CHAPTER 1

Getting Started

Note The terms "Unidirectional Path Switched Ring" and "UPSR" may appear in Cisco literature. These terms do not refer to using Cisco ONS 15xxx products in a unidirectional path switched ring configuration. Rather, these terms, as well as "Path Protected Mesh Network" and "PPMN," refer generally to Cisco's path protection feature, which may be used in any topological network configuration. Cisco does not recommend using its path protection feature in any particular topological network configuration.

Transaction Language 1 (TL1) is a subset of the input and output messages contained in the International Telecommunications Union (ITU) Man-Machine Language (MML). TL1 provides a standard set of messages that can be used for communicating between operating systems and network elements, and personnel and network elements. For more information about TL1, refer to Telcordia document GR-833-CORE, *Network Maintenance: Network Element and Transport Surveillance Messages*.

This chapter provides information and procedures for getting started with TL1:

- Setting up TL1 communication
- TL1 command syntax
- Autonomous messages
- TL1 commands by user security
- Provisioning a DS3E card in CTC using TL1
- Provisioning rules for Transponder and Muxponder cards
- CTC interoperability
- Mixed mode timing support
- TL1 command completion behavior
- Test access
- TL1 PCA provisioning
- FTP software download
- Scheduled performance monitoring (PM) Report

1.1 Setting up TL1 Communication

The period during which a user is logged into the node is called a session. There are three options you can use to open a session (login):

- Cisco Transport Controller (CTC)
- Telnet
- Craft interface

The TL1 password (PID) is masked when accessing a TL1 session using any of these options. When you logout of any of these options, you are closing a session. The ONS 15454, ONS 15327 and ONS 15310-CL allow a maximum of 20 (19 telnet sessions and one craft session) concurrent TL1 sessions using any one or any combination of the options listed above. The ONS 15600 supports a maximum of 10 concurrent TL1 sessions and two serial connections (A and B) on the two serial port connectors on the Customer Access Panel (CAP). For information on issuing commands to multiple nodes, see Chapter 2, "TL1 Gateway."

1.1.1 Open a TL1 session

Use the following procedures to open a TL1 session via the CTC, telnet, or craft interface. In the procedures the Activate and Cancel User commands are shown in their input format. For more information about these and other commands and messages, see Chapter 3, "TL1 Command Descriptions."

Open a TL1 Session Via CTC

Step 1 From the PC connected to the ONS node, start Netscape or Internet Explorer.

Step 2 Enter the IP address of the node you want to communicate with in the Netscape or Internet Explorer Web address (URL) field.

Step 3 Log into the CTC. The IP address at the title bar should match the IP address of the node you entered in Step 2.

Step 4 Once logged into the CTC, there are two ways to open a TL1 session:

- Click **Tools > Open TL1 Connection,** or
- Click on the **Open TL1 Connection** button  on the toolbar.

Step 5 From the Select Node dialog box choose the node you want to communicate with.

Step 6 Click **OK**.

A TL1 interface window opens. There are three sub-windows in the TL1 interface window: Request History, Message Log/Summary Log, and TL1 request. Type commands in the TL1 request window. You will see responses in the Message log window. The Request History window allows you to recall previous commands by double-clicking on them.

Step 7 Verify that the Connect button is selected (grayed out).

Step 8 Type the Activate User command in the TL1 request window to open a TL1 session:

ACT-USER:[<TID>]:<UID>:<CTAG>::<PID>; and press **Enter**.

Note You must press Enter after the semicolon in each TL1 command, or the command will not be issued.

Step 9 Type the Cancel User command in the TL1 request window or press the **Disconnect** button to close a TL1 session:

CANC-USER:[<TID>]:<USERID>:<CTAG>; and press **Enter**.

Open a TL1 Session Via Telnet

To communicate with the ONS NE using TL1 commands using a telnet session over a craft interface or a LAN connection, you can choose from several ports.

- Port number 3083 is a telnet port that uses the telnet protocol and associated telnet escape sequences.
- Port number 2361 is an alternative telnet port.
- Port number 3082 is a raw TCP/IP port; it will not echo and it will not prompt the user.

Step 1 At the DOS prompt, type **cmd** and press **Enter**. (The same steps can also be done from a Unix prompt).

Step 2 At the DOS command prompt type:

TELNET <NODE IP ADDRESS OR NODE NAME> <PORT NUMBER> and press **Enter**.

The Node IP address or Node Name refers to the IP address or Node Name of the node you want to communicate with. Port number is the port (2361, 3082, or 3083) where TL1 commands are understood. If the connection is successful, a screen opens with a prompt.

Step 3 Type the Activate User command to open a TL1 session:

ACT-USER:[<TID>]:<UID>:<CTAG>::<PID>;

Note When the semicolon is typed, the command is issued immediately.

Step 4 Type the Cancel User command to close a TL1 session:

CANC-USER:[<TID>]:<USERID>:<CTAG>;

Open a TL1 Session Via Craft Interface

ONS 15454, ONS 15327 and ONS 15310-CL

The TCC2/TCC2P, XTC and 15310-CL-CTX cards have two built-in interface ports for accessing the ONS 15454, ONS 15327 and ONS 15310-CL respectively. With one RJ-45 LAN connection you can access the system using a standard browser interface. In the browser interface, you can perform local and remote Operations, Administration, Maintenance, and Provisioning (OAM&P) functions and open a VT100 emulation window to enter TL1 commands. If a browser is not available, you can access the system using a nine-pin RS-232 port. The RS-232 port supports VT100 emulation such that TL1 commands may be entered directly without a browser.

Step 1 Connect the serial cable to the RS-232 port on the active TCC2/TCC2P, XTC or 15310-CL-CTX card.

Step 2 Configure the terminal emulation software (Hyperterminal):

a. Terminal emulation = vt100

b. Bits per second = 9600

c. Parity = None

d. Stop BITS = 1

e. Flow control = None

Step 3 Press **Enter**. An angle bracket prompt (>) appears.

Step 4 At the > prompt, type the Activate User command to open a TL1 session:

ACT-USER:[<TID>]:<UID>:<CTAG>::<PID>;

Note When the semicolon is typed, the TL1 command is issued immediately.

Step 5 Type the Cancel User command to close a TL1 session:

CANC-USER:[<TID>]:<USERID>:<CTAG>;

ONS 15600

The TSC card has one RJ-45 port of the faceplate. The RJ-45 port allows you to access the system using a standard web browser. You must use the RJ-45 port on the active TSC. While using the web browser, you can perform local and remote Operations, Administration, Maintenance and Provisioning (OAM&P) functions.

If a browser is not available, you can access the system using one of the two RS-232 ports on the Customer Access Panel (CAP). Each RS-232 port supports VT100 emulation so that you can enter TL1 commands directly without using a web browser. Each RS-232 port supports its own TL1 session.

Because the CAP RS-232 port is set up as a DTE interface, you must use a 3-pair swapping null modem adapter so that the TXD/RXC, DSR/DTR, and CTS/RTS pins are swapped when connecting to the serial ports. The null modem adapter connects the CAP RS-232 port (male configuration) and the serial cable (female configuration). Table 1-1 lists the null modem adapter pin assignments.

Table 1-1 Null Modem Adapter Pin Assignments

TSC Signal	From Pin at TSC (DTE)	To Pin at Second DTE
NC[1]	1	NC
RXD	2	3
TXD	3	2
DTR	4	6
GND	5	5
DSR	6	4
RTS	7	8
CTS	8	7
NC	9	NC

1. NC is Not Connected.

Step 1 Attach a 3-pair swapping null modem adapter to the RS-232 port on the CAP.

Step 2 Connect a serial cable to the null modem adapter, and to the serial port on your PC or workstation.

Step 3 Complete one of the following:

- If you are using a PC, configure the terminal emulation software (Hyperterminal):
  - Terminal emulation = vt100

- Bits per second = 9600
- Parity = None
- Stop BITS = 1
- Flow control = None

- If you are using a UNIX workstation, connect from X-windows or the terminal using the tip command:

  tip -9600 /dev/ttyb (or ttya depending on where serial cable is connected)

Step 4 Press **Enter**. A > prompt appears.

Step 5 At the > prompt, type the Activate User command to open a TL1 session:

ACT-USER:[<TID>]:<UID>:<CTAG>::<PID>;

Note When the semicolon is typed, the TL1 command is executed immediately.

Step 6 Type the Cancel User command to close a TL1 session:

CANC-USER:[<TID>]:<USERID>:<CTAG>;

1.2 TL1 Command Syntax

TL1 commands conform to the following syntax:

a:b:c:d:e: ... z;

where:

“a” is the command code

“b” is the target identifier (TID)

“c” is the access identifier (AID) or the user identifier (UID)

“d” is the correlation tag (CTAG)

“e: ... z;” are other positions required for various commands

The TID, AID, and CTAG route and control the TL1 command. Other parameters provide additional information required to complete the action requested by the command. TL1 command codes, parameter names and parameter values can be either uppercase or lowercase exclusively or any combination of the two, unless specifically noted in the command description.

The TID is a unique name given to each system when it is installed. The name identifies the particular NE (in this case, the ONS 15454, ONS 15327, ONS 15310-CL, and ONS 15600), to which each command is directed. The value of TID can be any TL1 identifier or text string, but it is limited to 20 characters. An identifier contains any number of letters or digits but must start with a letter. A text string is any alphanumeric or punctuation character enclosed in double-quotes. The presence of the TID is required in all input commands, but its value can be null (represented by two successive colons). The TID can be null when the operating system directly communicates with the target NE. The recommended value for the TID, when it is used, is the target’s CLLI code. To establish the TID for a node, use the Provisioning > General tabs in CTC.

The AID is an access code used to identify and address specific objects within the NE. These objects include individual pieces of equipment, transport spans, access tributaries, and other objects.

The CTAG is a unique identifier given to each input command by the user. When the NE responds to a specific command, it includes the command's CTAG in the reply. Including the CTAG eliminates discrepancies about which response corresponds to which command. Valid CTAG values include strings of up to six characters comprised of identifiers (alphanumeric, beginning with a letter) or decimal numerals (a string of decimal digits with an optional non-trailing ".").

The following specification characters are used throughout this document as vehicles for defining the syntax:

- < > enclose a symbol specifier, for example <CTAG>.
- [ ] enclose an optional symbol, for example [<TID>].
- " " enclose a literal character, for example an output format "SLOT-7:PLUGIN,TC,,,,,,,:\"EQUIPMENT PLUG-IN\",TCC"
- ^ is a space, a literal blank character used only in examples of messages.

1.2.1 Command Recall Keys

TL1 has the ability to store previously issued commands so that they can be recalled for future use. A maximum of 20 commands are stored. All types of commands are stored, including invalid commands. If the session is a GNE session, it will store commands sent to both the GNE and the ENE. To recall the last command issued, press **Ctrl-R**. Each time Ctrl-R is pressed, a previously-issued command is displayed. To recall commands in the forward direction, press **Ctrl-F**.

Once a command has been recalled, you can use the Backspace key to edit the command as necessary. Cursor keys (i.e., left and right arrows) are not permitted for editing.

Note Command recall keys are only available when using a serial port session or an interactive telnet session (i.e., telnet <hostname> 3083).

The CTC TL1 session has its own means for recalling previously issued commands as described in the "Open a TL1 Session Via CTC" section on page 1-2.

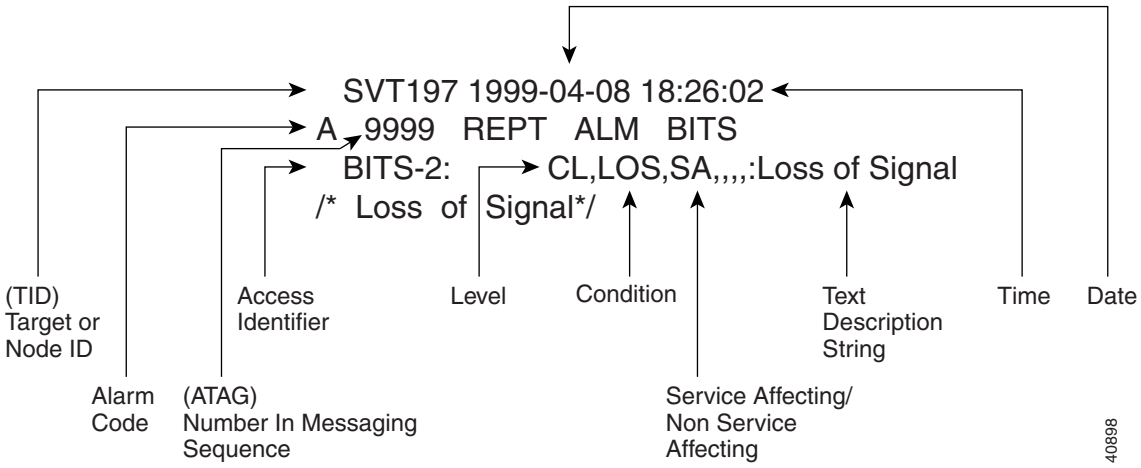
1.3 Autonomous Messages

Autonomous messages are used to report alarms, configuration changes or condition changes. Many of these messages, such as those relating to alarm conditions, are spontaneously triggered by the NE itself without intervention. Other messages, such as those relating to the reporting of periodic condition states or performance data values are scheduled by the NE user via other commands. Because you do not issue autonomous messages to the NE, they do not include input formats or input examples.

The autonomous TL1 messages are included in Chapter 3, "TL1 Command Descriptions" and listed alphabetically. Figure 1-1 shows the autonomous message format. The autonomous message tag (ATAG) is used for message sequencing. The number is incremented by one for each autonomous message sent by the NE. Cisco NEs use whole numbers 0000 to 9999.

Note Some autonomous messages (REPT DBCHG and REPT EVT SESSION, for example) differ slightly from the format shown in the third line of Figure 1-1.

Figure 1-1 Autonomous Message Format



1.3.1 Alarm Codes

The alarm code indicates the severity of the autonomous message. Valid values for alarm codes in decreasing order of severity are as follows:

- *C Critical alarm
- ** Major alarm
- *^ Minor alarm
- A^ Non-alarm message

Critical, Major, and Minor correspond to the reporting of alarmed events. The Non-alarm message designation is used when the NE is reporting non-alarmed events, periodic measurements, or results of previously-scheduled diagnostics or audits. If multiple alarms are reported in the same message, the alarm code is the highest severity of those being reported.

The following is an example of an output message that includes the Critical alarm code:

```
  AB7-56 1970-01-01 16:02:10
*C 100.100 REPT ALM EQPT
  "SYSTEM:CR,HITEMP,NSA,,,,:\"High Temperature\",TCC"
```

For more information about alarms, see Chapter 6, "TL1 Errors."

1.4 TL1 Commands by User Security

The following table specifies command access privileges for each user security level.

Table 1-2 Command Access

Command	Superuser	Provisioning	Maintenance	Retrieve
ALW-MSG-SECU	X			
ALW-USER-SECU	X			

Table 1-2 Command Access (continued)

Command	Superuser	Provisioning	Maintenance	Retrieve
APPLY	X			
CANC-USER-SECU	X			
CLR-COND-SECU	X			
COPY-RFILE	X			
DLT-USER-SECU	X			
ED-DAT	X			
ED-USER-SECU	X			
ENT-USER-SECU	X			
INH-MSG-SECU	X			
INH-USER-SECU	X			
REPT EVT SECU	X			
RTRV-DFLT-SECU	X			
RTRV-USER-SECU	X			
SET-ATTR-SECUDFLT	X			
DLT-*-*	X	X		
ED-*-*	X	X		
ENT-*-*	X	X		
SET-*-*	X	X		
SET-TOD	X	X		
INIT-*-*	X	X	X	
OPR-*-*	X	X	X	
RLS-*-*	X	X	X	
RMV-*-*	X	X	X	
RST-*-*	X	X	X	
SW-*-*	X	X	X	
ACT-*-*	X	X	X	X
ALW-*-*	X	X	X	X
CANC-*-*	X	X	X	X
ED-PID	X	X	X	X
INH-*-*	X	X	X	X
REPT * *[1]	X	X	X	X
RTRV-*-*	X	X	X	X

1. Except for REPT EVT SECU which is Superuser only as shown above.

User security levels limit the amount of time a user can leave the system idle before the TL1 session is locked to prevent unauthorized users from making changes. Higher security levels have shorter time outs. Starting with Release 4.0, time outs can be provisioned (by a Superuser) from CTC. If provisioned,

it only affects users who are not currently logged in. A user that is logged in has to log out and log back in before the new timeouts will take affect. A Superuser can provision security levels via TL1 with the SET-ATTR-SECUDFLT command.

Table 1-3 shows security levels and their default time outs.

Table 1-3 Security Default Time Outs

Security Level	Default Time Outs
Retrieve	Unlimited
Maintenance	60 minutes
Provisioning	30 minutes
Superuser	15 minutes

1.5 Rules for Framing Type Autoprovisioning in CTC Versus TL1

The DS3/DS3E/DS3XM/DS3I/DS1cards can autosense framing and set the format accordingly; however, this framing autosense feature can only be set using CTC. Use CTC to set the FMT attribute on DS3/DS3E/DS3XM/DS3I/DS1cards to autoprovision. The FMT field will blank out for a few seconds while the card is determining the framing mode received by that particular port. The FMT field is then set accordingly to unframed, M23, or CBit. If the card is not present (pre-provisioned), setting the FMT field to autoprovision will result in the FMT field defaulting to unframed.

The TL1 interface does not support the autoprovision option for the DS3/DS3E/DS3XM/DS3I/DS1cards; the TL1 interface only supports unframed, M23, or CBit. If autoprovision is selected from CTC and at the same time the TL1 command RTRV-T3 is issued, the TL1 output will indicate the FMT field as unframed during the time period that the card (if present) is autosensing the frame format. If the card is not present (pre-provisioned), the response of the RTRV-T3 command (after CTC sets the FMT to autoprovision) will indicate the FMT field as unframed.

1.6 Provisioning Rules for Transponder and Muxponder Cards

This section provides provisioning rules associated with the following cards and pluggable port modules (PPMs):

- MXP_2.5G_10G/TXP_MR_10G
- TXP_MR_2.5G/TXPP_MR_2.5G
- MXP_2.5G_10E/TXP_MR_10E
- MXP_MR_2.5G/MXPP_MR_2.5G

1.6.1 PPM Provisioning Rules

1. Card must be provisioned.

TL1 commands to provision are:

- ENT/DLT-EQPT

  Example of provisioning PPM on Slot-2, first PPM:

  ENT-EQPT::PPM-2-1:100::PPM-1PORT;

1.6.2 Payload Provisioning Rules

1. PPM must first be provisioned.
2. Changing the payload data type requires:
   a. All ports being edited must be in the OOS-MA,DSBLD state because this change is traffic affecting.
   b. All ports being edited must not have any DCC termination.
   c. All ports being edited must not be part of any timing source.
   d. The section trace mode of all ports being edited must be OFF.
   e. For all regeneration and retiming (2R) payload types, trunk ports must not have GCC termination or OTN/FEC enabled.
   f. Payload cannot be changed if any ports being edited are part of a Y Cable protection group.
   g. Only the transponder card can be used for the 10GigE payload. Termination mode must be set to Transparent-AIS or Transparent-Squelch (TXP_MR_10E only).
3. To set the payload to other than OC3/12/48/192/STM1/4/16/64, the termination mode must be set to Transparent-AIS or Transparent-Squelch (TXP_MR_10E only). For fibre-channel cards and all 2R payload types the termination mode is not applicable and must be set to Transparent (AIS or Squelch).
4. Changing payload while in a regeneration group requires first unprovisioning the regeneration group, unprovisioning the payload, reprovisioning the payload, and then reprovisioning the regeneration group.

TL1 commands to provision are:

- ENT/DLT/ED-(OCn, nGIGE, nGFC, 2R)

  Examples of provisioning payload:

  ENT-OC12

  ENT-10GIGE

  ED-2GFC

- ENT/DLT/ED-EQPT

  Example of setting termination mode:

  ENT-EQPT::SLOT-1:116::TXP-MR-10E:CARDMODE=DWDM-TRANS-AIS;

1.6.3 OCn Payloads Provisioning Parameters

SONET/SDH payloads are supported by DWDM cards according to Table 1-4. These payloads are configurable only for the Section and Line layers. STS layers cannot be provisioned or retrieved.

Table 1-4 Payload/Card Mode Support

Card Type	Payload	Card Mode
TXP-MR-10G	OC192	DWDM-LINE
	10GIGE	DWDM-SECTION DWDM-TRANS-AIS DWDM-TRANS-AIS with REGEN group
	OC192, 10GIGE	Does not support PPM. Card mode not applicable.
MXP-2.5G-10G	OC48	DWDM-LINE DWDM-SECTION DWDM-TRANS-AIS
TXP-MR-2.5G and TXPP-MR-2.5G	1GIGE, 1GF, 1GFICON, 2GFICON, ESCON, ISC1, ISC3, ETRCLO, DV6000, HDTV, D1VIDEO	DWDM-TRANS-AIS with REGEN group. Must be DWDM-TRANS-AIS. Requires the DWRAP and FEC disabled on the network/OCH ports.
	OC3, OC12, OC48	DWDM-LINE, DWDM-SECTION, DWDM-TRANS-AIS
TXP-MR-10E	OC192	DWDM-LINE, DWDM-SECTION, DWDM-TRANS-AIS, DWDM-TRANS-SSQUELCH
	10GIGE, 10GFC	DWDM-TRANS-AIS, DWDM-TRANS-SQUELCH, With REGEN group it must be DWDM-TRANS-AIS, DWDM-TRANS-SQUELCH
MXP-2.5G-10E	OC48	DWDM-SECTION, DWDM-TRANS-AIS, DWDM-TRANS-SQUELCH
MXP-MR-2.5G AND MXPP-MR-2.5G	Port-1: 1GFC, 1GFICON, GIGE Port-2: 1GFC, 2GFC, 1GFICON, 2GFICON, GIGE[1]	FCGE[2]

1. If 2GFC or 2GFICON is on Port-2, then Port-1 must be unprovisioned. If Port-1 is provisioned then Port-2 cannot contain 2GFC or 2GFICON because of bandwidth limitations. Ports 3 through 8 are not available. ESCON payload is not supported.
2. ESCON and mixed card modes are not supported.

The configuration parameters for OCn ports can be retrieved/edited using the ED-<OCN_TYPE> and RTRV-<OCN_TYPE> commands. The following is a list of restrictions when using the ED/RTRV-<OCN_TYPE> command parameters:

- DCC/LDCC parameters are used to enable/disable SDCC/LDCC functionality respectively.

- Synchronization parameters are applicable only to cards supporting synchronization: MXP-2.5G-10G, TXP-MR-10E, and MXP-2.5G-10E. Only SYNMSG and SENDDUS parameters are supported.
- Signal fail/signal degrade can be provisioned using SDBER and SFBER parameters respectively.
- Soak time and administrative/service state parameters can be provisioned using, SOAK, SOAKLEFT, PST, SST and CMDMDE parameters.
- The SONET/SDH selection can be provisioned using the MODE parameter.
- The name of the facility can be provisioned using the NAME parameter.
- The J0 section parameters can be provisioned using the EXPTRC, TRC, INCTRC, TRCMODE and TRCFORMAT parameters.

1.6.4 Termination Mode Provisioning Rules

1. This is a card-level operation.
2. Only applicable to payload types: OC3/12/48/192/STM1/4/16/64.
3. Changing termination mode requires:
   a. All ports must be in OOS state because this change is traffic-affecting.
   b. All ports must not have DCC termination (GCC is not applicable).
   c. The Section Trace Mode on all ports must be OFF>
   d. The trunk port must not be part of any timing source.
   e. If any port is Y Cable protected, rules a. to d. are applied to the peer's slot.
4. Section and line termination mode is supported for the following payloads: OC3/12/48/192/STM1/4/16/64.
5. You cannot change the termination mode if the port is part of a Y Cable protection or regeneration group.
6. Termination mode provisioning does not apply to the MXP_MR_2.5G and MXPP_MR_2.5G cards.

TL1 commands to provision are:

- ENT/ED-EQPT

  Examples of setting termination mode:

  ED-EQPT::SLOT-1:116:::CARDMODE=DWDM-LINE;

1.6.5 Wavelength Provisioning Rules

1. Changing trunk wavelength requires:
   a. All trunk ports must be in OOS state because this change is traffic-affecting.
2. Setting the wavelength to the first tunable wavelength will cause the first wavelength from the card manufacturing data to be used as the operational wavelength.
3. If the provisioned wavelength is set to the first tunable wavelength, any removal of an operational card and subsequent replacement with a card for a different wavelength will not cause a mismatch alarm to be raised.

4. In order to receive the mismatch alarm notification you need to explicitly provision the wavelength and not use the first tunable wavelength.

TL1 commands to provision are:

- ENT/ED-EQPT

  Example of setting card-level wavelength:

  ED-EQPT:VA454-22:SLOT-1:116:::PWL=1530.33;

1.6.6 Regeneration Group Provisioning Rules

1. The protect and unprotected version of the Transponder card can be used in a regeneration group.
2. When the protect version of the Transponder card is used as a regeneration group, the LOCKOUT_OF_PROTECTION, inhibit switching command will be issued on the working trunk port.
3. You cannot unlock the inhibit switching command until the regeneration group is unprovisioned for the protect Transponder.
4. Regeneration group provisioning will be denied if there is a FORCE or MANUAL switching command already provisioned on the trunk ports for the protect Transponder.
5. A regeneration group enables the continuation of the client signal across multiple spans.
6. Provisioning a regeneration group requires:
   a. Peer-slot must not be itself.
   b. Peer-slot must at least be preprovisioned.
   c. Peer-slot must not be part of another regeneration group.
   d. Peer-slot must not be part of a Y Cable protection group.
   e. Same card type.
   f. Same payload type and data rate.
   g. Same G.709 OTN status.
   h. Same FEC status.
   i. Termination mode has to be set to transparent (AIS or SQUELCH) mode.

TL1 commands to provision are:

- ED/ENT-EQPT

  Example of setting card-level regeneration group:

  ED-EQPT::SLOT-2:CTAG:::PROTID=SLOT-2,NAME=REGENGROUPNAME;

1.6.7 DCC/GCC Provisioning Rules

1. The DCC can be provisioned on the client port of a Transponder and Muxponder card.
2. All 2R payload types do not support GCC.
3. Provisioning a DCC requires:
   a. Payload data type is set to OC3/12/48/192/STM1/4/16/64.

   b. Termination mode is set to line/section terminated if the card supports provisionable termination mode.

4. The DCC can be provisioned on the trunk line provided that G.709 is provisionable and G.709 OTN status is turned off:
   a. To provision a GCC on the trunk port the G.709 should be enabled.
   b. To provision a DCC on the trunk port the G.709 should be disabled.
5. Only the working client port in a Y Cable protection scheme is allowed to be provisioned with DCC.
6. Only the working trunk port in a splitter protection scheme can be provisioned with DCC or GCC.

The TL1 commands to provision are:

- ED-(OCn, nGIGE, nGFC)

  Example of provisioning DCC/GCC:

  ED-OC192::FAC-1-1-1:100:::COMM=DCC:OOS,AINS;
- ED-OCH

  Example of provisioning DCC/GCC:

  ED-OCH::CHAN-6-2:114::COMM=GCC:OOS,AINS;

1.6.8 G.709 OTN, FEC and OTN SDBER/SFBER Provisioning Rules

1. The G.709 OTN, FEC and OTN SDBER/SFBER can only be provisioned on the trunk port.
2. All 2R (transparent) payload types (HDTV, passthrough) do not support G.709 OTN or FEC.
3. To enable the G.709 OTN status:
   a. All trunk ports must be in OOS state.
   b. All trunk ports must not have any SDCC provisioned.
4. In order to disable G.709:
   a. All trunk ports must be in OOS state.
   b. All trunk ports must not have any GCC or active trail trace identification (TTI) mode provisioned.
5. FEC status can be enabled only if G.709 is enabled.
6. To change FEC status, it requires:
   a. All trunk ports must be in OOS state.
7. Only G.709 OTN, FEC status, SDBER/SFBER setting on the working trunk port can be changed in the protected version of the Transponder. The value provisioned on the working trunk port will be reflected on the protect trunk port.
8. G.709 OTN Pane is only provisionable in non-2R (or unframed) payload type.
9. when G.709 is turned on OTN SFBER value is always set to 1E-5 and no other BER values are provisionable.

The TL1 commands to provision are:

- ED-OCH

  Example of provisioning G.709, FEC and OTN SDBER/SFBER:

  ED-OCH::CHAN-6-2:114:::OSDBER=1E-6,DWRAP=Y,FEC=Y,:OOS,AINS;

1.6.9 Synchronization Provisioning Rules

1. The Transponder is through-timed (passthrough) and:
   a. Cannot be used for a timing source (TXP_MR_10G, TXP_MR_2.5G and TXPP_MR_2.5G).
   b. TXP_MR_10E can be used as a time reference (only the client port, not the trunk port).
   c. MXP_MR_2.5G and MXPP_MR_2.5G card trunk ports can be used as a timing source.
2. Only Muxponder ports can be used for a timing source. Trunk port is only allowed as a timing reference if G.709 is off and the termination mode is line or section.
3. For Muxponder cards, all client ports are available for timing source irrespective of termination mode.

The TL1 commands to provision are:

- ENT/ED-OCn

  Example of setting port-level synchronization attributes:

  ED-OC48::FAC-1-1-1:CTAG:::SYNCMSG=Y,SENDDUS=N:;
- ED-OCH

  Example of setting port-level synchronization attributes:

  ED-OCH::CHAN-6-2:114:::SYNCMSG=N,SENDDUS=Y;:

1.6.10 Section Trace Provisioning (J0) Rules

1. The client and trunk ports only support the section trace if the payload is OC3/12/48/192/STM1/4/16/64.
2. The client and the trunk ports support the section trace only in line/section terminated mode.
3. In line termination mode the supported trace modes are:
   a. MANUAL and MANUAL_NO_AIS trace modes.
4. in section termination mode the supported trace mode is only:
   a. MANUAL_NO_AIS trace mode.
5. The section trace supports 1 or 16 bytes length trace format.
6. The trace mode of AUTO and AUTO-NO-AIS are not supported.
7. No trace is applicable for 2R (unframed) payload types, for example, DV-6000, HDTV, and ESCON.
8. The section trace received string should be displayed when the card is in transparent-AIS or TRANSPARENT-SQUELCH termination mode and the payload is OC3/12/48/192/STM1/4/16/64..
9. When the client port is configured in a Y Cable protection group the received string is always retrieved from the active client port.
10. If the line is Y Cable protected trace can only be provisioned on the working port, however the provisioning will be duplicated between the two ports. Both ports will contain the same values. This rule applies to the following parameters: Mode, Format, Send String and Expected String.
11. The MXP_2.5G_10E card is used for client test connection on client ports. For the trunk port the TTI is used.
12. The TXP_MR_10E card is used to test connections on client trunk ports.

13. On MXP_MR_2.5G/MXPP_MR_2.5G the trunk port section trace may be provisioned following the rules for line terminated SONET.

The TL1 commands to provision are:

- ED-OCn for trace provisioning of client ports provisioned for OCn payload.

  Example of provisioning port-level trace:

  ED-OC48::FAC-6-1-1:10:::EXPTRC="AAA",TRC="AAA",TRCMODE=MAN, TRCFORMAT=16-BYTE;

- ED-TRC-OCH for trace provisioning of trunk/OCH DWDM ports.

  Example of provisioning port-level trace:

  ED-TRC-OCH::CHAN-6-2:10:::EXPTRC="AAA",TRC="AAA",TRCMODE=MAN, TRCLEVEL-J0,TRCFORMAT=64-BYTE;

1.6.11 Trail Trace Identification Provisioning Rules

1. For the TXPP_MR_2.5G card, TTI can be provisioned on both the working trunk ports only, however the provisioning will be duplicated between the two ports. Both ports will contain the same values. This rule applies to the following parameters: Mode, Format, Send String and Expected String.
2. The TTI level trace supports only 64-byte length trace format.
3. The TTI level trace supports only the MANUAL and MANUAL_NO_AIS trace modes.
4. The TTI received string is always retrieved from the active trunk port.
5. The TTI level trace can be provisioned for the section and path monitoring.
6. MXP_MR_2.5G and MXPP_MR_2.5G cards do not support TTI.

The TL1 commands to provision are:

- ED-TRC-OCH

  Example of provisioning port-level trace:

  ED-TRC-OCH::CHAN-6-2:10:::EXPTRC="AAA",TRC="AAA",TRCMODE=MAN, TRCLEVEL=TTI-PM,TRCFORMAT=64-BYTE;

1.6.12 PM and Alarm Threshold Provisioning Rules

1. When framing type is unframed, for example, HDTV, DV6000:
   a. Only optics threshold provisioning and PM are applicable.
   b. Depending on ESCON SFP type, optics threshold provisioning and PM are or are not supported.
2. Optics PM supports only Near End, 15MIN and 1DAY interval buckets.
3. When framing type is FIBRE CHANNEL and ETHERNET (for example,1GFC, 1G Ethernet):
   a. Only 8B10B threshold provisioning and PM are available. (Applicable only to TXP_MR_2.5G/TXPP_MR_2.5G and MXP_2.5G_10G/TXP_MR_10G cards).
   b. 2G Fibre Channel does not support 8B10B threshold provisioning and PM.
4. 8B10B applies to both Tx and Rx directions. (Applicable only to TXP_MR_2.5G/TXPP_MR_2.5G and MXP_2.5G_10G/TXP_MR_10G cards).

5. 8B10B PM supports only Near End, 15MIN and 1DAY interval buckets.
6. 8B10B layer is not used for MXP_2.5G_10E and TXP_MR_10E cards.
7. When framing type is SONET/SDH:
   a. All monitored PM parameter terminology will follow the current chassis type.
8. The OTN thresholds are only applicable if G.709 OTN status is enabled.
9. The FEC thresholds are only applicable if the G.709 and FEC are enabled.
10. If the line is configured in a Y Cable or splitter protection group, only the working line thresholds can be provisioned. The working line thresholds will be reflected on the protect line thresholds. This rule applies for all threshold types including G.709 OTN and FEC thresholds.
11. Payload PM can be independently retrieved for both the working and protect port.

The TL1 commands to provision are:

- SET-TH-(OCn, nGIGE, nGFC, OCH)

  Examples of port-level threshold setting:

  SET-TH-OC48::FAC-1-1-1:123::CVL,12,NEND,,15-MIN;

  SET-TH-OCH::CHAN-6-1:123::ES-PM,12,NEND,,15-MIN;
- RTRV-PM-(OCn, nGIGE, nGFC, OCH)

  Examples of port-level threshold setting:

  RTRV-PM-OC48::FAC-1-1-1:123::CVL,10-UP,NEND,BTH,15-MIN,04-11,12-45;

  RTRV-PM-OCH::CHAN-6-1:123::ES-PM,10-UP,NEND, BTH,15-MIN,04-11,12-45:

1.6.13 Y Cable Protection Group Provisioning Rules

1. A Y cable protection group can be created between the client ports of two unprotected Transponders only.
2. While in Y cable protection a transponder cannot be part of a regeneration group.
3. Only the working client port can be provisioned with SDCC.
4. Y Cable cannot be provisioned for a protect version of the TXP_MR_2.5G card.
5. Only with the working ports (not the protect) can be provisioned with DCC and timing reference.

The TL1 commands to provision are:

- ENT/DLT/ED-FFP-(OCn, nGIGE, nGFC)

  Examples of Y Cable provisioning:

  ENT-FFP-OC48::FAC-1-1-1,FAC-2-1-1:100:::PROTTYPE=Y-CABLE,
  PROTID=DC-METRO-1,RVRTV=Y,RVTM=1.0,PSDIRN=BI:

  ENT-FFP-10GIGE::FAC-1-1-1,FAC-2-1-1:100:::PROTTYPE=Y-CABLE,
  PROTID=DC-METRO-2,RVRTV=Y,RVTM-1.0,PSDIRN=BI;

1.6.14 Splitter Protection Group Provisioning Rules

Note Splitter protection group provisioning rules apply only to the protect version of the Transponder card.

1. Splitter protection group cannot be created or deleted.
2. Splitter protection group is created automatically when a protect Transponder card is provisioned.
3. The only editable attributes are: Revertive, Revertivetime and Transponder mode.

The TL1 commands to provision are:

- ED-FFP-OCH

  Example of editing splitter protection group attributes:

  ED-FFP-OCH::CHAN-2-1:100:::PROTID=DC-METRO3,RVRTV=Y,
  RVTM=5.0,PSDIRN=BI;

1.6.15 Loopback Provisioning Rules

1. Loopback can be provisioned on the client and trunk ports.
2. Both terminal and facility loopback types can be provisioned.
3. Loopback is not applicable when framing type is UNFRAMED (HDTV, DV6000).
4. For the protect transponder the following loopback rules apply to the trunk ports:
   a. Only one loopback is allowed to be provisioned at the trunk ports at any given time.
   b. Loopback is allowed if the sibling trunk port is OOS-MT.
   c. Provisioning a loopback on a trunk port will trigger the Inhibit Switching Command LOCKOUT_OF_PROTECTION or LOCKOUT_OF_WORKING depending on whether the working or the protect is placed in a loopback.
   d. Once a loopback is provisioned on a trunk port, both the trunk ports will transmit the signal of the loopback port.
   e. A loopback will be denied if there is a FORCE or MANUAL switching command in place on the trunk ports.
   f. You cannot remove the Inhibit Switching command issued as a result of the loopback. This Inhibit Switching command will be removed only when the loopback is removed.

The TL1 commands to provision are:

- ED-FFP-OCH

  Example of editing splitter protection group attributes:

  ED-FFP-OCH::CHAN-2-1:100:::PROTID=DC-METRO3,RVRTV=Y,
  RVTM=5.0,PSDIRN=BI;

1.6.16 Automatic Laser Shutdown Provisioning Rules

1. ALS can be provisioned on the client and trunk ports.
2. If the trunk port is configured in a splitter protection group only the working trunk can be provisioned for ALS. However, provisioning on the working trunk port will be reflected on the protect port.
3. For the protected Transponder, ALS mode will only take effect when both ports receive LOS.

The TL1 commands to provision are:

- ED-ALS

  Example of editing ALS attributes:

  ED-ALS::FAC-1-1-1:100:::ALSMODE=Y,ALSRCINT=130,ALSRCPW=35.1,RLASER=Y;

- ED-ALS- (OCn, nGIGE, nGFC, OTS, OMS, OCH)

  Example of editing ALS attributes:

  ED-ALS-OC192::FAC-1-1-1:100:::ALSMODE=Y,ALSRCINT=130,
  ALSRCPW=35.1,RLASER=Y:

1.6.17 Port State Model Provisioning Rules

1. The Enhanced state model port state of primary state=OOS and secondary state=AINS is not supported for the 1GigE/2GigE payload type.
2. The working and protect port can be put in IS/OOS independently.
3. For the protect Transponder card:
   a. Setting the protect trunk port to OOS will enable the suppression of alarms on that port and will enable the card to be used like an unprotected card but the card still cannot be used for a Y cable protection group.
   b. Setting the protect trunk port to OOS will not switch off the transmit laser unless both trunk ports are OOS.
   c. The protect trunk port cannot be IS if there is a loopback or a regeneration group provisioned.

The TL1 commands to provision are:

- ED-(OCn, nGIGE, nGFC, OCH)

  Example of editing Port State:

  ED-OC48::FAC-6-1-1:114::::OOS,AINS;

  ED-10GIGE::FAC-6-1:114::::OOS,AINS;

  ED-OCH::CHAN-6-1:114::::IS;

1.6.18 SONET-Related Provisioning Rules

1. The SD/SFBER can only be provisioned on the working trunk port (OCH) for the protect Transponder card. Values set at the working port will be reflected on the trunk port.

The TL1 commands to provision are:

- ED-OCH

  Example of editing trunk port attributes:

  ED-OCH::CHAN-6-2:114:::RDIRN=W-E,EXPWLEN=1530.32,VOAATTN=2.5, VOAPWR=7.5,CALOPWR=0,CHPOWER=2.0,NAME="NYLINE",SFBER=1E-5, SDBER=1E-6,ALSMODE=MAN,ALSRCINT=60,ALSRCPW=35.1,COMM=DCC, GCCRATE=192K,OSDBER=1E-6,DWRAP=Y,FEC=Y, MACADDR=OO-OE-AA-BB-CC-DD,SYNCMSG=N,SENDDUS=Y, RLASER=Y,SOAK=10,OSPF=Y:OOS,AINS;

1.6.19 Overhead Circuit Provisioning Rules

1. LOW/EOW is possible between the AIC-I, OCn and TXP/TXPP cards in any combination in line-terminated mode.
2. F1/D4-D12 UDC:
   a. Not possible between TXP/TXPP and AIC-I cards in line-terminated mode.
   b. Not possible between TXP/TXPP and OCn cards in line-terminated mode.
   c. Possible between OCn ports.
3. All OH bytes are passed across client and DWDM ports in transparent mode.
4. SDCC/LDCC tunneling is not possible in line-terminated mode.
5. No end-to-end OH circuit provisioning. In R5.0 you can stitch them at each node.
6. For MXP_MR_2.5G and MXPP_MR_2.5G cards these rules apply to the trunk port only.

1.6.20 Hardware Limitation Rules

1. ESCON SFP does not support any monitoring.
2. Optics thresholds and PM are not shown on client ports.
3. HI/LO-TXPOWER is not supported for TXP_MR_2.5G and TXPP_MR_2.5G Cards.

1.7 Mixed Mode Timing Support

Although TL1 supports mixed mode timing, Cisco strongly advises against its implementation. Mixed mode timing is not a recommended timing mode because of the inherent risk of creating timing loops. Refer to Telcordia document GR-436-CORE, *Digital Network Synchronization Plan* for recommended synchronization planning. Refer to the platform-specific Cisco ONS Procedure Guide for information about setting up timing. For further assistance contact the Cisco Technical Assistance Center (TAC) at www.cisco.com or call (800) 553-2447 for unresolved problems.

1.8 TL1 Command Completion Behavior

When you enter a TL1 command, one of three completion codes will be returned. The completion codes are: completed (COMPLD), partial (PRTL), and deny (DENY). You can specify an explicit, implicit, or explicit with implicit list as explained in the following sections.

1.8.1 General Rules

Note The command completion behavior does not apply to RTRV-CRS, RTRV-ALM, and RTVR-COND commands.

1.8.1.1 Explicit List of AIDs - No Wildcards

If a set of AIDs is explicitly listed, including a set of just one AID, then each AID must complete successfully to return a COMPLD message. If more than one AID is in the set and at least one AID succeeds but all do not, then a PRTL with errors for each failed AID is returned. If all AIDs in the set fail, a DENY with errors for each failed AID is returned.

SLOT-1
FAC-2-1&FAC-3-3&FAC-4-2

1.8.1.2 Implicit List of AIDs - Single AID With Wildcard

If a set of AIDs is implied by the use of the ALL modifier on a single AID, then follow the same rules as in the "1.8.1.1 Explicit List of AIDs - No Wildcards" section on page 1-22. The caveat is that the implicit list only includes AIDs that apply to the command:

SLOT-ALL
FAC-1-ALL
STS-3-ALL

where Slot 3 contains an OC-12 and the command is ED-STS1 but STS-3-4 and STS-3-7 are STS3C. The set implied by STS-3-ALL then only contains STS-3-{1,2,3,10,11,12} and will not return an error for STS-3-{4,5,6,7,8,9}. Disregard the STS3C in this case because the modifier of the command specifies that the user is only interested in STS-1 paths. The rule specified in this section then applies to the implicit set of {1,2,3,10,11,12}.

1.8.1.3 Explicit List Grouped With Implicit List

If the set of AIDs is comprised of two subsets, one set including explicitly stated AIDs and the other set implied by one or more AID(s) with the ALL modifier, then follow the rules of the"1.8.1.1 Explicit List of AIDs - No Wildcards" section on page 1-22 and the "1.8.1.2 Implicit List of AIDs - Single AID With Wildcard" section on page 1-22, respectively.

FAC-1-1&FAC-2-ALL
FAC-3-ALL&FAC-7-ALL
STS-2-ALL&STS-12-1&STS-13-2&STS-14-ALL

1.8.2 Command Completion Behavior for Retrieval of Cross-Connections

When you enter a RTRV-CRS command, one of three completion codes will be returned. The completion codes are: completed (COMPLD), partial (PRTL), and deny (DENY). You can specify an explicit, implicit, or explicit with implicit list as explained in the following sections.

1.8.2.1 Explicit List of AIDs - No Wildcards

For an explicit list of AIDs on a RTRV-CRS command, an error code will be returned for each AID that fails validation (e.g. the user specifies STS-N-13 when SLOT-N only contains an OC-12) or for each AID where no matching cross-connection is found. To determine the completion code, follow the rules from the "1.8.1.1 Explicit List of AIDs - No Wildcards" section on page 1-22. If the result is either PRTL or COMPLD, then a list of matching cross-connections will accompany the response.

1.8.2.2 Implicit List of AIDs - Single AID With Wildcard

If a set of AIDs is implied by the use of the ALL modifier on a single AID, then follow the same AID expansion rule as defined in the example from the "1.8.1.2 Implicit List of AIDs - Single AID With Wildcard" section on page 1-22. Then apply the following rules to the set:

1. If all valid AIDs match, COMPLD is returned with a matching list of cross-connections.
2. If some valid AIDs match but not all, COMPLD is returned with a matching list of cross-connections.
3. If all valid AIDs fail to match, DENY is returned.

RTRV-CRS-STS1:[<TID>]:STS-9-ALL:<CTAG>; where STS-9-ALL maps to STS-9-{1,2,3,10,11,12} because there is a single-port OC-12 card in Slot 3 with STS-3C defined for STS-9-4 and STS-9-7. You then traverse the set and return only the STS1 cross-connections that exist using end points in that set. If no cross-connections are retrieved, COMPLD is returned.

1.8.2.3 Explicit List Grouped With Implicit List

When you have determined the implicit list, apply the rules from the "1.8.2.2 Implicit List of AIDs - Single AID With Wildcard" section on page 1-23 to the implicit list and the rules from the "1.8.2.1 Explicit List of AIDs - No Wildcards" section on page 1-23 to the explicit list. Apply the following logic to the results from the two subsets:

1. Explicit list returns COMPLD, implicit list returns COMPLD, return COMPLD plus matching list
2. Explicit list returns COMPLD, implicit list returns DENY, return PRTLwith errors plus matching list
3. Explicit list returns PRTL, implicit list returns COMPLD, return PRTL with errors plus matching lists
4. Explicit list returns PRTL, implicit list returns DENY, return PRTL with errors plus matching list
5. Explicit list returns DENY, implicit list returns COMPLD, return PRTL with errors plus matching list
6. Explicit list returns DENY, implicit list returns DENY, return DENY with errors

1.9 Test Access

Note Test access applies to the ONS 15454, ONS 15327 and ONS 15600. Test access does not apply to the ONS 15310-CL.

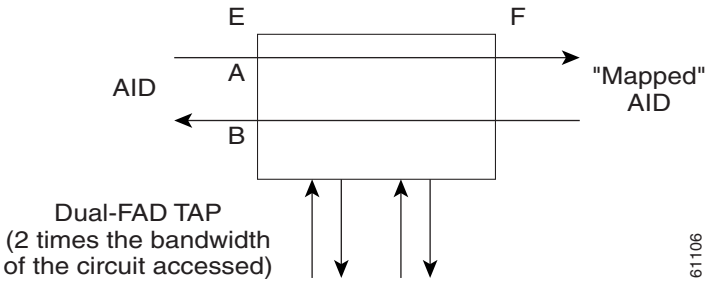
The test access (TACC) feature allows a third-party Broadband Remote Test Unit (BRTU) to create non-intrusive test access points (TAPs) to monitor the circuits on the ONS 15454, ONS 15327 and ONS 15600 for errors. The test access feature also allows the circuit to be split (intrusive), so that the transmission paths can be tested for bit errors via the use of various bit test patterns. The two BRTUs supported by the ONS 15454, ONS 15327 and ONS 15600 are the Hekimian/Spirent BRTU-93 (6750) and the TTC/Acterna Centest 650.

The test access functionality provides TL1 commands for creating and deleting TAPs, connecting or disconnecting TAPs to circuit cross-connects and changing the mode of test access on the ONS 15454, ONS 15327 and ONS 15600. You can view test access information in CTC; in node view click the **Maintenance > Test Access** tabs.

Refer to Telcordia document GR-834-CORE, *Network Maintenance: Access and Testing* and GR-1402-CORE, *Network Maintenance: Access Testing - DS3 HCDS TSC/RTU and DTAU Functional Requirements* for more information about Test Access. See Chapter 3, "TL1 Command Descriptions" for TL1 command information.

A TAP provides the capability of connecting the circuit under test to a BRTU. This connection initially provides in-service monitoring capability to permit the tester to determine that the circuit under test is idle. The monitor connection should not disturb the circuit under test. The access point and remote test unit (RTU) also provide the capability of splitting a circuit under test. A split consists of breaking the transmission path of the circuit under test. This is done out of service. The two sides of the access point are called the Equipment (E) and Facility (F) directions. For a 4-wire or 6-wire circuit, the transmission pairs within the access point are defined as the A and B pairs. The circuit under test should be wired into the access point so the direction of transmission on the A pair is from E to F, and the transmission direction for the B pair is from F to E (Figure 1-2).

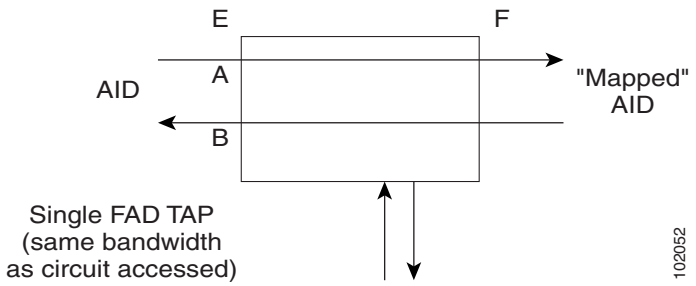
Figure 1-2 Circuit With No Access Dual FAD TAP



A dual FAD (facility access digroup) TAP uses twice the bandwidth of the circuit under test. This can be specified by the TAPTYPE parameter as shown in ED-<MOD2> command syntax in the "1.9.2 TAP Creation and Deletion" section on page 1-26. The values are SINGLE/DUAL. It defaults to DUAL.

A single FAD TAP uses half the bandwidth as that of the dual FAD i.e., it will use the same bandwidth as the circuit accessed for the TAP creation. This can be specified by the TAPTYPE parameter as shown in the "1.9.2 TAP Creation and Deletion" section on page 1-26. The values are SINGLE/DUAL. The MONEF, SPLTEF, LOOPEF modes are not supported by Single FAD TAPs (Figure 1-3).

Figure 1-3 Circuit With No Access Single FAD TAP



1.9.1 Test Access Terminology

BRTU—Broadband remote test unit

DFAD—Dual facility access digroup

FAD—Facility access digroup

FAP—Facility access path

LOOPE—Split/loop access on A and B paths equipment side

LOOPF—Split/loop access on A and B paths facility side

MONE—Monitor access with signal detector on A path

MONF—Monitor access with signal detector on B path

MONEF—Monitor access with signal detector on A and B paths

QRS—Quasi-random signal (bit test pattern)

SPLTA—Split access on A path with signal detector from equipment, QRS on facility side

SPLTB—Split access on B path with signal detector from equipment, QRS on equipment side

SPLTE—Split access on A and B paths with signal detector from equipment, QRS on equipment side

SPLTF—Split access on A and B paths with signal detector from equipment, QRS on facility side

SPLTEF—Split access on A and B paths for testing in both equipment and facility directions

TACC—Test access

TAP—Test access path/point

Path Naming Conventions:

E—Equipment test access point direction

F—Facility test access point direction

A—Transmission path (the direction of transmission on the A pair is from E to F)

B—Transmission path (the transmission direction for the B pair is from F to E)

1.9.2 TAP Creation and Deletion

TL1 supports commands to create, delete, connect, change, retrieve, and disconnect TAPs.

1.9.2.1 ED-<rr>

The edit command (ED-<rr>) is used to change an existing port, STS, or VT to a TAP.

Input Format:

ED- (T1, T3, STS1, STS3c, STS6c, STS9c, STS12c, STS24c, STS48c, VT1, DS1):[<TID>]:<AID>:<CTAG>[:::TACC=<TACC>][TAPTYPE=<TAPTYPE>];

Edit an existing port, STS, or VT and change it to a TAP so it can be used when requesting TACC connections. Includes a new optical parameter TACC=n that defines the port, STS, or VT as a TAP with a selected unique TAP number. This TAP number will be used when requesting test access connections to circuit cross-connections under test. The TAP creation will fail if there is a cross-connection already on the port, STS, or VT.

Notes:

1. This command generates a REPT DBCHG message.
2. The alarms and conditions on test access paths can be retrieved by the RTRV-ALM-ALL or RTRV-ALM-<MOD2> commands
3. The TAP is a persistent object. It will exist after the user has logged out of the TL1 session.

The following list applies to TAP numbers:

1. The TAP number is an integer within the range of 1–999. When TACC=0 is specified, the TAP is deleted (if already present).
2. The TAP number is unique across T1/T3/STS/VT/DS1 TAPs in the system.
3. The TAP number is not editable.

1.9.2.2 ED-T1

When the ED-T1 command is issued with a specified TACC value for a given T1 port/facility, a dual facility access group (DFAD) is created by using the specified port/facility and the consecutive port/facility.

The command in example Example 1-1 creates a DFAD on FAC-1-1 and FAC-1-2.

Example 1-1 ED-T1::FAC-1-1:12:::TACC=1;

```
   DV9-99 1970-01-02 03:16:11
M 12 COMPLD
;
```

Note These ports/facilities cannot be used for the creation of cross-connects until the TAP is deleted.

1.9.2.3 ED-T3

When the ED-T3 command is issued with a specified TACC value for a given T3 port/facility, a DFAD is created by using the specified port/facility and the consecutive port/facility.

The command in Example 1-2 creates a T3 DFAD on FAC-2-1 and FAC-2-2.

Example 1-2 ED-T3::FAC-2-1:12:::TACC=2;

```
   DV9-99 1970-01-02 03:16:11
M 12 COMPLD
;
```

Note These ports/facilities cannot be used for the creation of cross-connects until the TAP is deleted.

1.9.2.4 ED-DS1

When the ED-DS1 command is issued with a specified TACC value for a given DS1 facility on a DS3XM, a DFAD is created by using the specified facility and the consecutive port/facility.

The command in Example 1-3 creates DFAD on DS1-2-1-1 and DS1-2-1-2.

Example 1-3 ED-DS1::DS1-2-1-1:12:::TACC=3;

```
   DV9-99 1970-01-02 03:16:11
M 12 COMPLD
;
```

Note These ports/facilities cannot be used for the creation of cross-connects until the TAP is deleted.

1.9.2.5 ED-STSn

When the ED-STSn command is issued for a TACC it assigns the STS for the first two-way test access connection and STS+1 as the second 2-way connection. For STS3c, STS9c, STS12c, STS24c, and STS48c the next consecutive STS of same width is chosen. The TAP creation will fail if either of the consecutive STSs are not available.

The command in Example 1-4 creates a TAP on STS-5-1 and STS-5-2.

Example 1-4 ED-STS1::STS-5-1:12:::TACCC=4

```
   DV9-99 1970-01-02 03:16:11
M 12 COMPLD
;
```

Note These STSs cannot be used for the creation of cross-connects until the TAP is deleted.

The command in Example 1-5 creates an STS24C dual TAP on STS-6-1 and STS-6-25.

Example 1-5 ED-STS24C::STS-6-1:12:::TACC=5:

```
   DV9-99 1970-01-02 03:16:11
M 12 COMPLD
;
```

Note These STSs cannot be used for the creation of cross-connects until the TAP is deleted.

1.9.2.6 ED-VT1

When the ED-VT1 command is issued for a TACC, a VT TAP is created. The specified VT AID is taken as the first VT connection, the second VT connection is made by incrementing the VT group and keeping the VT number the same.

The command in Example 1-6 creates a VT TAP on VT1-1-1-1-1 and VT1-1-1-2-1.

Example 1-6 ED-VT1-1-1-1-1:12:::TACC=6;

```
   DV9-99 1970-01-02 03:16:11
M 12 COMPLD
;
```

Note These VTs cannot be used for the creation of cross-connects until the TAP is deleted.

1.9.3 Connect Test Access Points

The CONN-TACC command (CONN-TACC-<rr>) is used to make a connection between the TAP and the circuit or cross-connect under test.

Input Format: CONN-TACC-(T1, T3, STS1, STS3C, STS6C, STS9C, STS12C, STS24C, STS48C, VT1, DS1):[<TID>]:<AID>:<CTAG>::<TAP>:MD=<MD>;

Connect the port/STS/VT defined by <AID> to the port/STS/VT defined by the <TAP> number. The mode of test access to the circuit/cross-connect is specified by <MD>. The modes can be either of monitor (non-intrusive), split or loop (intrusive) modes. The various modes are described in the "1.9.9 Test Access Mode Definitions" section on page 1-33.

Note The connection is maintained only for the duration of the TL1 session (non-persistent).

Note The TAP number is displayed at the output if the CONN-TACC command completes successfully.

Error Codes Supported:

RTBY—Requested TAP busy

RTEN—Requested TAP does not exist

SCAT—Circuit is already connected to another TAP

SRCN—Requested condition already exists

IIAC—Invalid access identifier (AID)

EANS—Access not supported

SRAC—Requested access configuration is invalid

The command in Example 1-7 creates a connection between TAP with number one and the port/facility FAC-1-3 with access mode as MONE. The various modes are described in the "1.9.9 Test Access Mode Definitions" section on page 1-33.

Example 1-7 CONN-TACC-T1::FAC-1-3:12::1:MD=MONE;

```
   DV9-99 1970-01-02 02:51:54
M 12 COMPLD
   1
;
```

1.9.4 Change Access Mode

The CHG-ACCMD command (CHG-ACCMD-<rr>) is used to change the access mode.

Input Format: CHG-ACCMD-(T1, T3, STS1, STS3C, STS6C, STS9C, STS12C, STS24C, STS48C, VT1, DS1):[<TID>]:<TAP>:<CTAG>::<MD>;

Change the type of test access. This may be a change from monitoring the data to inserting data into the STS. This command can only be applied to an existing TAP connection. If a TAP connection does not exist, a RTEN error is returned.

Error codes supported:

SRCN—Requested condition already exists

SRAC—Requested access configuration is invalid

RTEN—Requested TAP does not exist

The command in Example 1-8 changes the access mode of TAP 1 to LOOPE.

Example 1-8 CHG-ACCMD-T1::1:12::LOOPE;

```
   DV9-9 1970-01-02 02:59:43
M 12 COMPLD
;
```

Note The access mode cannot be changed if the TAP is not connected.

Note This command generates a REPT DBCHG message.

1.9.5 Retrieve Test Access Point Information

1.9.5.1 RTRV-<rr>

Note A generic ALL AID would behave similarly to an ALL AID such as, SLOT-ALL or FAC-1-ALL for all the RTRV-rr commands that support a generic ALL AID.

The RTRV-<rr> command retrieves TAP information. See the "3.2.234 RTRV-TACC" section on page 3-673 for more information.

Input Format: RTRV-(T1, T3, STS1, STS3C, STS6C, STS9C, STS12C, STS24C, STS48C, VT1, DS1):[<TID>]:<AID>:<CTAG>;

This command is modified to include the return of a TAP number if the requested <AID> is defined as a TAP. An optional TACC=<TAPNUMBER> will be displayed in the output list if the requested <AID> is defined as a TAP.

Example 1-9 RTRV-T1::FAC-1-1:12;

```
   dv9-99 1970-01-02 02:49:16
M 12 COMPLD
   "FAC-1-1::LINECDE=AMI,FMT=D4,LBO=0-131,TACC=1,TAPTYPE=DUAL:OOS"
;
```

Parameter definitions:

- <TID> the node name which is optional
- <TAP> number from 1–999 identifying the TAP. Returned by the CONN-TACC command. If a TAP is 0, the TAP is deleted. <TAP> is an integer
- <CTAG> required identifier or number limited to six ASCII characters that correlates a response with a command
- <AID> can be a TL1 identifier such as STS-<slot>-<starting sts> VT-<slot>-<sts>-<group>-<vt>. For T1 and T3 the facility <AIDs> are used. See the "4.5 Access Identifiers" section on page 4-17 for a list of all AIDs
- <MD> defines the monitor or split mode: MONE, MONF, MONEF, SPLTE, SPLTF, LOOPE, LOOPF, SPLTA, SPLTB, SPLTEF (SPLTE, SPLTF, LOOPE, and LOOPF require an external QRS input signal)
- <TACC> specific block should be set to TACC=n where n is the desired TAP number. <TACC> marks the STS or VT as used for test access

1.9.5.2 RTRV-TACC

RTRV-TACC:[<TID>]:<TAP>:<CTAG>;

This command can also be used to retrieve details associated with a TAP. The TAP is identified by the TAP number. The ALL input TAP value means that the command will return all the configured TACCs in the NE.

Example 1-10 RTRV-TACC:CISCO:241:CTAG;

```
   TID-000 1998-06-20 14:30:00
M  001 COMPLD
"241:STS-2-1-1.STS-2-2,MONE,STS-12-1-1,STS-13-1-1"
;
```

Parameter Definitions:

- <TAP> the assigned number for the AID being used as a TAP. TAP is an integer.
- <TACC_AIDA> the A path of the TAP, i.e., the first STS/VT path of the TAP
- <TACC_AIDB> the B path of the TAP, i.e., the second STS/VT pat of the TAP. For a single FAD TAP this path will be empty.
- <MD> the test access mode. It identifies the mode of access between the TAP and the circuit connected to the TAP. MD is optional.
- <CrossConnectId1> the E path of the cross-connect. CrossConnectId1 is optional.
- <CrossConnectId2> the F path of the cross-connect. CrossConnectId2 is optional.

1.9.6 Disconnect Test Access Points

TAPs can be disconnected in the following ways:

- Issue the DISC-TACC command
- Delete or modify accessed connection
- Drop the TL1 session for any reason, including logout or a dropped telnet session
- Switch or reset a TCC2/TCC2P or XTC

The DISC-TACC command disconnects the <TAP> and puts the connection back to it's original state (no access). To issue the DISC-TACC command, follow the input format and examples shown below:

Input Format: DISC-TACC:[<TID>]:<TAP>:<CTAG>;

The command in Example 1-11 disconnects TAP 1 from the circuit/cross-connect under test.

Example 1-11 DISC-TACC::1:12;

```
   DV9-99 1970-01-02 02:59:43
M 12 COMPLD
;
```

Note This command generates a REPT DBCHG message.

Error codes supported:

SADC—Already disconnected

SRTN—Unable to release TAP

1.9.7 Delete Test Access Points

The command in Example 1-12 deletes a TAP.

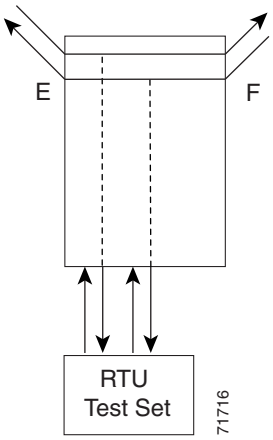
Example 1-12 ED-<STS_PATH>:[<[TID>]:<AID>:<CTAG>:::TACC=0:;

Note The TACC number must be set to zero in order to delete a TAP.

Note If a TAP is not removed the STS bandwidth will be stranded.

1.9.8 Test Access Configurations

Figure 1-4 Single Node View (Node 1)



Example 1-13 ED-STS1::STS-1-1:90:::TACC=1:;

This command changes STS1 and STS2 on Slot 1 to a TAP. The <CTAG> is 90. Sets the TAP number to 1.

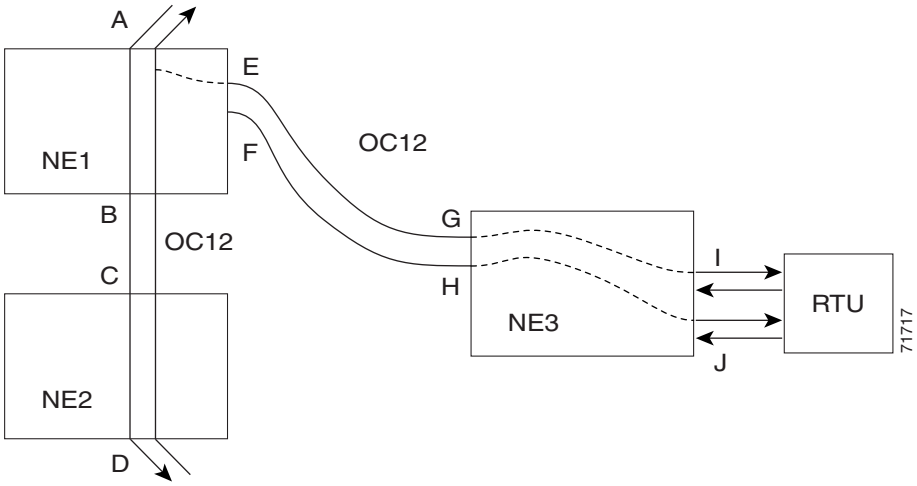
Example 1-14 CONN-TACC-STS1::<AID for E or F depending on MD>:91::TAP-1:MONE

This command connects the <AID> to the TACC defined by TAP 1 on the E side. <CTAG> is 91.

Note The connection made in the CONN-TACC command can use MONE to connect to the F side <AID>. The <AID> provided designates the E side and the other automatically becomes the F side. For example, if an <AID F> is supplied to a MONE connection the top line would be connected to the side of the path, or what is shown in the diagram as the F side. Once a CONN-TACC is set up, these designations cannot change until a DISC-TACC or another CONN-TACC command is issued. The connection is based on the <AID> supplied.

Note In the Figure 1-4 configuration there may be a single DS3 port wired-up but configured as 14 dual FADs (28 VTs).

Figure 1-5 Multi-Node View (MONE Example)



On NE3:

Example 1-15 ENT-CRS-STS1::<AID I-G>:100::2WAY; A connection, not a TAP. CTAG is 100. ENT-CRS-STS1::<AID J-H>:101::2WAY; Second connection, not a TAP.

On NE1:

Assuming the path from A to B is already entered; the A and B points in the diagram refer to entry and exit points on the node or different cards. The E/F designators refer to the two 2-way connections from NE3.

Example 1-16 ED-STS1::STS-1-1:TACC=4; Creates TAP with STS-1-1 and STS-1-2 through NE1. TAP number assigned is 4.

Example 1-17 CONN-TACC-STS1::<AID A or B>:102::4:<MD> Connects TAP 4 to the circuit.

Note The I and J connections above are TAPs in Figure 1-4, but normal connections in the Figure 1-5 configuration.

1.9.9 Test Access Mode Definitions

The following diagrams show what the different test access modes <MD> refer to. Figure 1-6 shows a circuit with no access (dual FAD TAP) and Figure 1-7 shows a circuit with no access (single FAD TAP), followed by all the modes. The QRS may be generated by an outside source, i.e. the empty connection of the BRTU.

MONE, MONF, and MONEF access modes are non-service effecting and can be applied to an IS (in service) port state.

LOOPE, LOOPF, SPLTE, SPLTF, SPLTEF, SPLTA, SPLTB, and SPLTAB access modes are intrusive and only be applied to a circuit/port that is in the OOS_MT (out of service, maintenance) port state. The NE will change the state of the circuit under test to OOS_MT during the period of TACC and restore it to the original state once the connection between the TAP and the circuit is dropped.

Figure 1-6 Circuit With No Access (Dual FAD TAP)

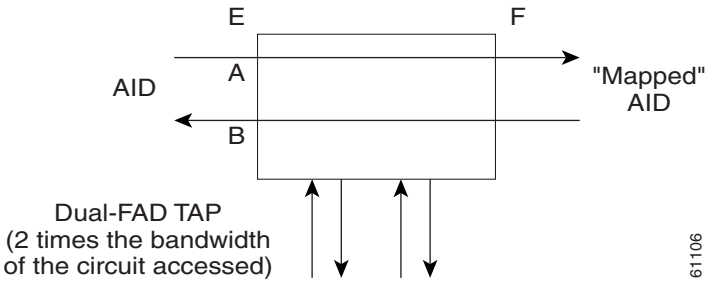
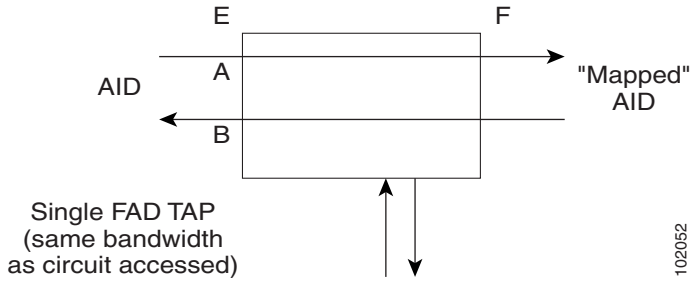


Figure 1-7 Circuit With No Access (Single FAD TAP)



1.9.9.1 MONE

Monitor E (MONE) indicates a monitor connection provided from the facility access digroup (FAD) to the A transmission path of the accessed circuit (Figure 1-8 and Figure 1-9). This is a non-intrusive mode.

Figure 1-8 MONE Access Single TAP

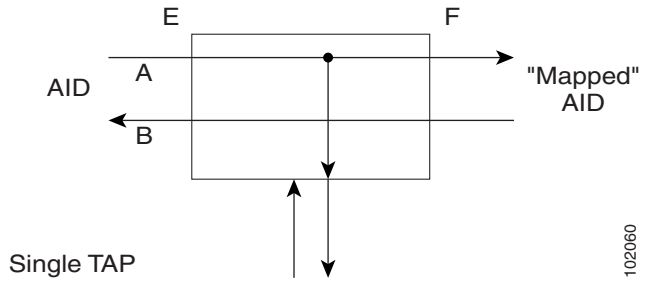
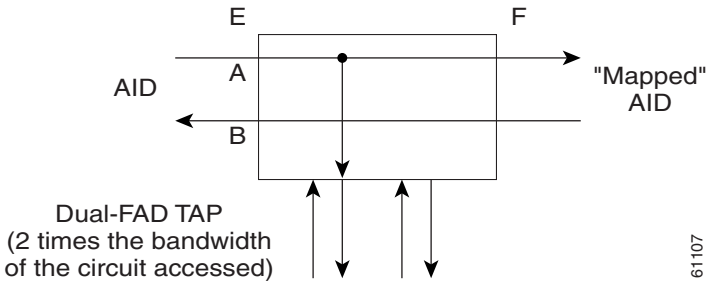


Figure 1-9 MONE Access Dual TAP



1.9.9.2 MONF

Monitor F (MONF) indicates that the FAD is providing a monitor connection to the B transmission path of the accessed circuit (Figure 1-10 and Figure 1-11). This is a non-intrusive mode.

Figure 1-10 MONF Access Single TAP

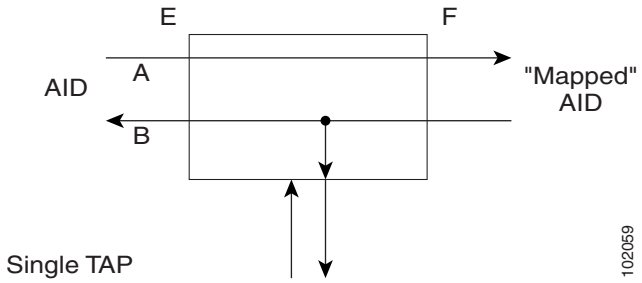
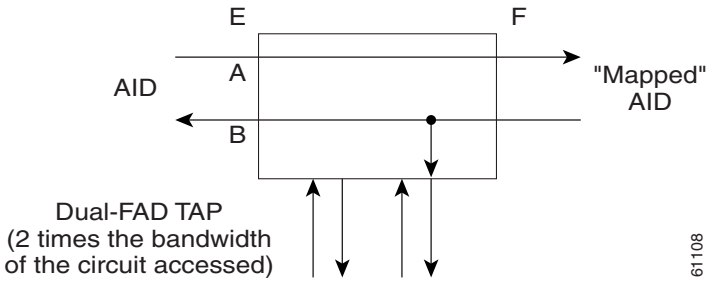


Figure 1-11 MONF Access Dual TAP



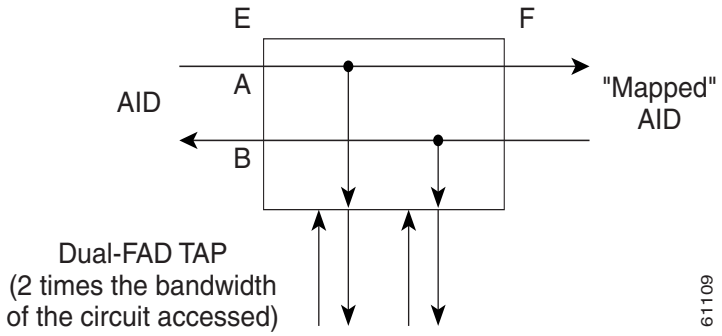
Note The MONE and SPLTA modes are applicable to unidirectional circuits from E to F. The MONF and SPLTB modes are applicable to unidirectional circuits from F to E.

1.9.9.3 MONEF

Monitor EF (MONEF) is a monitor connection provided from the FAD1 (odd pair) to a DFAD, to the A transmission path and from FAD2 (even pair) of the same DFAD, to the B transmission path of the accessed circuit. This is a non-intrusive mode (Figure 1-12).

MONEF for T3 (DS3 HCDS) indicates that the odd pair of a FAP is providing a monitor connection to the A transmission path and from the even pair of a facility access path (FAP) to the B transmission path of the accessed circuit.

Figure 1-12 MONEF Access Dual TAP



1.9.9.4 SPLTE

Split E (SPLTE) indicates to split both the A and B paths and connect the E side of the accessed circuit to the FAD (Figure 1-13 and Figure 1-14)

Figure 1-13 SPLTE Access Single TAP

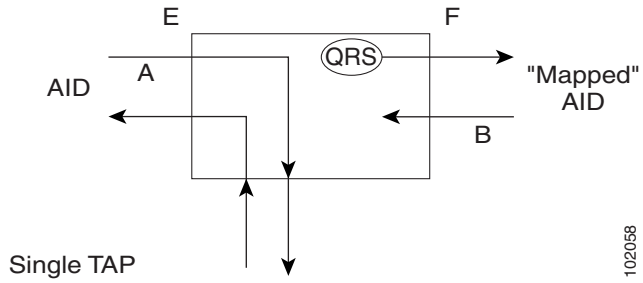
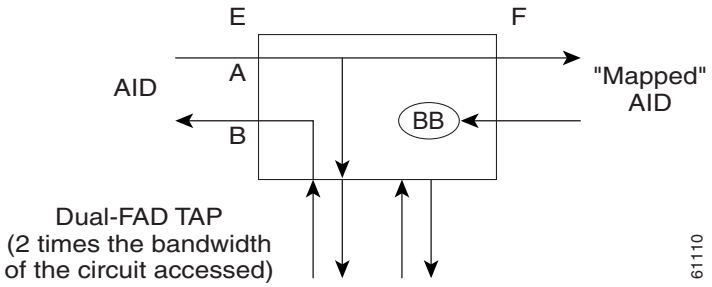


Figure 1-14 SPLTE Access Dual TAP



1.9.9.5 SPLTF

Split F (SPLTF) indicates to split both the A and B paths and connect the F side of the accessed circuit to the FAD (Figure 1-15 and Figure 1-16).

Figure 1-15 SPLTF Access Single TAP

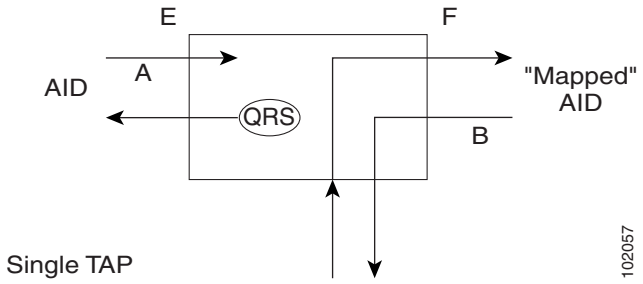
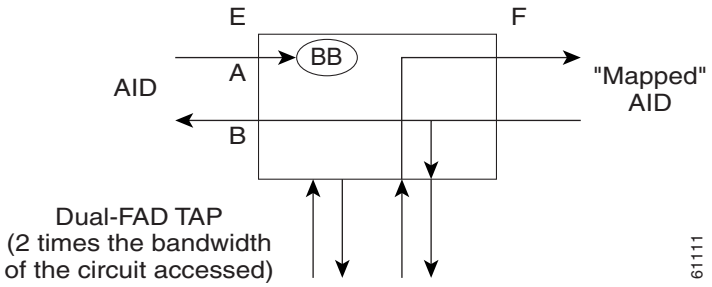


Figure 1-16 SPLTF Access Dual TAP

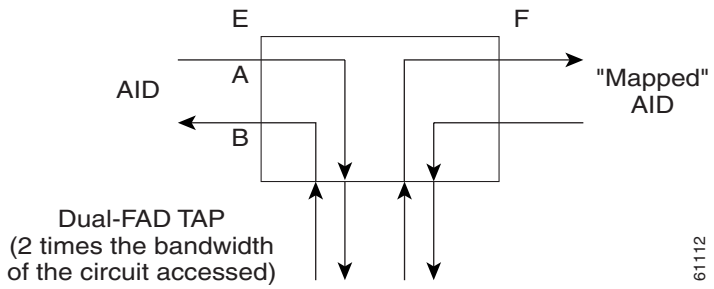


1.9.9.6 SPLTEF

Split EF (SPLTEF) for T1 (DS1 HCDS) indicates to split both the A and B paths, connect the E side of the accessed circuit to FAD1 and the dual facility access digroup (DFAD) pair, and connect the F side to the FAD2 of the same DFAD pair (Figure 1-17).

SPLTEF for T3 (DS3 HCDS) indicates to split both the A and B paths and connect the E side of the accessed circuit to the odd pair of the FAP and the F side to the even pair of the FAP.

Figure 1-17 SPLTEF Access Dual TAP



1.9.9.7 LOOPE

Loop E (LOOPE) indicates to split both the A and B paths, connect the incoming line from the E direction to the outgoing line in the E direction, and connect this looped configuration to the FAD (Figure 1-18 and Figure 1-19). Loop E and F modes are basically identical to the SPLT E and F modes except that the outgoing signal is the incoming signal and not the signal from the remote test unit (RTU).

Figure 1-18 LOOPE Access Single TAP

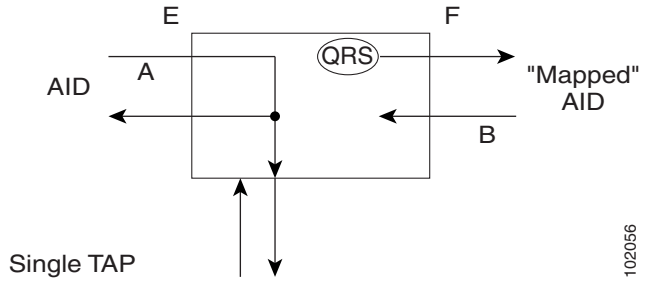
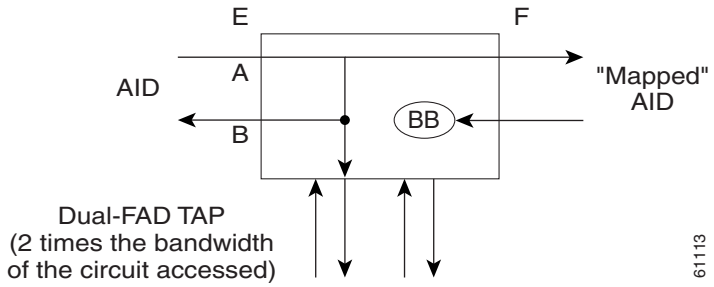


Figure 1-19 LOOPE Access Dual TAP



1.9.9.8 LOOPF

Loop F (LOOPF) indicates to split both the A and B paths, connect the incoming line from the F direction to the outgoing line in the F direction and connect this looped configuration to the FAD (Figure 1-20 and Figure 1-21).

Figure 1-20 LOOPF Access Single TAP

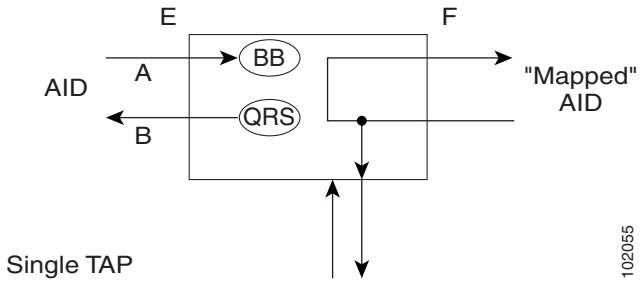
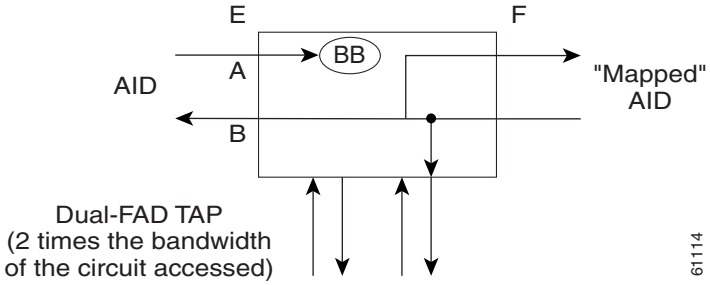


Figure 1-21 LOOPF Access Dual TAP



1.9.9.9 SPLTA

Split A (SPLTA) indicates that a connection is provided from both the E and F sides of the A transmission path of the circuit under test to the FAD and split the A transmission path (Figure 1-22 and Figure 1-23). These modes are similar to the Split E and F modes, except the signals are sent to the RTU, not the NE signal configuration.

Figure 1-22 SPLTA Access Single TAP

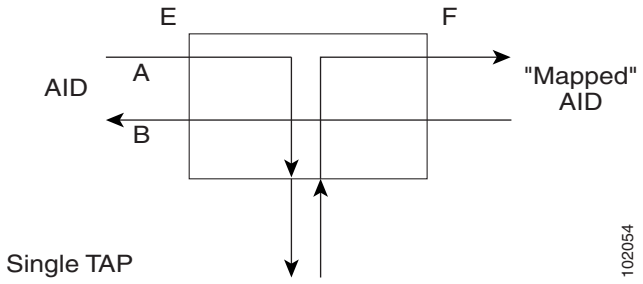
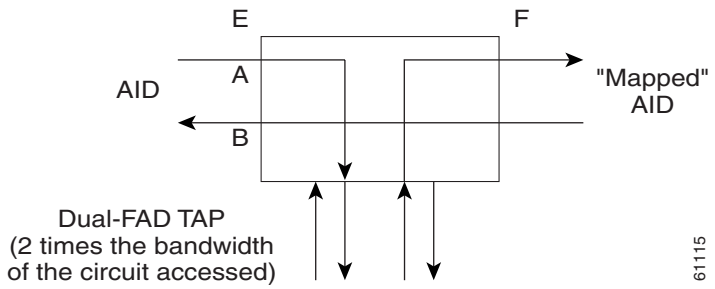


Figure 1-23 SPLTA Access Dual TAP



1.9.9.10 SPLTB

Split B (SPLTB) indicates that a connection is provided from both the E and F sides of the B transmission path of the circuit under test to the FAD and split the B transmission path (Figure 1-24 and Figure 1-25).

Figure 1-24 SPLTB Access Single TAP

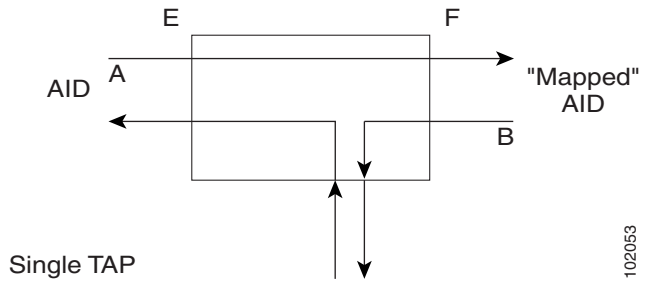
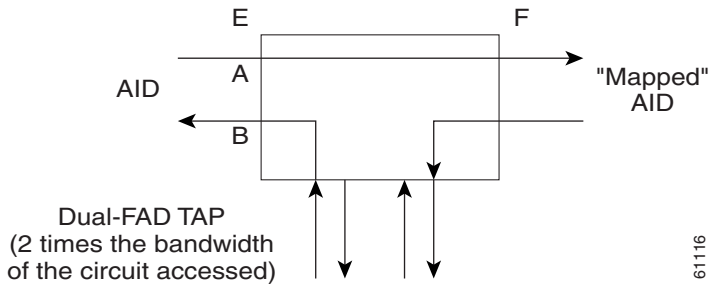


Figure 1-25 SPLTB Access Dual TAP



1.9.10 Unmapped AID Test Access Point Connections

The ONS 15454, ONS 15327 and ONS 15600 supports connections to unmapped AIDs (unmapped circuits). The TAPs can be connected to an unmapped AID, i.e. an AID that does not have a cross-connect on it. The access modes supported are: MONE, SPLTE, and LOOPE.

Example 1-18 creates a TAP on STS-5-1 and STS-5-2.

Example 1-18 ED-STS1::STS-5-1:12:::TACC=1;

```
   DV9-99 1970-01-02 03:16:11
M 12 COMPLD
;
```

Example 1-19 creates an unmapped AID connection with the MONE access mode.

Example 1-19 CONN-TACC-STS1::STS-5-3:12::1:MD=MONE;

```
   DV9-99 1970-01-02 02:51:54
M 12 COMPLD
   1
;
```

Note STS-5-3 does not have a cross-connect on it. STS-5-3 becomes unusable until the connection is disconnected by the DISC-TACC command.

Note The <AID> provided in the CONN-TACC command designates the E side and the other automatically becomes the F side.

Note In the case of all 1-way circuits (1-way, UPSR_HEAD, UPSR_DROP, UPSR_DC, UPSR_EN): If the <AID> specified is the source AID, the direction is designated as From E in the above table. If the <AID> specified is the destination AID or the drop side, the direction is designated as From F in the above table.

Examples:

The following examples assume an STS TAP is already created with TAP number = 1.

1.9.10.1 1-Way Circuit

Example 1-20 ENT-CRS-STS1::STS-5-1,STS-5-2:12::1WAY;

```
   DV9-99 1970-07-01 20:29:06
M 12 COMPLD;
```

Example 1-21 CONN-TACC-STS1::STS-5-1:12::1:MD=MONF;

```
   DV9-99 1970-01-01 20:29:47
M 12 DENY
   EANS
  STS-5-1
/*INCORRECT TAP MODE*/
```

The <AID> specified in the above CONN-TACC command is the source AID for the 1-way circuit. In this case only MONE and SPLTA modes are allowed because there is no B path in the case of a 1-way circuit (see Table 1-5 on page 1-42).

Example 1-22 CONN-TACC-STS1::STS-5-1:12::1:MD=MONE;
DV9-99 1970-01-01 20:30:09
M 12 COMPLD

Example 1-23 DISC-TACC::1:12;
DV9-99 1970-01-01 20:30:20
M 12 COMPLD
;

However if the <AID> specified is the destination AID as shown below, the modes allowed are MONF and SPLTB.

Example 1-24 CONN-TACC-STS1::STS-5-2:12::1:MD=MONF;
DV9-99 1970-01-01 20:30:32
M 12 COMPLD

Notes:

1. The same examples apply for UPSR_HEAD, UPSR_DROP, UPSR_DC and UPSR_EN which are all 1-way circuits.
2. The connections are made only to the working path irrespective of which path is currently active.

1.9.10.2 2-Way Circuits

For 2-way circuits all the modes are allowed as shown in Table 1-5 and the same applies for UPSR_UPSR and path protection circuit types. In the case of UPSR_UPSR and path protection circuits the working path is connected irrespective of which path is currently active.

1.9.10.3 Unmapped AID

As explained in the "1.9.10 Unmapped AID Test Access Point Connections" section on page 1-40, connections can be made to an <AID> without a cross-connect on it. The modes supported are MONE, SPLTE and LOOPE as shown in Table 1-5.

Table 1-5 Modes Supported by Circuit Type

	MONE	MONF	MONEF	SPLTE	SPLTF	SPLTEF	LOOPE	LOOPF	SPLTA	SPLTB
1-way (from E)	X								X	
1-way (from F)		X								X
2-way	X	X	X	X	X	X	X	X	X	X
UPSR	X	X	X	X	X	X	X	X	X	X
UPSR_HEAD (from E)	X								X	
UPSR_HEAD (from F)		X								X
UPSR_DROP UPSR_DC UPSR_EN (from E)	X								X	

Table 1-5 Modes Supported by Circuit Type

	MONE	MONF	MONEF	SPLTE	SPLTF	SPLTEF	LOOPE	LOOPF	SPLTA	SPLTB
UPSR_DROP UPSR_DC UPSR_EN (from F)		X								X
UPSR_UPSR	X	X	X	X	X	X	X	X	X	X
Unmapped AID	X			X			X			

Notes:

1. The <AID> provided in the CONN-TACC command designates the E side and the other automatically becomes the F side.
2. In the case of all 1-way circuits (1-way, UPSR_HEAD, UPSR_DROP,UPSR_DC, UPSR_EN):
   a. If the AID specified is the source AID, the direction is designated as from E in the above table.
   b. If the AID specified is the destination AID or the drop side, the direction is designated as from F in the above table.

1.10 TL1 PCA Provisioning

You can provision or retrieve protection channel access (PCA) cross-connections on two-fiber and four-fiber BLSR topologies at these supported OC rates: OC12 (two-fiber only), OC48, and OC192. The traffic on the protection channel is referred to as extra-traffic and has the lowest priority level. Extra-traffic will be preempted by any working traffic that requires the use of the protection channel.

In a two-fiber BLSR the extra traffic is provisioned on the upper half of the bandwidth path. In a four-fiber BLSR the extra traffic is provisioned on the protect fiber. The PCA provisioning feature allows you to establish the PCA cross-connection on the protection path of the two-fiber BLSR and protection channel of the four-fiber BLSR only when the query is an explicit request.

There are two PCA connection types: 1WAYPCA and 2WAYPCA. The PCA cross-connection is provisioned only when the user provides an explicit request using the ENT-CRS-STSp/VT1 commands. If the cross-connection is a PCA cross-connection, either 1WAYPCA or 2WAYPCA is shown in the CCT field of the RTRV-CRS-STSp/VT1 command output.

1WAYPCA and 2WAYPCA are only used in the TL1 user interface to provide usability and visibility for the user to specify a PCA cross-connection type in the TL1 cross-connection commands.

Note The network must be configured as either a two-fiber or four-fiber OC-12, OC-48, or OC-192 BLSR.

Note The STS or VT1 path cross-connection can be established with TL1 commands (ENT-CRS-xxx).

Note Because the RTRV-CSR-xxx command does not include the optional CTYPE field to specify a connection type, the output result reports the matched cross-connections based on the queried AID(s); therefore, the retrieved cross-connection inventory can be both PCA and non-PCA cross-connections.

1.10.1 Provision a PCA Cross-Connection

Input format for provisioning a PCA cross-connection:

Example 1-25 ENT-CRS-<PATH>:[<TID>]:<FROM>,<TO>:<CTAG>::[<CCT>][::];
<PATH>::={STS_PATH | VT1}
[<CCT>]::={1WAY, 1WAYDC, 1WAYEN, 2WAY, 1WAYPCA, 2WAYPCA}, it defaults to 2WAY.
{STS_PATH}::={STS1 | STS3C | STS6C | STS9C | STS12C | STS24C | STS48C | STS192C}

STS= all the STS bandwidth cross-connections.

VT1=VT1_5 cross-connection.

Input example of provisioning an STS3C PCA cross-connection:

Example 1-26 ENT-CRS-STS3C::STS-1-1,STS-2-1:123::2WAYPCA;

Note If the [<CCT>] of this cross-connection provisioning command is either 1WAYPCA or 2WAYPCA, and the NONE of both <FROM> and <TO> AID is PCA AID, an IIAC (Input, Invalid PCA AIDs) error message is returned.

Note If sending this command with a non-PCA connection type (CCT), and one (or two) AIDs is/are the PCA AIDs, an IIAC (The PCA AID Is Not Allowed for the Queried CCT Type) error message is returned.

1.10.2 Retrieve a PCA Cross-Connection

Input Format for retrieving a PCA cross-connection:

Example 1-27 RTRV-CRS-[<PATH>]:[<TID>]:<AID>:<CTAG>[::::];<PATH>::=
{STS_PATH | VT1 | STS}

If PATH is STS, it will retrieve all the STS cross-connections based on the queried AIDs.

<AID>={FacilityAIDs, STSAIDs, VTAIDs, ALL}

Output format of the PCA STSp cross-connection retrieval command:

Example 1-28 "<FROM>,<TO>:2WAYPCA,STS3C"

Output format of the PCA VT cross-connection retrieval command:

Example 1-29 "<FROM>,<TO>:2WAYPCA"

1.11 FTP Software Download

Note FTP software download applies to the ONS 15454, ONS 15327 and ONS 15310-CL.

Note FTP timeout is 30 seconds and is not configurable.

The file transfer protocol (FTP) software download feature downloads a software package to the inactive flash partition residing on either the TCC2/TCC2P, XTC or 15310-CL-CTX card. FTP software download provides for simplex and duplex TCC2/TCC2P, XTC or 15310-CL-CTX card downloads, success and failure status, and in-progress status at 20% increments.

1.11.1 COPY-RFILE

The COPY-RFILE command downloads a new software package from the location specified by the FTP URL into the inactive flash partition residing on either the TCC2/TCC2P, XTC or 15310-CL-CTX card. COPY-RFILE can also be used to backup and restore the database file.

Note Since Release 5.0, PACKAGE_PATH is relative to your home directory, instead of being an absolute path from the root directory of the NE. If you want to specify an absolute path, start the path with the string '%2F'.

Input format:

Example 1-30 COPY-RFILE:[<TID>]:[<SRC>]:<CTAG>::TYPE=<XFERTYPE>,[SRC=<SRC1>,] [DEST=<DEST>,][OVWRT=<OVWRT>];

where:

- SRC is the type of file being transferred
- <XFERTYPE> is the file transfer protocol
- <SRC1> specifies the source of the file to be transferred. Only the FTP URL is supported. In a non-firewall environment the format for the URL is: "FTP://FTTPUSER[:FTP_PASSWORD]]@FTP_HOST_IP[:FTP_PORT] /PACKAGE_PATH[:TYPE=I]"

  where:

  – FTP_USER is the userid to connect to the computer with the package file

  – FTP_PASSWORD is the password used to connect to the computer with the package file

  – FTP_HOST_IP is the IP address of the computer with the package file, DNS lookup of hostnames is not supported

  – FTP_PORT defaults to 21

  – PACKAGE_PATH is the long path name to the package file starting from the home directory of the logged-in user.

    In a firewall environment the hostname should be replaced with a list of IP addresses each separated by a "@" character. The first IP address should be for the computer where the package file is stored. Subsequent IP addresses are for firewall computers moving outward toward the edge of the network until the final IP address listed is the computer that outside users use to first access the network.

    For example, if your topology is:

    "FTPHOST <-> GNE3 <->GNE2 <-> GNE1 <-> ENE"

the FTP URL is:

FTP://FTP_USER:FTP_PASSWORD@FTP_HOST_IP@GNE3@GNE2@GNE1/PACKAGE_PATH

SRC1 is a String

- DEST specifies the destination of the file to be transferred. The comments for the SRC parameter are also valid here. DEST is a string
- If OVWRT is YES, then files are overwritten. Currently only YES is supported. Using a NO value for OVWRT will result in an error message.

Notes:

1. FTP is the only allowed file transfer method.
2. The use of the SWDL and the extended FTP URL syntax are required by the COPY-RFILE syntax.

1.11.2 APPLY

The APPLY command can activate or revert software depending on the version of software loaded on the active and protect flash. An error is returned if attempting to activate to an older software load or trying to revert to a newer software load. If this command is successful the appropriate flash is selected and the TCC2/TCC2P2, XTC or 15310-CL-CTX card will reboot.

Input format:

Example 1-31 APPLY:[<TID>]::<CTAG>[::<MEM_SW_TYPE>]:

where:

- <MEM_SW_TYPE> indicates memory switch action during the software upgrade.

1.11.3 REPT EVT FXFR

REPT EVT FXFR is an autonomous message used to report the start, completion, and completed percentage status of the FTP software download. REPT EVT FXFR also reports any failure during the software upgrade including invalid package, invalid path, invalid userid/password, and loss of network connection.

Note:

1. The “FXFR_RSLT” is only sent when the “FXFR_STATUS” is COMPLD.
2. The “BYTES_XFRD” is only sent when the “FXFR_STATUS” is IP or COMPLD.

Output format:

Example 1-32 SID DATE TIME
A ATAG REPT EVT FXFR
“<FILENAME>,<FXFR_STATUS>,[<FXFR_RSLT>],[<BYTES_XFRD>]”
;

where:

- <FILENAME> indicates the transferred file path name and is a string. When a package is being transferred between the FTP server and the controller cards, the filename field will contain the string "active". Following this transfer, if there is a second controller card on the node, the file will be copied over to the second card. While this is happening, REPT EVT FXFR messages will be generated with a filename of "standby".
- <FXFR_STATUS> indicates the file transferred status: Start, IP (in progress), or COMPLD.
- <FXFR_RSLT> indicates the file transferred result: success or failure. <FXFR_RSLT> is optional
- <BYTES_XFRD> indicates the transferred byte count. <BYTES_XFRD> is a string and is optional

1.11.4 Downloading New Software

The following procedure downloads new software to the TCC2/TCC2P, XTC or 15310-CL-CTX card using TL1.

Download New Software

Note Only Superusers can download and activate software.

Step 1 Copy the new software package (15454-0340-X02E-2804.pkg) to an FTP host.

Step 2 Establish a TL1 session with the target NE.

Step 3 Login with the ACT-USER command.

Step 4 Check the working and protect software on the NE by issuing the RTRV-NE-GEN command.

Input example:

Example 1-33 RTRV-NE-GEN:::1;

Output example:

Example 1-34

```
   VA454-94 1970-01-06 22:22:12
M 1 COMPLD
  "IPADDR=10.82.87.94,IPMASK=255.255.255.224,DEFRTR=10.82.86.1,
   ETHIPADDR=10.82.87.94,ETHIPMASK=255.255.255.224,NAME=VA454-94,
   SWER=3.40.00,LOAD=03.40-002G-14.21,PROTSWVER=4.00.00,
   PROTLOAD=04.00-X02G-25.07,DEFDESC=\"FACTORY DEFAULTS\""
;
```

Step 5 Issue the COPY-RFILE command. This command will initiate the download process. Refer to the "1.11.1 COPY-RFILE" section on page 1-45 for command syntax.

In the following example the package is located in "/%2FUSR/CET/VINTARA" in the host 10.77.22.199. The userid and passwords are TL1 and CISCO454. The directory path of the package is similar to what you will see during an FTP session.

Example 1-35 COPY-RFILE::RFILE-PKG:CTAG::TYPE=SWDL,SRC="FTP://TL1:CISCO454@10.77.29.199/%2FUSR/CET/VINTARA/15454-0340-X02E-2804.PKG";

```
   DEV208 1970-01-10 11:51:57
M   CTAG  COMPLD
;
```

Step 6 If any of the parameters are wrong or if the host is not accessible, a REPT EVT FXFR message will report from the following list. A download failure may be due to one or more of the following:

- Directory path of the package is invalid or not found
- Package is invalid (i.e., ONS 15454 package on an ONS 15327, vice-versa, or an invalid file type)
- Package not found on specified path
- Userid/password or hostname is invalid
- Host is not accessible
- Firewall userid/password or host in invalid
- Node rebooted/lost connection during download
- If software download is already in progress
- If the node or the host timed out during FTP protocol

Example 1-36

```
   DEV208 1970-01-10 11:52:02
A  2816.2816 REPT EVT EQPT
   "SLOT-11:SFTWDOWN-FAIL,TC,,,,,,:\"SOFTWARE DOWNLOAD FAILED\",TCC
;
```

Step 7 If the download is successful the REPT EVT FXFR message will report an active start:

Example 1-37

```
   DEV208 1970-01-10 11:52:15
A  2818,2818 REPT EVT FXFR
   "ACTIVE START"
;
```

Step 8 A SFTDOWN minor alarm is raised to indicate that the software download is in progress. The SFTDOWN alarm will clear when the download is complete.

Example 1-38

```
   DEV208 1970-01--10 11:52:15
*  2817.2817 REPT ALM EQPT
   "SLOT-7:MN,SFTWDOWN,NSA,,,,:\"SOFTWARE DOWNLOAD IN PROGRESS\",TCC"
;
```

Use the in-progress status at any time during the software download to verify the RTRV-NE-GEN command.

Example 1-39 RTRV-NE-GEN

```
   VA454-94 1970-01-06 22:22;12
M  1  COMPLD
   "IPADDR=10.82.87.94,IPMASK=255.255.255.224,DEFRTR=10.82.86.1,
   ETHIPADDR=10.82.87.94,EHTIPMASK=255.255.255.224,NAME=VA454-94,
   SWVER=3.40.00,LOAD=03.40-002G-14-21,PROTSWVER=NONE,
   PROTLOAD=DOWNLOADINPROGRESS,DEFDESC=\:FACTORY DEFAULTS\""
;
```

Step 9 The download progress is reported by the REPT EVT FXFR message which will report a message after every 20% of download is complete as shown:

Example 1-40

```
   DEV208 1970-01-10 11:53:12
A  2820,2820 REPT EVT FXFR
   "ACTIVE,IP,,20"
;

  DEV208 1970-01-10 11:53:12
A  2820,2820 REPT EVT FXFR
   "ACTIVE,IP,,40"
;

  DEV208 1970-01-10 11:53:12
A  2820,2820 REPT EVT FXFR
   "ACTIVE,IP,,60"
;

DEV208 1970-01-10 11:53:12
A  2820,2820 REPT EVT FXFR
   "ACTIVE,IP,,80"
;
```

Step 10 If the TL1 session times out during download or if the user terminates the TL1 session the download will continue. The download completion can be confirmed by issuing the RTRV-NE-GEN command and verifying the PROTLOAD.

Example 1-41 RTRV-NE-GEN:::1;

```
   VA454-94 1970-01-06 22:22:12
M  1  COMPLD
   "IPADDR=10.82.87.94,IPMASK=255.255.255.224,DEFRTR=10.82.86.1,
   ETHIPADDR=10.82.87.94,EHTIPMASK=255.255.254.0,NAME=VA454-94,
   SWVER=3.40.00,LOAD=03.40-002G-14-21,PROTSWVER=4.00.00,
   PROTLOAD=03.40-X02E-28.04,DEFDESC=\:FACTORY DEFAULTS\""
;
```

Step 11 REPT EVT FXFR confirms the completion of the software download.

Example 1-42

```
   DEV208 1970-01-10 12:01:16
A  2825,2825 REPT EVT FXFR
   "ACTIVE,COMPLD,SUCCESS"
;
```

Step 12 The SFTDOWN alarm clears when the download is complete.

Example 1-43 DEV208 1970-01-10 11:52:15
**** 2826,2817 REPT ALM EQPT***
"SLOT-7:CL,SFTWDOWN,NSA,,,,:\"SOFTWARE DOWNLOAD IN PROGRESS\",TCC"
;

1.11.5 Activating New Software

After the software is successfully downloaded, the new software which resides in the protect load must be activated to run on the NE. The APPLY command can be used to activate and revert depending on the version of the protect software and the newly downloaded software (refer to the "1.11.2 APPLY" section on page 1-46 for correct APPLY syntax).

Activate New Software

Step 1 If the protect software is newer than the working software, activate it as shown:

Example 1-44 APPLY::1::ACT;

DEV208 1970-01-10 13:40:53
M 1 COMPLD
;

An error is reported if a revert is attempted with a newer protect software.

Step 2 If the APPLY command is successful, logout of the TL1 session using the CANC-USER command:

Example 1-45 CANC-USER::CISCO15:1;

VA454-94 1970-01-07 01:18:18
M 1 COMPLD
;

After a successful completion of the APPLY command the NE will reboot and the TL1 session will disconnect. When the NE comes up after the reboot it will be running the new software. Traffic switches are possible during activation.

1.11.6 Remote Software Download/Activation Using the GNE

In a network with SDCC-connected ONS 15454, ONS 15327 and ONS 15310-CLs remote download and activation are possible using the GNE/ENE feature supported in TL1. The GNE must be connected by a LAN and the remaining ENEs can download the new software package through fiber from the GNE.

For remote software downloading, complete the steps in the "Download New Software" procedure on page 1-47 and the "Activate New Software" procedure on page 1-50, but ensure that the TID in each command is filled with the ENE node name.

Each GNE can support 11 (TCC2/TCC2P) or 6 (XTC or 15310-CL-CTX) concurrent communication gateway sessions and up to a maximum of 176 (TCC2/TCC2P) or 96 (XTC or 15310-CL-CTX) ENEs/GNE. For more information on TL1 Gateway, see Chapter 2, "TL1 Gateway."

Example 1-46 ***ACT-USER:NODE1:CISCO15:1;***
ACT-USER:NODE2:CISCO15:1;
ACT-USER:NODE3:CISCO15:1;
ACT-USER:NODE4:CISCO15:1;
ACT-USER:NODE5:CISCO15:1;

Five simultaneous software downloads can be initiated using the COPY-RFILE command with appropriate TIDs. All downloads will be independent of each other and download speeds may differ.

Example 1-47 ***COPY-RFILE:NODE1:RFILE-PKG:CTAG::TYPE=SWDL,SRC="FTP://TL1:CISCO454@10.77.29.199/USR/CET/VINTARA/15454-0340-X02E-2804.PKG";***

COPY-RFILE:NODE2:RFILE-PKG...
COPY-RFILE:NODE3:RFILE-PKG...
COPY-RFILE:NODE4:RFILE-PKG...
COPY-RFILE:NODE5:RFILE-PKG...

Individual REPT EVT FXFR messages can be isolated using the node names. RTRV-NE-GEN also requires the individual node names entered in the TID to see a specific download status.

You can activate the software on all of the nodes using the GNE node.

Note Activate the GNE last, after activating all the ENEs or else ENE connectivity will be lost when the GNE starts to reboot for activation.

Example 1-48 ***APPLY:NODE1::1::ACT;***
APPLY:NODE2::1::ACT;
APPLY:NODE3::1::ACT;
APPLY:NODE4::1::ACT;
APPLY:NODE5::1::ACT;

1.12 Scheduled PM Report

Scheduled performance monitoring (PM) report is a feature that extends the capability of PM reporting for the Cisco ONS 15454, ONS 15327, ONS 15310-CL and ONS 15600. With scheduled PM report the system automatically and periodically generates the PM report of any specified facility or cross-connection.

Note The current maximum number of schedules allowed to be created for an NE is 1000. If this number of schedules has been created for the NE, an error message "Reach Limits Of MAX Schedules Allowed. Can Not Add More" will be returned if trying to create more schedules on the NE.

Note Identical schedules for an NE is not allowed. Two schedules are considered identical if they have the same AID, MOD2 type, performance monitor type, performance monitor level, location, direction and time period.

Note An error message "Duplicate Schedule" is returned if you create a schedule which is a duplicate of an existing schedule. However, if the existing schedule expires (with the parameter <NUMINVL> equal to zero when retrieved by the RTRV-PMSCHED command which means no more performance monitoring report to be sent), then the new schedule with the identical parameter will replace the existing schedule.

Note When you create a PM schedule, the minimum report interval should not be less than five minutes.

See each command description for command formats and syntax:

- SCHED-PMREPT-<MOD2> on page 3-723
- ALW-PMREPT-ALL on page 3-51
- RTRV-PMSCHED-<MOD2> on page 3-618
- RTRV-PMSCHED-ALL on page 3-623
- INH-PMREPT-ALL on page 3-255
- REPT PM <MOD2> on page 3-344

1.12.1 Create a PM Schedule and Receive an Autonomous PM Report

1. Issue the SCHED-PMREPT-<MOD2> command to create a PM schedule.
2. Issue the ALW-PMREPT-ALL command to allow the current TL1 session to be able to receive the autonomous PM report.

1.12.2 Manage PM Schedules

1. Create a PM schedule by issuing the SCHED-PMREPT-<MOD2> command.
2. Delete a PM schedule by issuing the SCHED-PMREPT-<MOD2> command with the <NUMREPT> parameter equal to zero.

   Note The PM schedules created on a facility or a cross-connect will be automatically deleted if the card or the cross-connect are unprovisioned.

3. Retrieve all the PM schedules created on the node by issuing the RTRV-PMSCHED-ALL command. Retrieve a particular MOD2 type of PM schedule by issuing the RTRV-PMSCHED-<MOD2> command.

   Note The system will not automatically delete the schedules that are expired (for example, a schedule is created to report PM 10 times. After 10 PM reports are sent, the schedule is expired). The expired schedule can be identified by its <NUMINVL> field (equal to zero) in the response of RTRV-PMSCHED.

1.12.3 Enable or Disable a TL1 Session to Receive Autonomous PM Reports

1. Enable a TL1 session to receive a scheduled PM report by issuing the ALW-PMREPT-ALL command.

Note By default, a TL1 session is disabled to receive PM reports. The ALW-PMREPT-ALL command enables a TL1 user to receive all the scheduled PM reports from the system, regardless of whether or not the schedule is created by this TL1 user or by any other TL1 user.

2. Disable a TL1 session to receive any scheduled PM report by issuing the INH-PMREPT-ALL command.

1.13 Remote Monitoring-Managed PMs

This section describes the retrieval, threshold setting, threshold crossing alerts (TCAs) and scheduled performance monitoring (PM) reporting for all the remote monitoring (RMON)-managed PM data in the Cisco ONS 15454, 15327, 15310-CL and 15600.

The cards that support RMON PMs include: G1000-2/G1000-4, ML1000-2/ML100T-12, FC_MR-4, ASAP-4, MXP_MR_2.5G/MXPP_MR_2.5G and ML-100T-8/CE-100T-8. The PM types for these cards include Ethernet statistic types defined in standard SNMP/RMON MIB, and also include other statistic types managed by RMON, for example, the fibre channel statistic types.

When creating an RMON threshold there are two threshold values that need to be specified. The first threshold is the rising threshold and the other is the falling threshold. There are other parameters that need to be specified when creating the RMON threshold, for example, the startup type and the sample type.

Note There can be more than one threshold defined for each RMON statistic type.

The current bucket is not defined by the RMON. RMON-managed PM only shows the history data of the PMs and the data accumulated since the last time the counters are cleared (RAW-DATA).

In the RMON TCA, the accumulation time period is not the predefined PM bucket accumulation time, such as, 15-MIN or 1-DAY. It can be any integer (any time greater than 10 seconds) that is defined when creating the RMON threshold.

Note For platform-specific PM information, refer to the Procedure Guide and Reference Manual of that platform.

1.13.1 RTRV-PM-<MOD2>

The RTRV-PM-<MOD2> command retrieves the RMON-managed PMs.

The TL1 modifiers FSTE/GIGE/POS are used to retrieve the RMON-managed Ethernet PM, if the Ethernet port is a FSTE/GIGE/POS port type. The FC modifier retrieves the RMON-managed fibre channel PM.

There are three accumulation time periods for RMON statistics: 1-MIN, 1-HR and RAW-DATA. For RMON-managed PMs, only history PM buckets and RAW-DATA are supported and there is no current bucket defined for RMON-managed PMs. When RAW-DATA is specified in the input of RTRV-PM, the date and time specified in the input will be ignored. The mondate and montime in the output will be the last time the counters were cleared. RAW-DATA will be the default TMPER value for RMON-managed PM retrieval.

Because RMON PM only supports the history data if the accumulation time period is 1-MIN, 15-MIN, 1-HR or 1-DAY, you must specify the correct history PM bucket for the RTRV-PM command to succeed.

When retrieving PM, if an unsupported montype is specified, an error message will be returned.

Currently there is no support of LOCN (location) and DIRN (direction) for RMON-managed data statistics.

See the "3.2.216 RTRV-PM-<MOD2>" section on page 3-604 for a full command description.

Input Format

RTRV-PM-<MOD2>:[<TID>]:<AID>:<CTAG>::[<MONTYPE>],[<MONLEV>],[<lSTM>],[<DIRECTION>],[<TMPER>],[<DATE>],[<TIME>];

Input Example

RTRV-PM-GIGE:TID:FAC-2-1:123::ETHERSTATSOCTETS,,,,1-MIN,04-11,12-45;

RTRV-PM-GIGE:TID:FAC-2-1:123::,,,,RAW-DATA;

Output Format

```
   SID DATE TIME
M  CTAG COMPLD
   "<AID>,[<AIDTYPE>]:<MONTYPE>,<MONVAL>,[<VLDTY>],[<LOCN>],
   [<DIRECTION>],[<TMPER>],[<MONDAT>],[<MONTM>]"
;
```

Output Example

```
   TID-000 1998-06-20 14:30:00
M  001  COMPLD
   "FAC-2-1,GIGE:etherStatsOctets,21,COMPL,,,1-MIN,04-11,12-45"
;
```

Table 1-6 shows the error messages associated with the RTRV-PM-<MOD2> command.

Table 1-6 Error Messages for RTRV-PM-<MOD2>

Error Code	Description	Scenario When the Error Message is Sent
IDNV	TMPER Type Not Supported	When the TMPER parameter specified is not applicable for the MOD2 type. For example, 1-MIN is not applicable for OC48 PM types.
IDNV	Current Interval Not Supported For RMON PMs	The current interval is specified by default, or is explicitly specified by mondat/montm, when the TMPER is 1-MIN, 15-MIN, 1-HR or 1-DAY.

1.13.2 ENT-RMONTH-<MOD2_RMON>

The ENT-RMONTH-<MOD2_RMON> command creates a threshold type (an entry in the RMON alarm table) for an RMON statistic, for the RMON-managed PMs. An event (TCA) will be generated and reported when the threshold is crossed in the appropriate direction during the sampled time period.

More than one threshold can be created by using different parameters (rising/falling threshold), for each montype.

This command applies to G1000, GIGE, FSTE, POS, and FC data objects.

See the "3.2.90 ENT-RMONTH-<MOD2_RMON>" section on page 3-235 for a full command description.

Input Format

ENT-RMONTH-<MOD2>:[<TID>]:<AID>:<CTAG>::<MONTYPE>,,,,<INTVL>:RISE=<RISE>, FALL=<FALL>,[SAMPLE=<SAMPLE>,][STARTUP=<STARTUP >][:];

Input Example

The following example creates an entry in the RMON threshold table for the etherStatsOctets statistic type with an interval equal to 100 seconds, rising threshold of 1000, falling threshold of 100, DELTA sampling type and the startup type of RISING-OR-LTING.

ENT-RMONTH-GIGE:TID:FAC-2-1:123::ETHERSTATSOCTETS,,,,100:RISE=1000, FALL=100,SAMPLE=DELTA,STARTUP=RISING-OR-LTING;

Table 1-7 shows the error messages associated with the ENT-RMONTH-<MOD2_RMON> command.

Table 1-7 Error Messages for ENT-RMONTH-<MOD2_RMON>

Error Code	Description	Scenario When the Error Message is Sent
IDNV	Invalid Interval	The input interval value is less than 10.
IDRG	Invalid Threshold Value	The rising/falling threshold is less than 0, or the falling threshold is greater than or equal to rising threshold.
IDNV	Invalid MONTYPE value	The montype is not applicable to the data type (represented by the MOD2).
IIDT	Cannot Create More RMON Threshold	The number of RMON threshold created reached the maximum (256)
IIDT	Duplicate RMON Threshold	There already is a threshold created with the exact parameters.

1.13.3 DLT-RMONTH-<MOD2_RMON>

The DLT-RMONTH-<MOD2_RMON> command deletes a threshold type (an entry in the RMON alarm table) created for a montype (RMON statistic type). Because there can be multiple thresholds created for a particular montype, you must specify all the necessary parameters for the threshold, in order to identify the particular threshold to be deleted.

This command applies to G1000, GIGE, FSTE, POS, and FC data objects.

See the "3.2.29 DLT-RMONTH-<MOD2_RMON>" section on page 3-88 for a full command description.

Input Format

DLT-RMONTH-<MOD2>:[<TID>]:<AID>:<CTAG>::<MONTYPE>,,,,<INTVL>:RISE=<RISE>, FALL=<FALL>,[SAMPLE=<SAMPLE>,][STARTUP=<STARTUP>][:];

Input Example

The following example deletes an entry in the RMON threshold table for the etherStatsOctets statistic type, with an interval equal to 100 seconds, rising threshold of 1000, falling threshold of 100, DELTA sampling type, and the startup type of BOTH.

DLT-RMONTH-GIGE:TID:FAC-2-1:123::ETHERSTATSOCTETS,,,,100:RISE=1000,FALL=100, SAMPLE=DELTA,STARTUP=BOTH;

Table 1-8 shows the error messages associated with the DLT-RMONTH-<MOD2_RMON> command.

Table 1-8 Error Messages for DLT-RMONTH-<MOD2_RMON>

Error Code	Description	Scenario When the Error Message is Sent
IDNV	Invalid Interval	The input interval value is less than 10.
IDRG	Invalid Threshold Value	The rising/falling threshold is less than 0, or the falling threshold is greater than or equal to rising threshold.
IDNV	Invalid MONTYPE value	The montype is not applicable to the data type (represented by the MOD2).
SROF	RMON Threshold Does Not Exist	The RMON Threshold trying to delete does not exist.

1.13.4 RTRV-RMONTH-<MOD2_RMON>

The RTRV-RMONTH-<MOD2_RMON> command retrieves the thresholds defined in the RMON alarm table.

See the "3.2.226 RTRV-RMONTH-<MOD2_RMON>" section on page 3-643 for a full command description.

Input Format

RTRV-RMONTH-<MOD2>:[<TID>]:<AID>:<CTAG>::[<MONTYPE>]>,,,, [<INTVL>]:[RISE=<RISE>,][FALL=<FALL>,][SAMPLE=<SAMPLE>,][STARTUP=<STARTUP>];

Input Example

The following example retrieves all the thresholds defined in the RMON threshold table for the etherStatsOctets statistics type.

RTRV-RMONTH-GIGE:TID:FAC-2-1:123::ETHERSTATSOCTETS;

The following example retrieves all the thresholds with the DELTA sampling type, RISING startup type, for the etherStatsOctets statistics type, defined in the RMON threshold table.

RTRV-RMONTH-GIGE:TID:FAC-2-1:123::ETHERSTATSOCTETS:SAMPLE=DELTA, STARTUP=RISING;

Output Format

```
   SID DATE TIME
M  CTAG COMPLD
   "<AID>,[<AIDTYPE>]:<MONTYPE>,,,,[<INTVL>]:INDEX=<INDEX>,RISE=<RISE>,
   FALL=<FALL>,SAMPLE=<SAMPLE>,STARTUP=<STARTUP>"
;
```

Output Example

```
   TID-000 1998-06-20 14:30:00
M  001  COMPLD
   "FAC-2-1,GIGE:ETHERSTATSOCTETS,,,,100:INDEX=2,RISE=1000,FALL=100,
   SAMPLE=DELTA,STARTUP=RISING"
;
```

Table 1-9 shows the error messages associated with the DLT-RMONTH-<MOD2_RMON> command.

Table 1-9 Error Messages for RTRV-RMONTH-<MOD2_RMON>

Error Code	Description	Scenario When the Error Message is Sent
IDNV	Invalid Interval	The input interval value is less than 10.
IDRG	Invalid Threshold Value	The rising/falling threshold is less than 0, or the falling threshold is greater than or equal to rising threshold.
IDNV	Invalid MONTYPE value	The montype is not applicable to the data type (represented by the MOD2).
SROF	RMON Threshold Does Not Exist	The RMON Threshold trying to delete does not exist.

1.13.5 REPT EVT <MOD2ALM> for Threshold Crossing Events

The REPT EVT <MOD2ALM> autonomous message reports the threshold crossing event for the RMON statistics.

The HT or LT are generated when crossing the RISING or FALLING threshold.

The table index for threshold in the RMON alarm table is enclosed in the text of the TCA description. This table index is displayed in the output of the RTRV-RMONTH command also. You can retrieve additional information regarding the threshold that generates the TCA by issuing the RTRV-RMONTH command and comparing the output with corresponding table index.

See the "3.2.130 REPT EVT <MOD2ALM>" section on page 3-317 for a full message description.

Output Format

```
   SID DATE TIME
M  CTAG COMPLD
   "<AID>:<CONDTYPE>,[<CONDEFF>],[<OCRDAT>],[<OCRTM>],[<LOCN>],,[<MONVAL>],
   [<THLEV>],[<TMPER>]:[<DESC>],[<AIDDET>]"
;
```

Output Example

```
   VA454-23 2000-02-20 08:47:03
A  512.512 REPT EVT G1000
  "FAC-2-1,G1000:T-ETHERSTATSOCTETS-HT,TC,09-30,23-59-59,,,1003,
  1000,:\"RMON THRESHOLD CROSSING ALARM # 1 \",G1000-4"
;
```

1.13.6 INIT-REG-<MOD2>

This command initializes the performance monitoring (PM) registers.

This command applies to G1000, GIGE, FSTE, and FC data objects.

Only RAW-DATA is allowed to be specified for TMPER because no history data will be cleared for RMON-managed PMs by INIT-REG-<MOD2>.

See the "3.2.106 INIT-REG-<MOD2>" section on page 3-262 for the command description.

1.13.7 SCHED-PMREPT-<MOD2>

This command schedules/reschedules the NE to report the performance monitoring data.

The three accumulation time periods form RMON statistics are: 1-MIN, 1-HR and RAW-DATA.

See the "3.2.247 SCHED-PMREPT-<MOD2>" section on page 3-723 for a full command description.

1.13.8 RTRV-PMSCHED-<MOD2>

This command retrieves the RMON statistics reporting schedule that was set for the NE by the SCHED-PMREPT-<MOD2> command.

The LOCN parameter is optional in the output of RTRV-PMSCHED-<MOD2>, and no LOCN information will be given in the output of RTRV-PMSCHED for RMON PM schedule.

See the "3.2.218 RTRV-PMSCHED-<MOD2>" section on page 3-618 for a full command description.

1.13.9 REPT PM <MOD2>

Reports autonomous monitoring statistics as a result of the schedule created by SCHED-PMREPT-<MOD2>.

The LOCN parameter is optional in the output of REPT PM <MOD2> message, and no LOCN information will be given in the output of REPT PM <MOD2>.

See the "3.2.140 REPT PM <MOD2>" section on page 3-344 for a full message description.

1.13.10 REPT DBCHG

Reports any changes on the NE that result from issuing the following commands:

1. ENT-RMONTH-<MOD2>
2. DLT-RMONTH-<MOD2>

Also reports when an RMON PM schedule is created or deleted via the SCHED-PMREPT-<MO2> command.

See the "3.2.129 REPT DBCHG" section on page 3-315 for a full message description.

1.13.11 MONTYPE Defined for Ethernet Statistics and Condition Type for TCA

The names of Ethernet and fibre channel montypes are defined exactly as they are defined in the corresponding SNMP MIB statistics group. For example, etherStatsUndersizePkts will be used as the name for the same RMON statistics defined in request for comment (RFC)1757.

Unlike the PM of other SONET entities (such as STS path, OCn), there are two condition types defined for the TCAs of each RMON-managed statistics type (Ethernet or fibre channel montype). One condition type is for the rising threshold, and the other is for the falling threshold. For example, there are two condition types for etherStatsUndersizePkts stats type --- T-etherStatsUndersizePkts-HT for the rising threshold, and T-etherStatsUndersizePkts-LT for the falling threshold.

Note For platform-specific PM information, refer to the Procedure Guide and Reference Manual of that platform.

1.13.12 Enumerated types

1.13.12.1 TMPER

Table 1-10 TMPER Type

Values	Description
1-DAY	Performance Parameter Accumulation Interval Length - Every 24 Hours. For SONET PM data (line/session/path), only 1 day of history data is available. For RMON managed data stats, there are 7 days of history data are available.
15-MIN	Performance Parameter Accumulation Interval Length - Every 15 Minutes. 32 history data are available.
1-MIN	Performance Parameter Accumulation Interval Length - Every 1 minute. Only applicable to RMON stats. 60 history data are available.
1-HR	Performance Parameter Accumulation Interval Length - Every 1 Hours. Only applicable to RMON stats. 24 history data are available.
RAW-DATA	The data shown is accumulated starting from the last time the counters are cleared. This is only applicable to RMON managed PMs.

1.13.12.2 SAMPLE_TYPE

SAMPLE_TYPE describes how the data will be calculated during the sampling period.

Table 1-11 SAMPLE_TYPE

Value	Description
ABSOLUTE	Comparing directly
DELTA	Comparing with the current value of the selected variable subtracted by the last sample.

1.13.12.3 STARTUP_TYPE

STARTUP_TYPE indicates whether an event will be generated when the first valid sample is crossing the rising or falling threshold.

Table 1-12 STARTUP_TYPE

Value	Description
RISING	Generate the event when the sample is greater than or equal to the rising threshold.
FALLING	Generate the event when the sample is smaller than or equal to the falling threshold.
RISING-OR-LTING	Generate the event when the sample is crossing the rising threshold, or it is crossing the falling threshold.

1.13.13 Notes for DWDM Card Types

For the following cards:

- MXP_2.5G_10G
- TXP_MR_10G
- TXP_MR_2.5G
- TXP_MR_10E
- MXP_MR_2.5G

The PM for their client port and/or chunk port (OCH) can include both the RMON-managed PM and the SONET PM when their client payload is provisioned as 1GFC/2GFC/10GFC/1GFICON/2GFICON/GIGE/10GIGE.

1.13.13.1 Client Port of DWDM Cards

When the client port of a DWDM card is provisioned as 1GFC/2GFC/10GFC/1GFICON/2GFICON/GIGE/10GIGE, the applicable PM for the client port includes both the RMON-managed PM and the SONET PM. Therefore, the behavior of the RTRV-PM-MMOD2>, INIT-REG-<MOD2> and SCHED-PMREPT-<MOD2> commands is different from the Ethernet or fibre channel port of the other cards where only RMON PM is applicable. The differences include:

- LOCN and DIRN parameters are applicable to the RTRV-PM-<MOD2>, INIT-REG-<MOD2> and SCHED-PMREPT-<MOD2> commands because they are applicable to the SONET optics PM. When the LOCN or DIRN parameter is specified it would only apply to the SONET optics PM.
- Because 1-MIN, 1-HR or RAW-DATA are not applicable to SONET optics PM, no SONET optics PM would be returned in the output of RTRV-PM. If RAW-DATA is specified in the input of the INIT-REG command, no SONET optics PM counter will be cleared.
- When the accumulation time period is specified as 15-MIN or 1-DAY and the PM history bucket is specified as 0 (current bucket), only SONET optics PM will be returned in the output of the RTRV-PM command. No RMON-managed PM will be included in the output of the RTRV-PM command because RMON PM does not have current bucket.
- A SONET optics PM montype cannot be specified in the input of the INIT-REG command only the SONET optics PM counters will be cleared. When the ALL montype is specified, both the RMON and the SONET optics PM counters will be cleared.
- The commands used to manage RMON thresholds (ENT-RMONTH, DLT-RMONT and RTRV-RMONTH) are only applicable to the RMON PM of the client port. The SONET optics PM thresholds of the client port are still managed by the SET-TH and RTRV-TH commands. For example, if the client port type of an MXP_MR_2.5G card is provisioned as GIGE, the following commands would be used to create an RMON threshold:

  ENT-RMONTH-GIGE::FAC-2-1-1:1::IFINOTETS,,,,1000:RISE=1000,FALL=900;

  And the following command would be used to set the SONET optics PM threshold:

  SET-TH-GIGE::FAC-2-1-1:1LBCL-MIN,0.2;

1.13.13.2 OCH Port of the DWDM Card

The OCH port of the TXP_MR_10G and TXP_MR_10E cards include the RMON-managed 8B10B PM as well as the other SONET PM when their client port is provisioned as GIGE/10GIGE or 1GFC/2GFC/10GFC.

The RTRV-PM-OCH, INIT-REG-OCH, SCHED-PMREPT-OCH and REPT PM OCH commands will have similar behaviors as mentioned in the "1.13.13.1 Client Port of DWDM Cards" section on page 1-60.