normal response syntax of the Connect Loopback message is as follows:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^COMPLD cr lf
;
```

The error response syntax of the Connect Loopback message is as follows:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^DENY cr lf
^^^<errcde> cr lf
^^^/*<supplier_free_form_error_explanation>*/ cr lf
;
```

Message parameters	Description
`<sid>`	source identifier
`<date>`	TL1 message origination date
`<time>`	TL1 message origination time
`<ctag>`	is previously defined
`<errcde>`	error code

Connect Monitor Bridged (D, S)

The Connect Monitor Bridged command is used to remove all conditions from the transmission pairs. It connects the monitor circuit to the transmission pairs.

This command:

- bridges transmission pairs; E/M leads are not affected
- connects circuit monitor to the circuit under test regardless of whether the callback path has been established (see CONN-TACC and/or CONN-MONEST commands)

The input syntax of the Connect Monitor Bridged message is as follows:

```
CONN-MONBRDGD::<tsn>:<ctag>;
```

Message parameters	Description
<tsn>	test session number
<ctag>	correlation tag

The normal response syntax of the Connect Monitor Bridged message is as follows:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^COMPLD cr lf
;
```

The error response syntax of the Connect Monitor Bridged message is as follows:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^DENY cr lf
^^^<errcde> cr lf
^^^/*<supplier_free_form_error_explanation>*/ cr lf
;
```

Message parameters	Description
<sid>	source identifier
<date>	TL1 message origination date
<time>	TL1 message origination time
<ctag>	is previously defined
<errcde>	error code

Connect Monitor Establish (D, S)

The Connect Monitor Establish command is used to establish a DDD Monitor Talk line from the Remote Test Unit port to the testers console.

This command:

- establishes the callback path by dialing a specified number
- requires prior provisioning of ILC callback circuit for associated test head
- requires dial tone on callback line
- does not affect connection of monitor circuit to circuit under test

The input syntax of the Connect Monitor Establish message is as follows:

```
CONN-MONEST::<tsn>:<ctag>:<tel>;
```

Message parameters	Description
<tsn>	test session number
<ctag>	correlation tag
<tel>	32-digit telephone number of the Monitor Talk line at the tester console

The normal response syntax of the Connect Monitor Establish message is as follows:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^COMPLD cr lf
;
```

The error response syntax of the Connect Monitor Establish message is as follows:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^DENY cr lf
^^^<errcde> cr lf
^^^/*<supplier_free_form_error_explanation>*/ cr lf
;
```

Message parameters	Description
`<sid>`	source identifier
`<date>`	TL1 message origination date
`<time>`	TL1 message origination time
`<ctag>`	is previously defined
`<errcde>`	error code

Connect Monitor Listen (D, S)

The Connect Monitor Listen command provides the capability to listen selectively to the circuit under test. For 2-wire circuits, listening can be established in either the Equipment or Facility direction. For 4-wire circuits, both the direction and the pair may be selected.

This command:

- is rejected if a test signal (including SFN) is active in the opposite direction
- is rejected if a test signal (including SFN) is active in the same direction on the same pair of a 4-wire circuit
- overrides previous CONN-MONLIST or CONN-TLKSPLT regardless of the action

The input syntax of the Connect Monitor Listen message is as follows:

```
CONN-MONLIST::<tsn>:<ctag>:<dir>,[<pr>];
```

Message parameters	Description
`<tsn>`	test session number
`<ctag>`	correlation tag
`<dir>`	direction of listen connection
`<pr>`	pair to be monitored. This parameter is not valid for 2-wire circuits.

The normal response syntax of the Connect Monitor Listen message is as follows:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^COMPLD cr lf
;
```

The error response syntax of the Connect Monitor Listen message is as follows:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^DENY cr lf
^^^<errcde> cr lf
^^^/*<supplier_free_form_error_explanation>*/ cr lf
;
```

Message parameters	Description
`<sid>`	source identifier
`<date>`	TL1 message origination date
`<time>`	TL1 message origination time
`<ctag>`	is previously defined
`<errcde>`	error code

Connect Peak to Average Ratio Test Signal (D, S)

The Connect Peak to Average Ratio Test Signal command is used to transmit a Peak-to-Average Ratio (P/AR) test signal, in a specified direction, on the circuit under test. For 4-wire and 6-wire circuits, the pair may also be specified.

This command:

- is rejected if the parameter <pr> is not split
- is rejected if the test head is busy in the opposite direction (Rule 2 on page 5-2). This includes:
  - CONN-MONLIST
  - CONN-TLKSPLT
  - test signal (including SFN)
- is rejected if the test signal (including SFN) exists in the same direction on the other pair (Rule 3a on page 5-2)
- is rejected if CONN-MONLIST is active in the same direction on the same pair of a 4-wire circuit (Rule 4 on page 5-2)
- removes CONN-TLKSPLT in the same direction. CONN-MONLIST in the same direction on the other pair survives.
- overrides any existing test signal (including SFN) on the same pair in the same direction

The input syntax of the Connect Peak to Average Ratio Test Signal message is as follows:

```
CONN-PARSIG::<tsn>:<ctag>:<lev>:<dir>[,<pr>];
```

Message parameters	Description
`<tsn>`	test session number
`<ctag>`	correlation tag
`<lev>`	absolute integer value of the level of applied tone. This value is interpreted as a negative decimal number.
`<dir>`	direction of applied signal
`<pr>`	transmission pair to which the signal shall be applied. This field is not valid for 2-wire circuits.

The normal response syntax of the Connect Peak to Average Ratio Test Signal message is as follows:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^COMPLD cr lf
;
```

The error response syntax of the Connect Peak to Average Ratio Test Signal message is as follows:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^DENY cr lf
^^^<errcde> cr lf
^^^/*<supplier_free_form_error_explanation>*/ cr lf
;
```

Message parameters	**Description**
`<sid>`	source identifier
`<date>`	TL1 message origination date
`<time>`	TL1 message origination time
`<ctag>`	is previously defined
`<errcde>`	error code

Connect Short (D)

The Connect Short command is used to apply a 20 Ohm short circuit between the tip and ring of a selected transmission pair on the circuit under test, while leaving all other leads open. The A or B pair in either the E or F direction may be selected.

Note the following:

- this command splits pairs if bridged, and applies termination in the specified direction and LPN (open to ac and DC) supervision in the opposite direction
- on previously split pairs, opposite direction supervision is unaffected
- SHORT is through 20 ohms

The input syntax of the Connect Short message is as follows:

```
CONN-SHORT::<tsn>:<ctag>:<dir>[,<pr>];
```

Message parameters	Description
<tsn>	test session number
<ctag>	correlation tag
<dir>	direction of applied short
<pr>	indicates which pair on which to apply the short. This field is not valid for 2-wire circuits.

The normal response syntax of the Connect Short message is as follows:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^COMPLD cr lf
;
```

The error response syntax of the Connect Short message is as follows:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^DENY cr lf
^^^<errcde> cr lf
^^^/*<supplier_free_form_error_explanation>*/ cr lf
;
```

Message parameters	**Description**
`<sid>`	source identifier
`<date>`	TL1 message origination date
`<time>`	TL1 message origination time
`<ctag>`	is previously defined
`<errcde>`	error code

Connect Test Access (D, S)

The Connect Test Access command is used to control access to a particular circuit. It provides the Remote Test Unit (RTU) with the information required to make an access to the circuit under test.

For this command:

- only parameter combinations described on page 5-111 are accepted
- only <tlfe> and <tlpf> values of +20 to –20 are accepted
- a <tel> of 32 digits including 0–9, A–D, #, *, W, P, and T are accepted

The input syntax of the Connect Test Access message is as follows:

```
CONN-TACC:<tid>:<aid>:<ctag>:<tsn>[,<dtsn>]:<ortn>,<cnfgrn>:
<sig>,<ope>,<opf>,<rngdi>:<imp>,<tlpe>,<tlpf>[:<tel>];
```

Message parameters	Description
`<tid>`	target identifier for the network element to which a command is directed
`<aid>`	access identifier of the position of the equipment being addressed
`<ctag>`	correlation tag
`<tsn>`	test session number
`<dtsn>`	double test session number (1-3 numeric code) which is not currently supported
`<ortn>`	indicates which side of the access is towards the A end of the circuit under test
`<cnfgrn>`	metallic lead pair usage configuration
`<sig>`	signal code defining signaling format
`<ope>`	signaling operation in the Equipment direction
`<opf>`	signaling operation in the Facility direction
`<rngdi>`	ringing direction
`<imp>`	impedance of circuit
`<tlpe>`	transmission level point at access for transmission from F to E
—continued—	

Message parameters	Description
`<tlpf>`	transmission level point at access for transmission from E to F
`<tel>`	32-digit telephone number of the monitor/talk line of requesting operating system. SARTS uses a sequence of numeric digits only.
—end—	

The normal response syntax of the Connect Test Access message is as follows:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^COMPLD cr lf
[<spl> cr lf];
```

The error response syntax of the Connect Test Access message is as follows:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^DENY cr lf
^^^<errcde> cr lf
^^^/*<supplier_free_form_error_explanation>*/ cr lf
;
```

Message parameters	Description
`<sid>`	source identifier
`<date>`	TL1 message origination date
`<time>`	TL1 message origination time
`<ctag>`	is previously defined
`<spl>`	value of SPL if this is a special circuit
`<errcde>`	error code

Connect Talk Split (D, S)

The Connect Talk Split command is used to establish a talk and listen path between the circuit under test and the monitor/talk line. The paths can be connected in either the Equipment or Facility direction.

This command:

- is rejected if a test signal (including SFN) is active in the opposite direction
- is rejected if all transmission pairs are not split
- overrides test signal (including SFN) in the same direction
- overrides previous CONN-MONLIST or CONN-TLKSPLT commands regardless of direction

The input syntax of the Connect Talk Split message is as follows:

```
CONN-TLKSPLT::<tsn>:<ctag>:<dir>;
```

Message parameters	Description
`<tsn>`	test session number
`<ctag>`	correlation tag
`<dir>`	direction of the talk connection

The normal response syntax of the Connect Talk Split message is as follows:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^COMPLD cr lf
;
```

The error response syntax of the Connect Talk Split message is as follows:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^DENY cr lf
^^^<errcde> cr lf
^^^/*<supplier_free_form_error_explanation>*/ cr lf
;
```

Message parameters	**Description**
`<sid>`	source identifier
`<date>`	TL1 message origination date
`<time>`	TL1 message origination time
`<ctag>`	is previously defined
`<errcde>`	error code

Connect Tone (D, S)

The Connect Tone command is used to transmit a sinusoidal test tone, in a specified direction, on the circuit under test. For 4-wire or 6-wire circuits, the transmission pair is also specified.

This command:

- is rejected if the parameter <pr> is not split
- is rejected if the test head is busy in the opposite direction (Rule 2 on page 5-2). This includes:
  - — CONN-MONLIST
  - — CONN-TLKSPLT
  - — test signal (including SFN)
- is rejected if the test signal (including SFN) exists in the same direction on the other pair (Rule 3a on page 5-2)
- is rejected if CONN-MONLIST is active in the same direction on the same pair of a 4-wire circuit (Rule 4 on page 5-2)
- removes CONN-TLKSPLT in the same direction. CONN-MONLIST in the same direction on the other pair survives.
- overrides any existing test signal (including SFN) on the same pair in the same direction

The input syntax of the Connect Tone message is as follows:

```
CONN-TN::<tsn>:<ctag>:<freq>,<lev>:<dir>[,<pr>];
```

Message parameters	Description
`<tsn>`	test session number
`<ctag>`	correlation tag
`<freq>`	tone frequency
`<lev>`	absolute integer value of the level of applied tone. This value is interpreted as a negative decimal number.
`<dir>`	direction of applied signal
`<pr>`	transmission pair to which the signal shall be applied. This field is not valid for 2-wire circuits.

The normal response syntax of the Connect Tone message is as follows:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^COMPLD cr lf
;
```

The error response syntax of the Connect Tone message is as follows:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^DENY cr lf
^^^<errcde> cr lf
^^^/*<supplier_free_form_error_explanation>*/ cr lf
;
```

Message parameters	**Description**
<sid>	source identifier
<date>	TL1 message origination date
<time>	TL1 message origination time
<ctag>	is previously defined
<errcde>	error code

Disconnect Loopback (D)

The Disconnect Loopback command is used to remove a previously applied loopback to the circuit under test, and restore the supervisory conditions that existed before the proceeding Connect Loopback (CONN-LPBK) command.

This command:

- is rejected if CONN-LPBK is not active
- restores circuit to condition existing prior to CONN-LPBK command

The input syntax of the Disconnect Loopback message is as follows:

```
DISC-LPBK::<tsn>:<ctag>;
```

Message parameters	Description
<tsn>	test session number
<ctag>	correlation tag

The normal response syntax of the Disconnect Loopback message is as follows:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^COMPLD cr lf
;
```

The error response syntax of the Disconnect Loopback message is as follows:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^DENY cr lf
^^^<errcde> cr lf
^^^/*<supplier_free_form_error_explanation>*/ cr lf
;
```

Message parameters	Description
<sid>	source identifier
<date>	TL1 message origination date
<time>	TL1 message origination time
<ctag>	is previously defined
<errcde>	error code

Disconnect Measurement (D, S)

The Disconnect Measurement command is used to terminate measurement commands. Upon receipt of this command, the last results of the measurement are returned following a normal response to this command. If the measurement was not completed prior to receiving the command, zeroes are returned for the measurement value.

This command:

- is rejected if MEAS- or TST- command is not active
- restores circuit to the condition that would exist if the aborted command had completed successfully

The input syntax of the Disconnect Measurement message is as follows:

```
DISC-MEAS::<tsn>:<ctag>;
```

Message parameters	Description
<tsn>	test session number
<ctag>	correlation tag

The normal response syntax of the Disconnect Measurement message is as follows:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^COMPLD cr lf
;
```

The error response syntax of the Disconnect Measurement message is as follows:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^DENY cr lf
^^^<errcde> cr lf
^^^/*<supplier_free_form_error_explanation>*/ cr lf
;
```

Message parameters	Description
`<sid>`	source identifier
`<date>`	TL1 message origination date
`<time>`	TL1 message origination time
`<ctag>`	is previously defined
`<errcde>`	error code

Disconnect Monitor (D)

The Disconnect Monitor command is used to remove any monitor or talk conditions applied to the circuit under test.

This command:

- disconnects monitor and/or talk circuit from the circuit under test
- does not affect callback connection
- is not rejected if the monitor is not connected

The input syntax of the Disconnect Monitor message is as follows:

```
DISC-MON::<tsn>:<ctag>;
```

Message parameters	Description
<tsn>	test session number
<ctag>	correlation tag

The normal response syntax of the Disconnect Monitor message is as follows:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^COMPLD cr lf
;
```

The error response syntax of the Disconnect Monitor message is as follows:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^DENY cr lf
^^^<errcde> cr lf
^^^/*<supplier_free_form_error_explanation>*/ cr lf
;
```

Message parameters	Description
<sid>	source identifier
<date>	TL1 message origination date
<time>	TL1 message origination time
<ctag>	is previously defined
<errcde>	error code

Disconnect Test Access (D, S)

The Disconnect Test Access command is used to release access and return the circuit to its normal state, as well as free the Remote Test Unit (RTU). If a monitor/talk line was established for this access, it is released as part of the execution of the command.

This command is processed regardless of the test head state.

The input syntax of the Disconnect Test Access message is as follows:

```
DISC-TACC::<tsn>:<ctag>;
```

Message parameters	Description
<tsn>	test session number
<ctag>	correlation tag

The normal response syntax of the Disconnect Test Access message is as follows:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^COMPLD cr lf
;
```

The error response syntax of the Disconnect Test Access message is as follows:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^DENY cr lf
^^^<errcde> cr lf
^^^/*<supplier_free_form_error_explanation>*/ cr lf
;
```

Message parameters	Description
<sid>	source identifier
<date>	TL1 message origination date
<time>	TL1 message origination time
<ctag>	is previously defined
<errcde>	error code

Disconnect Special Termination (D)

The Disconnect Special Termination command is used to remove the special terminations previously applied by a Connect Battery (CONN-BATT), Connect Ground (CONN-GND), or Connect Short (CONN-SHORT) command.

This command:

- is rejected if the CONN-BATT, CONN-GND, or CONN-SHORT command is not active
- restores circuit to the condition existing prior to the CONN command

The input syntax of the Disconnect Special Termination message is as follows:

```
DISC-TERM::<tsn>:<ctag>;
```

Message parameters	Description
`<tsn>`	test session number
`<ctag>`	correlation tag

The normal response syntax of the Disconnect Special Termination message is as follows:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^COMPLD cr lf
;
```

The error response syntax of the Disconnect Special Termination message is as follows:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^DENY cr lf
^^^<errcde> cr lf
^^^/*<supplier_free_form_error_explanation>*/ cr lf
;
```

Message parameters	Description
<sid>	source identifier
<date>	TL1 message origination date
<time>	TL1 message origination time
<ctag>	is previously defined
<errcde>	error code

Disconnect Test Signal (D, S)

The Disconnect Test Signal command is used to remove the test signals (in a specified direction) that were previously applied to the circuit under test.

This command:

- removes test signal (including SFN) if present in the specified direction
- does not affect any test signal active in the opposite direction
- is not rejected if the test signal is not active

The input syntax of the Disconnect Test Signal message is as follows:

```
DISC-TSTSIG::<tsn>:<ctag>:<dir>;
```

Message parameters	Description
<tsn>	test session number
<ctag>	correlation tag
<dir>	direction of transmission of the test signal to be removed

The normal response syntax of the Disconnect Test Signal message is as follows:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^COMPLD cr lf
;
```

The error response syntax of the Disconnect Test Signal message is as follows:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^DENY cr lf
^^^<errcde> cr lf
^^^/*<supplier_free_form_error_explanation>*/ cr lf
;
```

Message parameters	Description
<sid>	source identifier
<date>	TL1 message origination date
<time>	TL1 message origination time
<ctag>	is previously defined
<errcde>	error code

Measure Capacitance (D, S)

The Measure Capacitance command is used to measure the capacitance of the circuit under test. These measurements may be made between the Tip (T) and Ring (R) leads, T and Ground (GRD) or R and GRD.

Single or repeating measurements can be made with the circuit under test bridged or test split conditions.

Note the following on multimeter measurements:

- all test signal and monitor activity is suspended during a multimeter measurement
- for split measurements:
  - — pair(s) to be measured are split with LPN (floating) supervision (for the MEAS-CUR command, any existing dc supervision is maintained during the measurement)
  - — the original conditions (supervision, test signal, and monitor) is restored following the measurement. For repeated measurements, the original condition is not reapplied until after the measurement is terminated.
- for bridged measurements:
  - — measurements on either transmission pair bridges all transmission pairs and leaves the circuit in a CONN-MONBRDGD state following the measurement. The E/M pair is not affected.
  - — measurements on the E/M pair bridges only the E/M pair and is left bridged following the measurement. Transmission pairs are not affected.

The input syntax of the Measure Capacitance message is as follows:

```
MEAS-CAPNC::<tsn>:<ctag>:<measloc>,<measlds>,<md>[,<pr>];
```

Message parameters	Description
`<tsn>`	test session number
`<ctag>`	correlation tag
`<measloc>`	location on the circuit
`<measlds>`	leads to which the meter circuit is connected to for measurements
—continued—	

Message parameters	Description
<md>	measurement mode
<pr>	identifies the pair on which the measurements are to be made. This parameter is omitted for 2-wire circuits, or if “ALL” is specified in the <measlds> parameter field.
—end—	

The normal response syntax of the Measure Capacitance message (for a single measurement) is as follows:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^COMPLD cr lf
cr lf^^^<i>[-<j>] cr lf {>|;}
```

The normal response syntax of the Measure Capacitance message (for multiple measurements) is as follows:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^COMPLD cr lf
[cr lf^^^A^TG=<cap>[-<or>],^RG=<cap>[-<or>],^RT=<cap>[-<or>]]
[cr lf^^^B^TG=<cap>[-<or>],^RG=<cap>[-<or>],^RT=<cap>[-<or>]]
[cr lf^^^C^TG=<cap>[-<or>],^RG=<cap>[-<or>],^RT=<cap>[-<or>]]
cr lf {>|;}
```

The error response syntax of the Measure Capacitance message is as follows:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^DENY cr lf
^^^<errcde> cr lf
^^^/*<supplier_free_form_error_explanation>*/ cr lf
;
```

Message parameters	Description
`<sid>`	source identifier
`<date>`	TL1 message origination date
`<time>`	TL1 message origination time
`<ctag>`	is previously defined
`<cap>`	capacitance between measurement points
`<or>`	indicates capacitance exceeded the range of the meter circuit when the <cap> parameter is set to the highest limit of the meter circuit capabilities. It also indicates that the measurement was not performed due to an irregular circuit condition such as voltage on the line or a low resistance on the circuit when the CAP parameter is set to 0.000.
`<errcde>`	error code

Measure Current (D, S)

The Measure Current command is used to measure the ac or dc current in the specified lead of the circuit under test. These measurements may be made on either the Tip (T) or Ring (R) lead.

Single or repeating measurements can be made with the circuit under test bridged or test split conditions.

Note: See guidelines for multimeter measurements on page 5-46.

The input syntax of the Measure Current message is as follows:

```
MEAS-CUR::<tsn>:<ctag>:<measmode>,<measloc>,<measld>,<md>
                                                  [,<pr>];
```

Message parameters	Description
<tsn>	test session number
<ctag>	correlation tag
<measmode>	measurement mode
<measloc>	location on circuit
<measld>	lead that the meter circuit is connected to for measurements
<md>	measurement mode
<pr>	identifies which pair the measurements are to be made. This parameter is omitted for 2-wire circuits, or if “ALL” is specified in the <measld> parameter field.

The normal response syntax of the Measure Current message (for a single measurement) is as follows:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^COMPLD cr lf
^^^<cur>[-<or>] cr lf {>|;}
```

The normal response syntax of the Measure Current message (for multiple measurements) is as follows:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^COMPLD cr lf
[cr lf^^^A^T=<cur>[-<or>],^R=<cur>[-<or>]]
[cr lf^^^B^T=<cur>[-<or>],^R=<cur>[-<or>]]
[cr lf^^^C^T=<cur>[-<or>],^R=<cur>[-<or>]] cr lf {>|;}
```

The error response syntax of the Measure Current message is as follows:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^DENY cr lf
^^^<errcde> cr lf
^^^/*<supplier_free_form_error_explanation>*/ cr lf
;
```

Message parameters	Description
`<sid>`	source identifier
`<date>`	TL1 message origination date
`<time>`	TL1 message origination time
`<ctag>`	is previously defined
`<cur>`	current measured in the specified lead
`<or>`	indicates the current exceeded the range of the meter circuit
`<errcde>`	error code

Measure Intermodulation Distortion (D)

The Measure Intermodulation Distortion command is used to measure Intermodulation Distortion (IMD) on the circuit under test. This measurement requires that the Intermodulation Distortion Test Signals be applied to the circuit under test.

Note the following:

- any CONN-MONLIST activity is suspended during the measurement (Rule 3 on page 5-2)
- any test signal activity in the opposite direction of, or on the same pair as, the measurement, is suspended during the measurement (Rules 2 and 4 on page 5-2)
- this command is rejected if the pair is split and a bridged measurement is requested, or if the pair is bridged and a split measurement is requested
- this command removes any CONN-TLKSPLT condition
- this command requires a sequence of two measurements: (1) with 4 tone IMD signal applied externally on the circuit under test and (2) with 2 tone or no IMD signal applied on the circuit.

The input syntax of the Measure Intermodulation Distortion message is as follows:

```
MEAS-IMD::<tsn>:<ctag>:<measmode>,<measloc>[,<pr>];
```

Message parameters	Description
`<tsn>`	test session number
`<ctag>`	correlation tag
`<measmode>`	measurement mode
`<measloc>`	location on circuit
`<pr>`	the pair on which the measurements are to be made. This parameter is omitted for 2-wire circuits.

The normal response syntax of the Measure Intermodulation Distortion message is as follows:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^COMPLD cr lf
[cr lf^^^<oor>] cr lf
;
```

The normal response syntax of the Measure Intermodulation Distortion message (when TL1 MEASMODE parameter selects 2nd or 3rd distortion product measurements) is as follows:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^COMPLD cr lf
^^^<scnd>[-<mr>],^<thrd>[-<mr>] cr lf
;
```

The error response syntax of the Measure Intermodulation Distortion message is as follows:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^DENY cr lf
^^^<errcde> cr lf
^^^/*<supplier_free_form_error_explanation>*/ cr lf
;
```

Message parameters	Description
<sid>	source identifier
<date>	TL1 message origination date
<time>	TL1 message origination time
<ctag>	is previously defined
<oor>	indicates whether the received signal is over or under range
<scnd>	second order IMD ratio in dB
<thrd>	third order IMD ratio in dB
<mr>	indicates that the ratio is less than the capability of the measuring circuit
<errcde>	error code

Measure Impulse Noise (D, S)

The Measure Impulse Noise command is used to measure impulse noise on the circuit under test. The impulse noise threshold and impulse noise measurement time can be set, as well as the measurement mode.

Measurements can be made with the circuit in either bridged or split test conditions.

Note the following:

- any CONN-MONLIST activity is suspended during the measurement (Rule 3 on page 5-2)
- any test signal activity in the opposite direction of, or on the same pair as, the measurement, is suspended during the measurement (Rules 2 and 4 on page 5-2)
- this command is rejected if the pair is split and a bridged measurement is requested, or if the pair is bridged and a split measurement is requested
- this command removes any CONN-TLKSPLT condition
- this command limits the threshold <th> from 0 dBm to 99 dBm. (The command is not rejected on this basis though.)

The input syntax of the Measure Impulse Noise message is as follows:

```
MEAS-IMPSNE::<tsn>:<ctag>:<net>,<th>,<tm>,<ctrate>,<measloc>
                                                    [,<pr>];
```

Message parameters	Description
<tsn>	test session number
<ctag>	correlation tag
<net>	weighting network used to shape the noise before the measurement
<th>	threshold value for impulse counters in dBrn0
<tm>	time in minutes that the impulse noise is measured. To indicate that the measurement is performed until terminated by the DISC-MEAS message, TM should contain “CO”.
<ctrate>	maximum counting rate for impulse measurement
<measloc>	location on the circuit
<pr>	identifies the pair on which the measurements are to be made. This field is omitted for 2-wire circuits.

The normal response syntax of the Measure Impulse Noise message is as follows:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^COMPLD cr lf
^^^<et>^<ct1>^[-<oc>]^<ct2>[-<oc>]^<ct3>[-<oc>] cr lf {>|;}
```

The error response syntax of the Measure Impulse Noise message is as follows:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^DENY cr lf
^^^<errcde> cr lf
^^^/*<supplier_free_form_error_explanation>*/ cr lf
;
```

Message parameters	Description
`<sid>`	source identifier
`<date>`	TL1 message origination date
`<time>`	TL1 message origination time
`<ctag>`	is previously defined
`<et>`	elapsed measurement time in the mm-ss format
`<ct1>`	impulse noise count at the requested threshold as a decimal number. No fractions permitted.
`<oc>`	indicates that the noise count exceeded the capability of the measuring circuit
`<ct2>`	impulse noise count at 4 dB above the requested threshold as a decimal number. No fractions permitted.
`<ct3>`	impulse noise count at 8 dB above the requested threshold as a decimal number. No fractions permitted.
`<errcde>`	error code

Measure Noise (D, S)

The Measure Noise command is used to measure the noise on the circuit under test. These measurements may be made on a 2-wire circuit or either transmission pair of a 4-wire or 6-wire circuit.

Single or repeating measurements can be made with the circuit in either a bridged or split condition.

Note the following:

- any CONN-MONLIST activity is suspended during the measurement (Rule 3 on page 5-2)
- any test signal activity in the opposite direction of, or on the same pair as, the measurement, is suspended during the measurement (Rules 2 and 4 on page 5-2)
- this command is rejected if the pair is split and a bridged measurement is requested, or if a bridged and split measurement is requested
- this command removes any CONN-TLKSPLT condition

The input syntax of the Measure Noise message is as follows:

```
MEAS-NSE::<tsn>:<ctag>:<net>,<md>,<measloc>[,<pr>];
```

Message parameters	Description
`<tsn>`	test session number
`<ctag>`	correlation tag
`<net>`	weighting network used to shape the noise before the measurement
`<md>`	measurement mode
`<measloc>`	location on circuit
`<pr>`	identifies which pair the measurements are to be made. This parameter is not valid for 2-wire circuits.

The normal response syntax of the Measure Noise message is as follows:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^COMPLD cr lf
^^^<nse>[-<or>] cr lf
^^^<snr>[-<oor>] cr lf{>|;}
```

The error response syntax of the Measure Noise message is as follows:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^DENY cr lf
^^^<errcde> cr lf
^^^/*<supplier_free_form_error_explanation>*/ cr lf
;
```

Message parameters	**Description**
`<sid>`	source identifier
`<date>`	TL1 message origination date
`<time>`	TL1 message origination time
`<ctag>`	is previously defined
`<nse>`	power of measured noise in decibels above reference noise and referenced to 0 TLP
`<or>`	indicates measurement level over range. If over range, then <nse> equals maximum value of metering range.
`<oor>`	indicates that the received signal is out of range. The values include: OR - indicates that the measurement is over range UR - indicates that the amplitude of the received signal is under the range of the measurement circuitry and the measurement could not be performed OA - indicates that the amplitude of the received signal is over the range of the measurement circuitry and the measurement could not be performed OF - indicates that the frequency of the received signal is outside the range of the measurement circuitry and the measurement could not be performed
`<snr>`	signal to noise ratio (present only if <net> = C-notch)
`<errcde>`	error code

Measure Outpulse (D)

The Measure Outpulse command is used to measure the outpulse components: digit identification, percent break, make and break intervals, number of pulses per second, and the interdigit interval. The Change Split and Supervision (CHG-SPLTSPUV) command is a prerequisite. The Measure Outpulse command is terminated by the Disconnect Measurement (DISC-MEAS) command.

Note the following:

- any CONN-MONLIST activity is suspended during the measurement (Rule 3 on page 5-2)
- any test signal activity in the opposite direction of or on the same pair as the measurement, is suspended during the measurement (Rules 2 and 4 on page 5-2)
- this command is rejected if the pair is split and a bridged measurement is requested, or if the pair is bridged and a split measurement is requested
- this command removes any CONN-TLKSPLT condition
- this command is rejected if pair being measured is bridged
- this command is rejected on DX circuits if DNN or DFN supervision is not applied in the measurement direction

The input syntax of the Measure Outpulse message is as follows:

```
MEAS-OUTPLSE::<tsn>:<ctag>:<addrfmt>,<cm>:<dir>;
```

Message parameters	Description
<tsn>	test session number
<ctag>	correlation tag
<addrfmt>	specifies the addressing format
<cm>	outpulse components to be measured
<dir>	specifies the direction in which the measurement is performed

The normal response syntax of the Measure Outpulse message is as follows:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^COMPLD cr lf
[cr lf^^^B=<brk>]
[cr lf^^^D=<digid>]
[cr lf^^^I=<idgint>]
[cr lf^^^K=<brkint>]
[cr lf^^^M=<mkint>]
[cr lf^^^P=<pps>] cr lf {>|;}
```

The error response syntax of the Measure Outpulse message is as follows:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^DENY cr lf
^^^<errcde> cr lf
^^^/*<supplier_free_form_error_explanation>*/ cr lf
;
```

Message parameters	Description
<sid>	source identifier
<date>	TL1 message origination date
<time>	TL1 message origination time
<ctag>	is previously defined
<brk>	percent break (using nn format)
<digid>	digits identified: digit A = ST' digit B = ST" digit C = ST"' digit D = KP digit E = ST
<idgint>	interdigit interval (msec)
<brkint>	break interval (msec)
<mkint>	make interval (msec)
<pps>	pulses per second
<errcde>	error code

Measure Peak to Average Ratio (D, S)

The Measure Peak to Average Ratio command is used to measure Peak-to-Average Ratio (P/AR) on the circuit under test. This measurement may be made on a 2-wire circuit or either transmission pair of a 4-wire or 6-wire circuit.

Bridged and split measurements can be requested.

Note the following:

- any CONN-MONLIST activity is suspended during the measurement (Rule 3 on page 5-2)
- any test signal activity in the opposite direction of or on the same pair as the measurement, is suspended during the measurement (Rules 2 and 4 on page 5-2)
- this command is rejected if the pair is split and a bridged measurement is requested, or if the pair is bridged and a split measurement is requested
- this command removes any CONN-TLKSPLT condition
- this command requires the PAR signal to be present on the circuit under test

The input syntax of the Measure Peak to Average Ratio message is as follows:

```
MEAS-PAR::<tsn>:<ctag>:<measloc>[,<pr>];
```

Message parameters	Description
`<tsn>`	test session number
`<ctag>`	correlation tag
`<measloc>`	location on circuit
`<pr>`	identifies which pair the measurements are to be made. This parameter is not valid for 2-wire circuits.

The normal response syntax of the Measure Peak to Average Ratio message is as follows:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^^<ctag>^COMPLD cr lf
<par> cr lf;
```

The error response syntax of the Measure Peak to Average Ratio message is as follows:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^DENY cr lf
^^^<errcde> cr lf
^^^/*<supplier_free_form_error_explanation>*/ cr lf
;
```

Message parameters	**Description**
`<sid>`	source identifier
`<date>`	TL1 message origination date
`<time>`	TL1 message origination time
`<ctag>`	is previously defined
`<par>`	rating ranging from 1 to 120 P/AR units
`<errcde>`	error code

Measure Phase Jitter (D, S)

The Measure Phase Jitter command is used to measure Phase Jitter (PHJTR) on the circuit under test. This measurement can be made on a 2-wire circuit or either transmission pair of a 4-wire or 6-wire circuit.

Measurements can be made with the circuit in bridged or split condition.

Note the following:

- any CONN-MONLIST activity is suspended during the measurement (Rule 3 on page 5-2)
- any test signal activity in the opposite direction of or on the same pair as the measurement, is suspended during the measurement (Rules 2 and 4 on page 5-2)
- this command is rejected if the pair is split and a bridged measurement is requested, or if the pair is bridged and a split measurement is requested
- this command removes any CONN-TLKSPLT condition
- this command requires holding tone to be present on the circuit under test

The input syntax of the Measure Phase Jitter message is as follows:

```
MEAS-PHJTR::<tsn>:<ctag>:<freqbnd>,<measloc>[,<pr>];
```

Message parameters	Description
<tsn>	test session number
<ctag>	correlation tag
<freqbnd>	the frequency band of weighting used to give jitter components in the selected band equal weighting
<measloc>	location on circuit
<pr>	identifies the pair on which the measurement is to be made. This parameter is not valid for 2-wire circuits.

The normal response syntax of the Measure Phase Jitter message is as follows:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^COMPLD cr lf
^^^<phjtr>[-<oor>] cr lf;
```

The error response syntax of the Measure Phase Jitter message is as follows:

```
cr lf lf
^^^<tsn>^<date>^<time> cr lf
M^^<ctag>^DENY cr lf
^^^<errcde> cr lf
^^^/*<supplier_free_form_error_explanation>*/ cr lf
;
```

Message parameters	**Description**
`<sid>`	source identifier
`<date>`	TL1 message origination date
`<time>`	TL1 message origination time
`<ctag>`	is previously defined
`<phjtr>`	measured phase jitter in degrees peak-to-peak
`<oor>`	indicates that the received signal is out of range. The values include: OR - indicates that the measurement is over range UR - indicates that the amplitude of the received signal is under the range of the measurement circuitry and the measurement could not be performed OA - indicates that the amplitude of the received signal is over the range of the measurement circuitry and the measurement could not be performed OF - indicates that the frequency of the received signal is outside the range of the measurement circuitry and the measurement could not be performed
`<errcde>`	error code

Measure Resistance (D, S)

The Measure Resistance command is used to measure the resistance of the circuit under test. These measurements may be made between the Tip (T) and Ring (R) leads, T and Ground (GND), and R and GND.

Single or repeating measurements can be made with the circuit in either a bridged or split condition.

> ***Note:*** See guidelines for multimeter measurements on page 5-46.

The input syntax of the Measure Resistance message is as follows:

```
MEAS-RES::<tsn>:<ctag>:<measloc>,<measlds>,<md>[,<pr>];
```

Message parameters	Description
`<tsn>`	test session number
`<ctag>`	correlation tag
`<measloc>`	location on circuit
`<measlds>`	leads the meter circuit is connected to for measurements
`<md>`	measurement mode
`<pr>`	identifies the pair on which the measurement is to be made. This parameter is omitted for 2-wire circuits, or if “ALL” is specified in the <measlds> parameter field.

The normal response syntax of the Measure Resistance message (for a single measurement) is as follows:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^COMPLD cr lf
^^^<res>[-<or>] cr lf {>|;}
```

The normal response syntax of the Measure Resistance message (for a multiple measurement) is as follows:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^COMPLD cr lf
[cr lf^^^A^TG=<res>[-<or>],^RG=<res>[-<or>],^RT=<res>[-<or>]]
[cr lf^^^B^TG=<res>[-<or>],^RG=<res>[-<or>],^RT=<res>[-<or>]]
cr lf {>|;}
```

The error response syntax of the Measure Resistance message is as follows:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^DENY cr lf
^^^<errcde> cr lf
^^^/*<supplier_free_form_error_explanation>*/ cr lf
;
```

Message parameters	Description
`<sid>`	source identifier
`<date>`	TL1 message origination date
`<time>`	TL1 message origination time
`<ctag>`	is previously defined
`<res>`	resistance between measurement points in kohms
`<or>`	indicates capacitance exceeded the range of the meter circuit when the CAP parameter is set to the highest limit of the meter circuit capabilities. It also indicates that the measurement was not performed due to an irregular circuit condition such as voltage on the line or a low resistance on the circuit when the CAP parameter is set to 0.000.
`<errcde>`	error code

Measure Resistance Simplex (D)

The Measure Resistance Simplex command is used to measure resistance between leads of the two transmission pairs of a 4-wire or 6/8-wire circuit under test. These measurements may be made between the Tip (T) and Ring (R) leads of the A and B pairs of the circuit under test.

Single or repeating measurements can be made with the circuit in either a bridged or split condition.

> ***Note:*** See guidelines for multimeter measurements on page 5-46.

The input syntax of the Measure Resistance Simplex message is as follows:

```
MEAS-RESSX::<tsn>:<ctag>:<measloc>,<measlds>,<md>;
```

Message parameters	Description
`<tsn>`	test session number
`<ctag>`	correlation tag
`<measloc>`	location on circuit
`<measlds>`	leads to which the meter is connected for measurements
`<md>`	measurement mode

The normal response syntax of the Measure Resistance Simplex message (for a single measurement) is as follows:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^COMPLD cr lf
^^^<res>[-<or>] cr lf {>|;}
```

The normal response syntax of the Measure Resistance Simplex message (for multiple measurements) is as follows:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^COMPLD cr lf
^^^TBTA=<res>[-<or>],^TBRA=<res>[-<or>] cr lf
^^^RBRA=<res>[-<or>],^RBTA=<res>[-<or>] cr lf {>|;}
```

The error response syntax of the Measure Resistance Simplex message is as follows:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^DENY cr lf
^^^<errcde> cr lf
^^^/*<supplier_free_form_error_explanation>*/ cr lf
;
```

Message parameters	**Description**
`<sid>`	source identifier
`<date>`	TL1 message origination date
`<time>`	TL1 message origination time
`<ctag>`	is previously defined
`<res>`	resistance between measurement points in kohms
`<or>`	indicates capacitance exceeded the range of the meter circuit when the CAP parameter is set to the highest limit of the meter circuit capabilities. It also indicates that the measurement was not performed due to an irregular circuit condition such as voltage on the line or a low resistance on the circuit when the CAP parameter is set to 0.000.
`<errcde>`	error code

Measure Return Loss (D)

The Measure Return Loss command is used to measure return loss (RLOSS) on the circuit under test. The measurement can be made with the circuit in a split condition.

Note the following:

- any CONN-MONLIST activity is suspended during the measurement (Rule 3 on page 5-2)
- any test signal activity in the opposite direction of or on the same pair as the measurement, is suspended during the measurement (Rules 2 and 4 on page 5-2)
- this command is rejected if the pair is split and a bridged measurement is requested, or if the pair is bridged and a split measurement is requested
- this command removes any CONN-TLKSPLT condition
- this command is rejected if the pair(s) being measured is bridged
- the output level <lev> is limited from -2 dBm to -10 dBm (The command is not rejected on this basis.)

The input syntax of the Measure Return Loss message is as follows:

```
MEAS-RLOSS::<tsn>:<ctag>:<wire>:<measloc>[,<pr>]:<interval>:
                          <lev>[,<thl>]:<filters>[:<imped>];
```

Message parameters	Description
`<tsn>`	test session number
`<ctag>`	correlation tag
`<wire>`	type of circuit
`<measloc>`	location of circuit
`<pr>`	identifies the pair on which the measurements are to be made. This parameter is omitted for 2-wire circuits.
`<interval>`	the reporting interval of returned results
`<lev>`	the output power level in the transmit direction
`<thl>`	the transhybrid loss compensation is applied at the receiver. This parameter is used for 4-wire and 6/8-wire circuits only (0 is always used for 2-wire circuits).
—continued—	

Message parameters	Description
<filters>	the signal weighting filter response network characteristic
<imped>	impedance of test hybrid's balance network. The impedance of the circuit, as specified in the CONN-TAC or CHG-PRTPAR command, is always used, regardless of the value specified in the MEAS-RLOSS command. This is an optional parameter for 2-wire circuits
—end—	

The normal response syntax of the Measure Return Loss message is as follows:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^COMPLD cr lf
^^^<rloss>[-<oor>] cr lf {>|;}
```

The error response syntax of the Measure Return Loss message is as follows:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^COMPLD cr lf
^^^<errcde> cr lf
;
```

Message parameters	Description
<sid>	source identifier
<date>	TL1 message origination date
<time>	TL1 message origination time
<ctag>	is previously defined
<rloss>	measured return loss in dB
<oor>	indicates the received signal is out of the range of the measuring circuit
<errcde>	error code

Measure Signaling Resistance (D)

The Measure Signaling Resistance command is used to measure resistance on the signaling leads of the circuit under test. These signaling only leads are carried through the access point on the C pair and may only be made between Tip (T) and Ground (GRD) or Ring (R) and GRD.

Note the following on non-interfering multimeter measurements on E/M leads:

- measurements are accepted only on 6/8-wire circuits
- all test signal and monitor activity are suspended during a multimeter measurement (Rules 2 and 3 on page 5-2)
- the <dir> parameter is ignored if the E/M pair is bridged
- the measurement does not interrupt dc supervision applied to any pair (transmission or E/M signaling pair)

The input syntax of the Measure Signaling Resistance message is as follows:

```
MEAS-SIGRES::<tsn>:<ctag>:<dir>,<measlds>,<md>;
```

Message parameters	Description
`<tsn>`	test session number
`<ctag>`	correlation tag
`<dir>`	direction of measurement
`<measlds>`	leads to which the measuring circuit is connected
`<md>`	measurement mode

The normal response syntax of the Measure Signaling Resistance message (for a single measurement) is as follows:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^COMPLD cr lf
cr lf^^^<res>[-<or>] cr lf {>|;}
```

The normal response syntax of the Measure Signaling Resistance message (for a multiple measurement) is as follows:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^COMPLD cr lf
cr lf^^^TG=<res>[-<or>],^RG=<res>[-<or>] cr lf {>|;}
```

The error response syntax of the Measure Signaling Resistance message is as follows:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^COMPLD cr lf
^^^<errcde> cr lf
;
```

Message parameters	**Description**
`<sid>`	source identifier
`<date>`	TL1 message origination date
`<time>`	TL1 message origination time
`<ctag>`	is previously defined
`<res>`	measured resistance in kilohms
`<or>`	indicates capacitance exceeded the range of the meter circuit when the CAP parameter is set to the highest limit of the meter circuit capabilities. It also indicates that the measurement was not performed due to an irregular circuit condition such as voltage on the line or a low resistance on the circuit when the CAP parameter is set to 0.000.
`<errcde>`	error code

Measure Signaling Voltage (D)

The Measure Signaling Voltage command is used to measure ac or dc voltages on the signaling leads of the circuit under test. These signaling-only leads is carried through the access point on the C pair. Voltage measurements may be made between the Tip (T) and Ground (GND) or Ring (R) and GRD. For these measurements, GRD should be at the negative terminal of the measuring circuit.

Note the following on non-interfering multimeter measurements on E/M leads:

- measurements are accepted only on 6/8-wire circuits
- all test signal and monitor activity is suspended during a multimeter measurement (Rules 2 and 3 on page 5-2)
- the <dir> parameter is ignored if the E/M pair is bridged
- the measurement does not interrupt dc supervision applied to any pair (transmission or E/M signaling pair)

Single or repeating measurements can be made with the circuit in a bridged or split condition.

The input syntax of the Measure Signaling Voltage message is as follows:

```
MEAS-SIGVG::<tsn>:<ctag>:<measmode>,<dir>,<mealds>,<md>;
```

Message parameters	Description
`<tsn>`	test session number
`<ctag>`	correlation tag
`<measmode>`	voltage measurement
`<dir>`	direction of measurement
`<measlds>`	leads to which the measuring circuit is connected for measurements
`<md>`	measurement mode

The normal response syntax of the Measure Signaling Voltage message (for a single measurement) is as follows:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^COMPLD cr lf
cr lf^^^<vg>[-<or>] cr lf {>|;}
```

The normal response syntax of the Measure Signaling Resistance message (for a multiple measurement) is as follows:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^COMPLD cr lf
cr lf^^^TG=<vg>[-<or>],^RG=<vg>[-<or>] cr lf {>|;}
```

The error response syntax of the Measure Signaling Voltage message is as follows:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^COMPLD cr lf
^^^<errcde> cr lf
;
```

Message parameters	Description
<sid>	source identifier
<date>	TL1 message origination date
<time>	TL1 message origination time
<ctag>	is previously defined
<vg>	voltage between measurement points
<or>	indicates the measurement exceeded the range of the measuring circuit
<errcde>	error code

Measure Tone (D, S)

The Measure Tone command is used to measure the level and frequency of tones present on the circuit under test. These measurements can be made on a 2-wire circuit or either transmission pair of a 4- or 6-wire circuit.

Single or repeating measurements can be made with the circuit in a bridged or split condition.

Note the following:

- any CONN-MONLIST activity is suspended during the measurement (Rule 3 on page 5-2)
- any test signal activity in the opposite direction of, or on the same pair as, the measurement, is suspended during the measurement (Rules 2 and 4 on page 5-2)
- this command is rejected if the pair is split and a bridged measurement is requested, or if the pair is bridged and a split measurement is requested
- this command removes any CONN-TLKSPLT condition

The input syntax of the Measure Tone message is as follows:

```
MEAS-TN::<tsn>:<ctag>:<md>:<measloc>[,<pr>];
```

Message parameters	Description
`<tsn>`	test session number
`<ctag>`	correlation tag
`<md>`	measurement mode
`<measloc>`	location on circuit
`<pr>`	identifies the pair on which the measurements are to be made. This parameter is omitted for 2-wire circuits.

The normal response syntax of the Measure Tone message is as follows:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^COMPLD cr lf
^^^<freq>[-<oor>]^<lev>[-<oor>] cr lf {>|;}
```

The error response syntax of the Measure Tone message is as follows:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^DENY cr lf
^^^<errcde> cr lf
^^^/*<supplier_free_form_error_explanation>*/ cr lf
;
```

Message parameters	Description
`<sid>`	source identifier
`<date>`	TL1 message origination date
`<time>`	TL1 message origination time
`<ctag>`	is previously defined
`<freq>`	measured frequency of tone
`<oor>`	indicates the received signal is out of range
`<lev>`	measured level of tone in decibels referred to a milliwatt and referenced to 0 TLP
`<errcde>`	error code

Measure Transients (D)

The Measure Transients command is used to measure transients on the circuit under test. The measurements that can be made are Phase Hits, Gain Hits, and Dropouts.

These measurements may be made on 2-wire circuits or either transmission pair of 4-wire or 6-wire circuits. The circuit can be either in a bridged or split condition.

Note the following:

- any CONN-MONLIST activity is suspended during the measurement (Rule 3b on page 5-2)
- any test signal activity in the opposite direction of or on the same pair as the measurement, is suspended during the measurement (Rules 2 and 4 on page 5-2)
- this command is rejected if the pair is split and a bridged measurement is requested, or if the pair is bridged and a split measurement is requested
- this command removes any CONN-TLKSPLT condition
- the parameter <thph> is limited to: 5 to 45 degrees
- the parameter <thgh> is limited to: 2, 3, 4, 6, 8, or 10 dB

The input syntax of the Measure Transients message is as follows:

```
MEAS-TRSNTS::<tsn>:<ctag>:<thph>,<thgh>,<tm>,<ctrate>,
                                          <measloc>[,<pr>];
```

Message parameters	Description
<tsn>	test session number
<ctag>	correlation tag
<thph>	threshold for phase hits
<thgh>	threshold for gain hits
<tm>	time that the transients are measured
<ctrate>	maximum counting rate for impulse measurement
<measloc>	location on circuit
<pr>	identifies which pair on which the measurements are to made. This parameter is omitted for 2-wire circuits.

The normal response syntax of the Measure Transients message is as follows:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^COMPLD cr lf
^^^<et>[PH=<phht>[-<oc>]^GH=<gnht>[-<oc>]][^DO=<dpot>[-<oc>]]
cr lf {>|;}
```

The error response syntax of the Measure Transients message is as follows:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^DENY cr lf
^^^<errcde> cr lf
^^^/*<supplier_free_form_error_explanation>*/ cr lf
;
```

Message parameters	Description
`<sid>`	source identifier
`<date>`	TL1 message origination date
`<time>`	TL1 message origination time
`<ctag>`	is previously defined
`<et>`	elapsed measurement time
`<phht>`	counted phase hits
`<oc>`	count exceeded capability of counting circuit
`<gnht>`	counted gain hits
`<dpot>`	counted drop hits
`<errcde>`	error code

Measure Voltage (D, S)

The Measure Voltage command is used to measure the ac or dc voltages on the circuit under test. These measurements may be made between the Tip (T) and Ring (R) leads, T and Ground (GRD) or R and GRD.

Note 1: For R-T measurements, the T lead is polled as the negative lead, and for T-GRD or R-GRD measurements, GRD is at the negative terminal of the metering circuit.

Note 2: See guidelines for multimeter measurements on page 5-46.

Single or repeating measurements can be made with the circuit in a bridged or split condition.

The input syntax of the Measure Voltage message is as follows:

```
MEAS-VG::<tsn>:<ctag>:<measmode>,<measloc>,<measlds>,<md>
                                                       [,<pr>];
```

Message parameters	Description
`<tsn>`	test session number
`<ctag>`	correlation tag
`<measmode>`	voltage measurement
`<measloc>`	location on circuit
`<measlds>`	leads the meter circuit is connected to for measurements
`<md>`	measurement mode
`<pr>`	identifies which pair the measurements are to be made. This parameter is omitted for 2-wire circuits, or if “ALL” is specified in the <measlds> parameter field.

The normal response syntax of the Measure Voltage message (for a single measurement) is as follows:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^COMPLD cr lf
^^^<vg>[-<or>] cr lf{>|;}
```

The normal response syntax of the Measure Voltage message (for a multiple measurement) is as follows:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^COMPLD cr lf
[cr lf^^^A^TG=<vg>[-<or>],^RG=<vg>[-<or>],^RT=<vg>[-<or>]]
[cr lf^^^B^TG=<vg>[-<or>],^RG=<vg>[-<or>],^RT=<vg>[-<or>]]
[cr lf^^^C^TG=<vg>[-<or>],^RG=<vg>[-<or>],^RT=<vg>[-<or>]]
cr lf{>|;}
```

The error response syntax of the Measure Voltage message is as follows:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^DENY cr lf
^^^<errcde> cr lf
^^^/*<supplier_free_form_error_explanation>*/ cr lf
;
```

Message parameters	Description
`<sid>`	source identifier
`<date>`	TL1 message origination date
`<time>`	TL1 message origination time
`<ctag>`	is previously defined
`<vg>`	voltage between measurement points
`<or>`	indicated that the voltage exceeded the range of the meter circuit
`<errcde>`	error code

Measure Voltage Simplex (D)

The Measure Voltage Simplex command is used to measure ac or dc voltages between leads of the two transmission pairs of a 4-wire or 6/8-wire circuit under test. These measurements can be made between the Tip (T) and Ring (R) leads of the A and B pairs of the circuit under test. Measurements are reported as first lead with respect to the second lead.

Single or repeating measurements can be made with the circuit in either a bridged or split condition.

Note: See guidelines for multimeter measurements on page 5-46.

The input syntax of the Measure Voltage Simplex message is as follows:

```
MEAS-VGSX::<tsn>:<ctag>:<measmode>,<measloc>,<measlds>,<md>;
```

Message parameters	Description
<tsn>	test session number
<ctag>	correlation tag
<measmode>	voltage measurement
<measloc>	location on circuit
<measlds>	leads the meter circuit is connected to for measurements
<md>	measurement mode

The normal response syntax of the Measure Voltage Simplex message (for a single measurement) is as follows:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^COMPLD cr lf
^^^<vg>[-<or>] cr lf{>|;}
```

The normal response syntax of the Measure Voltage Simplex message (for multiple measurements) is as follows:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^COMPLD cr lf
^^^TBTA=<vg>[-<or>],^TBRA=<vg>[-<or>]
^^^RBRA=<vg>[-<or>],^RBTA=<vg>[-<or>] cr lf {>|;}
```

The error response syntax of the Measure Voltage Simplex message is as follows:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^DENY cr lf
^^^<errcde> cr lf
^^^/*<supplier_free_form_error_explanation>*/ cr lf
;
```

Message parameters	**Description**
`<sid>`	source identifier
`<date>`	TL1 message origination date
`<time>`	TL1 message origination time
`<ctag>`	is previously defined
`<vg>`	voltage between measurement points
`<or>`	indicated that the voltage exceeded the range of the meter circuit
`<errcde>`	error code

Report Initialization (D, S)

The Report Initialization command is sent as part of the power up sequence to indicate that the OS has initialized and that the RTU should disconnect any accesses that are up at the request of the OS.

The input syntax of the Report Initialization message is as follows:

```
REPT-INITZN:::<ctag>;
```

Message parameters	Description
<ctag>	correlation tag

The normal response syntax of the Report Initialization message is as follows:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^COMPLD cr lf;
```

There is also an autonomous Report Initialization message sent to the OS to indicate that the RTU has initialized. The message syntax for this message is as follows:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
A^^<atag>^REPT^INITZN cr lf;
```

Message parameters	Description
<sid>	source identifier
<date>	TL1 message origination date
<time>	TL1 message origination time
<ctag>	is previously defined
<atag>	transaction identifier

Report Result (D, S)

The Report Result command is used to report impulse noise or transient measurements.

> ***Note:*** This command does not terminate the measurement in progress. The result is given in the format of the command in progress.

The input syntax of the Report Result message is as follows:

```
REPT-RSLT::<tsn>:<ctag>;
```

Message parameters	Description
`<tsn>`	test session number
`<ctag>`	correlation tag

The normal response syntax of the Report Result message is as follows:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^COMPLD cr lf
;
```

The error response syntax of the Report Result message is as follows:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^DENY cr lf
^^^<errcde> cr lf
^^^/*<supplier_free_form_error_explanation>*/ cr lf
;
```

Message parameters	Description
`<sid>`	source identifier
`<date>`	TL1 message origination date
`<time>`	TL1 message origination time
`<ctag>`	is previously defined
`<errcde>`	error code

Report Status (S)

The Report Status command is sent to check that the data link between the OS and TL1 interface is in operation. An acknowledgment to this request is sent within two seconds.

> ***Note:*** If the TSC does not receive a message from the OS for a period of 75 seconds, it releases any accesses that are up.

The input syntax of the Report Status message is as follows:

```
REPT-STAT:::<ctag>;
```

The normal response syntax of the Report Status message is as follows:

```
OK [<ctag>] cr lf<
```

Message parameters	**Description**
`<ctag>`	correlation tag

Report Supervision Status (D)

The Report Supervision Status command is used to provide an analysis of the present signaling state. This command instructs the test unit to examine both the audible and electrical states, and report the results.

This command:

- rejects <ssr> = B or S on TO, DDS, or SF circuits
- is rejected if any pair is split
- yields results in an interval which depends on circuit type and <ssr> parameter

The input syntax of the Report Supervision Status message is as follows:

```
REPT-SUPVSTAT::<tsn>:<ctag>:<ssr>;
```

Message parameters	Description
`<tsn>`	test session number
`<ctag>`	correlation tag
`<ssr>`	supervisory state being analyzed

The normal response syntax of the Report Supervision Status message is as follows:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^COMPLD cr lf
^^[^AS=<as>][,^SS=<ss>] cr lf {>|;}
;
```

The error response syntax of the Report Supervision Status message is as follows:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^DENY cr lf
^^^<errcde> cr lf
^^^/*<supplier_free_form_error_explanation>*/ cr lf
;
```

Message parameters	Description
<sid>	source identifier
<date>	TL1 message origination date
<time>	TL1 message origination time
<ctag>	is previously defined
<as>	audible supervisory state being analyzed
<ss>	signaling supervisory state being analyzed
<errcde>	error code

Test Outpulsing (D, S)

The Test Outpulsing command is used to provide an outpulsing test that can address a specified telephone number, or provide 15 seconds of continuous outpulsing.

This command:

- applies a 4 second on-hook
- applies off-hook
- waits for and measures STC
- outpulses specified digit string or 15 seconds of continuous DP outpulsing
- applies original supervision

In addition:

- this command is rejected if the pair on which outpulsing is to be applied is not split
- this command is rejected if the test head is busy in the opposite direction (Rule 2 on page 5-2). This includes:
  - — CONN-MONLIST
  - — CONN-TLKSPLT
  - — test signal (including SFN)
- any CONN-MONLIST or CONN-TLKSPLT is suspended during the outpulsing
- any test signal (including SFN) is removed
- the <stc> parameter supports DT, W, S, and I values. Delays during outpulsing (for example, stop-go outpulsing) is not supported.
- the <pb> and <idt> parameters are ignored if the parameter <adf> is not DP

The input syntax of the Test Outpulsing message is as follows:

```
TST-OUTPLSE::<tsn>:<ctag>:[<stc>],[<add>]:[<adf>],[<pf>],
                                        [<pb>],[<idt>],<dir>;
```

Message parameters	Description
<tsn>	test session number
<ctag>	correlation tag
<stc>	special timing consideration before outpulsing
<add>	digits to be outpulsed
<adf>	addressing format
<pf>	outpulse frequency in pulses per second as a decimal number
<pb>	percent break
<idt>	interdigit interval in milliseconds
<dir>	outpulse direction

The normal response syntax of the Test Outpulsing message is as follows:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^COMPLD
[cr lf^^^<rsm>]
[cr lf^^^<cda>] cr lf;
```

The error response syntax of the Test Outpulsing message is as follows:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^DENY cr lf
^^^<errcde> cr lf
^^^/*<supplier_free_form_error_explanation>*/ cr lf
;
```

Message parameters	Description
<sid>	source identifier
<date>	TL1 message origination date
<time>	TL1 message origination time
<ctag>	is previously defined
<rsm>	returned supervision measurement
<cda>	all disposition analysis
<errcde>	error code

Test Ringing Signal (D, S)

The Test Ringing Signal command is used to apply a ringing signal in the specified format and direction to the pair(s) or lead(s) specified in the Connect Test Access (CONN-TACC) command.

Note the following:

- apply one of the following:
  - trippable ringing: 2 second on, 4 second off power ringing on circuits supporting power ringing. Ring trip is reported in command results as <rtd> = A.
  - non-trippable ringing: 2 second on, 1.5 seconds off pulsed (on-hook/off/hook) ringing on circuits not supporting power ringing
- this command is rejected if the pair on which ringing is to be applied is not split
- this command is rejected if the test head is busy in the opposite direction (Rule 2 on page 5-2). This includes:
  - CONN-MONLIST
  - CONN-TLKSPLT
  - test signal (including SFN)
- this command is rejected if the <ringdi> parameter of the CONN-TACC command is B or N and the <dir> parameter for the TST-RNGSGNL command is not specified, or if the <ringdi> parameter of the CONN-TACC command and the <dir> parameter for the TST-RNGSGNL command conflict
- any CONN-MONLIST or CONN-TLKSPLT is suspended during the outpulsing
- any test signal (including SFN) is removed

The input syntax of the Test Ringing Signal message is as follows:

```
TEST-RINGSGNL::<tsn>:<ctag>:<rsf>[,<rcv>][:<dir>];
```

Message parameters	Description
`<tsn>`	test session number
`<ctag>`	correlation tag
`<rsf>`	ringing signal format
`<rcv>`	ringing cycles
`<dir>`	ringing direction

The normal response syntax of the Test Ringing Signal message is as follows:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^COMPLD
[cr lf^^^<rtd>] cr lf;
```

The error response syntax of the Test Ringing Signal message is as follows:

```
cr lf lf
^^^<sid>^<date>^<time> cr lf
M^^<ctag>^DENY cr lf
^^^<errcde> cr lf
^^^/*<supplier_free_form_error_explanation>*/ cr lf
;
```

Message parameters	Description
<sid>	source identifier
<date>	TL1 message origination date
<time>	TL1 message origination time
<ctag>	is previously defined
<rtd>	ring trip detection
<errcde>	error code

Line and loop testing message parameters

This section describes the possible values for the line and loop testing parameters supported by the TL1 interface.

ACT

This parameter defines the requested action.

Parameter values	Description
RMV	remove filter from path
RST	restore filter from path

ADD

The digits to be outpulsed.

Parameter values	Description
W	wait up to 30 seconds for dial tone before proceeding
D	delay 6 seconds before proceeding
T	wait 1 second to assure no dial tone is present before proceeding
0-9, *, #, A, B, C, D	characters used for dual tone addressing format only

ADDRFMT

This parameter is used with DARTS only.

Parameter values	Description
P	dial pulse
T	dual tone
M	multifrequency

ADF

The addressing format. When this parameter is not specified, the dial pulse format is used.

Parameter values	Description
T	dual tone
M	multifrequency
K	multifrequency with KP and ST control symbols
DP	dial pulse

AID

This parameter identifies a particular instance of the specified administrative view. The format of the parameter is <bay-shelf-slot>.

Parameter values	Description
bay	1
shelf	copper-distribution shelf, 1-7
slot	line card slot, 1-96

Note: The access identifier (AID) identifies the position of the equipment for the CDS system by shelf and line card slot within the shelf. The ANX AID only identifies the circuit pack within a voice module.

AS

Identifies the audible supervisory state being analyzed.

Parameter values	Description
B	busy
D	dial tone
O	reorder
Q	quiet
R	ringing
V	voice

ATAG

The ATAG parameter is an automatic message counter integer used to uniquely identify each REPT-INITZN autonomous message generated. The ATAG is an integer number ranging from 1 to 999999. The ATAG of the first message generated has a value of 1 and is incremented by 1 for each subsequent message.

BRK

The percent break. Value ranges from 1–99.

CDA

Call disposition analysis.

Parameter values	Description
A	audible ring
D	dial tone detected
B	busy tone
R	reorder tone
T	test tone (1004 Hz)
V	voice

CHG

This parameter defines the requested action.

Parameter values	Description
INCR	increase monitor level by 5 dB
DECR	decrease monitor level by 5 dB

CM

The component to be measured. It can be measured individually, in any combination, or measured collectively.

Collective measurements are specified by using the ampersand (&) symbol between component codes. For example, B&M&I indicates that the test is to measure percent break, the make/break interval, and the interdigit interval.

Parameter values	Description
A	all components
B	percent break
D	digits identified
I	interdigit interval
M	make/break interval
P	pulses per second

CNFGRN

This parameter defines the metallic lead pair usage configuration.

Parameter values	Description
2WA 4AB, 4BA MAB, MBA DAB, DBA	Refer to “Signaling configurations for UDLC services” on page 5-111 for details.

CTAG

The CTAG parameter is a numeric correlation identifier. The TL1 software in the OPC keeps track of correlation identifiers for outstanding non-autonomous requests.

The CTAG is used to correlate non-autonomous command and response messages.

Format

The CTAG parameter can be up to 6 ASCII characters

CTRATE

The maximum counting rate for impulse and transient measurements.

Parameter values	Description
8	maximum nominal counting rate of 8/sec
1	maximum nominal counting rate of 100/sec

CT1

The impulse noise count at the specified threshold.

CT2

The impulse noise count at four decibels (4 dB) above the specified threshold.

CT3

The impulse noise count at eight decibels (8 dB) above the specified threshold.

CUR

Current measured in the specified lead (in milliamperes).

Parameter values	Description
xxx.x	ac measurement format
+xxx.x	+dc measurement format
–xxx.x	–dc measurement format

DIGID

Digits identified. Entry includes one of the numerical digits 0 through 9, one of the symbols, * or #, or one of the characters A through F.

Date

The origination date of the TL1 message.

Format

<yy>-<mm>-<dd>

Parameter values	Description
<yy>	are the last two digits of the year [00 to 99]
<mm>	is the month [01 to 12]
<dd>	is the day of the month [01 to 31]

DIR

The DIR parameter defines the direction.

Parameter values	Description
E	Equipment direction
F	Facility direction

DPOT

The DPOT parameter indicates the counted drop outs.

Parameter values	Description
OR	amplitude over range
UR	amplitude under range
OF	frequency of holding tone is outside of measuring range

ERRCDE

The associated error code of the message. For a listing of all the possible error codes and corresponding error responses refer to “Supported TL1 error responses and codes” on page 5-113.

ET

The elapsed measurement time. Expressed in the mm-ss format.

FILTERS

The signal weighting filter response network characteristic.

Parameter values	Description
ERL	Echo return loss
SRL	Singing return loss
SRLHI	Singing return loss - high frequency band

FREQ

This parameter defines the measured tone frequency (in Hz). It is rounded to the nearest Hz.

FREQBND

The frequency band of the weighting used to give jitter components in the selected band equal weighting.

Parameter values	Description
LW	4–300 Hz weighting band
HI	20–300 Hz weighting band

GAIN

This parameter defines the gain of the loopback. It is specified in dB as a decimal number. Values can range from –25 dB to +25 dB in 0.5 dB steps. The maximum output level is +7 dBm.

GNHT

The counted gain hits.

Parameter values	Description
OR	amplitude over range
UR	amplitude under range
OF	frequency of holding tone is outside of measuring range

IDGINT

Interdigit interval (in msec). Values include 0–999.

IDT

Interdigit interval time. The value ranges from 150–800 msec. (With no entry, the default nominal time is set at 650 +/–100 msec.)

IMP

Impedance of the circuit.

Parameter values	Description
00	135 ohms
11	150 ohms
22	600 ohms
33	900 ohms
44	1200 ohms

IMPED

The impedance of the test hybrid's balance network. The impedance of the circuit (as specified in the CONN-TAC or CHG-PRTPAR commands) is always used, regardless of the value specified in the MEAS-RLOSS command. The format is xxx-x.xx, where x is a decimal number.

LEAD

The lead of the pair to which the battery or ground termination is applied.

Parameter values	Description
T	Tip
R	Ring

LEV

Absolute integer value of the level of applied test signal (in dBm0). This parameter is always interpreted as a negative number. (For the MEAS-RLOSS command, positive and negative LEV values are supported.)

LR

Load resistance for all signalling formats. The value used for this parameter is 200 ohms.

MEASLD

Lead to which the meter circuit is connected for the measurement. The following table defines the parameter set for the MEAS-CUR message.

Parameter values	Description
T	Tip
R	Ring
ALL	both measurements

MEASLDS

Leads to which the meter circuit is connected for the measurement. The value depends on the message in which it is used. The following tables define the parameter sets for each message using the MEASLDS parameter.

The MEAS-CAPNC, MEAS-RES, and MEAS-VG messages use the following parameter set:

Parameter values	Description
TG	Tip and Ground
RG	Ring and Ground
RT	Ring and Tip
ALL	all three measurements on the transmission pair for 2-wire circuits, and on both transmission pairs for 4-wire or 6-wire circuits

The MEAS-SIGRES and MEAS-SIGVG messages use the following parameter set:

Parameter values	Description
TG	Tip and Ground
RG	Ring and Ground
ALL	both measurements

The MEAS-VGSX and MEAS-RESSX message uses the following parameter set:

Parameter values	Description
TBTA	Tips of the B and A pairs
TBRA	Tip of the B pair and Ring of the A pair
RBRA	Rings of the B and A pairs
RBTA	Ring of the B and tip of the A pair
ALL	all four measurements

MEASLOC

Location on the circuit under test at which the measurement is made.

Note: Values LONGE, LONGF, and LONGB are only supported by the MEAS-IMPNSE SARTS message.

Parameter values	Description
BRDGD	bridged measurement
SPLTE	split measurement in the Equipment direction
SPLTF	split measurement in the Facility direction
LONGE	indicates split longitudinal measurement in the Equipment direction
LONGF	indicates split longitudinal measurement in the Facility direction
LONGB	indicates bridged longitudinal measurement

MEASMODE

Voltage measurement mode, ac or DC.

Parameter values	Description
ac	alternating current
DC	direct current

MD

Measurement mode.

Parameter values	Description
S	single measurements
nn	repeating measurements every nn seconds

MKINT

Make interval (in ms). Values expressed as a decimal number in the range 0-999.

MR

Indicates the Intermodulation Distortion (IMD) ratio is less than the capability of the measuring circuit. The value given is the minimum measurable ratio.

NET

The weighting network used to shape the noise before the measurement.

Note: The MEAS-NSE SARTS message only supports CN and 3.

Parameter values	Description
CM	C-Message network
CN	C-Message network with narrow stop band centered at 1010 Hz
3	3 kHz flat weighting network

NRE, NRF

This parameter indicates whether normal or reverse battery and ground lead conditions are applied in the Equipment (NRE) and Facility (NRF) direction.

Parameter values	Description
N	normal conditions
R	reverse conditions

NSE

The power of measured noise above the reference noise (expressed in dBrn0 and referenced to 0 TLP).

OC

Indicates that the impulse noise count exceeded the capability of the counting circuit. The value given is the maximum possible count.

OOR

Out-of-range measurement level.

Parameter values	Description
OR	over range
UR	under range
OA	amplitude over range
UA	amplitude under range
OF	frequency out-of-range

OPE, OPF

Signaling operation in the Equipment (OPE) and Facility (OPF) direction.

Note: The value OT is constant for the SARTS CONN-TACC message.

Parameter values	Description
LN	loop start
GS	ground start
RB	calling end seizure is indicated by closure of the circuit conductors and where an answer signal from the called end is a reversal of the battery and ground at the called end
RD	alerting signal is the application of 20 Hz ringing
AU	automatic
OT	other

OR

Indicates that the measured value (voltage, capacitance, current, or resistance) exceeded the range of the meter circuit. When this occurs, the value is “OR” and the maximum value of the metering circuit is returned.

ORTN

Indicates which side of the access is towards the A end of the circuit under test.

Parameter values	Description
FE	Facility side of access is towards the A end
EF	Equipment side of access is towards the A end

PAR

The peak to average ratio (PAR) rating.

Parameter values	Description
1-120	PAR rating expressed in P/AR
OR	over range
UR	under range

PB

The percent break. Expressed in the format nn%. The value ranges from 1-99. (With no entry, the default of 58% is used.)

PHHT

The counted phase hits.

Parameter values	Description
OR	amplitude over range
UR	amplitude under range
OF	frequency of holding tone is outside of circuitry range

PHJTR

The measured phase jitter.

Parameter values	Description
xx.x	values in degrees peak-to-peak

PPS

Pulses per second, expressed as a decimal number in the range 0-999.

PR

Identifies the pair on which the measurements are to be made. This parameter is omitted for 2-wire circuits. The values depend on the message in which it is used.

Transmission measurements and the CONN-MONLIST message use the following value set:

Parameter values	Description
A	A pair
B	B pair

The MEAS-VG, MEAS-RES, MEAS-CAPNC, and MEAS-CUR messages use the following value set:

Parameter values	Description
A	A pair
B	B pair
C	C pair

The CHG-SPLTSUPV message uses the following value set:

Parameter values	Description
A	A pair
B	B pair
AB	both A and B pairs
E	E lead
M	M lead
SX	simplex of A and B pairs
unspecified	entire circuit is split using the CNFGRN parameter from the CONN-TACC message

RCY

Specifies the ringing cycle.

Parameter values	Description
N-n	n normal rings, with n = 1 to15 rings
C-n	one continuous ring, with n = 1 to 5 seconds

RES

Resistance between measurement points (in kilohms). The resistance format is xxxx.xxx, where x is a decimal number.

RLOSS

The measured return loss expressed in dB with a range from 0.0 to 99.9.

RNGDI

Specifies the ringing direction.

Parameter values	Description
E	ringing towards Equipment
F	ringing toward Facility
B	ringing towards both Equipment and Facility ends
N	no ringing signal

RSF

Specifies the ringing signal format.

Parameter values	Description
8	84-88 volts RMS 20 Hz superimposed on the D voltage and applied to the tip and ring of the pair or the leads of the simplex
9	90-130 volts RMS 20 Hz superimposed on the dc voltage and applied to the tip and ring of the pair or the leads of the simplex

RSM

The returned supervision measurement.

Parameter values	Description
F	RTU failed to detect wink start, dial tone, or transition in start outpulse sequence before time out

RTD

This parameter determines the ring tip detection.

Parameter values	Description
N	no answer
A	answer detected

SCND

The value of the 2nd order Intermodulation Distortion (IMD) ratio (in dB).

SID (Source Identifier)

The source identifier contains the name which identifies the source of the data in the TL1 message. The SID can be up to 20 ASCII characters in length and is of the same format as the target identifier (TID) parameter.

The source identifier typically contains the NE name that was provisioned on the shelf that originated the TL1 message. If the NE name was not suitable for use as the TL1 target identifier (TID), a testing TID may have been specified using the OS Connection Manager tool on the OPC. If the NE name and the testing TID cannot be retrieved, the name of the OPC controlling the NE is used.

SIG

Signal code defining signaling format.

Note: For the CONN-TACC SARTS message, the value NON is constant.

Parameter values	Description
L2W	2-wire circuit using -48V battery
L4F	4-wire circuit with simplex lead reversal on the facility side
L4E	4-wire circuit with simplex lead reversal on the equipment side
L4S (SARTS)	4-wire circuit with no simplex lead reversal
SFC	4-wire circuit with SF signaling and no simplex signaling. Access point is not at an interface with metallic facilities.
SFD (SARTS)	4-wire circuit with SF signaling and no simplex signaling. Access point is at an interface with metallic facilities.
SFS	4-wire circuit with SF signaling and simplex signaling
EME	E&M circuit with M lead signaling from facility to equipment
EMF	E&M circuit with M lead signaling from equipment to facility
SME	E&M circuit with M lead signaling from facility to equipment with SF signaling
SMF	E&M circuit with M lead signaling from equipment to facility with SF signaling
DXE	4-wire DX circuit with simplex lead reversal on the equipment side
DXF	4-wire DX circuit with simplex lead reversal on the facility side
DXS (SARTS)	4-wire DX circuit with no simplex lead reversal
NON	signifies a transmission only circuit without signaling when used in conjunction with the OPE/OPF value OT. Signifies a 3-state tandem circuit when used in conjunction with the OPE/OPF values LN, GS, and AU.

SIGDIR

Signaling direction.

Parameter values	Description
E	Equipment direction
F	Facility direction

SPL

The value “S” indicates that the circuit is special. (This parameter is only given if the line termination is red-lined.)

SS

Specifies the signaling supervisory state being analyzed.

Parameter values	Description
B	off-hook (busy)
I	on-hook (idle)
O	outpulsing
R	ringing

SSR

Specifies the supervisory state for analysis.

Parameter values	Description
A	audible analysis: ringing, dial tone, voice, reorder, busy and idle
S	signaling lead status: off-hook, on-hook, outpulsing, and ringing
B	both

STC

Specifies the special timing consideration before outpulsing the address.

> ***Note:*** When the parameter is not specified, a 6-second wait is performed before outpulsing.

Parameter values	Description
DT	detect dial tone before outpulse
I	immediate (100 ms delay) outpulsing
S	start with on-hook
W	wink start

SUPVE, SUPVF

Specifies the supervision required in the Equipment (SUPVE) and Facility (SUPVF) directions.

> ***Note:*** SARTS does not use the values ON, OFF, or LPN.

Parameter values	Description
ON	apply on-hook supervision
OFF	apply off-hook supervision
LPO	dc loop conditions open, ac conditions maintained
LPC	loop closed
LPG	loop closed and grounded
LPN	dc loop conditions open and ac conditions removed
LB4	-48 V dc applied
DNN	DX supervision on-hook
DFN	DX supervision off-hook
SFN	SF (2600 Hz at -20 dBm0) on
SFF	SF (2600 Hz at -20 dBm0) off
ELO	E lead open
ELG	E lead grounded
MLO	M lead open
MLG	M lead grounded
MLB	M lead connected to battery

TEL

A 32-digit telephone number of the monitor/talk line of the requesting Operations System (OS).

> ***Note 1:*** The special timing characters (W, T, and D) must be separated by hyphens.
>
> ***Note 2:*** Two adjacent special timing characters must be separated by two hyphens.

Parameter values	Description
0 through 9	valid digits for dial pulse, dual tone, and multifrequency addressing
*, #, A, B, C, D	valid digits for dual pulse addressing only
W	wait up to 30 seconds for dial tone before proceeding
T	delay 1 second
D	delay 6 seconds (when used as a timing character), otherwise indicates dual tone digit D.

TH

The threshold value for impulse (noise) counters.

THGH

The threshold for gain hits. The threshold can be 2, 3, 4, 6, 8, or 10 dB.

THL

The transhybrid loss compensation to be applied at the receiver. This parameter has the format xx.x, where x is a decimal number. (This parameter is used for 4-wire and 6/8-wire circuits only. The value 0 is always used for 2-wire circuits, regardless of the value specified in the MEAS-RLOSS command.)

THPH

The threshold for phase hits. The threshold can be set between 5 to 45 degrees in 5 degree increments.

TID

The TID parameter contains either the network element name (NE name) that is the target of the TL1 message, or a user-specified value. The NE name is set during commissioning and can be up to 13 characters in length. Note that in order to be a valid TL1 TID, the NE name must adhere to a specific character set. This character set includes uppercase or lowercase letters, numerical digits, as well as certain special characters including the hyphen, underscore, period, and comma. Spaces (blanks) are not permitted.

User-specified TIDs are created using the OS Connection Manager on the OPC and can be up to 20 characters in length. Refer to *System Administration Procedures,* 323-3001-302, in *Operations, Administration, and Provisioning*, Volume 4A, for the procedure on how to set a user-specified TID.

> ***Note:*** The SARTS operating system can only accept TIDs of up to 10 characters in length. As a result, a user-specified TID is required if the NE name exceeds 10 characters.

Time

The origination time of the TL1 message.

Format

<hh>:<mm>:<ss>

Parameter values	Description
<hh>	is the hour of the day [00 to 23]
<mm>	is the minute of the hour [00 to 59]
<ss>	are the seconds of the minute [00 to 59]

TLPE, TLPF

The transmission level point at access for transmission from F to E (TLPE) or E to F (TLPF). Expressed in the format +xx.x or –xx.x, where x is a decimal number. The supported values are –20.0 to +10.0.

TM

The measurement time interval.

Parameter values	Description
1-9999	minute intervals
CO	continuously

TSN

Test session number used to identify all messages for a particular access. The value of TSN for SARTS and DARTS is a numerical string ranging from 1-999.

VG

Voltage between measurement points in decimal format.

Parameter values	Description
xxx.x	ac measurement format
+xxx.x	+dc measurement format
-xxx.x	-dc measurement format

WIRE

Indicates the circuit type.

Parameter values	Description
2	2-wire circuit
4	4-wire circuit

Signaling configurations for UDLC services

The following table summarizes the applicable signaling configurations for the UDLC services provided by AccessNode.

Service	CNFGN	SIG	RNGDI	OPE,OPF
2W TOO	2WA	NON	N	OT
2W TOS	2WA	NON	N	OT
2W ETOO	2WA	NON	N	OT
2W ETOS	2WA	NON	N	OT
2W FXO	2WA	L2W	F	LN, GS, AU
2W FXS	2WA	L2W	E	LN, GS, AU
POTSRT	2WA	L2W	E	LN
POTSCT	2WA	L2W	F	LN
UVGRT	2WA	L2W	E	LN, GS
UVGCT	2WA	L2W	F	LN, GS
COINRT	2WA	L2W	E	LN, GS
COINCT	2WA	L2W	F	LN, GS
2W DPT	2WA	L2W	N	RB
2W DPO	2WA	L2W	N	RB
PLAR	2WA	L2W	E	AU
MRD	2WA	L2W	B	RD
4W TO	4AB, 4BA	NON, SFC, SFD	N	OT
4W ETO	4AB, 4BA	NON, AFC, SFD	N	OT
4W FXO	4AB, 4BA	L4E, L4F, L4S	F	LN, GS, AU
4W FXS	4AB, 4BA	L4E, L4F, L4S	E	LN, GS, AU
DDS	DAB, DBA, 4AB, 4BA	NON	N	OT
DX	4AB, 4BA	DXE, DXF, DXS	N, B	OT
EM	MAB, MBA	EMF, SMF	N, B	OT

—continued—

Service	CNFGN	SIG	RNGDI	OPE,OPF
PLR	MAB, MBA	EME, SME	N, B	OT
TDMs	MAB, MBA	NON	F	LN, GS, AU
TDMo	MAB, MBA	NON	E	LN, GS, AU
TDM	MAB, MBA	NON	N, B	OT
—end—				

Supported TL1 error responses and codes

This section defines acknowledgment/error responses and error codes supported by the TL1 line and loop testing interface.

Acknowledgment/error responses

The following acknowledgment/error responses are used by the line and loop testing interface. These messages are sent back to the OS before an actual TL1 response to indicate that the TL1 request has actually been received by the OPC.

Printout Follows

A response of some kind must be sent to the originator of the TL1 request within 2 seconds of receiving the message. If the response to the TL1 request can not be sent in the time out period, then the TL1 task must send a "printout follows" acknowledgment as in:

PF^<CTAG> cr lf <

The left angle bracket (<) after the lf is a special character that is part of the message. The <CTAG> field is an optional and contains the correlation identifier (CTAG) from the message that is in progress.

> ***Note:*** This acknowledgment is not used for the Report Status message.

Not Acknowledged

If the TL1 task receives a TL1 request before initialization is completed, it sends an "NA" response indicating it is not ready to process TL1 request.

NA^<CTAG> cr lf <

The left angle bracket (<) after the lf is a special character that is part of the message. The <CTAG> field is an optional and contains the CTAG from the message that is to be retried later.

OK

When the Report Status request is issued and the data link between the OPC and OS is working properly, an 'OK' response is sent. With this response, the DENY/COMPLD normal responses are omitted.

OK^<CTAG> cr lf <

The left angle bracket (<) after the lf is a special character that is part of the message. The <CTAG> field is an optional and contains the CTAG from the message that is to be retried later.

Error codes

The following tables list the possible error codes and associated supplier free form error explanations supported by the Integrated Remote Test Unit (IRTU), processor card (Proc), and Operations Controller (OPC).

Error codes (IRTU)	**Associated supplier free form error explanations**
EATN	IRTU 4 - Invalid Command/error response
	IRTU 17 - Internal error (same message for IRTU 18-24)
ERNS	IRTU 13 - RTU does not support command
	IRTU 14 - Internal error (same message for IRTU 15-16)
ETNS	IRTU 58 - Command data not supported
FNDT	IRTU 5 - Dial Tone detection failed/error response
FRCE	IRTU 9 - Hazardous Voltage Detected
	IRTU 10 - Error sending RTU response
	IRTU 11 - Error sending/receiving message
	IRTU 12 - Error with timer utils/error response
	IRTU 36 - Internal error (same message for IRTU 37-57, 62-66, 68, 71-72, 80-81)
	IRTU 59 - Invalid configuration (same message for IRTU 60)
	IRTU 61 - Message timed out
	IRTU 67 - Measurement circuit unavailable
	IRTU 69 - Timed out waiting for resources
	IRTU 70 - Calibration in progress
	IRTU 73 - Shared resources busy
	IRTU 74 - ILC error / no mon established
	IRTU 75 - Timed out waiting for ILC
	IRTU 76 - ILC error (same message for IRTU 77-78)
ISTN	IRTU 79 - Invalid Test Session
SADC	IRTU 8 - Already disconnected
SCIS	IRTU 7 - Circuit in split/error response

—continued—

Error codes (IRTU)	Associated supplier free form error explanations
SCNS	IRTU 6 - Circuit not in split/error response
SCSN	IRTU 25 - Invalid command sequence (same message for IRTU 26–27, 30–35))
	IRTU 28 - Internal error (same message for IRTU 29)
—end—	

Error codes (Proc)	Associated supplier free form error explanations
EFON	APC 1024 - Feature not enabled
ENEQ	APC 1025 - RTU object does not exist
FRNR	APC 1028 - Response timeout
RALB	APC 1027 - RTU is in-service-abnormal
RTUB	APC 1032 - RTU busy
SABT	APC 1030 - Measurement discontinued
	APC 1031 - Command aborted by DISC-TACC
	APC 1033 - Command aborted by RTU
SCSN	APC 1029 - Invalid command sequence
SROS	APC 1026 - RTU is out-of-service

Error codes (OPC)	Associated supplier free form error descriptions
EATN	OPC - Line card service not permitted for testing
ENEQ	OPC - RTU 1 and 2 are not provisioned
	OPC - RTU 1 and 2 just de-provisioned
	OPC - LC unequipped, or LC service unassigned
	OPC - LC and its provisioned service are mismatched
	OPC - LC in Test Failed State
	OPC - LC in Diagnostic State
—continued—	

Error codes (OPC)	**Associated supplier free form error descriptions**
ENEQ continued	OPC - LC in Resource Failed State
	OPC - LC already under Metallic Test
	OPC - LC Loading failed
	OPC - loading
	OPC - LC supporting equipment failed
	OPC - FCOT is not equipped with IRTU
ETNS	OPC [TOS] - Command verb or command parameter not supported
FRCE	OPC - Command verb or command parameter not supported
	OPC - Invalid configuration
ICNV	OPC - Attempted overriding CONN-TACC requires same RTU
IDNV	OPC - Bad parameter value
IIAC	OPC - Invalid AID, CDS not provisioned, LC unequipped, or LC service unassigned
IISP	OPC [TOS] - Illegal syntax or punctuation
IITA	OPC - No NE found
IPMS	OPC - Required parameter not supplied
IPNV	OPC - Command parameter not valid
RANB	OPC - MTAU/MTAPT resources busy or failed
RNBY	OPC - Resource busy executing prior command
SABT	OPC - Out of memory
	OPC - Base error
	OPC - LTI already initialized
	OPC - Illegal type for client
	OPC - Interface not initialized
	OPC - Null pointer encountered for expected function argument
	OPC- Illegal parameter identifier

—continued—

Error codes (OPC)	**Associated supplier free form error descriptions**
SABT continued	OPC - Illegal command or response key
	OPC - Circuit access aborted, disconnected, or never existed
	OPC - No TL1 message received within past 75 second timeout period
	OPC - LTI's internal software error
	OPC - Unspecified MTAU or MTAPT abort
	OPC - Unspecified RTU or RTU Session abort
	OPC - NE has been decommissioned
	OPC - Command pre-empted by subsequent command or by abort condition
	OPC - NE CMISE association lost
SROF	OPC - Requested response parameter not found
	OPC - No more response parameters to pop off
SROS	OPC - RTU is out of service or has transitioned to out of service
—end—	

Valid conditions for CHG-SLPTSUPV command

The following tables provide valid conditions for the CHG-SLPTSUPV command.

CHG-SPLTSUPV pair	**CONN-TACC configuration**							
	A	B	AB	C	E	M	SX	NOT
2WA	T	F	F	F	F	F	F	T
4**	T	T	T	F	F	F	T	T
M**	T	T	T	T	T	T	f	T
D**	T	T	T	F	F	F	F	T
NON	T	T	T	f	f	f	f	T
L2W	T	F	F	F	F	F	F	T
SF*	T	T	T	F	F	F	F	T
L4*	F	F	F	F	F	F	T	T
DX*	F	F	F	F	F	F	T	T
EM*	T	T	T	T	T	T	F	T
SM*	T	T	T	T	T	T	F	T

Note: Asterisks denote legitimate characters. For example, 4** can be 4AB or 4BA.

CHG-SPLTSUPV pair	**CHG-SPLTSUPV “supve” and “supvf”**																
	O N	O F F	L P O	L P C	L P G	L P N	L B 4	L B 7	S F N	S F F	E L O	E L G	M L B	M L G	M L O	D N N	D N F
A	F	F	T	T	T	T	T	F	T	T	F	F	F	F	F	F	F
B	F	F	T	F	F	T	F	F	T	T	F	F	F	F	F	F	F
AB	F	F	T	F	F	T	F	F	F	F	F	F	F	F	F	F	F
C	F	F	F	F	F	F	F	F	F	F	T	T	T	T	T	F	F
E	F	F	F	F	F	F	F	F	F	F	T	T	F	F	F	F	F
M	F	F	F	F	F	F	F	F	F	F	F	F	T	T	T	F	F
SX	F	F	T	T	T	T	T	F	F	F	F	F	F	F	F	T	T

—continued—

CHG-SPLTSUPV pair	CHG-SPLTSUPV “supve” and “supvf”																
	ON	OFF	LPO	LPC	LPG	LPN	LB4	LB7	SFN	SFF	ELO	ELG	MLB	MLG	MLO	DNN	DNF
NOT	T	T	T	T	T	T	T	T	F	F	F	T	T	T	T	T	T
NON	F	F	T	F	F	T	F	F	f	f	f	f	f	f	f	F	F
L2W	T	T	T	T	T	T	T	F	F	F	F	F	F	F	F	F	F
SF*	F	F	T	F	F	T	F	F	T	T	F	F	F	F	F	F	F
L4*	T	T	T	T	T	T	T	F	F	F	F	F	F	F	F	F	F
DX*	T	T	T	F	T	F	F	F	F	T	T	T	T	T	T	F	F
EM*	T	T	T	F	F	T	F	F	F	F	T	T	T	T	T	F	F
SM*	F	F	T	F	F	T	F	F	T	T	T	T	T	T	T	F	F
Note: Asterisks denote legitimate characters.																	
—end—																	

Note: The symbols “T” and “F” denote a validity check pass or fail. The symbol “f” denotes exceptions to allow for signalling on TDM circuits. Exceptions are made only under the following condition:

CONN-TACC.cnfgrn == MAB or MBA and
CONN-TACC.sig == NON.

Other rejection cases occur under the following circumstances:

- CHG-SPLTSUPV “supve” and “supvf” parameters are both SFN (Rule 1 on page 5-2)
- CHG-SPLTSUPV “supve” and “supvf” parameters are SFN and a test signal currently exists on another pair or in the opposite direction (Rule 1 and 2 on page 5-2)
- CHG-SPLTSUPV “supve” and “supvf” parameters and CONN-MONLIST exists in the opposite direction or on the same pair in the same direction (Rule 4 on page 5-2)

Commands specific to the TL1 command line

These commands are supported over the TL1 command line interface (CI) and are not supported over the X.25 interface. These commands allow you to perform line/loop tests for voice or data circuits. The systems that support these commands include copper distribution shelves (CDS), Universal Edge 9000 (UE9000) shelves, and AccessNode Express (ANX).

> ***Note:*** For more information on testing UE9000 shelves, see the *UE9000 Voice OAM&P User Guide*.

Testing from the operating system

To use these commands, you must connect an external wideband test unit to the ABM shelf. The test unit communicates through the TAPIO card test access port 1 (TAP1) or test access 2 port (TAP2). You can issue these commands manually from the TL1 CI, or you can use an operating system such as AccessCare. The operating system (OS) sends TL1 commands to the ABM through the OPC in order to gain metallic access. The OS then uses TL1 commands to instruct the test unit to perform the test. Once the test is complete, the OS sends a TL1 command to the ABM through the OPC to release test access.

You can test voice circuits from many different locations such as the switch, the local test cabinet, or the OS. For more information, see *Line and Loop Testing Overview*, 323-3001-115, in *Description*, Volume 2B.

Using an external test unit

Two wire lead pair test unit

Connect both the A_{out} pair and A_{in} pair from TAP1 or TAP2 to the two-wire lead pair on the test unit. When the line card is split-out, A_{out} is activated and A_{in} is not. When the line card is split-in, A_{in} is activated and A_{out} is not.

> ***Note:*** Do not issue the CHG-SPLIT command when using a two-wire test unit. This command causes the test unit to receive signals from both A_{out} and A_{in} simultaneously, skewing test results.

To verify the line/loop test system connections, see *Line Test Interface Commissioning Procedures*, 323-3001-223, in *Commissioning and Testing*, Volume 3B.

Four wire lead pair test unit

Connect the A_{in} pair to the split-in lead pair on the test unit. Connect the A_{out} pair to the split-out lead pair on the test unit.

Metallic Test Access TL1 commands

The operating system (OS) sends the following list of TL1 commands to the AccessNode to gain or release metallic access to voice or data circuits.

The MTA TL1 commands are as follows:

- CONN-LPACC-MET
- CONN-TACC-MET
- CONN-MON
- CHG-SPLIT
- CHG-SPLIT-LILO
- CHG-BRIDGE
- DISC-TACC

Note: The CONN-LPACC-MET command must be the first command issued when gaining metallic test access.

Example 1

Assume the following:

- NE name (TID) is NE41
- external test unit is physically connected to TAP1
- line under test is circuit number 3, of MLC 9, of shelf number 2, which is a UE9000 shelf
- circuit under test is a two-wire voice circuit (see Table 5-3 on page 5-123)

The typical order of MTA TL1 commands is as follows:

```
TL1CI>  CONN-LPACC-MET:NE41:RT1-UE2-09-03:CTAG1::1:2WA;
```

```
TL1CI>   CONN-TACC-MET:NE41:1:CTAG2;
```

```
TL1CI>   CHG-SPLIT:NE41:1:CTAG3;
```

Note: At this point, the OS sends TL1 test commands to the wideband test unit. When the OS is finished testing, it disconnects the circuit by sending the following TL1 command to the AccessNode:

```
TL1CI>   DISC-TACC:NE41:1:CTAG4;
```

Note: Always use the same TAP number in all TL1 commands used throughout a test session.

Example 2

Assume the following:

- NE name (TID) is NE41
- line under test is circuit number 29 of shelf number 1, which is a CDS

- external test unit is physically connected to TAP2
- circuit under test is a two-wire voice circuit (see Table 5-3 on page 5-123)

The typical order of MTA TL1 commands is as follows:

```
TL1CI>  CONN-LPACC-MET:NE41:RT1-1-29:CTAG1::2:2WA;

TL1CI>   CONN-TACC-MET:NE41:2:CTAG2;

TL1CI>   CHG-SPLIT:NE41:2:CTAG3;
```

> ***Note:*** At this point, the OS sends TL1 test commands to the wideband test unit. When the OS is finished testing, it disconnects the circuit by sending the following TL1 command to the AccessNode:

```
TL1CI>   DISC-TACC:NE41:2:CTAG4;
```

> ***Note:*** Always use the same TAP number in all TL1 commands used throughout a test session.

Example 3

Assume the following:

- NE name (TID) is NE41
- line under test is circuit number 1, of MLC number 10, of shelf 2, which is a UE9000 shelf
- external test unit is physically connected to TAP1
- circuit under test is a two-wire data circuit (see Table 5-3)

The typical order of MTA TL1 commands is as follows:

```
TL1CI>  CONN-LPACC-MET:NE41:RT1-UE2-10-01:CTAG1::1:2WB;

TL1CI>   CONN-TACC-MET:NE41:1:CTAG2;

TL1CI>   CHG-SPLIT-LILO:NE41:1:CTAG3::E;

TL1CI>   CHG-SPLIT-LILO:NE41:1:CTAG4::F;
```

> ***Note:*** At this point, the OS sends TL1 test commands to the wideband test unit. When the OS is finished testing, it disconnects the circuit by sending the following TL1 command to the AccessNode:

```
TL1CI>   DISC-TACC:NE41:1:CTAG5;
```

> ***Note:*** Always use the same TAP number in all TL1 commands used throughout a test session.

CONN-LPACC-MET

Use this command to gain metallic access to a subscriber circuit. This command makes the initial connection and gives the external test unit loopback access to the MTAC or SI card. Loopback access allows the external test unit to test connection relays.

> ***Note:*** You must issue this command before issuing any other commands in this section.

Security level

3

User accounts with a user privilege code matching or exceeding this security level can issue this TL1 command from the TL1 CI.

Input syntax

```
CONN-LPACC-MET:TID:AID:CTAG::TAP:CNFGRN;
```

Table 5-3
Syntax descriptions

Field	Description
TID	target identifier, the name of the network element to which a command is directed
AID	the line circuit ID If circuit is in a copper distribution shelf, use: RT1-[CDSNUM]-[CDSCIRCUITNUM] If circuit is in a UE9000 shelf, use: RT1-UE[UENUM]-[MLCNUM]-[UECIRCUITNUM] If circuit is in an AccessNode Express Voice Module, use: RT1-VM[VMNUM]-[ANXCIRCUITNUM] where: CDSNUM has a range from **1** to **7** CDSCIRCUITNUM has a range from **1** to **96** UENUM has a range from **1** to **7** MLCNUM has a range from **01** to **16** * UECIRCUITNUM has a range from **01** to **24** * VMNUM has a range from **1** to **28** ANXCIRCUITNUM has a range from **01** to **48** * * Use double-digits for these numbers.
CTAG	correlation tag used to correlate input and output messages. This is a one to six character alphanumeric code.

—continued—

Table 5-3 (continued)
Syntax descriptions

Field	Description
TAP	TAP number; either **1** or **2**
CNFGRN	lead pair configuration of the test set: 2WA –2-wire circuit on A pair of selected TAP 2WB –2-wire circuit on B pair of selected TAP (for data circuits only) 4AB or 4BA –4-wire circuit on A and B pairs of selected TAP MAB or MBA –4-wire circuit on A and B pairs with E&M signaling on C pair DAB or DBA –4-wire circuit on A and B pairs at the DS0A level ***Note:*** To test a data circuit, use the 2WB configuration. All other configurations test only voice circuits.
—end—	

Example input

Connect loop around access to data circuit #8 in multi-circuit line card 14:

```
CONN-LPACC-MET:NE22:RT1-UE1-14-08:CTAG1::1:2WB;
```

Response syntax

Normal response

```
<cr> <lf> <lf>
^^^<sid>^<date>^<time> <cr> <lf>
M^^<ctag>^COMPLD <cr> <lf>
^^^<tap>
[cr lf ^^^<spl>]
[cr lf ^^^A, ^<tls>]
[cr lf ^^^B, ^<tls>]
[cr lf ^^^C, ^<tls>] <cr> <lf>;
```

Example Response:

```
<cr> <lf> <lf>
^^^MYSAS^97-04-01^10:27:25 <cr> <lf>
M^^CTAG1^COMPLD <cr> <lf>
```

CHG-BRIDGE

Use this command to establish a bridged connection to the circuit specified in the `CONN-LPACC-MET` command. A bridged connection allows you to communicate on a line that is already carrying traffic. The connection exists between the line circuit and the subscriber.

You must execute the CONN-LPACC-MET command before executing this command. However, you can issue other commands after the CONN-LPACC-MET command and prior to the CHG-BRIDGE command.

Security level

3

User accounts with a user privilege code matching or exceeding this security level can issue this TL1 command from the TL1 CI.

Input syntax

```
CHG-BRIDGE:TID:TAP:CTAG;
```

Table 5-4
Syntax descriptions

Field	Description
TID	target identifier, the name of the network element to which a command is directed
TAP	TAP number; either **1** or **2**
CTAG	correlation tag used to correlate input and output messages. This is a one to six character alphanumeric code.

Example input

Connect bridged access to a circuit that was specified in an initial CONN-LPACC-MET command that uses TAP2.

```
CHG-BRIDGE:NE22:2:CTAG2;
```

Response syntax

Normal response

```
<cr> <lf> <lf>
^^^<sid>^<date>^<time> <cr> <lf>
M^^<ctag>^COMPLD <cr> <lf>;
```

CONN-MON

This command is used to establish a monitor state without having to reaccess the circuit under test. You must execute the CONN-LPACC-MET command before executing this command. However, other commands can be issued after the `CONN-LPACC-MET` command and prior to the `CONN-MON` command.

Security level

3

User accounts with a user privilege code matching or exceeding this security level can issue this TL1 command from the TL1 CI.

Input syntax

```
CONN-MON:TID:TAP:CTAG;
```

Table 5-5
Syntax descriptions

Field	Description
TID	target identifier, the name of the network element to which a command is directed
TAP	TAP number; either **1** or **2**
CTAG	correlation tag used to correlate input and output messages. This is a one to six character alphanumeric code.

Example input

Connect monitor access to a circuit that was specified in an initial CONN-LPACC-MET command that uses TAP2.

```
CONN-MON:NE22:2:CTAG2;
```

Response syntax

Normal response

```
<cr> <lf> <lf>
^^^<sid>^<date>^<time> <cr> <lf>
M^^<ctag>^COMPLD <cr> <lf>;
```

CONN-TACC-MET

Use this command to gain bridged metallic access to a subscriber circuit. A bridged connection allows you to communicate on a line that is already carrying traffic. The connection exists between the line circuit and the subscriber.

You must execute the CONN-LPACC-MET command *immediately* before executing this command.

Security level

3

User accounts with a user privilege code matching or exceeding this security level can issue this TL1 command from the TL1 CI.

Input syntax

```
CONN-TACC-MET:TID:TAP:CTAG;
```

Table 5-6
Syntax descriptions

Field	Description
TID	target identifier, the name of the network element to which a command is directed
TAP	TAP number; either **1** or **2**
CTAG	correlation tag used to correlate input and output messages. This is a one to six character alphanumeric code.

Example input

Connect bridged access to a circuit that was specified in an initial CONN-LPACC-MET command that uses TAP2.

```
CONN-TACC-MET:NE22:2:CTAG2;
```

Response syntax

Normal response

```
<cr> <lf> <lf>
^^^<sid>^<date>^<time> <cr> <lf>
M^^<ctag>^COMPLD <cr> <lf>;
```

CHG-SPLIT

Use this command to gain full split metallic access to a subscriber circuit. This command breaks the line between the line circuit and the subscriber to allow tests in both directions simultaneously.

You can use this command only with at least a four-wire lead pair test unit connected to TAP1 or TAP2. You must execute the CONN-LPACC-MET command before executing this command.

> **CAUTION**
> **Split access is service-affecting**
> Do not issue a split access command on a line circuit while it is carrying traffic.
>
> Also, be sure to properly disconnect the access using the DISC-TACC command.

Security level

3

User accounts with a user privilege code matching or exceeding this security level can issue this TL1 command from the TL1 CI.

Input syntax

```
CHG-SPLIT:TID:TAP:CTAG;
```

Table 5-7
Syntax descriptions

Field	Description
TID	target identifier, the name of the network element to which a command is directed
TAP	TAP number; either **1** or **2**
CTAG	correlation tag used to correlate input and output messages. This is a one to six character alphanumeric code.

Example input

Connect full split access to a circuit that was specified in the initial CONN-LPACC-MET command that uses TAP1.

```
CHG-SPLIT:NE22:1:CTAG3;
```

Response syntax

Normal response

```
<cr> <lf> <lf>
^^^<sid>^<date>^<time> <cr> <lf>
M^^<ctag>^COMPLD <cr> <lf>;
```

CHG-SPLIT-LILO

Use this command to gain split-in or split-out metallic access to a subscriber circuit. This command breaks the line between the line circuit and the subscriber. Use this command to conduct tests in one direction or the other, but not both directions at the same time.

You usually use this command with a two-wire lead pair test unit connected to TAP1 or TAP2. You must execute the CONN-LPACC-MET command before executing this command.

CAUTION
Split access is service-affecting
Do not issue a split access command on a line circuit while it is carrying traffic.

Also, be sure to properly disconnect the access using the DISC-TACC command.

Security level

3

User accounts with a user privilege code matching or exceeding this security level can issue this TL1 command from the TL1 CI.

Input syntax

```
CHG-SPLIT-LILO:TID:TAP:CTAG::DIR;
```

Table 5-8
Syntax descriptions

Field	Description
TID	target identifier, the name of the network element to which a command is directed
TAP	TAP number; either **1** or **2**
CTAG	correlation tag used to correlate input and output messages. This is a one to six character alphanumeric code.
DIR	direction to test: • **F** –towards the facility (line card), also known as split-in • **E** –towards the equipment (loop), also known as split-out

Example input

Connect split-out access to a circuit that was specified in the initial CONN-LPACC-MET command that uses TAP1.

```
CHG-SPLIT-LILO:NE22:1:CTAG4::E;
```

Response syntax

Normal response

```
<cr> <lf> <lf>
^^^<sid>^<date>^<time> <cr> <lf>
M^^<ctag>^COMPLD <cr> <lf>;
```

DISC-TACC

Use this command to release metallic access from the test access port (TAP) specified in this command. This command also releases metallic test access from the subscriber circuit that was specified in the initial CONN-LPACC-MET command for this TAP.

Security level

3

User accounts with a user privilege code matching or exceeding this security level can issue this TL1 command from the TL1 CI.

Input syntax

```
DISC-TACC:TID:TAP:CTAG;
```

Table 5-9
Syntax descriptions

Field	Description
TID	target identifier, the name of the network element to which a command is directed
TAP	TAP number; either **1** or **2**
CTAG	correlation tag used to correlate input and output messages. This is a one to six character alphanumeric code.

Example input

Disconnect access to the circuit that was specified in the initial CONN-LPACC-MET command that uses TAP2.

```
DISC-TACC:NE22:2:CTAG5;
```

Response syntax

Normal response

```
<cr> <lf> <lf>
^^^<sid>^<date>^<time> <cr> <lf>
M^^<ctag>^COMPLD <cr> <lf>
^^^<tap>
[cr lf ^^^<spl>]
[cr lf ^^^A, ^<tls>]
[cr lf ^^^B, ^<tls>]
[cr lf ^^^C, ^<tls>] <cr> <lf>;
```

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SONET Products

AccessNode

TL1 Interface Description

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